

**Connector, OPTIMATE\*, Multimode, Ceramic, 2.5 mm Bayonet  
Fiber Optic****1. SCOPE****1.1. Content**

This specification covers performance, tests and quality requirements for OPTIMATE\* multimode ceramic 2.5 mm bayonet fiber optic connectors.

**1.2. Qualification**

When tests are performed on the subject product line, procedures specified in EIA-455 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

**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**

- 102-1099: Quality Specification
- 408-6935: Instruction Sheet
- 501-258: Qualification Test Report

**2.2. Commercial Standard**

EIA-455: Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices

**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. Optical Power Source**

Primary wavelength for optical power source(s) shall be  $810 \pm 30$  nm or  $1310 \pm 30$  nm as stated in the Test Report.

### 3.3. Ratings

Performance	Value	Units
Insertion Loss, typical (see Note)	0.3	dB
Storage Temperature	-40 to 85	°C
Operating Temperature	-40 to 85	°C
Cable Retention	177.92 [40]	N [lbf]
Durability	500	Cycles
Flex Cycling	500	Cycles

**NOTE**

See Figure 3 for maximum values.

Figure 1

### 3.4. 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.

### 3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing.	EIA-455-13. Visual, dimensional and functional per applicable quality inspection plan.
Insertion loss.	See Figure 3. See Note.	EIA-455-34, Method C. Launch and receive fiber/cable shall be wrapped 5 times around a mandrel so that the fiber loop shall be 20 mm [.787 in] for 62.5/125 fiber, or 25 mm [.98 in] for 50/125 and 100/140 fiber. Wraps shall be close wound turns on a smooth surface and be secured in such a manner as to guarantee integrity for duration of the test. See Figure 5 for cable length.
Temperature cycling.	Maximum change in optical transmittance during testing is 0.3 dB average and 0.5 dB for any single sample. Maximum change in optical transmittance after testing is 0.2 dB average and 0.4 dB for any single sample. See Note.	EIA-455-3, Test Condition C2. Subject mated samples to 5 cycles between -40 and 85°C. Measure optical transmittance before and after test with samples in place in the test chamber and 5 to 10 minutes before the end of each dwell during each cycle. Take final readings after samples have been inspected and cleaned. See paragraphs 5.1. and 5.2.

Figure 2 (cont)

Test Description	Requirement	Procedure
Humidity, steady state.	Maximum change in optical transmittance during testing is 0.3 dB average and 0.5 dB for any single sample. Maximum change in optical transmittance after testing is 0.2 dB average and 0.4 dB for any single sample. See Note.	EIA-455-5, Test Type 1, Test Condition B. Subject mated samples to steady state humidity at 90 to 95% RH at 60°C for 96 hours. Measure initial optical transmittance at least 1 hour after preconditioning with samples in place in the test chamber. Measure optical transmittance once every 24 hours. Take final readings after samples have been inspected and cleaned. See paragraphs 5.1. and 5.2.
Cable retention.	Maximum change in optical transmittance after testing is 0.2 dB average and 0.4 dB for any single sample. See Note.	EIA-455-6, Method 1. Apply a 177.92 N [40 lbf] tensile load behind the coupling nut of the cable of 1 connector of an unmated test sample for 1 minute. Measure optical transmittance before and after test. Take final readings after samples have been inspected and cleaned. See paragraph 5.1.
Coupling mechanism strength.	Maximum change in optical transmittance after testing is 0.2 dB average and 0.4 dB for any single sample. See Note.	EIA/TIA-4750000-B, Section 4.5.2. Apply a 111.20 N [25 lbf] tensile load for 1 minute at a maximum rate of 2.54 mm [.1 in] per minute. Mate only the sample under test to the coupling bushing. Measure optical transmittance before and after test. Take final readings after samples have been inspected and cleaned. See paragraph 5.1.
Cable flexing.	Maximum change in optical transmittance after testing is 0.2 dB average and 0.4 dB for any single sample. See Note.	EIA-455-1, Figure 2 apparatus. Using a 7.62 cm [3 in] mandrel, apply a 0.5 kg [1.1 lb] tensile load to the cable of a mated sample. Flex 1 side $\pm 90$ degrees per cycle for 500 cycles at a maximum rate of 15 cycles per minute. Measure optical transmittance before and after test with load removed.
Twist.	Maximum change in optical transmittance after testing is 0.2 dB average and 0.4 dB for any single sample. See Note.	EIA-455-36. Twist and return $\pm 90$ degrees from center for 10 cycles at a maximum rate of 15 cycles per minute.

Figure 2 (cont)

Test Description	Requirement	Procedure
Durability.	Maximum change in optical transmittance during/after testing is 0.2 dB average and 0.4 dB for any single sample. See Note.	EIA-455-21. Mate and unmate samples 500 times. Measure optical transmittance every 50 cycles, cleaning optical interface before each measurement. See paragraph 5.1.
Change in optical transmittance.	Maximum of 0.3 dB average and 0.5 dB for any single sample after completion of sequence.	EIA-455-20. Measure optical transmittance after all tests have been performed. Calculate change from the last measurement taken for insertion loss test. See paragraph 5.2.

**NOTE**

*Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence in Figure 4.*

Figure 2 (end)

Insertion Loss	50/125	62.5/125	100/140
Maximum allowed average of all values per test group (dB)	0.6	0.4	0.4
Maximum allowed individual value for any single sample (dB)	1.0	0.8	0.8

Figure 3

### 3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1	1	1	1
Insertion loss	2	2	2	2
Temperature cycling	3			
Humidity, steady state	4			
Cable retention		4		
Coupling mechanism strength		3		
Cable flexing		5		
Twist		6		
Durability		7		
Change in optical transmittance	5	8		

**NOTE**

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

Figure 4

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1. Qualification Testing

#### A. Sample Selection

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production per Figure 5. Cable used for qualification shall be of the type and length specified in Figure 5 and terminated with connectors on each end as required for equipment interfacing. Test cables shall be installed on test equipment and test samples by cutting the test cables in the center and terminating the cut ends with sample connectors. This procedure shall be followed as part of insertion loss measurements at the start of each test sequence.

Test Group	1	2	3	4
Fiber size (microns/microns)	62.5/125	62.5/125	50/125	100/140
Cable type (see Note)	LDS	LDS	LDS	LDS
Cable PN	502083-1	502083-1	502082-1	502084-1
Connector Kit PN	501380-5	501380-5	501380-5	501380-6
Coupling Bushing PN	501381-1	501381-1	501381-1	501381-1
Test cable length	10 m [32.81 ft]	10 m [32.81 ft]	5 m [16.40 ft]	5 m [16.40 ft]
Test samples required	5	5	5	5
Control cable required	1	0	0	0

**NOTE**

Light Duty Single, 3.0 mm diameter

Figure 5

**B. Test Sequence**

Qualification inspection shall be verified by testing samples as specified in Figure 4.

**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 product meets the requirements of Figure 2. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

**4.4. Quality Conformance Inspection**

The applicable quality inspection plan will 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.

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

If at any time, a connector sample is uncoupled during qualification testing, optical interface 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 specific 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 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 sample transmittance is made. Changes in control cable power of less than 0.05 dB may be neglected in test sample power and loss calculations. If control cable power changes by more than 0.05 dB over test or sequence of tests, change in control cable power shall be included in power and loss calculation per EIA-455-20.