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## H3APR IP68 EMC Hood and Housing Series

### Table of contents

<b>1. SCOPE .....</b>	<b>2</b>
1.1. Content .....	2
1.2. Qualification .....	2
<b>2. APPLICABLE DOCUMENTS .....</b>	<b>2</b>
2.1. TE Connectivity Documents .....	2
2.2. Other Documents .....	2
<b>3. REQUIREMENTS .....</b>	<b>3</b>
3.1. Design and Construction .....	3
3.2. Materials .....	3
3.3. Rated.....	3
3.4. Performance and Test Description.....	3
3.5. Test Requirements and Procedures Summary.....	3
3.6. Test Sequence.....	5
<b>4. QUALITY ASSURANCE PROVISIONS.....</b>	<b>6</b>
4.1. Qualification Testing.....	6
4.2. Requalification Testing.....	6
4.3. Acceptance.....	6
4.4. Quality Conformance Inspection.....	6

## 1. SCOPE

### 1.1. Content

This specification covers the performance, tests and quality standards for IP68 EMC anti corrosion hoods and housings of heavy duty connector series **H3APR**. The hoods and housings are designed for the insertion and protection of contact inserts of various series and sizes.

### 1.2. Qualification

When tests are performed, the following specified specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the case of a conflict between the requirements of this specification and the product drawing or of conflicts between the requirements of this specification and the referenced documents, this specification shall take precedence.

### 2.1. TE Connectivity Documents

A. Customer drawing and name: H3APR IP68 EMC anti corrosion hood and housing series

### 2.2. Other Documents

- EN 61984: Connectors - Safety requirements and tests
- EN 60068: Environmental testing
- EN 60512: Connectors for electronic equipment -Test and measurements
- EN 60529: Degrees of Protection Provided by Enclosures (IP Code)
- EN 60664-1: Insulation coordination for equipment within low-voltage systems (Part 1)
- EN 61373: Railway application - Rolling stock equipment - Shock and vibration test
- EN 62153-4-7: Electromagnetic compatibility (EMC) - Test method for measuring the transfer impedance and the screening - or the coupling attenuation - Tube in tube method
- ISO 6988: Metallic and other non-organic coatings - Sulfur dioxide test with general condensation of moisture
- ISO 8092/2: Road Vehicles-Connections for on-board electrical wiring harnesses

## 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

Materials used in the construction of this product shall be as specified on the applicable product drawing.

### 3.3. Rated

- Temperature -40°C to +125°C
- Degree of Protection IP65 or IP68 (See customer drawing)

### 3.4. Performance and Test Description

Product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Paragraph 3.5. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per EN 61984.

### 3.5. Test Requirements and Procedures Summary

<b>General</b>			
No.	Test Items	Requirements	Condition according to
3.5.1	Visual and dimensional examination	Meets requirements of product drawing	Visual and dimensional examination IEC 60512-1-1/-2, Test 1a and 1b

<b>Mechanical</b>			
3.5.2	Mechanical strength impact	No damage likely to impair function	Dropping height: - 750mm for specimens of mass ≤ 250g - 500mm for specimens of mass > 250g Dropping cycles: 8 positions in 45° step, one cycles per position IEC 60512-7-2 Test 7b
3.5.3	Vibration, Random	No damage likely to impair function No discontinuities greater than $t > 1\mu s$	Frequency: 5~150Hz Per EN 61373, Category 1, Class B (IEC60068-2-6 Test Fc)

3.5.4	Shock	No damage likely to impair function No discontinuities greater than $t > 1\mu s$	Acceleration: $50m/s^2$ Duration: 30ms Total 18 shocks (three positive and three negative in each of the three orthogonal axes) Per EN 61373
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## Environmental

3.5.5	Cold	No damage likely to impair function	Subject mated specimen to $-40^{\circ}C$ Duration time: 16h, Test Ab Per IEC 60512-11-10 Test 11j (IEC 60068-2-1)
3.5.6	Dry Heat	No damage likely to impair function	Subject mated specimen to $+125^{\circ}C$ Duration time: 168h Test Bb Per IEC 60512-11-9 Test 11i (IEC 60068-2-2)
3.5.7	Salt Mist Cyclic Test	No damage likely to impair function	Follow: ASTM B117-11 Test Condition: 1). Mated connector 2). Salt spray: $(5 \pm 1) \% NaCl$ (m/m) concentration solution; 3). Temperature $(35 \pm 1)^{\circ}C$ 4). Precipitation rate of salt spray $(1.0-2.0) ml (/ 80cm^*h)$ 5). PH value: 6.5-7.2 6). Duration: 500H

## Protection

3.5.8	Degree of protection IP6X	No ingress of dust	Test IP 6X according to IEC 60529
3.5.9	Degree of protection IPX5	No ingress of water	Test IP X5 (water jetting) according to IEC 60529 7.3.6.3 & 7.3.7 of EN61984
3.5.10	Degree of protection IPX8	No ingress of water	Test IP X8 according to IEC 60529 Water immersion: 1m, 24Hours, No water immerge. 7.3.6.3 & 7.3.7 of EN61984
3.5.11	Degree of protection IPX9K	No ingress of water	Test IP X9K according to DIN 40050-9 No water immerge. 7.3.6.3 & 7.3.7 of EN61984

Number of Specimen as below table 1:

Table 1 - Number of Specimen		
Test	Description	Numbers
Group A	Mechanical Strength Test,	3 pairs connectors
Group B	Degree of protection Test, Mated	3 pairs connectors
Group C	Degree of protection Test, Mated	3 pairs connectors
Group D	Vibration and Shock Test	3 pairs connectors (together with inserts)
Group E	Salt Mist Cyclic Test, Mated	3 pairs connectors

Note: For connector family of the same design and comparable size, test may be made only on that member of the family which represents the worse case for that test.

### 3.6. Test Sequence

Test or Examination	Test Group				
	A	B	C	D	E
	Test Sequence <sup>1)</sup>				
Visual and dimensional examination	1,3	1,6	1,8	1,4	1,3
Mechanical strength impact	2				
Vibration				2	
Shock				3	
Cold		3	4		
Dry Heat		4	5		
Salt Mist Cyclic Test					2
Degree of protection IP6X		2,5			
Degree of protection IPX5 or IPX8			2,6		
Degree of protection IPX9K			3,7		

**Notes:**

- 1) Numbers indicate the sequence in which the tests are performed.

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1. Qualification Testing

#### A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

#### B. Test Sequence

Specimens shall be tested in accordance with the paragraph 3.6 test sequence.

### 4.2. Requalification Testing

If changes significantly affecting form, fit or functions are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

### 4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of paragraph 3.5. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before re-submittal.

### 4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification. Bulk wire resistance shall be subtracted from resistance readings.