(2) Mount the covers on a battery box of the same design with which the covers are to be approved, including any support blocks, with the battery cells completely assembled. If used, support blocks must contact only the filler material or partitions between the individual cells. At the test temperature range of 65 °F –80 °F (18.3 °C–26.7 °C), apply a dynamic force of 200 ft. lbs. to the following areas using a hemispherical weight with a 6″ maximum radius:

(i) The center of the two largest unsupported areas;

(ii) The areas above at least two support blocks, if used;

(iii) The areas above at least two intercell connectors, one cell, and one filler cap; and

(iv) Areas on at least two corners. If the design consists of both inside and outside corners, test one of each.

(3) Record the condition of the covers, supports, intercell connectors, filler caps, cell covers, and filler material.

(b) *Acceptable performance.* Impact tests of any of the four covers shall not result in any of the following:

(1) Bent intercell connectors.

(2) Cracked or broken filler caps, except plastic tabs which extend from the body of the filler caps.

(3) Cracks in the cell cover, cells, or filler material.

(4) Cracked or bent supports.

(5) Cracked or splintered battery covers.

[53 FR 23500, June 22, 1988, as amended at 60 FR 33723, June 29, 1995]

§ 7.47 Deflection temperature test.

(a) *Test procedures.* (1) Prepare two samples for testing that measure 5 inches by ½ inch, by the thickness of the material as it will be used. Prior to testing, condition the samples at 73.4 ± 3.6 °F (23 ±2 °C) and 50 ±5% relative humidity for at least 40 hours.

(2) Place a sample on supports which are 4 inches apart and immersed in a heat transfer medium at a test temperature range of 65 °F – 80 °F (18.3 °C – 26.7 °C). The heat transfer medium must be a liquid which will not chemically affect the sample. The testing apparatus must be constructed so that expansion of any components during heating of the medium does not result in deflection of the sample.

(3) Place a temperature measuring device with an accuracy of 1% into the heat transfer medium within ⅛ inch of, but not touching, the sample.

(4) Apply a total load, in pounds, numerically equivalent to 11 times the thickness of the sample, in inches, to the sample midway between the supports using a ⅛ inch radius, rounded contact. The total load includes that weight used to apply the load and any force exerted by the deflection measurement device.

(5) Use a deflection measuring device with an accuracy of ±.001 inches to measure the deflection of the sample at the point of loading as the temperature of the medium is increased at a uniform rate of 3.6 ±.36 °F/min. (2 ±0.2 °C/min.). Apply the load to the sample for 5 minutes prior to heating, to allow compensation for creep in the sample due to the loading.

(6) Record the deflection of the sample due to heating at 180 °F (82 °C).

(7) Repeat steps 2 through 6 for the other sample.

(b) *Acceptable performance.* Neither sample shall have a deflection greater than .010 inch at 180 °F (82 °C).

[53 FR 23500, June 22, 1988; 53 FR 25569, July 7, 1988; 60 FR 33723, June 29, 1995]

§ 7.48 Acid resistance test.

(a) *Test procedures.* (1) Prepare one sample each of the insulated surfaces of the battery box and of the cover that measure at least 4 inches by 8 inches, by the thickness of the sample which includes the insulation plus the battery cover or box material. The insulation thickness shall be representative of that used on the battery box and cover. If the insulation material and thickness of material are identical for the battery box and cover, only one sample need be prepared and tested.

(2) Prepare a 30 percent solution of sulfuric acid ($H_2 SO_4$) by mixing 853 ml of water with 199 ml of sulfuric acid ($H_2 SO_4$) with a specific gravity of 1.84. Completely cover the samples with the acid solution at the test temperature range of 65 °F – 80 °F (18.3 °C – 26.7 °C) and maintain these conditions for 7 days.

(3) After 7 days, record the condition of the samples.

(b) *Acceptable performance.* At the end of the test, the insulation shall not exhibit any blistering, discoloration, cracking, swelling, tackiness, rubberiness, or loss of bond.

[53 FR 23500, June 22, 1988, as amended at 60 FR 33723, June 29, 1995]

§ 7.49 Approval marking.

Each approved battery assembly shall be identified by a legible and permanent approval plate inscribed with the assigned MSHA approval number and securely attached to the battery box.

§ 7.50 Post-approval product audit.

Upon request by MSHA, but no more than once a year except for cause, the approval-holder shall make an approved battery assembly available for audit at no cost to MSHA.

§ 7.51 Approval checklist.

Each battery assembly bearing an MSHA approval plate shall be accompanied by a description of what is necessary to maintain the battery assembly as approved.

[53 FR 23500, June 22, 1988, as amended at 60 FR 33723, June 29, 1995]

§ 7.52 New technology.

MSHA may approve a battery assembly that incorporates technology for which the requirements of this subpart are not applicable, if the Agency determines that the battery assembly is as safe as those which meet the requirements of this subpart.

Subpart D—Multiple-Shot Blasting Units

SOURCE: 54 FR 48210, Nov. 21, 1989, unless otherwise noted.

§ 7.61 Purpose and effective date.

This subpart establishes the specific requirements for MSHA approval of multiple-shot blasting units. It is effective January 22, 1990. Applications for approval or extensions of approval submitted after January 22, 1991 shall meet the requirements of this subpart.

§ 7.62 Definitions.

The following definitions apply in this subpart:

Blasting circuit. A circuit that includes one or more electric detonators connected in a single series and the firing cable used to connect the detonators to the blasting unit.

Blasting unit. An electric device used to initiate electric detonators.

Normal operation. Operation of the unit according to the manufacturer's instructions with fully-charged batteries, with electric components at any value within their specified tolerances, and with adjustable electric components set to any value within their range.

§ 7.63 Application requirements.

(a) Each application for approval of a blasting unit shall include the following:

(1) An overall assembly drawing showing the physical construction of the blasting unit.

(2) A schematic diagram of the electric circuit.

(3) A parts list specifying each electric component and its electrical ratings, including tolerances.

(4) A layout drawing showing the location of each component and wiring.

(5) The model number or other manufacturer's designation of the blasting unit.

(b) All drawings shall be titled, numbered, dated, and include the latest revision number. The drawings may be combined into one or more composite drawings.

(c) The application shall contain a list of all the drawings submitted, including drawing titles, numbers, and revisions.

(d) A detailed technical description of the operation and use of the blasting unit shall be submitted with the application.

[54 FR 48210, Nov. 21, 1989, as amended at 60 FR 33723, June 29, 1995]

§ 7.64 Technical requirements.

(a) *Energy output.* Blasting units shall meet the acceptable performance criteria of the output energy test in § 7.66.

(b) *Maximum blasting circuit resistance.* The maximum value of the resistance