

MISCELLANEOUS ELECTRICAL DEVICES

The following criteria specify the requirements for approval of non-permissible electrically operated tools, instrumentation, lighting, appliances, medical devices, and unmanned equipment used in underground mines.

When electrical devices in these categories are constructed, installed, and used in accordance with these criteria, they shall be deemed approved by the Bureau of Mine Safety without the need for specific evaluation by the Bureau. No approval numbers will be issued for these devices.

If mine operators desire to use devices or installation methods which are alternate to these criteria, application for approval must be made to the Bureau of Mine Safety.

TOOLS

A. Handheld tools

1. The tool shall be listed by Underwriters Laboratory or approved (listed) by another agency acceptable to the Bureau of Mine Safety.
2. The maximum input power shall be single phase 240 VAC or 38 VDC.
3. If powered from 240 VAC or 120 VAC, exposed metal non-current carrying parts of the tool, likely to become energized, shall be grounded by a grounding conductor, unless protected by a system of double insulation or its equivalent and distinctively marked.
4. If powered from 240 VAC or 120 VAC, the tool shall be protected by a listed GFCI device.
5. The cord specified by the manufacturer and included in the listing or approval referred to in Item No. 1 shall be acceptable for use in the mine.
6. Electric drills and other electrically operated rotating tools intended to be held in the hands shall be equipped with an integrally mounted electric switch designed to break the circuit when the hand releases the switch.
7. The tool may be taken into and then out of the mine after each use; or, if the tool is de-energized and disconnected, it may remain in the mine between uses.
8. A motor rated at 1 Hp or less shall be permitted on a nominal 120-volt branch circuit protected at not more than 20 amperes without any additional overload protection. Other motors shall be protected against overload by one of the following means:

- a. A separate overload device that is responsive to motor current.
- b. A thermal protector integral with the motor.
- c. Other protective device integral with the motor, specified by the manufacturer and included in the listing or approval referred to in Item No. 1.

B. Bench-mounted or freestanding tools

1. The tool shall be listed by Underwriters Laboratory or approved (listed) by another agency acceptable to the Bureau of Mine Safety.
2. The maximum input power shall be single phase 240 VAC.
3. Exposed metal non-current carrying parts of the tool, likely to become energized, shall be grounded by a grounding conductor, unless protected by a system of double insulation or its equivalent and distinctively marked.
4. If the tool is connected to the power system using a plug and receptacle, the circuit shall be protected by a listed GFCI device.
5. The connection to the power system shall be through a flame-resistant (P-number) cord or enclosed within flame-resistant conduit.
6. The tool shall be turned off after each use; but the wiring referred to in Item No. 5 may remain energized.
7. A motor rated at 1 Hp or less shall be permitted on a nominal 120-volt branch circuit protected at not more than 20 amperes without any additional overload protection. Other motors shall be protected against overload by one of the following means:
 - a. A separate overload device that is responsive to motor current.
 - b. A thermal protector integral with the motor.
 - c. Other protective device integral with the motor, specified by the manufacturer and included in the listing or approval referred to in Item No. 1.

INSTRUMENTATION

- A. Instruments shall be permitted to be used in the mine for the purpose of service, measurement, maintenance, or troubleshooting.

- B. The instrument shall be assembled and name plated by a reputable manufacturer recognized by the Bureau of Mine Safety. The instrument may only be used within the limits specified by the manufacturer. Any other instrument shall be reviewed by the Bureau of Mine Safety prior to use.
- C. The maximum input power shall be single phase 240 VAC or 38 VDC.
- D. Exposed metal non-current carrying parts of such instruments, likely to become energized shall be grounded by a grounding conductor, unless protected by a system of double insulation or its equivalent and distinctively marked.
- E. If powered from 240 VAC or 120 VAC, the tool shall be protected by a listed GFCI device.
- F. The metal case of battery-powered instruments shall be properly grounded if connected to an external electrical circuit.
- G. The instrument may be taken into and then out of the mine after each use; or, if the instrument is de-energized and disconnected, it may remain in the mine between uses. Instrumentation shall also be permitted to be temporarily installed and used in a mine if the instrumentation and cables are protected against physical damage. Examples of adequate physical protection include:
 - 1. Locating the instrument and cables within an equipment or machine enclosure.
 - 2. Constructing a substantial non-combustible structure to serve as a guard and locating all exposed conductors within a flame-resistant conduit.

UNDERGROUND MINE LIGHTING

A. Fixed lighting installations

Examples include, but are not limited to, belt drives, pump stations, shops, travelways, hoist and elevator boarding areas.

- 1. Lighting fixtures shall be listed by Underwriters Laboratory or approved (listed) by another agency acceptable to the Bureau of Mine Safety.
- 2. Exposed sockets must be of a weatherproof type, the exterior of which will be completely non-metallic.
- 3. Lighting fixtures will be suspended or mounted in a manner that will prevent the fixture from contacting combustible material and to minimize damage to the fixture and lamp from mechanical sources and vibration.
- 4. All external wiring will be in flame-resistant cable or enclosed in flame-resistant conduit. Metallic conduit is acceptable.

5. If the circuit is AC and the power connection is made through a plug and receptacle, it shall be protected by a listed GFCI device.
6. If the circuit is energized from a DC trolley system, a solid mechanical connection must be made to the trolley.
7. The lighting circuit must have branch circuit protection in compliance with the National Electric Code.
8. Exposed metallic surfaces of lighting fixtures must be connected to the grounding conductor of the lighting branch circuit.

B. Portable Lighting

Examples include, but are not limited to, maintenance and construction areas.

1. Portable lighting fixtures shall be listed by Underwriters Laboratory or approved (listed) by another agency acceptable to the Bureau of Mine Safety.
2. The maximum input power shall be single phase 240 VAC or 38 VDC.
3. If powered from 240 VAC or 120 VAC, the fixture shall be protected by a listed GFCI device.
4. Lighting fixtures will be suspended or mounted in a manner that will prevent the fixture from contacting combustible material and to minimize damage to the fixture and lamp from mechanical sources and vibration.
5. Portable lighting fixtures will be taken out of the mine after each use; or, if the portable lighting fixtures are de-energized and disconnected, they may remain in the mine between uses.
6. Portable lighting fixtures will include a handle to prevent contact with hot surfaces, strain relief for the cord, and a wire guard completely surrounding the lamp. Other materials may be used to guard the lamp if the material provides equivalent protection to the lamp as a metal wire guard.
7. The cord specified by the manufacturer and included in the listing or approval referred to in Item 1 shall be acceptable for use in the mine if manned while energized. Otherwise, the connection to the power system shall be through a flame-resistant (P-number) cord or enclosed within flame-resistant conduit.

APPLIANCES

- A. The appliance shall be listed by Underwriters Laboratory or approved (listed) by another agency acceptable to the Bureau of Mine Safety.
- B. Exposed metal non-current carrying parts of the appliance, likely to become energized, shall be grounded by a grounding conductor, unless protected by a system of double insulation or its equivalent and distinctively marked.
- C. The maximum input power shall be single phase 240 VAC or 38 VDC.
- D. If powered from 240 VAC or 120 VAC, the tool shall be protected by a listed GFCI device.
- E. The cord specified by the manufacturer and included in the listing or approval referred to in Item "A" shall be acceptable for use in the mine.
- F. All appliances that have a heating element, including microwave ovens, shall be provided with additional fire protection:
 - 1. The approved appliance shall be placed in a rigid, essentially fireproof enclosure.
 - 2. A fire extinguisher shall be provided at this location.
- G. All appliances shall be kept clean.
- H. Unless the connection to the power system is through a flame-resistant (P-number) cord or enclosed within flame-resistant conduit, the appliance shall be attended while in use.
- I. Microwave ovens that are not permanently installed in a stationary location shall be provided with the following:
 - 1. Shock mounting.
 - 2. A supplemental method of latching the door during movement. The supplemental latching shall be accomplished without any modification to the approved appliance.
- J. No internal repairs shall be made to a microwave oven except by a trained and certified technician.
- K. Any damage to a microwave oven, which will prevent the door from closing or sealing properly, will require that the microwave oven be removed from service and not returned to service until repaired and tested for microwave leakage by a trained and certified technician.

- L. A sign will be placed near microwave ovens to indicate that a microwave oven may be in use.

MEDICAL DEVICES

- A. Emergency medical apparatus may be used underground and may be stored in fresh air locations underground.

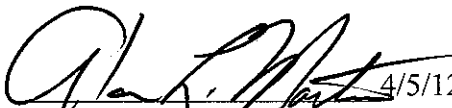
UNMANNED EQUIPMENT

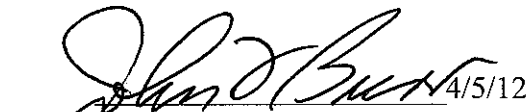
- A. This category includes heaters, pumps, air compressors, air conditioners, and air purification systems. Mine de-watering pumps are not included and must be specifically approved by the Bureau of Mine Safety.
- B. The equipment shall be listed by Underwriters Laboratory or approved (listed) by another agency acceptable to the Bureau of Mine Safety.
- C. The maximum input power shall be single phase 240 VAC.
- D. Exposed metal non-current carrying parts of the equipment, likely to become energized, shall be grounded by a grounding conductor, unless protected by a system of double insulation or its equivalent and distinctively marked.
- E. If the equipment is connected to the power system using a plug and receptacle, the circuit shall be protected by a listed GFCI device. If a plug and receptacle is not used, permanent wiring methods shall be used to connect the equipment to the power system.
- F. The connection to the power system shall be through a flame-resistant (P-number) cord or enclosed within flame-resistant conduit.
- G. A motor rated at 1 Hp or less shall be permitted on a nominal 120-volt branch circuit protected at not more than 20 amperes without any additional overload protection. Other motors shall be protected against overload by one of the following means:
 - 1. A separate overload device that is responsive to motor current.
 - 2. A thermal protector integral with the motor.
 - 3. Other protective device integral with the motor, specified by the manufacturer and included in the listing or approval referred to in Item "B".
- H. All unmanned air compressors and air conditioners, whether the installation is permanent or temporary, shall be housed in an incombustible structure that complies with Section 319 of the Act. An air compressor that is manned while in use is a tool.

NOTES

1. This document is limited to the categories specifically listed in the first sentence. Any item that is not generally recognized as being in one of the listed categories is not covered by this document.
2. A desktop, notebook, or handheld computer is an instrument.
3. A shop vacuum is an appliance.
4. A pump rated at 1 Hp or less that is manned while in use is a tool.
5. Small, sealed batteries of 38-volts or less may be charged underground at electrical installations, if the charger, cables and batteries are protected against damage. Examples of adequate physical protection include:
 1. Locating all the components within an equipment or machine enclosure.
 2. Constructing a substantial non-combustible structure to serve as a guard and locating all exposed conductors within a flame-resistant conduit.

Under these conditions of use, the battery charger is unmanned equipment.


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