

NFPA 12 - Chapter 6 Marine Systems

6-1 General

6-1.1*

This chapter outlines the modifications necessary for marine systems. All other requirements of this standard shall apply to marine systems except as modified by this chapter.

6-1.2 Special Definitions.

6-1.2.1 Space, Cargo.

A space for the carriage or storage of items or products that are transported by the vessel.

6-1.2.2* Space, Machinery.

A space that contains mechanical equipment for handling, pumping, or transferring flammable or combustible liquids as a fuel.

6-1.2.3* Space, Vehicle.

A space that is designed for the carriage of automobiles or other self-propelled vehicles.

6-1.2.4 Space, Electrical Equipment.

A space containing electrical propulsion, power generating or power distribution equipment.

6-1.2.5 Systems, Marine.

Systems installed on ships, barges, offshore platforms, motorboats, and pleasure craft.

6-2 System Requirements.

6-2.1 Components.

System components shall be specifically listed or approved for carbon dioxide system marine applications.

6-2.2 Operating Instructions.

6-2.2.1

Instructions for the operation of the system shall be located in a conspicuous place at or near all manual controls, and in the carbon dioxide storage room.

6-2.2.2

For systems in which the carbon dioxide storage is not within the protected space, the operating instructions shall include a chart indicating the location of the emergency control to be used if the normal controls fail to operate.

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6-2.3 System Actuation.

6-2.3.1

Two separate valves shall be provided for releasing carbon dioxide into any protected space. One valve shall control discharge from the carbon dioxide storage. The second valve shall control carbon dioxide discharge into the protected space(s). (See 1-8.3.6.)

Exception: For systems that contain 300 lb (136 kg) of carbon dioxide storage or less, only one valve need be used for the release of the system provided that the protected space is normally unoccupied and has horizontal egress.

6-2.3.2*

A separate manually operated control shall be provided to operate each valve required by 6-2.3.1. A set of controls shall be located outside at least one of the main means of egress from each protected space.

6-2.3.3*

In addition to the manually operated controls required by 6-2.3.2, each of the valves required by 6-2.3.1 shall be provided with its own emergency manual control.

6-2.3.4

Controls for the valves required by 6-2.3.2 shall be located inside a release box clearly identified for the protected space. If the box containing the controls is to be locked, a key to the box shall be provided in a break-glass-type enclosure conspicuously located adjacent to the box.

6-2.3.5*

In addition to the requirements of 1-6.1.5, audible predischage alarms shall be provided that depend on no source of power other than carbon dioxide pressure. The time delay required by 1-6.1.4 shall be a minimum of 20 seconds and shall depend on no source of power other than carbon dioxide pressure.

6-2.4 Carbon Dioxide Storage.

6-2.4.1

Carbon dioxide storage shall be permitted inside normally unoccupied protected spaces for systems that contain not more than 300 lb (136 kg) of carbon dioxide storage and are equipped for automatic actuation.

6-2.4.2

Low-pressure systems shall be provided with dual refrigeration units and shall be constructed in accordance with 46 CFR 58.20.

6-2.4.3

When the carbon dioxide containers are located outside a protected space, they shall be stored in a room that shall be situated in a safe and readily accessible location, and shall be effectively ventilated so that the agent containers are not exposed to ambient

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temperatures outlined in 1-9.5.5. Common bulkheads and decks located between agent container storage rooms and protected spaces shall be protected with A-60 class structural insulation as defined by 46 CFR 72. Doors and other means of closing any opening therein, which form the boundaries between such rooms and adjoining protected spaces, shall be gastight. Agent container storage rooms shall be accessible without having to pass through the space being protected. Access doors shall open outward. For systems that contain 300 lb (136 kg) of carbon dioxide storage or less, only one valve need be used for the release of the system provided that the protected space is normally unoccupied and has horizontal egress.

6-2.5 System Piping.

6-2.5.1*

Where necessary, drains shall be provided for the removal of accumulated moisture.

6-2.5.2

Carbon dioxide piping shall not be fitted with drains or other openings within living quarters.

6-2.5.3

Carbon dioxide piping shall be used for no other purpose.

Exception: Carbon dioxide piping shall be permitted to be used in an air-sampling-type smoke detection system.

6-2.6 System Design.

System design shall comply with Chapters 2, 3, and 4 except as follows:

- (a) *Machinery Spaces.* Machinery spaces shall be designed to a 34-percent concentration based on the gross volume. Eighty-five percent of this concentration shall be achieved within 2 minutes from the start of discharge. Gross volume shall include the casing.
- (b) ** Cargo Spaces.* Cargo spaces other than vehicle spaces shall be supplied with carbon dioxide based on 1 lb/ 30 ft³ based on the gross volume. The initial quantity of carbon dioxide discharged shall be based on the net volume of the space as determined by the amount of cargo in the cargo space. Additional carbon dioxide shall be released as needed to maintain control of the fire. Clear instructions shall be posted within the carbon dioxide storage room detailing the carbon dioxide release procedure.
- (c) *Vehicle Spaces.* Vehicle spaces where the vehicles contain more than 5 gallons of fuel (gasoline or diesel) shall be designed to a 34-percent concentration based on the gross volume. Eighty-five percent of this concentration shall be achieved within 2 minutes from start of discharge.
- (d) *Vehicle Spaces.* Vehicle spaces where the vehicles contain 5 gallons or less of fuel (gasoline or diesel) shall be designed to a 34-percent concentration based on the gross volume. Two-thirds of this concentration shall be achieved within 10 minutes from start of discharge.

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6-2.6.1 Electrical Equipment Spaces.

Electrical equipment spaces shall be treated as a dry electrical hazard in accordance with Chapter 2.

6-3 Inspection and Maintenance.

Inspection and maintenance shall comply with 1-11.3 and this section.

6-3.1 General.

Prior to testing or maintenance of a fixed carbon dioxide system, all personnel shall be evacuated from the protected space (*See Section 1-6*).

6-3.2 Approval of Installations.

The following approval tests shall be conducted prior to the tests required by 1-7.3. Pressure tests of the piping shall be performed to meet the requirements of the following paragraphs. The test media shall be a dry, noncorrosive gas such as nitrogen or carbon dioxide. When pressurizing the piping, pressure shall be increased in 50-psi (3.5-bar) increments. Once the pressure in the pipe has reached the required test pressure, the pressure source shall be shut off and disconnected from the pipe.

CAUTION:

Pneumatic pressure testing creates a potential risk of injury to personnel in the area, as a result of airborne projectiles, if rupture of the piping system occurs. Prior to conducting the pneumatic pressure test, the area in which the pipe is located shall be evacuated and appropriate safeguards shall be provided for test personnel.

6-3.2.1 High-Pressure Systems.

6-3.2.1.1 Systems with Stop Valves.

All piping from the carbon dioxide supply to the stop valves shall be subjected to a minimum pressure of 1000 psig (6895 KPa). The leakage during a 2-minute period shall not exceed a pressure drop of 10 percent.

All piping between the stop valves and the nozzles shall be subjected to a minimum pressure of 600 psig (4137 KPa). The leakage during a 2-minute period shall not exceed a pressure drop of 10 percent.

6-3.2.1.2 Systems without Stop Valves.

All piping from the carbon dioxide supply to the nozzles shall be subjected to a minimum pressure of 600 psig (4137 KPa). The leakage during a 2-minute period shall not exceed a pressure drop of 10 percent.

6-3.2.2 Low-Pressure Systems.

6-3.2.2.1

All piping that is normally pressurized shall be subjected to a pressure test of minimum 300 psig (2068 KPa). No leakage shall be permitted from the piping during a 2-minute test.

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6-3.2.2.2

All piping between the tank shut-off valve and the nozzles shall be subjected to a minimum pressure test of 300 psig (2068 KPa). The leakage during a 2-minute period shall not exceed a pressure drop of 10 percent.

6-3.3 Predischage Delays, Alarms, and Shutdowns.

Predischage delays and alarms and ventilation shutdowns shall be tested by flowing carbon dioxide into the system. Predischage delays that are not accurate to within +20%/-0% at 70°F (21°C) of their rating shall be replaced.

6-3.4 Verification.

Compliance with 6-2.2 shall be verified.