

§ 57.6310

no lower than 100 °F may be used at ambient air temperatures below 45 °F.

(b) Waste oil, including crankcase oil, shall not be used to prepare ammonium nitrate-fuel oil.

§ 57.6310 Misfire waiting period.

When a misfire is suspected, persons shall not enter the blast area—

(a) For 30 minutes if safety fuse and blasting caps are used; or

(b) For 15 minutes if any other type detonators are used.

§ 57.6311 Handling of misfires.

(a) Faces and muck piles shall be examined for misfires after each blasting operation.

(b) Only work necessary to remove a misfire and protect the safety of miners engaged in the removal shall be permitted in the affected area until the misfire is disposed of in a safe manner.

(c) When a misfire cannot be disposed of safely, each approach to the area affected by the misfire shall be posted with a warning sign at a conspicuous location to prohibit entry, and the condition shall be reported immediately to mine management.

(d) Misfires occurring during the shift shall be reported to mine management not later than the end of the shift.

§ 57.6312 Secondary blasting.

Secondary blasts fired at the same time in the same work area shall be initiated from one source.

ELECTRIC BLASTING—SURFACE AND UNDERGROUND

§ 57.6400 Compatibility of electric detonators.

All electric detonators to be fired in a round shall be from the same manufacturer and shall have similar electrical firing characteristics.

§ 57.6401 Shunting.

Except during testing—

(a) Electric detonators shall be kept shunted until connected to the blasting line or wired into a blasting round;

(b) Wired rounds shall be kept shunted until connected to the blasting line; and

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(c) Blasting lines shall be kept shunted until immediately before blasting.

§ 57.6402 Deenergized circuits near detonators.

Electrical distribution circuits within 50 feet of electric detonators at the blast site shall be deenergized. Such circuits need not be deenergized between 25 to 50 feet of the electric detonators if stray current tests, conducted as frequently as necessary, indicate a maximum stray current of less than 0.05 ampere through a 1-ohm resistor as measured at the blast site.

§ 57.6403 Branch circuits.

(a) If electric blasting includes the use of branch circuits, each branch shall be equipped with a safety switch or equivalent method to isolate the circuits to be used.

(b) At least one safety switch or equivalent method of protection shall be located outside the blast area and shall be in the open position until persons are withdrawn.

§ 57.6404 Separation of blasting circuits from power source.

(a) Switches used to connect the power source to a blasting circuit shall be locked in the open position except when closed to fire the blast.

(b) Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.

§ 57.6405 Firing devices.

(a) Power sources shall be capable of delivering sufficient current to energize all electric detonators to be fired with the type of circuits used. Storage or dry cell batteries are not permitted as power sources.

(b) Blasting machines shall be tested, repaired, and maintained in accordance with manufacturer's instructions.

(c) Only the blaster shall have the key or other control to an electrical firing device.

§ 57.6406 Duration of current flow.

If any part of a blast is connected in parallel and is to be initiated from powerlines or lighting circuits, the time of current flow shall be limited to a maximum of 25 milliseconds. This can be accomplished by incorporating

an arcing control device in the blasting circuit or by interrupting the circuit with an explosive device attached to one or both lead lines and initiated by a 25-millisecond delay electric detonator.

§ 57.6407 Circuit testing.

A blasting galvanometer or other instrument designed for testing blasting circuits shall be used to test the following:

- (a) In surface operations—
 - (1) Continuity of each electric detonator in the blasthole prior to stemming and connection to the blasting line;
 - (2) Resistance of individual series or the resistance of multiple balanced series to be connected in parallel prior to their connection to the blasting line;
 - (3) Continuity of blasting lines prior to the connection of electric detonator series; and
 - (4) Total blasting circuit resistance prior to connection to the power source.
- (b) In underground operations—
 - (1) Continuity of each electric detonator series; and
 - (2) Continuity of blasting lines prior to the connection of electric detonators.

NONELECTRIC BLASTING—SURFACE AND UNDERGROUND

§ 57.6500 Damaged initiating material.

A visual check of the completed circuit shall be made to ensure that the components are properly aligned and connected. Safety fuse, igniter cord, detonating cord, shock or gas tubing, and similar material which is kinked, bent sharply, or damaged shall not be used.

§ 57.6501 Nonelectric initiation systems.

- (a) When the nonelectric initiation system uses shock tube—
 - (1) Connections with other initiation devices shall be secured in a manner which provides for uninterrupted propagation;
 - (2) Factory-made units shall be used as assembled and shall not be cut except that a single splice is permitted

on the lead-in trunkline during dry conditions; and

- (3) Connections between blastholes shall not be made until immediately prior to clearing the blast site when surface delay detonators are used.
- (b) When the nonelectric initiation system uses detonating cord—
 - (1) The line of detonating cord extending out of a blasthole shall be cut from the supply spool immediately after the attached explosive is correctly positioned in the hole;
 - (2) In multiple row blasts, the trunkline layout shall be designed so that the detonation can reach each blasthole from at least two directions;
 - (3) Connections shall be tight and kept at right angles to the trunkline;
 - (4) Detonators shall be attached securely to the side of the detonating cord and pointed in the direction in which detonation is to proceed;
 - (5) Connections between blastholes shall not be made until immediately prior to clearing the blast site when surface delay detonators are used; and
 - (6) Lead-in lines shall be manually unreeled if connected to the trunklines at the blast site.
- (c) When nonelectric initiation systems use gas tube, continuity of the circuit shall be tested prior to blasting.

§ 57.6502 Safety fuse.

- (a) The burning rate of each spool of safety fuse to be used shall be measured, posted in locations which will be conspicuous to safety fuse users, and brought to the attention of all persons involved with the blasting operation.
- (b) When firing with safety fuse ignited individually using handheld lighters, the safety fuse shall be of lengths which provide at least the minimum burning time for a particular size round, as specified in the following table:

TABLE E-1—SAFETY FUSE—MINIMUM BURNING TIME

Number of holes in a round	Minimum burning time
1	2 min. ¹
2-5	2 min. 40 sec.
6-10	3 min. 20 sec.