

Lightning Protection for Metal Cable Trays

Article Overview

Proper lightning protection for metal cable trays involves grounding, bonding, and shielding according to recognized standards to prevent damage from surges and electromagnetic interference.

Grounding and Bonding

Metal cable trays must be electrically continuous and bonded to the building's grounding system. This includes connecting all tray sections, side rails, and any conduit or cable drops to the main power source using appropriately sized bonding jumpers, which can serve as an equipment grounding conductor (EGC) . Even if the tray is not mechanically continuous, electrical continuity must be maintained to safely conduct lightning or fault currents . For signal and communication circuits, grounding is essential to protect against lightning-induced surges and electromagnetic interference .

Standards and Compliance

Lightning protection and grounding should comply with NFPA 780, which provides criteria for building lightning protection systems, and TIA/EIA 607 for telecommunications grounding . International standards such as BS EN 62305, BS EN 62561, and UL467 also guide the design and installation of earthing and lightning protection systems . These standards ensure that the cable tray system can safely dissipate lightning energy and minimize the risk of equipment damage.

Shielding and EMI Considerations

Metal trays, especially steel, provide effective shielding against electromagnetic interference (EMI) up to approximately 100 kHz, while aluminum or copper trays are more effective at higher frequencies in the megahertz range . For sensitive signal or communication circuits, fully enclosed trays with gaskets and covers can reduce coupling of electrical noise from nearby power cables . Separating power and signal cables into different trays or using barriers is recommended to minimize interference .

Material Selection

Steel, stainless steel, and aluminum trays are commonly used, with finishes such as pre-galvanized or hot-dip galvanized steel providing corrosion resistance . The choice of material affects both mechanical durability and electrical conductivity, which is critical for lightning protection.

Best Practices

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- o Bond all tray sections and side rails to the main grounding system.
- o Use bonding jumpers sized according to equipment grounding conductor requirements.
- o Separate power and signal cables to reduce EMI.
- o Consider fully enclosed or shielded trays for sensitive circuits.
- o Ensure compliance with NFPA 780, NEC 318, TIA/EIA 607, and relevant international standards.
- o Regularly inspect and maintain grounding connections to ensure continuity and effectiveness. By following these practices, metal cable trays can safely handle lightning strikes and electrical surges, protecting both power and sensitive communication systems .

1. Electrical continuity of cable trays Where it is correctly inter-connected and connected to the installation's general

Lightning protection isn't just about those dramatic lightning rods you see on rooftops - it's a sophisticated system

Table 392.60(A) "Metal Area Requirements for Cable Trays used as Equipment Grounding Conductors" shows the minimum cross

Roof lightning protection systems are essential to protect buildings from lightning. Occupants and property

Earth Cable Size for Lightning Protection explained with IEC-based sizing guidelines, conductor selection methods,

Every cable tray will have a protection conductor electrically bonded to the tray, running all along the one. This conductor shall be

In this article, we will discuss the role that metal cable tray plays as a contributor to EMC performance within structured

The lightning class determines the minimum lightning protection level (LPL) that is used within the lightning protection design.

General Industry Information The Lightning Protection Institute is a nationwide not-for-profit

Lightning is a flow of electrical current between the earth and the sky. The result of the

If not designed and installed properly, wiring inside cable trays may pose hazards such as

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General Industry Information The Lightning Protection Institute is a nationwide not-for-profit organization founded in 1955 to promote

Learn best practices in protecting metal roof constructions from lightning strikes. Understand the role of air terminals

For such installations, it is best to use an insulated conductor and to remove the insulation where bonding connections are made to

Not all cable trays are equivalent. The mechanical and electrical characteristics, tests, certifications, overall quality management,

When designing and installing lightning protection systems, contractors will have to observe the IEC 62305 (EN 62305) standard

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