DEUTSCH* DRC26 Series Connector System

1. INTRODUCTION

1.1. Purpose

This report summarizes the results of testing performed on DEUTSCH DRC26 series connector system to determine conformance to the requirements of product specification 108-151052, rev A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the DEUTSCH DRC26 series connector system. Testing was performed at the DEUTSCH Industrial Products Division Laboratory and DEUTSCH Corporate Test Laboratory in 1997 and 2000. The test file numbers for this testing are listed in Figure 1. This documentation is on file at, and available from, DEUTSCH Industrial Products Division Laboratory.

Test Group	Test Report
1	IPD970812-01/02
2	IPD970812-01/02
3	IPD970812-01/02
4	IPD970812-01/02
5	IPD970812-01/02
6	000602-05/1
7	000602-05/2
8	000602-05/3
9	000602-05/4

Figure 1

1.3. Conclusion

The DEUTSCH DRC26 series connector system products listed in Paragraph 1.4 conform to the electrical, mechanical, and environmental performance requirements given in product specification 108-151052, rev A.

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.

1.5. Environmental Conditions

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

Temperature: 15° to 35°C

Relative humidity: 25 to 75%

DEUTSCH PART NUMBER	DESCRIPTION	TEST GROUP
DRC26-50S01	50-Pin Plug	1-5
0941107L01 (DRC20-50P01)	50-Pin Receptacle, Header	
1062-20-0144	Size 20 S&F Socket, Gold	
DRC26-60S01	60-Pin Plug	6-9
0944328L01 (DRC20-60P01)	60-Pin Receptacle, Header	
0462-201-20141	Size 20 Solid Socket, Nickel	

Figure 2

1.6. Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)								
	1	2	3	4	5	6	7	8	9
	TEST SEQUENCE (b)								
Inspection to Applicable Drawing	1					1			
Low Level Contact Resistance	2	3	3,7,11	2,6,10,14	2,6	2,6	3,7,11	2,6,10,14	2,6
Contact Resistance	3	4	4,8,12	3,7,11,15	3,7	3,7	4,8,12	3,7,11,15	3,7
Insulation Resistance	4	5	5,9,13	4,8,12,16	4,8	4,8	5,9,13	4,8,12,16	4,8
Crimp Tensile Strength		6				9			
Vibration-Component Level			2				2		
Contact Retention		1				10			
Drop		2				5			
Durability			1				1		
Thermal Life					5				5
Fluid Thermal Shock 1			6						
Fluid Thermal Shock 2							6		
Salt Spray				9				9	
Sand and Dust				5				5	
Thermal Cycle 1				1					
Thermal Cycle 2								1	
Chemical Resistance 1					1				
Chemical Resistance 2									1
Steam Cleaning/Pressure Wash				13				13	
Humidity			10				10		

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

— Groups 1 through 5 specimens consisted of 50-position with DEUTSCH stamped and formed terminal system size 20 gold socket contacts with size 18 AWG GXL wire.

— Groups 6 through 9 specimens consisted of 60-position with DEUTSCH solid terminal system size 20 nickel socket contacts with size 18 AWG TXL wire

(b) Numbers indicate sequence that tests were performed.

Figure 3

2. TEST METHODS

2.1. Inspection to Applicable Drawing (Groups 1,6)

A. Test Method: Inspect product visually for compliance with engineering drawing. Product to conform for correct use of materials, proper construction, correct part number and insert markings, and over-all quality of workmanship.

B. Requirement: Poor molding fabrication, loose materials, damaged or improperly manufactured contacts, galling of metal parts, nicks and burrs of metal parts, and torn seals or cracked plastic will be considered adequate basis for rejection.

C. Result: All test samples were correctly constructed and marked. There were no defects or other evidence of poor workmanship. All samples met required specifications for examination of product prior to start of testing.

2.2. Low Level Contact Resistance (Groups 1 - 9)

A. Test Method: Applied voltage did not exceed 20 mV open circuit, and the test current was limited to 100 mA. The resistance of an equal length of wire (reference wire) was subtracted from the same reel as what was used for the connector wiring.

B. Requirement: 10mΩ maximum

C. Result: All low level contact resistance measurements were less than 10 mΩ.

2.3. Contact Resistance (Groups 1 - 9)

A. Test Method: Use 7.5A max test current. The resistance of an equal length wire (reference wire) was subtracted from the actual readings to determine the added resistance of the terminal. The reference wire was taken from the same reel as what was used for the connector wiring.

B. Requirement: 10mΩ maximum

C. Result: All contact resistance measurements were less than 10 mΩ.

2.4. Insulation Resistance (Groups 1 - 9)

A. Test Method: Each contact was checked to all other contacts and the shell, if the shell is conductive. Test was performed using a 100 VDC ±10% and 500 VDC ±10% megohmmeter.

B. Requirement: 1000 MΩ minimum

C. Result: All insulation resistance measurements were greater than 1000 MΩ.

2.5. Crimp Tensile Strength (Groups 2,6)

A. Test Method: The tensile strength of the crimped connection was tested by using suitable apparatus at a constant speed within the range of 25 mm/min [1.00 in/min]. If the terminal had a cable insulation crimp, it was rendered mechanically ineffective.

B. Requirement: 111N [25 lbf] for 0.80mm² [18 AWG] minimum

C. Result: All tensile strength measurements were greater than 111 N.

2.6. Vibration – Component Level (Groups 3,7)

A. Test Method: Subject test samples to 20 hours of random vibration in each of three mutually perpendicular axes per the vibration profile of Figure 4. Amplitude of vibration was 16.79 grams.

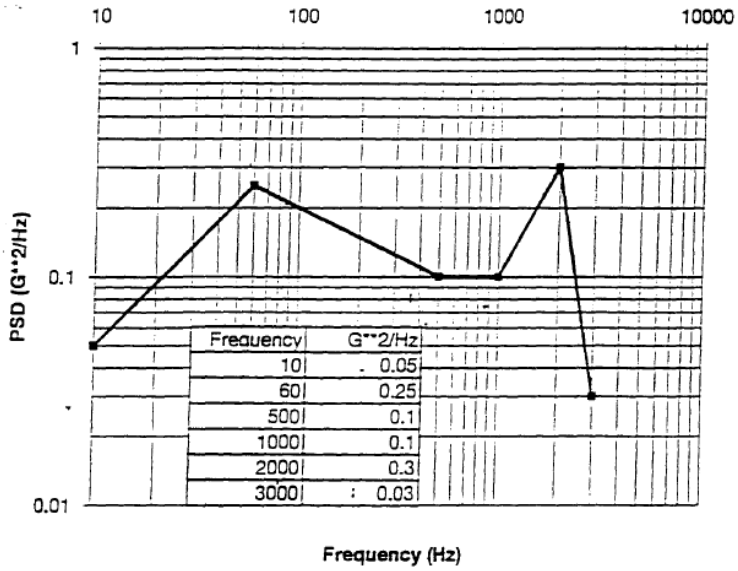

Figure 4

B. Requirement:

a. Connector contacts shall not exhibit evidence of contact wear which may be detrimental to reliable performance.

b. Low Level Contact Resistance: 10mΩ maximum

c. Contact Resistance: 10mΩ maximum

d. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. Following vibration testing no contact wear on the specimens which could be detrimental to reliable performance of sample was visible.

b. All low level contact resistance measurements were less than 10 mΩ.

c. All contact resistance measurements were less than 10 mΩ.

d. All insulation resistance measurements were greater than 1000 MΩ.

2.7. Contact Retention (Groups 2,6)

A. Test Method: Apply an axial load at a rate of 25 mm/min [1.00 in/min] until a force of 111N [25 lbf] was reached. The axial load was then maintained for 30 seconds.

B. Requirement: Contacts shall not become disengaged from connector body.

C. Result: All contact retention forces withstood 25 lbf for 30 seconds.

2.8. Drop (Groups 2,6)

A. Test Method: Drop unmated samples on each of their 6 sides from a height of 1 meter onto a solid concrete surface. This process was repeated a total of 3 times.

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.9. Durability (Groups 3,7)

A. Test Method: Connector shall be subject to 25 cycles of mating and unmating at room temperature.

B. Requirement:

a. Connector shall exhibit no evidence of damage to contacts, plating, connector housing or seals which may be detrimental to reliable performance.

b. Low Level Contact Resistance: 10mΩ maximum

c. Contact Resistance: 10mΩ maximum

d. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. No evidence of damage to the contacts, the contact plating, the connector housing and seals which could be detrimental to reliable connector performance were visible following the test.

b. All low level contact resistance measurements were less than 10 mΩ.

c. All contact resistance measurements were less than 10 mΩ.

d. All insulation resistance measurements were greater than 1000 MΩ.

2.10. Thermal Life (Groups 5,9)

A. Test Method: Subject mated wired connectors to 1000 hours at +125°C without current flowing.

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.11. Fluid Thermal Shock 1 (Group 3)

A. Test Method: Subject test samples to 10 cycles of thermal shock from 0°C to 100°C as follows. The connectors were mated and had all cavities without wires filled with sealing plugs. Submerge samples in a pan of water at 100°C for 10 minutes. Then place in a pan of water at 0°C for 10 minutes. Transfer time not to exceed 15 seconds.

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

d. No signs of water inside unmated connector after electrical tests.

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

d. All samples showed no presence of water inside following electrical tests.

2.12. Fluid Thermal Shock 2 (Group 7)

A. Test Method: Subject mated samples to 125°C for 2 hours in an appropriate oven. Subjects were then submerged in a 0°C water bath to a depth less than 1 meter for 10 minutes. This process was repeated for ten (10) cycles.

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

d. No signs of water inside unmated connector after electrical tests.

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

d. All samples showed no presence of water inside following electrical tests.

2.13. Salt Spray (Groups 4,8)

A. Test Method: Expose test samples is a salt fog chamber with 5% salt atmosphere at 35°C for 96 hours in a nonoperational condition.

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.14. Sand and Dust (Groups 4,8)

A. Test Method: Expose nonoperating mated samples to a constant suspension, 8.5 grams/cubic meter minimum, 80 mesh silica flour (i.e. air cleaner test dust) atmosphere for 24 hours. Test samples remained in a sealed chamber with the dust media for the duration of the test.

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.15. Thermal Cycle 1 (Group 4)

A. Test Method: Cycle mated connectors from -40° to +125°C. Connectors shall remain at each temperature extreme for 1 hour followed by a 45 minute transition period. Total of 100 cycles.

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Results:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.16. Thermal Cycle 2 (Group 8)

B. Test Method: Cycle mated connectors from -40° to +125°C. Connectors shall remain at each temperature extreme for 1 hour followed by a 45 minute transition period of 3°/min. Total of 20 cycles.

C. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

D. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.17. Chemical Resistance 1 (Group 5)

A. Test Method: Submerge test sample in the chemicals per Figure 6 at room temperature. Use same set of connectors for each chemical.

Test Chemical	Dip Cycles	Dip Time	Air Dry Time	Configuration
Motor Oil	80	3 seconds	3 minutes	Mated
Diesel Fuel	80	3 seconds	3 minutes	Mated
Brake Fluid	80	3 seconds	3 minutes	Mated
Antifreeze	80	3 seconds	3 minutes	Mated
Mineral Spirits	1	5 minutes	4 hours	Mated

Figure 6

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.18. Chemical Resistance 1 (Group 9)

A. Test Method: Submerge test sample in the chemicals per Figure 7 at room temperature. Use same set of connectors for each chemical. Next apply lithium-based grease to the interface area of unmated samples, then mate and stored for 48 hours. Next expose unmated samples to contact cleaner for 5 seconds followed by a 24 hour dry time for 10 cycles.

Test Chemical	Dip Cycles	Dip Time	Air Dry Time	Configuration
Motor Oil	80	3 seconds	3 minutes	Mated
Diesel Fuel	80	3 seconds	3 minutes	Mated
Brake Fluid	80	3 seconds	3 minutes	Mated
Antifreeze	80	3 seconds	3 minutes	Mated
Mineral Spirits	1	5 minutes	4 hours	Mated

Figure 7

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.19. Steam Cleaning/Pressure Wash (Groups 4,8)

A. Test Method: Expose test sample to high pressure 1500 psi spray at +85°C with 10% degreaser for 10 minutes. Test stand shall provide 360° coverage with nozzle distance at 6-12 inches. Fixture or nozzle rotation shall ensured direct impact on each side of the specimens under test for approximately 5 minutes per side

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.

2.20. Humidity (Groups 3,7)

A. Test Method: Expose nonoperating mated samples to profile per Figure 8. The temperature extremes shall be 60°C and 30°C with 85% to 95% humidity. Repeat for 10 cycles. Within 30 minutes after last cycle perform electrical tests.

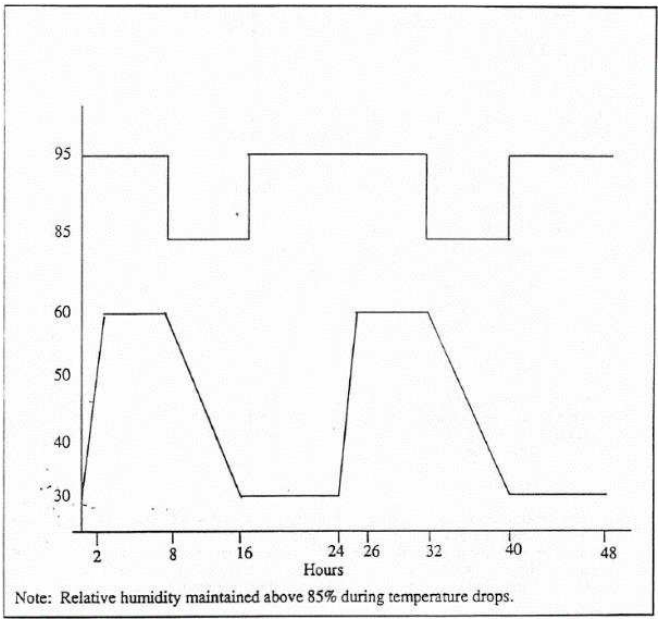

Figure 8

B. Requirement:

a. Low Level Contact Resistance: 10mΩ maximum

b. Contact Resistance: 10mΩ maximum

c. Insulation Resistance: 1000 MΩ minimum

C. Result:

a. All low level contact resistance measurements were less than 10 mΩ.

b. All contact resistance measurements were less than 10 mΩ.

c. All insulation resistance measurements were greater than 1000 MΩ.