Why are steel straps not used for indoor optical cables

Overview

One of the key characteristics of indoor optical cables is the use of flame-retardant and low-smoke materials in their construction.

Key Takeaways

Steel straps are not used for indoor optical cables because indoor cables are designed to be lightweight, flexible, and fire-safe, and metal straps can damage the fibers and violate building safety codes.Mechanical and Structural Considerations

Indoor optical cables are typically non-armored and lightweight, relying on materials like aramid fibers (e.g., Kevlar) for tensile strength rather than metal reinforcement . Unlike outdoor cables, which may include steel wires or corrugated steel tape to withstand heavy pulling forces, crushing, or environmental hazards, indoor cables are not expected to bear significant mechanical loads . Using steel straps can crush or deform the cable, leading to microbending or macrobending losses that degrade optical signal performance .

Fire Safety and Building Codes

Indoor cables must comply with strict fire safety standards, such as low-smoke zero-halogen (LSZH) or plenum-rated jackets, to minimize smoke and toxic gas in case of fire . Steel straps can pierce or abrade the cable jacket, compromising its fire-retardant properties and potentially creating a fire hazard. The National Electrical Code (NEC) explicitly recommends using cable ties, straps, or hangers designed not to damage the cable, avoiding metal supports that could puncture or stress the fibers .

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Installation Flexibility

Indoor environments often require tight bends and flexible routing around walls, ceilings, and conduits. Steel straps are rigid and can restrict the cable's natural bend radius, increasing the risk of fiber breakage or signal attenuation . Non-metallic supports allow installers to secure cables safely while maintaining the required bend radius and minimizing stress on the fibers.

Summary

In essence, steel straps are unsuitable for indoor optical cables because they:

• Can physically damage the fibers due to crushing or sharp edges.

• Compromise fire safety compliance by breaching protective jackets.

• Restrict flexibility, making it difficult to maintain proper bend radii.

• Are unnecessary, as indoor cables are designed for lightweight, low-stress environments and use non-metallic strength members like aramid fibers . For indoor installations, the recommended supports are plastic cable ties, straps, hangers, or other fittings specifically designed to avoid damaging the cable, ensuring both mechanical integrity and compliance with fire and building codes .

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Fiber-optic cable

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A fiber-optic cable, also known as an optical-fiber cable, is an assembly similar to an electrical cable but containing one or more

How Fiber Optic Cables Work | BroadbandSearch

This article explains the basics behind fiber optic cables and how they are used for telecommunications and other

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