

A.11.4.4 NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, can be used as a guide for diesel fuel piping. Figure A.11.4.4 shows a suggested diesel engine fuel system.

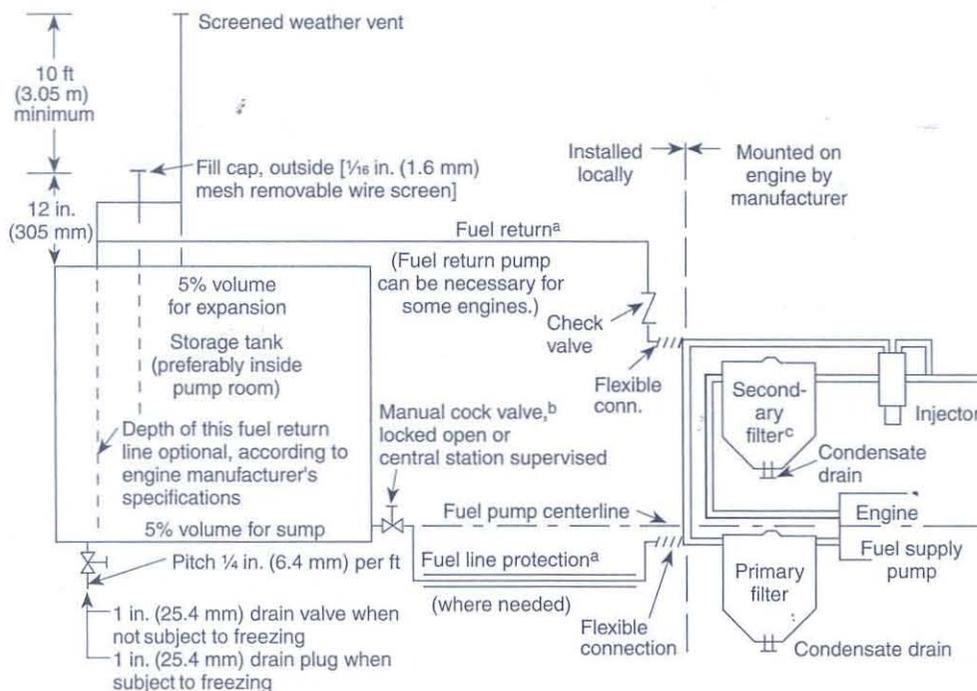
A.11.4.4.5 A means, such as covered floor trough, angle, channel steel, or other adequate protection cover(s) (mechanical or nonmechanical), should be used on all fuel line piping "exposed to traffic," to prevent damage to the fuel supply and return lines between the fuel tank and diesel driver.

A.11.4.5 The pour point and cloud point should be at least 10°F (5.6°C) below the lowest expected fuel temperature. (See 4.12.2 and 11.4.3.)

A.11.4.5.1 Biodiesel and other alternative fuels are not recommended for diesel engines used for fire protection because of the unknown storage life issues. It is recommended that these engines use only petroleum fuels.

A.11.5.2 A conservative guideline is that, if the exhaust system exceeds 15 ft (4.5 m) in length, the pipe size should be increased one pipe size larger than the engine exhaust outlet size for each 5 ft (1.5 m) in added length.

A.11.5.2.9 Exhaust emission after treatment devices are typically dependent upon high exhaust temperature to burn away collected materials to prevent clogging. Due to the lower exhaust temperatures produced by the engine when operating at pump shutoff during weekly operation, there is a high possibility the after treatment device will accumulate collected material and will not be capable of flowing the volume of exhaust in the event the engine is required to produce full rated power for an emergency.



^aSize fuel piping according to engine manufacturer's specifications.

^bExcess fuel can be returned to fuel supply pump suction, if recommended by engine manufacturer.

^cSecondary filter behind or before engine fuel pump, according to engine manufacturer's specifications.

FIGURE A.11.4.4 Fuel System for Diesel Engine-Driven Fire Pump.

A.11.6 Internal combustion engines necessarily embody moving parts of such design and in such number that the engines cannot give reliable service unless given diligent care. The manufacturer's instruction book covering care and operation should be readily available, and pump operators should be familiar with its contents. All of its provisions should be observed in detail.

A.11.6.2 See NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, for proper maintenance of engine(s), batteries, fuel supply, and environmental conditions.

A.11.6.4 Active systems that are permanently added to fuel tanks for removing water and particulates from the fuel can be acceptable, provided the following apply:

- (1) All connections are made directly to the tank and are not interconnected with the engine or its fuel supply and return piping in any way.
- (2) There are no valves or other devices added to the engine or its fuel supply and return piping in any way.

A.11.6.5 Proper engine temperature, per 11.2.8.2 and 11.6.5.1, maintained through the use of a supplemental heater has many benefits, as follows:

- (1) Quick starting (a fire pump engine might have to carry a full load as soon as it is started)
- (2) Reduced engine wear
- (3) Reduced drain on batteries
- (4) Reduced oil dilution
- (5) Reduced carbon deposits, so that the engine is far more likely to start every time