

(iv) The number, type, and location of discharge outlets must provide uniform distribution of carbon dioxide throughout a space.

(v) The total area of all discharge outlets must not exceed 85 percent nor be less than 35 percent of the nominal cylinder outlet area or the area of the supply pipe, whichever is smaller. The nominal cylinder outlet area in square millimeters (inches) is determined by multiplying the factor 0.015 (0.0022 if using square inches) by the total capacity in kilograms (pounds) of all carbon dioxide cylinders in the system, except in no case must the outlet area be of less than 71 square millimeters (0.110 square inches if using pounds).

(vi) The discharge of at least 85 percent of the required amount of carbon dioxide must be completed within two minutes.

(5) When installed in an enclosed ventilation system for rotating electrical propulsion equipment a fixed carbon dioxide extinguishing system must meet the following requirements.

(i) The quantity of carbon dioxide in kilograms (pounds) must be sufficient for initial and delayed discharges as required by this paragraph. The initial discharge must be equal to the gross volume of the system divided by 160 (10 if using pounds) for ventilation systems having a volume of less than 57 cubic meters (2,000 cubic feet), or divided by 192 (12 if using pounds) for ventilation systems having a volume of at least 57 cubic meters (2,000 cubic feet). In addition, there must be sufficient carbon dioxide available to permit delayed discharges to maintain at least a 25 percent concentration until the equipment can be stopped. If the initial discharge achieves this concentration, a delayed discharge is not required.

(ii) The piping sizes for the initial discharge must be in accordance with Table 181.410(f)(4)(ii) and the discharge of the required amount must be completed within two minutes.

(iii) Piping for the delayed discharge must not be less than 12.7 millimeters (0.5 inches) nominal pipe size, and need not meet specific requirement for discharge rate.

(iv) Piping for the delayed discharge may be incorporated with the initial discharge piping.

(6) When installed in a cargo space a fixed carbon dioxide extinguishing system must meet the following requirements.

(i) The number of kilograms (pounds) of carbon dioxide required for each space in cubic meters (feet) must be equal to the gross volume of the space in cubic meters (feet) divided by 480 (30 if using pounds).

(ii) System piping must be of at least 19 millimeters (0.75 inches).

(iii) No specific discharge rate is required.

(g) *Specific requirements for Halon 1301 systems.* (1) A custom engineering fixed gas fire extinguishing system, which uses Halon 1301, must comply with the applicable sections of UL Standard 1058 "Halogenated Agent Extinguishing System Units," and the requirements of this paragraph.

(2) The Halon 1301 quantity and discharge requirements of UL 1058 apply, with the exception that the Halon 1301 design concentration must be 6 percent at the lowest ambient temperature expected in the space. If the lowest temperature is not known, a temperature of -18°C (0°F) must be assumed.

(3) Each storage cylinder in a system must have the same pressure and volume.

(4) Computer programs used in designing systems must have been approved by an independent laboratory.

NOTE TO § 181.410(g): As of Jan. 1, 1994, the United States banned the production of Halon. The Environmental Protection Agency placed significant restrictions on the servicing and maintenance of systems containing Halon. Vessels operating on an international voyage, subject to SOLAS requirements, are prohibited from installing fixed gas fire extinguishing systems containing Halon.

[CGD 85-080, 61 FR 982, Jan. 10, 1996; 61 FR 20557, May 7, 1996, as amended at 62 FR 51358, Sept. 30, 1997; USCG-2000-7790, 65 FR 58465, Sept. 29, 2000]

§ 181.420 Pre-engineered fixed gas fire extinguishing systems.

(a) A pre-engineered fixed gas fire extinguishing system must:

(1) Be approved by the Commandant;

(2) Be capable of manual actuation from outside the space in addition to automatic actuation by a heat detector;

(3) Automatically shut down all power ventilation systems and all engines that draw intake air from within the protected space; and

(4) Be installed in accordance with the manufacturer's instructions.

(b) A vessel on which a pre-engineered fixed gas fire extinguishing system is installed must have the following equipment at the operating station:

(1) A light to indicate discharge;

(2) An audible alarm that sounds upon discharge; and

(3) A means to reset devices used to automatically shut down ventilation systems and engines as required by paragraph (a)(3) of this section.

(c) Only one pre-engineered fixed gas fire extinguishing system is allowed to be installed in each space protected by such a system.

§ 181.425 Galley hood fire extinguishing systems.

(a) A grease extraction hood required by §181.400 must meet UL 710 "Exhaust Hoods for Commercial Cooking Equipment," or other standard specified by the Commandant.

(b) A grease extraction hood must be equipped with a dry or wet chemical fire extinguishing system meeting the

applicable sections of NFPA 17 "Dry Chemical Extinguishing Systems," 17A "Wet Chemical Extinguishing Systems," or other standard specified by the Commandant, and must be listed by an independent laboratory recognized by the Commandant.

§ 181.450 Independent modular smoke detecting units.

(a) An independent modular smoke detecting unit must:

(1) Meet UL Standard 217 and be listed as a "Single Station Smoke detector—Also suitable for use in Recreational Vehicles," or other standard specified by the Commandant;

(2) Contain an independent power source; and

(3) Alarm on low power.

(b) [Reserved]

Subpart E—Portable Fire Extinguishers

§ 181.500 Required number, type, and location.

(a) Each portable fire extinguisher on a vessel must be of an approved type. The minimum number of portable fire extinguishers required on a vessel must be acceptable to the cognizant OCMI, but must be not less than the minimum number required by Table 181.500(a) and other provisions of this section.

TABLE 181.500(a)

Space protected	Minimum No. required	Type extinguisher permitted		
		CG class	Medium	Min size
Operating Station	1	B-I, C-I	Halon	1.1 kg (2.5 lb).
			CO2	1.8kg (4 lb).
			Dry Chemical	0.9 kg (2 lb).
			CO2	6.8 kg (15 lb).
Machinery Space	1	B-II, C-II located just outside exit.	Dry chemical	4.5 kg (10 lb).
			Foam	9.5 L (2.5 gal).
Open Vehicle Deck ...	1 for every 10 vehicles.	B-II	Halon	4.5 kg (10 lb).
			CO2	6.8 kg (15 lb).
			Dry Chemical	4.5 kg (10 lb).
			Foam	9.5 L (2.5 gal).
			Dry Chemical	4.5 kg (10 lb).
Accommodation Space	1 for each 232.3 square meters (2,500 square feet) or fraction thereof.	A-II	Foam	9.5 L (2.5 gal).
			Dry Chemical	4.5 kg (10 lb).
Galley, Pantry, Concession Stand.	1	A-II, B-II	Foam	9.5 L (2.5 gal).
			Dry Chemical	4.5 kg (10 lb).