Optimate DNP Fiber Optic Connector

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

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMP* Optimate single or dual channel, Dry Non Polish (DNP) fiber optic connectors of plastic construction used with 1000 micron outer diameter (OD) plastic optical fiber cables.

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).

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. AMP Documents

A. 102-1099:Quality Specification
B. 408-2974:Instruction Sheet
C. 501- : Qualification Test Report

2.2. Commercial Standard

EIA/TIA-455-A: 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(s).

3.2. Optical Power Source

The optical power source wavelength shall be 660 ± 30nm.

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* Trademark
I Indicates change

LOC B

3.3. Ratings

Performance	Value	Units
Insertion Loss, Typical		dB
Operating Temperature	-25 to 65	°C
Cable Retention	8.9 [2.0]	Newtons [Pounds Force]
Durability	150	Cycles
Flex Cycling	10	Cycles

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.	TIA/EIA-455-13A. Visual, dimensional and functional per applicable quality inspection plan.
Insertion loss.	Maximum allowed individual value for any single sample is 2.0 dB. See Note.	TIA/EIA-455-34A, Method A1, Procedure 1. No mandrel wrap required. See Figure 4 for cable length.
Temperature cycling.	Maximum change in optical transmittance during/after testing is 1.0 dB average and 2.0 dB for any single sample. See Note.	EIA/TIA-455-3A, Test Condition C2. Subject mated samples to 5 cycles between -25 and 65 °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 Para 5.2.

Figure 2 (cont)

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Test Description	Requirement	Procedure
Humidity, steady state.	Maximum change in optical transmittance during/after testing is 1.0 dB average and 2.0 dB for any single sample. See Note.	TIA/EIA-455-5B, Method A, Test Condition A. 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 the 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 Para 5.2.
Engaging and separation forces.	3 pounds minimum engagement force. 8 pounds maximum separation force.	EIA/TIA-455-187.
Cable retention.	Maximum change in optical transmittance after testing is 1.0 dB average and 2.0 dB for any single sample. See Note.	EIA/TIA-455-6B, Method 1. Fixture behind the back of the housing of the unmated test sample. Using a 7.6 cm [3 in] mandrel, apply 14.5 N [3.3 lbf] tensile load to the cable for 10 seconds. Measure optical transmittance before and after test. Take final readings after samples have been inspected and cleaned.
Flex cycling.	Maximum change in optical transmittance during/after testing is 1.0 dB average and 2.0 dB for any single sample. See Note.	EIA-455-1A, Figure 2 apparatus. Using a 7.6 cm [3 in] mandrel, apply 0.5 kg [1.1 lb] tensile load to cable at a minimum distance of 30 cm [12 in] behind the end of the housing of 1 connector of the mated test sample. Flex 1 side +/- 90 degrees per cycle for 10 cycles at a maximum rate of 15 cycles per minute. Measure optical transmittance before and after test, with the load removed.
Durability.	Maximum change in optical transmittance during/after testing is 1.0 dB average and 2.0 dB for any single sample. See Note.	EIA-455-21A. Mate and unmate 1 connector of the test sample 150 times. Measure optical transmittance every 15 cycles, cleaning the optical interface before each measurement. Take final readings after samples have been inspected and cleaned.

Figure 2 (cont)

Test Description	Requirement	Procedure
Change in optical transmittance	Maximum of 2.0 dB average and 3.0 dB for any single sample after completion of sequence.	TIA/EIA-455-20A. Measure optical transmittance after all tests have been performed. Calculate change from last measurement taken for the insertion loss test. See paragraphs 5.1. and 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 3.*

Figure 2 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)	
	1	2
	Test Sequence (b)	
Examination of product	1	1
Insertion loss	2	2
Temperature cycling	3	
Humidity, steady state	4	
Engaging/separation forces		3
Cable retention		4
Flex cycling		5
Durability		6
Change in optical transmittance	5	7

NOTE *(a) See Para 4.1.A.*
(b) Numbers indicate sequence in which tests are performed.

Figure 3

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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 4. Cable used for qualification shall be of type and length specified in Figure 4 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 test cables in center and terminating cut ends with sample connectors. This procedure shall be followed as part of insertion loss measurements at start of each test sequence.

Test Group	1	2
Fiber size (microns/microns)	980/1000	980/1000
Cable type (See Note)	LDS	LDS
Cable PN	501232-1	501232-1
Connector kit PN	228087-1	228087-1
Coupling receptacle PN	228042-1	228042-1
Test cable length (meters)	10	5
Test samples required	10	10
Control cable required	1	0

NOTE *Light Duty Simplex 2.2 mm outer diameter.*

Figure 4

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 AMP 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, 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 sample transmittance is made. Changes in control cable power of less than 0.05 dB may be neglected in the test sample 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.