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# BUILDING MATERIALS AND STRUCTURES

REPORT BMS60

Strength, Absorption,  
and Resistance to Laboratory  
Freezing and Thawing of  
Building Bricks Produced  
in the United States

by JOHN W. McBURNEY and  
JOSEPH C. RICHMOND

NATIONAL  
BUREAU OF STANDARDS

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JOHN W. McBURNEY *and* JOSEPH C. RICHMOND



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## Foreword

During the past 10 years a laboratory study of the resistance of building brick to freezing and thawing has been in progress at the National Bureau of Standards. Tests were made on a total of 4,558 bricks, comprising 722 samples of the various gradings produced by 229 manufacturers. These samples were collected from 36 of the 48 States, as well as from the principal cities of the United States.

This paper reports the compressive and transverse strengths, water absorptions, by two methods, saturation coefficients, and either the number of cycles of freezing and thawing required to produce failure, or the percentage loss in weight after 51 cycles of freezing and thawing for 3,368 of these bricks, representing 525 gradings as produced by 209 manufacturers. Average results, by grades, for all tests except freezing and thawing, are given for the remaining 197 gradings, representing 1,190 specimens, which include samples from 20 additional manufacturers.

These results should prove useful in (1) providing information for specification writers, (2) illustrating the types and qualities of bricks available in different sections of the United States, and (3) indicating needed improvements in certain districts.

LYMAN J. BRIGGS, *Director.*

# Strength, Absorption, and Resistance to Laboratory Freezing and Thawing of Building Bricks Produced in the United States

by JOHN W. MCBURNEY and JOSEPH C. RICHMOND

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## ABSTRACT

This paper reports the compressive and transverse strengths, water absorptions, saturation coefficients, and either the number of cycles of freezing and thawing required to produce failure or the loss in weight after 51 cycles for each of 3,368 bricks representing 525 gradings produced by 209 manufacturers. Average results for all tests except freezing and thawing are given for an additional 197 gradings or samples, comprising a total of 1,190 specimens. These 197 gradings include samples from 20 additional manufacturers.

## I. INTRODUCTION

For the past 10 years the National Bureau of Standards has conducted, as part of the work on masonry and masonry materials, a study of the durability of building brick. A survey conducted jointly by the Common Brick Manufacturers Association of America and the Bureau, which was started in 1930, included laboratory freezing-and-thawing tests. In the ensuing decade additional samples were received and tested from time to time. Partial reports

of the results have been communicated to the manufacturers supplying the samples and partial reports in summary have been published [1, 2].<sup>1</sup> The detailed results have hitherto not been published.

Publication is now undertaken for several reasons: (1) The Tentative Specifications for Building Brick (made from clay or shale) C 62-37T of the American Society for Testing Materials were recently revised (1939) [3] to provide for the waiver of certain physical requirements if a sample had been subjected to 50 cycles of freezing and thawing without the resulting loss in weight exceeding certain limits. This revision, furthermore, provided that "A particular lot or shipment shall be given the same grading as a previously tested lot, without repeating the freezing-and-thawing test, provided the brick are made by the same manufacturer from similar raw materials and by the same method of forming; and provided also

<sup>1</sup> Figures in brackets indicate the literature references at the end of this paper.

that a sample of five bricks selected from the particular lot has an average and individual minimum strength not less than a previously graded sample, and has average and individual maximum water absorption and saturation coefficient not greater than those of the previously tested sample graded according to the freezing-and-thawing test." Data presented in this paper, therefore, can be used as "reference sample" reports, as provided in this specification. (2) A number of individuals and organizations interested in the preparation of specifications for building brick have indicated the desirability of making these data generally available for examination and analysis by others in this field. (3) Though these data do not represent a complete cross section of the building bricks produced throughout the entire United States, it is believed that architects, engineers, and contractors will find them useful from the standpoint of indicating the expected durability and other properties of bricks in particular districts.

## II. SAMPLING, AND DISTRIBUTION OF SOURCES

Unless otherwise indicated, all samples were collected as part of the 1930 survey [1]. In this survey, 221 manufacturers submitted samples of their bricks. Quoting from the 1933 paper [1], "Each manufacturer was requested to submit a sample consisting of not fewer than five bricks for each commercial grade as classified and marketed by him. Where soft or salmon (underburned) brick were produced, a special sample representing that grade was requested, even though such brick were not marketed. Information as to the percentage of the kiln product represented by each sample was in all cases secured from the manufacturer. If it were the manufacturer's practice to sell the entire output of the kiln without sorting or classifying, then a sample of 15 bricks was requested. It was suggested that this 'kiln run' sample should be selected so as to represent a vertical section of the kiln setting."

The plant numbers and grade numbers in the present paper are those originally assigned to the manufacturers in 1930. The plant numbers range from 1 to 221 and were assigned in the order of receipt of samples.

In 1936 [4] 23 shipments of brick were purchased by the Bureau and sampled. Some of these shipments were from plants represented in the 1930 survey and were ordered to represent certain of the gradings previously sampled. Other shipments were from plants not previously sampled. Insofar as the samples represent plants and gradings previously sampled, the same numbers were assigned. These resamples are distinguished by the notation "1936," as are the new plants which have designating numbers beginning at 222. A third series of samples was received in 1937 [5], and they are so designated.

It was stated with reference to the 1930 survey [1]: "That portion of the United States situated between the Mississippi River and the Rocky Mountains, as well as several sections of the south are poorly represented." The same statement applies to the Pacific coast and to the Rocky Mountain States, with the exception of Colorado. The reader is referred to table 1 of the 1933 paper [1] for figures on the distribution of sources and completeness of sampling represented by the 1930 survey.

It should be pointed out that the results reported on freezing-and-thawing tests represent only the poorer grades of the samplings on hand, for the following reason. Samples were selected for test in the inverse order of their expected durability. The first freezing-and-thawing tests were made on samples classified by the manufacturer as "salmons." When these specimens had failed, the next grade in order of increasing durability was tested. In general, durability correlates positively with strength and negatively with a water absorption and saturation coefficient. Therefore, when a sample, or grading, of a particular manufacturer had successfully passed 50 cycles of freezing and thawing, no tests were made on samples which exceeded the satisfactory sample in strength and were characterized by lower absorption and saturation coefficient. Relatively few tests were made on bricks which had properties complying with grade SW of Specification C 62-39T of the American Society for Testing Materials. Certain districts (Connecticut, Hudson Valley, and Chicago) are represented by freezing and thawing tests on nearly all samples submitted as a part of the 1930 Survey, since these samples

exhibited some departures from the usual relation between freezing-and-thawing results and physical properties.

III. METHODS OF TESTING

Compressive strengths, moduli of rupture, and absorptions by cold immersion and by boiling were determined by methods complying in essence with those described in the American Society for Testing Materials' Standard Methods for Testing Brick C 67-39 [6]. Weighings for the absorption determinations in the 1930 survey were made to the nearest 5.0 grams. Succeeding samples were weighed to the nearest 1.0 gram, as were all of the freezing-and-thawing test specimens. Originally, the saturation coefficients were calculated by dividing the absorption after 48-hr cold immersion by the absorption measured by 5-hr boiling. Since 1936 the practice of using, as the numerator, the absorption resulting from 24-hr cold immersion has been followed.

Method A of "Freezing-and-Thawing Tests of Brick" (ASTM Designation C 67-39T [7]) was used except during the last year of this work, when method B of the same standard was substituted. Data have been published [5] which indicate that these two methods are of comparable severity.

IV. PRESENTATION OF DATA, BY PRODUCING DISTRICTS

The data on physical properties (strength, absorption, and saturation coefficients) and the results of freezing-and-thawing tests are presented in tables 1 to 25. Additional information, such as method of forming, raw material, percentage of kiln represented by the sample, the manufacturer's description of the grade, and, in some cases, the location of the plant, are given.

The following abbreviations are used in the tables:

- SM=sand-struck, soft-mud process.
- WM=water-struck, soft-mud process.
- DP=dry-press process.
- SDP=semidry-press process.
- SC=stiff-mud, side-cut process.
- EC=stiff-mud, end-cut process.

- C=clay.
- FC=fire clay.
- S=shale.
- F=failure.
- c=cycles.

Unless otherwise indicated, the loss in weight is that resulting from 51 cycles of freezing and thawing by method A. Where the designation (B) is used, the results are for 50 cycles and the test was made by method B. When failure occurred earlier, the number of cycles required for failure is substituted for loss in weight. In the last columns of the respective tables are entered the results obtained from additional cycles, insofar as such tests were made.

TABLE 1.—Properties of bricks produced in Maine, New Hampshire, and Vermont

[All samples received were made from surface clay and were formed by the soft-mud process]

| Specimen number                                               | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                               |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 4, grade 1 ("Arch," 23 percent of kiln, SM, C)          |                           |                           |                      |              |                        |                                                         |                          |
|                                                               | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                        | 1450                      | 7600                      | 4.3                  | 7.4          | 0.58                   | No test                                                 |                          |
| 2-----                                                        | 905                       | 10450                     | 4.4                  | 7.9          | .56                    | 0.20                                                    |                          |
| 3-----                                                        | 480                       | 7810                      | 3.1                  | 5.1          | .61                    | .51                                                     |                          |
| 4-----                                                        | 1470                      | 7300                      | 2.8                  | 6.3          | .44                    | .08                                                     |                          |
| 5-----                                                        | 1885                      | 7750                      | 1.0                  | 3.3          | .30                    | .09                                                     |                          |
| Avg-----                                                      | 1240                      | 8180                      | 3.1                  | 6.0          | 0.50                   | 0.22                                                    |                          |
| Plant 4, grade 2 ("Selected Body," 65 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                        | 1600                      | 10900                     | 3.0                  | 5.5          | 0.55                   | 0.00                                                    |                          |
| 2-----                                                        | 1120                      | 10250                     | 4.6                  | 8.0          | .58                    | .08                                                     |                          |
| 3-----                                                        | 1640                      | 11500                     | 4.0                  | 6.1          | .66                    | .00                                                     |                          |
| 4-----                                                        | 1090                      | 7350                      | 6.7                  | 10.8         | .62                    | .00                                                     |                          |
| 5-----                                                        | 1085                      | 10100                     | 7.0                  | 10.5         | .67                    | .20                                                     |                          |
| Avg-----                                                      | 1305                      | 10020                     | 5.1                  | 8.2          | 0.62                   | 0.06                                                    |                          |
| Plant 4, grade 2a ("Second sample of grade 2")                |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                        | 980                       | 7430                      | 9.0                  | 11.9         | 0.76                   | 0.11                                                    |                          |
| 2-----                                                        | 860                       | 7690                      | 7.0                  | 10.0         | .70                    | .08                                                     |                          |
| 3-----                                                        | 1140                      | 10000                     | 4.6                  | 7.2          | .64                    | .10                                                     |                          |
| 4-----                                                        | 990                       | 6380                      | 5.3                  | 8.9          | .60                    | .11                                                     |                          |
| 5-----                                                        | 1475                      | 8550                      | 1.6                  | 2.2          | .73                    | .11                                                     |                          |
| Avg-----                                                      | 1090                      | 8010                      | 5.5                  | 8.0          | 0.69                   | 0.10                                                    |                          |
| Plant 4, grade 3 ("Light Hard," 12 percent of kiln, SM, C)    |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                        | 705                       | 5000                      | 14.0                 | 16.2         | 0.86                   | 0.36                                                    | <i>%</i>                 |
| 2-----                                                        | 555                       | 4310                      | 15.0                 | 17.3         | .87                    | .36                                                     | 0.36(87c)                |
| 3-----                                                        | 810                       | 4860                      | 12.2                 | 14.6         | .84                    | .29                                                     | .29(87c)                 |
| 4-----                                                        | 585                       | 5000                      | 14.8                 | 16.6         | .89                    | .70                                                     | .70(87c)                 |
| 5-----                                                        | 720                       | 4490                      | 14.4                 | 16.1         | .89                    | .34                                                     | .42(87c)                 |
| Avg-----                                                      | 675                       | 4730                      | 14.1                 | 16.2         | 0.87                   | 0.41                                                    | 0.43(87c)                |

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont—Continued*

| Specimen number                                                        | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                        |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 6, grade 1 ("Arch," 20 percent of kiln, SM, C)                   |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       | %                        |
| 1-----                                                                 | 1080                | 8940                 | 3.8                  | 6.2          | 0.61                   | 0.10                                                    |                          |
| 2-----                                                                 | 1585                | 9910                 | 3.5                  | 6.0          | .58                    | .00                                                     |                          |
| 3-----                                                                 | 1615                | 9830                 | 4.4                  | 7.0          | .63                    | .09                                                     |                          |
| 4-----                                                                 | 970                 | 8650                 | 6.9                  | 9.2          | .75                    | .58                                                     |                          |
| 5-----                                                                 | 1540                | 8600                 | 4.3                  | 6.9          | .62                    | .00                                                     |                          |
| Avg-----                                                               | 1360                | 9190                 | 4.6                  | 7.1          | 0.64                   | 0.15                                                    |                          |
| Plant 6, grade 2 ("Body," 60 percent of kiln, SM, C)                   |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 795                 | 3920                 | 1.7                  | 5.7          | 0.30                   | 0.35                                                    |                          |
| 2-----                                                                 | 855                 | 9350                 | 4.3                  | 6.4          | .67                    | .09                                                     |                          |
| 3-----                                                                 | 1265                | 7940                 | 4.9                  | 8.1          | .61                    | .19                                                     |                          |
| 4-----                                                                 | 1015                | 6100                 | 4.8                  | 7.7          | .62                    | .00                                                     |                          |
| 5-----                                                                 | 990                 | 6070                 | 8.7                  | 11.2         | .78                    | .09                                                     |                          |
| Avg-----                                                               | 985                 | 6680                 | 4.9                  | 7.8          | 0.60                   | 0.14                                                    |                          |
| Plant 6, grade 3 ("Light Hard," 20 percent of kiln, SM, C)             |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 1220                | 7220                 | 8.4                  | 11.3         | 0.74                   | 0.20                                                    | 0.20(84c)                |
| 2-----                                                                 | 1180                | 5320                 | 11.9                 | 13.8         | .86                    | .29                                                     | .29(84c)                 |
| 3-----                                                                 | 525                 | 6400                 | 13.0                 | 14.2         | .92                    | .25                                                     | .25(84c)                 |
| 4-----                                                                 | 915                 | 5450                 | 14.4                 | 16.1         | .90                    | .34                                                     | .34(84c)                 |
| 5-----                                                                 | 870                 | 5620                 | 15.0                 | 16.4         | .91                    | .38                                                     | .38(84c)                 |
| Avg-----                                                               | 940                 | 6000                 | 12.5                 | 14.4         | 0.87                   | 0.29                                                    | 0.29(84c)                |
| Plant 21, grade 1 ("Body," 65 percent of kiln, SM, C)                  |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 1365                | 14550                | 3.6                  | 5.2          | 0.69                   | 0.10                                                    |                          |
| 2-----                                                                 | 1410                | 10750                | 2.2                  | 3.8          | .58                    | .11                                                     |                          |
| 3-----                                                                 | 1360                | 11800                | 9.0                  | 11.4         | .79                    | .60                                                     |                          |
| 4-----                                                                 | 1770                | 13400                | 7.5                  | 9.8          | .77                    | .23                                                     |                          |
| 5-----                                                                 | 1765                | 15800                | 5.3                  | 7.8          | .68                    | .10                                                     |                          |
| Avg-----                                                               | 1535                | 13260                | 5.5                  | 7.6          | 0.70                   | 0.23                                                    |                          |
| Plant 21, grade 2 ("Bench," 20 percent of kiln, SM, C)                 |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                 |                     | 9090                 | 10.3                 | 12.2         | 0.84                   | 0.38                                                    |                          |
| 2-----                                                                 | 1240                | 13100                | 7.0                  | 9.7          | .72                    | .33                                                     |                          |
| 3-----                                                                 | 520                 | 7790                 | 12.6                 | 14.5         | .87                    | .50                                                     |                          |
| 4-----                                                                 | 1260                | 10400                | 10.1                 | 12.4         | .81                    | .45                                                     |                          |
| 5-----                                                                 | 1430                | 9700                 | 5.4                  | 7.4          | .73                    | .20                                                     |                          |
| Avg-----                                                               | 1110                | 10020                | 9.1                  | 11.2         | 0.79                   | 0.37                                                    |                          |
| Plant 21, grade 3 ("Light Hard," 10 percent of kiln, SM, C)            |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 485                 | 5370                 | 16.0                 | 17.5         | 0.91                   | 0.64                                                    |                          |
| 2-----                                                                 | 760                 | 3990                 | 14.5                 | 15.6         | .93                    | .54                                                     |                          |
| 3-----                                                                 | 1070                | 9420                 | 13.4                 | 15.5         | .86                    | .41                                                     |                          |
| 4-----                                                                 | 760                 | 4960                 | 13.5                 | 16.0         | .84                    | .49                                                     |                          |
| 5-----                                                                 | 920                 | 5110                 | 13.8                 | 16.0         | .86                    | .53                                                     |                          |
| Avg-----                                                               | 800                 | 6170                 | 14.2                 | 16.1         | 0.88                   | 0.52                                                    |                          |
| Plant 21, grade 4 ("Soft," 5 percent of kiln, SM, C)                   |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 710                 | 4000                 | 17.2                 | 18.9         | 0.91                   | 0.33                                                    | 0.44(75c)                |
| 2-----                                                                 | 445                 | 4720                 | 15.8                 | 17.3         | .91                    | .45                                                     | .45(75c)                 |
| 3-----                                                                 | 735                 | 5160                 | 15.6                 | 17.9         | .87                    | .23                                                     | .35(75c)                 |
| 4-----                                                                 | 645                 | 4620                 | 14.3                 | 16.2         | .88                    | .26                                                     | .39(75c)                 |
| 5-----                                                                 | 780                 | 4480                 | 17.1                 | 18.2         | .94                    | .59                                                     | .70(75c)                 |
| Avg-----                                                               | 660                 | 4600                 | 16.0                 | 17.7         | 0.90                   | 0.37                                                    | 0.47(75c)                |
| Plant 26, grade 1 ("Kiln Run Hard," percentage of kiln unknown, SM, C) |                     |                      |                      |              |                        |                                                         |                          |
|                                                                        |                     |                      |                      |              |                        |                                                         |                          |
| Avg (20)                                                               | 1610                | 10070                | 9.1                  | 11.6         | 0.77                   | Not tested                                              |                          |

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont—Continued*

| Specimen number                                                            | Modulus of rupture | Compressive strength       | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------------------|--------------------|----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                            |                    |                            | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 26, grade 1A ("Hard," (1936) percentage of kiln unknown, SM, C)      |                    |                            |                      |              |                        |                                                         |                          |
|                                                                            | <i>lb/in.</i>      | <i>lb/in.</i> <sup>2</sup> | (24-hr)<br>%         | %            |                        | %                                                       |                          |
| 1-----                                                                     | 1375               | 14350                      | 4.0                  | 6.5          | 0.61                   | 0.35                                                    |                          |
| 2-----                                                                     | 1480               | 11900                      | 4.9                  | 7.8          | .63                    | .14                                                     |                          |
| 3-----                                                                     | 1815               | 12400                      | 4.7                  | 7.6          | .62                    | .22                                                     |                          |
| 4-----                                                                     | 1290               | 11350                      | 4.4                  | 7.8          | .57                    | .23                                                     |                          |
| 5-----                                                                     | 1920               | 11750                      | 4.3                  | 6.6          | .65                    | .00                                                     |                          |
| 6-----                                                                     | 965                | 9130                       | 5.8                  | 9.4          | .62                    | .11                                                     |                          |
| 7-----                                                                     | 1455               | 12320                      | 4.5                  | 7.3          | .62                    | .21                                                     |                          |
| 8-----                                                                     | 1465               | 12800                      | 5.0                  | 8.4          | .61                    | .20                                                     |                          |
| 9-----                                                                     | 1565               | 11300                      | 5.0                  | 8.0          | .63                    | .22                                                     |                          |
| 10-----                                                                    | 1625               | 12130                      | 4.6                  | 7.4          | .62                    | .27                                                     |                          |
| 11-----                                                                    | 1970               | 8675                       | 3.6                  | 4.7          | .76                    | .10                                                     |                          |
| 12-----                                                                    | 1790               | 11150                      | 4.8                  | 7.5          | .65                    | .11                                                     |                          |
| 13-----                                                                    | 1725               | 13880                      | 4.8                  | 7.6          | .64                    | .21                                                     |                          |
| 14-----                                                                    | 1760               | 11510                      | 4.5                  | 7.3          | .62                    | .21                                                     |                          |
| 15-----                                                                    | 1405               | 11500                      | 4.8                  | 7.7          | .63                    | .11                                                     |                          |
| 16-----                                                                    | 1625               | 6540                       | 4.8                  | 7.4          | .66                    | .11                                                     |                          |
| 17-----                                                                    | 1515               | 13300                      | 4.8                  | 7.4          | .65                    | .22                                                     |                          |
| 18-----                                                                    | 1740               | 13520                      | 3.4                  | 5.5          | .62                    | .11                                                     |                          |
| 19-----                                                                    | 1505               | 14100                      | 2.9                  | 4.8          | .62                    | .00                                                     |                          |
| 20-----                                                                    | 1820               | 11350                      | 3.9                  | 5.9          | .67                    | .13                                                     |                          |
| Avg-----                                                                   | 1595               | 11740                      | 4.5                  | 7.1          | 0.63                   | 0.15                                                    |                          |
| Plant 26, grade 2 ("Face," percentage of kiln unknown, WM, C)              |                    |                            |                      |              |                        |                                                         |                          |
| 1-----                                                                     | 1690               | 11150                      | 2.9                  | 5.7          | 0.51                   | 0.10                                                    |                          |
| 2-----                                                                     | 1790               | 13150                      | 5.1                  | 7.2          | .71                    | .21                                                     |                          |
| 3-----                                                                     | 1765               | 14200                      | 5.0                  | 6.9          | .72                    | .13                                                     |                          |
| 4-----                                                                     | 1885               | 11600                      | 3.6                  | 6.7          | .54                    | .21                                                     |                          |
| 5-----                                                                     | 1255               | 11100                      | 11.8                 | 14.7         | .80                    | .23                                                     |                          |
| Avg-----                                                                   | 1675               | 12240                      | 5.7                  | 8.2          | 0.66                   | 0.18                                                    |                          |
| Plant 26, grade 2A ("Hard," (1936) percentage kiln unknown, WM, C)         |                    |                            |                      |              |                        |                                                         |                          |
|                                                                            |                    |                            | (24-hr)              |              |                        |                                                         |                          |
| 1-----                                                                     | 1745               | 10480                      | 8.4                  | 12.3         | 0.68                   | 0.26                                                    |                          |
| 2-----                                                                     | 1665               | 10000                      | 11.2                 | 13.8         | .81                    | .22                                                     |                          |
| 3-----                                                                     | 2745               | 11800                      | 7.5                  | 12.0         | .63                    | .13                                                     |                          |
| 4-----                                                                     | 1705               | 12000                      | 9.1                  | 12.0         | .76                    | .24                                                     |                          |
| 5-----                                                                     | 1750               | 12200                      | 8.1                  | 11.7         | .69                    | .45                                                     |                          |
| 6-----                                                                     | 2055               | 11300                      | 6.1                  | 8.8          | .69                    | .26                                                     |                          |
| 7-----                                                                     | 2015               | 11200                      | 3.6                  | 5.8          | .62                    | .31                                                     |                          |
| 8-----                                                                     | 1825               | 11300                      | 9.9                  | 12.8         | .77                    | .11                                                     |                          |
| 9-----                                                                     | 1225               | 11400                      | 3.7                  | 6.0          | .62                    | .10                                                     |                          |
| 10-----                                                                    | 1150               | 11600                      | 6.0                  | 8.4          | .71                    | .34                                                     |                          |
| 11-----                                                                    | 2425               | 17700                      | 4.8                  | 7.0          | .69                    | .11                                                     |                          |
| 12-----                                                                    | 1440               | 12000                      | 9.2                  | 12.0         | .77                    | 1.88                                                    |                          |
| 13-----                                                                    | 1245               | 13300                      | 3.9                  | 5.4          | .73                    | .00                                                     |                          |
| 14-----                                                                    | 1750               | 12400                      | 2.5                  | 4.9          | .52                    | .13                                                     |                          |
| 15-----                                                                    | 1800               | 11400                      | 4.9                  | 7.9          | .62                    | .13                                                     |                          |
| 16-----                                                                    | 2150               | 15150                      | 5.6                  | 9.9          | .57                    | .27                                                     |                          |
| 17-----                                                                    | 1735               | 12850                      | 2.9                  | 5.2          | .55                    | .11                                                     |                          |
| 18-----                                                                    | 2300               | 12500                      | 7.8                  | 11.2         | .70                    | .22                                                     |                          |
| 19-----                                                                    | 1315               | 16700                      | 3.5                  | 4.2          | .85                    | .14                                                     |                          |
| 20-----                                                                    | 1685               | 16100                      | 1.3                  | 2.2          | .57                    | .00                                                     |                          |
| Avg-----                                                                   | 1785               | 12670                      | 6.0                  | 8.6          | 0.68                   | 0.27                                                    |                          |
| Plant 26, grade 3 ("Light Hard," (1936) percentage of kiln unknown, WM, C) |                    |                            |                      |              |                        |                                                         |                          |
|                                                                            |                    |                            | (24-hr)              |              |                        |                                                         |                          |
| 1-----                                                                     | 1070               | 6830                       | 13.8                 | 16.0         | 0.86                   | 0.43                                                    |                          |
| 2-----                                                                     | 1420               | 10200                      | 11.3                 | 13.8         | .82                    | .22                                                     |                          |
| 3-----                                                                     | 1210               | 6960                       | 14.0                 | 16.6         | .85                    | 3.68                                                    |                          |
| 4-----                                                                     | 755                | 4680                       | 18.5                 | 21.6         | .86                    | F 27c                                                   |                          |
| 5-----                                                                     | 1090               | 6850                       | 16.8                 | 19.3         | .87                    | F 33c                                                   |                          |
| 6-----                                                                     | 1875               | 8450                       | 9.7                  | 13.8         | .70                    | 0.21                                                    |                          |
| 7-----                                                                     | 845                | 8050                       | 14.2                 | 16.2         | .88                    | 1.36                                                    |                          |
| 8-----                                                                     | 1110               | 6230                       | 15.1                 | 18.7         | .81                    | F 36c                                                   |                          |
| 9-----                                                                     | 1110               | 7200                       | 13.1                 | 15.6         | .84                    | 0.35                                                    |                          |
| 10-----                                                                    | 1065               | 11400                      | 10.1                 | 13.0         | .78                    | .12                                                     |                          |
| 11-----                                                                    | 1285               | 7670                       | 13.8                 | 16.0         | .86                    | .47                                                     |                          |
| 12-----                                                                    | 1490               | 9800                       | 9.9                  | 14.4         | .69                    | .33                                                     |                          |
| 13-----                                                                    | 2125               | 7400                       | 11.9                 | 15.5         | .77                    | .26                                                     |                          |
| 14-----                                                                    | 1335               | 8400                       | 13.5                 | 16.6         | .81                    | 2.97                                                    |                          |
| 15-----                                                                    | 1840               | 7800                       | 11.3                 | 14.0         | .81                    | 0.34                                                    |                          |
| 16-----                                                                    | 1090               | 10000                      | 12.3                 | 14.9         | .82                    | .28                                                     |                          |
| 17-----                                                                    | 1395               | 7800                       | 15.1                 | 17.5         | .87                    | 3.28                                                    |                          |
| 18-----                                                                    | 1665               | 7700                       | 13.2                 | 15.8         | .84                    | F 29c                                                   |                          |
| 19-----                                                                    | 1640               | 7980                       | 15.2                 | 17.7         | .86                    | 1.80                                                    |                          |
| 20-----                                                                    | 1475               | 6230                       | 14.8                 | 17.8         | .83                    | .94                                                     |                          |
| Avg-----                                                                   | 1345               | 7880                       | 13.4                 | 16.2         | .82                    |                                                         |                          |

TABLE 1.—Properties of bricks produced in Maine, New Hampshire, and Vermont—Continued

| Specimen number                                                           | Modulus of rupture         | Compressive strength       | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------------------|----------------------------|----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                           |                            |                            | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 26, grade 4 ("Light Hard," (1936) percentage of kiln unknown SM, C) |                            |                            |                      |              |                        |                                                         |                          |
|                                                                           | <i>lb/in.</i> <sup>2</sup> | <i>lb/in.</i> <sup>2</sup> | %                    | %            |                        | %                                                       |                          |
| 1-----                                                                    | 720                        | 4770                       | 15.2                 | 17.3         | 0.88                   | 0.56                                                    |                          |
| 2-----                                                                    | 865                        | 5500                       | 16.3                 | 18.4         | .88                    | .57                                                     |                          |
| 3-----                                                                    | 625                        | 3720                       | 17.9                 | 19.9         | .90                    | .93                                                     |                          |
| 4-----                                                                    | 470                        | 3780                       | 13.9                 | 17.6         | .79                    | .76                                                     |                          |
| 5-----                                                                    | 855                        | 5480                       | 13.6                 | 17.1         | .80                    | .51                                                     |                          |
| 6-----                                                                    | 510                        | 2960                       | 17.8                 | 19.7         | .90                    | 2.08                                                    |                          |
| 7-----                                                                    | 430                        | 3130                       | 19.4                 | 20.6         | .95                    | 3.08                                                    |                          |
| 8-----                                                                    | 910                        | 5810                       | 13.0                 | 16.1         | .81                    | .42                                                     |                          |
| 9-----                                                                    | 725                        | 4220                       | 14.5                 | 17.6         | .82                    | .57                                                     |                          |
| 10-----                                                                   | 425                        | 3120                       | 16.6                 | 19.8         | .84                    | 1.07                                                    |                          |
| 11-----                                                                   | 720                        | 5500                       | 12.8                 | 16.3         | .79                    | .42                                                     |                          |
| 12-----                                                                   | 875                        | 5900                       | 13.2                 | 16.5         | .81                    | .39                                                     |                          |
| 13-----                                                                   | 590                        | 3300                       | 19.8                 | 20.6         | .97                    | 5.41                                                    |                          |
| 14-----                                                                   | 570                        | 3300                       | 16.8                 | 19.4         | .87                    | 1.59                                                    |                          |
| 15-----                                                                   | 315                        | 2120                       | 17.1                 | 20.5         | .84                    | 3.15                                                    |                          |
| 16-----                                                                   | 750                        | 5480                       | 16.5                 | 18.8         | .88                    | .85                                                     |                          |
| 17-----                                                                   | 910                        | 5530                       | 14.8                 | 17.2         | .86                    | .44                                                     |                          |
| 18-----                                                                   | 620                        | 3540                       | 17.1                 | 19.4         | .88                    | .94                                                     |                          |
| 19-----                                                                   | 610                        | 3550                       | 17.9                 | 19.8         | .90                    | .84                                                     |                          |
| 20-----                                                                   | 575                        | 4770                       | 13.6                 | 17.5         | .78                    | .82                                                     |                          |
| Avg-----                                                                  | 650                        | 4280                       | 15.9                 | 18.5         | 0.86                   | 1.27                                                    |                          |

Plant 48, grade 1 ("Selected Body," 70 percent of kiln, SM, C)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 1450 | 12950 | 6.9 | 9.4 | 0.75 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 48, grade 2 ("Arch and Clinker," 10 percent of kiln, SM, C)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 1455 | 14670 | 3.2 | 5.0 | 0.62 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 48, grade 3 ("Light hard or backing," 10 percent of kiln, SM, C)

|          |      |       |      |      |      |          |  |
|----------|------|-------|------|------|------|----------|--|
|          |      |       |      |      |      |          |  |
| 1-----   | 1070 | 8990  | 12.1 | 14.2 | 0.85 | 0.14 (B) |  |
| 2-----   | 1300 | 10650 | 12.4 | 14.0 | .89  | .34 (B)  |  |
| 3-----   | 920  | 6580  | 14.4 | 15.7 | .92  | .26 (B)  |  |
| 4-----   | 775  | 5990  | 15.8 | 17.0 | .93  | .24 (B)  |  |
| 5-----   | 1030 | 8130  | 12.0 | 14.4 | .83  | .12 (B)  |  |
| Avg----- | 1020 | 8070  | 13.3 | 15.1 | 0.88 | 0.22 (B) |  |

Plant 48, grade 4 ("Salmon," 10 percent of kiln, SM, C)

|          |      |      |      |      |      |         |  |
|----------|------|------|------|------|------|---------|--|
|          |      |      |      |      |      |         |  |
| 1-----   |      | 2080 | 17.0 | 17.0 | 1.00 | F 3c    |  |
| 2-----   | 260  | 4980 | 17.0 | 18.7 | .91  | a 26.20 |  |
| 3-----   |      | 5240 | 16.7 | 17.5 | .95  | F 3c    |  |
| 4-----   |      | 4980 | 16.2 | 17.9 | .91  | 1.70    |  |
| 5-----   | 1060 | 6220 | 17.0 | 18.2 | .93  | 1.20    |  |
| Avg----- |      | 4700 | 16.8 | 17.9 | 0.94 |         |  |

Plant 67, grade 1 ("Clinkers," 15 percent of kiln, SM, C)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 1775 | 12850 | 1.5 | 2.9 | 0.53 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 67, grade 2 ("Dark reds," 20 percent of kiln, SM, C)

|          |      |      |     |     |      |            |  |
|----------|------|------|-----|-----|------|------------|--|
| Avg (15) | 1580 | 8720 | 4.0 | 7.1 | 0.58 | Not tested |  |
|----------|------|------|-----|-----|------|------------|--|

Plant 67, grade 3 ("Backers," 20 percent of kiln, SM, C)

|         |      |      |     |     |      |            |  |
|---------|------|------|-----|-----|------|------------|--|
| Avg (5) | 1210 | 7860 | 3.2 | 6.5 | 0.48 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|

a 3.00 percent loss at 12 cycles.

TABLE 1.—Properties of bricks produced in Maine, New Hampshire, and Vermont—Continued

| Specimen number                                             | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                             |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 67, grade 4 ("Light reds," 15 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                             | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                      | 1125                      | 8740                      | 7.3                  | 10.7         | 0.68                   | F 3c (B)                                                |                          |
| 2-----                                                      | 1770                      | 12500                     | 7.9                  | 8.8          | .90                    | F 3c (B)                                                |                          |
| 3-----                                                      | 1650                      | 11850                     | 8.4                  | 10.1         | .83                    | 0.11 (B)                                                |                          |
| 4-----                                                      | 1820                      | 10500                     | 10.1                 | 11.8         | .86                    | .00 (B)                                                 |                          |
| 5-----                                                      |                           | 8890                      | 13.1                 | 14.8         | .89                    | 1.47 (B)                                                |                          |
| Avg.-----                                                   | 1590                      | 10500                     | 9.4                  | 11.2         | 0.83                   | -----                                                   |                          |

Plant 67, grade 5 ("Light Hard," 30 percent of kiln, SM, C)

|          |      |      |      |      |      |      |            |
|----------|------|------|------|------|------|------|------------|
|          |      |      |      |      |      |      |            |
| 1-----   | 1100 | 5000 | 14.0 | 16.5 | 0.85 | 0.49 | 0.61 (66c) |
| 2-----   | 1030 | 4730 | 13.8 | 16.3 | .85  | .41  | .51 (66c)  |
| 3-----   | 1125 | 5190 | 12.9 | 15.1 | .86  | .11  | .11 (66c)  |
| 4-----   | 785  | 4900 | 13.0 | 15.4 | .84  | .81  | .81 (66c)  |
| 5-----   | 1135 | 7560 | 12.4 | 14.4 | .86  | .31  | .31 (66c)  |
| Avg----- | 1035 | 5480 | 13.2 | 15.5 | 0.85 | 0.43 | 0.47 (66c) |

Plant 84, grade 1 ("Dark face," 30 percent of kiln, SM, C)

|         |      |      |     |      |      |            |  |
|---------|------|------|-----|------|------|------------|--|
| Avg (5) | 1440 | 8830 | 7.3 | 11.0 | 0.66 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|

Plant 84, grade 2 ("Light face," 30 percent of kiln, SM, C)

|          |      |      |      |      |      |          |  |
|----------|------|------|------|------|------|----------|--|
|          |      |      |      |      |      |          |  |
| 1-----   | 1080 | 7130 | 15.2 | 18.5 | 0.82 | 0.00 (B) |  |
| 2-----   | 1215 | 5910 | 17.5 | 20.7 | .85  | .00 (B)  |  |
| 3-----   | 1260 | 6700 | 16.1 | 19.3 | .83  | .21 (B)  |  |
| 4-----   | 925  | 5610 | 15.9 | 19.2 | .83  | .33 (B)  |  |
| 5-----   | 920  | 4600 | 17.3 | 20.4 | .85  | .10 (B)  |  |
| Avg----- | 1080 | 5990 | 16.4 | 19.6 | 0.84 | 0.13 (B) |  |

Plant 84, grade 3 ("Bench," 75 percent of kiln, SM, C)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 1495 | 12200 | 6.1 | 7.8 | 0.76 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 84, grade 4 ("Light hard," 25 percent of kiln, SM, C)

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
|          |     |      |      |      |      |          |  |
| 1-----   | 480 | 2850 | 19.5 | 24.4 | 0.80 | 0.37 (B) |  |
| 2-----   | 405 | 2320 | 19.9 | 25.1 | .79  | 1.30 (B) |  |
| 3-----   | 345 | 2330 | 18.5 | 22.6 | .82  | 0.82 (B) |  |
| 4-----   | 375 | 2180 | 18.6 | 22.6 | .82  | .61 (B)  |  |
| 5-----   | 550 | 2770 | 19.1 | 23.0 | .83  | .44 (B)  |  |
| Avg----- | 430 | 2490 | 19.1 | 23.5 | 0.81 | 0.71 (B) |  |

Plant 84, grade 5 ("Pale," 75 percent of kiln, SM, C)

|          |     |      |      |      |      |       |            |
|----------|-----|------|------|------|------|-------|------------|
|          |     |      |      |      |      |       |            |
| 1-----   | 550 | 2440 | 20.2 | 23.2 | 0.87 | 0.12  | 0.24 (63c) |
| 2-----   | 530 | 3160 | 23.7 | 25.0 | .95  | F 12c |            |
| 3-----   | 435 | 2460 | 20.1 | 22.6 | .89  | F 42c |            |
| 4-----   | 460 | 3380 | 22.8 | 24.7 | .92  | 8.40  | 9.16 (63c) |
| 5-----   | 170 | 1120 | 20.8 | 25.3 | .82  | F 45c |            |
| Avg----- | 430 | 2510 | 21.5 | 24.2 | 0.89 |       |            |

Plant 84, grade 6 ("Dark face," 30 percent of kiln, WM, C)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 1505 | 13210 | 4.4 | 6.2 | 0.70 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont—Continued*

| Specimen number                                                        | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                        |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 84, grade 7 ("Light face," 30 percent of kiln, WM, C)            |                           |                           |                      |              |                        |                                                         |                          |
|                                                                        | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                                 | 1375                      | 10100                     | 6.2                  | 9.2          | 0.67                   | 0.00 (B)                                                |                          |
| 2-----                                                                 | 1460                      | 9900                      | 6.8                  | 9.4          | .72                    | .24 (B)                                                 |                          |
| 3-----                                                                 | 1520                      | 9550                      | 6.3                  | 9.0          | .70                    | .11 (B)                                                 |                          |
| 4-----                                                                 | 2300                      | 11500                     | 6.5                  | 8.8          | .74                    | .00 (B)                                                 |                          |
| 5-----                                                                 | 1385                      | 10580                     | 8.0                  | 11.2         | .71                    | .21 (B)                                                 |                          |
| Avg-----                                                               | 1610                      | 10330                     | 6.8                  | 9.5          | 0.71                   | 0.11 (B)                                                |                          |
| Plant 84, grade 8 ("Bench," 75 percent of kiln, WM, C)                 |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                               | 1325                      | 7950                      | 5.8                  | 7.6          | 0.75                   | Not tested                                              |                          |
| Plant 84, grade 9 ("Light hard," 25 percent of kiln, WM, C)            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 1410                      | 8650                      | 10.7                 | 14.3         | 0.75                   | 0.12 (B)                                                |                          |
| 2-----                                                                 | 1550                      | 8520                      | 11.0                 | 13.7         | .80                    | .11 (B)                                                 |                          |
| 3-----                                                                 | 1470                      | 6820                      | 12.2                 | 14.9         | .82                    | .11 (B)                                                 |                          |
| 4-----                                                                 | 1705                      | 9190                      | 11.2                 | 14.0         | .80                    | .34 (B)                                                 |                          |
| 5-----                                                                 | 1390                      | 8930                      | 13.2                 | 15.7         | .84                    | .00 (B)                                                 |                          |
| Avg-----                                                               | 1505                      | 8420                      | 11.7                 | 14.5         | 0.80                   | 0.14 (B)                                                |                          |
| Plant 84, grade 10 ("Pale," 75 percent of kiln, WM, C)                 |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 465                       | 4040                      | 20.3                 | 22.8         | 0.89                   | F 42c                                                   | %                        |
| 2-----                                                                 | 395                       | 3660                      | 18.7                 | 21.5         | .87                    | F 39c                                                   |                          |
| 3-----                                                                 | 640                       | 3980                      | 19.0                 | 21.7         | .88                    | 0.87                                                    | F 57c                    |
| 4-----                                                                 | 535                       | 3760                      | 19.7                 | 22.3         | .88                    | .51                                                     | 0.51 (63c)               |
| 5-----                                                                 | 330                       | 3230                      | 18.9                 | 21.9         | .86                    | 4.30                                                    | 5.33 (63c)               |
| Avg-----                                                               | 475                       | 3730                      | 19.3                 | 22.0         | 0.88                   | -----                                                   |                          |
| Plant 96, grade 1 ("Kiln run," 100 percent of kiln, SM, C)             |                           |                           |                      |              |                        |                                                         |                          |
| Avg (16)-                                                              | 980                       | 5410                      | 8.3                  | 11.2         | 0.70                   | Not tested                                              |                          |
| Plant 108, grade 1 ("Kiln run," 100 percent of kiln, SM, C)            |                           |                           |                      |              |                        |                                                         |                          |
| Avg (15)-                                                              | 995                       | 7470                      | 8.8                  | 10.9         | 0.78                   | Not tested                                              |                          |
| Plant 128, grade 1 ("Dark red common face," 25 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                               | 1720                      | 16660                     | 1.3                  | 1.9          | 0.76                   | Not tested                                              |                          |
| Plant 128, grade 2 ("Bright Red Common," 40 percent of kiln, SM, C)    |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                               | 1995                      | 12030                     | 6.4                  | 9.4          | 0.68                   | Single test, 0.00 % loss.                               |                          |
| Plant 128, grade 3 ("Arch," 15 percent of kiln, SM, C)                 |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                               | 1580                      | 11840                     | 6.8                  | 8.4          | 0.82                   | Not tested                                              |                          |
| Plant 128, grade 4 ("Light hard," 20 percent of kiln, SM, C)           |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 1885                      | 6610                      | 11.4                 | 14.8         | 0.77                   | 0.10                                                    |                          |
| 2-----                                                                 | 1635                      | 7510                      | 10.5                 | 14.2         | .74                    | .21                                                     |                          |
| 3-----                                                                 | 1780                      | 8450                      | 11.1                 | 13.9         | .80                    | .11                                                     |                          |
| 4-----                                                                 | 2120                      | 7390                      | 10.3                 | 11.9         | .87                    | .21                                                     |                          |
| 5-----                                                                 | 1030                      | 5990                      | 13.8                 | 17.4         | .79                    | .31                                                     |                          |
| Avg-----                                                               | 1690                      | 7190                      | 11.4                 | 14.4         | 0.79                   | 0.19                                                    |                          |

TABLE 2.—*Properties of bricks produced in Massachusetts*

[All samples received with the exception of those from plant 7 (side-cut) were formed by the soft-mud process. All bricks were made from surface clay. Much of the Massachusetts brick production resembles that from Maine, New Hampshire, and Vermont in appearance and properties]

| Specimen number                                              | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                              |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant, 5, grade 1 ("Common face," 60 percent of kiln, SM, C) |                     |                      |                      |              |                        |                                                         |                          |
|                                                              | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1-----                                                       | 1170                | 5230                 | 7.7                  | 10.4         | 0.74                   | No test                                                 |                          |
| 2-----                                                       | 1220                | 4820                 | 7.6                  | 11.4         | .67                    | 0.00                                                    |                          |
| 3-----                                                       | 1120                | 4960                 | 7.8                  | 10.4         | .75                    | .13                                                     |                          |
| 4-----                                                       | 1145                | 5350                 | 7.5                  | 10.7         | .70                    | .00                                                     |                          |
| 5-----                                                       | 875                 | 6720                 | 8.5                  | 10.8         | .79                    | .11                                                     |                          |
| Avg----                                                      | 1105                | 5420                 | 7.8                  | 10.7         | 0.73                   | 0.06                                                    |                          |
| Plant 5, grade 2 ("Merchantable," 90 percent of kiln, SM, C) |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                       | 1240                | 6790                 | 12.5                 | 13.5         | 0.93                   | 0.10 (B)                                                |                          |
| 2-----                                                       | 1450                | 5470                 | 10.4                 | 11.6         | .90                    | .12                                                     |                          |
| 3-----                                                       | 980                 | 5380                 | 12.6                 | 13.8         | .91                    | .25                                                     |                          |
| 4-----                                                       | 1200                | 4750                 | 15.5                 | 16.8         | .92                    | .25                                                     |                          |
| 5-----                                                       | 835                 | 3910                 | 16.2                 | 17.3         | .94                    | .23                                                     |                          |
| Avg----                                                      | 1140                | 5260                 | 13.4                 | 14.6         | 0.92                   | 0.19 (A & B)                                            |                          |
| Plant 5, grade 3 ("Backup," 10 percent of kiln, SM, C)       |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                       | 905                 | 3930                 | 16.2                 | 18.6         | 0.87                   | 0.39                                                    | %                        |
| 2-----                                                       | 870                 | 3870                 | 17.3                 | 18.6         | .93                    | .52                                                     | 0.39 (77c)               |
| 3-----                                                       | 1120                | 3820                 | 19.5                 | 20.7         | .94                    | .47                                                     | .52 (77c)                |
| 4-----                                                       | 730                 | 3020                 | 20.1                 | 22.0         | .91                    | .49                                                     | .47 (77c)                |
| 5-----                                                       | 585                 | 2780                 | 18.8                 | 21.5         | .88                    | 1.00                                                    | .49 (77c)                |
| Avg----                                                      | 840                 | 3480                 | 18.4                 | 20.3         | 0.91                   | 0.57                                                    | 1.30 (77c)               |
| Plant 7, grade 1 ("Face," 33½ percent of kiln, SC, C)        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                       | 1885                | 13700                | 2.7                  | 5.0          | 0.54                   | 0.09                                                    |                          |
| 2-----                                                       | 2450                | 13300                | 2.8                  | 4.5          | .62                    | .00                                                     |                          |
| 3-----                                                       | 2180                | 15200                | 3.3                  | 5.4          | .61                    | .33                                                     |                          |
| 4-----                                                       | 3120                | 12750                | 3.0                  | 4.3          | .70                    | .00                                                     |                          |
| 5-----                                                       | 2490                | 12700                | 1.9                  | 3.1          | .61                    | .00                                                     |                          |
| Avg----                                                      | 2425                | 13530                | 2.7                  | 4.5          | 0.62                   | 0.08                                                    |                          |
| Plant 7, grade 2 ("Semi-face," 33½ percent of kiln, SC, C)   |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                       | 985                 | 7130                 | 13.5                 | 16.6         | 0.81                   | 0.62                                                    |                          |
| 2-----                                                       | 1075                | 6310                 | 14.6                 | 17.1         | .85                    | F 37c                                                   |                          |
| 3-----                                                       | 1370                | 7300                 | 16.6                 | 19.0         | .87                    | F 27c                                                   |                          |
| 4-----                                                       | 1180                | 8250                 | 10.3                 | 13.9         | .74                    | 0.21                                                    |                          |
| 5-----                                                       | 1020                | 3830                 | 17.1                 | 19.5         | .88                    | F 27c                                                   |                          |
| Avg----                                                      | 1125                | 6560                 | 14.4                 | 17.2         | 0.83                   |                                                         |                          |
| Plant 7, grade 3 ("Outside," 17½ percent of kiln, SC, C)     |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                       | 940                 | 6080                 | 14.4                 | 16.8         | 0.86                   | F 50c (B)                                               |                          |
| 2-----                                                       | 1120                | 5990                 | 11.9                 | 15.0         | .79                    | 0.31 (B)                                                |                          |
| 3-----                                                       | 1130                | 6370                 | 15.1                 | 18.3         | .82                    | .27 (B)                                                 |                          |
| 4-----                                                       | 650                 | 4290                 | 15.3                 | 17.0         | .90                    | .23 (B)                                                 |                          |
| 5-----                                                       | 580                 | 7610                 |                      |              |                        | No test                                                 |                          |
| Avg----                                                      | 885                 | 6070                 | 14.2                 | 16.8         | 0.84                   |                                                         |                          |

TABLE 2.—Properties of bricks produced in Massachusetts—Continued

| Specimen number                                        | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                        |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 7, grade 4 ("Backup," 16 percent of kiln, SC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                        | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                 | 1390                      | 7780                      | 11.7                 | 14.0         | 0.84                   | 0.36                                                    | F 63c                    |
| 2-----                                                 | 745                       | 4370                      | 19.4                 | 22.4         | .87                    | F 38c                                                   |                          |
| 3-----                                                 | 600                       | 3370                      | 19.7                 | 21.8         | .90                    | F 21c                                                   |                          |
| 4-----                                                 | 420                       | 4780                      | 17.2                 | 20.7         | .83                    | F 27c                                                   |                          |
| 5-----                                                 | 615                       | 3290                      | 17.6                 | 19.7         | .89                    | F 8c                                                    |                          |
| Avg-----                                               | 755                       | 4710                      | 17.1                 | 19.7         | 0.87                   | -----                                                   |                          |

|                                                       |      |      |      |      |      |      |  |
|-------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 27, grade 1 ("Arch," 26 percent of kiln, SM, C) |      |      |      |      |      |      |  |
| 1                                                     | 445  | 4290 | 20.8 | 24.7 | 0.84 | 0.91 |  |
| 2                                                     | 1090 | 6740 | 10.3 | 12.9 | .80  | .51  |  |
| 3                                                     | 300  | 2680 | 16.8 | 21.8 | .77  | .49  |  |
| 4                                                     | 710  | 3500 | 16.3 | 20.7 | .79  | .54  |  |
| 5                                                     | 755  | 3800 | 17.4 | 21.6 | .81  | .84  |  |
| Avg                                                   | 660  | 4200 | 16.3 | 20.3 | 0.80 | 0.66 |  |

|                                                                     |      |      |      |      |      |      |  |
|---------------------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 27, grade 2 ("Body, middle catch," 35 percent of kiln, SM, C) |      |      |      |      |      |      |  |
| 1                                                                   | 1110 | 6050 | 13.8 | 17.7 | 0.78 | 0.61 |  |
| 2                                                                   | 965  | 5420 | 14.5 | 18.2 | .80  | .48  |  |
| 3                                                                   | 990  | 5740 | 14.4 | 18.0 | .80  | .62  |  |
| 4                                                                   | 1105 | 5810 | 15.9 | 19.9 | .80  | .79  |  |
| 5                                                                   | 1265 | 9070 | 6.9  | 11.1 | .62  | .21  |  |
| Avg                                                                 | 1085 | 6420 | 13.1 | 17.0 | 0.76 | 0.54 |  |

|                                                                  |      |      |      |      |      |      |  |
|------------------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 27, grade 3 ("Body, Top catch," 35 percent of kiln, SM, C) |      |      |      |      |      |      |  |
| 1                                                                | 1010 | 5380 | 14.9 | 18.4 | 0.81 | 0.36 |  |
| 2                                                                | 500  | 2990 | 19.2 | 22.8 | .84  | .62  |  |
| 3                                                                | 1195 | 5760 | 12.4 | 16.0 | .77  | .24  |  |
| 4                                                                | 950  | 4410 | 13.8 | 18.4 | .75  | .41  |  |
| 5                                                                | 680  | 4130 | 18.8 | 23.0 | .82  | .73  |  |
| Avg                                                              | 865  | 4530 | 15.8 | 19.7 | 0.80 | 0.47 |  |

|                                                               |      |      |      |      |      |      |            |
|---------------------------------------------------------------|------|------|------|------|------|------|------------|
| Plant 27, grade 4 ("Double coaled," 4 percent of kiln, SM, C) |      |      |      |      |      |      |            |
| 1                                                             | 370  | 1535 | 25.3 | 30.4 | 0.83 | 0.88 | 1.26 (75c) |
| 2                                                             | 460  | 3380 | 19.1 | 25.8 | .74  | 2.00 | 2.59 (75c) |
| 3                                                             | 1415 | 4470 | 9.4  | 20.0 | .47  | 0.25 | 0.25 (75c) |
| 4                                                             | 305  | 1600 | 21.0 | 27.4 | .77  | .76  | 1.14 (75c) |
| 5                                                             | 370  | 2100 | 14.7 | 24.5 | .60  | .87  | 1.52 (75c) |
| Avg                                                           | 585  | 2620 | 17.9 | 25.6 | 0.68 | 0.95 | 1.35 (75c) |

|                                                                           |      |      |      |      |      |              |  |
|---------------------------------------------------------------------------|------|------|------|------|------|--------------|--|
| Plant 32, grade 1 ("Run of kiln merchantable," 90 percent of kiln, SM, C) |      |      |      |      |      |              |  |
| 1                                                                         | 1015 | 4460 | 10.6 | 14.1 | 0.75 | 0.56         |  |
| 2                                                                         | 1370 | 2830 | 4.0  | 6.3  | .64  | .58          |  |
| 3                                                                         | 890  | 3350 | 10.1 | 12.8 | .79  | .53          |  |
| 4                                                                         | 775  | 3340 | 2.1  | 4.7  | .45  | .21          |  |
| 5                                                                         | 1350 | 4120 | 2.2  | 4.4  | .50  | .45          |  |
| 6                                                                         | 935  | 3360 | 13.9 | 17.6 | .79  | .61          |  |
| 7                                                                         | 960  | 4160 | 14.0 | 17.7 | .79  | .73          |  |
| 8                                                                         | 1030 | 3590 | 14.9 | 18.2 | .82  | .52          |  |
| 9                                                                         | 1415 | 6340 | 13.5 | 16.8 | .80  | .43          |  |
| 10                                                                        | 1105 | 4480 | 13.8 | 17.2 | .80  | .49          |  |
| 11                                                                        | 875  | 3740 | 18.3 | 21.7 | .84  | .46 (B)      |  |
| 12                                                                        | 725  | 3620 | 18.2 | 21.9 | .83  | 2.18 (B)     |  |
| 13                                                                        | 895  | 4080 | 17.7 | 20.8 | .85  | 0.15 (B)     |  |
| 14                                                                        | 740  | 3730 | 17.8 | 21.0 | .85  | .13 (B)      |  |
| 15                                                                        | 1005 | 3880 | 16.7 | 20.2 | .83  | .30 (B)      |  |
| Avg                                                                       | 1005 | 3940 | 12.5 | 15.7 | 0.76 | 0.56 (A & B) |  |

TABLE 2.—Properties of bricks produced in Massachusetts—Continued

| Specimen number                                         | Modulus of rupture            | Compressive strength           | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------|-------------------------------|--------------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                         |                               |                                | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 32, grade 2 ("Salmon," 10 percent of kiln, SM, C) |                               |                                |                      |              |                        |                                                         |                          |
| 1-----                                                  | <i>lb/in.<sup>2</sup></i> 200 | <i>lb/in.<sup>2</sup></i> 2040 | % 19.6               | % 22.3       | 0.88                   | % F 2c                                                  |                          |
| 2-----                                                  | 280                           | 1440                           | 19.8                 | 22.4         | .88                    | F 2c                                                    |                          |
| 3-----                                                  | 545                           | 2260                           | 19.1                 | 21.6         | .88                    | F 14c                                                   |                          |
| 4-----                                                  | 495                           | 2540                           | 19.9                 | 23.2         | .86                    | F 2c                                                    |                          |
| 5-----                                                  | 325                           | 1260                           | 19.8                 | 21.9         | .90                    | F 2c                                                    |                          |
| Avg-----                                                | 370                           | 1910                           | 19.6                 | 22.3         | 0.88                   | F 4c                                                    |                          |

|                                                               |      |      |     |      |      |            |  |
|---------------------------------------------------------------|------|------|-----|------|------|------------|--|
| Plant 110, grade 1 ("Bodybrick," 66.7 percent of kiln, SM, C) |      |      |     |      |      |            |  |
| Avg (6)                                                       | 1480 | 8500 | 6.5 | 10.2 | 0.64 | Not tested |  |

|                                                             |      |       |     |     |      |          |  |
|-------------------------------------------------------------|------|-------|-----|-----|------|----------|--|
| Plant 110, grade 2 ("Hard arch," 16 percent of kiln, SM, C) |      |       |     |     |      |          |  |
| 1                                                           | 1685 | 13550 | 5.3 | 7.4 | 0.72 | 0.00 (B) |  |
| 2                                                           | 1370 | 9800  | 4.4 | 6.7 | .66  | .00 (B)  |  |
| 3                                                           | 1695 | 10680 | 3.9 | 6.3 | .62  | .16 (B)  |  |
| 4                                                           | 1100 | 10970 | 4.8 | 6.6 | .73  | .12 (B)  |  |
| 5                                                           | 1470 | 10450 | 5.7 | 8.2 | .70  | .10 (B)  |  |
| 6                                                           | 1315 | 12100 | 5.2 | 7.0 | .74  | .52 (B)  |  |
| Avg                                                         | 1440 | 11260 | 4.9 | 7.0 | 0.70 | 0.15 (B) |  |

|                                                              |      |      |      |      |      |      |  |
|--------------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 110, grade 3 ("Light hard," 17 percent of kiln, SM, C) |      |      |      |      |      |      |  |
| 1                                                            | 750  | 6340 | 14.8 | 16.7 | 0.88 | 0.00 |  |
| 2                                                            | 1060 | 6030 | 13.0 | 15.1 | .86  | .00  |  |
| 3                                                            | 1090 | 6340 | 14.3 | 16.6 | .86  | .00  |  |
| 4                                                            | 1155 | 6730 | 14.8 | 17.2 | .86  | .00  |  |
| 5                                                            | 1400 | 5650 | 14.1 | 16.3 | .87  | .00  |  |
| 6                                                            | 1200 | 6500 | 12.4 | 14.6 | .85  | .11  |  |
| Avg                                                          | 1110 | 6260 | 13.9 | 16.1 | 0.86 | 0.02 |  |

|                                                            |      |       |      |     |      |            |  |
|------------------------------------------------------------|------|-------|------|-----|------|------------|--|
| Plant 115, grade 1 ("Colonial," 10 percent of kiln, SM, C) |      |       |      |     |      |            |  |
| Avg (6)                                                    | 2055 | 13490 | 0.78 | 1.3 | 0.56 | Not tested |  |

|                                                                 |      |       |     |     |      |            |  |
|-----------------------------------------------------------------|------|-------|-----|-----|------|------------|--|
| Plant 115, grade 1A ("Water struck," 50 percent of kiln, WM, C) |      |       |     |     |      |            |  |
| Avg (6)                                                         | 1775 | 14800 | 4.3 | 6.0 | 0.72 | Not tested |  |

|                                                        |      |       |     |     |      |            |  |
|--------------------------------------------------------|------|-------|-----|-----|------|------------|--|
| Plant 115, grade 2 ("Body," 70 percent of kiln, SM, C) |      |       |     |     |      |            |  |
| Avg (6)                                                | 1600 | 11210 | 6.0 | 8.5 | 0.70 | Not tested |  |

|                                                              |      |      |      |      |      |      |  |
|--------------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 115, grade 3 ("Light hard," 20 percent of kiln, SM, C) |      |      |      |      |      |      |  |
| 1                                                            | 1515 | 9000 | 11.9 | 15.1 | 0.79 | 0.13 |  |
| 2                                                            | 975  | 8250 | 12.7 | 15.3 | .83  | .00  |  |
| 3                                                            | 1305 | 6830 | 14.7 | 17.1 | .86  | .00  |  |
| 4                                                            | 1385 | 7370 | 9.9  | 12.2 | .81  | .00  |  |
| 5                                                            | 1070 | 7100 | 11.0 | 13.6 | .81  | .13  |  |
| 6                                                            | 725  | 8860 | 13.3 | 16.4 | .81  | .00  |  |
| Avg                                                          | 1165 | 7900 | 12.2 | 15.0 | 0.82 | 0.04 |  |

TABLE 2.—*Properties of bricks produced in Massachusetts—Continued*

| Specimen number                                                  | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                  |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 146A, grade 1 ("Bench," 3 percent of kiln, SM, C)          |                           |                           |                      |              |                        |                                                         |                          |
|                                                                  | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                           | 1870                      | 11600                     | 3.3                  | 5.0          | 0.66                   | 0.22                                                    |                          |
| 2-----                                                           | 1780                      | 10450                     | 1.3                  | 2.5          | .52                    | .13                                                     |                          |
| 3-----                                                           | 1555                      | 10450                     | 6.3                  | 8.9          | .71                    | .31                                                     |                          |
| 4-----                                                           | 1475                      | 7290                      | 1.6                  | 3.2          | .50                    | .21                                                     |                          |
| 5-----                                                           | 2000                      | 5510                      | 1.1                  | 2.2          | .50                    | .33                                                     |                          |
| Avg-----                                                         | 1735                      | 9060                      | 2.7                  | 4.4          | 0.58                   | 0.24                                                    |                          |
| Plant 146A, grade 2 ("Body," 90 percent of kiln, SM, C)          |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                         | 1455                      | 5900                      | 8.9                  | 11.5         | 0.78                   | Not tested                                              |                          |
| Plant 146A, grade 3 ("Light hard," 7 percent of kiln, SM, C)     |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                           | 435                       | 2350                      | 17.7                 | 20.8         | 0.85                   | 1.98                                                    |                          |
| 2-----                                                           | 875                       | 2900                      | 17.9                 | 20.1         | .89                    | 0.67                                                    |                          |
| 3-----                                                           | 550                       | 3150                      | 18.7                 | 21.2         | .88                    | 1.01                                                    |                          |
| 4-----                                                           | 650                       | 2540                      | 18.1                 | 21.6         | .84                    | 1.28                                                    |                          |
| 5-----                                                           | 425                       | 3520                      | 18.5                 | 20.1         | .92                    | 6.56                                                    |                          |
| Avg-----                                                         | 585                       | 2890                      | 18.2                 | 20.8         | 0.88                   | 2.30                                                    |                          |
| Plant 146B, grade 1 ("Bench," 3 percent of kiln, SM, C)          |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                           | 1640                      | 6190                      | 2.5                  | 7.0          | 0.36                   | 0.10                                                    |                          |
| 2-----                                                           | 1720                      | 9950                      | 0.9                  | 1.3          | .69                    | .00                                                     |                          |
| 3-----                                                           | 2290                      | 17700                     | 2.3                  | 3.7          | .62                    | .00                                                     |                          |
| 4-----                                                           | 1590                      | 5790                      | 2.7                  | 4.9          | .55                    | .00                                                     |                          |
| 5-----                                                           | 1600                      | 8890                      | 5.0                  | 7.9          | .63                    | .10                                                     |                          |
| Avg-----                                                         | 1790                      | 9700                      | 2.7                  | 5.0          | 0.57                   | 0.04                                                    |                          |
| Plant 146B, grade 2 ("Body," 90 percent of kiln, SM, C)          |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                         | 2190                      | 12710                     | 4.4                  | 7.0          | 0.62                   | Not tested                                              |                          |
| Plant 146B, grade 3 ("Brush," percentage of kiln unknown, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                           | 2200                      | 15930                     | 3.9                  | 4.9          | 0.80                   | 0.00                                                    |                          |
| 2-----                                                           | 3050                      | 14450                     | 0.9                  | 2.2          | .41                    | .00                                                     |                          |
| 3-----                                                           | 2380                      | 15900                     | 4.4                  | 7.8          | .56                    | .10                                                     |                          |
| 4-----                                                           | 2280                      | 17850                     | 2.9                  | 3.8          | .76                    | .10                                                     |                          |
| 5-----                                                           | 2140                      | 17650                     | 5.0                  | 7.0          | .72                    | .20                                                     |                          |
| Avg-----                                                         | 2410                      | 16360                     | 3.4                  | 5.1          | 0.65                   | 0.08                                                    |                          |
| Plant 146C, grade 1 ("Bench," 3 percent of kiln, SM, C)          |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                           | 1425                      | 9500                      | 5.2                  | 8.5          | 0.61                   | 0.09 (B)                                                |                          |
| 2-----                                                           | 2135                      | 11350                     | 3.5                  | 5.5          | .64                    | .00 (B)                                                 |                          |
| 3-----                                                           | 1820                      | 12500                     | 3.6                  | 6.2          | .58                    | .10 (B)                                                 |                          |
| 4-----                                                           | 1680                      | 8580                      | 4.0                  | 7.1          | .56                    | .09 (B)                                                 |                          |
| 5-----                                                           | 1695                      | 6760                      | 1.5                  | 4.5          | .33                    | .10 (B)                                                 |                          |
| Avg-----                                                         | 1750                      | 9740                      | 3.6                  | 6.4          | 0.54                   | 0.08 (B)                                                |                          |
| Plant 146C, grade 2 ("Body," 90 percent of kiln, SM, C)          |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                           | 2480                      | 12950                     | 1.1                  | 2.7          | 0.41                   | 0.11                                                    |                          |
| 2-----                                                           | 2145                      | 12700                     | 1.5                  | 2.5          | .60                    | .20                                                     |                          |
| 3-----                                                           | 2045                      | 13150                     | 2.8                  | 4.5          | .62                    | .11                                                     |                          |
| 4-----                                                           | 2085                      | 9020                      | 3.2                  | 5.7          | .56                    | .51                                                     |                          |
| 5-----                                                           | 1830                      | 7980                      | 6.5                  | 8.1          | .80                    | .11                                                     |                          |
| Avg-----                                                         | 2115                      | 11160                     | 3.0                  | 4.7          | 0.60                   | 0.21                                                    |                          |

TABLE 2.—*Properties of bricks produced in Massachusetts—Continued*

| Specimen number                                                 | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                 |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 146C, grade 3 ("Tops," percentage of kiln unknown, SM, C) |                     |                      |                      |              |                        |                                                         |                          |
|                                                                 | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1-----                                                          | 1150                | 4660                 | 12.6                 | 16.0         | 0.79                   | 0.34                                                    |                          |
| 2-----                                                          | 1010                | 4400                 | 12.8                 | 16.0         | .80                    | .26                                                     |                          |
| 3-----                                                          | 860                 | 5030                 | 15.0                 | 17.4         | .86                    | .48                                                     |                          |
| 4-----                                                          | 820                 | 4000                 | 14.9                 | 17.5         | .85                    | .65                                                     |                          |
| 5-----                                                          | 1300                | 6470                 | 12.3                 | 15.1         | .82                    | .27                                                     |                          |
| Avg----                                                         | 1030                | 4910                 | 13.5                 | 16.4         | 0.82                   | 0.40                                                    |                          |
| Plant 146C, grade 4 ("Light hard," 7 percent of kiln, SM, C)    |                     |                      |                      |              |                        |                                                         |                          |
|                                                                 |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 700                 | 3650                 | 15.4                 | 18.8         | 0.82                   | 0.46                                                    |                          |
| 2-----                                                          | 2200                | 9640                 | 10.9                 | 13.5         | .81                    | .31                                                     |                          |
| 3-----                                                          | 750                 | 5170                 | 17.5                 | 20.8         | .80                    | 1.04                                                    |                          |
| 4-----                                                          | 805                 | 3710                 | 15.9                 | 20.0         | .80                    | .82                                                     |                          |
| 5-----                                                          | 1300                | 7300                 | 15.0                 | 17.1         | .88                    | .31                                                     |                          |
| Avg----                                                         | 1150                | 5890                 | 14.9                 | 18.0         | 0.83                   | 0.59                                                    |                          |
| Plant 160, grade 1 ("Arch," 25 percent of kiln, SM, C)          |                     |                      |                      |              |                        |                                                         |                          |
|                                                                 |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 830                 | 6730                 | 11.6                 | 13.8         | 0.84                   | 0.22                                                    |                          |
| 2-----                                                          | 1245                | 7590                 | 10.8                 | 12.0         | .90                    | .25                                                     |                          |
| 3-----                                                          | 940                 | 5940                 | 9.8                  | 11.4         | .86                    | .33                                                     |                          |
| 4-----                                                          | 1490                | 6970                 | 6.2                  | 7.5          | .83                    | .12                                                     |                          |
| 5-----                                                          | 1300                | 6750                 | 3.7                  | 4.3          | .86                    | .11                                                     |                          |
| Avg----                                                         | 1160                | 6800                 | 8.4                  | 9.8          | 0.86                   | 0.21                                                    |                          |
| Plant 160, grade 2 ("Body," 60 percent of kiln, SM, C)          |                     |                      |                      |              |                        |                                                         |                          |
|                                                                 |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 1885                | 8120                 | 5.6                  | 6.8          | 0.82                   | 0.12                                                    |                          |
| 2-----                                                          | 1655                | 6260                 | 5.5                  | 7.1          | .64                    | .22                                                     |                          |
| 3-----                                                          | 1640                | 6270                 | 5.6                  | 7.7          | .73                    | .28                                                     |                          |
| 4-----                                                          | 1090                | 5560                 | 5.5                  | 6.9          | .80                    | .14                                                     |                          |
| 5-----                                                          | 1525                | 5700                 | 6.0                  | 7.7          | .78                    | .11                                                     |                          |
| Avg----                                                         | 1560                | 6380                 | 5.6                  | 7.2          | 0.75                   | 0.17                                                    |                          |
| Plant 160, grade 3 ("Light Hard," 15 percent of kiln, SM, C)    |                     |                      |                      |              |                        |                                                         |                          |
|                                                                 |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 495                 | 2210                 | 16.6                 | 18.5         | 0.90                   | 0.51                                                    |                          |
| 2-----                                                          | 795                 | 3380                 | 13.3                 | 16.0         | .83                    | .14                                                     |                          |
| 3-----                                                          | 685                 | 3370                 | 13.7                 | 15.9         | .86                    | .22                                                     |                          |
| 4-----                                                          | 460                 | 4720                 | 17.8                 | 19.6         | .91                    | .61                                                     |                          |
| 5-----                                                          | 805                 | 2740                 | 17.0                 | 19.4         | .88                    | .35                                                     |                          |
| Avg----                                                         | 650                 | 3280                 | 15.7                 | 17.9         | 0.88                   | 0.37                                                    |                          |
| Plant 170, grade 1 ("Body," 60 percent of kiln, WM, C)          |                     |                      |                      |              |                        |                                                         |                          |
|                                                                 |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 315                 | 9170                 | 7.4                  | 9.6          | 0.77                   | No test                                                 |                          |
| 2-----                                                          | 7150                | 8.3                  | 10.6                 | .78          | 0.12                   |                                                         |                          |
| 3-----                                                          | 400                 | 4810                 | 5.1                  | 8.1          | .63                    | No test                                                 |                          |
| 4-----                                                          | 1335                | 5570                 | 4.1                  | 6.7          | .61                    | 0.00                                                    |                          |
| 5-----                                                          | 1260                | 8140                 | 3.2                  | 5.3          | .60                    | .09                                                     |                          |
| Avg----                                                         | 830                 | 6970                 | 5.6                  | 8.1          | 0.68                   | 0.07                                                    |                          |
| Plant 170, grade 1A ("Second sample of grade 1")                |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-                                                        | 1430                | 8120                 | 3.5                  | 7.1          | 0.49                   | Not tested                                              |                          |
| Plant 170, grade 2 ("Bench," 20 percent of kiln, WM, C)         |                     |                      |                      |              |                        |                                                         |                          |
|                                                                 |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 1590                | 7200                 | 8.6                  | 11.3         | 0.76                   | 0.19                                                    |                          |
| 2-----                                                          | 975                 | 6060                 | 1.9                  | 3.9          | .49                    | .19                                                     |                          |
| 3-----                                                          | 1015                | 5530                 | 10.7                 | 12.9         | .83                    | .09                                                     |                          |
| 4-----                                                          | 565                 | 3380                 | 12.4                 | 15.9         | .78                    | .21                                                     |                          |
| 5-----                                                          | 1085                | 6080                 | 8.9                  | 11.1         | .80                    | .19                                                     |                          |
| Avg----                                                         | 1045                | 5650                 | 8.5                  | 11.0         | 0.73                   | 0.17                                                    |                          |

TABLE 2.—*Properties of bricks produced in Massachusetts—Continued*

| Specimen number                                              | Modulus of rupture          | Compressive strength        | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------|-----------------------------|-----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                              |                             |                             | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 170, grade 2A ("Second sample of grade 2")             |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | lb/in. <sup>2</sup><br>1195 | lb/in. <sup>2</sup><br>6600 | %<br>4.1             | %<br>7.8     | 0.52                   | %<br>Not tested                                         |                          |
| Plant 170, grade 3 ("Tops," 15 percent of kiln, WM, C)       |                             |                             |                      |              |                        |                                                         |                          |
| 1                                                            | 780                         | 4420                        | 14.6                 | 16.3         | 0.90                   | 1.13                                                    |                          |
| 2                                                            | 675                         | 5190                        | 13.4                 | 16.0         | .84                    | 0.31                                                    |                          |
| 3                                                            | 825                         | 4920                        | 14.6                 | 16.3         | .90                    | .11                                                     |                          |
| 4                                                            | 710                         | 4900                        | 14.4                 | 16.5         | .87                    | F 26c                                                   |                          |
| 5                                                            | 1000                        | 5240                        | 12.4                 | 14.8         | .84                    | 0.12                                                    |                          |
| Avg                                                          | 800                         | 4930                        | 13.9                 | 16.0         | 0.87                   |                                                         |                          |
| Plant 179, grade 1 ("Arch," 15 percent of kiln, SM, C)       |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | 1245                        | 6720                        | 9.6                  | 12.3         | 0.77                   | Not tested                                              |                          |
| Plant 179, grade 2 ("Face," 70 percent of kiln, SM, C)       |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | 1185                        | 6720                        | 9.0                  | 12.3         | 0.73                   | Not tested                                              |                          |
| Plant 179, grade 3 ("Salmon," 15 percent of kiln, SM, C)     |                             |                             |                      |              |                        |                                                         |                          |
| 1                                                            | 825                         | 4180                        | 18.7                 | 21.1         | 0.89                   | 0.35 (B)                                                |                          |
| 2                                                            | 920                         | 2600                        | 18.9                 | 25.8         | .73                    | .25 (B)                                                 |                          |
| 3                                                            | 915                         | 4100                        | 18.5                 | 21.6         | .86                    | .13 (B)                                                 |                          |
| 4                                                            | 1060                        | 4500                        | 18.0                 | 20.8         | .90                    | .23 (B)                                                 |                          |
| 5                                                            | 870                         | 3590                        | 18.2                 | 21.0         | .87                    | .23 (B)                                                 |                          |
| Avg                                                          | 920                         | 3790                        | 18.5                 | 22.1         | 0.85                   | 0.24 (B)                                                |                          |
| Plant 191, grade 1 ("Bench," 20 percent of kiln, SM, C)      |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | 900                         | 5570                        | 8.5                  | 10.8         | 0.76                   | Not tested                                              |                          |
| Plant 191, grade 2 ("Body," 60 percent of kiln, SM, C)       |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | 1045                        | 6130                        | 11.8                 | 14.6         | 0.80                   | Not tested                                              |                          |
| Plant 191, grade 3 ("Light hard," 20 percent of kiln, SM, C) |                             |                             |                      |              |                        |                                                         |                          |
| 1                                                            | 1020                        | 4520                        | 15.0                 | 17.9         | 0.84                   | 0.48 (B)                                                |                          |
| 2                                                            | 990                         | 4900                        | 15.7                 | 18.4         | .85                    | .37 (B)                                                 |                          |
| 3                                                            | 785                         | 2560                        | 19.4                 | 21.4         | .91                    | .51 (B)                                                 |                          |
| 4                                                            | 1000                        | 2000                        | 12.9                 | 20.4         | .63                    | .54 (B)                                                 |                          |
| 5                                                            | 805                         | 4640                        | 15.2                 | 18.1         | .84                    | .47 (B)                                                 |                          |
| Avg                                                          | 920                         | 3720                        | 15.6                 | 19.2         | 0.81                   | 0.47 (B)                                                |                          |
| Plant 205, grade 1 ("Clinker," 5 percent of kiln, SM, C)     |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | 1110                        | 6530                        | 4.8                  | 8.2          | 0.56                   | Not tested                                              |                          |
| Plant 205, grade 2 ("Arch," 15 percent of kiln, SM, C)       |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | 830                         | 5480                        | 7.9                  | 11.9         | 0.67                   | Not tested                                              |                          |
| Plant 205, grade 3 ("Hard face," 50 percent of kiln, SM, C)  |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                      | 930                         | 5150                        | 10.8                 | 13.7         | 0.78                   | Not tested                                              |                          |

TABLE 2.—*Properties of bricks produced in Massachusetts—Continued*

| Specimen number                                                                  | Modulus of rupture         | Compressive strength        | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------------------------|----------------------------|-----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                                  |                            |                             | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 205, grade 4 ("Salmon," 20 percent of kiln, SM, C)                         |                            |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                           | lb/in. <sup>2</sup><br>385 | lb/in. <sup>2</sup><br>2460 | %<br>13.0            | %<br>16.9    | 0.77                   | %<br>0.45 (B)                                           |                          |
| 2-----                                                                           | 575                        | 2950                        | 14.0                 | 17.4         | .81                    | .45 (B)                                                 |                          |
| 3-----                                                                           | 500                        | 2200                        | 14.1                 | 17.4         | .81                    | .54 (B)                                                 |                          |
| 4-----                                                                           | 520                        | 3510                        | 13.6                 | 17.0         | .80                    | .55 (B)                                                 |                          |
| 5-----                                                                           | 605                        | 2780                        | 13.5                 | 17.1         | .79                    | .41 (B)                                                 |                          |
| Avg----                                                                          | 515                        | 2780                        | 13.6                 | 17.2         | 0.80                   | 0.48 (B)                                                |                          |
| Plant 205, grade 5 ("Soft," 10 percent of kiln, SM, C)                           |                            |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                           | 585                        | 2950                        | 16.6                 | 18.3         | 0.91                   | 2.41 (B)                                                |                          |
| 2-----                                                                           | 740                        | 4300                        | 14.8                 | 17.3         | .86                    | 0.37 (B)                                                |                          |
| 3-----                                                                           | 640                        | 3600                        | 16.0                 | 17.8         | .90                    | .28 (B)                                                 |                          |
| 4-----                                                                           | 695                        | 3250                        | 15.8                 | 17.8         | .89                    | 2.27 (B)                                                |                          |
| 5-----                                                                           | 695                        | 3270                        | 15.7                 | 18.0         | .87                    | 0.37 (B)                                                |                          |
| Avg----                                                                          | 670                        | 3470                        | 15.8                 | 17.8         | 0.89                   | 1.14 (B)                                                |                          |
| Plant 211, grade 1 ("Hard," 60 percent of kiln, SM, C)                           |                            |                             |                      |              |                        |                                                         |                          |
| Avg (8) -                                                                        | 675                        | 4070                        | 10.3                 | 15.3         | 0.66                   | Not tested                                              |                          |
| Plant 211, Grade 2 ("Light hard and interior bakers," 40 percent of kiln, SM, C) |                            |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                           | 785                        | 3250                        | 16.7                 | 21.2         | 0.79                   | 0.23 (B)                                                |                          |
| 2-----                                                                           | 280                        | 1550                        | 19.4                 | 24.6         | .79                    | 1.91 (B)                                                |                          |
| Avg----                                                                          | 535                        | 2400                        | 18.0                 | 22.9         | 0.79                   | 1.07 (B)                                                |                          |

TABLE 3.—*Properties of bricks produced in Connecticut*  
[All samples without exception were made from surface clay and formed by the sand-struck, soft-mud process. The descriptions have accordingly been omitted from the grade designations]

| Specimen number                                     | Modulus of rupture          | Compressive strength        | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------|-----------------------------|-----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                     |                             |                             | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 24, grade 1 ("Colonial," 27 percent of kiln)  |                             |                             |                      |              |                        |                                                         |                          |
| 1-----                                              | lb/in. <sup>2</sup><br>1100 | lb/in. <sup>2</sup><br>9650 | %<br>13.9            | %<br>17.4    | 0.80                   | %<br>0.14                                               |                          |
| 2-----                                              | 1275                        | 9300                        | 14.2                 | 17.6         | .81                    | .34                                                     |                          |
| 3-----                                              | 1340                        | 9560                        | 12.3                 | 15.1         | .81                    | .14                                                     |                          |
| 4-----                                              | 985                         | 9320                        | 14.6                 | 18.5         | .79                    | .26                                                     |                          |
| 5-----                                              | 1445                        | 6830                        | 16.9                 | 20.6         | .82                    | .25                                                     |                          |
| Avg----                                             | 1230                        | 8930                        | 14.4                 | 17.8         | 0.81                   | 0.23                                                    |                          |
| Plant 24, grade 2 ("Dark reds," 40 percent of kiln) |                             |                             |                      |              |                        |                                                         |                          |
| 1-----                                              | 1050                        | 7320                        | 19.1                 | 21.6         | 0.88                   | 0.38                                                    |                          |
| 2-----                                              | 545                         | 4570                        | 21.8                 | 25.6         | .85                    | .60                                                     |                          |
| 3-----                                              | 935                         | 6510                        | 19.9                 | 21.9         | .91                    | 1.23                                                    |                          |
| 4-----                                              | 740                         | 5890                        | 20.3                 | 23.1         | .88                    | 0.42                                                    |                          |
| 5-----                                              | 635                         | 5590                        | 20.8                 | 24.3         | .86                    | .23                                                     |                          |
| Avg----                                             | 780                         | 5980                        | 20.4                 | 23.3         | 0.88                   | 0.57                                                    |                          |

TABLE 3.—*Properties of bricks produced in Connecticut*

[All samples without exception were made from surface clay and formed by the sand-struck, soft-mud process. The descriptions have accordingly been omitted from the grade designations.]

| Specimen number                                     | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                     |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 24, grade 1 ("Colonial," 27 percent of kiln)  |                           |                           |                      |              |                        |                                                         |                          |
|                                                     | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                              | 1100                      | 9650                      | 13.9                 | 17.4         | 0.80                   | 0.14                                                    |                          |
| 2-----                                              | 1275                      | 9300                      | 14.2                 | 17.6         | .81                    | .34                                                     |                          |
| 3-----                                              | 1340                      | 9560                      | 12.3                 | 15.1         | .81                    | .14                                                     |                          |
| 4-----                                              | 985                       | 9320                      | 14.6                 | 18.5         | .79                    | .26                                                     |                          |
| 5-----                                              | 1445                      | 6830                      | 16.9                 | 20.6         | .82                    | .25                                                     |                          |
| Avg----                                             | 1230                      | 8930                      | 14.4                 | 17.8         | 0.81                   | 0.23                                                    |                          |
| Plant 24, grade 2 ("Dark reds," 40 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
|                                                     |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                              | 1050                      | 7320                      | 19.1                 | 21.6         | 0.88                   | 0.38                                                    |                          |
| 2-----                                              | 545                       | 4570                      | 21.8                 | 25.6         | .85                    | .60                                                     |                          |
| 3-----                                              | 935                       | 6510                      | 19.9                 | 21.9         | .91                    | 1.23                                                    |                          |
| 4-----                                              | 740                       | 5890                      | 20.3                 | 23.1         | .88                    | 0.42                                                    |                          |
| 5-----                                              | 635                       | 5590                      | 20.8                 | 24.3         | .86                    | .23                                                     |                          |
| Avg----                                             | 780                       | 5980                      | 20.4                 | 23.3         | 0.88                   | 0.57                                                    |                          |

TABLE 3.—*Properties of bricks produced in Connecticut—Continued*

| Specimen number                                  | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                  |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 24, grade 3 ("Inside," 33 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
|                                                  | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                | <i>%</i>                 |
| 1-----                                           | 620                       | 4810                      | 21.8                 | 24.1         | 0.90                   | 0.47                                                    | F 74c                    |
| 2-----                                           | 390                       | 3480                      | 23.5                 | 26.2         | .90                    | F 15c                                                   |                          |
| 3-----                                           | 530                       | 3600                      | 23.3                 | 25.1         | .93                    | 2.30                                                    | F 60c                    |
| 4-----                                           | 500                       | 3290                      | 23.0                 | 24.4         | .94                    | 2.80                                                    | F 75c                    |
| 5-----                                           | 620                       | 4090                      | 22.5                 | 24.2         | .93                    | 0.36                                                    | 1.42 (75c)               |
| Avg-----                                         | 530                       | 3850                      | 22.8                 | 24.8         | 0.92                   | -----                                                   |                          |

|                                                |     |      |      |      |      |          |  |
|------------------------------------------------|-----|------|------|------|------|----------|--|
| Plant 34, grade 1 ("Face," 85 percent of kiln) |     |      |      |      |      |          |  |
| 1-----                                         | 490 | 5620 | 13.8 | 17.3 | 0.78 | 0.14 (B) |  |
| 2-----                                         | 485 | 4200 | 15.5 | 19.7 | .79  | .42 (B)  |  |
| 3-----                                         | 410 | 5850 | 16.2 | 20.6 | .79  | .29 (B)  |  |
| 4-----                                         | 625 | 6550 | 18.9 | 22.3 | .85  | .13 (B)  |  |
| 5-----                                         | 415 | 3560 | 19.5 | 23.2 | .84  | .41 (B)  |  |
| Avg-----                                       | 485 | 5160 | 16.8 | 20.6 | 0.81 | 0.28 (B) |  |

|                                                  |      |      |      |      |      |       |  |
|--------------------------------------------------|------|------|------|------|------|-------|--|
| Plant 34, grade 2 ("Backup," 15 percent of kiln) |      |      |      |      |      |       |  |
| 1-----                                           | 710  | 3400 | 20.3 | 23.1 | 0.88 | F 18c |  |
| 2-----                                           | 1015 | 4470 | 18.9 | 21.7 | .87  | 0.28  |  |
| 3-----                                           | 950  | 4130 | 18.9 | 21.4 | .88  | .13   |  |
| 4-----                                           | 560  | 4200 | 17.0 | 20.6 | .83  | .85   |  |
| 5-----                                           | 500  | 3470 | 17.4 | 20.5 | .85  | .46   |  |
| Avg-----                                         | 745  | 3930 | 18.5 | 21.5 | 0.86 |       |  |

|                                                          |      |       |      |      |      |      |  |
|----------------------------------------------------------|------|-------|------|------|------|------|--|
| Plant 35, grade 1 ("Arch and Sewer," 20 percent of kiln) |      |       |      |      |      |      |  |
| 1-----                                                   | 1200 | 8310  | 9.7  | 12.0 | 0.81 | 0.23 |  |
| 2-----                                                   | 1140 | 11000 | 13.5 | 16.0 | .84  | .37  |  |
| 3-----                                                   | 1205 | 9770  | 10.9 | 14.1 | .77  | .38  |  |
| 4-----                                                   | 630  | 14450 | 8.9  | 11.4 | .78  | .38  |  |
| 5-----                                                   | 1080 | 7070  | 14.6 | 17.2 | .85  | .66  |  |
| Avg-----                                                 | 1050 | 10120 | 11.5 | 14.1 | 0.81 | 0.40 |  |

|                                                     |      |      |      |      |      |      |  |
|-----------------------------------------------------|------|------|------|------|------|------|--|
| Plant 35, grade 2 ("Dark face," 60 percent of kiln) |      |      |      |      |      |      |  |
| 1-----                                              | 875  | 6690 | 16.8 | 19.5 | 0.86 | 0.54 |  |
| 2-----                                              | 1205 | 7100 | 15.3 | 17.7 | .86  | .59  |  |
| 3-----                                              | 1290 | 9250 | 13.7 | 16.5 | .83  | .66  |  |
| 4-----                                              | 1020 | 7510 | 14.9 | 17.3 | .86  | .47  |  |
| 5-----                                              | 760  | 6950 | 16.0 | 18.3 | .87  | .71  |  |
| Avg-----                                            | 1030 | 7500 | 15.3 | 17.9 | 0.86 | 0.59 |  |

|                                                                   |      |      |      |      |      |      |  |
|-------------------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 35, grade 3 ("Light hards or red face," 20 percent of kiln) |      |      |      |      |      |      |  |
| 1-----                                                            | 465  | 8030 | 14.5 | 17.1 | 0.85 | 0.53 |  |
| 2-----                                                            | 795  | 7840 | 17.4 | 18.0 | .97  | .37  |  |
| 3-----                                                            | 1000 | 7100 | 14.4 | 17.5 | .82  | .38  |  |
| 4-----                                                            | 940  | 6640 | 15.1 | 17.3 | .87  | .34  |  |
| 5-----                                                            | 925  | 6470 | 18.5 | 21.7 | .85  | .25  |  |
| Avg-----                                                          | 825  | 7220 | 16.0 | 18.3 | 0.87 | 0.37 |  |

|                                                    |      |       |     |     |       |      |  |
|----------------------------------------------------|------|-------|-----|-----|-------|------|--|
| Plant 68, grade 1 ("Vitrified," 2 percent of kiln) |      |       |     |     |       |      |  |
| 1-----                                             | 2380 | 10500 | 0.9 | 3.2 | 0.28  | 0.18 |  |
| 2-----                                             | 2700 | 15450 | .0  | 0.5 | (a)   | .00  |  |
| 3-----                                             | 2840 | 15550 | .5  | .5  | (a)   | .10  |  |
| 4-----                                             | 2350 | 17750 | .5  | 1.0 | .50   | .29  |  |
| 5-----                                             | 2690 | 15450 | .4  | 0.4 | (a)   | .09  |  |
| Avg-----                                           | 2590 | 14940 | 0.5 | 1.1 | ----- | 0.13 |  |

<sup>a</sup> These brick were weighed only to the nearest 5 grams. With these low absorptions, saturation coefficients have no significance, unless more accurate weighings are made.

TABLE 3.—*Properties of bricks produced in Connecticut—Continued*

| Specimen number                                         | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                         |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 68, grade 2 ("Special facing," 5 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
|                                                         | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                  | 2000                      | 14250+                    | 6.3                  | 8.5          | 0.74                   | 0.00                                                    |                          |
| 2-----                                                  | 1415                      | 8520                      | 5.4                  | 8.3          | .65                    | .00                                                     |                          |
| 3-----                                                  | 1740                      | 10700                     | 4.8                  | 8.0          | .60                    | .11                                                     |                          |
| 4-----                                                  | 1470                      | 8800                      | 3.4                  | 6.3          | .54                    | .00                                                     |                          |
| 5-----                                                  | 1635                      | 7820                      | 5.1                  | 8.0          | .64                    | .11                                                     |                          |
| Avg-----                                                | 1650                      | 10020+                    | 5.0                  | 7.8          | 0.63                   | 0.04                                                    |                          |

|                                                    |      |       |     |      |      |      |  |
|----------------------------------------------------|------|-------|-----|------|------|------|--|
| Plant 68, grade 3 ("Colonial," 25 percent of kiln) |      |       |     |      |      |      |  |
| 1-----                                             | 1900 | 7310  | 9.1 | 11.5 | 0.79 | 0.12 |  |
| 2-----                                             | 1605 | 10850 | 7.2 | 9.4  | .77  | .11  |  |
| 3-----                                             | 1345 | 8630  | 7.1 | 9.5  | .75  | .12  |  |
| 4-----                                             | 1070 | 5980  | 8.6 | 10.5 | .82  | .12  |  |
| 5-----                                             | 1805 | 8690  | 8.0 | 10.3 | .78  | .11  |  |
| Avg-----                                           | 1545 | 8290  | 8.0 | 10.2 | 0.78 | 0.11 |  |

|                                               |      |      |      |      |      |      |  |
|-----------------------------------------------|------|------|------|------|------|------|--|
| Plant 68, grade 4 ("Arch," 5 percent of kiln) |      |      |      |      |      |      |  |
| 1-----                                        | 1635 | 8970 | 1.8  | 2.4  | 0.75 | 0.00 |  |
| 2-----                                        | 1230 | 8660 | 8.9  | 10.3 | .86  | .14  |  |
| 3-----                                        | 1135 | 8650 | 11.4 | 12.6 | .91  | .24  |  |
| 4-----                                        | 915  | 8090 | 10.3 | 12.1 | .85  | .12  |  |
| 5-----                                        | 1355 | 8680 | 6.7  | 8.3  | .81  | .33  |  |
| Avg-----                                      | 1255 | 8610 | 7.8  | 9.1  | 0.84 | 0.17 |  |

|                                                       |      |      |      |      |      |      |  |
|-------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 68, grade 5 ("Red Outside," 30 percent of kiln) |      |      |      |      |      |      |  |
| 1-----                                                | 920  | 7370 | 14.2 | 15.9 | 0.89 | 0.23 |  |
| 2-----                                                | 695  | 5900 | 14.1 | 16.2 | .87  | .32  |  |
| 3-----                                                | 1420 | 6600 | 14.2 | 16.2 | .88  | .95  |  |
| 4-----                                                | 990  | 6820 | 14.6 | 16.6 | .88  | .66  |  |
| 5-----                                                | 1130 | 6290 | 10.7 | 12.7 | .84  | .40  |  |
| Avg-----                                              | 1030 | 6540 | 13.6 | 15.5 | 0.87 | 0.51 |  |

|                                                         |       |      |      |      |      |      |  |
|---------------------------------------------------------|-------|------|------|------|------|------|--|
| Plant 68, grade 6 ("Light outside," 30 percent of kiln) |       |      |      |      |      |      |  |
| 1-----                                                  | 1070  | 4500 | 18.1 | 19.3 | 0.94 | 0.47 |  |
| 2-----                                                  | 1035  | 5680 | 17.8 | 20.6 | .86  | .43  |  |
| 3-----                                                  | 740   | 4090 | 18.2 | 20.1 | .91  | .25  |  |
| 4-----                                                  | 975   | 5740 | 17.8 | 19.6 | .91  | .49  |  |
| 5-----                                                  | ----- | 4750 | 17.6 | 19.1 | .92  | .46  |  |
| Avg-----                                                | 955   | 4950 | 17.9 | 19.7 | 0.91 | 0.42 |  |

|                                                      |     |      |      |      |      |       |           |
|------------------------------------------------------|-----|------|------|------|------|-------|-----------|
| Plant 68, grade 7 ("Light hards," 3 percent of kiln) |     |      |      |      |      |       |           |
| 1-----                                               | 735 | 3800 | 20.0 | 23.4 | 0.85 | 1.14  | %         |
| 2-----                                               | 890 | 5520 | 18.5 | 20.2 | .92  | F 39c | 1.26(66c) |
| 3-----                                               | 755 | 3170 | 19.5 | 20.1 | .97  | 0.47  | 0.47(66c) |
| 4-----                                               | 850 | 4500 | 18.4 | 19.1 | .96  | 1.45  | F 59c     |
| 5-----                                               | 430 | 4630 | 19.2 | 20.3 | .95  | F 38c |           |
| Avg-----                                             | 730 | 4320 | 19.1 | 20.6 | 0.93 | ----- |           |

|                                                                  |      |      |      |      |      |      |  |
|------------------------------------------------------------------|------|------|------|------|------|------|--|
| Plant 68, grade 8 ("Special facing," percentage of kiln unknown) |      |      |      |      |      |      |  |
| 1-----                                                           | 835  | 4730 | 18.0 | 19.9 | 0.90 | 0.26 |  |
| 2-----                                                           | 965  | 2880 | 17.5 | 20.1 | .87  | .27  |  |
| 3-----                                                           | 1175 | 3240 | 16.7 | 20.0 | .84  | .40  |  |
| 4-----                                                           | 670  | 4720 | 16.2 | 18.6 | .87  | .36  |  |
| 5-----                                                           | 870  | 2956 | 17.8 | 20.8 | .85  | .49  |  |
| Avg-----                                                         | 905  | 3700 | 17.2 | 19.9 | 0.87 | 0.36 |  |

TABLE 3.—Properties of bricks produced in Connecticut—  
Continued

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 76, grade 1 ("Arch," 25 percent of kiln)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|----------|---------------------|---------------------|------|------|------|------|--|
| 1.....   | 1850                | 8780                | 11.5 | 15.4 | 0.75 | 0.11 |  |
| 2.....   | 1350                | 8200                | 9.1  | 12.4 | .73  | .11  |  |
| 3.....   | 1715                | 10850               | 11.6 | 15.3 | .76  | .21  |  |
| 4.....   | 1980                | 8490                | 10.4 | 13.7 | .76  | .11  |  |
| 5.....   | 2105                | 10200               | 12.6 | 16.0 | .79  | .11  |  |
| Avg..... | 1800                | 9300                | 11.0 | 14.6 | 0.76 | 0.13 |  |

Plant 76, grade 2 ("Light Hard," 25 percent of kiln)

| 1.....   | 1060 | 6280 | 16.0 | 21.5 | 0.74 | 0.44 |  |
|----------|------|------|------|------|------|------|--|
| 2.....   | 790  | 6180 | 20.4 | 22.4 | .91  | .53  |  |
| 3.....   | 1255 | 5640 | 19.9 | 22.7 | .88  | .57  |  |
| 4.....   | 915  | 7090 | 20.5 | 21.1 | .97  | .94  |  |
| 5.....   | 860  | 6990 | 16.7 | 22.4 | .75  | .34  |  |
| Avg..... | 975  | 6440 | 18.7 | 22.0 | 0.85 | 0.56 |  |

Plant 76, grade 3 ("Face," grades 3 and 4 together represent 50 percent of kiln)

| 1.....   | 1240 | 8920 | 14.8 | 18.7 | 0.79 | 0.26 |  |
|----------|------|------|------|------|------|------|--|
| 2.....   | 1250 | 9500 | 14.6 | 18.7 | .78  | .24  |  |
| 3.....   | 1605 | 9400 | 15.0 | 19.0 | .79  | .26  |  |
| 4.....   | 1130 | 8550 | 16.4 | 18.8 | .87  | .36  |  |
| 5.....   | 1395 | 8920 | 13.4 | 18.3 | .73  | .12  |  |
| Avg..... | 1325 | 9060 | 14.8 | 18.7 | 0.79 | 0.25 |  |

Plant 76, grade 4 ("Special facing," grades 3 and 4 together represent 50 percent of kiln)

| 1.....   | 2160 | 9730  | 11.7 | 14.2 | 0.83 | 0.17         |  |
|----------|------|-------|------|------|------|--------------|--|
| 2.....   | 1150 | 8360  | 17.3 | 19.8 | .87  | .34          |  |
| 3.....   | 1470 | 10400 | 16.0 | 19.3 | .83  | .34          |  |
| 4.....   | 1695 | 10950 | 13.6 | 16.4 | .83  | .29 (B)      |  |
| 5.....   | 1390 | 7810  | 16.3 | 19.7 | .83  | .41          |  |
| Avg..... | 1575 | 9450  | 15.0 | 17.9 | 0.84 | 0.31 (A & B) |  |

Plant 106, grade 1 ("Special facing," 2 percent of kiln)

| Avg (5) | 1370 | 10230 | 8.0 | 13.6 | 0.59 | Not tested |  |
|---------|------|-------|-----|------|------|------------|--|

Plant 106, grade 2 ("Outside," 67 percent of kiln)

| 1.....   | 1170 | 9920  | 14.5 | 17.1 | 0.85 | 0.40 |  |
|----------|------|-------|------|------|------|------|--|
| 2.....   | 1620 | 10670 | 14.1 | 16.6 | .85  | .24  |  |
| 3.....   | 1140 | 8250  | 14.5 | 17.5 | .83  | .24  |  |
| 4.....   | 685  | 7140  | 15.2 | 17.9 | .85  | 1.43 |  |
| 5.....   | 1250 | 9540  | 14.1 | 16.8 | .84  | 0.27 |  |
| Avg..... | 1175 | 9100  | 14.5 | 17.2 | 0.84 | 0.52 |  |

Plant 106, grade 3 ("Arch," 14 percent of kiln)

| 1.....   | 580  | 4080 | 21.5 | 24.5 | 0.88 | 0.48      |  |
|----------|------|------|------|------|------|-----------|--|
| 2.....   | 960  | 6170 | 21.0 | 25.0 | .84  | F 13c     |  |
| 3.....   | 590  | 4150 | 22.0 | 25.4 | .87  | 0.57      |  |
| 4.....   | 700  | 3740 | 21.7 | 24.8 | .87  | 1.00      |  |
| 5.....   | 1065 | 5460 | 20.0 | 24.5 | .82  | F 26e (B) |  |
| Avg..... | 780  | 4720 | 21.2 | 24.8 | 0.86 |           |  |

TABLE 3.—Properties of bricks produced in Connecticut  
Continued

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 106, grade 4 ("Inside," 17 percent of kiln)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %     |  |
|----------|---------------------|---------------------|------|------|------|-------|--|
| 1.....   | 540                 | 4310                | 21.5 | 23.8 | 0.90 | F 28c |  |
| 2.....   | 825                 | 4150                | 19.9 | 24.1 | .83  | 0.36  |  |
| 3.....   | 570                 | 3920                | 20.0 | 23.6 | .85  | .49   |  |
| 4.....   | 330                 | 1720                | 22.6 | 28.9 | .78  | 3.66  |  |
| 5.....   | 335                 | 1850                | 22.4 | 28.3 | .79  | 3.03  |  |
| Avg..... | 520                 | 3190                | 21.3 | 25.7 | 0.83 |       |  |

Plant 153A, grade 1 ("No. 1 Hard," 20 percent of kiln)

| 1.....   | 1530 | 10000 | 4.3 | 6.4 | 0.67 | 0.11         |  |
|----------|------|-------|-----|-----|------|--------------|--|
| 2.....   | 1750 | 10650 | 3.8 | 5.0 | .76  | .00          |  |
| 3.....   | 1790 | 11700 | 3.1 | 5.2 | .60  | .00 (B)      |  |
| 4.....   | 1740 | 9160  | 3.4 | 5.7 | .60  | .11          |  |
| 5.....   | 1970 | 9170  | 2.0 | 3.4 | .59  | .27          |  |
| 6.....   | 2070 | 11300 | 3.3 | 4.4 | .75  | .11          |  |
| Avg..... | 1810 | 10330 | 3.3 | 5.0 | 0.66 | 0.10 (A & B) |  |

Plant 153A, grade 2 ("No. 2 Hard," 20 percent of kiln)

| 1.....   | 1340 | 8270 | 11.8 | 15.5 | 0.76 | 0.50 |  |
|----------|------|------|------|------|------|------|--|
| 2.....   | 850  | 6910 | 12.6 | 16.1 | .78  | .35  |  |
| 3.....   | 1035 | 7600 | 11.8 | 15.4 | .77  | .59  |  |
| 4.....   |      | 6160 | 16.4 | 19.2 | .86  | 3.66 |  |
| 5.....   | 845  | 4240 | 15.5 | 18.9 | .82  | 0.80 |  |
| 6.....   | 1330 | 6690 | 10.8 | 14.6 | .74  | .32  |  |
| Avg..... | 1080 | 6640 | 13.2 | 16.6 | 0.79 | 1.04 |  |

Plant 153A, grade 3 ("No. 1 Medium," 20 percent of kiln)

| 1.....   | 865 | 5850 | 15.2 | 17.4 | 0.87 | 0.46 |  |
|----------|-----|------|------|------|------|------|--|
| 2.....   | 710 | 5150 | 16.8 | 18.8 | .89  | .42  |  |
| 3.....   | 665 | 5560 | 17.8 | 20.4 | .87  | .40  |  |
| 4.....   | 690 | 4900 | 17.2 | 19.8 | .87  | .90  |  |
| 5.....   | 665 | 4870 | 17.3 | 20.0 | .87  | 1.10 |  |
| 6.....   | 935 | 4850 | 17.5 | 19.8 | .88  | 0.57 |  |
| Avg..... | 755 | 5200 | 17.0 | 19.4 | 0.88 | 0.64 |  |

Plant 153A, grade 4 ("No. 2 Medium," 20 percent of kiln)

| 1.....   | 595  | 4060 | 18.1 | 20.0 | 0.91 | 0.63 |  |
|----------|------|------|------|------|------|------|--|
| 2.....   |      | 4040 | 18.2 | 20.0 | .91  | .73  |  |
| 3.....   | 375  | 4080 | 17.4 | 19.7 | .88  | 1.23 |  |
| 4.....   | 1040 | 4430 | 17.3 | 19.5 | .89  | 0.45 |  |
| 5.....   | 575  | 3800 | 18.9 | 21.1 | .90  | .78  |  |
| 6.....   | 405  | 3730 | 18.6 | 20.5 | .91  | 1.54 |  |
| Avg..... | 600  | 4020 | 18.1 | 20.1 | 0.90 | 0.89 |  |

Plant 153A, grade 5 ("Soft," 20 percent of kiln)

| 1.....   | 670 | 2700 | 18.6 | 25.3 | 0.74 | 0.94 |  |
|----------|-----|------|------|------|------|------|--|
| 2.....   | 430 | 2530 | 19.8 | 24.8 | .79  | 3.69 |  |
| 3.....   | 420 | 2370 | 20.4 | 26.0 | .79  | 6.50 |  |
| 4.....   | 715 | 4210 | 18.3 | 21.7 | .84  | 0.68 |  |
| 5.....   | 595 | 3680 | 16.5 | 20.4 | .81  | .51  |  |
| 6.....   | 495 | 3630 | 18.3 | 20.9 | .88  | 1.65 |  |
| Avg..... | 555 | 3190 | 18.6 | 23.2 | 0.81 | 2.33 |  |

TABLE 3.—*Properties of bricks produced in Connecticut—*  
Continued

| Specimen number                                          | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                          |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 153B, grade 1 ("Hard," 20 percent of kiln)         |                           |                           |                      |              |                        |                                                         |                          |
|                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                   | 890                       | 7550                      | 15.6                 | 17.0         | 0.92                   | 0.14                                                    |                          |
| 2-----                                                   | 2070                      | 9090                      | 13.4                 | 15.3         | .88                    | .13                                                     |                          |
| 3-----                                                   | 1715                      | 8600                      | 11.9                 | 14.9         | .80                    | .45                                                     |                          |
| 4-----                                                   | 1275                      | 8210                      | 15.5                 | 17.4         | .89                    | .13                                                     |                          |
| 5-----                                                   | 1815                      | 7130                      | 9.1                  | 10.5         | .87                    | .26                                                     |                          |
| 6-----                                                   | 2170                      | 9120                      | 10.3                 | 11.0         | .94                    | .14                                                     |                          |
| Avg-----                                                 | 1655                      | 8280                      | 12.6                 | 14.4         | 0.88                   | 0.21                                                    |                          |
| Plant 153B, grade 2 ("No. 1 Medium," 30 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                   | 1105                      | 5590                      | 17.9                 | 18.5         | 0.97                   | 0.93                                                    |                          |
| 2-----                                                   | 1580                      | 6560                      | 18.2                 | 19.0         | .96                    | .29                                                     |                          |
| 3-----                                                   | 1040                      | 4430                      | 20.3                 | 21.3         | .95                    | F 19c                                                   |                          |
| 4-----                                                   | 1130                      | 6320                      | 17.9                 | 18.5         | .97                    | 0.37                                                    |                          |
| 5-----                                                   | 875                       | 7250                      | 15.2                 | 17.2         | .88                    | .66                                                     |                          |
| 6-----                                                   | 1020                      | 5340                      | 17.2                 | 18.5         | .93                    | .26                                                     |                          |
| Avg-----                                                 | 1125                      | 5920                      | 17.8                 | 18.8         | 0.94                   | -----                                                   |                          |
| Plant 153B, grade 3 ("No. 2 Medium," 30 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                   | 890                       | 5780                      | 19.1                 | 21.3         | 0.90                   | F 29c                                                   |                          |
| 2-----                                                   | 650                       | 5000                      | 19.5                 | 22.1         | .88                    | F 17c                                                   |                          |
| 3-----                                                   | 5050                      | 19.3                      | 21.7                 | .89          | 3.40                   |                                                         |                          |
| 4-----                                                   | 540                       | 6410                      | 21.0                 | 22.5         | .93                    | F 26c                                                   |                          |
| 5-----                                                   | 860                       | 5190                      | 19.7                 | 22.2         | .89                    | F 44c                                                   |                          |
| 6-----                                                   | 1070                      | 7170                      | 19.7                 | 21.8         | .90                    | F 18c                                                   |                          |
| Avg-----                                                 | 800                       | 5770                      | 19.7                 | 21.9         | 0.90                   | -----                                                   |                          |
| Plant 153B, grade 4 ("Soft," 20 percent of kiln)         |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                   | 1200                      | 8130                      | 14.5                 | 15.8         | 0.92                   | 0.27                                                    |                          |
| 2-----                                                   | 840                       | 5440                      | 19.7                 | 20.4         | .96                    | F 16c                                                   |                          |
| 3-----                                                   | 1060                      | 5320                      | 20.0                 | 20.6         | .97                    | F 30c                                                   |                          |
| 4-----                                                   | 1095                      | 7070                      | 18.4                 | 20.4         | .90                    | F 33c                                                   |                          |
| 5-----                                                   | 1130                      | 6400                      | 20.2                 | 21.6         | .93                    | F 30c                                                   |                          |
| 6-----                                                   | 940                       | 4060                      | 21.4                 | 22.1         | .97                    | F 15c                                                   |                          |
| Avg-----                                                 | 1045                      | 6070                      | 19.0                 | 20.2         | 0.94                   | -----                                                   |                          |
| Plant 153C, grade 1 ("Hard," 20 percent of kiln)         |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                   | 1125                      | 5310                      | 7.1                  | 11.7         | 0.61                   | 0.26                                                    |                          |
| 2-----                                                   | 1000                      | 5190                      | 7.4                  | 11.7         | .63                    | .37                                                     |                          |
| 3-----                                                   | 855                       | 5200                      | 7.0                  | 11.5         | .61                    | .38                                                     |                          |
| 4-----                                                   | 895                       | 4750                      | 6.4                  | 11.4         | .56                    | .29                                                     |                          |
| 5-----                                                   | 1070                      | 5890                      | 8.2                  | 12.0         | .68                    | .25                                                     |                          |
| 6-----                                                   | 620                       | 3760                      | 7.5                  | 12.6         | .60                    | .34                                                     |                          |
| Avg-----                                                 | 925                       | 5020                      | 7.3                  | 11.8         | 0.62                   | 0.32                                                    |                          |
| Plant 153C, grade 2 ("No. 1 Medium," 30 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                   | 1435                      | 5860                      | 9.6                  | 11.5         | 0.83                   | 0.00                                                    |                          |
| 2-----                                                   | 1185                      | 6580                      | 8.5                  | 12.1         | .70                    | .48                                                     |                          |
| 3-----                                                   | 1040                      | 4370                      | 9.9                  | 11.2         | .89                    | .00                                                     |                          |
| 4-----                                                   | 1175                      | -----                     | 11.0                 | 14.9         | .74                    | .13                                                     |                          |
| 5-----                                                   | 1285                      | 4000                      | 8.6                  | 12.9         | .67                    | .12                                                     |                          |
| 6-----                                                   | 945                       | 4290                      | 11.3                 | 15.0         | .75                    | .00                                                     |                          |
| Avg-----                                                 | 1175                      | 5020                      | 9.8                  | 12.9         | 0.76                   | 0.12                                                    |                          |

TABLE 3.—*Properties of bricks produced in Connecticut—*  
Continued

| Specimen number                                            | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                            |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 153C, grade 3 ("No. 2 Medium," 30 percent of kiln)   |                           |                           |                      |              |                        |                                                         |                          |
|                                                            | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                     | 995                       | 3950                      | 12.8                 | 16.5         | 0.78                   | 0.49                                                    |                          |
| 2-----                                                     | 1265                      | 5110                      | 12.1                 | 16.2         | .75                    | .20                                                     |                          |
| 3-----                                                     | 1030                      | 3040                      | 11.0                 | 14.5         | .76                    | .28                                                     |                          |
| 4-----                                                     | 1275                      | 4310                      | 9.6                  | 11.4         | .84                    | .12                                                     |                          |
| 5-----                                                     | 1210                      | 3110                      | 12.7                 | 16.8         | .76                    | .13                                                     |                          |
| 6-----                                                     | 1110                      | 3670                      | 9.6                  | 11.5         | .83                    | .00                                                     |                          |
| Avg-----                                                   | 1155                      | 3860                      | 11.30                | 14.5         | 0.79                   | 0.20                                                    |                          |
| Plant 153C, grade 4 ("Soft," 20 percent of kiln)           |                           |                           |                      |              |                        |                                                         |                          |
|                                                            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                     | 670                       | 2940                      | 18.5                 | 22.4         | 0.83                   | 0.45                                                    |                          |
| 2-----                                                     | 605                       | 2300                      | 18.6                 | 22.3         | .83                    | .37                                                     |                          |
| 3-----                                                     | 790                       | 2580                      | 20.0                 | 22.2         | .90                    | .59                                                     |                          |
| 4-----                                                     | 455                       | 2540                      | 19.0                 | 22.1         | .86                    | .85                                                     |                          |
| 5-----                                                     | 540                       | 2680                      | 19.5                 | 23.1         | .84                    | .73                                                     |                          |
| 6-----                                                     | 825                       | 1920                      | 18.6                 | 25.5         | .73                    | 5.00                                                    |                          |
| Avg-----                                                   | 650                       | 2490                      | 19.0                 | 22.9         | 0.83                   | 1.33                                                    |                          |
| Plant 175, grade 1 ("Bottom," 20 percent of kiln)          |                           |                           |                      |              |                        |                                                         |                          |
|                                                            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                     | 1500                      | 9330                      | 8.4                  | 11.2         | 0.75                   | 0.11                                                    |                          |
| 2-----                                                     | 1885                      | 9030                      | 6.4                  | 9.3          | .69                    | .12                                                     |                          |
| 3-----                                                     | 1335                      | 6980                      | 10.0                 | 13.6         | .73                    | .12                                                     |                          |
| 4-----                                                     | 1455                      | 10230                     | 8.0                  | 10.8         | .74                    | .11                                                     |                          |
| 5-----                                                     | 1910                      | 7940                      | 6.4                  | 9.3          | .69                    | .12                                                     |                          |
| 6-----                                                     | 540                       | 7500                      | 9.6                  | 12.6         | .76                    | .24                                                     |                          |
| Avg-----                                                   | 1440                      | 8510                      | 8.1                  | 11.1         | 0.73                   | 0.14                                                    |                          |
| Plant 175, grade 2 ("Middle and top," 60 percent of kiln)  |                           |                           |                      |              |                        |                                                         |                          |
|                                                            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                     | 790                       | 7860                      | 13.9                 | 16.3         | 0.85                   | 0.35                                                    |                          |
| 2-----                                                     | 1000                      | 7030                      | 14.0                 | 16.3         | .86                    | .11                                                     |                          |
| 3-----                                                     | 1370                      | 6060                      | 14.1                 | 16.4         | .86                    | .23                                                     |                          |
| 4-----                                                     | 1280                      | 7730                      | 14.4                 | 16.7         | .86                    | .60                                                     |                          |
| 5-----                                                     | 1135                      | 6810                      | 12.3                 | 14.6         | .84                    | .12                                                     |                          |
| 6-----                                                     | 860                       | 5490                      | 16.2                 | 18.4         | .88                    | .30                                                     |                          |
| Avg-----                                                   | 1070                      | 6830                      | 14.2                 | 16.4         | 0.86                   | 0.28                                                    |                          |
| Plant 175, grade 3 ("Arch," 10 percent of kiln)            |                           |                           |                      |              |                        |                                                         |                          |
|                                                            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                     | 1635                      | 9740                      | 7.9                  | 9.6          | 0.82                   | 0.11                                                    |                          |
| 2-----                                                     | 1225                      | 9570                      | 7.0                  | 10.2         | .69                    | .13                                                     |                          |
| 3-----                                                     | 750                       | 9040                      | 7.0                  | 10.5         | .67                    | .12                                                     |                          |
| Avg-----                                                   | 1205                      | 9450                      | 7.3                  | 10.1         | 0.73                   | 0.12                                                    |                          |
| Plant 175, grade 4 ("Salmon," 10 percent of kiln)          |                           |                           |                      |              |                        |                                                         |                          |
|                                                            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                     | 1035                      | 5460                      | 16.6                 | 18.3         | 0.91                   | 1.49                                                    |                          |
| 2-----                                                     | 970                       | 6020                      | 16.7                 | 19.0         | .88                    | 0.36                                                    |                          |
| 3-----                                                     | 810                       | 5160                      | 16.8                 | 18.5         | .91                    | .45                                                     |                          |
| Avg-----                                                   | 940                       | 5880                      | 16.7                 | 18.6         | 0.90                   | 0.73                                                    |                          |
| Plant 176, grade 1 ("Arch or clinkers," 5 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
|                                                            |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)                                                    | 1365                      | 8240                      | 6.8                  | 9.0          | 0.75                   | Not tested                                              |                          |

TABLE 3.—*Properties of bricks produced in Connecticut—*  
Continued

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 176, grade 2 ("Dark face," 20 percent of kiln)

| Avg (6) | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %          |  |
|---------|---------------------|---------------------|-----|-----|------|------------|--|
|         | 1675                | 8760                | 1.9 | 4.4 | 0.35 | Not tested |  |

Plant 176, grade 3 ("Common face," 40 percent of kiln)

|         |      |      |      |      |      |          |  |
|---------|------|------|------|------|------|----------|--|
| 1-----  | 1815 | 8960 | 10.7 | 11.9 | 0.90 | 0.36 (B) |  |
| 2-----  | 2010 | 7800 | 9.0  | 10.8 | .83  | .12 (B)  |  |
| 3-----  | 1810 | 8260 | 9.6  | 11.9 | .81  | .23 (B)  |  |
| 4-----  | 2160 | 9450 | 9.0  | 10.3 | .87  | .14 (B)  |  |
| 5-----  | 1640 | 8890 | 9.6  | 10.8 | .89  | .24 (B)  |  |
| Avg---- | 1885 | 8670 | 9.6  | 11.1 | 0.86 | 0.22 (B) |  |

Plant 176, grade 4 ("Light face," 30 percent of kiln)<sup>8</sup>

|         |      |      |      |      |      |      |  |
|---------|------|------|------|------|------|------|--|
| 1-----  | 1430 | 7820 | 12.9 | 14.7 | 0.88 | 0.86 |  |
| 2-----  | 1500 | 7450 | 12.6 | 14.8 | .85  | .68  |  |
| 3-----  | 1295 | 8250 | 13.4 | 14.6 | .92  | .47  |  |
| 4-----  | 1280 | 7190 | 14.1 | 16.5 | .85  | .59  |  |
| 5-----  | 1375 | 7250 | 12.7 | 14.6 | .87  | .25  |  |
| Avg---- | 1375 | 7590 | 13.1 | 15.0 | 0.87 | 0.57 |  |

Plant 176, grade 5 ("Light hard," 5 percent of kiln)

|         |      |      |      |      |      |       |  |
|---------|------|------|------|------|------|-------|--|
| 1-----  | 790  | 4550 | 16.9 | 19.2 | 0.88 | 0.58  |  |
| 2-----  | 1390 | 5660 | 19.3 | 20.0 | .96  | F 42c |  |
| 3-----  | 715  | 2600 | 19.2 | 20.9 | .92  | 7.56  |  |
| 4-----  | 530  | 2630 | 19.5 | 20.7 | .94  | 8.60  |  |
| 5-----  | 1405 | 2640 | 17.4 | 18.7 | .93  | 0.50  |  |
| 6-----  | 675  | 3390 | 20.3 | 22.1 | .92  | 4.88  |  |
| Avg---- | 920  | 3580 | 18.8 | 20.3 | 0.92 |       |  |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*

[With one exception, all plants reported that their samples were made from surface clay. The exception (plant 187) submitted one grade made from a clay-shale mixture. All of these bricks were formed by the sand-struck, soft-mud process]

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 23, grade 1 ("Commercial hard," 98 percent of kiln)

|         |                     |                     |      |      |      |      |           |
|---------|---------------------|---------------------|------|------|------|------|-----------|
| 1-----  | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    | %         |
|         | 580                 | 4360                | 18.0 | 21.8 | 0.83 | 0.90 | 0.90(75c) |
| 2-----  | 745                 | 4040                | 16.7 | 21.2 | .79  | .61  | .76(75c)  |
| 3-----  | 600                 | 4600                | 18.6 | 22.1 | .84  | .55  | .59(75c)  |
| 4-----  | 425                 | 3620                | 18.9 | 22.6 | .84  | 1.60 | 1.77(75c) |
| 5-----  | 725                 | 4980                | 17.7 | 21.1 | .84  | 0.68 | 0.95(75c) |
| Avg---- | 615                 | 4320                | 18.0 | 21.8 | 0.83 | 0.87 | 0.99(75c) |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—*Continued

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 45, grade 1 ("Commercial hard," 92 percent of kiln)

|         |                     |                     |      |      |      |      |  |
|---------|---------------------|---------------------|------|------|------|------|--|
| 1-----  | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|         | 410                 | 7110                | 14.2 | 18.3 | 0.78 | 1.79 |  |
| 2-----  | 320                 | 3970                | 15.7 | 19.5 | .80  | 0.93 |  |
| 3-----  | 475                 | 7780                | 10.9 | 14.0 | .78  | .47  |  |
| 4-----  | 545                 | 6050                | 10.4 | 14.3 | .73  | .66  |  |
| 5-----  | 485                 | 5280                | 14.2 | 18.2 | .78  | .95  |  |
| Avg---- | 445                 | 6040                | 13.1 | 16.9 | 0.77 | 0.96 |  |

Plant 45, grade 2 ("Arch," 6 percent of kiln)

|         |     |      |      |      |      |      |  |
|---------|-----|------|------|------|------|------|--|
| 1-----  | 670 | 4800 | 15.3 | 19.4 | 0.79 | 0.98 |  |
| 2-----  | 300 | 5930 | 11.3 | 15.0 | .75  | 1.13 |  |
| 3-----  | 355 | 4820 | 14.3 | 18.4 | .78  | 0.68 |  |
| 4-----  | 385 | 5610 | 13.9 | 18.2 | .76  | .44  |  |
| 5-----  | 490 | 5990 | 13.9 | 18.0 | .77  | .70  |  |
| Avg---- | 440 | 5430 | 13.7 | 17.8 | 0.77 | 0.79 |  |

Plant 45, grade 3 ("Salmon," 2 percent of kiln)

|         |     |      |      |      |      |       |  |
|---------|-----|------|------|------|------|-------|--|
| 1-----  | 445 | 2440 | 10.4 | 17.2 | 0.61 | 1.79  |  |
| 2-----  | 390 | 2200 | 13.8 | 20.2 | .68  | F 27c |  |
| 3-----  | 280 | 2380 | 10.8 | 18.3 | .59  | 1.36  |  |
| 4-----  | 420 | 3600 | 12.1 | 19.2 | .63  | 3.65  |  |
| 5-----  | 535 | 2920 | 9.5  | 17.6 | .54  | 0.81  |  |
| Avg---- | 415 | 2710 | 11.3 | 18.5 | 0.61 |       |  |

Plant 46, grade 1 ("Commercial hard," 97 percent of kiln)

|         |     |      |      |      |      |      |  |
|---------|-----|------|------|------|------|------|--|
| 1-----  | 610 | 4120 | 15.4 | 19.4 | 0.79 | 0.46 |  |
| 2-----  | 900 | 3800 | 12.6 | 16.3 | .77  | 1.20 |  |
| 3-----  | 705 | 5510 | 15.2 | 18.6 | .82  | 0.41 |  |
| 4-----  | 620 | 3850 | 14.0 | 18.1 | .77  | .47  |  |
| 5-----  | 710 | 4390 | 15.8 | 19.1 | .83  | .53  |  |
| 6-----  | 670 | 5420 | 15.4 | 18.8 | .82  | .68  |  |
| 7-----  | 710 | 4630 | 15.8 | 19.6 | .81  | .25  |  |
| 8-----  | 445 | 4830 | 15.6 | 19.1 | .82  | .35  |  |
| 9-----  | 855 | 4380 | 14.5 | 17.9 | .81  | .28  |  |
| 10----- | 800 | 5500 | 14.9 | 18.5 | .81  | .48  |  |
| Avg---- | 705 | 4680 | 14.9 | 18.5 | 0.80 | 0.51 |  |

Plant 75, grade 1 ("Select all hard," 50 percent of kiln)

|         |     |      |      |      |      |         |  |
|---------|-----|------|------|------|------|---------|--|
| 1-----  | 785 | 5260 | 14.7 | 18.4 | 0.80 | 0.75    |  |
| 2-----  | 710 | 5840 | 15.5 | 18.6 | .83  | No test |  |
| 3-----  | 780 | 6130 | 15.0 | 18.4 | .82  | do      |  |
| 4-----  | 840 | 5190 | 15.6 | 18.8 | .83  | 0.83    |  |
| 5-----  | 810 | 5600 | 13.4 | 17.7 | .76  | .61     |  |
| Avg---- | 785 | 5600 | 14.8 | 18.4 | 0.81 | 0.73    |  |

Plant 75, grade 2 ("Run of kiln, hard," 90 percent of kiln)

|         |       |      |      |      |      |      |  |
|---------|-------|------|------|------|------|------|--|
| 1-----  | 920   | 5890 | 16.0 | 18.7 | 0.86 | 0.70 |  |
| 2-----  | 480   | 4820 | 13.5 | 17.5 | .77  | .64  |  |
| 3-----  | 540   | 4780 | 16.5 | 19.8 | .83  | .66  |  |
| 4-----  | ----- | 4800 | 16.4 | 19.3 | .85  | .72  |  |
| 5-----  | 685   | 5360 | 12.7 | 16.4 | .77  | .36  |  |
| Avg---- | 655   | 5130 | 15.0 | 18.3 | 0.82 | 0.62 |  |

Plant 75, grade 3 ("Hard swelled or lammies," 5 percent of kiln)

|         |       |      |     |     |      |      |  |
|---------|-------|------|-----|-----|------|------|--|
| 1-----  | (a)   | 6940 | 4.0 | 6.4 | 0.63 | 0.32 |  |
| 2-----  | ----- | 6180 | 4.7 | 7.8 | .60  | .62  |  |
| 3-----  | ----- | 7100 | 4.4 | 9.4 | .47  | .25  |  |
| 4-----  | ----- | 7420 | 4.2 | 7.2 | .58  | .12  |  |
| 5-----  | ----- | 8010 | 3.7 | 5.9 | .63  | .14  |  |
| Avg---- | ----- | 7130 | 4.2 | 7.3 | 0.58 | 0.29 |  |

<sup>a</sup> Too irregular in shape for determination of modulus of rupture.

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number                                   | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                   |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 75, grade 4 ("Salmons," 10 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
|                                                   | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                | <i>%</i>                 |
| 1-----                                            | 315                       | 2450                      | 17.2                 | 21.4         | 0.80                   | F 42c                                                   |                          |
| 2-----                                            | 560                       | 2340                      | 19.9                 | 25.5         | .78                    | 9.70                                                    | F 51c                    |
| 3-----                                            | 460                       | 2660                      | 17.8                 | 20.8         | .86                    | 2.74                                                    | 5.96 (63c)               |
| 4-----                                            | 355                       | 2230                      | 17.1                 | 20.6         | .83                    | F 33c                                                   |                          |
| 5-----                                            | 285                       | 1010                      | 24.6                 | 32.1         | .77                    | F 2c                                                    |                          |
| Avg----                                           | 395                       | 2140                      | 19.3                 | 24.1         | 0.81                   | -----                                                   |                          |

|                                                  |      |      |      |      |      |      |            |
|--------------------------------------------------|------|------|------|------|------|------|------------|
| Plant 88, grade 1 ("Common," 95 percent of kiln) |      |      |      |      |      |      |            |
| 1-----                                           | 645  | 3250 | 19.4 | 23.0 | 0.84 | 0.97 | 0.97 (54c) |
| 2-----                                           | 640  | 3390 | 19.1 | 22.8 | .89  | .87  | 1.11 (54c) |
| 3-----                                           | 660  | 4030 | 13.5 | 17.7 | .76  | .59  | 0.59 (54c) |
| 4-----                                           | 435  | 7240 | 15.9 | 19.1 | .83  | .64  | .64 (54c)  |
| 5-----                                           | 780  | 4370 | 16.4 | 20.1 | .82  | .90  | 1.20 (54c) |
| 6-----                                           | 590  | 3970 | 18.1 | 22.6 | .80  | 1.17 | 1.55 (54c) |
| 7-----                                           | 1100 | 4610 | 13.7 | 17.9 | .77  | 0.63 | 1.26 (54c) |
| 8-----                                           | 605  | 4310 | 17.2 | 21.6 | .80  | 1.59 | 1.73 (54c) |
| 9-----                                           | 850  | 5920 | 18.4 | 22.7 | .81  | 0.85 | 1.27 (54c) |
| 10-----                                          | 415  | 4440 | 17.2 | 21.9 | .79  | .94  | 0.94 (54c) |
| Avg----                                          | 670  | 4550 | 16.9 | 20.9 | 0.81 | 0.92 | 1.13 (54c) |

|                                                |      |      |      |      |      |       |            |
|------------------------------------------------|------|------|------|------|------|-------|------------|
| Plant 94, grade 1 ("Hard," 95 percent of kiln) |      |      |      |      |      |       |            |
| 1-----                                         | 795  | 3380 | 18.7 | 22.5 | 0.83 | 2.40  | 2.40 (54c) |
| 2-----                                         | 535  | 4680 | 11.1 | 14.1 | .79  | 1.86  | 1.86 (54c) |
| 3-----                                         | 1450 | 4530 | 5.9  | 8.8  | .67  | 5.60  | 5.75 (54c) |
| 4-----                                         | 665  | 4900 | 13.4 | 16.5 | .81  | 1.86  | 2.12 (54c) |
| 5-----                                         | 1100 | 5600 | 15.5 | 18.3 | .85  | 0.42  | 0.42 (54c) |
| 6-----                                         | 1095 | 4900 | 19.9 | 23.1 | .86  | .64   | .64 (54c)  |
| 7-----                                         | 855  | 4740 | 18.3 | 21.6 | .85  | F 48c |            |
| 8-----                                         | 410  | 2550 | 21.3 | 25.0 | .85  | F 39c |            |
| 9-----                                         | 645  | 3060 | 22.2 | 24.8 | .90  | 1.20  | 1.37 (54c) |
| 10-----                                        | 595  | 2470 | 21.6 | 24.7 | .88  | 4.97  | 6.33 (54c) |
| Avg----                                        | 815  | 4080 | 16.8 | 19.9 | 0.83 |       |            |

Plant 94, grade 1A ("Second sample (1936) of grade 1," 95 percent of kiln)

|         |     |      |         |      |      |      |      |
|---------|-----|------|---------|------|------|------|------|
| 1-----  | 400 | 3540 | (24-hr) | 14.5 | 19.1 | 0.76 | 1.80 |
| 2-----  | 580 | 3750 | 18.7    | 21.9 | .85  |      | 1.20 |
| 3-----  | 425 | 3590 | 19.1    | 22.7 | .84  |      | 1.73 |
| 4-----  | 500 | 4460 | 18.8    | 22.0 | .85  |      | 1.62 |
| 5-----  | 290 | 2320 | 18.3    | 20.3 | .90  |      | 1.79 |
| 6-----  | 460 | 3880 | 18.7    | 21.1 | .89  |      | 1.92 |
| 7-----  | 470 | 3610 | 19.0    | 22.3 | .85  |      | 1.35 |
| 8-----  | 375 | 3000 | 18.9    | 22.0 | .86  |      | 1.20 |
| 9-----  | 310 | 3230 | 18.8    | 23.0 | .82  |      | 1.70 |
| 10----- | 480 | 3600 | 18.1    | 20.3 | .89  |      | 1.08 |
| 11----- | 580 | 5480 | 15.9    | 19.5 | .82  |      | 0.94 |
| 12----- | 445 | 2950 | 19.3    | 23.2 | .83  |      | 1.30 |
| 13----- | 450 | 3550 | 17.9    | 22.1 | .81  |      | 1.14 |
| 14----- | 635 | 3520 | 18.6    | 22.1 | .84  |      | 1.21 |
| 15----- | 445 | 4180 | 16.1    | 20.8 | .77  |      | 0.99 |
| 16----- | 370 | 2710 | 20.0    | 23.0 | .87  |      | 1.71 |
| 17----- | 445 | 3300 | 19.2    | 22.7 | .85  |      | 1.63 |
| 18----- | 425 | 4240 | 18.0    | 21.4 | .84  |      | 1.20 |
| 19----- | 635 | 3740 | 18.2    | 21.3 | .85  |      | 1.26 |
| 20----- | 610 | 3800 | 18.1    | 21.1 | .86  |      | 1.75 |
| Avg---- | 465 | 3620 | 18.2    | 21.6 | 0.84 |      | 1.42 |

|                                                     |     |      |      |      |      |      |            |
|-----------------------------------------------------|-----|------|------|------|------|------|------------|
| Plant 94, grade 2 ("Light hard," 5 percent of kiln) |     |      |      |      |      |      |            |
| 1-----                                              | 475 | 1260 | 14.5 | 21.4 | 0.68 | 0.85 | 1.02 (54c) |
| 2-----                                              | 755 | 4250 | 18.9 | 25.5 | .74  | 8.50 | 8.92 (54c) |
| 3-----                                              | 615 | 1440 | 11.9 | 18.3 | .65  | 0.73 | 0.92 (54c) |
| 4-----                                              | 970 | 4100 | 16.5 | 22.6 | .73  | 1.40 | 2.10 (54c) |
| 5-----                                              |     | 2180 | 17.1 | 20.7 | .83  | 4.70 | 4.90 (54c) |
| Avg----                                             | 705 | 2650 | 15.8 | 21.7 | 0.73 | 3.24 | 3.57 (54c) |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

|                                                          |                     |                     |      |      |      |      |   |
|----------------------------------------------------------|---------------------|---------------------|------|------|------|------|---|
| Plant 95, grade 1 ("Kiln run," 93 to 95 percent of kiln) |                     |                     |      |      |      |      |   |
| 1-----                                                   | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | 0.82 | %    | % |
| 2-----                                                   | 945                 | 6020                | 12.4 | 15.2 |      | 0.61 |   |
| 3-----                                                   | 515                 | 5290                | 14.0 | 17.3 | .81  | .34  |   |
| 4-----                                                   | 940                 | 7270                | 5.2  | 9.0  | .58  | .26  |   |
| 5-----                                                   | 545                 | 5390                | 15.3 | 18.8 | .81  | .59  |   |
| 6-----                                                   | 685                 | 5190                | 15.3 | 17.8 | .86  | .86  |   |
| 7-----                                                   |                     | 4530                | 16.0 | 19.4 | .82  | .92  |   |
| 8-----                                                   | 720                 | 4730                | 14.6 | 18.0 | .81  | .67  |   |
| 9-----                                                   | 520                 | 4810                | 15.3 | 18.8 | .81  | .82  |   |
| 10-----                                                  | 570                 | 5270                | 13.3 | 16.9 | .79  | .85  |   |
| 11-----                                                  | 555                 | 7400                | 12.0 | 15.8 | .76  | .88  |   |
| 12-----                                                  | 595                 | 4940                | 12.6 | 16.1 | .78  | 1.21 |   |
| 13-----                                                  | 475                 | 5340                | 12.7 | 16.0 | .79  | 0.78 |   |
| 14-----                                                  | 585                 | 5650                | 12.7 | 15.9 | .80  | .77  |   |
| 15-----                                                  | 615                 | 6600                | 11.7 | 15.3 | .76  | .73  |   |
| 16-----                                                  | 475                 | 5400                | 12.3 | 16.0 | .77  | .74  |   |
| Avg----                                                  | 625                 | 5590                | 13.0 | 16.4 | 0.80 | 0.74 |   |

|                                                    |  |      |     |      |      |            |  |
|----------------------------------------------------|--|------|-----|------|------|------------|--|
| Plant 95, grade 2 ("Lammies," 0.5 percent of kiln) |  |      |     |      |      |            |  |
| Avg (5)-----                                       |  | 6340 | 5.0 | 11.8 | 0.43 | Not tested |  |

|                                                                 |     |      |      |      |      |            |  |
|-----------------------------------------------------------------|-----|------|------|------|------|------------|--|
| Plant 95, grade 3 ("Heading course—hard," 1.25 percent of kiln) |     |      |      |      |      |            |  |
| Avg (5)-----                                                    | 580 | 2810 | 11.6 | 21.8 | 0.53 | Not tested |  |

|                                                                |     |      |      |      |      |      |            |
|----------------------------------------------------------------|-----|------|------|------|------|------|------------|
| Plant 95, grade 4 ("Heading course—light," 25 percent of kiln) |     |      |      |      |      |      |            |
| 1-----                                                         | 715 | 3190 | 16.1 | 25.9 | 0.62 | 2.70 | 3.23 (57c) |
| 2-----                                                         | 925 | 2880 | 9.1  | 17.0 | .54  | 0.52 | 0.78 (57c) |
| 3-----                                                         | 515 | 3020 | 17.7 | 26.9 | .66  | 2.17 | 2.48 (57c) |
| 4-----                                                         | 355 | 1460 | 19.0 | 28.9 | .66  | 7.50 | 8.19 (57c) |
| 5-----                                                         | 195 | 1770 | 19.2 | 28.7 | .67  | 9.02 | F 57c      |
| Avg-----                                                       | 540 | 2460 | 16.2 | 25.5 | 0.63 | 4.38 |            |

|                                                      |     |      |      |      |      |      |            |
|------------------------------------------------------|-----|------|------|------|------|------|------------|
| Plant 95, grade 5 ("Light hards," 2 percent of kiln) |     |      |      |      |      |      |            |
| 1-----                                               | 175 | 2630 | 16.3 | 18.9 | 0.86 | 3.28 | 3.66 (57c) |
| 2-----                                               | 230 | 2630 | 15.9 | 18.3 | .87  | 2.34 | 2.46 (57c) |
| 3-----                                               | 235 | 1030 | 18.0 | 28.1 | .64  | 8.77 | 9.25 (57c) |
| 4-----                                               | 165 | 1120 | 16.7 | 28.4 | .59  | 4.60 | 5.20 (57c) |
| 5-----                                               | 145 | 1920 | 14.2 | 22.7 | .63  | 5.31 | 5.60 (57c) |
| Avg----                                              | 190 | 1860 | 16.2 | 23.3 | 0.72 | 4.86 | 5.23 (57c) |

|                                                  |      |      |      |      |      |      |  |
|--------------------------------------------------|------|------|------|------|------|------|--|
| Plant 95, grade 6 ("Select," 70 percent of kiln) |      |      |      |      |      |      |  |
| 1-----                                           | 890  | 5090 | 9.7  | 13.7 | 0.71 | 0.49 |  |
| 2-----                                           | 670  | 3310 | 12.6 | 17.6 | .72  | 1.14 |  |
| 3-----                                           | 875  | 4710 | 11.8 | 16.3 | .72  | 0.66 |  |
| 4-----                                           | 780  | 4700 | 9.1  | 13.6 | .67  | .52  |  |
| 5-----                                           | 1035 | 4810 | 10.3 | 15.1 | .68  | .73  |  |
| 6-----                                           | 795  | 5380 | 9.6  | 14.4 | .63  | .60  |  |
| 7-----                                           | 915  | 4240 | 9.8  | 14.7 | .62  | .87  |  |
| 8-----                                           | 655  | 4040 | 13.0 | 17.1 | .76  | .69  |  |
| 9-----                                           | 785  | 5020 | 11.1 | 15.8 | .70  | 1.06 |  |
| 10-----                                          | 900  | 4880 | 11.3 | 16.2 | .70  | 0.71 |  |
| 11-----                                          | 660  | 3610 | 12.7 | 17.5 | .72  | 1.09 |  |
| 12-----                                          | 810  | 4930 | 10.7 | 16.0 | .67  | 0.46 |  |
| Avg----                                          | 815  | 4560 | 11.0 | 15.7 | 0.69 | 0.75 |  |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number                                     | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                     |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 130, grade 1 ("Kiln run," 90 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
|                                                     | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1.....                                              | 905                       | 4500                      | 15.3                 | 18.7         | 0.82                   | Not tested                                              |                          |
| 2.....                                              | 410                       | 4330                      | 16.4                 | 20.1         | .82                    | 0.63                                                    |                          |
| 3.....                                              | 860                       | 6950                      | 12.0                 | 14.4         | .83                    | Not tested                                              |                          |
| 4.....                                              | 1250                      | 6100                      | 9.9                  | 12.8         | .77                    | 0.43                                                    |                          |
| 5.....                                              | 725                       | 5040                      | 13.7                 | 17.0         | .81                    | .52                                                     |                          |
| 6.....                                              |                           | 4930                      | 13.4                 | 17.8         | .75                    | Not tested                                              |                          |
| 7.....                                              | 580                       | 4320                      | 15.5                 | 18.6         | .83                    | 0.62                                                    |                          |
| 8.....                                              | 265                       | 5130                      | 12.6                 | 16.5         | .76                    | .67                                                     |                          |
| 9.....                                              | 335                       | 5850                      | 10.5                 | 14.3         | .73                    | .61                                                     |                          |
| 10.....                                             | 590                       | 5500                      | 13.9                 | 18.3         | .76                    | .88                                                     |                          |
| 11.....                                             | 780                       | 5810                      | 14.7                 | 18.0         | .82                    | .67                                                     |                          |
| 12.....                                             | 970                       | 6730                      | 16.5                 | 18.6         | .89                    | .83                                                     |                          |
| 13.....                                             |                           | 7170                      | 15.5                 | 17.3         | .90                    | 1.11                                                    |                          |
| 14.....                                             | 925                       | 5850                      | 16.3                 | 18.9         | .86                    | 0.89                                                    |                          |
| 15.....                                             | 930                       | 7080                      | 16.0                 | 18.0         | .89                    | .98                                                     |                          |
| 16.....                                             | 605                       | 6380                      | 16.9                 | 19.9         | .85                    | .98                                                     |                          |
| 17.....                                             | 595                       | 6080                      | 15.7                 | 19.0         | .83                    | .50                                                     |                          |
| 18.....                                             | 660                       | 5840                      | 14.6                 | 18.5         | .79                    | .52                                                     |                          |
| 19.....                                             | 760                       | 5570                      | 16.2                 | 19.2         | .85                    | .96*                                                    |                          |
| 20.....                                             | 805                       | 6770                      | 12.8                 | 16.8         | .76                    | .41                                                     |                          |
| Avg.....                                            | 720                       | 5800                      | 14.4                 | 17.6         | 0.82                   | 0.72                                                    |                          |

Plant 130, grade 2 ("Salmon," 10 percent of kiln)

|          |     |      |      |      |      |       |  |
|----------|-----|------|------|------|------|-------|--|
| 1.....   | 450 | 2790 | 20.0 | 23.2 | 0.86 | F 9c  |  |
| 2.....   |     | 2720 | 20.0 | 22.2 | .90  | F 9c  |  |
| 3.....   |     | 2680 | 21.1 | 23.6 | .89  | F 1e  |  |
| 4.....   |     | 2770 | 19.8 | 23.2 | .85  | F 9c  |  |
| 5.....   | 485 | 3160 | 19.4 | 23.2 | .84  | F 21c |  |
| Avg..... | 470 | 2820 | 20.1 | 23.1 | 0.87 | F 10e |  |

Plant 136, grade 1 ("Arch," 33½ percent of kiln)

|          |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|--|
| 1.....   | 740  | 3050 | 15.4 | 20.0 | 0.77 | 1.23 |  |
| 2.....   | 595  | 3130 | 4.7  | 8.3  | .57  | 0.47 |  |
| 3.....   | 1290 | 4220 | 8.9  | 13.0 | .68  | .41  |  |
| 4.....   | 755  | 3150 | 14.0 | 18.5 | .76  | .76  |  |
| 5.....   | 1075 | 4220 | 11.2 | 15.1 | .74  | .53  |  |
| Avg..... | 890  | 3550 | 10.8 | 15.0 | 0.70 | 0.68 |  |

Plant 136, grade 2 ("Middle," 33½ percent of kiln)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 920 | 3710 | 18.7 | 22.9 | 0.82 | 2.41 |  |
| 2.....   | 690 | 4440 | 15.7 | 19.9 | .79  | 0.60 |  |
| 3.....   | 555 | 3310 | 17.7 | 22.0 | .80  | .43  |  |
| 4.....   | 845 | 3870 | 16.7 | 21.3 | .78  | .54  |  |
| 5.....   | 560 | 3350 | 16.9 | 20.9 | .81  | .54  |  |
| Avg..... | 715 | 3740 | 17.1 | 21.4 | 0.80 | 0.90 |  |

Plant 136, grade 3 ("Top," 33½ percent of kiln)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 610 | 3140 | 17.6 | 22.3 | 0.79 | 1.42 |  |
| 2.....   | 730 | 3230 | 17.9 | 22.5 | .80  | 0.66 |  |
| 3.....   | 655 | 3630 | 17.8 | 22.7 | .78  | .30  |  |
| 4.....   | 745 | 3880 | 17.4 | 21.7 | .80  | .87  |  |
| 5.....   | 655 | 3660 | 15.4 | 19.8 | .78  | .62  |  |
| Avg..... | 680 | 3510 | 17.2 | 21.8 | 0.79 | 0.77 |  |

Plant 147, grade 1 ("Arch," 18 percent of kiln)

|          |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|--|
| 1.....   | 1120 | 8010 | 9.7  | 12.1 | 0.80 | 0.48 |  |
| 2.....   | 565  | 5330 | 8.9  | 12.0 | .74  | 1.52 |  |
| 3.....   | 935  | 5460 | 16.4 | 19.5 | .84  | 0.62 |  |
| Avg..... | 875  | 6270 | 11.7 | 14.5 | 0.79 | 0.87 |  |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number                                         | Modulus of rupture                | Compressive strength              | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------|-----------------------------------|-----------------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                         |                                   |                                   | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 147, grade 2 ("Second bench," 18 percent of kiln) |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                  | <i>lb/in.<sup>2</sup></i><br>1080 | <i>lb/in.<sup>2</sup></i><br>5100 | %<br>14.6            | %<br>18.5    | 0.79                   | %<br>0.51                                               |                          |
| 2-----                                                  | 1275                              | 7900                              | 11.6                 | 14.2         | .82                    | .39                                                     |                          |
| 3-----                                                  | 1285                              | 6250                              | 12.2                 | 16.0         | .76                    | .64                                                     |                          |
| Avg-----                                                | 1215                              | 6420                              | 12.8                 | 16.2         | 0.79                   | 0.51                                                    |                          |

Plant 147, grade 3 ("Third bench," 18 percent of kiln)

|          |     |      |     |      |      |      |  |
|----------|-----|------|-----|------|------|------|--|
| 1.....   | 770 | 5490 | 8.3 | 12.4 | 0.67 | 0.28 |  |
| 2.....   | 395 | 5660 | 9.5 | 12.4 | .77  | .32  |  |
| 3.....   |     | 6010 | 8.3 | 11.5 | .72  | .25  |  |
| Avg..... | 580 | 5720 | 8.7 | 12.1 | 0.72 | 0.28 |  |

Plant 147, grade 4 ("Fourth bench," 18 percent of kiln)

|          |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|--|
| 1.....   | 1120 | 7520 | 12.4 | 15.0 | 0.83 | 0.52 |  |
| 2.....   | 1360 | 7000 | 13.0 | 15.0 | .87  | .68  |  |
| 3.....   | 1180 | 7150 | 14.1 | 16.3 | .87  | .59  |  |
| Avg..... | 1220 | 7220 | 13.2 | 15.4 | 0.86 | 0.60 |  |

Plant 147, grade 5 ("Fifth bench," 18 percent of kiln)

|          |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|--|
| 1.....   | 1090 | 2810 | 17.1 | 20.1 | 0.85 | 1.18 |  |
| 2.....   | 1195 | 4270 | 17.3 | 20.4 | .85  | 0.86 |  |
| 3.....   | 1125 | 6750 | 17.5 | 20.8 | .84  | .78  |  |
| Avg..... | 1135 | 4590 | 17.3 | 20.4 | 0.85 | 0.94 |  |

Plant 147, grade 6 ("Salmon," 10 percent of kiln)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 600 | 5500 | 20.5 | 24.3 | 0.84 | 2.42 |  |
| 2.....   | 510 | 3010 | 19.7 | 26.5 | .74  | 1.81 |  |
| 3.....   | 535 | 2240 | 20.5 | 26.9 | .76  | 1.42 |  |
| Avg..... | 550 | 3580 | 20.2 | 25.9 | 0.78 | 1.88 |  |

Plant 148, grade 1 ("Kiln run hard—top," 30 percent of kiln)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 725 | 3970 | 16.9 | 19.3 | 0.82 | 1.45 |  |
| 2.....   | 540 | 3750 | 16.4 | 20.5 | .80  | 1.65 |  |
| 3.....   | 645 | 3350 | 16.5 | 19.6 | .84  | 2.60 |  |
| 4.....   | 625 | 4110 | 14.6 | 18.3 | .80  | 1.47 |  |
| 5.....   | 725 | 3590 | 16.2 | 19.5 | .83  | 2.08 |  |
| Avg..... | 650 | 3750 | 16.1 | 19.4 | 0.82 | 1.85 |  |

Plant 148, grade 2 ("Kiln run hard—middle," 30 percent of kiln)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 795 | 4770 | 15.6 | 18.8 | 0.83 | 1.13 |  |
| 2.....   | 670 | 3530 | 15.7 | 18.7 | .84  | 0.96 |  |
| 3.....   | 810 | 3900 | 16.0 | 18.8 | .85  | 1.26 |  |
| 4.....   | 715 | 3530 | 16.3 | 19.3 | .84  | 0.96 |  |
| 5.....   | 785 | 3430 | 16.9 | 20.1 | .84  | 1.04 |  |
| Avg..... | 755 | 3830 | 16.1 | 19.1 | 0.84 | 1.78 |  |

Plant 148, grade 3 ("Kiln run hard—bottom," 30 percent of kiln)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 725 | 3170 | 16.2 | 19.5 | 0.83 | 0.79 |  |
| 2.....   | 575 | 3220 | 16.0 | 18.9 | .85  | .60  |  |
| 3.....   | 625 | 3770 | 16.2 | 18.6 | .87  | .75  |  |
| 4.....   | 535 | 4420 | 15.4 | 18.3 | .84  | .95  |  |
| 5.....   | 465 | 4650 | 15.7 | 18.9 | .83  | .63  |  |
| Avg..... | 585 | 3850 | 15.9 | 18.8 | 0.84 | 0.74 |  |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number                                   | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                   |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 148, grade 4 ("Salmon," 10 percent of kiln) |                           |                           |                      |              |                        |                                                         |                          |
|                                                   | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1 -----                                           | 475                       | 3630                      | 16.1                 | 18.5         | 0.87                   | 2.18                                                    |                          |
| 2 -----                                           | 175                       | 1925                      | 20.4                 | 27.0         | .76                    | 9.50                                                    |                          |
| 3 -----                                           | 180                       | 1680                      | 19.2                 | 23.3         | .82                    | F 3c                                                    |                          |
| 4 -----                                           | 285                       | 1650                      | 18.6                 | 23.1         | .81                    | 9.60                                                    |                          |
| 5 -----                                           | 255                       | 1385                      | 21.2                 | 30.3         | .67                    | F 33e                                                   |                          |
| Avg -----                                         | 275                       | 2050                      | 19.1                 | 24.4         | 0.79                   | -----                                                   |                          |

|                                                |      |      |      |      |      |      |  |
|------------------------------------------------|------|------|------|------|------|------|--|
| Plant 149, grade 1 ("Top," 30 percent of kiln) |      |      |      |      |      |      |  |
| 1.....                                         | 870  | 5150 | 13.6 | 16.7 | 0.81 | 0.86 |  |
| 2.....                                         | 925  | 3540 | 10.8 | 15.8 | .68  | .43  |  |
| 3.....                                         | 1585 | 8140 | 3.4  | 4.1  | .67  | .27  |  |
| 4.....                                         | 1215 | 6520 | 8.9  | 11.1 | .80  | .59  |  |
| 5.....                                         | 1160 | 5140 | 13.1 | 15.4 | .85  | .46  |  |
| Avg.....                                       | 1150 | 5700 | 10.0 | 12.6 | 0.76 | 0.52 |  |

|                                                   |     |      |      |      |      |      |  |
|---------------------------------------------------|-----|------|------|------|------|------|--|
| Plant 149, grade 2 ("Middle," 30 percent of kiln) |     |      |      |      |      |      |  |
| 1.....                                            | 565 | 2310 | 16.4 | 20.7 | 0.79 | 0.86 |  |
| 2.....                                            | 750 | 2420 | 16.0 | 19.9 | .80  | .90  |  |
| 3.....                                            | 695 | 2920 | 12.3 | 17.3 | .71  | .61  |  |
| 4.....                                            | 420 | 2420 | 13.6 | 18.2 | .75  | .91  |  |
| 5.....                                            | 720 | 3490 | 10.3 | 14.7 | .70  | .59  |  |
| Avg.....                                          | 630 | 2710 | 13.7 | 18.2 | 0.75 | 0.77 |  |

|                                                   |     |      |      |      |      |      |  |
|---------------------------------------------------|-----|------|------|------|------|------|--|
| Plant 149, grade 3 ("Bottom," 30 percent of kiln) |     |      |      |      |      |      |  |
| 1.....                                            | 870 | 3520 | 13.9 | 17.7 | 0.78 | 0.88 |  |
| 2.....                                            | 590 | 2660 | 11.3 | 15.8 | .72  | .75  |  |
| 3.....                                            | 790 | 2750 | 10.2 | 15.0 | .68  | .68  |  |
| 4.....                                            | 750 | 3370 | 15.2 | 18.8 | .81  | .72  |  |
| 5.....                                            | 565 | 2720 | 15.3 | 19.3 | .79  | .80  |  |
| Avg.....                                          | 715 | 3000 | 13.2 | 17.3 | 0.76 | 0.77 |  |

|                                                              |     |      |      |      |      |       |  |
|--------------------------------------------------------------|-----|------|------|------|------|-------|--|
| Plant 155, grade 1 ("Kiln run hard—top," 30 percent of kiln) |     |      |      |      |      |       |  |
| 1.....                                                       | 540 | 3180 | 16.2 | 20.8 | 0.78 | F 33c |  |
| 2.....                                                       | 465 | 2330 | 15.2 | 19.6 | .78  | 0.88  |  |
| 3.....                                                       | 580 | 2570 | 16.8 | 21.0 | .80  | .98   |  |
| 4.....                                                       | 560 | 2900 | 15.1 | 19.5 | .77  | 1.64  |  |
| 5.....                                                       | 640 | 3240 | 15.2 | 19.6 | .78  | 0.73  |  |
| Avg.....                                                     | 560 | 2840 | 15.7 | 20.1 | 0.78 |       |  |

|                                                                 |     |      |      |      |      |      |  |
|-----------------------------------------------------------------|-----|------|------|------|------|------|--|
| Plant 155, grade 2 ("Kiln run hard—middle," 30 percent of kiln) |     |      |      |      |      |      |  |
| 1.....                                                          | 475 | 2770 | 14.9 | 19.0 | 0.78 | 0.69 |  |
| 2.....                                                          | 325 | 2420 | 12.3 | 17.8 | .69  | .55  |  |
| 3.....                                                          | 430 | 2490 | 17.5 | 21.9 | .75  | .75  |  |
| 4.....                                                          | 419 | 2790 | 12.2 | 17.4 | .70  | .52  |  |
| 5.....                                                          | 670 | 3670 | 15.4 | 20.1 | .77  | .94  |  |
| Avg.....                                                        | 460 | 2830 | 14.5 | 19.2 | 0.74 | 0.69 |  |

|                                                                 |     |      |      |      |      |      |  |
|-----------------------------------------------------------------|-----|------|------|------|------|------|--|
| Plant 155, grade 3 ("Kiln run hard—bottom," 30 percent of kiln) |     |      |      |      |      |      |  |
| 1.....                                                          | 675 | 2440 | 10.8 | 15.6 | 0.69 | 0.36 |  |
| 2.....                                                          | 590 | 2720 | 12.0 | 16.5 | .73  | .63  |  |
| 3.....                                                          | 350 | 2130 | 17.2 | 21.6 | .80  | .90  |  |
| 4.....                                                          | 645 | 3610 | 12.5 | 17.0 | .74  | .54  |  |
| 5.....                                                          | 810 | 3170 | 10.5 | 15.2 | .69  | .58  |  |
| Avg.....                                                        | 615 | 2810 | 12.6 | 17.2 | 0.73 | 0.60 |  |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number                                   | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                   |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 155, grade 4 ("Salmon," 10 percent of kiln) |                    |                      |                      |              |                        |                                                         |                          |
|                                                   | <i>lb/in.²</i>     | <i>lb/in.²</i>       | %                    | %            |                        | %                                                       |                          |
| 1-----                                            | 425                | 1780                 | 19.0                 | 23.0         | 0.83                   | F 15c                                                   |                          |
| 2-----                                            | 310                | 2370                 | 18.6                 | 22.9         | .81                    | F 42c                                                   |                          |
| 3-----                                            | 300                | 990                  | 23.5                 | 31.6         | .74                    | F 15c                                                   |                          |
| 4-----                                            | 215                | 940                  | 23.9                 | 32.8         | .73                    | F 15c                                                   |                          |
| 5-----                                            | 345                | 1420                 | 19.3                 | 24.5         | .79                    | F 42c                                                   |                          |
| Avg-----                                          | 320                | 1480                 | 20.9                 | 27.0         | 0.78                   | F 26c                                                   |                          |

|                                                 |      |      |      |      |      |      |  |
|-------------------------------------------------|------|------|------|------|------|------|--|
| Plant 174, grade 1 ("Arch," 40 percent of kiln) |      |      |      |      |      |      |  |
| 1.....                                          | 700  | 4070 | 11.3 | 15.0 | 0.75 | 0.46 |  |
| 2.....                                          | 5120 | 3.9  | 6.2  | .63  | .16  |      |  |
| 3.....                                          | 1220 | 4980 | 11.6 | 14.8 | .78  | .39  |  |
| 4.....                                          | 425  | 5510 | 2.1  | 4.2  | .50  | .28  |  |
| 5.....                                          | 590  | 4000 | 6.6  | 9.9  | .67  | .33  |  |
| Avg.....                                        | 735  | 4740 | 7.1  | 10.0 | 0.67 | 0.32 |  |

|                                                                    |     |      |      |      |      |      |  |
|--------------------------------------------------------------------|-----|------|------|------|------|------|--|
| Plant 174, grade 2 ("All hard—middle and top," 90 percent of kiln) |     |      |      |      |      |      |  |
| 1.....                                                             | 540 | 3260 | 17.3 | 21.5 | 0.80 | 1.11 |  |
| 2.....                                                             | 530 | 3460 | 16.8 | 20.8 | .81  | 0.67 |  |
| 3.....                                                             | 650 | 4020 | 13.8 | 18.1 | .76  | .29  |  |
| 4.....                                                             | 300 | 2480 | 12.5 | 15.2 | .83  | .54  |  |
| 5.....                                                             | 595 | 3220 | 16.0 | 20.7 | .77  | .40  |  |
| 6.....                                                             | 480 | 2580 | 16.5 | 20.9 | .79  | 1.14 |  |
| 7.....                                                             | 615 | 3700 | 15.6 | 20.1 | .78  | 0.78 |  |
| 8.....                                                             | 450 | 3440 | 15.4 | 19.9 | .77  | .64  |  |
| 9.....                                                             | 590 | 3670 | 16.5 | 20.1 | .82  | .73  |  |
| 10.....                                                            | 565 | 3490 | 13.8 | 18.2 | .76  | .63  |  |
| Avg.....                                                           | 530 | 3330 | 15.4 | 19.6 | 0.79 | 0.69 |  |

|                                                                |      |      |      |      |         |          |  |
|----------------------------------------------------------------|------|------|------|------|---------|----------|--|
| Plant 174, grade 3 ("Light hard or salmon," 6 percent of kiln) |      |      |      |      |         |          |  |
| 1.....                                                         | 340  | 1960 | 23.5 | 29.5 | 0.80    | 8.78 (B) |  |
| 2.....                                                         | 395  | 2720 | 20.7 | 23.2 | .89     | 0.54 (B) |  |
| 3.....                                                         | 3010 | 20.0 | 23.0 | .87  | .90 (B) |          |  |
| 4.....                                                         | 435  | 1770 | 24.0 | 30.1 | .80     | No test  |  |
| 5.....                                                         | 425  | 3400 | 19.5 | 21.8 | .89     | do.....  |  |
| Avg.....                                                       | 400  | 2570 | 21.5 | 25.5 | 0.85    | 3.41 (B) |  |

|                                                      |      |      |      |      |      |           |  |
|------------------------------------------------------|------|------|------|------|------|-----------|--|
| Plant 181, grade 1 ("Kiln run," 100 percent of kiln) |      |      |      |      |      |           |  |
| 1.....                                               | 520  | 4280 | 18.1 | 19.4 | 0.93 | 0.25 (B)  |  |
| 2.....                                               | 470  | 3570 | 19.0 | 21.4 | .89  | .80 (B)   |  |
| 3.....                                               | 470  | 3770 | 17.2 | 19.0 | .91  | .52 (B)   |  |
| 4.....                                               | 470  | 4290 | 15.5 | 19.8 | .78  | .48 (B)   |  |
| 5.....                                               | 940  | 2850 | 17.0 | 24.0 | .71  | F 5e (B)  |  |
| 6.....                                               | 790  | 3560 | 10.8 | 15.8 | .66  | 0.50 (B)  |  |
| 7.....                                               | 1080 | 2960 | 12.6 | 17.1 | .74  | .36 (B)   |  |
| 8.....                                               | 1430 | 5630 | 8.6  | 12.2 | .70  | .29 (B)   |  |
| 9.....                                               | 1335 | 4570 | 9.0  | 13.3 | .68  | .24 (B)   |  |
| 10.....                                              | 1140 | 2809 | 9.2  | 13.8 | .67  | .26 (B)   |  |
| 11.....                                              | 1005 | 3350 | 11.3 | 15.7 | .72  | .38 (B)   |  |
| 12.....                                              | 1425 | 4540 | 9.0  | 13.2 | .68  | .14 (B)   |  |
| 13.....                                              | 845  | 3970 | 19.7 | 22.7 | .87  | F 8e (B)  |  |
| 14.....                                              | 700  | 2720 | 19.3 | 22.1 | .87  | F 50e (B) |  |
| 15.....                                              | 375  | 2730 | 18.2 | 20.1 | .91  | F 1c (B)  |  |
| Avg.....                                             | 865  | 3710 | 14.3 | 18.0 | 0.78 |           |  |

|                                                  |      |      |      |      |           |           |  |
|--------------------------------------------------|------|------|------|------|-----------|-----------|--|
| Plant 181, grade 2 ("Salmon," 5 percent of kiln) |      |      |      |      |           |           |  |
| 1.....                                           | 475  | 3530 | 19.1 | 22.7 | 0.84      | F 4c (B)  |  |
| 2.....                                           | 3630 | 19.6 | 20.6 | .95  | F 21c (B) |           |  |
| 3.....                                           | 3010 | 20.0 | 22.7 | .88  | F 9c (B)  |           |  |
| 4.....                                           | 460  | 3070 | 20.0 | 23.2 | .86       | F 18c (B) |  |
| 5.....                                           | 425  | 2970 | 19.8 | 22.7 | .87       | F 2c (B)  |  |
| Avg.....                                         | 455  | 3240 | 19.7 | 22.4 | 0.88      | F 11c (B) |  |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 181, grade 3 ("Body," 95 percent of kiln)

| Avg (5) | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | 0.69 | %          |  |
|---------|---------------------|---------------------|------|------|------|------------|--|
|         | 1055                | 4830                | 10.5 | 15.2 |      | Not tested |  |

Plant 187, grade 1 ("Arch," 5 percent of kiln)

|     |     |      |      |      |      |            |  |
|-----|-----|------|------|------|------|------------|--|
| 1   | 490 | 4080 | 18.7 | 19.4 | 0.96 | F 20c (B)  |  |
| 2   | 630 | 3500 | 18.1 | 18.7 | .97  | 0.42 (B)   |  |
| 3   | 185 | 4170 | 19.6 | 20.6 | .95  | Not tested |  |
| 4   | 155 | 4020 | 19.6 | 20.8 | .94  | F 2c (B)   |  |
| 5   | 735 | 4820 | 18.6 | 19.8 | .94  | Not tested |  |
| Avg | 440 | 4120 | 18.9 | 19.9 | 0.95 |            |  |

Plant 187, grade 2 ("Commercial hard," 85 percent of kiln)

|     |      |      |      |      |      |          |  |
|-----|------|------|------|------|------|----------|--|
| 1   | 915  | 4470 | 18.8 | 20.1 | 0.94 | 0.39 (B) |  |
| 2   | 1045 | 4270 | 19.7 | 20.4 | .97  | .39 (B)  |  |
| 3   | 930  | 5310 | 19.7 | 20.4 | .97  | .25 (B)  |  |
| 4   | 915  | 4190 | 18.9 | 20.2 | .94  | .26 (B)  |  |
| 5   | 785  | 5230 | 18.3 | 19.3 | .95  | .32 (B)  |  |
| Avg | 920  | 4700 | 19.1 | 20.1 | 0.95 | 0.32 (B) |  |

Plant 187, grade 3 ("Salmon," 10 percent of kiln)

|     |     |      |      |      |      |          |  |
|-----|-----|------|------|------|------|----------|--|
| 1   | 675 | 3320 | 21.7 | 22.4 | 0.97 | F 5c (B) |  |
| 2   | 285 | 3260 | 20.8 | 21.6 | .96  | F 5c (B) |  |
| 3   | 555 | 3060 | 20.5 | 21.1 | .97  | F 2c (B) |  |
| 4   |     | 2740 | 23.0 | 24.6 | .94  | F 1c (B) |  |
| 5   | 585 | 2880 | 21.8 | 22.7 | .96  | F 3c (B) |  |
| Avg | 525 | 3050 | 21.6 | 22.5 | 0.96 | F 3c (B) |  |

Plant 187, grade 4 ("Shale clay mixture," 80 percent of kiln)

|     |     |      |      |      |      |          |  |
|-----|-----|------|------|------|------|----------|--|
| 1   | 550 | 3090 | 12.6 | 16.3 | 0.77 | 0.42 (B) |  |
| 2   | 925 | 6390 | 11.9 | 15.2 | .78  | .22 (B)  |  |
| 3   | 840 | 3610 | 12.2 | 16.1 | .76  | .29 (B)  |  |
| 4   | 640 | 6520 | 14.7 | 17.8 | .83  | .31 (B)  |  |
| 5   | 820 | 7710 | 11.7 | 14.4 | .81  | .11 (B)  |  |
| Avg | 755 | 5460 | 12.6 | 16.0 | 0.79 | 0.27 (B) |  |

Plant 188, grade 1 ("Arch")<sup>b</sup>

|     |      |      |      |      |      |          |  |
|-----|------|------|------|------|------|----------|--|
| 1   | 1220 | 8050 | 13.0 | 15.5 | 0.81 | 0.31 (B) |  |
| 2   | 750  | 5840 | 17.0 | 19.9 | .85  | .23 (B)  |  |
| 3   | 940  | 6230 | 14.9 | 16.8 | .89  | .25 (B)  |  |
| 4   | 840  | 5190 | 16.9 | 20.0 | .84  | .38 (B)  |  |
| 5   | 340  | 5950 | 16.2 | 19.1 | .85  | .44 (B)  |  |
| Avg | 820  | 6250 | 15.6 | 18.3 | 0.85 | 0.32 (B) |  |

Plant 188, grade 2 ("Middle")<sup>b</sup>

|     |     |      |      |      |      |           |  |
|-----|-----|------|------|------|------|-----------|--|
| 1   | 290 | 5420 | 13.0 | 16.2 | 0.80 | 0.39 (B)  |  |
| 2   | 680 | 6600 | 16.2 | 19.3 | .84  | .52 (B)   |  |
| 3   | 805 | 6390 | 17.3 | 20.0 | .87  | F 50c (B) |  |
| 4   | 675 | 5160 | 16.5 | 19.1 | .86  | 0.63 (B)  |  |
| 5   | 715 | 5600 | 17.3 | 20.8 | .83  | 1.40 (B)  |  |
| Avg | 630 | 5890 | 16.1 | 19.1 | 0.84 |           |  |

TABLE 4.—*Properties of bricks produced in the Hudson Valley District—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 188, grade 3 ("Top")<sup>b</sup>

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %        |  |
|-----|---------------------|---------------------|------|------|------|----------|--|
| 1   | 765                 | 6190                | 17.2 | 19.3 | 0.89 | 0.97 (B) |  |
| 2   | 520                 | 3760                | 20.3 | 22.9 | .89  | .39 (B)  |  |
| 3   | 420                 | 5900                | 17.2 | 20.0 | .86  | .29 (B)  |  |
| 4   | 540                 | 4680                | 17.1 | 20.1 | .85  | .36 (B)  |  |
| 5   | 710                 | 4590                | 17.0 | 20.0 | .85  | .81 (B)  |  |
| Avg | 590                 | 5020                | 17.8 | 20.5 | 0.87 | 0.56 (B) |  |

Plant 201, grade 1 ("Arch," 8 percent of kiln)

|     |     |      |      |      |      |           |  |
|-----|-----|------|------|------|------|-----------|--|
| 1   | 800 | 3550 | 11.2 | 17.2 | 0.65 | 9.98 (B)  |  |
| 2   | 360 | 6180 | 6.9  | 10.8 | .64  | F 39c (B) |  |
| 3   | 950 | 6130 | 12.6 | 16.5 | .76  | 0.40 (B)  |  |
| 4   | 880 | 5080 | 7.7  | 11.6 | .66  | .52 (B)   |  |
| 5   | 865 | 5370 | 8.6  | 13.0 | .66  | .72 (B)   |  |
| Avg | 770 | 5260 | 9.4  | 13.8 | 0.67 |           |  |

Plant 201, grade 2 ("Clinker," 5 percent of kiln)

|     |      |      |     |      |      |          |  |
|-----|------|------|-----|------|------|----------|--|
| 1   | 1065 | 5180 | 6.1 | 10.8 | 0.56 | No test  |  |
| 2   | 1630 | 5010 | 4.8 | 10.2 | .47  | 0.56 (B) |  |
| 3   | 995  | 4580 | 5.7 | 10.2 | .56  | .38 (B)  |  |
| 4   | 515  | 4470 | 8.9 | 13.3 | .67  | .71 (B)  |  |
| 5   | 955  | 3510 | 6.8 | 11.5 | .59  | .68 (B)  |  |
| Avg | 1030 | 4550 | 6.5 | 11.2 | 0.57 | 0.58 (B) |  |

Plant 201, grade 3 ("Commercial," 87 percent of kiln)

|     |      |      |      |      |      |          |  |
|-----|------|------|------|------|------|----------|--|
| 1   | 1285 | 5730 | 11.2 | 15.4 | 0.73 | 0.98 (B) |  |
| 2   | 1235 | 5400 | 12.1 | 16.3 | .74  | .72 (B)  |  |
| 3   | 1240 | 6310 | 11.3 | 15.1 | .75  | .57 (B)  |  |
| 4   | 1125 | 3870 | 12.4 | 17.1 | .73  | .71 (B)  |  |
| 5   | 1280 | 5700 | 12.3 | 16.8 | .73  | No test  |  |
| Avg | 1235 | 5400 | 11.9 | 16.1 | 0.74 | 0.74 (B) |  |

Plant 222, grade 1 ("Light Hard," (1936) percentage of kiln unknown)

|     |      |      | (24-hr) |      |      |       |  |
|-----|------|------|---------|------|------|-------|--|
| 1   | 320  | 2050 | 22.9    | 25.5 | 0.90 | 1.28  |  |
| 2   | 305  | 2000 | 22.1    | 24.4 | .91  | 1.64  |  |
| 3   | 140  | 2070 | 20.8    | 22.7 | .92  | 1.82  |  |
| 4   | 195  | 2540 | 22.6    | 24.3 | .93  | 1.39  |  |
| 5   | 705  | 3680 | 20.9    | 23.1 | .90  | 7.61  |  |
| 6   | 305  | 1750 | 22.4    | 24.7 | .91  | 1.55  |  |
| 7   | 310  | 2150 | 21.5    | 24.5 | .88  | 1.05  |  |
| 8   | 300  | 2150 | 22.7    | 25.8 | .88  | F 48c |  |
| 9   | 820  | 5770 | 18.1    | 20.6 | .88  | 1.06  |  |
| 10  | 605  | 3580 | 20.4    | 22.8 | .90  | 0.36  |  |
| 11  | 485  | 2360 | 21.5    | 22.7 | .95  | 1.34  |  |
| 12  | 145  | 1480 | 23.0    | 25.2 | .91  | 7.00  |  |
| 13  | 1160 | 7360 | 16.0    | 18.5 | .86  | 0.13  |  |
| 14  | 295  | 1820 | 21.7    | 23.8 | .91  | F 1c  |  |
| 15  | 310  | 2300 | 21.3    | 23.5 | .91  | 0.73  |  |
| 16  | 395  | 3300 | 21.6    | 23.4 | .92  | .80   |  |
| 17  | 540  | 4300 | 19.9    | 22.5 | .88  | .43   |  |
| 18  | 260  | 1670 | 21.4    | 23.9 | .90  | 1.67  |  |
| 19  | 500  | 3440 | 19.6    | 21.6 | .91  | 0.81  |  |
| 20  | 350  | 2540 | 22.2    | 24.1 | .92  | 2.40  |  |
| Avg | 420  | 3420 | 21.1    | 23.4 | 0.90 |       |  |

<sup>b</sup> Grades 1, 2, and 3 together represent 100 percent of kiln.

TABLE 5.—*Properties of bricks produced in New York State, excluding the Hudson Valley District*

[On the basis of the few samples submitted, it appears that brick made from surface clay and formed by the soft-mud process are produced in the eastern part of the State, and that side-cut shale bricks are produced in the western part]

| Specimen number                                                           | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                           |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 15, grade 1 ("Clinker," 1.0 percent of kiln, SC, S)                 |                           |                           |                      |              |                        |                                                         |                          |
|                                                                           | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1-----                                                                    | 1790                      | 7140                      | 6.4                  | 9.8          | 0.65                   | 0.23                                                    |                          |
| 2-----                                                                    | 870                       | 4600                      | 13.5                 | 16.2         | .83                    | .68                                                     |                          |
| 3-----                                                                    | 2120                      | 10900                     | 3.9                  | 7.2          | .54                    | .22                                                     |                          |
| 4-----                                                                    | 1930                      | 10100                     | 5.1                  | 7.9          | .65                    | .22                                                     |                          |
| 5-----                                                                    | 1760                      | 7050                      | 9.0                  | 12.0         | .75                    | .60                                                     |                          |
| Avg-----                                                                  | 1695                      | 7960                      | 7.6                  | 10.6         | 0.68                   | 0.39                                                    |                          |
| Plant 15, grade 2 ("Textured face," 10 percent of kiln, SC, S)            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 730                       | 4960                      | 15.2                 | 17.4         | 0.87                   | 1.60                                                    |                          |
| 2-----                                                                    | 815                       | 4930                      | 14.5                 | 16.9         | .86                    | 1.18                                                    |                          |
| 3-----                                                                    | 740                       | 4580                      | 16.1                 | 18.3         | .88                    | 1.42                                                    |                          |
| 4-----                                                                    | 905                       | 5030                      | 15.0                 | 17.4         | .86                    | 1.58                                                    |                          |
| 5-----                                                                    | 790                       | 3960                      | 17.2                 | 19.4         | .88                    | 1.87                                                    |                          |
| Avg-----                                                                  | 795                       | 4690                      | 15.6                 | 17.9         | 0.87                   | 1.55                                                    |                          |
| Plant 15, grade 3 ("Common," 89 percent of kiln, SC, C)                   |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 620                       | 3490                      | 17.9                 | 20.2         | 0.89                   | F 30c                                                   | 9.37 (84c)<br>F 78c      |
| 2-----                                                                    | 795                       | 4900                      | 18.6                 | 21.2         | .88                    | F 39c                                                   |                          |
| 3-----                                                                    | 630                       | 2640                      | 18.2                 | 20.1         | .91                    | 2.40                                                    |                          |
| 4-----                                                                    | 905                       | 3310                      | 18.0                 | 21.0         | .86                    | 0.78                                                    |                          |
| 5-----                                                                    | 765                       | 3920                      | 18.9                 | 21.3         | .89                    | F 45c                                                   |                          |
| Avg-----                                                                  | 745                       | 3650                      | 18.3                 | 20.8         | 0.89                   | -----                                                   |                          |
| Plant 190, grade 1 ("Clinker," 0.5 to 3.0 percent of kiln, SC, S)         |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-----                                                              | 2230                      | 9020                      | 4.9                  | 6.8          | 0.71                   | Not tested                                              |                          |
| Plant 190, grade 2 ("Kiln run common," 97 to 99.5 percent of kiln, SC, S) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 1930                      | 8900                      | 5.6                  | 7.8          | 0.72                   | a+0.34 (B)                                              |                          |
| 2-----                                                                    | 2250                      | 9180                      | 6.8                  | 9.0          | .76                    | a+-.09 (B)                                              |                          |
| 3-----                                                                    | 2230                      | 10250                     | 5.7                  | 7.4          | .77                    | -.17 (B)                                                |                          |
| 4-----                                                                    | 2180                      | 9450                      | 5.9                  | 8.1          | .73                    | .09 (B)                                                 |                          |
| 5-----                                                                    | 2090                      | 9530                      | 5.7                  | 7.8          | .73                    | .24 (B)                                                 |                          |
| 6-----                                                                    | 1790                      | 9630                      | 6.2                  | 8.0          | .78                    | .18 (B)                                                 |                          |
| 7-----                                                                    | 1750                      | 7890                      | 6.9                  | 9.1          | .76                    | .17 (B)                                                 |                          |
| 8-----                                                                    | 1910                      | 8340                      | 7.0                  | 9.0          | .78                    | .16 (B)                                                 |                          |
| 9-----                                                                    | 980                       | 3470                      | 14.4                 | 16.4         | .87                    | .65 (B)                                                 |                          |
| 10-----                                                                   | 1125                      | 3190                      | 14.1                 | 15.7         | .90                    | 4.11 (B)                                                |                          |
| Avg-----                                                                  | 1825                      | 7980                      | 7.8                  | 9.8          | 0.78                   | -----                                                   |                          |
| Plant 198, grade 1 ("Run of kiln," 100 percent of kiln, SM, C)            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 480                       | 2970                      | 17.4                 | 22.9         | 0.76                   | 0.37 (B)                                                |                          |
| 2-----                                                                    | 565                       | 3980                      | 19.2                 | 23.6         | .81                    | .37 (B)                                                 |                          |
| 3-----                                                                    | 310                       | 2520                      | 21.0                 | 25.3         | .83                    | .72 (B)                                                 |                          |
| 4-----                                                                    | 355                       | 2340                      | 21.6                 | 25.8         | .84                    | .83 (B)                                                 |                          |
| 5-----                                                                    | 275                       | 2690                      | 21.2                 | 24.6         | .86                    | .95 (B)                                                 |                          |
| 6-----                                                                    | 530                       | 2780                      | 19.2                 | 23.6         | .81                    | .25 (B)                                                 |                          |
| 7-----                                                                    | 385                       | 2320                      | 19.1                 | 24.1         | .79                    | .68 (B)                                                 |                          |
| 8-----                                                                    | 485                       | 2140                      | 21.1                 | 24.7         | .86                    | .49 (B)                                                 |                          |
| 9-----                                                                    | 310                       | 3220                      | 19.9                 | 24.3         | .82                    | .51 (B)                                                 |                          |
| 10-----                                                                   | 1080                      | 3910                      | 15.8                 | 21.7         | .73                    | .79 (B)                                                 |                          |
| 11-----                                                                   | 565                       | 2450                      | 19.8                 | 24.8         | .80                    | .86 (B)                                                 |                          |
| 12-----                                                                   | 495                       | 2200                      | 22.4                 | 26.8         | .84                    | .75 (B)                                                 |                          |
| 13-----                                                                   | 420                       | 2200                      | 22.1                 | 26.4         | .84                    | .57 (B)                                                 |                          |
| 14-----                                                                   | 105                       | 770                       | 23.6                 | 26.6         | .89                    | F 5c (B)                                                |                          |
| 15-----                                                                   | 125                       | 1000                      | 25.7                 | 26.8         | .96                    | F 12c (B)                                               |                          |
| Avg-----                                                                  | 430                       | 2500                      | 20.6                 | 24.8         | 0.83                   | -----                                                   |                          |

<sup>a</sup> The gain in weight produced by 59 cycles of freezing and thawing in specimens 1 and 2 of grade 2 of plant 190 may have been caused by hydration of lime.

TABLE 6.—*Properties of bricks produced in New Jersey*

[All samples received were made from surface clay. The shale bricks made in the northern part of the state were not represented. The methods of forming include soft-mud and stiff-mud (side-cut and end-cut) processes. Dry-press bricks are also made in New Jersey but no samples were received]

| Specimen number                                                                  | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                                  |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 16, grade 1 ("Clinker face from arches," 5 percent of kiln, EC, C)         |                           |                           |                      |              |                        |                                                         |                          |
|                                                                                  | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1-----                                                                           | 1380                      | 3520                      | 4.5                  | 8.1          | 0.56                   | 0.45 (B)                                                |                          |
| 2-----                                                                           | 1030                      | 5080                      | 3.9                  | 7.3          | .53                    | .29 (B)                                                 |                          |
| 3-----                                                                           | 365                       | 5100                      | 5.5                  | 8.9          | .62                    | .20 (B)                                                 |                          |
| 4-----                                                                           | 1890                      | 5640                      | 4.2                  | 7.9          | .53                    | .28 (B)                                                 |                          |
| 5-----                                                                           | 1230                      | 5520                      | 4.6                  | 9.3          | .49                    | .93 (B)                                                 |                          |
| Avg.---                                                                          | 1180                      | 4970                      | 4.5                  | 8.3          | 0.55                   | 0.43 (B)                                                |                          |
| Plant 16, grade 2 ("Face brick from arches," 5 percent of kiln, EC, C)           |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                           | 1035                      | 5040                      | 7.1                  | 10.1         | 0.70                   | 0.10 (B)                                                |                          |
| 2-----                                                                           | 710                       | 4410                      | 6.8                  | 10.9         | .62                    | .18 (B)                                                 |                          |
| 3-----                                                                           | 1125                      | 5300                      | 5.7                  | 9.2          | .62                    | .31 (B)                                                 |                          |
| 4-----                                                                           | 605                       | 4590                      | 4.6                  | 7.3          | .63                    | .27 (B)                                                 |                          |
| 5-----                                                                           | 815                       | 4000                      | 7.0                  | 10.2         | .69                    | .32 (B)                                                 |                          |
| Avg.---                                                                          | 860                       | 4670                      | 6.2                  | 9.5          | 0.65                   | 0.24 (B)                                                |                          |
| Plant 16, grade 3 ("Common rough hard from arches," 25 percent of kiln, EC, C)   |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                           | 1345                      | 3990                      | 9.8                  | 12.8         | 0.77                   | 0.41                                                    |                          |
| 2-----                                                                           | 565                       | 3540                      | 10.6                 | 13.3         | .80                    | .18                                                     |                          |
| 3-----                                                                           | 850                       | 3930                      | 9.3                  | 13.2         | .70                    | .22                                                     |                          |
| 4-----                                                                           | 975                       | 3470                      | 13.0                 | 16.0         | .81                    | .24                                                     |                          |
| 5-----                                                                           | 720                       | 3370                      | 9.7                  | 13.0         | .75                    | .22                                                     |                          |
| Avg.---                                                                          | 890                       | 3660                      | 10.5                 | 13.7         | 0.77                   | 0.25                                                    |                          |
| Plant 16, grade 4 ("Common hard from above arches," 18.7 percent of kiln, EC, C) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                           | 605                       | 3400                      | 10.9                 | 14.4         | 0.76                   | 0.92                                                    |                          |
| 2-----                                                                           | 1160                      | 3770                      | 7.6                  | 11.7         | .65                    | .12                                                     |                          |
| 3-----                                                                           | 485                       | 3300                      | 8.3                  | 12.0         | .69                    | .52                                                     |                          |
| 4-----                                                                           | 1085                      | 3480                      | 8.7                  | 12.2         | .71                    | .26                                                     |                          |
| 5-----                                                                           | 405                       | 1930                      | 10.2                 | 14.3         | .71                    | 9.82                                                    |                          |
| Avg.---                                                                          | 750                       | 3180                      | 9.1                  | 12.9         | 0.70                   | 2.55                                                    |                          |
| Plant 16, grade 5 ("Straight hard from top," 16 percent of kiln, EC, C)          |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                           | 1545                      | 3750                      | 9.0                  | 12.9         | 0.70                   | 1.46                                                    |                          |
| 2-----                                                                           | 1435                      | 3400                      | 11.2                 | 15.8         | .71                    | 0.53                                                    |                          |
| 3-----                                                                           | 610                       | 3470                      | 10.2                 | 14.1         | .72                    | .19                                                     |                          |
| 4-----                                                                           | 990                       | 2590                      | 11.7                 | 15.2         | .77                    | .41                                                     |                          |
| 5-----                                                                           | 560                       | 3700                      | 9.7                  | 13.8         | .70                    | .28                                                     |                          |
| Avg.---                                                                          | 1025                      | 3380                      | 10.4                 | 14.4         | 0.72                   | 0.58                                                    |                          |
| Plant 16, grade 6 ("Swelled bricks—coales," 20 percent of kiln, EC, C)           |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5) -                                                                        | 760                       | 2950                      | 8.8                  | 14.4         | 0.61                   | Not tested                                              |                          |
| Plant 16, grade 7 ("Red straight—backup," 12.9 percent of kiln, EC, C)           |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                           | 940                       | 3060                      | 12.9                 | 16.7         | 0.77                   | 0.54                                                    |                          |
| 2-----                                                                           | 1305                      | 3420                      | 12.8                 | 16.3         | .79                    | .31                                                     |                          |
| 3-----                                                                           | 395                       | 1660                      | 14.4                 | 18.0         | .80                    | .92                                                     |                          |
| 4-----                                                                           | 1085                      | 2390                      | 14.6                 | 17.5         | .83                    | .99                                                     |                          |
| 5-----                                                                           | 790                       | 1550                      | 12.8                 | 19.0         | .67                    | 1.13                                                    |                          |
| Avg.---                                                                          | 900                       | 2420                      | 13.5                 | 17.5         | 0.77                   | 0.78                                                    |                          |

TABLE 6.—*Properties of bricks produced in New Jersey—*  
Continued

| Speci-<br>men<br>number                                               | Mod-<br>ulus<br>of rup-<br>ture | Com-<br>pressive<br>strength | Water ab-<br>sorption        |                      | Satur-<br>ation<br>coeffi-<br>cient | Weight<br>loss at 51<br>cycles or<br>number of<br>cycles at<br>failure | Results<br>beyond<br>51 cycles |
|-----------------------------------------------------------------------|---------------------------------|------------------------------|------------------------------|----------------------|-------------------------------------|------------------------------------------------------------------------|--------------------------------|
|                                                                       |                                 |                              | 48-hr<br>cold im-<br>mersion | 5-hr<br>boil-<br>ing |                                     |                                                                        |                                |
| Plant 16, grade 8 ("Hard Salmon—backup," 11.0 percent of kiln, EC, C) |                                 |                              |                              |                      |                                     |                                                                        |                                |
|                                                                       | lb/in. <sup>2</sup>             | lb/in. <sup>2</sup>          | %                            | %                    |                                     | %                                                                      | %                              |
| 1-----                                                                | 665                             | 2600                         | 16.3                         | 19.5                 | 0.84                                | 1.48                                                                   | 2.05 (84c)                     |
| 2-----                                                                | 445                             | 1800                         | 17.6                         | 20.7                 | .85                                 | 1.08                                                                   | F 75c                          |
| 3-----                                                                | 550                             | 2310                         | 16.2                         | 19.5                 | .83                                 | 0.67                                                                   | 2.67 (84e)                     |
| 4-----                                                                | 330                             | 2000                         | 16.0                         | 18.6                 | .86                                 | .96                                                                    | 1.71 (84c)                     |
| 5-----                                                                | 470                             | 1220                         | 20.4                         | 25.0                 | .82                                 | F 34c                                                                  |                                |
| Avg----                                                               | 495                             | 1990                         | 17.3                         | 20.7                 | 0.84                                | -----                                                                  |                                |

Plant 16, grade 9 ("Soft Salmon," 5.6 percent of kiln, EC, C)

|          |     |      |      |      |      |       |       |
|----------|-----|------|------|------|------|-------|-------|
| 1.....   | 510 | 960  | 17.9 | 22.9 | 0.78 | 8.90  | F 60c |
| 2.....   | 400 | 1220 | 22.0 | 26.8 | .82  | F 3c  |       |
| 3.....   | 305 | 1340 | 19.1 | 23.7 | .81  | F 12c |       |
| 4.....   | 380 | 1400 | 20.9 | 24.8 | .84  | F 3c  |       |
| 5.....   | 335 | 1250 | 20.1 | 25.0 | .80  | F 5c  |       |
| Avg..... | 385 | 1230 | 20.0 | 24.6 | 0.81 |       |       |

Plant 31, grade 1 ("Special face," 25 percent of kiln, EC, C)

|          |      |      |     |      |      |      |  |
|----------|------|------|-----|------|------|------|--|
| 1.....   | 795  | 4750 | 5.9 | 10.2 | 0.58 | 0.43 |  |
| 2.....   | 1320 | 4740 | 5.6 | 9.4  | .60  | .37  |  |
| 3.....   | 1035 | 4210 | 9.0 | 12.9 | .70  | .78  |  |
| 4.....   | 1090 | 3940 | 7.9 | 11.9 | .66  | .27  |  |
| 5.....   | 1105 | 4310 | 8.8 | 12.8 | .69  | .54  |  |
| Avg..... | 1070 | 4390 | 7.4 | 11.4 | 0.65 | 0.48 |  |

Plant 31, grade 2 ("Straight Hard," 25 percent of kiln, EC, C)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 745 | 2840 | 11.8 | 15.0 | 0.79 | 0.39 |  |
| 2.....   | 650 | 2530 | 12.6 | 15.8 | .80  | .53  |  |
| 3.....   | 710 | 2480 | 13.0 | 15.2 | .85  | .43  |  |
| 4.....   | 920 | 1880 | 14.0 | 16.8 | .83  | .56  |  |
| 5.....   | 900 | 2440 | 13.0 | 16.2 | .80  | .37  |  |
| Avg..... | 785 | 2430 | 12.9 | 15.8 | 0.81 | 0.46 |  |

Plant 31, grade 3 ("Common Hard," 25 percent of kiln, EC, C)

|          |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|--|
| 1.....   | 890  | 2230 | 11.5 | 15.2 | 0.76 | 0.31 |  |
| 2.....   | 475  | 1600 | 12.4 | 18.9 | .66  | .47  |  |
| 3.....   | 1425 | 3220 | 9.9  | 13.4 | .74  | .12  |  |
| 4.....   | 740  | 3220 | 6.8  | 11.0 | .62  | .51  |  |
| 5.....   | 380  | 1680 | 10.9 | 19.4 | .56  | .61  |  |
| Avg..... | 780  | 2390 | 10.3 | 15.6 | 0.67 | 0.50 |  |

Plant 31, grade 4 ("Light Hard," 10 percent of kiln, EC, C)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 345 | 1260 | 20.2 | 24.5 | 0.83 | 1.47 |  |
| 2.....   | 900 | 2520 | 16.0 | 19.4 | .82  | 0.55 |  |
| 3.....   | 830 | 2520 | 15.0 | 18.3 | .82  | .52  |  |
| 4.....   | 595 | 1440 | 15.3 | 21.5 | .71  | .61  |  |
| 5.....   | 545 | 1180 | 16.6 | 21.7 | .76  | 1.28 |  |
| Avg..... | 645 | 1780 | 16.6 | 21.1 | 0.79 | 0.89 |  |

Plant 31, grade 5 ("Swells," 10 percent of kiln, EC, C)

|          |      |      |     |      |      |      |  |
|----------|------|------|-----|------|------|------|--|
| 1.....   | 1130 | 3590 | 9.0 | 13.8 | 0.65 | 1.08 |  |
| 2.....   | 1065 | 4420 | 6.8 | 11.3 | .60  | 0.45 |  |
| 3.....   | 1275 | 3860 | 6.3 | 11.4 | .55  | .45  |  |
| 4.....   | 1035 | 4000 | 8.2 | 16.4 | .50  | .35  |  |
| 5.....   | 750  | 2730 | 9.2 | 17.8 | .52  | .66  |  |
| Avg..... | 1050 | 3720 | 7.9 | 14.1 | 0.56 | 0.60 |  |

TABLE 6.—*Properties of bricks produced in New Jersey—*  
Continued

| Specimen number                                        | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                        |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 31, grade 6 ("Salmon," 5 percent of kiln, EC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                        | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1                                                      | 525                       | 1830                      | 23.5                 | 26.2         | 0.90                   | F 3c                                                    |                          |
| 2                                                      | 480                       | 1440                      | 21.4                 | 25.4         | .84                    | F 3c                                                    |                          |
| 3                                                      | 295                       | 1560                      | 19.9                 | 24.0         | .83                    | F 12c                                                   |                          |
| 4                                                      | 250                       | 980                       | 24.5                 | 30.9         | .79                    | F 6c                                                    |                          |
| 5                                                      |                           | 1610                      | 22.2                 | 26.5         | .84                    | F 6c                                                    |                          |
| Avg                                                    | 385                       | 1480                      | 22.3                 | 26.6         | 0.84                   | F 6c                                                    |                          |

Plant 43, grade 1 ("Straight Hard," 60 percent of kiln, SC, C)

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
| 1.....   | 335 | 3500 | 10.4 | 14.5 | 0.72 | 0.35 (B) |  |
| 2.....   | 425 | 3760 | 10.5 | 14.0 | .75  | .36 (B)  |  |
| 3.....   | 525 | 3100 | 10.6 | 14.5 | .73  | 9.62 (B) |  |
| 4.....   | 445 | 3710 | 9.9  | 13.2 | .75  | 0.67 (B) |  |
| 5.....   | 350 | 3730 | 8.6  | 13.2 | .65  | .31 (B)  |  |
| Avg..... | 415 | 3560 | 10.0 | 13.9 | 0.72 | 2.26 (B) |  |

Plant 43, grade 2 ("Arch," 25 percent of kiln, SC, C)

|          |     |      |     |      |      |           |  |
|----------|-----|------|-----|------|------|-----------|--|
| 1.....   | 555 | 4010 | 9.1 | 12.8 | 0.71 | F 50c (B) |  |
| 2.....   | 485 | 3990 | 7.7 | 12.1 | .64  | 0.27 (B)  |  |
| 3.....   | 665 | 5180 | 8.5 | 12.4 | .69  | .23 (B)   |  |
| 4.....   | 500 | 4390 | 7.8 | 12.2 | .64  | .20 (B)   |  |
| 5.....   | 570 | 6520 | 9.4 | 12.6 | .75  | .33 (B)   |  |
| Avg..... | 555 | 4820 | 8.5 | 12.4 | 0.69 |           |  |

Plant 43, grade 3 ("Salmon," 15 percent of kiln, SC, C)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 615 | 3720 | 12.8 | 15.8 | 0.81 | 1.50 |  |
| 2.....   | 510 | 4830 | 14.4 | 17.7 | .81  | F 9c |  |
| 3.....   | 400 | 3650 | 15.4 | 18.3 | .84  | F 8c |  |
| 4.....   | 450 | 2750 | 18.4 | 20.4 | .90  | F 3c |  |
| 5.....   | 380 | 2690 | 18.7 | 21.3 | .88  | F 3c |  |
| Avg..... | 470 | 3530 | 15.9 | 18.7 | 0.85 |      |  |

Plant 57, grade 1 ("Smooth Face," 46 percent of kiln, SC, C)

|          |      |      |     |     |      |      |  |
|----------|------|------|-----|-----|------|------|--|
| 1.....   | 890  | 7240 | 6.4 | 9.9 | 0.65 | 0.40 |  |
| 2.....   | 1100 | 8890 | 4.2 | 7.8 | .54  | .10  |  |
| 3.....   | 935  | 8940 | 3.7 | 7.5 | .49  | .09  |  |
| 4.....   | 845  | 8530 | 5.2 | 9.1 | .57  | .26  |  |
| 5.....   | 1225 | 9250 | 4.8 | 8.3 | .58  | .18  |  |
| Avg..... | 1000 | 8570 | 4.9 | 8.5 | 0.57 | 0.29 |  |

Plant 57, grade 2 ("Textured Face," 46 percent of kiln, SC, C)

|          |     |      |     |      |      |      |  |
|----------|-----|------|-----|------|------|------|--|
| 1.....   | 445 | 6970 | 6.0 | 9.3  | 0.64 | 0.28 |  |
| 2.....   | 840 | 5210 | 5.3 | 9.7  | .55  | .29  |  |
| 3.....   | 365 | 6590 | 4.2 | 8.5  | .49  | .09  |  |
| 4.....   | 500 | 6520 | 6.5 | 9.9  | .66  | .78  |  |
| 5.....   | 440 | 7090 | 6.5 | 10.0 | .65  | .17  |  |
| Avg..... | 520 | 6480 | 5.7 | 9.5  | 0.60 | 0.52 |  |

Plant 60, grade 1 ("Commercial Hard," 90 percent of kiln, SM, C)

|          |      |      |      |      |      |          |  |
|----------|------|------|------|------|------|----------|--|
| 1.....   | 1480 | 8040 | 9.9  | 12.2 | 0.81 | 0.23 (B) |  |
| 2.....   | 1160 | 7190 | 10.6 | 12.8 | .83  | .34 (B)  |  |
| 3.....   | 825  | 5080 | 12.4 | 15.2 | .82  | .23 (B)  |  |
| 4.....   | 720  | 5000 | 12.3 | 14.9 | .83  | .52 (B)  |  |
| 5.....   | 545  | 7370 | 12.8 | 14.9 | .86  | .43 (B)  |  |
| 6.....   | 455  | 5230 | 11.5 | 14.6 | .79  | No test  |  |
| Avg..... | 865  | 6320 | 11.6 | 14.1 | 0.82 | 0.35 (B) |  |

TABLE 6.—*Properties of bricks produced in New Jersey—*  
Continued

| Specimen number                                                 | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                 |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 60, grade 2 ("Pale or salmon," 10 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %<br>(a)     | (a)                    | %<br>F 6c                                               | 3.34 (63c)               |
| 2-----                                                          | 970                       | 2770                      | 23.3                 | -----        | -----                  | 3.00                                                    |                          |
| 3-----                                                          | -----                     | 3070                      | 20.8                 | -----        | -----                  | F 36c                                                   |                          |
| 4-----                                                          | -----                     | 740                       | 22.4                 | -----        | -----                  | F 1c                                                    |                          |
| 5-----                                                          | 190                       | 1080                      | 22.2                 | -----        | -----                  | F 1c                                                    |                          |
| 6-----                                                          | 95                        | 1510                      | 21.7                 | -----        | -----                  | F 2c                                                    |                          |
| 6-----                                                          | 90                        | 510                       | 21.2                 | -----        | -----                  | -----                                                   |                          |
| Avg-----                                                        | 335                       | 1610                      | 21.9                 | -----        | -----                  | -----                                                   |                          |

Plant 87, grade 1 ("No. 1 Grade," 43 percent of kiln, SM, C)

|          |      |      |      |      |      |          |  |
|----------|------|------|------|------|------|----------|--|
| 1-----   | 770  | 3320 | 13.3 | 18.2 | 0.73 | 0.14 (B) |  |
| 2-----   | 515  | 3770 | 15.4 | 20.6 | .75  | .29 (B)  |  |
| 3-----   | 755  |      | 13.8 | 19.1 | .72  | .26 (B)  |  |
| 4-----   | 1000 | 5240 | 14.4 | 20.3 | .71  | .34 (B)  |  |
| 5-----   | 935  | 4940 | 10.8 | 15.7 | .69  | .17 (B)  |  |
| Avg----- | 795  | 4320 | 13.5 | 18.8 | 0.72 | 0.24 (B) |  |

Plant 87, grade 2 ("No. 2 Grade," 43 percent of kiln, SM, C)

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
| 1-----   | 755 | 6600 | 13.1 | 18.3 | 0.72 | 0.00 (B) |  |
| 2-----   | 855 | 4340 | 10.5 | 15.7 | .67  | .13 (B)  |  |
| 3-----   | 325 | 6870 | 7.3  | 11.3 | .65  | .32 (B)  |  |
| 4-----   | 505 | 7540 | 7.3  | 12.7 | .57  | .37 (B)  |  |
| 5-----   | 670 | 4560 | 13.7 | 19.4 | .71  | .34 (B)  |  |
| Avg----- | 625 | 5980 | 10.4 | 15.5 | 0.66 | 0.23 (B) |  |

Plant 87, grade 2A ("Second sample of Grade 2")

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
| 1-----   | 525 | 7250 | 6.6  | 13.2 | 0.50 | 0.15 (B) |  |
| 2-----   | 425 | 9400 | 9.6  | 15.7 | .61  | .17 (B)  |  |
| 3-----   | 885 | 6250 | 10.3 | 15.4 | .67  | .13 (B)  |  |
| 4-----   | 895 | 7990 | 9.5  | 14.6 | .65  | .15 (B)  |  |
| 5-----   | 545 | 4730 | 8.5  | 13.8 | .62  | .00 (B)  |  |
| Avg----- | 655 | 7120 | 8.9  | 14.5 | 0.61 | 0.12 (B) |  |

Plant 87, grade 3 ("Arch," 1.0 percent of kiln, SM, C)

|          |      |      |     |      |      |          |  |
|----------|------|------|-----|------|------|----------|--|
| 1-----   | 2150 | 7640 | 7.1 | 13.7 | 0.52 | 0.26 (B) |  |
| 2-----   | 595  | 5930 | 6.6 | 11.6 | .57  | .17 (B)  |  |
| 3-----   | 530  | 7130 | 6.6 | 10.4 | .58  | .19 (B)  |  |
| 4-----   | 1275 | 7900 | 6.8 | 12.9 | .53  | .15 (B)  |  |
| 5-----   | 1245 | 9210 | 7.8 | 13.3 | .59  | .31 (B)  |  |
| Avg----- | 1160 | 7560 | 7.0 | 12.4 | 0.57 | 0.22 (B) |  |

Plant 87, grade 4 ("Light Hard," 4 percent of kiln, SM, C)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1-----   | 330 | 2590 | 18.9 | 23.3 | 0.79 | 1.39 |  |
| 2-----   | 365 | 2420 | 19.6 | 24.0 | .82  | 0.78 |  |
| 3-----   | 290 | 2270 | 18.5 | 23.1 | .80  | 0.35 |  |
| 4-----   | 180 | 2400 | 19.4 | 23.7 | .82  | 1.01 |  |
| 5-----   | 355 | 2430 | 19.1 | 23.1 | .83  | 1.04 |  |
| Avg----- | 305 | 2420 | 19.1 | 23.4 | 0.81 | 0.91 |  |

<sup>a</sup> Grade 2 of plant 60 was partially disintegrated by boiling, with consequent loss in weight. The absorption measure by 5-hr. boiling and the saturation coefficients are therefore unknown.

TABLE 6.—*Properties of bricks produced in New Jersey—*  
Continued

| Specimen number                                        | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                        |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 87, grade 5 ("Salmon," 4 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                        | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                | <i>%</i>                 |
| 1-----                                                 | 250                       | 2360                      | 18.9                 | 24.4         | 0.78                   | 1.11                                                    | 1.11 (63c)               |
| 2-----                                                 | 140                       | 1760                      | 19.5                 | 24.4         | .80                    | 3.80                                                    | F 60c                    |
| 3-----                                                 | 305                       | 1740                      | 22.3                 | 27.0         | .83                    | F 39c                                                   |                          |
| 4-----                                                 | 215                       | 1890                      | 20.5                 | 25.6         | .80                    | 1.20                                                    | 1.54 (63c)               |
| 5-----                                                 | 215                       | 1610                      | 18.6                 | 23.7         | .79                    | 1.03                                                    | 1.28 (63c)               |
| Avg-----                                               | 225                       | 1870                      | 20.0                 | 25.0         | 0.80                   | -----                                                   |                          |

Plant 151, grade 1 ("Kiln Run," percentage of kiln unknown, SM, C)

|          |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|--|
| 1-----   | 670  | 4420 | 16.2 | 20.1 | 0.81 | 0.39 |  |
| 2-----   | 1010 | 5750 | 12.7 | 15.5 | .82  | .28  |  |
| 3-----   | 590  | 9040 | 9.2  | 12.1 | .76  | .14  |  |
| 4-----   | 1300 | 9000 | 9.6  | 12.4 | .77  | .28  |  |
| 5-----   | 685  | 5880 | 15.5 | 18.3 | .85  | .42  |  |
| 6-----   | 830  | 5500 | 15.4 | 17.9 | .86  | .26  |  |
| 7-----   | 455  | 8150 | 9.3  | 12.4 | .75  | .31  |  |
| 8-----   | 995  | 7260 | 10.8 | 15.1 | .71  | .29  |  |
| 9-----   | 470  | 6360 | 9.9  | 13.4 | .74  | .23  |  |
| 10-----  | 555  | 4100 | 17.5 | 20.6 | .85  | .62  |  |
| 11-----  |      | 7750 | 16.9 | 19.7 | .86  | .71  |  |
| 12-----  |      | 5140 | 15.7 | 18.0 | .87  | .45  |  |
| 13-----  | 680  | 4420 | 16.9 | 19.5 | .87  | .39  |  |
| 14-----  | 745  | 8860 | 14.0 | 15.9 | .88  | .12  |  |
| 15-----  | 1140 | 7960 | 8.4  | 11.2 | .75  | .19  |  |
| Avg----- | 780  | 6640 | 13.2 | 16.1 | 0.81 | 0.34 |  |

Plant 189, grade 1 ("Kiln Run," percentage of kiln unknown, SM, C)

|          |      |       |     |      |      |          |  |
|----------|------|-------|-----|------|------|----------|--|
| 1-----   | 1415 | 5220  | 6.9 | 11.1 | 0.62 | 0.11 (B) |  |
| 2-----   | 910  | 9740  | 5.0 | 6.9  | .72  | .25 (B)  |  |
| 3-----   | 1650 | 11540 | 6.7 | 8.1  | .83  | .13 (B)  |  |
| 4-----   | 1455 | 12070 | 7.8 | 9.2  | .85  | .14 (B)  |  |
| 5-----   | 1100 | 8630  | 5.8 | 7.7  | .75  | .39 (B)  |  |
| 6-----   | 1920 | 8120  | 7.1 | 9.0  | .79  | .13 (B)  |  |
| 7-----   | 1650 | 10440 | 5.7 | 8.2  | .70  | .13 (B)  |  |
| 8-----   | 1800 | 8760  | 5.9 | 8.5  | .69  | .39 (B)  |  |
| 9-----   | 1750 | 6560  | 7.9 | 9.4  | .84  | .29 (B)  |  |
| 10-----  | 1880 | 10900 | 8.3 | 9.5  | .87  | .24 (B)  |  |
| 11-----  | 1785 | 9380  | 7.3 | 9.4  | .78  | .10 (B)  |  |
| 12-----  | 1915 | 6110  | 7.7 | 9.7  | .79  | .20 (B)  |  |
| 13-----  | 2110 | 10880 | 6.4 | 8.2  | .78  | .23 (B)  |  |
| 14-----  | 1550 | 6670  | 7.3 | 9.1  | .80  | .00 (B)  |  |
| 15-----  | 1835 | 9340  | 7.9 | 9.6  | .82  | .11 (B)  |  |
| Avg----- | 1650 | 8960  | 6.9 | 8.9  | 0.78 | 0.19 (B) |  |

Plant 214, grade 1 ("Har 1," 50 percent of kiln, EC, C)

|            |      |      |      |      |      |            |  |
|------------|------|------|------|------|------|------------|--|
| Avg (5)--- | 1250 | 3020 | 10.1 | 13.7 | 0.73 | Not tested |  |
|------------|------|------|------|------|------|------------|--|

Plant 214, grade 2 ("Medium," 30 percent of kiln, EC, C)

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
| 1-----   | 895 | 1910 | 15.1 | 18.8 | 0.80 | 0.28 (B) |  |
| 2-----   | 875 | 1910 | 14.4 | 18.1 | .80  | .21 (B)  |  |
| 3-----   | 860 | 1710 | 16.4 | 19.8 | .83  | .68 (B)  |  |
| 4-----   | 495 | 1840 | 16.1 | 19.8 | .81  | .65 (B)  |  |
| 5-----   | 990 | 2300 | 17.2 | 20.4 | .84  | 1.12 (B) |  |
| Avg----- | 825 | 1930 | 15.8 | 19.4 | 0.82 | 0.59 (B) |  |

Plant 214, grade 3 ("Soft," 20 percent of kiln, EC, C)

|          |     |      |      |      |      |           |  |
|----------|-----|------|------|------|------|-----------|--|
| 1-----   | 975 | 1830 | 20.8 | 24.5 | 0.85 | F 8c (B)  |  |
| 2-----   | 805 | 1610 | 20.1 | 23.6 | .85  | F 11c (B) |  |
| 3-----   | 835 | 1850 | 21.0 | 24.2 | .87  | F 5c (B)  |  |
| 4-----   | 765 | 1850 | 20.9 | 23.9 | .87  | F 6c (B)  |  |
| 5-----   | 710 | 1740 | 19.4 | 22.3 | .87  | F 6c (B)  |  |
| Avg----- | 820 | 1780 | 20.4 | 23.7 | 0.86 | F 7c (B)  |  |

TABLE 7.—*Properties of bricks produced in Delaware and Maryland*

[The samples reported were all made from surface clay and were formed by the soft-mud or the stiff-mud (side-cut and end-cut) process. No bricks from Western Maryland, which are made from shale and formed by the side-cut process, are included. These shale bricks closely resemble, in properties, the bricks reported in table 10]

| Specimen number                                                                        | Modulus of rupture         | Compressive strength        | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------------------------------|----------------------------|-----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                                        |                            |                             | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 64, grade 1 ("Full range face," 60 percent of kiln, SM, C)                       |                            |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                                                | lb/in. <sup>2</sup><br>625 | lb/in. <sup>2</sup><br>3010 | %<br>10.6            | %<br>16.5    | 0.63                   | %<br>Not tested                                         | %                        |
| Plant 64, grade 2 ("Red range face," 35 percent of kiln, SM, C)                        |                            |                             |                      |              |                        |                                                         |                          |
| 1                                                                                      | 1120                       | 3830                        | 12.5                 | 17.5         | 0.71                   | 0.20 (B)                                                |                          |
| 2                                                                                      | 695                        | 3360                        | 13.8                 | 19.4         | .71                    | .25 (B)                                                 |                          |
| 3                                                                                      | 640                        | 3210                        | 9.2                  | 15.8         | .58                    | .33 (B)                                                 |                          |
| 4                                                                                      | 1175                       | 3619                        | 11.2                 | 16.1         | .70                    | .19 (B)                                                 |                          |
| 5                                                                                      | 530                        | 3090                        | 12.2                 | 17.1         | .71                    | .00 (B)                                                 |                          |
| Avg                                                                                    | 835                        | 3420                        | 11.8                 | 17.2         | 0.68                   | 0.19 (B)                                                |                          |
| Plant 64, grade 3 ("Salmons," 5 percent of kiln, SM, C)                                |                            |                             |                      |              |                        |                                                         |                          |
| 1                                                                                      | 360                        | 1520                        | 19.6                 | 24.3         | 0.81                   | F 3e                                                    | 1.22 (66c)               |
| 2                                                                                      | 750                        | 2060                        | 17.1                 | 21.5         | .80                    | 1.00                                                    |                          |
| 3                                                                                      | 570                        | 2140                        | 16.6                 | 21.0         | .79                    | F 4se                                                   |                          |
| 4                                                                                      | 280                        | 710                         | 22.8                 | 27.9         | .82                    | F 2c                                                    |                          |
| 5                                                                                      | 265                        | 1000                        | 22.1                 | 27.3         | .81                    | F 2e                                                    |                          |
| Avg                                                                                    | 445                        | 1490                        | 19.6                 | 24.4         | 0.81                   |                                                         |                          |
| Plant 64, grade 4 ("Range medium to salmon," (1937) percentage of kiln unknown, SM, C) |                            |                             |                      |              |                        |                                                         |                          |
| 1                                                                                      | 680                        | 2240                        | 12.8                 | 19.7         | 0.65                   | 0.62                                                    | 0.83 (75c)               |
| 2                                                                                      | 540                        | 3000                        | 12.9                 | 19.3         | .66                    | .44                                                     | .66 (75c)                |
| 3                                                                                      | 670                        | 2530                        | 13.6                 | 19.7         | .69                    | .70                                                     | .90 (75c)                |
| 4                                                                                      | 685                        | 2540                        | 13.0                 | 19.3         | .68                    | .58                                                     | .58 (75c)                |
| 5                                                                                      | 475                        | 2740                        | 15.0                 | 21.0         | .71                    | .69                                                     | .79 (75c)                |
| 6                                                                                      | 435                        | 2140                        | 15.4                 | 21.5         | .72                    | 1.58                                                    | 1.82 (75c)               |
| 7                                                                                      | 590                        | 2070                        | 16.0                 | 21.9         | .74                    | 0.69                                                    | 0.69 (75c)               |
| 8                                                                                      | 505                        | 2180                        | 17.9                 | 23.2         | .74                    | F 31e                                                   |                          |
| 9                                                                                      | 770                        | 2200                        | 16.1                 | 21.7         | .74                    | 0.75                                                    | .75 (75c)                |
| 10                                                                                     | 660                        | 2050                        | 16.7                 | 22.3         | .75                    | 4.48                                                    | F 57c                    |
| 11                                                                                     | 420                        | 1870                        | 18.0                 | 23.4         | .77                    | F 8c                                                    | 8.00 (75c)               |
| 12                                                                                     | 440                        | 1620                        | 18.0                 | 23.6         | .76                    | 6.05                                                    |                          |
| 13                                                                                     | 550                        | 1550                        | 19.3                 | 24.5         | .79                    | F 8c                                                    |                          |
| 14                                                                                     | 450                        | 2170                        | 18.1                 | 23.5         | .77                    | F 8c                                                    |                          |
| 15                                                                                     | 260                        | 1130                        | 19.9                 | 25.3         | .78                    | F 3c                                                    |                          |
| 16                                                                                     | 270                        | 1160                        | 19.8                 | 24.7         | .80                    | F 2c                                                    |                          |
| 17                                                                                     | 305                        | 1490                        | 20.1                 | 25.9         | .80                    | F 2c                                                    |                          |
| 18                                                                                     | 285                        | 1360                        | 20.5                 | 25.1         | .82                    | F 2c                                                    |                          |
| 19                                                                                     | 240                        | 920                         | 19.9                 | 23.9         | .84                    | F 2c                                                    |                          |
| 20                                                                                     | 240                        | 890                         | 20.9                 | 25.5         | .82                    | F 2c                                                    |                          |
| Avg                                                                                    | 475                        | 1880                        | 17.2                 | 22.7         | 0.75                   |                                                         |                          |
| Plant 65, grade 1 ("Face," 25 percent of kiln, EC, C)                                  |                            |                             |                      |              |                        |                                                         |                          |
| 1                                                                                      | 1005                       | 3270                        | 7.7                  | 10.8         | 0.71                   | 0.00 (B)                                                |                          |
| 2                                                                                      | 1330                       | 5060                        | 9.1                  | 12.2         | .74                    | .20 (B)                                                 |                          |
| 3                                                                                      | 1360                       | 4930                        | 8.3                  | 11.2         | .74                    | .10 (B)                                                 |                          |
| 4                                                                                      | 1075                       | 4240                        | 10.8                 | 13.2         | .82                    | .49 (B)                                                 |                          |
| 5                                                                                      | 1330                       | 4710                        | 11.5                 | 14.4         | .80                    | .19 (B)                                                 |                          |
| Avg                                                                                    | 1220                       | 4440                        | 9.5                  | 12.4         | 0.76                   | 0.20 (B)                                                |                          |
| Plant 65, grade 2 ("Arch," 70 percent of kiln, EC, C)                                  |                            |                             |                      |              |                        |                                                         |                          |
| 1                                                                                      | 1380                       | 4270                        | 8.1                  | 11.3         | 0.72                   | 0.21 (B)                                                |                          |
| 2                                                                                      | 710                        | 3390                        | 11.2                 | 14.6         | .77                    | .43 (B)                                                 |                          |
| 3                                                                                      | 905                        | 3440                        | 11.3                 | 14.5         | .78                    | .28 (B)                                                 |                          |
| 4                                                                                      | 1350                       | 4310                        | 9.6                  | 13.3         | .72                    | .43 (B)                                                 |                          |
| 5                                                                                      | 955                        | 4560                        | 12.4                 | 15.6         | .80                    | .65 (B)                                                 |                          |
| Avg                                                                                    | 1060                       | 3990                        | 10.5                 | 13.9         | 0.76                   | 0.40 (B)                                                |                          |

TABLE 7.—*Properties of bricks produced in Delaware and Maryland—Continued*

| Specimen number                                                | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 65, grade 3 ("Salmon," 5 percent of kiln, EC, C)         |                    |                      |                      |              |                        |                                                         |                          |
| 1-----                                                         | 400                | 2120                 | 15.3                 | 19.4         | 0.79                   | 5.70                                                    | F 66c                    |
| 2-----                                                         | 385                | 1930                 | 22.0                 | 24.6         | .90                    | F 2c                                                    |                          |
| 3-----                                                         | 425                | 1780                 | 19.8                 | 22.1         | .90                    | F 3c                                                    |                          |
| 4-----                                                         | 640                | 3060                 | 16.0                 | 18.7         | .86                    | F 9c                                                    |                          |
| 5-----                                                         | 575                | 2840                 | 18.5                 | 21.0         | .88                    | F 3c                                                    |                          |
| Avg-----                                                       | 485                | 2350                 | 18.3                 | 21.2         | 0.87                   | -----                                                   |                          |
| Plant 66, grade 1 ("Sewer brick," 25 percent of kiln, SC, C)   |                    |                      |                      |              |                        |                                                         |                          |
| 1-----                                                         | 1500               | 9290                 | 9.5                  | 11.5         | 0.83                   | 0.00 (B)                                                |                          |
| 2-----                                                         | 1280               | 6950                 | 10.9                 | 13.0         | .84                    | .00 (B)                                                 |                          |
| 3-----                                                         | 1600               | 6190                 | 10.6                 | 12.7         | .83                    | .08 (B)                                                 |                          |
| 4-----                                                         | 1400               | 6740                 | 10.6                 | 12.8         | .83                    | .00 (B)                                                 |                          |
| 5-----                                                         | 1355               | 7760                 | 11.1                 | 12.8         | .87                    | .18 (B)                                                 |                          |
| Avg-----                                                       | 1425               | 7390                 | 10.5                 | 12.6         | 0.84                   | 0.05 (B)                                                |                          |
| Plant 66, grade 2 ("Arch," 70 percent of kiln, SC, C)          |                    |                      |                      |              |                        |                                                         |                          |
| 1-----                                                         | 1670               | 8450                 | 8.3                  | 10.1         | 0.82                   | 0.28 (B)                                                |                          |
| 2-----                                                         | 1750               | 12000                | 5.5                  | 7.3          | .75                    | .00 (B)                                                 |                          |
| 3-----                                                         | 1775               | 8710                 | 4.9                  | 7.1          | .69                    | .09 (B)                                                 |                          |
| 4-----                                                         | 2190               | 12180                | 6.1                  | 8.2          | .74                    | .08 (B)                                                 |                          |
| 5-----                                                         | 1605               | 7460                 | 8.5                  | 10.7         | .79                    | .15 (B)                                                 |                          |
| Avg-----                                                       | 1800               | 9760                 | 6.7                  | 8.7          | 0.76                   | 0.12 (B)                                                |                          |
| Plant 66, grade 3 ("Salmon," 5 percent of kiln, SC, C)         |                    |                      |                      |              |                        |                                                         |                          |
| 1-----                                                         | 585                | 2950                 | 17.3                 | 19.1         | 0.91                   | F 3c                                                    |                          |
| 2-----                                                         | 740                | 4630                 | 17.3                 | 18.9         | .92                    | F 3c                                                    |                          |
| 3-----                                                         | 695                | 4350                 | 17.4                 | 18.9         | .92                    | F 3c                                                    |                          |
| 4-----                                                         | 1150               | 5130                 | 15.0                 | 17.1         | .88                    | F 9c                                                    |                          |
| 5-----                                                         | 635                | 4140                 | 17.5                 | 19.0         | .92                    | F 4e                                                    |                          |
| Avg-----                                                       | 760                | 4240                 | 16.9                 | 18.6         | 0.91                   | F 4c                                                    |                          |
| Plant 66, grade 3A ("Salmon," (1936) 5 percent of kiln, SC, C) |                    |                      |                      |              |                        |                                                         |                          |
| 1-----                                                         | 785                | 8180                 | (24-hr)<br>7.8       | 9.3          | 0.84                   | 0.45                                                    |                          |
| 2-----                                                         | 1005               | 5820                 | 13.1                 | 14.8         | .88                    | F 17c                                                   |                          |
| 3-----                                                         | 980                | 6060                 | 6.7                  | 8.7          | .76                    | 0.39                                                    |                          |
| 4-----                                                         | 70                 | 5570                 | 14.1                 | 15.7         | .90                    | F 9c                                                    |                          |
| 5-----                                                         | 1110               | 7880                 | 5.1                  | 7.0          | .72                    | 0.82                                                    |                          |
| 6-----                                                         | 705                | 5320                 | 12.7                 | 14.2         | .89                    | F 12c                                                   |                          |
| 7-----                                                         | 1565               | 8510                 | 8.2                  | 10.1         | .81                    | 0.26                                                    |                          |
| 8-----                                                         | 1295               | 8110                 | 11.9                 | 13.5         | .88                    | F 37c                                                   |                          |
| 9-----                                                         | 1225               | 6000                 | 9.4                  | 11.2         | .84                    | F 30c                                                   |                          |
| 10-----                                                        | 920                | 5000                 | 12.1                 | 14.1         | .86                    | F 19c                                                   |                          |
| 11-----                                                        | 1255               | 6160                 | 10.7                 | 12.4         | .86                    | 0.85                                                    |                          |
| 12-----                                                        | 1145               | 5940                 | 11.0                 | 12.4         | .88                    | F 16c                                                   |                          |
| 13-----                                                        | 895                | 7180                 | 9.0                  | 10.8         | .84                    | 0.61                                                    |                          |
| 14-----                                                        | 1160               | 9170                 | 7.4                  | 9.4          | .78                    | .30                                                     |                          |
| 15-----                                                        | 625                | 6810                 | 12.0                 | 13.8         | .87                    | F 8c                                                    |                          |
| 16-----                                                        | 1475               | 7890                 | 4.8                  | 6.3          | .76                    | 0.19                                                    |                          |
| 17-----                                                        | 660                | 6170                 | 11.2                 | 13.2         | .84                    | F 17c                                                   |                          |
| 18-----                                                        | 560                | 7500                 | 10.7                 | 12.4         | .86                    | F 27c                                                   |                          |
| 19-----                                                        | 1060               | 7890                 | 8.8                  | 10.5         | .84                    | 0.36                                                    |                          |
| 20-----                                                        | 845                | 6260                 | 9.6                  | 11.3         | .85                    | .92                                                     |                          |
| Avg-----                                                       | 965                | 6870                 | 9.8                  | 11.5         | 0.84                   | -----                                                   |                          |

TABLE 7.—Properties of bricks produced in Delaware and Maryland—Continued

| Specimen number                                                | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 66, grade 3B ("Salmon," (1937) 5 percent of kiln, SC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | (24-hr)<br>%         | %            |                        | %                                                       | %                        |
| 1                                                              | 2220                      | 9800                      | 8.3                  | 9.8          | 0.84                   | 0.00                                                    | 0.11 (75)                |
| 2                                                              | 875                       | 7920                      | 8.8                  | 10.7         | .83                    | F 3c                                                    |                          |
| 3                                                              | 1130                      | 7080                      | 11.6                 | 13.4         | .86                    | F 30c                                                   |                          |
| 4                                                              | 1560                      | 6260                      | 10.5                 | 12.2         | .86                    | F 24                                                    | 0.24 (75c)               |
| 5                                                              | 1320                      | 6880                      | 12.0                 | 13.8         | .87                    | F 19c                                                   |                          |
| 6                                                              | 1435                      | 6500                      | 12.0                 | 13.8         | .86                    | F 26c                                                   | F 56c                    |
| 7                                                              | 620                       | 5680                      | 11.9                 | 13.6         | .88                    | F 21c                                                   |                          |
| 8                                                              | 1065                      | 7790                      | 12.6                 | 14.4         | .88                    | F 26c                                                   |                          |
| 9                                                              | 1115                      | 5530                      | 13.0                 | 14.7         | .88                    | F 24c                                                   |                          |
| 10                                                             | 1080                      | 8360                      | 11.3                 | 12.9         | .88                    | F 23c                                                   |                          |
| 11                                                             | 910                       | 6080                      | 12.4                 | 14.1         | .88                    | F 20c                                                   |                          |
| 12                                                             | 1375                      | 8270                      | 12.3                 | 13.9         | .88                    | F 20c                                                   |                          |
| 13                                                             | 1045                      | 4460                      | 14.6                 | 16.5         | .88                    | F 12c                                                   |                          |
| 14                                                             | 1045                      | 6760                      | 14.0                 | 15.8         | .88                    | F 8c                                                    |                          |
| 15                                                             | 1275                      | 6700                      | 13.8                 | 15.6         | .89                    | F 15c                                                   |                          |
| 16                                                             | 1390                      | 7170                      | 14.2                 | 15.8         | .90                    | F 19c                                                   |                          |
| 17                                                             | 1280                      | 7380                      | 13.2                 | 14.7         | .90                    | F 16c                                                   |                          |
| 18                                                             | 910                       | 6440                      | 14.6                 | 16.5         | .89                    | F 11c                                                   |                          |
| 19                                                             | 960                       | 7040                      | 13.2                 | 14.8         | .90                    | F 18c                                                   |                          |
| 20                                                             | 1030                      | 4170                      | 15.4                 | 17.1         | .90                    | F 7c                                                    |                          |
| Avg                                                            | 1180                      | 6810                      | 12.5                 | 14.2         | 0.88                   |                                                         |                          |

Plant 103, grade 1 ("Arch," 35 percent of kiln, EC, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr) % | %    |      | %        | % |
|----------|---------------------|---------------------|-----------|------|------|----------|---|
| 1.....   | 1380                | 6400                | 5.4       | 8.9  | 0.61 | 0.00 (B) |   |
| 2.....   | 1330                | 5530                | 4.2       | 8.4  | .50  | .42 (B)  |   |
| 3.....   | 1845                | 4350                | 5.6       | 9.5  | .54  | .11 (B)  |   |
| 4.....   | 550                 | 4320                | 7.4       | 11.1 | .67  | .45 (B)  |   |
| 5.....   | 1340                | 4720                | 9.8       | 13.5 | .73  | .12 (B)  |   |
| Avg..... | 1290                | 5060                | 6.5       | 10.3 | 0.61 | 0.22 (B) |   |

Plant 103, grade 2 ("Hard red," 55 percent of kiln, EC, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr) % | %    |      | %    | % |
|----------|---------------------|---------------------|-----------|------|------|------|---|
| 1.....   | 905                 | 3720                | 10.0      | 13.3 | 0.75 | 0.13 |   |
| 2.....   | 1350                | 3970                | 10.7      | 13.9 | .77  | .11  |   |
| 3.....   | 1210                | 4020                | 10.7      | 13.6 | .79  | .57  |   |
| 4.....   | 1315                | 4510                | 11.4      | 14.4 | .79  | .00  |   |
| 5.....   | 1340                | 3540                | 9.9       | 13.4 | .74  | .23  |   |
| Avg..... | 1225                | 3950                | 10.5      | 13.7 | 0.77 | 0.21 |   |

Plant 103, grade 3 ("Hand made," percentage of kiln unknown, SM, C)

| Avg (5) | 630 | 4500 | 9.4 | 14.6 | 0.64 | Not tested |  |
|---------|-----|------|-----|------|------|------------|--|
|---------|-----|------|-----|------|------|------------|--|

Plant 103, grade 4 ("Salmon," 10 percent of kiln, EC, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr) % | %    |      | %     | % |
|----------|---------------------|---------------------|-----------|------|------|-------|---|
| 1.....   | 285                 | 2580                | 13.4      | 16.8 | 0.80 | 0.40  |   |
| 2.....   | 690                 | 2830                | 15.8      | 19.0 | .83  | .44   |   |
| 3.....   | 825                 | 3050                | 15.4      | 19.0 | .81  | .00   |   |
| 4.....   | 465                 | 2760                | 14.7      | 17.3 | .85  | F 30c |   |
| 5.....   | 560                 | 2180                | 17.6      | 20.6 | .86  | F 3c  |   |
| Avg..... | 565                 | 2680                | 15.4      | 18.5 | 0.83 |       |   |

TABLE 7.—Properties of bricks produced in Delaware and Maryland—Continued

| Specimen number                                                          | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                          |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 103, grade 4A ("Salmon," (1937) percentage of kiln unknown, EC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | (24-hr)              | %            |                        | %                                                       | %                        |
| 1.....                                                                   | 525                       | 3040                      | 13.1                 | 16.1         | 0.82                   | 1.17                                                    | 1.36 (75c)               |
| 2.....                                                                   | 355                       | 2240                      | 15.4                 | 18.8         | .82                    | F 6c                                                    |                          |
| 3.....                                                                   | 705                       | 2840                      | 14.0                 | 16.8         | .83                    | 2.80                                                    | 3.40 (75c)               |
| 4.....                                                                   | 410                       | 2850                      | 15.5                 | 18.8         | .82                    | F 6c                                                    |                          |
| 5.....                                                                   | 390                       | 2500                      | 15.4                 | 18.5         | .83                    | F 8c                                                    |                          |
| 6.....                                                                   | 315                       | 2420                      | 15.5                 | 18.6         | .84                    | F 8c                                                    |                          |
| 7.....                                                                   | 305                       | 2480                      | 15.5                 | 18.5         | .84                    | F 4c                                                    |                          |
| 8.....                                                                   | 275                       | 2400                      | 16.0                 | 19.2         | .84                    | F 3c                                                    |                          |
| 9.....                                                                   | 645                       | 2690                      | 14.8                 | 17.6         | .84                    | F 20c                                                   |                          |
| 10.....                                                                  | 450                       | 3000                      | 14.7                 | 17.5         | .84                    | F 27c                                                   |                          |
| 11.....                                                                  | 565                       | 2590                      | 15.2                 | 17.9         | .84                    | F 5c                                                    |                          |
| 12.....                                                                  | 640                       | 2850                      | 14.4                 | 17.1         | .84                    | F 34c                                                   |                          |
| 13.....                                                                  | 525                       | 3100                      | 15.2                 | 17.9         | .85                    | F 5c                                                    |                          |
| 14.....                                                                  | 405                       | 2300                      | 15.0                 | 18.4         | .85                    | F 6c                                                    |                          |
| 15.....                                                                  | 340                       | 2860                      | 14.6                 | 17.0         | .86                    | F 12c                                                   |                          |
| 16.....                                                                  | 375                       | 3140                      | 14.3                 | 16.7         | .86                    | F 48c                                                   |                          |
| 17.....                                                                  | 625                       | 2680                      | 15.1                 | 17.6         | .86                    | F 12c                                                   |                          |
| 18.....                                                                  | 495                       | 3670                      | 14.2                 | 16.4         | .86                    | F 12c                                                   |                          |
| 19.....                                                                  | 605                       | 3460                      | 14.4                 | 16.5         | .88                    | F 12c                                                   |                          |
| 20.....                                                                  | 500                       | 3400                      | 14.8                 | 16.8         | .88                    | F 5c                                                    |                          |
| Avg.....                                                                 | 470                       | 2830                      | 14.9                 | 17.6         | 0.84                   |                                                         |                          |

Plant 118, grade 1 ("Vitrified," 4 percent of kiln, SC, C)

| Avg (5) | 2345 | 10080 | 2.0 | 3.6 | 0.54 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 118, grade 2 ("Hard," 80 percent of kiln, SC, C)

| Avg (5) | 1845 | 7580 | 7.3 | 8.9 | 0.82 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|
|---------|------|------|-----|-----|------|------------|--|

Plant 118, grade 3 ("Light bard," 7 percent of kiln, SC, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr) % | %    |      | %         | % |
|----------|---------------------|---------------------|-----------|------|------|-----------|---|
| 1.....   | 1195                | 7740                | 11.8      | 13.7 | 0.86 | 0.19 (B)  |   |
| 2.....   | 1145                | 6900                | 12.2      | 14.2 | .86  | .20 (B)   |   |
| 3.....   | 1420                | 6680                | 12.8      | 14.8 | .87  | F 42c (B) |   |
| 4.....   | 1315                | 4790                | 13.5      | 15.4 | .88  | 0.09 (B)  |   |
| 5.....   | 1335                | 6450                | 12.7      | 14.6 | .87  | F 41c (B) |   |
| Avg..... | 1280                | 6510                | 12.6      | 14.5 | 0.87 |           |   |

Plant 118, grade 4 ("Salmon," 9 percent of kiln, SC, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr) % | %    |      | %    | % |
|----------|---------------------|---------------------|-----------|------|------|------|---|
| 1.....   | 860                 | 4110                | 17.3      | 19.6 | 0.88 | F 8c |   |
| 2.....   | 725                 | 3720                | 18.9      | 21.1 | .89  | F 3c |   |
| 3.....   | 905                 | 4330                | 17.1      | 19.2 | .89  | F 6c |   |
| 4.....   | 860                 | 4080                | 17.6      | 19.5 | .90  | F 6c |   |
| 5.....   | 590                 | 3130                | 19.2      | 21.4 | .90  | F 6c |   |
| Avg..... | 790                 | 3870                | 18.0      | 20.2 | 0.89 | F 6c |   |

Plant 173, grade 1 ("Special dark," 30 percent of kiln, EC, C)

| Avg (5) | 1595 | 8500 | 5.9 | 9.3 | 0.63 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|
|---------|------|------|-----|-----|------|------------|--|

TABLE 7.—*Properties of bricks produced in Delaware and Maryland—Continued*

| Specimen number                                                 | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 173, grade 2 ("Dark," 20 percent of kiln, EC, C)          |                    |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                         | $lb/in.^2$<br>1015 | $lb/in.^2$<br>4850   | %<br>9.6             | %<br>12.6    | 0.76                   | %<br>Not tested                                         |                          |
| Plant 173, grade 3 ("Reds," 10 percent of kiln, EC, C)          |                    |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 725                | 3340                 | 13.1                 | 15.7         | 0.83                   | 0.31 (B)                                                |                          |
| 2-----                                                          | 610                | 3230                 | 13.7                 | 15.7         | .87                    | 1.38 (B)                                                |                          |
| 3-----                                                          | 605                | 3580                 | 13.2                 | 15.6         | .85                    | 0.39 (B)                                                |                          |
| 4-----                                                          | 910                | 3720                 | 12.5                 | 15.4         | .81                    | .25 (B)                                                 |                          |
| 5-----                                                          | 625                | 3050                 | 12.5                 | 15.4         | .81                    | .33 (B)                                                 |                          |
| Avg-----                                                        | 695                | 3380                 | 13.0                 | 15.6         | 0.83                   | 0.52 (B)                                                |                          |
| Plant 173, grade 4 ("Arch," 30 percent of kiln, EC, C)          |                    |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                         | 1185               | 7110                 | 5.8                  | 8.7          | 0.63                   | Not tested                                              |                          |
| Plant 173, grade 5 ("Salmon," 10 percent of kiln, EC, C)        |                    |                      |                      |              |                        |                                                         |                          |
| 1-----                                                          | 270                | 2300                 | 13.5                 | 15.8         | 0.86                   | F 6e                                                    |                          |
| 2-----                                                          | 285                | 2700                 | 14.2                 | 16.3         | .87                    | F 6c                                                    |                          |
| 3-----                                                          | 320                | 2730                 | 14.0                 | 15.8         | .89                    | F 15e                                                   |                          |
| 4-----                                                          | 865                | 3400                 | 13.6                 | 15.2         | .90                    | 1.01                                                    |                          |
| 5-----                                                          | 525                | 2890                 | 13.5                 | 17.0         | .79                    | F 24c                                                   |                          |
| Avg-----                                                        | 450                | 2800                 | 13.8                 | 16.0         | 0.86                   | -----                                                   |                          |
| Plant 207, grade 1 ("Dark face," 10 percent of kiln, SM, C)     |                    |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                         | 1175               | 9830                 | 8.4                  | 14.3         | 0.59                   | Not tested                                              |                          |
| Plant 207, grade 2 ("Light face," 10 percent of kiln, SM, C)    |                    |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                         | 1615               | 10730                | 5.5                  | 11.2         | 0.48                   | Not tested                                              |                          |
| Plant 207, grade 3 ("Dark red," 20 percent of kiln, SM, C)      |                    |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                         | 1275               | 8100                 | 10.1                 | 15.5         | 0.65                   | Not tested                                              |                          |
| Plant 207, grade 4 ("Straight hard," 40 percent of kiln, SM, C) |                    |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                         | 1245               | 11070                | 5.2                  | 11.0         | 0.45                   | Not tested                                              |                          |
| Plant 207, grade 5 ("Light hard," 20 percent of kiln, SM, C)    |                    |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                         | 810                | 5930                 | 11.9                 | 17.4         | 0.68                   | Not tested                                              |                          |

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District*

[All samples received from the Philadelphia District were made from surface clay and were formed either by the soft-mud or the stiff-mud end-cut process]

| Specimen number                                               | Modulus of rupture         | Compressive strength        | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------|----------------------------|-----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                               |                            |                             | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 29, grade 1 ("Common hard," 25 percent of kiln, SM, C)  |                            |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                       | lb/in. <sup>2</sup><br>815 | lb/in. <sup>2</sup><br>7160 | %<br>11.1            | %<br>15.9    | 0.69                   | %<br>Not tested                                         |                          |
| Plant 29, grade 2 ("Stretchers," 50 percent of kiln, SM, C)   |                            |                             |                      |              |                        |                                                         |                          |
| 1 -----                                                       | 680                        | 8290                        | 9.1                  | 14.0         | 0.65                   | 0.42                                                    |                          |
| 2 -----                                                       | 725                        | 6600                        | 9.8                  | 14.0         | .70                    | .49                                                     |                          |
| 3 -----                                                       | 565                        | 8730                        | 8.5                  | 13.8         | .62                    | .31                                                     |                          |
| 4 -----                                                       | 675                        | 5890                        | 9.3                  | 13.8         | .67                    | .33                                                     |                          |
| 5 -----                                                       | 555                        | 9070                        | 8.4                  | 13.8         | .61                    | .12                                                     |                          |
| Avg ----                                                      | 640                        | 7720                        | 9.0                  | 13.9         | 0.65                   | 0.33                                                    |                          |
| Plant 29, grade 3 ("Salmon," 15 percent of kiln, SM, C)       |                            |                             |                      |              |                        |                                                         |                          |
| 1 -----                                                       | 245                        | 1560                        | 18.7                 | 24.1         | 0.78                   | 1.09                                                    |                          |
| 2 -----                                                       | 400                        | 1910                        | 19.2                 | 25.6         | .75                    | 0.90                                                    |                          |
| 3 -----                                                       | 570                        | 1620                        | 19.5                 | 27.5         | .71                    | .81                                                     |                          |
| 4 -----                                                       | 245                        | 1490                        | 19.1                 | 24.6         | .78                    | 1.54                                                    |                          |
| 5 -----                                                       | 245                        | 1500                        | 17.9                 | 22.5         | .80                    | 1.73                                                    |                          |
| Avg ----                                                      | 340                        | 1620                        | 18.9                 | 24.9         | 0.76                   | 1.21                                                    |                          |
| Plant 30, grade 1 ("Special face," 10 percent of kiln, SM, C) |                            |                             |                      |              |                        |                                                         |                          |
| 1 -----                                                       | 1275                       | 10450                       | 5.5                  | 11.1         | 0.50                   | 0.28                                                    |                          |
| 2 -----                                                       | 1510                       | 11300                       | 6.9                  | 12.3         | .56                    | .30                                                     |                          |
| 3 -----                                                       | 1270                       | 10050                       | 3.5                  | 7.5          | .47                    | .23                                                     |                          |
| 4 -----                                                       | 1215                       | 9430                        | 6.6                  | 12.0         | .55                    | .24                                                     |                          |
| 5 -----                                                       | 1380                       | 11850                       | 5.7                  | 10.9         | .52                    | .31                                                     |                          |
| Avg ----                                                      | 1330                       | 10620                       | 5.6                  | 10.8         | 0.52                   | 0.27                                                    |                          |
| Plant 30, grade 2 ("Stretchers," 25 percent of kiln, SM, C)   |                            |                             |                      |              |                        |                                                         |                          |
| 1 -----                                                       | 995                        | 7200                        | 8.8                  | 14.4         | 0.61                   | 0.55                                                    |                          |
| 2 -----                                                       | 995                        | 6470                        | 8.8                  | 13.7         | .64                    | .59                                                     |                          |
| 3 -----                                                       | 855                        | 7320                        | 10.1                 | 15.9         | .64                    | .48                                                     |                          |
| 4 -----                                                       | 1080                       | 7770                        | 8.5                  | 14.4         | .59                    | .54                                                     |                          |
| 5 -----                                                       | 610                        | 7100                        | 9.4                  | 14.8         | .63                    | .50                                                     |                          |
| Avg ----                                                      | 905                        | 7170                        | 9.1                  | 14.6         | 0.62                   | 0.57                                                    |                          |
| Plant 30, grade 3 ("Common hard," 60 percent of kiln, SM, C)  |                            |                             |                      |              |                        |                                                         |                          |
| 1 -----                                                       | 1015                       | 7930                        | 9.7                  | 14.7         | 0.66                   | 0.51                                                    |                          |
| 2 -----                                                       | 985                        | 7670                        | 10.3                 | 14.9         | .69                    | .62                                                     |                          |
| 3 -----                                                       | 1100                       | 8400                        | 7.7                  | 12.9         | .60                    | .35                                                     |                          |
| 4 -----                                                       | 1195                       | 8220                        | 9.2                  | 13.9         | .66                    | .35                                                     |                          |
| 5 -----                                                       | 720                        | 6200                        | 9.3                  | 13.4         | .69                    | .62                                                     |                          |
| Avg ----                                                      | 1005                       | 7680                        | 9.2                  | 14.0         | 0.66                   | 0.49                                                    |                          |

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 30, grade 4 ("Salmon," 5 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|---------|---------------------|---------------------|------|------|------|------|--|
| 1.....  | 520                 | 4070                | 13.2 | 18.7 | 0.71 | 0.33 |  |
| 2.....  | 695                 | 5360                | 13.0 | 18.1 | .72  | .21  |  |
| 3.....  | 560                 | 5120                | 13.0 | 18.3 | .71  | .29  |  |
| 4.....  | 445                 | 4830                | 14.8 | 19.8 | .75  | .66  |  |
| 5.....  | 465                 | 3880                | 15.4 | 19.6 | .79  | .28  |  |
| Avg.... | 540                 | 4650                | 13.9 | 18.9 | 0.74 | 0.35 |  |

Plant 49, grade 1 ("Common hard," 40 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|---------|---------------------|---------------------|------|------|------|------|--|
| 1.....  | 795                 | 5170                | 11.9 | 17.3 | 0.69 | 0.32 |  |
| 2.....  | 710                 | 4640                | 11.6 | 15.9 | .73  | .42  |  |
| 3.....  | 615                 | 4080                | 15.3 | 19.8 | .77  | .63  |  |
| 4.....  | 490                 | 4570                | 15.0 | 19.3 | .78  | .77  |  |
| 5.....  | 580                 | 4370                | 15.8 | 19.9 | .79  | .52  |  |
| Avg.... | 640                 | 4570                | 13.9 | 18.4 | 0.75 | 0.53 |  |

Plant 49, grade 2 ("Stretchers," 38 percent of kiln, SM, C)

|              | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %          |  |
|--------------|---------------------|---------------------|------|------|------|------------|--|
| 1.....       | 795                 | 5170                | 11.9 | 17.3 | 0.69 | 0.32       |  |
| 2.....       | 710                 | 4640                | 11.6 | 15.9 | .73  | .42        |  |
| 3.....       | 615                 | 4080                | 15.3 | 19.8 | .77  | .63        |  |
| 4.....       | 490                 | 4570                | 15.0 | 19.3 | .78  | .77        |  |
| 5.....       | 580                 | 4370                | 15.8 | 19.9 | .79  | .52        |  |
| Avg (5)..... | 610                 | 5060                | 12.3 | 17.1 | 0.71 | Not tested |  |

Plant 49, grade 3 ("Light hard," 12 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %         |  |
|---------|---------------------|---------------------|------|------|------|-----------|--|
| 1.....  | 445                 | 3880                | 17.0 | 21.3 | 0.80 | F 42c (B) |  |
| 2.....  | 365                 | 2610                | 20.2 | 24.6 | .82  | 0.44 (B)  |  |
| 3.....  | 345                 | 3070                | 18.0 | 24.1 | .75  | .33 (B)   |  |
| 4.....  | 555                 | 3250                | 17.9 | 22.9 | .78  | .46 (B)   |  |
| 5.....  | 380                 | 2660                | 19.5 | 24.4 | .80  | .37 (B)   |  |
| Avg.... | 415                 | 3290                | 18.5 | 23.5 | 0.79 | -----     |  |

Plant 49, grade 4 ("Salmon, 10 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %          |            |
|---------|---------------------|---------------------|------|------|------|------------|------------|
| 1.....  | 635                 | 2590                | 18.4 | 23.1 | 0.80 | 0.83 (75c) |            |
| 2.....  | 465                 | 2500                | 18.4 | 23.1 | .80  | .68        |            |
| 3.....  | 165                 | 1050                | 24.0 | 29.1 | .83  | 1.53 F 63c |            |
| 4.....  | 850                 | 24.0                | 29.7 | .81  | 1.49 | F 63c      |            |
| 5.....  | 105                 | 760                 | 24.6 | 29.7 | .83  | 2.80       | 4.63 (75c) |
| Avg.... | 345                 | 1550                | 21.9 | 26.9 | 0.81 | 1.42       |            |

Plant 58, grade 1 ("Face," 20 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %    |      | %    |  |
|---------|---------------------|---------------------|-----|------|------|------|--|
| 1.....  | 725                 | 5790                | 9.5 | 14.3 | 0.66 | 0.53 |  |
| 2.....  | 820                 | 7650                | 5.1 | 10.2 | .50  | .31  |  |
| 3.....  | 915                 | 8040                | 6.7 | 11.3 | .59  | .13  |  |
| 4.....  | 680                 | 6610                | 3.9 | 8.2  | .48  | .43  |  |
| 5.....  | 610                 | 8240                | 5.3 | 9.9  | .54  | .26  |  |
| Avg.... | 750                 | 7270                | 6.1 | 10.8 | 0.55 | 0.33 |  |

Plant 58, grade 2 ("Sewer brick," 20 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|---------|---------------------|---------------------|------|------|------|------|--|
| 1.....  | 1190                | 8610                | 10.4 | 15.4 | 0.68 | 0.45 |  |
| 2.....  | 845                 | 6940                | 10.6 | 14.6 | .73  | .27  |  |
| 3.....  | 580                 | 8900                | 8.3  | 13.7 | .61  | .20  |  |
| 4.....  | 725                 | 9010                | 7.9  | 13.2 | .60  | .26  |  |
| 5.....  | 845                 | 9310                | 8.0  | 13.2 | .61  | .35  |  |
| Avg.... | 835                 | 8550                | 9.0  | 14.0 | 0.65 | 0.31 |  |

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 58, grade 3 ("Straight hard," 20 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|---------|---------------------|---------------------|------|------|------|------|--|
| 1.....  | 590                 | 6620                | 10.8 | 15.2 | 0.71 | 0.36 |  |
| 2.....  | 335                 | 5710                | 13.9 | 18.8 | .74  | .61  |  |
| 3.....  | 590                 | 6130                | 13.5 | 18.4 | .73  | .36  |  |
| 4.....  | 550                 | 6250                | 13.0 | 18.4 | .71  | .54  |  |
| 5.....  | 435                 | 4420                | 15.7 | 20.7 | .76  | .55  |  |
| Avg.... | 500                 | 5830                | 13.4 | 18.3 | 0.73 | 0.48 |  |

Plant 58, grade 4 ("Hard," 20 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|---------|---------------------|---------------------|------|------|------|------|--|
| 1.....  | 470                 | 5230                | 13.3 | 17.6 | 0.76 | 0.57 |  |
| 2.....  | 885                 | 5370                | 11.5 | 15.8 | .73  | .19  |  |
| 3.....  | 830                 | 7240                | 8.9  | 13.9 | .64  | .10  |  |
| 4.....  | 650                 | 6280                | 13.6 | 17.5 | .78  | .19  |  |
| 5.....  | 4970                | 13.9                | 18.2 | .76  | 1.53 |      |  |
| Avg.... | 710                 | 5620                | 12.2 | 16.6 | 0.73 | 0.52 |  |

Plant 58, grade 5 ("Salmon," 20 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |            |
|---------|---------------------|---------------------|------|------|------|------|------------|
| 1.....  | 235                 | 2680                | 19.1 | 23.9 | 0.80 | 0.57 | 1.05 (75c) |
| 2.....  | 320                 | 1860                | 19.1 | 23.5 | .81  | .88  | F 60c      |
| 3.....  | 245                 | 2400                | 18.7 | 23.4 | .80  | .63  | 0.84 (75c) |
| 4.....  | 245                 | 2300                | 19.7 | 25.1 | .79  | .69  | 0.89 (75c) |
| 5.....  | 70                  | 1020                | 22.9 | 28.4 | .81  | 2.69 | 4.68 (75c) |
| Avg.... | 220                 | 2050                | 19.9 | 24.9 | 0.80 | 1.09 |            |

Plant 63, grade 1 ("Common hard," 60 percent of kiln, EC, C)

|        | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %    |      | %          |  |
|--------|---------------------|---------------------|-----|------|------|------------|--|
| 1..... | 755                 | 5980                | 8.7 | 12.2 | 0.71 | Not tested |  |

Plant 63, grade 2 ("Straight," 25 percent of kiln, EC, C)

|        | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %    |      | %          |  |
|--------|---------------------|---------------------|-----|------|------|------------|--|
| 1..... | 1090                | 8850                | 7.2 | 11.0 | 0.66 | Not tested |  |

Plant 63, grade 3 ("Salmon," 15 percent of kiln, EC, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %     |            |
|---------|---------------------|---------------------|------|------|------|-------|------------|
| 1.....  | 205                 | 2180                | 15.0 | 18.2 | 0.82 | 0.75  | 1.03 (66c) |
| 2.....  | 210                 | 2010                | 15.6 | 19.3 | .81  | 3.40  | 3.70 (66c) |
| 3.....  | 210                 | 1850                | 16.6 | 20.2 | .83  | F 51c |            |
| 4.....  | 240                 | 2310                | 17.2 | 21.6 | .80  | 3.70  | 4.47 (66c) |
| 5.....  | 240                 | 2310                | 15.2 | 18.8 | .81  | F 12c |            |
| Avg.... | 215                 | 2090                | 15.9 | 19.6 | 0.81 | ----- |            |

Plant 79, grade 1 ("Straight hard," 33 percent of kiln, SM, C)

|        | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %          |  |
|--------|---------------------|---------------------|------|------|------|------------|--|
| 1..... | 390                 | 5360                | 11.5 | 16.6 | 0.69 | Not tested |  |

Plant 79, grade 2 ("Rough hard or common," 33 percent of kiln, SM, C)

|        | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %          |  |
|--------|---------------------|---------------------|------|------|------|------------|--|
| 1..... | 720                 | 4690                | 13.0 | 18.3 | 0.71 | Not tested |  |

Plant 79, grade 3 ("Salmon," 33 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %     |            |
|---------|---------------------|---------------------|------|------|------|-------|------------|
| 1.....  | 335                 | 2170                | 18.5 | 23.8 | 0.78 | 1.06  | 1.19 (63c) |
| 2.....  | 145                 | 1420                | 19.7 | 23.9 | .82  | F 6c  |            |
| 3.....  | 190                 | 1420                | 20.6 | 26.1 | .79  | F 36c |            |
| 4.....  | 165                 | 1480                | 19.9 | 25.2 | .79  | 2.25  |            |
| 5.....  | 205                 | 1480                | 19.9 | 24.7 | .81  | F 12c |            |
| Avg.... | 210                 | 1590                | 19.7 | 24.7 | 0.80 | ----- |            |

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District—Continued*

| Specimen number                                                | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 86, grade 1 ("Straight hard," 30 percent of kiln, SM, C) |                     |                      |                      |              |                        |                                                         |                          |
|                                                                | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1.....                                                         | 700                 | 4300                 | 15.1                 | 21.0         | 0.72                   | 0.68                                                    |                          |
| 2.....                                                         | 455                 | 4170                 | 15.7                 | 20.9         | .75                    | .52                                                     |                          |
| 3.....                                                         | 690                 | 5280                 | 12.4                 | 18.2         | .68                    | .29                                                     |                          |
| 4.....                                                         | 940                 | 6550                 | 12.0                 | 17.7         | .68                    | .46                                                     |                          |
| 5.....                                                         | 335                 | 4640                 | 15.6                 | 21.8         | .72                    | 1.14                                                    |                          |
| Avg.....                                                       | 625                 | 4990                 | 14.2                 | 19.9         | 0.71                   | 0.62                                                    |                          |

Plant 86, grade 2 ("Common hard," 50 percent of kiln, SM, C)

|          |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|--|
| 1.....   | 1050 | 6630 | 11.7 | 17.3 | 0.68 | 0.19 |  |
| 2.....   | 665  | 6040 | 11.8 | 16.8 | .73  | .18  |  |
| 3.....   | 905  | 5840 | 11.8 | 16.9 | .70  | .31  |  |
| 4.....   | 490  | 5200 | 14.2 | 20.1 | .71  | .61  |  |
| 5.....   | 750  | 6730 | 11.5 | 17.0 | .68  | .28  |  |
| Avg..... | 770  | 6090 | 12.2 | 17.6 | 0.70 | 0.31 |  |

Plant 86, grade 3 ("Salmon," 20 percent of kiln, SM, C)

|          |     |      |      |      |      |       |            |
|----------|-----|------|------|------|------|-------|------------|
| 1.....   | 345 | 4030 | 18.5 | 24.4 | 0.76 | 1.08  | 1.27 (66e) |
| 2.....   | 140 |      | 21.8 | 27.3 | .80  | F 12e |            |
| 3.....   | 260 | 2610 | 20.9 | 26.9 | .78  | 2.29  | 2.79 (66e) |
| 4.....   | 165 | 1320 | 21.6 | 28.1 | .77  | 3.95  | 4.80 (66e) |
| 5.....   | 170 | 1780 | 19.8 | 25.4 | .78  | 3.97  | 4.68 (66e) |
| Avg..... | 215 | 2440 | 20.5 | 26.4 | 0.78 |       |            |

Plant 105, grade 1 ("Common hard," 50 percent of kiln, EC, C)

|         |      |      |     |      |      |            |  |
|---------|------|------|-----|------|------|------------|--|
| Avg (5) | 1000 | 8140 | 8.2 | 11.9 | 0.68 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|

Plant 105, grade 2 ("Straight hard," 25 percent of kiln, EC, C)

|         |      |      |      |      |      |            |  |
|---------|------|------|------|------|------|------------|--|
| Avg (5) | 1300 | 6230 | 11.5 | 15.5 | 0.75 | Not tested |  |
|---------|------|------|------|------|------|------------|--|

Plant 105, grade 2A ("Second sample (1930) of grade 2")

|         |      |      |     |      |      |            |  |
|---------|------|------|-----|------|------|------------|--|
| Avg (5) | 1015 | 7870 | 9.9 | 13.6 | 0.72 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|

Plant 105, grade 2B ("Third sample (1936) of grade 2")

|          |      |      |              |      |      |        |  |
|----------|------|------|--------------|------|------|--------|--|
| 1.....   | 860  | 6100 | (24-hr) 13.2 | 18.3 | 0.72 | 0.29   |  |
| 2.....   | 790  | 4400 | 12.7         | 18.1 | .70  | a 2.34 |  |
| 3.....   | 870  | 6890 | 12.0         | 16.7 | .72  | 0.31   |  |
| 4.....   | 925  | 4745 | 11.8         | 17.1 | .69  | .10    |  |
| 5.....   | 945  | 6000 | 13.0         | 18.1 | .72  | .45    |  |
| 6.....   | 505  | 6790 | 12.2         | 17.3 | .70  | .20    |  |
| 7.....   | 825  | 6360 | 12.7         | 17.8 | .71  | .33    |  |
| 8.....   | 780  | 5560 | 13.1         | 18.3 | .72  | .19    |  |
| 9.....   | 590  | 5490 | 12.3         | 17.3 | .71  | .22    |  |
| 10.....  | 885  | 6750 | 11.2         | 16.1 | .70  | .48    |  |
| 11.....  | 945  | 5550 | 12.2         | 17.5 | .70  | .35    |  |
| 12.....  | 655  | 4700 | 12.5         | 17.3 | .72  | .21    |  |
| 13.....  | 740  | 4350 | 12.8         | 18.2 | .70  | .31    |  |
| 14.....  | 870  | 7210 | 11.0         | 15.3 | .72  | .22    |  |
| 15.....  | 1055 | 7500 | 11.4         | 15.7 | .72  | .29    |  |
| 16.....  | 815  | 6640 | 11.5         | 16.2 | .71  | .40    |  |
| 17.....  | 1065 | 6780 | 11.1         | 15.4 | .72  | .30    |  |
| 18.....  | 920  | 7010 | 11.8         | 16.8 | .70  | .30    |  |
| 19.....  | 940  | 5740 | 12.1         | 17.3 | .70  | .20    |  |
| 20.....  | 710  | 6680 | 12.2         | 17.5 | .70  | .28    |  |
| Avg..... | 820  | 6060 | 12.1         | 17.1 | 0.71 | 0.39   |  |

a 2.10-percent loss on 21st cycle.

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District—Continued*

| Specimen number                                          | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                          |                           |                           | 48-yr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 105, grade 3 ("Salmon," 25 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                   | 475                       | 3960                      | 16.0                 | 20.3         | 0.79                   | 0.38                                                    |                          |
| 2-----                                                   | 925                       | 5030                      | 14.9                 | 19.4         | .77                    | .20                                                     |                          |
| 3-----                                                   | 820                       | 5410                      | 16.4                 | 20.1         | .82                    | .32                                                     |                          |
| 4-----                                                   | 705                       | 3130                      | 9.7                  | 13.6         | .71                    | .10                                                     |                          |
| 5-----                                                   | 215                       | 1910                      | 20.3                 | 24.5         | .83                    | 6.18                                                    |                          |
| Avg ----                                                 | 630                       | 3890                      | 15.5                 | 19.6         | 0.78                   | 1.49                                                    |                          |

Plant 141, grade 1 ("Dark hard," 40 percent of kiln, SM, C)

|         |      |      |     |      |      |            |  |
|---------|------|------|-----|------|------|------------|--|
| Avg (5) | 1125 | 9390 | 6.9 | 12.2 | 0.57 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|

Plant 141, grade 2 ("Medium hard," 45 percent of kiln, SM, C)

|         |      |      |     |      |      |            |  |
|---------|------|------|-----|------|------|------------|--|
| Avg (5) | 1165 | 9190 | 8.5 | 13.8 | 0.62 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|

Plant 141, grade 3 ("Salmon," 15 percent of kiln, SM, C)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 895 | 4400 | 13.9 | 19.8 | 0.70 | 0.64 |  |
| 2.....   | 930 | 3870 | 14.1 | 19.3 | .73  | .52  |  |
| 3.....   | 605 | 4020 | 14.1 | 19.8 | .72  | .34  |  |
| 4.....   | 430 | 2670 | 15.8 | 21.3 | .74  | 1.58 |  |
| 5.....   | 515 | 3230 | 14.9 | 19.7 | .76  | 0.87 |  |
| Avg..... | 675 | 3640 | 14.6 | 20.0 | 0.73 | 0.79 |  |

b Progressive spalling.

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)*

[The samples tested included bricks made from clay, shale, and mixtures of clay and shale, formed by either the soft-mud or the stiff-mud side-cut process]

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 18, grade 1 ("Special face," 15 percent of kiln, SM, C)

|          |     |      |     |      |      |          |  |
|----------|-----|------|-----|------|------|----------|--|
| 1.....   | 670 | 5350 | 7.0 | 13.9 | 0.50 | 0.10 (B) |  |
| 2.....   | 640 | 4370 | 7.8 | 14.1 | .55  | .10 (B)  |  |
| 3.....   | 805 | 5090 | 5.5 | 11.9 | .46  | .09 (B)  |  |
| 4.....   | 675 | 6420 | 8.2 | 15.0 | .55  | .31 (B)  |  |
| 5.....   | 520 | 4520 | 8.3 | 14.3 | .58  | .28 (B)  |  |
| Avg..... | 660 | 5150 | 7.4 | 13.8 | 0.53 | 0.18 (B) |  |

Plant 18, grade 2 ("Face," 25 percent of kiln, SM, C)

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
| 1.....   | 820 | 6550 | 7.9  | 13.7 | 0.58 | 0.21 (B) |  |
| 2.....   | 440 | 5920 | 8.1  | 14.8 | .55  | .28 (B)  |  |
| 3.....   | 565 | 5200 | 7.4  | 13.3 | .56  | .15 (B)  |  |
| 4.....   | 580 | 5070 | 10.0 | 16.3 | .61  | .11 (B)  |  |
| 5.....   | 670 | 5650 | 6.9  | 13.0 | .57  | .14 (B)  |  |
| Avg..... | 615 | 5680 | 8.1  | 14.2 | 0.57 | 0.18 (B) |  |

TABLE 9.—Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)—Continued

| Specimen number                                            | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                            |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 18, grade 3 ("Dark reds," 25 percent of kiln. SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                            | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                     | 455                       | 3890                      | 10. 5                | 16. 4        | 0. 64                  | 0. 40 (B)                                               |                          |
| 2-----                                                     | 460                       | 4030                      | 10. 2                | 16. 7        | . 61                   | . 46 (B)                                                |                          |
| 3-----                                                     | 450                       | 3660                      | 10. 8                | 17. 5        | . 62                   | . 41 (B)                                                |                          |
| 4-----                                                     | 535                       | 3700                      | 11. 1                | 17. 5        | . 63                   | . 42 (B)                                                |                          |
| 5-----                                                     | 840                       | 6130                      | 7. 8                 | 13. 6        | . 57                   | . 48 (B)                                                |                          |
| Avg-----                                                   | 545                       | 4280                      | 10. 1                | 16. 3        | 0. 61                  | 0. 43 (B)                                               |                          |

|                                                              |     |      |      |      |      |          |  |
|--------------------------------------------------------------|-----|------|------|------|------|----------|--|
| Plant 18, grade 4 ("Medium reds," 25 percent of kiln, SM, C) |     |      |      |      |      |          |  |
| 1-----                                                       | 365 | 3580 | 11.0 | 17.5 | 0.63 | 0.70 (B) |  |
| 2-----                                                       | 570 | 4260 | 10.2 | 16.1 | .63  | .58 (B)  |  |
| 3-----                                                       | 600 | 4490 | 10.0 | 15.9 | .63  | .40 (B)  |  |
| 4-----                                                       | 455 | 3520 | 10.7 | 17.0 | .63  | .50 (B)  |  |
| 5-----                                                       | 465 | 3720 | 10.8 | 17.0 | .64  | .35 (B)  |  |
| Avg-----                                                     | 490 | 3920 | 10.5 | 16.7 | 0.63 | 0.51 (B) |  |

|                                                              |     |      |      |      |      |      |  |
|--------------------------------------------------------------|-----|------|------|------|------|------|--|
| Plant 18, grade 5 ("Light reds," 9.5 percent of kiln, SM, C) |     |      |      |      |      |      |  |
| 1-----                                                       | 325 | 1860 | 15.2 | 22.2 | 0.68 | 1.44 |  |
| 2-----                                                       | 450 | 2530 | 13.4 | 20.1 | .67  | 0.68 |  |
| 3-----                                                       | 295 | 1760 | 14.4 | 20.8 | .69  | 1.81 |  |
| 4-----                                                       | 400 | 2530 | 13.5 | 20.0 | .67  | 0.55 |  |
| 5-----                                                       | 290 | 2200 | 12.7 | 18.8 | .68  | 1.14 |  |
| Avg-----                                                     | 350 | 2180 | 13.8 | 20.4 | 0.68 | 1.12 |  |

|                                                           |     |      |      |      |      |      |            |
|-----------------------------------------------------------|-----|------|------|------|------|------|------------|
| Plant 18, grade 6 ("Salmons," 0.5 percent of kiln, SM, C) |     |      |      |      |      |      |            |
| 1-----                                                    | 270 | 980  | 15.7 | 21.7 | 0.72 | 1.21 | % (84c)    |
| 2-----                                                    | 215 | 1380 | 14.4 | 20.5 | .70  | .72  | 1.34 (84c) |
| 3-----                                                    | 300 | 1820 | 14.6 | 21.2 | .69  | .61  | 1.21 (84c) |
| 4-----                                                    | 195 | 990  | 15.1 | 21.9 | .69  | 1.25 | 2.90 (84c) |
| 5-----                                                    | 245 | 1630 | 14.9 | 20.9 | .71  | 1.00 | 2.39 (84c) |
| Avg-----                                                  | 245 | 1360 | 14.9 | 21.2 | 0.70 | 0.96 | 2.27 (84c) |

|                                                        |     |      |         |      |      |      |  |
|--------------------------------------------------------|-----|------|---------|------|------|------|--|
| Plant 18, grade 6A ("Second sample (1936) of grade 6") |     |      |         |      |      |      |  |
|                                                        |     |      | (24-hr) |      |      |      |  |
| 1-----                                                 | 205 | 1150 | 16.6    | 23.7 | 0.70 | 1.69 |  |
| 2-----                                                 | 100 | 1145 | 18.2    | 25.2 | .72  | 3.13 |  |
| 3-----                                                 | 180 | 1450 | 16.5    | 24.1 | .68  | 3.19 |  |
| 4-----                                                 | 180 | 1365 | 16.3    | 23.8 | .68  | 1.47 |  |
| 5-----                                                 | 135 | 1325 | 15.8    | 23.7 | .66  | 2.29 |  |
| 6-----                                                 | 280 | 1280 | 16.3    | 24.0 | .69  | 1.44 |  |
| 7-----                                                 | 150 | 1375 | 16.5    | 24.0 | .66  | 1.81 |  |
| 8-----                                                 | 185 | 1405 | 15.1    | 22.7 | .70  | 1.12 |  |
| 9-----                                                 | 160 | 1175 | 16.7    | 23.7 | .70  | 1.21 |  |
| 10-----                                                | 255 | 1250 | 17.0    | 23.9 | .71  | 1.96 |  |
| 11-----                                                | 220 | 1120 | 17.1    | 24.2 | .70  | 1.80 |  |
| 12-----                                                | 275 | 1175 | 18.1    | 25.6 | .72  | 1.42 |  |
| 13-----                                                | 165 | 1130 | 17.2    | 24.1 | .72  | 2.21 |  |
| 14-----                                                | 215 | 1000 | 17.0    | 24.2 | .70  | 2.20 |  |
| 15-----                                                | 325 | 1215 | 16.8    | 24.2 | .70  | 2.01 |  |
| 16-----                                                | 295 | 1960 | 14.0    | 21.5 | .65  | 0.95 |  |
| 17-----                                                | 235 | 1445 | 15.2    | 23.0 | .66  | 2.05 |  |
| 18-----                                                | 150 | 1190 | 17.4    | 24.7 | .70  | 2.58 |  |
| 19-----                                                | 160 | 1260 | 16.9    | 23.8 | .71  | 1.68 |  |
| 20-----                                                | 230 | 1295 | 16.3    | 23.4 | .70  | 1.45 |  |
| Avg-----                                               | 205 | 1280 | 16.0    | 23.9 | 0.69 | 1.88 |  |

|                                                                        |      |       |     |      |      |      |  |
|------------------------------------------------------------------------|------|-------|-----|------|------|------|--|
| Plant 19, grade 1 ("Commercial hard, face," 55 percent of kiln, SC, S) |      |       |     |      |      |      |  |
| 1-----                                                                 | 1375 | 8250  | 5.8 | 8.4  | 0.69 | 0.32 |  |
| 2-----                                                                 | 1380 | 8130  | 6.0 | 8.6  | .70  | .30  |  |
| 3-----                                                                 | 1740 | 9900  | 6.4 | 9.1  | .70  | .11  |  |
| 4-----                                                                 | 1690 | 10300 | 6.5 | 9.2  | .71  | .11  |  |
| 5-----                                                                 | 1160 | 7560  | 8.8 | 10.4 | .85  | .11  |  |
| Avg-----                                                               | 1470 | 8830  | 6.7 | 9.1  | 0.73 | 0.19 |  |

TABLE 9.—Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)—Continued

| Specimen number                                                  | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                  |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 19, grade 2 ("Commercial hard," 45 percent of kiln, SC, S) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                           | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 2-----                                                           | 1840                      | 8710                      | 8.0                  | 9.9          | 0.81                   | 0.25                                                    |                          |
| 3-----                                                           | 2160                      | 7250                      | 6.9                  | 8.9          | .78                    | .10                                                     |                          |
| 4-----                                                           | 1730                      | 7770                      | 8.2                  | 10.0         | .82                    | .27                                                     |                          |
| 5-----                                                           | 1450                      | 6790                      | 10.9                 | 12.7         | .86                    | .36                                                     |                          |
| 6-----                                                           | 1175                      | 5590                      | 12.4                 | 13.8         | .90                    | .29                                                     |                          |
| Avg-----                                                         | 1670                      | 7220                      | 9.3                  | 11.1         | 0.83                   | 0.25                                                    |                          |

|                                                         |      |       |     |     |      |            |  |
|---------------------------------------------------------|------|-------|-----|-----|------|------------|--|
| Plant 19, grade 3 ("Clinker," 3 percent of kiln, SC, S) |      |       |     |     |      |            |  |
| Avg (5)-----                                            | 1350 | 10780 | 5.1 | 7.0 | 0.65 | Not tested |  |

|                                                           |      |       |     |     |      |      |  |
|-----------------------------------------------------------|------|-------|-----|-----|------|------|--|
| Plant 19, grade 4 ("Textured," 80 percent of kiln, SC, S) |      |       |     |     |      |      |  |
| 1-----                                                    | 1235 | 11700 | 6.5 | 8.6 | 0.76 | 0.54 |  |
| 2-----                                                    | 2010 | 10300 | 6.0 | 7.7 | .78  | .34  |  |
| 3-----                                                    | 1660 | 10600 | 7.7 | 9.6 | .80  | .48  |  |
| 4-----                                                    | 1820 | 11650 | 6.4 | 8.2 | .78  | .45  |  |
| 5-----                                                    | 1815 | 10400 | 6.7 | 8.5 | .79  | .36  |  |
| Avg-----                                                  | 1710 | 10930 | 6.7 | 8.5 | 0.78 | 0.43 |  |

|                                                                     |      |        |     |     |      |      |  |
|---------------------------------------------------------------------|------|--------|-----|-----|------|------|--|
| Plant 37, grade 1 ("Face," 65 percent of kiln, SC, C and S mixture) |      |        |     |     |      |      |  |
| 1-----                                                              | 2030 | 12050  | 8.2 | 9.7 | 0.84 | 0.59 |  |
| 2-----                                                              | 1860 | 14600  | 8.1 | 9.6 | .84  | .31  |  |
| 3-----                                                              | 2500 | 14600+ | 2.3 | 3.8 | .61  | .08  |  |
| 4-----                                                              | 3850 | 20600+ | 1.8 | 3.5 | .51  | .09  |  |
| 5-----                                                              | 1960 | 12500  | 5.4 | 6.8 | .79  | .29  |  |
| Avg-----                                                            | 2440 | 14870+ | 5.2 | 6.7 | 0.72 | 0.27 |  |

|                                                                            |      |       |      |      |      |      |  |
|----------------------------------------------------------------------------|------|-------|------|------|------|------|--|
| Plant 37, grade 2 ("Common Hard," 25 percent of kiln, SC, C and S mixture) |      |       |      |      |      |      |  |
| 1-----                                                                     | 1860 | 8630  | 9.1  | 10.6 | 0.86 | 0.22 |  |
| 2-----                                                                     | 1785 | 19350 | 5.9  | 7.0  | .84  | .16  |  |
| 3-----                                                                     | 1255 | 10200 | 10.0 | 11.6 | .86  | .33  |  |
| 4-----                                                                     | 940  | 5210  | 14.1 | 15.5 | .91  | .55  |  |
| 5-----                                                                     | 905  | 6050  | 13.6 | 15.1 | .90  | .66  |  |
| Avg-----                                                                   | 1350 | 9890  | 10.5 | 12.0 | 0.87 | 0.38 |  |

|                                                                       |       |      |      |      |      |       |  |
|-----------------------------------------------------------------------|-------|------|------|------|------|-------|--|
| Plant 37, grade 3 ("Salmon," 10 percent of kiln, SC, C and S mixture) |       |      |      |      |      |       |  |
| 1-----                                                                | 235   | 1720 | 16.1 | 17.9 | 0.90 | F 3c  |  |
| 2-----                                                                | 830   | 6170 | 13.7 | 15.2 | .90  | F 27c |  |
| 3-----                                                                | 1180  | 5460 | 13.2 | 14.8 | .89  | F 38c |  |
| 4-----                                                                | 1040  | 5910 | 15.3 | 16.7 | .92  | F 27c |  |
| 5-----                                                                | ----- | 1700 | 16.2 | 17.9 | .91  | F 3c  |  |
| Avg-----                                                              | 820   | 4190 | 14.9 | 16.5 | 0.90 | F 20c |  |

|                                                                          |      |       |     |     |      |            |  |
|--------------------------------------------------------------------------|------|-------|-----|-----|------|------------|--|
| Plant 38, grade 1 ("Stretchers or dark hard," 30 percent of kiln, SC, S) |      |       |     |     |      |            |  |
| Avg (5)-----                                                             | 3180 | 19720 | 1.3 | 2.5 | 0.52 | Not tested |  |

|                                                                |      |       |     |     |      |      |  |
|----------------------------------------------------------------|------|-------|-----|-----|------|------|--|
| Plant 38, grade 2 ("Straight hard," 35 percent of kiln, SC, S) |      |       |     |     |      |      |  |
| 1-----                                                         | 3090 | 16750 | 2.4 | 3.5 | 0.69 | 0.00 |  |
| 2-----                                                         | 3200 | 18850 | 2.3 | 3.5 | .66  | .00  |  |
| 3-----                                                         | 3470 | 17050 | 2.9 | 3.7 | .78  | .00  |  |
| 4-----                                                         | 3500 | 17550 | 2.3 | 3.5 | .66  | .15  |  |
| 5-----                                                         | 2700 | 16550 | 3.3 | 4.9 | .67  | .99  |  |
| Avg-----                                                       | 3190 | 17430 | 2.6 | 3.8 | 0.69 | 0.23 |  |

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)—Continued*

| Specimen number                                             | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                             |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 38, grade 3 ("Light hard," 25 percent of kiln, SC, S) |                     |                      |                      |              |                        |                                                         |                          |
|                                                             | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1-----                                                      | 1300                | 13000                | 4.3                  | 5.4          | 0.80                   | 0.22                                                    |                          |
| 2-----                                                      | 1570                | 11150                | 5.7                  | 7.0          | .81                    | .26                                                     |                          |
| 3-----                                                      | 1465                | 12500                | 4.6                  | 5.9          | .78                    | .52                                                     |                          |
| 4-----                                                      | 1980                | 11400                | 6.1                  | 7.4          | .82                    | .35                                                     |                          |
| 5-----                                                      | 1700                | 10800                | 6.7                  | 8.6          | .78                    | .49                                                     |                          |
| Avg-----                                                    | 1615                | 11770                | 5.5                  | 6.9          | 0.80                   | 0.37                                                    |                          |

Plant 38, grade 4 ("Salmon," 10 percent of kiln, SC, S)

|     |      |      |      |      |      |       |  |
|-----|------|------|------|------|------|-------|--|
| 1   | 890  | 5550 | 11.2 | 12.4 | 0.90 | 2.47  |  |
| 2   | 1025 | 4700 | 11.3 | 12.6 | .90  | 2.51  |  |
| 3   | 535  | 3580 | 12.8 | 14.1 | .91  | F 24c |  |
| 4   | 630  | 3970 | 12.1 | 13.3 | .91  | F 15c |  |
| 5   | 510  | 3240 | 12.2 | 13.6 | .90  | F 6c  |  |
| Avg | 720  | 4210 | 11.9 | 13.2 | 0.90 |       |  |

Plant 44, grade 1 ("Commercial face," 80 percent of kiln, SM, S)

|     |      |      |     |      |      |      |  |
|-----|------|------|-----|------|------|------|--|
| 1   | 1065 | 4840 | 6.2 | 10.8 | 0.57 | 0.62 |  |
| 2   | 1105 | 4100 | 8.1 | 12.6 | .64  | .50  |  |
| 3   | 850  | 3770 | 9.6 | 14.6 | .66  | .70  |  |
| 4   | 780  | 4600 | 8.1 | 13.1 | .62  | .50  |  |
| 5   | 960  | 4730 | 6.1 | 10.9 | .56  | .38  |  |
| Avg | 950  | 4410 | 7.6 | 12.4 | 0.61 | 0.54 |  |

Plant 44, grade 2 ("Dark red straight hard," 75 percent of kiln, SC, S)

|     |      |      |      |      |      |      |  |
|-----|------|------|------|------|------|------|--|
| 1   | 1070 | 6540 | 9.8  | 13.0 | 0.75 | 0.97 |  |
| 2   | 1220 | 6400 | 9.9  | 12.7 | .78  | .47  |  |
| 3   | 915  | 7230 | 10.0 | 12.9 | .78  | .67  |  |
| 4   | 1005 | 4790 | 10.0 | 12.8 | .78  | .64  |  |
| 5   | 870  | 5430 | 9.0  | 12.3 | .73  | .57  |  |
| Avg | 1015 | 6010 | 9.7  | 12.7 | 0.76 | 0.66 |  |

Plant 44A, grade 1 ("Dark hard," percentage of kiln unknown, SC, S)

|     |      |       |     |      |      |      |  |
|-----|------|-------|-----|------|------|------|--|
| 1   | 1445 | 7990  | 9.2 | 11.2 | 0.82 | 0.40 |  |
| 2   | 1450 | 7000  | 9.1 | 10.9 | .84  | .58  |  |
| 3   | 1750 | 10250 | 6.4 | 8.3  | .77  | .45  |  |
| 4   | 1475 | 7430  | 8.2 | 10.1 | .81  | .45  |  |
| 5   | 1410 | 7420  | 7.8 | 10.2 | .76  | .47  |  |
| Avg | 1505 | 8000  | 8.1 | 10.1 | 0.81 | 0.47 |  |

Plant 55, grade 1 ("Face," 72 percent of kiln, SM, C and S mixture)

|         |      |      |     |      |      |            |  |
|---------|------|------|-----|------|------|------------|--|
| Avg (5) | 1185 | 6830 | 8.4 | 12.9 | 0.65 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|

Plant 55, grade 2 ("Liners," 20 percent of kiln, SM, C and S mixture)

|     |     |      |      |      |      |           |  |
|-----|-----|------|------|------|------|-----------|--|
| 1   | 605 | 3520 | 17.3 | 21.8 | 0.79 | F 50c (B) |  |
| 2   | 940 | 3700 | 15.3 | 19.9 | .77  | 0.34 (B)  |  |
| 3   | 695 | 2840 | 17.4 | 21.7 | .80  | .43 (B)   |  |
| 4   | 515 | 3180 | 18.6 | 22.8 | .82  | .84 (B)   |  |
| 5   | 720 | 3620 | 17.0 | 21.3 | .80  | .32 (B)   |  |
| Avg | 695 | 3370 | 17.1 | 21.5 | 0.80 |           |  |

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)—Continued*

| Specimen number                                                      | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                      |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 55, grade 3 ("Salmon," 3 percent of kiln, SM, C and S mixture) |                     |                      |                      |              |                        |                                                         |                          |
|                                                                      | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       | %                        |
| 1                                                                    | 480                 | 2090                 | 21.7                 | 26.4         | 0.82                   | 0.42                                                    | 0.64 (75c)               |
| 2                                                                    | 385                 | 1910                 | 24.2                 | 28.4         | .85                    | 1.12                                                    | 1.75 (75c)               |
| 3                                                                    | 405                 | 1920                 | 22.9                 | 27.1         | .85                    | 0.63                                                    | 1.15 (75c)               |
| 4                                                                    | 435                 | 1580                 | 23.5                 | 28.7         | .82                    | .92                                                     | 1.27 (75c)               |
| 5                                                                    | 245                 | 1070                 | 25.9                 | 30.4         | .85                    | F 9c                                                    |                          |
| Avg.                                                                 | 390                 | 1710                 | 23.6                 | 28.2         | 0.84                   |                                                         |                          |

Plant 62, grade 1 ("Hard," 50 percent of kiln, SC, C)

|     |      |      |      |      |      |          |  |
|-----|------|------|------|------|------|----------|--|
| 1   | 1130 | 5330 | 10.2 | 12.3 | 0.83 | 0.10 (B) |  |
| 2   | 1610 | 6610 | 10.7 | 12.3 | .87  | .11 (B)  |  |
| 3   | 1190 | 5690 | 13.3 | 14.9 | .89  | .10 (B)  |  |
| 4   | 1110 | 3860 | 12.4 | 14.3 | .87  | .19 (B)  |  |
| 5   | 780  | 5320 | 13.2 | 15.5 | .85  | .46 (B)  |  |
| Avg | 1165 | 5360 | 12.0 | 13.9 | 0.86 | 0.19 (B) |  |

Plant 62, grade 2 ("Medium," 45 percent of kiln, SC, C)

|     |     |      |      |      |      |          |  |
|-----|-----|------|------|------|------|----------|--|
| 1   | 985 | 5690 | 14.3 | 15.8 | 0.91 | 0.20 (B) |  |
| 2   | 765 | 5920 | 14.1 | 15.6 | .90  | .10 (B)  |  |
| 3   | 945 | 6190 | 14.0 | 15.2 | .92  | .24 (B)  |  |
| 4   | 615 | 4480 | 15.9 | 17.4 | .91  | .20 (B)  |  |
| 5   | 750 | 4310 | 15.4 | 17.3 | .89  | .29 (B)  |  |
| Avg | 810 | 5320 | 14.7 | 16.3 | 0.91 | 0.24 (B) |  |

Plant 62, grade 3 ("Soft," 5 percent of kiln, SC, C)

|     |     |      |      |      |      |       |       |
|-----|-----|------|------|------|------|-------|-------|
| 1   | 825 | 4480 | 17.1 | 18.8 | 0.91 | F 51c |       |
| 2   | 690 | 3550 | 18.4 | 20.0 | .92  | 8.10  | F 54c |
| 3   | 825 | 4440 | 18.9 | 20.6 | .92  | 3.40  | F 57c |
| 4   | 500 | 3560 | 19.6 | 21.2 | .92  | F 36c |       |
| 5   | 655 | 3890 | 20.1 | 21.6 | .93  | F 12c |       |
| Avg | 700 | 3980 | 18.8 | 20.4 | 0.92 |       |       |

Plant 70, grade 1 ("Face," 20 percent of kiln, SM, C)

|     |      |       |      |      |      |      |  |
|-----|------|-------|------|------|------|------|--|
| 1   | 1405 | 8220  | 8.8  | 13.2 | 0.67 | 0.10 |  |
| 2   | 1130 | 8130  | 10.3 | 14.7 | .70  | .22  |  |
| 3   | 1165 | 10250 | 10.5 | 15.3 | .69  | .53  |  |
| 4   | 1465 | 8500  | 12.9 | 16.7 | .77  | .43  |  |
| 5   | 1060 | 7790  | 11.8 | 16.5 | .72  | .10  |  |
| Avg | 1245 | 8580  | 10.9 | 15.3 | 0.71 | 0.28 |  |

Plant 70, grade 2 ("Common," 70 percent of kiln, SM, C)

|     |      |      |      |      |      |          |  |
|-----|------|------|------|------|------|----------|--|
| 1   | 1480 | 8200 | 12.6 | 17.5 | 0.72 | 0.97 (B) |  |
| 2   | 1195 | 5700 | 12.4 | 17.3 | .72  | .35 (B)  |  |
| 3   | 1260 | 5670 | 12.7 | 16.7 | .76  | .09 (B)  |  |
| 4   | 1300 | 5770 | 13.4 | 17.9 | .75  | .18 (B)  |  |
| 5   | 1415 | 7150 | 10.5 | 15.5 | .68  | .09 (B)  |  |
| Avg | 1330 | 6500 | 12.3 | 17.0 | 0.73 | 0.34 (B) |  |

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)—Continued*

| Specimen number                                        | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                        |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 70, grade 2A ("Second sample (1936) of grade 2") |                           |                           |                      |              |                        |                                                         |                          |
|                                                        | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | (24-hr)<br>%         | %            |                        | %                                                       |                          |
| 1.....                                                 | 825                       | 5920                      | 12.6                 | 17.1         | 0.74                   | 1.60                                                    |                          |
| 2.....                                                 | 495                       | 5770                      | 12.6                 | 17.0         | .74                    | 0.21                                                    |                          |
| 3.....                                                 | 905                       | 5010                      | 12.3                 | 16.7         | .74                    | .29                                                     |                          |
| 4.....                                                 | 700                       | 5800                      | 12.5                 | 16.7         | .75                    | .28                                                     |                          |
| 5.....                                                 | 1045                      | 5290                      | 13.7                 | 17.9         | .76                    | .39                                                     |                          |
| 6.....                                                 | 685                       | 5560                      | 13.2                 | 17.6         | .75                    | .32                                                     |                          |
| 7.....                                                 | 765                       | 5150                      | 13.3                 | 17.8         | .75                    | .21                                                     |                          |
| 8.....                                                 | 805                       | 4850                      | 14.8                 | 19.6         | .76                    | .52                                                     |                          |
| 9.....                                                 | 745                       | 5890                      | 8.8                  | 13.6         | .65                    | .20                                                     |                          |
| 10.....                                                | 790                       | 4760                      | 13.6                 | 17.8         | .76                    | .30                                                     |                          |
| 11.....                                                | 1090                      | 4570                      | 13.8                 | 18.0         | .77                    | .21                                                     |                          |
| 12.....                                                | 1095                      | 4300                      | 13.2                 | 17.6         | .75                    | .28                                                     |                          |
| 13.....                                                | 910                       | 5600                      | 12.2                 | 16.5         | .74                    | .32                                                     |                          |
| 14.....                                                | 1025                      | 5150                      | 12.5                 | 16.9         | .74                    | .48                                                     |                          |
| 15.....                                                | 1080                      | 5160                      | 12.8                 | 15.3         | .84                    | .21                                                     |                          |
| 16.....                                                | 1135                      | 4680                      | 12.5                 | 17.0         | .74                    | .27                                                     |                          |
| 17.....                                                | 435                       | 5230                      | 11.9                 | 16.3         | .73                    | .37                                                     |                          |
| 18.....                                                | 860                       | 5410                      | 12.6                 | 17.0         | .74                    | .36                                                     |                          |
| 19.....                                                | 1035                      | 6120                      | 12.8                 | 17.3         | .74                    | .46                                                     |                          |
| 20.....                                                | 780                       | 5820                      | 13.5                 | 17.9         | .75                    | .50                                                     |                          |
| Avg.....                                               | 860                       | 5300                      | 12.8                 | 17.1         | 0.75                   | 0.39                                                    |                          |

Plant 70, grade 3 ("Salmon," 10 percent of kiln, SM, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %    |      | %     |  |
|----------|---------------------|---------------------|--------------|------|------|-------|--|
| 1.....   | 880                 | 5100                | 14.3         | 18.9 | 0.76 | 0.20  |  |
| 2.....   | 635                 | 3420                | 19.7         | 23.7 | .83  | F 27c |  |
| 3.....   | 820                 | 3980                | 19.7         | 24.3 | .81  | 0.62  |  |
| 4.....   | 615                 | 3500                | 19.6         | 24.2 | .81  | .52   |  |
| 5.....   | 785                 | 4500                | 17.5         | 22.3 | .79  | 2.20  |  |
| Avg..... | 745                 | 4100                | 18.2         | 22.7 | 0.80 | ----- |  |

Plant 172, grade 1 ("Stretchers," 50 percent of kiln, SM, C)

|              | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %    |      | %          |  |
|--------------|---------------------|---------------------|--------------|------|------|------------|--|
| Avg (5)..... | 795                 | 5080                | 13.9         | 18.0 | 0.77 | Not tested |  |

Plant 172, grade 2 ("Hard," 25 percent of kiln, SM, C)

|              | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %    |      | %          |  |
|--------------|---------------------|---------------------|--------------|------|------|------------|--|
| Avg (5)..... | 1015                | 6270                | 11.6         | 15.2 | 0.76 | Not tested |  |

Plant 172, grade 3 ("Salmon," 25 percent of kiln, SM, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %    |      | %     |  |
|----------|---------------------|---------------------|--------------|------|------|-------|--|
| 1.....   | 305                 | 2590                | 20.8         | 24.6 | 0.85 | 1.74  |  |
| 2.....   | 275                 | 1880                | 21.9         | 25.3 | .87  | F 6c  |  |
| 3.....   | 615                 | 3590                | 18.6         | 23.1 | .81  | 0.50  |  |
| 4.....   | 425                 | 2420                | 20.2         | 24.3 | .83  | 1.10  |  |
| 5.....   | 550                 | 2960                | 19.1         | 23.0 | .83  | 0.98  |  |
| Avg..... | 435                 | 2690                | 20.1         | 24.1 | 0.84 | ----- |  |

Plant 180, grade 1 ("Vitrified," 25 percent of kiln, SC, S)

|              | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %   |      | %          |  |
|--------------|---------------------|---------------------|--------------|-----|------|------------|--|
| Avg (5)..... | 2990                | 19450+              | 1.1          | 2.3 | 0.48 | Not tested |  |

Plant 180, grade 2 ("Straight hard," 60 percent of kiln, SC, S)

|              | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %   |      | %          |  |
|--------------|---------------------|---------------------|--------------|-----|------|------------|--|
| Avg (5)..... | 1675                | 11990+              | 5.5          | 7.4 | 0.74 | Not tested |  |

Plant 180, grade 3 ("Rough hard," 6 percent of kiln, SC, S)

|              | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %   |      | %          |  |
|--------------|---------------------|---------------------|--------------|-----|------|------------|--|
| Avg (5)..... | 1730                | 11650+              | 5.9          | 7.5 | 0.72 | Not tested |  |

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)—Continued*

| Specimen number                                             | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                             |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 180, grade 4 ("Light hard," 6 percent of kiln, SC, S) |                           |                           |                      |              |                        |                                                         |                          |
|                                                             | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1.....                                                      | 885                       | 5230                      | 9.9                  | 12.3         | 0.80                   | 0.55 (B)                                                |                          |
| 2.....                                                      | 1020                      | 6100                      | 9.3                  | 11.7         | .79                    | .19 (B)                                                 |                          |
| 3.....                                                      | 1120                      | 7550                      | 8.5                  | 10.9         | .78                    | .23 (B)                                                 |                          |
| 4.....                                                      | 980                       | 7550                      | 9.0                  | 10.4         | .86                    | .18 (B)                                                 |                          |
| 5.....                                                      | 865                       | 5200                      | 10.5                 | 12.1         | .87                    | .24 (B)                                                 |                          |
| Avg.....                                                    | 975                       | 6330                      | 9.4                  | 11.5         | 0.82                   | 0.27 (B)                                                |                          |

Plant 180, grade 5 ("Salmon," 3 percent of kiln, SC, S)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %        |  |
|----------|---------------------|---------------------|------|------|------|----------|--|
| 1.....   | 705                 | 4000                | 11.6 | 13.9 | 0.83 | 0.37 (B) |  |
| 2.....   | 565                 | 3810                | 12.4 | 14.9 | .83  | .99 (B)  |  |
| 3.....   | 785                 | 5050                | 11.0 | 13.1 | .84  | .16 (B)  |  |
| 4.....   | 1030                | 6490                | 9.7  | 11.6 | .84  | .10 (B)  |  |
| 5.....   | 905                 | 6450                | 9.0  | 10.7 | .84  | .17 (B)  |  |
| Avg..... | 800                 | 5160                | 10.7 | 12.8 | 0.84 | 0.36 (B) |  |

Plant 223, grade 1 ("Multicolored face," (1936) percentage of kiln unknown, SC, S, deaired)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr)<br>% | %    |        | %    |  |
|----------|---------------------|---------------------|--------------|------|--------|------|--|
| 1.....   | 745                 | 5970                | 9.7          | 11.2 | a 0.86 | 0.59 |  |
| 2.....   | 620                 | 5340                | 10.2         | 11.7 | .87    | .80  |  |
| 3.....   | 655                 | 7160                | 9.3          | 11.1 | .84    | .53  |  |
| 4.....   | 820                 | 6170                | 9.4          | 11.0 | .85    | .79  |  |
| 5.....   | 615                 | 5780                | 10.4         | 12.0 | .87    | .81  |  |
| 6.....   | 385                 | 6360                | 9.3          | 10.8 | .86    | .69  |  |
| 7.....   | 820                 | 6990                | 9.5          | 11.7 | .82    | .79  |  |
| 8.....   | 565                 | 5380                | 9.6          | 11.6 | .83    | .47  |  |
| 9.....   | 720                 | 4710                | 10.4         | 11.9 | .88    | .92  |  |
| 10.....  | 590                 | 6410                | 9.7          | 11.5 | .84    | .65  |  |
| 11.....  | 640                 | 6930                | 8.8          | 10.4 | .84    | .90  |  |
| 12.....  | 645                 | 6590                | 9.7          | 11.3 | .86    | .72  |  |
| 13.....  | 580                 | 6480                | 10.1         | 11.7 | .86    | .83  |  |
| 14.....  | 675                 | 6160                | 10.7         | 12.6 | .85    | .78  |  |
| 15.....  | 500                 | 6550                | 9.3          | 10.9 | .86    | .59  |  |
| 16.....  | 625                 | 5730                | 9.3          | 10.9 | .86    | 1.00 |  |
| 17.....  | 675                 | 6650                | 9.0          | 10.6 | .84    | 0.70 |  |
| 18.....  | 780                 | 6590                | 9.1          | 10.6 | .86    | 1.61 |  |
| 19.....  | 405                 | 5250                | 10.2         | 11.8 | .86    | 1.73 |  |
| 20.....  | 720                 | 7130                | 8.8          | 10.5 | .84    | 0.66 |  |
| Avg..... | 640                 | 6220                | 9.6          | 11.3 | 0.85   | 0.83 |  |

a Water absorption by 5-hr boiling is probably not a true measure of total fillable pore space for deaired bricks, hence the saturation coefficients are higher than would be those calculated from the true porosity.

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania*

[All samples received were formed by the stiff-mud, side-cut process. With few exceptions, shale was the raw material. Fire clay and mixtures of clay and shale were also reported as raw materials]

| Specimen number                                       | Modulus of rupture          | Compressive strength        | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------|-----------------------------|-----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                       |                             |                             | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 14, grade 1 ("Arch," 25 percent of kiln, SC, S) |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                               | lb/in. <sup>2</sup><br>1865 | lb/in. <sup>2</sup><br>9530 | %<br>5.1             | %<br>7.2     | 0.70                   | %<br>Not tested                                         |                          |

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 14, grade 2 ("Select," 15 percent of kiln, SC, S)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %    |      | %        |  |
|----------|---------------------|---------------------|-----|------|------|----------|--|
| 1.....   | 1805                | 8490                | 7.9 | 10.2 | 0.77 | 0.37 (B) |  |
| 2.....   | 1470                | 7070                | 9.1 | 10.8 | .84  | .35 (B)  |  |
| 3.....   | 1450                | 6380                | 7.7 | 9.6  | .80  | .18 (B)  |  |
| 4.....   | 1670                | 6350                | 7.8 | 9.7  | .80  | .18 (B)  |  |
| 5.....   | 1300                | 7240                | 8.3 | 10.1 | .82  | .26 (B)  |  |
| Avg..... | 1540                | 7110                | 8.2 | 10.1 | 0.81 | 0.27 (B) |  |

Plant 14, grade 3 ("50 percent of kiln run," SC, S)

|          |      |       |      |      |      |          |  |
|----------|------|-------|------|------|------|----------|--|
| 1.....   | 1125 | 4710  | 11.6 | 13.3 | 0.87 | 0.43 (B) |  |
| 2.....   | 1420 | 7750  | 9.1  | 10.9 | .83  | .44 (B)  |  |
| 3.....   | 1560 | 6090  | 6.9  | 9.1  | .76  | .26 (B)  |  |
| 4.....   | 1590 | 7730  | 8.8  | 10.8 | .82  | .29 (B)  |  |
| 5.....   | 1480 | 8400  | 8.3  | 10.2 | .81  | .28 (B)  |  |
| 6.....   | 1570 | 7350  | 7.6  | 9.6  | .79  | .24 (B)  |  |
| 7.....   | 1665 | 9050  | 8.5  | 10.2 | .83  | .43 (B)  |  |
| 8.....   | 1905 | 8960  | 6.5  | 8.7  | .75  | .17 (B)  |  |
| 9.....   | 1270 | 8960  | 9.4  | 11.3 | .83  | .31 (B)  |  |
| 10.....  | 1440 | 7650  | 9.2  | 11.0 | .84  | .43 (B)  |  |
| 11.....  | 1460 | 6780  | 8.7  | 10.9 | .80  | .35 (B)  |  |
| 12.....  | 1720 | 9820  | 7.3  | 9.1  | .80  | .18 (B)  |  |
| 13.....  | 1765 | 6390  | 7.4  | 9.5  | .78  | .33 (B)  |  |
| 14.....  | 1680 | 6070  | 8.0  | 9.8  | .82  | .45 (B)  |  |
| 15.....  | 2210 | 11850 | 5.3  | 7.4  | .72  | .25 (B)  |  |
| Avg..... | 1590 | 7840  | 8.2  | 10.1 | 0.80 | 0.32 (B) |  |

Plant 14, grade 4 ("Salmon," 10 percent of kiln, SC, S)

|          |     |      |      |      |      |       |            |
|----------|-----|------|------|------|------|-------|------------|
| 1.....   | 820 | 3030 | 12.6 | 14.5 | 0.87 | 0.87  | F 66c      |
| 2.....   | 805 | 4020 | 12.8 | 14.3 | .90  | F 45c |            |
| 3.....   | 785 | 3410 | 12.7 | 14.4 | .88  | 1.22  | 4.10 (84c) |
| 4.....   | 720 | 3460 | 14.0 | 15.7 | .89  | F 18c |            |
| 5.....   | 655 | 3670 | 13.7 | 15.7 | .87  | 7.10  | F 75c      |
| Avg..... | 755 | 3520 | 13.2 | 14.9 | 0.88 |       |            |

Plant 36, grade 1 ("Black," 18 percent of kiln, SC, S)

|          |      |        |     |     |      |      |  |
|----------|------|--------|-----|-----|------|------|--|
| 1.....   | 2390 | 16000  | 4.4 | 7.0 | 0.63 | 0.09 |  |
| 2.....   | 1980 | 10850  | 4.3 | 7.4 | .58  | .08  |  |
| 3.....   | 2200 | 14100  | 5.5 | 8.4 | .65  | .08  |  |
| 4.....   | 1930 | 13850+ | 4.3 | 7.3 | .59  | .26  |  |
| 5.....   | 1725 | 13000  | 4.4 | 7.4 | .59  | .15  |  |
| Avg..... | 2045 | 13560+ | 4.6 | 7.5 | 0.61 | 0.13 |  |

Plant 36, grade 2 ("Hearts," 35 percent of kiln, SC, S)

|          |      |       |     |     |      |      |  |
|----------|------|-------|-----|-----|------|------|--|
| 1.....   | 1990 | 12850 | 4.7 | 8.0 | 0.59 | 0.29 |  |
| 2.....   | 1630 | 12800 | 5.4 | 8.1 | .67  | .09  |  |
| 3.....   | 1120 | 14950 | 4.2 | 7.2 | .58  | .08  |  |
| 4.....   | 1825 | 14900 | 4.4 | 6.8 | .65  | .00  |  |
| 5.....   | 2130 | 14250 | 4.1 | 7.0 | .59  | .08  |  |
| Avg..... | 1740 | 13950 | 4.6 | 7.4 | 0.62 | 0.11 |  |

Plant 36, grade 3 ("Hard reds," 45 percent of kiln, SC, S)

|          |      |       |     |     |      |      |  |
|----------|------|-------|-----|-----|------|------|--|
| 1.....   | 2100 | 14250 | 4.8 | 7.0 | 0.69 | 0.17 |  |
| 2.....   | 2090 | 8590  | 7.0 | 9.4 | .74  | .08  |  |
| 3.....   | 1820 | 9340  | 6.7 | 9.4 | .71  | .16  |  |
| 4.....   | 2080 | 10900 | 5.1 | 7.3 | .70  | .17  |  |
| 5.....   | 1625 | 10300 | 6.8 | 9.7 | .70  | .17  |  |
| Avg..... | 1945 | 10760 | 6.1 | 8.6 | 0.71 | 0.15 |  |

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 36, grade 3A ("Second sample of grade 2")

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %    |      | %    |  |
|----------|---------------------|---------------------|-----|------|------|------|--|
| 1.....   | 1620                | 9800                | 8.6 | 10.7 | 0.80 | 0.34 |  |
| 2.....   | 1530                | 10300               | 8.6 | 10.7 | .80  | .25  |  |
| 3.....   | 1350                | 8670                | 9.1 | 11.3 | .81  | .26  |  |
| 4.....   | 1460                | 9770                | 8.2 | 10.8 | .76  | .17  |  |
| 5.....   | 1535                | 10000               | 7.1 | 10.1 | .70  | .17  |  |
| Avg..... | 1500                | 9710                | 8.3 | 10.7 | 0.77 | 0.24 |  |

Plant 36, grade 4 ("Salmon," 2 percent of kiln, SC, S)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 435 | 3280 | 16.5 | 18.7 | 0.88 | 0.55 |  |
| 2.....   | 640 | 3880 | 14.1 | 16.8 | .84  | .27  |  |
| 3.....   | 845 | 4560 | 13.7 | 16.1 | .85  | .28  |  |
| 4.....   | 535 | 3970 | 15.4 | 17.8 | .87  | .79  |  |
| 5.....   | 430 | 3580 | 15.5 | 17.9 | .87  | .77  |  |
| Avg..... | 575 | 3850 | 15.0 | 17.5 | 0.86 | 0.53 |  |

Plant 41, grade 1 ("No. 1 Hard burned common," 25 percent of kiln, SC, S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg. (5) | 2270 | 13570 | 3.3 | 5.2 | 0.64 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

Plant 41, grade 2 ("No. 2 Hard burned common," 65 percent of kiln, SC, S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg. (5) | 1910 | 12450 | 6.5 | 8.9 | 0.73 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

Plant 41, grade 3 ("Medium burned common," 10 percent of kiln, SC, S)

|          |      |       |     |     |      |      |  |
|----------|------|-------|-----|-----|------|------|--|
| 1.....   | 1265 | 12650 | 6.4 | 8.3 | 0.77 | 0.30 |  |
| 2.....   | 1955 | 12750 | 6.2 | 8.3 | .75  | .33  |  |
| 3.....   | 1540 | 12600 | 6.3 | 8.6 | .73  | .30  |  |
| 4.....   | 1655 | 13150 | 6.7 | 8.7 | .76  | .24  |  |
| 5.....   | 1805 | 12250 | 6.6 | 8.7 | .76  | .33  |  |
| Avg. (5) | 1645 | 12680 | 6.4 | 8.5 | 0.75 | 0.30 |  |

Plant 69, grade 1 ("Hard red," 70 percent of kiln, SC, S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg. (5) | 1550 | 13240 | 3.9 | 7.0 | 0.56 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

Plant 69, grade 2 ("Kiln run red," 90 percent of kiln, SC, S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg. (5) | 2035 | 11690 | 5.9 | 8.6 | 0.69 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

Plant 69, grade 3 ("Medium red," 20 percent of kiln, SC, S)

|          |      |       |     |      |      |            |  |
|----------|------|-------|-----|------|------|------------|--|
| Avg. (5) | 2390 | 12320 | 7.6 | 10.1 | 0.75 | Not tested |  |
|----------|------|-------|-----|------|------|------------|--|

Plant 69, grade 4 ("Salmon," 10 percent of kiln, SC, S)

|          |      |      |      |      |      |      |            |
|----------|------|------|------|------|------|------|------------|
| 1.....   | 1000 | 4990 | 11.1 | 13.3 | 0.83 | 0.44 | 0.53 (66c) |
| 2.....   | 1145 | 4730 | 12.0 | 14.5 | .83  | .77  | .86 (66c)  |
| 3.....   | 960  | 4740 | 12.3 | 14.7 | .84  | .87  | .95 (66c)  |
| 4.....   | 1430 | 6390 | 11.1 | 13.2 | .84  | .93  | 1.02 (66c) |
| 5.....   | 755  | 5720 | 11.6 | 13.7 | .85  | .77  | 0.94 (66c) |
| Avg..... | 1060 | 5310 | 11.6 | 13.9 | 0.84 | 0.76 | 0.86 (66c) |

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania—Continued*

| Specimen number                                                 | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                 |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 69, grade 5 ("Kiln run buff," 90 percent of kiln, SC, FC) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                 | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1 -----                                                         | 1800                      | 10800                     | 6.4                  | 8.7          | 0.74                   | 0.46                                                    |                          |
| 2 -----                                                         | 2730                      | 13600                     | 3.8                  | 5.9          | .64                    | .17                                                     |                          |
| 3 -----                                                         | 886                       | 7670                      | 9.3                  | 11.2         | .83                    | .50                                                     |                          |
| 4 -----                                                         | 2250                      | 12850                     | 3.6                  | 6.7          | .54                    | .18                                                     |                          |
| 5 -----                                                         | 1155                      | 9420                      | 6.1                  | 8.2          | .74                    | .49                                                     |                          |
| Avg ---                                                         | 1765                      | 10870                     | 5.8                  | 8.1          | 0.70                   | 0.36                                                    |                          |

Plant 69, grade 6 ("Medium buff," 50 percent of kiln, SC, FC)

|     |      |       |     |     |      |         |  |
|-----|------|-------|-----|-----|------|---------|--|
| 1   | 1660 | 12000 | 6.4 | 8.2 | 0.78 | 0.27    |  |
| 2   | 1370 | 6890  | 6.7 | 8.4 | .80  | .53     |  |
| 3   | 2040 | 12300 | 6.0 | 7.7 | .78  | .26     |  |
| 4   | 2170 | 11850 | 5.7 | 7.5 | .76  | No test |  |
| 5   | 1725 | 10650 | 6.3 | 8.4 | .75  | No test |  |
| Avg | 1795 | 10740 | 6.2 | 8.0 | 0.77 | 0.35    |  |

Plant 80, grade 1 ("Top of kiln" (down draft), 20 percent of kiln, SC, S)

|         |      |      |     |     |      |            |  |
|---------|------|------|-----|-----|------|------------|--|
| Avg (6) | 2030 | 8120 | 4.5 | 6.5 | 0.69 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|

Plant 80, grade 2 ("Middle of kiln" (down draft), 65 percent of kiln, SC, S)

|     |      |       |     |     |      |      |  |
|-----|------|-------|-----|-----|------|------|--|
| 1   | 2120 | 10100 | 5.1 | 7.4 | 0.69 | 0.23 |  |
| 2   | 2120 | 10750 | 4.8 | 7.0 | .69  | .44  |  |
| 3   | 1885 | 9300  | 5.5 | 7.2 | .76  | .25  |  |
| 4   | 2130 | 9900  | 5.0 | 7.1 | .70  | .17  |  |
| 5   | 2560 | 11100 | 4.1 | 6.1 | .67  | .16  |  |
| 6   | 2280 | 10450 | 4.8 | 7.1 | .68  | .27  |  |
| Avg | 2185 | 10270 | 4.9 | 7.0 | 0.70 | 0.25 |  |

Plant 80, grade 3 ("Bottom of kiln" (down draft), 5 percent of kiln, SC, S)

|     |      |      |      |      |      |      |  |
|-----|------|------|------|------|------|------|--|
| 1   | 1100 | 4920 | 8.6  | 10.7 | 0.80 | 0.60 |  |
| 2   | 985  | 4160 | 9.1  | 11.4 | .80  | .46  |  |
| 3   | 765  | 3450 | 10.7 | 13.2 | .81  | .50  |  |
| 4   | 825  | 3920 | 10.3 | 12.5 | .82  | .89  |  |
| 5   | 965  | 4000 | 10.0 | 12.0 | .83  | .64  |  |
| 6   | 1010 | 4180 | 9.0  | 11.0 | .82  | .39  |  |
| Avg | 940  | 4100 | 9.6  | 11.8 | 0.81 | 0.58 |  |

Plant 140, grade 1 ("Clinker," 5 percent of kiln, SC, S)

|     |      |       |     |     |      |          |  |
|-----|------|-------|-----|-----|------|----------|--|
| 1   | 2200 | 22500 | 1.6 | 3.9 | 0.44 | 0.08 (B) |  |
| 2   | 2490 | 21500 | 2.4 | 4.4 | .54  | .08 (B)  |  |
| 3   | 1635 | 18150 | 1.1 | 4.2 | .26  | .00 (B)  |  |
| 4   | 2670 | 24500 | 1.4 | 3.8 | .37  | .00 (B)  |  |
| 5   | 2570 | 23800 | 1.8 | 4.3 | .42  | .07 (B)  |  |
| 6   | 2980 | 22500 | 1.6 | 3.9 | .41  | .16 (B)  |  |
| Avg | 2425 | 22160 | 1.6 | 4.1 | 0.41 | 0.06 (B) |  |

Plant 140, grade 2 ("All hard," 60 percent of kiln, SC, S)

|     |      |       |     |     |      |          |  |
|-----|------|-------|-----|-----|------|----------|--|
| 1   | 1850 | 13200 | 5.8 | 8.5 | 0.68 | 0.15 (B) |  |
| 2   | 2330 | 16850 | 4.0 | 6.6 | .61  | .15 (B)  |  |
| 3   | 2240 | 15000 | 3.7 | 6.4 | .58  | .00 (B)  |  |
| 4   | 2120 | 15700 | 4.3 | 6.7 | .64  | .16 (B)  |  |
| 5   | 1960 | 12780 | 5.2 | 7.8 | .67  | .00 (B)  |  |
| 6   | 1425 | 12120 | 7.4 | 9.8 | .75  | .14 (B)  |  |
| Avg | 1990 | 14280 | 5.1 | 7.6 | 0.66 | 0.10 (B) |  |

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania—Continued*

| Specimen number                                                     | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                     |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 140, grade 3 ("Medium rough hard," 30 percent of kiln, SC, S) |                    |                      |                      |              |                        |                                                         |                          |
|                                                                     | $lb/in.^2$         | $lb/in.^2$           | $\%$                 | $\%$         |                        | $\%$                                                    |                          |
| 1                                                                   | 960                | 6680                 | 9.7                  | 11.5         | 0.84                   | 0.18 (B)                                                |                          |
| 2                                                                   | 1000               | 8560                 | 10.7                 | 12.9         | .83                    | .25 (B)                                                 |                          |
| 3                                                                   | 1330               | 9590                 | 10.4                 | 12.5         | .83                    | .62 (B)                                                 |                          |
| 4                                                                   | 1590               | 10730                | 7.7                  | 9.9          | .78                    | .17 (B)                                                 |                          |
| 5                                                                   | 1245               | 8600                 | 8.1                  | 9.9          | .82                    | .18 (B)                                                 |                          |
| 6                                                                   | 1035               | 5020                 | 11.7                 | 13.7         | .85                    | .25 (B)                                                 |                          |
| Avg.                                                                | 1195               | 8200                 | 9.7                  | 11.7         | 0.82                   | 0.28 (B)                                                |                          |

Plant 140, grade 4 ("Salmon," 5 percent of kiln, SC, S)

|     |     |      |      |      |      |       |  |
|-----|-----|------|------|------|------|-------|--|
| 1   | 885 | 5200 | 13.4 | 15.6 | 0.86 | 0.43  |  |
| 2   | 635 | 3290 | 14.7 | 16.5 | .89  | F 21c |  |
| 3   | 855 | 4600 | 13.1 | 15.4 | .85  | 0.32  |  |
| 4   | 485 | 2690 | 14.7 | 16.9 | .87  | F 8c  |  |
| 5   | 735 | 4530 | 13.9 | 15.7 | .89  | 0.36  |  |
| 6   | 580 | 2460 | 15.1 | 16.7 | .90  | F 6c  |  |
| Avg | 695 | 3800 | 14.2 | 16.1 | 0.88 |       |  |

Plant 143, grade 1 ("Vitrified," 20 percent of kiln, SC, S)

|     |      |       |     |     |      |          |  |
|-----|------|-------|-----|-----|------|----------|--|
| 1   | 2340 | 11150 | 3.3 | 6.7 | 0.49 | 0.15 (B) |  |
| 2   | 2750 | 19800 | 1.8 | 5.5 | .33  | .00 (B)  |  |
| 3   | 2520 | 17750 | 3.3 | 6.3 | .52  | .07 (B)  |  |
| 4   | 2440 | 16600 | 3.4 | 6.1 | .56  | .15 (B)  |  |
| 5   | 2385 | 11200 | 3.7 | 6.3 | .59  | .07 (B)  |  |
| Avg | 2485 | 15300 | 3.1 | 6.2 | 0.50 | 0.09 (B) |  |

Plant 143, grade 2 ("Commercial hard," 70 percent of kiln, SC, S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg (10) | 2200 | 13940 | 4.8 | 7.4 | 0.63 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

Plant 143, grade 3 ("Salmon," 10 percent of kiln, SC, S)

|     |      |      |      |      |      |      |  |
|-----|------|------|------|------|------|------|--|
| 1   | 1130 | 7960 | 8.6  | 10.8 | 0.80 | 0.81 |  |
| 2   | 1180 | 5740 | 10.9 | 13.3 | .82  | .70  |  |
| 3   | 970  | 4920 | 12.2 | 14.4 | .85  | 1.40 |  |
| 4   | 985  | 5220 | 11.7 | 14.1 | .83  | 1.17 |  |
| 5   | 1000 | 4650 | 12.4 | 14.7 | .84  | 1.95 |  |
| Avg | 1055 | 5700 | 11.2 | 13.5 | 0.83 | 1.21 |  |

Plant 145, grade 1 ("Face," 85 percent of kiln, SC, C and S)

|         |      |      |     |     |      |            |  |
|---------|------|------|-----|-----|------|------------|--|
| Avg (5) | 2095 | 9970 | 7.0 | 9.1 | 0.77 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|

Plant 145, grade 2 ("Arch," 10 percent of kiln, SC, C and S)

|     |      |       |     |      |      |          |  |
|-----|------|-------|-----|------|------|----------|--|
| 1   | 2330 | 11170 | 6.6 | 9.6  | 0.69 | 0.18 (B) |  |
| 2   | 2250 | 12630 | 6.8 | 9.8  | .69  | .17 (B)  |  |
| 3   | 1850 | 12000 | 6.8 | 9.2  | .74  | .16 (B)  |  |
| 4   | 1550 | 10000 | 8.8 | 10.8 | .82  | .24 (B)  |  |
| 5   | 2000 | 9600  | 7.7 | 10.2 | .76  | .10 (B)  |  |
| Avg | 1995 | 11080 | 7.3 | 9.9  | 0.74 | 0.17 (B) |  |

Plant 145, grade 3 ("Salmon," 5 percent of kiln, SC, C and S)

|     |      |      |      |      |      |      |  |
|-----|------|------|------|------|------|------|--|
| 1   | 1250 | 7170 | 10.6 | 12.5 | 0.85 | 0.38 |  |
| 2   | 1645 | 6620 | 9.1  | 11.3 | .81  | .35  |  |
| 3   | 1125 | 6040 | 11.4 | 13.6 | .84  | .70  |  |
| 4   | 1265 | 5400 | 10.4 | 12.4 | .84  | .58  |  |
| 5   | 1165 | 6610 | 10.0 | 12.2 | .82  | .52  |  |
| Avg | 1290 | 6370 | 10.3 | 12.4 | 0.83 | 0.51 |  |

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 157, grade 1 ("Common hard," 85 percent of kiln, SC, S)

| Avg (5) | lb/in. <sup>2</sup><br>1500 | lb/in. <sup>2</sup><br>7190 | %<br>7.5 | %<br>9.1 | 0.83 | %<br>Not tested |  |
|---------|-----------------------------|-----------------------------|----------|----------|------|-----------------|--|
|---------|-----------------------------|-----------------------------|----------|----------|------|-----------------|--|

Plant 163, grade 1 ("Hard," 50 percent of kiln, SC, S)

| Avg (5) | 3195 | 16160 | 0.90 | 2.60 | 0.35 | Not tested |  |
|---------|------|-------|------|------|------|------------|--|
|---------|------|-------|------|------|------|------------|--|

Plant 163, grade 2 ("Medium," 40 percent of kiln, SC, S)

| Avg (5) | 2305 | 11570 | 3.6 | 6.1 | 0.60 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 163, grade 3 ("Soft," 10 percent of kiln, SC, S)

| 1   | 2400 | 11500 | 5.2 | 7.4 | 0.70 | 0.00 |  |
|-----|------|-------|-----|-----|------|------|--|
| 2   | 2540 | 12890 | 3.8 | 5.7 | .67  | .00  |  |
| 3   | 2500 | 13000 | 4.2 | 6.2 | .68  | .00  |  |
| 4   | 2230 | 10840 | 4.8 | 7.2 | .67  | .00  |  |
| 5   | 2380 | 12090 | 5.1 | 7.0 | .73  | .08  |  |
| Avg | 2410 | 12060 | 4.6 | 6.7 | 0.69 | 0.02 |  |

Plant 177, grade 1 ("Common," 98 percent of kiln, SC, S)

| Avg (14) | 2260 | 9240 | 4.8 | 6.8 | 0.73 | Not tested |  |
|----------|------|------|-----|-----|------|------------|--|
|----------|------|------|-----|-----|------|------------|--|

Plant 210, grade 1 ("Representative sample," percentage of kiln unknown, SC, S)

| Avg (5) | 2050 | 11890 | 4.1 | 6.1 | 0.67 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 224, grade 1 ("Hard," (1936) percentage of kiln unknown, SC, S)

|     |      |       | (24-hr) |     |      |      |  |
|-----|------|-------|---------|-----|------|------|--|
| 1   | 1685 | 14150 | 2.9     | 5.2 | 0.56 | 0.16 |  |
| 2   | 1320 | 15050 | 3.0     | 5.0 | .59  | .28  |  |
| 3   | 1640 | 15750 | 2.9     | 5.0 | .57  | .10  |  |
| 4   | 1330 | 12950 | 1.8     | 3.3 | .54  | .10  |  |
| 5   | 1745 | 13100 | 0.9     | 2.3 | .39  | .20  |  |
| 6   | 2210 | 11150 | 3.0     | 5.2 | .58  | .24  |  |
| 7   | 1690 | 13100 | 2.8     | 5.0 | .56  | .16  |  |
| 8   | 1425 | 9500  | 2.9     | 5.2 | .56  | .25  |  |
| 9   | 1055 | 13200 | 3.0     | 5.1 | .58  | .22  |  |
| 10  | 3220 | 16400 | 1.1     | 2.6 | .42  | .10  |  |
| 11  | 905  | 15250 | 3.0     | 5.0 | .60  | .09  |  |
| 12  | 1040 | 12650 | 2.9     | 4.9 | .59  | .10  |  |
| 13  | 1540 | 13800 | 2.4     | 4.3 | .56  | .17  |  |
| 14  | 1575 | 14600 | 3.5     | 5.6 | .63  | .20  |  |
| 15  | 2300 | 13200 | 2.8     | 4.9 | .57  | .19  |  |
| 16  | 1785 | 14900 | 2.1     | 4.0 | .53  | .18  |  |
| 17  | 2400 | 11300 | 2.8     | 4.9 | .56  | .08  |  |
| 18  | 1170 | 16550 | 2.9     | 5.1 | .57  | .10  |  |
| 19  | 1530 | 14700 | 3.5     | 5.6 | .63  | .28  |  |
| 20  | 2150 | 12550 | 3.3     | 5.6 | .60  | .17  |  |
| Avg | 1685 | 13690 | 2.7     | 4.7 | 0.56 | 0.17 |  |

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant, 224, grade 2 ("Light hard" (1936), percentage of kiln unknown, SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | (24-hr) | %    |      | %     |  |
|-----|---------------------|---------------------|---------|------|------|-------|--|
| 1   | 1035                | 6320                | 11.9    | 14.0 | 0.85 | 0.43  |  |
| 2   | 1320                | 6640                | 11.0    | 13.0 | .84  | .28   |  |
| 3   | 1250                | 6730                | 11.6    | 13.4 | .86  | .43   |  |
| 4   | 1165                | 6840                | 11.4    | 13.4 | .86  | .34   |  |
| 5   | 1205                | 7450                | 11.2    | 13.0 | .86  | .40   |  |
| 6   | 995                 | 4870                | 13.7    | 15.4 | .89  | F 49c |  |
| 7   | 1035                | 4680                | 13.5    | 15.3 | .88  | F 36c |  |
| 8   | 960                 | 5530                | 12.2    | 14.1 | .86  | 0.45  |  |
| 9   | 1280                | 5410                | 10.4    | 12.2 | .86  | 1.36  |  |
| 10  | 1185                | 5910                | 11.8    | 13.8 | .86  | 0.42  |  |
| 11  | 930                 | 5290                | 12.1    | 13.8 | .87  | .72   |  |
| 12  | 1195                | 6840                | 11.8    | 12.7 | .85  | .43   |  |
| 13  | 1295                | 6490                | 11.5    | 13.5 | .85  | .51   |  |
| 14  | 795                 | 5590                | 13.2    | 15.2 | .87  | .54   |  |
| 15  | 1110                | 5850                | 12.5    | 14.6 | .86  | .41   |  |
| 16  | 965                 | 3860                | 13.3    | 15.1 | .88  | .93   |  |
| 17  | 1195                | 6310                | 11.8    | 13.9 | .85  | .43   |  |
| Avg | 1110                | 5960                | 12.1    | 13.9 | 0.86 |       |  |

Plant 224, grade 3 ("Unmarketable Salmons," (1937) percentage of kiln unknown, SC, S)

|     |     |      | (24-hr) |      |      |       |       |
|-----|-----|------|---------|------|------|-------|-------|
| 1   | 265 | 2000 | 13.9    | 17.3 | 0.80 | 6.22  | F 53c |
| 2   | 295 | 1910 | 14.5    | 18.2 | .80  | F 10c |       |
| 3   | 125 | 1010 | 15.7    | 19.4 | .81  | F 2c  |       |
| 4   | 150 | 1320 | 15.2    | 18.7 | .82  | F 4c  |       |
| 5   | 210 | 1590 | 15.1    | 18.4 | .82  | F 2c  |       |
| 6   | 260 | 1720 | 15.0    | 18.5 | .82  | F 2c  |       |
| 7   | 230 | 1700 | 15.1    | 18.4 | .82  | F 5c  |       |
| 8   | 180 | 1440 | 15.3    | 18.6 | .82  | F 2c  |       |
| 9   | 140 | 1060 | 15.5    | 18.6 | .83  | F 1c  |       |
| 10  | 140 | 1260 | 15.6    | 18.9 | .82  | F 2c  |       |
| 11  | 300 | 2160 | 15.1    | 18.1 | .84  | F 10c |       |
| 12  | 135 | 1150 | 15.6    | 18.9 | .83  | F 2c  |       |
| 13  | 150 | 1780 | 16.1    | 19.1 | .84  | F 2c  |       |
| 14  | 120 | 1190 | 15.7    | 18.2 | .84  | F 1c  |       |
| 15  | 140 | 1340 | 16.6    | 19.7 | .84  | F 1c  |       |
| 16  | 180 | 1560 | 15.7    | 18.6 | .84  | F 2c  |       |
| 17  | 270 | 1910 | 15.6    | 18.4 | .84  | F 13c |       |
| 18  | 260 | 1980 | 15.2    | 18.1 | .84  | F 10c |       |
| 19  | 235 | 2230 | 15.2    | 17.8 | .86  | F 10c |       |
| 20  | 215 | 2100 | 15.1    | 17.9 | .84  | F 9c  |       |
| Avg | 200 | 1620 | 15.3    | 18.5 | 0.83 |       |       |

Plant 225, grade 1 ("Hard," (1936) percentage of kiln unknown, SC, FC)

|     |      |       | (24-hr) |     |      |       |  |
|-----|------|-------|---------|-----|------|-------|--|
| 1   | 2725 | 14190 | 0.5     | 1.8 | 0.27 | 0.29  |  |
| 2   | 2765 | 15120 | .7      | 2.4 | .29  | .17   |  |
| 3   | 2920 | 15380 | .8      | 2.3 | .34  | .24   |  |
| 4   | 2655 | 16970 | .7      | 2.3 | .32  | .24   |  |
| 5   | 2915 | 17000 | .8      | 2.3 | .34  | .09   |  |
| 6   | 2410 | 19170 | .8      | 2.1 | .36  | a .93 |  |
| 7   | 2880 | 16160 | .5      | 1.9 | .26  | .18   |  |
| 8   | 3135 | 17750 | .7      | 2.2 | .32  | .18   |  |
| 9   | 3160 | 14050 | .7      | 2.0 | .34  | .00   |  |
| 10  | 2695 | 12580 | .8      | 2.2 | .36  | .18   |  |
| 11  | 2550 | 19420 | .8      | 2.4 | .32  | .50   |  |
| 12  | 2435 | 18540 | .8      | 2.4 | .34  | .08   |  |
| 13  | 2050 | 16080 | 1.0     | 2.5 | .38  | .33   |  |
| 14  | 2770 | 12270 | 0.6     | 2.2 | .28  | .19   |  |
| 15  | 2275 | 18970 | .8      | 2.5 | .31  | .16   |  |
| 16  | 2705 | 15160 | .7      | 2.4 | .31  | .08   |  |
| 17  | 2235 | 12770 | .5      | 1.9 | .26  | .09   |  |
| 18  | 2620 | 18070 | .7      | 2.3 | .32  | .17   |  |
| 19  | 2625 | 14220 | .8      | 2.1 | .36  | .42   |  |
| 20  | 2985 | 13330 | .7      | 2.0 | .38  | .17   |  |
| Avg | 2675 | 15860 | 0.7     | 2.2 | 0.32 | 0.23  |  |

a Loss of 0.80 percent occurred on 15th cycle.

TABLE 11.—*Properties of bricks produced in Ohio*

[The samples represent bricks formed by the soft-mud and the stiff-mud side-cut processes. The raw materials include surface clay, fire clay, and shale.]

| Specimen number                                                | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 2, grade 1 ("Common," percentage of kiln unknown, SC, S) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       | %                        |
| 1                                                              | 1540                      | 11890                     | 6.4                  | 8.6          | 0.74                   | 0.16                                                    | 0.16 (87c)               |
| 2                                                              | 1620                      | 14770                     | 5.2                  | 7.4          | .70                    | .08                                                     | .08 (87c)                |
| 3                                                              | 1765                      | 14600                     | 5.4                  | 7.8          | .69                    | .00                                                     | .00 (87c)                |
| 4                                                              | 2170                      | 18290                     | 3.0                  | 4.7          | .64                    | .00                                                     | .00 (87c)                |
| 5                                                              | 1690                      | 13620                     | 4.3                  | 6.5          | .66                    | .00                                                     | .00 (87c)                |
| 6                                                              | 1950                      | 15950                     | 1.2                  | 3.3          | .36                    | .25                                                     | .25 (87c)                |
| 7                                                              | 1690                      | 16150                     | 2.1                  | 4.1          | .51                    | .00                                                     | .00 (87c)                |
| 8                                                              | 2130                      | 19050+                    | 0.8                  | 2.1          | .38                    | .00                                                     | .00 (87c)                |
| Avg                                                            | 1820                      | 15540+                    | 3.6                  | 5.6          | 0.58                   | 0.06                                                    | 0.06 (87c)               |

Plant 2A, grade 1 ("Common," percentage of kiln unknown, SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %    | %          |
|-----|---------------------|---------------------|-----|-----|------|------|------------|
| 1   | 3305                | 20280               | 2.0 | 4.1 | 0.49 | 0.15 | 0.15 (87c) |
| 2   | 2100                | 14190               | 1.2 | 2.4 | .50  | .00  | .00 (87c)  |
| 3   | 2680                | 15240               | 3.5 | 5.6 | .62  | .08  | .08 (87c)  |
| 4   | 2770                | 17690+              | 2.4 | 4.3 | .56  | .09  | .09 (87c)  |
| 5   | 3350                | 20650               | 2.4 | 4.4 | .55  | .07  | .07 (87c)  |
| 6   | 3270                | 19570+              | 1.7 | 3.8 | .45  | .08  | .08 (87c)  |
| 7   | 1985                | 13450               | 5.8 | 7.8 | .74  | .14  | .14 (87c)  |
| 8   | 1575                | 12650               | 5.2 | 7.0 | .74  | .08  | .08 (87c)  |
| Avg | 2630                | 16700+              | 3.0 | 4.9 | 0.58 | 0.09 | 0.09 (87c) |

Plant 3, grade 1 ("90 percent kiln run," SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %    | %          |
|-----|---------------------|---------------------|-----|-----|------|------|------------|
| 1   | 1690                | 12100               | 2.9 | 4.9 | 0.59 | 0.00 | 0.00 (87c) |
| 2   | 1285                | 8970                | 4.1 | 7.4 | .55  | .09  | .09 (87c)  |
| 3   | 1170                | 11050               | 4.4 | 7.4 | .59  | .09  | .09 (87c)  |
| 4   | 1515                | 8900                | 4.6 | 7.1 | .65  | .08  | .08 (87c)  |
| 5   | 1460                | 9800                | 5.6 | 7.3 | .74  | .09  | .09 (87c)  |
| Avg | 1425                | 10160               | 4.3 | 6.8 | 0.62 | 0.07 | 0.07 (87c) |

Plant 3, grade 2 ("Salmon," 10 percent of kiln, SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    | %          |
|-----|---------------------|---------------------|------|------|------|------|------------|
| 1   | 765                 | 7150                | 10.8 | 13.1 | 0.83 | 0.54 | 0.54 (87c) |
| 2   | 545                 | 5570                | 10.8 | 13.8 | .78  | .52  | .52 (87c)  |
| 3   | 590                 | 6340                | 12.2 | 15.1 | .81  | .49  | .58 (87c)  |
| 4   | 595                 | 5600                | 11.4 | 13.8 | .83  | .41  | .41 (87c)  |
| 5   | 550                 | 5740                | 12.1 | 15.0 | .81  | .66  | .73 (87c)  |
| Avg | 610                 | 6080                | 11.5 | 14.2 | 0.81 | 0.52 | 0.56 (87c) |

Plant 74, grade 1 ("Clinker," 0.1 percent of kiln, SM, C)

| Avg (5) | 1890 | 9700 | 0.4 | 1.1 | 0.27 | Not tested |
|---------|------|------|-----|-----|------|------------|
|---------|------|------|-----|-----|------|------------|

Plant 74, grade 2 ("Face," 6 percent of kiln, SM, C)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %    |      | %    | %   |
|-----|---------------------|---------------------|-----|------|------|------|-----|
| 1   | 2140                | 11300               | 4.3 | 5.4  | 0.80 | 0.44 | (B) |
| 2   | 2110                | 8770                | 6.3 | 8.6  | .73  | .11  | (B) |
| 3   | 2090                | 11300               | 4.7 | 5.2  | .90  | .21  | (B) |
| 4   | 1780                | 9800                | 7.6 | 11.5 | .66  | .25  | (B) |
| 5   | 2380                | 13050               | 0.6 | 3.3  | .18  | .00  | (B) |
| Avg | 2100                | 10840               | 4.7 | 6.8  | 0.65 | 0.20 | (B) |

Plant 74, grade 3 ("Sewer (arch)," 5 percent of kiln, SM, C)

| Avg (5) | 1405 | 9840 | 7.9 | 11.7 | 0.68 | Not tested |
|---------|------|------|-----|------|------|------------|
|---------|------|------|-----|------|------|------------|

TABLE 11.—*Properties of bricks produced in Ohio—Con.*

| Specimen number                                         | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                         |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 74, grade 4 ("Hard," 84.9 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                         | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       | %                        |
| 1-----                                                  | 955                       | 4980                      | 16.3                 | 19.6         | 0.83                   | 0.77 (B)                                                |                          |
| 2-----                                                  | 1015                      | 5430                      | 16.0                 | 19.1         | .84                    | 1.25 (B)                                                |                          |
| 3-----                                                  | 1455                      | 9800                      | 8.7                  | 13.7         | .63                    | 0.22 (B)                                                |                          |
| 4-----                                                  | 1600                      | 10900                     | 9.3                  | 13.4         | .69                    | 0.10 (B)                                                |                          |
| 5-----                                                  | 565                       | 3480                      | 17.2                 | 20.0         | .86                    | 1.57 (B)                                                |                          |
| Avg . . .                                               | 1120                      | 6920                      | 13.5                 | 17.2         | 0.77                   | 0.78 (B)                                                |                          |

Plant 74, grade 5 ("Salmon," 4 percent of kiln, SM, C)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    | %          |
|-----|---------------------|---------------------|------|------|------|------|------------|
| 1   | 555                 | 3700                | 18.5 | 20.2 | 0.92 | 3.10 | 3.36 (63c) |
| 2   | 515                 | 2900                | 18.1 | 20.8 | .87  | 3.50 | 4.04 (63c) |
| 3   | 550                 | 3380                | 17.0 | 19.2 | .89  | 4.20 | 4.52 (63c) |
| 4   | 620                 | 2650                | 16.6 | 20.1 | .83  | 3.70 | 4.05 (63c) |
| 5   | 515                 | 3770                | 17.5 | 19.3 | .91  | 5.60 | 5.92 (63c) |
| Avg | 550                 | 3280                | 17.5 | 19.9 | 0.88 | 4.02 | 4.38 (63c) |

Plant 92, grade 1 ("Hard," 10 percent of kiln, SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %    | % |
|-----|---------------------|---------------------|-----|-----|------|------|---|
| 1   | 1660                | 10900               | 5.4 | 7.1 | 0.76 | 0.08 |   |
| 2   | 1720                | 11700               | 5.5 | 7.6 | .72  | .17  |   |
| 3   | 1400                | 13600               | 5.2 | 6.9 | .75  | .17  |   |
| 4   | 1885                | 12300               | 5.0 | 6.7 | .75  | .08  |   |
| 5   | 1760                | 12750               | 5.5 | 7.2 | .76  | .08  |   |
| Avg | 1685                | 12250               | 5.3 | 7.1 | 0.76 | 0.12 |   |

Plant 92, grade 2 ("Medium," 70 percent of kiln, SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %    | % |
|-----|---------------------|---------------------|-----|-----|------|------|---|
| 1   | 1810                | 13300               | 5.2 | 7.0 | 0.74 | 0.09 |   |
| 2   | 1750                | 13850               | 5.7 | 7.0 | .82  | .09  |   |
| 3   | 1675                | 10700               | 6.1 | 7.4 | .82  | .09  |   |
| 4   | 1570                | 11150               | 6.6 | 8.4 | .79  | .18  |   |
| 5   | 1350                | 10250               | 7.0 | 8.7 | .80  | .09  |   |
| Avg | 1630                | 11850               | 6.1 | 7.7 | 0.79 | 0.11 |   |

Plant 92, grade 3 ("Soft," 20 percent of kiln, SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    | %          |
|-----|---------------------|---------------------|------|------|------|------|------------|
| 1   | 1560                | 11150               | 7.5  | 9.3  | 0.81 | 0.18 | 0.18 (57c) |
| 2   | 1505                | 10800               | 7.5  | 9.2  | .82  | .08  | .08 (57c)  |
| 3   | 1680                | 7570                | 8.6  | 10.4 | .83  | .18  | .18 (57c)  |
| 4   | 1395                | 7280                | 9.7  | 10.9 | .89  | .08  | .08 (57c)  |
| 5   | 1000                | 6700                | 10.8 | 12.5 | .87  | .34  | .34 (57c)  |
| Avg | 1430                | 8700                | 8.8  | 10.5 | 0.84 | 0.17 | 0.17 (57c) |

Plant 101, grade 1 ("Light red common," 30 percent of kiln, SC, S)

| Avg (5) | 1530 | 11410 | 8.5 | 11.3 | 0.75 | Not tested |
|---------|------|-------|-----|------|------|------------|
|---------|------|-------|-----|------|------|------------|

Plant 101, grade 2 ("Full range commons," 60 to 80 percent of kiln, SC, S)

| Avg (5) | 2100 | 17090+ | 4.1 | 6.8 | 0.49 | Not tested |
|---------|------|--------|-----|-----|------|------------|
|---------|------|--------|-----|-----|------|------------|

Plant 101, grade 3 ("Dark range commons," 30 percent of kiln, SC, S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %       | % |
|-----|---------------------|---------------------|-----|-----|------|---------|---|
| 1   | 3510                | 21400+              | 0.4 | 2.1 | 0.19 | No test |   |
| 2   | 2730                | 21900+              | 1.2 | 3.6 | .33  | 0.00    |   |
| 3   | 2330                | 23200               | 1.9 | 5.0 | .38  | .00     |   |
| 4   | 2360                | 20060+              | 4.3 | 7.3 | .59  | .00     |   |
| 5   | 2210                | 18700               | 5.1 | 8.2 | .62  | .09     |   |
| Avg | 2630                | 21040+              | 2.6 | 5.2 | 0.42 | 0.02    |   |

TABLE 11.—Properties of bricks produced in Ohio—Con.

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 101, grade 4 ("Full range clay common," percentage of kiln unknown, SC, FC)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %       |  |
|-----|---------------------|---------------------|-----|-----|------|---------|--|
| 1   | 2210                | 19450               | 3.3 | 4.8 | 0.69 | No test |  |
| 2   | 2190                | 20500               | 3.3 | 4.3 | .77  | No test |  |
| 3   | 2100                | 21100+              | 3.4 | 4.3 | .79  | 0.10    |  |
| 4   | 2060                | 20500               | 0.9 | 2.8 | .32  | .00     |  |
| 5   | 1890                | 22300               | 1.4 | 2.9 | .48  | .00     |  |
| Avg | 2090                | 20770+              | 2.5 | 3.8 | 0.61 | 0.03    |  |

Plant 101, grade 5 ("Full range common," percentage of kiln unknown, SC, FC)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 2495 | 16350 | 4.7 | 6.6 | 0.65 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 111, grade 1 ("Commons," 98 percent of kiln, SC, S)

|         |     |       |     |     |      |            |  |
|---------|-----|-------|-----|-----|------|------------|--|
| Avg (5) | 800 | 10560 | 7.4 | 9.3 | 0.79 | Not tested |  |
|---------|-----|-------|-----|-----|------|------------|--|

Plant 111, grade 2 ("Clinkers," 2 percent of kiln, SC, S)

|         |     |       |     |     |      |            |  |
|---------|-----|-------|-----|-----|------|------------|--|
| Avg (5) | 795 | 12120 | 3.8 | 6.3 | 0.60 | Not tested |  |
|---------|-----|-------|-----|-----|------|------------|--|

Plant 114, grade 1 ("Clinkers," 5 percent of kiln, SM, C)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 2035 | 10610 | 4.5 | 6.8 | 0.73 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 114, grade 2 ("Hard," 5 percent of kiln, SM, C)

|     |      |      |      |      |      |          |  |
|-----|------|------|------|------|------|----------|--|
| 1   | 855  | 4030 | 21.7 | 27.1 | 0.80 | No test  |  |
| 2   | 1690 | 7010 | 18.0 | 23.8 | .76  | do       |  |
| 3   | 660  | 3880 | 23.7 | 26.6 | .89  | 1.78 (B) |  |
| 4   | 640  | 3630 | 22.1 | 26.7 | .83  | 0.58 (B) |  |
| 5   | 445  | 3900 | 20.1 | 23.9 | .84  | 1.39 (B) |  |
| Avg | 855  | 4490 | 21.1 | 25.6 | .82  | 1.25 (B) |  |

Plant 114, grade 3 ("Common, 90 percent kiln run," SM, C)

|     |     |      |      |      |      |      |  |
|-----|-----|------|------|------|------|------|--|
| 1   | 880 | 3340 | 20.5 | 24.0 | 0.85 | 1.50 |  |
| 2   | 810 | 4260 | 18.9 | 20.1 | .94  | 1.10 |  |
| 3   | 365 | 3960 | 23.5 | 27.1 | .87  | 1.50 |  |
| 4   | 565 | 3400 | 24.0 | 27.2 | .88  | 2.90 |  |
| 5   | 620 | 2940 | 20.7 | 21.6 | .96  | 5.60 |  |
| Avg | 650 | 3580 | 21.5 | 24.0 | .90  | 2.52 |  |

Plant 116, grade 1 ("Kiln run," percentage of kiln unknown, SM, C)

| 1   | 910  | 3730 | 21.5 | 24.5 | 0.88 | 0.00  |  |  |
|-----|------|------|------|------|------|-------|--|--|
| 2   | 650  | 3180 | 22.8 | 26.9 | .85  | F 42c |  |  |
| 3   | 960  | 4980 | 18.4 | 22.1 | .83  | 0.25  |  |  |
| 4   | 870  | 3580 | 22.6 | 26.8 | .84  | F 21c |  |  |
| 5   | 660  | 2610 | 23.8 | 26.8 | .89  | F 42c |  |  |
| 6   | 420  | 2450 | 24.2 | 26.8 | .90  | F 50c |  |  |
| 7   | 1020 | 3840 | 19.9 | 23.3 | .85  | F 45c |  |  |
| 8   | 1005 | 4540 | 18.7 | 22.3 | .84  | F 50c |  |  |
| 9   | 1020 | 3460 | 21.8 | 25.5 | .86  | F 48c |  |  |
| 10  | 1010 | 4020 | 20.9 | 25.0 | .84  | F 18c |  |  |
| Avg | 850  | 3640 | 21.5 | 25.0 | .86  |       |  |  |

Plant 120, grade 1 ("Face," 10 percent of kiln, SM, C)

|         |      |       |      |      |      |            |  |
|---------|------|-------|------|------|------|------------|--|
| Avg (6) | 3425 | 15620 | 0.35 | 0.78 | 0.36 | Not tested |  |
|---------|------|-------|------|------|------|------------|--|

TABLE 11.—Properties of bricks produced in Ohio—Con.

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 120, grade 2 ("Face (Variable shades)," 30 percent of kiln, SM, C)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %        |  |
|-----|---------------------|---------------------|-----|-----|------|----------|--|
| 1   | 2410                | 9650                | 3.1 | 5.8 | 0.53 | 0.36 (B) |  |
| 2   | 3200                | 8410                | 0.5 | 2.5 | .20  | .10 (B)  |  |
| 3   | 1970                | 11550               | 4.0 | 5.9 | .68  | .30 (B)  |  |
| 4   | 3170                | 12300               | 1.5 | 4.0 | .38  | .33 (B)  |  |
| 5   | 2180                | 9540                | 3.8 | 7.2 | .53  | .19 (B)  |  |
| 6   | 2090                | 9750                | 5.9 | 9.3 | .64  | No test  |  |
| Avg | 2505                | 10200               | 3.1 | 5.8 | 0.59 | 0.26 (B) |  |

Plant 120, grade 3 ("Selected commons," 20 percent of kiln, SM, C)

|         |      |      |     |      |      |            |  |
|---------|------|------|-----|------|------|------------|--|
| Avg (6) | 1300 | 7870 | 7.8 | 11.5 | 0.68 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|

Plant 120, grade 4 ("Commons, light," 25 percent of kiln, SM, C)

|         |     |      |      |      |      |            |  |
|---------|-----|------|------|------|------|------------|--|
| Avg (6) | 950 | 6210 | 11.7 | 15.6 | 0.75 | Not tested |  |
|---------|-----|------|------|------|------|------------|--|

Plant 120, grade 5 ("Backup (Salmon)," 15 percent of kiln, SM, C)

|     |     |      |      |      |      |          |  |
|-----|-----|------|------|------|------|----------|--|
| 1   | 720 | 4670 | 14.6 | 17.8 | 0.82 | 0.51 (B) |  |
| 2   | 375 | 3160 | 17.4 | 20.5 | .85  | .53 (B)  |  |
| 3   | 960 | 3720 | 15.9 | 18.9 | .84  | 1.10 (B) |  |
| 4   | 460 | 3930 | 15.1 | 18.6 | .81  | .30 (B)  |  |
| 5   | 675 | 4240 | 16.5 | 20.1 | .82  | .37 (B)  |  |
| 6   | 830 | 4250 | 15.8 | 18.8 | .84  | .73 (B)  |  |
| Avg | 670 | 4330 | 15.9 | 19.1 | 0.83 | 0.71 (B) |  |

Plant 122, grade 1 ("Vitrified," 18 percent of kiln, SC, S)

|         |      |        |     |     |      |            |  |
|---------|------|--------|-----|-----|------|------------|--|
| Avg (5) | 2085 | 18100+ | 3.1 | 5.4 | 0.57 | Not tested |  |
|---------|------|--------|-----|-----|------|------------|--|

Plant 122, grade 2 ("Hard," 30 percent of kiln, SC, S)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 2415 | 17580 | 2.1 | 3.9 | 0.54 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 122, grade 3 ("Medium," 50 percent of kiln, SC, S)

|         |      |       |     |     |      |            |  |
|---------|------|-------|-----|-----|------|------------|--|
| Avg (5) | 2090 | 14670 | 4.6 | 6.5 | 0.70 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|

Plant 122, grade 4 ("Soft or salmon," 2 percent of kiln, SC, S)

|         |      |      |      |      |      |      |  |
|---------|------|------|------|------|------|------|--|
| 1       | 715  | 6290 | 10.0 | 12.1 | 0.83 | 0.50 |  |
| 2       | 1010 | 6300 | 8.7  | 10.9 | .80  | .35  |  |
| 3       | 655  | 6900 | 9.7  | 11.8 | .82  | .43  |  |
| 4       | 955  | 6720 | 8.7  | 10.5 | .83  | .35  |  |
| 5       | 890  | 6720 | 9.3  | 11.1 | .84  | .65  |  |
| Avg (5) | 845  | 6590 | 9.3  | 11.3 | 0.82 | 0.46 |  |

Plant 208, grade 1 ("Line," 70 percent of kiln, SM, C)

|          |     |      |     |      |      |                              |  |
|----------|-----|------|-----|------|------|------------------------------|--|
| Avg (13) | 755 | 4600 | 9.5 | 14.0 | 0.66 | Onetested, 0.38 percent loss |  |
|----------|-----|------|-----|------|------|------------------------------|--|

Plant 208, grade 2 ("Backup," 20 to 30 percent of kiln, SM, C)

|     |     |      |      |      |      |              |  |
|-----|-----|------|------|------|------|--------------|--|
| 1   | 510 | 2340 | 13.6 | 18.3 | 0.74 | 1.26         |  |
| 2   | 340 | 2260 | 12.8 | 17.7 | .72  | 0.43 (B)     |  |
| 3   | 760 | 3010 | 13.1 | 16.9 | .78  | .25 (B)      |  |
| 4   | 595 | 2690 | 13.1 | 16.9 | .78  | .44 (B)      |  |
| 5   | 645 | 2350 | 13.4 | 17.2 | .78  | .67          |  |
| Avg | 570 | 2530 | 13.2 | 17.4 | 0.76 | 0.61 (A & B) |  |

TABLE 12.—*Properties of bricks produced in Detroit District*

[All samples received were formed from surface clay by the soft-mud process. The "kiln run" and "stock" grades were fired in scove kilns. The "exterior" grades were reported to be from downdraft kilns.]

| Specimen number                                                    | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                    |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 8, grade 1 ("Stock," percentage of kiln unknown, SM, C)      |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                | <i>%</i>                 |
| 1                                                                  | 385                       | 2310                      | 19.7                 | 23.5         | 0.84                   | 0.75                                                    |                          |
| 2                                                                  |                           | 2000                      | 15.6                 | 19.8         | .79                    | .39                                                     |                          |
| 3                                                                  | 610                       | 3130                      | 15.9                 | 19.2         | .83                    | .49                                                     |                          |
| 4                                                                  | 485                       | 2490                      | 19.2                 | 22.9         | .84                    | .33                                                     |                          |
| 5                                                                  | 445                       | 2020                      | 20.3                 | 23.6         | .86                    | .77                                                     |                          |
| Avg.                                                               | 480                       | 2390                      | 18.1                 | 21.8         | 0.83                   | 0.55                                                    |                          |
| Plant 8, grade 2 ("95 percent kiln run," salmons excluded, SM, C)  |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                | <i>%</i>                 |
| 1                                                                  | 815                       | 4270                      | 15.6                 | 19.7         | 0.79                   | 0.28                                                    | 0.28 (84c)               |
| 2                                                                  | 1010                      | 3790                      | 15.7                 | 20.6         | .76                    | .20                                                     | .29 (84c)                |
| 3                                                                  | 785                       | 3550                      | 16.4                 | 20.5         | .80                    | .62                                                     | .82 (84c)                |
| 4                                                                  | 950                       | 4540                      | 15.4                 | 19.8         | .78                    | .22                                                     | .22 (84c)                |
| 5                                                                  | 555                       | 3550                      | 15.8                 | 20.1         | .79                    | .77                                                     | 1.14 (84c)               |
| Avg.                                                               | 820                       | 3940                      | 15.8                 | 20.1         | 0.78                   | 0.42                                                    | 0.55 (84c)               |
| Plant 9, grade 1 ("Stock," percentage of kiln unknown, SM, C)      |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    |                           |                           |                      |              |                        |                                                         |                          |
| 1                                                                  | 450                       | 3880                      | 20.7                 | 20.7         | 1.00                   | 2.60                                                    |                          |
| 2                                                                  | 465                       | 4140                      | 22.0                 | 22.5         | 0.98                   | 0.80                                                    |                          |
| 3                                                                  | 720                       | 4070                      | 21.3                 | 21.3         | 1.00                   | .70                                                     |                          |
| 4                                                                  | 970                       | 4500                      | 21.7                 | 21.7         | 1.00                   | 1.81                                                    |                          |
| 5                                                                  |                           | 4130                      | 22.4                 | 23.2         | 0.97                   | 6.55                                                    |                          |
| Avg.                                                               | 650                       | 4140                      | 21.6                 | 21.9         | 0.99                   | 2.49                                                    |                          |
| Plant 9, grade 2 ("95 percent kiln run," salmons excluded, SM, C)  |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    |                           |                           |                      |              |                        |                                                         |                          |
| 1                                                                  | 620                       | 3490                      | 21.2                 | 23.5         | 0.90                   | 0.94                                                    | 3.40 (81c)               |
| 2                                                                  | 395                       | 2590                      | 24.7                 | 28.0         | .88                    | F 19c                                                   |                          |
| 3                                                                  | 895                       | 3150                      | 24.0                 | 27.6         | .87                    | F 21c                                                   |                          |
| 4                                                                  | 540                       | 3280                      | 23.8                 | 27.6         | .86                    | F 35c                                                   |                          |
| 5                                                                  | 480                       | 2900                      | 22.8                 | 25.9         | .88                    | F 9c                                                    |                          |
| Avg.                                                               | 585                       | 3080                      | 23.3                 | 26.5         | 0.88                   |                                                         |                          |
| Plant 10, grade 1 ("Stock," percentage of kiln unknown, SM, C)     |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    |                           |                           |                      |              |                        |                                                         |                          |
| 1                                                                  | 710                       | 3920                      | 18.5                 | 20.5         | 0.90                   | 0.40 (B)                                                |                          |
| 2                                                                  | 240                       | 3070                      | 19.6                 | 22.8         | .86                    | No test                                                 |                          |
| 3                                                                  | 430                       | 3170                      | 18.8                 | 21.0         | .90                    | 0.72 (B)                                                |                          |
| 4                                                                  | 805                       | 3390                      | 19.0                 | 21.1         | .90                    | .27 (B)                                                 |                          |
| 5                                                                  | 735                       | 3180                      | 18.5                 | 21.0         | .88                    | .37 (B)                                                 |                          |
| Avg.                                                               | 585                       | 3350                      | 18.9                 | 21.3         | 0.89                   | 0.44 (B)                                                |                          |
| Plant 10, grade 2 ("95 percent kiln run," salmons excluded, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    |                           |                           |                      |              |                        |                                                         |                          |
| 1                                                                  | 560                       | 2570                      | 22.0                 | 25.2         | 0.87                   | 0.60                                                    |                          |
| 2                                                                  | 760                       | 3500                      | 19.0                 | 21.1         | .90                    | .53                                                     |                          |
| 3                                                                  | 686                       | 3300                      | 18.6                 | 21.3         | .87                    | .65                                                     |                          |
| 4                                                                  | 460                       | 3020                      | 21.1                 | 23.4         | .90                    | .57                                                     |                          |
| 5                                                                  | 725                       | 3050                      | 18.8                 | 19.9         | .94                    | .69                                                     |                          |
| Avg.                                                               | 635                       | 3090                      | 19.9                 | 22.2         | 0.90                   | 0.61                                                    |                          |
| Plant 10, grade 3 ("Salmons," 5 percent of kiln, SM, C)            |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    |                           |                           |                      |              |                        |                                                         |                          |
| 1                                                                  | 550                       | 3460                      | 19.2                 | 20.3         | 0.94                   | 2.70                                                    | 4.10 (81c)               |
| 2                                                                  | 725                       | 2560                      | 19.6                 | 21.1         | .93                    | 2.10                                                    | 3.30 (81c)               |
| 3                                                                  | 600                       | 2280                      | 20.3                 | 21.8         | .93                    | 2.40                                                    | 4.80 (81c)               |
| 4                                                                  | 215                       | 2080                      | 18.3                 | 20.0         | .92                    | 1.00                                                    | 2.30 (81c)               |
| 5                                                                  | 680                       | 2330                      | 19.8                 | 20.9         | .95                    | 1.30                                                    | 2.70 (81c)               |
| Avg.                                                               | 555                       | 2540                      | 19.4                 | 20.8         | 0.93                   | 1.90                                                    | 3.44 (81c)               |

TABLE 12.—*Properties of bricks produced in Detroit District—Continued*

| Specimen number                                                          | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                          |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 11, grade 1 ("Exterior," percentage of kiln unknown, SM, C)        |                     |                      |                      |              |                        |                                                         |                          |
| 1.....                                                                   | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       | %                        |
| 2.....                                                                   | 2320                | 8630                 | 4.7                  | 5.8          | 0.81                   | No test                                                 |                          |
| 3.....                                                                   | 930                 | 10800                | 1.2                  | 1.8          | .67                    | 0.00 (B)                                                |                          |
| 4.....                                                                   | 1410                | 5880                 | 8.5                  | 11.6         | .73                    | .12 (B)                                                 |                          |
| 5.....                                                                   | 1450                | 11650                | 3.0                  | 3.5          | .86                    | .00 (B)                                                 |                          |
|                                                                          | 2800                | 8960                 | 2.7                  | 3.3          | .82                    | No test                                                 |                          |
| Avg.....                                                                 | 1780                | 9190                 | 4.0                  | 5.2          | 0.78                   | 0.04 (B)                                                |                          |
| Plant 11, grade 2 ("Stock," percentage of kiln unknown, SM, C)           |                     |                      |                      |              |                        |                                                         |                          |
| 1.....                                                                   | 815                 | 5250                 | 14.6                 | 17.8         | 0.82                   | No test                                                 |                          |
| 2.....                                                                   | 1280                | 4980                 | 13.2                 | 18.7         | .71                    | do.....                                                 |                          |
| 3.....                                                                   | 945                 | 6070                 | 14.1                 | 18.5         | .76                    | 0.22 (B)                                                |                          |
| 4.....                                                                   | 1045                | 5790                 | 14.5                 | 18.4         | .79                    | .13 (B)                                                 |                          |
| 5.....                                                                   | 1165                | 4890                 | 15.6                 | 19.2         | .81                    | .12 (B)                                                 |                          |
| Avg.....                                                                 | 1050                | 5400                 | 14.4                 | 18.5         | 0.78                   | 0.16 (B)                                                |                          |
| Plant 11, grade 3 ("95 percent kiln run," salmons excluded, SM, C)       |                     |                      |                      |              |                        |                                                         |                          |
| 1.....                                                                   | 565                 | 3490                 | 18.7                 | 20.7         | 0.90                   | 0.58                                                    | 0.67 (84c)               |
| 2.....                                                                   | 660                 | 3470                 | 19.3                 | 21.1         | .92                    | 0.54                                                    | .72 (84c)                |
| 3.....                                                                   | 495                 | 2880                 | 19.7                 | 22.0         | .90                    | 3.70                                                    | 3.90 (84c)               |
| 4.....                                                                   | 520                 | 3030                 | 19.3                 | 21.5         | .90                    | 0.55                                                    | 0.65 (84c)               |
| 5.....                                                                   |                     | 2650                 | 20.9                 | 23.3         | .90                    | .74                                                     | .98 (84c)                |
| Avg.....                                                                 | 560                 | 3100                 | 19.6                 | 21.7         | 0.90                   | 1.22                                                    | 1.38 (84c)               |
| Plant 12, grade 1 ("Exterior," percentage of kiln unknown, SM, C)        |                     |                      |                      |              |                        |                                                         |                          |
| 1.....                                                                   | 1970                | 6910                 | 4.1                  | 7.0          | 0.59                   | 0.00                                                    |                          |
| 2.....                                                                   | 1605                | 3840                 | 7.8                  | 12.0         | .65                    | .00                                                     |                          |
| 3.....                                                                   | 1550                | 5000                 | 10.0                 | 13.9         | .72                    | .11                                                     |                          |
| 4.....                                                                   | 1310                | 4860                 | 9.3                  | 14.2         | .65                    | .22                                                     |                          |
| 5.....                                                                   | 1570                | 4750                 | 9.2                  | 13.3         | .69                    | .31                                                     |                          |
| Avg.....                                                                 | 1600                | 5070                 | 8.1                  | 12.1         | 0.66                   | 0.13                                                    |                          |
| Plant 12, grade 2 ("Stock," percentage of kiln unknown, SM, C)           |                     |                      |                      |              |                        |                                                         |                          |
| 1.....                                                                   | 1080                | 3590                 | 19.0                 | 24.2         | 0.79                   | F 50c (B)                                               |                          |
| 2.....                                                                   | 595                 | 4360                 | 18.8                 | 22.3         | .84                    | No test                                                 |                          |
| 3.....                                                                   | 580                 | 3850                 | 21.9                 | 25.4         | .86                    | F 31c (B)                                               |                          |
| 4.....                                                                   | 1025                | 4030                 | 20.0                 | 23.9         | .84                    | F 34c (B)                                               |                          |
| 5.....                                                                   | 540                 | 3250                 | 22.5                 | 25.6         | .89                    | No test                                                 |                          |
| Avg.....                                                                 | 765                 | 3820                 | 20.4                 | 24.3         | 0.84                   | F 38c (B)                                               |                          |
| Plant 12, grade 3 ("95 percent kiln run," salmons excluded, SM, C)       |                     |                      |                      |              |                        |                                                         |                          |
| 1.....                                                                   | 710                 | 2740                 | 21.9                 | 25.0         | 0.88                   | 2.30                                                    | 2.50 (84c)               |
| 2.....                                                                   | 635                 | 2920                 | 21.7                 | 25.2         | .86                    | 0.40                                                    | 0.61 (84c)               |
| 3.....                                                                   | 590                 | 2450                 | 22.5                 | 26.2         | .86                    | 6.20                                                    | 6.30 (84c)               |
| 4.....                                                                   | 385                 | 3450                 | 21.3                 | 25.0         | .85                    | 0.25                                                    | 0.49 (84c)               |
| 5.....                                                                   | 640                 | 3500                 | 21.1                 | 23.7         | .89                    | .72                                                     | 0.93 (84c)               |
| Avg.....                                                                 | 590                 | 3010                 | 21.7                 | 25.0         | 0.87                   | 1.97                                                    | 2.17 (84c)               |
| Plant 13, grade 1 ("Exterior Type A," percentage of kiln unknown, SM, C) |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5).....                                                             | 2370                | 9500                 | 1.4                  | 2.9          | 0.44                   | Not tested                                              |                          |

TABLE 12.—Properties of bricks produced in Detroit District—Continued

| Specimen number                                                          | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                          |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 13, grade 2 ("Exterior type B," percentage of kiln unknown, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                                   | 1960                      | 9500                      | 2.4                  | 4.1          | 0.59                   | 0.24 (B)                                                |                          |
| 2-----                                                                   | 1830                      | 9060                      | 0.5                  | 1.6          | .31                    | .11 (B)                                                 |                          |
| 3-----                                                                   | 2370                      | 10000                     | .5                   | 1.9          | .26                    | .09 (B)                                                 |                          |
| 4-----                                                                   | 1920                      | 11350                     | .5                   | 1.0          | .50                    | .00 (B)                                                 |                          |
| 5-----                                                                   | 2095                      | 9510                      | .5                   | 1.0          | .50                    | .10 (B)                                                 |                          |
| Avg-----                                                                 | 2035                      | 9880                      | 0.9                  | 1.9          | 0.43                   | 0.11 (B)                                                |                          |
| Plant 13, grade 3 ("Exterior Type C," percentage of kiln unknown, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                   | 1425                      | 6410                      | 6.1                  | 8.9          | 0.69                   | 0.09 (B)                                                |                          |
| 2-----                                                                   | 1020                      | 3930                      | 11.4                 | 15.9         | .72                    | .34 (B)                                                 |                          |
| 3-----                                                                   | 890                       | 3920                      | 12.2                 | 16.8         | .73                    | .35 (B)                                                 |                          |
| 4-----                                                                   | 1430                      | 6300                      | 7.0                  | 11.3         | .62                    | .11 (B)                                                 |                          |
| 5-----                                                                   | 1265                      | 7510                      | 6.9                  | 9.0          | .77                    | .32 (B)                                                 |                          |
| Avg-----                                                                 | 1205                      | 5610                      | 8.7                  | 12.4         | 0.71                   | 0.24 (B)                                                |                          |
| Plant 13, grade 4 ("Exterior Type D," percentage of kiln unknown, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                   | 2610                      | 11500                     | 0.9                  | 2.2          | 0.40                   | 0.09 (B)                                                |                          |
| 2-----                                                                   | 2980                      | 14800                     | .5                   | 1.4          | .36                    | .09 (B)                                                 |                          |
| 3-----                                                                   | 2420                      | 9800                      | .6                   | 3.2          | .19                    | .25 (B)                                                 |                          |
| 4-----                                                                   | 2120                      | 12400                     | 1.3                  | 2.6          | .50                    | .13 (B)                                                 |                          |
| 5-----                                                                   | 2180                      | 11000                     | 1.4                  | 3.6          | .39                    | .18 (B)                                                 |                          |
| Avg-----                                                                 | 2460                      | 11900                     | 0.9                  | 2.6          | 0.37                   | 0.15 (B)                                                |                          |
| Plant 13, grade 5 ("Stock," percentage of kiln unknown, SM, C)           |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                   | 415                       | 2420                      | 22.0                 | 24.6         | 0.89                   | 0.94 (B)                                                |                          |
| 2-----                                                                   | 335                       | 2490                      | 21.7                 | 24.2         | .90                    | 1.14 (B)                                                |                          |
| 3-----                                                                   | 635                       | 2620                      | 22.1                 | 26.0         | .85                    | 0.49 (B)                                                |                          |
| 4-----                                                                   | 610                       | 2880                      | 21.1                 | 23.7         | .89                    | .72 (B)                                                 |                          |
| 5-----                                                                   | 485                       | 2320                      | 21.0                 | 23.0         | .91                    | .90 (B)                                                 |                          |
| Avg-----                                                                 | 495                       | 2550                      | 21.6                 | 24.3         | 0.89                   | 0.84 (B)                                                |                          |
| Plant 13, grade 6 ("95 percent of kiln run," salmons excluded, SM, C)    |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                   | 545                       | 2550                      | 20.1                 | 23.9         | 0.84                   | 0.43                                                    | <i>%</i>                 |
| 2-----                                                                   | 515                       | 2800                      | 19.5                 | 23.6         | .83                    | .31                                                     | .31 (84c)                |
| 3-----                                                                   | 425                       | 2650                      | 20.6                 | 23.9         | .86                    | 1.03                                                    | 1.29 (84c)               |
| 4-----                                                                   | 650                       | 3100                      | 19.3                 | 23.7         | .81                    | 0.44                                                    | .44 (84c)                |
| 5-----                                                                   | 655                       | 3030                      | 20.0                 | 23.1         | .87                    | .41                                                     | .62 (84c)                |
| Avg-----                                                                 | 555                       | 2830                      | 19.9                 | 23.6         | 0.84                   | 0.52                                                    | 0.66 (84c)               |
| Plant 13, grade 6A ("Second sample (1936) of grade 6")                   |                           |                           |                      |              |                        |                                                         |                          |
|                                                                          |                           |                           | (24-hr)              |              |                        |                                                         |                          |
| 1-----                                                                   | 680                       | 3860                      | 21.3                 | 24.9         | 0.86                   | 1.27                                                    |                          |
| 2-----                                                                   | 365                       | 3580                      | 20.5                 | 23.8         | .86                    | 1.04                                                    |                          |
| 3-----                                                                   | 535                       | 3540                      | 19.9                 | 22.4         | .88                    | 2.06                                                    |                          |
| 4-----                                                                   | 635                       | 3850                      | 19.4                 | 22.7         | .86                    | 0.91                                                    |                          |
| 5-----                                                                   | 790                       | 3260                      | 21.0                 | 24.6         | .86                    | .83                                                     |                          |
| 6-----                                                                   | 550                       | 2980                      | 21.2                 | 23.9         | .89                    | .90                                                     |                          |
| 7-----                                                                   | 470                       | 3020                      | 21.1                 | 25.1         | .84                    | .65                                                     |                          |
| 8-----                                                                   | 500                       | 2920                      | 20.7                 | 23.8         | .87                    | .86                                                     |                          |
| 9-----                                                                   | 535                       | 4300                      | 19.9                 | 23.2         | .86                    | .91                                                     |                          |
| 10-----                                                                  | 650                       | 3740                      | 19.2                 | 21.8         | .88                    | 1.36                                                    |                          |
| 11-----                                                                  | 530                       | 3850                      | 20.0                 | 23.5         | .85                    | 1.49                                                    |                          |
| 12-----                                                                  | 625                       | 3320                      | 20.3                 | 22.9         | .88                    | 0.91                                                    |                          |
| 13-----                                                                  | 750                       | 4520                      | 19.8                 | 23.2         | .86                    | .60                                                     |                          |
| 14-----                                                                  | 425                       | 3280                      | 22.0                 | 26.0         | .84                    | F 24c                                                   |                          |
| 15-----                                                                  | 580                       | 3070                      | 20.7                 | 23.5         | .88                    | 0.89                                                    |                          |
| 16-----                                                                  | 295                       |                           | 22.0                 | 26.0         | .84                    | F 51c                                                   |                          |
| 17-----                                                                  | 635                       | 3210                      | 21.0                 | 24.0         | .88                    | 0.94                                                    |                          |
| 18-----                                                                  | 485                       | 3070                      | 20.9                 | 22.3         | .94                    | 2.01                                                    |                          |
| 19-----                                                                  | 540                       | 4520                      | 18.6                 | 21.5         | .86                    | 0.59                                                    |                          |
| 20-----                                                                  | 695                       | 3380                      | 21.9                 | 25.6         | .86                    | 1.04                                                    |                          |
| Avg-----                                                                 | 565                       | 3540                      | 20.6                 | 23.7         | 0.87                   |                                                         |                          |

TABLE 13.—Properties of bricks produced in Wisconsin

[All samples received were formed from surface clay by either the soft-mud or the stiff-mud, side-cut process. Many of the bricks contain finely divided free lime which hydrates and carbonates with time, causing significant gains in weight. This high lime content is the cause of the characteristic light color of many of these samples]

| Specimen number                                                   | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                   |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 50, grade 1 ("Sewer," 4 percent of kiln, SM, C)             |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       | %                        |
| 2-----                                                            | 1975                | 7370                 | 10.5                 | 15.7         | 0.67                   | 0.13                                                    | 0.13 (78c)               |
|                                                                   | 1760                | 9270                 | 6.8                  | 10.7         | .64                    | .00                                                     | .00 (78c)                |
| Avg                                                               | 1870                | 8320                 | 8.6                  | 13.2         | 0.66                   | 0.06                                                    | 0.06 (78c)               |
| Plant 50, grade 2 ("Select," 46 percent of kiln, SM, C)           |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 940                 | 5350                 | 16.3                 | 20.1         | 0.81                   | 0.00                                                    | 0.00 (78c)               |
| 2-----                                                            | 985                 | 5440                 | 14.8                 | 18.9         | .78                    | .20                                                     | .31 (78c)                |
| Avg                                                               | 965                 | 5400                 | 15.6                 | 19.5         | 0.80                   | 0.10                                                    | 0.16 (78c)               |
| Plant 50, grade 3 ("Common," 46 percent of kiln, SM, C)           |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 485                 | 2660                 | 21.4                 | 24.7         | 0.87                   | 0.26                                                    | 0.39 (78c)               |
| 2-----                                                            | 445                 | 3070                 | 21.1                 | 24.7         | .85                    | .41                                                     | .62 (78c)                |
| Avg                                                               | 465                 | 2860                 | 21.2                 | 24.7         | 0.86                   | 0.34                                                    | 0.50 (78c)               |
| Plant 50, grade 4 ("Soft," 4 percent of kiln, SM, C)              |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 440                 | 2390                 | 20.9                 | 24.6         | 0.85                   | 0.60                                                    | 0.90 (78c)               |
| 2-----                                                            | 640                 | 2590                 | 22.4                 | 24.7         | .91                    | .83                                                     | 1.18 (78c)               |
| Avg                                                               | 540                 | 2490                 | 21.6                 | 24.6         | 0.88                   | 0.72                                                    | 1.04 (78c)               |
| Plant 61, grade 1 ("Clinkers," 5 percent of kiln, SM, C)          |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-                                                          | 1285                | 10590                | 8.9                  | 12.2         | 0.78                   | {Not tested}                                            |                          |
| Plant 61, grade 2 ("Hard," 90 percent of kiln, SM, C)             |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 1725                | 7140                 | 15.5                 | 21.0         | 0.74                   | 0.13 (B)                                                |                          |
| 2-----                                                            | 1850                | 6900                 | 13.8                 | 18.6         | .74                    | .14 (B)                                                 |                          |
| 3-----                                                            | 1060                | 6450                 | 19.5                 | 23.0         | .85                    | .53 (B)                                                 |                          |
| 4-----                                                            | 930                 | 5190                 | 20.7                 | 25.8         | .80                    | F 50c (B)                                               |                          |
| 5-----                                                            | 645                 | 4470                 | 23.8                 | 28.5         | .84                    | F 50c (B)                                               |                          |
| Avg                                                               | 1240                | 6030                 | 18.7                 | 23.4         | 0.79                   | -----                                                   |                          |
| Plant 61, grade 3 ("Soft," 5 percent of kiln, SM, C)              |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 465                 | 1960                 | 26.1                 | 29.3         | 0.89                   | 0.13                                                    | { 1.53 (101c A & B)      |
| 2-----                                                            | 455                 | 2300                 | 26.6                 | 30.5         | .87                    | .91                                                     | 1.04 (66c)               |
| 3-----                                                            | 300                 | 1850                 | 25.8                 | 29.0         | .89                    | a+.77                                                   | +0.77 (66c)              |
| 4-----                                                            | 475                 | 2980                 | 20.6                 | 24.4         | .84                    | .63                                                     | .75 (66c)                |
| 5-----                                                            | 305                 | 2050                 | 26.0                 | 30.3         | .86                    | 1.85                                                    | 2.13 (66c)               |
| Avg                                                               | 400                 | 2230                 | 25.0                 | 28.7         | 0.87                   | -----                                                   |                          |
| Plant 129, grade 1 ("Clinker," 10 percent of kiln, SC, C)         |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-                                                          | 2505                | 11180                | 8.5                  | 14.1         | 0.57                   | {Not tested}                                            |                          |
| Plant 129, grade 2 ("Commercial hard," 40 percent of kiln, SC, C) |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 1320                | 5350                 | 19.9                 | 26.3         | 0.76                   | 0.23 (B)                                                |                          |
| 2-----                                                            | 935                 | 4650                 | 21.6                 | 26.7         | .81                    | .25 (B)                                                 |                          |
| 3-----                                                            | 1130                | 4080                 | 21.4                 | 26.6         | .81                    | .12 (B)                                                 |                          |
| 4-----                                                            | 925                 | 4370                 | 20.4                 | 25.9         | .79                    | .12 (B)                                                 |                          |
| 5-----                                                            | 940                 | 5090                 | 22.0                 | 27.6         | .80                    | .00 (B)                                                 |                          |
| Avg                                                               | 1050                | 4710                 | 21.1                 | 26.6         | 0.79                   | 0.14 (B)                                                |                          |

a These bricks have a high lime content. The gain in weight is due to hydration and carbonation of the lime.

TABLE 13.— *Properties of bricks produced in Wisconsin—*  
Continued

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 129, grade 3 ("Select white," 30 percent of kiln, SC, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %         |          |
|----------|---------------------|---------------------|------|------|------|-----------|----------|
| 1-----   | 510                 | 1830                | 29.4 | 34.1 | 0.86 | } No test |          |
| 2-----   | 400                 | 1900                | 29.4 | 33.6 | .88  |           |          |
| 3-----   | 255                 | 1600                | 29.3 | 33.9 | .86  |           |          |
| 4-----   | 365                 | 1740                | 29.2 | 33.9 | .86  |           | 1.27 (B) |
| 5-----   | 350                 | 1480                | 29.2 | 34.1 | .86  |           | 1.93 (B) |
| Avg----- | 375                 | 1710                | 29.3 | 33.9 | 0.86 |           | 1.60 (B) |

Plant 129, grade 4 ("Soft or backup," 20 percent of kiln, SC, C)

| 1-----   | 575 | 2150 | 26.2 | 29.2 | 0.90 | F 12c |  |
|----------|-----|------|------|------|------|-------|--|
| 2-----   | 340 | 1180 | 29.9 | 33.2 | .90  | F 10c |  |
| 3-----   | 325 | 1130 | 33.3 | 37.7 | .88  | F 10c |  |
| 4-----   | 260 | 1600 | 32.4 | 35.1 | .92  | F 10c |  |
| 5-----   | 355 | 1660 | 29.1 | 32.3 | .90  | F 12c |  |
| Avg----- | 370 | 1540 | 30.2 | 33.5 | 0.90 | F 11c |  |

Plant 129, grade 4A ("Second sample (1936) of grade 4")

|          |     |      | (24-hr) |      |      |       |  |
|----------|-----|------|---------|------|------|-------|--|
| 1-----   | 930 | 3145 | 24.5    | 27.7 | 0.88 | F 38c |  |
| 2-----   | 295 | 1380 | 32.3    | 35.8 | .90  | F 1c  |  |
| 3-----   | 140 | 1715 | 32.2    | 35.3 | .91  | F 1c  |  |
| 4-----   | 305 | 940  | 33.2    | 35.6 | .93  | F 9c  |  |
| 5-----   | 820 | 3200 | 22.8    | 26.8 | .85  | F 38c |  |
| 6-----   | 650 | 2120 | 29.7    | 33.0 | .90  | F 9c  |  |
| 7-----   | 165 | 1615 | 32.2    | 34.8 | .92  | F 31c |  |
| 8-----   | 355 | 2280 | 27.9    | 31.8 | .88  | F 8c  |  |
| 9-----   | 815 | 6070 | 23.1    | 25.7 | .90  | F 1c  |  |
| 10-----  | 280 | 1965 | 33.0    | 36.6 | .90  | F 9c  |  |
| 11-----  | 530 | 1615 | 32.9    | 36.7 | .90  | F 9c  |  |
| 12-----  | 475 | 1390 | 33.3    | 36.0 | .93  | F 3c  |  |
| 13-----  | 620 | 1690 | 28.7    | 32.1 | .89  | F 1c  |  |
| 14-----  | 590 | 1565 | 32.6    | 35.3 | .92  | F 16c |  |
| 15-----  | 395 | 1805 | 33.1    | 36.3 | .91  | F 3c  |  |
| 16-----  | 300 | 1056 | 35.7    | 37.8 | .94  | F 6c  |  |
| 17-----  | 430 | 1545 | 33.9    | 36.3 | .93  | F 6c  |  |
| Avg----- | 480 | 2080 | 30.7    | 33.7 | 0.91 | F 11c |  |

Plant 150, grade 1 ("Clinker," 2½ percent of kiln, SM, C)

| 1-----   | 910  | 3980 | 5.4 | 6.9 | 0.78 | 0.15 |  |
|----------|------|------|-----|-----|------|------|--|
| 2-----   | 940  | 4190 | 5.4 | 8.1 | .67  | .27  |  |
| 3-----   | 1090 | 4060 | 4.0 | 6.7 | .60  | .27  |  |
| 4-----   | 1745 | 3950 | 3.7 | 6.8 | .54  | .25  |  |
| 5-----   | 1245 | 3870 | 5.0 | 7.8 | .64  | .14  |  |
| Avg----- | 1185 | 4010 | 4.7 | 7.3 | 0.65 | 0.22 |  |

Plant 150, grade 1A ("Second sample of grade 1")

| Avg (5) |      |      |      |      |      |             |  |
|---------|------|------|------|------|------|-------------|--|
|         | 1150 | 5180 | 12.7 | 15.7 | 0.81 | {Not tested |  |

Plant 150, grade 2 ("Commercial hard," 80 percent of kiln, SM, C)

| 1-----   | 830 | 2880 | 22.2 | 24.6 | 0.90 | 0.95  |  |
|----------|-----|------|------|------|------|-------|--|
| 2-----   | 755 | 2760 | 20.5 | 21.7 | .95  | 1.68  |  |
| 3-----   | 845 | 2910 | 21.3 | 23.3 | .91  | 0.80  |  |
| 4-----   | 760 | 2440 | 20.1 | 21.5 | .94  | .29   |  |
| 5-----   | 690 | 2760 | 21.3 | 25.0 | .85  | F 36c |  |
| Avg----- | 775 | 2750 | 21.1 | 23.2 | 0.91 | ----- |  |

TABLE 13.— *Properties of bricks produced in Wisconsin—*  
Continued

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 150, grade 3 ("Red commercial hard," percentage of kiln unknown, SM, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    |  |
|----------|---------------------|---------------------|------|------|------|------|--|
| 1-----   | 995                 | 4900                | 14.6 | 16.8 | 0.87 | 0.44 |  |
| 2-----   | 675                 | 4270                | 17.4 | 19.3 | .90  | .74  |  |
| 3-----   | 770                 | 3870                | 18.2 | 20.3 | .90  | .81  |  |
| 4-----   | 770                 | 4240                | 16.9 | 18.8 | .90  | .52  |  |
| 5-----   | 715                 | 3900                | 18.5 | 20.6 | .90  | 2.00 |  |
| Avg----- | 785                 | 4240                | 17.1 | 19.2 | 0.89 | 0.99 |  |

Plant 150, grade 4 ("Medium," 12½ percent of kiln, SM, C)

| 1-----   | 485 | 3280 | 20.8 | 23.3 | 0.89 | F 38c |  |
|----------|-----|------|------|------|------|-------|--|
| 2-----   | 510 | 2960 | 22.4 | 24.3 | .92  | 0.50  |  |
| 3-----   | 510 | 3100 | 22.2 | 24.8 | .90  | F 37c |  |
| 4-----   | 580 | 3620 | 22.0 | 24.1 | .91  | 0.70  |  |
| 5-----   | 700 | 2340 | 22.4 | 25.0 | .90  | .92   |  |
| Avg----- | 570 | 3050 | 22.0 | 24.3 | 0.90 | ----- |  |

Plant 150, grade 5 ("Salmon," 5 percent of kiln, SM, C)

| 1-----   | 290 | 2680 | 21.0 | 22.4 | 0.94 | F 33c |  |
|----------|-----|------|------|------|------|-------|--|
| 2-----   | 560 | 2900 | 21.6 | 23.0 | .94  | 2.34  |  |
| 3-----   | 515 | 2560 | 22.2 | 24.8 | .90  | F 27c |  |
| 4-----   | 465 | 1820 | 23.3 | 26.7 | .87  | F 48c |  |
| 5-----   | 545 | 2400 | 16.7 | 18.4 | .91  | F 11c |  |
| Avg----- | 475 | 2470 | 21.0 | 23.1 | 0.91 | ----- |  |

Plant 154, grade 1 ("Clinker," 5 percent of kiln, SC, C)

| 1-----   | 1235 | 11600 | 10.9 | 12.6 | 0.87 | 0.57 |  |
|----------|------|-------|------|------|------|------|--|
| 2-----   | 1935 | 10850 | 1.8  | 2.4  | .75  | .12  |  |
| 3-----   | 2580 | 12050 | 5.1  | 6.1  | .84  | .00  |  |
| 4-----   | 2480 | 9610  | 2.5  | 3.4  | .74  | .00  |  |
| 5-----   | 2330 | 6330  | 6.2  | 7.5  | .83  | .00  |  |
| Avg----- | 2110 | 10090 | 5.3  | 6.4  | 0.81 | 0.14 |  |

Plant 154, grade 2 ("Hard white," 80 percent of kiln, SM, C)

| 1-----   | 1175 | 5190 | 10.2 | 13.5 | 0.76 | 0.26 |  |
|----------|------|------|------|------|------|------|--|
| 2-----   | 620  | 5150 | 16.4 | 19.8 | .83  | .56  |  |
| 3-----   | 435  | 5190 | 15.2 | 19.2 | .79  | .53  |  |
| 4-----   | 820  | 4420 | 20.2 | 22.2 | .91  | .65  |  |
| 5-----   | 845  | 4730 | 16.6 | 19.9 | .83  | .33  |  |
| Avg----- | 780  | 4940 | 15.7 | 18.9 | 0.82 | 0.57 |  |

Plant 154, grade 3 ("Hard," 80 percent of kiln, SC, C)

| 1-----   | 2000 | 10000 | 12.4 | 14.0 | 0.89 | 0.00  |  |
|----------|------|-------|------|------|------|-------|--|
| 2-----   | 1740 | 7270  | 12.7 | 14.2 | .89  | .15   |  |
| 3-----   | 1595 | 6760  | 19.6 | 21.5 | .91  | F 3c  |  |
| 4-----   | 905  | 5730  | 20.5 | 22.3 | .92  | F 8c  |  |
| 5-----   | 1310 | 6850  | 19.9 | 22.2 | .90  | F 6c  |  |
| Avg----- | 1510 | 7320  | 17.0 | 18.8 | 0.90 | ----- |  |

Plant 154, grade 4 ("Hard red," 80 percent of kiln, SM, C)

| 1-----   | 1420 | 8700 | 1.7  | 5.1  | 0.33 | 0.00 |  |
|----------|------|------|------|------|------|------|--|
| 2-----   | 1530 | 6960 | 4.4  | 8.3  | .53  | .11  |  |
| 3-----   | 940  | 4780 | 11.0 | 14.9 | .74  | .78  |  |
| 4-----   | 460  | 2550 | 17.4 | 20.3 | .86  | 4.24 |  |
| 5-----   | 755  | 3900 | 13.9 | 17.9 | .78  | 0.46 |  |
| Avg----- | 1020 | 5380 | 9.7  | 13.3 | 0.65 | 1.12 |  |

TABLE 13.—*Properties of bricks produced in Wisconsin—Continued*

| Specimen number                                                  | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                  |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 154, grade 5 ("Soft," 5 percent of kiln, SC, C)            |                           |                           |                      |              |                        |                                                         |                          |
|                                                                  | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                           | 270                       | 2340                      | 21.5                 | 23.1         | 0.93                   | F 12c                                                   |                          |
| 2-----                                                           | 1060                      | 4540                      | 19.7                 | 21.2         | .91                    | F 4c                                                    |                          |
| 3-----                                                           | 255                       | 2870                      | 21.2                 | 22.4         | .95                    | F 9c                                                    |                          |
| 4-----                                                           | 930                       | 3690                      | 22.3                 | 24.4         | .91                    | F 12c                                                   |                          |
| 5-----                                                           | 630                       | 3510                      | 20.3                 | 21.5         | .94                    | F 12c                                                   |                          |
| Avg-----                                                         | 630                       | 3390                      | 21.0                 | 22.5         | 0.93                   | F 10c                                                   |                          |
| Plant 204, grade 1 ("Common," percentage of kiln unknown, SC, C) |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-----                                                     | 1790                      | 6840                      | 12.1                 | 17.7         | 0.68                   | fNot tested                                             |                          |

TABLE 14.—*Properties of bricks produced in Chicago District*

[All bricks received from the Chicago District were made from surface clay by the stiff-mud, end-cut process]

| Specimen number                                                             | Modulus of rupture                | Compressive strength              | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------------------------|-----------------------------------|-----------------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                             |                                   |                                   | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 73, grade 1 ("Hard burned common," percentage of kiln unknown, EC, C) |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                                      | <i>lb/in.<sup>2</sup></i><br>2000 | <i>lb/in.<sup>2</sup></i><br>4180 | %<br>11.7            | %<br>15.5    | 0.75                   | 0.89                                                    | 1.12 (66c)               |
| 2-----                                                                      | 1550                              | 4460                              | 12.0                 | 15.8         | .76                    | 1.64                                                    | 2.01 (66c)               |
| 3-----                                                                      | 1780                              | 3610                              | 13.5                 | 16.8         | .80                    | 1.40                                                    | 1.51 (66c)               |
| 4-----                                                                      | 2250                              | 4740                              | 10.6                 | 14.0         | .76                    | 1.87                                                    | 2.01 (66c)               |
| 5-----                                                                      | 1220                              | 2560                              | 21.7                 | 24.8         | .88                    | F 42c                                                   |                          |
| Avg-----                                                                    | 1760                              | 3910                              | 13.9                 | 17.4         | 0.79                   | -----                                                   |                          |
| Plant 109, grade 1 ("Common," percentage of kiln unknown, EC, C)            |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                                      | 690                               | 4100                              | 21.6                 | 23.9         | 0.90                   | F 27c                                                   |                          |
| 2-----                                                                      | 630                               | 2450                              | 20.6                 | 26.0         | .79                    | 4.77                                                    |                          |
| 3-----                                                                      | 1295                              | 4220                              | 12.1                 | 15.7         | .77                    | 1.04                                                    |                          |
| 4-----                                                                      | 905                               | 3350                              | 14.6                 | 18.7         | .78                    | 1.03                                                    |                          |
| 5-----                                                                      | 905                               | 2880                              | 17.8                 | 21.6         | .82                    | 1.29                                                    |                          |
| 6-----                                                                      | 1110                              | 3770                              | 11.2                 | 16.0         | .70                    | 0.64                                                    |                          |
| 7-----                                                                      | 780                               | 2780                              | 18.9                 | 22.4         | .84                    | 1.69                                                    |                          |
| 8-----                                                                      | 745                               | 3100                              | 15.7                 | 19.7         | .80                    | 1.46                                                    |                          |
| 9-----                                                                      | 1010                              | 2750                              | 15.6                 | 20.2         | .77                    | 2.11                                                    |                          |
| 10-----                                                                     | 1295                              | 2060                              | 6.7                  | 11.0         | .61                    | 0.24                                                    |                          |
| 11-----                                                                     | 670                               | 2420                              | 18.1                 | 24.0         | .75                    | 2.34                                                    |                          |
| 12-----                                                                     | 605                               | 3800                              | 7.9                  | 11.6         | .68                    | 2.16                                                    |                          |
| 13-----                                                                     | 750                               | 1890                              | 17.7                 | 23.5         | .75                    | 1.40                                                    |                          |
| 14-----                                                                     | 825                               | 2470                              | 11.9                 | 15.5         | .77                    | 2.08                                                    |                          |
| 15-----                                                                     | 970                               | 2850                              | 22.2                 | 24.4         | .91                    | F 3c                                                    |                          |
| Avg-----                                                                    | 880                               | 3000                              | 15.5                 | 19.6         | 0.77                   | -----                                                   |                          |

TABLE 14.—*Properties of bricks produced in Chicago District—Continued*

| Specimen number                                                    | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                    |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 152, grade 1 ("Kiln run common," 100 percent of kiln, EC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1-----                                                             | 2290                      | 4200                      | 8.2                  | 11.5         | 0.71                   | 2.53                                                    |                          |
| 2-----                                                             | 2150                      | 2780                      | 13.3                 | 15.8         | .84                    | 1.40                                                    |                          |
| 3-----                                                             | 1045                      | 4280                      | 17.3                 | 19.3         | .90                    | F 21c                                                   |                          |
| 4-----                                                             | 2050                      | 4000                      | 13.7                 | 15.0         | .91                    | 2.64                                                    |                          |
| 5-----                                                             | 2560                      | 4440                      | 10.8                 | 13.2         | .82                    | 0.48                                                    |                          |
| 6-----                                                             | 2000                      | 3390                      | 14.3                 | 17.5         | .82                    | 1.54                                                    |                          |
| 7-----                                                             | 2310                      | 3760                      | 12.8                 | 15.8         | .87                    | 0.71                                                    |                          |
| 8-----                                                             | 1335                      | 4650                      | 12.5                 | 14.8         | .84                    | 1.09                                                    |                          |
| 9-----                                                             | 1510                      | 3070                      | 14.2                 | 16.9         | .84                    | 0.94                                                    |                          |
| 10-----                                                            | 1780                      | 3260                      | 14.2                 | 16.9         | .84                    | 1.77                                                    |                          |
| 11-----                                                            | 2390                      | 4310                      | 11.5                 | 14.4         | .80                    | 0.69                                                    |                          |
| 12-----                                                            | 635                       | 3030                      | 16.7                 | 18.9         | .88                    | 8.56 (B)                                                |                          |
| 13-----                                                            | 2350                      | 3410                      | 10.9                 | 13.8         | .79                    | 0.46                                                    |                          |
| 14-----                                                            | 1480                      | 3480                      | 17.3                 | 20.1         | .86                    | F 34c                                                   |                          |
| 15-----                                                            | 1480                      | 4800                      | 15.4                 | 18.5         | .83                    | 0.99                                                    |                          |
| Avg.---                                                            | 1825                      | 3790                      | 13.5                 | 16.2         | 0.84                   | -----                                                   |                          |

Plant 152, grade 1A ("Second sample (1936) of grade 1")

|          |      |      | (24-hr) |      |      |       |
|----------|------|------|---------|------|------|-------|
| 1-----   | 1620 | 3140 | 13.7    | 17.5 | 0.79 | 1.89  |
| 2-----   | 1620 | 3640 | 8.6     | 12.4 | .70  | 3.91  |
| 3-----   | 1630 | 3600 | 8.9     | 12.6 | .71  | 0.74  |
| 4-----   | 1510 | 3250 | 11.8    | 15.8 | .75  | 1.18  |
| 5-----   | 1080 | 3650 | 11.8    | 16.0 | .74  | 1.39  |
| 6-----   | 1170 | 3200 | 16.4    | 20.0 | .82  | 1.71  |
| 7-----   | 1410 | 2660 | 17.1    | 20.5 | .84  | F 27c |
| 8-----   | 1530 | 5680 | 6.2     | 9.3  | .67  | 0.63  |
| 9-----   | 870  | 3150 | 17.5    | 20.5 | .86  | 2.94  |
| 10-----  | 1230 | 3770 | 17.6    | 20.6 | .86  | 9.00  |
| 11-----  | 1000 | 3110 | 14.2    | 17.8 | .80  | 1.92  |
| 12-----  | 1270 | 2700 | 12.5    | 16.3 | .77  | 0.75  |
| 13-----  | 660  | 3050 | 12.0    | 15.8 | .76  | 1.43  |
| 14-----  | 1760 | 2950 | 8.6     | 12.7 | .68  | 0.93  |
| 15-----  | 1590 | 2470 | 11.7    | 15.7 | .74  | .90   |
| 16-----  | 1070 | 4900 | 5.6     | 8.6  | .66  | .41   |
| 17-----  | 910  | 4120 | 5.8     | 9.3  | .62  | .43   |
| 18-----  | 1840 | 3680 | 12.0    | 15.2 | .79  | 0.93  |
| 19-----  | 1870 | 4360 | 6.6     | 10.1 | .65  | 2.34  |
| 20-----  | 1790 | 2790 | 12.8    | 16.9 | .76  | 1.87  |
| Avg----- | 1370 | 3500 | 11.6    | 15.2 | 0.75 | ----- |

Plant 167, grade 1 ("Common kiln run," 85 to 90 percent of kiln, EC, C)

|     |      |      |      |      |      |       |  |
|-----|------|------|------|------|------|-------|--|
| 1   | 745  | 2150 | 21.5 | 23.4 | 0.92 | F 5c  |  |
| 2   | 955  | 3220 | 19.5 | 22.4 | .87  | F 9c  |  |
| 3   |      | 2050 | 21.3 | 23.5 | .91  | F 43c |  |
| 4   | 855  | 2720 | 22.1 | 24.1 | .92  | F 19c |  |
| 5   | 955  | 3420 | 17.1 | 20.1 | .85  | 1.10  |  |
| 6   | 1700 | 4480 | 14.9 | 18.9 | .79  | 0.62  |  |
| 7   | 1620 | 2630 | 16.7 | 21.1 | .79  | .65   |  |
| 8   | 1715 | 3110 | 16.7 | 19.9 | .84  | .90   |  |
| 9   | 1665 | 4580 | 13.3 | 17.3 | .77  | .81   |  |
| 10  | 1270 | 2640 | 13.3 | 17.2 | .77  | .45   |  |
| 11  | 1060 | 2810 | 17.5 | 20.8 | .84  | .55   |  |
| 12  | 1750 | 3790 | 13.5 | 17.1 | .79  | .36   |  |
| 13  | 1520 | 2960 | 16.3 | 20.0 | .82  | 2.00  |  |
| 14  | 1425 | 2430 | 17.4 | 20.9 | .83  | 0.93  |  |
| 15  | 1080 | 2390 | 17.6 | 23.3 | .75  | 4.52  |  |
| Avg | 1310 | 3020 | 17.2 | 20.7 | 0.83 |       |  |

TABLE 14.—*Properties of bricks produced in Chicago District—Continued*

| Specimen number                                                            | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                            |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 168, grade 1 ("Commercial kiln run," 85 to 90 percent of kiln EC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                            | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1                                                                          | 460                       | 2660                      | 20.2                 | 23.1         | 0.87                   | F 38c                                                   |                          |
| 2                                                                          | 625                       | 2730                      | 16.6                 | 19.6         | .85                    | 0.90                                                    |                          |
| 3                                                                          | 1245                      | 2830                      | 11.2                 | 15.4         | .73                    | .43                                                     |                          |
| 4                                                                          | 540                       | 3200                      | 21.7                 | 23.9         | .91                    | F 20c                                                   |                          |
| 5                                                                          | 1330                      | 4620                      | 16.3                 | 19.7         | .83                    | F 28c                                                   |                          |
| 6                                                                          | 1025                      | 3530                      | 16.2                 | 19.6         | .83                    | 1.76                                                    |                          |
| 7                                                                          | 1090                      | 4050                      | 16.8                 | 20.3         | .83                    | 0.84                                                    |                          |
| 8                                                                          | 1175                      | 2800                      | 15.3                 | 19.1         | .80                    | .77                                                     |                          |
| 9                                                                          | 1440                      | 4560                      | 16.4                 | 19.6         | .84                    | .63                                                     |                          |
| 10                                                                         | 1560                      | 3530                      | 17.2                 | 20.5         | .84                    | .44                                                     |                          |
| 11                                                                         | 1240                      | 3400                      | 18.7                 | 21.9         | .85                    | F 41c                                                   |                          |
| 12                                                                         | 1550                      | 3800                      | 17.0                 | 20.6         | .83                    | 0.37                                                    |                          |
| 13                                                                         | 2050                      | 3370                      | 14.1                 | 18.1         | .78                    | .68                                                     |                          |
| 14                                                                         | 1645                      | 3770                      | 14.4                 | 18.1         | .80                    | .60                                                     |                          |
| 15                                                                         | 600                       | 1680                      | 20.9                 | 27.0         | .77                    | 4.62                                                    |                          |
| Avg                                                                        | 1170                      | 3370                      | 16.9                 | 20.4         | 0.82                   |                                                         |                          |

Plant 169, grade 1 ("Common kiln run," 85 to 90 percent of kiln, EC, C)

|     |      |      |      |      |      |       |  |
|-----|------|------|------|------|------|-------|--|
| 1   | 1070 | 3210 | 22.8 | 25.9 | 0.88 | F 24c |  |
| 2   | 1030 | 2960 | 19.7 | 23.6 | .84  | 2.66  |  |
| 3   | 1400 | 3320 | 21.4 | 24.6 | .87  | F 27c |  |
| 4   | 1400 | 3530 | 21.5 | 24.7 | .87  | F 23c |  |
| 5   | 1080 | 4060 | 12.7 | 17.1 | .74  | 0.29  |  |
| 6   | 900  | 3660 | 17.9 | 22.0 | .81  | .15   |  |
| 7   | 1125 | 5040 | 17.1 | 21.4 | .80  | .53   |  |
| 8   | 1165 | 5210 | 16.9 | 20.8 | .81  | 7.75  |  |
| 9   | 1220 | 3110 | 19.8 | 23.5 | .84  | 2.56  |  |
| 10  | 1230 | 2750 | 18.3 | 22.5 | .81  | 0.94  |  |
| 11  | 1805 | 3490 | 15.2 | 19.6 | .78  | .33   |  |
| 12  | 1355 | 3770 | 14.3 | 18.6 | .77  | .95   |  |
| 13  | 1820 | 3600 | 11.8 | 15.6 | .76  | .97   |  |
| 14  | 1800 | 3360 | 12.6 | 16.6 | .76  | 2.02  |  |
| 15  | 370  | 3060 | 14.7 | 19.1 | .77  | F 48c |  |
| Avg | 1250 | 3610 | 17.1 | 21.0 | 0.81 |       |  |

Plant 171, grade 1 ("Common kiln run," 100 percent of kiln, EC, C)

|     |      |      |      |      |      |       |  |
|-----|------|------|------|------|------|-------|--|
| 1   | 795  | 3590 | 16.0 | 19.2 | 0.83 | 1.07  |  |
| 2   | 675  | 3150 | 16.2 | 19.3 | .84  | F 1c  |  |
| 3   | 600  | 3650 | 22.3 | 24.0 | .93  | F 1c  |  |
| 4   | 470  | 3850 | 20.1 | 22.7 | .89  | F 21c |  |
| 5   | 610  | 4900 | 18.8 | 22.3 | .84  | 1.03  |  |
| 6   | 1400 | 4050 | 11.2 | 14.8 | .76  | 1.46  |  |
| 7   | 1755 | 4740 | 14.1 | 17.4 | .81  | 0.76  |  |
| 8   | 1640 | 3800 | 14.6 | 18.1 | .81  | 1.05  |  |
| 9   | 2000 | 4420 | 14.3 | 17.6 | .81  | 1.27  |  |
| 10  | 425  | 4130 | 23.1 | 24.2 | .95  | F 1c  |  |
| 11  | 1135 | 3150 | 18.6 | 20.7 | .90  | 4.00  |  |
| 12  | 765  | 3170 | 20.3 | 22.7 | .89  | F 33c |  |
| 13  | 1265 | 3320 | 18.8 | 21.7 | .87  | 2.96  |  |
| 14  | 520  | 3500 | 21.1 | 23.1 | .91  | 3.45  |  |
| 15  | 570  | 3020 | 20.8 | 22.9 | .91  | 8.90  |  |
| Avg | 975  | 3760 | 18.0 | 20.7 | 0.86 |       |  |

Plant 178, grade 1 ("Common kiln run," 90 percent of kiln, EC, C)

|     |      |      |      |      |      |          |  |
|-----|------|------|------|------|------|----------|--|
| 1   | 1200 | 3960 | 16.1 | 17.8 | 0.90 | 0.69 (B) |  |
| 2   | 1265 | 3340 | 8.5  | 12.0 | .71  | 1.61 (B) |  |
| 3   | 1810 | 4090 | 10.1 | 15.4 | .66  | 0.53 (B) |  |
| 4   | 2070 | 4760 | 9.0  | 12.0 | .75  | .48 (B)  |  |
| 5   | 1685 | 4420 | 9.0  | 12.5 | .72  | .30 (B)  |  |
| 6   | 1765 | 3860 | 9.7  | 13.5 | .72  | .54 (B)  |  |
| 7   | 1890 | 4910 | 9.5  | 12.5 | .76  | .36 (B)  |  |
| 8   | 2140 | 5630 | 9.6  | 13.8 | .70  | .21 (B)  |  |
| 9   | 1620 | 5630 | 8.3  | 11.6 | .72  | .55 (B)  |  |
| 10  | 1940 | 4110 | 11.5 | 15.2 | .76  | .97 (B)  |  |
| 11  | 1820 | 4220 | 10.2 | 13.4 | .76  | .21 (B)  |  |
| 12  | 2060 | 3930 | 9.5  | 13.7 | .69  | .42 (B)  |  |
| 13  | 1760 | 3280 | 10.2 | 13.8 | .74  | .36 (B)  |  |
| 14  | 1715 | 3580 | 8.7  | 12.3 | .71  | .41 (B)  |  |
| 15  | 1750 | 4900 | 9.0  | 12.4 | .73  | 1.19 (B) |  |
| Avg | 1765 | 4130 | 9.9  | 13.5 | 0.74 | 0.59 (B) |  |

\* The manufacturer classifies this sample as follows: Specimens 1 to 3—arch, 4 to 6—second bench, 7 to 9—third bench, 10 to 12—fourth bench, and 13 to 15—top.

TABLE 14.—*Properties of bricks produced in Chicago District—Continued*

| Specimen number                                                   | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                   |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 196, grade 1 ("Common kiln run," 95 percent of kiln, EC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                   | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1                                                                 | 1050                      | 3310                      | 9.0                  | 15.0         | 0.60                   | 0.48 (B)                                                |                          |
| 2                                                                 | 1220                      | 1795                      | 10.6                 | 16.4         | .65                    | .32 (B)                                                 |                          |
| 3                                                                 | 900                       | 2960                      | 13.7                 | 18.9         | .72                    | .74 (B)                                                 |                          |
| 4                                                                 | 1135                      | 3080                      | 13.6                 | 19.0         | .72                    | .54 (B)                                                 |                          |
| 5                                                                 | 1125                      | 2440                      | 7.0                  | 13.5         | .52                    | 1.86 (B)                                                |                          |
| 6                                                                 | 930                       | 3000                      | 11.5                 | 17.2         | .67                    | 0.52 (B)                                                |                          |
| 7                                                                 | 1360                      | 2240                      | 10.5                 | 16.8         | .62                    | .73 (B)                                                 |                          |
| 8                                                                 | 1170                      | 3070                      | 8.6                  | 15.1         | .57                    | 2.15 (B)                                                |                          |
| 9                                                                 | 245                       | 2790                      | 9.5                  | 15.3         | .62                    | 0.32 (B)                                                |                          |
| 10                                                                | 760                       | 2340                      | 14.9                 | 20.2         | .74                    | .53 (B)                                                 |                          |
| 11                                                                | 1040                      | 2530                      | 9.3                  | 15.5         | .60                    | .37 (B)                                                 |                          |
| 12                                                                | 1305                      | 2360                      | 7.6                  | 12.8         | .59                    | .35 (B)                                                 |                          |
| 13                                                                | 1135                      | 2720                      | 10.7                 | 16.3         | .66                    | .34 (B)                                                 |                          |
| 14                                                                | 1285                      | 2200                      | 15.4                 | 20.5         | .75                    | .64 (B)                                                 |                          |
| Avg                                                               | 1045                      | 2630                      | 10.8                 | 16.6         | 0.64                   | 0.66 (B)                                                |                          |

Plant 199, grade 1 ("Common kiln run," 95 percent of kiln, EC, C)

|     |     |      |      |      |      |          |  |
|-----|-----|------|------|------|------|----------|--|
| 1   | 720 | 3170 | 19.8 | 25.0 | 0.79 | 0.72 (B) |  |
| 2   | 535 | 2950 | 19.2 | 24.6 | .78  | 1.45 (B) |  |
| 3   | 605 | 3080 | 21.2 | 26.0 | .82  | 2.04 (B) |  |
| 4   | 570 | 3190 | 19.1 | 24.2 | .80  | 0.55 (B) |  |
| 5   | 690 | 3140 | 16.4 | 22.6 | .73  | .51 (B)  |  |
| 6   | 895 | 3650 | 17.3 | 23.3 | .74  | .59 (B)  |  |
| 7   | 860 | 4020 | 18.0 | 23.3 | .77  | .66 (B)  |  |
| Avg | 695 | 3310 | 18.7 | 24.1 | 0.78 | 0.92 (B) |  |

Plant 199, grade 2 ("Kiln run," percentage of kiln unknown, EC, C)

|     |     |      |      |      |      |          |  |
|-----|-----|------|------|------|------|----------|--|
| 1   | 365 | 2310 | 24.1 | 27.0 | 0.89 | 1.11 (B) |  |
| 2   | 515 | 2680 | 20.5 | 25.8 | .79  | 0.68 (B) |  |
| 3   | 355 | 2130 | 23.9 | 27.3 | .88  | 1.43 (B) |  |
| 4   | 385 | 2600 | 22.5 | 27.0 | .83  | 1.56 (B) |  |
| 5   | 390 | 2250 | 22.6 | 26.6 | .85  | 1.08 (B) |  |
| 6   | 465 | 2480 | 21.1 | 25.2 | .84  | 1.05 (B) |  |
| 7   | 385 | 2350 | 22.4 | 26.5 | .85  | 1.32 (B) |  |
| Avg | 410 | 2400 | 22.4 | 26.5 | 0.85 | 1.18 (B) |  |

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri*

[The bricks represented by the samples were made from clay or shale. The principal methods of forming were the stiff-mud, side-cut and the dry-press processes. One plant reported the use of the soft-mud process on a mixture of clay and shale.]

| Specimen number                                           | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                           |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 51, grade 1 ("Red face," 35 percent of kiln, DP, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                           | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1-----                                                    | 650                       | 8420                      | 12.6                 | 13.9         | 0.91                   | 0.35 (B)                                                |                          |
| 2-----                                                    | 735                       | 8210                      | 13.4                 | 15.1         | .89                    | .22 (B)                                                 |                          |
| 3-----                                                    | 705                       | 10650                     | 11.6                 | 13.0         | .89                    | .18 (B)                                                 |                          |
| 4-----                                                    | 695                       | 9030                      | 12.7                 | 14.3         | .89                    | .11 (B)                                                 |                          |
| 5-----                                                    | 600                       | 8140                      | 12.9                 | 14.9         | .87                    | .30 (B)                                                 |                          |
| 6-----                                                    | 520                       | 7620                      | 12.5                 | 13.9         | .90                    | .19 (B)                                                 |                          |
| 7-----                                                    | 600                       | 11900                     | 11.6                 | 12.9         | .90                    | .17 (B)                                                 |                          |
| Avg-----                                                  | 645                       | 9140                      | 12.5                 | 14.0         | 0.89                   | 0.22 (B)                                                |                          |

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 eyeles or number of eyeles at failure | Results beyond 51 eyeles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 51, grade 2 ("Hard basking," 25 percent of kiln, DP, C)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %            |  |
|-----|---------------------|---------------------|------|------|------|--------------|--|
| 1   | 740                 | 8180                | 7.9  | 9.8  | 0.81 | 0.19         |  |
| 2   | 500                 | 8750                | 9.6  | 11.3 | .85  | .24          |  |
| 3   | 820                 | 15000               | 9.1  | 10.6 | .86  | .50          |  |
| 4   | 825                 | 8590                | 9.8  | 11.4 | .86  | .57          |  |
| 5   | 730                 | 9420                | 9.9  | 12.1 | .82  | .27          |  |
| 6   | 530                 | 8390                | 13.3 | 14.8 | .90  | .60          |  |
| 7   | 790                 | 8830                | 11.3 | 12.6 | .90  | 3.03 (B)     |  |
| Avg | 705                 | 9590                | 10.1 | 11.8 | 0.86 | 0.77 (A & B) |  |

Plant 51, grade 3 ("Salmon," 40 percent of kiln, DP, C)

| 1   | 195 | 2900 | 20.5 | 22.1 | 0.93 | F 42e |       |
|-----|-----|------|------|------|------|-------|-------|
| 2   | 230 | 3550 | 17.5 | 18.8 | .93  | F 51e |       |
| 3   | 215 | 4120 | 17.0 | 18.3 | .93  | 0.35  | F 60e |
| 4   | 215 | 3300 | 18.4 | 19.3 | .95  | 1.60  | F 60e |
| 5   | 455 | 6500 | 15.8 | 17.1 | .92  | 0.54  | F 60e |
| 6   | 135 | 2640 | 18.8 | 19.7 | .96  | F 15e |       |
| Avg | 240 | 3840 | 18.0 | 19.2 | 0.94 |       |       |

Plant 77, grade 1 ("Hard," 70 percent of kiln, SC, S)

| Avg (5) | 1525 | 10550 | 6.3 | 7.9 | 0.80 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 77, grade 2 ("100 percent kiln run," SC, S)

| 1   | 1800 | 10900 | 8.0 | 9.8  | 0.82 | 0.09 (B) |  |
|-----|------|-------|-----|------|------|----------|--|
| 2   | 1450 | 7350  | 9.3 | 11.1 | .84  | .25 (B)  |  |
| 3   | 1840 | 11900 | 6.5 | 8.1  | .80  | .20 (B)  |  |
| 4   | 1580 | 10000 | 5.9 | 7.3  | .81  | .00 (B)  |  |
| 5   | 1600 | 9720  | 9.9 | 11.4 | .87  | .30 (B)  |  |
| Avg | 1655 | 9970  | 7.9 | 9.5  | 0.83 | 0.17 (B) |  |

Plant 81, grade 1 ("Hard," 25 percent of kiln, SC, S)

| 1   | 1175 | 13350 | 6.5 | 8.8  | 0.74 | 0.37 |  |
|-----|------|-------|-----|------|------|------|--|
| 2   | 1535 | 12800 | 6.7 | 8.7  | .77  | .10  |  |
| 3   | 845  | 16950 | 3.7 | 5.7  | .65  | .16  |  |
| 4   | 1700 | 15600 | 5.2 | 7.7  | .68  | .09  |  |
| 5   | 860  | 7690  | 8.5 | 11.0 | .77  | .08  |  |
| 6   | 1670 | 11700 | 7.0 | 9.6  | .73  | .00  |  |
| Avg | 1295 | 13020 | 6.3 | 8.6  | 0.72 | 0.13 |  |

Plant 81, grade 2 ("Medium," 60 percent of kiln, SC, S)

| 1   | 1060 | 7630 | 12.5 | 14.4 | 0.87 | 0.30 |  |
|-----|------|------|------|------|------|------|--|
| 2   | 1190 | 7090 | 11.4 | 13.7 | .86  | .18  |  |
| 3   | 1270 | 7100 | 11.9 | 14.3 | .83  | .19  |  |
| 4   | 1130 | 6790 | 12.3 | 14.5 | .85  | .09  |  |
| 5   | 1005 | 6840 | 12.1 | 14.6 | .83  | .19  |  |
| 6   | 1080 | 7300 | 12.2 | 14.0 | .87  | .36  |  |
| Avg | 1120 | 7120 | 12.1 | 14.2 | 0.85 | 0.22 |  |

Plant 81, grade 3 ("Salmon," 15 percent of kiln, SC, S)

| 1   | 1020 | 6390 | 15.1 | 17.1 | 0.88 | 0.50 | %          |
|-----|------|------|------|------|------|------|------------|
| 2   | 875  | 6280 | 14.0 | 16.5 | .85  | .25  | 0.60 (63e) |
| 3   | 1020 | 5980 | 14.9 | 17.1 | .87  | 1.17 | 1.10 (63e) |
| 4   | 1080 | 6180 | 14.9 | 16.9 | .88  | 1.99 | 1.44 (63e) |
| 5   | 955  | 6630 | 14.1 | 16.1 | .88  | 0.59 | (lost)     |
| 6   | 830  | 6150 | 14.4 | 16.8 | .86  | .60  | 0.84 (63e) |
| Avg | 965  | 6270 | 14.6 | 16.8 | 0.87 | 0.85 | 1.28 (63e) |

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 eyeles or number of eyeles at failure | Results beyond 51 eyeles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 83, grade 1 ("Straight hard common," 80 percent of kiln, SC, S)

| Avg (5) | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %          |  |
|---------|---------------------|---------------------|-----|-----|------|------------|--|
|         | 2230                | 17240               | 1.6 | 3.2 | 0.47 | Not tested |  |

Plant 104, grade 1 ("Hard common," 15 percent of kiln, SC, S)

| Avg (6) | 2160 | 21520+ | 0.63 | 2.5 | 0.24 | Not tested |  |
|---------|------|--------|------|-----|------|------------|--|
|---------|------|--------|------|-----|------|------------|--|

Plant 104, grade 2 ("Medium common," 80 percent of kiln, SC, S)

| Avg (6) | 1650 | 18860+ | 4.1 | 5.7 | 0.70 | Not tested |  |
|---------|------|--------|-----|-----|------|------------|--|
|---------|------|--------|-----|-----|------|------------|--|

Plant 104, grade 3 ("Backup common," 5 percent of kiln, SC, S)

| 1   | 1365 | 12250 | 9.6  | 11.5 | 0.83 | 0.10 |  |
|-----|------|-------|------|------|------|------|--|
| 2   | 960  | 11880 | 9.7  | 11.1 | .87  | .19  |  |
| 3   | 960  | 11480 | 9.8  | 11.6 | .84  | .62  |  |
| 4   | 800  | 12800 | 10.5 | 12.3 | .85  | .18  |  |
| 5   | 905  | 12670 | 11.6 | 14.0 | .83  | .28  |  |
| 6   | 820  | 11090 | 12.4 | 13.9 | .89  | 2.57 |  |
| Avg | 970  | 12030 | 10.6 | 12.4 | 0.85 | 0.66 |  |

Plant 117, grade 1 ("No. 1 Common," 70 percent of kiln, SC, C and S)

| Avg (5) | 1775 | 11710 | 6.2 | 8.4 | 0.68 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 117, grade 2 ("No. 2 Common," 30 percent of kiln, SC, C and S)

| 1   | 1195 | 7760 | 12.4 | 15.0 | 0.83 | 0.10  |  |
|-----|------|------|------|------|------|-------|--|
| 2   | 1400 | 8110 | 11.9 | 13.6 | .87  | .11   |  |
| 3   | 1425 | 6570 | 13.6 | 15.3 | .89  | .24   |  |
| 4   | 870  | 4940 | 15.9 | 17.9 | .89  | F 25e |  |
| 5   | 955  | 4790 | 15.2 | 17.1 | .89  | 0.50  |  |
| Avg | 1170 | 6430 | 13.8 | 15.8 | 0.87 |       |  |

Plant 124, grade 1 ("Hard," 45 percent of kiln, SC, S)

| Avg (5) | 1560 | 10300 | 4.8 | 6.4 | 0.75 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 124, grade 2 ("Medium," 47 percent of kiln, SC, S)

| Avg (5) | 1360 | 7470 | 8.7 | 10.8 | 0.81 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|
|---------|------|------|-----|------|------|------------|--|

Plant 124, grade 3 ("Salmon," 8 percent of kiln, SC, S)

| 1   | 1340 | 4110 | 12.5 | 13.9 | 0.90 | 0.29  | %          |
|-----|------|------|------|------|------|-------|------------|
| 2   | 1270 | 4550 | 11.7 | 13.1 | .89  | .43   | (54e)      |
| 3   | 610  | 3400 | 16.1 | 17.6 | .91  | F 18e |            |
| 4   | 1410 | 4960 | 11.7 | 13.2 | .89  | .37   | (54e)      |
| 5   | 835  | 3730 | 15.5 | 17.2 | .90  | 1.03  | 1.26 (54e) |
| Avg | 1095 | 4150 | 13.5 | 15.0 | 0.90 |       |            |

Plant 125, grade 1 ("Hard," 50 percent of kiln, SC, S)

| Avg (5) | 2400 | 17430 | 1.8 | 3.4 | 0.47 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 125, grade 2 ("Medium," 49 percent of kiln, SC, S)

| Avg (5) | 1365 | 10250 | 9.3 | 11.1 | 0.84 | Not tested |  |
|---------|------|-------|-----|------|------|------------|--|
|---------|------|-------|-----|------|------|------------|--|

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 125, grade 3 ("Salmon," 1 percent of kiln, SC, C)

|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %    | %          |
|----------|---------------------|---------------------|------|------|------|------|------------|
| 1-----   | 1155                | 7140                | 12.8 | 15.0 | 0.85 | 0.26 | 0.53 (57c) |
| 2-----   | 1230                | 7470                | 13.5 | 15.7 | .86  | .18  | .45 (57c)  |
| 3-----   | 1210                | 6590                | 13.4 | 15.3 | .88  | .30  | .40 (57c)  |
| 4-----   | 1170                | 6950                | 13.6 | 15.5 | .88  | .36  | .55 (57c)  |
| 5-----   | 1190                | 8750                | 11.7 | 13.5 | .87  | .35  | .35 (57c)  |
| Avg----- | 1190                | 7380                | 13.0 | 15.0 | 0.87 | 0.29 | 0.46 (57c) |

Plant 126, grade 1 ("Hard," 99.5 percent of kiln, SC, S)

|           |      |       |     |     |      |            |  |
|-----------|------|-------|-----|-----|------|------------|--|
| Avg (9) - | 1845 | 11360 | 5.4 | 8.6 | 0.62 | Not tested |  |
|-----------|------|-------|-----|-----|------|------------|--|

Plant 126, grade 2 ("Hollow," percentage of kiln unknown, SC, S)

|           |      |       |     |     |      |            |  |
|-----------|------|-------|-----|-----|------|------------|--|
| Avg (5) - | 1205 | 12460 | 3.9 | 7.0 | 0.55 | Not tested |  |
|-----------|------|-------|-----|-----|------|------------|--|

Plant 126, grade 3 ("Salmon," 0.5 percent of kiln, SC, S)

|         |      |      |      |      |      |      |            |
|---------|------|------|------|------|------|------|------------|
| 1-----  | 1170 | 7920 | 10.8 | 12.8 | 0.84 | 0.32 | 0.32 (57c) |
| 2-----  | 1055 | 6620 | 13.7 | 15.8 | .87  | .50  | .50 (57c)  |
| 3-----  | 990  | 6900 | 12.5 | 14.9 | .84  | .25  | .25 (57c)  |
| 4-----  | 1170 | 6970 | 12.3 | 14.9 | .87  | .53  | .53 (57c)  |
| 5-----  | 975  | 6100 | 14.1 | 16.3 | .86  | 5.56 | 5.64 (57c) |
| Avg---- | 1070 | 6900 | 12.7 | 14.9 | 0.85 | 1.43 | 1.45 (57c) |

Plant 132, grade 1 ("Face," 85 percent of kiln, SC, C)

|           |      |       |     |     |      |            |  |
|-----------|------|-------|-----|-----|------|------------|--|
| Avg (6) - | 3030 | 13730 | 0.4 | 2.2 | 0.17 | Not tested |  |
|-----------|------|-------|-----|-----|------|------------|--|

Plant 133, grade 1 ("Face," 75 percent of kiln, SC, S)

|          |      |        |     |     |      |            |  |
|----------|------|--------|-----|-----|------|------------|--|
| 1-----   | 2260 | 23700  | 1.9 | 4.5 | 0.42 | 0.07 (B)   |  |
| 2-----   | 2200 | 23500+ | 1.5 | 4.5 | .33  | .07 (B)    |  |
| 3-----   | 2260 | 23500+ | 2.2 | 4.4 | .50  | .15 (B)    |  |
| 4-----   | 2330 | 22700  | 1.5 | 4.1 | .37  | .07 (B)    |  |
| 5-----   | 2710 | 18500  | 3.7 | 5.8 | .64  | .34 (B)    |  |
| 6-----   | 2880 | 18700  | 3.9 | 6.2 | .63  | Not tested |  |
| Avg----- | 2440 | 21770+ | 2.4 | 4.9 | 0.48 | 0.14 (B)   |  |

Plant 134, grade 1 ("Face," 70 percent of kiln, SM, C)

|          |      |        |     |      |      |          |  |
|----------|------|--------|-----|------|------|----------|--|
| 1-----   | 1315 | 14500  | 2.1 | 7.4  | 0.28 | 0.11 (B) |  |
| 2-----   | 1455 | 12000  | 3.5 | 8.8  | .40  | .28 (B)  |  |
| 3-----   | 1370 | 12100  | 6.1 | 11.7 | .52  | .19 (B)  |  |
| 4-----   | 1590 | 15450  | 5.4 | 10.8 | .50  | .36 (B)  |  |
| 5-----   | 1590 | 14000  | 4.9 | 9.7  | .51  | .10 (B)  |  |
| 6-----   | 1475 | 12900+ | 4.6 | 10.2 | .45  | .93 (B)  |  |
| Avg----- | 1465 | 13490+ | 4.4 | 9.8  | 0.44 | 0.33 (B) |  |

Plant 142, grade 1 ("Hard commons," 75 percent of kiln, SC, S)

|           |      |       |     |     |      |            |  |
|-----------|------|-------|-----|-----|------|------------|--|
| Avg (5) - | 1795 | 15500 | 3.0 | 4.5 | 0.66 | Not tested |  |
|-----------|------|-------|-----|-----|------|------------|--|

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 142, grade 2 ("Medium common," 12.5 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %        | % |
|---------|---------------------|---------------------|------|------|------|----------|---|
| 1-----  | 1605                | 9570                | 10.0 | 11.3 | 0.89 | 0.17 (B) |   |
| 2-----  | 1710                | 10250               | 8.7  | 10.5 | .83  | .18 (B)  |   |
| 3-----  | 1705                | 9630                | 8.9  | 10.3 | .86  | .19 (B)  |   |
| 4-----  | 1645                | 11050               | 8.5  | 10.1 | .84  | .24 (B)  |   |
| 5-----  | 1470                | 11020               | 9.6  | 11.3 | .85  | .34 (B)  |   |
| Avg---- | 1625                | 10300               | 9.1  | 10.7 | 0.85 | 0.22 (B) |   |

Plant 142, grade 3 ("Salmon," 12.5 percent of kiln, SC, S)

|          |      |      |      |      |      |       |  |
|----------|------|------|------|------|------|-------|--|
| 1-----   | 770  | 4390 | 16.4 | 18.5 | 0.89 | F 18c |  |
| 2-----   | 1065 | 4880 | 14.2 | 16.0 | .89  | F 18c |  |
| 3-----   | 930  | 5890 | 15.2 | 17.4 | .88  | F 20c |  |
| 4-----   | 1060 | 5590 | 15.6 | 17.8 | .88  | F 10c |  |
| 5-----   | 685  | 3420 | 17.9 | 19.8 | .90  | F 15c |  |
| Avg----- | 900  | 4830 | 15.9 | 17.9 | 0.89 | F 16c |  |

Plant 212, grade 1 ("Dark flash," 5 percent of kiln, DP, C)

|           |      |       |     |      |      |            |  |
|-----------|------|-------|-----|------|------|------------|--|
| Avg (5) - | 1540 | 14260 | 7.7 | 10.4 | 0.74 | Not tested |  |
|-----------|------|-------|-----|------|------|------------|--|

Plant 212, grade 2 ("Hard," 20 percent of kiln, DP, C)

|           |     |       |     |      |      |            |  |
|-----------|-----|-------|-----|------|------|------------|--|
| Avg (5) - | 670 | 11060 | 8.5 | 10.6 | 0.80 | Not tested |  |
|-----------|-----|-------|-----|------|------|------------|--|

Plant 212, grade 3 ("Common," 30 percent of kiln, DP, C)

|           |     |       |     |      |      |            |  |
|-----------|-----|-------|-----|------|------|------------|--|
| Avg (5) - | 705 | 10750 | 9.5 | 12.2 | 0.74 | Not tested |  |
|-----------|-----|-------|-----|------|------|------------|--|

Plant 212, grade 4 ("Light," 10 percent of kiln, DP, C)

|         |     |      |      |      |      |           |  |
|---------|-----|------|------|------|------|-----------|--|
| 1-----  | 365 | 7850 | 12.8 | 15.3 | 0.84 | 0.00 (B)  |  |
| 2-----  | 315 | 4220 | 14.7 | 16.7 | .88  | 3.35 (B)  |  |
| 3-----  | 525 | 9300 | 13.9 | 16.6 | .84  | 0.09 (B)  |  |
| 4-----  | 570 | 7100 | 14.2 | 16.9 | .84  | .09 (B)   |  |
| 5-----  | 495 | 6800 | 13.3 | 16.2 | .82  | F 39c (B) |  |
| Avg---- | 455 | 7050 | 13.8 | 16.3 | 0.84 | -----     |  |

Plant 212, grade 5 ("Salmon," 5 percent of kiln, DP, C)

|          |     |      |      |      |      |           |  |
|----------|-----|------|------|------|------|-----------|--|
| 1-----   | --- | 6480 | 17.0 | 19.1 | 0.89 | F 29c (B) |  |
| 2-----   | 145 | 4470 | 16.2 | 18.8 | .86  | F 45c (B) |  |
| 3-----   | 175 | 2400 | 21.9 | 24.5 | .89  | F 42c (B) |  |
| 4-----   | 305 | 4700 | 17.2 | 20.4 | .84  | F 47c (B) |  |
| 5-----   | 265 | 4790 | 17.3 | 19.4 | .89  | F 47c (B) |  |
| Avg----- | 220 | 4570 | 17.9 | 20.4 | 0.87 | F 42c (B) |  |

Plant 213, grade 1 ("Common," 97 percent of kiln, SC, C and S)

|            |      |        |     |     |      |            |  |
|------------|------|--------|-----|-----|------|------------|--|
| Avg (13) - | 1795 | 11740+ | 6.5 | 8.7 | 0.69 | Not tested |  |
|------------|------|--------|-----|-----|------|------------|--|

Plant 213, grade 2 ("Salmon," 3 percent of kiln, SC, C and S)

|          |      |      |      |      |      |          |  |
|----------|------|------|------|------|------|----------|--|
| 1-----   | 830  | 6030 | 15.7 | 17.5 | 0.90 | 0.31 (B) |  |
| 2-----   | 1090 | 5870 | 15.2 | 17.0 | .89  | .36 (B)  |  |
| Avg----- | 915  | 5950 | 15.4 | 17.2 | 0.90 | 0.34 (B) |  |

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota*

[All samples received with the exception of those from plant 183 (soft-mud) were formed by the stiff-mud, side-cut process. Both clay and shale are represented. Two types of shale occur in this district. What might be called typical shale is represented by the specimens from plant 17. These bricks correspond in properties to those reported for shale bricks in tables 5, 9, 10, 11, and 15. A hard-burned shale brick, characterized by water absorption by 5-hr boiling exceeding 12 percent, is also produced in this district. The data on the specimens from plant 227 illustrate the properties of bricks made from this type of shale]

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 17, grade 1 ("Special," 75 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   | %    | %        |  |
|---------|---------------------|---------------------|-----|-----|------|----------|--|
| 1-----  | 3480                | 21350               | 0.4 | 0.8 | 0.50 | 0.08 (B) |  |
| 2-----  | 2660                | 21020               | .4  | 1.3 | .31  | .17 (B)  |  |
| 3-----  | 2760                | 16800               | .4  | 1.2 | .33  | .15 (B)  |  |
| 4-----  | 1765                | 20550               | .4  | 1.2 | .33  | .16 (B)  |  |
| 5-----  | 1105                | 18850               | .3  | 1.0 | .30  | .39 (B)  |  |
| Avg---- | 2355                | 19710               | 0.4 | 1.1 | 0.35 | 0.19 (B) |  |

Plant 17, grade 2 ("Dark commons (cored)," 50 percent of kiln, SC, S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg (5)- | 1660 | 16530 | 2.2 | 3.8 | 0.57 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

Plant 17, grade 3 ("Dark commons (solid)," 50 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   | %    | %        |  |
|---------|---------------------|---------------------|-----|-----|------|----------|--|
| 1-----  | 2480                | 18150               | 1.3 | 2.7 | 0.48 | 0.18 (B) |  |
| 2-----  | 2490                | 18900               | 1.8 | 3.2 | .56  | .18 (B)  |  |
| 3-----  | 2260                | 17200               | 1.6 | 2.8 | .57  | .24 (B)  |  |
| 4-----  | 2210                | 15500               | 1.3 | 2.6 | .50  | .00 (B)  |  |
| 5-----  | 2380                | 18150               | 1.4 | 2.7 | .52  | .00 (B)  |  |
| Avg---- | 2365                | 17580               | 1.5 | 2.8 | 0.53 | 0.12 (B) |  |

Plant 17, grade 4 ("Medium commons (cored)," 35 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   | %    | %        |  |
|---------|---------------------|---------------------|-----|-----|------|----------|--|
| 1-----  | 1550                | 13750               | 7.8 | 9.2 | 0.85 | 0.10 (B) |  |
| 2-----  | 1400                | 13206               | 7.5 | 8.9 | .74  | .28 (B)  |  |
| 3-----  | 1380                | 11700               | 7.5 | 9.4 | .80  | .09 (B)  |  |
| 4-----  | 1245                | 10400               | 7.4 | 9.3 | .80  | .19 (B)  |  |
| 5-----  | 1345                | 13650               | 6.6 | 8.5 | .78  | .00 (B)  |  |
| Avg---- | 1385                | 12540               | 7.4 | 9.1 | 0.79 | 0.13 (B) |  |

Plant 17, grade 5 ("Medium commons (solid)," 35 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | %    | %        |  |
|---------|---------------------|---------------------|------|------|------|----------|--|
| 1-----  | 1725                | 14600               | 6.8  | 8.4  | 0.81 | 0.00 (B) |  |
| 2-----  | 2100                | 15600               | 6.1  | 7.7  | .79  | .00 (B)  |  |
| 3-----  | 1885                | 14150               | 7.8  | 9.6  | .81  | .00 (B)  |  |
| 4-----  | 1530                | 8500                | 10.4 | 12.0 | .87  | .15 (B)  |  |
| 5-----  | 1305                | 10100               | 8.9  | 10.8 | .82  | .09 (B)  |  |
| Avg---- | 1710                | 12590               | 8.0  | 9.7  | 0.82 | 0.05 (B) |  |

Plant 17, grade 6 ("Light commons (cored)," 10 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | %    | %        |  |
|---------|---------------------|---------------------|------|------|------|----------|--|
| 1-----  | 945                 | 6070                | 13.0 | 15.0 | 0.87 | 0.00 (B) |  |
| 2-----  | 1060                | 7350                | 11.9 | 13.8 | .86  | .09 (B)  |  |
| 3-----  | 915                 | 6790                | 12.6 | 14.5 | .87  | .00 (B)  |  |
| 4-----  | 825                 | 7300                | 11.7 | 13.6 | .86  | .10 (B)  |  |
| 5-----  | 870                 | 8400                | 11.0 | 13.0 | .85  | .20 (B)  |  |
| Avg---- | 925                 | 7180                | 12.0 | 14.0 | 0.86 | 0.08 (B) |  |

Plant 17, grade 7 ("Light commons (solid)," 10 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | %    | %        |  |
|---------|---------------------|---------------------|------|------|------|----------|--|
| 1-----  | 1165                | 6500                | 13.1 | 15.2 | 0.86 | 0.41 (B) |  |
| 2-----  | 1270                | 6180                | 13.0 | 14.7 | .88  | .25 (B)  |  |
| 3-----  | 1140                | 6180                | 14.0 | 15.7 | .89  | .50 (B)  |  |
| 4-----  | 1055                | 6510                | 13.4 | 15.5 | .86  | .42 (B)  |  |
| 5-----  | 1175                | 7180                | 12.8 | 14.8 | .86  | .24 (B)  |  |
| Avg---- | 1160                | 6510                | 13.3 | 15.2 | 0.87 | 0.36 (B) |  |

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota— Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 17, grade 8 ("Salmon (cored)," 5 percent of kiln, SC, S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | %    | %     |  |
|---------|---------------------|---------------------|------|------|------|-------|--|
| 1-----  | 745                 | 5420                | 15.0 | 16.9 | 0.89 | F 33c |  |
| 2-----  | 630                 | 4270                | 16.1 | 17.5 | .92  | F 9c  |  |
| 3-----  | 420                 | 4200                | 16.3 | 17.8 | .92  | F 8c  |  |
| 4-----  | 645                 | 4470                | 16.1 | 17.6 | .91  | F 9c  |  |
| 5-----  | 515                 | 4140                | 16.7 | 18.2 | .92  | F 9c  |  |
| Avg---- | 590                 | 4500                | 16.0 | 17.6 | 0.91 | F 14c |  |

Plant 183, grade 1 ("Clinker," 5 percent of kiln, SM, C)

|          |     |      |     |      |      |            |  |
|----------|-----|------|-----|------|------|------------|--|
| Avg (5)- | 885 | 6970 | 9.2 | 15.6 | 0.57 | Not tested |  |
|----------|-----|------|-----|------|------|------------|--|

Plant 183, grade 2 ("Hard red," 80 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | %    | %        |  |
|---------|---------------------|---------------------|------|------|------|----------|--|
| 1-----  | 460                 | 2340                | 15.5 | 22.1 | 0.70 | 0.45 (B) |  |
| 2-----  | 400                 | 1170                | 16.0 | 23.1 | .69  | .52 (B)  |  |
| 3-----  | 485                 | 2300                | 14.8 | 22.1 | .67  | .34 (B)  |  |
| 4-----  | 330                 | 1310                | 16.8 | 23.2 | .72  | .65 (B)  |  |
| 5-----  | 290                 | 1055                | 16.5 | 23.2 | .71  | 1.11 (B) |  |
| Avg---- | 390                 | 1640                | 15.9 | 22.7 | 0.70 | 0.61 (B) |  |

Plant 183, grade 3 ("Salmon," 15 percent of kiln, SM, C)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | %    | %        |  |
|---------|---------------------|---------------------|------|------|------|----------|--|
| 1-----  | 255                 | 1010                | 16.3 | 22.9 | 0.71 | 1.19 (B) |  |
| 2-----  | 235                 | 940                 | 17.1 | 23.4 | .73  | 1.02 (B) |  |
| 3-----  | 260                 | 1050                | 17.9 | 23.9 | .75  | 1.08 (B) |  |
| 4-----  | 260                 | 1090                | 17.8 | 23.7 | .75  | 1.05 (B) |  |
| 5-----  | 370                 | 1020                | 17.0 | 24.0 | .71  | 1.31 (B) |  |
| Avg---- | 275                 | 1020                | 17.2 | 23.6 | 0.73 | 1.13 (B) |  |

Plant 218, grade 1 ("Clinker," 2 percent of kiln, SC, C and S)

|          |      |      |     |     |      |            |  |
|----------|------|------|-----|-----|------|------------|--|
| Avg (5)- | 1470 | 8690 | 4.1 | 7.6 | 0.53 | Not tested |  |
|----------|------|------|-----|-----|------|------------|--|

Plant 218, grade 2 ("Textured Face," 16 percent of kiln, SC, C and S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg (5)- | 1310 | 10290 | 7.4 | 9.9 | 0.74 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

Plant 218, grade 3 ("Common hard," percentage of kiln unknown, SC, C and S)

|          |      |      |     |      |      |            |  |
|----------|------|------|-----|------|------|------------|--|
| Avg (5)- | 1060 | 8190 | 8.3 | 11.6 | 0.71 | Not tested |  |
|----------|------|------|-----|------|------|------------|--|

Plant 218, grade 4 ("No. 1 Common hard," 82 percent of kiln, SC, C and S)

|         | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    | %    | %    |  |
|---------|---------------------|---------------------|------|------|------|------|--|
| 1-----  | 1510                | 10050               | 7.8  | 10.8 | 0.72 | 0.29 |  |
| 2-----  | 675                 | 5850                | 13.0 | 15.5 | .84  | .32  |  |
| 3-----  | 670                 | 5930                | 13.3 | 16.1 | .83  | .33  |  |
| 4-----  | 1360                | 9650                | 7.1  | 10.2 | .69  | .09  |  |
| 5-----  | 1495                | 9470                | 7.4  | 10.5 | .70  | .09  |  |
| Avg---- | 1140                | 8190                | 9.7  | 12.6 | 0.76 | 0.22 |  |

Plant 219, grade 1 ("Textured face," 65 percent of kiln, SC, S)

|          |      |       |     |     |      |            |  |
|----------|------|-------|-----|-----|------|------------|--|
| Avg (5)- | 1160 | 12400 | 5.1 | 7.8 | 0.66 | Not tested |  |
|----------|------|-------|-----|-----|------|------------|--|

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota—Continued*

| Specimen number                                                                          | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                                          |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 219, grade 2 ("No. 1 Hard common," 35 percent of kiln, SC, S)                      |                           |                           |                      |              |                        |                                                         |                          |
|                                                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1.....                                                                                   | 1580                      | 13150                     | 6.4                  | 8.3          | 0.77                   | 0.18                                                    |                          |
| 2.....                                                                                   | 1760                      | 17200                     | 5.3                  | 7.1          | .75                    | .09                                                     |                          |
| 3.....                                                                                   | 1655                      | 15100                     | 6.6                  | 8.0          | .83                    | .19                                                     |                          |
| 4.....                                                                                   | 1720                      | 16100                     | 6.5                  | 8.3          | .78                    | .09                                                     |                          |
| 5.....                                                                                   | 1685                      | 14800                     | 6.7                  | 8.5          | .79                    | .09                                                     |                          |
| Avg. ....                                                                                | 1680                      | 15270                     | 6.3                  | 8.0          | 0.78                   | 0.13                                                    |                          |
| Plant 220, grade 1 ("Semilinker," 5 to 10 percent of kiln, SC, S)                        |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5) ..                                                                               | 1565                      | 13620                     | 5.0                  | 7.3          | 0.68                   | Not tested                                              |                          |
| Plant 220, grade 2 ("Hard," 85 to 90 percent of kiln, SC, S)                             |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5) ..                                                                               | 1325                      | 10180                     | 6.9                  | 9.5          | 0.73                   | Not tested                                              |                          |
| Plant 220, grade 3 ("Soft," 0 to 5 percent of kiln, SC, S)                               |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                                                   | 1145                      | 7570                      | 9.0                  | 11.7         | 0.77                   | 0.81                                                    |                          |
| 2.....                                                                                   | 970                       | 7090                      | 9.2                  | 11.2         | .82                    | .16                                                     |                          |
| 3.....                                                                                   | 930                       | 6480                      | 9.7                  | 12.3         | .79                    | .17                                                     |                          |
| 4.....                                                                                   | 1080                      | 6760                      | 9.6                  | 11.8         | .81                    | .15                                                     |                          |
| 5.....                                                                                   | 960                       | 6400                      | 9.6                  | 11.5         | .83                    | .15                                                     |                          |
| Avg. ....                                                                                | 1015                      | 6860                      | 9.4                  | 11.7         | 0.80                   | 0.29                                                    |                          |
| Plant 221, grade 1 ("No. 1 common," 75 percent of kiln, SC, C)                           |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                                                   | 625                       | 5020                      | 14.4                 | 18.0         | 0.80                   | 0.60                                                    |                          |
| 2.....                                                                                   | 820                       | 6810                      | 11.7                 | 15.4         | .76                    | .28                                                     |                          |
| 3.....                                                                                   | 1020                      | 7350                      | 9.6                  | 13.7         | .70                    | .40                                                     |                          |
| 4.....                                                                                   | 675                       | 7320                      | 10.9                 | 15.0         | .73                    | .62                                                     |                          |
| 5.....                                                                                   | 1015                      | 7680                      | 10.7                 | 14.9         | .72                    | .28                                                     |                          |
| Avg. ....                                                                                | 830                       | 6840                      | 11.5                 | 15.4         | 0.74                   | 0.44                                                    |                          |
| Plant 221, grade 2 ("No. 2 common," 20 percent of kiln, SC, C)                           |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                                                   | 450                       | 4320                      | 15.0                 | 18.8         | 0.80                   | 0.69                                                    |                          |
| 2.....                                                                                   | 445                       | 4430                      | 14.5                 | 18.9         | .77                    | .80                                                     |                          |
| 3.....                                                                                   | 470                       | 4430                      | 14.2                 | 18.3         | .78                    | 1.12                                                    |                          |
| 4.....                                                                                   | 470                       | 4040                      | 14.8                 | 18.8         | .79                    | 1.59                                                    |                          |
| 5.....                                                                                   | 450                       | 4250                      | 15.1                 | 19.0         | .80                    | 0.98                                                    |                          |
| Avg. ....                                                                                | 455                       | 4290                      | 14.7                 | 18.8         | 0.79                   | 1.02                                                    |                          |
| Plant 226, grade 1 ("Dark to light," (1936) percentage of kiln unknown, SC, S (deaired)) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                                          |                           |                           | (24-hr)              |              |                        |                                                         |                          |
| 1.....                                                                                   | 500                       | 9830                      | 6.1                  | a 8.9        | a 0.69                 | (1)                                                     |                          |
| 2.....                                                                                   | 595                       | 12920                     | 5.9                  | 9.3          | .64                    | (1)                                                     |                          |
| 3.....                                                                                   | 630                       | 13640                     | 2.1                  | 3.4          | .62                    | (1)                                                     |                          |
| 4.....                                                                                   | 635                       | 9370                      | 2.2                  | 3.4          | .61                    | (1)                                                     |                          |
| 5.....                                                                                   | 570                       | 10950                     | 5.2                  | 9.7          | .54                    | (1)                                                     |                          |
| 6.....                                                                                   | 710                       | 11100                     | 10.0                 | 12.2         | .82                    | (1)                                                     |                          |
| 7.....                                                                                   | 1045                      | 11600                     | 6.9                  | 8.2          | .85                    | (1)                                                     |                          |
| 8.....                                                                                   | 495                       | 10780                     | 4.3                  | 9.7          | .44                    | (1)                                                     |                          |
| 9.....                                                                                   | 1195                      | 13280                     | 0.4                  | 2.3          | .16                    | (1)                                                     |                          |
| 10.....                                                                                  | 715                       | 13070                     | 5.5                  | 9.1          | .60                    | (1)                                                     |                          |
| 11.....                                                                                  | 1560                      | 13280                     | 0.4                  | 4.0          | .10                    | (1)                                                     |                          |
| 12.....                                                                                  | 600                       | 9420                      | 4.7                  | 13.4         | .36                    | (1)                                                     |                          |
| 13.....                                                                                  | 835                       | 12300                     | 4.7                  | 10.9         | .44                    | (1)                                                     |                          |
| 14.....                                                                                  | 735                       | 12180                     | 6.3                  | 9.6          | .66                    | (1)                                                     |                          |
| 15.....                                                                                  | 1740                      | 10220                     | 0.3                  | 1.3          | .24                    | (1)                                                     |                          |
| 16.....                                                                                  | 710                       | 12080                     | 1.5                  | 4.4          | .34                    | (1)                                                     |                          |
| 17.....                                                                                  | 925                       | 10450                     | 10.1                 | 12.5         | .81                    | (1)                                                     |                          |
| 18.....                                                                                  | 765                       | 15350                     | 0.6                  | 5.8          | .11                    | (1)                                                     |                          |
| 19.....                                                                                  | 1050                      | 12730                     | 5.2                  | 5.7          | .92                    | (1)                                                     |                          |
| 20.....                                                                                  | 1460                      | 18550                     | 0.2                  | 0.5          | .40                    | (1)                                                     |                          |
| Avg. ....                                                                                | 875                       | 12155                     | 4.1                  | 7.2          | 0.52                   |                                                         |                          |

<sup>1</sup> No disintegration.

<sup>a</sup> These deaired bricks have anomalous absorption and are difficult to dry to constant weight, therefore the absorption and saturation coefficient are uncertain and the effect of freezing and thawing was estimated visually instead of by loss in weight. A comparable sample exposed to natural weather showed disintegration in 10 percent of the specimens after 2 years.

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota—Continued*

| Specimen number                                                               | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                               |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 227, grade 1 ("Mingled face," (1936) percentage of kiln unknown, SC, S) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                               | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | (24-hr)<br>%         | %            |                        | %                                                       |                          |
| 1.....                                                                        | 620                       | 3800                      | 15.0                 | 17.9         | 0.84                   | b 0.34                                                  |                          |
| 2.....                                                                        | 345                       | 4550                      | 10.1                 | 14.7         | .68                    | +.11                                                    |                          |
| 3.....                                                                        | 555                       | 4090                      | 14.6                 | 18.7         | .78                    | +.22                                                    |                          |
| 4.....                                                                        | 650                       | 5600                      | 10.4                 | 16.4         | .63                    | .47                                                     |                          |
| 5.....                                                                        | 700                       | 4070                      | 14.6                 | 19.5         | .75                    | .84                                                     |                          |
| 6.....                                                                        | 550                       | 3970                      | 11.0                 | 15.9         | .70                    | .55                                                     |                          |
| 7.....                                                                        | 645                       | 3600                      | 12.6                 | 17.0         | .74                    | .54                                                     |                          |
| 8.....                                                                        | 625                       | 4600                      | 12.6                 | 22.8         | .56                    | .12                                                     |                          |
| 9.....                                                                        | 605                       | 4300                      | 13.1                 | 16.7         | .79                    | .00                                                     |                          |
| 10.....                                                                       | 895                       | 5650                      | 7.6                  | 13.9         | .54                    | .10                                                     |                          |
| 11.....                                                                       | 840                       | 8100                      | 6.2                  | 13.9         | .44                    | +.23                                                    |                          |
| 12.....                                                                       | 605                       | 4840                      | 9.9                  | 21.1         | .47                    | .00                                                     |                          |
| 13.....                                                                       | 550                       | 4410                      | 13.7                 | 22.6         | .61                    | .48                                                     |                          |
| 14.....                                                                       | 955                       | 6730                      | 7.3                  | 15.7         | .46                    | .32                                                     |                          |
| 15.....                                                                       | 485                       | 6640                      | 7.3                  | 11.8         | .62                    | .13                                                     |                          |
| 16.....                                                                       | 705                       | 4620                      | 12.1                 | 16.0         | .76                    | .85                                                     |                          |
| 17.....                                                                       | 295                       | 4270                      | 9.5                  | 13.7         | .70                    | .81                                                     |                          |
| 18.....                                                                       | 810                       | 4720                      | 12.1                 | 15.7         | .77                    | .62                                                     |                          |
| 19.....                                                                       | 575                       | 6050                      | 8.7                  | 13.3         | .66                    | .41                                                     |                          |
| 20.....                                                                       | 585                       | 9820                      | 3.1                  | 7.9          | .40                    | .10                                                     |                          |
| 21.....                                                                       | 690                       | 3100                      | 13.4                 | 15.9         | .84                    | .23                                                     |                          |
| 22.....                                                                       | 585                       | 5970                      | 9.2                  | 14.4         | .64                    | +.10                                                    |                          |
| 23.....                                                                       | 630                       | 4450                      | 13.6                 | 17.9         | .76                    | .00                                                     |                          |
| 24.....                                                                       | 830                       | 4680                      | 9.6                  | 19.5         | .50                    | .25                                                     |                          |
| 25.....                                                                       | 610                       | 3880                      | 15.5                 | 19.9         | .78                    | .73                                                     |                          |
| 26.....                                                                       | 685                       | 4250                      | 9.4                  | 14.3         | .66                    | .47                                                     |                          |
| 27.....                                                                       | 710                       | 3500                      | 11.7                 | 16.5         | .71                    | .65                                                     |                          |
| 28.....                                                                       | 765                       | 4640                      | 12.7                 | 22.2         | .58                    | +.24                                                    |                          |
| 29.....                                                                       | 725                       | 4560                      | 13.4                 | 17.0         | .79                    | .00                                                     |                          |
| 30.....                                                                       | 690                       | 5550                      | 8.4                  | 14.5         | .58                    | .21                                                     |                          |
| 31.....                                                                       | 825                       | 6380                      | 8.3                  | 16.6         | .50                    | +.23                                                    |                          |
| 32.....                                                                       | 605                       | 4850                      | 10.5                 | 21.4         | .49                    | .12                                                     |                          |
| 33.....                                                                       | 565                       | 3800                      | 14.3                 | 22.4         | .64                    | .72                                                     |                          |
| 34.....                                                                       | 825                       | 6370                      | 8.9                  | 19.0         | .46                    | +.35                                                    |                          |
| 35.....                                                                       | 585                       | 6450                      | 6.3                  | 11.2         | .56                    | .10                                                     |                          |
| Avg.....                                                                      | 655                       | 5055                      | 10.8                 | 16.8         | 0.64                   | -----                                                   |                          |
| Plant 229, grade 1 ("Common," (1940) percentage of kiln unknown, SC, S)       |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                                        | 740                       | 4100                      | (24-hr)<br>21.7      | 27.6         | 0.79                   | 0.25                                                    |                          |
| 2.....                                                                        | 525                       | 4640                      | 22.0                 | 25.3         | .87                    | .43                                                     |                          |
| Avg.....                                                                      | 650                       | 4370                      | 21.8                 | 26.4         | 0.83                   | 0.34                                                    |                          |
| Plant 229, grade 2 ("Common," (1940) percentage of kiln unknown, SC, S)       |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                                        | 440                       | 8010                      | (24-hr)<br>15.5      | 20.3         | 0.66                   | b +0.10                                                 |                          |
| 2.....                                                                        | 635                       | 4480                      | 18.3                 | 23.3         | .78                    | +.15                                                    |                          |
| 3.....                                                                        | 890                       | 6000                      | 17.0                 | 21.2         | .80                    | -.34                                                    |                          |
| 4.....                                                                        | 990                       | 4570                      | 17.5                 | 22.5         | .78                    | +.19                                                    |                          |
| 5.....                                                                        | 1220                      | 4210                      | 17.0                 | 23.0         | .74                    | +.15                                                    |                          |
| Avg.....                                                                      | 835                       | 5450                      | 17.1                 | 22.1         | 0.77                   | -----                                                   |                          |
| Plant 230, grade 1 ("Commons," percentage of kiln unknown, SM, C)             |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                                        | 535                       | 2920                      | 26.3                 | 31.7         | 0.83                   | F 5c                                                    |                          |
| 2.....                                                                        | 400                       | 1850                      | 27.1                 | 32.9         | .82                    | 1.0                                                     |                          |
| 3.....                                                                        | 445                       | 2245                      | 26.3                 | 32.5         | .81                    | 1.1                                                     |                          |
| 4.....                                                                        | 1030                      | 4210                      | 20.9                 | 27.6         | .76                    | 0.6                                                     |                          |
| 5.....                                                                        | 690                       | 2380                      | 25.0                 | 31.0         | .81                    | 1.0                                                     |                          |
| Avg.....                                                                      | 620                       | 2720                      | 25.1                 | 31.1         | 0.81                   | -----                                                   |                          |
| Plant 230, grade 2 ("Commons," percentage of kiln unknown, SC, S)             |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                                        | 810                       | 4600                      | 18.4                 | 22.1         | 0.83                   | F 3c                                                    |                          |
| 2.....                                                                        | 560                       | 2790                      | 25.8                 | 29.3         | .88                    | F 27c                                                   |                          |
| 3.....                                                                        | 505                       | 3250                      | 24.2                 | 28.7         | .84                    | -----                                                   |                          |
| 4.....                                                                        | 505                       | 3100                      | 25.8                 | 29.1         | .88                    | F 22c                                                   |                          |
| 5.....                                                                        | 985                       | 3700                      | 21.9                 | 25.8         | .85                    | F 18c                                                   |                          |
| Avg.....                                                                      | 675                       | 3490                      | 23.2                 | 27.0         | 0.86                   | -----                                                   |                          |

<sup>b</sup> These bricks contain considerable lime. The gain in weight in some specimens is due to hydration or carbonation of this lime.

TABLE 17.—*Properties of bricks produced in Utah and Wyoming*

[The samples received included bricks made from shale, surface clay, and fire clay and all methods of forming were represented except the soft-mud process. A more complete picture of brick production in Utah is given in the report by Beckstrand and French [8].]

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 78, grade 1 ("Arch," 10 percent of kiln, DP, C and S)

| Avg (5) | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %          |  |
|---------|---------------------|---------------------|-----|-----|------|------------|--|
|         | 980                 | 10090               | 4.8 | 7.6 | 0.63 | Not tested |  |

Plant 78, grade 2 ("Dark common," 30 percent of kiln, DP, C and S)

|     |     |      |     |      |      |      |  |
|-----|-----|------|-----|------|------|------|--|
| 1   | 605 | 5700 | 9.3 | 12.4 | 0.75 | 0.52 |  |
| 2   | 560 | 5680 | 9.2 | 12.1 | .76  | .38  |  |
| 3   | 725 | 6200 | 8.6 | 12.1 | .71  | .35  |  |
| 4   | 630 | 5930 | 9.5 | 12.5 | .76  | .50  |  |
| 5   | 595 | 7240 | 8.6 | 11.8 | .73  | .32  |  |
| Avg | 620 | 6200 | 9.0 | 12.2 | 0.74 | 0.41 |  |

Plant 78, grade 3 ("Dark Selects," 30 percent of kiln, DP, C and S)

|     |     |      |      |      |      |      |  |
|-----|-----|------|------|------|------|------|--|
| 1   | 540 | 5470 | 10.1 | 13.5 | 0.75 | 1.06 |  |
| 2   | 435 | 5510 | 10.9 | 13.9 | .78  | .89  |  |
| 3   | 485 | 5040 | 11.7 | 14.7 | .80  | .86  |  |
| 4   | 480 | 4980 | 9.5  | 12.4 | .77  | .57  |  |
| 5   | 505 | 5530 | 10.1 | 12.9 | .78  | .68  |  |
| Avg | 490 | 5310 | 10.5 | 13.5 | 0.77 | 0.82 |  |

Plant 78, grade 4 ("Picked reds," 25 percent of kiln, DP, C and S)

|     |     |      |      |      |      |                                             |  |
|-----|-----|------|------|------|------|---------------------------------------------|--|
| 1   | 270 | 4420 | 12.4 | 15.8 | 0.79 | } No test<br>0.66 (B)<br>.85 (B)<br>.58 (B) |  |
| 2   | 325 | 4250 | 11.2 | 13.5 | .83  |                                             |  |
| 3   | 445 | 5390 | 12.2 | 15.0 | .81  |                                             |  |
| 4   | 300 | 3680 | 11.9 | 14.8 | .80  |                                             |  |
| 5   | 505 | 4240 | 11.0 | 12.9 | .85  |                                             |  |
| Avg | 370 | 4400 | 11.7 | 14.4 | 0.82 | 0.70 (B)                                    |  |

Plant 78, grade 5 ("Salmon," 5 percent of kiln, DP, C and S)

|     |     |      |      |      |      |       |       |
|-----|-----|------|------|------|------|-------|-------|
| 1   | 305 | 6250 | 12.1 | 13.8 | 0.88 | F 45c | F 63c |
| 2   | 270 | 5300 | 14.5 | 17.5 | .83  | F 48c |       |
| 3   | 285 | 5490 | 13.7 | 15.4 | .89  | F 48c |       |
| 4   | 325 | 5760 | 15.2 | 17.8 | .85  | 2.74  |       |
| 5   | 305 | 5620 | 13.9 | 16.9 | .82  | F 42c |       |
| Avg | 300 | 5670 | 13.9 | 16.3 | 0.85 |       |       |

Plant 78, grade 6 ("Red sand," percentage of kiln unknown, DP, C and S)

|     |     |      |      |      |      |      |            |
|-----|-----|------|------|------|------|------|------------|
| 1   | 335 | 5380 | 9.6  | 12.3 | 0.78 | 0.64 | % (63c)    |
| 2   | 315 | 4400 | 10.4 | 13.9 | .75  | 1.19 | 1.29 (63c) |
| 3   | 225 | 4740 | 10.0 | 12.9 | .78  | 0.60 | 1.09 (63c) |
| 4   | 370 | 5260 | 10.7 | 14.2 | .75  | .47  | 0.59 (63c) |
| 5   | 340 | 5870 | 9.8  | 13.8 | .71  | .36  | .36 (63c)  |
| Avg | 315 | 5130 | 10.1 | 13.4 | 0.75 | 0.65 | 0.79 (63c) |

Plant 78, grade 7 ("Light commons from stock," percentage of kiln unknown, DP, C and S)

|     |     |      |      |      |      |          |  |
|-----|-----|------|------|------|------|----------|--|
| 1   | 125 | 3920 | 11.2 | 14.1 | 0.80 | 0.68 (B) |  |
| 2   | 150 | 4750 | 9.1  | 11.4 | .80  | .36 (B)  |  |
| 3   | 185 | 4510 | 9.9  | 11.7 | .85  | .63 (B)  |  |
| 4   | 95  | 3240 | 12.4 | 15.5 | .80  | .77 (B)  |  |
| 5   |     | 3160 | 13.7 | 16.8 | .82  | .98 (B)  |  |
| Avg | 140 | 3920 | 11.3 | 13.9 | 0.81 | 0.68 (B) |  |

TABLE 17.—*Properties of bricks produced in Utah and Wyoming—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 78, grade 8 ("Light sand," percentage of kiln unknown, DP, C and S)

|     | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %    | %    |      | %     | %          |
|-----|---------------------|---------------------|------|------|------|-------|------------|
| 1   | 285                 | 3290                | 13.9 | 16.7 | 0.83 | 2.90  | 3.00 (63c) |
| 2   | 225                 | 4350                | 13.3 | 15.5 | .86  | 1.24  | 1.59 (63c) |
| 3   | 145                 | 3370                | 13.3 | 16.2 | .82  | F 39c |            |
| 4   | 145                 | 2790                | 14.3 | 17.2 | .83  | F 39c |            |
| 5   | 135                 | 2900                | 12.6 | 14.3 | .88  | 1.34  | 1.61 (63c) |
| Avg | 185                 | 3340                | 13.5 | 16.0 | 0.84 |       |            |

Plant 78, grade 9 ("Dark common," percentage of kiln unknown, SC, C and S)

| Avg (5) | 1140 | 10690 | 3.2 | 7.5 | 0.42 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 78, grade 10 ("Textured Dark," percentage of kiln unknown, SC, C and S)

| Avg (5) | 905 | 8470 | 3.2 | 7.7 | 0.42 | Not tested |  |
|---------|-----|------|-----|-----|------|------------|--|
|---------|-----|------|-----|-----|------|------------|--|

Plant 78, grade 11 ("Rough texture," percentage of kiln unknown, SC, C and S)

| Avg (5) | 975 | 8340 | 6.7 | 10.7 | 0.62 | Not tested |  |
|---------|-----|------|-----|------|------|------------|--|
|---------|-----|------|-----|------|------|------------|--|

Plant 78, grade 12 ("Hollow," percentage of kiln unknown, EC, C)

| Avg (5) | 835 | 1790 | 10.9 | 15.8 | 0.69 | Not tested |  |
|---------|-----|------|------|------|------|------------|--|
|---------|-----|------|------|------|------|------------|--|

Plant 182, grade 1 ("Common," 80 percent of kiln, DP, C)

|     |     |      |      |      |      |       |  |
|-----|-----|------|------|------|------|-------|--|
| 1   | 465 | 3750 | 22.8 | 25.9 | 0.88 | F 12c |  |
| 2   | 465 | 4220 | 26.8 | 29.5 | .91  | F 14c |  |
| 3   | 945 | 4720 | 21.4 | 23.8 | .90  | F 15c |  |
| 4   | 445 | 3260 | 26.6 | 28.2 | .94  | F 18c |  |
| 5   | 735 | 5390 | 20.2 | 22.7 | .89  | F 21c |  |
| Avg | 610 | 4270 | 23.6 | 26.0 | 0.90 | F 16c |  |

Plant 182, grade 2 ("Common," 85 percent of kiln, SC, C)

|     |      |      |      |      |      |      |  |
|-----|------|------|------|------|------|------|--|
| 1   | 780  | 4170 | 25.4 | 27.8 | 0.91 | F 2c |  |
| 2   | 670  | 2770 | 27.2 | 30.0 | .91  | F 6c |  |
| 3   | 1145 | 4610 | 25.4 | 27.6 | .92  | F 8c |  |
| 4   | 700  | 3780 | 26.2 | 28.7 | .91  | F 4c |  |
| 5   | 1020 | 5340 | 24.6 | 27.4 | .90  | F 9c |  |
| Avg | 865  | 4130 | 25.8 | 28.3 | 0.91 | F 6c |  |

Plant 182, grade 3 ("Textured face," 93 percent of kiln, SC, FC)

| Avg (5) | 1380 | 9840 | 5.9 | 8.3 | 0.71 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|
|---------|------|------|-----|-----|------|------------|--|

Plant 182, grade 4 ("Vitrified," 96 percent of kiln, SC, FC and S)

|     |      |       |     |     |      |      |  |
|-----|------|-------|-----|-----|------|------|--|
| 1   | 2130 | 11700 | 3.7 | 6.0 | 0.62 | 0.15 |  |
| 2   | 2060 | 10200 | 4.9 | 7.6 | .64  | .28  |  |
| 3   | 2220 | 9230  | 3.4 | 5.7 | .60  | .08  |  |
| 4   | 2310 | 10180 | 4.8 | 7.7 | .62  | .40  |  |
| 5   | 2290 | 13070 | 3.5 | 5.8 | .60  | .23  |  |
| Avg | 2200 | 10880 | 4.1 | 6.6 | 0.62 | 0.23 |  |

TABLE 18.—*Properties of bricks produced in Colorado*

[The samples received represented bricks made from shale or from clay and formed by the stiff-mud, side-cut or the dry-press process]

| Specimen number                                                                | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                                |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 56, grade 1 ("Kiln run common," 100 percent of kiln, less salmons DP, S) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                                | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i> (B)                                            |                          |
| 1-----                                                                         | 835                       | 11300                     | 7.6                  | 10.1         | 0.75                   | 0.00 (B)                                                |                          |
| 2-----                                                                         | 880                       | 11350                     | 7.9                  | 9.9          | .80                    | .16 (B)                                                 |                          |
| 3-----                                                                         |                           | 7060                      | 13.4                 | 15.2         | .88                    | .56 (B)                                                 |                          |
| 4-----                                                                         | 575                       | 9160                      | 11.9                 | 13.5         | .88                    | .15 (B)                                                 |                          |
| 5-----                                                                         |                           | 8200                      | 11.9                 | 13.7         | .87                    | .24 (B)                                                 |                          |
| 6-----                                                                         | 500                       | 8360                      | 11.2                 | 13.1         | .86                    | .19 (B)                                                 |                          |
| 7-----                                                                         | 575                       | 10700                     | 9.5                  | 11.1         | .86                    | .16 (B)                                                 |                          |
| 8-----                                                                         | 370                       | 8220                      | 12.4                 | 14.2         | .87                    | .44 (B)                                                 |                          |
| 9-----                                                                         | 645                       | 9130                      | 11.6                 | 13.0         | .89                    | .18 (B)                                                 |                          |
| 10-----                                                                        | 655                       | 6640                      | 13.2                 | 15.1         | .87                    | .16 (B)                                                 |                          |
| 11-----                                                                        | 430                       | 6370                      | 13.9                 | 16.2         | .86                    | .31 (B)                                                 |                          |
| 12-----                                                                        | 475                       | 6130                      | 14.3                 | 16.5         | .87                    | .17 (B)                                                 |                          |
| 13-----                                                                        | 640                       | 8550                      | 12.6                 | 14.3         | .88                    | .25 (B)                                                 |                          |
| 14-----                                                                        | 770                       | 8270                      | 12.6                 | 14.6         | .86                    | .00                                                     |                          |
| 15-----                                                                        | 860                       | 6970                      | 13.1                 | 14.6         | .90                    | No test                                                 |                          |
| Avg-----                                                                       | 630                       | 8430                      | 11.8                 | 13.7         | 0.86                   | 0.21 (B)                                                |                          |
| Plant 56, grade 2 ("Salmon," percentage of kiln unknown, DP, S)                |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 455                       | 8110                      | 13.4                 | 14.7         | 0.91                   | F 45c                                                   | F 57c                    |
| 2-----                                                                         | 830                       | 9100                      | 12.1                 | 13.4         | .90                    | 0.43                                                    |                          |
| 3-----                                                                         | 620                       | 6780                      | 13.7                 | 15.1         | .91                    | F 21c                                                   |                          |
| Avg-----                                                                       | 635                       | 7980                      | 13.1                 | 14.4         | 0.91                   | -----                                                   |                          |
| Plant 121, grade 1 ("Arch," 25 percent of kiln, DP, S)                         |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 870                       | 7420                      | 8.4                  | 10.2         | 0.82                   | 0.00 (B)                                                |                          |
| 2-----                                                                         | 915                       | 8120                      | 11.1                 | 12.6         | .88                    | .23 (B)                                                 |                          |
| 3-----                                                                         | 580                       | 6530                      | 12.1                 | 13.8         | .88                    | .26 (B)                                                 |                          |
| 4-----                                                                         | 555                       | 7360                      | 11.7                 | 13.2         | .89                    | .25 (B)                                                 |                          |
| 5-----                                                                         | 540                       | 6390                      | 11.8                 | 13.6         | .87                    | .46 (B)                                                 |                          |
| Avg-----                                                                       | 690                       | 7160                      | 11.0                 | 12.7         | 0.87                   | 0.24 (B)                                                |                          |
| Plant 121, grade 2 ("No. 1 Commons," 50 percent of kiln, DP, S)                |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 485                       | 7180                      | 12.8                 | 14.2         | 0.90                   | 0.27 (B)                                                |                          |
| 2-----                                                                         | 530                       | 7150                      | 13.3                 | 14.8         | .90                    | .41 (B)                                                 |                          |
| 3-----                                                                         | 390                       | 7400                      | 13.6                 | 14.6         | .93                    | .30 (B)                                                 |                          |
| 4-----                                                                         | 390                       | 4450                      | 13.5                 | 14.7         | .92                    | F 42c (B)                                               |                          |
| 5-----                                                                         | 350                       | 4100                      | 14.0                 | 15.3         | .92                    | F 45c (B)                                               |                          |
| Avg-----                                                                       | 430                       | 6060                      | 13.4                 | 14.7         | 0.91                   | -----                                                   |                          |
| Plant 121, grade 3 ("No. 2 Commons," 18.75 percent of kiln, DP, S)             |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 510                       | 5550                      | 13.7                 | 15.0         | 0.91                   | F 43c (B)                                               |                          |
| 2-----                                                                         | 325                       | 4470                      | 14.5                 | 16.0         | .91                    | F 33c (B)                                               |                          |
| 3-----                                                                         | 415                       | 5330                      | 14.6                 | 16.0         | .91                    | F 21c (B)                                               |                          |
| 4-----                                                                         | 330                       | 3640                      | 15.2                 | 16.4         | .93                    | F 28c (B)                                               |                          |
| 5-----                                                                         | 465                       | 5550                      | 14.2                 | 15.1         | .94                    | F 33c (B)                                               |                          |
| Avg-----                                                                       | 410                       | 4910                      | 14.4                 | 15.7         | 0.92                   | F 32c (B)                                               |                          |
| Plant 121, grade 4 ("Salmon," 6.25 percent of kiln, DP, S)                     |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 455                       | 5110                      | 14.6                 | 15.8         | 0.92                   | F 18c                                                   |                          |
| 2-----                                                                         | 285                       | 4280                      | 15.3                 | 17.1         | .90                    | F 11c                                                   |                          |
| 3-----                                                                         | 275                       | 4240                      | 15.4                 | 16.6         | .93                    | F 9c                                                    |                          |
| 4-----                                                                         | 300                       | 4410                      | 14.7                 | 16.2         | .91                    | F 9c                                                    |                          |
| 5-----                                                                         | 440                       | 4260                      | 15.6                 | 16.9         | .92                    | F 9c                                                    |                          |
| Avg-----                                                                       | 350                       | 4460                      | 15.1                 | 16.5         | 0.92                   | F 11c                                                   |                          |

TABLE 18.—*Properties of bricks produced in Colorado—Continued*

| Specimen number                                                   | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                   |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 139, grade 1 ("Arch," 10 percent of kiln, DP, S)            |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1-----                                                            | 870                 | 5830                 | 12.4                 | 15.0         | 0.83                   | 0.52 (B)                                                |                          |
| 2-----                                                            | 1055                | 5480                 | 12.8                 | 15.1         | .85                    | No test                                                 |                          |
| 3-----                                                            | 785                 | 4900                 | 14.7                 | 17.0         | .86                    | do.                                                     |                          |
| 4-----                                                            | 955                 | 5590                 | 13.2                 | 15.5         | .85                    | 0.46 (B)                                                |                          |
| 5-----                                                            | 960                 | 6200                 | 13.2                 | 16.0         | .82                    | .48 (B)                                                 |                          |
| Avg-----                                                          | 925                 | 5600                 | 13.3                 | 15.7         | 0.84                   | 0.49 (B)                                                |                          |
| Plant 139, grade 2 ("Medium," 70 percent of kiln, DP, S)          |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 595                 | 4320                 | 16.7                 | 20.1         | 0.83                   | F 49c(B)                                                |                          |
| 2-----                                                            | 645                 | 3920                 | 16.0                 | 18.3         | .87                    | F 50c(B)                                                |                          |
| 3-----                                                            | 780                 | 5740                 | 14.2                 | 16.5         | .86                    | 0.83 (B)                                                |                          |
| 4-----                                                            | 670                 | 5350                 | 15.6                 | 17.9         | .87                    | .81 (B)                                                 |                          |
| 5-----                                                            | 640                 | 3980                 | 16.5                 | 19.5         | .84                    | 1.21 (B)                                                |                          |
| Avg-----                                                          | 665                 | 4660                 | 15.8                 | 18.5         | 0.85                   | -----                                                   |                          |
| Plant 139, grade 3 ("Salmon," 20 percent of kiln, DP, S)          |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 320                 | 2940                 | 18.7                 | 21.4         | 0.87                   | F 9c                                                    |                          |
| 2-----                                                            | 280                 | 2770                 | 19.6                 | 22.3         | .88                    | F 4c                                                    |                          |
| 3-----                                                            | 295                 | 2960                 | 18.9                 | 22.1         | .89                    | F 6c                                                    |                          |
| 4-----                                                            |                     | 2270                 | 19.9                 | 22.4         | .89                    | F 6c                                                    |                          |
| 5-----                                                            | 400                 | 2730                 | 19.7                 | 22.2         | .89                    | F 6c                                                    |                          |
| Avg-----                                                          | 325                 | 2740                 | 19.4                 | 21.9         | 0.88                   | F 6c                                                    |                          |
| Plant 139, grade 4 ("Arch," 10 percent of kiln, SC, S)            |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 1520                | 9170                 | 8.8                  | 11.2         | 0.79                   | 0.24 (B)                                                |                          |
| 2-----                                                            | 1635                | 7940                 | 9.0                  | 10.9         | .83                    | .23 (B)                                                 |                          |
| 3-----                                                            | 1545                | 7350                 | 12.3                 | 14.2         | .87                    | .46 (B)                                                 |                          |
| 4-----                                                            | 1600                | 6700                 | 12.0                 | 14.0         | .86                    | .48 (B)                                                 |                          |
| 5-----                                                            | 1245                | 8480                 | 9.7                  | 11.6         | .84                    | .47 (B)                                                 |                          |
| Avg-----                                                          | 1510                | 7930                 | 10.4                 | 12.4         | 0.84                   | 0.38 (B)                                                |                          |
| Plant 139, grade 5 ("Medium," 70 percent of kiln, SC, S)          |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 1520                | 6840                 | 13.3                 | 15.2         | 0.88                   | No test                                                 |                          |
| 2-----                                                            | 1370                | 7190                 | 13.2                 | 15.0         | .88                    | No test                                                 |                          |
| 3-----                                                            | 1450                | 7730                 | 13.2                 | 15.2         | .87                    | F 48c(B)                                                |                          |
| 4-----                                                            | 1455                | 6790                 | 12.4                 | 14.2         | .87                    | 0.17 (B)                                                |                          |
| 5-----                                                            | 1115                | 6770                 | 12.8                 | 14.4         | .89                    | .07 (B)                                                 |                          |
| Avg-----                                                          | 1380                | 7060                 | 13.0                 | 14.8         | 0.88                   | -----                                                   |                          |
| Plant 139, grade 6 ("Salmon," 20 percent of kiln, SC, S)          |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 1445                | 5470                 | 14.1                 | 15.9         | 0.89                   | F 12c                                                   |                          |
| 2-----                                                            | 1210                | 5900                 | 14.7                 | 16.4         | .90                    | F 11c                                                   |                          |
| 3-----                                                            | 1415                | 5890                 | 14.4                 | 15.8         | .91                    | F 6c                                                    |                          |
| 4-----                                                            | 1215                | 5650                 | 14.3                 | 15.8         | .91                    | F 11c                                                   |                          |
| 5-----                                                            | 1355                | 5550                 | 14.0                 | 15.7         | .89                    | F 15c                                                   |                          |
| Avg-----                                                          | 1330                | 5690                 | 14.3                 | 15.9         | 0.90                   | F 11c                                                   |                          |
| Plant 139, grade 7 ("Medium," percentage of kiln unknown, SC, FC) |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-                                                          | 1435                | 7860                 | 7.2                  | 9.1          | 0.80                   | Not tested                                              |                          |
| Plant 164, grade 1 ("No. 1 Common," 75 percent of kiln, SC, S)    |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                            | 1680                | 8380                 | 6.8                  | 10.7         | 0.62                   | 0.19                                                    |                          |
| 2-----                                                            | 1680                | 12050                | 5.8                  | 9.1          | .64                    | .10                                                     |                          |
| 3-----                                                            | 1840                | 8430                 | 7.4                  | 11.3         | .65                    | .20                                                     |                          |
| 4-----                                                            | 1375                | 6430                 | 10.1                 | 13.6         | .74                    | .30                                                     |                          |
| 5-----                                                            | 1780                | 8140                 | 6.7                  | 10.6         | .63                    | .29                                                     |                          |
| Avg-----                                                          | 1670                | 8690                 | 7.4                  | 11.1         | 0.66                   | 0.22                                                    |                          |

TABLE 18.—*Properties of bricks produced in Colorado—Continued*

| Specimen number                                                | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 165, grade 1 ("No. 1 Common," 75 percent of kiln, SC, S) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | %                    | %            |                        | %                                                       |                          |
| 1-----                                                         | 2200                      | 8530                      | 9.1                  | 11.1         | 0.82                   | 0.10                                                    |                          |
| 2-----                                                         | 1765                      | 7770                      | 10.8                 | 12.7         | .85                    | .10                                                     |                          |
| 3-----                                                         | 1945                      | 8310                      | 8.4                  | 10.5         | .80                    | .10                                                     |                          |
| 4-----                                                         | 1950                      | 8740                      | 8.1                  | 10.8         | .75                    | .11                                                     |                          |
| 5-----                                                         | 2030                      | 9890                      | 8.6                  | 11.0         | .78                    | .10                                                     |                          |
| Avg----                                                        | 1980                      | 8650                      | 9.0                  | 11.2         | 0.80                   | 0.10                                                    |                          |

Plant 186, grade 1 ("Vitrified," 20 percent of kiln, SC, C)

|              |      |      |     |     |      |            |  |
|--------------|------|------|-----|-----|------|------------|--|
| Avg (5)..... | 1445 | 8710 | 5.8 | 8.1 | 0.71 | Not tested |  |
|--------------|------|------|-----|-----|------|------------|--|

Plant 186, grade 2 ("Hard," 40 percent of kiln, SC, C)

|              |     |      |     |      |      |            |  |
|--------------|-----|------|-----|------|------|------------|--|
| Avg (5)..... | 950 | 6640 | 8.2 | 11.5 | 0.71 | Not tested |  |
|--------------|-----|------|-----|------|------|------------|--|

Plant 186, grade 3 ("Medium," 25 percent of kiln, SC, C)

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
| 1.....   | 905 | 5630 | 10.6 | 13.1 | 0.81 | 0.25 (B) |  |
| 2.....   | 840 | 6250 | 10.3 | 12.8 | .81  | .34 (B)  |  |
| 3.....   | 660 | 5890 | 11.6 | 14.3 | .81  | .45 (B)  |  |
| 4.....   | 900 | 7300 | 9.5  | 12.6 | .75  | .26 (B)  |  |
| 5.....   | 925 | 6230 | 10.2 | 13.1 | .78  | .33 (B)  |  |
| Avg..... | 845 | 6260 | 10.4 | 13.2 | 0.79 | 0.33 (B) |  |

Plant 186, grade 4 ("Soft," 15 percent of kiln, SC, C)

|          |     |      |      |      |      |           |  |
|----------|-----|------|------|------|------|-----------|--|
| 1.....   | 605 | 4300 | 13.5 | 15.8 | 0.85 | F 34c (B) |  |
| 2.....   | 725 | 4780 | 13.4 | 15.6 | .86  | 0.53 (B)  |  |
| 3.....   | 640 | 5190 | 12.8 | 15.3 | .84  | .60 (B)   |  |
| 4.....   | 755 | 4530 | 13.3 | 15.6 | .85  | F 31c (B) |  |
| 5.....   | 280 | 5060 | 13.3 | 15.4 | .86  | F 25c (B) |  |
| Avg..... | 600 | 4770 | 13.3 | 15.5 | 0.85 |           |  |

Plant 193, grade 1 ("Hard red," 85 percent of kiln, DP, S)

|          |     |      |      |      |      |           |  |
|----------|-----|------|------|------|------|-----------|--|
| 1.....   | 335 | 3220 | 15.4 | 17.2 | 0.90 | F 50c (B) |  |
| 2.....   | 550 | 4420 | 12.6 | 14.5 | .87  | 8.01 (B)  |  |
| 3.....   | 495 | 3590 | 12.6 | 14.9 | .85  | 0.90 (B)  |  |
| 4.....   | 410 | 2420 | 13.7 | 15.8 | .87  | .77 (B)   |  |
| 5.....   | 305 | 2510 | 15.7 | 17.8 | .88  | 1.33 (B)  |  |
| 6.....   | 415 | 3000 | 14.3 | 16.1 | .89  | 0.45 (B)  |  |
| 7.....   | 190 | 2860 | 14.6 | 16.7 | .87  | .60 (B)   |  |
| 8.....   | 505 | 4000 | 14.0 | 15.3 | .92  | F 34c (B) |  |
| 9.....   | 480 | 3920 | 15.5 | 17.2 | .90  | F 17c (B) |  |
| 10.....  | 295 | 2430 | 15.3 | 17.1 | .89  | F 34c (B) |  |
| 11.....  | 370 | 3380 | 16.4 | 17.8 | .92  | F 10c (B) |  |
| 12.....  | 550 | 3760 | 9.5  | 11.4 | .83  | 0.29 (B)  |  |
| 13.....  | 235 | 2310 | 18.1 | 20.0 | .91  | F 19c (B) |  |
| 14.....  | 315 | 2520 | 15.2 | 17.2 | .88  | F 42c (B) |  |
| 15.....  | 275 | 2110 | 15.7 | 17.4 | .90  | 1.71 (B)  |  |
| Avg..... | 380 | 3100 | 14.6 | 16.4 | 0.89 |           |  |

Plant 193, grade 2 ("Salmon," 15 percent of kiln, DP, S)

|          |     |      |      |      |      |           |  |
|----------|-----|------|------|------|------|-----------|--|
| 1.....   | 275 | 3210 | 17.5 | 19.1 | 0.92 | F 10c (B) |  |
| 2.....   | 275 | 3780 | 17.7 | 19.1 | .93  | F 12c (B) |  |
| 3.....   | 240 | 3620 | 17.2 | 19.2 | .90  | F 12c (B) |  |
| 4.....   | 255 | 3120 | 17.5 | 19.4 | .90  | F 14c (B) |  |
| 5.....   | 190 | 3090 | 17.6 | 19.2 | .92  | F 25c (B) |  |
| Avg..... | 245 | 3360 | 17.5 | 19.2 | 0.91 | F 15c (B) |  |

TABLE 18.—*Properties of bricks produced in Colorado—Continued*

| Specimen number                                                | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                |                           |                           | 48-hr cold immersion | 5-br boiling |                        |                                                         |                          |
| Plant 197, grade 1 ("Medium," 60 to 70 percent of kiln, DP, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                         | 445                       | 5600                      | 10.7                 | 12.3         | 0.87                   | 0.33 (B)                                                |                          |
| 2-----                                                         | 465                       | 5150                      | 11.0                 | 12.8         | .86                    | .27 (B)                                                 |                          |
| 3-----                                                         | 430                       | 5790                      | 9.5                  | 12.2         | .78                    | .27 (B)                                                 |                          |
| 4-----                                                         | 445                       | 4830                      | 11.0                 | 12.3         | .89                    | .26 (B)                                                 |                          |
| 5-----                                                         | 270                       | 3720                      | 12.4                 | 14.2         | .87                    | .18 (B)                                                 |                          |
| Avg.---                                                        | 410                       | 5020                      | 10.9                 | 12.8         | 0.85                   | 0.26 (B)                                                |                          |

Plant 197, grade 2 ("Soft," 10 to 15 percent of kiln, DP, C)

|          |     |      |      |      |      |          |  |
|----------|-----|------|------|------|------|----------|--|
| 1.....   | 525 | 6000 | 10.8 | 12.6 | 0.86 | 0.09 (B) |  |
| 2.....   | 310 | 4630 | 12.0 | 13.9 | .86  | .74 (B)  |  |
| 3.....   | 340 | 4210 | 11.3 | 13.4 | .84  | .25 (B)  |  |
| 4.....   | 225 | 3880 | 12.1 | 14.0 | .86  | .58 (B)  |  |
| 5.....   | 495 | 4390 | 10.8 | 12.9 | .84  | .31 (B)  |  |
| Avg..... | 380 | 4620 | 11.4 | 13.4 | 0.85 | 0.39 (B) |  |

TABLE 19.—*Properties of bricks produced in Washington, Oregon, and California*

[The samples received included bricks made from shale and surface clay and formed by the soft-mud and the stiff-mud, side-cut processes. Data on 13 additional plants in the Los Angeles District were provided by the California Clay Products Institute. All of these plants manufactured brick made from surface clay. The averages were as follows: Modulus of rupture 600 lb/in.<sup>2</sup>; compressive strength 3,690 lb/in.<sup>2</sup>; water absorption by 48-hr cold immersion 11.5 percent; water absorption by 5-hr boiling 14.2 percent; saturation coefficient 0.83. Reference is made to Williams' article [9] for additional data on Oregon bricks]

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 39, grade 1 ("Hard commons," 30 percent of kiln, SC, C)

|          |                     |                     |     |     |      |      |  |
|----------|---------------------|---------------------|-----|-----|------|------|--|
|          | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %   |      | %    |  |
| 1.....   | 2950                | 15200               | 1.2 | 3.5 | 0.34 | 0.08 |  |
| 2.....   | 2320                | 17250               | 0.8 | 3.3 | .24  | .16  |  |
| 3.....   | 2650                | 18350               | 1.3 | 3.4 | .38  | .26  |  |
| 4.....   | 3570                | 19400               | 1.3 | 3.4 | .38  | .08  |  |
| 5.....   | 3080                | 17600               | 2.8 | 4.8 | .58  | .08  |  |
| Avg..... | 2915                | 17560               | 1.5 | 3.7 | 0.38 | 0.13 |  |

Plant 39, grade 2 ("Medium," 60 percent of kiln, SC, C)

|          |      |       |      |      |      |      |  |
|----------|------|-------|------|------|------|------|--|
| 1.....   | 1810 | 8110  | 10.4 | 13.3 | 0.78 | 0.32 |  |
| 2.....   | 1685 | 9340  | 9.9  | 12.8 | .77  | .25  |  |
| 3.....   | 1460 | 8400  | 9.9  | 12.7 | .78  | .19  |  |
| 4.....   | 1600 | 9560  | 9.9  | 12.9 | .77  | .29  |  |
| 5.....   | 1740 | 10000 | 9.1  | 12.1 | .75  | .30  |  |
| Avg..... | 1665 | 9080  | 9.8  | 12.8 | 0.77 | 0.27 |  |

Plant 39, grade 3 ("Soft," 10 percent of kiln, SC, C)

|          |     |      |      |      |      |       |  |
|----------|-----|------|------|------|------|-------|--|
| 1.....   | 470 | 3250 | 17.3 | 20.3 | 0.85 | F 27c |  |
| 2.....   | 520 | 3340 | 16.6 | 19.7 | .84  | 0.54  |  |
| 3.....   | 520 | 3180 | 16.3 | 19.8 | .82  | .99   |  |
| 4.....   | 645 | 2590 | 17.4 | 20.4 | .85  | F 21c |  |
| 5.....   | 760 | 3820 | 17.2 | 20.2 | .85  | F 15c |  |
| Avg..... | 585 | 3240 | 17.0 | 20.1 | 0.84 |       |  |

TABLE 19.—*Properties of bricks produced in Washington, Oregon, and California—Continued*

| Specimen<br>number                                                   | Modulus<br>of rupture      | Compressive<br>strength     | Water absorption             |                 | Saturation<br>coefficient | Weight<br>loss at 51<br>cycles or<br>number of<br>cycles at<br>failure | Results<br>beyond<br>51 cycles |
|----------------------------------------------------------------------|----------------------------|-----------------------------|------------------------------|-----------------|---------------------------|------------------------------------------------------------------------|--------------------------------|
|                                                                      |                            |                             | 48-hr<br>cold im-<br>mersion | 5-hr<br>boiling |                           |                                                                        |                                |
| Plant 54, grade 1 ("Common over arches," 33⅓ percent of kiln, SC, S) |                            |                             |                              |                 |                           |                                                                        |                                |
| Avg (5)                                                              | lb/in. <sup>2</sup><br>920 | lb/in. <sup>2</sup><br>6770 | %<br>11.2                    | %<br>13.5       | 0.83                      | %<br>Not tested                                                        | %                              |
| Plant 54, grade 2 ("Center of kiln," 33⅓ percent of kiln, SC, S)     |                            |                             |                              |                 |                           |                                                                        |                                |
| 1-----                                                               | 655                        | 4610                        | 14.4                         | 16.5            | 0.87                      | 0.50 (B)                                                               |                                |
| 2-----                                                               | 840                        | 4550                        | 13.9                         | 16.4            | .85                       | .49 (B)                                                                |                                |
| 3-----                                                               | 720                        | 4430                        | 13.7                         | 16.0            | .86                       | F 47c (B)                                                              |                                |
| 4-----                                                               | 525                        | 4490                        | 14.0                         | 16.2            | .86                       | 0.45 (B)                                                               |                                |
| 5-----                                                               | 600                        | 4700                        | 13.6                         | 15.6            | .87                       | .40 (B)                                                                |                                |
| Avg-----                                                             | 670                        | 4560                        | 13.9                         | 16.1            | 0.86                      | -----                                                                  |                                |
| Plant 54, grade 3 ("Top of kiln," 33⅓ percent of kiln, SC, S)        |                            |                             |                              |                 |                           |                                                                        |                                |
| 1-----                                                               | 600                        | 4390                        | 15.4                         | 17.2            | 0.90                      | F 45c                                                                  |                                |
| 2-----                                                               | 675                        | 3600                        | 15.4                         | 17.1            | .90                       | 1.31                                                                   | 4.82 (75c)                     |
| 3-----                                                               | 665                        | 3930                        | 14.9                         | 16.8            | .89                       | 0.30                                                                   | F 72c                          |
| 4-----                                                               | 570                        | 3980                        | 15.2                         | 16.6            | .92                       | .37                                                                    | 0.65 (75c)                     |
| 5-----                                                               | 560                        | 4060                        | 15.5                         | 17.3            | .90                       | 1.37                                                                   | 3.56 (75c)                     |
| Avg-----                                                             | 615                        | 3990                        | 15.3                         | 17.0            | 0.90                      | -----                                                                  |                                |
| Plant 85, grade 1 ("Face," 25 percent of kiln, SC, S)                |                            |                             |                              |                 |                           |                                                                        |                                |
| 1-----                                                               | 2800                       | 15350                       | 1.1                          | 4.7             | 0.23                      | 0.07                                                                   |                                |
| 2-----                                                               | 2200                       | 14400                       | 3.5                          | 7.4             | .47                       | .00                                                                    |                                |
| 3-----                                                               | 2190                       | 13700                       | 3.5                          | 7.0             | .50                       | .16                                                                    |                                |
| 4-----                                                               | 2140                       | 11200                       | 4.4                          | 8.4             | .52                       | .08                                                                    |                                |
| 5-----                                                               | 1920                       | 12650                       | 2.7                          | 6.6             | .41                       | .00                                                                    |                                |
| Avg-----                                                             | 2250                       | 13460                       | 3.0                          | 6.8             | 0.43                      | 0.06                                                                   |                                |
| Plant 85, grade 2 ("Select common," 50 percent of kiln, SC, S)       |                            |                             |                              |                 |                           |                                                                        |                                |
| 1-----                                                               | 690                        | 8190                        | 6.5                          | 10.2            | 0.64                      | 0.19                                                                   |                                |
| 2-----                                                               | 1750                       | 8900                        | 5.8                          | 9.3             | .64                       | .09                                                                    |                                |
| 3-----                                                               | 900                        | 7890                        | 8.6                          | 12.1            | .71                       | .17                                                                    |                                |
| 4-----                                                               | 1130                       | 8170                        | 9.6                          | 13.0            | .74                       | .17                                                                    |                                |
| 5-----                                                               | 1170                       | 7730                        | 8.6                          | 11.8            | .73                       | .11                                                                    |                                |
| Avg-----                                                             | 1130                       | 8180                        | 7.8                          | 11.3            | 0.69                      | 0.15                                                                   |                                |
| Plant 85, grade 3 ("100 percent kiln run," SC, C)                    |                            |                             |                              |                 |                           |                                                                        |                                |
| 1-----                                                               | 1245                       | 8230                        | 10.5                         | 14.0            | 0.75                      | 0.30                                                                   | 0.50 (63c)                     |
| 2-----                                                               | 890                        | 4810                        | 14.4                         | 17.4            | .83                       | .50                                                                    | .60 (63c)                      |
| 3-----                                                               | 1095                       | 4610                        | 9.7                          | 13.0            | .75                       | .09                                                                    | .09 (63c)                      |
| 4-----                                                               | 820                        | 5190                        | 15.4                         | 18.5            | .83                       | .72                                                                    | .81 (63c)                      |
| 5-----                                                               | 520                        | 2990                        | 16.3                         | 18.9            | .86                       | .95                                                                    | 1.16 (63c)                     |
| Avg-----                                                             | 915                        | 5170                        | 13.3                         | 16.4            | 0.80                      | 0.51                                                                   | 0.73 (63c)                     |
| Plant 99, grade 1 ("Common," 80 percent of kiln, SM, C)              |                            |                             |                              |                 |                           |                                                                        |                                |
| 1-----                                                               | 370                        | 3160                        | 16.5                         | 23.2            | 0.71                      | 1.65                                                                   |                                |
| 2-----                                                               | 705                        | 4500                        | 12.4                         | 18.6            | .67                       | 0.34                                                                   |                                |
| 3-----                                                               | 470                        | 3840                        | 12.9                         | 18.8            | .69                       | .43                                                                    |                                |
| 4-----                                                               | 550                        | 4280                        | 12.3                         | 18.4            | .67                       | .33                                                                    |                                |
| 5-----                                                               | 335                        | 2240                        | 16.4                         | 22.9            | .72                       | 1.97                                                                   |                                |
| Avg-----                                                             | 485                        | 3600                        | 14.1                         | 20.4            | 0.69                      | 0.94                                                                   |                                |
| Plant 100, grade 1 ("100 percent kiln run," SC, S)                   |                            |                             |                              |                 |                           |                                                                        |                                |
| Avg (15)                                                             | 625                        | 5460                        | 11.9                         | 16.6            | 0.71                      | Not tested                                                             |                                |

TABLE 19.—*Properties of bricks produced in Washington, Oregon, and California—Continued*

| Specimen number                                                    | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                    |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 137, grade 1 ("Arch," 10 percent of kiln, SC, C)             |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                | <i>%</i>                 |
| 1.....                                                             | 655                       | 7150                      | 6.4                  | 9.8          | 0.65                   | 0.26 (B)                                                |                          |
| 2.....                                                             | 685                       | 7450                      | 5.9                  | 9.2          | .64                    | .67 (B)                                                 |                          |
| 3.....                                                             | 550                       | 5650                      | 5.7                  | 9.1          | .63                    | .09 (B)                                                 |                          |
| 4.....                                                             | 555                       | 7500                      | 5.9                  | 9.1          | .65                    | .32 (B)                                                 |                          |
| 5.....                                                             | 405                       | 4820                      | 8.2                  | 11.2         | .73                    | .52 (B)                                                 |                          |
| Avg.....                                                           | 570                       | 6510                      | 6.4                  | 9.7          | 0.66                   | 0.37 (B)                                                |                          |
| Plant 137, grade 2 ("Medium," 80 percent of kiln, SC, C)           |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)...                                                         | 435                       | 4040                      | 9.9                  | 13.5         | 0.73                   | Not tested                                              |                          |
| Plant 137, grade 3 ("Soft," 10 percent of kiln, SC, C)             |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                             | 320                       | 2920                      | 11.1                 | 14.7         | 0.76                   | 1.57                                                    |                          |
| 2.....                                                             | 375                       | 3730                      | 10.4                 | 14.4         | .72                    | 0.87                                                    |                          |
| 3.....                                                             | 305                       | 3170                      | 10.8                 | 14.4         | .75                    | 1.44                                                    |                          |
| 4.....                                                             | 335                       | 3020                      | 10.7                 | 14.7         | .73                    | 1.25                                                    |                          |
| 5.....                                                             | 330                       | 2960                      | 10.6                 | 14.3         | .74                    | 1.76                                                    |                          |
| Avg.....                                                           | 335                       | 3160                      | 10.7                 | 14.5         | 0.74                   | 1.38                                                    |                          |
| Plant 156, grade 1 ("Kiln run common," 100 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
| 1.....                                                             | 720                       | 2900                      | 19.5                 | 24.6         | 0.79                   | 0.12                                                    |                          |
| 2.....                                                             | 750                       | 2200                      | 19.3                 | 23.3         | .83                    | F 9c                                                    |                          |
| 3.....                                                             | 790                       | 2930                      | 19.1                 | 24.2         | .79                    | 5.25                                                    |                          |
| 4.....                                                             | 560                       | 2150                      | 20.7                 | 26.1         | .79                    | F 9c                                                    |                          |
| 5.....                                                             | 410                       | 1990                      | 21.8                 | 26.4         | .83                    | 1.04                                                    |                          |
| 6.....                                                             | 600                       | 1960                      | 21.0                 | 26.1         | .80                    | F 37c                                                   |                          |
| 7.....                                                             | 475                       | 1920                      | 21.0                 | 26.0         | .81                    | 0.55                                                    |                          |
| 8.....                                                             | 440                       | 1800                      | 21.1                 | 26.8         | .79                    | .93                                                     |                          |
| 9.....                                                             | 450                       | 1430                      | 22.7                 | 27.5         | .82                    | .97                                                     |                          |
| 10.....                                                            | 385                       | 1620                      | 21.9                 | 26.9         | .81                    | 1.63                                                    |                          |
| 11.....                                                            | 300                       | 1180                      | 23.2                 | 28.0         | .83                    | F 24c                                                   |                          |
| 12.....                                                            | 435                       | 1620                      | 22.1                 | 27.6         | .80                    | 0.79                                                    |                          |
| 13.....                                                            | 320                       | 1470                      | 22.8                 | 27.4         | .83                    | 1.37                                                    |                          |
| 14.....                                                            | 305                       | 1300                      | 23.4                 | 28.0         | .84                    | 1.87                                                    |                          |
| 15.....                                                            | 270                       | 1260                      | 23.8                 | 28.0         | .85                    | 1.31                                                    |                          |
| Avg.....                                                           | 485                       | 1850                      | 21.6                 | 26.5         | 0.81                   | -----                                                   |                          |

TABLE 20.—*Properties of bricks produced in Texas*

[All samples received were formed from shale or surface clay by the dry-press or the stiff-mud (side-cut or end-cut) process]

| Specimen number                                  | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                  |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 1, grade 1 ("100 percent kiln run," DP, S) |                           |                           |                      |              |                        |                                                         |                          |
|                                                  | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                | <i>%</i>                 |
| 1                                                | 830                       | 6580                      | 10.5                 | 12.5         | 0.84                   | 0.70                                                    | 0.90 (90c)               |
| 2                                                | 655                       |                           | 11.7                 | 13.1         | .89                    | 5.50                                                    | F 54c                    |
| 3                                                | 615                       |                           | 12.1                 | 14.2         | .85                    | F 42c                                                   |                          |
| 4                                                | 655                       | 4370                      | 12.0                 | 13.7         | .87                    | 1.10                                                    | F 69c                    |
| 5                                                | 760                       | 5230                      | 11.5                 | 12.6         | .91                    | 1.60                                                    | F 54c                    |
| 6                                                | 725                       | 4320                      | 11.4                 | 13.1         | .87                    | F 42c                                                   |                          |
| 7                                                | 880                       | 5460                      | 10.8                 | 12.4         | .81                    | 0.40                                                    | F 78c                    |
| 8                                                | 680                       | 4130                      | 12.0                 | 13.5         | .89                    | F 42c                                                   |                          |
| 9                                                | 790                       | 4550                      | 11.4                 | 13.1         | .87                    | F 45c                                                   |                          |
| 10                                               | 810                       | 5840                      | 11.1                 | 13.1         | .85                    | F 45c                                                   |                          |
| 11                                               | 725                       | 5120                      | 11.3                 | 12.9         | .88                    | 0.49                                                    | F 84c                    |
| Avg                                              | 740                       | 5100                      | 11.4                 | 13.1         | 0.87                   |                                                         |                          |

TABLE 20.—*Properties of bricks produced in Texas—*  
Continued

| Specimen number                                | Modulus of rupture               | Compressive strength              | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------|----------------------------------|-----------------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                |                                  |                                   | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 1, grade 1A ("Second sample of grade 1") |                                  |                                   |                      |              |                        |                                                         |                          |
| 1-----                                         | <i>lb/in.<sup>2</sup></i><br>875 | <i>lb/in.<sup>2</sup></i><br>7750 | %<br>15.5            | %<br>17.7    | 0.88                   | %<br>F 36c                                              |                          |
| 2-----                                         | 830                              | 7600                              | 14.8                 | 16.4         | .90                    | F 36c                                                   |                          |
| 3-----                                         | 905                              | 7940                              | 14.7                 | 16.2         | .91                    | F 15c                                                   |                          |
| 4-----                                         | 850                              | 8100                              | 15.0                 | 16.7         | .90                    | F 15c                                                   |                          |
| 5-----                                         | 800                              | 8290                              | 15.7                 | 17.3         | .91                    | F 19c                                                   |                          |
| 6-----                                         | 755                              | 8100                              | 15.4                 | 16.9         | .91                    | F 19c                                                   |                          |
| 7-----                                         | 760                              | 7530                              | 14.8                 | 16.4         | .90                    | F 20c                                                   |                          |
| 8-----                                         | 760                              | 8440                              | 16.1                 | 18.1         | .89                    | F 20c                                                   |                          |
| 9-----                                         | 755                              | 8120                              | 15.9                 | 17.5         | .91                    | F 20c                                                   |                          |
| 10-----                                        | 820                              | 8150                              | 15.0                 | 16.1         | .93                    | F 13c                                                   |                          |
| 11-----                                        | 905                              | 6400                              | 14.9                 | 16.7         | .89                    | F 20c                                                   |                          |
| 12-----                                        | 860                              | 7110                              | 14.7                 | 17.0         | .87                    | F 19c                                                   |                          |
| 13-----                                        | 850                              | 7040                              | 14.6                 | 15.9         | .92                    | F 20c                                                   |                          |
| 14-----                                        | 865                              | 7270                              | 15.1                 | 16.7         | .90                    | F 20c                                                   |                          |
| 15-----                                        | 675                              | 6990                              | 15.2                 | 16.8         | .90                    | F 19c                                                   |                          |
| Avg----                                        | 820                              | 7660                              | 15.2                 | 16.8         | 0.90                   | F 21c                                                   |                          |

Plant 20, grade 1 ("Reds," 100 percent of kiln, DP, S)

|          |      |       |      |      |      |      |            |
|----------|------|-------|------|------|------|------|------------|
| 1.....   | 525  | 8440  | 11.2 | 12.4 | 0.90 | 0.26 | %<br>F 63c |
| 2.....   | 935  | 10000 | 11.0 | 12.1 | .91  | .10  | 0.21 (S1c) |
| 3.....   | 960  | 11250 | 11.3 | 12.8 | .88  | .49  | F 60c      |
| 4.....   | 1230 | 10350 | 9.9  | 11.4 | .87  | .10  | F 72c      |
| 5.....   | 720  | 7700  | 11.8 | 12.7 | .93  | .26  | F 66c      |
| Avg..... | 875  | 9550  | 11.0 | 12.3 | 0.90 | 0.24 |            |

Plant 20, grade 1A ("Second sample of grade 1 (1936)")

|          |      |      | (24-hr) |      |      |      |  |
|----------|------|------|---------|------|------|------|--|
| 1.....   | 940  | 6740 | 13.3    | 15.2 | 0.88 | 1.01 |  |
| 2.....   | 810  | 6020 | 12.9    | 14.8 | .87  | 0.41 |  |
| 3.....   | 1050 | 7300 | 12.4    | 13.9 | .89  | .52  |  |
| 4.....   | 880  | 9500 | 12.6    | 14.1 | .89  | .29  |  |
| 5.....   | 850  | 6290 | 13.3    | 15.3 | .87  | .41  |  |
| 6.....   | 960  | 6640 | 13.5    | 15.3 | .88  | .10  |  |
| 7.....   | 1085 | 7540 | 12.2    | 13.8 | .88  | .29  |  |
| 8.....   | 775  | 7070 | 11.9    | 13.4 | .88  | .59  |  |
| 9.....   | 1120 | 7730 | 11.7    | 13.2 | .88  | .27  |  |
| 10.....  | 1055 | 8730 | 12.4    | 14.0 | .89  | .73  |  |
| 11.....  | 1085 | 9100 | 12.3    | 14.2 | .88  | .60  |  |
| 12.....  | 985  | 8520 | 12.2    | 13.7 | .89  | .69  |  |
| 13.....  | 1005 | 8230 | 12.3    | 13.8 | .89  | .29  |  |
| 14.....  | 1130 | 7690 | 12.7    | 14.3 | .89  | .49  |  |
| 15.....  | 840  | 6750 | 13.1    | 14.9 | .88  | .41  |  |
| 16.....  | 910  | 7400 | 13.4    | 15.3 | .88  | .50  |  |
| 17.....  | 900  | 6190 | 13.8    | 16.0 | .86  | .48  |  |
| 18.....  | 1100 | 7290 | 12.2    | 13.8 | .88  | .42  |  |
| 19.....  | 855  | 6900 | 13.5    | 15.6 | .87  | .40  |  |
| 20.....  | 995  | 7600 | 13.3    | 15.0 | .88  | .38  |  |
| Avg..... | 965  | 7360 | 12.7    | 14.5 | 0.88 | 0.46 |  |

Plant 20, grade 2 ("Standard," 100 percent of kiln, DP, S)

|          |     |      |      |      |      |           |  |
|----------|-----|------|------|------|------|-----------|--|
| 1.....   | 845 | 5570 | 17.5 | 18.9 | 0.93 | F 16c (B) |  |
| 2.....   | 785 | 7350 | 18.4 | 20.4 | .90  | F 23c (B) |  |
| 3.....   | 930 | 6510 | 18.4 | 20.0 | .92  | F 19c (B) |  |
| 4.....   | 745 | 5670 | 19.7 | 21.7 | .91  | F 23c (B) |  |
| 5.....   | 745 | 5490 | 17.6 | 19.0 | .93  | F 19c (B) |  |
| 6.....   | 525 | 4950 | 18.7 | 20.2 | .93  | F 25c (B) |  |
| Avg..... | 760 | 5920 | 18.4 | 20.0 | 0.92 | F 21c (B) |  |

TABLE 20.—*Properties of bricks produced in Texas—*  
Continued

| Specimen number                                   | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                   |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 28, grade 1 ("100 percent kiln run," DP, S) |                           |                           |                      |              |                        |                                                         |                          |
|                                                   | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                            | 1100                      | 8970                      | 16.5                 | 18.2         | 0.91                   | No test                                                 |                          |
| 2-----                                            | 975                       | 6760                      | 19.7                 | 20.8         | .95                    | do                                                      |                          |
| 3-----                                            | 795                       | 6170                      | 20.6                 | 21.8         | .95                    | F 19c (B)                                               |                          |
| 4-----                                            | 595                       | 4960                      | 20.1                 | 21.9         | .95                    | F 16c (B)                                               |                          |
| 5-----                                            | 885                       | 7000                      | 18.7                 | 20.2         | .93                    | F 19c (B)                                               |                          |
| 6-----                                            | 910                       | 8370                      | 18.6                 | 20.5         | .91                    | F 30c (B)                                               |                          |
| 7-----                                            | 1015                      | 7540                      | 18.3                 | 20.0         | .91                    | F 22c (B)                                               |                          |
| 8-----                                            | 885                       | 9050                      | 18.4                 | 20.1         | .92                    | F 16c (B)                                               |                          |
| 9-----                                            | 1220                      | 9500                      | 16.9                 | 18.6         | .91                    | F 26c (B)                                               |                          |
| 10-----                                           | 795                       | 8600                      | 17.6                 | 19.3         | .91                    | F 26c (B)                                               |                          |
| 11-----                                           | 840                       | 8290                      | 19.4                 | 20.6         | .94                    | F 22c (B)                                               |                          |
| 12-----                                           | 930                       | 6790                      | 18.8                 | 20.4         | .92                    | F 17c (B)                                               |                          |
| 13-----                                           | 765                       | 5920                      | 20.6                 | 21.7         | .95                    | F 17c (B)                                               |                          |
| 14-----                                           | 595                       | 5690                      | 20.6                 | 21.6         | .95                    | F 17c (B)                                               |                          |
| 15-----                                           | 760                       | 6370                      | 21.2                 | 22.4         | .95                    | F 26c (B)                                               |                          |
| Avg-----                                          | 870                       | 7330                      | 19.1                 | 20.5         | 0.93                   | F 21c (B)                                               |                          |

Plant 42, grade 1 ("100 percent kiln run common," DP, S)

|          |      |      |      |      |      |           |  |
|----------|------|------|------|------|------|-----------|--|
| 1.....   | 980  | 6790 | 19.1 | 20.8 | 0.92 | F 16c (B) |  |
| 2.....   | 1045 | 6370 | 18.8 | 19.9 | .95  | F 13c (B) |  |
| 3.....   | 740  | 5470 | 19.9 | 22.0 | .91  | F 12c (B) |  |
| 4.....   | 810  | 5540 | 18.2 | 19.8 | .92  | F 15c (B) |  |
| 5.....   | 850  | 6820 | 18.2 | 19.8 | .92  | F 13c (B) |  |
| 6.....   | 865  | 5830 | 18.5 | 19.6 | .94  | F 15c (B) |  |
| 7.....   | 650  | 6240 | 19.4 | 20.6 | .94  | F 13c (B) |  |
| 8.....   | 850  | 5590 | 18.6 | 19.7 | .91  | F 13c (B) |  |
| 9.....   | 1070 | 6160 | 18.5 | 19.6 | .94  | F 14c (B) |  |
| 10.....  | 715  | 5250 | 19.9 | 21.1 | .94  | F 17c (B) |  |
| 11.....  | 810  | 5870 | 18.4 | 20.0 | .92  | F 16c (B) |  |
| 12.....  | 770  | 4670 | 20.0 | 21.8 | .92  | F 14c (B) |  |
| 13.....  | 955  | 5440 | 19.1 | 20.1 | .95  | F 15c (B) |  |
| 14.....  | 960  | 5450 | 19.1 | 20.1 | .95  | F 14c (B) |  |
| 15.....  | 900  | 5470 | 19.8 | 21.4 | .93  | F 15c (B) |  |
| 16.....  | 750  | 5940 | 18.7 | 20.7 | .90  | F 14c (B) |  |
| Avg..... | 860  | 5800 | 19.0 | 20.4 | 0.93 | F 14c (B) |  |

Plant 47, grade 1 ("Flushed," 20 percent of kiln, SC, C)

|         |      |      |     |     |      |            |  |
|---------|------|------|-----|-----|------|------------|--|
| Avg (6) | 1085 | 8150 | 5.4 | 9.6 | 0.56 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|

Plant 47, grade 2 ("Dark," 40 percent of kiln, SC, C)

|         |      |      |     |     |      |            |  |
|---------|------|------|-----|-----|------|------------|--|
| Avg (6) | 1110 | 8240 | 5.5 | 9.4 | 0.58 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|

Plant 47, grade 3 ("Medium," 30 percent of kiln, SC, C)

|         |     |      |     |      |      |            |  |
|---------|-----|------|-----|------|------|------------|--|
| Avg (6) | 945 | 7890 | 7.9 | 11.2 | 0.70 | Not tested |  |
|---------|-----|------|-----|------|------|------------|--|

Plant 47, grade 4 ("Light," 10 percent of kiln, SC, C)

|          |     |      |      |      |      |      |  |
|----------|-----|------|------|------|------|------|--|
| 1.....   | 875 | 7440 | 9.3  | 12.7 | 0.73 | 0.19 |  |
| 2.....   | 830 | 7570 | 10.1 | 12.8 | .79  | .11  |  |
| 3.....   | 750 | 5440 | 11.4 | 14.2 | .80  | .19  |  |
| 4.....   | 725 | 6240 | 10.4 | 13.5 | .77  | .10  |  |
| 5.....   | 700 | 5040 | 12.8 | 15.7 | .81  | .10  |  |
| 6.....   | 595 | 5220 | 11.0 | 14.1 | .78  | .00  |  |
| Avg..... | 745 | 6160 | 10.8 | 13.8 | 0.78 | 0.12 |  |

TABLE 20.—*Properties of bricks produced in Texas—*  
Continued

| Specimen number                                          | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                          |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 82, grade 1 ("100 percent kiln run common," DP, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                   | 645                       | 5150                      | 10.1                 | 12.2         | 0.83                   | 0.42                                                    |                          |
| 2-----                                                   | 915                       | 5790                      | 9.5                  | 11.7         | .81                    | .22                                                     |                          |
| 3-----                                                   | 860                       | 5120                      | 9.3                  | 10.9         | .85                    | .32                                                     |                          |
| 4-----                                                   | 880                       | 6070                      | 8.2                  | 9.9          | .83                    | .34                                                     |                          |
| 5-----                                                   | 1055                      | 7800                      | 7.5                  | 9.2          | .82                    | .23                                                     |                          |
| 6-----                                                   | 540                       | 6410                      | 6.6                  | 8.1          | .81                    | .09                                                     |                          |
| 7-----                                                   | 830                       | 5950                      | 7.0                  | 9.1          | .77                    | .10                                                     |                          |
| 8-----                                                   | 810                       | 6880                      | 7.4                  | 8.9          | .83                    | .10                                                     |                          |
| 9-----                                                   | 800                       | 7160                      | 7.1                  | 9.1          | .78                    | .20                                                     |                          |
| 10-----                                                  | 1085                      | 7190                      | 7.2                  | 8.7          | .83                    | .10                                                     |                          |
| 11-----                                                  | 910                       | 5550                      | 8.0                  | 9.6          | .83                    | .20                                                     |                          |
| 12-----                                                  | 735                       | 6350                      | 7.8                  | 9.3          | .84                    | .19                                                     |                          |
| 13-----                                                  | 900                       | 6800                      | 9.4                  | 11.2         | .84                    | .18                                                     |                          |
| 14-----                                                  | 565                       | 5230                      | 13.3                 | 15.0         | .89                    | .68                                                     |                          |
| 15-----                                                  | 370                       | 6580                      | 12.5                 | 13.8         | .91                    | F 21c                                                   |                          |
| Avg-----                                                 | 795                       | 6270                      | 8.7                  | 10.4         | 0.83                   | -----                                                   |                          |

Plant 82, grade 2 ("No. 1 Common," 90 percent of kiln, DP, C)

|          |      |      |     |      |      |      |
|----------|------|------|-----|------|------|------|
| 1-----   | 1350 | 7170 | 6.3 | 8.2  | 0.77 | 0.00 |
| 2-----   | 1095 | 6680 | 7.3 | 8.8  | .83  | .19  |
| 3-----   | 535  | 9280 | 5.9 | 7.3  | .81  | .00  |
| 4-----   | 760  | 6850 | 7.5 | 9.1  | .82  | .10  |
| 5-----   | 950  | 7440 | 9.9 | 11.2 | .88  | .17  |
| Avg----- | 940  | 7480 | 7.4 | 8.9  | 0.82 | 0.09 |

Plant 98, grade 1 ("Arch," 30 percent of kiln, DP, C)

|          |      |      |      |      |      |       |
|----------|------|------|------|------|------|-------|
| 1-----   | 610  | 7320 | 12.4 | 13.4 | 0.93 | F 12c |
| 2-----   | 965  | 7420 | 13.6 | 15.0 | .91  | F 18c |
| 3-----   | 970  | 8340 | 13.8 | 14.8 | .93  | F 15c |
| 4-----   | 1040 | 9110 | 13.0 | 14.4 | .90  | F 18c |
| 5-----   | 950  | 7750 | 14.5 | 16.0 | .91  | F 15c |
| Avg----- | 910  | 7990 | 13.5 | 14.7 | 0.92 | F 16c |

Plant 98, grade 2 ("Middle bench," 30 percent of kiln, DP, C)

|          |      |      |      |      |      |       |
|----------|------|------|------|------|------|-------|
| 1-----   | 875  | 8840 | 12.1 | 13.4 | 0.90 | F 36c |
| 2-----   | 900  | 9090 | 12.1 | 13.6 | .89  | F 40c |
| 3-----   | 1000 | 8530 | 10.7 | 11.6 | .92  | F 41c |
| 4-----   | 900  | 8110 | 10.8 | 12.1 | .89  | F 27c |
| 5-----   | 1115 | 9800 | 11.7 | 13.1 | .89  | F 32c |
| Avg----- | 960  | 8870 | 11.5 | 12.8 | 0.90 | F 35c |

Plant 98, grade 3 ("Top bench," 40 percent of kiln, DP, C)

|              |     |      |      |      |      |            |
|--------------|-----|------|------|------|------|------------|
| Avg (5)----- | 715 | 8130 | 12.8 | 13.9 | 0.92 | Not tested |
|--------------|-----|------|------|------|------|------------|

Plant 138, grade 1 ("Hard reds," 70 percent of kiln, EC, C)

|              |      |       |     |     |      |            |
|--------------|------|-------|-----|-----|------|------------|
| Avg (5)----- | 1050 | 12380 | 6.9 | 9.3 | 0.73 | Not tested |
|--------------|------|-------|-----|-----|------|------------|

Plant 138, grade 2 ("Medium reds," 30 percent of kiln, EC, C)

|          |      |      |      |      |      |           |
|----------|------|------|------|------|------|-----------|
| 1-----   | 1005 | 8050 | 12.6 | 15.0 | 0.84 | 0.19 (B)  |
| 2-----   | 960  | 9050 | 13.6 | 16.2 | .84  | F 50c (B) |
| 3-----   | 980  | 7800 | 13.3 | 15.8 | .84  | F 45c (B) |
| 4-----   | 1065 | 7710 | 13.2 | 15.9 | .83  | F 45c (B) |
| 5-----   | 980  | 7280 | 13.7 | 16.1 | .85  | F 45c (B) |
| Avg----- | 995  | 7950 | 13.3 | 15.8 | 0.84 |           |

TABLE 20.—*Properties of bricks produced in Texas—*  
Continued

| Specimen number                                                         | Modulus of rupture                | Compressive strength               | Water absorption     |                 | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------------------|-----------------------------------|------------------------------------|----------------------|-----------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                         |                                   |                                    | 48-hr cold immersion | 5-hr boiling    |                        |                                                         |                          |
| Plant 194, grade 1 ("Average common," 95 to 98 percent of kiln, SC, S)  |                                   |                                    |                      |                 |                        |                                                         |                          |
| Avg (5)                                                                 | <i>lb/in.<sup>2</sup></i><br>1650 | <i>lb/in.<sup>2</sup></i><br>14660 | <i>%</i><br>5.4      | <i>%</i><br>8.2 | 0.65                   | <i>%</i><br>Not tested                                  |                          |
| Plant 194, grade 2 ("Hollow common," percentage of kiln unknown, EC, S) |                                   |                                    |                      |                 |                        |                                                         |                          |
| Avg (5)                                                                 | 1505                              | 2710                               | 5.3                  | 7.6             | 0.69                   | Not tested                                              |                          |
| Plant 194, grade 3 ("Average common," 95 to 98 percent of kiln, DP, S)  |                                   |                                    |                      |                 |                        |                                                         |                          |
| 1-----                                                                  | 530                               | 6140                               | 8.4                  | 10.6            | 0.79                   | 0.27 (B)                                                |                          |
| 2-----                                                                  | 995                               | 4880                               | 11.0                 | 13.6            | .81                    | .42 (B)                                                 |                          |
| 3-----                                                                  | 1270                              | 9040                               | 6.9                  | 8.9             | .78                    | .32 (B)                                                 |                          |
| 4-----                                                                  | 610                               | 6280                               | 9.1                  | 11.3            | .81                    | .32 (B)                                                 |                          |
| 5-----                                                                  | 940                               | 3750                               | 9.4                  | 11.5            | .82                    | .41 (B)                                                 |                          |
| Avg-----                                                                | 870                               | 6020                               | 9.0                  | 11.2            | 0.80                   | 0.35 (B)                                                |                          |

Plant 195, grade 1 ("100 percent kiln run," DP, C)

|     |      |      |      |      |      |          |
|-----|------|------|------|------|------|----------|
| 1   | 675  | 2650 | 27.4 | 34.6 | 0.79 | 2.54 (B) |
| 2   | 660  | 2300 | 26.7 | 34.4 | .78  | 4.52 (B) |
| 3   | 645  | 2570 | 25.0 | 32.5 | .77  | 0.33 (B) |
| 4   | 605  | 2460 | 27.2 | 34.8 | .78  | 4.29 (B) |
| 5   | 460  | 2220 | 28.5 | 35.4 | .80  | F 4c (B) |
| 6   | 635  | 3180 | 26.5 | 34.0 | .78  | 0.38 (B) |
| 7   | 570  | 3430 | 24.4 | 31.7 | .77  | F 5c (B) |
| 8   | 1040 | 3700 | 20.6 | 33.0 | .62  | 0.11 (B) |
| 9   | 1265 | 4920 | 20.3 | 30.1 | .67  | .00 (B)  |
| 10  | 915  | 3570 | 21.6 | 32.9 | .66  | .32 (B)  |
| 11  | 900  | 3290 | 23.5 | 35.2 | .67  | .37 (B)  |
| 12  | 980  | 3190 | 23.9 | 35.6 | .67  | .34 (B)  |
| 13  | 740  | 3010 | 25.5 | 34.8 | .73  | 0.58 (B) |
| 14  |      | 1575 | 29.4 | 35.0 | .84  | No test  |
| Avg | 775  | 3000 | 25.0 | 33.9 | 0.74 |          |

Plant 195, grade 1A ("Second sample (1936) of grade 1")

|          |     |      |              |      |      |       |
|----------|-----|------|--------------|------|------|-------|
| 1-----   | 720 | 2950 | (24-hr) 25.0 | 33.8 | 0.74 | +0.68 |
| 2-----   | 735 | 3090 | 23.5         | 34.5 | .68  | + .50 |
| 3-----   | 595 | 3050 | 24.2         | 32.2 | .76  | +1.24 |
| 4-----   | 940 | 2910 | 22.0         | 32.4 | .68  | +0.75 |
| 5-----   | 950 | 2800 | 21.6         | 31.8 | .68  | +1.30 |
| 6-----   | 540 | 3010 | 24.4         | 32.4 | .76  | +0.71 |
| 7-----   | 680 | 3070 | 24.2         | 32.5 | .75  | +1.03 |
| 8-----   | 580 | 2870 | 25.7         | 32.7 | .78  | +0.64 |
| 9-----   | 685 | 2470 | 24.7         | 34.1 | .73  | + .41 |
| 10-----  | 675 | 3470 | 23.4         | 33.5 | .70  | + .56 |
| Avg----- | 710 | 2970 | 23.9         | 33.0 | 0.73 | +0.78 |

Plant 195, grade 2 ("Textured," (1936) percentage of kiln unknown, DP, C)

|          |     |      |              |      |      |       |
|----------|-----|------|--------------|------|------|-------|
| 1-----   | 925 | 4950 | (24-hr) 25.8 | 30.9 | 0.84 | 0.28  |
| 2-----   | 460 | 4420 | 28.7         | 33.8 | .85  | F 24c |
| 3-----   | 575 | 5150 | 26.2         | 32.6 | .80  | F 36c |
| 4-----   | 425 | 3320 | 28.6         | 32.6 | .88  | F 16c |
| 5-----   | 670 | 4440 | 25.7         | 32.5 | .80  | +0.73 |
| 6-----   | 500 | 4390 | 28.5         | 31.6 | .90  | .13   |
| 7-----   | 490 | 3320 | 26.9         | 33.9 | .80  | F 8c  |
| 8-----   | 565 | 451c | 28.7         | 31.9 | .90  | F 21c |
| 9-----   | 755 | 3940 | 26.4         | 32.1 | .82  | F 17c |
| 10-----  | 445 | 4170 | 28.0         | 32.8 | .86  | F 18c |
| Avg----- | 580 | 4260 | 27.4         | 32.5 | 0.85 |       |

<sup>a</sup> The gain in weight resulting from freezing and thawing of grade 1A is accounted for by the hydration and carbonation of the very considerable lime content of these specimens. Grades 1A and 2 were tested within 60 days of their manufacture. Grade 1 had "aged" for 7 years before starting freezing and thawing tests and gave an average gain in initial dry weight of 8.0 percent. Grade 2 sufficiently disintegrated in 51 cycles so that the resulting loss in weight exceeded the gain results from hydration and carbonation, except for No. 5.

TABLE 20.—*Properties of bricks produced in Texas—Continued*

| Specimen number                                                        | Modulus of rupture          | Compressive strength        | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|------------------------------------------------------------------------|-----------------------------|-----------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                        |                             |                             | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 203, grade 1 ("Hard," 30 percent of kiln, SC, C)                 |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                                | lb/in. <sup>2</sup><br>1205 | lb/in. <sup>2</sup><br>7650 | %<br>5.4             | %<br>8.6     | 0.62                   | %<br>Not tested                                         |                          |
| Plant 203, grade 2 ("Medium," 60 percent of kiln, SC, C)               |                             |                             |                      |              |                        |                                                         |                          |
| Avg (5)                                                                | 1085                        | 7110                        | 6.5                  | 9.4          | 0.69                   | Not tested                                              |                          |
| Plant 203, grade 3 ("Salmon," 10 percent of kiln, SC, C)               |                             |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 770                         | 5830                        | 8.6                  | 12.2         | 0.70                   | 0.29 (B)                                                |                          |
| 2-----                                                                 | 970                         | 7130                        | 8.6                  | 11.6         | .74                    | .17 (B)                                                 |                          |
| 3-----                                                                 | 1165                        | 7200                        | 9.4                  | 12.4         | .75                    | 1.39 (B)                                                |                          |
| 4-----                                                                 | 180                         | 6500                        | 8.6                  | 11.7         | .73                    | 0.20 (B)                                                |                          |
| 5-----                                                                 | 575                         | 6460                        | 8.8                  | 12.2         | .72                    | .20 (B)                                                 |                          |
| Avg-----                                                               | 730                         | 6620                        | 8.8                  | 12.0         | 0.73                   | 0.45 (B)                                                |                          |
| Plant 209, grade 1 ("Solid common," 80 percent of kiln, SC, S)         |                             |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 1725                        | 8180                        | 7.7                  | 9.1          | 0.85                   | 0.36 (B)                                                |                          |
| 2-----                                                                 | 1910                        | 7660                        | 8.0                  | 9.5          | .84                    | .23 (B)                                                 |                          |
| 3-----                                                                 | 1050                        | 6810                        | 7.0                  | 9.0          | .78                    | 1.55 (B)                                                |                          |
| 4-----                                                                 | 1840                        | 8620                        | 7.7                  | 9.0          | .86                    | 0.51 (B)                                                |                          |
| 5-----                                                                 | 1715                        | 8630                        | 6.7                  | 7.9          | .85                    | .25 (B)                                                 |                          |
| 6-----                                                                 | 1795                        | 7650                        | 7.4                  | 8.9          | .83                    | .22 (B)                                                 |                          |
| Avg-----                                                               | 1670                        | 7920                        | 7.4                  | 8.9          | 0.84                   | 0.52 (B)                                                |                          |
| Plant 209, grade 2 ("Textured," 20 percent of kiln, SC, S)             |                             |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 1155                        | 10350                       | 10.4                 | 12.0         | 0.87                   | F 45e (B)                                               |                          |
| 2-----                                                                 | 1010                        | 7730                        | 9.8                  | 11.1         | .87                    | 7.78 (B)                                                |                          |
| 3-----                                                                 | 940                         | 9590                        | 9.7                  | 11.5         | .84                    | F 39c (B)                                               |                          |
| 4-----                                                                 | 1030                        | 12350                       | 7.8                  | 10.0         | .78                    | 4.11 (B)                                                |                          |
| 5-----                                                                 | 1085                        | 9310                        | 10.3                 | 12.0         | .86                    | F 43c (B)                                               |                          |
| 6-----                                                                 | 1130                        | 8500                        | 9.9                  | 11.6         | .85                    | 2.95 (B)                                                |                          |
| Avg-----                                                               | 1060                        | 9640                        | 9.6                  | 11.4         | 0.85                   | -----                                                   |                          |
| Plant, 209, grade 3 ("Light burned common," 20 percent of kiln, SC, S) |                             |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 1200                        | 6230                        | 11.1                 | 12.8         | 0.87                   | F 43e (B)                                               |                          |
| 2-----                                                                 | 410                         | 5340                        | 12.8                 | 14.2         | .90                    | F 12c (B)                                               |                          |
| 3-----                                                                 | 1145                        | 7310                        | 11.4                 | 13.0         | .88                    | F 38e (B)                                               |                          |
| 4-----                                                                 | 915                         | 6090                        | 12.7                 | 14.8         | .86                    | F 7c (B)                                                |                          |
| 5-----                                                                 | 1025                        | 6450                        | 11.8                 | 13.6         | .87                    | F 14e (B)                                               |                          |
| 6-----                                                                 | 315                         | 8090                        | 9.5                  | 11.3         | .84                    | F 41e (B)                                               |                          |
| Avg-----                                                               | 835                         | 6580                        | 11.6                 | 13.3         | 0.87                   | F 26e (B)                                               |                          |
| Plant 215, grade 1 ("100 percent kiln run," SC, S)                     |                             |                             |                      |              |                        |                                                         |                          |
| Avg (15)                                                               | 1390                        | 11810                       | 5.9                  | 7.4          | 0.75                   | Not tested                                              |                          |
| Plant 216, grade 1 ("100 percent kiln run," SC, S)                     |                             |                             |                      |              |                        |                                                         |                          |
| 1-----                                                                 | 2070                        | 14100                       | 3.9                  | 5.0          | 0.78                   | No test                                                 |                          |
| 2-----                                                                 | 2030                        | 12050                       | 6.0                  | 7.8          | .77                    | do                                                      |                          |
| 3-----                                                                 | 1855                        | 14550                       | 6.2                  | 8.1          | .77                    | do                                                      |                          |
| 4-----                                                                 | 1560                        | 13550                       | 8.1                  | 10.2         | .79                    | do                                                      |                          |
| 5-----                                                                 | 2205                        | 12750                       | 8.0                  | 10.0         | .80                    | do                                                      |                          |
| 6-----                                                                 | 1075                        | 9920                        | 9.6                  | 11.1         | .86                    | 0.29                                                    |                          |
| 7-----                                                                 | 1550                        | 10450                       | 9.9                  | 11.3         | .88                    | .09                                                     |                          |
| 8-----                                                                 | 1175                        | 10550                       | 9.3                  | 11.3         | .82                    | .16                                                     |                          |
| 9-----                                                                 | 1275                        | 10350                       | 9.9                  | 11.6         | .85                    | .08                                                     |                          |
| 10-----                                                                | 1570                        | 11550                       | 8.8                  | 10.6         | .83                    | .28                                                     |                          |
| 11-----                                                                | 965                         | 14300                       | 8.7                  | 10.5         | .83                    | .09 (B)                                                 |                          |
| 12-----                                                                | 1310                        | 10750                       | 9.5                  | 11.0         | .86                    | .15 (B)                                                 |                          |
| 13-----                                                                | 1665                        | 13050                       | 8.9                  | 10.6         | .84                    | .36 (B)                                                 |                          |
| 14-----                                                                | 1550                        | 9150                        | 10.3                 | 11.6         | .89                    | .26 (B)                                                 |                          |
| 15-----                                                                | 405                         | 10300                       | 9.6                  | 11.8         | .81                    | .74 (B)                                                 |                          |
| Avg-----                                                               | 1485                        | 11820                       | 8.4                  | 10.2         | 0.83                   | 0.25 (A & B)                                            |                          |

TABLE 20.—*Properties of bricks produced in Texas—Continued*

| Specimen number                                           | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                           |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 217, grade 1 ("100 percent kiln run," DP, S)        |                     |                      |                      |              |                        |                                                         |                          |
|                                                           | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1-----                                                    | 870                 | 5400                 | 19.2                 | 20.7         | 0.93                   | F 16e                                                   |                          |
| 2-----                                                    | 805                 | 5730                 | 19.1                 | 20.5         | .93                    | F 18c                                                   |                          |
| 3-----                                                    | 1090                | 5190                 | 18.3                 | 19.7         | .93                    | F 18e                                                   |                          |
| 4-----                                                    | 870                 | 4980                 | 18.8                 | 20.6         | .91                    | F 24e                                                   |                          |
| 5-----                                                    | 830                 | 6750                 | 18.7                 | 20.1         | .93                    | F 25e                                                   |                          |
| 6-----                                                    | 1180                | 7920                 | 17.5                 | 18.9         | .93                    | F 24c                                                   |                          |
| 7-----                                                    | 1140                | 6540                 | 17.8                 | 19.1         | .93                    | F 18c                                                   |                          |
| 8-----                                                    | 875                 | 4870                 | 19.7                 | 21.1         | .93                    | F 18e                                                   |                          |
| 9-----                                                    | 900                 | 7050                 | 19.3                 | 20.8         | .93                    | F 18e                                                   |                          |
| Avg-----                                                  | 950                 | 6050                 | 18.7                 | 20.2         | 0.93                   | F 20e                                                   |                          |
| Plant 217, grade 2 ("100 percent kiln run," SC, S)        |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                    | 5670                | 13.0                 | 15.2                 | 0.86         | 0.65                   |                                                         |                          |
| 2-----                                                    | 860                 | 5080                 | 14.7                 | 17.5         | .84                    | .28                                                     |                          |
| 3-----                                                    | 805                 | 5570                 | 13.9                 | 17.2         | .81                    | .19                                                     |                          |
| 4-----                                                    | 980                 | 5310                 | 14.1                 | 17.2         | .82                    | .20                                                     |                          |
| 5-----                                                    | 420                 | 6150                 | 14.4                 | 16.8         | .86                    | .29                                                     |                          |
| 6-----                                                    | 950                 | 5540                 | 14.4                 | 16.7         | .86                    | .18                                                     |                          |
| 7-----                                                    | 800                 | 5500                 | 14.4                 | 17.4         | .83                    | .40                                                     |                          |
| 8-----                                                    | 745                 | 5110                 | 14.6                 | 17.6         | .83                    | .70                                                     |                          |
| 9-----                                                    | 1095                | 6110                 | 13.8                 | 16.2         | .85                    | .13                                                     |                          |
| 10-----                                                   | 335                 | 5230                 | 14.1                 | 17.2         | .82                    | .81                                                     |                          |
| 11-----                                                   | 200                 | 4320                 | 14.9                 | 17.0         | .88                    | .57                                                     |                          |
| 12-----                                                   | 750                 | 5170                 | 14.2                 | 16.9         | .84                    | .27                                                     |                          |
| 13-----                                                   | 635                 | 4820                 | 15.3                 | 17.3         | .88                    | .41                                                     |                          |
| 14-----                                                   | 970                 | 5230                 | 14.4                 | 16.7         | .86                    | .33                                                     |                          |
| Avg-----                                                  | 735                 | 5340                 | 14.3                 | 16.9         | 0.85                   | 0.39                                                    |                          |
| Plant 217, grade 3 ("Hollow," 100 percent of kiln, EC, S) |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                    | 1030                | 1870                 | 13.6                 | 15.6         | 0.87                   | 0.65                                                    |                          |
| 2-----                                                    | 910                 | 2070                 | 13.4                 | 15.8         | .85                    | .47                                                     |                          |
| 3-----                                                    | 660                 | 2570                 | 14.2                 | 16.1         | .88                    | .90                                                     |                          |
| 4-----                                                    | 805                 | 2550                 | 13.7                 | 16.3         | .84                    | .78                                                     |                          |
| 5-----                                                    | 750                 | 2770                 | 13.0                 | 15.6         | .83                    | .91                                                     |                          |
| Avg-----                                                  | 830                 | 2370                 | 13.6                 | 15.9         | 0.85                   | 0.74                                                    |                          |

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama*

[The samples submitted included brick formed from surface clay, fire clay, or shale by the dry-press and the stiff-mud (side-cut and end-cut) processes. Some of the raw materials are unusual in that variations in time and temperature of firing, instead of producing variation in shades of red (dark to light) bring out entirely different colors (reds, browns, greys, etc.)]

| Specimen number                                          | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Result beyond 51 cycles |
|----------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|-------------------------|
|                                                          |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                         |
| Plant 22, grade 1 ("Common," 100 percent of kiln, SC, S) |                           |                           |                      |              |                        |                                                         |                         |
|                                                          | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                         |
| 1-----                                                   | 1730                      | 11250                     | 5.0                  | 8.0          | 0.62                   | 0.08 (B)                                                |                         |
| 2-----                                                   | 2000                      | 9650                      | 4.3                  | 7.1          | .61                    | .10 (B)                                                 |                         |
| 3-----                                                   | 1770                      | 10150                     | 7.1                  | 9.9          | .72                    | .08 (B)                                                 |                         |
| 4-----                                                   | 1660                      | 9290                      | 7.6                  | 10.0         | .76                    | .10 (B)                                                 |                         |
| 5-----                                                   | 1180                      | 6670                      | 9.9                  | 12.4         | .80                    | .16 (B)                                                 |                         |
| Avg-----                                                 | 1670                      | 9400                      | 6.8                  | 9.5          | 0.70                   | 0.10 (B)                                                |                         |

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama—Continued*

| Specimen number                                                           | Modulus of rupture          | Compressive strength         | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------------------|-----------------------------|------------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                           |                             |                              | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 22, grade 2 ("Face," 100 percent of kiln, SC, FC)                   |                             |                              |                      |              |                        |                                                         |                          |
| Avg (5)-                                                                  | lb/in. <sup>2</sup><br>1995 | lb/in. <sup>2</sup><br>14790 | %<br>3.9             | %<br>6.2     | 0.59                   | %<br>Not tested                                         |                          |
| Plant 22, grade 3 ("Face," 100 percent of kiln, DP, FC)"                  |                             |                              |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 1540                        | 18550+                       | 5.2                  | 8.0          | 0.65                   | 0.19                                                    |                          |
| 2-----                                                                    | 1765                        | 19650                        | 4.4                  | 6.4          | .69                    | .40                                                     |                          |
| 3-----                                                                    | 1170                        | 10900                        | 5.9                  | 8.2          | .72                    | .45                                                     |                          |
| 4-----                                                                    | 1235                        | 13450                        | 5.5                  | 7.7          | .71                    | .36                                                     |                          |
| 5-----                                                                    | 1040                        | 10400                        | 5.9                  | 8.2          | .72                    | .27                                                     |                          |
| Avg-----                                                                  | 1350                        | 14590+                       | 5.4                  | 7.7          | 0.70                   | 0.33                                                    |                          |
| Plant 22, grade 4 ("Face," 100 percent of kiln, DP, S)                    |                             |                              |                      |              |                        |                                                         |                          |
| Avg (5)-                                                                  | 1900                        | 12690                        | 5.3                  | 7.7          | 0.69                   | Not tested                                              |                          |
| Plant 22, grade 5 ("Common," 100 percent of kiln, DP, S)                  |                             |                              |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 1110                        | 6000                         | 6.4                  | 8.9          | 0.72                   | 0.34                                                    |                          |
| 2-----                                                                    | 1050                        | 4520                         | 7.2                  | 9.5          | .76                    | .46                                                     |                          |
| 3-----                                                                    | 830                         | 6050                         | 7.7                  | 10.0         | .77                    | .73                                                     |                          |
| 4-----                                                                    | 1025                        | 6130                         | 7.1                  | 9.7          | .73                    | .62                                                     |                          |
| 5-----                                                                    | 990                         | 4550                         | 7.1                  | 9.3          | .76                    | .45                                                     |                          |
| Avg-----                                                                  | 1000                        | 5450                         | 7.1                  | 9.5          | 0.75                   | 0.51                                                    |                          |
| Plant 33, grade 1 ("Reds," percentage of kiln unknown, DP, C)             |                             |                              |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 850                         | 9030                         | 13.0                 | 14.7         | 0.88                   | 0.11 (B)                                                |                          |
| 2-----                                                                    | 920                         | 8890                         | 13.4                 | 15.1         | .89                    | .11 (B)                                                 |                          |
| 3-----                                                                    | 770                         | 7020                         | 13.9                 | 15.5         | .90                    | .10 (B)                                                 |                          |
| 4-----                                                                    | 725                         | 6670                         | 14.7                 | 16.2         | .91                    | .42 (B)                                                 |                          |
| Avg-----                                                                  | 815                         | 7900                         | 13.8                 | 15.4         | 0.90                   | 0.15 (B)                                                |                          |
| Plant 33, grade 2 ("Browns," percentage of kiln unknown, DP, C)           |                             |                              |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 500                         | 4750                         | 13.3                 | 18.2         | 0.73                   | 0.22                                                    |                          |
| 2-----                                                                    | 685                         | 4920                         | 15.3                 | 20.5         | .75                    | .21                                                     |                          |
| 3-----                                                                    | 635                         | 4850                         | 16.9                 | 21.9         | .77                    | .25                                                     |                          |
| 4-----                                                                    | 375                         | 5370                         | 12.7                 | 16.4         | .77                    | .12                                                     |                          |
| 5-----                                                                    | 590                         | 4360                         | 15.7                 | 21.1         | .74                    | .73                                                     |                          |
| Avg-----                                                                  | 555                         | 4850                         | 14.8                 | 19.6         | 0.75                   | 0.31                                                    |                          |
| Plant 52, grade 1 ("100 percent shale common," 50 percent of kiln, SC, S) |                             |                              |                      |              |                        |                                                         |                          |
| Avg (7)-                                                                  | 1875                        | 13770                        | 1.6                  | 3.6          | 0.45                   | Not tested                                              |                          |
| Plant 52, grade 2 ("80 percent shale common," 50 percent of kiln, SC, S)  |                             |                              |                      |              |                        |                                                         |                          |
| Avg (7)-                                                                  | 1520                        | 7380                         | 8.6                  | 10.7         | 0.81                   | Not tested                                              |                          |
| Plant 53, grade 1 ("Dark face," 20 percent of kiln, EC, C)                |                             |                              |                      |              |                        |                                                         |                          |
| Avg (5)-                                                                  | 955                         | 3520                         | 9.7                  | 14.3         | 0.68                   | Not tested                                              |                          |
| Plant 53, grade 2 ("Light face," 75 percent of kiln, EC, C)               |                             |                              |                      |              |                        |                                                         |                          |
| Avg (5)-                                                                  | 645                         | 2720                         | 11.0                 | 15.9         | 0.69                   | Not tested                                              |                          |

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama—Continued*

| Specimen number                                               | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                               |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 53, grade 3 ("Salmon," 5 percent of kiln, EC, C)        |                     |                      |                      |              |                        |                                                         |                          |
|                                                               | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       | %                        |
| 1-----                                                        | 410                 | 2120                 | 10.8                 | 16.7         | 0.65                   | 0.86                                                    | 1.29 (75c)               |
| 2-----                                                        | 410                 | 2170                 | 10.6                 | 16.9         | .63                    | 1.10                                                    | 1.55 (75c)               |
| 3-----                                                        | 635                 | 2470                 | 10.6                 | 17.1         | .62                    | 0.71                                                    | 2.22 (75c)               |
| 4-----                                                        | 535                 | 2480                 | 11.2                 | 17.1         | .65                    | .94                                                     | 1.41 (75c)               |
| 5-----                                                        | 635                 | 2430                 | 11.0                 | 16.4         | .67                    | 1.19                                                    | 1.79 (75c)               |
| Avg-----                                                      | 525                 | 2330                 | 10.8                 | 16.8         | 0.64                   | 0.96                                                    | 1.65 (75c)               |
| Plant 97, grade 1 ("100 percent kiln run," SC, C)             |                     |                      |                      |              |                        |                                                         |                          |
| Avg (15)                                                      | 1155                | 7600                 | 13.7                 | 18.1         | 0.76                   | Not tested                                              |                          |
| Plant 102, grade 1 ("Common hard," 83 percent of kiln, SC, C) |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                       | 1755                | 8480                 | 7.7                  | 10.5         | 0.73                   | Not tested                                              |                          |
| Plant 102, grade 2 ("Clinker," 7 percent of kiln, SC, C)      |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                       | 2060                | 11060                | 4.8                  | 7.0          | 0.68                   | Not tested                                              |                          |
| Plant 102, grade 3 ("Salmon," 10 percent of kiln, SC, C)      |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                        | 1010                | 6350                 | 16.3                 | 18.8         | 0.87                   | F 42c                                                   |                          |
| 2-----                                                        | 1235                | 5440                 | 16.3                 | 18.7         | .87                    | 0.10                                                    |                          |
| 3-----                                                        | 940                 | 5730                 | 16.0                 | 18.3         | .87                    | F 50c                                                   |                          |
| 4-----                                                        | 655                 | 4160                 | 17.6                 | 20.6         | .85                    | 0.78                                                    |                          |
| 5-----                                                        | 805                 | 4850                 | 16.5                 | 19.2         | .86                    | .54                                                     |                          |
| Avg-----                                                      | 930                 | 5310                 | 16.5                 | 19.1         | 0.86                   | -----                                                   |                          |
| Plant 107, grade 1 ("Greys," 80 percent of kiln, EC, C)       |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                        | 1680                | 6030                 | 13.3                 | 17.8         | 0.75                   | 0.11 (B)                                                |                          |
| 2-----                                                        | 425                 | 7580                 | 12.2                 | 15.9         | .77                    | .09 (B)                                                 |                          |
| Avg-----                                                      | 1055                | 6800                 | 12.8                 | 16.8         | 0.76                   | 0.10 (B)                                                |                          |
| Plant 107, grade 2 ("Browns," 15 percent of kiln, EC, C)      |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                        | 665                 | 6870                 | 12.7                 | 16.2         | 0.78                   | 0.00 (B)                                                |                          |
| 2-----                                                        | 530                 | 5740                 | 13.1                 | 15.7         | .83                    | .31 (B)                                                 |                          |
| Avg-----                                                      | 600                 | 6300                 | 12.9                 | 16.0         | 0.80                   | 0.16 (B)                                                |                          |
| Plant 107, grade 3 ("Reds," 5 percent of kiln, EC, C)         |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                        | 470                 | 3940                 | 12.5                 | 15.9         | 0.79                   | 9.25 (B)                                                |                          |
| 2-----                                                        | 550                 | 4110                 | 12.6                 | 15.0         | .84                    | 0.10 (B)                                                |                          |
| Avg-----                                                      | 510                 | 4020                 | 12.6                 | 15.4         | 0.82                   | 4.68 (B)                                                |                          |
| Plant 131, grade 1 ("Blue common," 90 percent of kiln, SC, C) |                     |                      |                      |              |                        |                                                         |                          |
| Avg (10)                                                      | 1115                | 6200                 | 10.5                 | 15.0         | 0.69                   | Not tested                                              |                          |
| Plant 131, grade 1a ("Second sample of grade 1")              |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)                                                       | 1045                | 7050                 | 10.8                 | 15.3         | 0.70                   | Not tested                                              |                          |

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 131, grade 2 ("Buff commons," 90 percent of kiln, SC, C)

| Avg (10) | lb/in. <sup>2</sup> | lb/in. <sup>2</sup> | %   | %    |      | %          |  |
|----------|---------------------|---------------------|-----|------|------|------------|--|
|          | 1160                | 7500                | 7.4 | 12.1 | 0.61 | Not tested |  |

Plant 131, grade 2A ("Second sample of grade 2")

| Avg (5) | 1210 | 8640 | 6.9 | 11.5 | 0.60 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|
|---------|------|------|-----|------|------|------------|--|

Plant 131, grade 3 ("Face," percentage of kiln unknown, SC, C)

| Avg (10) | 1230 | 6790 | 8.1 | 12.2 | 0.66 | Not tested |  |
|----------|------|------|-----|------|------|------------|--|
|----------|------|------|-----|------|------|------------|--|

Plant 131, grade 4 ("Face," percentage of kiln unknown, SC, C)

| Avg (5) | 1700 | 9490 | 5.8 | 9.8 | 0.58 | Not tested |  |
|---------|------|------|-----|-----|------|------------|--|
|---------|------|------|-----|-----|------|------------|--|

Plant 131, grade 5 ("Face," percentage of kiln unknown, SC, C)

| Avg (5) | 1575 | 9100 | 7.2 | 11.0 | 0.64 | Not tested |  |
|---------|------|------|-----|------|------|------------|--|
|---------|------|------|-----|------|------|------------|--|

Plant 161, grade 1 ("Arch," 5 percent of kiln, SC, C)

| 1   | 1000 | 8670  | 5.7 | 7.8 | 0.73 | 0.42 |  |
|-----|------|-------|-----|-----|------|------|--|
| 2   | 1055 | 8540  | 5.6 | 7.9 | .71  | .00  |  |
| 3   | 795  | 10490 | 5.6 | 8.4 | .67  | .19  |  |
| 4   | 1055 | 11460 | 5.4 | 7.7 | .70  | .09  |  |
| 5   | 875  | 10020 | 5.4 | 7.9 | .68  | .10  |  |
| Avg | 955  | 9840  | 5.5 | 7.9 | 0.70 | 0.16 |  |

Plant 161, grade 2 ("Hard," 75 percent of kiln, SC, C)

| 1   | 1770 | 9070 | 6.4 | 8.5 | 0.75 | 0.00 |  |
|-----|------|------|-----|-----|------|------|--|
| 2   | 1700 | 8350 | 5.2 | 7.6 | .68  | .19  |  |
| 3   | 1640 | 8280 | 5.9 | 8.7 | .68  | .00  |  |
| 4   | 1340 | 6940 | 6.1 | 8.5 | .72  | .00  |  |
| 5   | 1490 | 8900 | 7.0 | 9.1 | .77  | .11  |  |
| Avg | 1590 | 8310 | 6.1 | 8.5 | 0.72 | 0.06 |  |

Plant 161, grade 3 ("Medium hard," 20 percent of kiln, SC, C)

| 1   | 1730 | 8300 | 7.4 | 9.8  | 0.76 | 0.00 |  |
|-----|------|------|-----|------|------|------|--|
| 2   | 1550 | 8930 | 7.6 | 10.4 | .73  | .00  |  |
| 3   | 1690 | 7650 | 6.0 | 8.3  | .72  | .00  |  |
| 4   | 1915 | 6900 | 7.3 | 9.9  | .74  | .00  |  |
| 5   | 1265 | 7280 | 7.7 | 10.5 | .73  | .00  |  |
| Avg | 1630 | 7810 | 7.2 | 9.8  | 0.74 | 0.00 |  |

Plant 185, grade 1 ("Commercial Hard Browns," 65 percent of kiln, SC, C)

| Avg (6) | 1025 | 8080 | 11.4 | 15.7 | 0.72 | Not tested |  |
|---------|------|------|------|------|------|------------|--|
|---------|------|------|------|------|------|------------|--|

Plant 185, grade 2 ("Commercial Hard, Purples," 10 percent of kiln, SC, C)

| Avg (6) | 1000 | 8020 | 11.4 | 15.2 | 0.75 | Not tested |  |
|---------|------|------|------|------|------|------------|--|
|---------|------|------|------|------|------|------------|--|

Plant 185, grade 3 ("Commercial Hard, Reds," 24 percent of kiln, SC, C)

| Avg (6) | 695 | 5670 | 11.4 | 15.2 | 0.75 | Not tested |  |
|---------|-----|------|------|------|------|------------|--|
|---------|-----|------|------|------|------|------------|--|

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama—Continued*

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 185, grade 4 ("Salmon," 1.0 percent of kiln, SC, C)

| 1   | 310  | 3490 | 12.9 | 16.4 | 0.79     | 0.47 (B) |  |
|-----|------|------|------|------|----------|----------|--|
| 2   | 225  | 3980 | 12.2 | 16.3 | .75      | .49 (B)  |  |
| 3   | 3970 | 12.4 | 16.0 | .77  | .36 (B)  |          |  |
| 4   | 4280 | 12.1 | 15.5 | .78  | 5.68 (B) |          |  |
| 5   | 3710 | 13.1 | 16.5 | .79  | 0.52 (B) |          |  |
| 6   | 280  | 3240 | 12.9 | 16.9 | .76      | .40 (B)  |  |
| Avg | 270  | 3780 | 12.6 | 16.3 | 0.77     | 1.58 (B) |  |

Plant 202, grade 1 ("Reds," percentage of kiln unknown, DP, C)

| Avg (6) | 730 | 3230 | 16.3 | 21.2 | 0.77 | Not tested |  |
|---------|-----|------|------|------|------|------------|--|
|---------|-----|------|------|------|------|------------|--|

Plant 206, grade 1 ("Average," percentage of kiln unknown, SC, C)

| Avg (5) | 1010 | 9580 | 10.4 | 15.0 | 0.69 | Not tested |  |
|---------|------|------|------|------|------|------------|--|
|---------|------|------|------|------|------|------------|--|

TABLE 22.—*Properties of bricks produced in Tennessee*  
[All samples received were formed from surface clay or shale either by the dry-press or by the stiff-mud, side-cut method]

| Specimen number | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                 |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |

Plant 25, grade 1 ("Dark to light," 100 percent of kiln, SC, C)

| 1   | 1270 | 10250 | 8.6  | 10.8 | 0.80 | 0.11  |  |
|-----|------|-------|------|------|------|-------|--|
| 2   | 1075 | 6540  | 11.4 | 13.4 | .85  | .20   |  |
| 3   | 1535 | 6040  | 7.9  | 11.1 | .71  | .42   |  |
| 4   | 550  | 4180  | 17.0 | 19.0 | .90  | F 14c |  |
| 5   | 255  | 3000  | 19.4 | 20.6 | .94  | F 12c |  |
| Avg | 935  | 6000  | 12.9 | 15.0 | 0.84 |       |  |

Plant 25, grade 2 ("Dark to light," 100 percent of kiln, SC, S)

| 1   | 1095 | 9100 | 7.1 | 9.9  | 0.72 | 0.33 |  |
|-----|------|------|-----|------|------|------|--|
| 2   | 755  | 8650 | 9.4 | 12.5 | .75  | .31  |  |
| 3   | 1170 | 7690 | 7.4 | 10.9 | .68  | .10  |  |
| 4   | 1635 | 7470 | 7.6 | 10.1 | .75  | .25  |  |
| 5   | 1150 | 8740 | 8.8 | 10.7 | .82  | .37  |  |
| Avg | 1160 | 8330 | 8.1 | 10.8 | 0.74 | 0.27 |  |

Plant 25, grade 3 ("Dark to light," percentage of kiln unknown, SC, S)

| Avg (5) | 1435 | 13270 | 4.7 | 6.8 | 0.68 | Not tested |  |
|---------|------|-------|-----|-----|------|------------|--|
|---------|------|-------|-----|-----|------|------------|--|

Plant 59, grade 1 ("All hard common," 90 percent of kiln, SC, C)

| 1   | 1820 | 20800+ | 2.4 | 4.9  | 0.49 | 0.08 |  |
|-----|------|--------|-----|------|------|------|--|
| 2   | 1910 | 13650  | 6.6 | 8.9  | .74  | .15  |  |
| 3   | 1325 | 9540   | 9.7 | 11.9 | .82  | .15  |  |
| 4   | 1710 | 12950  | 6.5 | 8.8  | .74  | .15  |  |
| 5   | 1430 | 10950  | 9.2 | 10.9 | .84  | 1.22 |  |
| 6   | 1380 | 11050  | 6.9 | 9.0  | .77  | 0.26 |  |
| Avg | 1595 | 13160+ | 6.9 | 9.1  | 0.73 | 0.34 |  |

TABLE 22.—*Properties of brick produced in Tennessee—Continued*

| Specimen number                                                    | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                    |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 59, grade 2 ("Kiln run average," 100 percent of kiln, SC, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                    | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i>                                                |                          |
| 1-----                                                             | 1730                      | 11950                     | 6.8                  | 9.3          | 0.73                   | 0.25                                                    |                          |
| 2-----                                                             | 1340                      | 12050                     | 6.7                  | 9.2          | .73                    | .25                                                     |                          |
| 3-----                                                             | 1865                      | 13050                     | 7.1                  | 9.3          | .76                    | .21                                                     |                          |
| 4-----                                                             | 2730                      | 18350                     | 4.1                  | 6.9          | .59                    | .08                                                     |                          |
| 5-----                                                             | 1120                      | 9500                      | 11.6                 | 13.6         | .85                    | .33                                                     |                          |
| 6-----                                                             | 635                       | 4550                      | 16.2                 | 18.3         | .89                    | 1.30                                                    |                          |
| Avg-----                                                           | 1570                      | 11580                     | 8.8                  | 11.1         | 0.76                   | 0.40                                                    |                          |
| Plant 127, grade 1 ("Vitrified," 15 percent of kiln, SC, S)        |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                             | 2880                      | 19150                     | 0.8                  | 4.9          | 0.16                   | 0.32 (B)                                                |                          |
| 2-----                                                             | 2680                      | 18400                     | 1.1                  | 5.3          | .21                    | .15 (B)                                                 |                          |
| 3-----                                                             | 2940                      | 17950                     | 1.1                  | 4.9          | .22                    | .75 (B)                                                 |                          |
| 4-----                                                             | 3110                      | 20370                     | 0.7                  | 5.0          | .14                    | .14 (B)                                                 |                          |
| 5-----                                                             | 3020                      | 22400                     | 1.1                  | 4.3          | .26                    | .07 (B)                                                 |                          |
| Avg-----                                                           | 2925                      | 19650                     | 1.0                  | 4.9          | 0.20                   | 0.29 (B)                                                |                          |
| Plant 127, grade 2 ("Hard," 45 percent of kiln, SC, S)             |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-----                                                       | 2425                      | 17330                     | 4.8                  | 7.8          | 0.61                   | Not tested                                              |                          |
| Plant 127, grade 3 ("Medium," 40 percent of kiln, SC, S)           |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-----                                                       | 1525                      | 10980                     | 6.8                  | 10.1         | 0.66                   | Not tested                                              |                          |
| Plant 144, grade 1 ("Common Hard," 92 percent of kiln, DP, C)      |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                             | 1175                      | 10550                     | 9.6                  | 12.1         | 0.79                   | 0.10 (B)                                                |                          |
| 2-----                                                             | 1025                      | 8270                      | 16.5                 | 18.6         | .89                    | F 38c (B)                                               |                          |
| 3-----                                                             | 1100                      | 7760                      | 12.6                 | 15.0         | .84                    | F 22c (B)                                               |                          |
| 4-----                                                             | 1400                      | 11700                     | 11.5                 | 13.8         | .83                    | 0.09 (B)                                                |                          |
| 5-----                                                             | 915                       | 6030                      | 14.1                 | 15.7         | .90                    | .00 (B)                                                 |                          |
| Avg-----                                                           | 1125                      | 8860                      | 12.9                 | 15.0         | 0.85                   | -----                                                   |                          |
| Plant 144, grade 2 ("Select," 25 percent of kiln, DP, C)           |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                             | 1290                      | 11050                     | 12.3                 | 14.9         | 0.83                   | 0.00 (B)                                                |                          |
| 2-----                                                             | 1155                      | 11550                     | 12.4                 | 14.8         | .84                    | .09 (B)                                                 |                          |
| 3-----                                                             | 1070                      | 11150                     | 12.3                 | 14.6         | .84                    | .09 (B)                                                 |                          |
| 4-----                                                             | 1710                      | 15600                     | 8.4                  | 10.8         | .78                    | .00 (B)                                                 |                          |
| 5-----                                                             | 1700                      | 14800                     | 9.1                  | 12.0         | .76                    | .29 (B)                                                 |                          |
| Avg-----                                                           | 1385                      | 12830                     | 10.9                 | 13.4         | 0.81                   | 0.09 (B)                                                |                          |
| Plant 144, grade 3 ("Salmon," 8 percent of kiln, DP, C)            |                           |                           |                      |              |                        |                                                         |                          |
| 1-----                                                             | 395                       | 4950                      | 19.0                 | 21.4         | 0.89                   | F 24c                                                   |                          |
| 2-----                                                             | 315                       | 3780                      | 19.4                 | 21.7         | .89                    | F 24c                                                   |                          |
| 3-----                                                             | 295                       | 2720                      | 19.9                 | 21.9         | .91                    | F 10c                                                   |                          |
| 4-----                                                             | 285                       | 2530                      | 19.7                 | 21.9         | .90                    | F 10c                                                   |                          |
| 5-----                                                             | 365                       | 4030                      | 19.5                 | 22.0         | .89                    | F 12c                                                   |                          |
| Avg-----                                                           | 330                       | 3600                      | 19.5                 | 21.8         | 0.90                   | F 16c                                                   |                          |

TABLE 23.—*Properties of bricks produced in Kentucky*

[All samples received represented bricks made from surface clay and formed by the dry-press, soft-mud or the stiff-mud, side-cut process]

| Specimen number                                                      | Modulus of rupture               | Compressive strength              | Water absorption     |                  | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|----------------------------------------------------------------------|----------------------------------|-----------------------------------|----------------------|------------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                      |                                  |                                   | 48-hr cold immersion | 5-hr boiling     |                        |                                                         |                          |
| Plant 40, grade 1 ("Arch," 30 percent of kiln, SM, C)                |                                  |                                   |                      |                  |                        |                                                         |                          |
| Avg (5)                                                              | <i>lb/in.<sup>2</sup></i><br>660 | <i>lb/in.<sup>2</sup></i><br>7500 | <i>%</i><br>12.8     | <i>%</i><br>17.7 | 0.72                   | <i>%</i><br>Not tested                                  |                          |
| Plant 40, grade 2 ("Commercial hard," 40 percent of kiln, SM, C)     |                                  |                                   |                      |                  |                        |                                                         |                          |
| Avg (5)                                                              | 1065                             | 9290                              | 12.2                 | 17.6             | 0.69                   | Not tested                                              |                          |
| Plant 40, grade 3 ("Pale hard," 20 percent of kiln, SM, C)           |                                  |                                   |                      |                  |                        |                                                         |                          |
| 1                                                                    | 610                              | 8410                              | 12.7                 | 17.4             | 0.73                   | 0.19 (B)                                                |                          |
| 2                                                                    | 525                              | 9600                              | 11.9                 | 16.8             | .71                    | .22 (B)                                                 |                          |
| 2                                                                    | 970                              | 10250                             | 12.0                 | 17.5             | .69                    | .33 (B)                                                 |                          |
| 4                                                                    | 1095                             | 8890                              | 12.2                 | 17.3             | .71                    | .51 (B)                                                 |                          |
| 5                                                                    | 970                              | 9580                              | 11.6                 | 16.6             | .70                    | .33 (B)                                                 |                          |
| Avg                                                                  | 835                              | 9350                              | 12.1                 | 17.1             | 0.71                   | 0.32 (B)                                                |                          |
| Plant 40, grade 4 ("Soft," 10 percent of kiln, SM, C)                |                                  |                                   |                      |                  |                        |                                                         |                          |
| 1                                                                    | 205                              | 3050                              | 16.2                 | 21.7             | 0.75                   | 0.71                                                    |                          |
| 2                                                                    | 235                              | 2870                              | 17.0                 | 21.8             | .78                    | .76                                                     |                          |
| 3                                                                    | 425                              | 2940                              | 15.9                 | 21.4             | .74                    | .66                                                     |                          |
| 4                                                                    | 405                              | 3330                              | 16.0                 | 21.2             | .75                    | .57                                                     |                          |
| 5                                                                    | 350                              | 3020                              | 15.8                 | 21.5             | .73                    | 1.52                                                    |                          |
| Avg                                                                  | 325                              | 3040                              | 16.2                 | 21.5             | 0.75                   | 0.84                                                    |                          |
| Plant 89, grade 1 ("Hard," percentage of kiln unknown, SC, C)        |                                  |                                   |                      |                  |                        |                                                         |                          |
| 1                                                                    | 2420                             | 8300                              | 7.2                  | 10.2             | 0.71                   | 0.25 (B)                                                |                          |
| 2                                                                    | 2030                             | 9410                              | 6.0                  | 9.3              | .65                    | .24 (B)                                                 |                          |
| 3                                                                    | 1990                             | 7540                              | 6.5                  | 9.6              | .68                    | .23 (B)                                                 |                          |
| 4                                                                    | 1550                             | 6890                              | 6.0                  | 8.7              | .69                    | .80 (B)                                                 |                          |
| 5                                                                    | 2880                             | 10950                             | 3.1                  | 5.8              | .53                    | .80 (B)                                                 |                          |
| 6                                                                    | 1650                             | 8690                              | 6.8                  | 9.6              | .71                    | .24 (B)                                                 |                          |
| 7                                                                    | 3060                             | 12550                             | 3.4                  | 6.0              | .57                    | .15 (B)                                                 |                          |
| 8                                                                    | 2250                             | 9640                              | 6.7                  | 9.6              | .70                    | .33 (B)                                                 |                          |
| 9                                                                    | 1900                             | 9400                              | 7.6                  | 10.6             | .72                    | 1.29 (B)                                                |                          |
| 10                                                                   | 2170                             | 9140                              | 5.9                  | 9.0              | .66                    | 0.00 (B)                                                |                          |
| Avg                                                                  | 2190                             | 9250                              | 5.9                  | 8.8              | 0.66                   | 0.43 (B)                                                |                          |
| Plant 89, grade 2 ("Medium hard," percentage of kiln unknown, SC, C) |                                  |                                   |                      |                  |                        |                                                         |                          |
| Avg (5)                                                              | 1595                             | 8400                              | 8.6                  | 11.3             | 0.76                   | Not tested                                              |                          |
| Plant 89, grade 3 ("Soft," percentage of kiln unknown, SC, C)        |                                  |                                   |                      |                  |                        |                                                         |                          |
| 1                                                                    | 1065                             | 4280                              | 14.4                 | 17.0             | 0.85                   | 0.21                                                    | <i>%</i><br>0.21 (54c)   |
| 2                                                                    | 775                              | 3910                              | 15.6                 | 18.3             | .85                    | F 51c                                                   |                          |
| 3                                                                    | 875                              | 4130                              | 15.4                 | 18.3             | .84                    | 2.10                                                    | 2.10 (54c)               |
| 4                                                                    | 730                              | 4570                              | 14.9                 | 17.4             | .85                    | 0.41                                                    | 0.92 (54c)               |
| 5                                                                    | 840                              | 4290                              | 14.9                 | 16.4             | .91                    | F 48c                                                   |                          |
| 6                                                                    | 840                              | 4910                              | 13.7                 | 16.4             | .84                    | 0.18                                                    | 0.27 (54c)               |
| 7                                                                    | 700                              | 4020                              | 15.8                 | 18.5             | .85                    | 4.35                                                    | 4.35 (54c)               |
| 8                                                                    | 865                              | 4070                              | 15.2                 | 18.1             | .84                    | 0.47                                                    | 0.47 (54c)               |
| 9                                                                    | 995                              | 4590                              | 15.3                 | 17.4             | .88                    | 0.42                                                    | .63 (54c)                |
| 10                                                                   | 700                              | 2870                              | 16.8                 | 19.1             | .83                    | 7.18                                                    | 7.51 (54c)               |
| Avg                                                                  | 840                              | 4160                              | 15.2                 | 17.7             | 0.85                   |                                                         |                          |

TABLE 23.—*Properties of bricks produced in Kentucky—*  
Continued

| Specimen number                                                                | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                                |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 90, grade 1 ("No. 1 Hard," 25 percent of kiln, SM, C)                    |                     |                      |                      |              |                        |                                                         |                          |
|                                                                                | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1-----                                                                         | 1320                | 9540                 | 9.7                  | 14.8         | 0.66                   | 0.09 (B)                                                |                          |
| 2-----                                                                         | 1280                | 7150                 | 10.8                 | 15.4         | .70                    | .66 (B)                                                 |                          |
| 3-----                                                                         | 1430                | 7520                 | 11.8                 | 16.6         | .71                    | .11 (B)                                                 |                          |
| 4-----                                                                         | 1870                | 9390                 | 9.2                  | 14.5         | .63                    | .19 (B)                                                 |                          |
| 5-----                                                                         | 1295                | 8150                 | 10.4                 | 15.0         | .69                    | .17 (B)                                                 |                          |
| 6-----                                                                         | 1500                | 9590                 | 10.4                 | 15.4         | .68                    | .30 (B)                                                 |                          |
| 7-----                                                                         | 1885                | 7830                 | 9.6                  | 14.7         | .65                    | .09 (B)                                                 |                          |
| Avg-----                                                                       | 1510                | 8450                 | 10.3                 | 15.2         | 0.69                   | 0.23 (B)                                                |                          |
| Plant 90, grade 2 ("No. 2 Hard," 50 percent of kiln, SM, C)                    |                     |                      |                      |              |                        |                                                         |                          |
| Avg (7)-----                                                                   | 1605                | 8650                 | 11.2                 | 15.9         | 0.71                   | Not tested                                              |                          |
| Plant 90, grade 3 ("Medium," 25 percent of kiln, SM, C)                        |                     |                      |                      |              |                        |                                                         |                          |
| Avg (7)-----                                                                   | 1665                | 7560                 | 12.6                 | 16.8         | 0.75                   | Not tested                                              |                          |
| Plant 184, grade 1 ("Common hard," 90 percent of kiln, DP, C)                  |                     |                      |                      |              |                        |                                                         |                          |
|                                                                                |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 790                 | 5020                 | 12.5                 | 14.3         | 0.87                   | 0.00 (B)                                                |                          |
| 2-----                                                                         | 865                 | 5350                 | 11.8                 | 13.9         | .85                    | .11 (B)                                                 |                          |
| 3-----                                                                         | 990                 | 5450                 | 14.2                 | 16.2         | .88                    | .00 (B)                                                 |                          |
| 4-----                                                                         | 655                 | 4320                 | 11.7                 | 13.2         | .89                    | .10 (B)                                                 |                          |
| 5-----                                                                         | 810                 | 4060                 | 9.3                  | 11.9         | .78                    | .00 (B)                                                 |                          |
| Avg-----                                                                       | 820                 | 4840                 | 11.9                 | 13.9         | 0.85                   | 0.04 (B)                                                |                          |
| Plant 184, grade 2 ("Medium," 10 percent of kiln, DP, C)                       |                     |                      |                      |              |                        |                                                         |                          |
|                                                                                |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 555                 | 3560                 | 16.5                 | 18.6         | 0.89                   | 0.21 (B)                                                |                          |
| 2-----                                                                         | 400                 | 3550                 | 18.5                 | 20.0         | .93                    | .70 (B)                                                 |                          |
| 3-----                                                                         | 270                 | 2730                 | 17.8                 | 19.9         | .89                    | .20 (B)                                                 |                          |
| 4-----                                                                         | 470                 | 4900                 | 16.8                 | 19.2         | .88                    | .11 (B)                                                 |                          |
| 5-----                                                                         | 660                 | 4800                 | 13.0                 | 15.0         | .87                    | .21 (B)                                                 |                          |
| Avg-----                                                                       | 470                 | 3910                 | 16.5                 | 18.5         | 0.89                   | 0.29 (B)                                                |                          |
| Plant 200, grade 1 ("Kiln run hard," 90 percent of kiln, SM, C)                |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-----                                                                   | 1320                | 8940                 | 11.5                 | 17.9         | 0.63                   | Not tested                                              |                          |
| Plant 200, grade 2 ("Face Reds," percentage of kiln unknown, SM, C)            |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-----                                                                   | 1400                | 8230                 | 13.0                 | 18.6         | 0.70                   | Not tested                                              |                          |
| Plant 200, grade 3 ("Face, mingled shades," percentage of kiln unknown, SM, C) |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-----                                                                   | 1390                | 10540                | 11.4                 | 17.1         | 0.67                   | Not tested                                              |                          |
| Plant 200, grade 4 ("Salmon," 10 percent of kiln, SM, C)                       |                     |                      |                      |              |                        |                                                         |                          |
|                                                                                |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                         | 310                 | 2380                 | 18.1                 | 24.9         | 0.73                   | 0.73 (B)                                                |                          |
| 2-----                                                                         | 365                 | 2490                 | 18.5                 | 25.4         | .76                    | .64 (B)                                                 |                          |
| 3-----                                                                         | 690                 | 4870                 | 16.4                 | 22.2         | .74                    | .38 (B)                                                 |                          |
| 4-----                                                                         | 570                 | 3300                 | 17.6                 | 24.2         | .73                    | .73 (B)                                                 |                          |
| 5-----                                                                         | 840                 | 4950                 | 16.7                 | 22.0         | .76                    | .32 (B)                                                 |                          |
| Avg-----                                                                       | 555                 | 3600                 | 17.5                 | 23.7         | 0.73                   | 0.56 (B)                                                |                          |

TABLE 24.—*Properties of bricks produced in*  
*North Carolina*

[The samples submitted represented bricks made from surface clay or shale and formed by the stiff-mud, side-cut and end-cut processes. The report by Greaves-Walker and Fontaine [10] provides a much more complete survey of the properties of North Carolina bricks]

| Specimen number                                              | Modulus of rupture | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------------|--------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                              |                    |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 91, grade 1 ("Common," 75 percent of kiln, EC, C)      |                    |                      |                      |              |                        |                                                         |                          |
| Avg (6)                                                      | 1060               | 3580                 | 7.4                  | 12.2         | 0.61                   | Not tested                                              |                          |
| Plant 112, grade 1 ("Common," 90 percent of kiln, EC, S)     |                    |                      |                      |              |                        |                                                         |                          |
| Avg (6)                                                      | 1330               | 6450                 | 10.1                 | 13.6         | 0.74                   | Not tested                                              |                          |
| Plant 119, grade 1 ("Hard," 40 percent of kiln, SC, S)       |                    |                      |                      |              |                        |                                                         |                          |
| 1                                                            | 3100               | 9390                 | 4.1                  | 5.5          | 0.74                   | 0.00 (B)                                                |                          |
| 2                                                            | 3200               | 11400                | 9.6                  | 11.5         | .83                    | .00 (B)                                                 |                          |
| 3                                                            | 2660               | 7910                 | 12.0                 | 13.5         | .89                    | .10 (B)                                                 |                          |
| 4                                                            | 2000               | 10370                | 10.3                 | 12.1         | .85                    | .38 (B)                                                 |                          |
| 5                                                            | 2410               | 7730                 | 15.3                 | 17.1         | .89                    | F 45c (B)                                               |                          |
| Avg                                                          | 2675               | 9360                 | 10.3                 | 11.9         | 0.84                   |                                                         |                          |
| Plant 119, grade 2 ("Light hard," 55 percent of kiln, SC, S) |                    |                      |                      |              |                        |                                                         |                          |
| 1                                                            | 1915               | 6330                 | 16.1                 | 18.1         | 0.89                   | 0.10 (B)                                                |                          |
| 2                                                            | 2090               | 7150                 | 17.9                 | 19.9         | .90                    | .00 (B)                                                 |                          |
| 3                                                            | 1730               | 6700                 | 17.5                 | 19.8         | .88                    | F 34c (B)                                               |                          |
| 4                                                            | 1470               | 6720                 | 17.7                 | 19.2         | .92                    | 0.20 (B)                                                |                          |
| 5                                                            | 1935               | 7090                 | 16.6                 | 18.2         | .91                    | .00 (B)                                                 |                          |
| Avg                                                          | 1830               | 6800                 | 17.2                 | 19.0         | 0.90                   |                                                         |                          |
| Plant 119, grade 3 ("Salmon," 5 percent of kiln, SC, S)      |                    |                      |                      |              |                        |                                                         |                          |
| 1                                                            | 205                | 5060                 | 20.1                 | 21.6         | 0.93                   | F 44c                                                   |                          |
| 2                                                            | 260                | 5100                 | 20.7                 | 23.2         | .89                    | 0.25                                                    |                          |
| 3                                                            | 1245               | 4970                 | 20.7                 | 22.7         | .91                    | F 40c                                                   |                          |
| 4                                                            | 765                | 3000                 | 24.4                 | 26.1         | .93                    | F 45c                                                   |                          |
| 5                                                            | 1115               | 3310                 | 22.2                 | 23.7         | .94                    | F 25c                                                   |                          |
| 6                                                            | 1150               | 4600                 | 21.9                 | 23.6         | .93                    | 0.24                                                    |                          |
| Avg                                                          | 1070               | 4360                 | 21.7                 | 23.5         | 0.92                   |                                                         |                          |
| Plant 166, grade 1 ("100 percent, kiln run," EC, C)          |                    |                      |                      |              |                        |                                                         |                          |
| 1                                                            | 1280               | 3470                 | 10.6                 | 15.7         | 0.68                   | 0.40                                                    |                          |
| 2                                                            | 960                | 3860                 | 12.0                 | 16.5         | .73                    | .25                                                     |                          |
| 3                                                            | 1675               | 3490                 | 12.4                 | 16.7         | .74                    | .26                                                     |                          |
| 4                                                            | 1425               | 4090                 | 12.2                 | 17.2         | .71                    | .11                                                     |                          |
| 5                                                            | 1255               | 3810                 | 12.7                 | 16.6         | .76                    | .19                                                     |                          |
| 6                                                            | 1680               | 4350                 | 12.3                 | 16.2         | .76                    | .10                                                     |                          |
| 7                                                            | 1545               | 3980                 | 11.7                 | 16.8         | .70                    | .10                                                     |                          |
| 8                                                            | 1545               | 4070                 | 11.9                 | 16.4         | .73                    | .00                                                     |                          |
| 9                                                            | 1800               | 3610                 | 12.0                 | 16.5         | .73                    | .10                                                     |                          |
| 10                                                           | 1265               | 3570                 | 11.9                 | 15.9         | .75                    | .20                                                     |                          |
| 11                                                           | 1470               | 3810                 | 12.7                 | 18.5         | .69                    | .11                                                     |                          |
| 12                                                           | 1410               | 3910                 | 12.8                 | 18.2         | .70                    | .20                                                     |                          |
| 13                                                           | 1540               | 3570                 | 14.3                 | 18.8         | .76                    | .20                                                     |                          |
| 14                                                           | 905                | 3390                 | 15.0                 | 19.2         | .78                    | .10                                                     |                          |
| 15                                                           | 930                | 2700                 | 16.7                 | 20.7         | .81                    | .40                                                     |                          |
| Avg                                                          | 1380               | 3710                 | 12.8                 | 17.3         | 0.74                   | 0.18                                                    |                          |

TABLE 25.—Properties of bricks produced in Virginia and the District of Columbia

[The samples from Virginia and the District of Columbia represent bricks made from surface clay or shale and formed by the soft-mud, dry-press or the stiff-mud, side-cut process. The report by Whittemore and Dear [11] gives a quite complete survey of the properties of Virginia brick, including freezing and thawing results at 10 cycles]

| Specimen number                                                       | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-----------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                       |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 71, grade 1 ("All hard red common," 100 percent of kiln, SC, C) |                     |                      |                      |              |                        |                                                         |                          |
|                                                                       | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1-----                                                                | 1750                | 6920                 | 8.3                  | 10.8         | 0.77                   | 0.25 (B)                                                |                          |
| 2-----                                                                | 1570                | 5610                 | 9.3                  | 11.7         | .80                    | .08 (B)                                                 |                          |
| 3-----                                                                | 1570                | 4660                 | 11.2                 | 13.3         | .84                    | .16 (B)                                                 |                          |
| 4-----                                                                | 1190                | 4660                 | 12.1                 | 14.2         | .85                    | .25 (B)                                                 |                          |
| 5-----                                                                | 1920                | 5290                 | 10.1                 | 12.1         | .83                    | .08 (B)                                                 |                          |
| Avg-----                                                              | 1600                | 5430                 | 10.2                 | 12.4         | 0.82                   | 0.16 (B)                                                |                          |
| Plant 72, grade 1 ("Common," 98 percent of kiln, SC, C)               |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                | 1720                | 12550                | 6.2                  | 8.9          | 0.70                   | 0.18 (B)                                                |                          |
| 2-----                                                                | 1900                | 10000                | 6.0                  | 9.2          | .65                    | .08 (B)                                                 |                          |
| 3-----                                                                | 1525                | 10750                | 7.8                  | 10.4         | .75                    | .09 (B)                                                 |                          |
| 4-----                                                                | 850                 | 6630                 | 10.1                 | 13.4         | .75                    | .19 (B)                                                 |                          |
| 5-----                                                                | 680                 | 4100                 | 18.2                 | 20.2         | .90                    | F 12c (B)                                               |                          |
| Avg-----                                                              | 1335                | 8810                 | 9.7                  | 12.4         | 0.75                   | -----                                                   |                          |
| Plant 72, grade 2 ("Sand finish face," 98 percent of kiln, SC, S)     |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-                                                              | 1705                | 14840                | 6.4                  | 9.1          | 0.69                   | Not tested                                              |                          |
| Plant 72, grade 3 ("Wire cut face," 98 percent of kiln, SC, C)        |                     |                      |                      |              |                        |                                                         |                          |
| Avg (5)-                                                              | 1620                | 11240                | 7.8                  | 10.8         | 0.71                   | Not tested                                              |                          |
| Plant 93, grade 1 ("Clinkers," 5 percent of kiln, SC, S)              |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                | 3240                | 17400                | 0.7                  | 1.9          | 0.37                   | 0.15                                                    |                          |
| 2-----                                                                | 1840                | 17350                | .8                   | 1.6          | .50                    | .16                                                     |                          |
| 3-----                                                                | 2570                | 11200                | 2.1                  | 4.5          | .47                    | .21                                                     |                          |
| 4-----                                                                | 2760                | 13000                | 1.9                  | 3.9          | .49                    | .31                                                     |                          |
| 5-----                                                                | 2700                | 19800                | 2.0                  | 4.5          | .44                    | .24                                                     |                          |
| 6-----                                                                | 3370                | 16000                | 1.5                  | 3.1          | .48                    | .08                                                     |                          |
| Avg-----                                                              | 2745                | 15790                | 1.5                  | 3.2          | 0.46                   | 0.23                                                    |                          |
| Plant 93, grade 2 ("Hard," 60 percent of kiln, SC, S)                 |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                | 2770                | 16000                | 1.9                  | 3.8          | 0.50                   | 0.76                                                    |                          |
| 2-----                                                                | 2780                | 15500                | 2.7                  | 4.3          | .63                    | .23                                                     |                          |
| 3-----                                                                | 3050                | 17200                | 2.6                  | 4.5          | .58                    | .07                                                     |                          |
| 4-----                                                                | 2870                | 12200                | 3.3                  | 5.5          | .60                    | .07                                                     |                          |
| 5-----                                                                | 2510                | 13000                | 4.1                  | 6.1          | .67                    | Not tested                                              |                          |
| 6-----                                                                | 2420                | 12150                | 4.4                  | 6.3          | .70                    | 0.00                                                    |                          |
| Avg-----                                                              | 2735                | 14340                | 3.2                  | 5.1          | 0.61                   | 0.23                                                    |                          |
| Plant 93, grade 3 ("Medium," 30 percent of kiln, SC, S)               |                     |                      |                      |              |                        |                                                         |                          |
| Avg (6)-                                                              | 2190                | 11300                | 5.4                  | 7.2          | 0.75                   | Not tested                                              |                          |
| Plant 93, grade 4 ("Salmon," 5 percent of kiln, SC, S)                |                     |                      |                      |              |                        |                                                         |                          |
| 1-----                                                                | 1340                | 6810                 | 12.1                 | 14.1         | 0.86                   | F 49c                                                   | %                        |
| 2-----                                                                | 1370                | 5800                 | 12.2                 | 14.1         | .87                    | 0.38                                                    | 0.46 (54c)               |
| 3-----                                                                | 1415                | 5850                 | 12.4                 | 14.1         | .88                    | .75                                                     | 1.05 (54c)               |
| 4-----                                                                | 1510                | 7290                 | 12.3                 | 14.2         | .87                    | .63                                                     | 4.27 (54c)               |
| 5-----                                                                | 1710                | 6540                 | 10.8                 | 12.8         | .84                    | .56                                                     | 0.63 (54c)               |
| 6-----                                                                | 1265                | 7100                 | 11.6                 | 13.3         | .87                    | .96                                                     | 7.24 (54c)               |
| Avg-----                                                              | 1435                | 6560                 | 11.9                 | 13.8         | 0.86                   | -----                                                   | 2.73 (54c)               |

TABLE 25.—Properties of bricks produced in Virginia and the District of Columbia—Continued

| Specimen number                                                           | Modulus of rupture                | Compressive strength              | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|---------------------------------------------------------------------------|-----------------------------------|-----------------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                           |                                   |                                   | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 113, grade 1 ("Clinker," 5 percent of kiln, SC, C)                  |                                   |                                   |                      |              |                        |                                                         |                          |
| Avg (5)                                                                   | <i>lb/in.<sup>2</sup></i><br>1640 | <i>lb/in.<sup>2</sup></i><br>9050 | %<br>5.6             | %<br>8.9     | 0.62                   | %<br>Not tested                                         |                          |
| Plant 113, grade 2 ("Hard," 80 percent of kiln, SC, C)                    |                                   |                                   |                      |              |                        |                                                         |                          |
| Avg (5)                                                                   | 1105                              | 7610                              | 11.1                 | 14.1         | 0.79                   | Not tested                                              |                          |
| Plant 113, grade 3 ("Salmon," 15 percent of kiln, SC, C)                  |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 780                               | 5150                              | 14.6                 | 17.7         | 0.82                   | 0.31                                                    |                          |
| 2-----                                                                    | 655                               | 3860                              | 15.4                 | 17.8         | .87                    | .58                                                     |                          |
| 3-----                                                                    | 650                               | 3980                              | 15.0                 | 17.9         | .84                    | .38                                                     |                          |
| 4-----                                                                    | 875                               | 5990                              | 14.4                 | 16.8         | .86                    | .29                                                     |                          |
| 5-----                                                                    | 405                               | 3720                              | 15.2                 | 17.1         | .89                    | F 6c                                                    |                          |
| Avg-----                                                                  | 675                               | 4540                              | 14.9                 | 17.5         | 0.86                   | -----                                                   |                          |
| Plant 123, grade 1 ("Arch," 10 percent of kiln, SC, C)                    |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 830                               | 7240                              | 4.2                  | 6.6          | 0.64                   | 0.48 (B)                                                |                          |
| 2-----                                                                    | 930                               | 7290                              | 6.1                  | 8.4          | .73                    | .62 (B)                                                 |                          |
| 3-----                                                                    | 1405                              | 7250                              | 4.9                  | 7.3          | .67                    | .49 (B)                                                 |                          |
| 4-----                                                                    | 1060                              | 7270                              | 5.0                  | 7.1          | .70                    | .14 (B)                                                 |                          |
| 5-----                                                                    | 1515                              | 7070                              | 6.1                  | 9.2          | .66                    | .41 (B)                                                 |                          |
| Avg-----                                                                  | 1150                              | 7220                              | 5.3                  | 7.7          | 0.68                   | 0.43 (B)                                                |                          |
| Plant 123, grade 2 ("Hard," 70 percent of kiln, SC, C)                    |                                   |                                   |                      |              |                        |                                                         |                          |
| Avg (5)                                                                   | 1045                              | 7220                              | 9.8                  | 12.1         | 0.80                   | Not tested                                              |                          |
| Plant 123, grade 3 ("Salmon," 20 percent of kiln, SC, C)                  |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 405                               | 2170                              | 21.2                 | 22.9         | 0.93                   | F 2e                                                    |                          |
| 2-----                                                                    | 215                               | 1470                              | 21.5                 | 22.8         | .94                    | F 2c                                                    |                          |
| 3-----                                                                    | 865                               | 3850                              | 15.0                 | 17.0         | .88                    | F 29c                                                   |                          |
| 4-----                                                                    | 700                               | 4830                              | 14.2                 | 16.5         | .86                    | 8.90                                                    |                          |
| 5-----                                                                    | 415                               | 2040                              | 20.7                 | 22.7         | .91                    | F 2c                                                    |                          |
| Avg-----                                                                  | 520                               | 2870                              | 18.5                 | 20.4         | 0.90                   | -----                                                   |                          |
| Plant 123, grade 4 ("Hand made—small," percentage of kiln unknown, SM, C) |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 1005                              | 3780                              | 10.7                 | 15.0         | 0.71                   | 0.43 (B)                                                |                          |
| 2-----                                                                    | 805                               | 2950                              | 11.8                 | 16.2         | .73                    | 1.19 (B)                                                |                          |
| 3-----                                                                    | 585                               | 3340                              | 9.9                  | 14.6         | .68                    | 0.67 (B)                                                |                          |
| 4-----                                                                    | 640                               | 3070                              | 11.1                 | 15.4         | .72                    | .74 (B)                                                 |                          |
| 5-----                                                                    | 485                               | 3430                              | 10.8                 | 15.9         | .68                    | .64 (B)                                                 |                          |
| Avg-----                                                                  | 705                               | 3310                              | 10.9                 | 15.4         | 0.70                   | 0.73 (B)                                                |                          |
| Plant 123, grade 5 ("Hand made—large," percentage of kiln unknown, SM, C) |                                   |                                   |                      |              |                        |                                                         |                          |
| 1-----                                                                    | 700                               | 2800                              | 15.1                 | 19.5         | 0.77                   | 1.35 (B)                                                |                          |
| 2-----                                                                    | 500                               | 2950                              | 14.8                 | 18.7         | .79                    | 0.46 (B)                                                |                          |
| 3-----                                                                    | 500                               | 2510                              | 15.7                 | 20.0         | .79                    | .76 (B)                                                 |                          |
| 4-----                                                                    | 610                               | 2500                              | 15.8                 | 20.1         | .79                    | .87 (B)                                                 |                          |
| 5-----                                                                    | 745                               | 2720                              | 14.9                 | 19.9         | .75                    | .50 (B)                                                 |                          |
| Avg-----                                                                  | 610                               | 2700                              | 15.3                 | 19.6         | 0.78                   | 0.79 (B)                                                |                          |

TABLE 25.—Properties of bricks produced in Virginia and the District of Columbia—Continued

| Specimen number                                        | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|--------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                        |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 135, grade 1 ("Arch," 20 percent of kiln, SM, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                        | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>%</i> (B)                                            |                          |
| 1 -----                                                | 1010                      | 8890                      | 6.3                  | 9.8          | 0.64                   | 0.08 (B)                                                |                          |
| 2 -----                                                | 1175                      | 9600                      | 6.2                  | 10.0         | .62                    | .08 (B)                                                 |                          |
| 3 -----                                                | 1175                      | 12280                     | 5.7                  | 9.0          | .63                    | .09 (B)                                                 |                          |
| 4 -----                                                | 1270                      | 10450                     | 5.8                  | 9.4          | .62                    | .12 (B)                                                 |                          |
| 5 -----                                                | 1560                      | 9550                      | 6.1                  | 9.1          | .67                    | .00 (B)                                                 |                          |
| Avg ----                                               | 1240                      | 10150                     | 6.0                  | 9.5          | 0.64                   | 0.07 (B)                                                |                          |

Plant 135, grade 2 ("Red," 70 percent of kiln, SM, C)

|         |      |       |     |      |      |            |  |
|---------|------|-------|-----|------|------|------------|--|
| Avg (5) | 1335 | 10160 | 7.8 | 10.8 | 0.73 | Not tested |  |
|---------|------|-------|-----|------|------|------------|--|

Plant 135, grade 3 ("Salmon," 10 percent of kiln, SM, C)

|     |      |      |      |      |      |      |  |
|-----|------|------|------|------|------|------|--|
| 1   | 1115 | 6940 | 11.1 | 14.0 | 0.79 | 0.00 |  |
| 2   | 1025 | 6940 | 11.1 | 13.6 | .82  | .10  |  |
| 3   | 775  | 6570 | 11.7 | 14.2 | .82  | .10  |  |
| 4   | 935  | 6520 | 12.2 | 15.0 | .81  | .28  |  |
| 5   | 935  | 6430 | 12.3 | 14.7 | .84  | .29  |  |
| Avg | 955  | 6680 | 11.7 | 14.3 | 0.82 | 0.15 |  |

Plant 158, grade 1 ("Hard," 95 percent of kiln, SC, C)

|     |      |      |     |      |      |      |  |
|-----|------|------|-----|------|------|------|--|
| 1   | 805  | 9400 | 6.7 | 9.4  | 0.71 | 0.22 |  |
| 2   | 930  | 6720 | 5.0 | 7.7  | .65  | .27  |  |
| 3   | 925  | 5200 | 9.0 | 11.2 | .80  | .32  |  |
| 4   | 1030 | 6450 | 5.5 | 8.6  | .64  | .30  |  |
| 5   | 1160 | 6120 | 9.6 | 12.0 | .80  | .48  |  |
| Avg | 970  | 6780 | 7.2 | 9.8  | 0.72 | 0.32 |  |

Plant 158, grade 2 ("Salmon," 5 percent of kiln, SC, C)

|     |     |      |      |      |      |       |  |
|-----|-----|------|------|------|------|-------|--|
| 1   | 520 | 2580 | 16.3 | 17.7 | 0.92 | F 18c |  |
| 2   | 495 | 2230 | 16.3 | 18.2 | .90  | F 12c |  |
| 3   | 465 | 2620 | 16.1 | 18.3 | .88  | 1.94  |  |
| 4   | 395 | 3230 | 16.3 | 18.2 | .89  | 0.87  |  |
| 5   | 435 | 2920 | 16.6 | 17.6 | .94  | .88   |  |
| Avg | 460 | 2720 | 16.3 | 18.0 | 0.91 | ----- |  |

Plant 159, grade 1 ("Sand finished face," 90 percent of kiln, SM, C)

|     |     |      |      |      |      |      |  |
|-----|-----|------|------|------|------|------|--|
| 1   | 480 | 2460 | 12.1 | 17.8 | 0.68 | 0.19 |  |
| 2   | 390 | 3160 | 12.8 | 18.0 | .71  | .51  |  |
| 3   | 235 | 3100 | 12.1 | 18.1 | .67  | .32  |  |
| 4   | 475 | 2240 | 11.2 | 18.0 | .62  | .39  |  |
| 5   | 515 | 1655 | 13.1 | 18.5 | .71  | .45  |  |
| 6   | 410 | 1665 | 13.7 | 19.1 | .72  | .78  |  |
| 7   | 700 | 2690 | 11.4 | 17.2 | .66  | .25  |  |
| 8   | 565 | 2750 | 12.9 | 18.3 | .71  | .39  |  |
| 9   | 745 | 2760 | 11.6 | 17.3 | .67  | .09  |  |
| 10  | 620 | 2500 | 12.0 | 17.5 | .69  | .37  |  |
| 11  | 750 | 2600 | 11.5 | 17.5 | .66  | .18  |  |
| 12  | 435 | 2770 | 13.7 | 19.0 | .72  | .39  |  |
| 13  | 220 | 1180 | 14.5 | 19.6 | .74  | .60  |  |
| 14  | 285 | 2540 | 13.4 | 19.3 | .69  | .40  |  |
| 15  | 180 | 1105 | 14.9 | 20.1 | .74  | 1.50 |  |
| Avg | 465 | 2340 | 12.7 | 18.4 | 0.69 | 0.47 |  |

TABLE 25.—Properties of bricks produced in Virginia and the District of Columbia—Continued

| Specimen number                                                   | Modulus of rupture  | Compressive strength | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------------|---------------------|----------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                   |                     |                      | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 159, grade 2 ("Kiln run common," 95 percent of kiln, SC, C) |                     |                      |                      |              |                        |                                                         |                          |
|                                                                   | lb/in. <sup>2</sup> | lb/in. <sup>2</sup>  | %                    | %            |                        | %                                                       |                          |
| 1                                                                 | 1410                | 9100                 | 3.5                  | 6.7          | 0.52                   | 0.14                                                    |                          |
| 2                                                                 | 1525                | 14950                | 1.6                  | 3.2          | .50                    | .11                                                     |                          |
| 3                                                                 | 1975                | 13600                | 1.8                  | 3.2          | .56                    | .07                                                     |                          |
| 4                                                                 | 1815                | 10000                | 3.1                  | 6.3          | .49                    | .07                                                     |                          |
| 5                                                                 | 1420                | 9390                 | 4.8                  | 7.6          | .63                    | .14                                                     |                          |
| 6                                                                 | 1560                | 7120                 | 4.9                  | 7.5          | .65                    | .23                                                     |                          |
| 7                                                                 | 1745                | 8540                 | 5.5                  | 8.5          | .65                    | .14                                                     |                          |
| 8                                                                 | 1315                | 9790                 | 7.3                  | 10.4         | .70                    | .14                                                     |                          |
| 9                                                                 | 1335                | 8610                 | 6.9                  | 10.0         | .69                    | .21                                                     |                          |
| 10                                                                | 1215                | 8160                 | 6.8                  | 10.4         | .65                    | .22                                                     |                          |
| 11                                                                | 1130                | 11200                | 6.7                  | 10.0         | .67                    | .32                                                     |                          |
| 12                                                                | 1500                | 7260                 | 6.1                  | 9.3          | .66                    | .06                                                     |                          |
| 13                                                                | 930                 | 8960                 | 9.8                  | 12.5         | .78                    | .28                                                     |                          |
| 14                                                                | 1220                | 7530                 | 9.4                  | 12.3         | .76                    | .13                                                     |                          |
| 15                                                                | 520                 | 4450                 | 12.8                 | 15.2         | .84                    | 1.22                                                    |                          |
| Avg                                                               | 1375                | 9240                 | 6.1                  | 8.9          | 0.65                   | 0.23                                                    |                          |

Plant 159, grade 2A ("Second sample (1936) of grade 2")

|     |     |      |         |      |      |      |      |  |
|-----|-----|------|---------|------|------|------|------|--|
| 1   | 445 | 3050 | (24-hr) | 11.7 | 15.1 | 0.78 | 0.99 |  |
| 2   | 595 | 7900 | 8.2     | 11.0 | .75  | .36  |      |  |
| 3   | 460 | 3960 | 9.8     | 12.9 | .76  | .48  |      |  |
| 4   | 280 | 4450 | 9.4     | 12.5 | .75  | .88  |      |  |
| 5   | 415 | 3650 | 10.2    | 13.5 | .76  | 1.30 |      |  |
| 6   | 355 | 3360 | 10.7    | 13.7 | .78  | 2.63 |      |  |
| 7   | 560 | 3450 | 9.7     | 12.9 | .75  | 0.76 |      |  |
| 8   | 485 | 3420 | 9.9     | 13.0 | .76  | .58  |      |  |
| 9   | 315 | 2650 | 12.2    | 15.3 | .80  | 1.51 |      |  |
| 10  | 325 | 3280 | 10.8    | 13.7 | .78  | 0.97 |      |  |
| 11  | 510 | 4200 | 10.2    | 13.0 | .78  | .90  |      |  |
| 12  | 665 | 5370 | 7.4     | 10.7 | .68  | .32  |      |  |
| 13  | 465 | 4310 | 10.2    | 12.9 | .79  | .46  |      |  |
| 14  | 410 | 4100 | 10.3    | 13.1 | .78  | .59  |      |  |
| 15  | 380 | 4240 | 10.3    | 13.2 | .78  | 1.09 |      |  |
| 16  | 515 | 4550 | 10.3    | 13.2 | .78  | 0.66 |      |  |
| 17  | 510 | 4440 | 8.5     | 12.1 | .70  | .97  |      |  |
| 18  | 520 | 5270 | 7.8     | 11.8 | .66  | .32  |      |  |
| 19  | 365 | 3220 | 10.8    | 13.9 | .78  | 1.16 |      |  |
| 20  | 430 | 2630 | 10.2    | 13.1 | .78  | 0.53 |      |  |
| Avg | 460 | 4120 | 9.9     | 13.0 | 0.76 | 0.87 |      |  |

Plant 159, grade 3 ("Salmon," 5 percent of kiln, SC, C)

|     |     |      |      |      |      |       |  |  |
|-----|-----|------|------|------|------|-------|--|--|
| 1   | 505 | 4070 | 12.6 | 14.4 | 0.87 | 2.08  |  |  |
| 2   | 480 | 3240 | 13.0 | 15.4 | .84  | 0.95  |  |  |
| 3   | 535 | 3840 | 13.3 | 15.8 | .84  | 1.17  |  |  |
| 4   | 685 | 4340 | 13.3 | 15.8 | .84  | 0.94  |  |  |
| 5   | 760 | 4550 | 13.8 | 15.6 | .88  | F 15c |  |  |
| Avg | 595 | 4010 | 13.2 | 15.4 | 0.85 | ----- |  |  |

Plant 162, grade 1 ("Arch," 20 percent of kiln, SDP, C)

|     |      |       |     |      |      |      |  |  |
|-----|------|-------|-----|------|------|------|--|--|
| 1   | 1600 | 10000 | 3.3 | 5.7  | 0.58 | 0.19 |  |  |
| 2   | 720  | 5170  | 7.8 | 9.7  | .80  | .39  |  |  |
| 3   | 780  | 6000  | 7.1 | 9.3  | .76  | .32  |  |  |
| 4   | 725  | 5020  | 8.8 | 10.8 | .82  | .40  |  |  |
| 5   | 700  | 5140  | 9.0 | 11.0 | .82  | .33  |  |  |
| Avg | 905  | 6270  | 7.2 | 9.3  | 0.76 | 0.33 |  |  |

Plant 162, grade 2 ("Body," 60 percent of kiln, SDP, C)

|     |     |      |      |      |      |      |  |  |
|-----|-----|------|------|------|------|------|--|--|
| 1   | 995 | 5720 | 10.2 | 12.4 | 0.82 | 0.18 |  |  |
| 2   | 715 | 4980 | 10.2 | 12.1 | .84  | .56  |  |  |
| 3   | 725 | 5360 | 10.0 | 11.9 | .84  | .70  |  |  |
| 4   | 320 | 4500 | 11.1 | 13.3 | .83  | .62  |  |  |
| 5   | 650 | 4040 | 10.7 | 12.9 | .83  | .80  |  |  |
| Avg | 680 | 4920 | 10.4 | 12.5 | 0.83 | 0.57 |  |  |

TABLE 25.—*Properties of bricks produced in Virginia and the District of Columbia—Continued*

| Specimen number                                                         | Modulus of rupture        | Compressive strength      | Water absorption     |              | Saturation coefficient | Weight loss at 51 cycles or number of cycles at failure | Results beyond 51 cycles |
|-------------------------------------------------------------------------|---------------------------|---------------------------|----------------------|--------------|------------------------|---------------------------------------------------------|--------------------------|
|                                                                         |                           |                           | 48-hr cold immersion | 5-hr boiling |                        |                                                         |                          |
| Plant 162, grade 3 ("Salmon," 20 percent of kiln, SDP, C)               |                           |                           |                      |              |                        |                                                         |                          |
|                                                                         | <i>lb/in.<sup>2</sup></i> | <i>lb/in.<sup>2</sup></i> | <i>%</i>             | <i>%</i>     |                        | <i>% F</i>                                              |                          |
| 1-----                                                                  | 295                       | 3400                      | 16.1                 | 17.6         | 0.92                   | F 10c                                                   |                          |
| 2-----                                                                  | 495                       | 3410                      | 15.9                 | 17.8         | .89                    | F 48c                                                   |                          |
| 3-----                                                                  | 395                       | 3980                      | 14.1                 | 15.7         | .90                    | 1.08                                                    |                          |
| 4-----                                                                  | 365                       | 3250                      | 17.0                 | 17.9         | .95                    | F 3c                                                    |                          |
| 5-----                                                                  | 185                       | 2850                      | 16.4                 | 17.8         | .92                    | F 3c                                                    |                          |
| Avg-----                                                                | 330                       | 3380                      | 15.9                 | 17.4         | 0.92                   |                                                         |                          |
| Plant 192, grade 1 ("Rough," 20 percent of kiln, SC, C)                 |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                                | 1730                      | 11470                     | 5.0                  | 8.9          | 0.56                   | Not tested                                              |                          |
| Plant 192, grade 2 ("Common red," 50 percent of kiln, SC, C)            |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                                | 1340                      | 9450                      | 9.8                  | 12.8         | 0.76                   | Not tested                                              |                          |
| Plant 192, grade 3 ("Textured face," 30 percent of kiln, SC, C)         |                           |                           |                      |              |                        |                                                         |                          |
| Avg (5)-                                                                | 1000                      | 9050                      | 8.4                  | 12.1         | 0.68                   | Not tested                                              |                          |
| Plant 228, grade 1 ("Common," (1936) percentage of kiln unknown, DP, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                         |                           |                           | (24-hr)              |              |                        |                                                         |                          |
| 1-----                                                                  | 465                       | 4450                      | 10.9                 | 13.7         | 0.80                   | 0.52                                                    |                          |
| 2-----                                                                  | 445                       | 3790                      | 10.9                 | 13.8         | .78                    | .27                                                     |                          |
| 3-----                                                                  | 275                       | 3050                      | 13.5                 | 16.8         | .80                    | .63                                                     |                          |
| 4-----                                                                  | 470                       | 4870                      | 11.2                 | 14.5         | .78                    | .34                                                     |                          |
| 5-----                                                                  | 380                       | 3550                      | 12.8                 | 15.4         | .83                    | .81                                                     |                          |
| 6-----                                                                  | 425                       | 3550                      | 11.0                 | 13.9         | .80                    | .51                                                     |                          |
| 7-----                                                                  | 450                       | 4520                      | 10.8                 | 13.7         | .79                    | .45                                                     |                          |
| 8-----                                                                  | 365                       | 3260                      | 12.9                 | 15.6         | .83                    | 1.24                                                    |                          |
| 9-----                                                                  | 355                       | 3150                      | 12.6                 | 16.2         | .78                    | 0.57                                                    |                          |
| 10-----                                                                 | 275                       | 4330                      | 12.3                 | 15.3         | .81                    | .51                                                     |                          |
| 11-----                                                                 | 390                       | 4550                      | 12.3                 | 14.6         | .84                    | .58                                                     |                          |
| 12-----                                                                 | 475                       | 4360                      | 10.5                 | 13.5         | .78                    | .26                                                     |                          |
| 13-----                                                                 | 410                       | 3400                      | 11.7                 | 14.4         | .81                    | .36                                                     |                          |
| 14-----                                                                 | 460                       | 3480                      | 11.5                 | 14.5         | .79                    | .38                                                     |                          |
| 15-----                                                                 | 380                       | 4620                      | 11.2                 | 13.9         | .80                    | .36                                                     |                          |
| 16-----                                                                 | 480                       | 4280                      | 12.2                 | 15.1         | .80                    | .38                                                     |                          |
| 17-----                                                                 | 380                       | 3360                      | 13.7                 | 16.4         | .84                    | .88                                                     |                          |
| 18-----                                                                 | 315                       | 4000                      | 12.2                 | 14.3         | .86                    | .47                                                     |                          |
| 19-----                                                                 | 520                       | 5200                      | 10.7                 | 13.6         | .79                    | .21                                                     |                          |
| 20-----                                                                 | 415                       | 4860                      | 10.9                 | 13.9         | .78                    | .37                                                     |                          |
| Avg-----                                                                | 410                       | 4030                      | 11.8                 | 14.6         | 0.81                   | 0.50                                                    |                          |
| Plant 228, grade 2 ("Salmon," (1936) percentage of kiln unknown, DP, C) |                           |                           |                      |              |                        |                                                         |                          |
|                                                                         |                           |                           | (24-hr)              |              |                        | <i>%</i>                                                |                          |
| 1-----                                                                  | 300                       | 2940                      | 14.5                 | 17.2         | 0.84                   | 0.89                                                    | 1.28 (75c)               |
| 2-----                                                                  | 310                       | 2940                      | 14.4                 | 17.3         | .84                    | .64                                                     | 0.92 (75c)               |
| 3-----                                                                  | 280                       | 2890                      | 14.5                 | 17.2         | .84                    | .54                                                     | .63 (75c)                |
| 4-----                                                                  | 180                       | 4000                      | 12.6                 | 14.9         | .84                    | .56                                                     | .75 (75c)                |
| 5-----                                                                  | 285                       | 2980                      | 15.0                 | 17.7         | .85                    | .81                                                     | .99 (75c)                |
| 6-----                                                                  | 180                       | 1620                      | 16.8                 | 20.2         | .84                    | 1.55                                                    | 1.99 (75c)               |
| 7-----                                                                  | 305                       | 3280                      | 13.8                 | 16.2         | .85                    | 0.70                                                    | 0.87 (75c)               |
| 8-----                                                                  | 400                       | 3240                      | 14.1                 | 16.6         | .85                    | .45                                                     | .54 (75c)                |
| 9-----                                                                  | 280                       | 2500                      | 15.7                 | 18.4         | .86                    | 1.54                                                    | 1.91 (75c)               |
| 10-----                                                                 | 275                       | 2650                      | 15.4                 | 18.0         | .86                    | 0.76                                                    | 1.04 (75c)               |
| 11-----                                                                 | 270                       | 2880                      | 15.2                 | 17.8         | .86                    | 1.12                                                    | 1.36 (75c)               |
| 12-----                                                                 | 225                       | 2180                      | 16.7                 | 19.5         | .86                    | 2.93                                                    | 3.50 (75c)               |
| 13-----                                                                 | 225                       | 3060                      | 15.1                 | 17.6         | .86                    | 0.87                                                    | 1.01 (75c)               |
| 14-----                                                                 | 415                       | 3550                      | 14.1                 | 16.4         | .86                    | .47                                                     | 0.61 (75c)               |
| 15-----                                                                 | 415                       | 3530                      | 14.3                 | 16.5         | .86                    | .63                                                     | .72 (75c)                |
| 16-----                                                                 | 320                       | 3460                      | 14.4                 | 16.7         | .86                    | .69                                                     | .82 (75c)                |
| 17-----                                                                 | 275                       | 2900                      | 15.5                 | 17.9         | .86                    | .79                                                     | .89 (75c)                |
| 18-----                                                                 | 200                       | 2460                      | 16.7                 | 19.3         | .86                    | 1.37                                                    | 1.74 (75c)               |
| 19-----                                                                 | 240                       | 2920                      | 15.9                 | 18.1         | .88                    | 1.43                                                    | 1.86 (75c)               |
| 20-----                                                                 | 475                       | 3720                      | 13.7                 | 15.8         | .87                    | 0.64                                                    | 0.68 (75c)               |
| Avg-----                                                                | 295                       | 2980                      | 14.9                 | 17.5         | 0.86                   | 0.97                                                    | 1.21 (75c)               |

C. E. Lovewell, W. W. Harrison, Gifford Earnest, D. A. Parsons, E. E. W. Bowen, G. P. Ransom, C. B. Affleck, A. R. Eberle, R. H. Brink, I. Bachman, H. Dollar, and E. C. Patrick assisted in the laboratory work and in making calculations at various times. Special acknowledgment is made to the staff of the Common Brick Manufacturers Association of America and to the staff of its successor, The Structural Clay Products Institute, for their aid in collecting samples and securing information from the industry.

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WASHINGTON, June 14, 1940.

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