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**Connector, OPTIMATE\*, FSMA 905 & 906, Fiber Optic**

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**1. SCOPE**

## 1.1. Content

This specification covers the performance, tests and quality requirements for the OPTIMATE\* FSMA 905 and 906 Series 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(s) and product drawing(s).

**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 requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and referenced documents, this specification shall take precedence.

## 2.1. TE Connectivity Documents

- 102-1099: Quality Specification
- 408-9863: Instruction Sheet
- 501-359: Qualification Test Report

## 2.2. Commercial Standard

EIA-455: Standard Test Procedures 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(s).

## 3.2. Optical Power Source

The optical power source wavelength shall be as indicated in Figure 5.

3.3. Ratings

Performance	Value	Units
Insertion Loss, Typical (See Note)	1.3	dB
Operating Temperature	-40 to 85	°C
Cable Retention	177.9 (40)	Newtons (Pounds)
Durability	200	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-455-34A, Method A1, for plastic fiber (no mandrel wrap on launch). Method A2, for glass fiber as follows: Launch fiber/cable shall be wrapped 5 times around mandrel so that fiber loop shall be 20mm (.787 inch) for 62.5/125 fiber and 25mm(0.98 inch) for 100/140 fiber. Wraps shall be close wound turns on a smooth surface and be secured in such a manner to guarantee integrity for the duration of testing. See Figure 5 for cable length.

Figure 2 (continued)

Test Description	Requirement	Procedure
Temperature cycling.	<p>Maximum change in optical transmittance during testing is 1.0 dB average and 1.3 dB for any single sample.</p> <p>Maximum change in optical transmittance after testing is 0.5 dB average and 0.7 dB for any single sample.</p> <p>See Note.</p>	<p>EIA-455-3, Test Condition C2.</p> <p>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.</p> <p>See paragraph 5.2.</p>
Cable retention.	<p>Maximum change in optical transmittance after testing is 0.5 dB average and 0.7 dB for any single sample.</p> <p>See Note.</p>	<p>EIA-455-6, Method 1.</p> <p>Fixture the adapter. Samples mated. Using a 7.6cm (3 inch) mandrel, apply 177.92 N (40 pound force) tensile load to the cable for 1 minute. Measure optical transmittance before and after test.</p>
Durability.	<p>Maximum change in optical transmittance during/after testing is 0.7 dB average and 1.0 dB for any single sample.</p> <p>See Note.</p>	<p>EIA-455-21.</p> <p>Mate and unmate samples 200 times. Measure optical transmittance every 50 cycles, cleaning the optical interface every 10 cycles.</p>
Change in optical transmittance.	<p>Maximum of 1.0 dB average and 1.3 dB for any single sample after completion of sequence.</p>	<p>EIA-455-20.</p> <p>Measure optical transmittance after all tests have been performed. Calculate the change from the last measurement taken in the insertion loss test.</p> <p>See paragraph 5.2.</p>

**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)

3.6. Specification Limits

Insertion Loss	62.5/125	100/140	980/1000
Maximum allowed average of all values per test group (dB)	2.0	1.5	1.5
Maximum allowed individual value for any single sample (dB)	3.0	2.0	2.0

Figure 3

3.7. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Examination of product	1	1	1	1	1
Insertion loss	2	2	2	2	2
Temperature cycling	3				
Cable retention	4				
Durability	5				
Change in optical transmittance	6				

**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 type and length specified in Figure 5 and terminated with connectors on each end as required for equipment interfacing. Test samples shall be installed as described in the insertion loss test procedure at the start of each sequence.

Test Group	1	2	3	4	5
Fiber size (microns/microns)	62.5/125	62.5/125	62.5/125	100/140	980/1000
Cable type (See Note)	LDS	LDS	LDS	LDS	LDS
Cable PN	502083-1	502083-1	502083-1	502084-1	501232-5
Connector kit PN 905 Style	504566-1	504569-1	504095-1	504566-2	3-504566-0
Connector kit PN 906 Style	504014-1	504015-1	504094-1	1-504014-0	4-504014-2
Coupling bushing PN	501049-1	501049-1	501049-1	501049-1	501049-1
Test cable length	10m (32.81 feet)	10m (32.81 feet)	10m (32.81 feet)	5m (16.4 feet)	5m (16.4 feet)
Test samples required	5	5	5	5	5
Control cable required	1	1	1	0	0
Source wavelength	1300nm	1300nm	1300nm	850nm	660nm

**NOTE** *Light Duty Single*

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 the 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(s) and this specification.

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## 5. SPECIAL INSTRUCTIONS

### 5.1. Cleaning

If at any time a connector sample is uncoupled during qualification testing, the 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 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 sample transmittance measurement 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 the duration of the test or sequence of tests, change in control cable power shall be included in power and loss calculations per EIA-455-20.