

## External Mini-SAS HD Connector System

### DESIGN OBJECTIVES

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

### 1. SCOPE

#### 1.1. Content

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

#### 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 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

- 114-13316 Application Specification (Mini-SAS HD External Receptacle)
- 501-TBD Qualification Test Report (External Mini-SAS Connector System)

#### 2.2. Industry Document

EIA-364 Electrical Connector/Socket Test Procedures Including Environmental Classifications

#### 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: 120 volts AC
- Current: Signal application only
- Temperature: -55 to 85°C

# PRELIMINARY

### 3.4. Performance and Test Description

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

### 3.5. Test Requirements and Procedures Summary

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.
<b>ELECTRICAL</b>		
Low Level Contact Resistance (LLCR).	$\Delta R$ 20 milliohms maximum for signal contacts.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
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.
<b>MECHANICAL</b>		
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII, Condition Letter D. Subject mated specimens to 3.10 G's rms between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 250 cycles at a maximum rate of 500 cycles per hour with latches engaged.
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.

Figure 1 (continued)

Test Description	Requirement	Procedure
Plug extraction force.	50 N [11.25 lbf] maximum.	EIA-364-13. Measure force necessary to un-mate specimens with latches disengaged at a maximum rate of 12.7 mm [.5 in] per minute.
Latch retention.	133.5 N [30 lbf] minimum.	Apply specified load to engaged cable plug connector and hold for 1 minute.
Rotational cable pull.	33.4 N [7.5 lbf] minimum without displacement of cage assembly or connector from Printed Circuit Board (PCB).	Load cabled module into cage/connector assembly applied to PCB with attached bezel. Rotate cable 40 degrees toward PCB, and then rotate 360 degrees with the load still applied.
<b>ENVIRONMENTAL</b>		
Thermal shock.	See Note.	EIA-364-32, Test Condition I. Subject mated specimens to 10 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.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 2, Test Time Condition C. Subject mated specimens to 85°C for 500 hours.
Mixed flowing gas.	See Note.	EIA-364-65, Class IIA (4 gas). Subject board mounted specimens to environmental Class IIA for 14 days. Seven days unmated and 7 days mated.
Thermal disturbance.	See Note.	EIA-364-32. Subject mated and board mounted specimens to 10 temperature cycles between $15 \pm 3^\circ\text{C}$ and $85 \pm 3^\circ\text{C}$ as measured on the part. Ramp times shall be a minimum of 2°C per minute with dwell times long enough to ensure contacts reach the temperature extremes (5 minutes minimum). Humidity not controlled.

**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 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)				
	1	2	3	4	5
Test Sequence (b)					
Initial examination of product	1	1	1	1	1
LLCR	3(e),6,8	2(e),4,6	2(e),5,7		
Insulation resistance				2,6	
Withstanding voltage				3,7	
Random vibration	5				
Mechanical shock	7				
Durability	4(c)				4(c)
Plug insertion force	2				
Plug extraction force	9				
Latch retention					2,5
Rotational cable pull					3,6
Thermal shock				4(d)	
Humidity/temperature cycling		5		5	
Temperature life		3(d)	3(d)		
Mixed flowing gas			4		
Thermal disturbance			6		
Final examination of product	10	7	8	8	7

**NOTE**

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Latches engaged.
- (d) Precondition specimens with 25 durability cycles with latches engaged.
- (e) Precondition specimens with 5 durability cycles with latches engaged.

Figure 2

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#### 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 4 specimens.

###### 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 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.