AMP 2.5mm Pitch HPI High Performance Interconnect Wire-To-Board System

1. INTRODUCTION

1.1 OBJECTIVE

Testing was performed on the HPI connector 2.5 mm Pitch to determine if it meets the requirements of AMP Specification, 108-57099.

1.2 SCOPE

This report covers the electrical, mechanical and environmental performance requirements of the HPI connector 2.5 mm Pitch.

1.3 CONCLUCION

The HPI connector 2.5 mm Pitch meets the electrical, mechanical and environmental performance requirements of Product Specification, 108-57099.

1.4 PRODUCT DESCRIPTION

This connector is wire-to-board connector of 2.5 mm pitch.

Applicable wire size: AWG #28, #26, #24, #22 (Insulation diameter: 1.0 ~ 1.9 mm dia.)

1.5 TEST SAMPLES

Samples were taken randomly from current production.

The following samples were used.

Product Part No.	Descriptions	
X- 440133 -X	Receptacle CRIMP Housing,	3,8,15 Circuit Position
X- 440134 -X	Receptacle CRIMP Contact,	Applicable wire: AWG#22-28
X- 440052 -X	Post Header Vertical Type,	3,8,15 Circuit Position
X- 440053 -X	Post Header Right-angle Type,	3,8,15 Circuit Position

2. TEST CONTENTS

Table 2

NO.	TEST ITEMS	REQUIREMENTS		JUDGEMENT
2.1.1	Conformity of Product physical requirements	Product shall conform to the requirements of applicable Product Drawing and Application Specification		Acceptable.
	ELECTRICAL PERFORMANCE REQUIREMENTS			
2.2.1	Termination Resistance	Initial	10m ohms max.	Acceptable
		Final	20m ohms max.	
2.2.2	Insulation Resistance	1000M ohms min. (Initial) 500M ohms min (Final)		Acceptable
2.2.3	Dielectric Strength	Connector must withstand test potential of 1000 VAC for 1 min. Current leakage limit to 5.0mA max.		Acceptable

To be continue …

<table>
<tr><th>NO.</th><th>TEST ITEMS</th><th>REQUIREMENTS</th><th>JUDGEMENT</th></tr>
<tr><td colspan="4">MECHANICAL PERFORMANCE REQUIREMENTS</td></tr>
<tr><td>2.3.1</td><td>Connector Mating/ Unmating Force</td><td>Initial And 50th Cycle
<table>
<tr><td rowspan="2">Circuit Pos</td><td rowspan="2">Mating N (kgf max)</td><td colspan="2">Unmating N (kgf min)</td></tr>
<tr><td>Initial</td><td>Final</td></tr>
<tr><td>3pos</td><td>24.5N (2.5kgf)</td><td>4.9N(0.5kgf)</td><td>2.9N(0.3kgf)</td></tr>
<tr><td>8pos</td><td>49.0N(5.0kgf)</td><td>9.8N(1.0kgf)</td><td>7.8N(0.8kgf)</td></tr>
<tr><td>15pos</td><td>83.3N(8.5kgf)</td><td>16.7N(1.7kgf)</td><td>14.7N(1.5kgf)</td></tr>
</table>
Mate and unmate to measure the force required to engage and disengage by operating at a rate of 25mm a minute.</td><td>Acceptable.</td></tr>
<tr><td>2.3.2</td><td>Individual Pin Insertion/ Extraction Force</td><td>
<table>
<tr><td>Insertion Force</td><td>Extraction Force</td></tr>
<tr><td>6.9N(0.7kgf) max</td><td>1.0N(0.10kgf) min (Initial)
0.8N(0.08kgf)min (Final)</td></tr>
</table>
Mate and unmate to measure the force required to engage and disengage by operating at a rate of 25mm a minute.</td><td>Acceptable</td></tr>
<tr><td>2.3.3</td><td>Tensile Strength of Wire Termination</td><td>AWG #22—49.0N(5.0kgf) min.
AWG #24—29.4N(3.0kgf) min.
AWG #26—19.6N(2.0kgf) min.
AWG #28—9.8N(1.0kgf)min.
At a rate of 100mm a minute.</td><td>Acceptable</td></tr>
<tr><td>2.3.4</td><td>Contact Retention Force</td><td>14.7N(1.5 kgf) min. per contact
At a rate of 100mm a minute.</td><td>Acceptable</td></tr>
<tr><td>2.3.5</td><td>Post Retention Force</td><td>9.8N(1.0 kgf) min. per contact
At a rate of 100mm a minute.</td><td>Acceptable</td></tr>
</table>

To be continue …

NO.	TEST ITEMS	REQUIREMENTS	JUDGEMENT
		ENVIRONMENTAL PERFORMANCE REQUIREMENTS	
2.4.1	Vibration Sinusoidal Low Frequency	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours in each of 3 mutually perpendicular planes. No electrical discontinuities greater than 1 microsecond. Termination resistance (low level) shall be met.	Acceptable
2.4.2	Temperature Life (Heat Aging)	85°C±2°C for 240hours. Termination resistance (low level) shall be met.	Acceptable
2.4.3	Humidity, Steady State	40°C 90-95% R.H for 240hrs Insulation Resistance (Final) 500 M ohms min. Termination resistance (low level) shall be met. Dielectric Strength shall be met.	Acceptable
2.4.4	Thermal Shock	25 cycle -55 °C and +85 °C for 30 minutes each duration at temperature extremes. Termination resistance (low level) shall be met. Must meet electrical requirement.	Acceptable
2.4.5	Salt Spray	5% salt concentration for 48 hours. Termination resistance (low level) shall be met.	Acceptable
2.4.6	Industrial Gas / Sulfurous Acid Gas (SO2)	3±1 ppm concentration at 40±2°C for 96 hours Termination resistance (low level) shall be met.	Acceptable
2.4.7	Solderability	245±5°C for 3±0.5sec The contact solder tails should be covered by a continuous new solder coating for 95% Minimum of affected area.	Acceptable
2.4.8	Resistance to Soldering Heat	Subject product mounted on printed circuit board to solder bath at 245±5°C for 3±1 seconds MIL-STD-202, Method 210 except as indicated above when testing by manual soldering iron, apply it as 350±10°C for 1-2 seconds without forcing pressure to affect the tine of contact.	Acceptable

To be continue ...

NO.	TEST ITEMS	REQUIREMENTS	JUDGEMENT
2.4.9	Durability (Repeated Mating /Unmating)	50 cycles of repeated mating /unmating at a rate of 10 cycles a minute. Termination resistance (low level) shall be met.	Acceptable
2.4.10	Ammonia	After72hours exposure in ammonia chamber with 25cc of 3% ammonia solution for every liter of chamber capacity Termination resistance (low level) shall be met.	Acceptable

End

3. TEST RESULT

No	Test Items			Unit	Result N	Max.	Min.	Ave.	S	Spec.	Judgment
1	Dielectric withstanding Voltage		Initial	Ohm	52	Tested samples withstood test potential of 1k VAC for 1 minute, and showed no evidence of abnormalities in appearance.				No abnormalities	Acceptable
			After Humidity	Ohm	52					No abnormalities	
			After Thermal Shock	Ohm	52					No abnormalities	
	Insulation Resistance		Initial	Ohm	52	All samples 1000M ohm min.				1000M ohm min.	Acceptable
			After Humidity	Ohm	52	All samples 500M ohm min.				500M ohm min.	
			After Thermal Shock	Ohm	52	All samples 500M ohm min.				500M ohm min.	
2	Connector Mating Force	3pos	1st mating	N	20	17.83	14.21	15.68	1.47	24.5N Max.	Acceptable
		8pos	1st mating	N	20	49	37.24	42.63	4.02	49.0N Max.	Acceptable
		15pos	1st mating	N	20	83.3	71.54	77.52	5.59	83.3N Max.	Acceptable
	Connector Unmating Force	3pos	1st mating	N	20	18.03	16.07	16.76	0.59	4.9N Min.	Acceptable
		3pos	After 50 times	N	20	5.29	4.70	4.9	0.16	2.9N Min.	Acceptable
		8pos	1st mating	N	20	44.1	34.3	38.12	3.72	9.8N Min	Acceptable
		8pos	After 50 times	N	20	9.41	8.82	9.11	0.14	7.8N Min.	Acceptable
		15pos	1st mating	N	20	76.44	73.5	74.68	5.59	16.7N Min.	Acceptable
		15pos	After 50 times	N	20	59.0	54.29	57.72	1.39	14.7N Min.	Acceptable
3	Individual pin Insertion/ Extraction Force		1st mating	N	30	4.31	3.43	3.82	0.29	6.9N Max.	Acceptable
			1st unmating	N	30	2.65	1.27	1.67	0.39	1.0N Min.	Acceptable
			After 50 times unmating	N	30	2.64	1.862	2.35	0.20	0.8N Min.	Acceptable
4	Tensile Strength of wire Termination		AWG #22	N	30	59.98	52.23	55.27	17.25	49.0N Min	Acceptable
			AWG #24	N	30	43.24	33.81	36.95	25.09	29.4N Min	Acceptable
			AWG #26	N	30	24.01	15.29	19.40	9.90	19.6N Min.	Acceptable
			AWG #28	N	30	21.89	12.25	17.37	2.89	9.8N Min.	Acceptable

To be continue …

No	Test Items		Unit	Result N	Max.	Min.	Ave.	S	Spec	Judgment
5	Contact Retention Force		N	30	25.58	18.52	21.95	1.96	14.7N min.	Acceptable
6	Post Retention Force		N	30	26.3	15.2	19.74	4.39	9.8N min.	Acceptable
7	Vibration Sinusoidal Low Frequency	Initial	Mili-ohm	52	2.62	1.40	2.06	0.32	10milliohm max.	Acceptable
		Final	Mili-ohm	52	2.88	1.54	2.17	0.35	20milliohm max.	Acceptable
			⊥gS	52	No discontinuity				1⊥gS max	Acceptable
8	Temperature Life	Initial	Milli-ohm	52	2.66	1.47	2.03	0.32	10milliohm max.	Acceptable
		Final	Milli-ohm	52	2.78	1.41	2.13	0.36	20milliohm max.	Acceptable
9	Humidity, Steady State	Initial	Milli-ohm	52	2.71	1.14	2.02	0.34	10milliohm max.	Acceptable
		Final	Milli-ohm	52	2.91	1.03	2.11	0.37	20miliohm max.	Acceptable
10	Thermal Shock	Initial	Milli-ohm	52	2.68	1.65	2.09	0.31	10milliohm max.	Acceptable
		Final	Milli-ohm	52	2.82	1.60	2.26	0.36	20milliohm max.	Acceptable
11	Salt Spray	Initial	Milli-ohm	52	2.65	1.41	1.98	0.31	10milliohm max.	Acceptable
		Final	Milli-ohm	52	2.73	1.26	2.07	0.41	20milliohm max	Acceptable
12	Industrial Gas / Sulfurous Acid Gas (SO2)	Initial	Milli-ohm	52	2.60	1.41	2.02	0.29	10milliohm max.	Acceptable
		Final	Milli-ohm	52	2.92	1.46	2.19	0.37	20milliohm max.	Acceptable

To be continue ...

No	Test Items		Unit	Result N	Max.	Min.	Ave.	S	Spec	Judgment
13	Solderability			More than 90% of tested area was covered with fresh wet solder.					Wet solder Coverage 90% min.	Acceptable
14	Resistance to Soldering Heat			All tested samples proved acceptable. Tested samples showed no evidence of effects such as deformation etc. that are detrimental to connector function.					No physical damage shall occur.	Acceptable
15	Durability (Repeated Mating / Unmating)	1st mating	Milli-ohm	52	2.48	1.19	2.00	0.33	10milliohm max.	Acceptable
		After 50 times	Milli-ohm	52	2.66	1.39	2.07	0.34	20milliohm max.	Acceptable
16	Ammonia	Initial	Milli-ohm	52	2.75	1.47	2.05	0.37	10milliohm max.	Acceptable
		Final	Milli-ohm	52	2.87	1.52	2.26	0.42	20milliohm max.	Acceptable

End