

TECHNICAL INFORMATION ON BUILDING MATERIALS  
FOR USE IN THE DESIGN OF LOW-COST HOUSING

TIBM-12

\*\*\*\*\*

THE NATIONAL BUREAU OF STANDARDS  
UNITED STATES DEPARTMENT OF COMMERCE  
WASHINGTON, D. C.

---

May 18, 1936.

---

THERMAL INSULATION

Insulating Values for Frame Wall Construction--  
Wood Siding with Various Types of Interior Finishes

This is a brief presentation of calculated thermal insulating values for frame wall construction--wood siding with various types of interior finishes, based on tests conducted by the National Bureau of Standards and presented in detail in former Letter Circular No. 227, "Thermal Insulation", (April 19, 1927);<sup>1</sup> and Bureau of Standards Research Paper No. 291, "Heat Transfer Through Building Walls", (August 6, 1930),<sup>2</sup> by M. S. Van Dusen and J. L. Finck.

---

<sup>1</sup>Out of Print.

<sup>2</sup>Out of print and not available by purchase but may be consulted in Government depository libraries.

1870

1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

1882

1883

1884

1885

1886

1887

1888

1889

1890

1891

1892

1893

1894

1895

1896

1897

1898

1899

1900

1901

1902

1903

1904

1905

1906

1907

1908

1909

1910

1911

1912

1913

1914

1915

1916

1917

1918

1919

1920

1921

1922

1923

1924

1925

1926

COMPARATIVE INSULATING VALUES (I.V.) FOR FRAME WALL CONSTRUCTION  
WOOD SIDING WITH VARIOUS TYPES OF INTERIOR FINISHES<sup>1</sup>

| Exterior Wall Construction | Commercial Insulating Materials                           | Interior Finish                                     | I.V. <sup>1</sup> | I.V. <sup>1</sup> | I.V. <sup>1</sup> |
|----------------------------|---|---|-------------------|-------------------|-------------------|
| Type of Sheathing          | Placed Between 2" x 4" Studding (1 5/8" x 3 5/8" Dressed) | 3/4" Plaster and Metal Lath or 1/2" Plaster         | 4.3               | 6.3               | 7.2               |
|                            | Type  | Board <sup>2</sup> or Wall Board <sup>2</sup> alone | I.V. <sup>1</sup> | I.V. <sup>1</sup> | I.V. <sup>1</sup> |
|                            | Thickness   | 1/2"  | 5.7               | 6.4               | 7.2               |
|                            | Inches  | 3 5/8"  | 4.5               | 6.4               | 7.2               |
| 3/4" Wood Siding           | Unfilled Air Space  |   | 4.5               | 6.4               | 7.2               |
|                            | Flexible Insulation                                       |   | 6.3               | 8.3               | 9.0               |
|                            | Placed against one side, with one air space               |   | 7.3               | 9.3               | 10.0              |
|                            |   |   | 8.2               | 10.2              | 10.9              |
|                            |   |   | 11.9              | 13.9              | 14.6              |
|                            | Rigid Insulation Board                                    |   | 6.7               | 8.7               | 9.4               |
|                            | Centered, with 2 air spaces of equal thickness            |   | 7.5               | 9.5               | 10.2              |
|                            |   |   | 8.2               | 10.2              | 10.9              |
|                            | Flexible Insulation                                       |   | 7.0               | 9.0               | 9.8               |
|                            | Centered, with 2 air spaces of equal thickness            |   | 8.0               | 10.0              | 10.7              |
|                            |   |   | 8.9               | 10.9              | 11.7              |
|                            |   |   | 12.4              | 14.6              | 15.3              |
|                            | "Fill" Insulation   |   | 15.7              | 17.8              | 18.6              |
|                            | Flexible Insulation                                       |   | 16.6              | 18.7              | 19.5              |

<sup>1</sup>The insulating value is defined as the number of hours required for the passage of 1 Btu of heat through 1 square foot of wall area, per degree Fahrenheit temperature difference between the air on one side of the wall and the air on the other.

<sup>2</sup>If 1/2" plaster is applied to plaster board or wall board, add 0.22.

<sup>3</sup>For siding and paper on studs, without sheathing, deduct 0.75.

<sup>4</sup>If wood sheathing is replaced by 1/2", 3/4", or 1" rigid insulation boards, add 0.77, 1.52, or 2.28 respectively.

<sup>5</sup>If 1/2", 3/4", or 1" rigid insulation board is used with wood sheathing, add 1.52, 2.27, or 3.03 respectively.

<sup>6</sup>If 1/2", 3/4", or 1" flexible insulation is used with wood sheathing, add 1.85, 2.78, or 3.70 respectively.

