How to install fiber optic cable protection conduit

Overview

Fiber optic cable which passes through manholes containing petroleum-based waste will require special protection.

Key Takeaways

Installing fiber optic cable in a protective conduit ensures physical protection, simplifies maintenance, and allows future upgrades.Step 1: Select the Appropriate Conduit

Choose a conduit material based on the installation environment. HDPE (High-Density Polyethylene) is ideal for underground and long continuous runs due to its flexibility and durability, while PVC is suitable for exposed areas or duct banks. For industrial or high-impact areas, rigid galvanized steel (RGS) may be required. Conduit size should accommodate current and future cable needs, including potential innerducts for multiple fiber runs .

Step 2: Prepare the Conduit Path

Ensure the conduit path is clear of debris, sharp edges, and obstacles. Seal open ends daily during installation to prevent moisture or dirt from entering. For long runs, consider intermediate access points or manholes to manage pulling tension and facilitate lubrication .

Step 3: Use Innerduct if Needed

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Innerducts are smaller tubes placed inside the main conduit to separate and protect individual fiber runs. Corrugated HDPE innerduct reduces friction for pulling, while smoothwall HDPE is suitable for direct burial or cable-blowing applications. Maintain a fill ratio of 40% initially and no more than 70% to prevent excessive tension during pulls .

Step 4: Attach Pulling Equipment

Secure the fiber optic cable to a pre-installed pull string using a swivel pulling eye to prevent twisting. Apply pulling force only to the cable's internal strength members (e.g., Aramid yarn), never to the outer jacket or glass fibers .

Step 5: Apply Lubrication

Use a water-based fiber optic pulling lubricant compatible with the cable jacket. Apply liberally to both the cable and conduit interior to reduce friction, especially for long runs or multiple bends. Avoid petroleum-based lubricants, which can damage the cable over time .

Step 6: Pull the Cable

Pull the cable smoothly and continuously, adhering to the manufacturer's maximum pulling tension (commonly around 600 pounds for outdoor cables). Never bend the cable tighter than its minimum bend radius, typically 20 times the cable diameter under tension. For complex or long pathways, consider pulling from the middle outwards or using mid-span access points .

Step 7: Final Checks and Maintenance

After installation, inspect the conduit and cable for damage. Ensure all bends, offsets, and transitions maintain proper radius and tension. Conduit allows easy future upgrades or cable replacement without re-excavation, so maintain clear access and document the pathway for long-term management . By following these steps, fiber optic cables will be protected from environmental hazards, physical damage, and rodent interference, while ensuring a durable and maintainable installation .

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