DEUTSCH* DRC16 Series Connector System

1. INTRODUCTION

1.1. Purpose

This report summarizes the results of testing performed on DEUTSCH DRC16 series connector system to determine conformance to the requirements of product specification 108-151018.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the DEUTSCH DRC16 series connector system. Testing was performed at the DEUTSCH Industrial Products Division Laboratory in 1986. 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	51714
2	
3	
4	
5	
6	

Figure 1

1.3. Conclusion

The DEUTSCH DRC16 series connector system products listed in Paragraph 1.4 conform to the electrical, mechanical, and environmental performance requirements given in product specification 108-151018.

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
DRC10-40P	40pin Header Receptacle, 180°	1-6
DRC16-40S	40pin 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%

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1.6. Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)					
	1	2	3	4	5	6
	TEST SEQUENCE (b)					
Examination of Product	1	1	1	1	1	1
Insulation Resistance	2	2	2	2	2	2
Dielectric Withstanding Voltage	3	3	3	3	3	3
Maintenance Aging	4		4			
Temperature Life		4		4		4
Contact Retention	5		5			
Durability		5	6		4	
Tool Abuse				5	5	
Salt Spray		6	7			5
Altitude Immersion				6	6	6
Fluid Immersion	6	7	8	7	7	7
Thermal Shock	7	8				8
Vibration	8		9	8		
Shock	9		10	9		
External Bending Moment		9	11			9
Insert Retention	10			10	8	
Low Level Contact Resistance		10	12			
Contact Resistance	11	11	13	11	9	10
Final Examination	12	12	14	12	10	11

(a) Specimens were prepared in accordance production drawings and were selected at random from current production.

- Groups 1-6 specimens consisted of 40-position connectors with DEUTSCH solid terminal system size 16 nickel sockets with 16 AWG wire.

(b) Numbers indicate sequence that tests were performed.

Figure 3

2. TEST METHODS AND RESULTS

2.1. Visual Inspection (Groups 1-6)

A. Procedure: EIA-364-18

B. Method: Visually examine each test specimen prior to testing and/or conditioning noting any manufacturing or material defects such as cracks, tarnishing, flash, etc.

C. Requirement: No physical defects detrimental to product performance.

D. Result: **PASSED.**

2.2. Insulation Resistance (Groups 1-6)

A. Procedure: MIL-STD-1344, Method 3003.1

B. Method: Using a 500 VDC megohmeter check each contact to all other contacts and the shell electrically connected together.

C. Requirement: ≥ 1000 MΩ

D. Result: **PASSED.**

2.3. Dielectric Withstanding Voltage (Groups 1-6)

A. Procedure: MIL-STD-1344, Method 3001.1

B. Method: Check each contact to all other contacts and the shell electrically connected together for breakdown / flashover when subjected to a 1500 VAC test potential for a period of 1 minute.

C. Requirement: No evidence of breakdown or flashover or current leakage in excess of 2.0 milliamps.

D. Result: **PASSED.**

2.4. Contact Resistance (Groups 1-6)

A. Procedure: MIL-STD-1344, Method 3004.1

B. Method: Test current to be 13A for size 16 (16 and 18 AWG)

C. Requirement: Maximum voltage drop across a 6 inch wire/contact assembly shall be 89mV max for 16AWG.

D. Result: **PASSED.**

2.5. Low Level Contact Resistance (Groups 1-6)

A. Procedure: MIL-STD-1344, Method 3002.1

B. Method: The resistance of an equal length of wire shall be subtracted from all readings to determine the added resistance of the terminal.

C. Requirement: Calculated resistance across mated contact pair shall not exceed 6 mΩ using 100 mA current.

D. Result: **PASSED.**

2.6. Maintenance Aging (Groups 1,3)

A. Procedure: MIL-STD-1344, Method 2002.1

B. Method: Subject 10% of the cavities to 10 cycles of inserting and removing its respective contact. Insert by hand, remove using removal tool.

C. Requirement: There shall be not visible change or damage to the contact cavities

D. Result: **PASSED.**

2.7. Contact Retention (Groups 1,3)

A. Procedure: MIL-STD-1344, Method 2007.1

B. Method: Subject each wired contact to an applied load of 25 lbf for a period of 15 seconds in a direction tending to push the contact or of the rear of the connector.

C. Requirement: The contact shall remain in place

D. Result: **PASSED.**

2.8. Durability (Groups 2,3,5)

A. Procedure: MIL-STD-1344, Method 2016

B. Method: The connector shall be mated and unmated for a total of 100 complete cycles at room temperature.

C. Requirement: No evidence of damage to the contacts, contacting plating, connector housing or seals detrimental to reliable connector performance. Coupling torque must not increase as a result of cycling past the point where it can reasonably be done by hand.

D. Result: **PASSED.**

2.9. Tool Abuse (Groups 4,5)

A. Procedure: Not Applicable

B. Method: Use the applicable removal tool shall be inserted into the connector. With an axial load of 5 lbf applied, the tool shall be rotated 180° and then removed, also removing the terminal. Repeat 3 times.

C. Requirement: There shall be no visible damage to the connector seals or contact cavities.

D. Result: **PASSED.**

2.10. Vibration (Groups 1,3,4)

A. Procedure: MIL-STD-1344, Method 2005.1

B. Method:

- Sine Sweep: 10 to 2000 Hz
- Sweep Cycle: 20 minutes
- Initial Displacement: .07 inch DA Maximum
- Max Acceleration: 20G's
- Test Duration: 12 hours
- Time Per Axis X, Y, Z: 4 hours
- Test Current first 3 hours each axis: 13A

C. Requirement: No discontinuity in excess of 1.0 µs at 100 mA during the last hour of each axis. Shall meet visual requirements, show no physical damage and meet requirements of additional tests as needed.

D. Result: **PASSED.**

2.11. Shock (Groups 1,3,4)

A. Procedure: MIL-STD-1344, Method 2004.1

B. Method: 10 cycles of ½ sine pluses, 50g±15%, 11±1 ms duration X and Z axis are to be tested.

C. Requirement: No discontinuity in excess of 1.0 µs at 100 mA during the last hour of each axis. Shall meet visual requirements, show no physical damage and meet requirements of additional tests as needed.

D. Result: **PASSED.**

2.12. External Bending Moment (Groups 2,3)

A. Procedure: Not Applicable

B. Method: Mount the Receptacle panel mounted in normal service to a rigid plane. Apply a 50 in-lbf bending moment at a rate of 1.0 lbf per second for 60 seconds

C. Requirement: No discontinuity in excess of 1.0 µs at 100 mA during the test.

D. Result: **PASSED.**

2.13. Insert Retention (Groups 1,4,5)

A. Procedure: MIL-STD-1344, Method 2010.1

B. Method: Apply a pulling force of 100 lbf at a rate of 10 lbf per second to the wire bundle that exist the rear of the connector for a period of 30 seconds.

C. Requirement: The inserts shall retain their proper location inside the housing. There shall be no evidence of cracking, breaking, separation from housing or loose parts.

D. Result: **PASSED.**

2.14. Temperature Life (Groups 2,4,6)

A. Procedure: MIL-STD-1344, Method 1005.1

B. Method: The wired mated connectors shall be subjected to 1000 hours at 125°C. Insulation resistance shall be measured immediately after removing sample from oven.

C. Requirement: There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test. Meet 500 MΩ minimum.

D. Result: **PASSED.**

2.15. Salt Spray (Groups 2,3,6)

A. Procedure: MIL-STD-1344, Method 1001.1

B. Method: Connector shall be fully mated, then submerged in a fine mist of 5% by weight of salt solution for 96 hours.

C. Requirement: There should be no evidence of corrosion on the connector or terminals after the connector is removed from the test and cleaned with tap water.

D. Result: **PASSED.**

2.16. Altitude Immersion (Groups 4,5,6)

A. Procedure: MIL-STD-1344, Method 1004.1

B. Method: Chamber pressure reduced to 32.68 torr and maintained for 30 minutes, then returned to atmospheric pressure within 1 minute and maintained for another 30 minutes. Test repeated for three times.

C. Requirement: Standard pressure is 32.68 torr. The wire mated connectors shall be immersed in a container of tap water, placed in an altitude chamber such that the water covers the connector being tested.

D. Result: **PASSED.**

2.17. Fluid Immersion (Groups 1-6)

A. Procedure: MIL-STD-1344, Method 1016

B. Method: Subject each connector to one fluid only. The wired mated connectors shall be submerged in the fluids below at ambient temperature. Each connector shall be submerged for 5 minutes, then removed from the fluid to air dry for 24 hours. This cycle is to be completed a total of 5 cycles.

- Motor Oil 30 weight
- Brake Fluid (disc type 1)
- Gasoline
- Diesel Fuel #2
- Antifreeze Solution (max protection)
- Gear Oil 90 weight

C. Requirement: There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.

D. Result: **PASSED.**

2.18. Thermal Shock (Groups 1,2,6)

A. Procedure: MIL-STD-1344, Method 1003.1

B. Method: Cycle mated connectors for 30 minutes at –67°F followed by 30 minutes at +257°F with 2 minute max transfer time. Repeat for 5 cycles. Insulation resistance measured during last heat cycle.

C. Requirement: There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test. Meet insulation resistance 500 MΩ minimum.

D. Result: **PASSED.**

3. REVISION HISTORY

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	12-Aug-2019	DM	DM
A1	Corrected document number (is) 501-151018 (was) 501-151062	04-Oct-2019	DM	DM
B	Revised on TE 501 qual test report template	07-Oct-2019	DM	DM