

National Fire Protection Association (NFPA) 110 – Standard for Emergency and Standby Power Systems – 2013 Edition

7.9.1.2* Fuel system design shall provide for a supply of clean fuel to the prime mover.

7.9.1.3 Tanks shall be sized so that the fuel is consumed within the storage life, or provisions shall be made to remediate fuel that is stale or contaminated or to replace stale or contaminated fuel with clean fuel.

A.5.1.1(1) The grade of diesel fuel selected for use in a prime mover should be based on recommendations from the diesel engine manufacturer and ASTM D 975, *Standard Specification for Diesel Fuel Oils*. Where possible, the purchaser of fuel for the prime mover should specify a diesel fuel that does not contain Biodiesel, which can accelerate the degradation of the diesel fuel if stored longer than 6 months. If diesel fuel is stored outside for long-term storage, it may be necessary to use a winter or arctic grade of diesel fuel or to take precautions such as insulating and heat-tracing fuel tanks and lines to ensure that fuel will flow to the prime mover under the coldest possible conditions.

A.5.5.3 Consideration should be given to sizing tanks in order to meet minimum fuel supplier delivery requirements, particularly for small tanks. Consideration also should be given to over sizing tanks. More important, biodiesel blends up to B5 (ASTM D 975, *Standard Specification for Diesel Fuel Oils*) have much shorter shelf lives than conventional diesel fuel [ultra-low sulfur diesel (ULSD)] and can accelerate degradation processes, endangering the entire diesel fuel supply. Where fuel is stored for extended periods of time (e.g., more than 12 months), it is recommended that fuels be periodically pumped out and used in other services and replaced with fresh fuel. Prudent disaster management could require much larger on-site temporary or permanent fuel storage, and several moderate-sized tanks can be preferable to a single very large tank.

A.7.9.1.2 To optimize the long-term storage of fuels for prime movers, the fuel tanks should be kept cool and dry, and the tank as full as possible. Tanks that are subject to temperature variations can experience accelerated fuel degradation, especially if the tanks are outside and above ground or close to an extreme heat

source if stored inside a structure. The more constant and cooler the tank temperatures, the less likely temperature-related fuel degradation will occur. Tank ullage (air space) should be kept to a minimum. Excess air space allows for warm, humid air to enter the tank and condense moisture during the cool evening. Also, prolonged exposure to ambient air, which is 20 percent oxygen, can facilitate oxidative degradation of the fuel. Fuel storage tanks should be kept as dry as possible and have provisions for water drainage on a regular basis. The presence of water can lead to microbiological contamination and growth, which in turn can lead to general or pitting corrosion of steel tanks and components, possibly resulting in filter plugging, operational issues, or a hydrocarbon release to the environment. Regularly scheduled surveillance of the fuel allows the operator(s) to evaluate the condition of the fuel and make important decisions regarding the quality of the fuel dedicated to reliable operation of the prime mover. Fuel maintenance and testing should begin the day of installation and first fill in order to establish a benchmark guideline for future comparison. Laboratory testing services should always be sought from a qualified or certified petroleum laboratory.

A.8.3.8 Limited fuel quality testing performed annually using appropriate ASTM standard test methods is recommended as a means to determine that existing fuel inventories are suitable for continued long-term storage. Special attention should be paid to sampling the bottom of the storage tank to verify that the stored fuel is as clean and dry as practicable and that water, sediment, or microbial growth on the tank bottom is minimized. ASTM D 975, *Standard Specification for Diesel Fuel Oils*, contains test methods for existing diesel fuel.