
IMPACT* Power Interconnect Systems

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) IMPACT Power Interconnect Systems which consists of modular groupings of broad-edge coupled signals with optional integrated guidance. These connectors are two-piece devices, which connect two Printed Circuit Boards (PCBs). The right angle receptacle connectors (daughtercard) and header pin connectors (backplane) are through-hole devices with Eye-of-the-Needle (EON) compliant pin terminals.

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

- 114-13258 Application Specification, IMPACT* Standard Connector Systems
- 501-134005 Qualification Test Report

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

- Agency Voltage: 48 volts DC
Non-Agency Voltage: 250 volts DC
- Current:
 - 3 pair: 15 amperes x 4 circuits, 60 amperes per module
 - 4 pair: 20 amperes x 4 circuits, 80 amperes per module
 - 5 pair: 25 amperes x 4 circuits, 100 amperes per module
 - 6 pair: 20 amperes x 6 circuits, 120 amperes per module
- Temperature:
 - Operating: -55 to 85°C
 - Storage: -55 to 85°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).	One milliohm maximum per circuit. Initial. One milliohm max change for subsequent tests.	EIA-364-23. Subject mated specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Contact resistance, rated current.	One milliohm maximum per circuit.	EIA-364-6. Subject mated specimens to 20 millivolts maximum at rated current. See Figure 3.
Insulation resistance.	20,000 megohms minimum.	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of mated specimens.
Withstanding voltage.	One minute hold with no breakdown, flashover or leakage exceeding 5 milliseconds.	EIA-364-20, Condition I. 1500 volts DC at sea level. Test between adjacent contacts of mated specimens.

Figure 1 (continued)

Test Description	Requirement	Procedure
Temperature rise vs. current.	30°C maximum temperature rise at specified current.	EIA-364-70, Method 3, Test Conditions 3 and 4. Apply specified DC current for power circuit through a mated pair of connectors for a minimum of 2 hours. 1.6 mm thick PCB with total copper traces of 12 ounces shall be used in this testing. 3 pair: 60 amperes per module; 4 pair: 80 amperes per module; 5 pair: 100 amperes per module; 6 pair: 120 amperes per module.
MECHANICAL		
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. See Figure 4.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition 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. See Figure 4.
Durability, preconditioning.	See Note. One milliohm max change from initial.	EIA-364-9. Mate and unmate specimens for 20 cycles at a maximum rate of 500 cycles per hour.
Durability.	See Note. One milliohm max change from initial.	EIA-364-9. Mate and unmate specimens for 200 cycles at a maximum rate of 500 cycles per hour.
Mating force.	3 pair: 1.5 kgf maximum per module. 4 pair: 2.0 kgf maximum per module. 5 pair: 2.5 kgf maximum per module. 6 pair: 3.0 kgf maximum per module.	EIA-364-37. Measure force required to mate specimens (male to female) at a maximum rate of 25 mm per minute.
Unmating force.	0.20 kgf minimum for 3, 4, & 5 pair. 0.30 kgf minimum for 6 pair.	EIA-364-37. Measure force required to unmate specimens (male from female) at a maximum rate of 25 mm per minute.

Figure 1 (continued)

Test Description	Requirement	Procedure
Compliant pin mounting force onto PCB.	6.0 kgf maximum per pin.	Measure force required to insert a compliant pin into the PCB at a maximum rate of 25 mm per minute.
Compliant pin retention force.	0.50 kgf minimum per pin.	Measure force required to pull a compliant pin from the PCB at a maximum rate 25 mm per minute.
Compliant pin push-out force.	0.50 kgf minimum per pin.	Measure force required to push out a compliant pin from the PCB at a maximum rate 25 mm per minute.
Terminal retention force, in housing.	1.30 kgf minimum per pin.	Measure force required to withdraw a terminal from the housing at a maximum rate 25 mm per minute.
Compliant pin performance.	No damage to the plated thru-hole.	EIA-364-37. Insert the single compliant section into the plated thru-hole, extract the section from the hole after 12 hours, repeat 2 times. Insert new pin into the same hole.
Reseating.	See Note.	Unmate and remate the specimens 3 times.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Method A, Test Condition I, Test Duration A. Subject mated specimens to 5 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 24 cycles between 25 ± 3°C at 80 ± 3 % RH to 65 ± 3°C at 50 ± 3% RH. Ramp times shall be 0.5 hour; dwell time shall be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within the specified levels.
Temperature life, preconditioning.	See Note.	EIA-364-17, Method A, Test Condition 4. Subject mated specimens to 105°C for 120 hours.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 4. Subject mated specimens to 105°C for 240 hours.

Figure 1 (continued)

Test Description	Requirement	Procedure
Mixed flowing gas.	See Note.	EIA-364-65, Class IIA (4 gas). Subject specimens to environmental Class IIA for 14 days (9 days unmated followed by 5 days mated).
Thermal disturbance.	See Note.	EIA-364-110 (Thermal Cycling), Condition A, Duration A. Subject mated specimens to 10 cycles between 15 and 85°C. Dwell until acclimated, transition approximately 10 degrees per minute.

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	4A	4B	5	6	7	8	9
	Test Sequence (b)									
Initial examination of product	1	1	1	1	1	1	1	1	1	1
LLCR	3,5						2,4,6,8	2,5,7,9	2,5,8	2,4,6,8,10,12,14
Insulation resistance		2								
Withstanding voltage		3								
Temperature rise vs current						2				
Random vibration									6	
Mechanical shock									7	
Durability, preconditioning							3	3	3	3
Durability	4									
Mating/Unmating force	2,6									
Compliant pin mounting force onto PCB				2						
Compliant pin push-out force				3						
Terminal retention force, in housing			2							
Compliant pin performance					2					
Reseating							7	8		13
Thermal shock								4		
Humidity/temperature cycling								6		
Temperature life, preconditioning									4	5
Temperature life							5			
Mixed flowing gas										7,9
Thermal disturbance										11
Final examination of product	6	4	3	4	3	3	9	10	9	15

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

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. Each test group shall of 5 mated pairs.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

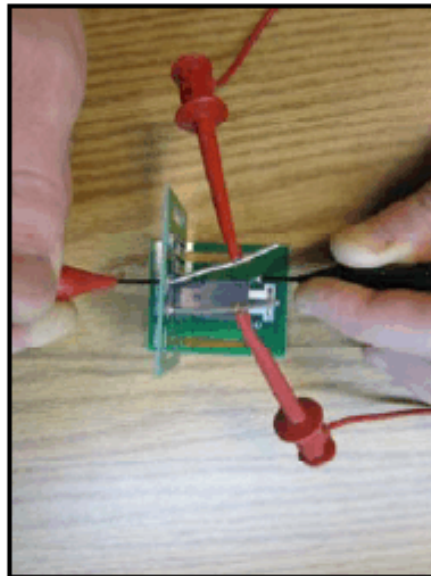
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

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.

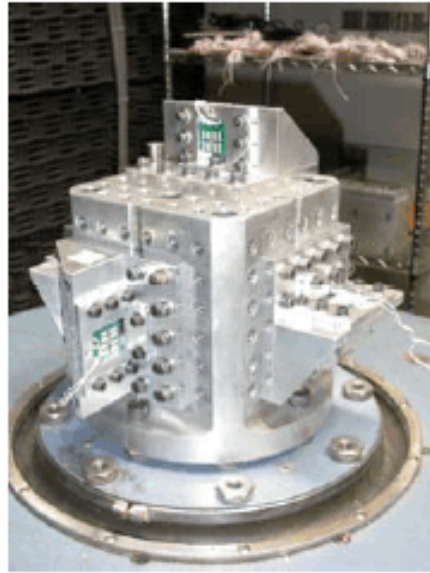
4.4. Quality Conformance Inspection

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.



Low Level Contact Resistance test setup

Figure 3



Vibration/Shock Setup

Figure 4