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## DEUTSCH\* DRC70pin Series Connector System

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### 1. SCOPE

#### 1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) DRC70pin Series Connector System.

#### 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

#### 1.3. Successful qualification testing on the subject product line was completed in 1992. The Qualification Test Report number for this testing is [501-151068](#). These documents are on file at and available from Product Engineering, Industrial Commercial Transportation (ICT).

### 2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies.

#### 2.1. TE Connectivity (TE) Documents

- [109-1](#) General Requirements for Testing
- [408-151007](#) Instruction Guide DEUTSCH Extraction Tools
- [501-151068](#) DRC70pin Qualification Test Report
- [502-151018](#) DRC16 Ingress Protection Engineering Test Report
- Product Drawings

X refers to A, B, C, D keys. XXXX refers to product modification.

DRC12-70PX-XXXX	70pin Flange Receptacle
DRC13-70PX-XXXX	70pin Header Receptacle
DRC14-70PX-XXXX	70pin Inline Receptacle
DRC16-70SX-XXXX	70pin Plug

#### 2.2. Industry Documents

- DIN 40050-9: Road Vehicles Degrees of protection (IP Code)
- DIN 72551-6: Road Vehicles—Low-Tension Cables—Part 6: Single-Core, Unscreened with Thin Insulation Wall; Dimensions, Materials, Marking
- IEC 60529: Degrees of protection Provided by Enclosures (IP Code)
- ISO 6722: Road Vehicles—60 V and 600 V Single-Core Cables—Dimensions, Test Methods, and Requirements
- SAE J1128: Low Voltage Primary Cable

### 3. REQUIREMENTS

#### 3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

#### 3.2. Ratings

- Voltage: 250 VAC/VDC
- Current (Amp): See Figure 1

Contact Size	Wire Size AWG [mm <sup>2</sup> ]	All Circuits Energized (A)
16	12 [2.5]	13
	14 [2.0]	
	16 [1.5-1.0]	
	18 [0.8-0.75]	10
	20 [0.5]	7.5

Figure 1

- Temperature: -55°C to +125°C
- Ingress Protection (IP): IP68 and IP6K9K
- Flammability: UL Recognized. Parts have been successfully tested to the 20 mm Flame Test per Standard UL-94

3.3. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Test Description	Requirement	Procedure
Examination of Product	The connectors shall be correctly constructed, marked and shall show good quality and workmanship.	Conduct visual examination only for identification or product, torn seals, cracked plastic, etc.
<b>ELECTRICAL</b>		
Insulation Resistance	10 MΩ minimum at 25°C. Maximum leakage current is 100 μA.	Using a 1000 VDC megohmmeter check each contact to all other contacts and the shell electrically connected.
Contact Resistance	Maximum voltage drop across a 6 inch wire/contact assembly shall be 100mV max for 16 & 18 AWG.	MIL-C-39029 Test voltage: 4.5VDC Test current: 5A (18AWG), 10A (16AWG) Correction for the wire alone must be added. Molded in contacts designs to allow for the additional contact length by correcting readings to standards contact length and considering the resistance of the additional length to be equal to the wire resistance.
Low Level Contact Resistance	Maximum voltage drop after subtracting the wire leads to be less than 0.1 mV.	Apply a 4.5VDC potential and 10 mA current to sample. Molded in contacts designs to allow for the additional contact length by correcting readings to standards contact length and considering the resistance of the additional length to be equal to the wire resistance.
Solderability DRC13 only	See MIL-STD-002, Method 208 for pass/fail criteria.	Receptacle extended leads to be tested to MIL-STD-002, Method 208.
Soldering Heat DRC13 only	See MIL-STD-002, Method 210 for pass/fail criteria.	Receptacles to be tested to MIL-STD-202, Method 210 Condition C (+260°C, 10 seconds)
<b>MECHANICAL</b>		
Contact Retention	Contact displacement not to exceed 0.03 inch.	Subject the same contact cavities used for maintenance aging test to a 25 lbf for 15 seconds in a direction tending to push the contact or of the rear of the connector.
Maintenance Aging	There shall be not visible change or damage to the contact cavities	Subject 10% of the cavities to 8 cycles of inserting and removing its respective contact. This will then be repeated 2 additional times at 0°C. Insertion to be done by hand, removal to use specified tool.
Durability	No mechanical or electrical defects allowed.	The connector shall be mated and unmated for a total of 45 complete cycles at room temperature. This will be repeated 5 additional cycles at -18°C.

Figure 2

Test Description	Requirement	Procedure
Vibration	Discontinuity not to exceed 1 $\mu$ s at 100 mA during last hour of vibration in each axis.	Search for resonance frequencies. Dwell at any resonant frequencies for 30 minutes. <ul style="list-style-type: none"> <li>Sine Sweep: 18-500Hz</li> <li>Initial Displacement: 0.07 inch DA</li> <li>Max Acceleration: 10 G</li> <li>X, Y, Z axis: 3 hours per axis</li> <li>Test Duration: 9 hours</li> </ul> Monitor discontinuity during last hour each axis.
Insert Retention	Inspect for damage after test.	Apply a pulling force of 100 lbf to the wire bundle that exist the rear of the connector for a period of 30 seconds.
Crimp Tensile	Wire must not pullout of the crimped contact.	Remove all terminals from connector and apply tensile force at a rate of 1 in/min to the force below and hold for 10 seconds. 25 lbf for 18 AWG 35 lbf for 16 AWG
<b>ENVIRONMENTAL</b>		
Thermal Cycle	No evidence of cracking, chipping or other damage detrimental to the normal operation of the connector.	The wired mated connector shall be subjected to 10 cycles. One cycle shall consist of -40°C for 1 hour followed by +121°C for 1 hour with transfer rate of 2-5°C per minute.
Temperature Life	Connectors to show no visible damage	The wired mated connectors shall be subjected to 500 hours at +120°C.
Sealing DRC13 only	No air bubbles appear for a period of 5 minutes.	Apply a 5 psi air pressure to the entire rear face of the receptacle inside the fixture and submerge the fixture and receptacle in water. Eliminate all trapped bubbles.
Vacuum Decay DRC13 only	Decay rate not to exceed 5 ml/min.	Apply a 5 psi vacuum to the inside of the receptacle fixture.
Water Immersion	10 M $\Omega$ minimum at 25°C No water inside.	Heat mated sample for 2 hours at +50°C. The samples should then be immediately submerged in water at ambient temperature to a depth of 3 feet for 2 hours. Air off the outside of the connector then open and inspect for presence of water.
Fluid Immersion	Connectors to show no visible damage	Subject each connector to one fluid only in the wired mated condition. Submerge mated connector in fluid at the temperature indicated in table below for 5 seconds. Remove and allow to drip for 1 hour. This is 1 cycle. Repeat for total of 60 cycles -Brake Fluid (disc type 1) at +25°C -Diesel Fuel #2 at +60°C -30 wt Engine Oil at +100°C - 50/50 Antifreeze Mixture at +100°C

Figure 2 End

**i** **NOTE**

a) All cavities wired with the minimum approved wire gauge per SAE J1128 suitable for the terminal size and with enough length to accommodate testing. Wire insulation shall be minimum diameter per SAE J1128 and shall be verified to be within the connector wire sealing range. Crimp characteristics (i.e. height, width, etc.) shall be checked prior to testing.

All unsealed cavities shall be secured with sealing plugs. To prevent capillary action on the sealed connector, all free wire ends and test points (i.e. millivolt test connection) shall be sealed with alcohol-based RTV silicone or equivalent and covered with heat shrink tubing.

b) Specimens shall be prepared in accordance with applicable production drawings and shall be selected at random from current production.

3.4. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)			
	1	2	3	4
	TEST SEQUENCE (b)			
Examination of Product	1,12	1,6	1,15	1,16
Insulation Resistance	5,11	2,5	2,8	2,6,9,12
Contact Resistance			3,10	3,7,13
Low Level Contact Resistance			9	
Contact Retention				4
Thermal Cycle	7		4	
Maintenance Aging			11	
Durability			12	
Vibration	6			10
Sealing (DRC13 only)	2,8		6	
Vacuum Decay (DRC13 only)	3,9		7	
Water Immersion	4,10	4	5	8,11
Temperature Life				5
Insert Retention			13	
Fluid Immersion		3		
Solderability (DRC13 only)			14	
Soldering Heat (DRC13 only)				14
Crimp Tensile				15

**i** **NOTE**

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

- Groups 1-4, Specimens shall consist of 70 position connectors with DEUTSCH Solid Terminal System size 16 nickel sockets with 16 AWG and 18 AWG wire.

(b) Numbers indicate sequence in which tests are performed.

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### 3.5 Revision History

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	14-Oct-2019	DM	DM