

Table 9.11: Foam Sprinkler/ Deluge/ Pourer System Requirements

ITEMS	REQUIREMENTS
15. DESIGN CRITERIA FOR LOW – EXPANSION FOAM SYSTEM	<ul style="list-style-type: none"> i. Design Criteria for above the surface application with fixed foam discharge outlet for Fixed-Roof Storage tanks containing Hydrocarbons shall comply with Table 9.11.A and Table 9.11.E. ii. Low-expansion foam shall be provided to protect outdoor storage tanks, interior flammable liquid hazards, loading racks, diked areas and non-diked spill areas. iii. Foam Monitor nozzles shall not be considered as the primary means of protection for fixed-roof tanks over 18 m (60 ft.) in diameter. iv. Foam handlines shall not be permitted to be used as the primary means of protection for fixed-roof tanks over 9 m (30 ft.) in diameter or those over 6 m (20 ft.) in height. v. Fixed foam outlets shall not be used to protect horizontal or pressure tanks. vi. For the protection of a flammable liquid contained in a vertical fixed-roof (cone) atmospheric storage tank, discharge outlets shall be attached to the tank. vii. Where two or more discharge outlets are required, the outlets shall be spaced equally around the periphery of the tank, individually piped and separately valved for isolation outside the dike area. viii. Fixed foam discharge outlets shall be attached at the top of the shell and shall be located or connected to preclude the possibility of the tank contents overflowing into the foam lines. ix. Fixed foam discharge outlets shall be provided with a seal, frangible under low pressure, to prevent entrance of vapors into foam outlets and pipelines. x. Fixed foam discharge outlets shall be provided with inspection means to allow maintenance and for inspection and replacement of vapor seals.

Table 9.11.D.: Foam Handline and Monitor for Fixed Roof Hydrocarbon Tanks

HAZARD	REQUIRED DESIGN DENSITY (MINIMUM APPLICATION RATE)	FOAM ADDITION FOR HYDRAULIC IMBALANCE	DURATION
1. Class II Hydrocarbons	6.5 lpm/m ² (1.06 gpm/ ft ²)	10%	50 Minutes
2. Class I Hydrocarbons and Hydrocarbons heated above their Flash Points	6.5 lpm/m ² (1.06 gpm/ ft ²)	10%	65 Minutes
3. Crude Oil and Liquid with Boil Over Characteristics	6.5 lpm/m ² (1.06 gpm/ ft ²)	10%	65 Minutes

Table 9.11.E.: Required Number of Fixed Foam Discharge Outlets for Fixed Roof Hydrocarbon Tanks

TANK DIAMETER OR EQUIVALENT AREA	MINIMUM NUMBER OF FOAM DISCHARGE OUTLETS
1. Up to 24 m	1
2. Over 24 m - 36 m	2
3. Over 36 m - 42 m	3
4. Over 42 m - 48 m	4
5. Over 48 m - 54 m	5
6. Over 54 m - 60 m	6
7. Over 60 m	6, Plus 1 outlet for each additional 462 m ² area