

**DEUTSCH\* DRC70pin Series Connector System**

**1. INTRODUCTION**

1.1. Purpose

This report summarizes the results of testing performed on DEUTSCH DRC70pin series connector system to determine conformance to the requirements of product specification 108-151068.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the DEUTSCH DRC70pin series connector system. Testing was performed at the DEUTSCH Industrial Products Division Laboratory in 1992. The test file numbers for this testing are listed in Figure 1. This documentation is on file at, and available from Product Engineering, Industrial Commercial Transportation (ICT) Laboratory.

Test Group	Test Report
1	9224410
2	
3	
4	

Figure 1

1.3. Conclusion

The DEUTSCH DRC70pin series connector system products listed in Paragraph 1.4 conform to the electrical, mechanical, and environmental performance requirements given in product specification 108-151068.

1.4. Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the part numbers given in Figure 2 were used for testing.

DEUTSCH PART NUMBER	DESCRIPTION	TEST GROUP
DRC13-70PA	70pin Header Receptacle, 90°	1-4
DRC16-70SA	70pin Plug	
0462-201-16141	Size 16 Solid Socket, Nickel	

Figure 2

1.5. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15° to 35°C

Relative humidity: 25 to 75%

1.6. Qualification 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

- (a) Specimens were prepared in accordance production drawings and were selected at random from current production.
- Groups 1-4 specimens consisted of 70-position connectors with DEUTSCH solid terminal system size 16 nickel sockets with 16 AWG and 18 AWG wire.
- (b) Numbers indicate sequence that tests were performed.

**Figure 3**

## 2. TEST METHODS AND RESULTS

### 2.1. Examination of Product (Groups 1-4)

- A. Procedure: Not Applicable
- B. Method: Conduct visual examination only for identification or product, torn seals, cracked plastic, etc.
- C. Requirement: The connectors shall be correctly constructed, marked and shall show good quality and workmanship.
- D. Result: **PASSED.**

### 2.2. Insulation Resistance (Groups 1-6)

- A. Procedure: Not Applicable
- B. Method: Using a 1000 VDC megohmmeter check each contact to all other contacts and the shell electrically connected.
- C. Requirement:  $\geq 10 \text{ M}\Omega$
- D. Result: **PASSED.**

### 2.3. Contact Resistance (Groups 3,4)

- A. Procedure: MIL-C-39029
- B. Method: 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.
- C. Requirement: Maximum voltage drop across a 6 inch wire/contact assembly shall be 100 mV max for 16AWG.
- D. Result: **PASSED.**

### 2.4. Low Level Contact Resistance (Group 3)

- A. Procedure: Not Applicable
- B. Method: 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.
- C. Requirement: Maximum voltage drop after subtracting the wire leads to be less than 0.1 mV.
- D. Result: **PASSED.**

### 2.5. Contact Retention (Group 4)

- A. Procedure: Not Applicable
- B. Method: 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.
- C. Requirement: Contact displacement not to exceed 0.03 inch.
- D. Result: **PASSED.**

### 2.6. Thermal Cycle (Groups 1,3)

- A. Procedure: Not Applicable
- B. Method: 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.
- C. Requirement: No evidence of cracking, chipping or other damage detrimental to the normal operation of the connector.
- D. Result: **PASSED.**

- 2.7. Maintenance Aging (Group 3)
- A. Procedure: Not Applicable
  - B. Method: 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.
  - C. Requirement: There shall be not visible change or damage to the contact cavities.
  - D. Result: **PASSED.**
- 2.8. Durability (Group 3)
- A. Procedure: Not Applicable
  - B. Method: 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.
  - C. Requirement: No mechanical or electrical defects allowed.
  - D. Result: **PASSED.**
- 2.9. Vibration (Groups 1,4)
- A. Procedure: Not Applicable
  - B. Method:
    - Sine Sweep: 18 to 500 Hz
    - Initial Displacement: .07 inch DA maximum
    - Max Acceleration: 10 G's
    - Test Duration: 9 hours
    - Time Per Axis X, Y, Z: 3 hours
  - C. Requirement: Discontinuity not to exceed 1  $\mu$ s at 100 mA during last hour of vibration in each axis.
  - D. Result: **PASSED.**
- 2.10. Sealing (Groups 1,3)
- A. Procedure: Not Applicable
  - B. Method: 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.
  - C. Requirement: No air bubbles appear for a period of 5 minutes.
  - D. Result: **PASSED.**
- 2.11. Vacuum Decay (Groups 1,3)
- A. Procedure: Not Applicable
  - B. Method: Apply a 5 psi vacuum to the inside of the receptacle fixture.
  - C. Requirement: Decay rate not to exceed 5 ml/min.
  - D. Result: **PASSED.**
- 2.12. Water Immersion (Groups 1-6)
- A. Procedure: Not Applicable
  - B. Method: 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.
  - C. Requirement: 10 M $\Omega$  minimum at 25°C. Not water inside.
  - D. Result: **PASSED.**

- 2.13. Temperature Life (Group 4)
- A. Procedure: Not applicable
  - B. Method: The wired mated connectors shall be subjected to 500 hours at +120°C.
  - C. Requirement: Connectors to show no visible damage.
  - D. Result: **PASSED.**
- 2.14. Insert Retention (Group 3)
- A. Procedure: Not Applicable
  - B. Method: Apply a pulling force of 100 lbf to the wire bundle that exist the rear of the connector for a period of 30 seconds.
  - C. Requirement: Inspect for damage after test.
  - D. Result: **PASSED.**
- 2.15. Fluid Immersion (Group 2)
- A. Procedure: Not Applicable
  - B. Method: 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
  - C. Requirement: Connectors to show no visible damage.
  - D. Result: **PASSED.**
- 2.16. Solderability (Group 3)
- A. Procedure: MIL-STD-202, Method 208
  - B. Method: Receptacle extended leads to be tested to MIL-STD-002, Method 208.
  - C. Requirement: See MIL-STD-002, Method 208 for pass/fail criteria.
  - D. Result: **PASSED.**
- 2.17. Soldering Heat (Group 4)
- A. Procedure: MIL-STD-202, Method 210
  - B. Method: Receptacles to be tested to MIL-STD-202, Method 210 Condition C (+260°C, 10 seconds)
  - C. Requirement: See MIL-STD-002, Method 210 for pass/fail criteria.
  - D. Result: **PASSED.**
- 2.18. Crimp Tensile (Group 4)
- A. Procedure: Not Applicable
  - B. Method: 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
  - C. Requirement: Wire must not pullout of the crimped contact.
  - D. Result: **PASSED.**

**3. REVISION HISTORY**

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	10-Oct-2019	DM	DM