

## **§ 57.6404**

### **§ 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—

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(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. <sup>1</sup>
2-5 .....	2 min. 40 sec.
6-10 .....	3 min. 20 sec.
11 to 15 .....	5 min.

<sup>1</sup>For example, at least a 36-inch length of 40-second-per-foot safety fuse or at least a 48-inch length of 30-second-per-foot safety fuse would have to be used to allow sufficient time to evacuate the area.

(c) Where flyrock might damage exposed safety fuse, the blast shall be timed so that all safety fuses are burning within the blastholes before any blasthole detonates.

(d) Fuse shall be cut and capped in dry locations.

(e) Blasting caps shall be crimped to fuse only with implements designed for that purpose.

(f) Safety fuse shall be ignited only after the primer and the explosive material are securely in place.

(g) Safety fuse shall be ignited only with devices designed for that purpose. Carbide lights, liquefied petroleum gas torches, and cigarette lighters shall not be used to light safety fuse.

(h) At least two persons shall be present when lighting safety fuse, and no one shall light more than 15 individual fuses. If more than 15 holes per person are to be fired, electric initiation systems, igniter cord and connectors, or other nonelectric initiation systems shall be used.

EXTRANEEOUS ELECTRICITY—SURFACE AND UNDERGROUND

**§ 57.6600 Loading practices.**

If extraneous electricity is suspected in an area where electric detonators are used, loading shall be suspended until tests determine that stray current does not exceed 0.05 amperes through a 1-ohm resistor when measured at the location of the electric detonators. If greater levels of extraneous electricity are found, the source shall be determined and no loading shall take place until the condition is corrected.

**§ 57.6601 Grounding.**

Electric blasting circuits, including powerline sources when used, shall not be grounded.

**§ 57.6602 Static electricity dissipation during loading.**

When explosive material is loaded pneumatically into a blasthole in a manner that generates a static electricity hazard—

(a) An evaluation of the potential static electricity hazard shall be made and any hazard shall be eliminated before loading begins;

(b) The loading hose shall be of a semiconductive type, have a total of not more than 2 megohms of resistance over its entire length and not less than 1000 ohms of resistance per foot;

(c) Wire-counter hoses shall not be used;

(d) Conductive parts of the loading equipment shall be bonded and grounded and grounds shall not be made to other potential sources of extraneous electricity; and

(e) Plastic tubes shall not be used as hole liners if the hole contains an electric detonator.

**§ 57.6603 Air gap.**

At least a 15-foot air gap shall be provided between the blasting circuit and the electric power source.

**§ 57.6604 Precautions during storms.**

During the approach and progress of an electrical storm—

(a) Surface blasting operations shall be suspended and persons withdrawn