

NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE 1 of 8	REVISION <b>G</b>
		AUTHORIZED BY Bob Gu	DATE 27 Feb 17
		CLASSIFICATION <b>UNRESTRICTED</b>	

### 1.0 **OBJECTIVE**

This specification defines the performance, test, quality and reliability requirements of 0.8mm pitch BergStak® product.

### 2.0 **SCOPE**

This specification is applicable to the termination characteristics of 0.8mm pitch BergStak® family of products (receptacle with plug mating height 5.0mm to 20.0mm), with 30u" Palladium-Nickel plating and 8u"/15u"/30u" Au plating, which provides electrical connections between parallel mounted boards.

### 3.0 **GENERAL**

This document is composed of the following sections:

<b><u>PARAGRAPH</u></b>	<b><u>TITLE</u></b>
1.0	OBJECTIVE
2.0	SCOPE
3.0	GENERAL
4.0	APPLICABLE DOCUMENTS
4.1	Standards and Specifications
5.0	REQUIREMENTS
5.1	Qualification
5.2	Material
5.3	Finish
5.4	Design and Construction
5.5	Rating
6.0	PERFORMANCE
6.1	Performance
6.2	Test Methods
6.3	Test Sequence

### 4.0 **APPLICABLE DOCUMENTS**

#### 4.1 Standards and Specifications

- 4.1.1MIL-STD-202: Test methods for electronic and electrical component parts.
- 4.1.2MIL-STD-1344: Test methods for electronic connectors.
- 4.1.3EIA 364: Electronic connector/socket test procedures including environmental classifications.
- 4.1.4QQ-N-290: Nickel plating.
- 4.1.5QQ-N-533: BeCu strip.
- 4.1.6MIL-G-45204: Gold plating electrodeposited
- 4.1.7MIL-C-45662: Calibration system requirements

NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE 2 of 8	REVISION <b>G</b>
		AUTHORIZED BY Bob Gu	DATE 27 Feb 17
CLASSIFICATION <b>UNRESTRICTED</b>			

## 5.0 REQUIREMENTS

### 5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

### 5.2 Material

- 5.2.1 Housing: All housing materials shall be high temperature plastic, rated flame retardant 94V-0 in accordance with UL-94.
- 5.2.2 Receptacle Terminal: Nickel Copper
- 5.2.3 Plug Terminal: Brass.
- 5.2.4 Metal Cap: Stainless steel.
- 5.2.5 Hold Down: Brass.

### 5.3 Finish

The finish for applicable components shall be specified in product drawings with plating area, plating material and plating thickness.

### 5.4 The thickness of the PCB solder paste

Below data is FCI recommended dimension, For some customer's process are different (such as, PCB thickness, solder temperature, solder paste type, etc.), customer can according to the actual application environment adjust the solder paste thickness.

- 5.4.1 The position less than 120pin, recommend using solder paste thickness 0.15mm Min.
- 5.4.2 The position greater than or equal to 120pin, recommend using solder paste thickness 0.18mm Min.

### 5.5 Design and Construction

The connector shall be a multi-piece assembly having two rows of contacts with surface mount solder-tail terminations for installation on printed wiring board.


### 5.6 Rating

Voltage Rating	100V AC
Current Rating	0.8A Max.
Temperature Rating	-40°C ~ 125°C

## 6.0 PERFORMANCE

Unless otherwise specified, the performance of connectors given in the attached list shall satisfy the values specified in Table 6.1. The performance test shall follow the test method and the test sequence given in Table 6.2 & 6.3 under the environmental conditions listed below. All connectors to be tested shall be free of defects such as burr, flaw, void, blister etc. which will affect the life and application of connectors.

- Temperature ----- 15°C ~ 35°C
- Humidity ----- 25% ~ 85%
- Pressure ----- 86 ~ 106KPa

NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>		
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE 3 of 8	REVISION <b>G</b>
		AUTHORIZED BY Bob Gu	DATE 27 Feb 17
CLASSIFICATION <b>UNRESTRICTED</b>			

6.1 Performance

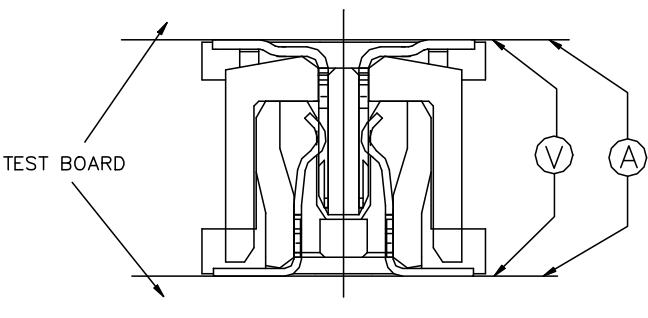
**TABLE 6.1**


	Test Item	Requirements
6.1.1	Visual Examination	Product shall meet the requirements of product drawings. Visual Examination performed under 10X magnification. Parts should be free from blistering, discoloration, cracks, etc
<b>Electric Requirements</b>		
6.1.2	Low Level Contact Resistance(LLCR)	Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum
6.1.3	Dielectric Withstanding Voltage	No evidence of arc-cover, insulation breakdown or leakage current in excess of 1 mA.
6.1.4	Insulation Resistance	1000 MΩ Minimum
6.1.5	Current Rating	Temperature rise above ambient shall not exceed 30°C with all contacts powered at 0.8A
<b>Mechanical Requirements</b>		
6.1.6	Vibration	No discontinuity greater than 1 microsecond
6.1.7	Shock	No discontinuity greater than 1 microsecond
6.1.8	Mating Force	0.9N (90 gramf) Maximum per contact.
6.1.9	Un-mating Force	0.1N (10 gramf) Minimum per contact.
6.1.10	Durability	Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum
6.1.11	Solderability	Solder coverage ----- 95% Minimum
6.1.12	Resistance to Solder Heat	No evidence of physical or mechanical damage.
6.1.13	Contact Retention Force	1N Minimum per contact.
6.1.14	Reseating	Manually unplug/replug the mated connector assembly.
<b>Environmental Requirements</b>		
6.1.15	Thermal Shock	Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum
6.1.16	Temperature Life	Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum
6.1.17	Cyclical Humidity & Temperature	Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum
6.1.18	Mixed Flow Gas	Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum
6.1.19	Thermal Disturbance	Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum

NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE 4 of 8	REVISION <b>G</b>
		AUTHORIZED BY Bob Gu	DATE 27 Feb 17
		CLASSIFICATION <b>UNRESTRICTED</b>	


6.2 Test Methods

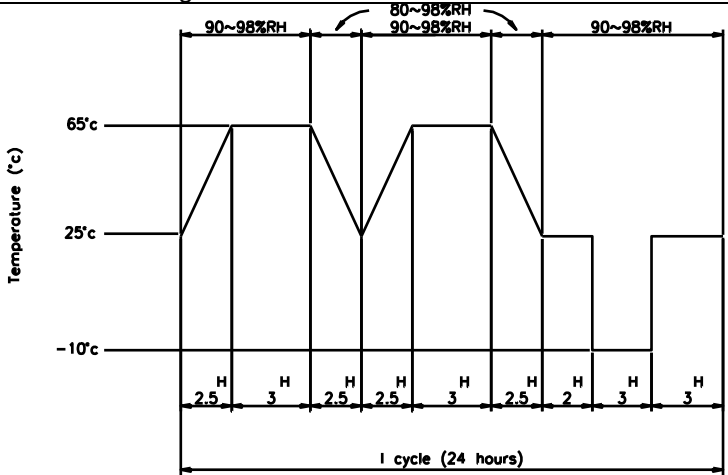
**TABLE 6.2**

	Test Item	Test Methods
6.2.1	Visual Examination	Visually and functionally inspected. Under 10X magnification.
6.2.2	Low Level Contact Resistance(LLCR)	<p>Plug connector</p>  <p>TEST BOARD</p> <p>Receptacle connector</p> <p style="text-align: center;">Figure 1</p> <p><b>EIA-364-23</b>  Test method of connection as Figure 1.  Test current ----- 100 mA Maximum  Open circuit ----- 20 mV Maximum  Number of readings ----- 100 separable contact interface minimum or 3 connectors whichever is greater</p>
6.2.3	Dielectric Withstanding Voltage	<p><b>EIA-364-20 Method B, Test Condition I</b>  Test voltage ----- 500 Vrms AC  Duration ----- 1 minute  Measure between adjacent terminals of mated connectors.  Number of readings ----- 30 (10 readings per connector set)</p>
6.2.4	Insulation Resistance	<p><b>EIA-364-21</b>  Test voltage ----- 500 V DC  Duration ----- 1 minute  Measure between adjacent terminals of mated connectors.  Number of readings ----- 30 (10 readings per connector set)</p>
6.2.5	Current Rating	<p><b>EIA-364-70</b>  Ambient still air ----- 25°C  All contact powered ----- 0.8A</p>
6.2.6	Vibration	<p><b>EIA-364-28 Test Condition V, Letter D</b>  Frequency ----- 50 to 2000 Hz  Power spectral Density ----- 0.1 g<sup>2</sup>/Hz  Overall rms g ----- 11.95  Duration ----- 1 1/2 hours in each of three mutually perpendicular axes (4 1/2 hours total).</p>

NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>		
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE 5 of 8	REVISION <b>G</b>
		AUTHORIZED BY Bob Gu	DATE 27 Feb 17
		CLASSIFICATION <b>UNRESTRICTED</b>	

6.2.7	Shock	<b>EIA-364-27, Test Condition A</b> Accelerated velocity ----- 490 m/s <sup>2</sup> (50G). Waveform ----- half-sine shock pulse. Duration ----- 11 mSec. Velocity change ----- 11.3 feet per second Number of cycles ----- 18
6.2.8	Mating Force	<b>EIA-364-13</b> Operating speed ----- 25 mm/minute No lubrication and utilize free-floating fixture. Number of connectors ----- 5 mated pair
6.2.9	Un-mating Force	<b>EIA-364-13</b> Operating speed ----- 25 mm/minute No lubrication and utilize free-floating fixture. Number of connectors ----- 5 mated pair
6.2.10	Durability	<b>EIA-364-09</b> Operating speed ----- 25 mm/minute Number of cycles ----- 100 Pre-Conditioning cycles ----- 25
6.2.11	Solderability	For leaded: Solder temperature ----- 230 ± 5°C. Immersion duration ----- 3± 0.5 seconds Flux immersion ----- 5 to 10 seconds Flux and solder material are defined in MIL-STD-202, method 208  For Non- leaded: Solder temperature ----- 260 ± 5°C. Immersion duration ----- 3± 0.5 seconds Flux immersion ----- 5 to 10 seconds Flux and solder material are defined in MIL-STD-202, method 208
6.2.12	Resistance to Solder Heat	For leaded: Peak temperature ----- 240 ± 5°C. Duration ----- 10 seconds  For Non- leaded: Peak temperature ----- 260 ± 5°C. Duration ----- 30 seconds
6.2.13	Contact Retention Force	Operating speed ----- 25 mm/minute Number of readings ----- 30 (10 readings per connector set)
6.2.14	Reseating	Perform 3 cycles mate/unmate
6.2.15	Thermal Shock	<b>EIA-364-32 Method A</b> Temperature range ----- -40 +0/-5°C to 125 +5/-0°C Time at temperature extremes ----- 30 minutes Test Duration (A-4) ----- 10 cycles Transfer Time ----- 5 minutes maximum

NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>		
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE 6 of 8	REVISION <b>G</b>
		AUTHORIZED BY Bob Gu	DATE 27 Feb 17
		CLASSIFICATION <b>UNRESTRICTED</b>	

6.2.16	Temperature Life	<p><b>EIA-364-17 Method A, Test Condition 4</b>  Temperature ----- 105 ±5°C.  Duration Condition D ---- 1000 hours.  Plug &amp; receptacle to remain mated without electrical load.  LLCR measured @ Initial, 250 and 1000 hours</p> <p>Pre-Conditioning Temperature ---- 105 ±5°C  Pre-Conditioning Duration ----- 120 hours</p>
6.2.17	Cyclical Humidity & Temperature	 <p>The graph shows a 24-hour cycle. The temperature profile starts at 25°C, ramps up to 65°C (2.5h), dwells at 65°C (3h), ramps down to 25°C (2.5h), dwells at 25°C (2.5h), ramps up to 65°C (2.5h), dwells at 65°C (3h), ramps down to 25°C (2.5h), dwells at 25°C (2h), ramps down to -10°C (3h), dwells at -10°C (3h), and ramps up to 25°C (3h). Humidity is 90~98%RH during the 65°C dwell periods and 80~98%RH during the 25°C dwell periods.</p>
6.2.18	Mixed Flow Gas	<p><b>EIA-364-31, Method III (omit step 7b)</b>  Temperature and humidity are listed figure 2.  Duration ----- 10 cycles.</p> <p><b>EIA-364-65, Class IIA</b>  Temperature: 30°C  Relative Humidity: 70%  Concentration: H<sub>2</sub>S 10 ppb  NO<sub>2</sub> 200 ppb  Cl<sub>2</sub> 10 ppb  SO<sub>2</sub> 100 ppb</p> <p>Test duration: 1) 7days unmated (Both halves are exposed to gas) and 7days mated  2) 14days mated</p> <p>**Test Group 9b is only applicable to parts with 30u" GXT and 30u" Au plating.</p>
6.2.19	Thermal Disturbance	<p><b>EIA-364-1000 Table 4, Test Group 4</b>  Cycle the mated connectors between 15 ± 3°C and 85 ± 3°C as measured on the part. Ramps should be a minimum of 2°C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled.</p>


NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE <b>7 of 8</b>	REVISION <b>G</b>
		AUTHORIZED BY <b>Bob Gu</b>	DATE <b>27 Feb 17</b>
CLASSIFICATION <b>UNRESTRICTED</b>			

		Perform 10 cycles.
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**7.0 QUALIFICATION TEST MATRIX**

**Table 7.1**

TEST ITEM	TEST GROUP											
	Section	1	2	3	4	5	6	7	8	9a	9b	10
Visual Examination	6.2.1	1,10	1,11	1,9	1	1 3	1 3	1	1	1	1,13	1
Low Level Contact Resistance (LLCR)	6.2.2		2 4 6 8 10	2 8				2 4 6 8 10	2 4 6 8	2 4 6 8 10 12	2 4 6 8 10 14	
Dielectric Withstanding Voltage	6.2.3	2,5, 8										
Insulation Resistance	6.2.4	3,6, 9										
Current Rating	6.2.5											2
Vibration	6.2.6		7									
Shock	6.2.7		9									
Mating Force	6.2.8			3,6								
Un-mating Force	6.2.9			4,7								
Durability Pre-conditioning	6.2.10	4	3					3	3	3	3	
Durability	6.2.10			5								
Solderability	6.2.11					2						
Resistance To Solder Heat	6.2.12						2					
Contact Retention Force	6.2.13				2							
Reseating	6.2.14							9	7	11	13	
Thermal Shock	6.2.15							5				
Temperature Life Pre-Conditioning	6.2.16		5							5	5	
Temperature Life	6.2.16								5			
Cyclical Humidity & Temperature	6.2.17	7						7				
Mixed Flowing Gas 7 days unmated	6.2.18										7	
Mixed Flowing Gas 7 days mated	6.2.18										9	
Mixed Flowing Gas 14 days mated	6.2.18									7		
Thermal Disturbance	6.2.19									9	11	
Number of Samples		3	3	5	3	3	3	3	3	3	3	3

NUMBER <b>GS-12-547</b>	TYPE <b>PRODUCT SPECIFICATION</b>		
TITLE <b>0.8mm BergStak® Product Specification</b>		PAGE 8 of 8	REVISION <b>G</b>
		AUTHORIZED BY Bob Gu	DATE 27 Feb 17
CLASSIFICATION <b>UNRESTRICTED</b>			

## 8.0 RECORD RETENTION

<b>REVISION RECORD</b>
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REV	PAGE	DESCRIPTION	ECR #	DATE
1	ALL	INITIAL PRELIMINARY	--	12 Feb 08
2		Change test sequence Group I adding Cyclical Humidity & Temp/removing Temp Life Pre-conditioning	--	12 Feb 08
A	ALL	INITIAL RELEASE	S08-0033	1 Apr 08
B	5	Addition of temperature for LF parts to Section 6.2.11 & 6.2.12	S08-0332	8 Oct 08
C	3-4	Current Rating, change to 0.8A, Section 6.1.5 & 6.2.5	S09-0329	28 Oct 09
D	2	Update Section 5.5, Temperature Rating -40°C ~ 125°C	S10-0070	30 Mar 10
E	2	Add solder paste thickness recommended dimension	ELX-N-15808	11 Spe 13
F	1/2/5	Add mating height information, change terminal material and change the resistance to solder Heat time to 30sec.	ELX-N-20663	9 Apr 15
G	7	Divide group1 to be two groups.	ELX-N-26194	27 Feb 17



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