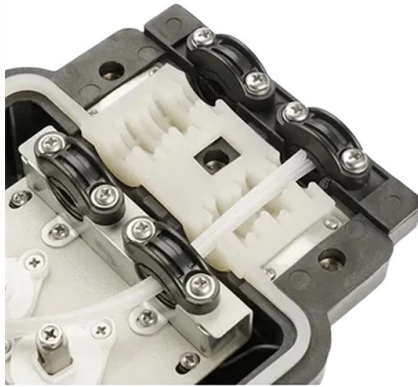


Grounding Standards for Mine Distribution Boxes



Overview

MSHA METAL/NONMETAL ELECTRICAL GROUNDING Frame grounding of portable equipment is required by 12027 and 12028 requires testing of all the grounding compone.

Key Takeaways

Mine distribution boxes must be properly grounded to protect personnel and equipment, with grounding systems tested and maintained according to MSHA regulations and 30 CFR Part 57 standards. Regulatory Requirements

Mine distribution boxes are subject to strict grounding and safety standards under 30 CFR Part 57 Subpart K. Key requirements include:

- **Disconnecting Devices:** Each branch circuit in a distribution box must have a disconnecting device that clearly indicates when the circuit is de-energized, and the box must be labeled to show which circuit each device controls (§ 57.12006) .
- **Frame Grounding:** All metal parts of distribution boxes must be grounded to prevent shock hazards. This includes connecting exposed metallic parts to a grounding system that provides a low-resistance path back to the electrical service equipment (§ 57.12010) .



- Testing: Grounding systems must be tested for continuity and resistance immediately after installation, repair, or modification, and at least annually thereafter. Records of these tests must be maintained and available for inspection (§ 57.12028) .
- Correction of Dangerous Conditions: Any potentially dangerous condition, including improper grounding, must be corrected before energizing the equipment (§ 57.12030) .

Grounding System Design

A mine grounding system typically consists of main and local grounding arrangements:

- Main Grounding: Usually a metal bar installed in a water storage or sump, with at least two main grounding points per mine for redundancy. All levels of the mine are electrically connected to these main grounds .
- Local Grounding: Installed near transformers, distribution substations, and electrical equipment. Metal strips on a rock pad or other conductive surfaces are used to ensure low-resistance grounding .
- Grounding Conductors: Grounding conductors must be sized to carry the maximum expected fault current without excessive voltage drop. They provide a non-current-carrying path under normal operation but carry fault currents during ground faults .

Safety Considerations

- Low-Resistance Path: Grounding conductors must provide a low-resistance path to limit potential gradients and prevent lethal voltage exposure to personnel .
- Integration with Equipment: All metal parts of machines, distribution boxes, and portable equipment must be connected to the grounding network to prevent sparks and electrical hazards .
- Ground Fault Protection: While not always mandated, ground fault protection is recommended to quickly detect and interrupt fault currents, enhancing safety .

Summary

To comply with mine safety standards, distribution boxes must be:

- Properly labeled and equipped with disconnecting devices.
- Frame-grounded to the mine's grounding system.
- Tested for continuity and resistance after installation and annually.
- Integrated into a main and local grounding network to ensure low-resistance paths.
- Maintained to correct any dangerous conditions before energization. Following these requirements ensures electrical safety for miners and reliable operation of mine power distribution systems.

Article Content

MSHA METAL/NONMETAL ELECTRICAL GROUNDING

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Technical Support

This paper will discuss several of these standards and the methods that MSHA prefers to use in complying with these standards. The

eCFR :: 30 CFR 77.701-1 -

For purposes of grounding metallic frames, casings and other enclosures of equipment receiving power from ungrounded alternating

30 CFR Part 75 Subpart I -

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30 CFR § 56.12006

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Requirements And Specifications For Installation Of

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Mine Power System Grounding Research Abstract: Mines possess unique power system grounding requirements because mobile

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