Mine Safety and Health Admin., Labor § 7.99

other mechanical flame arrester designs shall be evaluated under the provisions of §7.107. The flame arrester shall be designed and attached so that it can be removed for inspection and cleaning.

(2) The exhaust system shall allow a wet exhaust conditioner to be used as the exhaust flame arrester provided that the explosion tests of §7.100 demonstrate that the wet exhaust conditioner will arrest flame. When used as a flame arrester, the wet exhaust conditioner shall be equipped with a sensor to automatically activate the safety shutdown system at or above the minimum allowable low water level established by §7.100. Restarting of the engine shall be prevented until the water supply in the wet exhaust conditioner has been replenished above the minimum allowable low water level. All parts of the wet exhaust conditioner and associated components that come in contact with contaminated exhaust conditioner water shall be constructed of corrosion-resistant material. The wet exhaust conditioner shall include a means for verifying that the safety shutdown system operates at the proper water level. A means shall be provided for draining and cleaning the wet exhaust conditioner. The final exhaust gas temperature at discharge from the wet exhaust conditioner shall not exceed 170 °F (76 °C) when tested in accordance with the exhaust gas cooling efficiency test of §7.102. A sensor shall be provided that activates the safety shutdown system before the exhaust gas temperature at discharge exceeds 185 °F (85 °C) when tested in accordance with the safety system control test in §7.103. A means shall be provided to prevent the discharge of glowing particles, and it shall be evaluated under the provisions of §7.107.

(3) The exhaust system shall be designed so that improper installation of the flame arrester is impossible.

(4) The exhaust system shall provide a means to cool the exhaust gas and prevent discharge of glowing particles.

(i) When a wet exhaust conditioner is used to cool the exhaust gas, the temperature of the exhaust gas at discharge from the diesel power package shall not exceed 302 °F (150 °C) when tested in accordance with the exhaust gas cooling efficiency test of §7.102. A sensor shall be provided that activates the safety shutdown system before the exhaust gas exceeds 302 °F (150 °C) when tested in accordance with the safety system control test in §7.103. A means shall be provided to prevent the discharge of glowing particles, and it shall be evaluated under the provisions of §7.107.

(5) Other means for cooling the exhaust gas and preventing the propagation of flame or discharge of glowing particles shall be evaluated under the provisions of §7.107.

(6) There shall be a connection in the exhaust system for temporary attachment of a device to indicate the total backpressure in the system and collection of exhaust gas samples. This opening shall be closed by a plug or other suitable device that is sealed or locked in place except when in use.

§ 7.99 Critical characteristics.

The following critical characteristics shall be inspected or tested on each diesel power package to which an approval marking is affixed:

(a) Finish, width, planarity, and clearances of surfaces that form any part of a flame-arresting path.

(b) Thickness of walls and flanges that are essential in maintaining the explosion-proof integrity of the diesel power package.

(c) Size, spacing, and tightness of fastenings.

(d) The means provided to maintain tightness of fastenings.
§ 7.100 Explosion tests.

(a) Test procedures.

(i) Prepare to test the diesel power package as follows:

(1) Perform a detailed check of parts against the drawings and specifications submitted under § 7.97 to determine that the parts and drawings agree.

(2) Remove all parts that do not contribute to the operation or ensure the explosion-proof integrity of the diesel power package such as the air cleaner and exhaust gas dilution system.

(3) Fill coolant system fluid and engine oil to the engine manufacturer's recommended levels.

(4) Interrupt fuel supply to the injector pump.

(5) Establish a preliminary low water level for systems using the wet exhaust conditioner as a flame arrester.

(ii) Fill the test chamber with a mixture of natural gas and air or methane and air. If natural gas is used, the content of combustible hydrocarbons shall total at least 98.0 percent, by volume, with the remainder being inert. At least 80.0 percent, by volume, of the gas shall be methane. For all tests, the methane or natural gas concentration shall be 8.5 ±1.8 percent, by volume, and the oxygen concentration shall be no less than 18 percent, by volume.

(iii) Using the auxiliary drive mechanism, motor the engine to fill the intake and exhaust systems with the flammable mixture. The intake system, exhaust system, and test chamber gas concentration shall not differ by more than ±0.3 percent, by volume, at the time of ignition.

(iv) For static tests, stop the engine, actuate the ignition source, and observe the peak pressure. The peak pressure shall not exceed 110 psig. If the peak pressure exceeds 110 psig, construction changes shall be made that result in a reduction of pressure to 110 psig.

(b) Test, retest, and recheck.

(c) Inspection and tests.

(d) Acceptance.

(e) Length of thread engagement on fastenings and threaded parts that ensure the explosion-proof integrity of the diesel power package.

(f) Diesel engine approval marking.

(g) Fuel rate setting to ensure that it is appropriate for the intended application, or a warning tag shall be affixed to the fuel system notifying the purchaser of the need to make proper adjustments.

(h) Material and dimensions of gaskets that are essential in maintaining the explosion-proof integrity of the diesel power package.

(i) Dimensions and assembly of flame arresters.

(j) Materials of construction to ensure that the intake system, exhaust system, cooling fans, and belts have been fabricated from the required material.

(k) Proper interconnection of the coolant system components and use of specified components.

(l) Proper interconnection of the safety shutdown system components and use of specified components.

(m) All plugs and covers to ensure that they are tightly installed.

(n) The inspections and tests described in the diesel power package checklist shall be performed and all requirements shall be met.