EVERCLEAR* Mini-SAS Connector System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) EVERCLEAR* Mini-SAS 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.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 05Jun06. The Qualification Test Report number for this testing is 501-638. This documentation is on file at and available from Engineering Practices and Standards (EPS).

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

501-638: Qualification Test Report (EVERCLEAR* Mini-SAS Connector System)

2.2. Industry Standards

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- EIA-638: Surface Mount Solderability

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.

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3.3. Ratings

- Voltage: 120 volts AC
- Current: 0.5 ampere maximum per contact
- Temperature: -55 to 105°C

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.	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		
Low Level Contact Resistance (LLCR).	ΔR 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. 500 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		
Connector solderability.	Solderable area shall have a minimum of 95% solder coverage.	EIA-638. Subject connector to solderability.
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII, Condition D. Subject mated specimens to 3.10 G's rms between 20-500 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.

Figure 1 (continued)

Test Description	Requirement	Procedure
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.	55.5 N [12.5 lbf] maximum.	EIA-364-13. Measure force necessary to mate specimens with latches engaged at a maximum rate of 6.35 mm [.25 in] per minute.
Plug extraction force.	49 N [11 lbf] maximum.	EIA-364-13. Measure force necessary to unmate specimens with latches disengaged at a maximum rate of 6.35 mm [.25 in] per minute.
Latch retention, axial.	100 N [22 lbf] minimum. 68 N [15 lbf] minimum perpendicular pull for external products. 44.5 N [10 lbf] minimum perpendicular pull for internal products.	Apply axial load to engaged cable plug connector and hold for 1 minute.
Latch retention, side load.	45 N [10 lbf] minimum for vertical and right angle shells. 66.7 N [15 lbf] minimum for right angle die cast shells.	Apply load perpendicular to axis and hold for 1 minute.
Latch retention, toward the latch.	45 N [10 lbf] minimum for vertical and right angle shells. 66.7 N [15 lbf] minimum for right angle die cast shells.	Apply load perpendicular to axis to specimens mounted on the top of the printed circuit board and hold for 1 minute.
Latch retention, away from the latch.	45 N [10 lbf] minimum for vertical and right angle shells. 66.7 N [15 lbf] minimum for right angle die cast shells.	Apply load perpendicular to axis to specimens mounted on the bottom of the printed circuit board and hold for 1 minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Test Condition VII. Subject mated specimens to 10 cycles between -55 and 105°C.
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 4. Subject mated specimens to 105°C for 120 hours.

Figure 1 (continued)

Test Description	Requirement	Procedure
Mixed flowing gas.	See Note.	EIA-364-65, Class IIA (4 gas). Subject board mounted specimens to environmental Class IIA for 14 days. One-half of the specimens (receptacle only) unmated for 10 days followed by 4 days mated. The remaining ½ of the specimens mated for 14 days.
Thermal disturbance.	See Note.	Subject mated and board mounted specimens to 10 temperature cycles between 15 ± 3°C and 85 ± 3°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	6
	Test Sequence (b)					
Initial examination of product	1	1	1	1	1	1
LLCR	3,7	2,4,6	2,5,7			
Insulation resistance				2,6		
Withstanding voltage				3,7		
Solderability, connector					2	
Random vibration	5					
Mechanical shock	6					
Durability	4(c)					6(c)
Plug insertion force	2					
Plug extraction force	8					
Latch retention, axial						2,7
Latch retention, side load						3.8
Latch retention, toward the latch						4,9
Latch retention, away from the latch						5,10
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	9	7	8	8	3	11

NOTE

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Latches engaged for these test groups.
(d) Precondition specimens with 50 durability cycles with latches engaged.

Figure 2

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. Test groups 1 and 2 shall consist of 7 specimens each. Test group 3 shall consist of 14 specimens. Test groups 4, 5 and 6 shall consist of 5 specimens each.

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 resubmittal.

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.