DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

U.S. Coast Guard (G-MTH-2)
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NVIC 11-86
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NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 11-86

Subj: Guidelines Governing the Use of Fiberglass Pipe (FGP) on Coast Guard Inspected Vessels

1. PURPOSE. The purpose of this Circular is to provide the marine industry and Coast Guard personnel with updated guidelines regarding the application of Coast Guard rules and regulations for the use of FGP on Coast Guard inspected vessels.

2. DIRECTIVE AFFECTED. Navigation and Vessel Inspection Circular (NVIC) 4-83 is canceled.

3. DISCUSSION. The regulations that permit the use of non-metallic piping materials aboard Coast Guard inspected vessels are contained in 46 CFR 56.10-5(d) and 56.60-25. They primarily address limited uses of Polyvinyl Chloride (PVC) plastic pipe. The use of other non-metallic materials may be permitted by the Commandant, under 46 CFR 56.60-25(a)(10) and 56.60-25(f), subject to a review of the material's properties and its intended uses. FGP has been accepted by the Coast Guard via this process for some specific applications which were documented in NVIC 4-83. This document extends the use of FGP based upon a recent review of potential applications. The use of fiberglass pipe and fittings is becoming increasingly more common in ship construction worldwide. Clearly there are systems in which FGP is acceptable and in some cases preferable. Selection of additional systems for which FGP is acceptable, however, must be done carefully and assurances need to be made that vessel safety is adequately addressed. This must be done with full examination of each service and the related hazards that its use would introduce on a vessel. The parameters to be considered are:

- Vital versus non-vital systems
- Physical properties
- Flooding/watertight integrity
- Combustibility/fire load
- Flame spread
- Fire endurance under the following conditions:
- Filled with flowing fluid
- Filled with stagnant fluid
- Empty
- Smoke/toxicity
- Fire protective coatings
- Joint strength
- Mode of failure
- Installation and inspection
- Electrostatic hazards
- Bulkhead/deck penetrations

In any installation the consequences of system loss from fire or other casualty must be carefully analyzed and evaluated. In general there are four potential problem areas:

- Pipe failure resulting in spilling of its contents. Pipe failure resulting in spread of fire, smoke or toxic substances through the pipe.
- Pipe material adding to the compartment fuel load and flame spread.
- Pipe failure precluding the system from performing its required safety function.

These criteria were all considered for the systems cited in Enclosure (1).

Enclosure (1) is a guide detailing acceptable methods of complying with the Coast Guard requirements for FGP. It provides general guidance regarding the material requirements, installation procedures and acceptance procedures for the use of FGP. It also provides specific guidance for the use of FGP in the following systems:

- Auxiliary Steam Exhaust Lines
- Ballast Systems*
- Bilge Systems*
- Fuel Oil Systems
- Inert Gas Systems*
- Liquid Cargo Systems*
- Marine Sanitation Devices
- Nonvital Salt and Fresh Water Systems
- Oil-Water Separators*
- Sounding Tubes
- Tank Washing Systems*
- Vent Systems for Tanks and Voids* Vital Salt and Fresh Water Systems

* New or revised applications

This NVIC is applicable to all vessels, including Mobile Offshore Drilling SEP 1986 Units (NODUs), except where noted.

4. ACTION.

(a) Coast Guard personnel, FGP manufacturers, shipbuilders, ship designers and operators should consider Enclosure (1) when addressing FGP installations.

(b) Coast Guard field inspection personnel, shipyard personnel, vessel owners and operators, and FGP manufacturers should take appropriate steps to ensure that FGP systems are installed and tested in accordance with manufacturer's guidelines, that personnel performing these tasks are qualified, and that required testing and quality/material control is properly performed.

(c) Those desiring to use FGP, for systems not cited as acceptable in Enclosure (1), should address the criteria cited in 3. above in any proposal to be submitted to the Coast Guard at the address in (d) below.

(d) Questions arising which pertain to specific issues not addressed in this guide should be referred to the Commandant U.S. Coast Guard Headquarters, 2100 Second Street, Washington, D.C. 20593-0001.

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Acting Chief, Office of Marine Safety,
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End: (1) Guidelines Governing the Use of Fibergalss Pipe (FGP) on Coast Guard Inspected Vessels

Non-Standard Distribution:

C:e Baltimore (45); Alameda (40); Port Arthur, Honolulu, Puget Sound (35); Miami, Mobile, Long Beach (25); Hampton Roads, Jacksonville, Portland OR (20); Boston, Portland ME, Charleston, Anchorage (15); Cleveland (12); Cincinnati, Louisville, Memphis, Nashville, Paducah, Pittsburgh, St. Louis, Savannah, San Juan, Tampa, Galveston, Buffalo, Chicago, Detroit, Duluth, Milwaukee, San Diego, Juneau, Valdez (10); Providence, Huntington, Wilmington, Corpus Christi, Toledo (5).

C:m New Orleans (140); New York (70); Philadelphia (35); Houston (25); St. Ignace (5); Sturgeon Bay (4).

D:l CG Liaison Officer MILSEALIFTCOMD M-65 STRAT MOB, CG Liaison Officer JUSMAGPHIL (1).

ZTC-68

GUIDELINES GOVERNING THE USE OF FIBERGLASS PIPE (FGP) ON COAST GUARD INSPECTED VESSELS

1. INTRODUCTION. This guide is intended as an aid for Coast Guard technical personnel, marine inspectors, those who fill similar roles on behalf of the Coast Guard, materials manufacturers, vessel owners, designers, shipbuilders, and others who deal in the design, approval, installation, and testing of shipboard piping systems.

This document provides minimum material and installation requirements for FGP, a listing of where FGP may be used aboard ships including any additional design requirements, and where its use is specifically prohibited.

Nothing contained in this guide shall be taken as amending the applicable requirements set forth in the Code of Federal Regulations, or as limiting the authority of the Officer in Charge, Marine Inspection in his determination of acceptable materials and installation methods.

The Regulations cited in this guide or impacted by its contents are found in:

CFR	Subchapter	Name
33	N	Outer Continental Shelf Activities
46	D	Tank Vessels
46	F	Marine Engineering
46	H	Passenger Vessels
46	I	Cargo and Miscellaneous Vessels
46	I-A	Mobile Offshore Drilling Units
46	J	Electrical Engineering
46	N	Dangerous Cargoes
46	O	Certain Bulk Dangerous Cargoes
46	T	Small Passenger Vessels
46	U	Oceanographic Research Vessels

2. DEFINITIONS. The following definitions apply to terms used in this document.

a. Concealed Spaces: Areas behind ceilings or linings or behind joiner bulkheads.

b. Hazardous Materials: Substances regulated under 46 CFR Subchapters D, N, and/or 0. This includes these substances in vapor or residue (e.g. Dirty Ballast).

c. Incompatible Cargoes: Cargoes as described in 46 CFR 150.120.

3. SPECIFIC SYSTEMS. The systems listed below have all been reviewed in accordance with the criteria cited in the Discussion section of this NVIC.

a. ACCEPTABLE APPLICATIONS. FGP may be used in the following systems/locations:

(1) Auxiliary Steam Exhaust Lines: FGP may be used for auxiliary steam exhaust lines located on deck, if the system pressure and temperature are within the limits set forth under Section 5 - Design Requirements.

(2) Ballast Systems: FGP may be used for ballast systems including segregated or dedicated clean ballast systems on tank vessels) subject to the following:

(a) It must be electrically conductive for all ballast system piping wherever it passes through potentially explosive atmospheres (e.g. cargo tanks fuel tanks, dirty ballast tanks, tankship pumprooms, areas identified in 46 CFR 111.105); See Section 6 -Installation Requirements.

(b) For runs through cargo and ballast tanks:

(1) All penetrations are accomplished with a metallic spool piece and adjacent control valve operable from above the tank at the main deck level. The control valve may be omitted between two tanks where:

- Both tanks are normally protected by an inert gas system, or
- neither tank contains hazardous materials (see Section 2 - Definitions) or
- one of the tanks is a clean ballast tank and either the other tank is normally protect by an inert gas system or the other tank does not contain hazardous materials.

(2) A pipe tunnel must be used for runs through tanks containing any of the cargoes listed in Table 1 of 46 CFR 153.

(c) Runs through deep tanks must be accomplished in accordance with Section 5.b - Design Requirements.

(d) On column stabilized MODUs, it may be used only within ballast tanks, inboard of the assumed extent of damage.

(3) Bilge Systems:

(a) FGP may be used for bilge system piping, if it is installed in accordance with 46 CFR 56.60-25(b), except that:

- The installation of a steel independent bilge suction in accordance with 46 CFR 56.50-50(e) and a steel emergency bilge suction, if required by 46 CFR 56.50-50(f), will satisfy the duplicate bilge system requirement of 46 CFR 56.60-25(b) within engineroom/machinery spaces.
- In pipe tunnels and duct keels, a fully duplicated system is not necessary, provided that where the Commandant permits a common rail system, an independent steel suction to the pipe tunnel or duct keel must be installed.

(b) Piping runs through deep tanks must be accomplished in accordance with Section 5.b - Design Requirements.

(c) All discharge piping must be steel.

(4) Fuel Oil Systems: FGP may be used only within fuel and ballast tanks provided all penetrations are accomplished with a metallic spool piece and adjacent control valve operable from above the tank at the main deck level. The control valve may be omitted only between two ballast tanks. The FGP shall be electrically conductive.

(5) Inert Gas Systems:

(a) FGP may be used in inert gas supply and on-deck distribution piping. For on-deck distribution piping, each cargo tank penetration is to be accomplished with a metallic spool piece and adjacent valve installed outside the tank. Remote or automatic operation of the individual tank shut off valves is required.

(b) FGP may be used in water supply and drain lines for deck seals and scrubbers inboard of required shell valves.

(6) Liquid Cargo Systems: FGP may be used in liquid cargo systems, except that systems intended to carry cargoes regulated by 46 CFR Subchapters D and 0 are subject to the following:

(a) It may be used only within cargo and ballast tanks provided all penetrations are accomplished with a metallic spool piece and adjacent control valve operable from above the tank at the main deck level. The control valve may be omitted between two tanks where:

- Both tanks are normally protected by an inert gas system, or
- neither tank contains hazardous materials or
- one of the tanks. is a ballast tank and either the other tank is normally protected by an inert gas system or the other tank does not contain hazardous materials.

(b) It may be used for cargo piping runs through tanks containing incompatible cargoes (See Section 2 -Definitions) provided a piping tunnel is installed (46 CFR 150.130).

(c) It may be used for cargo piping runs through ballast tanks provided that a piping tunnel must be used for piping runs containing any of the following cargoes (46 CFR 150.130):

- Cargoes listed in 46 CFR Part 150 as Group 2 (Sulfuric Acids), Group 3 (Nitric Acids), Group 11 (Organic Annydrides), or Group 12 (Isocyanates).
- Cargoes listed in 46 CFR Part 150 as incompatible with Group 43 (Miscellaneous Water Solutions).

(7) Marine Sanitation Devices (MSD): FGP may be used in MSD piping, including vent lines subject to the restrictions in paragraph (8).

(8) Nonvital Salt and Fresh Water Systems:

(a) FGP may be used in nonvital salt and fresh water systems in accordance with 46 CFR 56.60-25(a). Note particularly that where FGP is used in nonvital service and is within concealed spaces in accommodation or service areas (See Section 2 -Definitions), the pipe must be boxed with "A" class divisions.

(b) Nonvital salt and fresh water systems where FGP may be used include the following services:

- Sanitary Systems
- Potable Water Systems
- A/C Chill Water Systems Hot Water Heating Systems
- Cooling Water Piping for Nonessential Equipment

(c) FGP intended for potable water service must have National Sanitation Foundation (NSF) marking.