

## § 36.28

NOTE: This shutoff valve is in addition to the normal shutoff provided in the fuel-injection system and also in addition to the air-shutoff valve.

### § 36.28 Signal or warning device.

All mobile diesel-powered transportation equipment shall be provided with a bell, horn, or other suitable warning device convenient to the operator. Warning devices shall be operated manually or pneumatically.

### § 36.29 Brakes.

All mobile diesel-powered transportation equipment shall be equipped with adequate brakes acceptable to MSHA.

### § 36.30 Rerailing device.

All mobile diesel-powered transportation equipment designed to travel on rails in haulage service shall carry a suitable rerailing device.

### § 36.31 Fire extinguisher.

Each unit of mobile diesel-powered transportation equipment shall be fitted with a fire extinguisher carried in a location easily accessible to the operator and protected by position from external damage. Liquid carbon dioxide extinguishers shall contain an active charge of not less than 4 pounds. Pressurized dry chemical extinguishers shall contain an active charge of not less than 2½ pounds.

### § 36.32 Electrical components and systems.

(a) Electrical components on mobile diesel-powered transportation equipment shall be certified or approved under Part 18, 20 or 27 of this chapter, as applicable, and shall bear the certification number assigned by MSHA.

(b) Electrical systems on mobile diesel-powered transportation equipment shall meet the requirements of Part 18 or 27 of this chapter, as applicable.

[47 FR 11372, Mar. 16, 1982]

### § 36.33 Headlights and fixtures.

(a) Headlights and lighting fixtures on mobile diesel-powered transportation equipment shall be protected from external damage by recessing them in the equipment frame, enclosing them within a shield of substantial

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construction, or by any other method that provides equivalent protection.

(b) Mobile diesel-powered transportation equipment shall be equipped with at least one headlight on each end.

[47 FR 11372, Mar. 16, 1982]

## Subpart C—Test Requirements

### § 36.40 Test site.

Tests shall be conducted at MSHA's Diesel Testing Laboratory or other appropriate place(s) determined by MSHA.

[39 FR 24006, June 28, 1974, as amended at 43 FR 12318, Mar. 24, 1978]

### § 36.41 Testing methods.

Mobile diesel-powered transportation equipment submitted for certification and approval shall be tested to determine its combustion, explosion-proof, and other safety characteristics. MSHA shall prescribe the tests and reserves the right to modify the procedure(s) to attain these objectives (see § 36.20).

### § 36.42 Inspection.

A detailed inspection shall be made of the equipment and all components and features related to safety in operation. The inspection shall include:

(a) Investigating the materials, workmanship, and design to determine their adequacy.

(b) Checking the parts and assemblies against the drawings and specifications with respect to materials, dimensions, and locations to verify their conformance.

(c) Inspecting and measuring joints, flanges, and other possible flame paths in the intake and exhaust systems to determine whether they will prevent the issuance of flame or propagation of an internal explosion.

(d) Inspecting and measuring flame arresters to determine whether they will prevent the issuance of flame or propagation of an internal explosion.

### § 36.43 Determination of exhaust-gas composition.

(a) Samples shall be taken to determine the composition of the exhaust gas while the engine is operated at loads and speeds prescribed by MSHA

to determine the volume of air (ventilation) required to dilute the exhaust gas (see §36.45). The engine shall be at temperature equilibrium before exhaust-gas samples are collected or other test data are observed. At all test conditions the intake mixture shall contain 1.5 ±0.1 percent, by volume, of Pittsburgh natural gas (see footnote 3) in the air. Test observations shall include the rate of fuel consumption, pressures, temperatures, and other data significant in the safe operation of diesel equipment.

(b) Exhaust-gas samples shall be analyzed for carbon dioxide, oxygen, carbon monoxide, hydrogen, methane, nitrogen, oxides of nitrogen, and aldehydes, or any other constituent prescribed by MSHA.

(c) The intake and exhaust systems shall be complete with all component equipment such as air cleaners, flame arresters, and exhaust cooling systems. The performance of component equipment shall be observed to determine whether it functions properly.

[Sched. 31, 26 FR 645, Jan. 24, 1961, as amended at 61 FR 55526, Oct. 25, 1996]

**§36.44 Maximum allowable fuel:air ratio.**

(a) When an engine is delivered to MSHA with the fuel-injection system adjusted by the applicant and tests of the exhaust-gas composition (see §36.43) show not more than 0.30 percent, by volume, of carbon monoxide, the applicant's adjustment of the fuel-injection system shall be accepted. The maximum fuel:air ratio determined from the exhaust-gas composition shall be designated as the maximum allowable fuel:air ratio. The maximum liquid fuel rate (pounds per hour) that produces the maximum allowable fuel:air ratio shall be designated as the maximum allowable fuel rate for operating the equipment at elevations not exceeding 1,000 feet above sea level.

(b) When the carbon monoxide content of the exhaust exceeds 0.30 percent, by volume, only near maximum power output, the maximum fuel:air ratio at which carbon monoxide does not exceed 0.30 percent shall be calculated and designated as the maximum allowable fuel:air ratio. The corresponding calculated liquid fuel

rate shall be designated as the maximum allowable fuel rate at elevations not exceeding 1,000 feet above sea level.

NOTE: The applicant may be requested to adjust the liquid fuel rate during tests to determine the maximum allowable fuel:air ratio.

(c) The maximum allowable fuel:air ratio and maximum liquid fuel rates shall be used to calculate a liquid fuel rate-altitude table that shall govern the liquid fuel rate of engines operated at elevations exceeding 1,000 feet above sea level.

**§36.45 Quantity of ventilating air.**

(a) Results of the engine tests shall be used to calculate ventilation (cubic feet of air per minute) that shall be supplied by positive air movement when the permissible mobile diesel-powered transportation equipment is used underground. This quantity shall be stamped on the approval plate. The quantity so determined shall apply when only one machine is operated.

(b) Determination of the ventilation rate shall be based upon dilution of the exhaust gas with normal air. The most undesirable and hazardous condition of engine operation prescribed by MSHA shall be used in the calculations. The concentration of any of the following individual constituents in the diluted mixture shall not exceed:

- 0.25 percent, by volume, of carbon dioxide (CO<sub>2</sub>).
- 0.005 percent, by volume, of carbon monoxide (CO).
- 0.00125 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide, NO<sub>2</sub>).

The oxygen (O<sub>2</sub>) content of the diluted mixture shall be not less than 20 percent, by volume. The maximum quantity of normal air to produce the above dilution shall be designated the ventilation rate.

NOTE: This ventilation rate will provide a factor of safety for exposure of persons to air mixtures containing harmful or objectionable gases and for minor variations in engine performance.

**§36.46 Explosion tests of intake and exhaust systems.**

(a) Explosion tests to determine the strength of the intake and exhaust systems to withstand internal explosions