



Marine Safety Center Technical Note

MTN 02-10, CH-1
16715/Vital Piping
August 6, 2026

MARINE SAFETY CENTER TECHNICAL NOTE (MTN) NO. 02-10, CH-1

Subj: MATERIAL SELECTION FOR VITAL PIPING SYSTEMS

Ref: (a) ASTM F1155-10 (2015) Standard Practice for Selection and Application of Piping System Materials
(b) ASME Boiler and Pressure Vessel Code
(c) NVIC 11-84, Guidelines for New Construction or Major Modification of U.S. Flag Vessels in Foreign Shipyards

1. Purpose: This Marine Technical Note (MTN) serves two purposes. First, it provides additional guidance for industry and Authorized Classification Societies for selection of piping materials for vital piping systems subject to review by the Marine Safety Center (MSC). Additionally, this MTN provides guidance to vessel owners on establishing equivalency to the material requirements in 46 CFR Subchapters F, K, L, and T.

2. Background: On June 12, 2024, 46 CFR 56.60-1(a)(2) was updated to provide expanded options for the selection of acceptable materials used in piping systems. The change allowed materials listed in reference (a).

3. Discussion: The previous edition of this MTN provided avenues to use materials listed in reference (a). The material allowances discussed below have been altered to remove standards now formally addressed in the regulations and to clarify regulations that remain vague or conflicting. However, while there are now a variety of alternative material standards available for use, the number of authorized foreign material standards is limited. To facilitate commerce in response to an increase in requests to utilize foreign material standards in shipboard systems, MSC has developed streamlined equivalency process, which is now included in this MTN.

4. Applicability: This MTN applies to plans containing vital piping systems for all vessels to which the marine engineering requirements of 46 CFR Subchapters D, F, H, I, I-A, K, L, O, R, T, and U apply. This MTN may also be used to select materials for non-vital systems.

5. Definitions:

- a. **Heat Sensitive Material**: Materials that have a melting point of 1700 °F or less are considered heat-sensitive in accordance with 46 CFR 56.50-1(a). For those materials with a melting range, the melting point is considered the **solidus** temperature. The solidus temperature is the highest temperature at which the material can exist in fully solid form.

6. Regulatory Applications:

- a. The regulatory requirements of 46 CFR 56.60-20(a) prohibit the use of heat sensitive metallic piping materials in systems that convey flammable, combustible or other dangerous fluids, or for certain vital systems due to the low melting points of many nonferrous metals and alloys. However, reference (a) permits the use of ASTM B61 and B62 bronze, which have solidus melting temperatures of slightly less than 1700 °F, for the valves and certain fittings and appurtenances in specific vital systems that do not contain flammable, combustible, or dangerous fluids. Therefore, ASTM B61 and B62 are permitted for use in vital and nonvital systems as listed in reference (a), including for valves as required by 46 CFR 56.50-95(f). All materials of construction are subject to the temperature limitations listed in Table 1 of reference (a).
- b. Ball valves, though not explicitly listed in Tables (2) through (27) of reference (a), may be used interchangeably with gate, globe, butterfly, or angle valves where throttling conditions are not warranted.
- c. Socket welded, flanged, brazed, and threaded connections, as listed under the “Type/Style” column of Tables (2) through (27) of reference (a), may be used interchangeably as limited by section 3 of reference (a).
- d. Section 3.5 of reference (a) states that resilient seated valves shall be in accordance with 46 CFR 56.20-15. Therefore, the trim group limitations outlined in Tables (2) through (27), and defined in Table (28) of reference (a), are not mandatory. The stem, wedge/disc, or seating of these valves must meet the requirements of the applicable subchapter and valve design standard.
- e. Materials selected from Sections I or VIII of reference (b) are authorized under 46 CFR 56.60-1(a)(2)(iii). While Section II is not explicitly listed in that regulation, its use for material selection is authorized in PG-5.1 in Section I, so materials selected from Section II are considered acceptable.
- f. The allowances for specific use of nonferrous piping made by 46 CFR 119.730(a) and 182.730(a) for aluminum hulled vessels are extended to fiberglass and wood hulled vessels for the following systems and restrictions:
 1. Aluminum fuel and exhaust piping having a thickness not less than schedule 80
 2. Aluminum bilge, ballast, and fire main piping
 3. Other systems deemed acceptable by the OCMI

Materials in fuel systems must have a solidus melting temperature no less than that of the hull material.

7. Material Equivalency Request Process: Reference (c), in Paragraph IV.B(4), provides an equivalency process that requires 13 parameters to be addressed by each request. That process,

originally designed for foreign shipyards, has since become commonly used for U.S. shipyards as well. This MTN reduces the burden of the equivalency process on both submitters and MSC by identifying key components for each request, thereby streamlining the process. Each request will be evaluated within one of the four categories listed below, and MSC will determine if the material information provided demonstrates equivalency with the regulated material for each category.

- a. Enclosure (1) provides a list of foreign materials that have been designated as equivalent to an approved material standard and have been pre-approved for use in accordance with 46 CFR 56.60-1(a)(3). Each material standard is approved for a specific category of systems to broaden their range of use. The four categories are separated by system criteria and are defined as follows.
 1. Category 1: Non-vital systems with a maximum allowable working pressure (MAWP) under 1,034 kPa (150 psig) and transporting non-corrosive fluids.
 2. Category 2: All other piping transporting non-corrosive fluids.
 3. Category 3: Non-vital systems with a MAWP of under 1,034 kPa (150 psig) systems and transporting corrosive fluids.
 4. Category 4: All other piping transporting corrosive fluids.
- b. When an alternative material standard, not listed in Enclosure (1), is detailed for use in an applicable system, an equivalency request must be submitted. However, in lieu of submitting a request in accordance with reference (c), the submitter may submit an equivalency request with only the following information:
 1. The alternative material standard specification and grade/type (i.e. EN 10217-1, P235TR1), including a copy of the standard for our reference.
 2. The material specification, grade, and type authorized for use to which equivalency is being requested.
 3. The conditions under which the equivalency is requested, specifically the type of system (vital or non-vital), maximum allowable working pressure, and corrosivity.
- c. Equivalency requests are granted at the discretion of MSC, and the Coast Guard reserves the right to deny any requests if an equivalent level of safety and reliability cannot be determined.

Note that if an equivalency is granted, it only means that the material is acceptable in principle. Installations are still subject to all the same design regulations, and require the same review by MSC, as they would for materials listed in 46 CFR Subchapter F.

8. Action: Vital piping system plans submitted to the Marine Safety Center for approval will be reviewed for compliance with the applicable regulations, this MTN, and any specific requirements established by the OCMI or MSC. The plans must provide sufficient details to permit a complete review of the piping system.

9. Disclaimer: While the guidance contained in this document may assist the industry, the public, the Coast Guard, and other Federal and State agencies in applying statutory and regulatory requirements, this guidance is not a substitute for the applicable legal requirements, nor is it in itself a regulation. It is not intended to, nor does it impose legally binding requirements on any party, including the Coast Guard, other Federal agencies, the States, or the regulated community.

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Encl: (1) Table of Alternative Material Standards

Copy: Commandant (CG-ENG), Office of Design and Engineering Standards
Commandant (CG-CVC), Office of Commercial Vessel Compliance
Commandant (CG-5P-TI), Traveling Inspector Staff

Encl: (1) Table of Approved Alternative Material Standards

Approval Category	Alternative Standard	Equivalent ASTM Standard
Category 1 (Non-Vital System, MAWP <150 psi, non-corrosive fluids)	JIS G 3460:2013 - Symbol STPL380	ASTM A333/A333M-13 - Grade 1 - K03008
	GB/T 18984-2003 - Grade 10MnDG	ASTM A333/A333M-13 - Grade 1 - K03008
	JIS G 3460:2013 - Symbol STPL690	ASTM A333/A333M-13 - Grade 6 - K03006
	GB/T 18984-2003 - Grade 16MnDG	ASTM A333/A333M-13 - Grade 3 - K31918
	JIS G 3460:2013 - Symbol STPL450	ASTM A333/A333M-13 - Grade 3 - K31918
	JIS G 3460:2013 - Symbol STPL690	ASTM A333/A333M-13 - Grade 8 - K81340
	EN 10217-1:2002 A1:2005 - P235TR1 - 1.0254	ASTM A135/A135M-09 (2014) - Grade A - K02509
	EN 10217-1:2002 A1:2005 - P235TR2 - 1.0255	ASTM A135/A135M-09 (2014) - Grade A - K02509
	JIS G 3457:2012 - Symbol STPY400	ASTM A135/A135M-09 (2014) - Grade A - K02509
	EN 10217-1:2002 A1:2005 - P235TR1 - 1.0254	ASTM A139/A139M-04 (2010) - Grade A
	EN 10217-1:2002 A1:2005 - P235TR2 - 1.0255	ASTM A139/A139M-04 (2010) - Grade A
	JIS G 3457:2012 - Symbol STPY400	ASTM A139/A139M-04 (2010) - Grade A
	EN 10217-1:2002 A1:2005 - P235TR1 - 1.0254	ASTM A53/A53M-12 - Type E Grade A - K02504
	EN 10217-1:2002 A1:2005 - P235TR2 - 1.0255	ASTM A53/A53M-12 - Type E Grade A - K02504
	JIS G 3454:2012 - Symbol STPG410	ASTM A53/A53M-12 - Type E Grade A - K02504
	EN 10216-1:2013 - P235TR1 - 1.0254	ASTM A53/A53M-12 - Type S Grade A - K02504
	EN 10216-1:2013 - P235TR2 - 1.0255	ASTM A53/A53M-12 - Type S Grade A - K02504
	JIS G 3454:2012 - Symbol STPG410	ASTM A53/A53M-12 - Type S Grade A - K02504
	EN 10216-2:2013 - P235GH - 1.0345	ASTM A106/A106M-14 - Grade A - K02501
	EN 10217-2:2002 A1:2005 - P235GH - 1.0345	ASTM A178/A178M-02 (2012) - Grade A - K01200

	GB 3087-1999 - Grade 10	ASTM A179/A179M-90a (2012) - K01200
	AFNOR NF A 49-220:1990 - TU 37 C	ASTM A179/A179M-90a (2012) - K01200
	EN 10216-2:2013 - P265GH - 1.0425	ASTM A192/A192M-02 (2012) - K01201
Category 2 (all other non-corrosive fluids)	JIS G 3459:2012 - Symbol SUS321TP	ASTM A312/A312M-15 - Grade TP321 - S32100
	JIS G 3459:2012 - Symbol SUS316TP	ASTM A312/A312M-15 - Grade TP316 - S31600
	EN 10216-5:2013 - X2CrNiMo17-12-2 - 1.4404	ASTM A312/A312M-15 - Grade TP316L - S31603
	JIS G 3459:2012 - Symbol SUS321TP	ASTM A312/A312M-15 - Grade TP321 - S32100
	JIS G 3455:2012 - Symbol STS480	ASTM A106/A106M-14 - Grade B - K03006
Category 3 (Non-Vital System, MAWP <150 psi, corrosive fluids)	GB 6479-2000 - Grade 10	ASTM A135/A135M-09 (2014) - Grade A - K02509
	GB 6479-2000 - Grade 20	ASTM A135/A135M-09 (2014) - Grade A - K02509
	GB 6479-2000 - Grade 20	ASTM A135/A135M-09 (2014) - Grade B
	JIS G 3454:2012 - Symbol STPG370	ASTM A53/A53M-12 - Type E Grade A - K02504
	JIS G 3457:2012 - Symbol STPY400	ASTM A53/A53M-12 - Type E Grade A - K02504
	JIS G 3454:2012 - Symbol STPG370	ASTM A53/A53M-12 - Type F Grade A
	JIS G 3457:2012 - Symbol STPY400	ASTM A53/A53M-12 - Type F Grade A
	JIS G 3454:2012 - Symbol STPG410	ASTM A53/A53M-12 - Type F Grade A
	GB 6479-2000 - Grade 10	ASTM A53/A53M-12 - Type S Grade A - K02504
	JIS G 3454:2012 - Symbol STPG370	ASTM A53/A53M-12 - Type S Grade A - K02504
	JIS G 3457:2012 - Symbol STPY400	ASTM A53/A53M-12 - Type S Grade A - K02504
	GB 6479-2000 - Grade 20	ASTM A53/A53M-12 - Type S Grade A - K02504
Category 4 (all other corrosive fluids)	JIS G 3459:2012 - Symbol SUS304TP	ASTM A312/A312M-15 - Grade TP304 - S30400
	JIS G 3459:2012 - Symbol SUS347TP	ASTM A312/A312M-15 - Grade TP347 - S34700
	ASTM A269/A269M Grade TP 300 Series	ASTM A213/A213M Grade TP 300 Series