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**SM and MM LC\SC Simplex Tight Jacketed Style Connector**

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**DESIGN OBJECTIVES**

The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, Tyco Electronics makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, Tyco Electronics may change these requirements based on the results of additional testing and evaluation. Contact Tyco Electronics Engineering for further details.

**1. SCOPE**

## 1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics Singlemode and Multimode LC/SC Simplex Tight Jacketed Style Connector.

## 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan(s) and product drawing(s).

## 1.3. Test Results

Testing on the subject product line was completed on 24Aug06. The Engineering Report number for this testing is 502-1191. This documentation is on file at and available from Engineering Practices and Standards (EPS).

**2. APPLICABLE DOCUMENTS**

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

## 2.1. Tyco Electronics Documents

- 102-952: Quality Specification (Qualification of Fiber Optic Connectors and Cable Assemblies)
- 501-TBD: Qualification Test Report (SM and MM LC\SC Simplex Tight Jacketed Style Connector)
- 502-1191: Engineering Report (SM and MM Simplex Tight Jacketed Style Connector)

## 2.2. Commercial Standard

TIA/EIA-455-B: Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components

**3. REQUIREMENTS**

## 3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

## 3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

- 3.3. Optical power source wavelength shall be 1310 and 1550 ± 30 nm or as stated in the Test Report.
- 3.4. Ratings

Performance	Value	Units
Attenuation, Maximum	0.75	dB
Return Loss, Minimum	30	dB
Storage Temperature	-28 to 100	°C
Operating Temperature	-28 to 85	°C
Durability	300	Cycles

Figure 1

3.5. Performance and Test Description

Product is designed to meet the mechanical, environmental and optical transmittance performance requirements specified in Figure 2. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.6. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Visual and mechanical inspection.	Meets requirements of product drawing.	TIA/EIA-455-13A. Visual, dimensional and functional per applicable quality inspection plan.
Attenuation (insertion loss), initial and verification.	Maximum value for any single specimen shall be 0.75 dB. See Note.	TIA/EIA-455-171A, Method A1 or D1 for MM; TIA/EIA-455-171A, Method A3 or D3 for SM. Interconnection Device Insertion Loss Test. Wraps shall be on a smooth surface and be secured in such a manner to guarantee integrity for the duration of the testing. See Figure 4 for cable length.
Return loss.	Minimum value for any single specimen shall be 30 dB. See Note.	TIA/EIA-455-107A. Alternative procedure: an optical time domain reflectometer may be substituted for the coupler method.
Temperature cycling.	Maximum Change In Transmittance (CIT) for any single specimen shall be 0.5 dB during and after test. Minimum return loss for any single specimen shall be 30 dB during and after test. See Note.	TIA/EIA-455-3. Subject specimens to 5 cycles between -28 and 85°C with a maximum ramp time of 40° per hour. See paragraph 5.2.

Figure 2 (continued)

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Test Description	Requirement	Procedure
Temperature life.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. See Note.	TIA/EIA-455-4. Subject specimens to 110°C for 240 hours. If tested at lower temperature, increase the duration by 2.5 times for every 10°C decrease. See paragraph 5.2.
Thermal shock.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. See Note.	TIA/EIA-455-71 Condition C-0. Subject specimens to cycles between -40 and 85°C with a minimum of 5 minute transition between temperature extremes. See paragraph 5.2.
Flex.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. See Note.	TIA/EIA-455-1. Subject specimens to 200 flexing cycles, 100 initial cycles, and 100 cycles with the connector rotated 90 degrees with an applied load of 0.5 kg [1.1 lb] at a flexing rate of 12 to 14 cycles per minute.
Twist.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. See Note.	TIA/EIA-455-36. Subject specimens to 500 twisting cycles with an applied load of 1.5 kg [3.3 lb] at a maximum twisting rate of 30 twists per minute.
Mechanical shock.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. Optical discontinuities shall not exceed 0.5 dB for 50 microseconds.	TIA/EIA-455-14, Table I Test Conditions J, A, B. Subject specimens to sinusoidal shocks having a magnitude of 30 to 75 g on each axis. Three impacts per direction for a total of 9 impacts.
Vibration.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. Optical discontinuities shall not exceed 0.5 dB for 50 microseconds.	TIA/EIA-455-11, Test Conditions II and VI. Subject specimens to 5 to 55 Hz, vibration excursion of 1.52 mm double amplitude, 10 g from 55 to 500 Hz, RMS level 10 g minimum. Thirty minutes in each axis.
90 degree cable pull.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. See Note.	TIA/EIA-455-6. Subject specimens to a 19.5 N [4.4 lbf] static load applied at a 90 degree angle and held for 5 seconds.
Salt spray.	No visual evidence of deterioration, loosening of finishes, corrosion of metal surfaces, or corrosion of base metal on plated parts. See Note.	EIA/TIA-455-16 Subject specimens to 5% NaCl solution for 48 hours. See paragraph 5.2.

Figure 2 (continued)

Test Description	Requirement	Procedure
Strength of coupling mechanism.	Connector shall not unlatch.	TIA/EIA-455-185. Subject specimens to a tensile load of 66 N [15 lbf].
0 degree cable pull.	Maximum CIT for any single specimen shall be 0.5 dB after test. Minimum return loss for any single specimen shall be 30 dB after test. See Note.	EIA/TIA-455-6. Subject specimens to a 44.5 N [10 lbf] static tensile load for 1 minute.
Mating durability.	Maximum CIT for any single specimen shall be 0.5 dB during (every 100 cycles) and after test. Minimum return loss for any single specimen shall be 30 dB during (every 100 cycles) and after test. See Note.	TIA/EIA-455-21. Mate and unmate specimens for 300 cycles at a maximum rate of 300 cycles per hour.

**NOTE**

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 3.

Figure 1 (end)

3.7. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)								
	1	2	3	4	5	6	7	8	9
	Test Sequence (b)								
Visual and mechanical inspection	1	1	1	1	1	1	1	1	1
Attenuation (insertion loss)	2	2	2	2	2	2		2	2
Return loss	3								
Temperature cycling	4								
Temperature life	5								
Thermal shock		3							
Flex			3						
Twist				3					
Mechanical shock					3				
Vibration					4				
90 degree cable pull						3			
Salt spray			4	4			2		
Strength of coupling mechanism								3	
0 degree cable pull								4	
Mating durability									3

**NOTE**

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.

Figure 3

**4. QUALITY ASSURANCE PROVISIONS**

**4.1. Qualification Testing**

**A. Specimen Selection**

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production per Figure 4. Specimen shall be defined as a cable terminated with 2 connector plugs. Specimen is cut in the center of the length of cable and fiber ends attached to the measurement system. Connector plugs form a mated pair. Cable used for qualification shall be of type specified in Figure 4.

Component Description	Test Group								
	1	2	3	4	5	6	7	8	9
Connector Type	LC/SC Simplex SM Tight Jacket Style Connector								
Connector PNs	6828095-1, 6828100-1								
Cable Type	2.0 mm Simplex Tight Jacket								
Cable PN	1828110-4								
Adapter PN	1457567-1	1457567-4							
Control Cable Required	Yes				No		Yes		No
Test Specimens Required	8 each								

Figure 4

**B. Test Sequence**

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

**4.2. Requalification Testing**

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

**4.3. Acceptance**

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

**4.4. Quality Conformance Inspection**

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

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**5. SPECIAL INSTRUCTIONS****5.1. Cleaning**

If at any time, a specimen is uncoupled during qualification testing, the optical interfaces shall be cleaned according to the applicable Instruction Sheet prior to any subsequent optical measurements. Additional cleaning techniques deemed necessary by Product Engineering shall be described in the Test Report. If, after cleaning the connector as prescribed, loss performance exceeds the specified limit, or, if the operator suspects the presence of debris at the optical interface, perform the cleaning procedure a second time. If the resultant optical reading still exceeds the specification, clean the interface a third time and accept that reading.

**5.2. Control Cables**

Control cables shall be subjected to climatic environmental tests. Transmittance shall be recorded each time a specimen transmittance is made. Changes in control cable power of less than 0.05 dB may be neglected in the test specimen power and loss calculations. If control cable power changes by more than 0.05 dB during the duration of the test or sequence of tests, change in control cable power shall be included in power and loss calculations per TIA/EIA-455-20A.