

NUMBER GS-12-1670	TYPE PRODUCT SPECIFICATION	Amphenol FCI	
TITLE PRODUCT SPECIFICATION FOR 75 AMPERE HIGH CURRENT D-SUB		PAGE 1 of 9	REVISION A
		AUTHORIZED BY GREGAR MATHEW	DATE 15/09/2021
		CLASSIFICATION UNRESTRICTED	

1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the 75 Ampere High Current D-Sub Connectors.

2.0 Scope

This specification is applicable to the termination characteristics of the 75 Ampere High Current D-Sub family of products which provides separable interface of cable receptacle - cable header application. Typical configurations are 2V2, 3V3, 3W3, 5W5, 8W8 with Solder Cup & Crimp Termination

3.0 Ratings

- 3.1 Operating Voltage Rating = 300 (Vrms)
- 3.2 Operating Current Rating = 75 A per contact
- 3.3 Operating Temperature Range = -55° C to +125° C

4.0 Applicable Documents

- 4.1 AFCI Specifications
 - 4.1.1 Engineering drawings
 - 4.1.2 Material specification(s)
- 4.2 National or International Standards
 - 4.3.1 Flammability: UL94-V0
 - 4.3.2 NFC 93425: AFNOR
 - 4.3.2 IEC 60512: Connectors for Electronic Equipment – Tests and Measurement
 - 4.4.1 UL 1977 (Current Rating: See Temperature Rise Curves on page 3-4 for details)

5.0 Requirements

5.1 Qualification

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

5.2 Material

The material for each component shall be as specified herein or equivalent.

- 5.2.1 Header and Receptacle Housing – Thermoplastic UL 94 V0
- 5.2.2 Power Contacts – Copper Alloy
- 5.2.3 Metallic Shell/Shield – Steel

5.3 Finish

The finish for applicable components shall be as specified herein or equivalent.

5.3.1. Contact Area:

Silver plated, qualified to meet requirement of this specification.

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5.3.2. Termination Area:

Silver plated, qualified to meet requirement of this specification.

5.3.2. Metallic Shell/Shield:

Nickel or Tin.

5.4 Design and Construction

Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing. There shall be no cracks, burrs, or other physical defects that may impair performance.

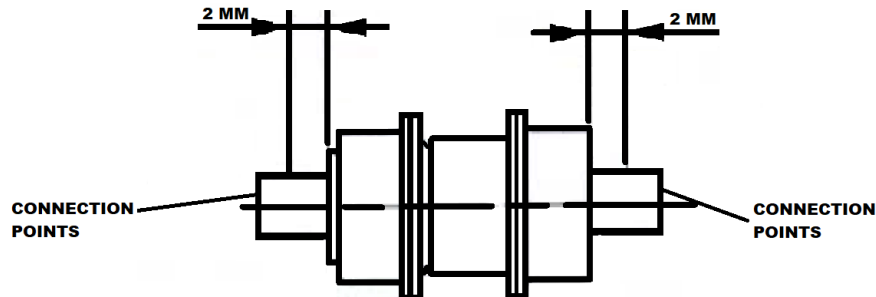
6.0 Electrical Characteristics

6.1 Contact Resistance, Low Level (LLCR)

The low level contact resistance shall not exceed 1 mΩ milliohms initially. The low level contact resistance shall also not exceed 0.2 milliohms increase in resistance (from the initial measurement) after any treatment and/or environmental exposure. Measurements shall be in accordance with IEC 60512-2-1 or EIA 364-23.

The following details shall apply:

- Method of Connection - Attach current and voltage leads as shown in Figure 1 & 2
- Test Voltage - 20 milli-volts DC max open circuit.
- Test Current - Not to exceed 100 milli-amperes.



6.2 Insulation Resistance

The insulation resistance of mated connectors shall be 5000M ohms Minimum initially and 100M ohms after environmental exposure.

Measurements shall be in accordance with IEC 60512-3-1 or EIA 364-21.

The following details shall apply:

- Test Voltage – 500 volts DC.
- Test Duration - 60 seconds.
- Points of Measurement - Between adjacent contacts and between contacts and Shell.

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6.3 Dielectric Withstanding Voltage

There shall be no evidence of arc-over or insulation breakdown when connectors are mated and tested in accordance with IEC 60512-4-1 or EIA 364-20.

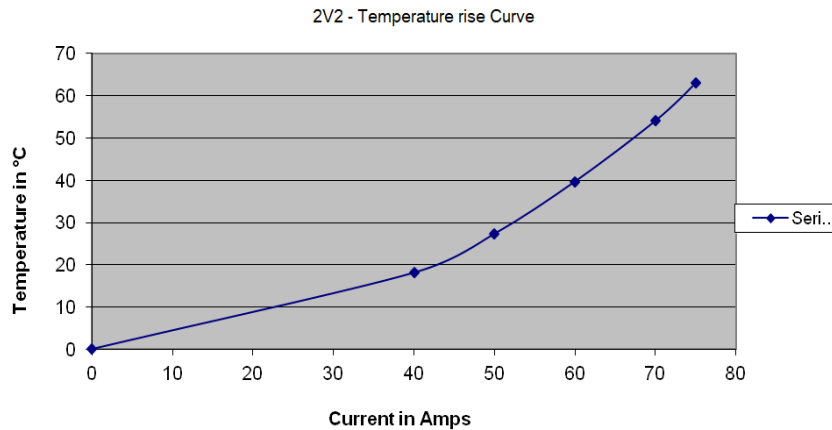
The following details shall apply:

- Test Voltage - 1000 Volt AC RMS (Between contacts)
1200 Volt AC RMS (Between contact & Shell)
- Test Duration - 60 seconds.
- Points of Measurement - Between adjacent contacts and between contacts and Shell.

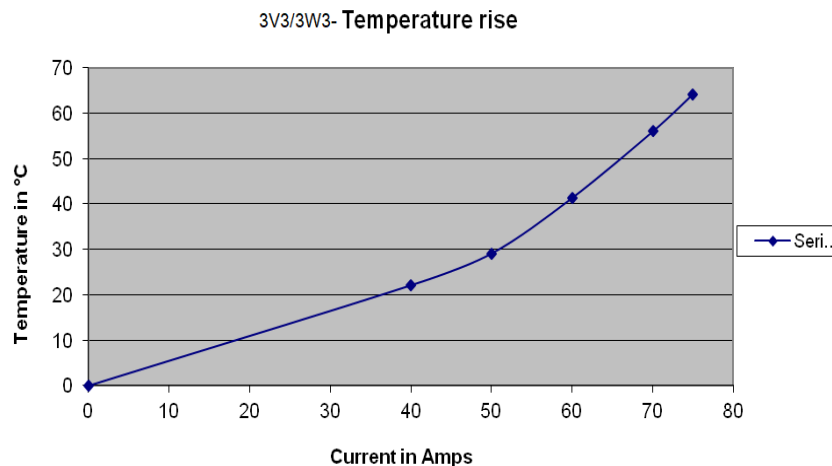
6.4 Current Rating

- Test conducted in accordance with UL1977
- The objective of this test is to detail a standard test method to assess the current-carrying capacity of electromechanical components at ambient temperature
- The temperature of a device, when measured at the points shall not exceed the Relative Thermal Index (130°) of the insulating material when the device is carrying its maximum rated current of 75A

6.4.1 Temperature rise curve for 2V2 position

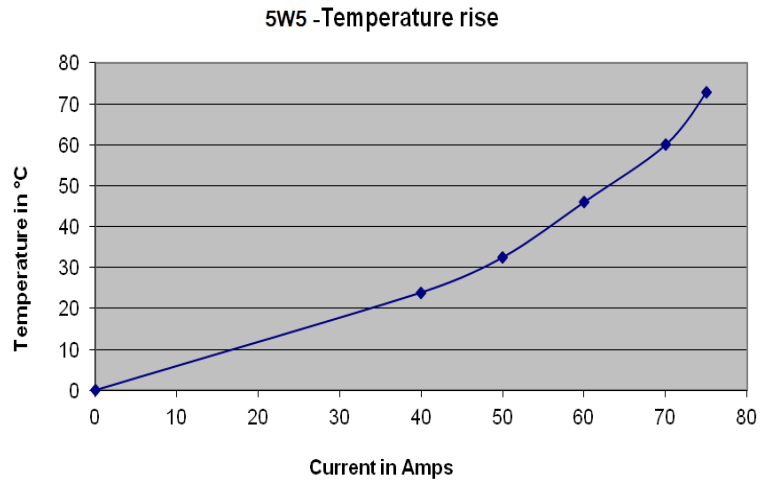


6.4.2 Temperature rise curve for 3V3/3W3 position

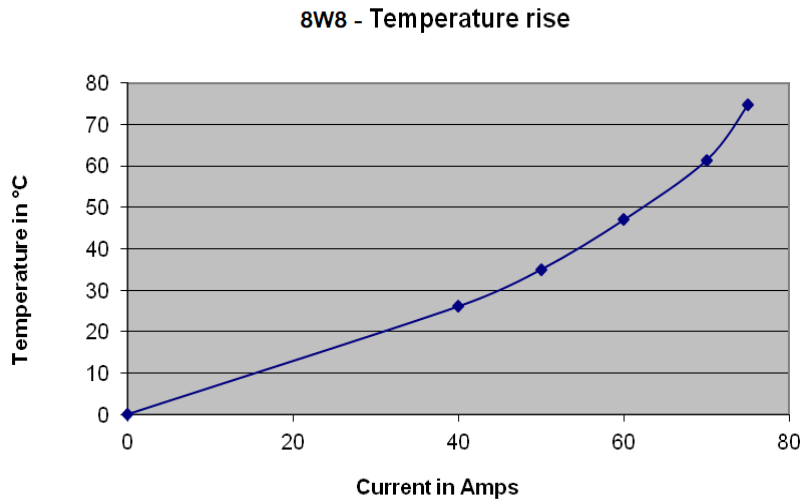


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6.4.3 Temperature rise curve for 5W5 position



6.4.4 Temperature rise curve for 8W8 position



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7.0 Mechanical Characteristics

7.1 Mating/Unmating Force

The force to mate a receptacle connector and compatible header shall not exceed 10 Newton per contact. The Unmating force shall not be less than 1.6 Newton per contact.

Test shall follow

- a. IEC 60512-13-2 or EIA 364-13.

7.2 Durability

The connector pairs shall be capable of withstanding 500 mating/unmating cycles.

7.3 Crimp Connections

Unless otherwise specified, all tests shall be carried out under the standard conditions for testing as specified in IEC 60512-1.

Pull out force test shall be carried out in accordance with test 16d of IEC 60512

The minimum values of the pull out force is 355 N Minimum

7.3 Retention to Torque – 0.5 Nm max to be applied (Optional for Mounting feature).

8.0 Environmental Conditions

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements per paragraphs 6.0 and 7.0 as specified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

Use recommended details or select others as appropriate

8.1 Thermal Shock – IEC 60512-11-4 or EIA 364-32.

- a. Number of Cycles - 5
- b. Temperature Range - Between -55 and +125 deg C
- c. Time at Each Temperature - 30 minutes
- d. Transfer Time - 5 minutes, maximum

8.2 Vibration Test –

- a. 10 Hz to 500 Hz and 1.5 mm or 20g, 3x2.5 h

8.2 Humidity – IEC 60512-11-3 (steady state)

- a. Relative Humidity – 95%
- b. Temperature - 40 deg C
- c. Duration - 96 hours

8.3 Solderability – IEC 60512-12-1 or AFCI GS-19-037

- a. Test Condition – Solder Iron Method Bath Temperature $350 \pm 5^\circ \text{C}$

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- b. Minimum solder coverage: 95 %
- 8.4 Temperature Life – EIA 363-17
 - a. 500 hours without electrical load at 125° C
- 8.5 Life Electric
 - Perform in accordance with IEC 60512 TEST 9B
 - a. 500 hours with electrical load, 60 A & temperature, 75°

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9.0 QUALITY ASSURANCE PROVISIONS

9.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with ANSI Z-540 and ISO 9000.

9.2 Inspection Conditions

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

- a. Temperature: 25 +/- 5 deg C
- b. Relative Humidity: 30% to 60%
- c. Barometric Pressure: Local ambient

9.3 Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

9.4.2 Failures attributed to equipment, test setup, or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production. The test sequences shall be as shown in the qualification test table. Data shall be provided with the samples noting production history: production lot codes for components and assemblies, components and assemblies produced to print revision A, verification of plating composition and thickness, etc.

9.6 Re-Qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate requalification testing consisting of all applicable parts of the qualification test matrix.

- a) A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.
- b) A significant change is made to the manufacturing process which impacts the product form, fit or function.
- c) A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

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9.7 Qualification Test Table

TEST	SECTION	TEST GROUP						
		1	2	3	4	5	6	7
		TEST SEQUENCE						
VISUAL EXAMINATION		1,7	1,5	1, 3, 5	1,12	1, 9	1	1, 9
LOW EVEL CONTACT RESISTANCE		2,5	2,4		2,9	2, 6		2, 6
INSULATION RESISTANCE					3,6,10	3, 7		3, 7
DIELECTRIC WITHSTAND VOLTAGE					4,7,11	4, 8		4, 8
MATING / UNMATING FORCE		3,6						
CURRENT RATING							2	
TEMPERATURE LIFE						5		
LIFE ELECTRIC								5
SOLDERABILITY				2				
THERMAL SHOCK					5			
VIBRATION			3					
HUMIDITY, STEADY STATE					8			
RETENTION TO TORQUE (Optional)				4				
DUABILITY 500 CYCLES		4						
TEST SAMPLES NEEDED	TOTAL							
HEADER		4	4	4	4	4	4	4
RECEPTACLE		4	4	4	4	4	4	4

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REVISION RECORD

Rev	Page	Description	EC#	Date
A		New Release	-	15/09/2021