COETZER OPTICAL SYSTEMS (Pty) Ltd

Standards for Cable Trays in Highway Tunnels

Overview

Cable trays can be located in areas where access is either difficult or restricted; service tunnels, vertical risers and ladder racking.

Key Takeaways

Cable trays in highway tunnels must ensure fire resistance, mechanical strength, corrosion protection, and compliance with international and local standards to maintain continuous operation of safety and signaling systems.Materials and Construction

Cable trays for tunnels are typically made from 304 or 316L stainless steel for corrosion resistance, or glass-reinforced polyester (GRP) for halogen-free, self-extinguishing properties . Common types include welded wire, perforated sheet metal, cable ladders, and GRP trays, each offering flexibility to accommodate tunnel shapes, slopes, and bends . Stainless steel trays are often roll-formed with reinforced siderails and perforated bottoms to support heavy cable loads and allow ventilation .

Fire Resistance

Fire safety is critical in tunnels. Cable trays must maintain functionality of emergency lighting, fire alarms, evacuation signage, and signaling systems during a fire. Standards such as DIN 4102-12 and EN 61537 specify testing for 30, 60, or 90 minutes of fire resistance, ensuring cables continue to operate under high temperatures . GRP trays provide additional fire retardancy and are halogen-free, reducing toxic smoke in emergencies .

Standards and Certification

Cable trays must comply with international and national standards, including:

• EN 61537 for cable tray systems

• CEI 64-20 for tunnel installations

• NFPA 130 and NFPA 502 for transit and highway tunnels in the USA

• UL and IMQ certifications for quality and safety CE marking indicates compliance with European directives, while third-party certifications ensure adherence to mechanical, electrical, and fire safety requirements .

Installation and Support Systems

Tunnel cable trays require optimized support systems to fit curved walls, ceilings, or concrete beams. Accessories allow for direction changes, slope adjustments, and secure fixing . Multi-pocket or ladder designs facilitate rapid installation, cable segregation, and future expansion for power, signaling, lighting, fiber optics, and other services . Firestop modules can be installed to prevent fire propagation through walls or penetrations .

Mechanical and Electrical Considerations

Trays must support the weight of multiple cable types, resist vibration, and allow adequate airflow to prevent overheating . Perforated or ventilated designs help maintain cable temperature, while strong siderails and rungs ensure structural integrity under dynamic loads . Electrical continuity and grounding are essential for safety and compliance.

Summary

When specifying cable trays for highway tunnels, engineers should prioritize:

• Material selection: stainless steel or GRP for corrosion and fire resistance

• Fire performance: certified 30–90 minutes under tunnel fire conditions

• Standards compliance: EN 61537, CEI 64-20, NFPA 130/502, UL/IMQ

• Mechanical strength and support: suitable for tunnel geometry and cable load

• Installation flexibility: modular systems with accessories for bends, slopes, and future expansion

• Safety continuity: ensuring emergency systems remain operational during fire or power loss These specifications ensure reliable, safe, and durable cable management in the challenging environment of highway tunnels.

Article Content

cable tray solutions For tunnels guide

Ceilings, walls, beams, etc., each tunnel has particular installation requirements, and P31 can provide a response with its range of

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Codes and Standards | Cable Tray Institute

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Cable Tray Questions | Cable Tray Institute

Telecommunications standard TIA/EIA-569 recommends a minimum of 12-inch access headroom above the cable tray. Question 6: It

Cable Tray Institute

The Cable Tray Institute (CTI) was founded in 1991 to support the cable tray industry by engaging in research, development,

Cable Tray Technical Guide A practical guide to product selection

A practical guide to product selection and installation This guide for engineers and installers has been developed by ABB as a

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Cable trays can be located in areas where access is either difficult or restricted; service tunnels, vertical risers and ladder racking.

Safety Guidelines for Cable Installation

The document provides a job hazard analysis for erecting cabling, cable trays, and cable supports inside tunnels. It outlines 4 key

IEC 61537:2023 | IEC

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

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

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