External Mini-SAS HD Cable Assembly System

1. SCOPE

1.1. Content

This specification defines performance, tests and quality requirements for the TE Connectivity (TE) External Mini-SAS HD cable assembly System.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Table 1 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. TE Documents

- 109-5000 Test Specification (General Requirements for Test Methods)
- 108-2462 Product Specification (External Mini-SAS connector System)
- 501-152052 Qualification Test Report (External Mini-SAS cable assembly System)
- 501-134013 Qualification Test Report (External Mini-SAS connector System)

2.2. Industry Document

EIA-364 Electrical Connector/Socket Test Procedures Including Environmental Classifications
SFF-8644 SFF Product Specification
SFF-8417 Test Specification (Cable Flex)

2.3. Reference Document

109-197 Test Specification (TE Test Specifications vs. EIA and IEC Test Methods)

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. Ratings

- Voltage / Current 30 volts DC / 0.5A
- Storage Temperature: -20 to 55°C
- Operating Temperature: -20 to 85°C
- Humidity: 80 percent Relative Humidity

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3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Table 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Table 1

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application Specification 114-13316.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
High Speed Test	Conforms to SAS 3.0 SI requirements	EIA-364-108
Insulation resistance	1000 megohms minimum.	EIA-364-21. 100 volts DC, 2 minute hold. Test between adjacent contacts.
Withstanding voltage	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 300 volts AC at sea level. Test between adjacent contacts, signal to signal and signal to ground as applicable.
MECHANICAL		
Cable flex	See Note	Flex cable 180° for 100 cycles at 13cycles per minute with a 1.0kg load applied to the cable jacket. Flex in the cable area 90º in each direction from vertical, per SFF 8417
Cable Retention in Plug	90N Min. No physical damage	Cable plug is clamped with the cable hanging vertically. A 90N load is applied (gradually) to the cable jacket for a 1 minute duration. Per EIA-455-6B
Plug insertion force	100 N [22.5 lbf] maximum.	EIA-364-13. Measure force necessary to mate specimens with latches engaged at a maximum rate of 12.7 mm [.5 in] per minute.
Plug extraction force	50 N [11.25 lbf] maximum.	EIA-364-13. Measure un-latch force with latches engaged at a maximum rate of 12.7 mm [.5 in] per minute.
Latch retention	75 N [16.8 lbf] minimum.	Apply specified load to engaged cable plug connector and hold for minimum 1 minute.
Pull tab strength	75 N [16.8 lbf] maximum. No break.	A axial 75N load is applied to the latch pull for 1minute duration per EIA-455-6B

Table 1

Test Description	Requirement	Procedure
ENVIRONMENTAL		
Thermal shock.	See Note. Conforms to SAS 3.0 SI after test.	EIA-364-32, Test Condition I. Subject mated specimens to 100 cycles between -55 and 85°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH.
Salt spraying	After 48 hours salt spraying (35℃±2℃), shell corrosive area less than 5%	EIA-364-26B, NaCl concentration:50g/L±5g/L, PH:6.5~7.2(20℃±2℃).
Cold bend	Test for cable,4h, no crack	UL758, Condition: -20℃±2℃, mandrel diameter is 6 times of the cable diameter.

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 Table 2.*

3.6. Product Qualification and Requalification Test Sequence

Table 2

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Initial examination of product	1	1	1	1
High speed test	2,4			
Insulation resistance			2,6	
Withstanding voltage			3,7	
Cable flex	3			
Cable retention in plug	5			
Plug insertion force	6(c)			
Plug extraction force	7(d)			
Latch retention	8(c)			
Pull tab strength	9			
Thermal shock			4	
Humidity/temperature cycling			5	
Salt spraying		2		
Cold bend				2
Final examination of product			8	

NOTE

(a) See Paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Latches engaged.
(d) Latches engaged.

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. Each test group shall consist of 3 specimens.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Table 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 Table 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 re-submittal.

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.