

NUMBER GS-12-1499	TYPE PRODUCT SPECIFICATION	Amphenol FCi	
TITLE 0.8mm BergStak HS Product Specification		PAGE 1 of 8	REVISION A
		AUTHORIZED BY Bob Gu	DATE 28 Feb 20
CLASSIFICATION UNRESTRICTED			

1.0 **OBJECTIVE**

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

2.0 **SCOPE**

This specification is applicable to the termination characteristics of 0.8mm pitch BergStak HS 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:

<u>PARAGRAPH</u>	<u>TITLE</u>
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

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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 Insert molding: Plastic material shall be high temperature plastic, rated flame retardant 94V-0 in accordance with UL-94.

5.2.3 Receptacle Terminal: Nickel Copper

5.2.4 Plug Terminal: 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

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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
Electric Requirements		
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
Mechanical Requirements		
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.
Environmental Requirements		
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

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6.2 Test Methods

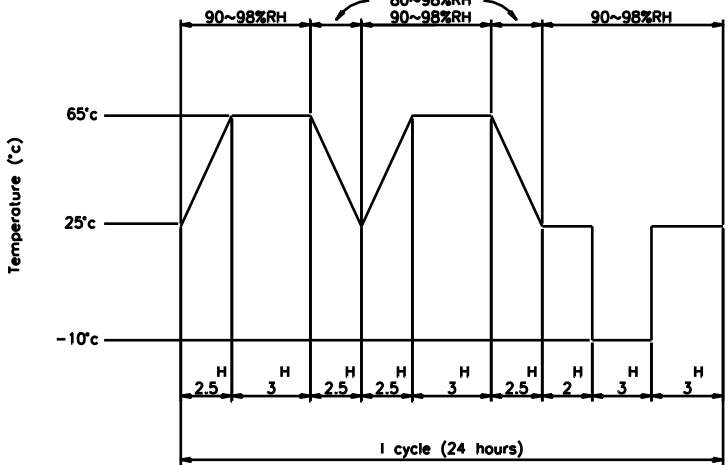
TABLE 6.2

	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>EIA-364-23 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>EIA-364-20 Method B, Test Condition I 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>EIA-364-21 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>EIA-364-70 Ambient still air ----- 25°C All contact powered ----- 0.8A</p>
6.2.6	Vibration	<p>EIA-364-28 Test Condition V, Letter D Frequency ----- 50 to 2000 Hz Power spectral Density ----- 0.1 g²/Hz Overall rms g ----- 11.95 Duration ----- 1 1/2 hours in each of three mutually perpendicular axes (4 1/2 hours total).</p>

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6.2.7	Shock	EIA-364-27, Test Condition A Accelerated velocity ----- 490 m/s ² (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	EIA-364-13 Operating speed ----- 25 mm/minute No lubrication and utilize free-floating fixture. Number of connectors ----- 5 mated pair
6.2.9	Un-mating Force	EIA-364-13 Operating speed ----- 25 mm/minute No lubrication and utilize free-floating fixture. Number of connectors ----- 5 mated pair
6.2.10	Durability	EIA-364-09 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	EIA-364-32 Method A 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

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6.2.16	Temperature Life	<p>EIA-364-17 Method A, Test Condition 5 Temperature ----- 125 ±5°C. Duration Condition D ---- 96 hours. Plug & receptacle to remain mated without electrical load. LLCR measured @ Initial, 48 and 96 hours</p> <p>Pre-Conditioning Temperature ----- 125 ±5°C Pre-Conditioning Duration ----- 24 hours</p>
6.2.17	Cyclical Humidity & Temperature	 <p>The graph shows a cyclical temperature and humidity profile over a 24-hour cycle. The y-axis is Temperature (°C) with markers at -10°C, 25°C, and 65°C. The x-axis represents time in hours, with segments of 2.5, 3, 2.5, 2.5, 3, 2.5, 2, 3, and 3 hours. Humidity levels are indicated as 90~98%RH for the first, third, and fifth segments, and 80~98%RH for the second and fourth segments. The temperature profile shows ramps up to 65°C, dwells, ramps down to 25°C, dwells, ramps up to 65°C, dwells, ramps down to 25°C, dwells, and then dwells at 25°C for the final two segments.</p> <p>EIA-364-31, Method III (omit step 7b) Temperature and humidity are listed figure 2. Duration ----- 10 cycles.</p>
6.2.18	Mixed Flow Gas	<p>EIA-364-65, Class IIA Temperature: 30°C Relative Humidity: 70% Concentration: H₂S 10 ppb NO₂ 200 ppb CL₂ 10 ppb SO₂ 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>EIA-364-1000 Table 4, Test Group 4 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. Perform 10 cycles.</p>

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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	13	13	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+3	5	3	3	3	3	3	3	3	3

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8.0 RECORD RETENTION

REVISION RECORD

REV	PAGE	DESCRIPTION	ECR #	DATE
1	ALL	INITIAL PRELIMINARY	--	25 Oct 20
A	ALL	INITIAL RELEASE		28 Feb 20