Customization Process for SC APC Fiber Optic Connectors G 652 for Backbone Networks



Overview

Recommendation ITU-T G.652 (08/2024) The ITU-T G.652 fibre was originally optimized for use in the 1310 nm wavelength region but can also be used in the 15.

Key Takeaways

SC/APC connectors on G. 652 fiber are customized through precise termination, polishing, and testing to ensure low insertion loss and high return loss for backbone network reliability. Overview of SC/APC ConnectorsSC/APC (Subscriber Connector/Angled Physical Contact) connectors feature an 8° angled ferrule end-face, which minimizes back reflection (< -60 dB), making them ideal for high-speed, long-distance backbone networks, FTTH, and PON deployments.

They are widely used in customer premise equipment, optical line terminals, and drop cables where signal integrity is critical.

Fiber Type Selection

For backbone networks, G. 652 single-mode fiber is commonly used due to its low attenuation and low chromatic dispersion, suitable for long-haul transmission. The fiber may be jacketed with LSZH (Low Smoke Zero Halogen) for safety and environmental compliance.

Proper fiber selection ensures compatibility with SC/APC connectors and network equipment.

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Customization and Termination Process

Fiber Preparation: Strip the fiber jacket and clean the bare fiber to remove coatings and contaminants. Cleaving the fiber to a precise length is critical for optimal splicing and connector performance. Connector Assembly: Insert the prepared fiber into the SC/APC connector ferrule.

Heat-cure epoxy or pre-polished ferrules may be used depending on factory or field termination methods. Zirconia ferrules with pre-radiused end faces are preferred for consistent physical contact and low insertion loss. Polishing: The ferrule end-face is polished to achieve the angled physical contact.

AP

C polishing reduces back reflection and ensures high return loss, which is essential for WDM, CATV, and analog applications. Fusion Splicing: The unconnectorized end of the pigtail is typically fusion-spliced to the backbone fiber. This ensures a seamless, low-loss optical path while maintaining mechanical stability.

Testing and Quality Assurance: Each terminated connector is tested for insertion loss, return loss, and optical continuity. Automated assembly and testing are recommended to maintain consistent quality and reduce human error.

Considerations for Backbone Networks

Connector Type Consistency: APC connectors must not be mated with UPC connectors to avoid signal degradation. Environmental Factors: Choose appropriate jacket materials and fiber counts based on installation environment and network design. Automation vs.

Manual Termination: Factory-terminated connectors with automated polishing and testing provide higher repeatability and reliability for backbone deployments.

Summary

Customizing SC/APC connectors on G. 652 fiber involves careful fiber preparation, precise connector assembly, APC polishing, fusion splicing, and rigorous testing. This process ensures low insertion loss, high return loss, and long-term network stability, which are critical for backbone networks, FTTH, and high-speed telecommunication infrastructures.

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Article Content

Recommendation ITU-T G.652 (08/2024)

The ITU-T G.652 fibre was originally optimized for use in the 1310 nm wavelength region but can also be used in the 1550 nm region. This is the latest revision of a Recommendation that was

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