Engineering Standards and Technology
Fiber Optic Assemblies

Scope

This Engineering Specification is written to provide a summary of the performance criteria for terminated optical fiber connectors on optical fiber cable. This document will summarize product performance requirements based on the following established criteria: EIA/TIA-455, Fiber Optic Test Procedures (FOTP), and parts of Telcordia GR-326. This document may be revised, without notice, in accordance with standard Clearfield® document change procedures.

General Product Descriptions

Optical Fiber:

- Singlemode full Spectrum fiber meets ITU-T G.652.D (06/05) specification. Reduced Water Peak (RWP) fibers are considered. Full Spectrum because the reduction of loss in the water absorption spectral region (the E band)
- Singlemode Bending Loss Insensitive optical fiber meets ITU-T G.657 Class A (12/06). Fully compliant with the G.652 singlemode fibers specification
- Multimode 50/125 µm Graded Index Optical Fiber meets ITU-T G.651 (02/98). Multimode 50/125 µm Graded Index Optical Fiber for the optical access network meets ITU-T G.651.1 (07/07)
- Optical fiber cable for the optical access network recommends a quartz multimode fiber to be used for the access network in specific environments
- Color Coding of Fiber Optic Cable must be in accordance with TIA/EIA 598-A

Fiber Optic Jacketing:

- All riser and plenum cables will meet requirements described in TR-NWT-000409. Fiber optic cable for plenum environments shall be NEC type OFNP and listed as UL 910. Fiber optic cable for riser environments shall be listed as NEC type OFNR and listed as UL 1666. Fiber optic cable for outside plant environments shall meet Telcordia GR-20 requirements

Connectors Optical Fiber:

- GR-326: Generic Requirements for Singlemode Optical Connectors and Jumper Assemblies

Performance Requirements

The following specifications refer to terminated optical fiber connectors on optical fiber cable. All measurements performed using standard procedures with a non-contacting interferometer. Insertion Loss and Return Loss figures are measured using a launch cable meeting the criteria specified in WIO 900.

Applicable Documents

The following documents form a part of this specification to the extent defined herein. In the event of a conflict, this document shall govern:

Applicable Documents	
GR-326-CORE	Generic requirements for singlemode optical connectors and jumper assemblies, Issue 4
EIA/TIA-455	Fiber optic test procedures (FOTP), EIA/TIA
Clearfield® Drawing #17012	Connector end-face polish geometry, Clearfield®
Clearfield Drawing #17010	Specification for multimode connector end-face visual inspection criteria
Clearfield Drawing #17011	Specification for multimode connector end-face visual inspection criteria
ITU-T G.652.D (06/05)	Characteristics of singlemode optical fiber and cable
ITU-T G.657 Class A (12/2006)	Characteristics of a bending loss insensitive singlemode optical fiber and cable for the access network

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Minimum Performance Specifications for Terminated Singlemode Connectors

Connector Type	Ferrule Material	Polish Type	Ins. Loss Typical	Max. Ins. Loss	Min. Ret. Loss	Polish Radius (mm)	Fiber Height, Max.	Fiber Height Typical	Apex Offset	Polish Angle
ST	Ceramic	UPC	0.15 dB	0.30 dB	55.00 dB	7 - 25	±100 nm	±50 nm	< 50 µm	N/A
SC	Ceramic	UPC	0.15 dB	0.30 dB	55.00 dB	7 - 25	±100 nm	±50 nm	< 50 µm	N/A
FC	Ceramic	UPC	0.15 dB	0.30 dB	55.00 dB	7 - 25	±100 nm	±50 nm	< 50 µm	N/A
LC	Ceramic	UPC	0.15 dB	0.30 dB	55.00 dB	7 - 25	±100 nm	±50 nm	< 50 µm	N/A
D4	Ceramic	UPC	0.15 dB	0.30 dB	55.00 dB	7 - 25	±100 nm	±50 nm	< 50 µm	N/A
SC	Ceramic	APC	0.20 dB	0.30 dB	65.00 dB	5 - 12	±100 nm	±100 nm	< 50 µm	8.0° ± 0.3°
FC	Ceramic	APC	0.20 dB	0.30 dB	65.00 dB	5 - 12	±100 nm	±100 nm	< 50 µm	8.0° ± 0.3°
LC	Ceramic	APC	0.20 dB	0.30 dB	65.00 dB	5 - 12	±100 nm	±100 nm	< 50 µm	8.0° ± 0.3°
MPO/MTP*	Thermoplastic	APC	0.20 dB	0.35 dB	60.00 dB	N/A	N/A	N/M	N/A	N/A

**MPO/MTP Connector Specifications are for 12 fiber cable assembly connectors*
Note: All Clearfield® fiber optic patch cords are designed and tested to operate between -40°C and 85°C.

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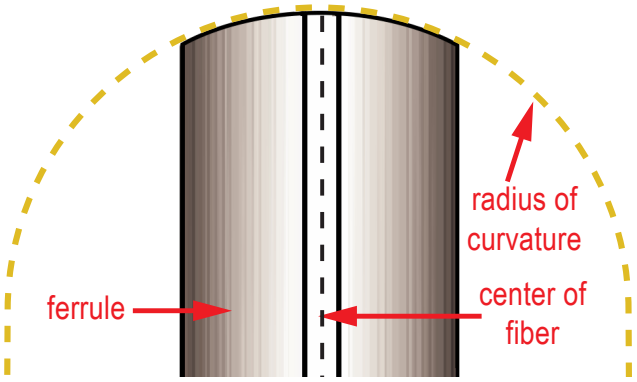
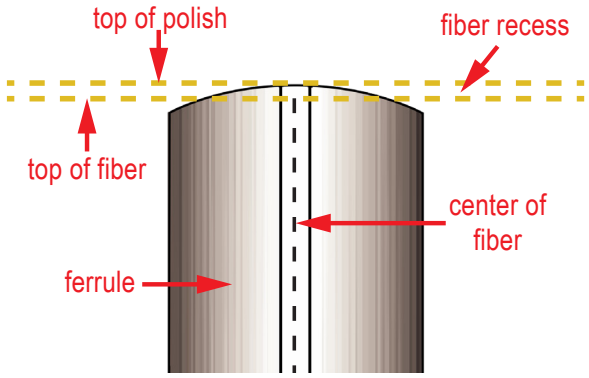
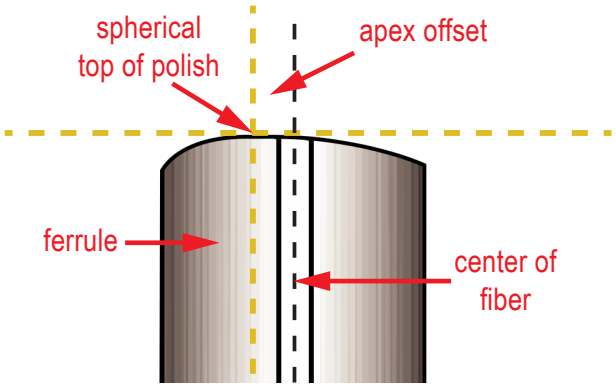
Specifications



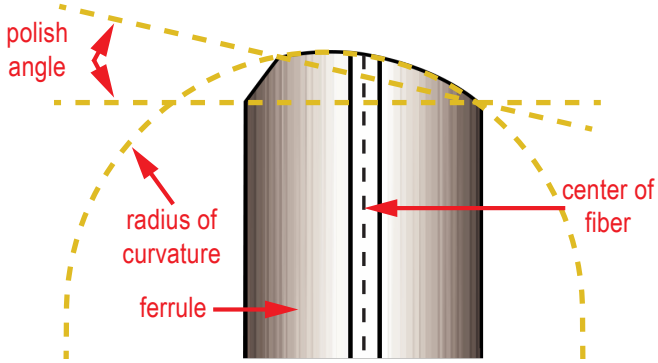
1.0 POLISH RADIUS
The radius of curvature is defined as the radius of the end-face surface as measured from the ferrule axis.



2.0 FIBER UNDERCUT / PROTRUSION
Fiber undercut or protrusion is defined as the distance between the top of the glass fiber as measured against the surrounding material in a spherical plane.
Undercut = -.02R3 + 1.3R2 - 31R + 325.



3.0 APEX OFFSET
Apex offset is measured as the distance between the spherical center of the polished end-face and the center of the fiber.



4.0 ANGLED POLISH
The end face is polished at an angle relative to the axis perpendicular to the ferrule axis.