

7.6.4.1* The cover shall be attached to the tank fill by mechanical means to prevent air from entering or escaping during normal service.

7.6.5 Where the foam concentrate tank is over 100 gal (400 L), it shall incorporate an expansion compartment or dome located so that foam concentrate enters this compartment only after the entire main tank compartment is completely filled.

7.6.5.1 The volume of the expansion compartment in 7.6.5 shall be not less than 2 percent of the total foam concentrate tank volume.

7.6.6 Pressure/Vacuum Vent.

7.6.6.1 The foam concentrate tank shall be equipped with a pressure/vacuum vent that allows the tank to adjust automatically for changes in pressure when filling or withdrawing foam concentrate from the tank.

7.6.6.2 The pressure/vacuum vent shall not permit outside air to enter the tank freely except during operation or for normal changes in volume due to changes in temperature.

7.6.6.3 The alternative to a pressure/vacuum vent shall be permitted to be a small vented header tank, fitted with a sight glass or similar level indicator, that would present a small contact surface area of foam to the atmosphere, and ensure that the main storage tanks are void of air.

7.6.7 Foam Isolation.

7.6.7.1 The foam concentrate shall be isolated from direct contact with the atmosphere to prevent drying out and to reduce risk of internal corrosion in the tank.

7.6.7.2 The foam concentrate tank shall be fitted with a pressure vacuum vent or alternative device that allows the tank to react safely to changes in pressure when filling or removing foam concentrate from the tank.

7.6.7.3 The pressure vacuum vent or alternative device shall not permit outside air or water to enter the tank freely except during operation or for normal changes in volume due to changes in temperature.

7.6.7.4 An acceptable alternative to a pressure vacuum vent shall be permitted to be a small vented header tank, fitted with a sight glass or similar level indicator, which presents only a small contact surface area of foam to the atmosphere and ensures that the main storage tanks are void of air.

7.6.8* The foam concentrate tank shall be designed and constructed to facilitate cleaning the inside of the tank as required.

7.6.8.1 Foam concentrate tanks larger than 200 gal (800 L) with more than one internal compartment shall incorporate a removable top allowing access to each compartment or a removable personnel access hatch with a minimum inside diameter of 20 in. (510 mm).

7.6.8.2 Tanks equipped with a personnel access hatch shall also be equipped with a 20 in. (510 mm) minimum inside diameter opening through any internal baffles to allow personnel access to the entire tank interior.

7.6.8.3 Single compartment foam concentrate tanks shall incorporate a removable hatch or fill opening that allows personnel access to the entire interior of the tank.

7.6.9 Swash Partitions.

7.6.9.1 The foam concentrate tank shall have a sufficient number of swash partitions so that the maximum dimension

of any space in the tank, either transverse or longitudinal, shall not exceed 48 in. (1220 mm) and shall be not less than 23 in. (584 mm).

7.6.9.2 The swash partitions shall have vents and openings at the top and bottom to permit movement of air and foam concentrate between compartments to meet the maximum flow requirements of the foam-proportioning system.

7.6.10 Discharge.

7.6.10.1 The foam concentrate tank outlet connection shall be connected to a sump located in the bottom of the tank and shall permit discharge of at least 95 percent of the tank's capacity.

7.6.10.2 The discharge shall be protected by an antiswirl baffle in systems where the foam concentrate delivery rate exceeds 5 gpm (20 L/min).

7.6.10.3 The foam concentrate tank inlet connection shall terminate within 2 in. (51 mm) of the tank bottom to prevent aerating the foam concentrate.

7.6.11 Valved Drain.

7.6.11.1 A minimum 1 in. (25 mm) valved drain shall be provided in the sump of any foam concentrate tank of 20 gal (80 L) or more.

7.6.11.2 A minimum ½ in. (13 mm) valved drain shall be provided in the sump of any foam concentrate tank of less than 20 gal (80 L).

7.7 Foam Concentrate Pump.

7.7.1* Where the vessel's foam-proportioning system incorporates a foam concentrate pump, the requirements of this section shall apply.

7.7.2 The foam concentrate pump shall operate at a design speed that prevents cavitation and foaming in the concentrate system when delivering maximum design flow.

7.7.3 Drive train components required to transmit power to the foam concentrate pump shall be capable of transmitting the power required by the pump under the maximum design condition.

7.7.4 The foam concentrate pump shall deliver the flow and pressure required by the system when it is operating at 110 percent of rated capacity.

7.7.5 A relief valve or other overpressure limiting device shall be provided in the foam-proportioning system to protect the foam concentrate pump.

7.7.6* A strainer designated by the foam concentrate manufacturer shall be installed on the intake side of the foam concentrate pump so that any foam concentrate entering the system passes through the strainer.

Chapter 8 Manufacturer/Purchaser Responsibilities

8.1* Personnel Training. After delivery of the marine fire-fighting vessel, the owner shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the marine fire-fighting vessel and associated equipment as defined in NFPA 1005, *Standard for Professional Qualifications for Marine Fire Fighting for Land-Based Fire Fighters*,



and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

8.2* Compliance with Regulations. The owner shall comply with all applicable regulations for operation of vessels in their location.

8.3 Training and Instruction. The fire-fighting vessel manufacturer/builder of the fire-fighting vessel shall supply a qualified person to provide operational training to fire department personnel that includes the following:

- (1) A complete system component familiarization/walkaround
- (2) A complete review of the system and its safety features
- (3) A review of all operation, service, and maintenance documentation
- (4) Hands-on familiarization of the safe operation of the vessel

Chapter 9 Fire Protection Equipment for the Vessel

9.1 General.

9.1.1 The requirements in *ABS Guidance Notes on Fire Fighting Systems* shall apply to Type I through Type III marine fire-fighting vessels.

9.1.2 The requirements of 46 CFR 175-187, Subchapter T, "Small Passenger Vessels (under 100 Gross Tons)"; ABYC A-4, *Fire Fighting Equipment*; and NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, shall apply to Type IV and Type V marine fire-fighting vessels.

9.1.3 Type I and Type II marine fire-fighting vessels shall be equipped with a water curtain or equivalent system to protect the vessel and its equipment during fire-fighting operations.

9.1.4 The melting point of the exposed water curtain or equivalent system piping materials shall be equal to or greater than that of the hull structure material.

9.2 Fire Detection and Alarm Systems.

9.2.1 Machinery, accommodation, and service spaces shall be provided with an approved automatic detection system and alarms that indicate at the control station the location of out-break of a fire.

9.2.2 Ventilation arrangements to the machinery, accommodation, and service spaces containing the fire detection equipment shall be such as to preclude, as far as practicable, the possibility of smoke from the fire being drawn into those spaces.

9.2.3 Smoke, heat, or flame detectors shall be of an approved or listed type.

9.2.4 Carbon monoxide detection shall be provided in accordance with ABYC A-24, *Carbon Monoxide Detection Systems*, and NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, for vessels fitted with inboard spark ignition engines.

9.2.5 Detector Location.

9.2.5.1 Detectors shall be located in accordance with NFPA 72, *National Fire Alarm and Signaling Code*, NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, and NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*.

9.2.5.2 Positions near beams and ventilation ducts where air flow could adversely affect performance shall be avoided.

9.2.5.3 At least one fire detector shall be provided in each crew accommodation space.

9.2.5.4 In service spaces, at least one fire detector shall be provided in each enclosed space not normally entered.

9.2.5.5 Detectors shall be installed and maintained according to the device manufacturer's instructions.

9.2.6 Control Panels for Type I Through Type III Marine Fire-Fighting Vessels.

9.2.6.1 Visual and audible alarm signal panels shall be arranged on the vessel's pilothouse and main control center.

9.2.6.2 The control panel shall indicate where the detection unit has operated.

9.2.7 All detectors shall be of a type such that they can be tested and reset to normal surveillance without the renewal of any component.

9.2.8 Type I through Type III marine fire-fighting vessels with enclosed engine spaces shall have at least two sources of power for the electrical equipment used in the operation of the fire detection and fire alarm systems, one of which shall be an emergency power source.

9.2.9 All electrical components shall meet the requirements found in Section 14.1.

9.3 Fire Protection Water Piping and Pumps.

9.3.1 All Type I through Type III vessels shall have at least one fire protection pump.

9.3.2 The fire protection pump system shall have at least the capacity and at least be powered as shown in Table 9.3.2 in accordance with 46 CFR 181, "Fire Protection Equipment."

9.3.3 Where sanitary, ballast, bilge, or general service pumps are used as a vessel's fire pump, such pumps shall meet the capacities given in Table 9.3.2 for fire protection.

9.3.4 All Type I through Type III vessels shall be fitted with a fire protection main.

9.3.5 The fire protection main shall have drains installed for maintenance and protection from freezing.

9.3.6 All piping shall be tested in accordance with Chapter 19.

9.4 Hose Stations.

9.4.1 The number and position of hose stations shall be sufficient to reach any part of the vessel with an effective stream of water from a single length of hose.

9.4.1.1 The pipes and hose stations shall be so placed that the fire hoses can be easily coupled to them.

9.4.1.2 All hose couplings and nozzles shall be interchangeable throughout the vessel.

9.4.2 Hose station fire hose shall have a minimum diameter of 1 in. (25 mm) and a maximum length of 75 ft (23 m).

9.4.3 Each fire hose shall be provided with a nozzle and couplings constructed of a compatible and noncorrosive material.

9.4.4 All fire hoses attached to hose stations in the machinery spaces shall be fitted with combination nozzles.

Table 9.3.2 Fire Protection Pump Capacity and Power Source

Minimum Pump Capacity		Power Source	Vessel Length			
			Greater than		Less than or Equal to	
gpm	L/min		ft	m	ft	m
5	20	Hand, electric, or engine driven	20	6	40	12
25	100	Electric or engine driven	40	12	65	20
50	200	Electric or engine driven	65	20	100	31
66.6	255	Electric or engine driven	100	31	—	—

9.5 Fixed Inert Gas Extinguishing Systems.

9.5.1* A manually activated fixed inert gas or equivalent extinguishing system shall be installed for all Category A machinery spaces in Type I through Type III vessels.

9.5.2 Pre-engineered systems located in a Category A machinery space shall be located as high as possible and away from mechanical and natural ventilation.

9.5.3 Where a fixed gas fire extinguishing system is installed, access doors to the space shall be such that they remain closed at all times with no holdback arrangements.

9.5.4 For occupiable, protected spaces, audible and visual alarms shall automatically sound and illuminate for at least 20 seconds prior to the discharge of an extinguishing medium into the space.

9.5.5 Doors to the protected space shall open outward.

9.5.6 The system shall have two control stations.

9.5.6.1 One station shall be located near the entrance to the protected space, and the second station shall be located near the helm at the designated fire control station.

9.5.6.2 These controls shall be protected to prevent accidental discharge of an inert gas extinguishing system into the space.

9.5.6.3 Operating instructions shall be posted at all control stations.

9.5.7 Means shall be provided for automatically stopping all ventilating fans, securing the protected space, closing all openings that would permit air to enter the space, and shutting down all internal combustion engines within the affected space.

9.5.8 Necessary controls shall operate from outside the space.

9.5.9 Carbon dioxide (CO₂) or inert extinguishing gas cylinders shall meet the U.S. Coast Guard, Canadian Transportation Commission, or American Bureau of Shipping requirements and shall be maintained in accordance with NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*, or NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, as applicable.

9.5.10 Cylinders and associated controls shall be securely mounted and protected from weather, corrosion, mechanical damage, and temperatures outside the system's operating range.

9.5.11 A method of ascertaining the quantity of an inert extinguishing gas within the cylinders shall be provided.

9.5.12 Piping, valves, and fittings shall meet the requirements of Subchapter F of 46 CFR 56, "Piping Systems and Appurtenances"; *ABS Rules for Building and Classing Steel Vessels*; NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*; and NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, as applicable.

9.5.13 Piping shall be arranged and discharge nozzles positioned such that uniform distribution of the medium is attained.

9.5.14 Fixed inert gas extinguishing systems shall have sufficient quantity of inert gas to provide at least the minimum effective concentration for the gross volume of the protected space.

9.5.15 Discharge nozzles shall be listed and approved for discharge characteristics.

9.5.16 Each discharge nozzle shall be permanently marked to identify the equivalent single orifice diameter.

9.5.17 The total area of all discharge nozzles shall not exceed 85 percent or be less than 35 percent of nominal cylinder outlet area or the area of the supply pipe, whichever is smaller.

9.5.18 All dead-end lines shall extend 2 in. (50 mm) beyond the last orifice and shall be closed with a cap or plug.

9.5.19 All piping, valves, and fittings shall be securely supported and, where necessary, protected against mechanical damage.

9.5.20 Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture and shall be readily accessible.

9.6 Hand Portable/Semiportable Fire Extinguishers.

9.6.1* Portable fire extinguishers shall be provided, located, and maintained in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*; Chapter 12 of NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*; ABYC A-4, *Fire Fighting Equipment*; and 46 CFR 25.30, "Fire-Extinguishing Equipment."

9.6.2 Whenever propulsion or pumping engines and generator sets are enclosed in housings, a portable extinguisher sized for the volume of the enclosed housing shall be provided so that the extinguishing agent can be discharged into the enclosure without opening it.

Chapter 10 Fire-Fighting and Emergency Equipment for the Vessel

and mounted or stowed as per the AHJ prior to the vessel being placed in operation in accordance with Table 10.1.1(a) and Table 10.1.1(b).

10.1 General.

10.1.1 Fire-fighting equipment that is specified in this chapter and required for a given class of vessel shall be supplied

Table 10.1.1(a) Fire-Fighting Equipment (U.S. Units)

Equipment	Type I		Type II		Type III		Type IV		Type V	
	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size
Line gun	1		1		1			Optional per AHJ		Optional per AHJ
Pry bar	2	6 ft	2	6 ft	2	6 ft	1	Optional/Length per AHJ	1	Optional/Length per AHJ
Bolt cutter	1	24 in.	1	24 in.	1	24 in.	1	24 in.	1	24 in.
Pike pole	2	15 ft	2	15 ft	2	15 ft	1	10 ft or 6 ft	1	6 ft or longer
Scoop shovel	2		2		2		1			Optional per AHJ
Adjustable hydrant wrench	2		2		2		1		1	
Sprinkler shutoff/wedge	4		4		4		2		1	
Utility rope	2	100 ft	2	100 ft	2	100 ft	1	100 ft	1	100 ft
Floating stretcher with harness	2		2		2		1			Optional per AHJ
Portable extinguisher	4	2-A:20-B:C	4	2-A:20-B:C	4	2-A:20-B:C	1	2-A:20-B:C	1	2-A:10-B:C
Dry chemical extinguisher	2	80-B:C	2	80-B:C	2	80-B:C	1	80-B:C	1	80-B:C
Electrical extension cords	2	100 ft	2	100 ft	2	100 ft	1	50 ft		Optional per AHJ
Flathead axe	1	6 lb	1	6 lb	1	6 lb	1	6 lb	1	6 lb
Pickhead axe	1	6 lb	1	6 lb	1	6 lb		Optional per AHJ		Optional per AHJ
Halligan tools or equivalent	2	6 lb	2	6 lb	2	6 lb	1	6 lb		Optional per AHJ
Spanner wrench	8		8		8		4		4	
Sledge hammer	1	10 lb	1	10 lb	1	10 lb	1	10 lb		Optional per AHJ
Grappling hook	2		2		2		1			Optional per AHJ
Ropes in throw bag	2	75 ft	2	75 ft	2	75 ft	1	75 ft	1	75 ft
Heaving line	2	75 ft	2	75 ft	2	75 ft	1	75 ft		Optional per AHJ
NFPA 1983 life safety rope	1	100 ft	1	100 ft	1	100 ft		Optional per AHJ		Optional per AHJ
Jet siphons	2	2½ in. to 3½ in. or larger	2	2½ in. to 3½ in. or larger	2	2½ in. to 3½ in. or larger		Optional per AHJ		Optional per AHJ
	2	1½ in. to 2½ in.	2	1½ in. to 2½ in.	2	1½ in. to 2½ in.	1	1½ in. to 2½ in.		Optional per AHJ
Positive pressure fan (portable)	2	Size per AHJ	2	Size per AHJ	2	Size per AHJ		N/A		N/A
Gasoline-powered chain saw	1		1		1			Optional per AHJ		N/A
Portable oxygen gas cutting set or equal	1		1		1			N/A		N/A
Hydraulic rescue tool	1	Gas powered or manually operated	1	Gas powered or manually operated	1	Gas powered or manually operated		Optional per AHJ		N/A

N/A = Not applicable.

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MARINE FIRE-FIGHTING VESSELS

Table 10.1.1(b) Fire-Fighting Equipment (SI Units)

Equipment	Type I		Type II		Type III		Type IV		Type V	
	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size
Line gun	1		1		1			Optional per AHJ		Optional per AHJ
Pry bar	2	1.8 m	2	1.8 m	2	1.8 m	1	Optional/Length per AHJ	1	Optional/Length per AHJ
Bolt cutter	1	610 mm	1	610 mm	1	610 mm	1	610 mm	1	610 mm
Pike pole	2	4.5 m	2	4.5 m	2	4.5 m	1	3 m or 1.8 m	1	1.8 m or longer
	2	1.8 m	2	1.8 m	2	1.8 m				Optional per AHJ
Scoop shovel	2		2		2		1			
Adjustable hydrant wrench	2		2		2		1		1	
Sprinkler shutoff/wedge	4		4		4		2		1	
Utility rope	2	30 m	2	30 m	2	30 m	1	30 m	1	30 m
Floating stretcher with harness	2		2		2		1			Optional per AHJ
Portable extinguisher	4	2-A:20-B:C	4	2-A:20-B:C	4	2-A:20-B:C	1	2-A:20-B:C	1	2-A:10-B:C
Dry chemical extinguisher	2	80-B:C	2	80-B:C	2	80-B:C	1	80-B:C	1	80-B:C
Electrical extension cords	2	30 m	2	30 m	2	30 m	1	15 m		Optional per AHJ
Flathead axe	1	2.7 kg	1	2.7 kg	1	2.7 kg	1	2.7 kg	1	2.7 kg
Pickhead axe	1	2.7 kg	1	2.7 kg	1	2.7 kg		Optional per AHJ		Optional per AHJ
Halligan tools or equivalent	2	2.7 kg	2	2.7 kg	2	2.7 kg	1	2.7 kg		Optional per AHJ
Spanner wrench	8		8		8		4		2	
Sledge hammer	1	4.5 kg	1	4.5 kg	1	4.5 kg	1	4.5 kg		Optional per AHJ
Grappling hook	2		2		2		1			Optional per AHJ
Ropes in throw bag	2	23 m	2	23 m	2	23 m	1	23 m	1	23 m
Heaving line	2	23 m	2	23 m	2	23 m	1	23 m		Optional per AHJ
NFPA 1983 life safety rope	1	30 m	1	30 m	1	30 m		Optional per AHJ		Optional per AHJ
Jet siphons	2	65 mm to 90 mm or larger	2	65 mm to 90 mm or larger	2	65 mm to 90 mm or larger	1	65 mm to 90 mm or larger		Optional per AHJ
	2	38 mm to 65 mm	2	38 mm to 65 mm	2	38 mm to 65 mm	1	38 mm to 65 mm		Optional per AHJ
Positive pressure fan (portable)	2	Size per AHJ	2	Size per AHJ	2	Size per AHJ		N/A		N/A
Gasoline-powered chain saw	1		1		1			Optional per AHJ		N/A
Portable oxygen gas cutting set or equal	1		1		1			N/A		N/A
Hydraulic rescue tool	1	Gas powered or manually operated	1	Gas powered or manually operated	1	Gas powered or manually operated		Optional per AHJ		N/A

N/A = Not applicable.

10.1.2 Fire-fighting equipment specified in this chapter are minimum requirements for the given type of vessel and shall be mounted or stowed securely utilizing the manufacturer's recommendations along with standard marine practices.

10.1.2.1 Portable gasoline equipment and containers shall be stored in a well-ventilated storage compartment so that vapors are vented overboard and away from air intakes in accordance with ABYC H-25, *Portable Gasoline Fuel Systems*.

10.1.2.2 Any electrical equipment installed within the storage compartment shall be ignition protected as defined by ABYC E-11, *Alternating Current (AC) and Direct Current (DC) Electrical Systems on Boats*.

10.1.3 All fire service equipment required by this chapter and Table 5.1 shall meet the requirements of NFPA standards for the particular type of equipment as identified as follows:

- (1) NFPA 10, *Standard for Portable Fire Extinguishers*
- (2) NFPA 1931, *Standard for Manufacturer's Design of Fire Department Ground Ladders*
- (3) NFPA 1961, *Standard on Fire Hose*
- (4) NFPA 1963, *Standard for Fire Hose Connections*
- (5) NFPA 1964, *Standard for Spray Nozzles*
- (6) NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*
- (7) NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*

10.1.4 Type I through Type III vessels shall be outfitted with a minimum complement of the equipment identified in Table 10.1.1(a) and Table 10.1.1(b).

10.2 Self-Contained Breathing Apparatus (SCBA).

10.2.1* All SCBA shall be in accordance with this section and Table 10.2.1 and shall meet the requirements of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*.

10.2.2 Stowage of SCBA in compartments shall be secure and shall use racks to allow rapid donning.

10.2.3 Stowage space shall be provided for spare breathing air cylinders in racks.

10.3 Fire Hose and Appliances.

10.3.1 Fire Hose. All fire hose shall be in accordance with Table 10.3.1(a) or Table 10.3.1(b) and shall meet the requirements of NFPA 1961, *Standard on Fire Hose*.

Table 10.2.1 Self-Contained Breathing Apparatus (SCBA)

Equipment	Type I Qty	Type II Qty	Type III Qty	Type IV Qty	Type V Qty
SCBA (at least)	1 per crew 1 spare set	1 per crew 1 spare set	1 per crew 1 spare set	1 per crew 1 spare set	1 per crew 1 spare set
Spare SCBA Cylinder	2 spare cylinder per crew SCBA carried	Same as Type I	Same as Type I	1 spare cylinder per crew SCBA carried	1 spare cylinder per crew SCBA carried

10.3.2 Fire Hose Storage. Weather-protected stowage compartments shall be provided for fire-fighting equipment and appliances.

10.3.3 Couplings. All couplings on fire hose shall meet the requirements of NFPA 1963, *Standard for Fire Hose Connections*.

10.3.4 Nozzles.

10.3.4.1 All nozzles shall be in accordance with Table 10.3.1(a) or Table 10.3.1(b) and meet the requirements of NFPA 1964, *Standard for Spray Nozzles*.

10.3.4.2 All nozzles and accessories shall be of corrosion-resistant construction.

10.3.5 Couplings and Appliances. All connections on appliances shall comply with the requirements of NFPA 1963, *Standard for Fire Hose Connections*.

10.4 Rescue/Work Boat. Type I and Type II vessels shall be outfitted with a motorized rescue/work vessel capable of safely carrying a minimum of two fire fighters in full protective clothing and SCBA and a minimum weight-bearing capacity of 1500 lb (680 kg).

10.5 Required Safety Equipment. All vessels shall carry the appropriate U.S. Coast Guard safety equipment required for the size and operational territory of the vessel.

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Table 10.3.1(a) Fire Hoses, Fittings and Appliances (U.S. Units)

Equipment	Type I		Type II		Type III		Type IV		Type V	
	Qty	Size	Qty	Size	Qty	Size	Qty	Size	Qty	Size
Large-diameter hose	600 ft	3½ in. or larger	600 ft	3½ in. or larger	400 ft	3½ in. or larger	200 ft	3½ in. or larger		N/A
Attack hose (large)	600 ft	2½ in. or 3 in.	600 ft	2½ in. or 3 in.	400 ft	2½ in. or 3 in.	200 ft	2½ in. or 3 in.		N/A
Attack hose (small)	600 ft	1½ in., 1¾ in., or 2 in.	600 ft	1½ in., 1¾ in., or 2 in.	400 ft	1½ in., 1¾ in., or 2 in.	200 ft	1½ in., 1¾ in., or 2 in.	200 ft	1½ in., 1¾ in., or 2 in.
Combination nozzle with shutoff	4	2½ in.	4	2½ in.	4	2½ in.	2	2½ in.	2	1½ in. or 2½ in.
Cellar or distributor nozzle	4	1½ in.	4	1½ in.	4	1½ in.	2	1½ in.		N/A
	2	2½ in.	2	2½ in.	2	2½ in.	1	2½ in.		N/A
Foam eductor with matching nozzle (portable)		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		N/A
		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		N/A
Couplings:										
Double male	2	Consistent with large-diameter hose used	2	Same as Type I	2	Same as Type I	2	Same as Type I		N/A
Double female	2	Consistent with large-diameter hose used	2	Same as Type I	2	Same as Type I	2	Same as Type I		N/A
Double males	2	2½ in.	2	2½ in.	2	2½ in.	2	2½ in.		Consistent with hose used
Double females	2	2½ in.	2	2½ in.	2	2½ in.	2	2½ in.		Consistent with hose used
Reducers:										
Large-diameter to 2½ in.	2		2		2		1			N/A
2½ in. to 1½ in.	2		2		2		1			N/A
Increasesers:										
2½ in. to large-diameter	2		2		2		1			N/A
Wyes:										
2½ in. × 1½ in. × 1½ in. gated	2		2		2		1			N/A
2½ in. gated	2		2		2		1			N/A
Large-diameter to 2-2½ in. gated	1		1		1			N/A		N/A
2½ in. plug (male thread)	2		2		2		1			N/A
2½ in. cap (female thread)	2		2		2		1			N/A
2½ in. Siamese	2		2		1			N/A		N/A
International shore connection	2		2		2		1			N/A

N/A = Not applicable.



Table 10.3.1(b) Fire Hoses, Fittings and Appliances (SI Units)

Equipment	Type I		Type II		Type III		Type IV		Type V	
	Qty	Size (mm)	Qty	Size (mm)	Qty	Size (mm)	Qty	Size (mm)	Qty	Size (mm)
Large-diameter hose	180 m	90 or larger	180 m	90 or larger	120 m	90 or larger	60 m	90 or larger		N/A
Attack hose (large)	180 m	65 or 76	180 m	65 or 76	120 m	65 or 76	60 m	65 or 76		N/A
Attack hose (small)	180 m	38, 45, or 50	180 m	38, 45, or 50	120 m	38, 45, or 50	60 m	38, 45, 50	60 m	38, 45, 50
Combination nozzle with shutoff	4	65	4	65	4	65	2	65	2	38 or 65
Cellar or distributor nozzle	4	38	4	38	4	38	2	38		N/A
	2	65	2	65	2	65	1	65		N/A
Foam eductor with matching nozzle (portable)		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		N/A
		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		Opt. per AHJ		N/A
Couplings:										
Double male	2	Consistent with large-diameter hose used	2	Same as Type I	2	Same as Type I	2	Same as Type I		N/A
Double female	2	Consistent with large-diameter hose used	2	Same as Type I	2	Same as Type I	2	Same as Type I		N/A
Double males	2	65	2	65	2	65	2	65		Consistent with hose used
Double females	2	65	2	65	2	65	2	65		Consistent with hose used
Reducers:										
Large-diameter to 65 mm	2		2		2		1			N/A
65 mm to 38 mm	2		2		2		1			N/A
Increases:										
65 mm to large-diameter	2		2		2		1			N/A
Wyes:										
65 mm × 38 mm × 38 mm gated	2		2		2		1			N/A
65 mm gated	2		2		2		1			N/A
Large-diameter to 50–65 mm gated	1		1		1			N/A		N/A
65 mm plug (male thread)	2		2		2		1			N/A
65 mm cap (female thread)	2		2		2		1			N/A
65 mm Siamese	2		2		1			N/A		N/A
International shore connection	2		2		2		1			N/A

N/A = Not applicable.

Chapter 11 Marine Fire-Fighting Vessel Stability and Subdivision

11.1 Subdivision.

11.1.1 Standard of Subdivision.

11.1.1.1 Marine fire-fighting vessels shall meet the standard of subdivision required for the individual type, as described in Table 11.1.1.1.

Table 11.1.1.1 Vessel Subdivision Standards

Type of Marine Fire-Fighting Vessel	Types I, II, and III	Type IV	Type V
Requirements for compartment	One compartment	Collision bulkhead, and able to survive largest compartment flooding, or positive flotation	Positive flotation

11.1.1.2 The marine fire-fighting vessel shall be presumed to be in a maximum design load condition when damage occurs.

11.1.1.3 Where watertight doors are fitted in subdivision bulkheads, they shall be permitted to be fitted with indicators of open/closed status at the main control station.

11.1.2 Collision Bulkheads.

11.1.2.1 A collision bulkhead shall be fitted to all marine fire-fighting vessels of Types I through III, in accordance with the requirements of *ABS Rules for Building and Classing Steel Vessels*.

11.1.2.2 A collision bulkhead shall be fitted to all marine fire-fighting vessels of Type IV, in accordance with the requirements of ABYC fire protection standards.

11.1.2.3 A collision bulkhead shall be fitted to all fireboats, located at least 5 percent of the length between perpendiculars and no more than 5 percent plus 10 ft (3 m) from the point where the stem intersects the waterline.

11.1.2.4 Penetrations or openings in the collision bulkhead shall be watertight and placed as high and as far inboard as practicable.

11.1.3 Positive Flotation.

11.1.3.1 Vessels of Type IV and V shall be fitted with positive flotation or an equivalent level of subdivision or compartmentalization.

11.1.3.2 The amount of flotation shall be sufficient to support the weight of the fully laden boat in fresh water, plus 10 percent of that weight.

11.1.3.3 Flotation shall be in the form of either buoyancy tanks, foam blocks, or hull structure.

11.1.3.4 Flotation shall be secured in place and shall retain its effectiveness after submergence in fresh water after 24 hours.

11.2 Intact Stability.

11.2.1 Design Objectives.

11.2.1.1 Every marine fire-fighting vessel shall have stability characteristics commensurate with its intended service and its intended area of operation.

11.2.1.2 Every marine fire-fighting vessel shall have, when new, an allowance/margin built into the design for appreciable growth in weight of systems and equipment throughout its life.

11.2.1.3 Every marine fire-fighting vessel shall be designed to provide a platform that is safe and stable for the operating crews, recognizing that the crews are in most cases not likely to be seasoned seafarers.

11.2.1.4 All possible operations of the marine fire-fighting vessel shall be addressed in the stability analysis of the vessel, including deployment and operation of all monitors, lateral thrusters, cranes, ladders, workboats, and so forth.

11.2.1.5 The stability of planing and semi-planing craft shall be carefully assessed, including operation at full speed.

11.2.2 Stability Criteria.

11.2.2.1 Marine fire-fighting vessels, according to their type, shall comply fully with the latest published relevant standard for marine fire-fighting vessel stability as described in Table 11.2.2.1.

11.2.2.2 Every new marine fire-fighting vessel shall have intact stability characteristics that, when new, are not less than 20 percent in excess of the minimum criteria stipulated in Table 11.2.2.1.

11.2.2.3 In no case shall the stability characteristics of a Type I, II, or III marine fire-fighting vessel be less than those permitted by IMO A 18, Resolution 749, *Code on Intact Stability for All Types of Ships Covered by IMO Instruments*.

11.2.3 Stability Calculations.

11.2.3.1 Detailed calculations shall be submitted to the pertinent regulatory authority for approval where applicable, and/or to the AHJ for acceptance, describing the following:

- (1) The adequacy of the marine fire-fighting vessel's stability during all fire-fighting operations
- (2) The adequacy of propulsion power and steering capability required for the marine fire-fighting vessel to maintain station and hold position during fire-fighting operations

11.2.3.2 The stability information shall be placed onboard the marine fire-fighting vessel for the information and guidance of the master and shall become part of the vessel operating booklet.

11.2.3.3 The master of the marine fire-fighting vessel shall receive training in the use of formal stability documentation.

11.2.4 Specific Stability Concerns.

11.2.4.1 Monitor Heel.

11.2.4.1.1 Each marine fire-fighting vessel shall have adequate stability for the full range of fire-fighting operation conditions, with all fire-fighting monitors operating at maximum output, in the direction most unfavorable to the stability of the marine fire-fighting vessel.

