Technical Requirements for Cable Tray Fabrication

Overview

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

Key Takeaways

Cable tray manufacturing must comply with international and regional standards, ensuring mechanical strength, corrosion resistance, electrical continuity, fire safety, and proper installation per IEC 61537, NEMA VE-1/VE-2, and CSA C22. 2 guidelines.

Standards and Compliance

Cable trays are governed by IEC 61537 internationally, which specifies construction, testing, and performance requirements for metal cable tray systems, including steel, stainless steel, and aluminum trays. In North America, NEMA VE-1 and VE-2 standards define manufacturing requirements for metal trays (ladder, channel, wire mesh, solid bottom, ventilated) and associated fittings, harmonized with CSA C22. 2 Specification #126.

1 for compliance with the Canadian Electrical Code. Compliance ensures safety, durability, and compatibility across installations.

Materials and Corrosion Resistance

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Manufacturers use steel, stainless steel (AISI 316L), aluminum alloys, or pultruded fiberglass depending on environmental conditions. Stainless steel trays require chromium and molybdenum for corrosion resistance, while aluminum relies on a natural oxide layer. Coatings such as pre-galvanized or hot-dip galvanized steel are common for additional protection.

Material selection must consider chemical exposure, humidity, marine environments, and temperature extremes.

Mechanical and Load Requirements

Cable trays must withstand cable weight, environmental loads, and external pressure. Load/span classes are defined in NEMA VE-1/VE-2, with recommended support spacing typically at 1/4 span to minimize deflection and stress at splice points. Tray types (ladder, channel, wire mesh) have specific rung spacing (150–230 mm) and structural designs to support power, control, and instrumentation cables.

Electrical and Fire Safety

Trays often serve as a grounding path, so electrical continuity must be ensured. Fire resistance is critical in sensitive facilities, with standards specifying performance under high temperatures. Ventilation and fill ratios are also defined to prevent overheating and maintain cable integrity.

Installation and Fittings

Manufacturing must account for compatibility with bends, risers, splice plates, and expansion joints. Proper installation guidelines include minimum bend radius, tray alignment, and secure fastening to maintain structural integrity and electrical grounding.

C

E marking or UL certification may be required depending on regional regulations.

Quality Management

Manufacturers are expected to implement quality control, testing, and certification processes, including mechanical load tests, corrosion resistance evaluation, and electrical continuity verification. Third-party audits (UL, LCIE, IMQ) ensure compliance with national and international standards.

Summary

In essence, cable tray manufacturing requires adherence to mechanical, electrical, fire, and environmental standards, careful material selection, and precision in design and installation compatibility. Compliance with IEC 61537, NEMA VE-1/VE-2, and CSA C22. 2 ensures safe, durable, and reliable cable management systems suitable for industrial, commercial, and utility applications.

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Article Content

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

Codes and Standards | Cable Tray Institute

Provides technical requirements concerning the construction, testing, and performance of metal cable tray systems. It is the first joint effort of NEMA and CSA International to put in one place standards

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The document outlines codes and standards that must be followed for design and construction of cable trays and their components. Standards listed include those for materials, rolling and cutting

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Understanding IEC 61537: A Comprehensive Guide to Cable Tray

Focusing on the technical aspects of cable tray systems, IEC 61537 outlines strict requirements and regulatory guidelines for various technical indicators.

IEC Standard for Cable Tray: Complete Technical Guide

For proper installation, design, and maintenance, adherence to international standards is essential. One of the most recognized frameworks globally is the IEC standard for cable tray

B-Line series Cable Tray Design Considerations

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Cable tray support locations are defined by the NEMA VE-1 and VE-2 Manufacturing & Installation Standards, which specify the requirements for cable tray systems designed for use in accordance

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