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TITLE 3—THE PRESIDENT

PROCLAMATION 2987

FIRE PREVENTION WEEK, 1952

BY THE PRESIDENT OF THE UNITED STATES
OF AMERICA
A PROCLAMATION

WHEREAS destructive fires continue to take an enormous toll of life and property despite the compelling need for the conservation of our human and natural resources in order to strengthen the defense of the Nation; and

WHEREAS a more concerted and widespread effort to prevent such fires must be made during the coming year if the lives of approximately eleven thousand of our citizens are to be spared, and the suffering and disability of many thousands more prevented; and

WHEREAS, in this period of crisis, the Nation can ill afford the needless waste of nearly a billion dollars in irreplaceable materials, facilities, and resources:

NOW, THEREFORE, I, HARRY S. TRUMAN, President of the United States of America, do hereby designate the week beginning October 5, 1952, as Fire Prevention Week.

I urge that every man, woman, and child in this great country contribute to the nation-wide effort to strengthen the United States by accepting a personal responsibility in the never-ending campaign to save life and property by preventing destructive fires. I request that State and local governments, the American National Red Cross, the National Fire Waste Council, the Chamber of Commerce of the United States, and business, labor, and farm organizations, as well as churches, schools, civic groups, and agencies of public information, cooperate fully in the observance of Fire Prevention Week. I also direct the appropriate agencies of the Federal Government to assist in this crusade against the loss of life and property resulting from fires.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Seal of

the United States of America to be affixed.

DONE at the City of Washington this 18th day of August in the year of our Lord nineteen hundred and fifty-two, and of the Independence of the United States of America the one hundred and seventy-seventh.

HARRY S. TRUMAN

By the President:

DAVID BRUCE,
Acting Secretary of State.

[F. R. Doc. 52-9292; Filed, Aug. 20, 1952; 11:27 a. m.]

TITLE 7—AGRICULTURE

Chapter VII—Production and Marketing Administration (Agricultural Adjustment), Department of Agriculture

[(1022-Burley and Flue-53)-3]

PART 725—BURLEY AND FLUE-CURED TOBACCO

PROCLAMATION OF RESULTS OF MARKETING QUOTA REFERENDUM

§ 725.403 *Basis and purpose.* This section is issued to announce the results of the flue-cured tobacco marketing quota referendum for the marketing year beginning July 1, 1953, and for the three-year period beginning July 1, 1953. Under the provisions of the Agricultural Adjustment Act of 1938, as amended, the Secretary proclaimed a national marketing quota for flue-cured tobacco for the 1953-54 marketing year (17 F. R. 6022). The Secretary announced (17 F. R. 6058) that a referendum would be held on July 19, 1952, to determine whether flue-cured tobacco producers were in favor of or opposed to marketing quotas for the marketing year beginning July 1, 1953, and to determine whether flue-cured tobacco producers were in favor of or opposed to marketing quotas for the three-year period beginning July 1, 1953. Since the only purpose of this proclama-

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tion is to announce the results of the referendum, it is hereby found and determined that with respect to this proclamation, application of the notice and procedure provisions of the Administrative Procedure Act (5 U. S. C. 1003) is unnecessary.

§ 725.404 Proclamation of the results of the flue-cured tobacco marketing quota referendum for the marketing year beginning July 1, 1953, and for the three-

year period beginning July 1, 1953. In a referendum of farmers engaged in the production of the 1952 crop of flue-cured tobacco held on July 19, 1952, 260,163 farmers voted. Of those voting, 254,317, or 97.8 percent, favored quotas for a period of three years beginning July 1, 1953; 2,639, or 1.0 percent, favored quotas for only the one year beginning July 1, 1953; and 3,207, or 1.2 percent, were opposed to quotas. Therefore, the national marketing quota of 1,234 million pounds proclaimed July 1, 1952 (17 F. R. 6022) for flue-cured tobacco for the 1953-54 marketing year will be in effect for such year and marketing quotas on flue-cured tobacco will be in effect for three marketing years beginning July 1, 1953.

(Sec. 375, 52 Stat. 66; 7 U. S. C. 1375. Interprets or applies sec. 312, 52 Stat. 46, as amended; 7 U. S. C. 1312)

Done at Washington, D. C., this 18th day of August 1952. Witness my hand and the seal of the Department of Agriculture.

[SEAL] K. T. HUTCHINSON,
Acting Secretary of Agriculture.

[F. R. Doc. 52-9239; Filed, Aug. 20, 1952; 8:51 a. m.]

TITLE 32A—NATIONAL DEFENSE, APPENDIX

Chapter III—Office of Price Stabilization, Economic Stabilization Agency

[Ceiling Price Regulation 164]

CPR 164—GROCERS, VARIETY AND SPECIALTY PAPER, FILM AND FOIL BAGS

Pursuant to the Defense Production Act of 1950, as Amended, Executive Order 10161, and Economic Stabilization Agency General Order No. 2, this Ceiling Price Regulation 164 is hereby issued.

STATEMENT OF CONSIDERATION

This regulation establishes ceiling prices for all manufacturers of bags made from paper, film, or foil. These bags exclude paper shipping sacks covered by Ceiling Price Regulation 115, but include those other bags made of paper and those made wholly or partly of plastic film, mesh, foil or protective laminants, and those made wholly or partly by hand or machine. However, manufacturers whose ceiling prices have been established under General Overriding Regulation 20 or 21, or under Supplementary Regulation 17 or 18 to Ceiling Price Regulation 22, may elect to retain their ceiling prices so established for products covered by this regulation.

The ceiling price provisions of the regulation are divided into two subarticles under Article II. Subarticle I covers all bags which are made to standard specifications and the ceiling prices for the most part are spelled out. Subarticle II covers all bags which are made to order to the specifications and quantity requirements of an individual buyer and the ceiling prices are computed by a formula for each order.

Generally speaking, the bags covered by Subarticle I are carried in stock by

manufacturers for sale to wholesale buyers who in turn stock these bags for resale to retail stores. However, the bags covered by Subarticle II are generally sold and shipped by the manufacturer directly to the ultimate user.

Description of the product and the industry covered. The largest single segment of bags covered by Subarticle I is composed of retail store bags, commonly used for over-the-counter delivery of food and other consumer merchandise. Within this segment the largest single grade is the grocers bag. The cubic capacity, basic weight and minimum strength of paper for each grocers bag size have been standardized by the U. S. Department of Commerce, National Bureau of Standards, in Simplified Practice Recommendation R42-43.

All other types of standard-size bags used in retail stores, such as notion and millinery bags used by department stores, garment bags used by dry-cleaning establishments and bottle bags used by package stores are commonly designated in the trade as Variety bags. Some of these Variety bags also have been standardized by the U. S. Bureau of Standards in Simplified Practice Recommendations R129-41 and R107-31, covering millinery and notion, and glassine bags, respectively.

A third, well-established group of bags which is covered by Subarticle I of Article II is designated in the trade as Household bags, and includes bags designed for household, hospital, restaurant, and similar uses, such as kitchen and garbage bags, lunch bags, sandwich bags and moth-proof storage bags. Although Household bags also are manufactured for stock in standard sizes, their specification standards (and also some variety bags) may vary as between different manufacturers, whereas grocers bags specifications are standardized for all manufacturers by the Government.

More than 100 manufacturers produce Standard bags of the types which fall under Subarticle I. Twenty-eight of them produce Grocers and Variety bags. The others produce one or more types of Variety or Household bags or both. The total volume of all bags covered by Subarticle I is estimated at 700,000 tons annually, with a sales value of approximately \$200,000,000.

In the Grocers and Variety bag group, 10 of the 28 manufacturers are integrated, i. e., producers of most of their raw materials, and the remaining 18 are converters who buy the raw materials from which they manufacture bags. In general, the 18 converters distribute in less-than-carload lots of their respective local markets, while the integrated manufacturers distribute nationally on a carload basis. The 10 integrated manufacturers produce approximately 75 percent of the total tonnage of Grocers and Variety bags made by this group.

Many of the manufacturers who produce Standard bags covered by Subarticle I produce some types of Specialty bags covered by Subarticle II. There are also many converters who produce Specialty bags only. Combined, over 150

manufacturers produce Specialty bags covered by Subarticle II. No exact figures are available, but it is estimated that these Specialty bags total 90,000 tons annually, with a sales value of \$100,000,000. This is about four times the value-per-ton of the Standard bags in Subarticle I, due to the use of higher priced materials and to the higher-cost "tailored-made" nature of the manufacturing operations required for Specialty as compared with Standard bags.

Recent economic developments. Although some stability is exhibited by this industry in price, there is an unusual degree of stability in consumption of bags. For the large volume items, grocers bags, the average annual shipment from 1936 through 1940 was 12.7 million bales while for the comparable period 10 years later, 1946 through 1950, it was 12.1 million bales. During World War II there was an extreme shortage, shipments dropping to as low as 7.6 million bales in 1945. For the year 1951, there were 13.0 million bales shipped, 3.2 percent above the 1950 rate of 12.6 million bales.

Much of the growth in the industry's volume lines occurred in grocers sacks, reflecting a change in consumer habits and the development of supermarkets where this type of bag has extensive use. For the period 1937 through 1940, shipments of grocers sacks averaged 1.6 million bales annually while 10 years later for the comparable period (1947-50) this average was 3.1 million bales. The average weight of each bale of sacks is about the same as of grocers bags (60 pounds) but there are five times as many bags as there are sacks in a bale. Only 1.5 million bales of sacks were shipped in 1945, the low point of the World War II shortage. During the year 1951, there were 4.0 million bales of sacks shipped, which was 10 percent above 1950.

The most representative product for this segment of the bag industry is the 12-pound grocers bag. It is of medium size and is made of 35-pound basis weight paper, which is about an average for all grocers bags. The raw material paper cost is about two-thirds of the selling price of the finished bag. Over the past five years the domestic price of 35-pound basis weight unbleached kraft paper rose from an average of \$120 per ton in 1947 to \$137 in 1950 and \$156 in 1951. The corresponding price movement of the 12-pound bag in carload lots was from an average of \$182 per ton in 1947 to \$192 in 1950 and \$226 in 1951. In 1947, paper cost was 66 percent of the price of the bag, in 1950 it was 71 percent and in 1951 it was 69 percent.

Summary of the main features of the regulation. Dollar-and-cent ceilings are established in section 4 for about 75 percent of the tonnage of Standard bags. For the remaining 25 percent of the tonnage, ceiling prices are fixed in section 5 by applying the historical differential of each manufacturer to the dollar-and-cent ceiling price established for his largest volume item in the category in which the product for which he is de-

termining a ceiling price falls; or if there are no spelled out ceiling prices in section 4 of grades produced by him, the manufacturer's ceiling prices on all items are those which he had in effect on November 1, 1951. On new grades, ceiling prices are determined by use of his most closely competitive manufacturer's price or by relating the bag in question to his own most comparable grade.

For many years most paper bag manufacturers have priced their standard product by the use of discounts from base lists and this regulation utilizes that technique in specifying the ceiling prices of Standard and Variety bags. These discounts are stated in terms of so many "fives"; that is, each successive "five" representing 5 percent discount from the previous net figure. A common base list is used by the trade so that any difference in price can be recognized and measured immediately for any size and grade of bag by the difference in discount. Base list and discount tables are located in Appendix A.

Ceiling prices for the Specialty bags are related directly to the individual specifications and quantities requested by each buyer. Consequently, they are computed by a formula which adds a markup, or a profit margin, to the material and conversion cost factors used in pricing the production of the exact specifications and quantity which the customer requests. Whatever formula was in use during the base period, January 25 through February 24, 1951, becomes the basis for determining the ceiling price on any such Specialty bag. All the factors in the formula, except for the basic raw materials (paper, film or foil), are frozen as of the base period.

For the basic raw materials an adjustment is made necessary by the particular pricing conditions which existed during the general freeze period. Standard bag prices generally are highly sensitive to competitive conditions and move more widely and quickly than Specialty bag prices which are set by relatively fixed formula, reflecting changes in costs with a fixed profit margin, and without the sensitivity to market conditions which obtains on Standard bag prices. For this reason, Specialty bag prices had not moved upward, by the time of the general freeze, to the extent that Standard bags had adjusted themselves to the demand and, consequently, there was an imbalance between the two categories of bag production.

Being tailor-made, Specialty bags normally sell at prices netting more dollars per ton than do Standard bags made of identical material. The distortion during the freeze period reversed this relationship and the present action corrects this distortion by permitting the use, in this raw material factor, of costs for the basic raw materials (paper, film and foil) not exceeding the ceiling prices initially established in tailored regulations covering such raw materials, or until such a regulation is issued, the highest cost incurred for such basic raw materials up to and including December 31, 1951.

Although this adjustment affects unbleached bag specialties to a limited ex-

tent due to the light weight paper differentials of CPR 88, it is of prime consequence in only about one-sixteenth of the tonnage of this industry, in the bleached paper and plastics group where it is quite important to a large number of the smaller companies which tend toward production to individual specification and might otherwise be forced out of this type of manufacture or to the use of substitute materials.

The level of ceiling prices under this regulation. The ceiling prices established for standard bags are at or below the ceilings which were in effect under the General Ceiling Price Regulation and reflect current prices except in the case of standard plastic film bags, where cost studies have indicated that the appropriate level lies between the GCPR ceilings and the lower selling prices currently in effect. The spelled out ceiling prices established for Standard stock size bags, for orders of minimum lots of 600 bales or more, are those which manufacturers accounting for most of the production of such bags had in effect during the base period January 25 through February 24, 1951, and have currently in effect. They are substantially below the ceiling prices that have been filed for this tonnage with the Office of Price Stabilization under Ceiling Price Regulation 22. Orders for intermediate quantities (250 to 599 bales) take a one "five" upcharge above the ceiling price for minimum orders of 600 bales. Orders for less than 250 bales take an upcharge of three "fives" above the ceiling price for minimum orders of 600 bales of paper bags, other than those made from glassine paper and from plastic films.

The ceiling prices on Standard bags made from glassine paper are adjusted to the current level which is 7 percent less than the prices in effect during the base period. Standard bags made from plastic film have ceiling prices about 3 percent less than those in effect during the base period and 5 percent higher than prices currently in effect. The ceiling prices for Standard bags made of plastic film were developed by adjusting their prices prior to June 1950 for changes in costs other than basic raw materials through July 26, 1951 and reflecting the increase in basic raw material costs up to and including December 31, 1951.

Ceiling prices for Specialty bags will be above those which have been in effect since January 25, 1951, but well below the filed ceiling prices which were permitted many manufacturers under Ceiling Price Regulation 22. These ceiling prices will correct the imbalance, referred to above, between the ceiling prices for specialty bags and the ceiling prices for standard bags which were in effect under the General Ceiling Price Regulation.

FINDINGS OF THE DIRECTOR OF PRICE STABILIZATION

In the judgment of the Director of Price Stabilization, the ceiling prices established by this regulation are generally fair and equitable and are necessary to effectuate the purposes of Title IV of the Defense Production Act of 1950, as amended.

So far as practicable, the Director of Price Stabilization gave due consideration to the national effort to achieve maximum production in furtherance of the objective of the Defense Production Act of 1950, as amended; to prices prevailing during the period January 25 through February 24, 1951, and just before the issuance of this regulation, and to relevant factors of general applicability.

In the formulation of this regulation there has been consultation with industry representatives, including meetings with the industry advisory committee and with trade association representatives, and consideration has been given to their recommendations.

Every effort has been made to conform this regulation to existing business practices, cost practices or methods, or means or aids to distribution. Insofar as any provisions of this regulation may operate to compel changes in the business practice or methods or means or aids to distribution, such provisions are found by the Director of Price Stabilization to be necessary to prevent circumvention or evasion of this regulation.

REGULATORY PROVISIONS

ARTICLE I—APPLICABILITY

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2. Applicability.
3. What this regulation supersedes.

ARTICLE II—CEILING PRICES

SUBARTICLE I—CEILING PRICES FOR STANDARD BAGS

4. Grocers and certain variety bags.
5. Standard bags not listed in section 4 of this regulation.
6. Standard bags not covered by sections 4 and 5 of this regulation.

SUBARTICLE II—CEILING PRICES FOR SPECIALTY BAGS

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18. Interpretations.
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20. Prohibitions and violations.
21. Evasions.
22. Definitions and explanations.

APPENDIX A: Industry Base Lists and Discount Tables and General specifications of certain Standard bags.

AUTHORITY: Sections 1 to 22 issued under sec. 704, 64 Stat. 816, as amended; 50 U. S. C. App. Sup. 2154. Interpret or apply Title IV, 64 Stat. 803, as amended; 50 U. S. C. App. Sup. 2101-2110, E. O. 10161, Sept. 9, 1950, 15 F. R. 6105; 3 CFR 1950 Supp.

ARTICLE I—APPLICABILITY

SECTION 1. *What this regulation does.*
(a) This regulation establishes ceiling prices for sales by manufacturers of all

types of bags produced in the United States, which are made from paper, film, foil or any combination thereof (except shipping sacks). This includes bags wholly or in part of bag-making plastic films, paper, paper mesh, foil or protective laminants. It also includes paper bags made with a textile mesh window.

(b) Ceiling prices for all bags which are made in standard specification are established under Subarticle I of Article II. For most of these, uniform dollar-and-cent ceiling prices per thousand bags are established in section 4 of this regulation in the form of discounts from base lists and net price tables which are located in Appendix A. Ceiling prices for the remaining Standard bags, covered by section 5, are determined by the application of historical differentials to the grades of bags having spelled-out ceiling prices in section 4 of this regulation.

(c) Ceiling prices of all Specialty (made-to-order) bags are established under Subarticle II of Article II. A separate ceiling price for each bag is determined by the application of each manufacturer's base period formula. In applying the formula, he may not use raw material costs higher than the ceiling prices which existed during the base period, except for the basic raw material (paper, film, or foil) which cost may be adjusted to the ceiling price established in the initial tailored regulation or, until such regulation is issued, the highest cost to the manufacturer of such basic raw materials through December 31, 1951.

Sec. 2. Applicability. The provisions of this regulation are applicable to all sales by manufacturers to purchasers located in the United States, the District of Columbia and the territories and possessions of the United States.

Sec. 3. What this regulation supersedes. The ceiling prices in this regulation supersede those established under the provisions of the General Ceiling Price Regulation and Ceiling Price Regulation 22. Ceiling Price Regulation 61 and 9 are superseded with respect to shipments to the territories and possessions of the United States. However, manufacturers who have received ceiling price adjustments under General Overriding Regulation 20 or 21, or under Supplementary Regulation 17 or 18 to Ceiling Price Regulation 22, may elect to retain the ceiling prices which have been established thereunder, but in all other respects are subject to this regulation. If a manufacturer so elects, he must do so for all the products covered by this regulation for which his ceiling prices are now determined under GOR 20 or 21, or SR 17 or 18 to CPR 22.

ARTICLE II—CEILING PRICES

SUBARTICLE I—CEILING PRICES FOR STANDARD BAGS

Sec. 4. Grocers and certain variety bags. (a) For the grades of grocers and variety bags listed below and further specified in Appendix A, ceiling prices are determined by applying the following discounts to the corresponding industry base price lists included in Ap-

pendix A to obtain a net ceiling price. This net ceiling price for each bag is obtained by deducting 5 percent from the base price, then deducting 5 percent from the resultant figure, and so on until the indicated number of "fives" has been applied. The net price tables with each base list provide a method of rapid de-

termination of the net ceiling prices for standard sizes and grades of bags after deducting the manufacturer's discount but before applying any cash discount or other terms of sale. This section applies to a manufacturer who publishes net prices as well as to one who publishes base price lists and discounts.

STANDARD GROCERS AND VARIETY BAGS

Column No.	Items	Minimum discounts			
		(1) 600 bales minimum	(2) 250 to 599 bales	(3) Less than 250 bales	(4) Base list No. (Ap- pendix A)
	Grocers bags, automatic:				
	Popular weight brown M. F.	18/5	17/5	15/5	1
	Popular weight white M. F.	14/5	13/5	11/5	1
	Popular weight white M. G. striped.	13/5	12/5	10/5	1
	Heavy weight brown M. F.	14/5	13/5	11/5	1
	Extra heavy weight brown M. F.	18/5	17/5	15/5	2
	Grocers bags, square or flat:				
	Popular weight brown M. F.	19/5	18/5	16/5	1
	Popular weight white M. F.	14/5	14/5	12/5	1
	Popular weight white M. G. striped.	14/5	13/5	11/5	1
	Grocers sacks, satchel bottom:				
	Standard				
	Bundle, Brown M. F.	19/5	18/5	16/5	3
	Poultry				
	Bread bags, square:				
	30-pound brown M. F.	14/5	13/5	11/5	4
	30-pound brown M. G. striped.	13/5	12/5	10/5	4
	25-pound brown M. G. striped.	14/5	14/5	12/5	4
	30-pound white M. F.	10/5	9/5	7/5	4
	30-pound white M. G. striped.	9/5	8/5	6/5	4
	Candy bags, automatic, flat:				
	30-pound white M. F. automatic.	7/5	6/5	4/5	5
	30-pound white M. F. flat.	8/5	7/5	5/5	5
	Garment and pants bags, flat with shoulder:				
	30-pound brown M. F. striped.	14/5	13/5	11/5	6
	25-pound brown M. F. striped.	15/5	14/5	12/5	6
	30-pound brown M. G. striped.	13/5	12/5	10/5	6
	25-pound brown M. G. striped.	14/5	13/5	11/5	6
	30-pound white M. F. striped.	10/5	9/5	7/5	6
	25-pound white M. F. striped.	11/5	10/5	8/5	6
	30-pound white M. G. striped.	9/5	8/5	6/5	6
	25-pound white M. G. striped.	10/5	9/5	7/5	6
	Garbage bags (bulk square): 41-pound brown M. F. waxed.	11/5	10/5	8/5	7
	Liquor bags, square: Brown M. F.	18/5	17/5	15/5	8
	Mail bags, automatic: Brown M. F.	18/5	17/5	15/5	9
	Notion and millinery bags, flat:				
	30-pound brown M. F.	13/5	12/5	10/5	10
	25-pound brown M. F.	14/5	13/5	11/5	10
	30-pound brown M. G. striped.	12/5	11/5	9/5	10
	25-pound brown M. G. striped.	13/5	12/5	10/5	10
	Shoe bags, square:				
	30-pound brown M. F.	15/5	14/5	12/5	11
	30-pound brown M. G. striped.	14/5	13/5	11/5	11
	35-pound brown M. F.	13/5	12/5	10/5	11
	Glassine bags:				
	25-pound white glassine, flat.			10/5	12
	25-pound white glassine, square.			10/5	13
	Cellophane bags, satchel bottom, flat or square:				
	Merchants discount.			1 8/5-2 1/4	14
	Consumers discount.			1 7/5-2 1/4	14

¹ The affix "2 1/4" after the discount in column (3) for cellophane bags means that an additional reduction of 2 1/4 percent is applied to the net price to establish a ceiling price for these bags. Example: The ceiling price for sale to the merchants on a 1-pound satchel bottom cellophane bag made from 300 MFT is shown as 8/5-2 1/4 from the industry base list No. 14 in Appendix A. 8/5 applied to that base list for that grade and size bag is \$7.04 per thousand. That price is reduced by 2 1/4 percent or by \$0.18, resulting in a ceiling price of \$6.86 per thousand for that grade and size of bag.

NOTE.—M. F. means machine finished and M. G. means machine glazed.

(b) The discounts in the column (1) above apply to the base price lists (indicated by number in the fourth column above) which appear in Appendix A. The resulting net ceiling prices apply to orders of no less than 600 bales of Grocers or Variety bags or a combination of both shipped at one time to one buyer, one shipping destination f. o. b. the bag manufacturer's plant with the same amount of freight allowance as was allowed by each manufacturer during the base period.

(c) The discounts in column (2) above apply to the base price lists (indicated by the number in the fourth column above) which appear in Appendix A. The resulting net ceiling prices apply to orders of 250 through 599 bales of Grocers or Variety bags or a combination of

both shipped at one time to one buyer, one shipping destination f. o. b. the bag manufacturer's plant with the same amount of freight allowance as was allowed by each manufacturer during the base period.

(d) The discounts in the column (3) above apply to the base price lists (indicated by number in the fourth column above) which appear in Appendix A. The resulting net ceiling prices apply to orders of less than 250 bales of Grocers or Variety bags f. o. b. the bag manufacturer's plant subject to the same freight allowance for the same minimum order quantities that each manufacturer had in effect during the base period.

(e) For glassine bags, the resulting net ceiling prices shall apply to all orders shipped to all destinations covered by

this regulation, except those shipments made into the States of California, Oregon, Washington, Idaho, Montana, Wyoming, Utah, Nevada, Colorado, Arizona or New Mexico. On orders to be shipped to points in those eleven States all manufacturers shall be permitted to use a price 7 percent higher than the ceiling prices established in section 4 (a) of this regulation on glassine bags.

Sec. 5. Standard bags not listed in section 4 of this regulation. For all other grades of Standard bags for which you had a published base or net price list in effect on November 1, 1951, you shall establish your ceiling prices f. o. b. your plant, with the same amount of freight allowance as was allowed by you during the base period by the following procedure:

(a) Select from your November 1, 1951, price list those items which are listed in section 4 and which are in the same category as the item for which you are determining a ceiling price under this section. From such items, select that one which was your largest volume item. This selection is your "reference item". Your largest volume item can be measured by tons or by sales dollars as of the calendar year 1950 or, if you began manufacturing bags after January 1950, as of the first 12 months of your operations. The determination of category is by the material from which the bag is made: (1) Paper other than glassine; (2) glassine paper; (3) cellophane, plastic, and other films. Where a product for which the ceiling price is to be determined by the provisions of this section is made of materials which fall within more than one of the three categories, your reference item should be chosen from the category of the material which adds most to the cost of the product.

(b) Next determine the difference, if any, between the net price on the price list which you had in effect on November 1, 1951, for the largest quantity sales of your reference item and the net price given for that same item in the corresponding quantity in section 4 of this regulation. This difference is your "adjustment factor".

(c) Then apply the adjustment factor, determined above, to the price for each size bag in the same category shown on those base or net price lists which you had in effect on November 1, 1951, other than those items listed in section 4. The prices resulting from application of the adjustment factor are your ceiling prices under this regulation for Standard bags not listed in section 4 of this regulation.

Example A: Assume that your reference item is popular weight Brown M. F. Grocers Bags for which item section 4 establishes a discount of 18/5's and that on November 1, 1951, your discount for the reference item on your price list was 16/5's. Since this is a difference of 2/5's, your ceiling prices on all your Standard bags made of other than glassine or films, which do not appear in section 4 are your November 1, 1951, prices reduced by 2/5's.

Example B: Assume that your reference item is satchel bottom cellophane bags and that you wish to price a 1 lb. size bag made from 300 M S T cellophane:

(1) On the effective date of this regulation the discount in section 4 resulting from

the application of 8/5's-2 1/2 for this size bag produces a ceiling price of \$6.88 per M to the merchants for those manufacturers using net price lists and that,

(2) On November 1, 1951 your price on this 1 lb. bag was \$7.36 per thousand. It follows that:

(3) The ceiling price of \$6.88 per thousand is 6.8 percent below your November 1, 1951 price of \$7.36 per thousand for this size bag.

Consequently, your ceiling prices on all your Standard bags made from cellophane, plastic, or other films, which do not appear in section 4 are your November 1, 1951 net list prices reduced by 6.8 percent.

Sec. 6. Standard bags which are not covered by sections 4 and 5 of this regulation. (a) If you cannot determine a ceiling price for any Standard bag under the provisions of sections 4 and 5 of this regulation you must apply for approval of a ceiling price by filing your application with the Forest Products Division, Office of Price Stabilization, Washington 25, D. C. Your application shall contain the following:

(1) The reason why you cannot determine a ceiling price for that same item under the provisions of sections 4 and 5 of this regulation.

(2) Your proposed ceiling price for that same item which may not exceed the ceiling price of that same item established by your most closely competitive manufacturer to purchasers of the same class.

(3) The ceiling price of your most closely competitive manufacturer for that same item to purchasers of the same class and the reason why you have selected him as your most closely competitive manufacturer.

(4) The name and address of your most closely competitive manufacturer.

(b) If the item is one for which you are unable to find that another manufacturer has established a ceiling price under this regulation, you shall propose a ceiling price calculated as follows:

(1) Find the percentage markup (margin factor) over total current unit direct cost of labor and materials which you are currently receiving on the most comparable item for which you have established a ceiling price under sections 4 and 5 of this regulation.

(2) Apply not more than the same margin factor to the total current unit direct cost of labor and materials of the proposed item to determine your proposed price.

(c) You may not sell the item priced under this section 6 of this regulation until the Director of Price Stabilization in writing establishes your ceiling price for the item. However, if the commodity is one required to be priced under this section, and which, prior to the effective date of this regulation, you sold or offered for sale upon the basis of a ceiling price determined under the GCPR or CPR 22, you may continue to use your ceiling price which was applicable on the effective date of this regulation for 21 days from the filing of your application, or until you receive notice from the Director of Price Stabilization concerning your proposed ceiling price if such notice is received before the 21 day period expires. If within 21 days from the filing of the application you have not received

notice from the Director approving, disapproving, or modifying the proposed ceiling price, requesting additional information, or extending for cause the time within which to do any of the foregoing, such application may be deemed to have been approved, subject to non-retroactive disapproval or modification at any later time by the Director.

SUBARTICLE II—CEILING PRICES FOR SPECIALTY BAGS

Sec. 7. Application of base period formulas. (a) For all Specialty bags, as defined in section 22 (b) (7) of this regulation, each manufacturer shall determine his ceiling prices by using the formula which he had in effect during the base period January 25, 1951, through February 24, 1951.

(b) His formula shall contain the following factors: Raw material, conversion, margin and delivery. The ceiling price for each bag shall be established by computing the sum of those factors in the same manner that prices were determined during the base period, subject, however, to the following limitations in the determinations of each factor.

(1) *Raw material factors.* Your basic raw material costs shall be calculated in your base period manner:

(i) Except as provided in subdivision (ii) of this subparagraph, in calculating your factor for basic raw materials (paper, film and foil) you may use, and shall not exceed, the ceiling prices of the basic raw materials as initially established by a tailored regulation or, until such a regulation is issued, the highest costs to you of such basic raw materials up to and including December 31, 1951. For all other raw material you may use the highest lawful costs to you during the base period.

(ii) If you produce any basic raw material and during the base period it was your practice to use a transfer price for that basic raw material which was lower than your market price, you shall reduce the ceiling price in the tailored regulation for such basic raw material by the same dollar amount as your transfer price was below your market price during the base period. If, however, you did not have a market price for such basic raw material during the base period, you shall reduce the ceiling price in the tailored regulation for such basic raw material by the same dollar amount as your transfer price was below the market price of your most closely competitive manufacturer who had a market price during the base period.

(iii) If you included amounts for waste or spoilage in computing your raw material factor during the base period, you may continue to do so in your base period manner. However, you may not add more than the same percentage allowed for waste or spoilage during the base period, and you must subtract credits received from the sale or other disposition of waste material in the same manner in which such credits were subtracted during the base period.

(2) *Conversion factor.* (i) Conversion charges for any hand or machine operation, or both, incident to the manufacture of the bags, including make-

ready, fabrication, printing, assembly, marking and packing, shall be computed in accordance with the hourly or piece rates, or both, and standards of production which you used for the same commodity during the base period, or if any of these supplementary operations were covered by a price list during the base period, the same base period prices may be added to, but not included in, the formula for these supplementary operations.

(ii) Conversion charges for a bag which was not offered or manufactured by you during the base period shall be calculated by the same method as for your conversion charges for the most comparable bag upon which you did quote a price during the base period.

(3) *Margin factor.* Your margin factor is the difference between your selling price f. o. b. your plant and the sum of your raw material and conversion factors as computed during the base period. Your margin factor may be figured on a percentage basis, or on a rate per unit of material basis, or it may be included in the machine hour rate. It may also be a combination of any or all of these methods, but it must be based upon the same accounting and costing practices which you used during the base period. In no event shall the margin factor exceed the following limitations:

(i) If the bag is one which you sold to the same class of purchaser during the base period, your margin factor shall not exceed the margin factor employed by you for sales of the same bag to the same class of purchaser during the base period.

(ii) If the bag is one that you did not sell to the same class of purchaser during the base period, the margin factor shall not exceed that employed by you in pricing the most comparable bag which you sold to the same class of purchaser during the base period.

(iii) If you did not sell any bag to the same class of purchaser, then you should apply for a margin factor under section 9.

(4) Differentials for quantities shall be no less favorable to the buyer than those you had in effect during the base period for the same or similar type of bag to the same class of purchaser.

(5) *Delivery factor.* With respect to all delivery charges, you shall continue to use the method employed by you during the base period, for example, f. o. b. mill pricing, f. o. b. mill pricing with a freight allowance, delivered pricing, delivered zone pricing, or any other method which you applied consistently during the base period.

SEC. 8. Ceiling prices for new manufacturers. (a) If you are a manufacturer of Specialty bags who started business after February 24, 1951, and before the date of issuance of this regulation, your ceiling prices shall be determined under the provisions of Subarticle II of this regulation except that, insofar as you are concerned, the term "base period" wherever used in this regulation shall refer to the thirty day period immediately preceding the issuance of this regulation. Your ceiling prices shall be

subject to non-retroactive modification by the Director of Price Stabilization.

(b) If you are a manufacturer of Specialty bags who starts business after the effective date of this regulation, you shall file a proposed formula with the Office of Price Stabilization, Forest Products Division, Washington 25, D. C., including such items as, but not limited to, hourly rates or piece rates for hand or machine operations, or rates per thousand units, and standards of production applicable thereto, as defined in section 22 of this regulation, make-ready charges, delivery charges, and margin factors employed by you in determining the selling price of each commodity or service, as well as one sample estimate showing how each formula is applied. You may not sell the commodity or service until the Director of Price Stabilization, in writing, approves your formula. If the Director does not approve your formula within twenty-one days from the date your formula is filed, your formula may be deemed to be approved subject to non-retroactive disapproval or modification at any later time by the Director of Price Stabilization.

SEC. 9. Application for approval of new formula factors. (a) If you are a manufacturer who was in business during the base period and who has subsequently installed new equipment or methods of production requiring new conversion or margin factors, or if you cannot establish a margin factor under section 7, you shall file by registered mail return receipt requested, an application with the Office of Price Stabilization, Forest Products Division, Washington 25, D. C., which shall include your proposed factors for approval, disapproval or modification.

(b) Your application for approval of a new conversion factor shall include: (1) The hourly or piece rates for similar hand or machine operations generally prevailing in your immediate competitive area during the base period, and (2) an explanation for any variance between such generally prevailing rate and the rate you now wish to apply.

(c) Your application for approval of a new margin factor shall include: (1) The location of your plants; (2) the type of equipment you use; (3) the capacity of your equipment; (4) a list of the products you intend to produce; (5) the margins proposed; and (6) a statement and an example of the method you use to determine special differentials.

(d) You may use the proposed conversion or margin factors as soon as you file your application. However, until your application has been approved by the Director of Price Stabilization, you shall notify the purchaser in writing that all prices which have been based upon the proposed conversion or margin factors are subject to adjustment by you, and to refunds if necessary, to conform with the conversion or margin factors as established by the Director of Price Stabilization. If the Director does not disapprove or revise your formula or factor by letter order within twenty-one days from the date of the return receipt of the application (or date of receipt by the Office of Price Stabilization

if the application is delivered by hand), the factors requested may be deemed to be approved subject to non-retroactive disapproval or revision at any later time by the Director. In the event that more information is requested, your ceiling price shall not be deemed to be approved until fifteen days after filing the additional information.

ARTICLE III—REPORTS AND RECORDS

SEC. 10. Base period records. On and after the effective date of this regulation, and for so long as the Defense Production Act of 1950, as amended, shall remain in effect, and for two years thereafter, each manufacturer shall maintain and keep for examination by the Director of Price Stabilization:

(a) All of his existing records, relating to prices and terms of sale which he charged for bags sold or offered for sale during the base period, and his published base or net price list which was in effect on November 1, 1951.

(b) His price formulas or estimating manuals for grades under section 7 of Article II which were employed by him during the base period for each formula including such items as, but not limited to, material costs, hourly rates or piece rates per thousand units and standards of production applicable thereto as defined in section 22 of this regulation, make-ready charges, charges for all extra operations such as printing, tin tie or handle attachment, punching, die cutting, special packing, etc., margins and delivery charges, plus one sample of each formula to show how it was applied.

SEC. 11. Current records. (a) Each manufacturer, and each person who in the course of business buys bags from manufacturers covered by this regulation, shall keep for inspection by the Director of Price Stabilization for a period of two years from date of sale accurate records or invoices for each sale or purchase made after the effective date of this regulation showing (1) the date of the sale or purchase, (2) the name and address of the seller and purchaser, (3) the price charged or paid, and (4) the quantity and specifications of the bag.

(b) Each manufacturer who produces bags covered by this regulation shall keep and maintain so long as the Defense Production Act, as amended, shall remain in effect and for two years thereafter for inspection by the Director of Price Stabilization:

(1) His net price lists, or base price lists and discount tables and his actual discounts or prices put into effect after determining ceiling prices under sections 5 and 6 of this regulation.

(2) The calculation by which his ceiling price was determined for each bag covered by Subarticle II of Article II of this regulation.

SEC. 12. Agents of manufacturers. Within 30 days of the effective date of this regulation each manufacturer shall file with the Forest Products Division, Office of Price Stabilization, Washington 25, D. C., the names of his authorized agents, as defined in section 22 of this regulation.

ARTICLE IV—GENERAL PROVISIONS

Sec. 13. Export sales and shipment to territories and possessions of the United States. (a) Ceiling prices for export sales and sales for export to foreign countries are established under Ceiling Price Regulation 51.

(b) If you are a manufacturer located within the continental United States and you ship a commodity covered by this regulation to one or more of the territories and possessions, your ceiling price for the sale of that commodity is your ceiling price on that commodity as established under this regulation for a domestic sale, f. o. b. the nearest domestic port of exit, plus all actual direct or indirect costs incident to such transactions, such as but not limited to, special packaging, warehousing, transportation, insurance and taxes.

Sec. 14. Cash discount and terms of sale. Your cash discount and terms of sale shall be no less favorable to your purchaser than you allowed during the base period to the same or most comparable class of purchaser.

Sec. 15. Petitions for amendment. Any person who wishes to have this regulation amended may file a petition for amendment in accordance with the provisions of Price Procedural Regulation 1, Revision 2.

Sec. 16. Modification of ceiling prices by the Director of Price Stabilization. The Director of Price Stabilization may at any time disapprove or reduce ceiling prices established under this regulation so as to bring them into line with the level of ceiling prices otherwise established by this regulation.

Sec. 17. Adjustable pricing. Nothing in this regulation shall be construed to prohibit the making of a contract or offer to sell paper bags at (a) the ceiling price in effect at the time of delivery, or (b) the lower of a fixed price or the ceiling price in effect at the time of delivery.

Sec. 18. Interpretations. If you want an official interpretation of this regulation, you should write to the District Counsel of your local OPS District Office. Any action taken by you in reliance upon and in conformity with a written official interpretation will constitute action in good faith pursuant to this regulation. Further information on obtaining official interpretations is contained in Price Procedural Regulation 1.

Sec. 19. Transfer of business or stock in trade. If the business, assets or stock in trade of any business are sold or otherwise transferred after the effective date of this regulation and the transferee carries on the business or continues to deal in the same type of commodities in an establishment separate from any other establishment previously owned or operated by him, the ceiling prices of the transferee, with respect to sales of bags, shall be the same as those to which his transferor would have been subject if no such transfer had taken place, and his obligation to keep records sufficient to verify such prices shall be the same. The transferor shall either preserve and

make available for so long as the Defense Production Act of 1950, as amended, remains in effect, and for two years thereafter, or turn over to the transferee all records of transactions prior to the transfer which are necessary to enable the transferee to comply with the provisions of this regulation.

Sec. 20. Prohibitions and violations. (a) You shall not do any act prohibited or omit to do any act required by this regulation, nor shall you offer, solicit, attempt, or agree to do or omit to do any such acts. Specifically, but not in limitation of the above, you shall not, regardless of any contract or other obligation, sell, and no person in the regular course of trade or business shall buy from you, at a price higher than the ceiling prices established by this regulation, and you and buyers from you shall keep and preserve true and accurate records and reports required by this regulation. Prices lower than the ceiling prices may be charged, paid or offered.

(b) If you violate any provisions of this regulation, you are subject to criminal penalties, enforcement action, and action for damages.

(c) If any person subject to this regulation fails to prepare or keep any record or file any report required by this regulation in connection with the establishment of his ceiling price, or if any person subject to this regulation fails to establish a ceiling price or apply to the Office of Price Stabilization for the establishment of a ceiling price, if he is required to do so, the Director of Price Stabilization may issue an order fixing his ceiling prices. Any ceiling price fixed in this manner will be in line with ceiling prices generally established by this regulation. The order fixing the ceiling price may apply to all deliveries or transfers completed prior to the date of issuance of the order. The issuance of such an order will not relieve the seller of his obligation to comply with the requirements of this regulation or of the various penalties for failure to do so.

Sec. 21. Evasion. Any means or device which results in obtaining indirectly a higher price than is permitted by this regulation, or in concealing or falsely representing information as to which this regulation requires records to be kept, constitutes an evasion and is a violation of this regulation. This prohibition includes, but is not limited to, means or devices making use of commissions, services, gross sales, transportation arrangements, premiums, discounts, special privileges, tie-in agreements, and trade understandings, as well as the omission from records of true data and the inclusion in records of false data.

Sec. 22. Definitions and explanations—(a) General. (1) "Authorized agent" means a person whom the manufacturer designates as his representative and who is directed by that manufacturer to sell the latter's products at prices and terms no higher than those authorized by that manufacturer, and who bills and collects in his own name

or his firm name. This does not include any manufacturer's sales representative whose orders are billed by the manufacturer to the customer.

(2) "Class of purchaser" refers to the practice adopted by you in setting different prices for commodities or services for sales to different purchasers or kinds of purchasers. The practice may (but need not) be based on the characteristics or distributive level of the buyer (for instance manufacturer, wholesaler, individual retail store, retail chain, mail order house, government agency, public institution). It may (but need not) be based on the location of the purchaser or the quantity purchased by him. If you have followed the practice of giving an individual customer a price differing from that charged others, that customer is a separate class of purchaser.

If in your industry a practice prevails of charging different prices for sales to groups of buyers based on their characteristics or distributive level, any such group to whom you did not make sales during your base period and for whom you did not have a customary differential in effect during or before your base period, is a separate class of purchaser as to you.

(3) "Contract to sell" means the written acceptance of any written or oral order or an oral acceptance of a written order.

(4) "Fives" means the number of consecutive 5 percent discounts (each taken from the previous net figure) from any of the base price lists.

(5) "Manufacturer" means any person who fabricates paper, film or foil or a combination of any of these materials into bags, and includes any person who sells such bags as an "authorized agent" of the manufacturer as that term is defined in this section.

(6) "Most closely competitive manufacturer" means the manufacturer who is your most direct competitor by reason of his sales of similar grades to similar classes of purchasers.

(7) "Person" means any individual, corporation, partnership, association, or other organized group of persons, or legal successors or representatives of the foregoing, and the United States or any other government or other political subdivisions or agencies.

(8) "Sell" means sell, supply, dispose, barter, exchange, lease, transfer, and deliver, and contracts and offers to do any of the foregoing. The terms "sale", "selling", "sold", "buy", "purchase", or "purchaser" shall be construed accordingly.

(9) "You" means any person subject to this regulation. "Your" and "yours" are construed accordingly.

(b) **Grade identifications.** (1) "Bag" means any type, shape or style of flexible container, sealed at one end and on either one or both sides, and produced from paper, film, foil, or any combination thereof, including those made of paper with a textile mesh window. They are used chiefly for over-the-counter delivery of food and other consumer merchandise.

(2) "Grocers bags" mean standard bags manufactured for all-purpose over-

the-counter use in food stores in accordance with the specifications of the U. S. Department of Commerce, National Bureau of Standards, Simplified Practice Recommendation R-42-43 or any revision thereof. Such bags are usually identified by the mark (SWS) which means standard weight and size.

(3) "Household bags" mean standard bags manufactured for use in hospitals, restaurants, homes, etc., on which standard specifications have been established by individual manufacturers.

(4) "Most comparable bag" means the bag of the same general class furnished by you during the base period which differs the least from the bag to be priced as determined by the use of the following tests, applied successively:

- (i) Size and shape and number of walls.
- (ii) Kind and quantity of raw materials per M bags.
- (iii) Supplementary operations, such as printing, attachment of handles, punching, and string and button attachment.

(5) "Most comparable grade" means the grade of bag furnished by you for which you have established a ceiling under this regulation and which differs the least from the grade to be priced in terms of end use, materials and construction.

(6) "Shipping sacks" mean new bags or sacks manufactured basically from shipping sack kraft paper, rope paper, or a combination of rope and kraft paper for use as (i) plant-packed shipping containers designed to carry 25 pounds or more of any particular commodity either as the primary container or as an overslip for the primary container or as a container (baler) for assembly of a number of primary containers into a single shipping unit; or (ii) plant-packed consumer packages, designed to carry one pound or more of the same commodities which are also packed in the larger shipping containers.

(7) "Specialty bags" mean any bag manufactured to individual order in the specifications and in the quantity requested by the buyer.

(8) "Standard bags" mean any bags manufactured in standardized specifications, viz: size, shape, kind and basis weight of paper. A bag is considered to be standard whether its specifications are standardized for the entire industry or only by an individual manufacturer.

(9) "Variety bags" mean standard bags manufactured primarily for use in retail stores, other than grocers bags. Industry specifications for certain variety bags (millinery, notion and glassine) are given in the U. S. Department of Commerce, National Bureau of Standards, Simplified Practice Recommendations R-129-41 and R-107-31. Other

grades of variety bags have been standardized by individual manufacturers.

(c) *Technical terms and miscellaneous.* (1) "Base period" means the period from January 25, 1951, through February 24, 1951, except as provided in section 8 of this regulation.

(2) "Base price list and discount table" means a schedule of base prices for each size in a given grade of standard bags, with a computation of net selling prices for each bag size at various discounts. (See Appendix A.)

(3) "File, filed or filing" means the forwarding of any records or reports by registered mail, return receipt requested, to the Office of Price Stabilization, Washington 25, D. C. The date of filing shall be construed as the date of receipt by the Office of Price Stabilization in Washington, D. C. If hand delivered, the date of delivery shall be the date of receipt.

(4) "Hourly rates" mean the cost per hour for labor, machine overhead, and other manufacturing expenses as established in your base period accounting procedures for estimating purposes.

(5) "Make-ready" means the preparation of a machine for a particular conversion operation, including such procedures as adjustment of feeding devices, installation of proper printing plates, adjustment of gears or cutting

knives and cleaning of the machine after the completion of the conversion operation.

(6) "Piece rate" means the cost per numerical unit for labor, machine, machine overhead and other manufacturing expenses as established for estimating purposes in your base period accounting procedures.

(7) "Published price" means the price listed in any form of written or printed notice to the trade or to a sales representative by which a manufacturer offers his product for sale.

(8) "Rate per unit of material" means a method used by some manufacturers in computing the margin on the basis of bag wall area and weight or both. (For example: \$----- per pound of paper per M Sacks.)

(9) "Standards of production" means the number of units produced in relation to machine or man-hours.

Effective date: This regulation shall become effective August 25, 1952.

NOTE: The reporting and record keeping requirements of this regulation have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

JOSEPH H. FREEHILL,
Acting Director of Price Stabilization.

AUGUST 19, 1952.

APPENDIX A

The basic manufacturers' price lists, and the computation of discounts off such lists as referred to in Article II of this regulation are set forth below, together with the general specifications of each grade:

GROCERS BAGS, POPULAR AND HEAVY WEIGHT, LIST NO. 1

Specifications

S W S sizes.....	1/4	1	2	3	4	5	6	8	10	12	15	20	25
"Popular" basis weight.....	30	30	30	30	30	35	35	35	35	35	40	40	40
"Heavy" basis weight.....						40			40	40	50	50	50
Base list.....	\$2.10	\$2.60	\$3.20	\$4.00	\$4.70	\$5.60	\$6.40	\$7.40	\$8.20	\$9.30	\$12.60	\$13.60	\$15.00
Discount table:													
1/5.....	2.00	2.47	3.04	3.80	4.47	5.32	6.08	7.03	7.79	8.84	11.97	12.92	14.25
2/5.....	1.90	2.35	2.89	3.61	4.24	5.05	5.78	6.68	7.40	8.39	11.37	12.27	13.54
3/5.....	1.80	2.23	2.74	3.43	4.03	4.80	5.49	6.34	7.03	7.97	10.80	11.66	12.86
4/5.....	1.71	2.12	2.61	3.26	3.83	4.56	5.21	6.03	6.68	7.57	10.26	11.08	12.22
5/5.....	1.62	2.01	2.48	3.10	3.64	4.33	4.95	5.73	6.35	7.20	9.75	10.52	11.61
6/5.....	1.54	1.91	2.35	2.94	3.45	4.12	4.70	5.44	6.03	6.84	9.26	10.00	11.03
7/5.....	1.47	1.82	2.23	2.79	3.28	3.91	4.47	5.17	5.73	6.49	8.80	9.50	10.47
8/5.....	1.39	1.72	2.12	2.65	3.12	3.72	4.25	4.91	5.44	6.17	8.36	9.02	9.95
9/5.....	1.32	1.64	2.02	2.52	2.96	3.53	4.03	4.66	5.17	5.86	7.94	8.57	9.45
10/5.....	1.26	1.56	1.92	2.39	2.81	3.35	3.83	4.43	4.91	5.57	7.54	8.14	8.98
11/5.....	1.19	1.48	1.82	2.28	2.67	3.19	3.64	4.21	4.66	5.29	7.17	7.74	8.53
12/5.....	1.13	1.41	1.73	2.16	2.54	3.03	3.46	4.00	4.43	5.03	6.81	7.35	8.11
13/5.....	1.08	1.33	1.64	2.05	2.41	2.87	3.29	3.80	4.21	4.77	6.47	6.98	7.70
14/5.....	1.02	1.27	1.56	1.95	2.29	2.73	3.12	3.61	4.00	4.54	6.15	6.63	7.32
15/5.....	.97	1.20	1.48	1.85	2.18	2.59	2.97	3.43	3.80	4.31	5.84	6.30	6.95
16/5.....	.92	1.14	1.41	1.76	2.07	2.46	2.82	3.26	3.61	4.09	5.55	5.99	6.60
17/5.....	.88	1.09	1.34	1.67	1.97	2.34	2.68	3.09	3.43	3.89	5.27	5.69	6.27
18/5.....	.83	1.03	1.27	1.59	1.87	2.22	2.54	2.94	3.26	3.69	5.00	5.40	5.96
19/5.....	.79	.98	1.21	1.51	1.77	2.11	2.42	2.79	3.09	3.51	4.76	5.13	5.66
20/5.....	.75	.93	1.15	1.43	1.68	2.01	2.29	2.65	2.94	3.33	4.52	4.88	5.38
21/5.....	.72	.89	1.09	1.36	1.60	1.91	2.18	2.52	2.79	3.17	4.29	4.63	5.11
22/5.....	.68	.84	1.04	1.29	1.52	1.81	2.07	2.39	2.65	3.01	4.08	4.40	4.83
23/5.....	.65	.80	.98	1.23	1.44	1.72	1.97	2.27	2.52	2.86	3.87	4.18	4.61
24/5.....	.61	.76	.93	1.17	1.37	1.64	1.87	2.16	2.39	2.72	3.68	3.97	4.38
25/5.....	.58	.72	.89	1.11	1.30	1.53	1.78	2.03	2.27	2.58	3.50	3.77	4.16
26/5.....	.55	.69	.84	1.05	1.24	1.48	1.69	1.95	2.16	2.45	3.32	3.58	3.95
27/5.....	.53	.65	.80	1.00	1.18	1.40	1.60	1.85	2.05	2.33	3.15	3.40	3.75
28/5.....	.50	.62	.76	.95	1.12	1.33	1.52	1.76	1.95	2.21	3.00	3.23	3.57
M's per bale.....	10	8	6	5	4	3	3	2	2	2	1	1	1

EXTRA HEAVY DUTY GROCERS SIZES, LIST No. 2
Specifications

"SWS" sizes.....	1	2	3	4	5	6	8	10	12	15	20	25
Basis.....	50	50	50	50	80	50	60	60	60	60	80	60
Base list.....	\$4.00	\$5.00	\$6.20	\$7.00	\$8.00	\$9.70	\$12.00	\$14.00	\$15.00	\$19.80	\$21.20	\$23.40
Discount table:												
1/5.....	3.80	4.75	5.89	6.65	7.60	9.22	11.97	13.30	14.82	18.81	20.14	22.23
2/5.....	3.61	4.51	5.60	6.32	7.22	8.75	11.37	12.64	14.08	17.87	19.13	21.12
3/5.....	3.43	4.29	5.32	6.00	6.86	8.32	10.80	12.00	13.38	16.98	18.18	20.05
4/5.....	3.26	4.07	5.05	5.70	6.52	7.90	10.26	11.40	12.71	16.13	17.27	19.05
5/5.....	3.10	3.87	4.80	5.42	6.19	7.51	9.75	10.83	12.07	15.32	16.40	18.11
6/5.....	2.94	3.68	4.56	5.15	5.88	7.13	9.26	10.29	11.47	14.55	15.58	17.20
7/5.....	2.79	3.49	4.33	4.89	5.59	6.77	8.80	9.78	10.89	13.83	14.80	16.34
8/5.....	2.65	3.32	4.11	4.64	5.31	6.43	8.36	9.29	10.35	13.14	14.06	15.52
9/5.....	2.52	3.15	3.91	4.41	5.04	6.11	7.94	8.82	9.83	12.48	13.36	14.75
10/5.....	2.39	2.99	3.71	4.19	4.79	5.81	7.54	8.38	9.34	11.85	12.69	14.01
11/5.....	2.28	2.84	3.53	3.98	4.55	5.52	7.17	7.96	8.87	11.26	12.05	13.31
12/5.....	2.16	2.70	3.35	3.78	4.32	5.24	6.81	7.57	8.43	10.70	11.46	12.65
13/5.....	2.05	2.57	3.18	3.59	4.11	4.98	6.47	7.19	8.01	10.16	10.88	12.01
14/5.....	1.95	2.44	3.02	3.41	3.90	4.73	6.15	6.83	7.61	9.66	10.34	11.41
15/5.....	1.85	2.32	2.87	3.24	3.71	4.49	5.84	6.49	7.23	9.17	9.82	10.84
16/5.....	1.76	2.20	2.73	3.08	3.52	4.27	5.55	6.16	6.87	8.71	9.33	10.30
17/5.....	1.67	2.09	2.59	2.93	3.34	4.06	5.27	5.85	6.52	8.28	8.86	9.78
18/5.....	1.59	1.99	2.46	2.78	3.18	3.85	5.00	5.55	6.20	7.86	8.42	9.29
19/5.....	1.51	1.89	2.34	2.64	3.02	3.66	4.76	5.28	5.89	7.47	8.00	8.83
20/5.....	1.43	1.79	2.22	2.51	2.87	3.48	4.52	5.02	5.59	7.10	7.60	8.29
21/5.....	1.36	1.70	2.11	2.38	2.72	3.30	4.29	4.77	5.31	6.74	7.22	7.97
22/5.....	1.29	1.62	2.01	2.26	2.59	3.14	4.08	4.53	5.05	6.41	6.86	7.57
23/5.....	1.23	1.54	1.91	2.15	2.46	2.98	3.87	4.30	4.80	6.09	6.52	7.19
24/5.....	1.17	1.46	1.81	2.04	2.34	2.83	3.68	4.09	4.56	5.78	6.19	6.83
25/5.....	1.11	1.39	1.72	1.94	2.22	2.69	3.50	3.88	4.33	5.49	5.88	6.49
26/5.....	1.05	1.32	1.63	1.84	2.11	2.56	3.32	3.69	4.11	5.22	5.59	6.17
27/5.....	1.00	1.25	1.55	1.75	2.00	2.43	3.15	3.50	3.90	4.96	5.31	5.85
28/5.....	.95	1.19	1.47	1.66	1.90	2.31	3.00	3.33	3.71	4.71	5.04	5.56

GROCERS SACKS, SATCHEL BOTTOM MF KRAFT, LIST No. 3
Specifications

Grade.....	Standard sacks			Poultry sacks			Bundle			
	14 barrel 17 x 27-6						14 barrel 14 1/4 x 21-4 1/4		14 barrel 17 x 21-6	
Size.....	40			50			60		60	
Basis weight.....	40	50	70	40	50	60	50	60		
Base list.....	\$34.00	\$43.00	\$50.00	\$21.90	\$24.30	\$28.20	\$29.00	\$33.00		
Discount table:										
1/5.....	32.30	40.85	47.50	20.81	23.09	26.79	27.55	31.35		
2/5.....	30.69	38.81	45.13	19.75	21.93	25.45	26.17	29.78		
3/5.....	29.15	36.87	42.87	18.78	20.83	24.18	24.86	28.29		
4/5.....	27.69	35.02	40.73	17.84	19.79	22.97	23.62	26.88		
5/5.....	26.31	33.27	38.60	16.95	18.80	21.82	22.44	25.54		
6/5.....	24.99	31.61	36.76	16.10	17.86	20.73	21.32	24.26		
7/5.....	23.74	30.03	34.92	15.29	16.97	19.69	20.25	23.04		
8/5.....	22.56	28.53	33.17	14.53	16.12	18.71	19.24	21.89		
9/5.....	21.43	27.10	31.51	13.80	15.31	17.77	18.28	20.80		
10/5.....	20.36	25.74	29.94	13.11	14.55	16.88	17.36	19.76		
11/5.....	19.34	24.46	28.44	12.46	13.82	16.04	16.50	18.77		
12/5.....	18.37	23.24	27.02	11.83	13.13	15.24	15.67	17.83		
13/5.....	17.45	22.07	25.67	11.24	12.47	14.48	14.89	16.94		
14/5.....	16.58	20.97	24.39	10.68	11.85	13.75	14.14	16.09		
15/5.....	15.75	19.92	23.17	10.15	11.26	13.07	13.44	15.29		
16/5.....	14.96	18.92	22.01	9.64	10.69	12.41	12.76	14.52		
17/5.....	14.22	17.98	20.91	9.16	10.16	11.79	12.12	13.80		
18/5.....	13.50	17.08	19.85	8.70	9.65	11.20	11.52	13.11		
19/5.....	12.83	16.23	18.87	8.27	9.17	10.64	10.94	12.45		
20/5.....	12.19	15.42	17.93	7.85	8.71	10.11	10.40	11.83		
21/5.....	11.58	14.65	17.03	7.46	8.28	9.60	9.88	11.24		
22/5.....	11.00	13.91	16.18	7.08	7.86	9.12	9.38	10.68		
23/5.....	10.45	13.22	15.37	6.73	7.47	8.67	8.91	10.14		
24/5.....	9.93	12.56	14.60	6.39	7.10	8.23	8.47	9.64		
25/5.....	9.43	11.93	13.87	6.08	6.74	7.82	8.04	9.15		
26/5.....	8.96	11.33	13.18	5.77	6.40	7.43	7.64	8.70		
27/5.....	8.51	10.76	12.52	5.48	6.08	7.06	7.26	8.26		
28/5.....	8.09	10.23	11.89	5.21	5.78	6.71	6.90	7.85		

BREAD BAGS, LIST No. 4
Specifications

Size	Vienna	Large vienna	Round loaf
Dimensions (square).....	5 1/4 x 3 1/4 x 18	5 1/4 x 3 1/4 x 20	8 x 4 x 14
Base list.....	\$6.10	\$6.60	\$6.70
Discount table:			
1/5.....	5.80	6.27	6.37
2/5.....	5.51	5.96	6.05
3/5.....	5.23	5.66	5.74
4/5.....	4.97	5.38	5.45
5/5.....	4.72	5.11	5.18
6/5.....	4.48	4.85	4.93
7/5.....	4.26	4.61	4.68
8/5.....	4.05	4.38	4.44
9/5.....	3.84	4.16	4.22
10/5.....	3.65	3.95	4.01
11/5.....	3.47	3.75	3.81
12/5.....	3.30	3.57	3.62
13/5.....	3.13	3.39	3.44
14/5.....	2.97	3.22	3.27
15/5.....	2.83	3.06	3.10
16/5.....	2.68	2.90	2.95
17/5.....	2.55	2.76	2.80
18/5.....	2.42	2.62	2.66
19/5.....	2.30	2.49	2.53
20/5.....	2.19	2.37	2.40

CANDY BAGS, FLAT AND AUTOMATIC, BLEACHED KRAFT, LIST No. 5
Specifications

"SS" size....	1/2	1	2
Basis.....	30	30	30
Dimensions Automatic.....	3 x 1 1/4 x 5 1/4	3 1/2 x 2 1/4 x 6 1/4	4 1/4 x 2 1/4 x 8 1/4
Flat.....	4 1/2 x 6 1/2	5 1/2 x 7 1/2	6 1/2 x 8 1/2
Base list.....	\$2.20	\$2.80	\$4.05
Discount table:			
1/5.....	2.09	2.66	3.85
2/5.....	1.99	2.53	3.65
3/5.....	1.89	2.40	3.47
4/5.....	1.79	2.28	3.30
5/5.....	1.70	2.17	3.13
6/5.....	1.62	2.06	2.98
7/5.....	1.54	1.96	2.83
8/5.....	1.46	1.86	2.69
9/5.....	1.39	1.76	2.55
10/5.....	1.32	1.68	2.42
11/5.....	1.25	1.59	2.30
12/5.....	1.19	1.51	2.19
13/5.....	1.13	1.44	2.08
14/5.....	1.07	1.37	1.98
15/5.....	1.02	1.30	1.88
16/5.....	.97	1.23	1.78
17/5.....	.92	1.17	1.69
18/5.....	.87	1.11	1.61
19/5.....	.83	1.06	1.53
20/5.....	.79	1.00	1.45

GARMENT AND PANTS BAGS, LIST NO. 6
Specifications

Size.....	20 3/4 x 36	20 3/4 x 54	18 x 30
Base list.....	\$32.10	\$47.50	\$22.00
Discount table:			
5/5.....	24.84	36.76	17.02
6/5.....	23.60	34.92	16.17
7/5.....	22.42	33.17	15.36
8/5.....	21.30	31.51	14.59
9/5.....	20.23	29.93	13.86
10/5.....	19.22	28.44	13.17
11/5.....	18.26	27.02	12.51
12/5.....	17.35	25.67	11.89
13/5.....	16.48	24.38	11.29
14/5.....	15.66	23.17	10.73
15/5.....	14.87	22.01	10.19
16/5.....	14.13	20.90	9.68
17/5.....	13.42	19.86	9.20
18/5.....	12.75	18.87	8.74
19/5.....	12.11	17.93	8.30
20/5.....	11.51	17.03	7.89
21/5.....	10.93	16.18	7.49
22/5.....	10.38	15.37	7.12
23/5.....	9.87	14.60	6.76
24/5.....	9.37	13.87	6.42
25/5.....	8.90	13.18	6.10

NAIL BAGS, LIST NO. 9
Specifications

Basin (pounds)..... Weight (pounds).....	3 50	5 50	10 60	16 60	20 60	25 60
List price.....	\$5.55	\$6.70	\$11.95	\$16.85	\$18.00	\$19.45
1/5.....	5.27	6.37	11.35	16.01	17.10	18.48
2/5.....	5.01	6.05	10.78	15.21	16.25	17.55
3/5.....	4.76	5.74	10.25	14.45	15.43	16.68
4/5.....	4.52	5.46	9.73	13.72	14.66	15.84
5/5.....	4.29	5.18	9.25	13.04	13.93	15.05
6/5.....	4.08	4.93	8.78	12.39	13.23	14.30
7/5.....	3.88	4.68	8.35	11.77	12.57	13.58
8/5.....	3.68	4.44	7.93	11.18	11.94	12.90
9/5.....	3.50	4.22	7.53	10.62	11.34	12.26
10/5.....	3.32	4.01	7.15	10.09	10.78	11.65
11/5.....	3.16	3.81	6.80	9.58	10.24	11.06
12/5.....	3.00	3.62	6.46	9.11	9.73	10.51
13/5.....	2.85	3.44	6.13	8.65	9.24	9.98
14/5.....	2.71	3.27	5.83	8.22	8.78	9.49
15/5.....	2.57	3.10	5.54	7.81	8.34	9.01
16/5.....	2.44	2.93	5.26	7.42	7.92	8.56
17/5.....	2.32	2.80	5.00	7.05	7.53	8.13
18/5.....	2.20	2.66	4.75	6.69	7.15	7.73

NAIL BAGS, LIST NO. 9—Continued
Specifications—Continued

Basin (pounds)..... Weight (pounds).....	3 50	5 50	10 60	16 60	20 60	25 60
List price.....	\$5.55	\$6.70	\$11.95	\$16.85	\$18.00	\$19.45
19/5.....	2.00	2.53	4.51	6.36	6.79	7.34
20/5.....	1.90	2.40	4.28	6.04	6.45	6.97
21/5.....	1.80	2.28	4.07	5.74	6.13	6.62
22/5.....	1.80	2.17	3.87	5.45	5.82	6.29
23/5.....	1.71	2.06	3.67	5.18	5.53	5.98
24/5.....	1.62	1.96	3.49	4.92	5.26	5.68
25/5.....	1.54	1.86	3.31	4.67	4.99	5.40
26/5.....	1.46	1.77	3.15	4.44	4.74	5.13
27/5.....	1.39	1.68	2.99	4.22	4.51	4.87
28/5.....	1.32	1.59	2.84	4.01	4.28	4.63
29/5.....	1.25	1.51	2.70	3.81	4.07	4.39
30/5.....	1.19	1.44	2.56	3.62	3.86	4.17
31/5.....	1.13	1.37	2.44	3.44	3.67	3.97
32/5.....	1.08	1.30	2.32	3.26	3.49	3.77
33/5.....	1.02	1.23	2.20	3.10	3.31	3.58
34/5.....	.97	1.17	2.09	2.95	3.15	3.40
35/5.....	.92	1.11	1.98	2.80	2.99	3.23

GARBAGE BAGS, SQUARE, WAXED KRAFT, LIST NO. 7
Specifications

Size.....	8 x 7 3/4 x 17 1/2	7 x 6 1/2 x 14
Base list.....	\$10.20	\$12.15
Discount table:		
1/5.....	18.24	11.54
2/5.....	17.33	10.97
3/5.....	16.46	10.42
4/5.....	15.64	9.90
5/5.....	14.86	9.40
6/5.....	14.11	8.93
7/5.....	13.41	8.48
8/5.....	12.74	8.06
9/5.....	12.10	7.66
10/5.....	11.50	7.27
11/5.....	10.92	6.91
12/5.....	10.38	6.57
13/5.....	9.86	6.24
14/5.....	9.36	5.93
15/5.....	8.90	5.63
16/5.....	8.45	5.35
17/5.....	8.03	5.08
18/5.....	7.63	4.83
19/5.....	7.25	4.59
20/5.....	6.88	4.36

NOTION AND MILLINERY BAGS, LIST NO. 10
Specifications

Grade.....	Notion Bags up to but not including bags 10 inches wide or 13 inches long					Millinery Bags, bags 10 inches and wider or 13 inches and longer				
	4 x 6 1/4	5 x 7 1/2	6 1/4 x 9 1/4	7 1/2 x 10 1/2	8 1/4 x 11	10 x 13	12 x 15	15 x 18	17 x 21	21 x 24
Bag size.....	4 x 6 1/4	5 x 7 1/2	6 1/4 x 9 1/4	7 1/2 x 10 1/2	8 1/4 x 11	10 x 13	12 x 15	15 x 18	17 x 21	21 x 24
Lip.....	1 1/2	3/4	1	1	1 1/4	—	—	—	—	—
Base list.....	\$1.50	\$1.90	\$2.60	\$3.40	\$4.00	\$5.30	\$6.90	\$10.40	\$13.40	\$19.20
Discount table:										
1/5.....	1.43	1.81	2.47	3.23	3.80	5.04	6.56	9.88	12.73	18.24
2/5.....	1.35	1.71	2.35	3.07	3.61	4.78	6.23	9.39	12.09	17.33
3/5.....	1.29	1.63	2.23	2.92	3.43	4.54	5.92	8.92	11.49	16.46
4/5.....	1.22	1.55	2.12	2.77	3.26	4.32	5.62	8.47	10.91	15.64
5/5.....	1.16	1.47	2.01	2.63	3.10	4.10	5.34	8.05	10.37	14.89
6/5.....	1.10	1.40	1.91	2.50	2.94	3.90	5.07	7.65	9.85	14.11
7/5.....	1.05	1.33	1.82	2.37	2.79	3.70	4.82	7.25	9.36	13.41
8/5.....	1.00	1.26	1.72	2.26	2.65	3.52	4.58	6.90	8.89	12.74
9/5.....	.95	1.20	1.64	2.14	2.52	3.34	4.35	6.55	8.44	12.10
10/5.....	.90	1.14	1.56	2.04	2.39	3.17	4.13	6.23	8.02	11.50
11/5.....	.85	1.08	1.48	1.93	2.28	3.01	3.92	5.92	7.62	10.92
12/5.....	.81	1.03	1.41	1.84	2.16	2.89	3.73	5.62	7.24	10.38
13/5.....	.77	.98	1.33	1.75	2.05	2.72	3.54	5.34	6.88	9.86
14/5.....	.73	.93	1.27	1.66	1.95	2.58	3.37	5.07	6.54	9.36
15/5.....	.69	.88	1.20	1.58	1.85	2.46	3.20	4.82	6.21	8.90
16/5.....	.66	.84	1.14	1.50	1.76	2.33	3.04	4.58	5.90	8.45
17/5.....	.63	.79	1.09	1.42	1.67	2.22	2.88	4.35	5.60	8.03
18/5.....	.60	.75	1.03	1.35	1.59	2.11	2.74	4.13	5.32	7.63
19/5.....	.57	.72	.98	1.28	1.51	2.00	2.60	3.92	5.06	7.25
20/5.....	.54	.68	.93	1.22	1.43	1.90	2.47	3.73	4.80	6.88
21/5.....	.51	.65	.89	1.16	1.36	1.81	2.35	3.54	4.56	6.54
22/5.....	.49	.61	.84	1.10	1.29	1.71	2.23	3.36	4.33	6.21
23/5.....	.46	.58	.80	1.05	1.23	1.63	2.12	3.20	4.12	5.90
24/5.....	.44	.55	.76	.99	1.17	1.55	2.01	3.04	3.91	5.61
25/5.....	.42	.53	.72	.94	1.11	1.47	1.91	2.88	3.72	5.33

LIQUOR BOTTLE BAGS, LIST NO. 8
Specifications

Size.....	Pint	Quart
Dimensions.....	3 3/4 x 2 3/4 x 11 1/4	4 1/4 x 2 3/4 x 10 3/4
Base list.....	\$4.00	\$6.00
Discount table:		
8/5.....	2.65	3.98
9/5.....	2.52	3.78
10/5.....	2.39	3.59
11/5.....	2.28	3.41
12/5.....	2.16	3.24
13/5.....	2.05	3.08
14/5.....	1.95	2.93
15/5.....	1.85	2.78
16/5.....	1.76	2.64
17/5.....	1.67	2.51
18/5.....	1.59	2.38
19/5.....	1.51	2.26
20/5.....	1.43	2.15
21/5.....	1.36	2.04
22/5.....	1.29	1.94
23/5.....	1.23	1.84
24/5.....	1.17	1.75
25/5.....	1.11	1.66
26/5.....	1.05	1.58
27/5.....	1.00	1.50
28/5.....	.95	1.43

SHOE BAGS, SQUARE STYLE, LIST NO. 11
Specifications

Size.....	Dimensions.....
Small.....	6 1/4 x 2 1/2 x 15
Large.....	6 3/4 x 3 1/4 x 18

BASE LIST AND NET PRICE DISCOUNT TABLE

Bag size.....	Net cost on \$100	Small		Large	
		Small	Large	Small	Large
List price.....		\$6.50	\$8.10		
1/5.....	\$95.00	6.18	7.70	44.01	5.56
2/5.....	90.25	5.87	7.31	41.81	5.39
3/5.....	85.74	5.57	6.94	39.72	5.22
4/5.....	81.45	5.29	6.60	37.74	5.06
5/5.....	77.38	5.03	6.27	35.85	4.90
6/5.....	73.51	4.78	5.95	34.06	4.76
7/5.....	69.83	4.54	5.66	32.35	4.62
8/5.....	66.34	4.31	5.37	30.74	4.49
9/5.....	63.02	4.10	5.10	29.20	4.37
10/5.....	59.87	3.89	4.85	27.74	4.25
11/5.....	56.88	3.70	4.61	26.35	4.13
12/5.....	54.04	3.51	4.38	25.03	4.03
13/5.....	51.33	3.34	4.16	23.78	3.93
14/5.....	48.77	3.17	3.95	22.59	3.83
15/5.....	46.33	3.01	3.75	21.46	3.74
M's per bale.....		3	2		2

CELLOPHANE BAGS, LIST NO. 14
CELLOPHANE SACHET BOTTOM BAGS

[Prices listed are per M unless otherwise specified]

No.	Size	Base list	Discounts											
			1/5	2/5	3/5	4/5	5/5	6/5	7/5	8/5	9/5	10/5	11/5	12/5
300 MST														
1	3 1/4 x 6	\$7.55	\$6.17	\$6.51	\$6.47	\$6.15	\$5.84	\$5.55	\$5.27	\$5.01	\$4.70	\$4.52	\$4.29	\$4.08
2	3 1/4 x 7	8.40	8.07	7.67	7.29	6.93	6.64	6.35	6.07	5.81	5.50	5.22	4.94	4.69
3	4 1/4 x 8	10.00	9.57	9.09	8.64	8.19	7.74	7.29	6.84	6.39	5.94	5.49	5.04	4.59
4	5 1/4 x 10	13.25	12.60	11.97	11.37	10.80	10.25	9.70	9.15	8.60	8.05	7.50	6.95	6.40
5	6 1/4 x 10	16.00	15.20	14.44	13.73	13.03	12.33	11.79	11.17	10.63	10.08	9.54	9.00	8.46
450 PT														
1	3 1/2 x 6	7.72	7.33	6.90	6.63	6.28	5.97	5.67	5.39	5.12	4.86	4.63	4.39	4.17
2	4 1/2 x 7	8.89	8.36	7.94	7.54	7.16	6.80	6.46	6.14	5.82	5.54	5.26	4.99	4.70
3	5 1/2 x 8	11.22	10.66	10.13	9.62	9.14	8.68	8.25	7.84	7.43	7.07	6.72	6.38	6.00
4	6 1/2 x 10	14.18	13.47	12.80	12.16	11.55	10.97	10.42	9.90	9.40	8.91	8.49	8.06	7.60
5	7 1/2 x 10	17.64	16.76	15.92	15.12	14.35	13.64	12.96	12.31	11.70	11.11	10.55	10.03	9.52
6	8 1/2 x 11 1/2	22.47	21.35	20.28	19.27	18.31	17.39	16.52	15.69	14.91	14.16	13.45	12.78	12.14
7	9 1/2 x 12	25.65	24.38	23.16	22.01	20.91	19.89	18.92	18.00	17.12	16.28	15.49	14.75	14.04
450 MST														
1	4 1/4 x 8	12.39	11.77	11.18	10.62	10.09	9.59	9.11	8.65	8.22	7.81	7.42	7.05	6.70
2	5 1/4 x 9	15.89	15.07	14.32	13.60	12.92	12.27	11.66	11.08	10.52	10.00	9.50	9.02	8.57
3	6 1/4 x 10	19.88	18.87	17.95	17.03	16.18	15.37	14.60	13.87	13.18	12.52	11.89	11.30	10.73
4	7 1/4 x 11 1/2	24.39	23.14	21.98	20.88	19.84	18.84	17.91	17.01	16.16	15.35	14.59	13.86	13.16
5	8 1/4 x 12	28.49	27.07	25.72	24.45	23.21	22.05	20.95	19.91	18.91	17.96	17.06	16.21	15.40

CELLOPHANE FLAT BAGS

No.	Size	Base list	Discounts											
			1/5	2/5	3/5	4/5	5/5	6/5	7/5	8/5	9/5	10/5	11/5	12/5
300 MST														
1	1-ounce	\$5.37	\$5.01	\$4.70	\$4.42	\$4.20	\$4.08	\$3.98	\$3.89	\$3.80	\$3.70	\$3.60	\$3.50	\$3.40
2	1-ounce	4.84	4.60	4.37	4.15	3.94	3.74	3.55	3.37	3.20	3.04	2.89	2.75	
3	1-ounce	5.71	5.42	5.15	4.89	4.65	4.42	4.20	3.99	3.79	3.60	3.42	3.25	
4	No. 1 peanut	6.94	6.59	6.26	5.95	5.65	5.37	5.10	4.85	4.60	4.37	4.15	3.95	
5	No. 2 peanut	8.30	7.88	7.49	7.12	6.76	6.42	6.10	5.80	5.51	5.23	4.97	4.72	
6	No. 3 peanut	9.65	9.17	8.71	8.27	7.86	7.47	7.10	6.75	6.41	6.09	5.78	5.48	
7	No. 4 peanut	11.17	10.62	10.18	9.76	9.39	9.01	8.65	8.32	7.91	7.42	7.05	6.69	

CELLOPHANE SQUARE BAGS

No.	Size	Base list	Discounts											
			1/5	2/5	3/5	4/5	5/5	6/5	7/5	8/5	9/5	10/5	11/5	12/5
300 MST														
1	2 1/2 x 3 1/2 x 6 1/2	\$5.30	\$5.00	\$4.69	\$4.40	\$4.13	\$3.87	\$3.63	\$3.40	\$3.18	\$2.97	\$2.77	\$2.58	\$2.40
2	3 1/2 x 4 1/2 x 7 1/2	7.40	7.03	6.68	6.35	6.03	5.73	5.44	5.17	4.91	4.66	4.42	4.19	
3	4 1/2 x 5 1/2 x 8 1/2	9.19	8.73	8.29	7.88	7.49	7.12	6.76	6.42	6.10	5.80	5.51	5.23	
4	5 1/2 x 6 1/2 x 9 1/2	11.02	10.52	10.05	9.61	9.20	8.81	8.45	8.11	7.79	7.48	7.18	6.90	
5	6 1/2 x 7 1/2 x 10 1/2	14.00	13.30	12.63	12.00	11.40	10.83	10.29	9.78	9.29	8.82	8.38	7.95	
450 MST														
1	3 1/2 x 4 1/2 x 7 1/2	11.86	11.27	10.71	10.17	9.66	9.18	8.72	8.28	7.87	7.48	7.10	6.75	
2	4 1/2 x 5 1/2 x 8 1/2	15.06	14.28	13.54	12.84	12.17	11.54	10.94	10.37	9.83	9.32	8.85	8.41	
3	5 1/2 x 6 1/2 x 9 1/2	18.19	17.26	16.42	15.60	14.82	14.08	13.38	12.71	12.08	11.47	10.90	10.35	
4	6 1/2 x 7 1/2 x 10 1/2	22.76	21.57	20.44	19.37	18.35	17.36	16.40	15.46	14.56	13.69	12.85	12.03	
5	7 1/2 x 8 1/2 x 11 1/2	25.79	24.50	23.28	22.12	21.01	19.95	18.96	18.00	17.11	16.26	15.44	14.67	

[F. R. Doc. 52-9275; Filed, Aug. 19, 1952; 4:23 p. m.]

GLASSINE BAGS, FLAT, 25-POUND WHITE GLASSINE, LIST NO. 13

Specifications

Size	No. 1 peanut	No. 2 peanut	Collar	3/4 pound	1 pound	2 pounds	Stand-wich	Pie	Cake
1 ounce	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 5/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-6 x 7/8	3/4-7/8 x 5/8	1-11 x 10	1-11 x 5 1/2
1/5 lb.	\$1.50	\$1.75	\$2.50	\$2.25	\$3.75	\$4.50	\$3.00	\$8.50	\$10.00
2/5 lb.	1.71	1.96	2.83	2.55	3.56	4.26	2.85	8.08	10.07
3/5 lb.	1.84	2.09	3.16	2.82	3.38	4.02	2.71	7.67	9.57
4/5 lb.	1.97	2.22	3.43	3.03	3.58	4.23	2.57	7.25	9.09
5/5 lb.	2.10	2.35	3.70	3.23	3.78	4.44	2.44	6.83	8.63
6/5 lb.	2.23	2.48	3.97	3.46	3.99	4.69	2.32	6.42	8.20
7/5 lb.	2.36	2.61	4.24	3.75	4.26	4.89	2.20	6.01	7.79
8/5 lb.	2.49	2.74	4.51	4.04	4.53	5.09	2.09	5.60	7.40
9/5 lb.	2.62	2.87	4.78	4.37	4.84	5.29	1.96	5.19	7.03
10/5 lb.	2.75	2.99	5.05	4.66	5.12	5.49	1.85	4.78	6.65
11/5 lb.	2.88	3.12	5.32	4.95	5.39	5.69	1.74	4.37	6.28
12/5 lb.	3.01	3.25	5.59	5.24	5.58	5.89	1.63	3.96	5.91
13/5 lb.	3.14	3.38	5.86	5.49	5.77	6.09	1.52	3.55	5.54
14/5 lb.	3.27	3.51	6.13	5.74	5.96	6.29	1.41	3.14	5.17
15/5 lb.	3.40	3.64	6.40	6.00	6.19	6.49	1.30	2.73	4.80
16/5 lb.	3.53	3.77	6.67	6.25	6.42	6.69	1.19	2.32	4.43
17/5 lb.	3.66	3.90	6.94	6.50	6.61	6.89	1.08	1.91	4.06
18/5 lb.	3.79	4.03	7.21	6.75	6.84	7.09	0.97	1.50	3.69
19/5 lb.	3.92	4.16	7.48	7.00	7.03	7.29	0.86	1.09	3.32
20/5 lb.	4.05	4.29	7.75	7.25	7.28	7.49	0.75	0.68	2.95

GLASSINE BAGS, SQUARE, WHITE GLASSINE, LIST NO. 13

Specifications

Size	1/4 lb.	1/2 lb.	3/4 lb.	1 lb.	1 1/2 lb.	2 lb.	3 lb.	4 lb.	5 lb.	6 lb.	Cookie	Eye bread	Vienna bread	Round loaf
1/5 lb.	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-7/8 x 7/8	1/2-11 x 7/8 x 7/8	1/2-8 1/2 x 7/8 x 7/8	1/2-11 x 10	1/2-11 x 5 1/2
2/5 lb.	\$2.35	\$2.90	\$3.75	\$4.70	\$4.70	\$4.90	\$5.30	\$5.70	\$6.25	\$6.65	\$5.20	\$10.75	\$12.85	\$13.50
3/5 lb.	2.57	3.12	4.07	5.02	5.02	5.22	5.62	6.02	6.57	6.97	5.40	10.45	12.55	13.20
4/5 lb.	2.79	3.34	4.29	5.24	5.24	5.44	5.84	6.24	6.79	7.19	5.60	10.25	12.35	13.00
5/5 lb.	3.01	3.56	4.51	5.46	5.46	5.66	6.06	6.46	7.01	7.41	5.80	10.05	12.15	12.80
6/5 lb.	3.23	3.78	4.73	5.68	5.68	5.88	6.28	6.68	7.23	7.63	6.00	9.85	11.95	12.60
7/5 lb.	3.45	4.00	4.95	5.90	5.90	6.10	6.50	6.90	7.45	7.85	6.20	9.65	11.75	12.40
8/5 lb.	3.67	4.22	5.17	6.12	6.12	6.32	6.72	7.12	7.67	8.07	6.40	9.45	11.55	12.20
9/5 lb.	3.89	4.44	5.39	6.34	6.34	6.54	6.94	7.34	7.89	8.29	6.60	9.25	11.35	12.00
10/5 lb.	4.11	4.66	5.61	6.56	6.56	6.76	7.16	7.56	8.11	8.51	6.80	9.05	11.15	11.80
11/5 lb.	4.33	4.88	5.83	6.78	6.78	6.98	7.38	7.78	8.33	8.73	7.00	8.85	10.95	11.60
12/5 lb.	4.55	5.10	6.05	7.00	7.00	7.20	7.60	8.00	8.55	8.95	7.20	8.65	10.75	11.40
13/5 lb.	4.77	5.32	6.27	7.22	7.22	7.42	7.82	8.22	8.77	9.17	7.40	8.45	10.55	11.20
14/5 lb.	4.99	5.54	6.49	7.44	7.44	7.64	8.04	8.44	8.99	9.39	7.60	8.25	10.35	11.00
15/5 lb.	5.21	5.76	6.71	7.66	7.66	7.86	8.26	8.66	9.21	9.61	7.80	8.15	10.15	10.80
16/5 lb.	5.43	5.98	6.93	7.88	7.88	8.08	8.48	8.88	9.43	9.83	8.00	7.95	9.95	10.60
17/5 lb.	5.65	6.20	7.15	8.10	8.10	8.30	8.70	9.10	9.65	10.05	8.20	7.85	9.75	10.40
18/5 lb.	5.87	6.42	7.37	8.3										

Chapter XXI—Office of Rent Stabilization, Economic Stabilization Agency

[Rent Regulation 1, Amdt. 16 to Schedule B]
[Rent Regulation 2, Amdt. 16 to Schedule B]

RR 1—HOUSING

RR 2—ROOMS IN ROOMING HOUSES AND OTHER ESTABLISHMENTS

SCHEDULE B—SPECIFIC PROVISIONS RELATING TO INDIVIDUAL DEFENSE-RENTAL AREA OR PORTIONS THEREOF

FLORIDA

Effective August 21, 1952, Rent Regulation 1 and Rent Regulation 2 are amended as set forth below.

(Sec. 204, 61 Stat. 197, as amended; 50 U. S. C. App. Sup. 1894)

Issued this 18th day of August 1952.

TIGHE E. WOODS,
Director of Rent Stabilization.

1. A new item 61 is added to Schedule B of Rent Regulation 1, reading as follows:

61. *Provisions relating to the Seminole County, Florida, Defense-Rental Area (Item 64a of Schedule A):*

(a) Wherever the words "December 1 to March 31" appear in section 41, the words "December 1 to April 30" are substituted.

(b) All provisions of this regulation insofar as they are applicable to the Seminole County, Florida, Defense-Rental Area, are hereby amended to the extent necessary to carry these provisions of item 61 into effect.

2. A new item 67 is added to Schedule B of Rent Regulation 2, reading as follows:

67. *Provisions relating to the Seminole County, Florida, Defense-Rental Area (Item 64a of Schedule A):*

(a) Wherever the words "December 1 to March 31" appear in section 42, the words "December 1 to April 30" are substituted.

(b) All provisions of this regulation insofar as they are applicable to the Seminole County, Florida, Defense-Rental Area, are hereby amended to the extent necessary to carry these provisions of item 67 into effect.

[F. R. Doc. 52-9228; Filed, Aug. 20, 1952; 8:48 a. m.]

[Rent Regulation 3, Amdt. 14 to Schedule B]
[Rent Regulation 4, Amdt. 7 to Schedule B]

RR 3—HOTELS

RR 4—MOTOR COURTS

SCHEDULE B—SPECIFIC PROVISIONS RELATING TO INDIVIDUAL DEFENSE-RENTAL AREA OR PORTIONS THEREOF

FLORIDA

Effective August 21, 1952, Rent Regulation 3 and Rent Regulation 4 are amended as set forth below.

(Sec. 204, 61 Stat. 197, as amended; 50 U. S. C. App. Sup. 1894)

Issued this 18th day of August 1952.

TIGHE E. WOODS,
Director of Rent Stabilization.

1. A new item 19 is added to Schedule B of Rent Regulation 3, reading as follows:

19. *Provisions relating to the Seminole County, Florida, Defense-Rental Area (Item 64a of Schedule A):*

(a) Wherever the words "December 1 to March 31" appear in section 27, the words "December 1 to April 30" are substituted.

(b) All provisions of this regulation insofar as they are applicable to the Seminole County, Florida, Defense-Rental Area, are hereby amended to the extent necessary to carry these provisions of item 19 into effect.

2. A new item 19 is added to Schedule B of Rent Regulation 4, reading as follows:

19. *Provisions relating to the Seminole County, Florida, Defense-Rental Area (Item 64a of Schedule A):*

(a) Wherever the words "December 1 to March 31" appear in section 26, the words "December 1 to April 30" are substituted.

(b) All provisions of this regulation insofar as they are applicable to the Seminole County, Florida, Defense-Rental Area, are hereby amended to the extent necessary to carry these provisions of item 19 into effect.

[F. R. Doc. 52-9229; Filed, Aug. 20, 1952; 8:48 a. m.]

TITLE 19—CUSTOMS DUTIES

Chapter I—Bureau of Customs, Department of the Treasury

[T. D. 53079]

PART 8—LIABILITY FOR DUTIES, ENTRY OF IMPORTED MERCHANDISE

INVOICES; GLASSWARE AND GLASS ARTICLES

In order to assist collectors of customs in properly classifying glass articles sold as beverage, toilet, cruet, or other sets, customs invoices for glassware commercially known as plated or cased glass and for articles of every description, not specially provided for, wholly or in chief value of glass, blown or partly blown in the mold or otherwise, or colored, cut, engraved, etched, frosted, gilded, ground (except such grinding as is necessary for fitting stoppers or for purposes other than ornamentation), painted, printed in any manner, sand-blasted, silvered, stained, or decorated or ornamented in any manner, shall contain the separate value of each component article when such articles are imported in sets.

This requirement shall be effective as to certified or commercial invoices filed after the expiration of 30 days after the publication of this ruling in the weekly Treasury Decisions.

Section 8.13 (i), Customs Regulations of 1943 (19 CFR 8.13 (i)), as amended, is further amended by adding the following to the list of merchandise with respect to which information is required to be furnished on customs invoices, and by placing opposite such addition the number and date of this Treasury decision:

§ 8.13 *Contents of invoices; incomplete invoices; general requirements supplemented.* * * *

(i) * * *

Glassware commercially known as plated or cased glass, and articles of every description, not specially provided for, composed wholly or in chief value of glass, blown or partly blown in the mold or otherwise, or colored, cut, engraved, etched, frosted, gilded, ground (except such grinding as is necessary for fitting stoppers or for purposes other than ornamentation), painted, printed in any manner, sand-blasted, silvered, stained, or decorated or ornamented in any manner; all the foregoing when imported in sets.

(Sec. 624, 46 Stat. 759; 19 U. S. C. 1624. In-

terprets or applies sec. 481, 46 Stat. 719; 19 U. S. C. 1481)

[SEAL]

FRANK DOW,
Commissioner of Customs.

Approved: August 14, 1952.

JOHN S. GRAHAM,
Acting Secretary of the Treasury.

[F. R. Doc. 52-9234; Filed, Aug. 20, 1952; 8:50 a. m.]

TITLE 38—PENSIONS, BONUSES, AND VETERANS' RELIEF

Chapter I—Veterans' Administration

PART 36—SERVICEMEN'S READJUSTMENT ACT OF 1944

SUBPART A—TITLE III; LOAN GUARANTY MISCELLANEOUS AMENDMENTS

1. In § 36.4301, paragraph (a) is amended to read as follows:

§ 36.4301 *Definitions.* * * *

(a) "Act" means Public Law 346, 78th Congress (58 Stat. 284), cited as the "Servicemen's Readjustment Act of 1944," as amended by Public Law 268, 79th Congress (59 Stat. 626), Public Law 864, 80th Congress, 2d session (62 Stat. 1206), Public Law 475, 81st Congress, 2d session (64 Stat. 48), Public Law 139, 82d Congress, 1st session (65 Stat. 293), Public Law 142, 82d Congress, 1st session (65 Stat. 320), and Public Law 550, 82d Congress, 2d session (66 Stat. 663) (38 U. S. C. 694, et seq.).

2. In § 36.4302, paragraph (c) is amended to read as follows:

§ 36.4302 *Computation of guaranties or insurance credits.* * * *

(c) The following formula shall govern the ascertainment of the amount of the guaranty or insurance entitlement which remains available to an eligible veteran after prior use of entitlement: Add to the amount of such entitlement previously used for realty, twice the amount previously used for non-realty purposes. Subtract this sum from \$4,000. The sum remaining is the amount available for the guaranty or insurance of a real estate loan other than a section 501 (b) loan and one-half of such sum is so available for a non-real estate loan. For the purpose of ascertaining the amount of guaranty entitlement which remains available for a section 501 (b) loan after prior use of entitlement, add to the amount of such entitlement previously used for realty, twice the amount previously used for non-realty purposes. Subtract this sum from \$7,500. Subject to the provisions of paragraph (j) of this section, the sum remaining is the amount of entitlement available for section 501 (b) purposes.

3. Section 36.4331 is revised to read as follows:

§ 36.4331 *Disqualification of lenders.* In the event the Administrator takes action under section 514 of the act to suspend a lender or holder from obtaining the guaranty or insurance of loans or from acquiring guaranteed or insured loans, such lender or holder shall there-

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[CGFR 52-9]

MARINE ENGINEERING REGULATIONS

upon become entitled then or thereafter to apply to the Administrator for a hearing at which the lender or holder shall be afforded full opportunity to introduce evidence showing why such suspension should be terminated or modified. The Administrator shall designate such time and place as he may deem appropriate for such hearing. The person or persons designated by the Administrator to conduct such hearing shall have the authority to administer oaths to witnesses. The lender concerned shall have the right to appear at such hearing in person or by attorney or both and to submit such evidence as he may deem material. Based on the evidence presented at such hearing the Administrator will determine whether to terminate the suspension conditionally or otherwise, or affirm its continuance for a definite period or permanently.

4. The centerhead "Real Estate Loans" immediately preceding § 36.4346 is hereby deleted.

5. Section 36.4347 is revised to read as follows:

§ 36.4347 *Minimum property and construction requirements.* No loan for the purchase or construction of residential property shall be eligible for guaranty or insurance unless such property complies or conforms with those standards of planning, construction, and general acceptability that may be applicable thereto and prescribed by the Administrator pursuant to section 504 (b) of the act.

6. In § 36.4501, paragraph (a) is amended to read as follows:

§ 36.4501 *Definitions.* * * *

(a) "Act" means Public Law 346, 78th Congress (58 Stat. 284), cited as "Servicemen's Readjustment Act of 1944," as amended by Public Law 268, 79th Congress (59 Stat. 626), Public Law 864, 80th Congress, 2d session (62 Stat. 1206), Public Law 475, 81st Congress, 2d session (64 Stat. 48), Public Law 139, 82d Congress, 1st session (65 Stat. 293), Public Law 142, 82d Congress, 1st session (65 Stat. 320), Public Law 325, 82d Congress, 2d session (66 Stat. 64), and Public Law 550, 82d Congress, 2d session (66 Stat. 663) (38 U. S. C. 694, et seq.).

7. Section 36.4521 is revised to read as follows:

§ 36.4521 *Minimum property and construction requirements.* No loan for the purchase or construction of residential property shall be eligible for guaranty or insurance unless such property complies or conforms with those standards of planning, construction, and general acceptability that may be applicable thereto and prescribed by the Administrator pursuant to section 504 (b) of the act.

(Sec. 504, 58 Stat. 293, as amended; 38 U. S. C. 694d)

This regulation is effective August 21, 1952.

[SEAL]

H. V. STIRLING,
Deputy Administrator.

[F. R. Doc. 52-9232; Filed, Aug. 20, 1952;
8:49 a. m.]

establish a new specification for automatically controlled, packaged auxiliary boilers.

The requirements for steering apparatus have been revised, consolidated and transferred to 46 CFR Subpart 57.25 in the marine engineering regulations. This was done to eliminate conflicting requirements, as well as to clarify Coast Guard regulations previously contained in over 14 different sections in 46 CFR Chapter I, which were also published in the Tank Vessel Regulations (CG-123), Load Line Regulations (CG-176) and the various General Rules and Regulations for Vessel Inspection (CG-170, 186, 189, and 185). Where necessary, appropriate cross references have been made. This was considered as Item IX on the agenda for the public hearing held September 18, 1951, and Item VII on the agenda for the public hearing held March 25, 1952. The revised regulations for steering apparatus are in substantial agreement with the American Bureau of Shipping Rules and the petitions from several manufacturers and others were considered and incorporated into the regulations.

This revision of the marine engineering regulations in 46 CFR Parts 51 to 57, inclusive, as well as the Marine Engineering Regulations and Material Specifications (CG-115), changes the requirements to permit the use of liberalized design stresses based upon a factor of safety of four under certain restricted requirements which must be met in order to use the higher stresses allowed; to utilize common practices and procedures employed in the industry insofar as possible; to clarify existing requirements; to effect necessary editorial changes; and to bring the requirements into closer agreements with the rules of the American Bureau of Shipping, standards for the American Society for Testing Materials, and various codes of the American Society of Mechanical Engineers. While relaxations have been made to permit the use of liberalized design stresses under certain conditions, the application of the revised regulations may in certain isolated cases be more stringent than before. This will be based on individual findings of each Officer in Charge, Marine Inspection. The petitions received from industry, as well as the many comments submitted, were considered and in most cases were accepted with minor modifications.

The revision of 46 CFR Part 51, regarding materials and material specifications used in marine engineering construction, has been made in order to utilize insofar as possible the practices and procedures used by industry. In this revision of material requirements, the Coast Guard has adopted by reference various material specifications of the American Society for Testing Materials and, where necessary, only those specific limitations applicable to certain materials are set forth in the regulations. Since the A. S. T. M. specifications have been widely accepted and are normally used in specifying requirements for materials purchased from steel manufacturers, the adoption of standard specifications with limitations

A notice regarding the proposed revision of the marine engineering regulations and material specifications, together with certain proposed changes and transfer of requirements relating to marine engineering presently published in the tank vessel regulations, load line regulations, and general rules and regulations for vessel inspection, was published in the FEDERAL REGISTER dated August 16, 1951, 16 F. R. 8136-8139, as Items I to IX, inclusive, on the agenda to be considered by the Merchant Marine Council, and a public hearing was held by the Merchant Marine Council on September 18, 1951, in Washington, D. C. Another notice regarding further proposed changes in the marine engineering regulations and material specifications was published in the FEDERAL REGISTER dated February 27, 1952, 17 F. R. 1727-1731, as Items VII, and XII to XVII, inclusive, on the agenda to be considered by the Merchant Marine Council, and a public hearing was held by the Merchant Marine Council on March 25, 1952, in Washington, D. C. Since the 1948 Convention for Safety of Life at Sea becomes effective on and after November 19, 1952, and it is necessary to change the regulations to complement and implement this Convention, a revision in the format of the regulations presently contained in Chapter I of Title 46 (Shipping), Code of Federal Regulations, is necessary in order that the regulations may be published in compliance with the Administrative Procedure Act. In order to have an orderly presentation of marine engineering regulations, only those changes in 46 CFR Parts 51 to 57, inclusive, which will not be affected by the general revision of regulations to be made to implement the 1948 Convention, are contained in this document. The proposed changes described in the notices published in the FEDERAL REGISTER dated August 16, 1951, and February 27, 1952, and considered by the Merchant Marine Council at public hearings held September 18, 1951, and March 25, 1952, which have not been included in this document, will be incorporated in the document containing the necessary revision of Chapter I (Shipping) expected to be published before the 1948 Convention becomes effective November 19, 1952.

All the comments, views, and data submitted either in writing or orally at the public hearings were considered and, where practicable, were incorporated into the regulations.

The purpose of the amendments to the regulations contained in this document is to revise and bring up to date the requirements for marine engineering and material specifications applicable to merchant vessels and to transfer to the marine engineering regulations certain revised engineering requirements from the tank vessel regulations, load line regulations, and general rules and regulations for vessel inspection, as well as to

applicable to certain materials when used in marine service, will be beneficial to both the steel manufacturer and the purchaser. A new regulation designated 51 CFR 51.01-95 permits the use of materials complying with the requirements set forth in applicable A. S. T. M. emergency alternate provisions for the period of the National Emergency proclaimed by the President on Dec. 16, 1950. The revision also relaxes material requirements for flange and firebox quality steel plate in order that the maximum temperature permitted may be increased from 500° to 650° F. to be consistent with the limitations imposed on this material when used as flange material in piping systems.

The revision of the construction regulations in 46 CFR Part 52, as well as in the Marine Engineering Regulations and Material Specifications (CG-115), brings these regulations up to date with modern usages and practices of industry; changes certain definitions and general requirements by incorporating the American Society of Mechanical Engineers stresses in the design formulas governing shells and heads of boilers and unfired pressure vessels; provides stress tables for ferrous materials; establishes definite limitations for the design of boilers and unfired pressure vessels employing stresses based upon a factor of safety of four, such as corrosion allowance, removal of welding reinforcement, and consideration of additional stresses imposed by effects other than internal pressure; establishes new tables for allowable welded joint efficiencies, which permit increases in the basic welding efficiencies for classes I, II, and III pressure vessels by the removal of weld reinforcement and by the use of spot radiography and stress relief; revises design formulas for cylindrical shells and dished heads of boilers and unfired pressure vessels, welding requirements covering furnaces, fireboxes, and waterlegs on fire tube boilers, and formulas for determining the allowable pressure and minimum thickness of boiler tubes so that these requirements will be in closer agreement with the American Society of Mechanical Engineers boiler code as petitioned by manufacturers; and provides a method for determining the ligament efficiency in tube sheets with unsymmetrically spaced holes.

The changes in 46 CFR Part 53, regarding low pressure heating boilers, (Marine Engineering Regulations and Material Specifications (CG-115)) make the Coast Guard requirements similar to the current heating boiler code of the American Society of Mechanical Engineers. The factor of safety of five has been retained for the design of heating boilers. However, the requirements regarding the capacity and testing of safety and relief valves on low pressure heating boilers have been revised in part and further changes will be considered by the Merchant Marine Council at its next public hearing. New requirements have been added covering automatically controlled packaged type heating boilers.

The revision of the unfired pressure vessel regulations in 46 CFR Part 54, as well as in the Marine Engineering

Regulations and Material Specifications (CG-115), establishes a uniform set of requirements for the design and construction of unfired pressure vessels. The requirements covering stress relieving of unfired pressure vessels constructed of A. S. T. M. A204 and A212 steel plate have been revised to agree with the American Society of Mechanical Engineers unfired pressure vessel code. There have been added a table of stresses for nonferrous materials and cast iron; design formulas for tube sheets and tubes of heat exchangers, and cast iron heads; and requirements regarding access and inspection openings to provide for suitable inspection and cleaning of unfired pressure vessels. The requirements have been revised for nozzle openings and reinforcements and pressure relief devices on unfired pressure vessels.

The piping system regulations in 46 CFR Part 55, as well as in Marine Engineering Regulations and Material Specifications (CG-115), have been revised and new requirements have been added for new materials permitted. The piping material stress table has been revised by incorporating additional piping materials for use in high temperature service and a number of new nonferrous grades have been added. The design pressures for piping have been clarified in order to establish minimum design requirements for saturated and superheated steam piping. The requirements covering the design of pipe pierced with tube holes have been revised to agree with the American Society of Mechanical Engineers code. The allowable variations in pressures and temperatures above the design limit for piping have been clarified. Certain requirements covering design of valves, plug cocks, and flange joints have been revised to clarify their intent. The design of boiler feed and blow-off piping has been revised to require a design pressure of not less than 125 percent of the maximum allowable pressure of the boiler. The number and location of independent bilge suction required have been revised to agree with the 1948 Convention for Safety of Life at Sea. Changes have also been made to the fuel oil service requirements to permit a vessel having an auxiliary packaged boiler not exceeding 3,000 pounds per hour generating capacity to be equipped with a single fuel oil pump and heater. Vessels burning fuel oils of low viscosity will no longer be required to be equipped with fuel oil heaters. Certain requirements covering lubricating oil systems have been revised to agree with the American Bureau of Shipping Rules. The regulations for sounding pipes have been revised to clarify their intent.

The welding regulations in 46 CFR Part 56, as well as in the Marine Engineering Regulations and Material Specifications (CG-115), have been revised by clarifying the scope of the regulations; redefining welding terms employed in welding processes to agree with the American Welding Society standard, and changing certain requirements regarding acceptable types of welded joints to agree with the American Society of Mechanical Engineers' codes and American Bureau of Shipping rules. The revision of Sub-

part 56.01, regarding arc welding and gas welding, deals with the scope of the regulations; definition of welding terms used; approval of plans showing essential fabrication details; requirements for submerged arc welding electrodes; joint efficiency requirements for classes II and III welded pressure vessels; revised figures illustrating joint details; requirements for various types of welded joints, seal welding and intermittent welding; stress relieving requirements for class II welded pressure vessels; classes I and II welded piping connections; and slip-on flanges of class I welded piping. The revision of Subpart 56.05, regarding tests and inspection, deals with new requirements for spot radiography of welded joints for class II welded pressure vessels designed with a factor of safety of 4. The changes in Part 56 bring the regulations into closer agreement with American Welding Society standards, American Society of Mechanical Engineers' codes, Navy Department requirements, and American Bureau of Shipping rules.

The requirements regarding installations, tests, inspections, repairs, etc., in 46 CFR Part 57, and considered as Item VIII on the agenda of the Merchant Marine Council at the public hearing held September 18, 1951, were considered favorably but the publication of the revised regulations is being postponed in order that these regulations will not be further amended by changes in section numbers and cross references when it is necessary to revise the arrangement of regulations in 46 CFR Chapter I (Shipping). These regulations will be included in the document containing the necessary revision of Chapter I expected to be published before the 1948 Convention of Safety of Life at Sea becomes effective November 19, 1952.

The new specification regarding automatically controlled, packaged, auxiliary boilers has been added as a new Subpart 162.026 in Subchapter Q (Specifications) in 46 CFR Chapter I. This specification sets forth the requirements for the manufacturer to follow in manufacturing such equipment and covers design, construction, controls required, boiler alarms, tests and inspections required, and procedure for approval.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Order No. 120, dated July 31, 1950 (15 F. R. 65,21), as well as the statutes cited with the regulations below, the following amendments to the regulations are prescribed which shall become effective 30 days after the date of publication of this document in the FEDERAL REGISTER:

Subchapter D—Tank Vessels

PART 32—SPECIAL EQUIPMENT, MACHINERY, AND HULL REQUIREMENTS

SUBPART 32.35—MAIN AND AUXILIARY MACHINERY

1. Section 32.35-25 is amended to read as follows:

§ 32.35-25 *Steering apparatus on tank vessels—TB/ALL.* Tank vessels shall be provided with steering apparatus as required by Subpart 57.25 of Subchapter F (Marine Engineering) of this chapter.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4417a, as amended; 46 U. S. C. 391a)

2. Section 32.35-30. *Steering apparatus on tank ships constructed on or after July 1, 1951—T/ALL is canceled.*

3. Section 32.35-35 *Steering apparatus on tank barges—B/ALL is canceled.*

Subchapter E—Load Lines

PART 46—SUBDIVISION LOAD LINES FOR PASSENGER VESSELS

RULES FOR DETERMINING SUBDIVISION LOAD LINES FOR PASSENGER VESSELS ENGAGED ON FOREIGN AND COASTWISE VOYAGES

1. Section 46.40 *Auxiliary steering apparatus is canceled.*

(Sec. 2, 49 Stat. 888, as amended; 46 U. S. C. 88a)

Subchapter F—Marine Engineering

1. Part 51 is amended to read as follows:

PART 51—MATERIALS

SUBPART 51.01—GENERAL

Sec.

- 51.01-1 Statutory requirements.
- 51.01-5 Basic information requirements.
- 51.01-10 General classification of materials.
- 51.01-15 Inspection and testing of class A material.
- 51.01-20 Chemical analyses.
- 51.01-25 Certification of class B material.
- 51.01-30 Tension tests.
- 51.01-40 Retests.
- 51.01-45 Rejections.
- 51.01-50 Appeals.
- 51.01-55 Process of steel manufacture.
- 51.01-60 Stamping plates and specimens.
- 51.01-65 Stock plates.
- 51.01-70 Workmanship and finish.
- 51.01-75 Heat treatment.
- 51.01-80 Reclassification of materials.
- 51.01-85 Alternative materials.
- 51.01-90 Material specification standards.
- 51.01-95 Emergency alternate provisions.

SUBPART 51.04—MARINE BOILER STEEL PLATE

- 51.04-1 Scope.
- 51.04-5 Heat treatment.
- 51.04-10 Test specimens.
- 51.04-15 Marking.

SUBPART 51.07—STAYBOLT AND RIVET STEEL

- 51.07-1 Scope.

SUBPART 51.10—STEEL BARS AND SHAPES

- 51.10-1 Scope.
- 51.10-5 Process.
- 51.10-10 Chemical composition.
- 51.10-15 Tensile properties.
- 51.10-20 Modification in elongation.
- 51.10-25 Bending properties.
- 51.10-30 Test specimens.
- 51.10-35 Number of tests.
- 51.10-40 Finish.
- 51.10-45 Marking.

SUBPART 51.13—STAYBOLT AND RIVET IRON

- 51.13-1 Scope.

SUBPART 51.22—FLANGE AND FIREBOX STEEL PLATES

- 51.22-1 Scope.

SUBPART 51.25—CARBON AND ALLOY-STEEL AND WROUGHT IRON TUBES

- 51.25-1 Scope.

SUBPART 51.34—CARBON AND ALLOY-STEEL AND WROUGHT IRON PIPE

- 51.34-1 Scope.

SUBPART 51.46—STEEL FORGINGS

Sec.

- 51.46-1 Scope.
- 51.46-5 Hydrostatic tests.

SUBPART 51.49—CARBON AND ALLOY-STEEL BOLTING AND NUT MATERIAL

- 51.49-1 Scope.

SUBPART 51.58—STEEL CASTINGS

- 51.58-1 Scope.
- 51.58-5 Hydrostatic tests.

SUBPART 51.61—MALLEABLE IRON AND GRAY IRON CASTINGS

- 51.61-1 Scope.
- 51.61-5 Hydrostatic tests.

SUBPART 51.67—COPPER AND COPPER-ALLOY PLATE

- 51.67-1 Scope.

SUBPART 51.70—SEAMLESS COPPER AND COPPER-ALLOY PIPE

- 51.70-1 Scope.

SUBPART 51.73—SEAMLESS COPPER AND COPPER-ALLOY TUBES

- 51.73-1 Scope.

SUBPART 51.76—COPPER-ALLOY CASTINGS

- 51.76-1 Scope.
- 51.76-5 Hydrostatic tests.

SUBPART 51.79—ALUMINUM-ALLOY PLATE

- 51.79-1 Scope.

AUTHORITY: §§ 51.01-1 to 51.79-1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275.

SUBPART 51.01—GENERAL

§ 51.01-1 *Statutory requirements.* (a) Plates, bars, and shapes used as pressure parts of boilers intended for marine service shall be tested, inspected, and stamped by an inspector in accordance with the requirements of Title 52 of the Revised Statutes of the United States.

(b) Material used for pressure parts in the construction of pressure vessels other than boilers shall conform to the requirements of this part.

§ 51.01-5 *Basic information requirements.* When ordering material for the construction of boilers or unfired pressure vessels to be installed on vessels subject to the inspection of the Coast Guard, boiler manufacturers shall, as far as practicable, furnish the following information to the manufacturer of the material and to the Officer in Charge, Marine Inspection, in the district where the boiler or unfired pressure vessel is to be fabricated:

(a) Name and location of manufacturer's works.

(b) Type and size of boiler or unfired pressure vessel.

(c) Manufacturer's serial or shop number.

(d) Design pressure.

(e) Name of shipyard and hull number.

(f) Vessel's name.

§ 51.01-10 *General classification of materials.* (a) The materials to be used in the construction of boilers and unfired pressure vessels, piping, valves, fittings,

and appurtenances below listed shall be of three general classes of which classes A and B shall be used for pressure parts and class C may be used for other parts as specified.

Class A: Tested materials manufactured under the supervision of the Coast Guard, tests of which shall be witnessed by an inspector.

Class B: Certified materials tested by the manufacturers, and certified by them as conforming to the requirements.

Class C: Materials for nonpressure parts of boilers or unfired pressure vessels such as casings for water-tube boilers, uptakes, furnace fronts, and operating equipment shall be of good commercial quality. No detail requirements are herein specified for materials in this class. Class C materials shall be accepted by inspectors without requiring tests or certification by manufacturers.

(b) Except as may be otherwise required, the classification of materials under classes A and B and the sections of this part in which they are specified, are as follows:

CLASS A

Subparts

- 51.04 Marine boiler steel plate.
- 51.07 Staybolts and rivet steel.
- 51.10 Steel bars and shapes.
- 51.13 Staybolt and rivet iron.

CLASS B

- 51.22 Flange and firebox steel plates.
- 51.25 Carbon and alloy-steel and wrought iron tubes.
- 51.34 Carbon and alloy-steel and wrought iron pipe.
- 51.46 Steel forgings.
- 51.49 Carbon and alloy-steel bolting material.
- 51.58 Steel castings.
- 51.61 Malleable iron and gray iron castings.
- 51.67 Copper and copper-alloy plate.
- 51.70 Seamless copper and copper-alloy pipe.
- 51.73 Seamless copper and copper-alloy tubes.
- 51.76 Copper-alloy castings.
- 51.79 Aluminum-alloy plate.

§ 51.01-15 *Inspection and testing of class A material.* Inspectors shall have free entry at all times to those parts of the works where material subject to the regulations in this part is being manufactured. The manufacturer shall afford inspectors all reasonable facilities to satisfy them that the material is being manufactured in accordance with the requirements of the Commandant. Unless otherwise authorized, tests and inspection shall be made at the place of manufacture prior to shipment and shall be so conducted as not to interfere unnecessarily with the operation of the works. Inspectors shall assure themselves that test specimens are marked for positive identification with the materials which they represent. Unless otherwise specified, tests shall be made at ordinary temperature.

§ 51.01-20 *Chemical analyses.* (a) A ladle analysis of each melt of class A materials shall be made by the manufacturer and a certified report thereof shall be furnished by him to the inspector upon request. This analysis shall be made from a test ingot taken during the pouring of the melt. The chemical composition thus determined shall conform to the specified requirements. This requirement shall apply also to the following class B materials:

(1) Flange and firebox quality steel plates specified in Subpart 51.22.

(2) Steel forgings specified in Subpart 51.46.

(3) Alloy-steel bolting material specified in Subpart 51.49.

(4) Steel castings specified in Subpart 51.58.

(5) Copper-alloy plate specified in Subpart 51.67.

(6) Copper-alloy castings specified in Subpart 51.76.

(b) A check analysis may be made at the discretion of the Commandant from test specimens representing material for which chemical composition is specified in any section of this part, in either class A or B. The chemical composition thus determined shall conform to the requirements.

§ 51.01-25 *Certification of class B material.* (a) Certification of chemical analyses and physical tests of materials of class B shall be an affidavit by the manufacturer certifying that all materials of this class supplied by him for marine service do, or will conform to all the requirements of the regulations in this part applicable thereto.

(b) Materials in this class are not required to be tested in the presence of an inspector, but whenever deemed necessary by the Commandant, he may detail an inspector to witness such tests and satisfy himself that the requirements of the specification for class B materials are met.

§ 51.01-30 *Tension tests.* All tension tests shall be made on standard calibrated machines. The yield point in tension tests shall be determined by the drop of the beam or the halt in the gauge of the testing machine. Except where otherwise specified in this part, the speed of the crosshead of the machine shall not exceed $\frac{1}{16}$ inch per minute per inch of gauge length up to the yield point, nor shall it exceed $\frac{1}{2}$ inch per minute per inch of gauge length beyond the yield point. Any convenient speed of the crosshead may be used from the start of loading the test specimen until a value estimated as one-half of the yield point is reached. In determining the yield strength by use of an extensometer, the crosshead speed shall not exceed 0.025 inch per minute per inch of gauge length. In the event the machine is stopped in taking readings, the speed may be exceeded in the take up only. The ends of all test specimens shall be of form to fit the holders of the testing machine in such a way that the load will be axial.

§ 51.01-40 *Retests.* When the result of any of the physical tests specified for any of the materials does not conform to the requirements, two additional specimens may, at the request of the manufacturer, be taken from the same lot and tested in the manner specified, but in such case, both of the specimens shall conform to the requirements. In the case of tension tests, this retest shall be allowed if the percentage of elongation obtained is less than required, or if any part of the fracture is outside of the middle third of the gauge length. If any test specimen develops flaws, it shall be discarded and another specimen from the same lot substituted.

§ 51.01-45 *Rejections.* Failure of the tests (or retests) specified in the regulations in this subchapter for each particular material shall be cause for rejection. Unless otherwise required, any rejection shall be reported by the inspector within 5 working days from the receipt of the test specimen. Acceptance of material on results of tests at the place of manufacture shall not prejudice the right to reject any of such material in which injurious defects are subsequently discovered. The manufacturer shall be promptly notified of such subsequent rejections, and the records shall be corrected.

§ 51.01-50 *Appeals.* In case of dissatisfaction with the results of any test, the manufacturer may appeal to the Coast Guard District Commander from the decision of the Officer in Charge, Marine Inspection. Should the Coast Guard District Commander sustain the Officer in Charge, Marine Inspection, the manufacturer may appeal to the Commandant. Tested specimens which represent rejected material shall be retained for at least 30 days.

§ 51.01-55 *Process of steel manufacture.* Unless otherwise officially authorized by the Commandant, all wrought steel to be used in the construction of boilers or unfired pressure vessels to be installed on vessels shall be manufactured by the open-hearth, electric furnace, or crucible process.

§ 51.01-60 *Stamping plates and specimens.* (a) Class A plates shall be stamped by the manufacturer, before they are tested, with his name or trademark, the word "Marine", the letter indicating the grade of the steel, and the minimum tensile strength of the plate per square inch of cross-sectional area expressed in thousands. Inspectors shall permit cutting a plate into two or more parts before testing, but each part shall be stamped or match-marked for identification before cutting. All plates accepted by the inspector as conforming to the requirements shall be stamped by him near the manufacturer's stamp with the official stamp of the Coast Guard, the initials of his name, and the serial number. All test specimens shall be ring-stamped or match-marked for identification before being detached. Plates shall be stamped lengthwise in two places on one long side about 18 inches from the edges at the corners. Each butt strap shall be stamped lengthwise of the plate about the middle of the strap.

(b) The impression of the official stamp of the Coast Guard for stamping plates and specimens shall be as shown below:

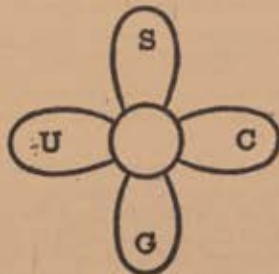


FIGURE 51.01-60 (b)—Official stamp.

§ 51.01-65 *Stock plates.* Plates may be ordered to be carried in stock ashore or on shipboard for repairs to boilers and unfired pressure vessels. Such plates shall be inspected and tested at the place of manufacture and stamped for identification as stock plates. A test report for such plates shall be furnished to the Coast Guard District Commander of the district where the purchaser is located, with a copy to the purchaser. The Coast Guard District Commander shall furnish a copy thereof to the Officer in Charge, Marine Inspection, in the district where the material is kept in stock, and if the material is to be used by persons other than the original purchaser, they shall also be furnished with a copy of such report, for submittal by them to the Officer in Charge, Marine Inspection, in the district where the repairs are actually to be made before the material may be used. Vessels carrying such stock plates shall obtain and carry identification and test records of each plate. Where such plates are cut into pieces for repairs, the Officer in Charge, Marine Inspection, shall, upon request, stamp each piece so detached for identification with the original plate and a record of such stamping shall be made.

§ 51.01-70 *Workmanship and finish.* All materials within the scope of the regulations in this subchapter shall be free from injurious defects and shall have a workmanlike finish.

§ 51.01-75 *Heat treatment.* Some of the materials herein specified require heat treatment. This may consist of annealing, or of normalizing, or of normalizing followed by annealing, or of normalizing followed by a draw back to a temperature below the critical range. Annealing shall consist of allowing material to cool after forging or rolling to a temperature below the critical range, then reheating it to proper temperature to refine the grain and allowing it to cool in the furnace. Normalizing shall consist of allowing material to cool after forging or rolling to a temperature below the critical range, then reheating it to proper temperature to refine the grain and allowing it to cool in still air.

§ 51.01-80 *Reclassification of materials.* When more than one grade is specified for any material or purpose and tests of a material of a superior grade fail to meet the requirements, such material may be reclassified and accepted as a specified lower grade if it fulfills the specified requirements for the latter. In such cases, the material shall be restamped or re-marked as required for proper identification, and revised records shall be made to cover it.

§ 51.01-85 *Alternative materials.* If, in the development of industrial arts, other suitable or improved materials differing from those specified in this part are developed, their use will be given consideration, upon formal application to the Commandant with full information as to the characteristics of the material, and such scientific data and facts as may be necessary to establish the suitability and safety of the material for the use proposed. The material requirements in this subchapter are minimum

requirements and are not intended to bar better materials.

§ 51.01-90 *Material specification standards.* (a) The specifications prescribed in this part cover materials for use in the construction of boilers, unfired pressure vessels, piping, valves, fittings, and appurtenances, and shall comply with the standard specifications issued by the American Society for Testing Materials (A. S. T. M.), as listed in this part, subject to the limitations noted in the applicable subparts.

(b) Reference copies of all A. S. T. M. specifications listed in this part are available for reading purposes at U. S. Coast Guard Headquarters, Washington 25, D. C., and are on file with various Coast Guard District Commanders.

(c) The A. S. T. M. Standards referred to in this subchapter may be purchased from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.

§ 51.01-95 *Emergency alternate provisions.* For the period of the National Emergency proclaimed by the President on December 16, 1950 (Proclamation 2914, 3 CFR, 1950 Supp.), the "Emergency Alternate Provisions" issued by the American Society for Testing Materials affecting the A. S. T. M. Standards specified in this part may be used as alternate specifications.

SUBPART 51.04—MARINE BOILER STEEL PLATE

§ 51.04-1 *Scope.* (a) The material specifications covering marine boiler steel plate subject to class A inspection shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations given in this subpart:

TABLE 51.04-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
A201-52T.....	A and B	A and B
A212-52T.....	A and B	C and D
A204-52T.....	A, B, and C	E, F, and G

(b) Steel plates for any part of a boiler subject to pressure and exposed to the fire or products of combustion shall be of firebox quality, steel plates for any part of a boiler subject to pressure and not exposed to the fire or products of combustion shall be of either flange or firebox quality.

(c) The grades listed in paragraph (a) of this section are suitable for arc or gas welding, but are not suitable for forge welding.

(d) Sufficient discard from the top of each ingot shall be made at any stage of the manufacture, to secure freedom from piping and undue segregation in the finished product, but in no case shall the amount of top discard be less than 30 percent.

§ 51.04-5 *Heat treatment.* (a) Plates over 2 inches in thickness, before being fabricated, shall be uniformly heat-treated to produce grain refinement. Heat treatment involving quenching in a liquid medium is prohibited. If this treatment is not done at the rolling mill, the testing shall be car-

ried out in accordance with paragraph (d) of this section.

(b) When plates are heat-treated to produce grain refinement the test specimens and the plates shall be stamped "G. R." The tensile strength of the plates in the grain-refined state shall be not less than the minimum of the specified range.

(c) Orders to the plate manufacturer or the fabricator shall specify when plates subject to the requirements of this section are to be stress-relieved and when they are to be heat-treated for grain-refinement so that proper provision may be made for the treatment of test specimens.

(d) When a fabricator, equipped to perform the work, elects to do the required heat treatment of plates for grain refinement, he shall accept the plates on the basis of the mill tests. The plate manufacturer shall make the tests prescribed in this subpart. The tension and bend test specimens shall be prepared from full thickness pieces heat-treated under conditions he considers appropriate for grain refinement and to meet the test requirements. The manufacturer shall inform the fabricator of the procedure followed in treating the pieces at the mill for guidance in treating the plates. The required physical properties shall be determined after heat treatment of the plates on specimens prepared from pieces similarly and simultaneously treated with the plates. Pieces for two tension tests, one top and one bottom, shall be provided from each plate as rolled. These pieces shall be stamped by the inspector with his official stamp for identification.

NOTE: The term "plate as rolled" as used in this section and in § 51.04-10 (c) refers to the unit plate rolled from a slab or directly from an ingot in its relation to the location and number of specimens; not to its condition.

(e) In the case of plates over 2 inches in thickness which subsequently are to be stress-relieved, the test specimens for such plates shall, before testing, be stress-relieved following the heat treatment for grain refinement.

§ 51.04-10 *Test specimens.* (a) For plates 2 inches and under in thickness, tension and bend test specimens shall be the full thickness of the material and shall be machined to the form and dimensions shown in figure 51.04-10 (a); or the bend test specimen may be machined with both edges parallel.

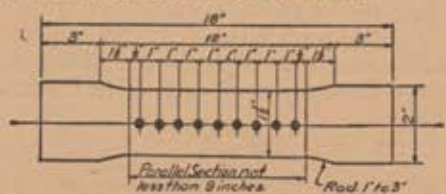


FIGURE 51.04-10 (a)—Standard rectangular tension-test specimen with 8-inch gauge length.

(b) For grade A or B plates over 2 inches and not over 4 inches in thickness, tension-test specimens may be the full thickness of the material and of the form shown in figure 51.04-10 (a); when adequate testing machine capacity is available,

(c) For plates over 2 inches in thickness, except as permitted in paragraph (b) of this section, tension-test specimens shall be machined to the form and dimensions shown in figure 51.04-10 (c); and the axis of each such specimen shall be located midway between the center and the top or bottom surface of the plate. The bend test specimens shall be at least 1 1/2 inches in width, with both edges parallel, and may be reduced to 2 inches in thickness; but shall have one surface as rolled.

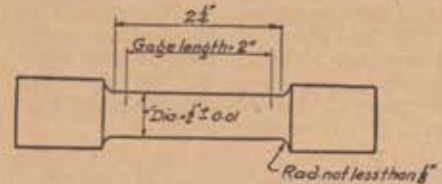


FIGURE 51.04-10 (c)—Standard round tension-test specimen with 2-inch gauge length.

§ 51.04-15 *Marking.* The quality classification to be marked on all class A plates in accordance with § 51.01-60 shall be the word, "Marine" followed by the letter designating the grade of the steel.

SUBPART 51.07—STAYBOLT AND RIVET STEEL

§ 51.07-1 *Scope.* The material specifications covering staybolt and rivet steel subject to class A inspection shall comply with the following standard specifications issued by the American Society for Testing Materials:

TABLE 51.07-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
A31-52T.....	A	A
A31-52T.....	B	B
A202-52T.....	A	C

SUBPART 51.10—STEEL BARS AND SHAPES

§ 51.10-1 *Scope.* (a) The material specifications covering round steel bars and structural steel shapes subject to class A inspection shall comply with the following standard specification issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

A. S. T. M. designation:	Grade
A107-52T.....	1010 through 1030

§ 51.10-5 *Process.* The steel shall be made by either or both of the following processes: open-hearth or electric-furnace.

§ 51.10-10 *Chemical composition.* The steel shall conform to the following requirements as to chemical composition:

Phosphorus, maximum, percent:	
Acid.....	0.05
Basic.....	.04
Sulfur, maximum, percent.....	.05

§ 51.10-15 *Tensile properties.* The material shall conform to the following requirements as to tensile properties:

Tensile strength, p. s. l.....	55,000 to 65,000
Yield point, p. s. l.....	0.5 tensile strength
Elongation in 8 inches, minimum, percent.....	1,500,000 tensile strength
Elongation in 2 inches, minimum, percent.....	25

§ 51.10-20 *Modification in elongation.* For material over 3/4 inch in thickness, a deduction from the percentages of elongation specified in § 51.10-15 of 0.125 percent shall be made for each increase of 1/32 inch of the specified thickness above 3/4 inch.

§ 51.10-25 *Bending properties.* The bend test specimen shall stand being bent cold through 180° without cracking on the outside of the bent portion to an inside diameter which shall have the following relation to the thickness of the specimen:

TABLE 51.10-25—BENDING TEST

Thickness of material	Ratio of inside diameter of bend to thickness of specimen
3/4 inch and under	3/4
Over 3/4 to 1 inch, inclusive	1
Over 1 to 1 1/2 inches, inclusive	1 1/4
Over 1 1/2 to 2 inches, inclusive	2 1/4
Over 2 inches	3

§ 51.10-30 *Test specimens.* (a) Test specimens shall be of the full thickness or diameter of material as rolled, except as specified in paragraphs (b) and (c) of this section.

(b) Test specimens for shapes and flats may be machined to the form and dimensions shown in figure 51.04-10 (a), or with both edges parallel.

(c) Test specimens for bars over 1 1/2 inches in thickness or diameter may be machined to a thickness or diameter of at least 3/4 inch for a length of at least 9 inches; or tension test specimens may conform to the dimensions shown in figure 51.04-10 (c). Bend test specimens may be 1 by 1/2 inch in section.

§ 51.10-35 *Number of tests.* (a) One tension and one bend test shall be made from each melt; except that if material from one melt differs 3/8 inch or more in thickness, one tension and one bend test shall be made from both the thickest and the thinnest material rolled.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any tension test specimen is less than that specified in § 51.10-15 and any part of the fracture is more than 3/4 inch from the center of the gauge length of a 2-inch specimen, or is outside the middle third of the gauge length of an 8-inch specimen, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

§ 51.10-40 *Finish.* The finished material shall be free from injurious defects and shall have a workmanlike finish.

§ 51.10-45 *Marking.* Bars shall, when loaded for shipment, be properly separated, and marked with the name or brand of the manufacturer and melt number for identification. The melt number shall be legibly marked on each test specimen.

SUBPART 51.13—STAYBOLT AND RIVET IRON

§ 51.13-1 *Scope.* The material specifications covering wrought iron bars for stays and staybolts and wrought iron

rivets subject to class A inspection shall comply with the following standard specifications issued by the American Society for Testing Materials:

TABLE 51.13-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
A84-39	Staybolts	A
A152-39	Rivets	B

SUBPART 51.22—FLANGE AND FIREBOX STEEL PLATE

§ 51.22-1 *Scope.* The material specifications covering carbon steel plate of flange and firebox quality, class B, certified material, shall comply with the following standard specification issued by the American Society for Testing Materials:

TABLE 51.22-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
A285-52T	A (flange quality)	A
A285-52T	B (flange quality)	B
A285-52T	C (flange quality)	C
A285-52T	A (firebox quality)	A
A285-52T	B (firebox quality)	B
A285-52T	C (firebox quality)	C

SUBPART 51.25—CARBON AND ALLOY STEEL AND WROUGHT IRON TUBES

§ 51.25-1 *Scope.* (a) The material specifications covering steel and iron tubes, class B, certified material, shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

TABLE 51.25-1 (a)—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
Carbon steel and iron:		
A83-46	Type A (low-carbon seamless steel)	T83-A
A178-51T	Type A (low-carbon electric-resistance-welded steel)	T178-A
A178-51T	Type B (electric-resistance-welded iron)	T178-B
A178-51T	Type C (medium-carbon electric-resistance-welded steel)	T178-C
A179-51T	Low-carbon seamless steel condenser tubes	T179
A192-51T	Low-carbon seamless steel	T192
A210-51T	Medium-carbon seamless steel	T210
A226-51T	Electric-resistance-welded steel	T226
Alloy steel:		
A299-51T	T1 (C-Mo)	T1
A299-51T	T1a (C-Mo)	T1a
A299-51T	T1b (C-Mo)	T1b
A213-51T	T3 (1.75 Cr-0.75 Mo)	T3
A213-51T	T5 (5 Cr-0.50 Mo)	T5
A213-51T	T11 (1.25 Cr-0.50 Mo)	T11
A213-51T	T12 (1 Cr-0.50 Mo)	T12
A213-51T	T14 (2 Cr-0.50 Mo)	T14
A213-51T	T21 (3 Cr-1 Mo)	T21
A213-51T	T22 (2.25 Cr-1 Mo)	T22
A213-51T	TP321 (18 Cr-8Ni+Ti)	TP321
A213-51T	TP347 (18 Cr-8Ni+Co)	TP347

(b) Grade T179 shall be permitted only for use as tube material in heat exchangers.

SUBPART 51.34—CARBON AND ALLOY STEEL AND WROUGHT IRON PIPE

§ 51.34-1 *Scope.* The material specifications covering steel and wrought iron pipe, class B, certified material, shall comply with the following standard

specifications issued by the American Society for Testing Materials:

TABLE 51.34-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
Carbon-steel and iron:		
A53-52T	Lap-welded steel	P53-LW
A53-52T	Butt-welded steel	P53-BW
A53-52T	A (seamless steel)	P53-A
A53-52T	B (seamless steel)	P53-B
A53-52T	A (electric-resistance-welded steel)	P53-RW-A
A53-52T	B (electric-resistance-welded steel)	P53-RW-B
A106-52T	A (seamless steel)	P106-A
A106-52T	B (seamless steel)	P106-B
A135-51T	A (electric-resistance-welded steel)	P135-A
A135-51T	B (electric-resistance-welded steel)	P135-B
A72-45	Lap-welded wrought iron	P72-LW
A72-45	Butt-welded wrought iron	P72-BW
Alloy-steel:		
A335-52T ¹	(A206) P1 (C-Mo)	P1
A335-52T ¹	(A280) P2 (0.50 to 0.70 Cr-0.50 Mo)	P2 (P280)
A335-52T ¹	(A158) P3a (1.75 Cr-0.70 Mo)	P3a
A335-52T ¹	(A158) P3b (2 Cr-0.50 Mo)	P3b
A335-52T ¹	(A158) P11 (1.25 Cr-0.50 Mo)	P11
A335-52T ¹	(A315) P12 (1 Cr-0.50 Mo)	P12 (P315)
A335-52T ¹	P21 (3 Cr-0.90 Mo)	P21
A335-52T ¹	P22 (2.25 Cr-1 Mo)	P22
A312-51T ²	(A158) TP321 (18 Cr-8Ni+Ti)	TP 321
A312-51T ²	(A158) TP347 (18 Cr-8Ni+Co)	TP 347

¹ This A. S. T. M. specification for seamless ferritic alloy steel pipe for high temperature service is a combination of, and is intended to replace A. S. T. M. specifications A206-51T, A280-51T, A158-51T, and A315-51T, with the addition of two new grades P21 and P22.

² The austenitic grades TP321 and TP347 formerly in A. S. T. M. specification A158 have been incorporated in specification A312.

SUBPART 51.46—STEEL FORGINGS

§ 51.46-1 *Scope.* The material specifications covering carbon-steel and alloy-steel pipe flanges, forged fittings, valves and parts of class B, certified material, intended for general service and high-temperature service, shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

TABLE 51.46-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
Carbon-steel:		
A105-46	I	F105-I
A105-46	II	F105-II
A181-49	I	F181-I
A181-49	II	F181-II
Alloy-steel:		
182-52T	F1 (C-Mo)	F1
182-52T	F2 (1 Cr-0.50 Mo)	F2
182-52T	F5 (5 Cr-0.50 Mo)	F5
182-52T	F22 (2.25 Cr-1 Mo)	F22
182-52T	F8m (18 Cr-8 Ni+Mo)	F8m
182-52T	F8c (18 Cr-8 Ni+Co)	F8c
182-52T	F8t (18 Cr-8 Ni+Ti)	F8t

§ 51.46-5 *Hydrostatic tests.* Valve bodies or fittings and other pressure-containing parts shall be tested after machining to the hydrostatic test pressures specified in tables 55.07-15 (e12) and 55.07-15 (e13) in § 55.07-15 of this subchapter.

SUBPART 51.49—CARBON AND ALLOY-STEEL BOLTING AND NUT MATERIAL

§ 51.49-1 *Scope.* The material specifications covering carbon and alloy-steel

bolts and nuts of class B, certified material, shall comply with the following standard specifications of the American Society for Testing Materials:

TABLE 51.49-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
Carbon-steel bolting:		
A201-51T	BO	BO
A307-50T	B	B
Alloy-steel bolting:		
A193-51T	BA (ferritic alloy)	BA
A193-51T	BB (ferritic alloy)	BB
A193-51T	BC (ferritic alloy)	BC
A193-51T	B4 (3 Cr-0.50 Mo)	B4
A193-51T	B6 (12 Cr)	B6
A193-51T	B7 (1 Cr-0.20 Mo)	B7
A193-51T	B7a (1 Cr-0.60 Mo)	B7a
A193-51T	B14 (1 Cr-0.35 Mo-0.25 Va)	B14
A193-51T	B16 (1 Cr-0.55 Mo-0.30 Va)	B16
A193-51T	B8c (18 Cr-8Ni+Co)	B8c
A193-51T	B8t (18 Cr-8Ni+TD)	B8t
A193-51T	B8F (18 Cr-8 Ni)	B8F
Carbon and alloy steel nuts:		
A194-51	Class 1 (carbon-steel)	1
A194-51	Class 2 (carbon-steel)	2
A194-51	Class 2H (carbon-steel)	2H
A194-51	Class 3 (5 Cr-0.50 Mo-1W)	3
A194-51	Class 4 (0.15 Si-0.20 Mo)	4

SUBPART 51.58—STEEL CASTINGS

§ 51.58-1 Scope. (a) The material specifications covering carbon and alloy-steel castings of class B, certified material, shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

TABLE 51.58-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
Carbon-steel:		
A95-44		A
A216-47T	WCA	WCA
A216-47T	WCB	WCB
Alloy-steel:		
A217-49T	WC1 (C-Mo)	WC1
A217-49T	WC4 (1 Ni-0.63 Cr-0.50 Mo)	WC4
A217-49T	WC5 (0.80 Ni-0.70 Cr-1 Mo)	WC5
A217-49T	WC6 (1.25 Cr-0.50 Mo)	WC6
A217-49T	WC9 (2.25 Cr-1 Mo)	WC9
A217-49T	C5 (5 Cr-0.50 Mo)	C5
A217-49T	C12 (9 Cr-1 Mo)	C12

(b) Grades C5, C12, WCA, WCB, WC1, WC4, WC5, WC6, and WC9 are suitable for arc or gas welding. Other grades may be considered weldable when employing proper welding technique approved by the Commandant.

§ 51.58-5 Hydrostatic tests. (a) Castings intended for use as pipe flanges and flanged fittings shall be tested after machining to the hydrostatic test pressures specified in tables 55.07-15 (e12) and 55.07-15 (e13) in § 55.07-15 of this subchapter, and show no leaks.

(b) Pressure containing castings other than those specified in paragraph (a) in this section shall be tested to a hydrostatic pressure of 2 times the maximum allowable pressure and show no leaks.

SUBPART 51.61—MALLEABLE IRON AND GRAY IRON CASTINGS

§ 51.61-1 Scope. The material specifications covering malleable and gray iron castings of class B, certified material, used for pipe fittings, valves, flanges, and manifolds, shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

TABLE 51.61-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
Malleable iron:		
A47-48	32510	A1
A47-48	35018	A2
A197-47	Cupola	B
Cast iron:		
A126-42	Class A (regular)	C
A126-42	Class B (higher strength)	D
A126-42	Class C (high-test)	E
A48-48	Class No. 20	No. 20
A48-48	Class No. 25	No. 25
A48-48	Class No. 30	No. 30
A48-48	Class No. 35	No. 35
A48-48	Class No. 40	No. 40
A48-48	Class No. 50	No. 50

§ 51.61-5 Hydrostatic tests. Castings intended for use as pipe flanges and flanged fittings shall be tested after machining to a hydrostatic pressure as required by § 55.07-30 of this subchapter.

SUBPART 51.67—COPPER AND COPPER-ALLOY PLATE

§ 51.67-1 Scope. (a) The material specifications covering copper and copper-alloy rolled plate of class B, certified material, suitable for use as shells and tube sheets of heat exchangers and unfired pressure vessels, shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

TABLE 51.67-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
Copper:		
B11-49	Type ETP (tough pitch copper nonarsenical)	B11-1
B11-49	Type DHP (phosphorized copper nonarsenical)	B11-2
B11-49	Type ATP (tough pitch arsenical copper)	B11-3
B11-49	Type DPA (phosphorized arsenical copper)	B11-4
Copper-alloy:		
B171-51	Naval brass	B171-A
B171-51	Copper nickel alloy	B171-B
B171-51	Aluminum bronze	B171-C

(b) When copper plates are to be welded, grades B11-2 and B11-4 only shall be employed.

SUBPART 51.70—SEAMLESS COPPER AND COPPER-ALLOY PIPE

§ 51.70-1 Scope. The material specifications covering seamless copper and copper-alloy pipe, of class B, certified material, shall comply with the follow-

ing standard specifications issued by the American Society for Testing Materials:

TABLE 51.70-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
B42-51	Seamless copper	B42
B43-51	Red brass	B43

SUBPART 51.73—SEAMLESS COPPER AND COPPER-ALLOY TUBES

§ 51.73-1 Scope. (a) The material specifications covering seamless copper and copper-alloy tubes, of class B, certified material, shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

TABLE 51.73-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
B88-51	Copper type K	B88-K
B88-51	Copper type L	B88-L
B88-51	Copper type M	B88-M
B13-49	Arsenical copper boiler tubes	B13-A
B13-49	Nonarsenical copper boiler tubes	B13-B
B75-51T	Phosphorized copper type DLP	B75-A
B75-51T	Phosphorized copper type DHP	B75-B
B75-51T	Phosphorized arsenical copper type DPA	B75-C
B111-51	Copper	B111-A
B111-51	Arsenical copper	B111-B
B111-51	Admiralty metal grade B, C, or D	B111-C
B111-51	Aluminum brass	B111-D
B111-51	Aluminum bronze	B111-E
B111-51	Red brass	B111-F
B111-51	Copper nickel 70-30	B111-G
B111-51	Copper nickel 80-20	B111-H
B111-51	Copper nickel 90-10	B111-I

(b) When copper tubes are to be welded, deoxidized copper shall be employed.

SUBPART 51.76—COPPER-ALLOY CASTINGS

§ 51.76-1 Scope. The material specifications covering bronze castings of class B, certified material, for pressure-containing parts of valves, pipe fittings, and similar appliances, shall comply with the following standard specifications issued by the American Society for Testing Materials, subject to the limitations noted in this subpart:

TABLE 51.76-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
B62-51	Composition brass or ounce metal	4A
B61-51	Steam or valve bronze	2A
B143-49	Tin bronze, 1A	1A
B143-49	Tin bronze, 1B	1B

§ 51.76-5 Hydrostatic tests. Castings intended for use as pipe flanges and flanged fittings shall be tested after machining to a hydrostatic test as required by § 55.07-30 of this subchapter.

SUBPART 51.79—ALUMINUM-ALLOY PLATE

§ 51.79-1 *Scope.* The material specifications covering aluminum-alloy plate of class B, certified material, suitable for use as shells and tube sheets of unfired pressure vessels and heat exchangers, shall comply with the following standard specifications issued by the American Society for Testing Materials:

TABLE 51.79-1—MATERIAL SPECIFICATIONS

A. S. T. M. designation	A. S. T. M. grade	Coast Guard grade
B178-51T	900A (28)	600A
B178-51T	M1A (38)	M1A
B178-51T	GR20A (32S)	GR20A
B178-51T	GS11A (61S)	GS11A

PART 52—CONSTRUCTION

SUBPART 52.01—PROCEDURE AND GENERAL REQUIREMENTS

1. Sections 52.01-1, 52.01-5, 52.01-10, and 52.01-15 are amended to read as follows:

§ 52.01-1 *Definitions*—(a) *Main boiler.* A main boiler is a steam boiler used for generating steam for propulsion purposes on shipboard.

(b) *Auxiliary or donkey boiler.* An auxiliary or donkey boiler is a steam boiler used for all purposes on shipboard for which steam may be required other than propulsion.

(c) *Pressure vessel.* A pressure vessel is an unfired vessel containing gases, vapors, or liquids under pressure. (See § 54.01-5 of this subchapter.)

(d) *Water-tube boiler.* A water-tube boiler is a steam boiler in which the boiler tubes contain water and steam, the heat being applied to the outside surface of the tubes; and is composed generally of drums, headers, and tubes.

(e) *Internally-fired fire-tube boiler (Scotch boiler).* An internally-fired fire-tube boiler is a steam boiler containing furnaces, one or more combustion chambers and tubes or flues, which are surrounded by water and through which the products of combustion pass from the furnace to the uptake. In such boilers no part of the shell is in contact with the fire or products of combustion.

(f) *Externally fired fire-tube or flue boiler (horizontal return tubular).* An externally fired fire-tube or flue boiler is a steam boiler, part of the outer shell of which is exposed to fire or to the products of combustion, and containing flues through which such products pass from the furnace to the uptake.

(g) *Factor of safety.* Factor of safety is the ratio of the ultimate strength of the material to the maximum allowable stress.

(h) *Pressure or p. s. i.* Pressure or p. s. i. is the gauge pressure or the pressure above the atmospheric pressure in pounds per square inch.

(i) *Design pressure.* Design pressure is the theoretical bursting pressure of the weakest part of a boiler, pressure vessel, or piping divided by its factor of safety.

(j) *Maximum allowable pressure.* The maximum allowable pressure of a boiler and its appurtenances or of an unfired pressure vessel shall be considered as the highest setting of the safety valves or relief valves.

(k) *Repair.* Repair is the restoration of any damaged or impaired part to an effective and safe condition.

(l) *Alteration.* Alteration is a structural modification of or departure from an approved design or existing construction.

(m) *Packaged boiler.* A packaged boiler is a steam boiler equipped, and shipped complete with fuel burning equipment, mechanical draft equipment, feed water apparatus and all necessary controls for manual or automatic operation, all completely mounted on a common base and requiring only to be connected to fuel, water and electric supplies to be ready for use.

§ 52.01-5 *Plans.* (a) Manufacturers intending to fabricate boilers, unfired pressure vessels or appliances of riveted, welded, brazed, or seamless material to be installed on vessels subject to inspection by the Coast Guard, shall submit detail plans in triplicate which shall be fully descriptive of the pressure containing parts of such boilers, unfired pressure vessels, or appliances to be manufactured, to the Officer in Charge, Marine Inspection, having jurisdiction over the vessel. When due to location of the shipyard or design office, such a procedure would result in unnecessary delay in transmission, the plans may be forwarded directly to the Commandant (MMT), U. S. Coast Guard, Washington 25, D. C.

(b) The procedure specified in paragraph (a) of this section shall apply also to proposed alterations in boilers, unfired pressure vessels, or appliances of riveted, welded, brazed, or seamless material.

(c) In addition to the requirements specified in paragraph (a) of this section, manufacturers intending to fabricate packaged boilers to be installed on vessels subject to inspection by the Coast Guard shall submit detail plans, in triplicate, fully descriptive of the manual or automatic features of such boilers, to the Commandant (MMT), U. S. Coast Guard, Washington 25, D. C. Manufacturers intending to fabricate automatically controlled packaged auxiliary boilers shall submit plans and descriptive data, in quadruplicate, as specified in Subpart 162.026 of Subchapter Q (Specifications) of this chapter.

§ 52.01-10 *Automatically controlled packaged boilers.* All automatically controlled packaged auxiliary boilers shall be designed, constructed and tested in conformance with the requirements of Subpart 162.026 of Subchapter Q (Specifications) of this chapter.

§ 52.01-15 *Conditions for approval.* (a) Manufacturers of boilers to be installed on vessels subject to inspection by the Coast Guard shall make calculations of the pressure parts of such boilers using the formulas provided in this subchapter, and submit such calculations together with the drawings required by § 52.01-5. In making calculations, the

design stress shall not exceed the maximum allowable stresses for the material permitted in this subchapter.

(b) When it is determined that the design of the boiler complies with all of the requirements specified in this subchapter and in Part 162 of Subchapter Q (Specifications) of this chapter, the drawings shall be approved for the maximum allowable pressure at which the boiler may be operated. If it is determined that the design does not comply with the specified requirements, the manufacturer will be notified by a written statement which will list the reasons for disapproval.

(R. S. 405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

2. Section 52.01-35, is amended to read as follows:

§ 52.01-35 *Auxiliary, donkey, and low-pressure heating boilers.* (a) All auxiliary and donkey boilers shall be designed, constructed, installed, and inspected in accordance with the requirements specified in this subchapter for main boilers, and shall be subject to the same initial procedure and general requirements.

(b) Low-pressure steam and hot-water heating boilers, the maximum allowable pressure of which does not exceed 30 pounds per square inch, shall conform to the requirements of Part 53 of this subchapter. Boilers of this type, the maximum allowable pressure of which exceeds 30 pounds per square inch, shall conform to the requirements specified in this subchapter for main boilers.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

SUBPART 52.05—CYLINDRICAL SHELLS

3. Sections 52.05-5, 52.05-10, 52.05-15, and 52.05-20 are amended and § 52.05-12 is added to Part 52 and these sections read as follows:

§ 52.05-5 *Materials.* (a) Plates shall be of marine boiler steel complying with Subpart 51.04 of this subchapter, except that boilers designed for pressures not exceeding 150 pounds per square inch may be constructed of steel plate meeting the specifications of Subpart 51.22 of this subchapter, and which are tested, inspected, and stamped as required by § 51.01-1 of this subchapter.

(b) Boiler shells not exceeding 24 inches in diameter may be of seamless pipe or tubing in accordance with requirements of § 52.05-15. Boiler shells not exceeding 18 inches in diameter may be fabricated of electric-resistance butt-welded pipe in accordance with § 52.05-20.

TABLE 52.05-10 (a)—MAXIMUM ALLOWABLE STRESSES¹ FOR FERROUS MATERIALS—Continued
[Boilers, unfired pressure vessels, boiler tubes, and bolting]

Specification subpart	A. S. T. M. designation	Grade		Minimum tensile strength (p. s. i.)	Notes	For metal temperatures not exceeding °F. ²							
		A.S.T.M.	C. G.			-20 to 650	700	750	800	850	900	950	1,000
BOLTING													
Carbon steel:													
51.49	A261	BO	BO	100,000	(9)	16,250	14,950	12,500					
51.49	A307		B	55,000	(10)	7,000							
Alloy steel:													
51.49	A193	BA	BA		(9)	16,250	14,950	13,650					
51.49	A193	BB	BB		(9)	18,750	17,200	15,650					
51.49	A193	BC	BC		(9)	20,000	18,400	16,750					
51.49	A193	B5	B5		(9)	20,000	20,000	20,000	20,000	17,250	13,750	10,300	7,300
51.49	A193	B6	B6		(9)	20,000	18,400	16,700					
51.49	A193	B7	B7		(9)	20,000	20,000	20,000	20,000	16,250	12,500		
51.49	A193	B7a	B7a		(9)	20,000	20,000	20,000	20,000	17,250	13,750	10,300	7,300
51.49	A193	B14	B14		(9)	20,000	20,000	20,000	20,000	15,750	16,650	14,250	11,000
51.49	A193	B16	B16		(9)	20,000	20,000	20,000	20,000	18,750	16,650	14,250	11,000
51.49	A193	B8c	B8c			14,850	14,800	14,700	14,550	14,300	14,100	13,850	13,500
51.49	A193	B8t	B8t			14,850	14,800	14,700	14,550	14,300	14,100	13,850	13,500
51.49	A193	B8F	B8F			14,850	14,800	14,700					
CASTINGS													
Carbon steel:													
51.58	A95		A	70,000	(11)	17,500	16,600	14,750	12,000				
51.58	A216	WCA	WCA	60,000	(11)	15,000	14,350	12,950	10,800				
51.58	A216	WCB	WCB	70,000	(11)	17,500	16,600	14,750	12,000				
Alloy steel:													
51.58	A217	WC1	WC1	65,000	(11)(12)	16,250	16,250	16,250	15,650	14,400	12,500		
51.58	A217	WC4	WC4	70,000	(11)(12)	17,500	17,500	17,500	17,000	15,800	14,000		
51.58	A217	WC5	WC5	70,000	(11)(12)	17,500	17,500	17,500	17,000	15,800	14,000	11,000	7,800
51.58	A217	WC6	WC6	70,000	(11)(12)	17,500	17,500	17,500	17,000	15,800	14,000	11,000	7,800
51.58	A217	WC9	WC9	70,000	(11)(12)	17,500	17,500	17,500	17,000	15,800	14,000	11,000	7,800
51.58	A217	C5	C5	90,000	(11)	22,500	21,600	20,400	19,000	17,000	13,600	10,000	7,300
51.58	A217	C12	C12	90,000	(11)	22,500	22,000	21,000	19,400	17,300	15,000	11,750	8,500

¹ In general, the allowable S values in table 52.05-10 (a), except for welded pipe and tubing, and bolting, are based on one-fourth of the minimum of the specified tensile range of the material for temperatures of 650° and below; and on creep stress or stress-rupture for temperatures above 650° F.

² Intermediate values of S may be obtained by interpolation.

³ Carbon-molybdenum alloy-steel plate, pipe, forging, and cast material shall be limited to a maximum temperature of 875° F.

⁴ The minimum tensile strength employed not given in the specification; tensile strength value assumed.

⁵ Permitted only for use as tube material in heat exchangers.

⁶ This material shall be limited to a temperature of 875° F. when used in the design of pressure vessels.

⁷ Maximum allowable stress values for temperatures below 700° F. are as follows:

A. S. T. M. designation	Grade	For metal temperatures not exceeding °F.			
		-20 to 400	500	600	650
A213	T5	15,000	14,500	14,000	13,700
A182	F2	17,500	17,500	17,500	16,800
A182	F5	22,500	21,600	20,100	19,000

⁸ These stresses include weld joint efficiency of 0.85.

⁹ Between temperatures of -20° to 400° F., stress values equal to the lower of the following will be permitted: 20 percent of the minimum tensile strength or 25 percent of the minimum yield strength.

¹⁰ Material not permitted for temperatures exceeding 450° F.

¹¹ To these stresses a quality factor as specified in § 52.05-13 shall be applied.

¹² These stresses apply to the normalized material only.

(b) (1) The efficiency E for riveted joints shall be calculated as required by § 52.10-10.

(2) The efficiency E for ligaments between tube holes shall be calculated as required by § 52.40-5 and 52.40-15.

(3) The efficiency E for seamless shells may be taken as 100 percent.

(4) The efficiency E for welded joints shall be as given in § 56.01-30 of this subchapter.

(5) The efficiency E for brazed unfired pressure vessels shall be taken as 90 percent.

§ 52.05-12 Maximum allowable stress.

(a) The maximum allowable stresses given in tables 52.05-10 (a) and 54.03-10 (c) in Part 54 of this subchapter may be used in the formulas for determining the maximum allowable pressure and the minimum thickness of seamless or arc- or gas-welded shells which do not require staying, unstayed blank hemispherical and ellipsoidal heads, with the pressure on the concave side, flat heads which do not require staying, bolting flanges, and reinforced openings in shells and heads of boilers and unfired pressure vessels, provided the fabrication complies with the requirements of this section.

(b) The pressure parts of boilers designed in accordance with the requirements of paragraph (a) of this section, shall have a minimum thickness of 1/2

inch, and to the calculated thickness as determined by the applicable design formula, a corrosion allowance of 0.1 inch shall be added.

(c) The pressure parts of unfired pressure vessels, designed in accordance with the requirements of paragraph (a) of this section, shall have a corrosion allowance of one sixth of the calculated thickness, or 1/16 inch, whichever is smaller, added to the calculated thickness as determined by the applicable design formula, except that no additional thickness need be provided when suitable corrosion-resistant materials are employed.

(d) All weld reinforcement on both inside and outside of the plates at the longitudinal and circumferential joints shall be removed substantially flush with the surface of the plate.

(e) Class II welded pressure vessels which are not given a complete radiographic examination shall have portions of the welded joints examined by spot radiography as required by § 56.05-6 of this subchapter.

(f) The stresses due to hydrostatic head shall be taken into account in determining the maximum thickness of the shell or head of any pressure vessel. Additional stresses, imposed by effects other than internal pressure or static head, which increase the average stress over substantial sections of the shell or

head by more than 10 percent of the allowable stress shall be taken into account. These effects include the weight of the vessel and its contents, and method of support, impact loads, superimposed loads, localized stresses due to the reactions of supports, and stresses due to temperature gradient.

(g) (1) The maximum allowable stress used in the formulas for determining the maximum allowable pressure and the minimum thickness of the following pressure parts of boilers and unfired pressure vessels, shall not exceed 80 percent of the values given in tables 52.05-10 (a) and 54.03-10 (c) in Part 54 of this subchapter for:

- (i) Riveted or brazed shells.
- (ii) Dished heads, other than hemispherical or ellipsoidal.
- (iii) Unstayed hemispherical or ellipsoidal heads with pressure on the convex side.

(iv) Hemispherical and ellipsoidal heads with flanged-in or other reinforced manholes.

(v) All stays, braces, and parts requiring staying.

(2) Where the maximum allowable stress does not exceed 80 percent of the values given in tables 52.05-10 (a) and 54.03-10 (c) in Part 54 of this subchapter, compliance with the other provisions of this section is not required.

§ 52.05-13 *Quality factors for steel castings.* (a) A quality factor as specified in this section shall be applied to the allowable stresses for steel casting materials as given in table 52.05-10 (a), when used in special design of pressure parts. (b) A factor not to exceed 80 percent shall be applied when a casting is produced only in accordance with the material specifications given in Subpart 51.58 of this subchapter.

(c) A factor not to exceed 90 percent may be used for castings which have been radiographed at all critical sections¹ and found free of injurious defects.

(d) Radiographing, where required shall conform to the requirements of § 56.05-5 of this subchapter.

(e) Serious defects shall be the basis for rejection of the casting. Defects which are not considered as impairing the strength of the castings may be repaired by welding in accordance with the applicable requirements of this subchapter for welding repairs to defective carbon-steel or alloy-steel castings.

(f) Castings to which a quality factor exceeding 80 percent is to be applied shall be marked as required by § 51.58-5 of this subchapter, and in addition, the applicable quality factor shall be clearly stamped on the casting.

§ 52.05-15 *Seamless pipe shells.* Shells may be of seamless pipe or tubing with or without integral heads not exceeding 24 inches in diameter, provided the material conforms to Subpart 51.25 or 51.34 of this subchapter, except that grades T83, P53-A and P53-B shall not be used for diameters exceeding 18 inches.

§ 52.05-20 *Electric-resistance-welded pipe shells.* (a) Shells not exceeding 18 inches in diameter may be fabricated of electric-resistance-welded pipe or tubing made of open-hearth or electric furnace steel, as specified in Subpart 51.25 or 51.34 of this subchapter. The maximum allowable stress values in table 52.05-10 (a) shall be substituted in formulas (1) or (2) of § 52.05-10 for the values of SE.

(b) Holes for tubes, nozzles or other openings shall not be drilled in the weld.

(R. S. 4405, as amended, 4462, as amended; 49 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

4. Section 52.05-25 *Cylindrical shells pierced for tubes* is canceled.

5. Subparts 52.10, 52.15, 52.20, and 52.25 consisting of §§ 52.10-1 to 52.10-25, 52.15-1 to 52.15-15, 52.20-1 to 52.20-20, and 52.25-1 to 52.25-20 are amended and Subparts 52.22 and 52.24 are added to Part 52 and these subparts and sections read as follows:

¹ Critical sections of a casting are defined as the sections where defects are usually encountered, such as the junction of risers, gates, or feeders in the castings, and at abrupt changes in section. All integrally cast bosses and all chaplets and internal chills shall be radiographed.

SUBPART 52.10—SHELL JOINTS

Sec.

52.10-1	Type of shell joints.
52.10-5	Materials and workmanship.
52.10-8	Longitudinal riveted joints.
52.10-10	Efficiency of riveted joints.
52.10-15	Butt straps and computations.
52.10-20	Circumferential joints.
52.10-25	Welded joints.

§ 52.10-1 *Type of shell joints.* The shells of boilers or unfired pressure vessels may be fabricated by riveting or welding.

§ 52.10-5 *Materials and workmanship.* (a) The butt straps of riveted joints shall be of steel conforming with the specifications and requirements for the shell plates.

(b) Rivets shall conform to the requirements of Part 51 of this subchapter, as follows:

Steel rivets.....	Subpart 51.07
Iron rivets.....	Subpart 51.13

(c) Rivet holes shall be drilled wholly and fairly, preferably in position. After drilling, plates and straps shall be disassembled, burrs removed, and edges of holes faired before the plates are riveted together. Drifting of rivet holes is prohibited.

(d) The calking edges of plates, butt-straps, and heads shall be beveled to an angle not sharper than 70° to the plane of the plate and as near thereto as practicable. Every portion of the unfinished surfaces of the calking edges of plates, butt-straps, and heads shall be planed or milled to a depth of not less than 1/4 of the thickness of the plate, but in no case less than 1/8 inch. Calking shall be done with a tool of such form that there is no danger of scoring or damaging the plate underneath the calking edge, or splitting the calked sheet.

(e) Plates and shapes shall be so closely fitted, metal to metal, as to require a minimum of calking to obtain tightness.

(f) The seal welding of rivet heads to secure tightness is prohibited.

§ 52.10-8 *Longitudinal riveted joints.*

(a) The longitudinal joints of drums and shells of all boilers shall be of riveted double-butt strap construction, at least double-riveted.

(b) The longitudinal joints of externally fired fire-tube or flue boilers shall be located above the fire line of the setting.

(c) Boiler shell plates having longitudinal joints shall be rolled or formed by pressure, not blows, to the proper curvature.

(d) The maximum allowable pitch of rivets in longitudinal joints shall be such as to insure good calking.

(e) The distance between the center lines of any two adjacent rows of rivets in longitudinal joints or the "back pitch" measured at right angles to the direction of the joint, shall have the following minimum values:

- (1) If $\frac{P}{d}$ is 4 or less, the minimum value shall be: $2d$, or
- (2) If $\frac{P}{d}$ is over 4, the minimum value shall be: $2d + 0.1(P - 4d)$

Where:

P = Pitch of the rivets in outer row where a rivet in the inner row is located midway between two rivets in the outer row, in inches, or

P' = pitch of rivets in the outer row less pitch of rivets in the inner row where two rivets in the inner row is located between two rivets in the outer row, in inches.

d = diameter of the rivet holes, in inches.

(3) The "back pitch" of rivets shall be measured either on the flat plate before rolling or on the median line after rolling. The "back pitch" thus measured shall govern the locations of the rivet holes in the butt-straps. The diagonal ligaments between staggered rivets shall have the proper strength, as determined by figure 5230-5 (c) (4).

(f) On longitudinal joints the distance from the center of rivet holes to the edge of the plate, except rivet holes in the ends of butt-straps, shall be not less than $1\frac{1}{2}$ and not more than $1\frac{3}{4}$ times the diameter of the rivet holes, the distance to be measured from the center of the rivet holes to the calking edge of the plate before calking.

§ 52.10-10 *Efficiency of riveted joints.*

(a) The efficiency of riveted joints is the ratio which the strength of the joint bears to the strength of the solid plate. The efficiency of a riveted joint is determined by calculating the breaking strength of a unit section of the joint, considering each possible mode of failure separately, and dividing the lowest result by the breaking strength of the solid plate of a length equal to that of the section considered. It shall be computed in accordance with the following formulas:

(1) For plate section:

$$E = \frac{P-d}{P} \quad (1)$$

(2) For rivet section:

$$E = \frac{Nas}{PST} \quad (2)$$

(3) For combined efficiency of plate in second row and shearing strength of rivet in outer row:

$$E = \frac{p-d}{p} + \frac{nas}{PST} \quad (3)$$

(4) For combined efficiency of plate in second row and crushing strength of butt strap in front of rivet in outer row:

$$E = \frac{p-d}{p} + \frac{ncdt}{PST} \quad (4)$$

where:

E = efficiency of riveted joint in ratio to solid plate.

P = pitch in inches of rivets in outer row.

p = pitch in inches of rivets in second row.

d = diameter of rivet hole, in inches.

N = total number of rivets per pitch P .

n = number of rivets in outer row per pitch P .

T = thickness of shell plate, in inches.

t = thickness of butt strap, in inches.

a = sectional area of the driven rivet, in square inches.

c = crushing strength of plate in front of rivets. (Assumed as 95,000 pounds per square inch.)

S = tensile strength of plate in pounds per square inch.

¹ It is assumed that the joints are of the usual construction where the rivets are symmetrically spaced.

s = shearing strength of rivets in pounds per square inch of sectional area, assumed as follows:

Iron rivets in single shear.....	38,000
Iron rivets in double shear.....	76,000
Steel rivets, grade A, in single shear.....	44,000
Steel rivets, grade A, in double shear.....	88,000
Steel rivets, grade B, in single shear.....	52,000
Steel rivets, grade B, in double shear.....	104,000
Alloy-steel rivets, grade C, in single shear.....	60,000
Alloy-steel rivets, grade C, in double shear.....	120,000

(b) Where the drums of water-tube boilers are pierced through the longitudinal butt-strap joint for the purpose of inserting tubes to connect the headers to the drum, the combined thickness of both butt straps shall be taken in computing the efficiency of the ligament between tube holes. This efficiency shall in no case be less than that required for the riveted joint.

§ 52.10-15 *Butt straps and computations.* (a) The thickness of butt straps shall be such as to permit efficient calking of the edges. Where the pitch of the rivets is so great as to make effective calking doubtful, as occurs in quadruple riveting, the edge should be scalloped around the outer rivets.

(b) The thickness of the outer butt strap shall be not less than that determined by the following formula, but it shall in no case be less than 1/4 inch:

$$t = \frac{5T(P-d)}{8(P-Kd)} \quad (1)$$

where:

- t* = thickness of outer strap, in inches.
- T* = required thickness of shell plate, in inches.
- P* = pitch of rivets in outer rows, in inches.
- d* = diameter of rivet holes, in inches.
- K* = ratio of pitch of rivets in outer row to minimum pitch in inner rows.

(c) The thickness of the inner butt strap shall equal *t* plus 0.125 inch, but is not required to exceed the thickness of the shell plate.

(d) The thickness of butt straps on drums of water-tube boilers pierced for the purpose of inserting tubes to connect the headers to the drums, shall be increased if necessary to maintain the efficiency on which the allowable pressure is based.

(e) Butt straps shall be formed to the curvature of the shell by rolling or pressing.

§ 52.10-20 *Circumferential joints.*

(a) The minimum strength of circumferential joints attaching shells to heads of boilers or other pressure vessels shall bear the following ratios to that required for the longitudinal joints of the shell:

- (1) Fifty percent when no part of the load on the head is supported by either tubes or stays.
- (2) Forty percent when one-half or more of the load on the head is sustained by stay tubes, flues, or stays; except that circumferential head joints of externally fired fire-tube or flue boilers exposed to fire or to the products of combustion, shall have a minimum strength of not less than 50 percent of that of the longitudinal joint.

(b) The strength of the circumferential joints connecting courses of the shell shall be not less than 75 percent of that required for the longitudinal joints of the shell except that in the case of externally fired flue boilers the strength of circumferential joints need not exceed 60 percent of the strength of the longitudinal joint.

(c) Circumferential end joints of shell plates over 3/8 inch thick and circumferential joints connecting courses of shells, the required thickness of which is over 1/2 inch, shall be at least double riveted. Where the thickness of the shell plate exceeds 1 3/8 inches for single-ended boilers, and 1 1/2 inches for double-ended boilers, the circumferential seams connecting shell courses shall be triple riveted.

(d) On circumferential joints of shells having heads which are not supported by tubes or through stays, the distance from the center of rivet holes to the calking edges of the plates, shall be not less than 1 1/2 and not more than 1 3/4 times the diameter of the rivet holes. The distance from the centers of rivet holes of circumferential joints to the edges of the plate in boilers having heads which are supported by tubes or through stays shall not be less than 1 1/4 times the diameter of the rivet holes.

(e) The distance between any two rows of rivets in a circumferential joint or the "back pitch" shall be not less than 1 3/4 times the diameter of the rivet hole.

§ 52.10-25 *Welded joints.* (a)

Drums, shells, or other cylindrical pressure parts and non-cylindrical pressure parts of boilers and unfired pressure vessels, except stays or braces as specified in Subpart 52.35, may be fabricated by means of arc or gas welding, provided the construction meets the requirements for material and design as specified in Parts 51 and 52 of this subchapter, and the welding conforms to the requirements of Part 56 of this subchapter.

(b) Arc or gas welding used in the fabrication of the pressure parts of boilers, as specified in paragraph (a) of this section, need not be radiographed, unless otherwise specified in this subchapter, provided the stress or load is carried by other construction which conforms to the requirements of the regulations in this subchapter, such as stays, staybolts, and stay tubes, and where the adequacy of the boiler design is not solely dependent upon the strength of the weld. Welding done under these provisions shall otherwise conform in all respects to Part 56 of this subchapter, unless otherwise specified in this subchapter.

(c) Arc or gas welding is permitted in the construction of boilers and unfired pressure vessels for the purpose of securing tightness in parts of riveted joints which are otherwise constructed fully in accordance with the regulations in this subchapter.

(d) The ends of inner butt-straps of riveted butt-strap longitudinal joints may be arc- or gas-welded to the edges of heads or of the adjoining shell plate, or to the circumferential butt-straps for tightness. When the butt-strap of a longitudinal joint does not extend the full length of the shell plates, the abut-

ting edges of the shell plate may be welded provided the distance from the end of the butt-strap to the edge of the flange of the head or adjacent shell plate is not greater than 2 1/2 inches.

(e) The longitudinal and circumferential joints of corrugated furnaces may be fabricated by arc welding in accordance with the requirements of § 52.50-15 (g).

(f) (1) A furnace in a fire tube boiler may be attached to an outwardly flanged opening in a front tube sheet by a circumferential fillet weld, or, the furnace may be attached to either tube sheet by flaring the end which extends beyond the outside face of the head to an angle of 20 to 30 degrees, and using a circumferential fillet weld, provided:

- (i) The area of the heads around the furnace is stayed by tubes or braces in accordance with the requirements of Subpart 52.35;
- (ii) The joint is wholly outside the furnace;
- (iii) The throat of the full fillet weld is not less than 0.7 times the thickness of the head;
- (iv) Unless protected by refractory material, the furnace shall not extend beyond the outside face of the tube sheet a distance greater than the thickness of the tube sheet. Any excess shall be removed before welding.
- (v) The welding conforms in all respects to Part 56 of this subchapter, except that radiographic examination is not required.

(2) A furnace may also be attached by a full penetration weld, provided the furnace extends through the full thickness of the tube sheet. The furnace shall not extend beyond the toe of the weld and the toe shall not project beyond the face of the tube sheet by more than 3/8 inch.

(g) Arc- or gas-welded construction may be used in lieu of riveted joints in the fire boxes of internally-fired boilers provided the welds are located between two rows of staybolts, or in the case of flat surfaces, the weld is not less than one half of a staybolt pitch from the corner of the knuckle.

(h) The bottom edges of plates of vertical tubular and firebox types of boilers may be attached by full penetration butt welds provided the load due to internal pressure is carried by staybolting and the inside width of the waterleg does not exceed 4 inches. The plates may be considered as fully supported if the distance from the welds to the nearest row of staybolts is not more than one-half the pitch allowed by Subpart 52.35.

(i) Mud rings of plate material may be used in the construction of waterlegs of vertical fire-tube boilers and may be attached as shown in figure 52.20-10 (E), provided the width of the waterleg does not exceed 4 inches, and the thickness of the mud ring plate is at least 1/2 inch. The welding shall be stress-relieved, but radiographic examination is not required.

SUBPART 52.15—DOMES AND STEAM CHIMNEYS

Sec.	
52.15-1	Definitions.
52.15-5	Materials and workmanship.
52.15-10	Computations.
52.15-15	Detail requirements.

§ 52.15-1 *Definitions*—(a) *Domes*. Domes are superstructures of shells, attached by riveting or welding. They generally consist of a cylindrical shell with one end flanged for attachment to the main shell and the other end closed by a head which may be integral with, riveted, or welded to the shell.

(b) *Steam chimneys*. Steam chimneys are superstructures of steam boilers which are fitted with a lining inside of which the products of combustion pass to the smokestack. They may be constructed in the form of a dome integral with the boiler or as independent steam vessels connected by piping to the boiler.

§ 52.15-5 *Materials and workmanship*.

(a) Steel plates used in the construction of domes shall conform to the specifications and requirements for the shell plates. For steam chimneys the steel plates used shall conform to the specifications and requirements of Subpart 51.04 or 51.22, and which are tested, inspected, and stamped in accordance with § 51.01-1 of this subchapter.

(b) Rivets shall conform to the requirements of Part 51 as follows:

Steel rivets..... Subpart 51.07
Iron rivets..... Subpart 51.13

§ 52.15-10 *Computations*. (a) The maximum allowable pressure and the minimum thickness of the shell of domes and steam chimneys shall be computed as specified for cylindrical shells in Subpart 52.05, employing the minimum efficiency of the joint.

(b) Flat surfaces of heads of domes and steam chimneys shall be stayed as specified for surfaces to be stayed or reinforced in Subparts 52.30 and 52.35.

(c) The maximum allowable pressure on unstayed steam chimney linings, or the minimum thickness of such linings, shall depend upon their type and shall be computed in accordance with the requirements for furnaces and flues specified in Subpart 52.50.

(d) A cylindrical surface exposed to external pressure and not entirely self-supporting shall be stayed in accordance with the requirements of Subparts 52.30 and 52.35, specifically § 52.30-10 (g).

(e) The strength of the rivets and of ligaments between rivets in the flange attaching a dome or steam chimney to a main shell shall be sufficient to give a factor of safety of not less than six against the full load acting on the head. This factor of safety may be reduced to not less than four when not less than 50 percent of the load on the head is carried by stays secured to the main shell.

(f) Domes attached to shells of boilers shall comply with the requirements for reinforced openings as specified in Subpart 52.25.

§ 52.15-15 *Detail requirements*. (a) All domes and steam chimneys shall be so arranged that any water can drain back into the boiler.

(b) The diameter of a dome shall not exceed one-half of the diameter of the boiler shell.

(c) Flanges of domes shall be formed with a corner radius of at least twice the thickness of the plate for plates 1 inch in thickness or less, and at least three

times the thickness of the plate, for plates over 1 inch in thickness.

(d) The longitudinal joints of a dome or steam chimney may be butt-welded and the dome flange may be double full-fillet lap-welded to shell, in lieu of riveting, provided the welding fully complies with the requirements of Part 56 of this subchapter, except that radiographic examination of the fillet welds may be omitted.

SUBPART 52.20—DISHED HEADS

Sec.	
52.20-1	Definitions.
52.20-5	Materials and workmanship.
52.20-10	Computations.
52.20-15	Detail requirements.
52.20-20	Openings in dished heads.

§ 52.20-1 *Definitions*—(a) *Unstayed heads*. Unstayed heads are the ends of a pressure vessel shell. They may be either flat or dished. Heads may be integral with, riveted or welded, to the shell.

(b) *Dished heads*. Dished heads are heads formed to a segment of a sphere or to a hemispherical or elliptical section and may be attached to the shell so that the pressure will be either on the concave or on the convex side.

§ 52.20-5 *Materials and workmanship*. (a) Steel plate used in the fabrication of heads shall be either flange or firebox quality complying with Subpart 51.04 or 51.22. Flanged or dished heads if pressed or flanged cold shall be stress-relieved as required by § 56.01-70 of this subchapter after the cold-forming operations are completed. Heads that are flanged or dished hot need not be stress-relieved.

NOTE: It is not mandatory in fresh and salt water service systems that flanged or dished heads be stress-relieved for use on compression tanks with an air cushion containing liquids operating at temperatures not exceeding 212° F.

(b) The inside radius of the bend of the flange formed on an unstayed dished head shall be not less than three times the thickness of the head and shall in no case be less than 8 percent of the diameter of the shell.

(c) Dished heads having the pressure on the convex side shall be formed to a true surface without flats.

(d) The heads here considered are of steel plate. Cast-steel, bronze and cast-iron heads may be used for unfired pressure vessels, but only where specifically authorized by the Commandant.

(e) The edge of the flange formed on a head shall be machined to a true surface. Where the flange is to be calked inside, the edge shall be beveled as specified for the edges of plates and straps in § 52.10-5. Care shall be taken in calking to avoid damaging the surface of the plate.

(f) The holes for rivets to attach the head to the shell shall, as far as practicable, be drilled in position, and the shell and head shall be taken apart after the holes are drilled, and burrs removed. In cases where holes cannot be drilled in position, the holes shall be examined after assembly and faired by reaming where necessary. (The requirements to take apart shell and head for removing burrs shall not apply to heads where the

contact surfaces have been machined and the heads shrunk in place.)

§ 52.20-10 *Computations*. (a) The maximum allowable pressure and the minimum thickness of blank unstayed spherically dished heads, hemispherical heads, or ellipsoidal heads having the pressure on the concave side shall be calculated by the following:

(1) *Spherically dished heads*.

$$P = \frac{STE}{0.833R} \quad (1)$$

$$T = \frac{0.833PR}{SE} \quad (2)$$

(2) *Hemispherical heads*.

$$P = \frac{2STE}{R} \quad (3)$$

$$T = \frac{PR}{2SE} \quad (4)$$

Where:

P = maximum allowable pressure, in pounds per square inch.

S = maximum allowable stress, in pounds per square inch, taken from tables 52.05-10 (a) and 54.03-10 (c), and subject to the limitations of § 52.05-12.

T = minimum thickness of the head, in inches.

E = efficiency of the weakest joint used in forming the head, including the head to shell joint for hemispherical heads only, for the following types:
Riveted joints = calculated riveted efficiency, § 52.10-10.

Welded joints = efficiency specified in table 52.05-10 (b).

Seamless shells with integral heads = 100 percent.

R = radius to which the head is dished or formed, measured on the concave side, in inches.

(3) *Ellipsoidal heads*. A blank head of a semi-ellipsoidal form in which half the minor axis (or the depth of the head not including the flange) is at least equal to one-fourth of the inside diameter of the head, shall be made at least as thick as the required thickness of a seamless shell of the same diameter, as specified in § 52.05-10.

(b) The radius to which a head is dished shall be not greater than the outside diameter of the flanged portion of the head. Where two radii are used, the longer shall be taken as the value of *R* in formulas (1) and (2) of this section.

(c) The maximum allowable pressure and minimum thickness of dished cast steel or bronze heads, where permitted, shall be calculated by the appropriate formulas in this section.

(d) The maximum allowable pressure and minimum thickness of cast-iron dished heads, where permitted, shall be calculated by the appropriate formulas in Part 54 of this subchapter for unfired pressure vessels.

§ 52.20-15 *Detail requirements*. (a) Where the radius *R* to which a dished head is formed is less than 80 percent of the inside diameter of the shell, the thickness of a head with a flanged-in manhole opening shall be not less than the value found by making *R*, in formulas (1) and (2) in § 52.20-10, equal to 80 percent of the outside diameter of the shell and with the added thickness for the manhole. The thickness calculated shall be the minimum thickness of a head with a flanged-in manhole opening for

any form of head and the maximum allowable stress shall not exceed the values given in table 52.05-10 (a) or 54.03-10 (c) in Part 54 of this subchapter.

(b) When dished heads are of a thickness less than called for by § 52.20-10 they shall be stayed as flat surfaces. Allowance may be made for the holding power of the spherical form provided the following conditions are met:

(1) The heads are at least two-thirds of the thickness required for unstayed dished heads;

(2) The heads are at least 3/8 inch in thickness;

(3) Through stays are used and attached to the dished head by outside and inside nuts; and,

(4) The maximum allowable pressure shall not exceed that calculated by the regulations for an unstayed dished head plus the pressure corresponding to the strength of the stays or braces obtained by Subpart 52.30, using 170 for the value of C.

(c) If a dished head concave to the pressure is formed with a flattened spot or surface, the diameter of the flat spot shall not exceed that allowed for flat heads as given by formulas (1) and (2) of § 52.22-10, and the minimum thickness shall be computed by these formulas, using $C=0.25$.

(d) When a spherically dished head has a flanged-in manhole or other access opening exceeding 6 inches in any dimension, the thickness of the head shall be increased by not less than 15 percent of the required thickness for a blank head computed by formula (2) of § 52.20-10, but in no case by less than 1/8 inch additional thickness over a blank head.

(e) If a flanged-in manhole which meets the requirement of § 52.20-20 is placed in a full-hemispherical head or ellipsoidal head, the thickness of the head shall be the same as for a head dished to a segment of a sphere, with the radius of dish equal to eight-tenths of the outside diameter of the shell and with the added thickness for the manhole as specified in paragraph (d) of this section.

(f) (1) Except as provided for in paragraphs (d) and (e) of this section, all openings which require reinforcement placed in an unstayed spherically dished head, or an ellipsoidal head, or in a full-hemispherical head, including all types of manholes except those of the integral flanged-in type, shall be reinforced in accordance with § 52.25-20, in the application of which the opening shall be treated as though it were in a shell:

(i) Of the same outside diameter as the outside diameter of the flange of the head;

(ii) Of the same material, thickness and allowable pressure; and,

(iii) One-half the required thickness of the shell used for computing the amount of reinforcement required may be used for T when the opening is in a full-hemispherical head.

(2) When so reinforced, the thickness of such a head may be the same as for a blank unstayed dished head.

(g) Where a spherically dished head has a flanged opening supported by an attached flue, an increase in the thickness over that computed by formula (2) of § 52.20-10 is not required.

(h) If more than one manhole is inserted in a dished head, the thickness of which is calculated by paragraphs (f) and (g) of this section, the minimum distance between the openings shall be not less than one-fourth of the outside diameter of the head.

(i) The maximum allowable pressure and the minimum thickness of an unstayed dished head of any form without manholes or handholes with the pressure on the convex side shall be calculated by formulas (1) and (2) of § 52.20-10, but only 60 percent of the maximum allowable pressure thus determined shall be allowed.

(j) No head, except a full-hemispherical head, shall be of a lesser thickness than that required for a seamless shell of the same diameter.

(k) When the flange of an unstayed dished head is machined to make a close fit into or onto the shell, the thickness shall be not reduced to less than 90 percent of that required for a blank head.

§ 52.20-20 *Openings in dished heads.*

(a) Flanged-in manholes or other flanged openings in a dished head shall be flanged to a minimum radius measured on the inside of the plate of not less than 3/8 inch, for plates up to and including 1 1/8 inches in thickness, and for plates exceeding 1 1/8 inches thickness, the radius shall be increased proportionately. The minimum depth of the flange measured from the outside of the plate at the ends of the major axis shall be determined by the following formula:

$$d = \sqrt{Tw} \quad (1)$$

Where:

d = depth of flange, measured from the outer face, in inches.

T = thickness of the plate, in inches.

w = minor axis of the opening, in inches.

(b) A manhole opening may be reinforced by a riveted manhole frame or other attachment in lieu of flanging.

(c) Unreinforced openings in dished heads shall be governed by the following:

(1) The edge of any unreinforced opening, excluding rivet holes, shall come no closer to the line bounding the spherical or ellipsoidal portion of the head around a manhole than the distance equal to the thickness of the head, and in no case, except for water-column connections, shall it come within the part formed by the corner radius of a dished head.

(2) The maximum allowable diameter of any unreinforced opening in a head, except in a full-hemispherical head, shall not exceed that permitted by § 52.25-15 (a) for a shell of the same outside diameter as the outside diameter of the flange of the head, of the same thickness, allowable pressure and material as that in the head, nor shall it exceed 8 inches in any case.

(3) For unreinforced openings in full-hemispherical heads, the requirements of subparagraph (2) of this paragraph shall apply, except that the value of K

shall be one-half the value given by the formula in § 52.25-15 (a).

(4) The minimum distance between the centers of any two unreinforced openings, rivet holes excepted, shall be determined by the following formula:

$$L = \frac{A+B}{2(1-K)} \quad (2)$$

Where:

L = distance between the centers of the two openings, measured on the surface of the head, in inches.

A and B = diameters of the two openings in inches.

K = same as defined in § 52.25-15 (a) for the equivalent shell described in subparagraph (2) of this paragraph.

SUBPART 52.22—FLAT HEADS

Sec.

52.22-1 Definitions.

52.22-5 Materials and workmanship.

52.22-10 Computations.

52.22-15 Openings in flat head.

§ 52.22-1 *Definitions*—(a) *Unstayed heads.* Unstayed heads are the ends of a pressure vessel. They may be either flat or dished. Heads may be integral with, riveted, or welded to the shell. Unstayed flat heads may be used to close shells as permitted by § 52.22-10.

(b) *Stayed heads.* Stayed heads are heads supported in whole or in part by stays, furnaces, flues, tubes, etc.

§ 52.22-5 *Materials and workmanship.* (a) Steel used in the fabrication of flat heads shall be either flange or firebox quality complying with Subpart 51.04 or 51.22.

(b) The heads here considered are of steel plate. Cast steel, cast iron or bronze heads may be used for pressure vessels other than boilers, but only where specifically authorized by the Commandant.

§ 52.22-10 *Computations.* (a) The maximum allowable pressure and minimum required thickness of unstayed flat heads, cover plates, blind flanges, etc., shall be determined by the following formulas:

$$P = \frac{ST^2}{CD^3} \quad (1)$$

$$T = D \sqrt{\frac{CP}{S}} \quad (2)$$

Where:

D = diameter, or shortest span, measured as indicated in figure 52.22-10, in inches.

P = maximum allowable pressure, in pounds per square inch.

T = minimum required thickness of plate, in inches.

S = maximum allowable stress, in pounds per square inch, taken from tables 52.05-10 (a) and 54.03-10 (c) and subject to the limitations of § 52.05-12.

C = 0.162 for plates rigidly riveted or bolted to shells, flanges, or side plates as shown in figure 52.22-10 (A); and for integral flat heads as shown in figure 52.22-10 (B) where dimension D does not exceed 24 inches and the ratio of thickness of the head to dimension D is at least equal to or greater than 0.05.

$C=0.25$ for heads forged integral with or butt-welded to shells, pipes, or headers as shown in figures 52.22-10 (C) and (D), where the corner radius on the inside is not less than three times the thickness of the flange immediately adjacent thereto, and where the welding meets all the requirements for circumferential joints given in Part 56, including stress relieving and radiographic examination.

$C=0.50$ for plates arc- or gas-welded to the inside of pressure vessels, pipes or headers and otherwise meeting the requirements for respective type of arc- or gas-welded vessels, including stress relieving but omitting radiographic examination. The plate shall be welded as shown in figure 52.22-10 (E), with a fillet weld having a throat equal to two times the required thickness of a seamless shell, but not greater than the head thickness nor in any case less than 1.25 times the actual shell thickness, and where the weld is deposited in a welding groove with the root of the weld at the inner face of the head. The remainder of the head plate may be beveled to an angle not exceeding 45° .

$C=0.30+1.40 \frac{Wh_p}{HD}$ for plates bolted to shells, flanges, or side plates, in such a manner that the setting of the bolts tends to dish the plate, and where the pressure is on the same side of the plate as the bolting flange, as shown in figures 52.22-10 (F) and (G), where:

W =flange design bolt load, in pounds.
 h_p =radial distance from the bolt-circle diameter to the diameter D , in inches.

H =total hydrostatic end force on area bounded by the mean diameter of the gasket or joint contact surface, in pounds.

D =diameter, or shortest span, measured as indicated in figure 52.22-10, in inches.

$C=0.50$ for plates having a dimension D not exceeding 18 inches inserted into pressure vessels and welded thereto as shown in figure 52.22-10 (H), and otherwise meeting the requirements for the respective type of class II welding including stress relieving but omitting radiographic examination. The end of the pressure vessel shall be crimped over to an angle not less than 30° nor more than 45° . The throat of the weld shall be not less than the thickness of the shell or head, whichever is the greater.

$C=0.75$ for plates screwed into the end of a pressure vessel having an inside diameter D not exceeding 12 inches, as shown on figure 52.22-10 (I), or for heads having an integral flange screwed over the end of a pressure vessel having an inside diameter D not exceeding 12 inches. The design of the threaded joint against failure by shear, tension, or compression resulting from the end force due to pressure shall be based on a factor of safety of at least 4 and the threaded parts are at least as strong as the threads for standard piping of the same diameter, and the head shall be welded to the pressure vessel by means of a seal weld.

$C=0.30$ for plates inserted into the ends of pressure vessels and held in place as shown in figure 52.22-10 (J) where all possible means of failure, either by shear, tension, or compression, due to the hydrostatic end force, are resisted with a factor of safety of 4. Seal welding may be used, if desired.

§ 52.22-15 *Openings in flat head.*
 (a) Unreinforced openings in unstayed flat heads shall be calculated in accordance with § 52.25-15 (a), where the value of D (outside diameter of shell or drum) shall be equal to the diameter D or shortest span of the flat head measured as indicated in figure 52.22-10, and K shall be the ratio of the thickness T required by

formula (2) of § 52.22-10 (a) to the actual thickness of the flat head.

(b) Reinforced openings in unstayed flat heads, where the maximum diameter of the opening does not exceed 50 percent of the dimension D or shortest span of the flat head measured as indicated in figure 52.22-10, shall be designed in accordance with § 52.25-20, where T is the thickness required by formula (2) of § 52.22-10 (a), except that the required cross-section need only be 75 per cent of that specified in § 52.25-20.

(c) Where the maximum diameter of an opening exceeds 50 percent of the dimension D as indicated in figure 52.22-10, the flat plate shall be designed as a flange.

SUBPART 52.24—ACCESS AND INSPECTION OPENINGS

Sec.

52.24-1 Definitions.

52.24-5 Materials and workmanship.

52.24-10 Detail requirements.

§ 52.24-1 *Definitions*—(a) *Openings.* Access or inspection openings, as defined in this subpart, are holes cut in the shells or heads of boilers or other pressure vessels for the purpose of inspection and cleaning.

NOTE: Openings in the shells or heads of boilers or other pressure vessels, including domes and steam chimneys, for other purposes than above defined (such as pipe connections and mountings) are covered in Subpart 52.25.

(b) *Manhole.* A manhole is an access opening in a boiler or unfired pressure vessel of sufficient size to permit an inspector to enter the vessel. Manholes may be of elliptical or circular shape.

(c) *Handhole.* A handhole is an opening in a pressure part of a boiler or unfired pressure vessel for the purpose of access or inspection, usually not exceeding 6 inches in longest dimension.

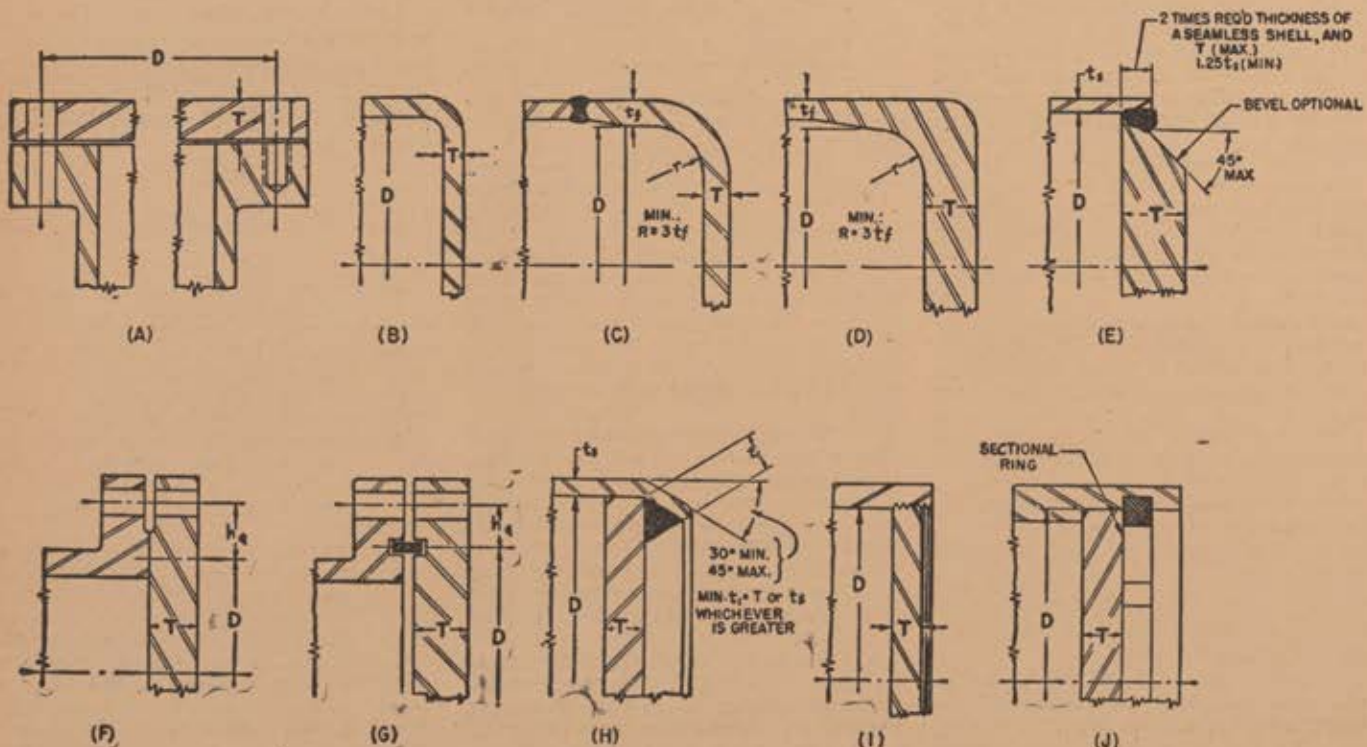


FIGURE 52.22-10—Acceptable types of flat heads.

The shapes of handholes may be circular, elliptical, or rectangular with rounded corners.

§ 52.24-5 Materials and workmanship.

(a) The cover plates for manholes shall be of rolled or forged steel conforming to the requirements of Subpart 51.04 or 51.46 of this subchapter. Handhole covers may be made of rolled, forged or cast steel conforming to the requirements of Subpart 51.04, 51.22, 51.46 or 51.58 of this subchapter.

(b) Manhole covers shall be marked with the manufacturer's name or trademark together with the maximum allowable pressure.

(c) Manhole and handhole yokes or dogs shall be of forged steel, pressed steel, or cast steel conforming to the requirements of Subpart 51.04, 51.22, 51.46 or 51.58 of this subchapter. The material of bolts securing yokes or dogs and cover plates shall conform to the requirements of Subpart 51.07 of this subchapter.

(d) When handhole or other access openings are made, a margin of not less than 1/4 inch shall be left when punching operations are used, and not less than 3/8 inch shall be left when machine burning methods are employed. Such margins shall be machined or ground away to relieve the metal of any stresses which may be set up due to burning or punching operations.

(e) The minimum width of bearing surface for a gasket on a manhole opening shall be 1/16 inch. No gasket for use on a manhole or handhole of any boiler shall have a thickness greater than 1/4 inch, when compressed.

§ 52.24-10 Detail requirements.

(a) All boilers or pressure parts thereof shall be provided with suitable manhole, handhole, or other inspection openings for examination and cleaning.

(b) Manhole openings shall be of elliptical form, the dimensions of which shall be not less than 10 by 16 inches or 11 by 15 inches. The size 12 by 16 inches should be used wherever practicable. Circular manholes having diameters of not less than 15 inches may be permitted.

(c) A handhole opening in a boiler shell or header shall be not less than 4 inches in any direction. This requirement does not apply to small access openings such as used in superheater headers.

(d) Inspection openings smaller than specified for handholes are permissible where a handhole is impracticable.

(e) Where elliptical openings are made in the shell of a boiler or other pressure vessel, the minor axis shall, as far as practicable, be placed longitudinally.

(f) All manholes, handholes, and inspection openings shall be closed by readily removable internal cover plates which shall be held by one or more girders or dogs and bolts. The cover plates shall be formed with a projection to fit within the opening with a radial clearance not exceeding 1/16 inch at any point. This projection may be in form of a raised face which shall protrude straight out from the joint face within the opening not less than 1/2 inch on manholes or 3/8 inch on smaller cover plates.

(g) When a threaded opening is to be used for inspection or washout purposes, it shall be not less than 1 inch pipe size. The closing plug or cap shall be of non-ferrous material, except for pressures over 250 p. s. i. or temperatures over 406° F.

(h) A manhole shall be located in the front head below the tubes of a horizontal-return tubular boiler 48 inches or over in diameter. Smaller boilers shall have either a manhole or a handhole below the tubes. There shall be a manhole in the upper part of the shell or head of a fire-tube boiler over 40 inches in diameter, except on a vertical fire-tube boiler, or except on internally fired boilers not over 48 inches in diameter. Smaller boilers shall have either a manhole or a handhole above the tubes.

(i) Externally fired boilers shall be fitted with a manhole opening in the lower front head beneath the flues. The minimum dimensions of such opening shall be 10 inches on the minor axis and 16 inches on the major axis. When shells are less than 46 inches in diameter, handholes 4 by 5 inches in size may be used in place of manholes.

(j) A vertical fire-tube boiler shall have not less than four handhole openings in the shell located as follows:

(1) One at or about the water line or opposite the fusible plug.

(2) Three at or about the line of the crown sheet or lower tube sheet, and if internally fired, not less than three additional handholes at the lower part of the waterleg.

(k) If a vertical fire-tube boiler is equipped with manholes or other access openings through which adequate inspection may be made, the required handholes and/or inspection openings at the water line and for the tube sheets may be omitted.

SUBPART 52.25—NOZZLE OPENINGS AND REINFORCEMENTS

Sec.	
52.25-1	Definitions.
52.25-5	Materials and workmanship.
52.25-10	Unreinforced openings.
52.25-15	Computations.
52.25-20	Reinforced openings.

§ 52.25-1 Definitions—(a) Openings. Openings, as defined in this subpart, are holes cut in shells or heads of boilers or other pressure vessels, including domes and steam chimneys, for the purpose of connecting nozzles or mountings to the shell or head of such boilers or pressure vessels.

§ 52.25-5 Materials and workmanship. (a) The material for reinforcing plates around openings shall conform to the requirements of the plate to be reinforced. When they are locally heated for flanging or forming, they shall be properly annealed.

(b) A forged nozzle or forged flange, riveted or welded to the plate, may be considered as reinforcement, provided such fittings are properly designed to compensate for the material removed.

(c) Rivets used in securing reinforcing plates to the shell or other structural part shall conform to the requirements of Subpart 51.07 or 51.13 of this subchapter.

(d) The inner radius of the bend of

any flanged opening in heads, except manholes or other access openings as specified in § 52.20-20, shall be: for furnace attachments, not less than twice the thickness of the plate flanged; for flue attachments in externally fired boilers, not less than one and one-half times the thickness of the plate flanged.

(e) The riveted joint of a reinforcing plate fitted to an opening in the shell or other part of a boiler or other pressure vessel, shall be properly calked along the edge of the opening and the outer edge of the reinforcing plate as specified in Subpart 52.10 for riveted joints.

§ 52.25-10 Unreinforced openings.

(a) The regulations in this subpart governing the maximum size of an unreinforced opening apply only to shells in which there are tube holes or other plain unreinforced openings, and are limited to shells 8 inches or more in outside diameter in which the shell thickness does not exceed one-fifth of this diameter and in which the largest opening does not exceed six-tenths of the shell diameter.

(b) Plain unreinforced openings shall not exceed the diameter determined by § 52.25-15, nor shall they exceed a diameter of 8 inches in any case.

§ 52.25-15 Computations.

(a) (1) The maximum diameter of an unreinforced opening in a shell or drum shall be determined by the following formulas:

$$d = 2.75 \sqrt{DT(1-K)} \quad (1)$$

$$K = \frac{1.1PD}{2ST} \quad (2)$$

$$K = \frac{PD}{2ST} \quad (3)$$

Where:

- d* = maximum allowable diameter of unreinforced openings, in inches.
- T* = actual full thickness of shell plate, in inches (including the 0.10 inch additional thickness).
- D* = outside diameter of the drum or shell, in inches.
- S* = maximum allowable stress as given in table 52.05-10 (a), in pounds per square inch.
- K* = ratio of the computed stress in the solid plate to the maximum allowable stress.

(2) In determining the maximum size of an unreinforced opening in a shell, head, or header designed under the provisions of § 52.05-10 (a), the value of *K* shall be computed by formula (2). Where the value of *K* equals or exceeds unity, the maximum size of an unreinforced opening shall be 2 inches.

(3) In determining the maximum size of an unreinforced opening in a shell, head, or header in which the value of *S* is taken as not more than 80 percent of that given in tables 52.05-10 (a) and 54.03-10 (c) in Part 54 of this subchapter, the value of *K* shall be computed by formula (3). When computing *K* by this formula, the pressure *P* shall be that for which the part is designed, *S* shall be 80 percent of the value from tables 52.05-10 (a) and 54.03-10 (c), and *T* shall be the actual thickness of the shell. Where *K* so computed equals or exceeds unity, a value of 0.99 shall be used.

(b) (1) The maximum diameter of unreinforced openings may be determined

by use of diagrams, figures 52.25-15 (b1) and 52.25-15 (b2).

(2) To use the diagrams compute the value of (DT) and also the value of K as shown in the preceding formula (2). Next find on a diagram the vertical line corresponding to the (DT) value and

follow this line vertically to the point where the line representing the K value intersects. By projecting this point horizontally to the left-hand edge of the diagram, the maximum diameter of an unreinforced opening may be read from the scale.

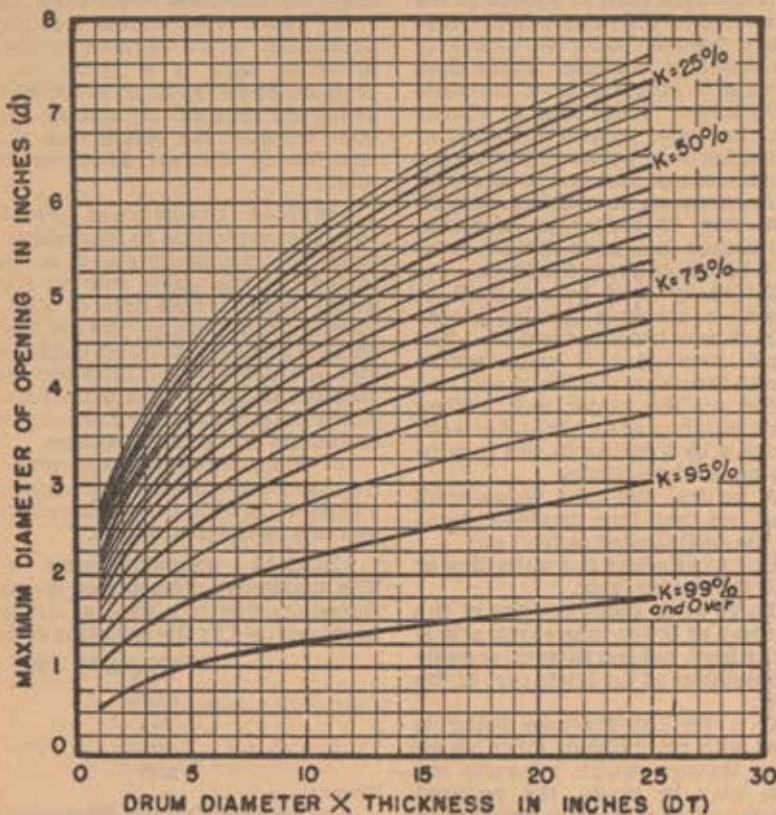


FIGURE 52.25-15 (b1)—Maximum diameter of unreinforced openings in shells.

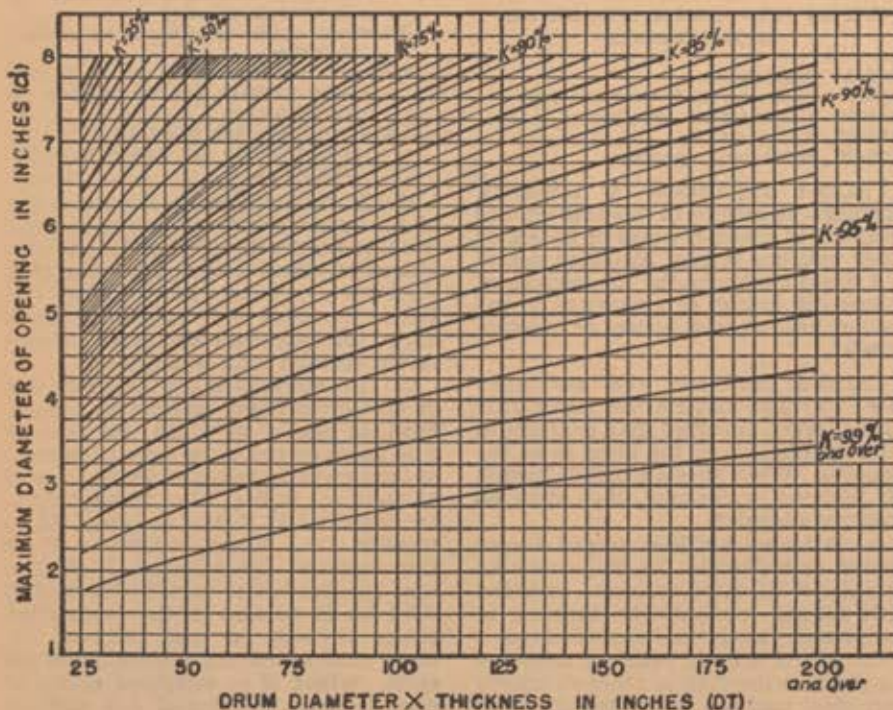


FIGURE 52.25-15 (b2)—Maximum diameter of unreinforced openings in shells.

§ 52.25-20 *Reinforced openings.* (a) An opening in a shell or drum with a diameter greater than the maximum unreinforced opening permitted by § 52.25-15 shall be provided with reinforcement. Openings of the reinforced type shall consist of one or more reinforcing rings or flanges riveted or welded to the shell and a nozzle or fitting welded to the shell and/or welded to or integral with the reinforcing flange. Openings requiring reinforcement shall have the reinforcement applied equally on the outside and inside of the shell. If placed in shells constructed under the requirements of § 52.05-12 (g) the reinforcement need not be so applied, provided however, the amount of reinforcement required shall be calculated for a required shell thickness using 80 percent of the allowable stress values given in table 52.05-10 (a). Openings in heads may have reinforcement on the outside only.

(b) (1) The thickness of a nozzle or fitting welded to the shell, reinforcing ring or flange shall be of a thickness not less than schedule 80 pipe for boilers and in no instance shall the nozzle wall thickness be less than that determined by § 55.07-5 of this subchapter.

(2) For nozzle fittings having a bolting flange and an integral flange for riveting, the thickness of the flange attached to the boiler shall also be not less than the thickness of the neck of the fitting.

(c) All circular or elliptical openings of the reinforced type shall comply with the following requirements:

(1) On a line parallel to the longitudinal axis of the shell and passing through the center of the opening, the total cross-sectional area in the complete reinforced opening including the shell and cross-sectional area of the welds and reinforcing rings, if any, within the limits defined by rectangle $ABCD$ in figure 52.25-20 (c), shall be at least equal to the area of the cross section $EFGH$ plus $JKLM$, obtained by multiplying the shell thickness T required by § 52.05-10, using $E=0.90$, by twice the diameter (d) of the opening less 2 inches. The limits of rectangle $ABCD$ are:

(i) A distance on each side of the center line of the opening equal to the actual inside diameter d of the opening in the shell, defined by lines AD and BC .

(ii) A distance on each side of the middle line of the actual thickness m of the shell equal to three times such actual thickness, defined by lines AB and DC , except that in no case shall the limits extend along the tubular portion of the nozzle connection beyond the surface NP of the reinforcement more than two and one-half times the thickness n of the nozzle.

(2) On either side of the line parallel to the longitudinal axis of the shell, as determined in subparagraph (1) of this paragraph, the strength of the attachment to the vessel of each separate part entering into the construction of the reinforced opening shall be at least equal to the tensile strength of the cross section of the reinforcing part within rectangle $ABCD$, or to the tensile strength of a cross-sectional area equal to the sum

of rectangles $QFGR$ plus $JSTM$, determined by multiplying the shell thickness T required by § 52.05-10, using $E=0.90$, by diameter d of the shell opening less 2 inches, whichever tensile strength is smaller. For riveted construction, the strength of the attachment is the shearing strength of the rivets, and for welded construction, it is the strength of the weld in shear or in tension, whichever is smaller.

(3) When there are two or more adjacent openings, the limits for the openings, defined by AD and BC , shall not be considered to overlap, and in no case shall any portion of a cross section be considered to apply to more than one opening.

(d) Figure 52.25-20 (d) illustrates some types of arc or gas welded connections which are acceptable.

(e) The unit shear stress of a weld shall not exceed 0.8 times the allowable stress in tension.

(f) For arc or gas welded connections, in addition to complying with the regulations given in paragraph (c) of this section, the following additional requirements shall be met:

(1) Where the thickness t of the thinner of the two parts being joined is $\frac{3}{4}$ inch or less, the dimensions of the welds shall not be less than the requirements given in figure 52.25-20 (d).

(2) Where the thickness t is greater than $\frac{3}{4}$ inch, the dimensions of the welds shall not be less than the requirements given in figure 52.25-20 (d), using a value of $\frac{3}{4}$ inch for t in the formulas.

(3) When nozzles or couplings are attached to boilers and unfired pressure vessels as shown in figures 52.25-20 (d), (B) and (D), and are welded from one side only, backing strips shall be used unless the inside of the joint can be visually inspected in order that the inspector may satisfy himself that complete penetration is obtained. When attach-

ments as shown in figures 52.25-20 (d), (K) and (L), are employed they shall be limited to 2-inch pipe size for pressures exceeding 150 p. s. i.

(g) When the end faces of nozzles or manhole necks are to remain unwelded in the completed vessel, these end faces shall not be cut by shearing unless at least $\frac{1}{8}$ inch of the additional metal is removed by any method that will produce a smooth finish.

(h) The thickness of each independent riveted reinforcing flange or ring shall not be less than given in table 52.25-20 (h).

TABLE 52.25-20 (h)—MINIMUM THICKNESS OF INDEPENDENT RIVETED REINFORCING RINGS OR FLANGES

Thickness of shell plate	Thickness of reinforcing ring or flange	Thickness of shell plate	Thickness of reinforcing ring or flange
Inch	Inch	Inches	Inch
$\frac{1}{8}$	$\frac{3}{8}$	$\frac{5}{8}$ - $\frac{3}{4}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{5}{8}$
$\frac{3}{8}$ - $\frac{1}{2}$	$\frac{1}{2}$	1	$\frac{3}{4}$
$\frac{5}{8}$ - $\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{2}$ -2	$\frac{3}{4}$
$\frac{3}{4}$ -1	$\frac{3}{4}$	Over 2	1
$\frac{1}{2}$ - $\frac{3}{4}$	$\frac{3}{4}$		

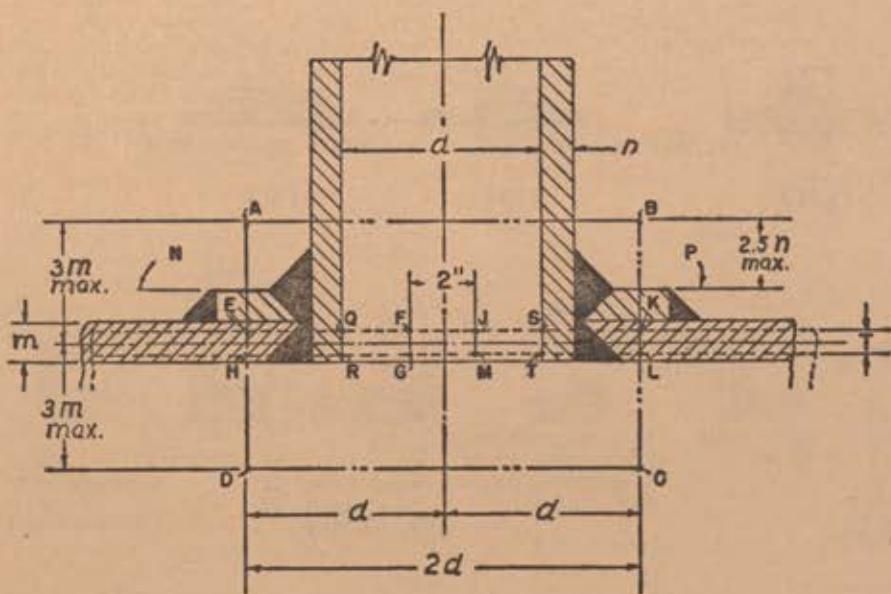
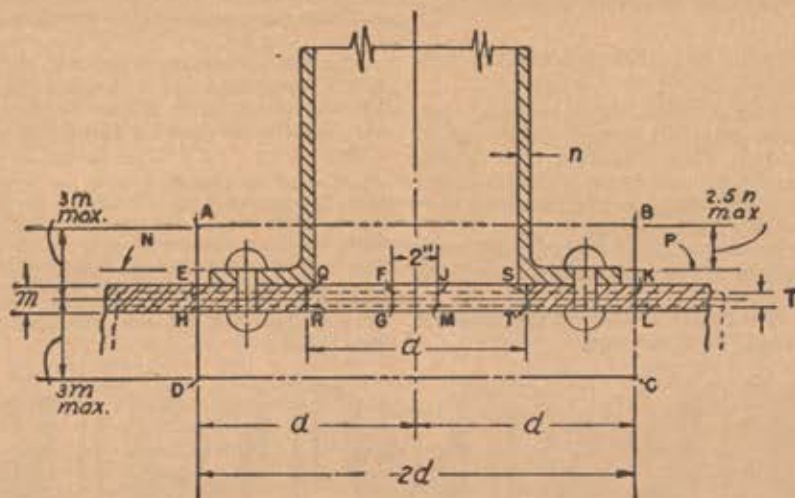


FIGURE 52.25-20 (e)—Computation of reinforced nozzle fittings.

(i) The outside diameter of a riveted reinforcing ring or flange shall not be less than one and one-half times the diameter of the opening in the shell.

(j) The rivets attaching the nozzle shall be so placed as to avoid the possibility of the shell plate falling by tearing around the rivet holes.

(k) Manhole or other openings in a flat, stayed surface shall be deemed to be sufficiently reinforced if the plate is flanged inwards to a depth not less than that determined by § 52.20-15 (b).

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1393, 50 U. S. C. App. 1275)

SUBPART 52.30—SURFACES REQUIRED TO BE STAYED OR REINFORCED

6. The cross references following § 52.30-1 are amended to read as follows:

§ 52.30-1 Definitions. * * *

CROSS REFERENCES: For unstayed flat heads, see Subpart 52.22. For flat tube sheets, see Subpart 52.45. For curved tube sheets, see Subpart 52.40.

SUBPART 52.35—STAYS AND REINFORCEMENTS

7. Section 52.35-1 is amended by changing paragraphs (b) and (c) to read as follows:

§ 52.35-1 Definitions. * * *

(b) *Solid screw staybolt.* Solid screw staybolt is a threaded bar screwed through the plates, the ends being riveted over or fitted with nuts or welded collars. (See figures 52.35-1 (b) and 52.35-1 (1).)

(c) *Hollow screw staybolt.* Hollow screw staybolt is a hollow threaded bar screwed through the plate, the ends being riveted over or fitted with nuts or

welded collars. (See figure 52.35-1 (c).)

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

8. Sections 52.35-5 and 52.35-10 (b) are amended to read as follows:

§ 52.35-5 *Materials.* (a) Round bar stays which require no welding or forging other than upsetting at the ends for threading or to form eyes for use in conjunction with crowfeet, or similar fastenings, shall conform to the requirements of Subpart 51.07, 51.10, or 51.13 of this subchapter.

(b) Crowfeet, lugs, and similar connections for stays shall be forgings without welds conforming to the requirements of Subpart 51.46 of this subchapter.

(c) Forged-welded stays or parts thereof shall conform to the requirements of Subpart 51.13 of this subchapter. All welds in the body of the stay shall be made by the hammer-weld process.

(d) Stiffeners made of structural shapes shall conform to the requirements specified in Subpart 51.10 of this subchapter.

(e) Gusset and diagonal stays made of steel plate, also doubling plates and girders shall conform to the requirements specified in Subpart 51.04 of this subchapter.

(f) Stay tubes shall conform to the requirements of Subpart 51.25 of this subchapter.

(g) Rivets shall conform to the following requirements:

Steel rivets..... Subpart 51.07
Iron rivets..... Subpart 51.13

(h) Nuts for screw stays shall be made of steel, conforming to the requirements of Subpart 51.46 or 51.49, or, refined wrought iron, conforming to the requirements of Subpart 51.13 of this subchapter.

§ 52.35-10 *Workmanship.* * * *

(b) Holes for screw staybolts shall be drilled and tapped fair and true and shall have a full thread.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

9. Section 52.35-20 is amended to read as follows:

§ 52.35-20 *Detail requirements.* (a) All screw staybolts, except flexible staybolts, shall have a telltale hole in the center of each end not less than $\frac{3}{16}$ inch diameter extending not less than $\frac{1}{2}$ inch beyond the inside of the plate.

(b) Joining of steel stays in the body by any process of welding is not permissible.

(c) The length of screw staybolts shall not exceed 20 diameters.

(d) Where the length of a boiler exceeds 18 feet, the through stays shall be supported in the middle.

(e) Where the heads of screw staybolts are riveted over, the end of the staybolt before riveting shall extend not less than $\frac{1}{4}$ inch from the surface of the plate to provide sufficient material for a substantial head.

(f) Where welded collars are used instead of nuts, the depth of the collar, measured on the staybolt, and the width, measured on the plate, shall not be less than one-half the diameter of the staybolt.

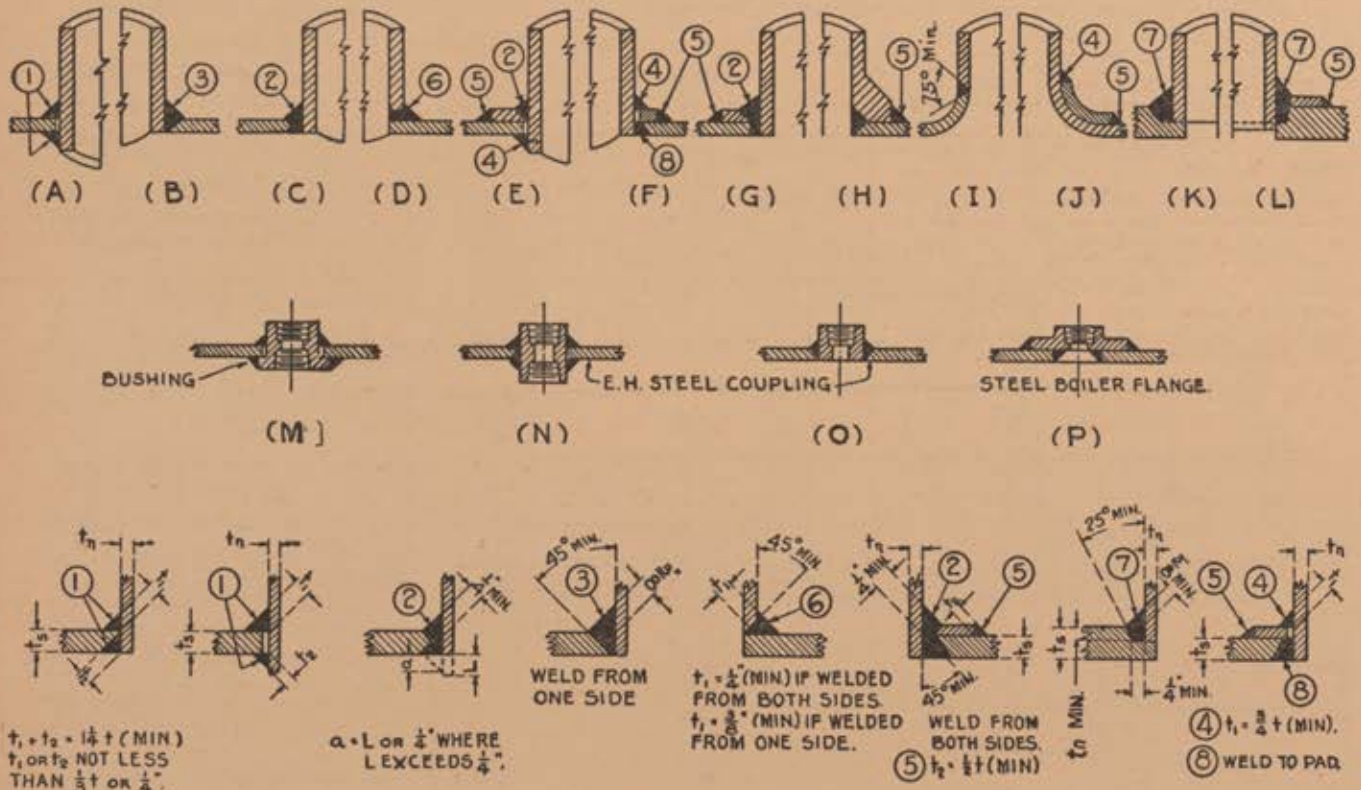
(g) The minimum thickness of nuts used in connection with screw stays shall be one-half of the diameter of the stay, but in no case less than $\frac{3}{4}$ inch. The stays shall be so placed in relation to the joints that the plates can be calked without removing the nuts.

(h) Nuts shall not be fitted to staytubes at the combustion chamber end.

(i) The ends of stays fitted with nuts shall not be exposed to the direct radiant heat of the fire.

(j) The minimum thickness of staytubes measured at the root of the threads shall be $\frac{1}{4}$ inch for marginal staytubes and $\frac{1}{8}$ inch for other staytubes.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)



$t_1 + t_2 = \frac{1}{4}t + (\text{MIN})$
 t_1 OR t_2 NOT LESS THAN $\frac{1}{2}t$ OR $\frac{1}{4}$.

$a \cdot L$ OR $\frac{1}{4}$ WHERE L EXCEEDS $\frac{1}{4}$.

$t_1 = \frac{1}{2}$ (MIN) IF WELDED FROM BOTH SIDES.
 $t_1 = \frac{3}{8}$ (MIN) IF WELDED FROM ONE SIDE.

WELD FROM BOTH SIDES.
⑤ $t_2 = \frac{1}{2}t$ (MIN)

④ $t_1 = a + (\text{MIN})$.
⑥ WELD TO PAD

DIMENSIONS ① ④ & ⑤ ARE MINIMUM VALUES WHERE t = THE THINNER OF t_s OR t_n .
 t_s = REQUIRED SHELL THICKNESS, t_n = REQUIRED NECK THICKNESS.

FIGURES 52.25-20 (d)—Acceptable types of welded nozzles and fittings.

SUBPART 52.40—TUBE SHEETS OF WATER-TUBE BOILERS

10. Sections 52.40-5, 52.40-10 and 52.40-15 are amended to read as follows:

§ 52.40-5 Computations for curved tube sheet. (a) The maximum allowable pressure and minimum thickness of a cylindrical shell pierced for tubes and of a curved tube sheet shall be calculated by formula (1), (2), or (3) of § 52.05-10, using the lowest value of E, determined in accordance with this section.

(b) (1) Where cylindrical shells are pierced by a single row of tubes or by two or more rows so placed in the cylindrical shell as not to be considered nests of tubes, as in a double-butt strap joint, or where reinforcing plates are fitted, the ligament efficiency between tube holes shall be computed by formula (1) of this section. For tube rows other than those placed on the longitudinal joint, the shell if necessary shall be either reinforced or increased in thickness.

(2) The relative strength of the ligaments between tube holes which come in a single line in a butt-strap joint or reinforced shell, shall be computed by the following formula:

$$E = \frac{(p-d)T_1}{pT} \quad (1)$$

where:

- E = relative strength of ligament.
- p = pitch of tubes, in inches.
- d = diameter of tube holes, in inches.
- T = thickness of shell, in inches.
- T₁ = the aggregate thickness of the two butt straps, or the shell and reinforcing plate, in inches.

(c) When a shell is pierced for tubes in a series of rows parallel to its axis, the efficiency of the ligament between the tube holes in any row shall be determined as follows:

(1) When the pitch of the tube holes in any row is uniform. (See figure 52.40-5 (c1).)

$$E = \frac{p-d}{p} \quad (2)$$

(2) When the pitch of the tube holes in any row is not uniform. (See figures 52.40-5 (c2) and 52.40-5 (c3).) The calculations shall be made for a section of the row not exceeding the diameter of the shell.

$$E = \frac{p_1 - nd}{p_1} \quad (3)$$

(3) When the holes in one row are placed so as to form diagonal ligaments with the holes in an adjacent row. (See figure 52.40-5 (c4).) The efficiency of these ligaments shall be taken from the diagram figure 52.40-5 (c5). To use this diagram compute the value of $\frac{pd}{p}$ and also the efficiency of the longitudinal ligament. Next find in the diagram, the vertical line corresponding to the longitudinal efficiency of the ligament and follow this line vertically to the point where the diagonal line representing the ratio of $\frac{pd}{p}$ intersects. By projecting

¹ Where the tube hole is not of the straight bore type, the equivalent diameter shall be calculated by dividing the cross-sectional area of the removed metal by the material thickness.

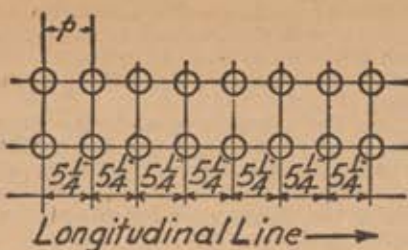


FIGURE 52.40-5 (c1)—Example of tube spacing with pitch of holes equal in every row.

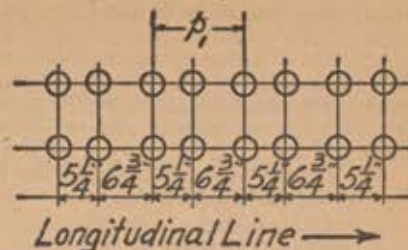


FIGURE 52.40-5 (c2)—Example of tube spacing with pitch of holes unequal in every second row.

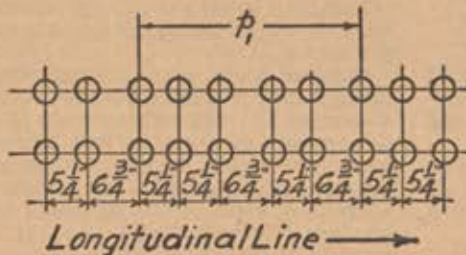


FIGURE 52.40-5 (c3)—Example of tube spacing with pitch of holes varying in every second and third row.

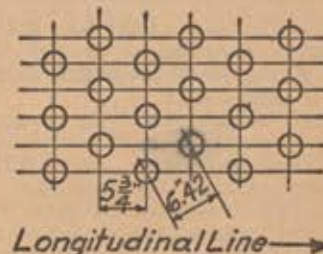


FIGURE 52.40-5 (c4)—Example of tube spacing with holes on diagonal lines.

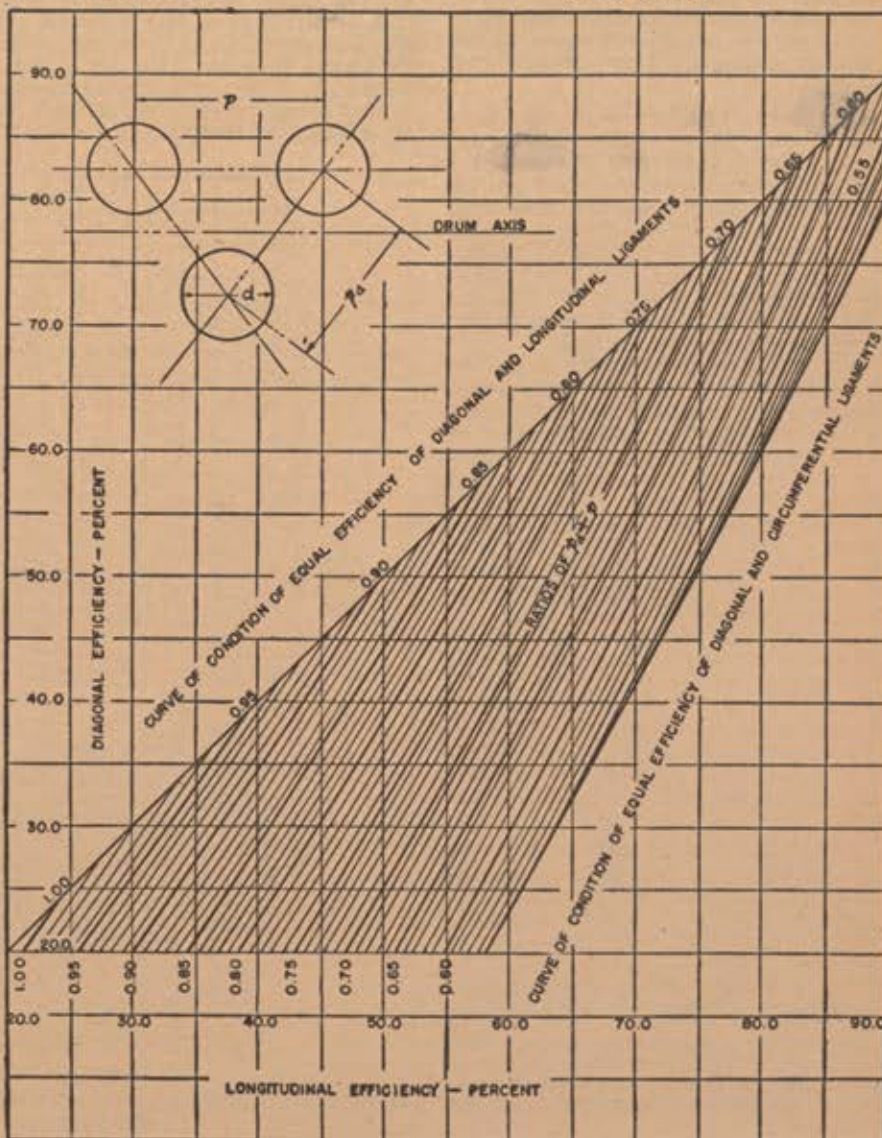


FIGURE 52.40-5 (c5)—Diagrammatic computation of diagonal efficiency.

this line horizontally to the left on the edge of the diagram, the diagonal efficiency of the ligament may be read from the scale. If this efficiency is less than that of the longitudinal ligament it shall be used in computing the allowable pressure.

(4) The symbols used in the formulas in this paragraph mean:

- E = relative strength of the ligament.
- p = longitudinal pitch of tube holes, in inches.
- p_d = diagonal pitch of tube holes, in inches.
- p_1 = unit length of section of the row considered, in inches.
- d = diameter of tube holes, in inches.
- n = number of tube holes in section p_1 .

(d) The pitch of the tube holes shall be measured either on the flat plate before rolling or on the middle line of the plate after rolling.

(e) The strength of the circumferential ligaments between tube holes shall be at least one-half the required strength of the longitudinal ligaments.

(f) When the tube holes are not normal to the plate, the plate thickness shall be sufficient to provide a parallel seating not less than $\frac{3}{8}$ inch depth between planes at right angles with the axis of the tube for tubes $2\frac{1}{2}$ inches in diameter and under; for tubes having diameters over $2\frac{1}{2}$ inches, the depth of the parallel seating shall not be less than $\frac{1}{2}$ inch.

§ 52.40-10 Reinforcement of ligaments. (a) Where reinforcing plates are applied to the drums of water-tube boilers to strengthen the shell at the point where the tubes enter, they shall be riveted to the shell, and where outside caulking is used, the tubes shall be expanded into the inner and outer plates so that the rivets and tubes will hold the plates together in accordance with the regulations for stayed surfaces.

(b) The rivet spacing with respect to the tubes shall conform to the requirements of Subparts 52.30 and 52.35, using a value of 250 for C , and shall be based on a unit pressure equal to the pressure that can be carried by the inner plate with a factor of safety of 5. The shearing strength of the rivets securing the reinforcing plate on each side of the tube line shall be at least equal to the required strength of the ligament of the reinforcing plate between the tubes.

(c) The combined drum shell and reinforcing plate or plates, and riveted connections, shall have a factor of safety of not less than 5 in the ligaments when calculated in accordance with § 52.40-5. When reinforcing plates or butt-straps are exposed to the products of combustion, the joints shall be protected therefrom.

§ 52.40-15 Unsymmetrical ligaments. (a) When tubes or holes are unsymmetrically spaced, the average ligament efficiency shall be not less than that required by this section, which applies to ligaments between tube holes and not to single openings. When this procedure results in lower efficiencies than those for

* Where the tube hole is not of the straight bore type, the equivalent diameter shall be calculated by dividing the cross-sectional area of the removed metal by the material thickness.

symmetrical groups which extend a distance greater than the inside diameter of the shell as covered by § 52.40-5, the efficiencies computed by § 52.40-5 may be used.

(b) For a length equal to the inside diameter of the shell for the position which gives the minimum efficiency, the efficiency shall be not less than that on which the maximum allowable pressure is based.

(c) For a length equal to the inside radius of the shell for the position which gives the minimum efficiency, the efficiency shall be not less than 80 percent of that on which the maximum allowable pressure is based.

(d) For holes placed longitudinally along a shell but which do not come in a straight line, the requirements of this section shall apply, except that the equivalent longitudinal width of a diagonal ligament shall be used. To obtain the equivalent width the longitudinal pitch of the two holes having a diagonal ligament shall be multiplied by the efficiency of the diagonal ligament. The efficiency to be used for the diagonal ligaments is given in figure 52.40-15 (d).

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

SUBPART 52.45—COMBUSTION CHAMBERS AND TUBE SHEETS OF FIRE-TUBE BOILERS

11. Section 52.45-15 (c) is amended to read as follows:

§ 52.45-15 Detail requirements. * * *

(c) When plates are flanged to form the combustion chamber and back connections, the minimum inner radius shall be not less than one and one-half times the thickness of the plate flanged.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 389, 1333, 50 U. S. C. App. 1275)

SUBPART 52.50—FURNACES AND FLUES

12. Section 52.50-5 and 52.50-15 (g) are amended to read as follows:

§ 52.50-5 Materials. (a) Steel plate used in the fabrication of furnaces or flues shall be of firebox quality complying with Subpart 51.04 or 51.22 of this subchapter.

(b) Seamless, lap welded or electric resistance welded flues may be made of pipe complying with Subpart 51.34 of this subchapter.

§ 52.50-15 Detailed requirements. * * *

(g) Plain or corrugated furnaces may be constructed by arc welding. The longitudinal and circumferential joints

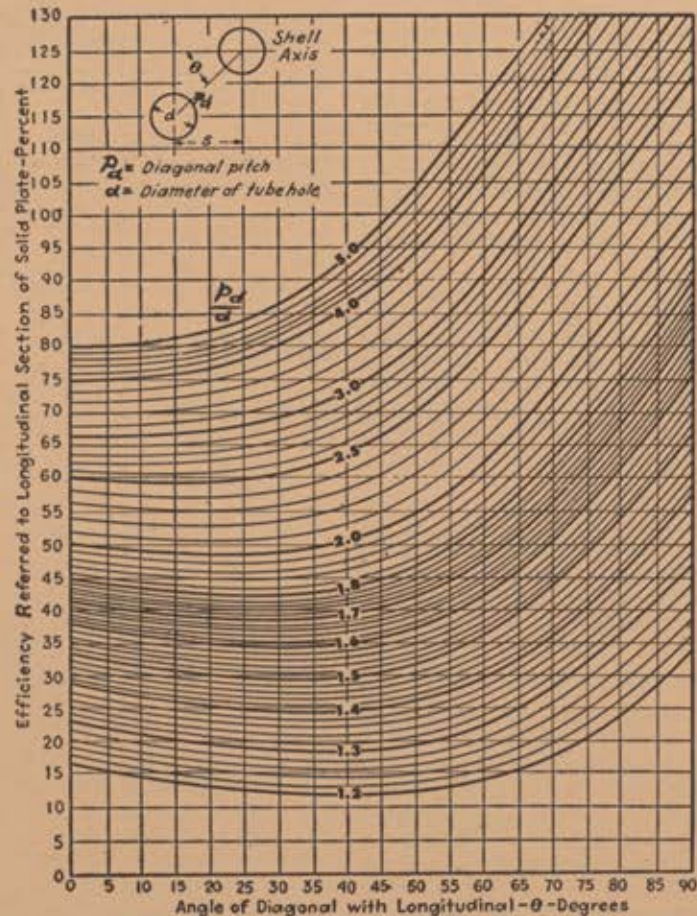


FIGURE 52.40-15 (d)—Diagram for determining efficiency of diagonal ligaments in order to obtain equivalent longitudinal efficiency.

shall be of the double-welded butt type, and the following modifications in the requirements for Class I welded pressure vessels will be acceptable:

(1) The customary test plates need not be furnished, provided each furnace has sufficient material left on one end to obtain two guided side bend specimens, which shall not be detached until all the work and heat treatment on the furnace has been completed. One retest will be permitted for each specimen failing to meet the specified requirements.

(2) Radiographic examination of the furnace seam is not required, but will be accepted in lieu of the guided side bend specimens. If radiographs are taken, they shall meet the requirements of § 56.05-5 of this subchapter except that the films will not be retained by the Coast Guard.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4428-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 389, 1333, 50 U. S. C. App. 1275)

SUBPART 52.55—BOILER AND SUPERHEATER TUBES

13. Sections 52.55-1, 52.55-5, and 52.55-10 (with tables) are amended to read as follows:

§ 52.55-1 *Definitions*—(a) *Tubes*. Tubes, within the meaning of this subpart, are cylindrical shells of comparatively small diameter constituting the main part of the heating surface of a boiler or superheater.

(b) *Safe end*. Safe end is a short piece of boiler tube which is usually thicker than the ordinary tube and is welded to a tube of lighter gauge for the purpose of lengthening it.

(c) *Seamless tube*. Seamless tube is a tube without any longitudinal joint.

(d) *Electric-resistance-welded tube*. Electric-resistance-welded tube is a tube the longitudinal joint of which is made by the electric-resistance butt welding process and the tube is required to be normalized after welding.

(e) *Stay tube*. Stay tube is a thick-walled tube, the end of which is usually thickened by upsetting to compensate for threading. Such tubes are used for staying tube sheets into which they are screwed and expanded.

(f) *Expanding*. Expanding is the process of enlarging the end of a tube to make it fit tightly in the tube sheet.

(g) *Beading*. Beading is the process of turning over the protruding end of a tube after expanding to form a supporting collar for the tube sheet.

(h) *Bell-mouthing*. Bell-mouthing is the process of flaring the end of a tube beyond where it is expanded in the tube sheet.

§ 52.55-5 *Materials and workmanship*.

(a) Seamless steel boiler tubes shall comply with the requirements of Subpart 51.25 of this subchapter for such tubes.

(b) Electric-resistance-welded steel and iron boiler tubes shall comply with the requirements of this Subpart 51.25 of this subchapter for such tubes.

(c) The ends of tubes used in fire-tube boilers shall not extend more than 3/8 inch beyond the tube sheet. All such tubes shall be rolled tight in the sheet and the ends shall be beaded over, or the ends rolled, beaded, and welded around the edge of the bead. Where the tubes do not exceed 1 1/2 inches in diameter, the tube sheet may be chamfered or recessed to a depth equal to the thickness of the tubes and the tubes rolled in place and welded.

(d) (1) The ends of all tubes and nipples shall be expanded and flared not less than 1/8 inch over the diameter of the tube hole on all water tube boilers and headers, or they may be flared not less than 1/8 inch, rolled and beaded, or flared, rolled and seal welded, or rolled and seal welded without flaring provided the throat of the weld is not less than 3/16 inch nor more than 3/8 inch.

(2) The ends of tubes or nipples of water tube boilers when not seal welded shall project through the tube plates or headers not less than 1/4 inch nor more than 1/2 inch before flaring. When the tubes enter at an angle, the maximum limit of 1/2 inch shall apply only at the point of least projection.

(3) If tubes and nipples are seal welded, they shall be reexpanded. Stress relieving shall not be used after welding.

(4) Superheater, waterwall, or economizer tubes of a weldable quality may be arc or gas welded to tubular manifolds, headers, or drums, without being expanded, provided the welds are full-strength welds complying with figure 52.25-20 (d), (A) or (B), and are stress-relieved by means of controlled temperature. Radiographic examination is not required.

(e) Tube holes shall be drilled full size from the solid plate. Tube holes may be counterbored where the metal is thicker than that required to get a proper bearing by expanding, so as to form narrow seats into which the tube ends can be properly expanded, provided there is space available to permit a proper amount of flare of the tube end.

§ 52.55-10 *Computations*. (a) (1) The maximum allowable pressure and

the minimum thickness of seamless and electric-resistance-welded carbon and seamless alloy steel tubes or nipples subject to internal pressure for water tube boilers, economizers and superheaters shall be computed by the following formulas:

$$P = S \left[\frac{2T - 0.027D - 2e}{D - 2T + 0.027D + 2e} \right] \quad (1)$$

$$T = \frac{D}{2} \left(\frac{P}{P+S} \right) + 0.0135D + e \quad (2)$$

where:

P = maximum allowable pressure, in pounds per square inch. Where the calculated maximum allowable pressure exceeds an even unit of 10 by more than 1, the next higher unit of 10 may be used.

S = maximum allowable stress, in pounds per square inch, as given in table 52.05-10 (a), at not less than the maximum expected mean wall temperature, which in no case shall be taken as less than 700° F. for tubes absorbing heat. The mean wall temperature is defined as the sum of the outside and inside surface temperatures divided by 2. For tubes which do not absorb heat, the wall temperature may be taken as the temperature of the fluid within the tube but not less than the saturation temperature.

T = thickness of the tube wall, in inches.
D = outside diameter of the tube, in inches.
e = 0.04 inch over a length at least equal to the width of the seat plus 1 inch, for tubes expanded into the tube seats.

e = 0, for tubes strength-welded to headers and drums.

(2) Where tubes are expanded into drums or headers, table 52.55-10(a2) may be used in lieu of formula (1) or (2) for determining the maximum allowable pressure and minimum thickness of seamless or electric-resistance-welded low carbon steel tubes, provided the maximum mean wall temperature does not exceed 700° F.

(3) The thickness of the ends of tubes strength-welded to drums or headers need not be greater than the run of the tube as determined by formula (2), but the thickness of no tube, where expanded into headers or drums, shall be less than that given in table 52.55-10(a3).

TABLE 52.55-10 (a2)—MAXIMUM ALLOWABLE PRESSURE FOR SEAMLESS AND ELECTRIC-RESISTANCE WELDED LOW CARBON STEEL TUBES SUBJECT TO INTERNAL PRESSURE, WHERE EXPANDED INTO DRUMS OR HEADERS¹

Outside diameter, in inches	Maximum allowable pressure, in pounds per square inch, nearest BWG number and the thickness of tube wall, in inches															
	17 0.065	16 0.065	15 0.075	14 0.085	13 0.095	12 0.105	11 0.120	10 0.135	9 0.150	8 0.165	7 0.180	6 0.200	5 0.220	4 0.240	3 0.260	
3/4	160	450	520	1,190	1,570											
1		270	530	790	1,040	1,330	1,770									
1 1/4		210	430	650	880	1,130	1,500	1,910								
1 1/2		160	350	550	750	950	1,300	1,630								
1 3/4			230	400	560	730	1,000	1,280	1,570	1,870						
2				290	430	570	800	1,030	1,260	1,510	1,770					
2 1/4				210	340	460	650	840	1,040	1,250	1,470	1,770				
2 1/2					250	370	530	700	880	1,060	1,250	1,460	1,770			
2 3/4					200	300	450	600	750	910	1,070	1,300	1,530	1,770		
3					160	240	370	510	650	790	930	1,130	1,340	1,550	1,770	
3 1/4						190	320	440	560	690	820	1,000	1,180	1,370	1,570	
3 1/2							270	380	490	610	730	860	1,060	1,230	1,400	
3 3/4								230	330	430	540	650	800	950	1,100	1,250
4									280	380	480	580	720	860	1,000	1,150
4 1/4										240	340	430	530	650	780	910
4 1/2											260	340	420	530	650	760

¹ These values have been calculated by formula (1) in § 52.55-10 (a) using allowable stress values at 700° F.
² Where calculated allowable pressures exceed an even unit of 10 by more than 1, the next higher unit of 10 is given in the table.

TABLE 52.55-10 (a3)—EXPANDED TUBES

Outside diameter, in inches:	Minimum thickness of expanded tubes, in inches
¾	0.055
1, 1¼, 1½	.065
1½	.075
1¾, 2	.085
2¼, 2½, 2¾	.095
3	.105
3¼, 3½, 3¾	.120
4	.135
4½	.150

(b) (1) The maximum allowable pressure and minimum thickness of seamless or welded boiler tubes less than 6 inches in diameter, and subject to external pressure, shall be computed by the following formulas:

$$P = \frac{14,000 (T - 0.065)}{D} \quad (4)$$

$$T = \frac{PD}{14,000} + 0.065 \quad (5)$$

where:

- P = maximum allowable pressure, in pounds per square inch.
- T = thickness of tube, in inches.
- D = external diameter of tube, in inches.

(2) As a matter of convenience, table 52.55-10 (b) has been computed from the preceding formulas.

TABLE 52.55-10 (b)—MAXIMUM ALLOWABLE PRESSURE AND MINIMUM THICKNESS FOR SEAMLESS OR WELDED BOILER TUBES LESS THAN 6" IN DIAMETER AND SUBJECT TO EXTERNAL PRESSURE

Outside diameter of tube in inches	Maximum allowable pressure, in pounds per square inch, nearest B. W. G. number and thickness of tube wall, in inches						
	13 0.095	12 0.105	11 0.120	10 0.135	9 0.150	8 0.165	7 0.180
1	420	560	770	980			
1½	280	380	520	660	800	940	
1¾	240	320	440	570	680	800	920
2	210	280	390	490	600	700	810
2¼	190	250	350	430	530	630	720
2½	170	230	310	400	480	560	650
3		190	260	330	400	470	540
3¼		180	240	310	370	430	500
3½		160	220	280	340	400	460
4			200	250	300	350	410
4½			180	220	270	320	360
5				200	240	280	330
5¼					220	270	300
6½					220	260	300

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 389, 1333, 50 U. S. C. App. 1275)

SUBPART 52.60—SUPERHEATERS, HEADERS, WATER WALLS, AND ECONOMIZERS

14. Subpart 52.60, consisting of §§ 52.60-1 to 52.60-20, inclusive, is amended to read as follows:

- Sec. 52.60-1 Definitions.
- 52.60-10 Materials.
- 52.60-15 Computations.
- 52.60-20 Detail requirements.

§ 52.60-1 *Definitions*—(a) *Superheaters*. Superheaters, within the meaning of this subpart, are appliances for the purpose of increasing the temperature of steam.

(b) *Header*. Header is a hollow forging, pipe, or welded plate of cylindrical,

square, or rectangular cross-section, serving as a manifold to which tubes are connected.

(c) *Water wall*. Water wall is a series of tubes or elements spaced along or integral with a wall of a furnace to protect the wall and provide additional heating surface.

(d) *Economizer*. Economizer is a feed-water heater usually located in the uptake or casing of a boiler to absorb heat from the waste gases.

§ 52.60-10 *Materials*. (a) Headers or fittings used in connection with these appurtenances, shall be constructed of steel plate conforming to the requirements of Subpart 51.04 of this subchapter; seamless steel pipe conforming to the requirements of Subpart 51.34 of this subchapter or of steel forgings conforming to the requirements of Subpart 51.46 of this subchapter.

(b) Ends of the headers may be closed by plug material conforming to the requirements of Subpart 51.04 or Subpart 51.22 of this subchapter.

(c) Alternate materials may be used in the construction of headers, provided such materials are approved by the Commandant for the particular application.

§ 52.60-15 *Computations*. (a) The maximum allowable pressure of cylindrical headers shall be determined by formula (1), (2), or (3) of § 52.05-10.

(b) The maximum allowable pressure and minimum thickness of tubes shall be in accordance with the tables and formulas provided in Subpart 52.55.

§ 52.60-20 *Detail requirements*—(a) *Superheater*. (1) The design pressure of a superheater integral with the boiler shall be not less than the highest setting of the drum safety valves, except that the superheater outlet connections may have a pressure rating conforming to § 52.70-10 (e).

(2) Superheaters fitted in conjunction with water-tube boilers may be considered as a part of the boiler, provided the pipe between the boiler and superheater and between superheaters is made of seamless steel material having a minimum thickness computed by the formula specified for piping in § 55.07-5 of this subchapter. Fittings used in making such connections shall be of forged or cast steel.

(3) Superheater headers in which it is possible for water to accumulate shall be fitted with adequate means for draining.

(4) Superheaters designed for normal operating temperatures in excess of 850° F., at the superheater outlet shall be fitted with controls to insure that the maximum temperature does not rise more than 15° above the design conditions. Visual or audible alarms shall be provided.

(b) *Economizer*. The design pressure of an economizer integral with the boiler and connected to the boiler drum without intervening stop valves shall be at least equal to 110 percent of the highest setting of the safety valves on the drum.

(c) *Headers*. Headers fabricated by means of arc or gas welding shall comply with the requirements of Part 56

of this subchapter for Class I welded pressure vessels.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

SUBPART 52.70—BOILER MOUNTINGS AND ATTACHMENTS

15. Subpart 52.70, consisting of §§ 52.70-1 to 52.70-55, inclusive, is amended to read as follows:

- Sec. 52.70-1 Definitions.
- 52.70-5 Materials and workmanship.
- 52.70-10 Detail requirements.
- 52.70-25 Feed connections.
- 52.70-30 Blow-off connections.
- 52.70-35 Dry pipes.
- 52.70-40 Fusible plugs.
- 52.70-45 Pressure gauges.
- 52.70-50 Water indicators.
- 52.70-55 Salinometer cocks.

§ 52.70-1 *Definitions*—(a) *Mountings*. Mountings, within the meaning of the regulations in this subchapter, are nozzle connections, distance pieces, valves, or fittings attached directly to the boiler.

(b) *Main stop valve*. Main stop valve is a valve usually connected directly to the boiler for the purpose of shutting off the steam from the main steam line.

(c) *Auxiliary stop valve*. Auxiliary stop valve is a valve usually connected directly to the boiler for the purpose of shutting off the steam from the auxiliary lines (including the whistle lines).

(d) *Manifold*. Manifold is a fitting with two or more branches having valves either attached by bolting or integral with the fitting.

(e) *Feed valve*. Feed valve is a valve in the feed-water line which controls the boiler feed.

(f) *Blow-off valve*. Blow-off valve is a valve connected directly to the boiler for the purpose of blowing out water, scum, or sediment.

(g) *Dry pipe*. Dry pipe is a perforated or slotted pipe placed in the highest part of the steam space of a boiler to prevent priming.

(h) *Water column*. Water column is a fitting or tube equipped with a water glass attached to a boiler for the purpose of indicating the water level.

(i) *Test cocks*. Test cocks are small cocks on a boiler for indicating the water level.

(j) *Salinometer cocks*. Salinometer cocks are cocks attached to a boiler for the purpose of drawing off a sample of water for salinity tests.

(k) *Fusible plugs*. Fusible plugs are plugs made with a bronze casing and a tin filling which melts at a temperature of 450° to 500° F. They are intended to melt in the event of low water and thus warn the engineer on watch.

§ 52.70-5 *Materials and workmanship*. (a) Boiler mountings or attachments shall be made of steel forgings conforming to the requirements of Subpart 51.46 of this subchapter; steel castings conforming to the requirements of Subpart 51.58 of this subchapter; or,

where the temperature does not exceed 450° F., they may be made of bronze castings conforming to the requirements of Subpart 51.76 of this subchapter.

(b) For temperatures exceeding 450° F., high strength or alloy steel bolting material complying with the requirements of Subpart 51.49 of this subchapter shall be employed. For temperatures not exceeding 450° F., commercial carbon-steel bolting conforming to the requirements of Subpart 51.49 of this subchapter may be used.

(c) The use of cast iron for mountings, fittings, valves, or cocks, attached directly to boilers operating at pressures exceeding 30 p. s. i. is prohibited.

§ 52.70-10 *Detail requirements.* (a) Boiler nozzles, mountings and attachments having diameters over 1¼ inches shall be fitted with flanged or welding ends. Slip-on flanges may be used for sizes not exceeding 2 inches in diameter and butt-welded flanges may be used without diameter limitations. Socket welded connections are prohibited for use in boiler mountings and attachments. Screwed ends shall be limited to ½-inch maximum pipe size for boilers of design pressures exceeding 600 p. s. i.

(b) Where bolt holes extend through the plating of a boiler or pressure vessel, the plate shall be threaded to receive the bolt. The bolt head, or, in the case of stud bolts, a nut with washer and grommet shall be fitted on the inside. Where stud bolts are used, with the holes not extending through the plate, the stud shall be screwed into the plate a distance at least equal to the diameter of the stud over the threads.

(c) Where pipes are screwed into the plating of the boiler, the minimum number of pipe threads permitted shall be in accordance with the following table:

TABLE 52.70-10 (c)—MINIMUM NUMBER OF PIPE THREADS FOR CONNECTIONS TO BOILER

Size of pipe connection, inches..... 1 and 1¼	
Number of threads per inch..... 11½	
Minimum number of threads required in opening.....	4
Minimum thickness of material required to give above number of threads (inches).....	0.348

(d) The nearest steam stop valves and fittings attached to the boiler drum or superheater inlet shall have a pressure rating at least equal to the maximum set pressure of any safety valve on the boiler drum at the corresponding saturated steam temperature.

(e) The nearest steam stop valves and fittings attached to the superheater outlet shall have a pressure rating at least equal to the maximum set pressure of any safety valve on the superheater and at the normal operating superheated steam temperature. Where the superheater safety valve is of the drum pilot actuated type, the pressure rating shall be at least equal to 95 percent of the drum pilot safety valve setting at the normal operating steam temperature of the superheater outlet.

(f) All nozzles wherein steam or water enters or leaves a shell or head at a temperature differential of 100° F. or greater above or below the normal contents therein shall be fitted with a sleeve or other suitable means to reduce the effects of metal temperature differentials.

§ 52.70-25 *Feed connections.* (a) Feed water shall not be discharged into a boiler against surfaces exposed to hot gases, to the radiant heat of the fire or close to a riveted joint.

(b) Feed water nozzles shall be fitted with a sleeve or other suitable means to reduce the effects of metal temperature differentials in the shells or heads for design pressures of 400 pounds per square inch or over.

§ 52.70-30 *Blow-off connections.* (a) Boilers shall be fitted with a surface and a bottom blow-off valve or cock attached directly to the boiler or to a short distance piece. The surface blow-off valve shall be located within the permissible range of the water level, or fitted with a scum pan or pipe at this level. The bottom blow-off valve shall be attached to the lowest part of the boiler or fitted with an internal pipe leading to the lowest point inside the boiler. Water-tube boilers designed for pressures of 350 pounds per square inch or over are not required to be fitted with a surface blow-off valve. Boilers equipped with a continuous blow-down valve on the steam drum are not required to be fitted with an additional surface blow-off connection.

(b) Where blow-off pipes are exposed to radiant heat of the fire, they shall be protected by fire brick or other suitable heat-resisting material.

§ 52.70-35 *Dry pipes.* Internal dry pipes may be fitted to stop valves and safety valves, provided such dry pipes have a wall thickness at least equal to standard commercial pipe thickness for their diameter. The area of the opening in such dry pipes shall be at least twice the nominal area of the dry pipe. Openings in dry pipes shall be as near as practicable to the valve and shall be slotted or drilled, the width of the slots to be not less than ¼ inch, or the diameter of the holes to be not less than ⅜ inch. Where dry pipes are used, they shall be provided with drains at each end to prevent an accumulation of water.

§ 52.70-40 *Fusible plugs.* (a) All boilers, except water-tube boilers, and low-pressure heating boilers operating at pressures not in excess of 30 pounds per square inch, shall be fitted with fusible plugs manufactured from acceptable heats in accordance with Subpart 162.014 of Subchapter Q (Specifications) of this chapter.

(b) Vertical boilers shall be fitted with one fusible plug located in a tube not more than 2 inches below the lowest gauge cock.

(c) Externally fired, cylindrical boilers, with flues, shall have one plug fitted to the shell immediately below the fire line not less than 4 feet from the front end.

(d) Firebox, Scotch, and other types of shell boilers not specifically provided for, having a combustion chamber common to all furnaces, shall have one plug fitted at or near the center of the crown sheet of the combustion chamber.

(e) Double-ended boilers having individual combustion chambers for each end, which combustion chambers are common to all the furnaces in one end of the boiler, shall have one plug fitted

at or near the center of the crown sheet of each combustion chamber.

(f) Boilers constructed with a separate combustion chamber for each individual furnace shall be fitted with a fusible plug in the center of the crown sheet of each combustion chamber.

(g) Boilers of types not herein provided for shall be fitted with at least one fusible plug of such dimensions and located in a part of the boiler as will, in the judgment of the inspector, best meet the purposes for which it is intended.

(h) Fusible plugs shall be so fitted that the smaller end of the filling is in direct contact with the radiant heat of the fire, and shall be at least 1 inch higher on the water side than the plate or flue in which they are fitted, and in no case more than 1 inch below the lowest permissible water level as defined in paragraph (i) of this section.

(i) The lowest permissible water level shall be determined as follows:

(1) Vertical fire-tube boilers, one-half of the length of the tubes above the lower tube sheets.

(2) Vertical submerged tube boiler, 1 inch above the upper tube sheet.

(3) Internally-fired fire-tube boilers with combustion chambers integral with the boiler, 2 inches above the highest part of the combustion chamber.

(4) Horizontal-return tubular and dry back Scotch boilers, 2 inches above the top row of tubes.

(5) The lowest permissible water level for all water-tube boilers shall be determined at the time drawings of the boilers are submitted for approval.

(j) Fusible plugs shall be cleaned and will be examined by the inspector at each annual inspection, and oftener if necessary, and if, in the inspector's opinion, the condition of the plugs is satisfactory, they may be continued in use.

(k) Fusible plugs shall not be permitted where the maximum steam temperature to which they are exposed exceeds 425° F.

§ 52.70-45 *Pressure gauges.* (a) Each boiler shall have a steam gauge connected to the steam space or to the water column or its steam connection. The steam gauge shall be connected to a syphon or equivalent device of sufficient capacity to keep the gauge tube filled with water. Stop valves shall be provided at the connections to the boiler and at the gauge. Gauges shall be located where they can be easily seen.

(b) The gauge connections to the boiler, except the syphon, shall be not less than ¼ inch pipe size, but where ferrous pipe or tubing is used, they shall be not less than ½ inch inside diameter.

(c) The dial of the steam gauge shall be graduated to approximately double the pressure at which the safety valve is set, but in no case less than 1½ times this pressure.

(d) Each double-ended boiler shall be fitted with two steam gauges, one on either end of the boiler.

(e) The error in reading at any point on the gauge shall not exceed 1½ percent of the maximum reading to which the scale is graduated; except that the error in reading at the graduation indicating the steam pressure shall not exceed one-

half of 1 percent of the maximum reading to which the scale is graduated.

§ 52.70-50 *Water indicators.* (a) Each boiler shall have two independent means of indicating the water level in the boiler, one of which shall be a gauge glass. The secondary indicator may consist of a gauge glass, or other device approved by the Commandant, or where the allowable steam pressure does not exceed 250 pounds per square inch, three test cocks attached directly to the head or shell of the boiler. Where the allowable pressure exceeds 250 pounds per square inch, the gauge glasses shall be of the flat type instead of the common tubular type.

(b) Glass water gauges shall be so located that the lowest visible part of the glass is not lower than the lowest permissible water level, as determined by § 52.70-40 (f). The lowest gauge cock shall be located 2 inches higher than the lowest visible part of the gauge glass, except that for horizontal boilers 48 inches or less in diameter they may be located at the lowest permissible water level.

(c) Double-ended fire-tube boilers shall be equipped as specified in paragraphs (a) and (b) of this section, except that a water-gauge glass, and three water-gauge cocks shall be installed on each end of the boiler.

(d) Externally fired flue boilers, such as are used on central western river vessels, shall be equipped as specified in paragraphs (a) and (b) of this section, except that float gauges may be substituted for gauge glasses.

(e) Gauge glass connections, and pipe connections shall be not less than ½ inch pipe size. Each water gauge glass shall be fitted with a globe or gate-valve drain piped to a safe discharge point. Water-gauge glasses shall be fitted with top and bottom shut-off valves of such through-flow construction as to prevent stoppage by deposits of sediments. Straight-run globe valves of the ordinary type so designed as to form pockets in which sediment may collect shall not be used on such connections.

(f) When water columns are provided they shall be fitted to the heads or shells of boilers or drums with shut-off valves attached directly to the boiler or drums, or if necessary, connected thereto by a distance piece both at the top and bottom of the water columns. Shut-off valves used in the pipe connections between the boiler and water column or between the boiler and the shut-off valves required by paragraph (e) of this section for gauge glasses, shall be locked or sealed open. Water column piping shall not be fitted inside the uptake, the smoke box, or the casing.

(g) No connections, except for regulators, drain, steam gauges, or appurtenances which do not permit the escape of an appreciable amount of steam or water therefrom, shall be placed on the pipes connecting a water column or gauge glass to a boiler.

§ 52.70-55 *Salinometer cocks.* In vessels operating in salt water, each boiler shall be equipped with a salinometer cock or valve which shall be fitted di-

rectly to the boiler in a convenient position. They shall not be attached to the water gauge or water column.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

PART 53—LOW PRESSURE HEATING BOILERS
SUBPART 53.03—STEEL PLATE HEATING BOILERS

1. Section 53.03-15 (b) is amended to read as follows:

§ 53.03-15 *Computations and design.* * * *

(b) The maximum allowable pressure and the minimum thickness of the cylindrical shell and dished heads of steel plate boilers shall be determined in accordance with the requirements of Subparts 52.05 and 52.20 of this subchapter except that the maximum allowable stress shall not exceed 80 percent of the values given in table 52.05-10 (a) in Part 52 of this subchapter.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

2. Section 53.03-25 (b) is amended to read as follows:

§ 53.03-25 *Areas to be stayed.* * * *

(b) The staying of unflanged heads of welded boilers is not required if the greatest distance measured along a radial line from the inner surface of the shell to a fully supported line or point does not exceed 1¼ times the maximum allowable pitch of the stays as determined by Subpart 52.30 of this subchapter. For boilers fabricated with the heads set inside of the shell plates so that the distance from the end of the shell to the outside face of the head is at least 3 times the shell thickness, staying is not required if the greatest distance measured as above does not exceed 1½ times the maximum allowable pitch of the stays. For the purposes of applying this paragraph, a fully supported line is a stay rod or tube extending through the head and welded, having sufficient area to meet the requirements of table 53.03-30, and having area of weld in shear at least 1¼ times the required area of the stay member. A fully supported line is the tangent to a row of rolled or welded tubes or welded stays complying with the requirements of Subpart 52.30 of this subchapter or a bent or welded corner joint.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

3. Section 53.03-45 is amended to read as follows:

§ 53.03-45 *Welded boilers.* (a) The design and construction of welded heating boilers shall conform to the applicable requirements prescribed in Part 56 of this subchapter for power boilers, except as specified in this subpart.

(b) Radiographic examination and stress relieving of welded joints are not required.

(c) Welded longitudinal shell joints shall be of the double welded butt type or of the single welded butt type fitted with a backing strip.

(d) The circumferential welded shell joints may be of the single or double welded butt type.

(e) Unstayed dished heads, either concave or convex to the pressure, with or without flanges, may be used, provided the diameter of the heads does not exceed 42 inches and the radius of the dish does not exceed 75 inches. For diameters exceeding 42 inches, dished heads shall have flanges not less than 1 inch in length, and shall meet the requirements for power boilers.

(f) Where stays or tubes are welded to plates which require staying, the attachment shall meet the following requirements:

(1) The stays shall be inserted into holes through the tube sheets and attached thereto by strength fillet welds. The size of the fillet weld attaching the stay to the plate shall be not less than the thickness of the plate being stayed, except for plates thicker than ¾ inch, in which case the size of the fillet weld shall be ¾ inch. The holes in the plate shall be countersunk or beveled by machining or pressing, or the stays may protrude through the plates or a combination of these methods may be used. The area of the weld, in shear, measured parallel to that portion of the stay in or extending through the plate shall be not less than 1¼ times the required cross-sectional area of the stay.

(2) The ends of stays inserted through plates shall not project more than ¾ inch beyond surfaces exposed to the products of combustion.

(3) The welding shall be done in such manner that excessive weld deposits do not project beyond the surface of the plate at the root of the weld.

(g) Welded joints attaching unflanged heads, tube sheets, sides, or combustion chamber plates shall be of the single or double welded butt type where possible. Other acceptable types of attachments are the square tee double fillet welded joint and single or double bevel grooved joints.

(h) Unflanged plates of welded joints shall be beveled not less than 45° to permit complete penetration of the weld metal and shall have a fillet reinforcement whose throat dimension shall not be less than one and one-fourth times the thickness of the shell or head, whichever is the least.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec.

3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

4. Part 53 is amended by adding a new § 53.03-63 reading as follows:

§ 53.03-63 *Installation of safety and relief valves.* (a) Safety and relief valves shall be installed with the spindle vertical, if possible, and may be connected directly to the boiler, or to a fitting connected to the boiler by a close nipple, or to a Y base or valveless steam or water pipe between adjacent boilers, or to a valveless header connecting steam or water outlets in the same boiler. Safety and relief valves shall not be connected to an internal pipe in the boiler.

(b) When a Y base is used the inlet area shall be not less than the combined outlet areas.

(c) When the size of the boiler requires a safety or relief valve larger than 4 inches in diameter, two or more valves having the required combined capacity shall be used. When two or more valves are used on a boiler, they may be single, directly attached, or mounted on a Y base.

(d) No shut-off of any description shall be placed between the safety or relief valve and the boiler, nor on discharge pipes between such valves and the atmosphere.

(e) The escape from safety or relief valves shall be fitted with discharge piping so arranged that there is no danger of scalding operating personnel.

(f) The area of the discharge pipe shall be not less than the area of the valve or aggregate area based on the nominal diameters of the valves with which it connects. The discharge pipe shall be fitted with an open drain to prevent water from lodging in the upper part of the valve or in the pipe. When an elbow is placed on a safety- or relief-valve discharge pipe, it shall be located close to the valve outlet.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4490, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

5. Sections 53.03-70 and 53.03-75 are amended to read as follows:

§ 53.03-70 *Fittings and appliances—*

(a) *Steam gauges.* (1) Each steam boiler shall have a steam gauge connected to its steam space, or to its water column, or to its steam connection by means of a siphon or equivalent device exterior to the boiler and of sufficient capacity to keep the gauge tube filled with water and so arranged that the gauge cannot be shut off from the boiler except by a cock, with T or lever handle, placed in the pipe near the gauge. The handle of the cock shall be parallel to the pipe on which it is located when the cock is open.

(2) Connections to steam gauge siphon shall be of nonferrous metal when smaller than 1 inch pipe and longer than 5 feet between the siphon and point of connection of pipe to boiler, and also when smaller than ½ inch pipe size and

shorter than 5 feet between the siphon and point of connection of pipe to boiler.

(3) The scale on the dial of the gauge shall be graduated to not less than 30 p. s. i. The gauge shall be provided with effective stops for indicating pointer at the zero point. The travel of the pointer from zero to 30 p. s. i. shall be at least 3 inches.

(b) *Water pressure gauges.* (1) Each hot water boiler shall have a pressure gauge connected to it or to its flow connection in such a manner, that it cannot be shut off from the boiler except by a cock, with T or lever handle, placed on the pipe near the gauge. The handle of the cock shall be parallel to the pipe on which it is located when the cock is open.

(2) Pressure gauge connections shall be of nonferrous material when smaller than 1 inch pipe size and longer than 5 feet between gauge and point of connection of pipe to boiler, and also when smaller than ½ inch pipe size and shorter than 5 feet between gauge and point of connection of pipe to boiler.

(c) *Thermometers.* (1) Each hot-water boiler shall have a thermometer so located and connected that the temperature may be read at the same time as the water pressure is being observed.

(2) The thermometer shall be so located that it shall at all times indicate the temperature in degrees Fahrenheit of the water in the boiler or near the outlet.

(d) *Temperature combustion regulator.* A temperature combustion regulator, which will control the rate of combustion to prevent the temperature of the water from rising above 250° F. at or near the outlet, or a thermostatic device which will relieve the pressure on the boiler when the temperature exceeds 250° F. shall be installed on each hot water heating boiler.

(e) *Pressure control regulator.* When a pressure control regulator is used, it shall operate and prevent the steam pressure from rising above 30 p. s. i.

(f) *Bottom blowoff.* Each boiler shall have a blowoff pipe connection fitted with a valve or cock of not less than ¾ inch pipe size connected to the lowest water space available.

(g) *Water gauge glasses.* Each steam boiler shall have one or more water gauge glasses attached to the water column or boiler by means of valved fittings with the lower fitting provided with a valve or pet cock.

(h) *Gauge cocks.* Each steam boiler shall have two or more gauge cocks located within the visible range of the water glass.

(i) *Water column pipes.* The minimum size of pipes connecting a water column to a steam boiler shall be 1 inch. No connections, except for regulator, drain or steam gauge, shall be attached to a water column or the piping connecting a water column to a boiler. If the water column or gauge glass is connected to the boiler by pipe and fittings, a T, or equivalent fitting, in which a drain valve and piping may be attached, shall be installed in the water piping connection at every right angle turn to facilitate cleaning.

(j) *Automatic low-water fuel cut-off.* (1) Each automatically-fired steam

boiler shall be equipped with an automatic low-water fuel cut-off, so located as to automatically cut off the fuel supply when the surface of the water falls below the lowest safe water level. If a water-feeding device is installed in conjunction with the required low-water fuel cut off, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber and so located as to supply the required amount of feed-water when the surface of the water falls to the lowest safe water level. This point shall be not lower than the lowest visible part of the water glass.

(2) The fuel or feed-water control device may be attached direct to the boiler or to the tapped openings provided for attaching a water glass direct to a boiler, provided that such connections from the boiler are non-ferrous T's or Y's not less than ½-inch pipe size between the boiler and the water glass, so that the water glass is attached direct and as close as possible to the boiler. The straightway tapping of the Y or T shall take the water glass fitting, and the side outlet of the Y or T shall take the fuel cut-off of water-feeding device.

(3) Low water cut-off devices employing a float and float bowl shall have a vertical straight-a-way valved drain pipe at the lowest point in the water equalizing pipe connection by which the bowl and equalizing pipe can be flushed and the device tested.

§ 53.03-75 *Hydrostatic tests, inspection, and stamping.* (a) Each boiler shall be subject to a hydrostatic test pressure of not less than 60 pounds per square inch by the manufacturer.

(b) In the event of any defects developing, the defective material may be replaced and the boiler retested.

(c) Individual shop inspection of heating boilers by an inspector is not required. Such inspection shall be made by the manufacturer while the boiler is subjected to the required hydrostatic test pressure to insure that there are no defects in workmanship and materials.

(d) Steel plate heating boilers of the automatically controlled packaged type shall be subjected to such operating tests as may be prescribed by the Commandant.

(e) Upon completion of the hydrostatic test and inspection and after the boiler is found acceptable it shall be stamped in a suitable location so as to be readily visible, with the following data:

(Name of fabricator and serial number)

(Month and year fabricated)

----- p. s. i.
(Maximum w. p.) (Steam or water)
----- B. t. u. per hour, or pounds per hour.
(Safety or relief valve capacity, minimum)

(Coast Guard Approval No.)

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

SUBPART 53.05—CAST-IRON HEATING
BOILERS

6. Section 53.05-30 (c) is amended to read as follows:

§ 53.05-30 *Hydrostatic tests, inspection and stamping.* * * *

(c) The requirements of § 53.03-75 (c) and (d) apply to cast-iron heating boilers.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 469, 1333, 50 U. S. C. App. 1275)

7. Section 53.05-50 is amended to read as follows:

§ 53.05-50 *Fittings and appliances.* The provisions of § 53.03-70 shall apply to fittings and appliances for cast-iron boilers, except that the pressure control regulator shall operate to prevent the pressure from rising above 15 p. s. i.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 469, 1333, 50 U. S. C. App. 1275)

PART 54—UNFIRED PRESSURE VESSELS

Part 54 is amended to read as follows:

SUBPART 54.01—GENERAL REQUIREMENTS

Sec.

- 54.01-1 Scope.
54.01-5 Definitions.
54.01-10 Plan approval.

SUBPART 54.03—DESIGN AND CONSTRUCTION

- 54.03-1 Materials.
54.03-5 Workmanship and design.
54.03-10 Cylindrical shells and heads.
54.03-12 Cast iron heads.
54.03-15 Tube sheets.
54.03-20 Heat exchanger tubes.
54.03-25 Bolted flanged connections.
54.03-30 Evaporators.
54.03-35 Access and inspection openings.
54.03-40 Nozzle openings and reinforcements.

SUBPART 54.07—PRESSURE-RELIEF DEVICES

- 54.07-1 General requirements.
54.07-5 Relief valves.
54.07-10 Evaporator safety valves.
54.07-15 Heat exchanger relief valves.
54.07-20 Rupture disks.

AUTHORITY: §§ 54.01-1 to 54.07-20 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 469, 1333, 50 U. S. C. App. 1275.

§ 54.01-1 *Scope.* (a) The regulations in this part contain detail requirements for the design and construction of unfired pressure vessels subject to inspection by the Coast Guard.

(b) An unfired pressure vessel is subject to shop inspection when such a vessel may contain any of the following:

(1) Steam, gas, or vapors at pressures exceeding 15 pounds per square inch or temperatures exceeding 300° F. The shell, tubes, or coils of a heat exchanger shall be considered a pressure vessel if such parts may be subjected to steam, gas, or vapor pressures exceeding 15 pounds per square inch or temperatures exceeding 300° F.

(2) Fuel oil at pressures exceeding 100 pounds per square inch or temperatures exceeding 150° F.

(3) Lubricating oil at pressures exceeding 100 pounds per square inch or temperatures exceeding 200° F.

(4) Liquids, except fuel oil and lubricating oil, at pressures exceeding 100 pounds per square inch or temperatures exceeding 200° F.

(5) Liquids in compression tanks with air cushions of pressures exceeding 100 pounds per square inch.

(6) Stored or stowed dangerous articles, substances, or combustible liquids which are required by law or regulation to be carried in containers fabricated as a pressure vessel, irrespective of pressures, temperatures, or capacities, except such stored or stowed dangerous articles, substances, or combustible liquids which are permitted by Subchapter N (Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter to be carried in containers constructed in accordance with the requirements of the Interstate Commerce Commission.

(c) Unfired pressure vessels may be exempted from shop inspection when the internal volume does not exceed 5 cubic feet capacity and the design pressure does not exceed 100 pounds per square inch; however, such vessels shall otherwise comply with the requirements for materials, construction, welding and marking as specified in this subchapter.

§ 54.01-5 *Definitions.*—(a) *Unfired pressure vessel.* An unfired pressure vessel is a tank containing gas, vapor, or liquid, or a combination thereof, under pressure, and not exposed to the products of combustion.

(b) *Heat exchanger.* A heat exchanger is a device usually consisting of a shell and tubes or coils by which heat is transferred from one substance to another.

§ 54.01-10 *Plan approval.* Manufacturers intending to fabricate unfired pressure vessels, heat exchangers, evaporators and similar appurtenances covered by the regulations in this part, to be installed on vessels subject to inspection by the Coast Guard, shall submit to the Officer in Charge, Marine Inspection, having jurisdiction over the vessel, detail plans in triplicate, which shall be fully descriptive of the pressure parts of such unfired pressure vessels. When due to location of the fabrication shop, such procedure would result in unnecessary delay in transmission, the plans may be forwarded directly to the Commandant (MMT), U. S. Coast Guard, Washington 25, D. C.

SUBPART 54.03—DESIGN AND CONSTRUCTION

§ 54.03-1 *Materials.* (a) Unfired pressure vessels and appurtenances covered by this part may be fabricated of mate-

rial conforming to the specifications given in Part 51 of this subchapter and limited to the grades of material listed in table 52.05-10 (a) in Part 52 of this subchapter and table 54.03-10 (c) except as otherwise provided for in this part.

(b) Steel plate used for pressure parts of unfired pressure vessels may be of Class B material complying with the requirements of Subpart 51.04 or 51.22, except that unfired pressure vessels designed for pressures exceeding 700 pounds per square inch or temperatures exceeding 650° F. shall be constructed of Class A steel plate meeting the requirements of Subpart 51.04.

(c) (1) Arc- or gas-welded pressure vessels over 1 inch in thickness constructed of steel plate complying with Subpart 51.04 of this subchapter for grades C, D, E, F and G shall conform to the requirements for Class I welded pressure vessels.

(2) Where vessels constructed of these grades of steel plate do not exceed 1 inch in thickness, the requirements for Class II welded pressure vessels shall apply and the vessels shall be stress-relieved as required by § 56.01-70 (h) of this subchapter.

(d) Carbon- and alloy-steel castings shall comply with the grades of material listed in table 52.05-10 (a) in Part 52 of this subchapter. The casting quality factor specified in § 52.05-13 of this subchapter shall be applied to the stresses given in table 52.05-10 (a).

(e) For electric resistance-welded pipe or tubing the stress values in table 52.05-10 (a) in Part 52 of this subchapter shall be substituted in the applicable design formulas for the factor SE.

(f) Unfired pressure vessels may be constructed of cast iron conforming to the applicable specifications of Part 51 of this subchapter under the following conditions:

(1) Cast iron shall not be used in the construction of shells and heads of pressure vessels where subject to steam pressures exceeding 30 pounds per square inch or where subject to gas or liquid pressures exceeding 125 pounds per square inch.

(2) The maximum allowable stress for cast iron as given in table 54.03-1 (f) shall be used in the application formula for unfired pressure vessels.

TABLE 54.03-1 (f)—MAXIMUM ALLOWABLE
STRESS FOR CAST IRON

Minimum tensile strength, p. s. i.:	Maximum tensile stress, p. s. i.
20,000.....	2,000
25,000.....	2,500
30,000.....	3,000
35,000.....	3,500
40,000.....	4,000
50,000.....	5,000

(g) Nonferrous materials may be used in the construction of unfired pressure vessels subject to the following conditions:

(1) The grade of material shall be as specified in Part 51 of this subchapter, and as given in table 54.03-10 (c).

(2) The pressure and temperature limitations for nonferrous materials shall be as given in § 55.07-1 (d) of this subchapter.

§ 54.03-5 Workmanship and design. (a) Equipment covered by this part and constructed of plates with riveted or welded joints shall conform to all the requirements of Part 52 of this subchapter for such construction, except as provided otherwise in this part. (b) Flanges cast integral with shells or heads shall have a fillet radius not less than the thickness of the necks to which they are attached.

(c) The corner radius of a cast unstayed dished head measured on the concave side of the head shall be not less than three times the thickness of the head, but in no case less than 6 percent of the outside diameter of the shell.

§ 54.03-10 Cylindrical shells and heads. (a) The maximum allowable pressure of cylindrical shells and heads of unfired pressure vessels shall be deter-

mined by the applicable formulas given in Part 52 of this subchapter, except as provided otherwise in this part.

(b) The minimum thickness of shell plates, heads or dome plates, after flanging, shall be 1/8 inch, except that for riveted construction, the minimum thickness shall be 3/16 inch.

(c) The maximum allowable stresses for nonferrous materials shall be as given in table 54.03-10 (c).

TABLE 54.03-10 (c)—MAXIMUM ALLOWABLE STRESSES¹ FOR NON-FERROUS MATERIALS USED IN UNFIRED PRESSURE VESSELS

Specification subpart	A. S. T. M. designation	Grade		Minimum tensile strength (p. s. l.)	Minimum yield strength (p. s. l.)	Notes	For metal temperatures not exceeding °F.						
		A. S. T. M.	C. G.				Subzero to 150	250	300	350	400 ²	450	500
Aluminum-alloy plates:													
51.79	B178	990A (2S)	990 A	11,000	3,500	(7)	2,350	2,100	1,850	1,600	1,300		
51.79	B178	M1A (3S)	M1 A	14,000	5,000	(7)	3,150	2,700	2,400	2,100	1,800		
51.79	B178	GR20A (32S)	GR20A	23,000	9,500	(7)	5,700	5,250	4,800	4,200	3,500		
51.79	B178	GS11A (61S)	GS11A	16,000	6,000	(7)	3,800	3,300	3,100	2,700	2,300		
51.79	B178	GS11A (61S) (T4)	GS11A	30,000	16,000	(7)	7,100	6,200	5,850	5,600	4,300		
Copper and copper-alloy plates:													
51.67	B111	Copper	B 11	20,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500		
51.67	B171	Naval brass	B 171-A	50,000	20,000		12,500	11,200	10,500	7,500	2,000		
51.67	B171	Copper-nickel 70-30	B 171-B	50,000	20,000		12,500	12,500	12,200	12,000	11,700	11,300	11,000
51.67	B171	Aluminum bronze	B 171-C	90,000	36,000	(7)	22,500	19,500	18,000	16,500	15,000	13,500	
Seamless pipe or tubes:													
51.73	B13	Copper boiler tubes	B 13	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500		
51.73	B42	Copper pipe	B 42	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500		
51.73	B42	Copper pipe	B 42	30,000	10,000	(7)	9,000	8,300	8,000	5,000	2,500		
51.73	B43	Red brass pipe	B 43	40,000	12,000	(7)	8,000	8,000	8,000	6,000	3,000		
51.73	B75	Copper tubes	B 75	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500		
51.73	B75	Copper tubes	B 75	30,000	30,000	(7)	9,000	8,300	8,000	5,000	2,500		
51.73	B88	Copper tubes	B 88	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500		
51.73	B88	Copper tubes	B 88	30,000	30,000	(7)	9,000	8,300	8,000	5,000	2,500		
51.73	B111	Copper tubes	B 111A or B	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500		
51.73	B111	Copper tubes	B 111 A or B	30,000	30,000	(7)	9,000	8,300	8,000	5,000	2,500		
51.73	B111	Admiralty metal	B 111-C	45,000	15,000	(7)	10,000	10,000	10,000	8,000	5,000		
51.73	B111	Aluminum brass tubes	B 111-D	50,000	20,000	(7)	12,500	12,200	12,000	7,500	3,000	2,000	
51.73	B111	Aluminum bronze tubes	B 111-E	50,000	20,000	(7)	12,500	12,200	12,000	10,000	6,000	4,000	
51.73	B111	Red brass tubes	B 111-F	45,000	12,000	(7)	8,000	8,000	8,000	6,000	3,000		
51.73	B111	Copper nickel tubes 70-30	B 111-G	55,000	20,000	(7)	13,300	12,700	12,300	12,000	11,700	11,300	11,000
51.73	B111	Copper nickel tubes 80-20	B 111-H	50,000	18,000	(7)	12,000	11,300	11,000	10,700	10,300	10,000	9,500
51.73	B111	Copper nickel tubes 90-10	B 111-I	40,000	15,000	(7)	10,000	9,500	9,300	9,000	8,700	8,300	8,000
Brazed pipe:													
Castings:													
51.76	B61	Steam bronze	2 A	34,000		(7)	6,800	6,800	6,500	6,000	5,500	5,000	
51.76	B62	Ounce metal	4 A	30,000		(7)	6,000	5,500	5,000	4,500	3,500		
51.76	B143	Tin bronze, 1A	1 A	40,000		(7)	8,000	8,000	7,000	6,000	5,500	5,000	
51.76	B143	Tin bronze, 1B	1 B	40,000		(7)	8,000	8,000	7,000	6,000	5,500	5,000	

¹ All stresses refer to the annealed condition of the material, unless otherwise specified. For wrought material, the allowable S values are based upon one-fourth of the minimum tensile strength or two-thirds of the minimum yield strength for temperatures of 150° F. and below, whichever is lower, and upon creep stress or stress-rupture at the higher temperatures. For cast material, the allowable S values are based upon one-fifth of the minimum tensile strength for temperatures of 150° F. and below, and upon creep stress or stress-rupture at the higher temperatures. ² The same stress may be employed for a temperature of 400° F. ³ The minimum yield strength employed not included in the specification.

⁴ For temperatures of 100° F. and below, the following stress values may be used: M1A, 3,250; GS11A, 4,000; GS11A (T4), 7,500. ⁵ The minimum tensile strength employed not included in the specification. ⁶ This material approved for tube sheets only. ⁷ These stresses refer to the light drawn condition. ⁸ The same stress may be employed for 320° F. ⁹ To these stresses a casting quality factor of 80 percent shall be used. This is not intended to apply to valves and fittings complying with A. S. A. standards. ¹⁰ This stress is not permitted for temperatures exceeding 360° F.

§ 54.03-12 Cast-iron heads. (a) The maximum allowable pressure and minimum thickness of circular cast iron blank spherically dished heads concave to the pressure shall be calculated by the following formulas:

$$P = \frac{ST}{0.6R} \quad (1)$$

$$T = \frac{0.6PR}{S} \quad (2)$$

where:

- P = maximum allowable pressure, in pounds per square inch.
- T = thickness of dished portion of the head, in inches.
- R = radius to which the head is dished measured on the concave side of the head, in inches (not to exceed the inside diameter of the shell to which the head is attached).
- S = maximum allowable tensile stress, as given in table 54.03-1 (f), in pounds per square inch.

(b) Cast-iron heads of semi-ellipsoidal form in which the inside depth of the

head (one-half of the minor axis of the ellipse) is not less than one-quarter of the inside diameter of the shell to which the head is to be attached, shall have a thickness of at least that required for a cast-iron shell of the same diameter.

(c) Heads flatter than the limits prescribed in this section for dished heads shall be designed as flat plates.

(d) Cast-iron dished heads integral with the cast shell shall have a corner radius equal to at least three times the thickness of the head.

§ 54.03-15 Tube sheets. (a) The maximum allowable pressure and the minimum thickness of fixed tube sheets to which the tubes are attached by expanding shall be calculated by the following formulas:

$$P = \frac{ST^2}{0.25D^2} \quad (1)$$

$$T = D \sqrt{\frac{0.25P}{S}} \quad (2)$$

where:

- P = maximum allowable pressure, in pounds per square inch.
- S = maximum allowable stress, 80 percent of the values as given in tables 52.05-10 (a) and 54.03-10 (c), in pounds per square inch.
- T = minimum thickness of the tube sheet, in inches.
- D = means gasket diameter for flanged attachments, or inside diameter of shell when bolted attachment is not employed, in inches.

(b) The minimum thickness of a fixed tube sheet shall be not less than 3/4 inch.

(c) Where tubes are welded or brazed to fixed tube sheets and no expansion joint is employed in the shell construction, consideration may be given by the Commandant to the use of a tube sheet of lesser thickness than required by formula (2) of this section.

(d) Floating tube sheets shall have a thickness not less than that required for a fixed tube sheet.

(e) U-tube tube sheets shall have a thickness of at least one and one-fourth times the thickness required for a fixed tube sheet.

(f) The pitch of tubes attached to tube sheets by expanding shall be not less than that given in table 54.03-15 (f).

TABLE 54.03-15 (f)—MINIMUM PITCH OF TUBES

Outside diameter of tube (in inches):	Pitch of tube (in inches)
½ and below	¾
¾	1 1/16
1	1 1/8
1 1/4	1 3/8
1 1/2	1 7/8

(g) Some types of arc or gas welded tube sheet attachments which are acceptable are illustrated in figure 54.03-15 (g).

§ 54.03-20 Heat exchanger tubes.

(a) The maximum allowable pressure and the minimum thickness of tubes for heat exchangers subject to internal pressure shall be calculated by the following formulas:

$$P = \frac{2.3 ST}{D} - 0.036 S \quad (1)$$

$$T = \frac{D}{2.3 S} (P + 0.036 S) \quad (2)$$

where:

P = maximum allowable pressure, in pounds per square inch.

S = maximum allowable stress, 80 percent of the values as given in table 52.05-10 (a), or 100 percent of the values as given in table 54.03-10 (c), in pounds per square inch.

T = minimum thickness of the tube wall, in inches.

D = external diameter of the tube, in inches.

(b) Additional wall thickness above the minimum required by formula (2) of this section shall be provided as follows:

(1) When tubes act as stays, additional wall thickness shall be provided to carry the external load imposed upon the tubes.

(2) When tubes are expanded into the tube seats, at least one additional B. W. G. thickness shall be provided over a length at least equal to the width of the seat plus 1 inch.

(3) Bent tubes shall have the thickness increased when the radius is less than 5 times the outside diameter of the tube, to compensate for the reduction in wall thickness due to fabrication.

§ 54.03-25 Bolted flanged connections—(a) Scope. (1) Bolted flanged

connections conforming to the American Standard for Steel Pipe Flanges and Flanged Fittings as given in tables 55.07-15 (e1) to 55.07-15 (e11), inclusive, in Part 55 of this subchapter shall be used for connections to external piping and may be used for other flanged connections.

(2) Bolted flanged connections to pressure vessels and special flange designs other than those meeting the requirements of subparagraph (1) of this paragraph shall be designed in accordance with the requirements of this section.

(3) The regulations in this section may be applied to flanges having the gasket entirely within the inner edge of the bolt holes.

(4) This section shall not be construed to prohibit the use of other types of bolted flanged connections, such as flanges using full-face gaskets, or other means to provide effective restraint against flange deflection. Such designs may be used provided the design is acceptable to the Commandant.

(b) Material. (1) For temperatures not exceeding 450° F., commercial carbon-steel bolting material may be used for attaching heads, doors, covers, or flanges. Carbon-steel bolting and nut material shall comply with Subpart 51.49 of this subchapter. Bolting and nuts shall meet the minimum requirements of American Standard Heavy Dimensions as given in table 54.03-25 (b).

(2) For temperatures exceeding 450° F., high strength of alloy steel bolting and nut material complying with the requirements of Subpart 51.49 of this subchapter shall be employed. Nuts of the below classes shall not be used for temperatures exceeding the following: class 1, 750° F.; classes 2 and 2H, 800° F.; class 4, 900° F.; and class 3, 1,050° F. Bolting and nuts shall meet the minimum requirements of the American Standard Heavy Dimensions and the American Standard Threads for High Strength Bolting as given in table 54.03-25 (b). Washers are not required but when used shall be of forged rolled steel.

(3) Studs continuously threaded or bolts with the unthreaded portion reduced to the same diameter as that of the root of the thread, shall be employed when the temperature exceeds 450° F.

(4) Bolting shall have a length of thread engagement of not less than the normal thickness dimension of American Standard heavy nuts.

(5) In no case shall the size of a bolt be less than ½ inch in diameter.

(c) Bolt loads—(1) Operating bolt load. The minimum required operating bolt load W_{m1} shall be determined by formula (1) under maximum operating conditions.

$$W_{m1} = H + H_p = 0.785 G^2 P + (2b \times 3.14 G m P) \quad (1)$$

NOTE 1: Under maximum operating conditions the minimum required operating bolt load W_{m1} is the load required to resist the hydrostatic end force H exerted by the maximum internal pressure upon the area bounded by the mean diameter of the gasket, and, in addition, maintain a compression load H_p on the gasket or joint-contact surface which experience has shown to be sufficient to insure a tight joint.

(2) Initial bolt load. The minimum required initial bolt load W_{m2} shall be determined by formula (2) under atmospheric temperature conditions without consideration of internal pressure.

$$W_{m2} = H_y = 3.14 b G y \quad (2)$$

NOTE 2: Under atmospheric temperature conditions without consideration of internal pressure, the minimum required initial bolt load W_{m2} is the load H_y required to seat the gasket or joint-contact surfaces sufficiently to insure a tight joint.

(3) Bolt areas. (1) The total required bolt area A_m shall be determined from the greater of the values obtained from formula (3) under operating conditions, or from formula (4) under atmospheric temperature conditions without consideration of internal pressure.

$$A_{m1} = \frac{W_{m1}}{S_b} \quad (3)$$

$$A_{m2} = \frac{W_{m2}}{S_a} \quad (4)$$

(2) The actual total cross-sectional area of the bolts A_b shall be not less than A_m .

(4) Flange design bolt load. The bolt load W used in the design of the flange shall be not less than the greater of the values obtained from formula (1) under maximum operating conditions, or from formula (5) under atmospheric temperature conditions without consideration of internal pressure.

$$W = \frac{(A_m + A_b)}{2} S_a \quad (5)$$

(5) Nomenclature of bolt and flange design symbols. The symbols used in this paragraph mean:

W_{m1} = minimum required bolt load for maximum operating conditions, in pounds.

W_{m2} = minimum required initial bolt load for atmospheric temperature conditions without consideration of internal pressure, in pounds.

W = flange design bolt load, in pounds.

H = total hydrostatic end force, in pounds.

H_p = total joint-contact-surface compression load, in pounds.

H_y = total joint-contact-surface-seating load, in pounds.

G = mean diameter of gasket or joint-contact-surface, in inches (except for lap joints with full face gasket, in which case it is midpoint of contact between flange and lap).

P = maximum allowable pressure, in pounds per square inch.

b = effective gasket or joint-contact-surface seating width, in inches (see table 54.03-25 (c)).

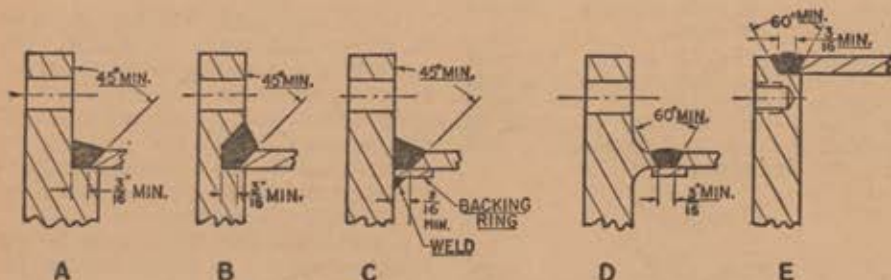


FIGURE 54.03-15 (g)—Acceptable types of tube sheet attachments.

TABLE 54.03-25 (b)—BOLTING AND NUTS

[All dimensions given are in inches]

2b = effective gasket or joint-contact-surface pressure width, in inches (see table 54.03-25 (c)).
 N = possible contact width of gasket in inches (see table 54.03-25 (c)).
 w = width of local concentration on gasket, in inches (see table 54.03-25 (c)).
 m = limit contact compression factor (see table 54.03-25 (c)).
 y = gasket or joint-contact-surface unit seating load, in pounds per square inch (see table 54.03-25 (c)).
 S_p = maximum allowable bolt stress at operating temperature, in pounds per square inch, as given in table 52.05-10 (a).
 S_a = maximum allowable bolt stress at atmospheric temperature, in pounds per square inch, as given in table 52.05-10 (a).
 A_m = total required cross-sectional area of bolts at root of thread or section of least diameter under stress, in square inches.
 A_b = total actual cross-sectional area of bolts at root of thread or section of least diameter under stress, in square inches.

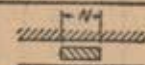
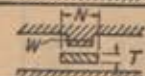







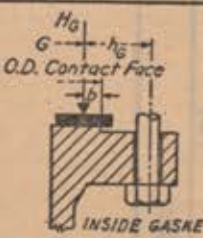
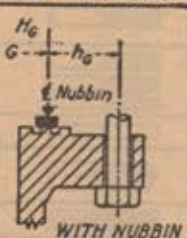
Diameter	Commercial steel bolts		High strength steel bolts		American Standard heavy nuts semifinished hexagonal		
	Number of threads ¹	Root area	Number of threads ¹	Root area	Width across flats (min.)	Width across corners (min.)	Nut thickness (min.)
1/4	13	0.126	13	0.126	0.850	0.900	0.464
5/16	12	.162	12	.162	.909	1.037	.526
3/8	11	.202	11	.202	1.031	1.175	.587
7/16	10	.302	10	.302	1.212	1.382	.710
1/2	9	.419	9	.419	1.394	1.589	.833
5/8	8	.551	8	.551	1.575	1.796	.956
3/4	7	.693	8	.728	1.756	2.002	1.097
7/8	7	.890	8	.929	1.938	2.209	1.187
1	6	1.054	8	1.155	2.119	2.416	1.310
1 1/8	6	1.294	8	1.405	2.300	2.622	1.433
1 1/4	5 1/2	1.515	8	1.680	2.481	2.828	1.556
1 3/8	5	1.744	8	1.980	2.662	3.035	1.679
1 1/2	5	2.049	8	2.304	2.844	3.242	1.802
1 3/4	4 1/2	2.300	8	2.652	3.025	3.449	1.925
2	4 1/2	3.021	8	3.423	3.288	3.862	2.155
2 1/8	4	3.716	8	4.202	3.750	4.275	2.401
2 1/4	4	4.619	8	5.259	4.112	4.688	2.647
2 3/8	4	5.621	8	6.324	4.475	5.102	2.893

¹ All bolting shall have threads at least as strong as American Standard screw threads.

TABLE 54.03-25 (c1)—GASKET MATERIALS AND CONTACT FACINGS

GASKET FACTORS (w) FOR OPERATING CONDITIONS AND MINIMUM DESIGN STRESS (y)						
GASKET MATERIAL	GASKET FACTOR	MIN. DESIGN SEATING STRESS	SKETCHES	FACING LIMITATIONS	USE COL.	
Rubber without fabric or a high percentage of asbestos fiber: Below 75 Shore Durometer 75 or higher Shore Durometer	0.50 1.00	0 200		Use I, 4, 6 only	II	
Asbestos with a suitable binder for the operating conditions	1/8 thick 1/16 thick 1/32 thick	2.00 2.75 3.50				
Cloth inserted soft rubber Cloth inserted hard rubber	0.75 1.25	50 400		None		
Rubber with asbestos fabric insertion, with or without wire reinforcement	3-ply 2-ply 1-ply	2.25 2.50 3.70				
Vegetable fiber	1.75	1100		I, 4, 6		
Spiral-wound metal, asbestos filled	Carbon Stainless	2.50 3.00	2900 4500			
Serrated steel	Asbestos filled	2.75	3700			
Corrugated metal, Asbestos inserted or Corrugated metal, Jacketed asbestos filled	Soft aluminum Soft copper or brass Iron or soft steel Monel or 4-6% chrome Stainless steels	2.50 2.75 3.00 3.25 3.50	2900 3700 4500 6500 6500			Use Ia only
Corrugated metal	Soft aluminum Soft copper or brass Iron or soft steel Monel or 4-6% chrome Stainless steels	2.75 3.00 3.25 3.50 3.75	3700 4500 5500 6500 7600			only
Flat metal jacketed asbestos filled	Soft aluminum Soft copper or brass Iron or soft steel Monel 4-6% chrome Stainless steels	3.25 3.50 3.75 3.50 3.75 3.75	5500 6500 7400 8000 9000 9000			
Grooved iron or soft steel with or without metal jacketed	Soft aluminum Soft copper or brass Iron or soft steel Monel or 4-6% chrome Stainless steels	3.25 3.50 3.75 4.00 4.25	5500 6500 7600 8800 10100		Use I, 2, 3 only	
Solid flat metal	Soft aluminum Soft copper or brass Iron or soft steel Monel or 4-6% chrome Stainless steels	4.00 4.75 5.50 6.00 6.50	8500 13000 18000 21800 26000		None	I
Ring joint	Iron or soft steel Monel or 4-6% chrome Stainless steel	5.50 6.00 6.50	18000 21800 26000		Use 8 only	

TABLE 54.03-25 (c1)—GASKET MATERIALS AND CONTACT FACINGS—Continued

EFFECTIVE GASKET WIDTH		
FACING SKETCH Exaggerated	BASIC GASKET SEATING WIDTH b_0	
	COLUMN I	COLUMN II
1a 	$\frac{N}{2}$	$\frac{N}{2}$
1b 	$\frac{W+T}{2} \left(\frac{N+N}{4} \max \right)$	$\frac{W+T}{2} \left(\frac{W+N}{4} \max \right)$
2 	$\frac{W+N}{4}$	$\frac{W+3N}{8}$
3 	$\frac{W}{2} \left(\frac{N}{4} \min \right)$	$\frac{W+N}{4} \left(\frac{3N}{8} \min \right)$
4 	$\frac{3N}{8}$	$\frac{7N}{16}$
5 	$\frac{N}{4}$	$\frac{3N}{8}$
6 	$\frac{W}{8}$	
7 	$\frac{W}{8}$	
8 	$\frac{W}{8}$	
EFFECTIVE GASKET SEATING WIDTH b^*		
$b = b_0, \text{ when } b_0 \leq \frac{1}{4}$ $b = \frac{10a}{2}, \text{ when } b_0 > \frac{1}{4}$		
LOCATION OF GASKET LOAD REACTION		
		NOTE: The gasket factors listed only apply to flanged joints in which the gasket is contained entirely within the inner edges of the bolt holes.

§ 54.03-30 *Evaporators.* (a) An evaporator in which steam is generated shall be fitted with an efficient water level indicator, a pressure gauge, and a blow-down valve.

(b) An approved safety valve shall be fitted on evaporators as required by § 54.07-10.

§ 54.03-35 *Access and inspection openings.* (a) All unfired pressure vessels for use with compressed air or where subject to internal corrosion shall be provided with suitable manhole, handhole, or other inspection openings for examination and cleaning.

(b) Unless otherwise specified in this subchapter, the access and inspection openings in the shell or head of an unfired pressure vessel shall comply with the requirements of Subpart 52.24 of this subchapter for power boilers.

(c) When a threaded inspection opening is to be used for inspection or cleaning purposes, it shall be not less than $1\frac{1}{2}$ inches pipe size.

(d) All unfired pressure vessels which require access or inspection openings shall be equipped as follows:

(1) Vessels less than 18 inches in diameter shall have at least two handholes or two plugged threaded inspection openings of not less than 2-inch pipe size.

(2) Vessels 18 to 36 inches, inclusive, in diameter, shall have a manhole, or at least two handholes, or two plugged threaded inspection openings of not less than 2 inches pipe size.

(3) Vessels over 36 inches in diameter shall have a manhole, except those whose shape or use make it impracticable, in which case they shall have at least two 4 x 6 inch handholes or two handholes of equivalent area.

(4) When handholes or plugged openings are used for inspection openings in place of a manhole, where permitted, one handhole or one plugged opening shall be placed in each head or in the shell near each head.

(5) Removable heads or cover plates may be used in place of the required openings provided they are equal at least to the required size of the required inspection openings.

§ 54.03-40 *Nozzle openings and reinforcements.* (a) Unless otherwise specified in this subchapter, nozzle openings and reinforcement in the shell or heads of unfired pressure vessels shall comply with the requirements of Subpart 52.25 of this subchapter for power boilers.

(b) The thickness of a nozzle or fitting welded to the shell, reinforcing ring, or flange shall be not less than that for schedule 40 pipe of the same diameter, and in no instance shall the nozzle wall thickness be less than that determined by § 55.07-5 of this subchapter.

(c) Screwed and flanged piping connections to the outlets on a pressure vessel shall comply with the requirements of Part 55 of this subchapter. When subject to Class I piping, screwed nozzle connections shall be limited to a maximum diameter of 2 inches.

(d) Some types of acceptable arc- or gas-welded nozzle connections are illustrated in figure 52.25-20 (d) in Part 52 of this subchapter.

SUBPART 54.07—PRESSURE-RELIEF DEVICES

§ 54.07-1 *General requirements.* (a) Unfired pressure vessels, such as tanks, containing liquids, gases, or vapors, and in which steam is not generated, shall be protected by a relief valve set to relieve at a pressure not exceeding that for which the vessel is designed and of sufficient relieving capacity to prevent a pressure increase exceeding 10 percent above the maximum allowable pressure, except as provided for in paragraph (b) of this section.

(b) Where an additional hazard can be created by exposure of an unfired pressure vessel containing compressed gas to fire or other unexpected sources of external heat (for example, vessels used for the transportation of liquefied compressed gases) relief valves shall be capable of preventing the pressure from rising more than 20 percent above the maximum allowable pressure of the vessel. The minimum required relief valve capacities for liquefied compressed gases are in Part 38 of Subchapter D (Tank Vessels) and in Part 146 of Subchapter N (Explosives or other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter.

(c) Pressure-relief devices shall be constructed so that they can not be readily rendered inoperative, and shall be so located, and installed as to be readily accessible for inspection and repair.

(d) For certain pressure vessels containing substances that may render a relief valve inoperative, or where the installation of a relief valve is considered impracticable, the Commandant may authorize the use of a rupture disk in lieu of a relief valve, provided such pressure vessels contain liquids or vapors that are not lethal or noxious and the temperature of the contents does not exceed 212° F. When the use of rupture disks is approved by the Commandant, the in-

stallation shall comply with the requirements of § 54.07-20.

(e) The opening through all pipes and fittings between a pressure vessel and its pressure-relieving device shall have at least the area of the pressure-relieving device inlet, and in all cases shall have sufficient area so as not to unduly restrict the flow to the pressure-relieving device. The opening in the vessel shall be designed to provide direct and unobstructed flow between the vessel and its pressure-relieving device.

§ 54.07-5 *Relief valves.* (a) All relief valves for use on unfired pressure vessels or on piping systems where approved safety valves are not required shall in general comply with the requirement of safety valve construction in Part 52 of this subchapter and shall be designed to suitably meet the protection and service requirements for which they are intended, except that relief valves are not required to have huddling chambers for service other than steam.

(b) In no case shall the diameter of a relief valve be less than $\frac{1}{2}$ inch.

(c) Cast iron may be employed in the construction of relief valves for pressures not exceeding 125 pounds per square inch and temperatures not exceeding 450° F. Seats or disks of cast iron are prohibited.

(d) Relief valves for steam or air service shall be provided with a substantial lifting device so that the disk can be lifted from its seat when the pressure in the vessel is 75 percent or less of that at which the valve is set to blow.

(e) If the design of a relief valve is such that liquid can collect on the discharge side of the disk, the valve shall be equipped with a drain at the lowest point where liquid can collect.

(f) The spring in a relief valve in service for pressures up to and including 250 pounds per square inch shall not be re-set for any pressure more than 10 percent above or 10 percent below that for which the relief valve is marked. For higher pressures, the spring shall not be re-set for any pressure more than 5 percent above or 5 percent below that for which the relief valve is marked.

(g) The capacities of relief valves shall be rated at pressures of 3 percent for steam, 10 percent for gases or vapors, and at 10 or 25 percent for liquids above the pressure at which the valve is set to operate.

§ 54.07-10 *Evaporator safety valves.* (a) An approved safety valve set to relieve at a pressure not exceeding that for which the shell is designed shall be fitted to all evaporators except the following:

(1) Evaporators of the coil or tube type designed to operate with a steam inlet pressure not exceeding 15 pounds per square inch gauge.

(2) Evaporators of the atmospheric type designed for vapor discharge direct to a distiller with no shut-off valve in the discharge line. The distiller connected to atmospheric evaporators shall be fitted with a vent to obviate a build-up in pressure. In no case shall the vent be less than $1\frac{1}{2}$ inches in diameter.

(b) Safety valves for use on unfired pressure vessels in which pressure is generated shall comply with the requirements specified in Part 52 of this sub-

chapter for power boilers when subject to pressures exceeding 30 p. s. i., and Part 53 of this subchapter for low pressure heating boilers when subject to pressures of 30 p. s. i. or less.

(c) The relieving capacity of safety valves required by paragraph (a) of this section shall be at least equal to the capacity of the orifice fitted in the steam supply to the evaporator. The orifice capacity shall be determined in accordance with formula (1) or (2) as follows:

(1) Where the set pressure of the evaporator shell safety valve is 58 percent or less than the setting of the safety valve in the steam supply:

$$W = 51.45AP \quad (1)$$

(2) Where the set pressure of the evaporator shell safety valve exceeds 58 percent of the setting of the safety valve on the steam supply:

$$W = 105.3A\sqrt{P_1(P-P_1)} \quad (2)$$

where:

W = the required orifice capacity, in pounds per hour.

A = cross-sectional area of rounded entrance orifice, in square inches.¹

P = set pressure of steam supply safety valve, in pounds per square inch, absolute.

P₁ = set pressure of evaporator shell safety valve, in pounds per square inch, absolute.

(d) On new installations and where the orifice size of an existing evaporator is increased, an accumulation test shall be made by closing all steam outlet connections except the safety valves for a period of five minutes. When conducting the accumulation test, the water shall be at the normal operating level and the steam pressure shall be at the normal operating pressure, and while under this test the pressure shall not rise more than 6 percent above the safety valve setting.

§ 54.07-15 *Heat exchanger relief valves.* (a) A heat exchanger with liquid in the shell and the heating medium in the tubes or coils, shall be fitted with a liquid relief valve meeting the requirement of § 54.07-1.

(b) (1) A heat exchanger with steam in the shell and liquid in the tubes or coils at a pressure exceeding that in the shell, shall have a liquid relief valve fitted to protect the shell against excess pressure.

(2) The discharge capacity of such relief valves shall be calculated on the basis of the discharge from one tube using the difference in pressures between that in the shell and that in the tubes, and shall be not less than that determined by the following formula:

$$Q = 29.81 KD^2\sqrt{P_1 - P_2} \quad (1)$$

where:

Q = required relief valve discharge capacity, in gallons per minute, based on relief valve set pressure.

P₁ = pressure in the tube or coils, in pounds per square inch.

P₂ = set pressure of the shell relief valve, in pounds per square inch.

D = internal diameter of the largest tube or coil, in inches.

K = coefficient of discharge = 0.62.

¹The orifice shall be installed near the steam inlet of the coils or tubes and where no orifice is employed the area used in the formula shall be that of the inlet connection or manifold.

§ 54.07-20 *Rupture disks.* (a) Every rupture disk shall have a specified bursting pressure at a specified temperature, shall be marked with a lot number and shall be guaranteed by its manufacturer to burst at within 5 percent (plus or minus) of its specified bursting pressure.

(b) The specified bursting pressure at the coincident operating temperature shall be determined by bursting two or more specimens from a lot of the same material and of the same size as those to be used. The test shall be made in a holder of the same form and pressure area dimensions as that with which the disk is to be used.

(c) Where it is desired to minimize the loss by leakage through the safety or relief valve of liquids or vapors, the rupture disk may be installed between a safety or relief valve and the vessel, provided the following requirements are met:

(1) The bursting pressure of the disk does not exceed the maximum allowable pressure of the vessel.

(2) The connection between the rupture disk and the relief valve is provided with a pressure gauge, test cock, or free vent to atmosphere, to indicate when the rupture disk has leaked or burst.

(3) The opening provided through the rupture disk, after breakage, is sufficient to permit a flow equal to the capacity of the attached valve and there is no chance of interference with the proper functioning of the relief valve; but in no case shall this area be less than the inlet area of the relief valve.

PART 55—PIPING SYSTEMS, PUMPS, REFRIGERATION MACHINERY, AND FUEL TANKS

SUBPART 55.07—DETAIL REQUIREMENTS

1. Sections 55.07-1 to 55.07-25, inclusive, are amended to read as follows:

§ 55.07-1 *Material.* (a) Materials used in the manufacture of pipe, valves, flanges, fittings or bolting shall conform with the requirements of this part, and shall comply with the respective specifications of Part 51 of this subchapter unless alternate equivalent material is approved by the Commandant.

(b) Pipe and flange material are acceptable for the pressures and temperatures listed in table 55.07-1 (b).

(c) Forged steel or cast steel, conforming to the requirements of Subparts 51.46 and 51.58 of this subchapter, may be used for the construction of valves and fittings for any system without pressure limitation, subject to the maximum design temperatures as specified in table 52.05-10 (a) in Part 52 of this subchapter. Grades F181-I and II, Subpart 51.46, may be used in the construction of valves and fittings for pressures and temperatures not exceeding those allowed for 300-pound service pressure rating for steel pipe flanges and flanged fittings.

(d) Bronze castings conforming to the requirements of Subpart 51.76, of this subchapter, for Grade 4A (ounce metal) may be used in the construction of valves and fittings for pressures not exceeding 150 pounds per square inch and temperatures not exceeding 366° F. Grade 2A (steam bronze) and Grades 1A and 1B (tin bronze) may be used for steam pressures not exceeding 300 pounds per square inch and temperatures not ex-

TABLE 55.07-1 (b)—PIPING MATERIALS¹

Material specification subpart	A. S. T. M. specification	Grade	Maximum design		Limitation
			Pressure (p. s. i.)	Metal temperature ° F.	
Steel pipe					
Seamless-carbon:					
51.34	A53	P23-A, B	None	750	
51.34	A106	P106-A, B	None	800	
Seamless-alloy:					
51.34	A335 (A206)	P1	None	875	
51.34	A335 (A286)	P2	None	900	
51.34	A335 (A158)	P3a, P3b	None	1,050	
51.34	A335 (A158)	P11	None	1,050	
51.34	A335 (A315)	P12	None	1,050	
51.34	A335	P21	None	1,050	
51.34	A335	P22	None	1,050	
51.34	A312	TP312, TP347	None	1,050	
Electric-resistance welded:					
51.34	A53	P23-EW-A, B	350	650	
51.34	A135	P135-A, B	250	650	
Lap-welded: 51.34	A53	P23-LW	350	450	
Butt-welded: 51.34	A53	P23-BW	150	450	
Wrought iron pipe					
Lap-welded: 51.34	A72	P72-LW	350	450	
Butt-welded: 51.34	A72	P72-BW	150	450	
Copper and copper-alloy pipe and tubing					
Seamless-copper:					
51.73	B13	B13-A, B	None	406	(2, 3)
51.73	B42	B42	None	406	(2, 3)
51.73	B75	B75-A, B, C	None	406	(2, 3)
51.73	B88	B88-K, L, M	None	406	(2, 3)
51.73	B111	B111-A, B	None	406	(2, 3)
Copper-alloy:					
51.73	B43	B43 (Red brass)	None	406	
51.73	B111	B111-C (Adm. metal)	None	406	
51.73	B111	B111-D (Al-brass)	None	450	
51.73	B111	B111-E (Al-bronze)	None	450	
51.73	B111	B111-F (Red brass)	None	406	
51.73	B111	B111-G (70-30 Cu-Ni)	None	500	
51.73	B111	B111-H (80-20 Cu-Ni)	None	500	
51.73	B111	B111-I (90-10 Cu-Ni)	None	500	
Brazed copper			75	320	(5)
Plates					
Carbon-steel:					
51.04	A201	A, B	150	650	(6, 7)
51.04	A212	C, D	150	650	(6, 7)
51.22	A285	C	150	650	(6, 7)

¹ The carbon content of the material listed in table 55.07-1 (b) shall not exceed 0.25 percent if welded fabrication is to be employed.

² Copper pipe shall not be used for hot oil service other than short flexible connections at the burners.

³ Copper pipe shall be annealed prior to installation for Class I piping systems.

⁴ Copper pipe fabricated with brazed longitudinal joints shall be limited to water or saturated steam service for the maximum pressure and temperature as indicated.

⁵ These limitations apply only when plates are used as flange material. See table 52.05-10 (a) for maximum design temperatures of plate material used in the construction of pressure vessels.

⁶ Not permitted for lugged flanges. Ring type flanges may be machined from plate.

⁷ For temperatures exceeding 300° F., the pressure shall not exceed that permitted by table 55.07-15 (e12).

ceeding 450° F., and for hydraulic or compressed air service at higher pressures where the temperature does not exceed 150° F.

(e) (1) Malleable iron castings conforming to the requirements of Subpart 51.61 of this subchapter for Grade A1 or A2 material, may be used in the construction of valves and fittings for pressures not exceeding 300 pounds per square inch and temperatures not exceeding 450° F. Grade B malleable iron may be used for pressures not exceeding 150 pounds per square inch and temperatures not exceeding 450° F. Cast iron conforming to the requirements of Subpart 51.61 may be used in the construction of valves and fittings for pressures not exceeding 125 pounds per square inch and temperatures not exceeding 450° F.

(2) Malleable iron and cast-iron valves and fittings designed and marked for class 300 refrigeration service may be used for such service, provided the pressure limitation of 300 pounds per square

inch is not exceeded. Malleable iron flanges of this class may also be used in sizes 4 inches and smaller (oval and square design).

(f) Ferrous pipe used for salt-water service should be protected against corrosion by hot-dipped galvanizing or other suitable means.

(g) Carbon-steel bolting material conforming to the requirements of Subpart 51.49 of this subchapter may be used for temperatures not exceeding 450° F. For temperatures exceeding 450° F. alloy-steel bolting material as specified in Subpart 51.49 shall be employed.

(h) If it is desired to use materials other than those specified in this section, a request furnishing chemical and physical properties of the material which it is desired to employ shall be submitted to the Commandant for special consideration.

§ 55.07-5 *Design pressures and thickness of pipes.* (a) (1) The maximum allowable pressure and minimum thickness

of pipes shall be calculated by the following formulas:

$$P = \frac{2S(T-A)}{D-M(T-A)} \quad (1)$$

$$T = \frac{PD}{2S+MP} + A \quad (2)$$

Where:

P = maximum allowable pressure, p. s. i.¹
 T = minimum wall thickness of pipe, inches.²

D = external diameter of pipe, inches.

S = allowable fiber stress, p. s. i. (for pipe stresses see table 55.07-5 (a)).
 When steel tubing material is employed, the allowable fiber stresses shall be 80 percent of the stresses as given in table 52.05-10 (a).

M = multiplier as given in table 55.07-5 (a).

A = allowance for threading or grooving.
 = 0.05 inch for threaded pipe $\frac{1}{2}$ inch and below.

= depth of thread h for threaded pipe $\frac{1}{2}$ inch and above.

= depth of groove for grooved pipe.

Note: The depth of thread h may be determined by the formula $h=0.8/n$; where, n = the number of threads per inch, or from the following values: $h=0.100$ inch, 0.0696 inch, and 0.0571 inch, for 8, 11½, and 14 threads per inch, respectively.

(2) The value of P in the formula shall not be taken at less than 150 p. s. i. for class I piping nor less than 50 p. s. i. for nonferrous class II piping; however, copper piping shall be of not less than 0.065 inch in thickness except for lines below 1 inch in diameter, nor shall ferrous material to be fabricated by welding be of a thickness less than 0.120 inch.

(b) (1) The design pressures of the steam piping connected to the boiler drum or to the superheater inlet header shall be not less than the highest pressure at which any drum safety valve is set to blow.

(2) The design pressure of the superheater outlet flange and the superheated steam piping beyond the superheater outlet shall be not less than the pressure at which the superheater safety valve is set to blow. Where the superheater safety valve is of the drum pilot actuated type, the design pressure shall be at least equal to 95 percent of the drum pilot safety valve setting. The S value for the material shall not exceed that permitted for the total steam temperature at the superheater outlet.

(c) Carbon steel or wrought iron pipe shall have a wall thickness of not less than standard weight pipe. Where the installation of light wall pipe is deemed

³ When computing the allowable pressure for a pipe, the pipe wall thickness used in formula (1) shall not be more than the minimum thickness resulting from the application of mill tolerances prescribed in the applicable pipe specifications for the material to be employed, including tubing material when used for piping. For bent sections of pipe, the reduction in wall thickness due to fabrication, in addition to the mill tolerance, shall be subtracted from the nominal pipe wall thickness to obtain the minimum pipe wall thickness.

⁴ The wall thickness to which the pipe or tubing is ordered shall not be less than the sum of the minimum wall thickness determined by formula (2), plus the mill tolerance, and the reduction in wall thickness due to bending.

TABLE 55.07-5 (a)—MAXIMUM ALLOWABLE STRESSES FOR PIPING

FERROUS MATERIALS

Specification subpart	A. S. T. M. designation	Grade		Minimum tensile strength (p. s. l.)	Notes	For metal temperatures not exceeding °F.†									
		A. S. T. M.	C. G.			650	700	750	800	850	900	950	1000	1050	
						Multiplier "M"‡									
						0.8	0.8	0.8	0.8	1.1	1.7	2.0	2.0	2.0	
Seamless carbon-steel:															
51.34	A53	A	P53-A	48,000	(7)	9,600	9,300	8,550							
51.34	A53	B	P53-B	60,000	(7)	12,000	11,500	10,400							
51.34	A106	A	P106-A	48,000	(7)	9,600	9,300	8,550	7,200						
51.34	A106	B	P106-B	60,000	(7)	12,000	11,500	10,400	8,650						
Seamless alloy-steel:															
51.34	A335 (A206)	P1	P1	55,000	(7)	11,000	11,000	11,000	10,750	10,500	10,000				
51.34	A335 (A280)	P2	P2	55,000	(7)	11,000	11,000	11,000	10,750	10,500	10,000				
51.34	A335 (A188)	P3a	P3a	60,000	(7)	12,000	12,000	12,000	12,000	11,500	10,500	8,800	6,250	4,400	
51.34	A335 (A158)	P3b	P3b	60,000	(7)	12,000	12,000	12,000	11,750	11,200	10,000	8,000	4,950	3,350	
51.34	A335 (A155)	P11	P11	60,000	(7)	12,000	12,000	12,000	12,000	11,500	10,500	8,800	6,250	4,400	
51.34	A335 (A315)	P12	P12	60,000	(7)	12,000	12,000	12,000	11,800	11,350	10,500	8,800	6,000	4,000	
51.34	A335	P21	P21	60,000	(7)	12,000	11,850	11,600	11,100	10,550	9,600	7,200	5,600	4,400	
51.34	A335	P22	P22	60,000	(7)	12,000	12,000	12,000	12,000	11,500	10,500	8,800	6,250	4,650	
51.34	A312	P8b	P8b	75,000	(7)	11,900	11,850	11,750	11,650	11,450	11,300	11,100	10,800	10,500	
51.34	A312	P8d	P8d	75,000	(7)	11,900	11,850	11,750	11,650	11,450	11,300	11,100	10,800	10,500	
Electric-resistance-welded Carbon-steel:															
51.34	A53	A	P53-RW-A	48,000	(7)	8,150									
51.34	A53	B	P53-RW-B	60,000	(7)	10,200									
51.34	A135	A	P135-A	48,000	(7)	8,150									
51.34	A135	B	P135-B	60,000	(7)	10,200									
Lap-welded:															
51.34	A53	Steel	P53-LW	45,000	(4)	7,200									
51.34	A72	W. L.	P72-LW	40,000	(4)	6,400									
Butt-welded:															
51.34	A53	Steel	P53-BW	45,000	(4)	5,400									
51.34	A72	W. L.	P72-BW	40,000	(4)	4,800									

NONFERROUS MATERIALS

Specification subpart	A. S. T. M. designation	Grade		Minimum tensile strength p. s. l.	Minimum yield strength	Notes	For metal temperatures not exceeding °F.†								
		A. S. T. M.	C. G.				150	250	300	350	400‡	450	500		
							Multiplier "M"‡								
							0.8	0.8	0.8	0.8	0.8	0.8	0.8		
Seamless copper:															
51.73	B13		B13-A, B	20,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500				
51.73	B42		B42	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500				
51.73	B75		B75	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500				
51.73	B88		B88	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500				
51.73	B111		B111	30,000	10,000	(7)	6,700	6,300	5,000	3,800	2,500				
Brazed copper:															
Seamless copper-alloy:															
51.70	B43	Red brass	B43	40,000	12,000	(7)	8,000	8,000	8,000	6,000	3,000				
51.73	B111	Admiralty metal	B111-C	45,000	15,000	(7)	10,000	10,000	10,000	8,000	5,000				
51.73	B111	Aluminum brass	B111-D	55,000	20,000	(7)	12,500	12,200	12,000	7,500	3,000	2,000			
51.73	B111	Aluminum bronze	B111-E	50,000	20,000	(7)	12,500	12,200	12,000	10,000	6,000	4,000			
51.73	B111	Red brass	B111-F	40,000	12,000	(7)	8,000	8,000	8,000	6,000	3,000				
51.73	B111	Cu-Ni 70-30	B111-G	55,000	20,000	(7)	13,300	12,700	12,300	12,000	11,700	11,300	11,000		
51.73	B111	Cu-Ni 80-20	B111-H	50,000	18,000	(7)	12,000	11,300	11,000	10,700	10,300	10,000	9,500		
51.73	B111	Cu-Ni 90-10	B111-I	40,000	15,000	(7)	10,000	9,500	9,300	9,000	8,700	8,300	8,000		

† Intermediate values of "S" and "M" may be obtained by interpolation.
 ‡ This material shall be limited to a maximum temperature of 875° F.
 § These stresses include a weld efficiency factor of 0.85.
 ¶ These stresses include a weld efficiency factor of 0.80.
 ** Stress permitted for temperatures not to exceed 450° F.

† These stresses include a weld efficiency factor of 0.60.
 ‡ The same stress may be employed for a temperature of 406° F.
 § The minimum tensile and yield strengths employed not given in the specifications, tensile and yield strengths shown are assumed.
 ¶ The same stress may be employed for a temperature of 320° F.

satisfactory, the use of pipe having a wall thickness less than standard weight will be given special consideration by the Commandant.

(d) Where the Officer in Charge, Marine Inspection, is not otherwise satisfied, each length of piping having a diameter exceeding 4 inches shall be drilled, for the purpose of gauging, and fitted with a screw plug to extend beyond the pipe covering. Where bends are used, the test holes shall be drilled in the outer wall of the bend. The drilling of such pipes may be omitted where pipes which are intended for bending comply with paragraph (e) of this section.

(e) The radius of a pipe bend measured from the centerline of the pipe shall be not less than three times the

nominal pipe diameter, except for copper which shall have a radius of not less than twice the nominal pipe diameter.

(f) (1) Where pipe is pierced with tube holes the ligament efficiency of the tube holes shall be employed in the formulas in § 52.05-10 of this subchapter to determine the maximum allowable pressure of the piping. The pressure thus calculated shall in no case be greater than that allowed for the unpierced pipe.

(2) Where branch connections are welded to Class I piping, or to piping conveying steam at pressures exceeding 50 p. s. l., reinforcement of the pierced pipe shall be provided unless the connection is adequate for the design pressure. The amount of reinforcement required

shall be determined by § 52.25-20 of this subchapter.

(3) The longitudinal joint of a welded pipe shall not be pierced with holes.

§ 55.07-6 Expansion and flexibility.

(a) Piping systems shall be designed to have sufficient flexibility to prevent thermal expansion or contraction from causing excessive stresses in the piping material, excessive bending moments at the joints, or excessive forces or moments at points of connection to equipment or at anchorage and guide points.

(b) Provision shall be made for expansion and contraction by changes in direction of pipe runs or by the use of expansion bends, loops, offsets, or slip joints.

(c) Piping shall be installed to avoid excessive strains and shall be adequately

supported by hangers or guides, so that the weight of the piping is not transmitted to valves and fittings, and the effects of vibrations, pitching and rolling of the vessel are minimized. Pipe supports shall be designed and arranged so as not to interfere with expansion and contraction of the piping. Anchors, pivots and restraints shall be fabricated and installed to secure the desired points of piping in relatively fixed positions and freely permit expansion and contraction in opposite directions. Main junction points of piping subject to temperatures exceeding 450° F., which are not balance points shall be fitted with fixed anchors. If considered as a balance point the junction point may be free to move in all directions, or may be guided to limit the movement in one or more directions if computations indicate excessive strain may occur in any of the branch pipes.

(d) The combined stresses due to bending and pressure for the normal operating conditions shall not exceed two-thirds of the sum of the "S" value given in table 55.07-5 (a) for the piping material at 650° F. and the "S" value at the design temperature.

(e) In order to modify the effect of expansion and contraction, runs of pipe should be cut short and sprung into place. Piping may be cold sprung any amount up to 100% of the total expansion. When it is desired to take credit for cold spring, the piping shall be cold sprung at least half of its computed expansion. In computing stress calculations for the hot condition, the total expansion movement may be reduced by one-third of the actual cold spring applied: *Provided*, That, in the opinion of the Commandant, satisfactory provision is made to obtain the design amount of cold spring. The full amount of cold spring shall be taken into account in considering the forces, moments, and stresses acting in the cold condition.

(f) A summary of the results of pipe stress calculations for the main and auxiliary steam piping where the design temperature exceeds 800° F., together with the arrangement piping drawings, shall be submitted for approval. Calculations shall be made in accordance with one of the recognized methods of stress analysis acceptable to the Commandant. Under no conditions shall the calculated value of the combined stress be taken as less than the total longitudinal stress (the sum of the longitudinal bending stress and the longitudinal pressure stress).

(g) The stress calculations and piping arrangement plans shall indicate all piping runs, connections, materials, sizes, design pressure and temperature, anchorages, guides or junction points, total thermal expansion between anchor points, and design cold spring. The moment of inertia of the pipe shall be based upon the minimum thickness of the pipe or tubing.

(h) Stress calculations shall be made to determine the magnitude and direction of the forces (reactions) and moments at all terminal connections, anchor, guide and junction points, as well as the longitudinal bending and pressure stress, hoop stress, shear stress, and combined stress at all such points. The

location of the maximum combined stress shall be indicated in each run of pipe between anchor or junction points. Where deemed necessary by the Commandant, and conditions are such as to warrant it, calculations for the cold conditions shall be made.

(i) Where it is desired to employ alloy steel pipe materials of better heat resistant properties than those specified in Part 51 of this subchapter, special consideration may be given by the Commandant for an increase in the maximum combined stress, if satisfactory evidence is furnished to establish the suitability of the material for the design temperature.

§ 55.07-8 *Variations in pressures and temperatures.* (a) Superheater outlet flanges and superheated and desuperheated steam piping direct from the boiler shall be designed for not less than the maximum pressure and temperature to which they may be exposed in service under normal sustained operating conditions.

(b) Occasional increases in pressure and/or temperature are unavoidable and may be permitted without changing the normal design provided the corresponding stress in the pipe wall calculated by formulas (1) and (2) of § 55.07-5 does not exceed the maximum allowable stress (S) values as given in table 55.07-5 (a) for the actual expected temperature by more than the following allowances for the periods of duration indicated:

(1) Up to 15 percent increase above the S value during 10 percent of the operating period.

(2) Up to 20 percent increase above the S value during 1 percent of the operating period.

§ 55.07-10 *Valves and fittings.* (a) All valves shall close with a right hand (clockwise) motion of the handwheels when facing the end of the valve stem. Valves shall be of the rising stem type preferably with the stem threads external to the valve body. Where operating conditions will not permit of such installations, the use of a non-rising stem valve will be permitted, provided indicators are fitted to show clearly whether same is opened or closed. Valves installed in cargo tanks of tank vessels are not required to be fitted with indicators.

(b) Valves of class I piping having diameters exceeding 2 inches shall have bolted, pressure seal, or breech lock bonnets and flanged or welding ends, except that socket type welding ends shall not be used where the diameter exceeds 2 inches. For diameters not exceeding 2 inches, screwed union bonnet valves or a type which will positively prevent the stem from screwing out of the body may be employed. Cast-iron valves with screwed-in or screwed-over bonnets are prohibited. Union bonnet type cast-iron valves shall have the bonnet ring made of steel, bronze or malleable iron.

(c) Valves, flanges, fittings and appurtenances shall be designed for the maximum pressure to which they may be subjected, but in no case shall the design pressure be less than 50 p. s. i. for the medium to be conveyed, except large fabricated ballast manifolds connecting

lines exceeding 8 inches nominal pipe size may be designed for a pressure of not less than 25 p. s. i.

(d) Disks or disk faces, seats, stems and other wearing parts of valves shall be made of material possessing corrosion and heat-resisting qualities suitable for the service conditions to which they may be subjected.

(e) Valves, flanges, and fittings shall be legibly marked with the manufacturer's name or registered trademark and if of alloy steel, the type and grade of alloy steel used, and the primary service pressure rating for which same are guaranteed in service, except as otherwise permitted below:

(1) Screwed malleable iron fittings of the 150-pound ASA standard need not carry a service pressure marking.

(2) Screwed bronze fittings of the 125-pound ASA standard which are identifiable as to pressure rating by the narrow bands at the inlet and outlet widely separated at the fitting crotches need not carry a service pressure rating.

(3) Screwed bronze fittings of the 250-pound ASA standard which are identifiable as to pressure rating by the heavy bands at the inlet and outlet and which meet and fill the crotches need not carry a pressure rating.

(4) Small finished or polished non-ferrous products such as trycocks need not be marked.

(f) Plug cocks shall be constructed with satisfactory and positive means of preventing the plug from becoming loosened or removed from the body when the plug is operated. Cocks having plug locking arrangements depending on cotter pins are prohibited.

(g) Cocks shall be marked in a straight line with the body to indicate whether same are open or closed.

§ 55.07-15 *Joints and flange connections.* (a) Flanged or butt-welded joints are required for Class I piping for diameters exceeding 2 inches, except as otherwise specified in this subchapter.

(b) Slip-on flanges, complying with the requirements of tables 55.07-15 (e5) and (e6) for 150-pound and 300-pound standard may be used in Class I piping for temperatures not exceeding 450° F. Screwed joints for Class I piping are not permitted for pipe diameters exceeding 2 inches.

(c) Forged or cast steel valves, flanges, and pipe fittings of the socket welding type, wherein the pipe is inserted into the socket and is secured by means of a strength fillet weld may be employed for pipe diameters not exceeding 2 inches for Class I piping and without diameter limitation for Class II piping.

(d) Valves, flanges and fittings may be attached to nonferrous pipe by means of soldering where the pressures do not exceed 10 pounds per square inch at 240° F. and 100 pounds per square inch at 150° F. For temperatures between 150° F. and 240° F. the pressure shall be proportionate. Silver brazing alloy shall be employed for temperatures and pressures exceeding the foregoing.

(e) (1) Flanges shall conform in strength at least to the dimensional standards in the following tables:

TABLE 55.07-15 (60)—STEEL FLANGED FITTINGS AND COMPANION FLANGES—Continued

[For maximum steam service pressure at a temperature of 750° F.]

Table with 10 columns: Nominal pipe size (inches), Outside diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Metal thickness of hub (inches), Hub diameter at base (inches), and 300 pounds.

TABLE 55.07-15 (67)—STEEL FLANGED FITTINGS AND COMPANION FLANGES

[For maximum steam service pressure at a temperature of 750° F.]

Table with 10 columns: Nominal pipe size (inches), Outside diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Metal thickness of hub (inches), Hub diameter at base (inches), and 600 pounds.

TABLE 55.07-15 (68)—STEEL FLANGED FITTINGS AND COMPANION FLANGES

[For maximum steam service pressure at a temperature of 500° F.]

Table with 10 columns: Nominal pipe size (inches), Outside diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Metal thickness of hub (inches), Hub diameter at base (inches), and 150 pounds.

TABLE 55.07-15 (69)—BRONZE FLANGED FITTINGS AND COMPANION FLANGES

[For maximum steam service pressure at a temperature of 750° F.]

Table with 10 columns: Nominal pipe size (inches), Outside diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Metal thickness of hub (inches), Hub diameter at base (inches), and 300 pounds.

TABLE 55.07-15 (65)—BRONZE FLANGED FITTINGS AND COMPANION FLANGES

[For maximum steam service pressure at a temperature of 500° F.]

Table with 10 columns: Nominal pipe size (inches), Outside diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Metal thickness of hub (inches), Hub diameter at base (inches), and 150 pounds.

TABLE 55.07-15 (66)—BRONZE FLANGED FITTINGS AND COMPANION FLANGES

[For maximum steam service pressure at a temperature of 750° F.]

Table with 10 columns: Nominal pipe size (inches), Outside diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Metal thickness of hub (inches), Hub diameter at base (inches), and 300 pounds.

TABLE 55.07-15 (63)—CAST-IRON FLANGED FITTINGS AND COMPANION FLANGES, CLASS 125

[125-pound cast-iron flanged fittings given in inches]

Table with 10 columns: Nominal pipe size (inches), Diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Diameter of hub (inches), Length of hub and threads (inches), and 125 pounds.

TABLE 55.07-15 (62)—CAST-IRON FLANGED FITTINGS AND COMPANION FLANGES, CLASS 250

[250-pound cast-iron flanges. All dimensions given in inches]

Table with 10 columns: Nominal pipe size (inches), Diameter of flange (inches), Thickness of flange (inches), Diameter of bolt circle (inches), Number of bolts, Size of bolts (inches), Metal thickness of fitting (inches), Diameter of hub (inches), Length of hub and threads (inches), and 250 pounds.

1 The raised face of 1/4 inch is included in "thickness of flange, minimum."

1 The "flange thickness, minimum" as shown in the table is the dimension from back of flange to gasket contact face. Blind flanges may be recessed 1/8 inch with a diameter equal to the inside diameter of the flange fitting.

1 All 125-pound standard flanges have a plain face. 2 Sizes 14 inches and larger are to be used with O. D. pipe of the same size. 3 All blind flanges for size 12 inches and larger must be dished, with inside radius equal to the port diameter.

1 The raised face of 1/4 inch is included in "thickness of flange, minimum."

1 The "flange thickness, minimum" as shown in the table is the dimension from back of flange to gasket contact face. Blind flanges may be recessed 1/8 inch with a diameter equal to the inside diameter of the flange fitting.

1 All 250-pound cast-iron standard flanges have a 1/2-inch raised face. This raised face is included in the minimum thickness of flange dimensions. 2 Sizes 14 inches and larger are to be used with O. D. pipe of the same size. 3 All blind flanges for sizes 10 inches and larger must be dished, with inside radius equal to the port diameter.

1 The raised face of 1/4 inch is included in the minimum thickness of flange.

1 The "flange thickness, minimum" as shown in the table is the dimension from back of flange to gasket contact face. Blind flanges may be recessed 1/8 inch with a diameter equal to the inside diameter of the flange fitting.

1 All 250-pound cast-iron standard flanges have a 1/2-inch raised face. This raised face is included in the minimum thickness of flange dimensions. 2 Sizes 14 inches and larger are to be used with O. D. pipe of the same size. 3 All blind flanges for sizes 10 inches and larger must be dished, with inside radius equal to the port diameter.

TABLE 55.07-15 (a12)—SERVICE PRESSURE RATINGS FOR ALLOY STEEL PIPE FLANGES AND FLANGED FITTINGS¹—Con.

	Alloy steels of suitable heat resistant properties at temperatures 1,000° F. and below with standard facings (other than ring joints) ²						Alloy steels of suitable heat resistant properties at temperatures 1,000° F. and below with ring joint facings ²					
	300	400	600	900	1,500	2,500	300	400	600	900	1,500	2,500
Primary service pressure ratings	300	400	600	900	1,500	2,500	300	400	600	900	1,500	2,500
Maximum hydrostatic shell test pressures ³	900	1,200	1,800	2,700	4,500	7,500	1,100	1,450	2,175	3,250	5,400	9,000
Service temperatures (° F.)	Maximum, nonshock, service pressure ratings at temperatures from 100° to 1,000° F.						Maximum, nonshock, service pressure ratings at temperatures from 100° to 1,000° F.					
850	320	425	640	960	1,600	2,605	320	475	700	1,050	1,750	2,925
900	300	400	600	900	1,500	2,500	325	425	650	975	1,625	2,700
950	285	350	530	795	1,325	2,205	300	400	600	900	1,500	2,500
1,000	190	250	380	570	950	1,580	230	310	470	700	1,170	1,950

¹ All pressures are in pounds per square inch, gauge.
² Carbon-molybdenum steel flanges and flanged fittings are not permitted for temperatures exceeding 875° F.
³ All tests shall be made with water at a temperature not to exceed 125° F.
⁴ Primary service pressure ratings.

(f) Flanges shall be attached to the pipe by any method shown by figures 55.07-15 (f1) to 55.07-15 (f15), inclusive, or by any additional means that may be approved by the Commandant.

(1) Figure 55.07-15 (f1). Flanges with screwed threads may be used for class I piping not exceeding 2 inches nominal pipe size. For class II piping, flanges with screwed threads may be used without diameter limitation.

(2) Figure 55.07-15 (f2). 150-pound and 300-pound low-hubbed flanges with screwed threads plus the addition of a strength fillet weld of the size as shown may be used for class I piping without diameter limitation for temperatures not exceeding 750° F., subject to the pressures and temperatures as given in Table 55.07-15 (e12).

(3) Figure 55.07-15 (f3). 150-pound and 300-pound slip-flanges may be used for class I piping for temperatures not exceeding 450° F. For Class II piping slip-on flanges may be used for pressures and temperatures not exceeding the limitations as given in table 55.04-5.

(4) Figure 55.07-15 (f4). Socket welding flanges may be used for class I piping of nominal pipe size not exceeding 2 inches. For class II piping, socket welding flanges may be used without diameter limitation.

(5) Figure 55.07-15 (f5). Flanges machined from steel plate meeting the requirements of subpart 51.22 may be used for class II piping for pressures not exceeding 125 pounds per square inch and temperatures not exceeding 450° F. The machined flanges shall comply with table 55.07-15 (e5).

(6) Figure 55.07-15 (f6). Steel plate flanges meeting the material and construction requirements listed in figure 55.07-15 (f5) may be used for class II piping for pressures not exceeding 150 pounds per square inch and temperatures not exceeding 650° F. The flange shall be attached to the pipe as shown by figure 55.07-15 (f6). For temperatures exceeding 500° F. the pressure shall not exceed that permitted by table 55.07-15 (e12).

(7) Figure 55.07-15 (f7). Lap joint flanges (Van Stone) may be used for class I and class II piping. The Van Stone equipment shall be operated by qualified personnel and the ends of the pipe shall be heated from 1,650° F. to 1,900° F. de-

pendent upon the size of the pipe prior to the flanging operation. The foregoing temperatures shall be carefully adhered to in order to prevent excess scaling of the pipe. The extra thickness of metal built up in the end of the pipe during the forming operation shall be machined to restore the pipe to its original diameter. The machined surface shall be free from surface defects and the back of the Van Stone lap shall be machined to a fine tool finish to furnish a line contact with the mating surface on the flange for the full circumference as close as possible to the fillet of the flange. The number of heats to be used in forming a flange shall be determined by the size of the pipe and not more than two push-ups per heat are permitted. The width of the lap flange shall be at least three times the thickness of the pipe wall and the end of the pipe shall be properly stress-relieved after the flanging operation is completed. Manufacturers desiring to employ this type of joint shall demonstrate to an inspector that they have the proper equipment and personnel to produce acceptable lap joints.

(8) Figure 55.07-15 (f8). Welding neck flanges may be used on any piping provided the flanges are butt-welded to the pipe. The joint shall be welded as indicated by figure 55.07-15 (f8) and a backing ring employed which will permit complete penetration of the weld metal.

(9) Figure 55.07-15 (f9). Welding neck flanges may also be attached to pipe by a double-welded butt joint as shown by figure 55.07-15 (f9).

(10) Figure 55.07-15 (f10). Flanges may be attached by shrinking the flange on to the end of the pipe and flaring the end of the pipe to an angle or not less than 20°. A fillet weld of the size shown by figure 55.07-15 (f10) shall be used to attach the hub to the pipe. This type of flange is limited to a maximum pressure of 300 pounds per square inch at temperatures not exceeding 500° F.

(11) Figure 55.07-15 (f11). The flange of the type described and illustrated by figure 55.07-15 (f10), except with the fillet weld omitted, may be used for class II piping for pressures not exceeding 150 pounds per square inch and temperatures not exceeding 450° F.

(12) Figure 55.07-15 (f12). High-hub bronze flanges may be used for temperatures not exceeding 406° F. The hub of

the flange shall be bored to a depth of not less than that required for a threaded connection of the same diameter leaving a shoulder for the pipe to butt against. A preinserted ring of silver brazing alloy having a melting point of not less than 1,000° F. and of sufficient quantity to fill the annular clearance between the flange and the pipe shall be inserted in the groove. The pipe shall then be inserted in the flange and sufficient heat applied externally to melt the brazing alloy until it completely fills the clearance between the hub and the flange of the pipe. A suitable flux shall be applied to the surfaces to be joined to produce a satisfactory joint. (For clearances of silver soldered joints, see § 56.10-30 (e) of this chapter.)

(13) Figure 55.07-15 (f13). The type of flange as described for figure 55.07-15 (f12) may be employed and in lieu of an annular groove being machined in the hub of the flange for the preinserted ring of silver brazing alloy, a bevel may be machined on the end of the hub and the silver brazing alloy introduced from the end of the hub to attach the pipe to the flange. (For clearances of silver soldered joints, see § 56.10-30 (e) of this chapter.)

(14) Figure 55.07-15 (f14). Flanges may be attached to nonferrous pipe by inserting the pipe in the flange and flanging the end of the pipe into the recess machined in the face of the flange to receive same. The width of the flange shall be not less than three times the pipe wall thickness. In addition thereto, the pipe shall be securely brazed to the wall of the flange. This flange is limited to a maximum temperature of 406° F.

(15) Figure 55.07-15 (f15). The flange of the type described and illustrated by figure 55.07-15 (f14), except with the brazing omitted, may be used for class II piping and where the temperature does not exceed 250° F.

§ 55.07-20 *Bolting*. (a) Valves, fittings and flanges for piping systems shall have bolting complying with the standards for the various pressure ratings as given in tables 55.07-15 (e1) to 55.07-15 (e11), inclusive. For the design requirements of bolted flanged connections on pressure vessels, see § 54.03-25 of this subchapter.

(b) Bolting material shall comply with the requirements of § 54.03-25 of this subchapter.

§ 55.07-25 *Installation*. (a) Slip joints shall not be used in cargo holds, deep tanks, and in other places that are not always accessible, except that they may be used in cargo lines of tank vessels. Where used, slip joints shall be provided with positive means for preventing the end of the pipe from pulling out of the joint.

(b) Pumps used to transfer oil shall have no discharge connections to fire-mains, boiler feed systems, or condensers unless approved positive means are provided to prevent oil from being accidentally discharged into any of the aforementioned systems.

(c) Piping may be run through deep tanks or fuel tanks, provided a pipe tunnel is installed. Where a pipe tunnel is installed, the watertight integrity of the bulkheads shall be maintained, and if the tunnel is not of sufficient size to afford easy access, no valve or fitting shall be located therein. Bilge and ballast piping may be run through such tanks without a pipe tunnel, where the thickness of the piping is not less than Schedule 80, expansion bends are fitted, and all joints within the tanks are welded.

(d) Where pipes are carried through watertight or oiltight bulkheads, decks or tank tops, the watertight integrity of the structure shall be maintained. Where plate insert pads are used, bolted con-

nections shall have threads tapped into the plate to a depth of not less than the diameter of the bolt. If welded, the pipe or flange shall be welded to both sides of the plating. Openings in structure through which pipes pass shall be reinforced where necessary. Flanges shall not be bolted to bulkheads so that the plate forms a part of the joint.

(e) Piping shall not be run over or in the vicinity of switchboards or other electrical equipment if avoidable. When such leads are necessary, welded joints only shall be used and provision shall be made to prevent leakage from damaging the equipment.

(f) Fresh water piping shall not run through oil tanks nor oil piping through

fresh water tanks. Care should be taken to prevent the accidental contamination of fresh water from salt water lines.

(g) Stuffing boxes shall not be used on deep tank bulkheads, double bottoms or in any position where they cannot be easily examined. This requirement does not apply to ore carriers operating on the Great Lakes or cargo lines of oil tankers.

(h) Piping systems shall be installed so that under no condition will the operation of safety or relief valves be impaired.

(i) (1) Remote valve controls which are not readily identifiable as to service shall be fitted with name plates. Remote valve controls shall always be accessible under service conditions and an indicator shall be fitted to show whether the valve is open or closed. Valve control rods shall be adequately protected and only solid reach rods shall be used in tanks containing liquids, except that tank barges having plug cocks inside cargo tanks may have reach rods of extra heavy pipe with annular space between the lubricant tube and the pipe wall sealed with a non-soluble material to prevent penetration of the cargo.

(2) Where air operated remote control valves are installed, a self-indicating air cock and a pressure gauge or other acceptable means shall be provided in the actuating line to the remote valve as close as possible to the control board to indicate whether the remote control valve is open or closed.

(j) Suitable drains shall be provided at low points of piping systems.

(k) Valves and cocks shall be located so as to be easily accessible and valves or cocks attached to the shell of the vessel or to sea chests located below the floor plating shall be operable from above the floor plates.

(l) When welded fabrication is employed, a sufficient number of detachable joints shall be provided to facilitate overhauling and maintenance of machinery and appurtenances. The joints shall be located so that adequate space is provided for welding, and the location of the welds shall be indicated on the plans.

(m) Pipes piercing the collision bulkhead shall be fitted with screw-down valves operable from above the bulkhead deck and the valve shall be secured to the bulkhead fitting inside the forepeak tank. Passenger vessels shall not have the collision bulkhead pierced below the margin line by more than one pipe conveying liquids in the forepeak tank.

(n) Valves and cocks not forming part of a piping system are not permitted in watertight subdivision bulkheads.

(o) (1) Piping systems which may be subjected to pressures exceeding that for which same are designed shall be provided with a pressure reducing valve, and on the low pressure side of the reducing station a relief valve and pressure gauge shall also be installed.

(2) The relief valves installed on reduced pressure lines shall have a relieving capacity at least equal to the capacity of the pressure reducing valve at a pressure of not more than the design pressure of the reduced pressure piping or any appurtenance thereof, whichever is the lesser.

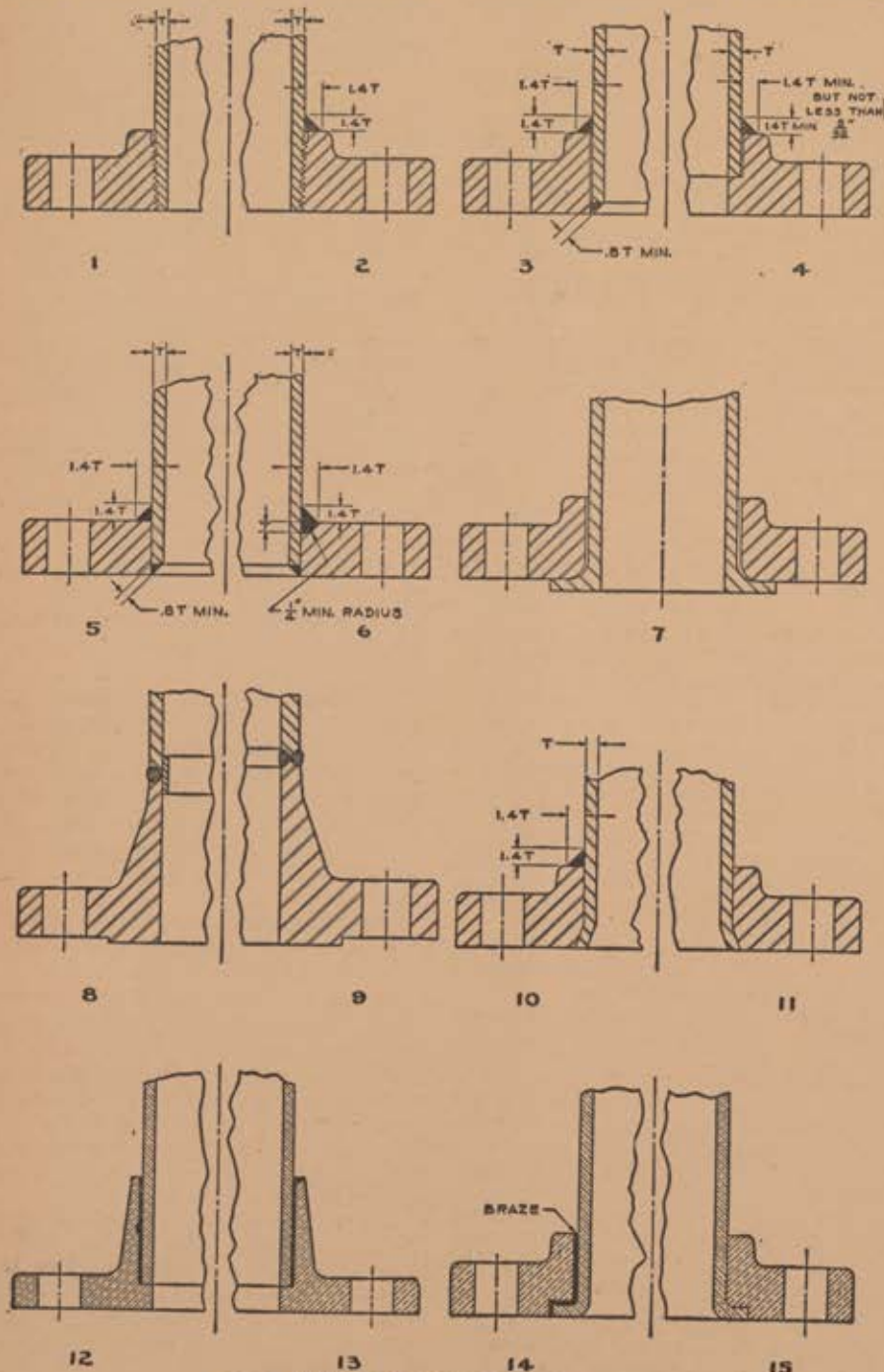


FIGURE 55.07-15 (f). Methods of attachments.

(p) Fuel oil service, cargo and fuel oil transfer and boiler feed pumps shall be provided with a pressure gauge. Relief valve shall also be installed in the discharge line provided the piping system or appurtenances are not designed for the pressure which such pumps are capable of developing when operating under shut-off head.

(q) Valves for fuel oil equalizing lines in machinery spaces shall comply with § 55.10-35 (d). Where flooding equalizing cross-connections are required for stability considerations, the arrangement shall be approved by the Commandant.

(r) Where pipes are run through cargo spaces and coal bunkers, they shall be substantially encased to protect them from mechanical injury. In coal bunkers such casings shall be made of steel.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333; 50 U. S. C. App. 1275)

SUBPART 55.10—PUMPING ARRANGEMENTS AND PIPING SYSTEMS

2. Section 55.10-10 is amended to read as follows:

§ 55.10-10 *Boiler feed piping.*—(a) *General requirements.* (1) Steam vessels shall have at least two entirely separate means of supplying feed water for power boilers, except donkey boilers and installations where the unit feed system is employed. All feed pumps shall be fitted with the necessary connections for this purpose.

(2) Feed pump supply to power boilers may utilize the group feed system or the unit feed system.

(3) Feed discharge piping shall be designed for not less than either (i) 125 percent of the maximum allowable pressure of the boiler; or (ii) the feed pump relief valve setting, or shut-off head when a pump relief valve is not fitted; whichever is the greater.

(4) Feed pumps for water tube boilers shall have fresh water connections only.

(b) *Feed valves.* (1) Stop and stop-check valves shall be fitted in the main feed line and shall be attached as close as possible to the drum feed inlet nozzles or to the economizer feed inlet nozzles on boilers fitted with integral economizers.

(2) Where the installation will not permit the feed stop valve to be attached directly to the drum inlet nozzle on boilers not fitted with economizers, a distance piece may be installed between the stop valve and the inlet nozzle.

(3) Consideration will be given by the Commandant to the location of the feed stop or stop-check valves near the operating platform on boilers fitted with economizers, provided the piping between the valves and the economizer is installed without intervening flanged connections and all butt-welded joints 4 inches and above in diameter are radiographed the full circumference of the welds as required by § 56.05-5 of this subchapter.

(4) Auxiliary feed lines shall be fitted with stop valves and stop-check valves. Boilers not having auxiliary feed water nozzles, or where independent auxiliary feed lines are not installed, shall have the auxiliary feed line to the drum or economizer connected to the main feed line as close as possible to the main feed stop valves; and the valves in the auxiliary feed line shall be fitted as close as possible to the junction point.

(5) Boilers fitted with economizers shall have a check valve fitted in the economizer discharge and located as close as possible to the drum feed inlet nozzle. When economizer by-passes are fitted, a stop-check valve shall be installed in lieu of the aforementioned check valve.

(6) A sentinel valve shall be fitted to an economizer when a by-pass is installed.

(c) *Feed-water regulators, feed-water heaters and grease extractors.* (1) Feed-water regulators, feed-water heaters, and grease extractors, where installed, shall be fitted with by-passes.

(2) Feed-water regulators designed with a built-in by-pass for emergency use need not be fitted with an external by-pass when installed in a feed system provided with an auxiliary feed line. All feed-water regulators installed in a unit feed system shall be fitted with an external by-pass. Feed-water regulator by-passes shall be so arranged that the regular feed valves are in operation while the by-pass is in use.

(3) A feed-water regulator may be interposed between the stop and stop-check valves in the feed lines.

(d) *Group feed system.* Group feed systems shall be provided with pumps and piping as follows:

(1) Ocean-going and Great Lakes steam vessels, having a feed pump attached to the main propelling unit, shall be provided with at least one independently driven feed pump. Each of these pumps shall be used exclusively for feed purposes and shall be capable of supplying the operating boilers at their normal capacity. In addition, a second independently driven pump, capable of supplying such boilers at 75 percent of their normal capacity, shall be provided for emergency use. This second pump may be used for other purposes.

(2) If two independently driven pumps are provided, each capable of supplying the operating boilers at their normal capacity, and neither of which is used for other purposes, the third or emergency feed pump is not required.

(3) River or harbor steam vessels shall have at least two means for feeding the boilers; one of which shall be an independently driven pump, the other may be an attached pump, an additional independently driven pump, or an injector.

(e) *Unit feed system.* Unit feed systems shall be provided with pumps and piping as follows:

(1) The unit feed system may be used on vessels having two or more boilers. When the unit feed system is employed each boiler shall have its own independently driven main feed pump capable of supplying the boiler at its normal operating capacity. In addition there shall be

an auxiliary independently driven feed pump of the same capacity which can be operated in place of and in conjunction with the main feed pump. In vessels with two boilers there shall be provided one auxiliary pump for each boiler. In vessels with three or more boilers, not more than two boilers may be served by any one auxiliary pump. The auxiliary pump may be so interconnected that any pump can feed any boiler.

(2) In the unit feed system, a separate feed line shall be provided for each boiler from its pumps. A separate auxiliary feed line is not required. The discharge from each pump and the feed supply to each boiler shall be automatically controlled by the level of the water in that boiler. In addition to the automatic control, manual control shall be provided.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

3. Section 55.10-15 (b) is amended to read as follows:

§ 55.10-15 *Blow-off piping.* * * *

(b) Blow-off piping external to the boiler shall be designed for not less than 125 percent of the maximum allowable pressure of the boiler.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

4. Sections 55.10-25 and 55.10-30 are amended to read as follows:

§ 55.10-25 *Bilge and ballast piping.*

(a) All vessels shall be provided with a satisfactory pumping plant capable of pumping from and draining any watertight compartment under all practical conditions after a casualty when the vessel is upright or listed. For this purpose wing suction will generally be necessary except in narrow compartments at the ends of the vessel. Arrangements shall be made whereby water in the compartments will drain to the suction pipes. Efficient means shall be provided for draining water from all tank tops, other watertight flats and holds. Peak tanks, chain lockers and decks over peak tanks may be drained by eductors, ejectors or hand pumps. Where piping is led through the forepeak bulkhead, see § 55.07-25 (m).

(b) Passenger vessels shall have provision made to prevent the compartment served by any bilge suction piping from being flooded in the event the pipe is severed or otherwise damaged by collision or grounding in any other compartment. Where the piping is located within one-fifth of the beam of the side

of the vessel¹ or in a ductkeel, a non-return valve shall be fitted to the end of the pipe in the compartment which it serves.

(c) (1) Bilge suction shall be led from manifolds, which shall be controlled above the floor plating in the compartment in which they are located, and shall be easily accessible at all times. Valves in the machinery space controlling bilge suction from various compartments shall be of the stop-check type.

(2) Passenger vessels shall have the bilge manifolds arranged so that in the event of flooding, one of the bilge pumps can take suction from any compartment. If a bilge system common to all pumps is installed, the necessary valves for controlling the bilge suction shall be operable from above the bulkhead deck. If, in addition to the main bilge pumping system, an emergency bilge pumping system is installed, it shall be so arranged that the emergency bilge pump may take suction from any flooded compartment.

(d) The internal diameter of bilge suction pipes shall be determined by the following formulas, except that the nearest commercial size not more than one-fourth inch under the required diameter may be used.

(1) For suction to each main bilge pump:

$$d=1+\sqrt{\frac{L(B+D)}{2,500}} \quad (1)$$

(2) For branch suction to cargo and machinery spaces:

$$d=1+\sqrt{\frac{c(B+D)}{1,500}} \quad (2)$$

where:

L = length of vessel, in feet on load water line.

B = breadth of vessel, in feet.

D = molded depth to bulkhead deck, in feet.

c = length of compartment, in feet.

d = required internal diameter of suction pipe, in inches.

NOTE: For tankers *L* may be reduced by the combined length of the cargo oil tanks.

(3) No main suction piping shall be less than 2½ inches internal diameter. No branch piping need be more than 4 inches nor less than 2 inches in diameter except for drainage of small pockets or spaces in which case 1½ inches diameter may be used.

(4) For vessels of 65 feet in length or less and not engaged on an international voyage, the bilge pipe sizes computed by formulas (1) and (2) of this paragraph are not mandatory, but in no case shall the size be less than 1 inch nominal pipe size.

(5) The number, location and size of bilge suction in the boiler and machinery compartments shall be determined when the piping plans are submitted for approval and shall be based upon the size of the compartments and the drainage arrangements.

(e) One of the independent bilge pumps shall have a suction of a diameter

¹ Measured at right angles to the center line at the level of the deepest subdivision load line or deep load line, where subdivision load line is not assigned.

not less than that given by formula (2) led directly from the engine room bilge entirely independent of the bilge main, and on passenger vessels each independent bilge pump located in the machinery spaces shall have such direct suction from these spaces, except that not more than two pumps are required to have direct suction from any one space. Where two direct suction are required in any one compartment on passenger vessels, one suction shall be located on each side of the compartment. If watertight bulkheads separate the engine and boiler rooms, a direct suction or suction shall be fitted to each compartment unless the pumps available for bilge service are distributed throughout these compartments, in which case at least one pump in each such compartment shall be fitted with direct suction in its compartment.

(f) Main circulating pumps shall be fitted with direct suction connections provided with nonreturn valves in the machinery space. Great Lakes cargo vessels may have the emergency bilge suction connected to the largest available pump in the machinery space, provided it has a capacity not less than that of the main circulating pump. The diameter of such suction pipes shall be not less than two-thirds of the diameter of the main sea inlet. Where coal is used as fuel and no watertight bulkhead is provided between the engine and boiler rooms, a direct discharge overboard shall be fitted from at least one circulating pump, or a by-pass may be fitted to the circulating discharge.

(g) For internal-combustion engine installations, the emergency bilge suction shall be connected to the largest

available pump in the engine room and shall have an area equal to the full suction inlet of the pump. This requirement is in addition to the independent bilge suction stipulated in paragraph (e) of this section.

(h) Each individual bilge suction shall be fitted with a suitable bilge strainer having an open area of not less than three times that of the suction pipe. In addition a mud box or basket strainer shall be fitted in an accessible position between the bilge suction manifold and the pump.

(i) Pipes for draining cargo or machinery spaces shall be separate from pipes which are used for filling or emptying spaces where water or oil is carried and shall be controlled by separate valves at the pumps so arranged as to preclude the entrance of water or oil into cargo or machinery spaces. The requirements of this paragraph do not apply to bilge and ballast systems on Great Lakes cargo vessels which may employ a common line for the bilge and ballast system for the cargo spaces.

(j) Bilge and ballast pumping systems shall be so arranged as to prevent water from the sea or from ballast spaces from entering cargo or machinery spaces, or from passing from one compartment to another. Blind flanges or reversible pipe fittings may be employed for blanking-off oil and ballast lines when cargo is carried in deep tanks, or for blanking-off the bilge suction when oil is carried.

§ 55.10-30 Bilge pumps—(a) Self-propelled vessels. (1) All self-propelled vessels shall be provided with power pumps connected to the bilge main as required in table 55.10-30 (a).

TABLE 55.10-30 (a)—POWER BILGE PUMPS REQUIRED FOR SELF-PROPELLED VESSELS

Vessel length	Passenger vessels			Dry cargo vessels		Tank vessels
	International voyage ¹	Ocean, coast-wise, and Great Lakes	All other	Ocean, coast-wise, and Great Lakes	All other	All
180 feet or more.....	23	23	2	3	2	2
Below 180 feet and exceeding 65 feet.....	23	22	22	22	22	22
65 feet or less.....	23	21	21	21	21	21

¹ Not applicable to passenger vessels which do not proceed more than 20 miles from the nearest land, or which are employed in the carriage of large numbers of unberthed passengers in special trades.

² When the criterion numeral exceeds 30 on passenger vessels, an additional independent power driven bilge pump is required. (See Part 46 of Subchapter E (Load Lines) of this chapter for determination of criterion numeral.)

³ Vessels operating on lakes (including Great Lakes), bays, sounds, or rivers where steam is always available, or where suitable water supply is available from a power pump of adequate pressure and capacity, syphons or eductors may be substituted for one of the required power pumps, provided a syphon or eductor is permanently installed in each hold or compartment.

⁴ Two acceptable hand pumps may be substituted for one of the independent power pumps.

(2) On passenger vessels 300 feet or more in length engaged in international voyages, or passenger vessels 180 feet or more in length and operating more than 200 miles offshore, or on all passenger vessels having a criterion numeral of 30 or more, one of the power bilge pumps shall be available at all times for use under emergency conditions in which a vessel may be flooded at sea. One of the following installations will be considered as complying with the requirements of this paragraph.

(i) One of the required bilge pumps is an emergency pump of a reliable submersible type, the source of power for

which shall be located above the bulkhead deck; or,

(ii) The bilge pumps and their sources of power are located throughout the ship so that under any condition of flooding which the vessel is required to withstand, at least one pump will be available in an undamaged compartment.

(3) One of the required power bilge pumps may be attached to the propelling engine.

(4) The bilges forward of the cargo tanks on tank ships may be drained by a power or hand pump, syphons, or eductors. If syphons or eductors are employed, the same shall be permanently installed in each compartment.

(5) On Great Lakes cargo vessels which do not employ a common bilge main, the pumps used for bilge suction are not required to be connected to a bilge main.

(b) *Non-self-propelled vessels.* (1) Ooceangoing sailing vessels and barges shall be provided with pumps connected to the bilge main as required in table 55.10-30 (b).

TABLE 55.10-30 (b)—BILGE PUMPS REQUIRED FOR NON-SELF-PROPELLED VESSELS

Type of vessel	Waters navigated	Power pumps	Hand pumps
Sailing.....	Ocean and coast-wise.	2	(¹)
Manned barges.....	do.	2	(²)
Unmanned barges.....	All.	(³)	(⁴)

¹ Where power is always available, independent power bilge pumps shall be installed as required and shall be connected to the bilge main.

² Efficient hand pumps connected to the bilge main may be substituted for the power pumps. Where there is no common bilge main, one hand pump will be required for each compartment.

³ Suitable hand or power pumps or syphons, portable or fixed, carried either on board the barge or on the towing vessel shall be provided.

(2) The pumps and source of power for operation on oceangoing sailing vessels and barges shall be located above the bulkhead deck or at the highest convenient level which is always accessible.

(c) *Capacity of independent power pumps.* Each independent power pump shall have a capacity developing a suction velocity of not less than 400 ft. per minute through the size of pipe required by § 55.10-25 under ordinary conditions, except that for vessels of less than 65 feet in length not engaged on international voyages the pump shall have a minimum capacity of 50 gallons per minute and need not meet the velocity requirement of this paragraph.

(d) *Priming.* Suitable means shall be provided for priming centrifugal pumps which are not of the self-priming type.

(e) *Location.* The power bilge pumps on passenger vessels shall be located in separate watertight compartments and so arranged that these compartments will not readily be flooded by the same damage. If the engines and boilers are in two or more watertight compartments, the bilge pumps shall be distributed throughout these compartments. When the location of bilge pumps in separate watertight compartments is not possible, the Commandant will consider alternate arrangements of the bilge pumps.

(f) *Other pumps.* Sanitary, ballast, and general service pumps having the required capacity may be accepted as independent power bilge pumps if fitted with the necessary connections to the bilge pumping system.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

5. Section 55.10-40 (b) is amended to read as follows:

§ 55.10-40 *Fuel oil service systems.*

(b) (1) All vessels having oil fired power boilers shall have at least two fuel oil service pumps each of sufficient capacity to supply all the boilers at full power, and arranged so that one may be overhauled while the other is in service. At least two fuel oil heaters of approximately equal capacity shall be installed and so arranged that any heater may be overhauled while the other(s) are in service. Suction and discharge strainers shall be of the duplex or other type capable of being cleaned without interrupting the oil supply.

(2) Vessels having auxiliary package boilers not exceeding 3000 pounds per hour generating capacity may be equipped with a single fuel oil service pump and single fuel oil heater, and in addition such pumps need not be fitted with discharge strainers.

(3) Boilers burning fuel oils of low viscosity need not be equipped with fuel oil heaters, provided acceptable evidence is furnished to indicate that satisfactory combustion will be obtained without the use of heaters.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

6. Section 55.10-55 is amended to read as follows:

§ 55.10-55 *Lubricating oil system.* (a) The lubricating oil system shall be designed to function satisfactorily when the vessel is permanently inclined to an angle of 15 degrees athwartship and 5 degrees fore or aft.

(b) When pressure or gravity forced lubrication is employed for the main propelling machinery an independent lubricating pump shall be provided except on internal combustion engine installations where each engine is fitted with a separate oil pump and the Commandant deems an auxiliary oil pump is unnecessary.

(c) The lubricating oil piping shall be independent of other piping systems and shall be provided with necessary coolers, heaters, filters, etc., for proper operation. Main propulsion engines fitted with full-flow type filters shall be arranged so that the filters may be cleaned without interrupting the oil supply.

(d) Oil coolers shall be provided with two separate means of circulating water through the coolers and oil heaters shall be fitted with by-passes.

(e) Diesel engine lubrication systems shall be so arranged that vapors from the sump tank may not be discharged back into the engine crank case of engines of the dry sump type.

(f) Steam turbine driven propulsion and auxiliary generating machinery depending on forced lubrication shall be arranged to shut down automatically upon failure of the lubricating system.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347,

sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

7. Section 55.10-65 (a) is amended to read as follows:

§ 55.10-65 *Sounding pipes.* (a) Oil tanks and water tanks shall be provided with manual means of sounding. All other tanks and hold compartments with or without bilge drain wells which are not at all times accessible under service conditions shall be fitted with sounding pipes of not less than 1½-inch pipe size which shall be led as straight as possible to within 2 inches of the lowest part of the tank or compartment to a position which is always accessible. In addition, tank liquid level indicators may be fitted as an auxiliary means of indicating the liquid level.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

SUBPART 55.13—REFRIGERATION SYSTEMS

8. Sections 55.13-1 and 55.13-5 are amended to read as follows:

§ 55.13-1 *Scope.* The regulations in this subpart apply to fixed refrigeration systems. The requirements shall not apply to small, portable self-contained units.

§ 55.13-5 *Design pressure.* The pressure vessels, compressors, piping, and controls shall be designed for the minimum pressures given in table 55.13-5.

TABLE 55.13-5—REFRIGERANT DESIGN PRESSURES

Refrigerant	Design pressure	
	High side (p. s. l.)	Low side (p. s. l.)
Ammonia (NH ₃).....	300	150
Carbon dioxide (CO ₂).....	1,500	1,000
Freon-11 (CCl ₃ F) ₂	30	30
Freon-12 (CCl ₂ F ₂).....	225	150
Freon-21 (CHCl ₂ F) ₂	70	40
Freon-22 (CHClF ₂).....	1300	1150
Freon-113 (C ₂ Cl ₃ F ₃).....	30	30
Freon-114 (C ₂ Cl ₂ F ₄).....	50	50

¹ Permitted for watercooled installations only.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

9. Section 55.13-20 *Small portable, self-contained units* is canceled.

PART 56—ARC WELDING, GAS WELDING, AND BRAZING

SUBPART 56.01—ARC WELDING AND GAS WELDING

1. Sections 56.01-1 and 56.01-5 are amended and Part 56 is amended by adding a new § 56.01-8, which reads as follows:

RULES AND REGULATIONS

TABLE 56.01-15 (c)—REQUIRED TESTS FOR PLATE GROOVE WELDS

Test plate thickness T	Maximum production plate thickness	Number and type of tests required				
		Reduced section tensile	Root bend	Face bend	Side bend	Macro-etch
$\frac{3}{8}$ inch to and including $\frac{3}{4}$ inch.	2T.....	2	2	2	-----	1
Over $\frac{3}{4}$ inch.....	2T for multiple pass welding.....	2	-----	-----	4	1
	2T but not over 2 inches for welding 1 pass from each side.....	2	-----	-----	4	1
	T for welding from 1 side only against a copper or melt back-up.....	2	-----	-----	4	1

§ 56.01-1 *Scope.* This part contains detail requirements covering the welded fabrication of machinery appurtenances and pressure-containing parts such as boilers, boiler furnaces, unfired pressure vessels, piping, valves, pipe fittings, etc., subject to inspection by the Coast Guard.

§ 56.01-5 *Definitions.*—(a) *Welding terms.* All references in this part or on plans, specifications, etc., to welding or allied processes shall be understood to be those of the American Welding Society's A3.0-49 "Welding Terms and Their Definitions."¹

(b) *Fabrication.* The term "fabrication" as used in this part refers to the assembly of machinery and appurtenances by welding, cutting and other processes allied to welding.

(c) *Welding procedure.* The term "welding procedure" refers to the detailed methods and practices including joint welding procedures involved in the production of a weldment.

(d) *Welding process.* Welding process is a metal-joining process wherein coalescence is produced by heating to suitable temperatures with or without the application of pressure, and with or without the use of filler metal.

§ 56.01-8 *Plan approval.* Plans shall clearly show all essential fabrication details. Welded or brazed joints shall be clearly and completely detailed on the plans, or standard welding symbols as specified in the American Welding Society's Standard A2.0-47, "Standard Welding Symbols"² shall be used to designate the type and size of welds.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

2. Sections 56.01-15 and 56.01-20 are amended to read as follows:

§ 56.01-15 *Submerged arc welding procedure qualification.* (a) Fabricators desiring to use the submerged arc welding process or a combination of submerged arc and manual welding processes shall conduct a procedure qualification test to insure that they have proper equipment, trained personnel, and are using correct procedure to produce acceptable welds.

(b) The deposited weld metal may be laid in single or multiple passes. The joint design, amperage, voltage, speed of welding, size of welding wire and grade of melt or flux shall be in accordance with the recommendations of the welding equipment manufacturer.

(c) Manufacturers desiring to secure process approval to fabricate pressure vessels, pipe and pressure-containing appurtenances by the use of the submerged arc welding process shall prepare test plates in the presence of an inspector who will stamp the plates with the official stamp of the Coast Guard. Specimens as required by table 56.01-15 (c) shall be machined from the test plate.

¹These standards included in American Welding Society Handbook.

(d) The test plate material shall be of the type to be welded in production and of a thickness as shown in table 56.01-15 (c). The requirements specified in this section are applicable to materials having equivalent physical properties. If preheat is not used in production welding, it shall not be used in the preparation of the test plate. If it is desired to conduct a procedure qualification to weld metals of dissimilar physical properties, the fabricator shall so inform the Commandant who will designate the types and methods of tests.

(e) Specimens may be tested by the fabricator or at a recognized testing laboratory. Specimens shall meet the requirements of § 56.05-1 and shall be tested in the presence of an inspector. One retest will be permitted for each specimen failing to meet the requirements. Should the retest fail, the fabricator shall take suitable remedial action to insure that the procedure is correct prior to the preparation of an additional set of test plates.

(f) The macro-etch specimen with the weld reinforcement in place shall be etched with a reagent which will clearly define the weld grain structure. After the specimen is etched it shall be given a protective coating to prevent oxidation.

(g) Results of the physical tests, the etch specimen and a sketch showing joint preparation, together with the information required in paragraph (b) of this section shall be forwarded to the Commandant for consideration prior to the fabricator using the equipment in production.

(h) The fabricator shall prepare a specification covering the procedure qualification as used in preparing the test plate and shall furnish a copy to the inspector. The procedure used in qualifying shall be employed in a fabrication except that speed of welding, amperage and voltage may vary to suit different material thicknesses. If the joint design is changed or alloy steel is to be fabricated and carbon steel used in the preparation of the test plate, a new procedure qualification shall be conducted.

(i) The fabricator shall weld a test plate of the actual thickness to be used in production to demonstrate to an inspector that he is using the proper welding procedure to obtain complete penetration.

§ 56.01-20 *Arc welding electrodes.*

(a) Acceptable brand names of arc welding electrodes, as published in the Equipment List for Merchant Vessels, CG-190, shall be used in the welded fabrication of machinery appurtenances

and pressure-containing parts as given in § 56.01-1.

(b) Type E6012 or E6013 electrodes shall not be used in the fabrication of any item listed in paragraph (a) of this section.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

3. Section 56.01-50 (d) is amended by revising figure 56.01-50 (d) as follows:

§ 56.01-50 *Detail requirements.* * * * (d) * * *

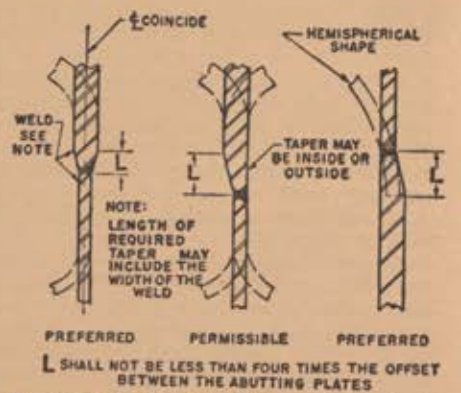


FIGURE 56.01-50 (d)—Types of joints for material of unequal thicknesses.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

4. Section 56.01-55 (b) is amended to read as follows:

§ 56.01-55 *Joints.* * * *

(b) The longitudinal joints of Class III welded pressure vessels shall be as given in § 56.01-30. The weld reinforcement shall be as required in paragraph (a) of this section. Fillet welds of lap type joints shall have a throat dimension of not less than $\frac{5}{8} T$, where T is the thickness of the shell plate. The surface of the overlap shall be not less than $4T$.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as

amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

5. Section 56.01-60 *Welded nozzle connections* is canceled.

6. Sections 56.01-65 and 56.01-70 are amended to read as follows:

§ 56.01-65 *Seal welding and tack welding.* (a) Seal welding may be used for the purpose of securing tightness of connections where the structure is such that no strain is placed upon the weld. Seal welding consists of depositing not more than two beads of weld metal. The throat of the weld shall not exceed 1/4 inch and the size of the electrode employed shall not exceed 3/16 inch diameter. Seal welds are not required to be stress-relieved.

(b) Intermittent welding may be used for attaching internal baffles, strainers, external lugs, securing lagging, etc., provided the welds are of at least two passes, do not have a throat exceeding 1/4 inch, are not more than 3 inches in length and have a center to center distance of at least twice their length.

(c) Intermittent welding and seal welding shall be done by qualified welders using acceptable electrodes (see § 56.01-20). Intermittent or seal welding shall not be done when the temperature of the metal of a pressure vessel is below 50° F. unless the base metal is preheated and held at a temperature of at least 200° F.

§ 56.01-70 *Preheating and stress relieving.* (a) All Class I welded pressure vessels unless specifically exempted in other sections of this subchapter, shall be stress-relieved to dissipate the major portion of the residual stresses.

(b) Stress relieving shall be done by heating the weldment slowly and uniformly to a temperature of from 1,100° F. to 1,200° F. for carbon-steel and held at that temperature for a period of time proportioned on the basis of at least one hour per inch of thickness and allowed to remain in the furnace until 500° F. is reached at which time the weldment may be withdrawn and allowed to cool in a still atmosphere. When a weldment of various thicknesses of material is stress-relieved, the thickest section of the parts welded shall govern the length of time required for soaking. Pressure vessels fabricated of carbon-steel exceeding 1/2-inch in thickness shall be preheated locally to 125° F., prior to welding, when the ambient temperature is below 50° F. Alloy materials usually require different stress-relieving temperatures due to different chemical properties of the material. The heat treatment covering preheating and stress relieving to be employed on the latter types of materials shall be in accordance with the recommendations of the manufacturer of the material and as specifically approved by the Commandant.

(c) When the vessel is required to be stress-relieved, all connections attached by arc or gas welding unless specifically exempted shall also be stress-relieved as required by this part.

(d) Local stress relieving of welds shall be performed by means of electrical inductance, electrical resistance, or other acceptable means whereby the tempera-

ture is accurately controlled. When a type of stress relief is used that produces direct radiation, the thermocouple shall be insulated so that the hot junction of the thermocouple will not be subject to the heat of radiation. Pyrometric equipment shall be provided to indicate the hottest and coolest points of the weldment. If the weldment is of appreciable size, the number of thermocouples provided shall be sufficient to insure complete coverage. The temperature of the weldment shall be considered as being the average of the observed temperature.

(e) The stress relieving operations shall be indicated by pyrometric equipment. When an autographic record of local stress-relieving operations is made, this record shall be maintained by the fabricator.

(f) The weldment shall be stress-relieved by one of the methods as follows:

(1) Heating the complete structure as a unit.

(2) Heating a section containing the part or parts to be stress-relieved. In employing this method of stress relief direct flame impingement shall be avoided.

(3) Circumferential joints may be stress-relieved by uniformly heating a circumferential band having a minimum width of six times the material thickness on each side of the welded joint in such a manner that the entire band is

brought up to the required temperature and held for the period specified in paragraph (b) of this section.

(4) Pipe shall be stress-relieved by heating a circumferential band having a width of at least 3 times the width of the widest part of the welding groove but not less than 6 times the maximum wall thickness at the weld with the weld at the center of the band. Where pipe is welded to a valve the heated zone may be decreased on the valve side of the joint to a minimum of one times the width of the weld reinforcement measured from the edge of the reinforcement toward the valve.

(5) Nozzles or other welded attachments which are required to be stress-relieved may be locally stress-relieved by heating a circumferential band around the entire vessel with the connection at the middle of the band to the required temperature and length of time specified for stress relieving. The band width shall be a minimum of six times the shell thickness on each side of the attachment.

(g) Except where specifically allowed in other sections in this subchapter, all nozzle connections after being attached by welding on Class I welded pressure vessels shall be stress-relieved.

(h) (1) Class II welded pressure vessels shall be stress-relieved if so required by figure 56.01-70 (h) or if fabricated of grade C or D marine steel boiler plate of a thickness exceeding 1 inch, or of

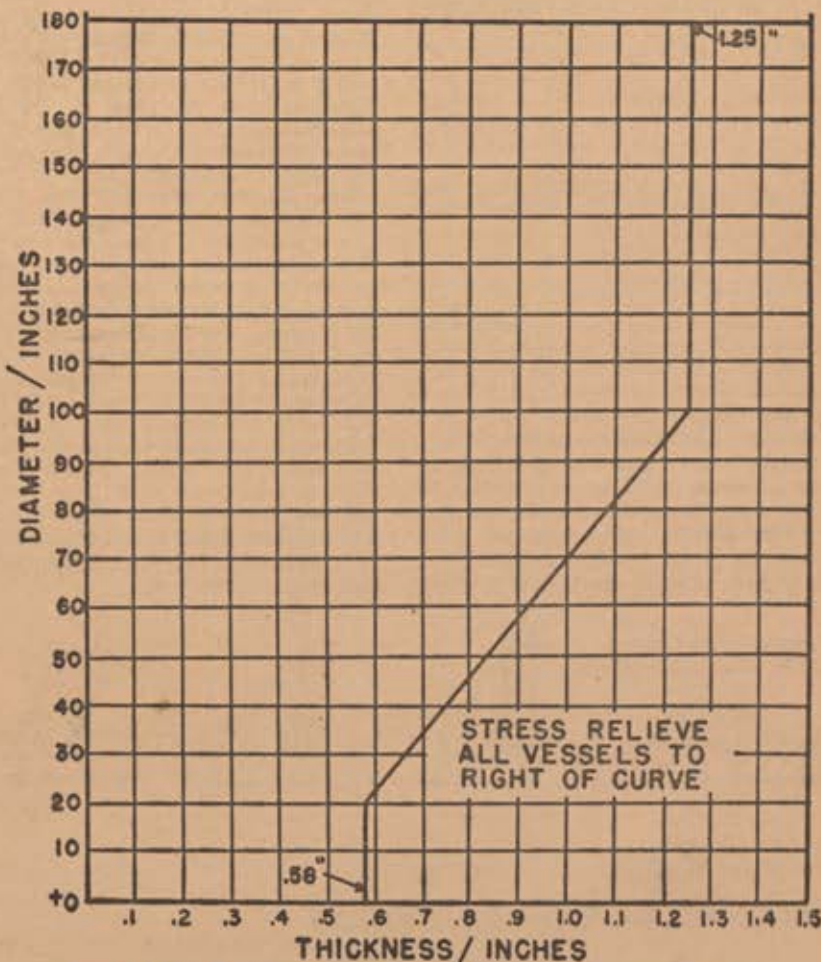


FIGURE 56.01-70 (h)—Stress relief diagram for class II pressure vessels.

grade E, F, or G marine steel boiler plate of a thickness of 0.58 inch and over.

(2) When class II welded pressure vessels are required to be stress-relieved, all nozzles or other welded attachments when joined by arc- or gas-welding shall be stress-relieved. When class II welded pressure vessels are not required to be stress-relieved, unreinforced nozzle connections and other attachments when joined by arc- or gas-welding are not required to be stress-relieved.

(3) When nozzles are reinforced with pads having a thickness greater than that of the shell or head to which they are attached, the nozzles shall be stress-relieved.

(i) Arc- or gas-welded connections may be added to class I and class II welded pressure vessels after they have been stress-relieved, without requiring stress-relief, provided:

(1) The diameter of the attachment opening in the vessel walls does not exceed that allowed for an unreinforced opening or does not exceed 2 inches, whichever is smaller; and,

(2) The inside and outside attachment welds do not exceed $\frac{3}{8}$ inch throat dimension.

(3) This paragraph does not apply to those connections so placed as to form ligaments in the shell, the efficiency of which will affect the shell thickness. Such added connections shall be stress-relieved.

(j) All connections attached by arc or gas welding to vessels fabricated by other means shall be stress-relieved in accordance with the requirements for connections on class II pressure vessels. If any such vessels are to be used for service equivalent to class I pressure vessels, arc- or gas-welded connections shall be stress-relieved.

(k) Arc- or gas-welded connections which require stress relieving and which are attached to vessels whose seams are of riveted construction shall be fabricated and stress-relieved prior to the making up or attachment of the courses by riveting. If they do not require stress relieving and are attached after riveting, the welds shall be located at a distance from the riveted seam at least equal to the diameter of the opening plus four times the plate thickness of the shell.

(l) All vessels containing lethal liquids or gases shall be stress-relieved. Any vessels containing liquids, gases or other substances which Part 38 (Subchapter D—Tank Vessels) or Part 146 or 147 (Subchapter N—Explosives or Other

Dangerous Articles or Substances, and Combustible Liquids on Board Vessels) of this subchapter require to be fabricated in accordance with a class of pressure vessel requiring stress relief shall be stress-relieved.

(m) Cold weldments shall not be placed in the furnace when the temperature therein exceeds 500° F. Upon cooling, the weldment may be removed from the furnace when the temperature of same has reached 500° F. and allowed to cool in still air to assure a gradual decrease in temperature.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

6. Section 56.01-80 is amended to read as follows:

§ 56.01-80 *Welded piping.* (a) Piping materials complying with Part 51 of this subchapter may be joined by means of arc or gas welding provided the fabrication complies with the requirements of this section.

(b) The requirements of this section are applicable to class I piping (see Part 55 of this subchapter) and class II piping unless specifically exempted.

(c) Sections of pipe shall be welded insofar as possible in the fabricating shop. Prior to welding class I piping, the fabricator shall request an inspector to visit his plant to examine his fabricating equipment and to witness the qualification tests required by § 56.01-10. One test specimen shall be prepared for each process and welding position to be employed in the fabrication.

(d) (1) For class I piping, double-welded butt joints or single-welded butt joints fitted with a backing ring or its equivalent on the inside of the pipe shall be employed when the pipe diameter exceeds 2 inches, except as permitted in this paragraph. Piping of diameters not exceeding 2 inches may be joined by single-welded butt joints, with the backing ring omitted in sizes below 1 inch, or by sleeves fitted over the ends of pipes, or by socket joints attaching the ends of the pipes by strength fillet welds. Slip-on welded flanges complying with figure 55.07-15 (f3) and tables 55.07-15 (e5) and (e6) for 150-pound and 300-pound standards may be used in class I piping for temperatures not exceeding 450° F.

(2) Some acceptable types of weld pipe connections are shown in figure 56.01-80 (d).

(3) For carbon-steel material the backing ring for class I piping shall be of low-carbon steel and shall be of the plain type or a type with projections spaced intermittently around the outside of the periphery to establish a minimum root gap as shown in figure 56.01-80 (d), detail F. For alloy steel material the backing ring shall have heat resisting properties equivalent to that of the material being welded except carbon steel backing rings may be used when welding carbon-molybdenum material.

(e) For class II piping, the type of joints shall be similar to class I piping, with the following exceptions:

(1) Single-welded butt joints may be employed without the use of backing rings in all sizes provided that the weld is chipped or ground flush on the root side of the weld.

(2) For services such as vents, overflows, and gravity drains, the backing ring may be eliminated and the root of the weld need not be ground.

(3) Square-groove welds without edge preparation may be employed for butt joints in vents, overflows, and gravity drains where the pipe wall thickness does not exceed $\frac{3}{16}$ inch.

(4) The crimped or forged backing ring with continuous projection around the outside of the ring is acceptable only for class II piping.

(f) All butt welds shall be reinforced at the center of the weld by not less than 10 percent of the wall thickness for pipe or tubes for thicknesses not exceeding $\frac{3}{8}$ inch; pipes and tubes having a wall thickness exceeding $\frac{3}{8}$ inch shall be reinforced by at least $\frac{1}{16}$ inch. The reinforcement shall be free of grooves, valleys, or other changes in contour along the edge or upon the surface of the weld if the inspector deems such to be objectionable.

(g) Each butt-welded joint shall be stamped with the welder's identification symbol.

(h) All butt-welded joints on Class I piping exceeding 2½ inches in diameter with the exception of high pressure salt water piping systems used in tank cleaning operations shall be stress-relieved as required by § 56.01-70.

(i) All complicated connections including manifolds, shall be stress-relieved in a furnace as a whole as required by § 56.01-70 before being taken aboard ship for installation.

(j) Class I carbon-steel and alloy-steel piping exceeding 2½ inches in diameter shall be preheated as required by § 56.01-70.

(k) (1) All butt-welded joints on Class I piping exceeding 2½ inches in diameter, with the exception of high pressure salt water piping systems used in tank cleaning operations, shall be nondestructively tested as required by § 56.05-5.

(2) All welds shall be free of grooves and depressions. Surfaces of welded joints which are to be magnetic powder tested shall be made smooth of all surface irregularities so that the powder may properly indicate any fracture or defect.

(l) The base material and joint preparation for welding shall comply with the manufacturer's process record.

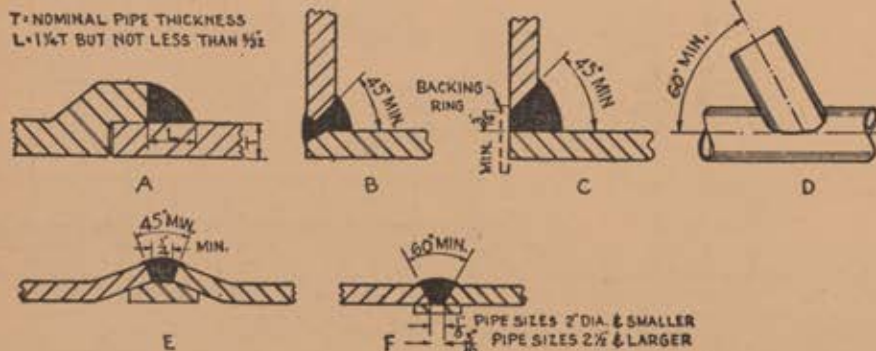


FIGURE 56.01-80 (d)—Acceptable types of welded pipe connections.

(m) A complete record of the manufacturer's process shall be maintained on the form shown by figure 56.01-80 (m) to establish definite limits of all essential variables involved. The manufacturer shall, after his welding process has been approved, conduct all welding in accordance with the requirements of his process record.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491 as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

SUBPART 56.05—TESTS AND INSPECTION

7. Part 56 is amended by adding a new § 56.05-6 reading as follows:

§ 56.05-6 *Spot examination of welded joints*—(a) *Scope*. (1) All class II welded unfired pressure vessels which are not given a complete radiographic

examination as specified by § 56.05-5 of this subchapter shall have portions of the finished welded joints examined by spot radiography, except vessels meeting the requirements of subparagraph (2) of this paragraph need not be so examined.

(2) Spot examination specified by subparagraph (1) of this paragraph is not required when an allowable stress of 80 percent of the values given in table 52.05-10 (a) in Part 52 of this subchapter is used in the design of the vessel.

(b) *Number required*. At least one spot shall be examined on each vessel welded having 50 feet or less of combined longitudinal and circumferential welds. For vessels having more than 50 feet of combined longitudinal and circumferential joints at least one spot shall be examined for each 50 feet or less of welded joints. If more than one welding procedure is employed or if more than one welder does the welding on a vessel, at least one spot shall be examined for each

procedure and each welder. The spot(s) examined may be considered representative of the procedure, the welder and one interval of 50 feet of welded joint. The spot(s) to be examined shall be designated by an inspector.

(c) *Spot radiographing*. Each spot required by paragraph (b) shall be examined by radiography as prescribed in § 56.05-5. The spot radiographs shall meet the standards given in § 56.05-5 (k). Retest radiographs permitted by paragraph (d) of this section shall comply with the standards given therein. Films of spot radiographs which have been examined by the inspector may be destroyed.

(d) *Retests*—(1) *Spot examination*. When a spot has been examined and the welding does not comply with the minimum quality requirements prescribed in paragraph (c) of this section, two additional spots shall be examined in the same joint at locations to be designated by the inspector, one on each side of and not far from the initial spot to determine the limits of defective welding, and if the welding at either of these spots fails to meet the minimum requirements of subparagraph (2) of this paragraph, additional nearby spots shall be examined until the limits of unacceptable welding are determined. In addition, the inspector shall require that an additional spot be examined at one location to be selected by him in each joint not previously examined on which the same welder has welded and if any additional spot fails to comply with the minimum quality requirements of paragraph (c) of this section, the limits of unacceptable welding shall be determined as described in this section. All rewelded areas shall be re-examined as required by the inspector and shall comply with the prescribed requirements in this section.

(2) *Radiographic standard for retest*. Welds in which the radiographs show any type of cracks or zones of incomplete penetration shall be unacceptable. Welds in which radiographs show elongated slag inclusions, cavities, or lack of fusion shall be unacceptable if the length of such imperfection is greater than $2/3T$, where T is the thickness of the thinner plate. If several imperfections within the above limitations exist in line, the welds shall be judged acceptable if the sum of the longest dimension of all such imperfections is not more than T in length of $6T$, and if the defects are separated by at least $6L$ of acceptable welding, when L is the length of the longest imperfection. The maximum permissible porosity shall not exceed that permitted by § 56.05-5, except that not more than twice as many cavities or slag inclusions, but of no greater size, shall be permitted within any single square inch of film area, or for the whole film area.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491 as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275)

CONTRACTOR'S NAME _____							
ADDRESS _____							
PROCESS _____				DATE _____			
MATERIAL (BASE METAL _____)							
MATERIAL (FILLER METAL _____)							
For Gas Welding Type of Flame _____				For Arc Welding Type of Current _____			
If D. C., state polarity. _____							
IDENTIFICATION SYMBOLS OF THIS WELD							
In above space indicate edge preparation and relative position of each pass as deposited.	PASS NUMBER	HEAT	INPUT	DATA	DIAM. OF FILLER METAL	TEMP. DEG. F*	REMARKS
*Give degree of preheat, if any. Indicate temperature of weld metal just prior to the deposition of each succeeding pass.							
Cleaning of Passes _____							
Treatment of Defects _____							
Peening _____							
Heat Treatment (Temp. _____)		Name of welder _____					
(Time _____)		Name of Recorder _____					
(Cooling _____)							

FIGURE 56.01-80 (m)—Manufacturer's record of welding process.

PART 57—INSTALLATIONS, TESTS, INSPECTIONS, REPAIRS, AND MISCELLANEOUS REQUIREMENTS

1. Part 57 is amended by adding a new Subpart 57.25, consisting of §§ 57.25-1 to 57.25-60, reading as follows:

SUBPART 57.25—STEERING APPARATUS

Sec.	
57.25-1	Steering apparatus; existing installations.
57.25-5	Steering apparatus; new installations.
57.25-10	Rudder movement.
57.25-15	Plan approval.
57.25-20	Power driven steering gear.
57.25-25	Auxiliary means of steering.
57.25-30	Steadying the rudder.
57.25-35	Controlling rudder movement.
57.25-40	Buffers.
57.25-45	Emergency steering wheel.
57.25-50	Arrangement of steering wheels.
57.25-55	Special steering apparatus.
57.25-60	Steering gear piping.

AUTHORITY: §§ 57.25-1 to 57.25-60 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 489, 1333, 50 U. S. C. App. 1275.

§ 57.25-1 *Steering apparatus; existing installations.* (a) All existing vessels subject to inspection by the Coast Guard shall be provided with suitable steering apparatus. Extra steering apparatus, consisting of relieving tackle, or of auxiliary power- or hand-steering gear attached to the rudder stock independent of the regular steering gear, shall be provided.

(b) Where reasonable and practicable, the emergency steering wheel shall be located on the after weather deck.

(c) Replacements of steering apparatus on existing vessels shall be in accordance with this subpart for new installations.

§ 57.25-5 *Steering apparatus; new installations.* All new vessels subject to inspection by the Coast Guard, except certain towed barges, shall be provided with main and auxiliary steering apparatus in accordance with §§ 57.25-10 to 57.25-60, inclusive.

§ 57.25-10 *Rudder movement.* The steering gear shall be provided with effective means for putting the rudder from 35 degrees over to 35 degrees over with the vessel running ahead at the maximum continuous rated shaft RPM. The timing may be conducted from 35 degrees on one side through 30 degrees on the other side, and the average rate of the rudder shall be not less than 2½ degrees per second. In addition, they shall be provided with effective auxiliary means for actuating the rudder which shall be capable of putting the rudder from 15 degrees over to 15 degrees over in 60 seconds with the vessel running ahead at half speed, or seven knots, whichever is greater.

§ 57.25-15 *Plan approval.* General arrangement plans of the main and aux-

iliary steering arrangements and piping systems shall be submitted to the Commandant (MMT) U. S. Coast Guard, Washington 25, D. C., for approval.

§ 57.25-20 *Power driven steering gear.* The main steering gear shall be power driven for vessels over 250 feet in length or when the required upper rudder stock diameter is over 9 inches. The auxiliary means for steering shall be power driven when the required upper rudder stock diameter is over 14 inches.

§ 57.25-25 *Auxiliary means of steering.* (a) An auxiliary means of steering will not be required where the main gear is of the dual-power hydraulic type, having two independent pumps and separate leads to the pump prime movers from the source of power. In such cases the attachment to the rudder stock shall be designed for strength in excess of that of the rudder stock.

(b) A suitable arrangement of block and tackle will be acceptable as an auxiliary steering means, and when arranged for operation by means of power driven winches or similar machinery, will be considered an auxiliary power steering gear.

(c) An auxiliary means of steering will not be required on double-ended ferryboats where independent steering gears are fitted at each end of the vessel, and two sources of power are provided where the gear is power driven.

§ 57.25-30 *Steadying the rudder.* All ocean-going vessels requiring power gears shall be provided with arrangements for steadying the rudder in the event of an emergency and when a change of gear is required. On hydraulic type steering gears a suitable arrangement of stop valves in the main piping may be considered as a means of steadying the rudder.

§ 57.25-35 *Controlling rudder movement.* Main power gears shall be provided with positive arrangements for stopping the gear before the rudder stops are reached. These arrangements shall be synchronized with the rudder stock or the position of the gear itself, rather than with the steering gear control system. The steering gear shall have a follow-up device to control rudder movements when operated from the main steering station.

§ 57.25-40 *Buffers.* On vessels in ocean, coastwise, and Great Lakes service, steering gears other than the hydraulic type shall be designed with suitable buffer arrangements to relieve the gear from shocks to the rudder.

§ 57.25-45 *Emergency steering wheel.* An emergency steering station from which the control of the steering gear can be affected by mechanical means, shall be located on the after weather deck or other suitable location acceptable to the Commandant.

§ 57.25-50 *Arrangement of steering wheels.* Steering wheels, including "trick wheels" located in the steering gear room, shall turn in a clockwise direction for "right rudder" and counterclockwise for "left rudder." The ship's

heading shall be to the right, following clockwise movement of the wheel. The arrangement of steering stations shall be such that the helmsman is abaft the wheel. However, if a wheel is fitted in the steering gear room, and is intended solely for warming up and testing the gear, the helmsman need not stand abaft the wheel. The rims of the wheels shall be plainly marked with arrows and lettering for right and for left rudder, or a suitable notice indicating these directions shall be posted directly in the helmsman's line of vision.

§ 57.25-55 *Special steering apparatus.* (a) Where no regular rudder is fitted and steering action is obtained by a change of setting of the propelling unit, emergency steering is not required, nor will the requirements of this subpart be generally applicable. Special consideration will be given by the Commandant for such installations.

(b) When tiller bars instead of wheels are installed in the pilothouse, they shall be fore and aft when the rudders are amidships. A pointer shall be fitted to the forward end of the bar which shall point directly ahead when the rudders are amidships, and shall point to the right when the bow of the ship moves to the right, and shall point to the left when the bow of the ship moves to the left.

§ 57.25-60 *Steering gear piping.* The arrangement of piping for hydraulic steering gears shall be such that a change from the main to the auxiliary gear can be readily effected. A relief valve shall be provided for the protection of the hydraulic system. Pressure piping shall meet the requirements of Part 55 of this subchapter.

Subchapter G—Ocean and Coastwise; General Rules and Regulations

PART 59—BOATS, RAFTS, BULKHEADS, AND LIFESAVING APPLIANCES (OCEAN)

1. Section 59.62 *Steering apparatus; existing installations* is canceled.
2. Section 59.62a *Steering apparatus; new installations* is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 60—BOATS, RAFTS, BULKHEADS, AND LIFESAVING APPLIANCES (COASTWISE)

1. Section 60.55 *Steering apparatus; existing installations* is canceled.
2. Section 60.55a *Steering apparatus; new installations* is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter H—Great Lakes; General Rules and Regulations

PART 76—BOATS, RAFTS, BULKHEADS, AND LIFESAVING APPLIANCES

1. Section 76.55 *Steering apparatus; existing installations* is canceled.
2. Section 76.56 *Steering apparatus; new installations* is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter I—Bays, Sounds, and Lakes Other Than the Great Lakes; General Rules and Regulations.

PART 94—BOATS, RAFTS, BULKHEADS, AND LIFESAVING APPLIANCES

1. Section 94.54 *Steering apparatus; existing installations* is canceled.

2. Section 94.55 *Steering apparatus; new installations* is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter J—Rivers; General Rules and Regulations

PART 113—BOATS, RAFTS, BULKHEADS, AND LIFESAVING APPLIANCES

1. Section 113.46a *Steering apparatus; existing installations* is canceled.

2. Section 113.47 *Steering apparatus; new installations* is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter Q—Specifications

PART 162—ENGINEERING EQUIPMENT

Part 162 is amended by adding a new Subpart 162.026, consisting of §§ 162.026-1 to 162.026-17, reading as follows:

SUBPART 162.026—BOILERS, AUXILIARY, AUTOMATICALLY CONTROLLED, PACKAGED, FOR MERCHANT VESSELS

Sec.	
162.026-1	Applicable regulations and specifications.
162.026-2	Scope.
162.026-3	Construction.
162.026-4	Controls.
162.026-5	Water level controls.
162.026-6	Safety combustion control.
162.026-7	Pressure controls.
162.026-8	Program control.
162.026-9	Fuel supply shut-off controls.
162.026-10	Heavy fuel oil.
162.026-11	Boiler alarms.
162.026-12	Wiring of electrical components.
162.026-13	Tests and inspection.
162.026-14	Types of approval.
162.026-15	Procedure for initial approval.
162.026-16	Procedure after initial approval.
162.026-17	Instruction booklets.

AUTHORITY: §§ 162.026-1 to 162.026-17 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interprets or applies R. S. 4400, 4417, 4417a, 4418, 4426-4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 347, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 362, 363, 366, 367, 391, 391a, 392, 404-412, 435, 439, 1333, 50 U. S. C. App. 1275.

§ 162.026-1 *Applicable regulations and specifications.* (a) The following regulations and specifications, of the issue in effect on the date the contract is awarded, forms a part of this subpart:

(1) Marine Engineering Regulations and Material Specifications (Subchapter F (Marine Engineering) of this chapter).

(2) National Electrical Code, published by National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass.

§ 162.026-2 *Scope.* (a) This specification covers requirements for the design, construction, and testing of automatically controlled packaged auxiliary boilers, intended for installation on mer-

chant vessels subject to inspection by the Coast Guard.

(b) The term "automatically controlled packaged auxiliary boiler" means a steam boiler operating at pressures exceeding 30 p. s. i. used for all purposes on shipboard for which steam may be required other than propulsion; equipped with all necessary controls for automatic operation; and furnished complete with fuel burning equipment, mechanical draft equipment and necessary mechanical feed water equipment, thus requiring only to be connected to fuel, water, and electric supplies to be ready for use.

§ 162.026-3 *Construction.* (a) All automatic packaged boilers shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter, for the design, construction and testing of the bare boiler, except as otherwise specified in this subpart.

(b) All electrical and mechanical control devices shall be of a type tested and approved by Underwriters' Laboratories, Inc., Factory Mutual Laboratory, or a recognized inspection board or test laboratory acceptable to the Commandant.

(c) Safety control devices shall be designed to perform satisfactorily in marine service. The boiler and control equipment shall be designed to permit normal operation with a momentary roll of 30 degrees or a permanent list of 15 degrees to either side and a permanent inclination of 5 degrees fore and aft with the boiler installed with its longitudinal axis in the fore and aft position.

(d) All electrical devices shall be of drip-proof construction, as simple and rugged as practicable and suitable for marine service.

§ 162.026-4 *Controls.* (a) Each automatic packaged boiler shall be fitted with the following controls:

- (1) Operating water level control.
- (2) Low-water cut-offs.
- (3) Safety combustion control.
- (4) Pressure controls.
- (5) Program control.

(b) Wherever possible safety control devices shall be designed to "fail safe" and thus immediately prevent continued operation of the boiler in the event of mechanical failure which may cause unsafe operation of the boiler.

(c) Electrical controls shall be provided to shut down the boiler from a position outside the compartment in which it is located, so that fuel will not be supplied to the fuel burning equipment. The entire boiler shall be disconnected from all sources of potential by means of one disconnect switch located adjacent to boiler.

(d) Mercury tube actuated controls are prohibited.

§ 162.026-5 *Water level controls.*—(a) *Operating water level control.* (1) Each boiler shall be equipped with an operating level control device to automatically supply the required amount of feedwater when the surface of the water falls to a predetermined level, and to automatically shut-off the feed-water supply when the water level exceeds a predetermined level.

(b) *Low-water cut-offs.* (1) Each boiler shall be equipped with two (2) low-water cut-offs, so arranged and located as to automatically cut off the fuel supply to the burners when the surface of the water falls to a point no lower than that visible in the gauge glass.

(2) The upper low-water cut-off may be arranged to operate in conjunction with operating water level control.

(3) The lower or auxiliary low-water cut-off shall have a separate and independent connection to the boiler and shall be arranged so that the lowest point of cut-off shall be not less than 1 inch above the top boiler tubes of boilers of the fire tube type, or the lowest permissible water level of boilers of the water tube type. When low-water cut-offs are inserted in the boiler shell, separate and independent connections to the boiler are not required.

(4) The auxiliary low-water cut-off shall control a separate fuel oil valve and shall be fitted with manual reset devices which will necessitate recycling or resetting of the controls after the low-water cut-off has functioned.

(c) *Detail requirements.* (1) Operating level controls and low-water cut-offs may be of the float type, electrode probe type, thermostatic expansion tube, or thermo-hydraulic type, or such other type acceptable to the Commandant. Float chamber type low-water cut-offs using stuffing boxes to transmit the motion of the float from the chamber to the external switches are prohibited.

(2) Water level controls shall be so located as to minimize the effect of vessel roll and pitch.

(3) Water level devices shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber.

(4) The minimum size of pipes connecting a float chamber to a boiler shall be 1 inch. Shut-off valves fitted in connecting piping shall be either outside-screw-and-yoke or lever lifting type gate valves, or stopcocks having levers permanently fastened thereto and marked in line with the passageway, or of such other through construction as to prevent stoppage by deposits of sediment and also constructed to indicate by the position of the operating mechanism whether open or closed. Where stopcocks are used they shall be of a type having the plug held in place by a guard or gland.

(5) No outlet connection except for damper regulation, pressure controls, water columns, drains or steam gauges shall be placed on the float chamber or on the pipes connecting the float chamber to the boiler on which it is mounted.

(6) Float or electrode chambers shall be equipped with suitable drain connection not less than 3/4-inch pipe size.

(7) Float operated water control or cut-off devices shall be equipped with "fixed stops" of a design to prevent over-travel of control floats and rods, which would unduly stress the control mechanisms, or the control mechanism shall be designed to permit such over-travel after operation of the mechanism.

(8) Boilers designed to operate with forced circulation feed, or boilers with no fixed steam and water line, will be

given special consideration by the Commandant.

(9) The requirements in this section apply to boilers having a definite water line.

§ 162.026-6 *Safety combustion control.* (a) Each boiler shall be equipped with a safety combustion control designed to automatically shut off the fuel oil supply to the burners in the event of flame extinguishment and power failure. The safety combustion device shall be so designed that any vacuum tube or other component will cause a safety shut down, or by the employment of a safety interlock circuit, prevent recycling of the control.

(b) The safety combustion controls shall be of the electronic type, or such other type as may be approved by the Commandant. Safety combustion controls of the thermostatic type, such as stack switches and pyrostats operated by means of an open bi-metal helix, are prohibited.

(c) The safety combustion control shall be capable of shutting off the fuel oil supply to the burners within 2 to 4 seconds following flame extinguishment.

§ 162.026-7 *Pressure controls.* (a) Each boiler shall be equipped with steam operated controls designed to regulate or cut-off the fuel oil to the burners in the event the steam pressure exceeds a predetermined amount (the maximum shall not exceed the boiler safety valve setting).

(b) Operating steam pressure controls shall be designed to operate at cut-out and cut-in pressures, when arranged for automatic operation.

§ 162.026-8 *Program control.* (a) Automatically controlled boilers shall be equipped with a program control to assure a safe cycle of operation upon initial starting, and upon cycling between temperature or pressure limits.

(b) The programming control shall be designed to cycle the boiler in accordance with a predetermined sequence. The sequence of events shall include the following:

(1) A pre-purge period for a sufficient length of time to assure a minimum of 3 changes of air in the combustion chamber, passes and stack.

(2) Ignition (spark coming on) shall precede the opening of the fuel valve by not less than 5 seconds.

(3) A post-purge period of at least 30 seconds after the closing of the fuel valve.

(4) When controls are provided to modulate the air-fuel ratio, the pre-purge period shall start with the modulating control in the high-fire position, and ignition shall not be turned on until the modulating control has returned to low-fire position.

§ 162.026-9 *Fuel supply shut-off controls.* (a) Fuel supply to the burners shall be shut off automatically in the event of low water, flame extinguishment, forced draft fan failure, low voltage, or other abnormal conditions.

(b) Oil solenoid valves shall be approved as required by § 162.026-3 (b), and shall be acceptable to the Commandant.

(c) The fuel oil supply to the burners shall shut off automatically in the event of the malfunctioning of any component as a result of reduced voltage or open circuit of circuit components.

§ 162.026-10 *Heavy fuel oil.* (a) If heavy fuel oil is used, a light oil pilot shall be employed to ignite the heavy oil and a thermostatically controlled electric oil heater shall be furnished and equipped with a limit switch so that the boiler cannot be started if the oil temperature is too low for proper combustion. The aforementioned device shall automatically shut off the fuel oil to the burners if the temperature of the oil falls below the proper combustion temperature during operation of the boiler.

§ 162.026-11 *Boiler alarms.* (a) The lower or auxiliary low-water cut-off shall be fitted with audible alarm.

(b) Safety combustion control circuit shall be fitted with an audio alarm to provide audible warning in the event of safety shutdown of the device.

(c) Means shall be provided to silence the audible alarms by transferring signal to visible indicator. The alarm circuits shall be reset manually on return to normal operating conditions.

§ 162.026-12 *Wiring of electrical components.* (a) All insulated wire shall be of a moisture resistant type and rated for the maximum temperature that will be encountered in the location installed.

(b) Wiring between equipment enclosures shall be protected by rigid metal conduit, except that short runs of wire may be protected by flexible conduit where the use of rigid conduit would be impracticable.

(c) All conduit shall be securely supported and shall enter enclosures from the bottom where practicable.

(d) All conduit runs shall be adequately drained at low points.

(e) Wire sizes and overcurrent protection shall be in accordance with the applicable requirements of National Electrical Code.

§ 162.026-13 *Tests and inspections—*
(a) *Performance test.* (1) A performance test shall be conducted for a continuous period of not less than 48 hours, at the following rated loads:

16 hours at full rated capacity;
16 hours at 50 percent rated capacity;
8 hours at variable loads between full capacity and 50 percent of full capacity; and,
8 hours at variable loads between 50 percent and 25 percent of full capacity.

(2) Capacity changes shall be made abruptly requiring controls to respond automatically with safe performance. The controls and safety devices shall be tested as prescribed in this subpart for each load test.

(3) All wiring, junction boxes, connections and control components shall be examined to determine compliance with good marine practice.

(4) The boiler shall be started cold and the functioning of all controls shall be observed.

(5) After the unit is delivering steam at the rated output, the water level controls shall be tested by slowly lowering the water level in the boiler. This test

shall simulate actual operating conditions as closely as possible. A low water condition may be obtained by either (i) opening the electrical circuit to the boiler feed pump with the boiler carrying full steam load, or (ii) cracking the main blow-off valves. The water level controls shall not be tested by blowing down water column. The operating water level controls and the upper and lower auxiliary low-water cut-offs shall be tested individually. Test audible alarm in the lower auxiliary low-water cut-off circuit. The manual reset device shall be tested after operation of the auxiliary low-water cut-off.

(6) The safety combustion control shall be tested to determine that the device will shut off the fuel oil supply to the burners under conditions of flame extinguishment and power failure, or open or short circuit of circuit components. The audible alarm shall be tested in the safety combustion control circuit.

(7) A low voltage test shall be conducted to satisfactorily demonstrate that the fuel supply to the burners will be automatically shut off before any control component malfunctions as a result of the reduced voltage.

(8) The operating steam pressure controls shall be tested by regulating the steam pressure to determine that the device will automatically cut off the fuel supply to the burners at the high pressure limit and restart the burners when the boiler pressure drops to the low limit.

(9) The program control shall be tested through a sufficient number of cycles of operation to determine that the controls are satisfactorily arranged for automatic operation of the boiler.

(10) Interrupt the power supply and the ignition transformer supply and observe operating function of the safety controls.

(11) Measure all temperatures of generators, motors, relays and solenoid coils to determine if units are operating at safe temperatures.

(12) Test all emergency disconnect switches to observe proper functioning.

(b) *Installation tests—*(1) *Operating test.* An operating test after installation shall be conducted for a period of at least two (2) hours to insure that all the control components have been properly installed and that all parts of the boiler, including controls and safety devices, are in satisfactory operating condition.

(2) *Hydrostatic tests and inspection.* The hydrostatic test and inspection of the boiler after installation shall conform to the requirements for new boilers as prescribed in Subchapter F (Marine Engineering), of this chapter.

(c) All tests shall be witnessed by an inspector.

§ 162.026-14 *Types of approval.* (a) Type approval may be granted by the Commandant for a prototype design of stock units which are completely packaged and assembled in the boiler manufacturer's shop. Wherever possible the boiler shall be designed and shipped as a packaged unit.

(b) If the component parts of the boiler are received from one or more sources and are initially assembled aboard the vessel without being subjected to a satisfactory performance test, approval shall be limited to the specific installation only.

§ 162.026-15 *Procedure for initial approval*—(a) *Plan submittal*. (1) Before approval action is taken on any new design of automatic packaged boilers, the manufacturer shall submit for approval the following plans and descriptive data, in quadruplicate, to the Commandant (MMT), U. S. Coast Guard, Washington 25, D. C.:

(i) Plans showing the pressure parts and piping components.

(ii) Equipment wiring and elementary schematic wiring diagram.

(iii) Master plans for electrical equipment.

(iv) Drawings of electrical control components and safety devices.

(v) Manufacturer's descriptive literature or assembly drawings of all individual control components, such as oil solenoid valves, pressure switches, air solenoid switches, program controls, water level controls, and combustion safety equipment, etc.

(2) If such drawings and descriptive data are satisfactory, the manufacturer will be advised to proceed with the fabrication of the boiler.

(b) *Pre-approval tests*. (1) Upon completion of the packaged unit, the manufacturer shall notify the Officer in Charge, Marine Inspection, in the district in which the boiler is fabricated or assembled, when the boiler is ready for the required performance test.

(2) When the boilers are completely packaged and assembled in the boiler manufacturer's shop, one complete unit of a prototype design shall be subjected to the performance test prescribed in § 162.026-13 (a). Upon satisfactory completion of this test, type approval may be granted by the Commandant.

(3) If the component parts of the boiler are received from one or more sources and are initially assembled aboard the vessel without being subjected to a satisfactory performance test, individual performance tests prescribed in § 162.026-13 (a) will be required for each installation. Upon satisfactory completion of the performance test, specific approval of each packaged boiler may be granted by the Commandant, and such approval shall be limited to the specific installation.

§ 162.026-16 *Procedure after initial approval*. (a) Packaged units manufactured from an approved prototype design without change need not be subjected to the performance test, but shall be tested after each installation as prescribed in § 162.026-13 (b).

(b) All boilers approved for a specific installation only are required to be subjected to the performance and hydrostatic tests after each installation as prescribed in § 162.026-13.

(c) When the performance test is conducted after installation aboard the vessel, the boilers need not be subjected to the operating test.

§ 162.026-17 *Instruction booklets*.

(a) The boiler manufacturer shall furnish with each boiler, instruction booklets providing a full description of the boiler and all auxiliaries, and complete instructions for installation and operation of the packaged unit.

Dated: August 15, 1952.

[SEAL] MERLIN O'NEILL,
Vice Admiral, U. S. Coast Guard,
Commandant.

[F. R. Doc. 52-9233; Filed, Aug. 20, 1952;
8:49 a. m.]

TITLE 14—CIVIL AVIATION

Chapter I—Civil Aeronautics Board

Subchapter A—Civil Air Regulations

[Supp. 9]

PART 43—GENERAL OPERATION RULES

ANNUAL AND PERIODIC INSPECTIONS

This supplement alters the existing provisions of §§ 43.22-1 and 43.22-2 by providing that annual inspections of aircraft may be conducted not only by representatives of the Administrator but also by appropriately rated certificated repair stations, as authorized in recently revised Part 52 of this subchapter. The supplement further provides that periodic inspections of aircraft, and inspections required prior to annual inspections, may continue to be recorded on Form ACA-319, or may be recorded on forms prepared by the aircraft manufacturer or the operator which reflect in detail the items inspected. Inasmuch as the use of Form ACA-319 will not be mandatory, the scope of the periodic inspection which has been a part of such form is included in this supplement.

The supplement does not impose additional burdens upon interested persons. Compliance with the notice, procedures, and effective date provisions of section 4 of the Administrative Procedure Act would be unnecessary, and therefore is not required. Sections 43.22-1 and 43.22-2, published on December 28, 1951, in 16 F. R. 13035, are revised to read:

§ 43.22 *Inspections*—(a) *Annual inspection*. An aircraft shall not be flown, except for airworthiness flight tests, unless within the preceding 12 calendar months it has been given an annual inspection as prescribed by the Administrator and has been found to be airworthy by a person designated by the Administrator.

(b) *Periodic inspection*. An aircraft shall not be flown for hire, unless within the preceding 100 hours of flight time it has been given a periodic inspection by an appropriately rated mechanic in accordance with the periodic inspection report form prescribed by the Administrator, has been found to be airworthy, and a notation to that effect has been entered by such mechanic in the aircraft log. The annual inspection required by paragraph (a) of this section will be accepted as one such periodic inspection.

(c) *Air carrier exemption*. Air carrier aircraft are exempted from paragraphs (a) and (b) of this section when such aircraft are maintained and inspected in accordance with a continuous maintenance and inspection system as provided for by Part 41, 42, or 61 of this subchapter.

§ 43.22-1 *Annual inspections (CAA rules which apply to § 43.22 (a))*. The purpose of this section is to prescribe the scope of the annual inspection required by § 43.22 (a) and to set forth the procedure to be followed by an aircraft owner when making application for an annual inspection.

(a) *Inspection requirement prior to presenting application*. Immediately prior to submitting an application for annual inspection, the aircraft shall be inspected and found airworthy by a certificated aircraft and engine mechanic(s) or by an appropriately rated and certificated repair station. The mechanic(s) or the appropriately rated certificated repair station shall conduct and record the airworthiness inspection in accordance with § 43.22-2 (a) and (b). All items found unairworthy, as a result of the inspection, shall be corrected prior to presenting the aircraft for annual inspection.

(b) *Application procedure*. (1) After the aircraft has been found airworthy in accordance with paragraph (a) of this section, the aircraft owner (or his agent) shall make application for annual inspection by completing Form ACA-305 entitled, "Application for Airworthiness Certificate and/or Annual Inspection of Aircraft,"¹ and present it and the aircraft to a CAA representative for consideration. The aircraft shall be presented in condition for inspection, i. e., all inspection plates, access doors, fairing and cowlings shall be open or removed and the aircraft and engine thoroughly cleaned to properly reflect the actual condition of all the parts and components being inspected.

(2) The following official documents shall be available in the aircraft at the time it is presented for inspection:

(i) Current registration certificate as required by § 43.10 (a).

(ii) If the aircraft is flown to the point where the annual inspection is to be conducted, the aircraft shall display a current Certificate of Airworthiness, Form ACA-1362, issued in accordance with § 1.67 of this subchapter, or carry a special flight authorization (Form ACA-1779) entitled, "Application and Authorization for Ferry Permit," issued in accordance with § 43.10 (a).

(iii) The aircraft and engine records required by § 43.23.

(iv) A visual reference form of the operations limitations, as required by § 43.10-1.

(v) The Inspection Report, required by paragraph (a) of this section.

(c) *Renewal of airworthiness certificate*. Section 1.64 (a) (3) of this subchapter provides for renewing an airworthiness certificate upon satisfactory completion of the annual inspection described in paragraphs (a) and (b) of this section. The CAA will issue a new Certificate of Airworthiness, Form ACA-1362, each time the aircraft passes the annual inspection requirements. The CAA representative conducting the an-

¹ The reporting requirements of this form have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

nual inspection will, upon completion of the inspection, issue the new Certificate of Airworthiness to expire one year from the date the annual inspection was completed. This procedure will be applied without reference to whether the former Certificate of Airworthiness has expired or is still current.

(d) *Application and inspection forms.* The inspection and application forms mentioned in paragraphs (b) and (c) of this section are available at all CAA regional and Aviation Safety district offices, all Designated Aircraft Maintenance Inspectors, and those Certificated Repair Stations holding a class type airframe rating.

§ 43.22-2 *Periodic inspection (CAA rules which apply to § 43.22 (b)).* The purpose of this section is to prescribe the scope of the periodic inspection required by § 43.22 (b) and to identify the form and method of recording the findings of this inspection.

(a) *Scope of periodic aircraft inspection.* The inspection required by § 43.22-1 (a) shall be conducted as follows:

(1) Prior to inspection, all inspection plates, access doors, fairing and cowling shall be opened or removed and the aircraft and engine thoroughly cleaned to properly reflect the actual condition of the parts being inspected. Airworthiness of the aircraft shall be determined by thoroughly inspecting the pertinent items in subdivisions (i) through (ix) of this subparagraph in accordance with instructions contained in the aforementioned subdivisions, manufacturer's inspection procedures, supplemental service information, and standard inspection practices. Each item shall conform with CAA Aircraft Specifications and Airworthiness Directives before being checked as airworthy.

(i) *Fuselage and hull group.* Carefully inspect the fuselage and/or hull for general condition; fabric or skin for deterioration, distortion, pulled rivets, fabric attachment, other evidence of failure, and security of attachment fittings. The various systems and components installed in this group should be checked to assure that they are properly installed with no apparent defects and are operating satisfactorily. When applicable, the same general inspection procedures will apply to lighter-than-air craft and a determination made of the condition of the envelope, gas bags, ballast tanks, etc. Rotary-wing-type aircraft or other craft utilizing rotor or other propellant drive shafts should have the shafts inspected in accordance with the manufacturer's maintenance manual. Lubricate items as required.

(ii) *Cabin and cockpit group.* Check the cabin and cockpit for cleanliness and loose equipment which might foul the controls; seats and safety belts for condition and apparent defects; windows and windshields for deterioration or breakage; instruments for proper operation, mounting, and marking; flight and engine controls for installation and operation; batteries for installation and proper charge; the various systems for installation, general condition, apparent and obvious defects and security of attachment. The above inspection procedure

will also apply to the control car of lighter-than-air craft. Lubricate items as required.

(iii) *Engine and nacelle group.* Remove all engine cowling and make a visual inspection of the entire engine section for evidence of excessive oil, fuel, or hydraulic leaks. Trace any and all leaks to their origin so that they may be corrected. Check all studs and nuts for tightness or obvious defects. Inspect the engine mount for cracks, tightness of mounting, and security of engine attachment to mount. Insure that flexible vibration dampeners are in good condition. Examine the engine controls for defects, proper travel, and safetying; lines for leaks and hoses and clamps for condition and tightness. Check exhaust stacks for cracks or other defects and satisfactory attachment. Examine accessories for apparent defects and security of mounting. Inspect the various systems for proper installation, general condition, defects, and attachment. Inspect cowling for cracks or other defects. On rotary-wing-type aircraft inspect the main rotor transmission gear box for obvious defects as outlined in the manufacturer's maintenance manual. Properly lubricate items so requiring.

(iv) *Landing gear group.* Examine the landing gear for general condition and security of attachment of all units. Make certain the oleo fluid level is at proper height or other shock-absorbing devices are in good condition. Inspect all linkage, trusses, and members for evidence of undue or excessive wear, fatigue, distortion, and security of attachment. Assure that the retracting and locking mechanisms, when installed, are operating satisfactorily. Check hydraulic lines for leakage and electrical system for chafing and proper operation of switches. Remove the wheels and examine for cracks or other defects, tires for wear or cuts, brakes for proper adjustment. Lubricate entire landing gear assembly. If floats or skis are installed, inspect for security of attachment, general condition, and any obvious or apparent defects.

(v) *Wing and center-section group.* Determine the airworthiness of the wing and center-section group by thoroughly inspecting the complete assemblies for general condition, fabric or skin for deterioration, distortion, pulled rivets, fabric attachment, other evidences of failure, and for security of attachment. This inspection is to include the various systems installed which make up a complete wing assembly. Rotary-wing-type aircraft are to be inspected in accordance with the manufacturer's maintenance manual. Lubricate items as required.

(vi) *Empennage group.* Inspect the complete empennage assembly for general condition; fabric or skin for deterioration, distortion, fabric or skin attachment, other evidences of failure, and for security of attachment. Components and systems which make up the complete assembly should receive the same attention and it should be determined that they are installed properly and operating satisfactorily. Lighter-than-air craft should be inspected in the same manner. Helicopters should have the tail rotors inspected in accordance

with the manufacturer's maintenance manual. Lubricate items as required.

(vii) *Propeller group.* Carefully examine all parts of the propeller for cracks, nicks, bends, or oil leakage, if hydraulically controlled. Assure that all bolts are tight and properly safetied. Check the propeller anti-icing devices for proper operation or obvious defects. Assure that control mechanism operates satisfactorily, is securely mounted, and controls operate through full range of travel. Lubricate as required.

(viii) *Radio group.* Inspect radio and electronic equipment for installation and security of mounting. Assure that wiring and conduits are properly routed to prevent short-circuiting and that there are no obvious defects. Determine that bonding and shielding is properly installed and in good condition. If installed, inspect trailing antenna mechanism for security and proper functioning.

(ix) *Miscellaneous group.* When installed, inspect the miscellaneous items of equipment to determine that the component or assembly is installed in accordance with accepted standard practices, and that the items are operating satisfactorily.

(b) *Periodic inspection report form.* (1) The results of the inspection called for in § 43.22-1 (a) shall be recorded on any of the following forms, and a signed copy given to the aircraft owner upon completion of the inspection:

(i) The Periodic Aircraft Inspection Report, Form ACA-319,¹ furnished by the CAA, or

(ii) An aircraft manufacturer's form, which reflects in detail the condition of the items of inspection set forth in paragraph (a) of this section, as appropriate to the particular model aircraft;

(iii) Any other form similar to the example given in Fig. 1.²

(2) On all forms, excepting the Form ACA-319, the following statement must be imprinted:

This form is authorized by the CAA. The inspection recorded herein was conducted in accordance with the Civil Air Regulations.

(3) In addition, the forms must contain instructions for their use.

(c) *Entries in aircraft and engine records.* The aircraft owner shall make available to the mechanic(s) the aircraft and engine records in order that the mechanic(s) may record the inspection as required by this part and Part 18 of this subchapter. After conducting the inspection of an aircraft and upon finding it airworthy, the mechanic(s) will enter in the logbook over his name, certificate number and rating(s), the following statement:

It is certified that this aircraft has been thoroughly inspected, as required by Civil Air Regulations, and found to be airworthy.

(d) *Annual inspection acceptable in lieu of periodic inspection.* When an aircraft has satisfactorily passed the annual inspection required by § 43.22 (a),

¹The reporting requirements of this form have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

²Not submitted for publication in the FEDERAL REGISTER.

it is also considered to have passed the periodic inspection required by § 43.22 (b). In such cases, accumulation of flight time toward the next periodic inspection will start immediately after the inspection specified in § 43.22-1 (a).

(Sec. 205, 52 Stat. 984, as amended; 49 U. S. C. 425. Interpret or apply secs. 601, 603, 605, 608, 52 Stat. 1007, 1009, 1010, 1011; 49 U. S. C. 551, 553, 555, 558)

This supplement shall become effective August 25, 1952.

[SEAL] F. B. LEE,
Acting Administrator of
Civil Aeronautics.

[F. R. Doc. 52-9206; Filed, Aug. 20, 1952;
8:45 a. m.]

TITLE 32—NATIONAL DEFENSE

Chapter V—Department of the Army

Subchapter A—Aid of Civil Authorities and Public Relations

PART 514—RANGE REGULATIONS FOR FIRING AMMUNITION FOR TRAINING AND TARGET PRACTICE

REVOCATION

Part 514 is revoked.
(R. S. 161; 5 U. S. C. 22)

[SEAL] WM. E. BERGIN,
Major General, U. S. Army,
The Adjutant General.

[F. R. Doc. 52-9225; Filed, Aug. 20, 1952;
8:48 a. m.]

TITLE 43—PUBLIC LANDS: INTERIOR

Chapter I—Bureau of Land Management, Department of the Interior

[Circular 1830]

PART 295—WITHDRAWALS AND RESTORATIONS

EDITORIAL NOTE: Federal Register Document 52-8900, appearing at page 7368 of the issue for Wednesday, August 13, 1952, has been corrected as follows: In the second sentence of § 295.11 (a), "(Form 4-1493)" has been changed to read "(Form 4-1193)".

PROPOSED RULE MAKING

DEPARTMENT OF AGRICULTURE

Bureau of Entomology and Plant Quarantine

[7 CFR Parts 319, 321]

FOREIGN QUARANTINE NOTICES; RESTRICTED ENTRY ORDERS

PINK BOLLWORM OF COTTON, FOREIGN COTTON LINT, COTTONSEED PRODUCTS FROM ALL FOREIGN COUNTRIES; EXTENSION OF TIME

Notice is hereby given of an extension, until September 16, 1952, of the period of time within which any interested person may submit written data, views,

or arguments concerning the proposal to revoke the order restricting the entry of cottonseed oil from Mexico into the United States (7 CFR 321.202), and to revise and combine into one quarantine, with supplementary regulations, under a new subpart heading "Foreign Cotton," the foreign pink bollworm of cotton quarantine and regulations (7 CFR 319.8, 319.8-1 et seq.), the order regulating the admission into the United States of foreign cotton lint (7 CFR 321.101), the regulations governing the importation of cotton and cotton wrappings into the United States (7 CFR 321.102 et seq.), the order restricting the admission into the United States of cottonseed cake, cottonseed meal, and all other cottonseed

products except cottonseed oil (7 CFR 321.201), and the regulations governing the importation into the United States of cottonseed cake, cottonseed meal, and other cottonseed products (7 CFR 321.203 et seq.).

Notice of rule making concerning the proposed revocation, revision, and combination was published in the FEDERAL REGISTER on July 16, 1952 (17 F. R. 6434).

Done at Washington, D. C., this 15th day of August 1952.

[SEAL] CHARLES F. BRANNAN,
Secretary of Agriculture.

[F. R. Doc. 52-9220; Filed, Aug. 20, 1952;
8:47 a. m.]

NOTICES

DEPARTMENT OF DEFENSE

Department of the Navy

ORGANIZATION STATEMENT

BUREAU OF SUPPLIES AND ACCOUNTS

In Organization Statement of the Department of the Navy, published at 16 F. R. 12573-12590, delete Subsection F, *Bureau of Supplies and Accounts*, appearing at 16 F. R. 12583-12584, as amended, 17 F. R. 2093-2094, and insert the following subsection in lieu thereof:

F. *Bureau of Supplies and Accounts*.
1. The duties of the Bureau of Supplies and Accounts are performed under the authority of the Secretary of the Navy, and its orders are considered as emanating from him and have full force and effect as such. The bureau is directed by a Chief who has the additional title of Paymaster General. The Chief of the Bureau is appointed by the President by and with the advice and consent of the Senate for a term of four years. The Deputy and Assistant Chief of Bureau performs the duties of the Chief of Bureau in the latter's absence.

2. The bureau develops plans, conducts research, formulates policies, and specifies procedures to be followed in the performance of supply and specified fiscal functions afloat and ashore.

3. Except as otherwise prescribed by the Secretary of the Navy, the bureau exercises management control over the following types of organizations and/or activities of the Shore Establishment: naval supply centers; naval supply depots; supply demand control points (offices); Navy purchasing offices; supply annexes; naval storehouses; naval fuel supply depots; Navy central freight control offices; Navy market offices; Navy overseas air cargo terminals; naval clothing factory; Navy exchanges; Navy commissary stores; the Navy Ship's Store Office, New York; the Naval Supply Research and Development Facility, Bayonne, New Jersey; Navy Material Catalog Office, New York; cost inspection offices; Navy regional accounts offices; Navy accounts disbursing offices; and naval supply facilities.

4. The functions of the bureau and its field activities are as follows:

a. Supervises the procurement, receipt, custody, warehousing, and issu-

ance of Navy supplies and materials, exclusive of ammunition, projectiles, mines, and explosives.

b. Supervises and directs the operation of the supply phases of the Navy Supply System, and administers the redistribution program of excess personal property within the Department of Defense and the sale of Navy surplus property.

c. Administers a centralized storage program for the control of all storage facilities of the Naval Shore Establishment.

d. Administers the Navy's participation in the storage phase of the National Stockpile Program; provides storage space at Navy activities for the storage of strategic and critical materials of the program, and establishes operating procedures.

e. Authorizes and supervises the transportation of Navy property and the household goods of naval personnel, both military and civilian, and administers the functions relating to the disposition of private personal property and effects.

f. Loads and unloads cargo ships; and procures, operates, and administers cargo terminal facilities, including the

procurement and assignment of stevedores.

g. Controls and administers the Navy Stock Fund, the Naval Working Fund, designated parts of the Navy Management Fund and the Navy Industrial Fund, and the stocks of material and supplies procured with these funds.

h. Establishes operating procedures and furnishes technical direction to naval activities on matters concerning handling, warehousing, shipping, and stevedoring to the end that naval materials may be expeditiously handled into and through naval activities at a minimum cost and with the least expenditure of manpower, storage, and shipping space.

i. Recommends to the Bureau of Yards and Docks action relative to the location, design, construction, and equipment of storehouses and other facilities or parts thereof, whose principal purpose is a function over which the Bureau of Supplies and Accounts has technical and management control.

j. Recommends to the Bureau of Ships action relative to the space and equipment requirements of disbursing, clothing, resale, messing, and supply activities afloat.

k. Coordinates the assembly of the materials required for the initial establishment of supply components of advance bases, and determines storage and space requirements in connection with the movement of such materials.

l. Develops and implements the industrial mobilization planning program with respect to the material under the bureau's control.

m. Prepares budget estimates and administers funds for the Supply Distribution System, the Accounting and Disbursing System, Transportation, Fuel, and Subsistence of Navy Personnel.

n. Exercises material control over all food products, including the processing of coffee, their development and use in the Navy, and exercises technical control over general messes of the Navy (except naval hospital messes).

o. Determines accounting accuracy of contractors' cost representations where such costs are the basis for contract price negotiations and/or reimbursement, including Army and Air Force Contracts where assigned. Directs naval cost inspection; and renders the essential periodic and special reports as required by law.

p. Supervises disbursement for all articles and services procured for the Navy and for payrolls, military and civilian; pays allotments including those in substantiation of Basic Allowance for Quarters for all Navy military personnel and for civilians employed at naval activities outside Continental United States; pays retired and fleet reserve personnel of the Navy; pays repatriated military and civilian personnel of the Navy; pays death gratuities; arranges for funds required by Navy disbursing officers and administratively examines their accounts.

q. Prepares information and instructions regarding federal income tax, and disseminates throughout the Naval Establishment.

r. Supervises the issuance of United States Savings Bonds purchased by

Naval personnel through payroll deductions and allotments.

s. Maintains the official Fidelity Accounts for public funds and property entrusted to the custody of accountable officers, and certifies to the Comptroller General of the United States all charges against an officer or agent of the Navy entrusted with public property arising from loss occurring through fault or negligence.

t. Develops fiscal procedures and practices in consonance with policies established by higher authority and maintains and issues instructions on the operational detail of specified fiscal procedures.

u. Performs audits of property accounts and the administrative examination of the money accounts of the Naval Establishment; and keeps inventory records relating to the plant properties, facilities and capital equipment owned in whole or in part by the Navy and Marine Corps.

v. Renders an annual report to the Congress of money value of supplies on hand at the various stations at the beginning of each fiscal year; disposition thereof; purchases and expenditures of supplies for the year, and balance on hand.

w. Performs research and development in the supply, fiscal, and logistics fields, both to fulfill bureau obligations under directives from the Chief of Naval Operations and to improve the peacetime efficiency and wartime potential of bureau and related Navy-wide operations.

x. Recommends to the Bureau of Naval Personnel action relative to the entire personnel program for officers of the Supply Corps and pay clerks, and for the development of programs for training of related enlisted rates.

y. Coordinates the compilation and arranges for the printing of the Catalog of Navy Material. Coordinates and prepares the supply requirements of all federal and military coordinated specifications used by the Department of the Navy; budgets for and establishes the stocks of, and supervises the distribution of the specifications.

z. Prepares and revises Navy Travel Instructions jointly with the Bureau of Naval Personnel and the Headquarters, U. S. Marine Corps.

Dated: August 11, 1952.

DAN A. KIMBALL,
Secretary of the Navy.

[F. R. Doc. 52-9211; Filed, Aug. 20, 1952;
8:45 a. m.]

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

ALASKA

SHORESPACE RESTORATION ORDER NO. 486
AND SMALL TRACT CLASSIFICATION NO. 63

AUGUST 13, 1952.

By virtue of the authority contained in the act of June 5, 1920 (41 Stat. 1059, 48 U. S. C. 372), and pursuant to sections 2.21 and 2.22 (a) (3), of Order No. 1, Bureau of Land Management, Region VII, approved by the Acting Secretary

of the Interior August 20, 1951 (16 F. R. 8625), it is ordered as follows:

Subject to valid existing rights, the 80-rod shorespace reserve which may now or hereafter be created under the act of May 14, 1898 (30 Stat. 409), as amended by the act of March 3, 1903 (32 Stat. 1028; 48 U. S. C. 371), is hereby revoked as to the public lands hereinafter described in the Anchorage, Alaska Land District, which are hereby classified as chiefly valuable for lease and sale under the Small Tract Act of June 1, 1938 (52 Stat. 609; 43 U. S. C. 882a), as amended:

KETCHIKAN AREA

FOR LEASE AND SALE

For Home Sites

U. S. Survey 2603—Lot 12.
U. S. Survey 2604—Lots 13, 19A, 29A, 31, and 37.
U. S. Survey 2602—Lots 1-7 inclusive and Lot 9; Lots 19-23 inclusive; Lots 25-29 inclusive; Lots 32-44 inclusive.
U. S. Survey 2603—Lots 10, 11, 14, 15, 16, 17, 18.
U. S. Survey 2604—Lots 3, 4, 5, 8, 9, 10.
U. S. Survey 2605—Lots 1, 4, 11, 12, 13, 14.
U. S. Survey 2606—Lots 6, 9.
U. S. Survey 2607—Lot 20.

For Cabin Sites

U. S. Survey 2678—Tract 2, Lot 3.
U. S. Survey 2602—Lot 30.
U. S. Survey 2604—Lots 1, 2.
U. S. Survey 2607—Lots 17, 19, 21.

For Home or Business

U. S. Survey 2602—Lot 8.
U. S. Survey 2603—Lot 13.

For Cabin or Business

U. S. Survey 2602—Lots 24 and 31.

For Business Only

U. S. Survey 2603—Lot 12.

The above-described area comprises 72 tracts aggregating approximately 179.67 acres.

JUNEAU AREA

FOR LEASE AND SALE

For Home Sites

U. S. Survey 2386—Lots A, F, G.
U. S. Survey 2388—Tract A, Lot B.
U. S. Survey 2389—Lots B, C, F, G, H.
U. S. Survey 2390—Tract A, Lots C and F.
U. S. Survey 2391—Lots X, Y, Z, AA.
U. S. Survey 2392—Tract A, Lots J, CC, DD, EE; Tract B, Lots O, P, Q, R, S, T, U, W, X, Y, Z, AA, BB.
U. S. Survey 2492—Lot C.
U. S. Survey 2517—Lot D.
U. S. Survey 2901—Lots 1-14, inclusive.
U. S. Survey 2902—Lots 15-26, inclusive.
U. S. Survey 2903—Lots 27-32, inclusive.
U. S. Survey 3054—Lot 26.

For Cabin Sites

U. S. Survey 2387—Tract A, Lots A and B; Tract B, Lot F.
U. S. Survey 2392—Tract A, Lot M; Tract B, Lot V.
U. S. Survey 2515—Lot 17.
U. S. Survey 2517—Lots E, F.
U. S. Survey 2560—Lots A and B.
U. S. Survey 2604—Group 2, Lots 3, 5.
U. S. Survey 2689—Lot 2.
U. S. Survey 2670—Lot 3C.
U. S. Survey 2671—Lots 7C, 8.
U. S. Survey 2672—Lots 12, 13, 14A, 15, 16.
U. S. Survey 2741—Block 1, Lot 2.
U. S. Survey 2909—Lots 1 and 4.
U. S. Survey 3050—Lots 1-11, inclusive.
U. S. Survey 3051—Lots 1-9, inclusive, and Lot 10B.

U. S. Survey 3052—Lots 15-22, inclusive,
U. S. Survey 3053—Lots A-H, inclusive, and
1-13, inclusive, and Lots 3A and 8A.
U. S. Survey 3054—Lots 16-25, inclusive, and
Lots 27-32, inclusive.

The above-described area comprises
159 tracts aggregating approximately
290.42 acres.

CRAIG AREA

FOR LEASE AND SALE

For Home Sites

U. S. Survey 2327—Lots A, C, Q, R.
U. S. Survey 2611—Lots 1-21, inclusive, and
H8600, 602, and 790.
U. S. Survey 2612—Lot S.

The above-described area comprises
29 tracts aggregating approximately
76.47 acres.

PETERSBURG AREA

FOR LEASE AND SALE

For Home Sites

U. S. Survey 2461—Lots A and C.
U. S. Survey 2462—Lots E-H, inclusive.
U. S. Survey 2463—Lot I.
U. S. Survey 2464—Lots M, N, O.
U. S. Survey 2465—Lots S-X, inclusive.
U. S. Survey 2466—Lots Y, Z, 1.
U. S. Survey 2467—Lots 2-8, inclusive.
U. S. Survey 2468—Lots 9, 9A, 10, 11, 12.
U. S. Survey 2470—Lot 14.
U. S. Survey 2471—Lots 18-21, inclusive.
U. S. Survey 2472—Lots 22-27, inclusive, and
Lots 24A, 25A, and 27A.
U. S. Survey 2473—Lots 28-32, inclusive.
U. S. Survey 2474—Lots 33A and 34-37, in-
clusive.

For Cabin or Business Sites

Copper River Meridian
T. 38 S., R. 79 E.,
Sec. 33: Lots 30-36, inclusive.

The above-described area comprises
62 tracts aggregating approximately
259.04 acres.

WRANGELL AREA

FOR LEASE AND SALE

For Home Sites

U. S. Survey 2321—Lots D, K, M, V, W, Y, 3, 4.
U. S. Survey 2589—Lots 1-10, inclusive and
Lots 12, 13, 14, and 16.

For Cabin Sites

U. S. Survey 2321—Lot G.

The above-described area comprises
23 tracts aggregating approximately
78.34 acres.

2. The lands lie within an elimination
from the Tongass National Forest ef-
fected by Public Land Order 842 of June
19, 1952, and are located near the cities
indicated above. The lands are accessi-
ble for the most part from the above
mentioned cities by primary and sec-
ondary roads, or in some instances only
by boat. The terrain is generally rocky,
covered in most places with a thin mantle
of soil. The vegetative cover consists
mainly of a dense growth of hemlock,
Sitka spruce, and cedar. The climate is
typical of the southeastern Alaska
coastal type, characterized by cool sum-
mers and mild winters, with heavy pre-
cipitation experienced throughout most
of the year. A large part of the lands
are presently served by public utilities.
Adequate water supply for domestic uses
may be obtained from water systems sup-

plied by nearby streams, and sewage dis-
posal may be made through use of cess-
pools and septic tanks. Commercial,
school, and church facilities are available
in the nearby cities, and in some places
within immediate access of the lands.

3. This classification order shall not
become effective to change the status of
the land or to permit the leasing thereof
under the Small Tract Act of June 1,
1938, cited above, until 10:00 a. m. on
September 3, 1952. At that time the
land shall, subject to valid existing rights
and the provisions of existing withdraw-
als and section 24 of the Federal Power
Act of June 10, 1920 (41 Stat. 1075; 16
U. S. C. 818), as amended, as to the lands
lying within 50 feet of the center line of
the transmission line right-of-way of
Federal Power Project No. 201, of the
Town of Petersburg, Alaska, become sub-
ject to application as follows:

(a) *Ninety-one day period for prefer-
ence right filings.* For a period of 91
days from 10 a. m. on September 3, 1952,
to close of business December 2, 1952, in-
clusive, to (1) application under the
Small Tract Act of June 1, 1938, by
qualified veterans of World War II, for
whose service recognition is granted by
the act of September 27, 1944 (58 Stat.
747, 43 U. S. C. Secs. 279, 282), as
amended, and by other qualified persons
entitled to credit for service under the
said act, subject to the requirements of
applicable law, and (2) applications under
any applicable public land laws,
based on prior existing valid settlement
and preference rights conferred by exist-
ing laws or equitable claims subject to
allowance and confirmation. Applica-
tion by such veterans and by other per-
sons entitled to credit for service shall
be subject to claims of the classes de-
scribed in subdivision (2).

(b) *Advance period for simultaneous
preference right filings.* All applica-
tions by such veterans and persons
claiming preference rights superior to
those of such veterans and filed on Au-
gust 13, 1952, or thereafter, up to and
including 10 a. m. on September 3, 1952,
shall be treated as simultaneously filed.

(c) *Date for non-preference right
filings authorized by the public land laws.*
Commencing at 10 a. m. on December 3,
1952, any of the land remaining unap-
propriated shall become subject to appli-
cation under the Small Tract Act by the
public generally.

(d) *Advance period for simultaneous
non-preference right filings.* Applica-
tions under the Small Tract Act by the
general public filed on November 13,
1952, or thereafter, up to and including
10 a. m. on December 3, 1952, shall be
treated as simultaneously filed.

4. A veteran shall accompany his ap-
plication with a complete photostatic,
or other copy (both sides) of his certifi-
cate of honorable discharge, or of an
official document of his branch of ser-
vice which shows clearly his honorable
discharge as defined in § 181.36 of Title
43 of the Code of Federal Regulations,
or constitutes evidence of other facts
upon which the claim for preference is
based and which shows clearly the period
of service. Other persons claiming
credit for service of veterans must fur-

nish like proof in support of their claim.
Persons asserting preference rights,
through settlement or otherwise, and
those having equitable claim, shall ac-
company their applications by duly cor-
roborated statements in support thereof,
setting forth in detail all facts relevant
to their claims.

5. All applications referred to in para-
graphs 3 and 4, which shall be filed in
the Land Office at Anchorage, Alaska,
shall be acted upon in accordance with
the regulations contained in § 295.8 of
Title 43 of the Code of Federal Regula-
tions to the extent that such regulations
are applicable. Applications under the
Small Tract Act of June 1, 1938, shall be
governed by the regulations contained
in Part 257 of Title 43 of the Code of
Federal Regulations.

6. Lessees under the Small Tract Act
of June 1, 1938, will be required, within
a reasonable time after execution of the
lease, to construct upon the leased
land, to the satisfaction of the appropri-
ate officer of the Bureau of Land Man-
agement authorized to sign the lease,
improvements which, in the circum-
stances, are presentable, substantial, and
appropriate for the use for which the
lease is issued. Leases will be for a pe-
riod of not more than three years, at an
annual rental of \$5 for cabin sites and
homesites, payable in advance for the
entire lease period. The rental for busi-
ness sites will be in accordance with a
schedule of graduated charges based on
gross income, with a minimum charge
of \$20 payable yearly in advance, the
remainder, if any, to be paid within 30
days after each yearly anniversary of
the lease. Every lease will contain an
option to purchase clause and every
lessee may file an application to purchase
at the sale price as provided in the lease.

7. All of the land will be leased in
tracts varying in size from approxi-
mately 0.07 to 7.17 acres, in accordance
with the plats of survey on file in the
Land Office, Anchorage, Alaska.

8. Lessees must locate any well, water
supply system, or sewage disposal facil-
ity according to the regulations and laws
of the Territory of Alaska.

9. As to the lands lying within the
rectangular system of survey, leases will
be made subject to rights-of-way for
road purposes and public utilities, of 50
feet in width, along section and/or quar-
ter section lines and 33 feet in width
along other tract boundaries, as shown
on the classification maps on file in the
Land Office, Anchorage, Alaska. Such
rights-of-way may be utilized by the
Federal Government, State, Territory,
county, or municipality, or any agency
thereof. The rights-of-way may, in the
discretion of the authorized officer of
the Bureau of Land Management, be
definitely located prior to the issuance
of the patent. If not so located, they
may be subject to location after patent
is issued.

10. All inquiries relating to these lands
shall be addressed to the Manager, Land
Office, Anchorage, Alaska.

FRED J. WEILER, Chief,
Division of Land Planning.

[F. R. Doc. 52-9209; Filed, Aug. 20, 1952;
8:45 a. m.]

WYOMING

CLASSIFICATION ORDER NO. 12

AUGUST 12, 1952.

1. Pursuant to the authority delegated to me by the Director, Bureau of Land Management, by Order No. 427, dated August 16, 1950, 15 P. R. 5639, I hereby classify under the Small Tract Act of June 1, 1938 (52 Stat. 609), as amended July 14, 1945 (59 Stat. 467, 43 U. S. C. 682a), as hereinafter indicated, the following described land in the Cheyenne, Wyoming land district, embracing approximately 51.67 acres.

WYOMING SMALL TRACT CLASSIFICATION No. 12

For lease and sale for home and business sites:

T. 52 N., R. 93 W., 6th P. M. Wyoming
Section 17, Lots 11 through 23 and Lot 25, as indicated on legal plat of survey by the Bureau of Land Management approved March 26, 1952, copies of which are on file and may be viewed at the office of the Manager, Land and Survey Office, Cheyenne, Wyoming, and also at the office of the Area Manager, Bureau of Land Management, Worland, Wyoming.

Lot 24, Section 17 is not available for lease or sale for the reason that this lot has already been classified for lease and sale under the provisions of the small tract act.

These lots lie adjacent to the city of Greybull, Wyoming. Year around access is provided to all of the tracts by U. S. Highway No. 20 and a county road. The Chicago, Burlington & Quincy Railroad passes through Lot 11 in a north-south direction. All of the lots, with the exception of Lot 11 have frontage on the county road or U. S. Highway No. 20. Electricity is available or can be obtained. Lot 24 which has already been classified for lease and sale for business purposes under the small tract act has been developed for business purposes and contains improvements necessary for the operation of a small oil refinery and a filling station. The land is level to rough but all of the lots contain a sufficient area of level ground for home or business sites.

2. As to applications regularly filed prior to 10 a. m., August 1, 1952, and are for the type of site for which the land is classified, this order shall become effective upon the date it is signed.

3. This order shall not otherwise become effective to change the status of such lands until 10 a. m. on the 35th day after the date of this order. At that time the said lands shall, subject to valid existing rights and the provisions of existing withdrawals, become subject to applications under the Small Tract Act as follows:

(a) *Ninety-one day period for preference-right filings.* For a period of 91 days, commencing at the hour and on the day specified above, the public lands affected by this order shall be subject only to application under the Small Tract Act of June 1, 1938, 52 Stat. 609 (43 U. S. C. 682a), as amended, by qualified veterans of World War II, subject to the requirements of applicable law. All applications filed under this paragraph either at or before 10 a. m. on the 35th day

after the date of this order shall be treated as though filed simultaneously at that time. All applications filed under this paragraph after 10 a. m. on the said 35th day shall be considered in the order of filing.

(b) *Date for non-preference-right filings.* Commencing at 10 a. m. on the 126th day after the date of this order, any lands remaining unappropriated shall become subject to disposal under the Small Tract Act only. All such applications filed either at or before 10 a. m. on the 126th day after the date of this order, shall be treated as though filed simultaneously at the hour specified on such 126th day. All applications filed thereafter shall be considered in the order of filing.

4. A veteran shall accompany his application with a complete photostatic, or other copy (both sides), of his certificate of honorable discharge, or of an official document of his branch of the service which shows clearly his honorable discharge as defined in § 181.36 of Title 43 of the Code of Federal Regulations, or constitutes evidence of other facts upon which the claim for preference is based and which shows clearly the period of service. Other persons claiming credit for service of veterans must furnish like proof in support of their claims. Persons asserting preference rights, through settlement or otherwise, and those having equitable claims, shall accompany their application by duly corroborated statements in support thereof, setting forth in detail all facts relevant to their claims.

5. All of the land will be leased in individual tracts as shown on the approved plat of survey dated March 26, 1952, on file in the Land & Survey Office at Cheyenne, Wyoming.

6. Leases for homesites will be for a period of three years at an annual rental of \$5.00 payable for the entire lease period in advance of the issuance of the lease. Leases for business purposes will be for a period of five years at a minimum annual rental of \$20.00, payable for the entire lease period in advance of the issuance of the lease. Rentals on business sites will be in accordance with the schedule of rentals for business sites where such rental is in excess of the minimum rental of \$20.00 per year.

(a) Leases for business sites shall contain a provision requiring an annual report from each lessee who has taken a tract for such purposes as to whether or not he has conducted a business thereon and if so, an accounting of the gross income derived therefrom. Such lease will also contain a clause reserving to the duly appointed, qualified and acting representative of the Department of the Interior the right to enter upon and inspect the premises and to examine the books and accounts pertaining to any business conducted thereon at any time during regular business hours.

Leases will contain an option to purchase clause at the appraised value of the tracts as follows:

T. 52 N., R. 93 W. Sec. 17	Per tract
Lot 11.....	\$75.00
Lot 12.....	235.00
Lot 13.....	210.00

T. 52 N., R. 93 W.

Sec. 17	Per tract
Lot 14.....	\$175.00
Lot 15.....	190.00
Lot 16.....	225.00
Lot 17.....	225.00
Lot 18.....	195.00
Lot 19.....	165.00
Lot 20.....	190.00
Lot 21.....	150.00
Lot 22.....	115.00
Lot 23.....	255.00
Lot 25.....	300.00

Application to purchase may be filed during the term of the lease but not more than 30 days prior to the expiration of one year from the date of the lease issuance.

7. Lessees under the Small Tract Act of June 1, 1938, will be required within a reasonable time after execution of the lease, to construct upon the leased land, to the satisfaction of the appropriate officer of the Bureau of Land Management authorized to sign the lease, improvements which in the circumstances are presentable, substantial and appropriate for the use for which the lease is issued.

8. Leases will be subject to existing rights-of-way for road and railroad purposes as follows:

100 ft. right-of-way along the south boundary of Lots 13, 14, 15, 16, 17, 18, 21, and 22.

150 ft. right-of-way along the west boundary of Lots 12 and 25.

100 ft. right-of-way on each side of the center line of the Chicago, Burlington & Quincy Railroad through Lot 11.

9. Lessees will be required to comply with the Wyoming State Highway Commission concerning road approaches, borrow pits and other requirements.

10. Lessees and/or their successors in interest shall comply with all Federal, State, county, and municipal laws and ordinances, especially those governing health and sanitation, and failure or refusal to do so may be cause for cancellation of the lease in the discretion of the authorized official of the Bureau of Land Management.

11. All inquiries relating to these lands should be addressed to the Manager, Land and Survey Office, Cheyenne, Wyoming.

PAUL W. HOWARD,
Acting Regional Administrator.

[F. R. Doc. 52-9210; Filed, Aug. 20, 1952;
8:45 a. m.]

CIVIL AERONAUTICS BOARD

[Serial No. E-6619; Docket No. 1705 et al.,
Consolidated]

AIR FREIGHT RATE INVESTIGATION;
DIRECTIONAL RATES

CERTIFICATED AND NON-CERTIFICATED AIR
CARRIERS

Eighth supplemental order modifying minimum rates (Serial No. E-6698). In the matter of rates and charges for the transportation of freight by air established, demanded, and charged by certificated and non-certificated air carriers, known as air freight rate investigation (directional rates); Docket No. 1705 et al., Consolidated.

Adopted by the Civil Aeronautics Board at its office in Washington, D. C., on the 18th day of August 1952.

The Board on July 21, 1952, adopted an Order (Order Serial No. E-6819), incorporating a Statement of Tentative Findings and Conclusions (Statement), directing all interested parties to show cause why the Board should not adopt the findings and conclusions specified in the statement and indefinitely extend the directional rates authorized by Orders Serial Nos. E-4048, E-4890, and E-5648.

The time designated for filing notice of objection has elapsed and no notice of objection to the show cause order has been filed by any person.

All parties have therefore waived all other procedural steps short of the final decision of the Board.

The Board, hereby reaffirming and making final all the findings and conclusions in the order and statement: *It is ordered*, That:

1. The directional rates authorized by Orders Serial Nos. E-4048, E-4890, and E-5648 are extended indefinitely.

2. The record in this proceeding will be held open and any party in interest may petition for reconsideration and modification of the directional rates authorized by this order as to any commodity or groups of commodities between any points, such petition to be filed and further proceedings in connection therewith to be conducted as follows:

a. Each petition shall conform to §§ 302.3 and 302.200 (b) of the rules of practice in Economic Proceedings and in addition two copies of such petition shall be served by the petitioner upon all parties or their attorneys of record;

b. Within 10 days after service of any such petition any party may file an answer thereto, such answer to be executed and copies thereof to be filed and served in the same manner as provided herein for petitions;

c. Further proceedings in connection with any such petition shall be conducted in such manner as the Board may deem appropriate.

3. The Board may on its own motion modify the directional rates established herein in any such manner as it may deem proper.

4. This order be published in the FEDERAL REGISTER.

By the Civil Aeronautics Board,

[SEAL] M. C. MULLIGAN,
Secretary.

[F. R. Doc. 52-9237; Filed, Aug. 20, 1952; 8:50 a. m.]

[Docket No. 4603, et al.]

NORTH CENTRAL ROUTE INVESTIGATION CASE; REOPENED

NOTICE OF POSTPONEMENT OF HEARING

In the matter of the Reopened North Central Route Investigation Case.

Notice is hereby given, pursuant to the provisions of the Civil Aeronautics Act of 1938, as amended, that hearing in the above-entitled proceeding, now assigned

for September 3, 1952, is postponed indefinitely and that announcement of the new hearing date will be made at a later time.

Dated at Washington, D. C., this 18th day of August 1952.

By the Civil Aeronautics Board.

[SEAL] FRANCIS W. BROWN,
Chief Examiner.

[F. R. Doc. 52-9238; Filed, Aug. 20, 1952; 8:51 a. m.]

[Docket No. 5547]

PROVINCE OF SASKATCHEWAN, DOMINION OF CANADA; DEPARTMENT OF PUBLIC HEALTH AIR AMBULANCE SERVICE

NOTICE OF HEARING

In the matter of the application of the Department of Public Health, Province of Saskatchewan, Dominion of Canada for a foreign air carrier permit pursuant to section 402 of the Civil Aeronautics Act of 1938, as amended.

Notice is hereby given pursuant to the Civil Aeronautics Act of 1938, as amended, particularly sections 402 and 1001 of the said act, that hearing in the above-entitled proceeding is assigned to be held on August 26, 1952 at 10:00 a. m., e. d. t., in Room 5040 Commerce Building, Fourteenth and E Streets, NW., Washington, D. C., before Examiner Barron Fredricks.

Without limiting the scope of the issues presented by the application, particular attention will be directed to the questions whether it will be in the public interest to authorize the Province of Saskatchewan to operate air ambulance service in foreign air transportation between points in the Province and points in the United States, and whether the requested authorization will be consistent with the obligations assumed by the United States in any treaty, convention or agreement that may be in force between the United States and the Dominion of Canada or any other foreign country.

For further details as to the requested authorization and the issues in connection therewith, reference is made to the application and the report of the pre-hearing conference on file in the Board's Docket Section.

Notice is further given that any person, other than a party of record, desiring to be heard in this proceeding must file with the Board on or before August 26, 1952, a statement setting forth the pertinent issues of fact or law that he desires to controvert or support, and such person then may appear and participate at the hearing in accordance with the Board's rules of practice.

Dated at Washington, D. C., August 18, 1952.

By the Civil Aeronautics Board.

[SEAL] FRANCIS W. BROWN,
Chief Examiner.

[F. R. Doc. 52-9236; Filed, Aug. 20, 1952; 8:50 a. m.]

ECONOMIC STABILIZATION AGENCY

Office of Price Stabilization

[Delegation of Authority 6, Supplement 3, Revision 1]

CHIEFS OF BRANCHES, CONSUMER GOODS DIVISION

REDELEGATION OF AUTHORITY TO REQUEST FURTHER INFORMATION CONCERNING PROPOSED CEILING PRICES

By virtue of the authority vested in me as Director of the Consumer Goods Division of the Office of Price Operations, Office of Price Stabilization, by Delegation of Authority No. 6, Supplement 1, Revised (16 F. R. 3672; 17 F. R. 2105), this delegation of authority is hereby issued.

Delegation of Authority No. 6, Supplement 3, effective May 4, 1951 (16 F. R. 4153) is revised to read as follows:

1. Authority is hereby redelegated to the Chiefs of the Branches of the Consumer Goods Division of the Office of Price Operations, Office of Price Stabilization to request further information from a seller who has submitted a proposed ceiling price for approval.

2. This redelegation of authority supersedes Delegation of Authority 6, Supplement 7 (16 F. R. 4628).

This redelegation of authority shall take effect on August 20, 1952.

THOMAS L. KARSTEN,
Director, Consumer Goods Division,
Office of Price Operations.

AUGUST 19, 1952.

[F. R. Doc. 52-9271; Filed, Aug. 19, 1952; 12:01 p. m.]

FEDERAL POWER COMMISSION

[Docket No. E-6442]

MOUNTAIN STATES POWER Co.

NOTICE OF SUPPLEMENTAL ORDER AUTHORIZING ISSUANCE OF SECURITIES

AUGUST 15, 1952.

Notice is hereby given that on August 12, 1952, the Federal Power Commission issued its order entered August 11, 1952, authorizing issuance of securities in the above-entitled matter.

[SEAL] LEON M. FUQUAY,
Secretary.

[F. R. Doc. 52-9212; Filed, Aug. 20, 1952; 8:46 a. m.]

[Docket Nos. G-1968, G-1976]

CITIES SERVICE GAS Co. AND PANHANDLE EASTERN PIPE LINE Co.

NOTICE OF FINDINGS AND ORDERS ISSUING CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY

AUGUST 15, 1952.

In the matters of Cities Service Gas Company, Docket No. G-1968; Panhandle Eastern Pipe Line Company, Docket No. G-1976.

Notice is hereby given that on August 13, 1952, the Federal Power Commission issued its orders entered August 12, 1952, issuing certificates of public convenience and necessity in the above-entitled matters.

[SEAL]

LEON M. FUQUAY,
Secretary.

[F. R. Doc. 52-9213; Filed, Aug. 20, 1952;
8:46 a. m.]

[Docket Nos. G-1810, G-1938, G-1939]

TEXAS-OHIO GAS CO.

ORDER RECONVENING HEARING

AUGUST 14, 1952.

On October 10, 1951, Texas-Ohio Gas Company (Applicant) filed, in Docket No. G-1810, an application for a certificate of public convenience and necessity pursuant to section 7 of the Natural Gas Act, authorizing the construction and operation of a natural-gas pipeline system from a point in Hidalgo County, Texas, to a point in the State of West Virginia.

On November 6, 1951, the Commission notified Applicant that the data and exhibits in support of the application were lacking and directed that such data be filed by December 1, 1951. At the request of Applicant, this period was extended 60 days to February 1, 1952. On January 31, 1952, Applicant filed a request that it be granted an additional 90 days to file such data, although Applicant stated in its request that it would be prepared to proceed on April 1, 1952, or in 60 days from February 1, 1952. In response to such request the Commission, by order of February 20, 1952, found that it would be in the public interest to grant Applicant an extension of not more than 60 days within which to file the necessary supporting data and exhibits, and set the application for hearing to commence on April 15, 1952. Paragraph (B) of the Commission's February 20, 1952, order provided as follows:

Failure on the part of Applicant to be fully prepared on said hearing date to prosecute its application with all supporting data, exhibits and evidence shall be ground for dismissal.

Hearings on the application in Docket No. G-1810 commenced on April 15 and continued until April 17, 1952, on which date the Commission, by order, recessed the hearings to permit its consideration of a motion made by Commission Staff Counsel for the dismissal of the application without prejudice. Thereafter, on May 13, 1952, the Commission, by order, provided for oral argument before the Commission on June 6, 1952, concerning the matters involved and the issues presented by said motion to dismiss and the answer which had been filed by the Applicant opposing such motion.

Upon consideration of the matters presented at the oral argument on June 6, 1952, the Commission on June 17, 1952, entered an order reserving decision on the Staff's motion to dismiss the proceeding in Docket No. G-1810 pending Applicant's presentation of the support-

ing evidence that it was then prepared to offer, and setting the G-1810 application for further hearings to commence on July 7, 1952. By that order the Commission consolidated the proceedings in Docket Nos. G-1938 and G-1939 with the proceeding in Docket No. G-1810. This order, by providing for further hearings, afforded the Applicant a further opportunity to discharge its obligation to show in Docket No. G-1810 that it is entitled to a certificate. Paragraph (D) of that order provided as follows:

After Applicant has presented all of its evidence in support of the applications at Docket Nos. G-1810, G-1938, and G-1939, other parties, including Staff counsel, may conduct so much of their cross-examination as they are then prepared to undertake. Thereupon, the Presiding Examiner shall recess the hearing pending further order of the Commission.

The hearings resumed on July 7, 1952, and continued until July 14, 1952, when the same were recessed at the request of the Applicant to reconvene on August 4, 1952. The hearing reconvened on August 4, 1952, and near the close of the proceedings on that date, Applicant moved for a 30-day continuance of the hearings in the above-entitled dockets. This motion was made orally on the record and reads as follows:

Now, if the Court please, I move that this case stand in recess for 30 days, during which time it shall be the privilege of the Texas-Ohio Gas Company to present to the staff of the Commission geological data and further contracts in support of this petition, that when the case be reconvened we be ready for cross-examination and at the same time that we be permitted to introduce such contracts and data as may already at that time have been presented to the staff for its study and examination.

Commission Staff Counsel and counsel for interveners, National Coal Association, et al., opposed the motion. After argument thereon the Presiding Examiner recessed the hearing subject to further order of the Commission.

The Commission finds: Applicant has been afforded abundant opportunity to complete the presentation of evidence in support of its applications in the above-entitled proceedings, but has failed to do so. However, it may be appropriate and in the public interest to afford applicant a further and final opportunity to complete its case, and, accordingly, the hearing should be reconvened as hereinafter ordered.

The Commission orders:

(A) The public hearing in the above-entitled proceedings shall reconvene on September 2, 1952, at 10 a. m., e. d. s. t., in the Hearing Room of the Federal Power Commission, 1800 Pennsylvania Avenue NW., Washington, D. C.

(B) At such public hearing Applicant shall present all of its evidence in support of its applications in Docket Nos. G-1810, G-1938 and G-1939 and complete its entire direct case without further continuance. Upon conclusion of such presentation by Applicant, other parties, including Staff counsel, may conduct so much of their cross-examination as they are then prepared to undertake. Thereupon, the Presiding Examiner shall

recess the hearing pending further order of the Commission.

Date of issuance: August 15, 1952.

By the Commission.

[SEAL]

J. H. GUTRIDE,
Acting Secretary.

[F. R. Doc. 52-9214; Filed, Aug. 20, 1952;
8:46 a. m.]

SECURITIES AND EXCHANGE COMMISSION

[File No. 70-2903]

SOUTHWESTERN DEVELOPMENT CO. ET AL.

ORDER AUTHORIZING ISSUE AND SALE OF
TWO YEAR NOTES

AUGUST 15, 1952.

In the matter of Southwestern Development Company, Amarillo Gas Company, West Texas Gas Company; File No. 70-2903.

Southwestern Development Company ("Southwestern"), a registered holding company, and two of its wholly-owned subsidiaries, Amarillo Gas Company ("Amarillo Gas") and West Texas Gas Company ("West Texas"), having filed a joint application-declaration and amendments thereto, pursuant to sections 7, 10 and 12 (b) of the Public Utility Holding Company Act of 1935 ("act"), and Rule U-50 (a) (2) and (3) promulgated under the act, with respect to the following proposed transactions:

Pursuant to a supplemental loan agreement dated July 15, 1952, Southwestern proposes to borrow from Guaranty Trust Company of New York ("Bank") \$2,700,000, and to issue and sell to the Bank, as evidence of said loan, a two year 3¼ percent unsecured note, in the same principal amount.

Southwestern proposes to advance the total proceeds of said loan (\$2,700,000) to Amarillo Gas and West Texas in the principal amounts of \$300,000 and \$2,400,000, respectively. Amarillo Gas and West Texas propose to issue and sell, and Southwestern proposes to acquire, the separate two-year 3¼ percent unsecured notes of such subsidiaries in the foregoing respective amounts. It is stated that Amarillo Gas and West Texas will use the proceeds of said loans to pay the cost of necessary additional facilities, to provide working capital, and for other proper corporate purposes.

It is represented that no State Commission approval of the proposed transactions is required, and that no other Federal Commission has jurisdiction over such transactions. Applicants-declarants request that the Commission's order herein become effective upon its issuance.

Notice of the filing of the application-declaration having been given in the form and manner provided by Rule U-23 promulgated under the act, and a hearing not having been requested of or ordered by the Commission, and the Commission finding that the applicable provisions of the act and the rules and regulations promulgated thereunder are satisfied, that no adverse findings are necessary,

observing no basis for imposing terms and conditions other than those specified by Rule U-24, and deeming it appropriate in the public interest and in the interest of investors and consumers that said application-declaration be granted and permitted to become effective forthwith:

It is ordered, Pursuant to Rule U-23 and the applicable provisions of the act and the rules and regulations promulgated under the act, that said application-declaration, as amended, be, and it hereby is granted and permitted to become effective forthwith, subject to the terms and conditions prescribed in Rule U-24.

It is further ordered, That this order shall become effective upon its issuance.

By the Commission.

[SEAL] ORVAL L. DuBOIS,
Secretary.

[F. R. Doc. 52-9216; Filed, Aug. 20, 1952;
8:47 a. m.]

[File No. 70-2907]

UNITED GAS CORP. ET AL.

ORDER REGARDING PURCHASE OF DEBT
SECURITIES OF SUBSIDIARY COMPANIES

AUGUST 14, 1952.

In the matter of United Gas Corporation, United Gas Pipe Line Company, Union Producing Company; File No. 70-2907.

United Gas Corporation ("United"), a gas utility subsidiary of Electric Bond and Share Company, a registered holding company, and United's two wholly owned subsidiaries, United Gas Pipe Line Company ("Pipe Line") and Union Producing Company ("Union"), having filed a joint application-declaration, and amendment thereto, pursuant to the Public Utility Holding Company Act of 1935, particularly sections 6 (a), 7, 9 (a) (1), 10 and 12 thereof with respect to the following transactions:

United proposes to purchase from Pipe Line and Pipe Line proposes to issue and sell to United for cash at the face amount of \$12,000,000 principal amount of Pipe Line's 4½ percent Sinking Fund Debentures due 1971. The proceeds from said sale will be used by Pipe Line for its general corporate purposes, including the financing of its construction program.

United proposes to lend to Union and the latter proposes to borrow from United the sum of \$1,000,000. The proposed loan will be evidenced by an unsecured promissory note issued by Union to United or order, payable on or before six years from the date of issuance, and bearing interest at the rate of 4 percent per annum. The proceeds from the loan will be used by Union to increase its working capital.

Under the terms of United's Mortgage and Deed of Trust, as supplemented, securing United's outstanding First Mortgage and Collateral Trust Bonds, the note evidencing the proposed loan to Union is required to be pledged with the Corporate Trustee, and the Debentures

which Pipe Line proposes to sell to United must include a statement that they are non-negotiable and cannot be transferred, assigned or pledged except to a successor of United.

United will obtain the funds necessary to acquire the above-mentioned debt securities of Pipe Line and Union from aggregate borrowings of \$15,000,000 from commercial banks, such borrowings to be evidenced by United's 3 percent Promissory Notes payable on or before December 31, 1952.

The application-declaration states that the proposed transactions have been adopted by the companies for the purpose of securing needed capital funds on an interim basis. The borrowings which will be made by United in the aggregate amount of \$15,000,000 from commercial banks will be refinanced on a permanent basis by the later issuance and sale of securities. The nature and amounts of such securities will be the subject of an application to be filed at a later date with this Commission.

The application-declaration also states that the proposed transactions are initial steps in an over-all financing program designed to provide the companies with funds to finance on a permanent basis their estimated construction requirements for the years 1952 and 1953, including the repayment by United of the bank borrowings described above and the presently outstanding bank loans of United maturing on July 1, 1953 in the aggregate amount of \$35,000,000. United's management anticipates that, in order to finance the 1952 and 1953 construction requirements and to repay the above-described bank loans, United will be required to raise, on a permanent basis, approximately \$100,000,000.

The joint application-declaration having been filed on July 28, 1952, an amendment thereto having been filed on August 11, 1952, notice of said filing having been given in the form and manner required by Rule U-23 promulgated pursuant to said act, the Commission not having received a request for a hearing within the time specified in said notice, or otherwise, and the Commission not having ordered a hearing thereon; and

The Commission finding that the proposed transactions are in accordance with the applicable standards of the act and that no adverse findings are necessary thereunder, and the Commission deeming it appropriate that said joint application-declaration, as amended, should be granted and permitted to become effective without the imposition of terms or conditions:

It is ordered, Pursuant to Rule U-23 and the applicable provisions of the act and subject to the terms and conditions contained in Rule U-24, that said joint application-declaration, as amended, be, and the same hereby is, granted and permitted to become effective, forthwith.

By the Commission.

[SEAL] ORVAL L. DuBOIS,
Secretary.

[F. R. Doc. 52-9215; Filed, Aug. 20, 1952;
8:47 a. m.]

[File No. 812-788]

FIDUCIARY MANAGEMENT, INC., AND R.
PAUL WEESNER

NOTICE OF APPLICATION

AUGUST 15, 1952.

Notice is hereby given that Fiduciary Management, Inc. (hereinafter called Fiduciary), 55 Green Village Road, Madison, New Jersey, an investment company registered under the Investment Company Act of 1940, has filed an application pursuant to section 17 (b) of the act on behalf of R. Paul Weesner, 9632 Northeast Fifth Avenue Road, Miami Shores, Florida (hereinafter called Weesner), for an order of the Commission exempting from the provisions of section 17 (a) of the act the proposed sale by Weesner to Fiduciary of all of the outstanding shares of the capital stock of Nationwide Air Transport Service, Inc. (hereinafter called Nationwide), in consideration of 104,412 shares of the authorized but unissued common stock of Fiduciary.

The agreement of sale, dated June 2, 1952, provides that on the closing date the assets of Nationwide will consist solely of 1,953,000 shares of the common stock of Resort Airlines, Inc. (hereinafter called Resort), and not less than \$147,461.89 in cash plus any and all dividends and distributions paid to Nationwide on the common stock of Resort between the date of the agreement and the closing date, and that the total liabilities of Nationwide will not exceed \$12,323.34. As security against any further liabilities of Nationwide, and any expenses in connection therewith, the agreement provided for the deposit with Fiduciary by Weesner for a period of three years of 20,000 of the shares of Fiduciary to be received by Weesner. The contract is expressly subject to a favorable order under section 17 (b) of the act.

Fiduciary presently owns 5,553,866, or 62 percent, of the outstanding 8,956,240 common shares of Resort. Following the consummation of the proposed sale, Fiduciary intends to liquidate Nationwide.

Nationwide was organized by Weesner for the purpose of running a non-schedule airline. On January 15, 1951, it sold substantially all of its assets to Resort for 2,000,000 shares of Resort stock. It was made a condition of the agreement of sale that prior to the closing date Resort and Weesner should have entered into an agreement for the employment of Weesner as an officer of Resort.

There is no active market in the stock of either company and Resort has had an insufficient earnings record upon which to base a valuation. It is urged in the application that the exchange is justified by management's appraisal of the net asset value of \$4.10 per share for Fiduciary's stock as of May 26, 1952 (using 15 cents a share for the Resort stock owned by Fiduciary) and the book value of 15 cents a share for the Resort stock as shown by its balance sheet as at December 31, 1951. Fiduciary acquired all of its shares of Resort at 10 cents per share.

By reason of his employment as president of Resort and his indirect owner-

ship of approximately 22 percent of the stock of Resort, Weesner is an affiliate of an affiliate of Fiduciary. The proposed transaction therefore appears to be prohibited by section 17 (a) of the act. Accordingly, the application requests an order pursuant to section 17 (b) exempting the transaction from the prohibitions of section 17 (a).

Notice is further given that an order granting the application, in whole or in part and upon such conditions as the Commission may deem necessary or appropriate, may be issued by the Commission at any time after September 4, 1952, unless prior thereto a hearing upon the application is ordered by the Commission, as provided in Rule N-5 of the rules and regulations promulgated under the act. Any interested person may, not later than September 2, 1952, at 5:30 p. m., submit to the Commission in writing his views or any additional facts bearing upon this application or the desirability of a hearing thereon or request the Commission in writing that a hearing be held thereon. Any such communication or request should be addressed: Secretary, Securities and Exchange Commission, 425 Second Street NW., Washington 25, D. C., and should state briefly the nature of the interest of the person submitting such information or requesting a hearing, the reasons for such request, and the issues of fact or law raised by the application which he desires to controvert.

By the Commission.

[SEAL] ORVAL L. DuBOIS,
Secretary.

[F. R. Doc. 52-9217; Filed, Aug. 20, 1952;
8:47 a. m.]

INTERSTATE COMMERCE COMMISSION

[Fourth Sec. Application 27315]

SAND AND GRAVEL FROM DICKASON PIT,
IND., TO WELLINGTON, ILL.

APPLICATION FOR RELIEF

AUGUST 18, 1952.

The Commission is in receipt of the above-entitled and numbered application for relief from the long-and-short-haul provision of section 4 (1) of the Interstate Commerce Act.

Filed by: W. S. Mercer, Alternate Agent, for the Chicago & Eastern Illinois Railroad Company.

Commodities involved: Sand and gravel, carloads.

From: Dickason Pit, Ind.

To: Wellington, Ill.

Grounds for relief: Market competition and wayside pit competition.

Schedules filed containing proposed rates: C&EI RR. tariff I. C. C. No. 144, Supp. 18.

Any interested person desiring the Commission to hold a hearing upon such application shall request the Commission in writing so to do within 15 days from the date of this notice. As pro-

vided by the general rules of practice of the Commission, Rule 73, persons other than applicants should fairly disclose their interest, and the position they intend to take at the hearing with respect to the application. Otherwise the Commission, in its discretion, may proceed to investigate and determine the matters involved in such application without further or formal hearing. If because of an emergency a grant of temporary relief is found to be necessary before the expiration of the 15-day period, a hearing, upon a request filed within that period, may be held subsequently.

By the Commission, Division 2.

[SEAL] W. P. BARTEL,
Secretary.

[F. R. Doc. 52-9221; Filed, Aug. 20, 1952;
8:47 a. m.]

[Fourth Sec. Application 27316]

FERTILIZER FROM POINTS IN ARKANSAS,
LOUISIANA, AND TEXAS TO VIRGINIA

APPLICATION FOR RELIEF

AUGUST 18, 1952.

The Commission is in receipt of the above-entitled and numbered application for relief from the long-and-short-haul provision of section 4 (1) of the Interstate Commerce Act.

Filed by: F. C. Kratzmeir, Agent, for carriers parties to his tariff I. C. C. No. 3746.

Commodities involved: Fertilizer and fertilizer materials, carloads.

From: Points in Arkansas, Louisiana, and Texas.

To: Points in Virginia.

Grounds for relief: Competition with rail carriers, circuitous routes, and additional routes.

Schedules filed containing proposed rates: F. C. Kratzmeir, Agent, I. C. C. No. 3746, Supp. 91.

Any interested person desiring the Commission to hold a hearing upon such application shall request the Commission in writing so to do within 15 days from the date of this notice. As provided by the general rules of practice of the Commission, Rule 73, persons other than applicants should fairly disclose their interest, and the position they intend to take at the hearing with respect to the application. Otherwise the Commission, in its discretion, may proceed to investigate and determine the matters involved in such application without further or formal hearing. If because of an emergency a grant of temporary relief is found to be necessary before the expiration of the 15-day period, a hearing, upon a request filed within that period, may be held subsequently.

By the Commission, Division 2.

[SEAL] W. P. BARTEL,
Secretary.

[F. R. Doc. 52-9222; Filed, Aug. 20, 1952;
8:48 a. m.]

DEPARTMENT OF JUSTICE

Office of Alien Property

CLARA RAFFLOER DROESSE

NOTICE OF INTENTION TO RETURN VESTED PROPERTY

Pursuant to section 32 (f) of the Trading With the Enemy Act, as amended, notice is hereby given of intention to return, on or after 30 days from the date of the publication hereof, the following property, subject to any increase or decrease resulting from the administration thereof prior to return, and after adequate provision for taxes and conservatory expenses:

Claimant, Claim No., Property, and Location

Clara Raffloer Droesse, also known as Clara G. Droesse, Schonau, Berchtesgaden, Bavaria, Germany, Claim No. 42780; \$39,331.00 in the Treasury of the United States. All right, title, interest and claim of any kind or character whatsoever of Clara G. Droesse in and to the estate of Millie Raffloer, deceased.

Executed at Washington, D. C., on August 15, 1952.

For the Attorney General.

[SEAL] ROWLAND F. KIRKS,
Assistant Attorney General,
Director, Office of Alien Property.

[F. R. Doc. 52-9226; Filed, Aug. 20, 1952;
8:48 a. m.]

KAROLINE FRITZ-SCHOULA ET AL.

NOTICE OF INTENTION TO RETURN VESTED PROPERTY

Pursuant to section 32 (f) of the Trading With the Enemy Act, as amended, notice is hereby given of intention to return, on or after 30 days from the date of the publication hereof, the following property, subject to any increase or decrease resulting from the administration thereof prior to return, and after adequate provision for taxes and conservatory expenses:

Claimant, Claim No., Property, and Location

Karoline Fritz-Schoula (Karoline Schoula geb Fritz), Vienna, Austria, Claim No. 37602; Karl Woseczek, Vienna, Austria, Claim No. 37803; Paula Woseczek, Vienna, Austria, Claim No. 37805; Adolf Werner, also known as Adolf Woseczek, Vienna, Austria, Claim No. 37807. The following cash amounts in the Treasury of the United States: \$220.65 to Karoline Fritz-Schoula; \$220.65 to Karl Woseczek; \$110.32 to Paula Woseczek; \$441.27 to Adolf Werner, also known as Adolf Woseczek.

Executed at Washington, D. C., on August 15, 1952.

For the Attorney General.

[SEAL] ROWLAND F. KIRKS,
Acting Director,
Office of Alien Property.

[F. R. Doc. 52-9227; Filed, Aug. 20, 1952;
8:48 a. m.]