

1.0 PURPOSE

The regulations in this part set forth the test requirements for dust collectors used in connection with rock drilling in coal mines to procure their certification as permissible for use in coal mines.

2.0 SCOPE

This procedure applies to dust collector tests conducted by the Mechanical & Engineering Safety Division on dust collectors to determine compliance with the requirements of 30 CFR Part 33: " DUST COLLECTORS FOR USE IN CONNECTION WITH ROCK DRILLING IN COAL MINES ".

3.0 REFERENCE

3.1. 30 CFR Part 33, Subpart C - Test Requirements.

4.0 DEFINITIONS

- 4.1. *Permissible*, as applied to a dust collector, means that it conforms to the requirements of this part, and that a certificate of approval to that effect has been issued.
- 4.2. *Certificate of approval* means a formal document issued by MSHA stating that the dust collector unit or combination unit has met the requirements of this part, and authorizing the use and attachment of an official approval plate or a marking so indicating.
- 4.3. *Certificate of performance* means a formal document issued by MSHA stating that a dust-collecting system has met the test requirements of Subpart C of this part and therefore is suitable for use as part of permissible units.

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- 4.4. *Dust-collector unit* means a complete assembly of parts comprising apparatus for collecting the dust that results from drilling in rock in coal mines, and is independent of the drilling equipment.
 - 4.5. *Combination unit* means a rock-drilling device with an integral dust-collecting system, or mining equipment with an integral rock-drilling device and dust-collecting system.
 - 4.6. *Dust-collecting system* means an assembly of parts comprising apparatus for collecting the dust that results from drilling in rock and is dependent upon attachment to other equipment for its operation.
 - 4.7. *Applicant* means an individual, partnership, company, corporation, association, or other organization that designs and manufactures, assembles or controls the assembly of a dust-collecting system, dust-collector unit, or a combination unit, and seeks certification thereof.
 - 4.8. *MSHA* means the United States Department of Labor, Mine Safety and Health Administration.

5.0 TEST EQUIPMENT

- 5.1. A rock drilling device.
- 5.2. A dust-collector unit, combination unit, or dust-collecting system.
- 5.3. Drill steels (drill bits).
- 5.4. A midget impinger apparatus.

6.0 TEST SAMPLES

See section 7.3.3. below.

7.0 PROCEDURES

- 7.1. Test site.
 - 7.1.1. Tests shall be conducted at an appropriate location determined by MSHA.
 - 7.2. Test space.
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- 7.2.1. Drilling tests shall be conducted in a test space formed by two curtains suspended across a mine opening in such a manner that the volume of the test space shall be approximately 2,000 cubic feet.
- 7.2.2. No mechanical ventilation shall be provided in the test space during a drilling test, except such air movement as may be induced by operation of drilling or dust-collecting equipment.
- 7.2.3. All parts of a unit or system shall be within the test space during a drilling test.
- 7.3. Determination of dust concentration.
- 7.3.1. Concentrations of airborne dust in the test space shall be determined by sampling with a midget impinger apparatus, and a light-field microscopic technique shall be employed in determining concentrations of dust in terms of millions of particles (5 microns or less in diameter) per cubic foot of air sampled.
- 7.3.2. Before a drilling test is started the surfaces of the test space shall be wetted; the test space shall be cleared of air-borne dust insofar as practicable by mechanical ventilation or other means; and an atmospheric sample, designated as a control sample, shall be collected during a 5-minute period to determine residual airborne dust in the test space.
- 7.3.3. A sample of airborne dust, designated as a test sample, shall be collected in the breathing zone of the drill operators during the drilling of each test hole. Time consumed in changing drill steel shall not be considered as drilling time and sampling shall be discontinued during such periods.
- 7.4. Drilling test.
- 7.4.1. A drilling test shall consist of drilling a set of 10 test holes, without undue delay, under specified operating conditions. When the test involves the control of dust from more than one drill, all the drills shall be used in the intended manner to complete the set of test holes.
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- 7.4.2. Holes shall be drilled to a depth of 4 feet plus or minus 2 inches and shall be spaced so as not to interfere with adjacent holes. Each hole may be plugged after completion.
- 7.4.3. Receptacles and filters for collecting drill cuttings shall be emptied and cleaned before each drilling test is started.
- 7.4.4. Holes designated as "vertical" shall be drilled to incline not more than 10 degrees to the vertical. Holes designated as "angle" shall be drilled to incline not less than 30 and not more than 45 degrees to the vertical. Holes designated as "horizontal" shall be drilled to incline not more than 15 degrees to the horizontal.
- 7.5. Methods of drilling; dust-collector unit.
- 7.5.1. *General.* All drilling shall be done with conventional, commercial drilling equipment -- pneumatic-percussion, hydraulic-rotary, and/or electric-rotary types--in accordance with the applicant's specifications.
- 7.5.2. *Pneumatic-percussion drilling.* A stoper-type drill with a piston diameter of 2 1/2 to 3 inches shall be used for roof drilling, A hand-held, sinker-type drill with a piston diameter of 2 1/2 to 3 inches shall be used for down drilling and also for horizontal drilling, except that the drill shall be supported mechanically. Compressed air for operating the drill shall be supplied at a gage pressure of 85-95 pounds per square inch. Drill bits shall be detachable, cross type with hard inserts, and shall be sharp when starting to drill each set of 10 holes. In roof drilling, 1 1/4- and 1 1/2-inch diameter drill bits shall be used; in horizontal and down drilling, 1 3/4-inch diameter bits shall be used. The drill steel shall be 7/8-inch hexagonal and of hollow type to permit the introduction of compressed air through the drill steel when necessary to clean a hole during drilling.
- 7.5.3. *Rotary drilling.* A hydraulic-rotary drill with a rated drilling speed of 18 feet per minute free lift, capable of rotating drill steel at 900 revolutions per minute with 100 foot-pounds torque, and having a feed force of 7,000 pounds, shall be used for roof drilling. An electric-rotary drill, supported by a post mounting, with a rated drilling speed of 30 inches per minute and powered by a 2.25 horsepower motor, shall be used for horizontal drilling. For roof drilling, the bits shall be hard-tipped, 1 3/8 and 1 1/2
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inches outside diameter, and 1 1/4-inch auger-type drill steel shall be used. For horizontal drilling, the bits shall be hard-tipped, 2 inches outside diameter, and 1 3/4-inch auger-type drill steel shall be used. Drill bits shall be sharp when starting to drill each set of 10 holes.

7.6. Method of drilling; combination unit or dust-collecting system.

7.6.1. Drilling shall be conducted in accordance with the applicant's specifications and operating instructions. If special drill bits or drill steel are required, they shall be furnished to MSHA by the applicant. Otherwise the drill bit and drill steel requirements stated in paragraphs (b) and (c) of [§33.35](#) (sections 7.5.2. and 7.5.3. above) shall be complied with for all types of combination units or dust-collecting systems.

7.7. Test procedure.

7.7.1. Roof drilling: Drilling shall be done in friable strata which is acceptable to MSHA and tends to produce large scale-like cuttings.

7.7.2. Horizontal drilling: Drilling shall be done in strata comparable in hardness to that of coal-mine draw slate. Holes shall be started near the roof of the test space under conditions simulating the drilling of draw slate in coal mining.

7.7.3. Down drilling: Drilling shall be done in typical mine floor strata with a pneumatic percussion-type drill. Five holes shall be drilled vertically and five holes shall be drilled at an angle.

7.7.4. At MSHA's discretion drilling in "on site" strata may be acceptable in lieu of strata requirements in paragraphs (a), (b), and (c) of this section. (See [§33.20\(a\)](#)).

8.0 TEST DATA

See section 9.0 below.

9.0 PASS/FAIL CRITERIA

9.1. Allowable limits of dust concentration.

- 9.1.1. The concentration of dust determined by the control sample shall be subtracted from the average concentration of dust determined by the test samples collected at each drill operator's position, and the difference shall be designated as the net concentration of airborne dust. Calculations of the average concentration of dust determined from the test samples shall be based upon the results of not less than 80 percent of each set of test samples.
- 9.1.2. Under each prescribed test condition, the net concentration of airborne dust at each drill operator's position shall not exceed 10 million particles (5 microns or less in diameter) per cubic foot of air when determined in accordance with the method given in [§33.32\(a\)](#) (section 7.3.1. above).