

Article Overview

Cable trays must comply with international and North American standards such as IEC 61537, NEC Article 392, NEMA VE 1, UL 568, and CSA C22.1 to ensure safe and reliable electrical installations.

Key Standards and Guidelines

IEC 61537:2023 specifies requirements and tests for cable tray and ladder systems used to support electrical and communication cables. It covers structural integrity, load capacity, and the arrangement of cables into groups, but does not apply to conduit or ducting systems. The standard also includes provisions for using trays as protective earth conductors and ensures compatibility with modern electrical installations. NEC Article 392 outlines installation rules for industrial cable tray systems in the U.S. Key points include:

- o Only use conductors rated for open-air environments, such as Tray Rated (Type TC) or Metal-Clad (Type MC) cables.
- o Maintain at least 12 inches of vertical clearance above trays for installation and maintenance.
- o Cable trays cannot be installed in hoistways or enclosed spaces and must remain accessible.
- o Metallic trays can serve as equipment grounding conductors if they meet NEC requirements.
- o Fill limits: 40% for power cables, 50% for control cables.
- o Separation of high-power and low-power cables to prevent electromagnetic interference.
- o Material selection (aluminum, steel, or FRP) should match environmental and load requirements. NEMA VE 1 provides manufacturing requirements for metal cable trays, including ladder, channel, single-rail, wire mesh, solid bottom, and ventilated trays. It specifies load/span class designations and harmonizes with CSA C22.1 for Canadian installations. UL 568 covers performance requirements for fiberglass cable trays, ensuring safe application in industrial environments. CSA C22.1-Part 1 (Canadian Electrical Code) provides installation and maintenance requirements, including methods of installation, ampacities of conductors, and conductor placement in cable trays.

Materials and Construction

Cable trays are manufactured from aluminum, steel, stainless steel, or fiberglass-reinforced plastic (FRP). Material selection depends on environmental conditions, corrosion resistance, mechanical strength, and weight considerations. Aluminum offers excellent corrosion resistance due to its natural oxide layer, while stainless steel (AISI 316L) provides high resistance to corrosion and stress cracking. FRP trays are lightweight, corrosion-resistant, and suitable for harsh environments.

Installation Considerations

- o Maintain proper rung spacing (typically 6-9 inches) to support cables and prevent sagging.

Cable trays according to standards

- o Ensure minimum bend radius for cables exiting the tray.
- o Use solid or ventilated covers depending on heat dissipation and protection requirements.
- o Follow grounding and bonding requirements to ensure electrical safety.
- o Periodically inspect and maintain trays to prevent mechanical damage or cable displacement .

Summary

Compliance with IEC, NEC, NEMA, UL, and CSA standards ensures that cable tray systems are structurally sound, electrically safe, and suitable for their intended environment. Proper material selection, installation, and maintenance are critical to prevent overheating, mechanical failure, and electromagnetic interference, while ensuring long-term reliability and safety of electrical installations.

NEMA Standards Publication VE 2-2018 Cable Tray Installation Guidelines Endorsed by Cable Tray Institute

This guide for engineers and installers has been developed by ABB as a practical reference regarding cable tray characteristics,

Cable trays are components of support systems for power and communications cables and wires. A cable tray system supports and

This document specifies requirements and tests for cable tray systems and cable ladder systems intended for the support and

All the cable trays have the standard configuration in the nuclear buildings, where all the cable trays have a cover to minimize the fire

Specifies requirements for metal cable trays and associated fittings designed for use in accordance with the rules of Canadian

INFORMATION ON STANDARDS FOR CABLE TRAYS The manufacture and use of cable trays are subject to specific strict

As an industry leader in cable tray, Eaton offers one of the widest ranges of cable management solutions available in the market

Understanding the IEC Standard for Cable Tray Cable trays play a vital role in supporting

Where necessary, cable tray systems and cable ladder systems can be used for the arrangement of cables into groups. This

Cable trays according to standards

Explore the cable tray standards of 30 countries across five continents. Learn about the key

INTRODUCTION The B-Line series Cable Tray Manual was produced by our technical staff. We recognize the need for a complete

Core rules for selecting, installing, grounding, and filling cable trays--clearances, materials, separation, and bonding

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

This standards publication was developed by the NEMA Metal Cable Tray and Nonmetallic Cable Tray Sections. Section approval of

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