

TABLE 56.50-105—ACCEPTABLE MATERIALS AND TOUGHNESS TEST CRITERIA²—Continued

Product form	ASTM specification ³	Grade ⁴	Minimum service temperature	Minimum avg Charpy V notch energy
Bolting	A-320	L7, L9, L10, L43	- 150 °F	20 ft. lb.
		B8D, B8T, B8F, B8M ...	- 325 °F	No test required.
		2B8, B8C	No limit	No test required, except for service temperatures colder than - 425 °F. In such case the minimum average energy is 25 ft. lb.
Nuts, bolting	A-194	4	- 150 °F	20 ft. lb.
		8T, 8F	- 325 °F	No test required.
		8, 8C	No limit	Same requirement as comparable grades (B8, B8C) of bolting listed above.

¹ Quench and temper heat treatment may be permitted when specifically authorized by the Commandant. In those cases the minimum average Charpy V-notch energy shall be specially designated by the Commandant.
² Other material specifications for product forms acceptable under part 54 for use at low temperatures may also be used for piping systems provided the applicable toughness requirements of this Table are also met.
³ Any repair method must be acceptable to the Commandant (G-MSE), and welding repairs as well as fabrication welding must be in accordance with part 57 of this chapter.
⁴ The acceptability of several alloys for low temperature service is not intended to suggest acceptable resistance to marine corrosion. The selection of alloys for any particular shipboard location must take corrosion resistance into account and be approved by the Marine Safety Center.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 72-59R, 37 FR 6189, 6190, Mar. 25, 1972; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CG 79-108, 43 FR 46545, Oct. 10, 1978; CGD 74-289, 44 FR 26008, May 3, 1979; CGD 77-140, 54 FR 40611, Oct. 2, 1989; CGD 83-043, 60 FR 24775, May 10, 1995; USCG-2000-7790, 65 FR 58460, Sept. 29, 2000]

§ 56.50-110 Diving support systems.

(a) In addition to the requirements of this part, piping for diving installations which is permanently installed on the vessel must meet the requirements of subpart B (Commercial Diving Operations) of part 197 of this chapter.

(b) Piping for diving installations which is not permanently installed on the vessel need not meet the requirements of this part, but must meet the requirements of subpart B of part 197 of this chapter.

(c) Piping internal to a pressure vessel for human occupancy (PVHO) need not meet the requirements of this part, but must meet the requirements of subpart B of part 197 of this chapter.

[CGD 76-009, 43 FR 53683, Nov. 16, 1978]

Subpart 56.60—Materials

§ 56.60-1 Acceptable materials and specifications (replaces 123 and Table 126.1 in ANSI-B31.1).

(a)(1) The material requirements in this subpart shall be followed in lieu of those in 123 in ANSI-B31.1.

(2) Materials used in piping systems must be selected from the specifications which appear in Table 56.60-1(a) of this section or Table 56.60-2(a) of this part, or they may be selected from the material specifications of section I, III, or VIII of the ASME Code if not prohibited by a regulation of this subchapter dealing with the particular section of the ASME Code. Table 56.60-1(a) of this section contains only pipe, tubing, and fitting specifications. Determination of acceptability of plate, forgings, bolting, nuts, and castings may be made by reference to the ASME Code as previously described. Additionally, accepted materials for use as piping system components appear in Table 56.60-2(a) of this part. Materials conforming to specifications not described in this subparagraph must receive the specific approval of the Marine Safety Center before being used. Materials listed in Table 126.1 of ANSI B31.1 are not accepted unless specifically permitted by this paragraph.

(b) Components made in accordance with the commercial standards listed in Table 56.60-1(b) of this section and made of materials complying with paragraph (a) this section may be used

in piping systems within the limitations of the standards and within any further limitations specified in this subchapter.

TABLE 56.60-1(A)—ADOPTED SPECIFICATIONS AND STANDARDS

NOTE: Table 56.60-1(A) replaces Table 126.1 in ANSI B31.1 and sets forth specifications of pipes, tubing, and fittings intended for use in piping-systems. The first column lists acceptable standards from ASTM; the second lists those from ANSI. The Coast Guard will consider use of alternative pipes, tubing, and fittings when it receives certification of their mechanical properties. Without this certification it will restrict use of such alternatives to piping-systems inside heat exchangers that ensure containment of the material inside pressure shells.

Pipe, seamless:		
A106 Carbon steel	ANSI-B31.1	
A335 Ferritic alloys	ANSI-B31.1	
A376 Austenitic alloys	ANSI-B31.1	(1).
Pipe, seamless and welded:		
A53 Types S, F, and E steel pipe	ANSI-B31.1	(2,3,4).
A312 Austenitic steel (welded with no filler metal)	ANSI-B31.1	(1,4).
A333 Low temperature steel pipe	Sec. VIII, ASME Code	(5).
Pipe, welded:		
A134 Fusion welded steel plate pipe	See footnote 7	(7).
A135 ERW pipe	ANSI-B31.1	(3).
A139 Grade B only, fusion welded steel pipe	ANSI-B31.1	(8).
A358 Electric fusion welded pipe, high temperature, austenitic	ANSI-B31.1	(1,4,9).
Pipe, forged and bored:		
A369 Ferritic alloy	ANSI-B31.1	
Pipe, centrifugally cast:		
	(None applicable)	(1,9)
Tube, seamless:		
A179 Carbon steel heat exchanger and condenser tubes	UCS23, Sec. VIII, ASME Code	(11).
A192 Carbon steel boiler tubes	PG23.1, Sec. I, ASME Code	(10).
A210 Medium carbon boiler tubes	PG23.1, Sec. I, ASME Code	
A213 Ferritic and austenitic boiler tubes	PG23.1, Sec. I, ASME Code	(1).
Tube, seamless and welded:		
A268 Seamless and ERW ferritic stainless tubing	PG23.1, Sec. I, ASME Code	(4).
A334 Seamless and welded (no added filler metal) carbon and low alloy tubing for low temperature	UCS23, Sec. VIII, ASME Code	(4,5).
Tube, welded:		
A178 (Grades A and C only) ERW boiler tubes	PG23.1, Sec. I, ASME Code	(10 Grade A) (4).
A214 ERW heat exchanger and condenser tubes	UCS27, Sec. VIII, ASME Code	
A226 ERW boiler and superheater tubes	PG23.1, Sec. I, ASME Code	(4,10).
A249 Welded austenitic boiler and heat exchanger tubes (no added filler metal)	PG23.1, Sec. I, ASME Code	(1,4).
Wrought fittings (factory made):		
A234 Carbon and ferritic alloys	Conforms to applicable American National Standards (ANSI-B16.9 and ANSI-B16.11)	(12).
A403 Austenitic alloys .....	.....do	(12).
A420 Low temperature carbon and steel alloy .....	.....do	(12).
Castings,¹³ iron:		
A47 Malleable iron	Conform to applicable American National Standards or refer to UCI-23 or UCD-23, Sec. VIII, ASME Code	(14).
A126 Gray iron .....	.....do	(14).
A197 Malleable iron .....	.....do	(14).
A395 Ductile iron	UCD-23, Sec. VIII, ASME Code	(14).
A536 Ductile iron	See footnote 20	(20).

NONFERROUS MATERIALS¹⁵

Pipe, seamless:		
B42 Copper	UNF23, Sec. VIII, ASME Code	(16).
B43 Red brass .....	.....do	
B241 Aluminum alloy .....	.....do	
Pipe and tube, seamless:		
B161 Nickel .....	.....do	
B165 Nickel-copper .....	.....do	
B167 Ni-Cr-Fe .....	.....do	
B315 Copper-silicon .....	.....do	
Tube, seamless:		
B68 Copper	See footnote 17	(16,17,18).
B75 Copper	UNF23, Sec. VIII, ASME Code	(16).
B88 Copper	See footnote 17	(16,17).
B111 Copper and copper alloy	UNF23, Sec. VIII, ASME Code	
B210 Aluminum alloy, drawn .....	.....do	

TABLE 56.60-1(A)—ADOPTED SPECIFICATIONS AND STANDARDS—Continued

NOTE: Table 56.60-1(A) replaces Table 126.1 in ANSI B31.1 and sets forth specifications of pipes, tubing, and fittings intended for use in piping systems. The first column lists acceptable standards from ASTM; the second lists those from ANSI. The Coast Guard will consider use of alternative pipes, tubing, and fittings when it receives certification of their mechanical properties. Without this certification it will restrict use of such alternatives to piping systems inside heat exchangers that ensure containment of the material inside pressure shells.

B234 Aluminum alloy, drawn .....	.....do	(16.17).
B280 Copper tube for refrigeration service	See footnote 17	
Welding fittings:		
B361 Wrought aluminum welding fittings	Shall meet ANSI Standards	

ASTM specification	Minimum tensile	Longitudinal joint efficiency	P No.	Allowable stresses (p.s.i.)
A134:				
Grade 285A	45,000	0.80	1	11,250×0.8=9,000.
Grade 285B	50,000	0.80	1	12,500×0.8=10,000.
Grade 285C	55,000	0.80	1	13,750×0.8=11,000.

NOTE: When using 104.1.2 in ANSI-B31.1 to compute wall thickness, the stress shown here shall be applied as though taken from the stress tables. An additional factor of 0.8 may be required by § 56.07-10(c) and (e).

- ¹For austenitic materials where two sets of stresses appear, use the lower values.
- ²Type F (Furnace welded, using open hearth, basic oxygen, or electric furnace only) limited to Class II applications with a maximum service temperature of 450 °F. Type E (ERW grade) limited to maximum service temperature of 650 °F, or less.
- ³Electric resistance welded pipe or tubing of this specification may be used to a maximum design pressure of 350 pounds per square inch gage.
- ⁴Refer to limitations on use of welded grades given in § 56.60-2(b).
- ⁵Use generally considered for Classes I-L and II-L applications. For Class I-L service only, the seamless grade is permitted. For other service refer to footnote 4 and to § 56.50-105.
- ⁶Furnace lap or furnace butt grades only. Limited to Class II applications only where the maximum service temperature is 450 °F, or less.
- ⁷Limited to Grades 285A, 285B, and 285C only (straight and spiral seam). Limited to Class II applications only where maximum service temperature is 300 °F or less for straight seam, and 200 °F or less for spiral seam.
- ⁸Limited to Class II applications where the maximum service temperature is 300 °F or less for straight seam and 200 °F or less for spiral seam.
- ⁹For Class I applications only the Class I Grade of the specification may be used.
- ¹⁰When used in piping systems, a certificate shall be furnished by the manufacturer certifying that the mechanical properties at room temperature specified in ASTM A520 have been met. Without this certification, use is limited to applications within heat exchangers.
- ¹¹When used in piping systems, a certificate shall be furnished by the manufacturer certifying that the mechanical properties for A192 in ASTM A520 have been met. Without this certification, use is limited to applications within heat exchangers.
- ¹²Hydrostatic testing of these fittings is not required but all fittings shall be capable of withstanding without failure, leakage, or impairment of serviceability, a hydrostatic test of 1½ times the designated rating pressure.
- ¹³Other acceptable iron castings are in UCI-23 and UCD-23 of section VIII of the ASME Code. (See also §§ 56.60-10 and 56.60-15.) Acceptable castings of materials other than cast iron may be found in section I or VIII of the ASME Code.
- ¹⁴Acceptable when complying with American National Standards. Ductile iron is acceptable for temperatures not exceeding 650 °F. For pressure temperature limitations refer to UCD-3 of section VIII of the ASME Code. Other grades of cast iron are acceptable for temperatures not exceeding 450 °F. For pressure temperature limitations refer to UCI-3 of section VIII of the ASME Code.
- ¹⁵For limitations in use refer to §§ 56.10-5(c) and 56.60-20.
- ¹⁶Copper pipe must not be used for hot oil systems except for short flexible connections at burners. Copper pipe must be annealed before installation in Class I piping systems. See also §§ 56.10-5(c) and 56.60-20.
- ¹⁷The stress values shall be taken from UNF23 of section VIII of the ASME Code for B75 annealed and light drawn temper as appropriate.
- ¹⁸B68 shall be acceptable if provided with a mill hydrostatic or eddy current test.
- ¹⁹Centrifugally cast pipe must be specifically approved by the Marine Safety Center.
- ²⁰Limited to pipe fittings and valves. See § 56.60-15(d) for additional information.

TABLE 56.60-1(B)—ADOPTED STANDARDS APPLICABLE TO PIPING SYSTEMS (REPLACES TABLE 126.1)

ANSI Standards (American National Standards Institute), 11 West 42nd Street, New York, NY 10036.

B1.1	Unified Screw Threads.
B1.20.1 ..	Pipe Threads, General Purpose.
B1.20.3 ..	Dryseal Pipe Threads.
B2.1	Pipe Threads.
B2.2	[Reserved]
B16.1	C.I. Flanges and Fittings—Classes 125 and 250 Only.
B16.3	M.I. Threaded Fittings—Classes 150 and 300.
B16.4	C.I. Threaded Fittings—Classes 125 and 250.
B16.5	Steel Pipe Flanges and Flanged Fittings. ³
B16.9	Steel Buttwelding Fittings. ³
B16.10	Dimensions of Ferrous Valves.
B16.11 ..	Steel S.W. and Threaded Fittings.

TABLE 56.60-1(B)—ADOPTED STANDARDS APPLICABLE TO PIPING SYSTEMS (REPLACES TABLE 126.1)—Continued

B16.14 ...	Ferrous-Threaded Plugs, Bushings and Lock-nuts. ⁴
B16.15 ...	Cast Bronze Threaded Fittings—Classes 125 & 250. ⁴
B16.18 ...	Cast Copper Alloy Solder Joints. ⁴
B16.20 ...	Ring Joint Gaskets—Steel Flanges.
B16.21 ...	Non-metallic Gaskets for Flanges.
B16.22 ...	Wrought Copper and Copper Alloy Solder Joint Fittings. ⁴
B16.23 ...	Cast Copper Alloy Solder-Joint Drainage Fittings. ⁴
B16.24 ...	Bronze Pipe Flanges and Flanged Fittings—Class 150 and 300. ³
B16.25 ...	Butt Welding Ends—Pipe, Valves, Flanges, & Fittings.

TABLE 56.60-1(B)—ADOPTED STANDARDS APPLICABLE TO PIPING SYSTEMS (REPLACES TABLE 126.1)—Continued

B16.28 ...	Wrought Steel Butt-welding Short Radius Elbows and Returns. ⁴
B16.29 ...	Wrought Copper and Wrought-Copper Alloy Solder Joint Drainage Fittings. ⁴
B16.34 ...	Valves—Flanged, Threaded and Welding end. ³
B16.42 ...	Ductile Iron Pipe Flanges and Fittings. ³
B18.2 ...	[Reserved]
B18.2.1 ...	Square and Hex Bolts and Screws, Inch series.
B18.2.2 ...	Square and Hex Nuts.

ASTM Standards (American Society for Testing and Materials), 100 Barr Harbor Drive, Conshohocken, PA 19428-2959.

F682	Wrought Carbon Steel Sleeve-Type Couplings.
F1006	Entrapment Separators for Use in Marine Piping Applications. ⁴
F1007	Pipe Line Expansion Joints of the Packed Slip Type for Marine Applications.
F1020	Line Blind Valves for Marine Applications. ⁴
F1120	Circular Metallic Bellows Type Expansion Joints.
F1123	Non-Metallic Expansion Joints.
F1139	Steam Traps and Drains.
F1172	Fuel Oil Meters of the Volumetric Positive Displacement Type.
F1173	Epoxy Resin Fiberglass Pipe and Fittings to be Used for Marine Applications.
F1199	Cast and Welded Pipe Line Strainers.
F1200	Fabricated (Welded) Pipe Line Strainers.
F1201	Fluid Conditioner Fittings in Piping Applications Above 0 °F.

EJMA Standards (Expansion Joint Manufacturers Association, Inc.), 25 North Broadway, Tarrytown, NY 10591

Standards of the Expansion Joint Manufacturers Association, Inc.

FCI Standards (Fluid Controls Institute, Inc.), 31 South Street, Suite 303, Morristown, NJ 07960.

FCI 69-1 Pressure Rating Standard for Steam Traps.⁴

MSS Standards (Manufacturers' Standardization Society of the Valve and Fittings Industry), 127 Park Street NE, Vienna, VA 22180.

B36.10 ...	Wrought-Steel & Iron Pipe.
B36.19 ...	Stainless Steel Pipe.

MSS Standards (Manufacturers' Standardization Society of the Valve and Fittings Industry), 1815 North Fort Myer Drive, Arlington, Va. 22209.

SP-6	Finishes-On Flanges, Valves & Fittings.
SP-9	Spot-Facing.
SP-25	Standard Marking System for Valves, Fittings, Flanges and Unions.
SP-37	[Reserved]
SP-42	[Reserved]
SP-44	Steel Pipe Line Flanges. ⁴
SP-45	Bypass and Drain Connection.
SP-51	Class 150LW Corrosion Resistant Cast Flanges and Flanged Fittings. ⁴
SP-53	Magnetic Particle Inspection—Steel Castings.
SP-55	Visual Inspection—Steel Castings.
SP-58	Pipe Hangers & Supports.
SP-61	Hydrostatic Testing Steel Valves.
SP-66	[Reserved]
SP-67	Butterfly Valves. ^{2,4}
SP-69	Pipe Hangers and Supports—Selection and Application.

TABLE 56.60-1(B)—ADOPTED STANDARDS APPLICABLE TO PIPING SYSTEMS (REPLACES TABLE 126.1)—Continued

SP-72	Ball Valves with Flanged or Butt-Welding Ends for General Service. ⁴
SP-73	Silver Brazing Joints for Wrought and Cast Solder Joint Fittings.
SP-83	Carbon Steel Pipe Unions Socket-Welding and Threaded.

¹ [Reserved]

² In addition, for bronze valves, adequacy of body shell thickness shall be satisfactory to the Marine Safety Center. Refer to § 56.60-10 of this part for cast iron valves.

³ Mill or manufacturer's certification is not required, except where a needed portion of the required marking is deleted due to size or is absent due to age of existing stocks.

⁴ Because this standard offers the option of several materials, some of which are not generally acceptable to the Coast Guard, compliance with the standard does not necessarily indicate compliance with these regulations. The marking on the component or the manufacturer or mill certificate must indicate the material specification and/or grade as necessary to fully identify the materials used. The material used must comply with the requirements in this subchapter relating to the particular application.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGFR 72-59R, 37 FR 6190, Mar. 25, 1972; CGD 72-206R, 38 FR 17229, June 29, 1973; CGD 73-248, 39 FR 30839, Aug. 26, 1974; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CGD 77-140, 54 FR 40611, Oct. 2, 1989; 55 FR 39968, 39969, Oct. 1, 1990; CGD 95-027, 61 FR 26001, May 23, 1996; USCG-1999-6216, 64 FR 53224, Oct. 1, 1999; USCG-1999-5151, 64 FR 67180, Dec. 1, 1999]

§ 56.60-2 Limitations on materials.

Welded pipe and tubing. The following restrictions apply to the use of welded pipe and tubing specifications when utilized in piping systems, and not when utilized in heat exchanger, boiler, pressure vessel, or similar components:

(a) *Longitudinal joint.* Wherever possible, the longitudinal joint of a welded pipe shall not be pierced with holes for branch connections or other purposes.

(b) *Class II.* Use unlimited except as restricted by maximum temperature or pressure specified in Table 56.60-1(a) or by the requirements contained in § 56.10-5(b) of this chapter.

(c) *Class I.* (1) For those specifications in which a filler metal is used, the following applies to the material as furnished prior to any fabrication:

(i) For use in service above 800 °F, full welding procedure qualifications by the Coast Guard are required. See part 57 of this subchapter.

(ii) Ultrasonic examination as required by item S-6 in ASTM A-376 shall be certified as having been met in all applications except where 100 percent

radiography is a requirement of the particular material specification.

(2) For those specifications in which no filler material is used in the welding process, the ultrasonic examination as required by item S-6 in ASTM A-376 shall be certified as having been met for service above 800 °F.

TABLE 56.60-2(A)—ADOPTED SPECIFICATIONS NOT LISTED IN THE ASME CODE

ASTM specifications	Source of allowable stress	Notes
FERROUS MATERIALS¹		
Bar stock:		
A276 (Grades 304-A, 304L-A, 310-A, 316-A, 316L-A, 321-A, 347-A, and 348-A), A575 and A576 (Grades 1010-1030)	See footnote 4.	(4).
NONFERROUS MATERIALS		
Bar stock:		
B16 (soft and half hard tempers).	See footnote 5.	(5,7).
B21 (alloys A, B, and C).	See footnote 8.	(8).
B124:		
Alloy 377	See footnotes 5 and 9.	(5,9).
Alloy 464	See footnote 8.	(8,10).
Alloy 655	See footnote 11.	(11).
Alloy 642	See footnote 12.	(7,12).
Alloy 630	See footnote 13.	(7,13).
Alloy 485	See footnote 8.	(8,10).
Forgings:		
B283 (forging brass) ...	See footnotes 5 and 9.	(5,9).
Castings:		
B26	See footnotes 5, 14, and 15.	(5,14,15).
B85	See footnotes 5, 14, and 15.	(5,14,15).

¹For limitations in use refer to § 56.60-5.
²Allowable stresses shall be the same as those listed in UCS23 of section VIII of the ASME Code for SA-675 material of equivalent tensile strength.
³Physical testing shall be performed as for material manufactured to ASME Specification SA-675, except that the bend test shall not be required.
⁴Allowable stresses shall be the same as those listed in UCS23 of section VIII of the ASME Code for the corresponding SA-182 material.
⁵Limited to air and hydraulic service with a maximum design temperature of 150 °F. The material must not be used for salt water service or other fluids that may cause dezincification or stress corrosion cracking.
⁶[Reserved]
⁷An ammonia vapor test, in accordance with ASTM B 858M (incorporated by reference, see § 56.01-2), shall be performed on a representative model of each finished product design.
⁸Allowable stresses shall be the same as those listed in UNF23 of section VIII of the ASME Code for SB-171, naval brass.
⁹An ammonia vapor test, in accordance with ASTM B 858 (incorporated by reference, see § 56.01-2), shall be performed on a representative model for each finished product design. Tension tests shall be performed to determine tensile strength, yield strength, and elongation. Minimum values shall be those listed in table 3 of ASTM B283.

¹⁰Physical testing, including mercurous nitrate test, shall be performed as for material manufactured to ASTM B21.
¹¹Physical testing shall be performed as for material manufactured to ASTM B96. Allowable stresses shall be the same as those listed in UNF23 of section VIII of the ASME Code for SB-96 and shall be limited to a maximum allowable temperature of 212 °F.
¹²Physical testing shall be performed as for material manufactured to ASTM B171, alloy D. Allowable stresses shall be the same as those listed in UNF23 of section VIII of the ASME Code for SB-171, aluminum bronze D.
¹³Physical testing shall be performed as for material manufactured to ASTM B171, alloy E. Allowable stresses shall be the same as those listed in UNF23 of section VIII of the ASME Code for SB-171, aluminum bronze, alloy E.
¹⁴Tension tests shall be performed to determine tensile strength, yield strength, and elongation. Minimum values shall be those listed in table X-2 of ASTM B85.
¹⁵Those alloys with a maximum copper content of 0.6 percent or less shall be acceptable under this specification. Cast aluminum shall not be welded or brazed.

Note: This Table 56.60-2(a) is a listing of adopted bar stock and nonferrous forging and casting specifications not listed in the ASME Code. Particular attention should be given to the supplementary testing requirements and service limitations contained in the footnotes.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGD 72-104R, 37 FR 14233, July 18, 1972; CGD 73-248, 39 FR 30839, Aug. 26, 1974; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CGD 77-140, 54 FR 40612, Oct. 2, 1989; CGD 95-012, 60 FR 48050, Sept. 18, 1995; CGD 95-027, 61 FR 26001, May 23, 1996; CGD 95-028, 62 FR 51201, Sept. 30, 1997; USCG-1998-4442, 63 FR 52190, Sept. 30, 1998; USCG-1999-5151, 64 FR 67180, Dec. 1, 1999]

§ 56.60-3 Ferrous materials.

(a) Ferrous pipe used for salt water service must be protected against corrosion by hotdip galvanizing or by the use of extra heavy schedule material.

(b) (Reproduces 123.2.3(c).) Carbon or alloy steel having a carbon content of more than 0.35 percent may not be used in welded construction or be shaped by oxygen cutting process or other thermal cutting process.

[CGD 73-254, 40 FR 40165, Sept. 2, 1975]

§ 56.60-5 Steel (High temperature applications).

(a) (Reproduces 123.2.3(a).) Upon prolonged exposure to temperatures above 775 °F., the carbide phase of plain carbon steel, plain nickel alloy steel, carbon-manganese alloy steel, manganese-vanadium alloy steel, and carbon-silicon steel may be converted to graphite.

(b) (Reproduces 123.2.3(b).) Upon prolonged exposure to temperatures above 875 °F., the carbide phase of alloy steels, such as carbon-molybdenum, manganese-molybdenum-vanadium, and manganese-chromium-vanadium and

chromium-vanadium, may be converted to graphite.

(c) [Reserved]

(d) The design temperature of a piping system employing one or more of the materials listed in paragraphs (a), (b), and (c) of this section shall not exceed the lowest graphitization temperature specified for materials used.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGD 72-104R, 37 FR 14233, July 18, 1972; CGD 73-248, 39 FR 30839, Aug. 26, 1974; CGD 73-254, 40 FR 40165, Sept. 2, 1975]

§ 56.60-10 Cast iron and malleable iron.

(a) The low ductility of cast iron and malleable iron should be recognized and the use of these metals where shock loading may occur should be avoided. Cast iron and malleable iron components shall not be used at temperatures above 450 °F. Cast iron and malleable iron fittings conforming to the specifications of Table 56.60-1(a) of this part may be used at pressures not exceeding the limits of the applicable standards of Table 56.60-1(b) of this part at temperatures not exceeding 450 °F. Valves of either of these materials may be used if they conform to the standards for class 125 and class 250 flanges and flanged fittings in ANSI B16.1 and if their service does not exceed the rating as marked on the valve.

(b) Cast iron and malleable iron shall not be used for valves or fittings in lines carrying flammable or combustible fluids¹ which are directly connected to, or in the proximity of, equipment or other lines having open flame, or any parts operating at temperatures above 500 °F. Cast iron shall not be used for hull fittings, or in systems conducting lethal products.

(c) 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

¹For definitions of flammable or combustible fluids, see §§ 30.10-15 and 30.10-22 of subchapter D (Tank Vessels) of this chapter.

may also be used in sizes 4 inches and smaller (oval and square design).

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CGD 77-140, 54 FR 40612, Oct. 2, 1989; CGD 95-027, 61 FR 26001, May 23, 1996]

§ 56.60-15 Ductile iron.

(a) Ductile cast iron components made of material conforming to ASTM A 395 (incorporated by reference, see § 56.01-2) may be used within the service restrictions and pressure-temperature limitations of UCD-3 of section VIII of the ASME Code.

(b) Ductile iron castings conforming to ASTM A 395 (incorporated by reference, see § 56.01-2) may be used in hydraulic systems at pressures in excess of 7500 kilopascals (1000 pounds per square inch) gage, provided the following:

(1) The castings receive a ferritizing anneal when the as-cast thickness does not exceed one inch;

(2) Large castings for components, such as hydraulic cylinders, are examined as specified for a casting quality factor of 90 percent in accordance with UG-24 of section VIII of the ASME Code; and

(3) The castings are not welded, brazed, plugged, or otherwise repaired.

(c) After machining, ductile iron castings must be hydrostatically tested to twice their maximum allowable working pressure and must show no leaks.

(d) Ductile iron castings exhibiting less than 12 percent elongation in 50 millimeters (2 inches) when subjected to a tensile test must meet the requirements for cast iron in this part.

[CGD 77-140, 54 FR 40612, Oct. 2, 1989, as amended by CGD 95-027, 61 FR 26001, May 23, 1996; USCG-2000-7790, 65 FR 58460, Sept. 29, 2000]

§ 56.60-20 Nonferrous materials.

Nonferrous materials listed in this subpart may be used in piping systems under the following conditions (see also § 56.10-5(c)):

(a) The low melting points of many nonferrous metals and alloys, such as aluminum and aluminum alloys, must be recognized. These types of heat sensitive materials must not be used to

conduct flammable, combustible, or dangerous fluids, or for vital systems unless approved by the Marine Safety Center.

NOTE: For definitions of flammable or combustible fluids, see §§ 30.10-15 and 30.10-22 or parts 151-154 of this chapter. Dangerous fluids are those covered by regulations in part 98 of this chapter.

(b) The possibility of galvanic corrosion due to the relative solution potentials of copper and aluminum and their alloys should be considered when used in conjunction with each other or with steel or with other metals and their alloys when an electrolyte is present.

(c) A suitable thread compound must be used in making up threaded joints in aluminum pipe to prevent seizing which might cause leakage and perhaps prevent disassembly. Pipe in the annealed temper should not be threaded.

(d) The corrosion resistance of copper bearing aluminum alloys in a marine atmosphere is poor and alloys with copper contents exceeding 0.6 percent should not be used. Refer to Table 56.60-2(a) of this part for further guidance.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGD 77-140, 54 FR 40612, Oct. 2, 1989; CGD 95-027, 61 FR 26001, May 23, 1996]

§ 56.60-25 Nonmetallic materials.

(a) Plastic pipe installations shall be in accordance with the International Maritime Organization (IMO) resolution A.753(18), Guidelines for the Application of Plastic Pipes on Ships and the following supplemental requirements:

(1) Materials used in the fabrication of plastic pipe shall comply with the appropriate standards listed in § 56.01-2 of this chapter.

(2) Plastic pipe is not permitted in a concealed space in an accommodation or service area, such as behind ceilings or linings or between double bulkheads, unless—

(i) Each trunk or duct containing such piping is completely surrounded by “A” class divisions; or

(ii) An approved smoke-detection system is fitted in the concealed space and each penetration of a bulkhead or deck and each installation of a draft stop is made in accordance with IMO

resolution A.753(18) to maintain the integrity of fire divisions.

(3) Plastic pipe used outboard of the required metallic shell valve in any piping system penetrating the vessel's shell (see § 56.50-95(f)) shall have the same fire endurance as the metallic shell valve. Where the shell valve and the plastic pipe are in the same un-manned space, the valve shall be operable from above the freeboard deck.

(4) Pipe that is to be used for potable water shall bear the seal of approval or NSF mark of the National Sanitation Foundation Testing Laboratory, Incorporated, School of Public Health, University of Michigan, Ann Arbor, MI 48103.

(b) *Nonmetallic flexible hose.* (1) Nonmetallic flexible hose must be in accordance with SAE J-1942 and may be installed only in vital and nonvital fresh and salt water systems, nonvital pneumatic systems, lube oil and fuel systems, and fluid power systems.

(2) Nonmetallic flexible hose may be used in vital fresh and salt water systems at a maximum service pressure of 150 psi. Nonmetallic flexible hose may be used in lengths not exceeding 30 inches where flexibility is required subject to the limitations of paragraphs (a) (1) through (4) of this section. Nonmetallic flexible hose may be used for plastic pipe in duplicate installations in accordance with paragraph (a) of this section.

(3) Nonmetallic flexible hose may be used for plastic pipe in nonvital fresh and salt water systems and nonvital pneumatic systems subject to the limitations of paragraphs (a) (1) through (4) of this section. Unreinforced hoses are limited to a maximum service pressure of 50 psi, reinforced hoses are limited to a maximum service pressure of 150 psi.

(4) Nonmetallic flexible hose may be used in lube oil, fuel oil and fluid power systems only where flexibility is required and in lengths not exceeding 30 inches.

(5) Nonmetallic flexible hose must be complete with factory-assembled end fittings requiring no further adjustment of the fittings on the hose, except that field attachable type fittings may be used. Hose end fittings must comply

with SAE J-1475. Field attachable fittings must be installed following the manufacturer's recommended practice. If special equipment is required, such as crimping machines, it must be of the type and design specified by the manufacturer. A hydrostatic test of each hose assembly must be conducted in accordance with § 56.97-5 of this part.

(c) Plastic valves, fittings, and flanges may be used in systems employing plastic pipe. Such valves, fittings, and flanges shall be designed, fabricated, tested, and installed so as to satisfy the intent of the requirements for plastic pipe contained in this section.

(d) If it is desired to use nonmetallic materials other than those specified in this section, a request furnishing the chemical and physical properties of the material shall be submitted to the Commandant for consideration.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9979, June 17, 1970; CGD 72-104R, 37 FR 14234, July 18, 1972; CGD 73-254, 40 FR 40165, Sept. 2, 1975; CGD 77-140, 54 FR 40613, Oct. 2, 1989; CGD 88-032, 56 FR 35822, July 29, 1991; CGD 83-043, 60 FR 24775, May 10, 1995; CGD 95-072, 60 FR 50462, Sept. 29, 1995; CGD 96-041, 61 FR 50728, Sept. 27, 1996; CGD 95-028, 62 FR 51201, Sept. 30, 1997; USCG-2002-13058, 67 FR 61278, Sept. 30, 2002]

Subpart 56.65—Fabrication, Assembly and Erection

§ 56.65-1 General (replaces 127 through 135.4).

(a) The requirements for fabrication, assembly and erection in subparts 56.70 through 56.90 shall apply in lieu of 127 through 135.4 of ANSI-B31.1. Those paragraphs reproduced are so noted.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9978, June 17, 1970]

Subpart 56.70—Welding

§ 56.70-1 General.

(a) The following generally applies to all types of welding, such as stud welding, casting repair welding and all processes of fabrication welding. Where the detailed requirements are not appropriate to a particular process, alter-

natives must be approved by the Marine Safety Center.

[CGD 77-140, 54 FR 40614, Oct. 2, 1989]

§ 56.70-3 Limitations.

Backing rings. Backing strips used at longitudinal welded joints must be removed.

[CGD 73-254, 40 FR 40165, Sept. 2, 1975]

§ 56.70-5 Material.

(a) *Filler metal.* All filler metal, including consumable insert material, must comply with the requirements of section IX, ASME Boiler and Pressure Vessel Code and § 57.02-5 of this subchapter.

(b) *Backing rings.* When metallic backing rings are used they shall be made from material of weldable quality compatible with the base metal, whether subsequently removed or not. When nonmetallic backing rings are used they shall be of material which does not deleteriously affect either base or weld metal, and shall be removed after welding is completed. Backing rings may be of the consumable insert type, removable ceramic type, of solid or split band type. A ferrous backing ring which becomes a permanent part of the weld shall not exceed 0.05 percent sulphur. If two abutting surfaces are to be welded to a third member used as a backing ring and one or two of the three members are ferritic and the other member or members are austenitic, the satisfactory use of such materials shall be determined by procedure qualifications.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGD 73-254, 40 FR 40165, Sept. 2, 1975; USCG-2002-13058, 67 FR 61278, Sept. 30, 2002]

§ 56.70-10 Preparation (modifies 127.3).

(a) *Butt welds (reproduces 127.3.1)–(1) End preparation.* (i) Oxygen or arc cutting is acceptable only if the cut is reasonably smooth and true, and all slag is cleaned from the flame cut surfaces. Discoloration which may remain on the flame cut surface is not considered to be detrimental oxidation.

(ii) Butt-welding end preparation dimensions contained in ANSI-B16.25 or any other end preparation which meets