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Proper installation of cables and optical fibers requires careful planning, adherence to manufacturer specifications, specialized equipment, and strict handling procedures to ensure performance and longevity.

Planning and Site Preparation Before installation, a site survey is essential to identify all endpoints, intermediate equipment rooms, and potential obstacles such as HVAC ducts or structural beams. The installation plan should account for future network expansion, leaving 25–40% extra conduit space. For outdoor installations, permits and compliance with local building codes are required, while indoor installations may involve raceways, cable trays, or conduits under floors or ceilings.

Cable Selection and Equipment Choosing the correct type of cable is critical. Options include single-mode or multi-mode fibers, armored or dielectric cables, depending on bandwidth requirements and environmental conditions. Specialized tools are required, such as fusion splicers, cable-pulling equipment with tension monitoring, OTDRs, light sources, and power meters. Safety equipment must also be provided to protect installers.

Installation Techniques Fiber optic cables can be installed underground, aerially, or indoors. Methods include:

- Pulling:** Using tension-controlled equipment to avoid exceeding the cable's maximum pulling force.
- Blowing:** Using compressed air to insert fiber into ducts or innerducts.
- Direct burial:** Laying cables in trenches with protective conduits.
- Aerial installation:** Mounting cables on poles or existing infrastructure. Installers must respect the minimum bend radius and avoid kinking or twisting the cable, as excessive bending or pulling can damage fibers and degrade performance.

Termination and Testing After installation, cables must be terminated and connected to network equipment. Testing is performed using OTDRs, light sources, and power meters to verify signal integrity and ensure proper operation. Proper cable management, including color-coded labeling and cable ties, facilitates maintenance...

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A fiber optic cable should be tested three separate times during an installation: on the reel, the splicing test, and the final acceptance test. Extreme caution should

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