

are between the face and a point 5 feet outby the machine.

(4) *Shortwall and longwall mining equipment.* In working places in which shortwall or longwall mining equipment is operated, the areas which shall be illuminated shall be as follows:

(i) The area for the length of the self-advancing roof support system and which is between the gob-side of the travelway and the side of the block of coal from which coal is being extracted, and

(ii) The control station, and the head piece and tail piece of the face conveyor, and

(iii) The roof and floor for a distance of 5 feet horizontally from the control station, head piece and tail piece.

(5) *Roof bolting equipment.* In working places in which roof bolting equipment is operated, the areas which shall be illuminated shall be as follows:

(i) *Where the distance from the floor, to the roof is 5 feet, or less:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which is a distance of 5 feet from the machine, when measured parallel to the floor.

(ii) *Where the distance from the floor to the roof is more than 5 feet:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which from the front and sides of the machine is a distance equal to the distance from the floor to the roof and from the rear of the machine a distance of 5 feet, when measured parallel to the floor.

(6) *Other self-propelled equipment.* Unless the entire working place is illuminated by stationary lighting equipment, in working places in which self-propelled equipment is operated, other than equipment specified in paragraphs (e)(1) through (e)(5) of this section, illumination shall be provided as follows:

(i) Luminaires shall be installed on each machine operated in the working place which shall illuminate a face or rib coal surface which is within 10 feet of the front and the rear of the machine to a luminous intensity of not less than 0.06 footlamberts, and

(ii) The height and width of the area of the coal surface which shall be illuminated shall equal the height and

width, respectively, of the machine on which the luminaires are installed, and

(iii) The luminaires in the direction of travel shall be operated at all times the equipment is being trammed in the working place.

(f) The Administrator, Coal Mine Health and Safety, MSHA, may specify other areas in a working place to be illuminated for the protection of miners while self-propelled mining equipment is being operated in the working place.

(g) Surface brightness of floor, roof, coal and machine surfaces in the normal visual field of a miner shall not vary more than 50 percent between adjacent fields of similar surface reflectance, and the maximum surface brightness of such surface shall not exceed 120 footlamberts when measured in accordance with § 75.1719-3.

[41 FR 43534, Oct. 1, 1976, as amended at 42 FR 18859, Apr. 11, 1977; 43 FR 43458, Sept. 26, 1978; 47 FR 28096, June 29, 1982]

§ 75.1719-2 Lighting fixtures; requirements.

(a) Lighting fixtures shall be permissible.

(b) Lighting fixtures may be installed on self-propelled machines or may be stationary lighting fixtures.

(c)(1) Electrically operated lighting fixtures shall be energized by direct current, or by sinusoidal full wave alternating current not less than 50 cycles per second (100 pulses per second), or by an equivalent power source that causes no greater flicker.

(2) Alternating current circuits supplying power to stationary lighting fixtures shall contain conductors energized at voltages not greater than 70 volts to ground. Alternating current circuits, energized at 100 volts or more and used to supply power to stationary lighting fixtures, shall originate at a transformer having a center or neutral tap grounded to earth through a proper resistor, which shall be designed to limit fault current to not more than 5 amperes. A grounding circuit in accordance with § 75.701-4 shall originate at the grounded terminal of the grounding resistor and extend along with the power conductors and serve as a grounding conductor for the frames of all equipment receiving power from the circuit. The ground fault current

rating of grounding resistors shall meet the "extended time rating" set forth in the Institute of Electrical and Electronics Engineers, Inc. Standard No. 32 (IEEE Std. 32-1972) which is hereby incorporated by reference and made a part hereof. The incorporated publication is available for examination at each MSHA Coal Mine Safety and Health district office, and may be obtained from the Institute of Electrical and Electronics Engineers, Inc., Publications Office, 10662 Los Vaqueros Circle, P.O. Box 3014 Los Alamitos, CA 90720-1264 Telephone: 800-272-6657 (toll free); <http://www.ieee.org>.

(3) Machine-mounted lighting fixtures shall be electrically grounded to the machine by a separate grounding conductor in compliance with §75.701-4.

(d) Direct current circuits in excess of a nominal voltage of 300 volts shall not be used to supply power to stationary light fixtures.

(e) Cables conducting power to stationary lighting fixtures from both alternating and direct current power sources, other than intrinsically safe devices, shall be considered trailing cables, and shall meet the requirements of Subpart G of this part. In addition, such cables shall be protected against overloads and short circuits by a suitable circuit breaker or other device approved by the Secretary. Circuit breakers or other device approved by the Secretary protecting trailing cables receiving power from resistance grounded circuits shall be equipped with a ground trip arrangement which shall be designed to deenergize the circuit at not more than 50% of the available fault current.

(f) Before shunts are removed from blasting caps, lighting fixtures and associated cables located in the same working place shall be deenergized. Furthermore, lighting fixtures shall be removed out of the line of blast and not less than 50 feet from the blasting operation unless otherwise protected against flying debris.

(g) Lighting fixtures shall be designed and installed to minimize discomfort glare.

[41 FR 43534, Oct. 1, 1976, as amended at 71 FR 16669, Apr. 3, 2006]

§75.1719-3 Methods of measurement; light measuring instruments.

(a) Compliance with §75.1719-1(d) shall be determined by MSHA by measuring luminous intensity (surface brightness).

(b) In measuring luminous intensity the following procedures shall be used:

(1) In areas of working places specified in §§75.1719.1(e)(1) through 75.1719-1(e)(3) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with the cutting, loading, or drilling head toward the face and not more than 3 feet from the face.

(2) In areas of working places specified in §75.1719-1(e)(4) luminous intensity measurements may be made at any time longwall or shortwall mining equipment is operated except that when measurements are made in the vicinity of shearers, plows, or continuous miners, the equipment shall be idle while measurements are being made.

(3) In areas of working places specified in §75.1719-1(e)(5) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with the drilling head toward the face and a distance from the face of 5 feet, or the distance from the floor to the roof, whichever is applicable. When the machine is located in the center of the working place and the surfaces of the ribs to be illuminated are not within the perimeter of the area determined in accordance with §75.1719-1(e)(5), the machine shall be positioned the applicable distance from the face and each rib and luminous intensity measurements made for each rib, provided, however, that luminous intensity measurements may be made of the face, roof, floor, and exposed surfaces of mining equipment with the machine so located without locating the machine in the center of the working place.

(4) In areas of working places specified in §75.1719-1(e)(6), luminous intensity measurements of a coal surface