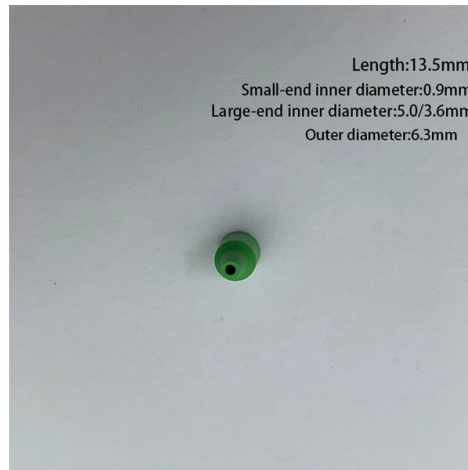


Fiber optic pigtail patch cord processing method



Overview

A fiber patch cord and pigtail production line typically involves several key processes to ensure high-quality output.

Key Takeaways

Fiber optic pigtail patch cords are manufactured through a precise multi-step process involving cable preparation, connector attachment, curing, polishing, and rigorous testing to ensure high-quality performance.

Overview of Pigtails and Patch Cords

A fiber optic pigtail is a short fiber with a factory-terminated connector on one end and bare fiber on the other, designed for fusion or mechanical splicing to a main cable. A patch cord has connectors on both ends and is used for flexible connections in optical distribution frames or devices. Pigtails provide factory-grade quality, low insertion loss, and high return loss, making them ideal for permanent terminations, while patch cords are used for reconfigurable connections ().

Production Steps

- Material Preparation
- Select the appropriate fiber type (single-mode or multi-mode) and connector type (LC, SC, ST, FC, MTP, etc.) ().
- Fiber cables are supplied on reels and cut to required lengths using automated cutting machines for precision and efficiency ().

- Cable Stripping and Identification
 - Use a jacket stripper to remove the outer jacket (commonly 3.0 mm, 2.0 mm, or 0.9 mm).
 - Strip the tight-buffered inner fiber using a miller stripper.
 - Identify fibers for duplex or multi-fiber assemblies ().
- Connector Attachment
 - Apply epoxy glue (commonly 353 epoxy) to the fiber and insert it into the ferrule of the connector.
 - Cure the epoxy using vertical or horizontal solidification furnaces to secure the fiber in place ().
- Polishing
 - Polish the connector end using specialized jigs for UPC or APC geometry.
 - Polishing ensures the fiber core aligns precisely with the ferrule for minimal insertion loss ().
- Cleaning and Inspection
 - Clean the half-finished patch cords with ultrasonic cleaning machines.
 - Inspect the connector end-face under 400x-600x microscopes to ensure cleanliness and proper alignment ().
- Testing
 - Perform insertion loss (IL) and return loss (RL) tests to verify optical performance.
 - High-precision interferometry or video fiber microscopes may be used for quality control ().

Industrial Production Considerations

- Automated production lines increase efficiency, allowing hundreds of patch cords per hour.
- Equipment includes cable cutting machines, crimpers, epoxy injection systems, curing ovens, polishing machines, and testing stations ().
- Following standards like Telcordia GR-326-CORE ensures global compatibility and reliability ().

Summary Workflow

- Bare fiber → cabled and cut to length.
- Fiber → stripped, identified, and prepared.
- Connector → epoxy applied, fiber inserted, and cured.
- Connector end → polished and cleaned.

- Finished pigtail → inspected and tested.
- Pigtails → fusion-spliced to main cables; patch cords → used for flexible connections (). This structured process ensures that fiber optic pigtail patch cords meet high-performance standards, providing reliable connectivity in telecom, data centers, and FTTH networks.

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