

## 1.0 PURPOSE

This test procedure is used by the Electrical Safety Division (ESD) to determine if representative samples of cap lamp headpiece designs meet the construction and 'suitability of materials' requirements of 30 CFR 19.6(a).

## 2.0 SCOPE

This Standard Test Procedure (STP) applies to electric cap lamps approved per 30 CFR Part 19.

## 3.0 REFERENCES

30 CFR 19.6(a): The suitability of the materials and the construction shall be determined..., by dropping test,<sup>1</sup>...

*(1) Headpieces are dropped six feet, at least 20 times, onto concrete.*

## 4.0 DEFINITIONS

Headpiece – The part of the cap lamp normally attached to the miner's hard hat that encloses the lamp bulb.

## 5.0 TEST EQUIPMENT

5.1. Digital Thermometer. Minimum resolution of 0.20 degree Celsius and minimum range from 0 to 40 degrees Celsius (Fluke 2170A).

5.2. A device to measure the specified distance (6 feet, ±1 inch) the headpiece is to be dropped.

5.3. A flat concrete floor.

5.4. A power source, either the specified battery or a power supply, appropriate for the application and coincides with the cap lamp manufacturer's electrical specifications.

## 6.0 TEST SAMPLES

Three (3) samples of the headpiece in its proposed marketable form.

## 7.0 PROCEDURES

**TITLE: Cap Lamp Headpiece Drop Test****MSHA Mine Safety and Health Administration, Approval & Certification Center**

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- 7.1. Conduct the test in an ambient temperature of 25° ±10 degrees Celsius. Record the ambient temperature on test sheet.
- 7.2. Take a photograph of the headpiece. This will be used as a reference for the test sheet.
- 7.3. Inspect the sample headpiece for any mechanical defects, noting any on the test sheet. Verify the operational condition of the cap lamp using a power source and leave light turned on.
- 7.4. Position the power source so that the cord has enough slack so as not to interfere with the fall.
- 7.5. Release the headpiece from a height of 6 feet (+/- one inch) to fall unobstructed onto the concrete floor.
- 7.6. Inspect the headpiece for damage. If any of the conditions in section 9 are observed, note on the test sheet and discontinue testing.
- 7.7. Repeat steps 7.4 thru 7.6 for a total of twenty drops. Attempt to strike each of the following surfaces of the headpiece at least once during the test: front, back, left side, right side, top, bottom, and switch knob (if applicable).
- 7.8. Repeat steps 7.3 - 7.7 for the remaining samples.

**8.0 TEST DATA**

- 8.1. Ambient temperature.
- 8.2. Manufacturer and model number of the cap lamp or lamp bulb holder assembly.
- 8.3. Manufacturer and part number of the bulb tested.
- 8.4. Sample number.
- 8.5. Pretest inspection results (7.3).
- 8.6. Surface of the headpiece impacted.
- 8.7. Detail of damage after each drop if applicable.

**9.0 PASS/FAIL CRITERIA**

A test failure occurs if any of the following conditions are noted:

- 9.1. The light is off and cannot be switched on. The main bulb and auxiliary bulb are both rendered inoperable (other than filament burnout).
- 9.2. Breaking or cracking of the bulb envelope.
- 9.3. Breaking or cracking of the lens.
- 9.4. Breaking or cracking through the entire thickness of any component of the headpiece assembly which would permit an entry of coal dust.
- 9.5. Displacement of any component that would affect the integrity of the headpiece assembly.
- 9.6. Any impairment to the safe operation of the headpiece.
- 9.7. Exposure of any live metal parts.