

ISSUE DATE: 03/14/08

PROGRAM INFORMATION BULLETIN NO. P08-06

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SUBJECT: MSHA Approval of Electric Cap Lamps

### **Scope**

This program information bulletin (PIB) is intended for Mine Safety and Health Administration (MSHA) personnel, equipment manufacturers, repair facilities, underground coal mine operators, gassy underground metal and nonmetal mine operators, underground independent contractors, miners' representatives, and other interested parties.

### **Purpose**

This PIB is issued to inform the mining industry how MSHA applies Title 30 Code of Federal Regulations (30 C.F.R.) § 19.1(b), "Electric Cap Lamps" to evaluate cap lamps with associated electronic circuitry.

### **Information**

In an effort to address advancements in technology and designs of electric cap lamps, MSHA intends to evaluate cap lamps for compliance using MSHA's "Criteria for the Evaluation and Test of Intrinsically Safe Apparatus and Associated Apparatus"

(<http://www.msha.gov/techsupp/acc/application/acri2001.pdf>), where applicable, in addition to the existing 30 C.F.R. § 19.1(b) requirements.

### **Background**

The regulations for the approval of Electric Cap Lamps are specified in 30 C.F.R. Part 19. This regulation was originally promulgated in 1939 and has not been substantially updated since. At the time Part 19 was promulgated, the authors did not address more recent developments in the design of electric cap lamps. The requirements for protection against explosion hazard are found in 30 C.F.R. § 19.7. This section is prefaced with the following statement:

“Unless properly designed, electric cap lamps may present two sources of probable explosion hazards: Ignition of an explosive atmosphere by the heated filament of the bulb in case the bulb glass is accidentally broken, and ignition by sparks or flashes from the battery....”

Section 19.7 also lists several requirements that are intended to address these hazards. These requirements were developed to address the technology in use at the time. For many years, the only designs developed and submitted for MSHA approval consisted of lead acid batteries directly powering an electric filament in a cap lamp headpiece.

Recent electric cap lamp designs include newer battery chemistries such as nickel metal hydride and lithium ion. These new battery assemblies typically include electronic control circuitry. Additionally, electric cap lamps are now routinely designed to deliver power to accessories such as radio frequency identification (RFID) tags, and personal messaging devices or an accessory receptacle (power take-off or ‘PTO’) to power remote control transmitters. These accessories introduce additional electronic circuitry into the electric cap lamp design.

Also, alternate lighting technologies are being incorporated into cap lamp headpieces. MSHA has processed applications that included fluorescent lamps or light emitting diodes (LEDs). These types of light sources require additional electronic circuitry. Section 19.7(e) requires cap lamp battery current to be restricted to a value that will not produce sparks that could ignite an explosive mixture of methane and air. In order to ensure that an adequate degree of safety is provided on new cap lamp designs, the A&CC is applying the “Criteria for the Evaluation and Test of Intrinsically Safe Apparatus and Associated Apparatus” to the evaluation of MSHA approval requests for electric cap lamps. These criteria have been used during the evaluation of all recent applications that include, but are not limited to, accessories, alternate light sources, or alternate battery chemistries.

### **Authority**

Federal Mine Safety and Health Act of 1977, as amended, 30 U.S.C. § 801 et seq. and 30 C.F.R. § 19.1.

**Internet Availability**

This PIB may be viewed on the World Wide Web by accessing the MSHA home page ([www.msha.gov](http://www.msha.gov)) and choosing "Compliance Info" and "Program Information Bulletins."

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