

Changes shown by ↗

SCOPE

- I ↗ 1.1 This practice covers the purchase of firefighting equipment, including foam proportioning truck, foam concentrate truck, fire equipment truck, trailer mounted firewater pump, portable/auxiliary firefighting equipment used with firewater or foam systems (such as nozzles, monitors, fire hose) and other auxiliary firefighting equipment (such as extinguishers, loudspeakers, lighting equipment, firesuits and blankets).
- I 1.2 An asterisk (*) indicates that a decision by the Purchaser is required or that additional information is furnished by the Purchaser.

SUMMARY OF ADDITIONAL REQUIREMENTS

- I ↗ 2.1 **Table 1** lists the practice, standards, and codes which shall be used with this practice.

TABLE 1

PRACTICE	
IP 20-1-1	Inspection of Equipment and Materials
STANDARDS	
UL Standards	
154	Carbon-Dioxide Fire Extinguishers
299	Dry Chemical Fire Extinguishers
626	2-1/2 Gallon, Stored-Pressure, Water-Type Fire Extinguishers
OSHA	Fire Protection, Subpart L, Section 1910.157 (for USA ONLY)
CODES	
NFPA	
1901	Automotive Fire Apparatus
11C	Standard for Mobile Foam Apparatus
1976	Protective Clothing for Proximity Firefighting

- I ↗ 2.2 The standards specified for use with this practice, and the equipment descriptions given herein, apply to equipment installations in countries with no comparable standards. Where compliance with any code or standard by a local jurisdiction is mandatory, the requirements prescribed therein shall also be met.
- * **Motor vehicles** shall comply with all local rules and regulations, as specified by the Purchaser.
- S ↗ 2.3 **Fire hose couplings** selected for a particular plant location shall be **compatible with mutual aid and local fire protection facilities**.

FOAM PROPORTIONING TRUCK

- S 3.1 The foam proportioning truck shall comply with NFPA-1901 and NFPA-11C and shall be designed to operate with **low, intermediate, or high back pressure foam systems**, as specified. The foam proportioning system shall be of the balanced pressure inductor type.
- S 3.2 The piping and equipment arrangement shall be per **Figure 1** and the additional requirements given herein.

FOAM CONCENTRATE TANK AND APPURTENANCES

- S ↗ 3.3 The foam concentrate tank shall be **designed to carry** 1000 gal. (3795 L) of foam concentrate. Other size tank may be specified.
- * **Carbon steel**, stainless steel or plastic (FRP) tank material is acceptable but must be compatible with the specific foam concentrate selected. Material selected shall be approved by the plant Fire Chief.
- S 3.4 The foam concentrate tank shall be furnished with the following appurtenances:
 - a. **Internal baffles** to prevent excessive surging of the fluid. The baffle system shall be designed such that all parts of the tank are accessible for inspection.
 - b. **A hatch**, minimum size 8 in. (200 mm), with a hinged and latched cover to permit manual gauging and inspection of the concentrate.

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(This practice is appropriate for attachment to Inquiry or Purchase Document)

FOAM PROPORTIONING TRUCK (Cont)

- c. **Additional openings as required**, with bolted covers shall be provided **for inspection and cleaning of the tank**.
 - d. **An expansion dome** of approximately 2% of the volume shall be located on the top of the tank. The horizontal cross-sectional area of the dome shall not exceed 300 sq in. (0.19 m²).
 - e. **A sediment sump**, approximately 15 in. (380 mm) in diameter and 6 in. (150 mm) deep, shall be provided at the bottom of the tank directly below the expansion dome. The following connections shall be provided.
 - 1. The sump shall be connected to the suction line of the concentrate pump.
 - 2. The connecting pipe shall extend through the sump and terminate 1/2 in. (13 mm) above the bottom of the tank.
 - 3. A separate size 2 in. (50 mm) valved drain shall be provided on the sump.
 - 4. The suction line valve and the drain valve shall be located adjacent to the sump.
 - f. **All fittings and attachments** shall have **gas-tight closures**.
- S 3.5 **A pressure-vacuum vent** shall be provided as follows:
- a. Installed on the top of the expansion dome on a riser which shall be baffled to prevent splashing of the foam concentrate on the seat of the vent valve when the truck is in motion.
 - b. Set to open at 1 psig (6.9 kPa) pressure and at 1/2 oz/sq in. (0.22 kPa) vacuum.
 - c. Sized to permit filling and pumping out of the foam concentrate at 100 gpm (22.7 m³/h) and 37.5 gpm (8.5 m³/h), respectively.

FOAM PROPORTIONING SYSTEM

- S 3.6 **Balanced pressure** between the **discharges of the water pump** and the **foam concentrate pump** may be achieved by either:
- a. **A pressure regulator** in the recycle line from the foam concentrate pump back to the foam concentrate tank, or
 - b. **A variable speed foam concentrate pump** driven by a hydraulic motor with automatic control of the discharge pressure to equal water pump discharge pressure, equivalent to National Foam "Servo Command TM" proportioning system.
- S ♦ 3.7 **The balanced pressure system** (used in the foam system to maintain foam pressure equal to water pressure) shall be **provided with a manual bypass valve/controls** to permit the operation of the system in the event of malfunctioning of the automatic system.
- S ♦ 3.8 **The foam concentrate** shall be **supplied to inductors** fitted to the individual hose outlets **through variable percentage proportioning needle valves**. The valves shall be locked in position to prevent movement after the system has been calibrated for 3% foam pick up. The system must be capable of supplying either foam solution or plain water through all of the hose outlets. Other proportioning systems may be specified, but shall be approved by the plant Fire Chief.
- * Where the need for **proportioning at different concentrations** has been defined by the plant Fire Chief, the proportioning valves shall be calibrated at all the defined concentrations. In addition, the required position of the needle valve to achieve the different concentrations shall be clearly labeled and be capable of being locked in position.

WATER PUMP

- S ♦ 3.9 **The water pump** shall be of a **centrifugal type, driven by a power take-off from the truck transmission**. In addition:
- * a. The pump materials of construction shall be suitable for the plant firewater.
 - b. A priming system shall be provided.
 - * c. The pump shall have a minimum 1000 gpm (227 m³/h) capacity and be designed to operate over a range of inlet pressures from 10 ft (3 m) suction lift to 125 psig (860 kPa). A larger capacity pump may be specified.
 - d. The pump performance shall comply with NFPA-1901 requirements.

FOAM CONCENTRATE PUMP

- S ♦ **3.10** The foam concentrate pump shall be a rotary or gear type, driven by either a variable speed hydraulic motor, by a direct drive auxiliary engine or by a power take-off from the truck transmission. In all cases, the drive system for the foam concentrate pump shall be independent of the drive system for the water pump, so that the foam concentrate pump can be run without the water pump. In addition:
- The foam concentrate pump shall be suitable for pumping foam concentrate at the full range of temperatures experienced at the location.
 - The foam concentrate pump rated capacity at 250 psig (1725 kPa) discharge pressure shall be sufficient to proportion foam at the highest required concentration at the maximum water pump capacity, but shall not be less than 37.5 gpm (8.5 m³/h).
 - The foam concentrate pump maximum discharge pressure shall be 300 psig (2100 kPa) as limited by the pump pressure relief (PR) valve.
 - The foam concentrate pump shall be capable of providing sufficient concentrate when the water pump is running at low speed. A 90 gpm (20.4 m³/h) pump is usually required.
 - To protect the pump, a PR valve, sized for pump blocked outlet, shall be provided on the discharge side, bypassing back to the pump suction.
 - A valved blowoff strainer shall be installed on the foam concentrate pump suction, to protect this circuit from scale and foreign particles.

MONITOR NOZZLE

- S **3.11** The monitor nozzle shall be a combination foam-water nozzle equivalent to National Foam Systems, Inc., Model PC-50, for delivering a minimum of 500 gpm (113.5 m³/h) of solution at 150 psig (1035 kPa) as a straight stream or in spray form. The monitor shall be permanently connected to the water and foam concentrate circuits entirely with pipe, except that a short permanent hose section is permitted. The monitor shall be located on top of the truck, aft of the cab in an area accessible for manual operation. This monitor shall be omitted on trucks with an elevating platform or water tower.

OPERATING PANEL AND OTHER CONTROLS

- S ♦ **3.12** The operating panel is mounted on a single position on the truck to house all controls required for this proportioning system. The location of the operating panel shall be on the side of the truck unless a different position is defined by the plant Fire Chief. The panel shall be as follows:
- The controls shall be shown on a simple graphic panel or flow diagram, and shall be suitably labeled to indicate their functions.
 - The graphic panel shall be either part of the operating panel or mounted adjacent to it.
 - The operating panel shall be provided with illumination to permit operation and reading of gages at night.

Alternatives to the above shall be approved by the plant Fire Chief.

- S **3.13** The operating panel shall include the following:
- A duplex indicating pressure gage, 0 to 300 psig (0 to 2500 kPa), to indicate water and foam concentrate pressure.
 - The taps for the duplex pressure gage shall be located as close as practical to the inductors.
 - A dual-scale, indicating pressure gage, 30 in. Hg vacuum to 0 psig (-100 to 0 kPa), and 0 to 300 psig (0 to 2500 kPa), to indicate inlet water pressure to the pump.
 - Extensions to operate the block and bypass valves around the pressure regulator or hydraulic motor, and the size 2-1/2 in. (65 mm) hose outlets.
 - Standard controls and instruments for engine and pump operation.

WATER AND FOAM SOLUTION PIPING AND CONNECTIONS

- S **3.14** The foam concentrate tank fill line piping shall permit re-filling while the proportioning system is in operation

- S ♦ **3.15 Inlet water piping** shall be provided with two suction connections, one located on either side of the truck, as follows:
- * a. Each connection shall terminate in a mating coupling with a pressure cap, consistent with the plant coupling standard.
 - b. The pipe size shall be suitable for drafting with a suction lift of 10 ft (3 m) with hard suction hose.
 - c. The piping and pump suction fittings shall be suitable for 150 psig (1050 kPa) maximum pressure.
- S **3.16 Water strainers**, flat plate type with 1/4 in. (6.35 mm) maximum openings, shall be fitted in the inlet water line and shall be accessible for inspections and cleaning through the couplings.
- S **3.17 Discharge piping for water and foam circuits** shall be suitable for 300 psig (2100 kPa) maximum pressure. The size 1-1/2 in. (40 mm) valved washout connections shall terminate in mating couplings.
- S **3.18 Hose connections on the vehicle** shall be as follows:
- a. Three, minimum size 2-1/2 in. (65 mm) valved connections shall be located on each side of the truck.
 - b. The valves shall be quarter-turn ball valves.
 - c. The hose connections shall be of the hydrant coupling type, furnished with suitable caps or plugs held by safety chains.
- Additional connections shall be specified by the Owner's Engineer after consultation with the plant Fire Chief.

TRUCK AND AUXILIARY EQUIPMENT

- S **3.19 Truck Body and Equipment.** The truck body shall be equipped with and designed to accommodate the equipment listed below, with economical use of space. Any space left over shall be designed for the storage of 2-1/2 in. or larger fire hose.

EQUIPMENT TO BE FURNISHED WITH FOAM PROPORTIONING TRUCK	
Portable/Auxiliary Equipment	Other Equipment
- Two electric hand lanterns. - One 20-lb (minimum) dry chemical fire extinguisher. - Three 25-ft lengths of soft suction hose, size consistent with truck suction piping connections. - Two 10-ft lengths of soft suction hose, size consistent with truck suction piping connections. - At least 500 ft of 2-1/2 in. fire hose. - Two portable 2-1/2 in. foam playpipes. - Two portable 1-1/2 in. foam playpipes.	- Two hose bridges, suitable for water suction hose, size consistent with truck suction piping connections and designed for vehicles having a gross weight of 35,000 lbs. - Two 10-ft lengths of hard suction hose. The size and coupling type are to be determined by the truck supplier. One metal suction strainer shall be provided for use with this hose. - Twelve gaskets for large diameter hose size consistent with truck suction piping connections. - Space provisions for SCBA.

ACCEPTABLE METRIC EQUIVALENTS

Hose size:	in.	1-1/2	2-1/2	4	Length:	36 in.	10 ft	25 ft	500 ft	Weight:	27 lb	35000 lb
	mm	40	65	100		1 m	3 m	7.5 m	150 m		12 kg	16000 kg

- S **3.20 Truck Engine and auxiliaries.** The engine furnished to drive the truck and pumps shall be of standard design for fire truck service, and shall have a certified net power output at the recommended full load equal to 110% of the power requirements of the pumps at the design outputs.
- S * **3.21 The engine radiator and radiator fan** shall be sized to maintain satisfactory engine jacket temperatures during full load operation at the specified maximum ambient temperature of the site where the unit will be operating.
- S **3.22 The engine exhaust** shall discharge away from the proportioning system operating panel.