



Verizon NEBS™ Compliance: Fiber-Drop Splice Closures

Verizon Technical Purchasing Requirements

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1.0 PURPOSE

The purpose of this Verizon Technical Purchasing Requirement (VZTPR) document is to provide the FOC testing requirements for Fiber Drop Splice Closures. These requirements are based on those specified in TR-251: Generic Requirements for Service Wire Splice for Buried Service Wire.

2.0 SCOPE

Fiber Drop Splice Closures

3.0 REFERENCES

TR-NWT-000215, Issue 2, May 1991	Generic Requirements for Service Wire Splice for Buried Service Wire
FOC Memo # 39	Applicable to Punch List for Fiber Drop Splice Closures
GR-771-CORE, Issue 1, July 1994	Generic Requirements for Fiber Optic Splice Closures

4.0 ACRONYMS

A	After
B	Before
D	During
FOC	Fiber Optic Components
ITL	Independent Test Laboratory
OM	Optical Monitoring

5.0 TEST REQUIREMENTS FOR FIBER DROP SPLICE CLOSURES

Verizon purchases Fiber Drop Splice Closures to the requirements specified in Telcordia document TR-NWT-000215, Issue 2 May 1991 modified as indicated below:



FOC Test Plan for Fiber Drop Splice Closures - based on TR-NWT-000215				
Task Name	Sequence	Samples	Optical Measurements	Comments
Total Test Time				
Prepare Closures & Materials				
General Requirements & Documentation				
3.1.1 Practices				Complete Set of documentation. Telcordia TR-NWT-000251 § 3.1.1
3.1.2 Installation Instructions				Complete instruction package. Telcordia TR-NWT-000251 § 3.1.2
3.2 Marking Packaging and Shipping				
3.2.1 Marking				Material identifiable as to the manufacturer and part number. Telcordia TR-NWT-000251 § 3.2.1
3.2.2 Packaging and Shipping				Packaging to prevent damage to the product under normal shipping, handling and storage. Telcordia TR-NWT-000251 § 3.2.2
3.3 Quality				
3.3.1 Quality Assurance Program				TL9000. Product and Process requirements shall be met via Quality control.
3.3.2 Product Samples				Product shall meet the required specifications upon changes in manufacturing methods, location or product specifications. Telcordia TR-NWT-000251 § 3.3.2
4. Functional Design and Performance				
4.1 Design and Fabrication Requirements				
4.1.1 Manufacturing Standards				Product shall contain no hazardous features. Telcordia TR-NWT-000251 § 4.1.1
4.1.2 Non-Metallic Chemical Resistance		5 Test Bars / Material		Plastic Bar shall show no signs of crazing or cracking. Telcordia TR-NWT-000251 § 4.1.2. Add Acidified Water as used in 5.4.7 GR771.
4.1.3 Tools				Use of specialized tools or equipment shall be avoided. Telcordia TR-NWT-000251 § 4.1.3
4.1.4 Cable Pullout		3 Closures	OM B/D*/A	-18°C & +40°C, 35 lb load for 1/2 hour
4.1.5 Torsion		3 Closures	OM B/D*/A	-18°C & +40°C. Clamp 4 inch from each end, 10 product rotations, 90 Deg in each direction



FOC Test Plan for Fiber Drop Splice Closures - based on TR-NWT-000215				
Task Name	Sequence	Samples	Optical Measurements	Comments
4.1.6 Cable Bending		3 Closures	OM B/D*/A	-18°C & +40°C. 10 cable bends 90 Deg on each side (total bend 180 Deg = 1 cycle)
4.3 Environmental Requirements				
4.2.2 Temperature Cycling with Humidity		3 Closures	OM B/D*/A	+4.4°C / UC RH to +60°C / 95% RH; 45 cycles; 30 Days; Dwell Time: 4 hours; Ramp: 4 hours
4.2.3 Fungus		3 Closures		Per: ASTM G21. Rating of #0 - ok pass; for level #1 Verizon to review pictures
4.3.3 Shock Resistance				
4.3.3.1 Impact		3 Closures		40 ft-lbs impact @center of splice: -18°C & +40°C. Telcordia TR-NWT-000251 § 5.3.3.1 No evidence of breakage or cracking.
4.3.3.2 Drop		3 Closures		6 ft drop, 4 hr soak@temp: -18°C & +40°C. Telcordia TR-NWT-000251 § 5.3.3.2 No cracking or breaking of any of the packaged parts.
4.3.4 Low Temp Handling		3 Closures	OM D/A	Assemble product@-9.5°C (or equipment limits). (OM) taken after full assembly@Temp and @room Temp (give 1hr to stabilize)
4.3.5 Accelerated Aging	A/B	6 Closures	OM B/D*/A	85°C - 7 day 2 samples built@Room Temp 2 samples built@ -9.5°C 2 samples built@Room temp & w/Impact testing performed
5.3.5.1 Water Immersion	A	3 Closures (1 per exposure)		No water ingress beyond end of cable ring cut indicated by Trace dye.
5.3.5.2 Thermal Shock	B	3 Closures (1 per exposure)		-40°C to 60°C; 15 cycles; 10 Days; Dwell Time: 4 hours; Ramp: 4 hours. No water ingress beyond end of cable ring cut indicated by Trace dye.
4.3.6 Freeze Thaw in Wet Sand		3 Closures	OM B/D*/A	-40°C to 70°C; 50 cycles; Dwell Time: 10 hours; Ramp: 4 hours. No water ingress beyond end of cable ring cut indicated by Trace dye.
4.3.7 Water Head		3 Closures		10 ft water head for 14 Days. No water ingress beyond end of cable ring cut indicated by Trace dye.



FOC Test Plan for Fiber Drop Splice Closures - based on TR-NWT-000215				
Task Name	Sequence	Samples	Optical Measurements	Comments
UV Exposure		5 Test Bars / Material		Per GR-771, section 6.4.9 (42 days)
GR771, 5.5.3 Rodent Resistance		5 Test Bars / Material		As per GR771 5.5.3 Rodent Resistance, flat section of product or approx 2x2x1/8 inch bar
4.3.8 Sealant Encapsulate				
4.3.8.1 Sealant Compatibility	See 4.3.8.5	3 Closures		Sealant shall be compatible with the fiber drop cable material. Compliance determined in 4.3.8.5 (Stress Cracking of Cable)
4.3.8.2 Sealant Materials		3 Closures		Sealant shall not contain any carcinogen recognized by OSHA and does not contain toluene diisocyanate (TDI). Telcordia TR-NWT-000251 § 5.3.8.2 Also review RoHs requirements.
4.3.8.3 Sealant Consistency		3 Closures		Packaged sealant shall meet all requirements of section 4.3.8.3 after conditioning, 14 days at 60 C per Telcordia TR-NWT-000251 § 5.3.8.3
4.3.8.4 Sealant Odor		3 Closures		Sealant shall be "essentially odorless. Telcordia TR-NWT-000251 § 4.3.8.4
4.3.8.5 Stress Cracking of Cable		3 Closures		Test per ASTM D 1693: Condition A, Preconditioning Cables at normal room temp. for 40 hr. then 48 Hr @ 50 C on actual cables with notches immersed in sealant, bent to a radius 10 times the dia (GR 20). View cables for damage per ASTM D1693



NOTES:

Assumes GR-765 Splice, GR-1380 splice protector & GR-20 Cable

Test Procedures:

Cables:

- 1) Testing to be performed on cables approved by customer for use out in the field.
- 2) Use the Drop cable types specified in the following table.

Verizon Select Cables for Drop Splice Closure Testing					
Manufacturer	Cable Type	Cable P/N	Sheath	Cable Size	Fibers
Sumitomo					
	Drop	SE-5B81PT-006	Flat	0.18	6
	Drop	SE-5B8MPT-006	Figure 8	0.2	6
Pirelli					
	Drop	0006-HDHNLEDJNZK	Figure 8	0.17	6
	Drop	0006-HDHNLADJNVK	Flat	0.2	6
Corning Cable Systems					
	Drop	002EB4-14101A-20	Flat	0.18	2
	Drop	006EBA-14101A-20	Figure 8	0.16	6
Draka/Compteq					
	Drop	F-DFTNATJ-06-BB-xxx	Flat		

Sample Size:

- 1) Unless otherwise specified, a minimum of three samples shall be used for each test. 1 at low & hi temp & 1 done at both.
- 2) No tests are in sequence but samples for water immersion & Thermal Shock must be aged as a precondition
- 3) Samples should be soaked 4 hrs at temp extremes similar to GR-771

Optical Measurement Requirements

Unless otherwise specified, the optical requirements when tested are as follows:

- 1) Measurements at the following wavelengths: 1310, 1490, 1550, 1625nm.
- 2) Change in attenuation (insertion loss) may be 0.05db or less per fiber for 90% of the fibers and no greater than 0.15db for up to 10% of the fibers.
- 3) Optical measurements taken on tests when specified.