HWIC CONNECTOR

1. SCOPE

This specification covers the requirements for product performance, test methods and quality assurance provisions of HWIC connectors consisting of Receptacles, Vertical Headers and Right Angle Headers.

Applicable product description and part numbers are as shown in Appendix A.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. 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 Specifications

A. 501-51033 Qualification Test Report.

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

A. Contact (Leaded version)
Material: Copper Alloy
Finish: Gold plating on mating area and Tin-lead on solder tails ; Nickel underplate all over.

B. Contact (Lead-free version)
Material: Copper Alloy
Finish: Gold plating on mating area and Tin on solder tails ; Nickel underplate all over.

C. Housing
Material: LCP, Glass filled.
Flame Class Rating: UL 94 V-0

D. Shields
Material : Copper Alloy
Finish: Pre-plated Nickel and post Tin-dipped soldertails.

3.3. Ratings

Voltage: 100 VAC

Current: Signal Contacts: 0.5A
Power Contacts: 3A

Temperature: -40°C to 85°C (inclusive of temperature rise by energized current)

3.4. Performance Requirements and Test Descriptions

The product shall be designed to meet the electrical, mechanical and environmental performance requirements as specified in Figure 1.

3.4.1 Test Environment

All tests shall be performed in the environmental conditions listed below, unless otherwise specified.

Temperature:	15°C to 30°C
Humidity:	20% to 80% RH
Atmospheric Pressure:	650 to 800mm Hg

3.5. Test Requirements and Procedure Summary

Para	Test Items	Requirements	Procedure
3.5.1	Examination of Product	Meets requirements of product drawing.	Visually, dimensionally and functionally inspected per applicable inspection plan
		Electrical Requirements	
3.5.2	Termination Resistance (Low Level)	40mΩ Max. (Initial) ΔR=20mΩ Max. (Final)	Subject mated contacts assembled in housing to 20mV Max open circuit at 100mA Max. EIA 364-23A
3.5.3	Dielectric Withstanding Voltage	No creeping discharge nor flashover shall occur. Current leakage: 1mA Max.	500 VAC for 1 minute. Test between adjacent circuits of unmated connectors. And between contacts and shield of unmated connector. EIA 364-20B Condition I
3.5.4	Insulation Resistance	Initial : 1000 MΩ min. Final : 100 MΩ min.	Apply voltage 500 VDC. Test between adjacent circuits of unmated connector. And between contacts and shield of unmated connector. EIA 364-21C
3.5.5	Temperature Rise	30℃ Max. under rated current.	Apply rated current an d measure temperature rise. EIA 364-70A method 1
		Mechanical Requirements	
3.5.6	Mating force	5.5 kg max	Measure force required to mate connector. Rate of travel 100mm per min. EIA 364-13B
3.5.7	Unmating force	1 kg min	Measure force required to unmate connector. Rate of travel 100mm per min. EIA 364-13B

3.5.8	Durability (Repeated mate/unmate)	ΔR=20mΩ Max. (Final)	Mate and unmate connectors at 300 cycles per hour. No. of cycles: 100 cycles. EIA 364-9C
3.5.9	Vibration	No electrical discontinuity greater than 0.1μsec. shall occur.	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude. 2 hours each of 3 mutually perpendicular planes. EIA 364-28D condition I.
3.5.10	Physical Shock	No electrical discontinuity greater than 0.1μsec. shall occur.	Accelerated Velocity: 490m/s^2 (50G). Waveform: Halfsine Wave. Duration: 11 msec. Velocity Change: 3.4 m/s. Number of Drops: 3 drops each to normal and reversed directions of X, Y and Z axes, total 18 drops. EIA 364-27B method A
3.5.11	Solderability For Receptacle and Vertical Header	Good solder fillet to be formed	Reflow solder conditions: Preheat: 100 – 150℃ for 60 sec. Min. Heating: 210℃ min. for 30 sec. Max. Peak Temp: 240℃ Max. (Measured at housing surface)
3.5.12	Solderability For Right Angle Header	Solderable area shall have minimum of 95% solder coverage.	Dip in solder pot. EIA 364-52 Cat 1
3.5.13	Contact Normal Force (For Power Receptacle contacts only)	60 grams min.	Measure normal force for contacts at calculated nominal deflection.

Environmental Requirements			
3.5.14	Thermal Shock	ΔR=20mΩ Max. (Final) Insulation resistance: 100 MΩ Min. (Final).	Subject mated connector to –55℃/30min., 85℃/30 min. Making this one cycle, repeat for 5 cycles. EIA 364-32C Condition I
3.5.15	Humidity, Steady State	ΔR=20mΩ Max. (Final)	Subject mated connectors to 90 – 95%R.H. 40℃, 96 hours. EIA 364-31B Method II
3.5.16	Humidity-Temperature Cycling	Insulation resistance: 100 MΩ Min. (Final). Termination Resistance: ΔR=20mΩ Max. (Final)	Subject mated connectors to 25 – 65℃, 80 – 100% R.H., 10 cycles (10days). EIA 364-31B Method III
3.5.17	Salt Spray Test	ΔR=20mΩ Max. (Final)	Subject mated connectors to 5% salt concentration for 48 hours. Temperature 35 deg C EIA 364-26B Condition B
3.5.18	Temperature Life	ΔR=20mΩ Max. (Final)	Subject mated connectors to 85℃, 500 hours. EIA 364-17B Method A
3.5.19	Resistance to soldering heat (for Receptacle and Vertical Header only)	No blister or other physical damage	Subject connector to 260 deg C for 30 sec. EIA 364-56D Procedure 6, Test level 4 Reflow profile as per Figure 4
3.5.20	Resistance to soldering heat (for RA Headers)	No blister or other physical damage	Subject connector to 265 deg C for 10 sec. 109 -202 Condition B

3.5.21	Dust	ΔR=20mΩ Max. (Final)	Measure initial TR. Unmate connectors and subject to recirculating dust in chamber per EIA 364-91. Composition #1 (Benign); Dust volume qty 9 ±1 grams/ft3 of chamber volume; Flowrate 360 ±10% cfm; Duration 1 hour (±15 min). Mate connectors and measure final TR.
3.5.22	Industrial Mixed Flowing Gas (IMFG)	ΔR=20mΩ Max. (Final)	Subject connectors to a total of 14 days of IMFG per EIA-364-65 Class IIa (4-gas test). Follow test sequence and groupings as shown in Figure 3.

Figure 1

4. PRODUCT QUALIFICATION TEST SEQUENCE

Test item	Test Group											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test Sequence (a)											
Examination of Product	1, 6	1, 7	1, 5	1, 5	1, 5	1, 8	1, 3	1, 3	1, 3	1,3	1, 5	See Figure 3
Termination Resistance (Low Level)	2, 5	2, 6	2, 4	2, 4	2, 4						2, 4	
Dielectric Withstanding Voltage						3, 7						
Insulation Resistance						2, 6						
Temperature Rise							2					
Vibration (Low Frequency)	3											
Physical Shock	4											
Durability		4										
Solderability								2				
Thermal Shock						4						
Humidity, Steady State			3									
Humidity-Temperature Cycling						5						
Salt Spray				3								
Temperature Life					3							
Mating Force		3										
Unmating Force		5										
Resistance to soldering heat									2			
Contact Normal Force										2		
Dust											3	
IMFG												

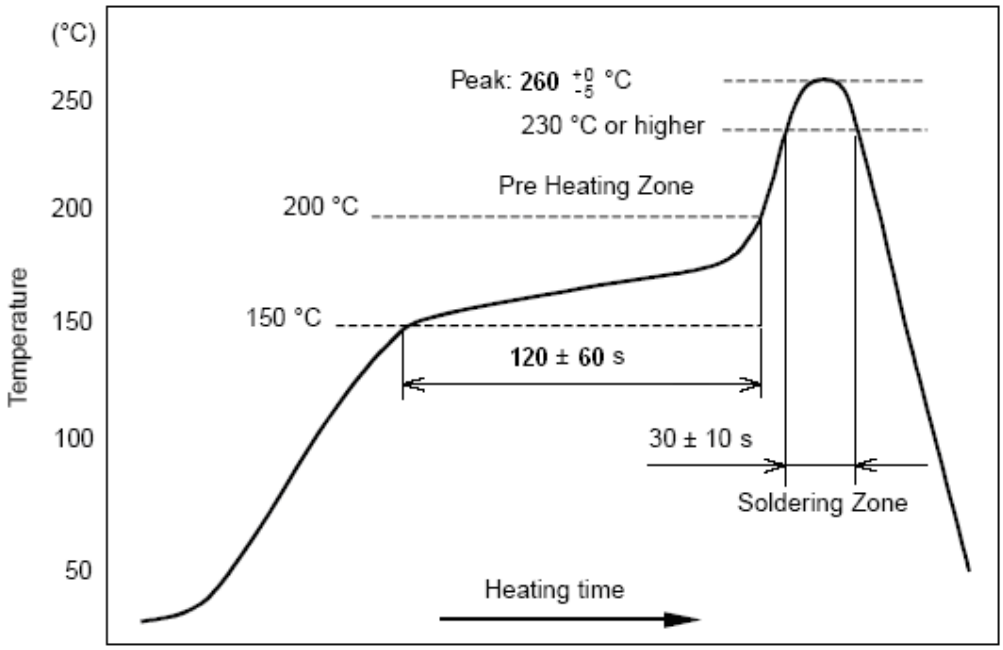
(a) Numbers indicate sequence in which the tests are performed.

Figure 2

Test Sequence for Industrial Mixed Flowing Gas Test

Test Group 12a (Mated)	**Test Group 12b (Mated/Unmated)**
Mate Connector	Mate Connector
Measure initial TR	Measure initial TR
25 cycles unmate/mate	25 cycles unmate/mate
Measure TR – Initial Stability (ΔR)	Measure TR – Initial Stability (ΔR)
Leave connectors mated	Unmate connectors
Mixed Flowing Gas exposure for 7 days (mated)	Mixed Flowing Gas exposure for 7 days (unmated)
	Mate connector
Measure TR – 7 day undisturbed ΔR	Measure TR – 7 day undisturbed ΔR
Unmate/remate, 1 cycle	Unmate/remate, 1 cycle
Measure TR – 7 day disturbed ΔR	Measure TR – 7 day disturbed ΔR
Mixed Flowing Gas exposure for 7 days (mated)	Mixed Flowing Gas exposure for 7 days (mated)
Measure TR – 14 day undisturbed ΔR	Measure TR – 14 day undisturbed ΔR
Unmate/remate, 1 cycle	Unmate/remate, 1 cycle
Measure TR – 14 day disturbed ΔR	Measure TR – 14 day disturbed ΔR

Figure 3



Average ramp rate: 3°C per second maximum
Ramp to peak: 3°C per second maximum
Time over liquidus (217°C): 60 to 150 seconds
Time within 5°C of peak: 20 to 40 seconds
Ramp - cool down: 6°C per second maximum
Time 25°C to peak: 8 minutes maximum

(with reference to TEC-109-201 Condition B reflow profile)

Figure 4

Appendix A.

The applicable product descriptions and part numbers are as follows:

Part Number	Part Description
84879-1	Receptacle
84884-1	Vertical Header
84888-1	Right Angle Low header
84895-1	Right Angle Tall Header
1735305-1	Right Angle Ultra Tall Header
5084879-x	Receptacle (Pb-free)
5084888-x	Right Angle Low Header (Pb-free)
1735305-x	Right Angle Ultra Tall Header (Pb-free)
5084895-x	Right Angle Tall Header (Pb-free)