



REVIEW OF SANITARY SYSTEMS

Procedure Number: E1-24

Revision Date: July 10, 2020

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Purpose

This Plan Review Guideline (PRG) provides guidance regarding the information required to be submitted to the Marine Safety Center (MSC) for review of sanitary (sewage and grey water) piping system arrangements on U.S. flagged inspected vessels.

Contact Information

If you have any questions or comments concerning this document, please contact the Marine Safety Center (MSC) by e-mail or phone. Please refer to Procedure Number E1-24.

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1. Applicability

This Plan Review Guideline (PRG) is applicable to sanitary system installations, such as sewage and grey water, on U.S. flagged vessels. This PRG is not applicable to the type approval of Marine Sanitation Devices.

2. References

Title 33 CFR 159; Marine Sanitation Devices (All Vessels)

Title 46 CFR 56.50-1 & 56.50-95 (Subchapter F)

Title 46 CFR 179.350 (Subchapter T)

Title 46 CFR 182.720 & 182.730 (Subchapter T)

[COMDTINST M16000.7, Marine Safety Manual \(MSM\), Vol. II - Material Inspection](#), Section C, Chapter 2, Part K - Marine Sanitation Devices

COMDTINST M16714.3E, Equipment Lists, 159.015-Marine Sanitation Devices

3. Definitions

a. Marine Sanitation Devices (MSD) - any equipment for installation on board a vessel which is designed to receive, retain, treat, or discharge sewage, and any process to treat such sewage.

4. Content

Applicable to All Vessels

a. Vessels 65 feet in length and under must have a Type I, II, or III device. Type I MSD's are still permitted on new installations because of a USCG waiver issued by Federal Register notice of Monday, 10 July 1978 and clarified in 33 CFR 159.7 in 1997. (33 CFR 159.5 & 159.7)

b. Vessels over 65 feet in length must have a Type II or III device. Waivers are permitted for Type I devices installed prior to 31 January 1980. (33 CFR 159.5 & 159.7)

c. A Type III holding tank shall operate at ambient air temperature and pressure. Vacuum collection systems are not automatically certified under 33 CFR 159.12a and must be submitted for review to the MSC. (33 CFR 159.12a(b))

d. Type I, II, and certain Type III MSDs receive certification from the Marine Safety Center (MSC). Type III holding tanks (under ambient pressure and temperature) do not need certification approval, but are reviewed by the MSC to the standards in 33 CFR Part 159 and 46 CFR Subchapters F and J.

e. It is not recommended that Type III holding tank receive galley wastes. Adding these wastes can greatly increase the hazards of putrefied material accumulating in the tank.

f. The capacity of a MSD must be adequate for the vessel. Type I and II device capacities are determined by manufacturers and should be evaluated with respect to average passenger waste per day (1.5 liters) and the amount of water used by different toilet flushing systems (conventional, vacuum, etc). Type III device capacities, in addition to the above, must account for the vessel’s route for proper discharge. Installing an MSD with inadequate capacity may lead to a discharge in violation of Environmental Protection Agency (EPA) regulations. Please refer to the guidance below for evaluating adequate capacities.

g. Liters of Graywater per day

<u>Duration</u>	<u>User</u>	<u>Graywater</u>
LONG	Crew	113.6
(Note 1)	Passenger	113.6
MEDIUM	Crew	113.6
(Note 2)	Passenger	56.8
SHORT	Crew	11.4
(Note 3)	Passenger	5.7

Note 1: All crew and passengers aboard 24-hour/day.

Note 2: All crew aboard 24-hour/day; 2 groups of passengers aboard for 4 hours each (2 trips per day), each passenger using facilities once.

Note 3: All crew aboard 12 hr/day; 6 groups of passengers aboard for 2 hours (6 trips per day), one fourth of passengers using facilities once.

h. Type III tanks must be constructed of acceptable materials listed in 46 CFR 56.60 or equivalent and vented in accordance with 46 CFR 56.50-85. Tanks constructed with MAWP exceeding 15 psig must be designed as pressure vessels in accordance with American Society of Mechanical Engineers (ASME) Section VIII, Division I, as amended by 46 CFR 54.

i. Piping systems and appurtenances must be designed to ASME B31.1 as limited or modified by 46 CFR 56. Materials must be listed in 46 CFR 56.60-1 or 46 CFR 56.60-25 (Nonmetallic Materials), or shown to be equivalent. (MSM Volume IV – Technical, Chapter 3 – Engineering Systems, Section 3.C.3.a.)

Vessels Subject to Subchapter F

Overboard Discharges and Shell Connections:

a. Discharges originating at any level must be provided with an automatic, non-return valve at the shell, if penetrating the shell either;

- (1) more than 17.5 inches below the freeboard deck, or,
- (2) less than 23.5 inches above the summer load waterline (46 CFR 56.50-95(b)(1))

b. Non-return valve, unless otherwise required, may be omitted if;

- (1) Piping not less than Schedule 80 for nominal pipe sizes through 8 inches.
- (2) Piping not less than Schedule 60 for nominal pipe sizes between 8 inches and 16 inches
- (3) Piping not less than Schedule 40 for nominal pipe sizes above 16 inches. (46 CFR 56.50-95(b)(1))

c. Discharges originating from spaces below the freeboard deck or from within enclosed superstructures on the freeboard deck shall be fitted with efficient and accessible means for preventing water from passing inboard. Should take the form of one of the following:

- (1) Discharge shall have one automatic non-return valve with a positive means of closing it from above the freeboard deck. (46 CFR 56.50-95(b)(2))
- (2) Exceptions:

- i. Vertical distance exceeds 0.01L - Where the vertical upward distance from the summer load line to the inboard end of the discharge pipe where flooding can take place exceeds 0.01L (L = Length of Vessel), discharge may have two automatic non-return valves without positive means of closing. This is provided that the inboard valve is always accessible for examination. (46 CFR 56.50-95(b)(2))

- ii) Vertical distance exceeds 0.02L - Where the vertical distance exceeds 0.02L, a single automatic non-return valve without positive means of closing is acceptable. (46 CFR 56.50-95(b)(2))

d. Pipes terminating at the shell shall be fitted with bends or elbows between the outboard openings and the first rigid connection inboard. In no case shall such pipes be fitted in a direct line between the shell opening and the first inboard connection. (46 CFR 56.50-95(e)(1))

e. The thickness of discharge connections outboard of the shutoff valves must meet the following:

- (1) Piping is not less than Schedule 80 for nominal pipe sizes through 8 inches.
- (2) Piping is not less than Schedule 60 for nominal pipe sizes above 8 inches and below 16 inches.
- (3) Piping is not less than Schedule 40 for nominal pipe sizes above 16 inches. (46 CFR 56.50-95(e)(3))

Sewage/Grey Water Tank Vents

a. Tank vents must remain within the watertight subdivision boundaries in which the tanks they vent are located. (46 CFR 56.50-85(b))

b. Vents extending above the freeboard deck must be at least Schedule 40. (46 CFR 56.50-85(a)(6))

c. Vents are not cross-connected with any other systems

Bulkhead Penetrations

a. Where pipes are carried through bulkheads, decks, or tank tops, the integrity of the structure shall be maintained. (46 CFR 56.50-1(a))

Vessels Subject to SOLAS

a. The collision bulkhead may be pierced below the bulkhead deck by not more than one pipe for dealing with fluid in the forepeak tank. If the forepeak is divided to hold two different kinds of liquids, the collision bulkhead may be pierced by two pipes. (SOLAS II-1/12)

(1) Each pipe must be fitted with a screw-down valve capable of being operated from above the bulkhead deck, the valve chest being secured inside the forepeak to the collision bulkhead. The valve may be fitted on the after side of the collision bulkhead provided that the valve is readily accessible and the space in which it is located is not a cargo space.

(2) All valves must be of steel, bronze, or other approved ductile material. Cast iron or similar material is not acceptable.

Vessels Subject to MARPOL Annex IV

a. Drains leading from wash basins, wash tubs, and scuppers located within medical spaces or spaces containing live animals, must be led to the sewage holding tank. (MARPOL ANNEX IV, Revised by MEPC.115(51))

Vessels Subject to Subchapter T

Watertight integrity

a. If the discharge pipe penetrates the hull below a line drawn parallel to and at least 150 mm (6 inches) above the deepest load waterline, it must have a means to prevent water from entering the vessel if the pipe fractures or otherwise fails. A positive action valve or cock located as close as possible to the hull is acceptable. (46 CFR 179.350(c) and (d))

b. If the discharge pipe is inaccessible, a shutoff valve shall be:

(1) Operable from the weather deck or any other accessible location above the bulkhead deck; (46 CFR 179.350(e)(1)) and

(2) Labeled at the operating point for identity and direction of closing. (46 CFR 179.350(e)(2))

c. Any connecting device or valve in a hull penetration must not be cast iron. (46 CFR 179.350(f))

d. Each plug cock in an inlet or discharge pipe must have a means, other than a cotter pin, to prevent its loosening or removal from the body. (46 CFR 179.350(g))

Sewage/Grey Water Piping

a. Title 33 CFR 159.12a(b)(1) states that automatic certification of a Type III is only for MSDs that receive sewage and flush water at ambient air pressure and temperature.

(1) If grey water is routed to the sewage tank, acceptability is subject OCMI approval, based on adequate tank capacity for number of persons carried and vessel operating conditions.

Non-metallic Piping Materials

a. Each hull penetration must be accomplished using an acceptable metallic through deck or through bulkhead fitting that is welded or attached to the bulkhead or deck using an accepted method. (46 CFR 182.720(d)(1)(i))

b. One or more metallic shutoff valves must be installed in accordance with the following guidance:

(1) One metallic shutoff valve is permitted if operable from above the bulkhead deck. (46 CFR 182.720(d)(1)(ii)(A))

(2) Two metallic shutoff valves are permitted on either side of the bulkhead provided immediate access to both is possible. Operation from above the bulkhead deck is not required. (46 CFR 182.720(d)(1)(ii)(B))

5. Disclaimer

This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is not intended to nor does it impose legally-binding requirements on any party. It represents the Coast Guard's current thinking on this topic and may assist industry, mariners, the general public, and the Coast Guard, as well as other federal and state regulators, in applying statutory and regulatory requirements. You can use an alternative approach for complying with these requirements if the approach satisfies the requirements of the applicable statutes and regulations. If you want to discuss an alternative, you may contact MSC, the unit responsible for implementing this guidance.