
DEUTSCH* DTV Series Connector System

1. INTRODUCTION

1.1. Purpose

This report summarizes the results of testing performed on DEUTSCH DTV series connector system to determine conformance to the requirements of product specification 108-151013, rev A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the DEUTSCH DTV series connector system. Testing was performed at the DEUTSCH Industrial Products Division Laboratory in 2005. 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	IPD001208-01
2	IPD001208-02
3	IPD001208-03
4	IPD001208-04
5	IPD001208-05
6	IPD001208-06

Figure 1

1.3. Conclusion

The DEUTSCH DTV series connector system products listed in Paragraph 1.4 conform to the electrical, mechanical, and environmental performance requirements given in product specification 108-151013, rev A.

1.4. Test Specimens

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

1.5. Environmental Conditions

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

Temperature: 18° to 28°C

Relative humidity: 20 to 80%

DEUTSCH PART NUMBER	DESCRIPTION	TEST GROUP
DTV02-18PB	18-Pin Receptacle, Flanged	1,3,4,5,6
DTV06-18SB	18-Pin Plug	
WV-18P	18-Pin Receptacle Wedge Lock	
WV-18S	18-Pin Plug Wedge Lock	
1060-16-0988	Size 16 S&F Pin, PdNiAu	
1062-16-0988	Size 16 S&F Socket, PdNiAu	
DTV02-18PB	18-Pin Receptacle, Flanged	2
DTV02-18PB-C032	18-Pin Receptacle, Flanged	
DTV06-18SB	18-Pin Plug	
DTV06-18SB-C032	18-Pin Plug	
WV-18P	18-Pin Receptacle Wedge Lock	
WV-18S	18-Pin Plug Wedge Lock	
1060-16-0988	Size 16 S&F Pin, PdNiAu	
1062-16-0988	Size 16 S&F Socket, PdNiAu	

Figure 2

1.6. Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)					
	1	2	3	4	5	6
	TEST SEQUENCE (b)					
Visual Inspection	1,8	1,6	1,11	1,15	1,3	1,3
Insulation Resistance	3,7	2,5	2,7	2,6,9,12		
Contact Resistance			3,8	3,7,13		
Low Level Contact Resistance			5			
Contact Retention				4		
Thermal Cycle	5		4			
Maintenance Aging			9			
Durability and Mating/Unmating Force			10			
Vibration	4			10		
5 psi Sealing	2,6	3	6	8,11		
Temperature Life				5		
Fluid Resistance		4				
Crimp Tensile				14		
Terminal Retention Assurance					2	
Audible Confirmation						2

Figure 3

- (a) Specimens were prepared in accordance production drawings and were selected at random from current production.
- Group 1 through 4 specimens consisted of connectors with DEUTSCH S&F terminal system size 16 palladium/nickel/gold pin and socket contacts with sizes 16 AWG Raychem Spec 44 non-wicking wire (PN 44A9605-16) with insulation OD $\varnothing.093\text{-}\varnothing.101$.
 - Group 5 specimens consisted of connectors with DEUTSCH S&F terminal system size 16 palladium/nickel/gold pin and socket contacts with sizes 16 GXL.
 - Group 6 specimens consisted of connectors with DEUTSCH S&F terminal system size 16 palladium/nickel/gold pin and socket contacts with sizes 16 AWG Raychem Spec 44 non-wicking wire (PN 44A9605-16) with insulation OD $\varnothing.093\text{-}\varnothing.101$.
- (b) Numbers indicate sequence that tests were performed.

Figure 3 (cont)

2. TEST METHODS AND RESULTS

2.1. Visual Inspection

Examine samples for defects or damages (i.e. torn seals, cracked plastic, missing parts, arcing, charring, identification, finish, interchangeability, workmanship, etc...)

2.2. Insulation Resistance

Check insulation resistance at 1000 VDC between adjacent contacts. The minimum insulation resistance shall be 10 M Ω . The maximum leakage current shall be 100 μ A.

2.3. Contact Resistance

Measure the voltage drop across each pair of mated contacts using 10A test current. The voltage drop shall be 4.50 ± 0.25 VDC open circuit. The voltage drop shall be measured 76.2mm (3 inches) from each end of the mated connector. Measurements can be taken further from the connector if the voltage drop in the extra wire length is subtracted. The voltage drop shall not exceed 100 mV when measured 30 seconds after the voltage is applied

2.4. Low Level Contact Resistance

Measure the voltage across the mated contacts. The applied test voltage shall not exceed 20 mV open circuit and the test current shall be limited to 100 mA. The maximum contact resistance allowed shall be 6 m Ω for 16AWG wire. The resistance shall be measured 76.2mm (3 inches) from each end of the mated connector. The test shall be conducted per MIL-STD-1344, method 3002-1.

2.5. Contact Retention

Axially load the contact by gradually applying a force of 111 N (25 lbs.). Contact displacement shall not exceed 0.8mm (0.031 inch).

2.6. Thermal Cycle

Cycle mated connectors from -40°C to $+140^{\circ}\text{C}$ at a rate of 5°C per minute. The minimum dwell times at the temperature extremes are a function of mass of the samples. Weight of specimen greater than 136g is 8 hours. Repeat for a total of 20 cycles. Samples may be held at the temperature extremes for extended time, such as overnight. On the last cycle, thoroughly soak the test samples to -50°C for 8 hours.

2.7. Maintenance Aging

Remove and then reinsert 20% of the connector contacts eight (8) times. The terminal position assurance device must also be removed. Repeat two (2) times at $0^{\circ}\pm 3^{\circ}\text{C}$. Remove and replace contacts using the approved tool(s).

2.8. Durability & Mating/Unmating Force

Assembled connectors shall be subjected to 50 cycles of mating and unmating. No mismatching, moving back or bending of contacts is allowed. Also, during this test the mating and unmating forces are to be measured and recorded.

2.9. Vibration

The vibration profile consisted of two (2) parts. See Figure 5. Monitor for discontinuities.

PROFILE 1		
	FREQ (Hz)	ACCEL (g)
15.3 GRMS for 20 hours	24	0.04
	60	0.50
	100	0.50
	240	0.10
	2000	0.10
PROFILE 2		
	FREQ (Hz)	ACCEL (g)
7.7 GRMS for 100 hours	24	0.01
	60	0.125
	100	0.125
	240	0.025
	2000	0.025

Figure 4

2.10. 5 psi Sealing

The mated connector test samples shall be placed inside a sealed pressure chamber with a vent tube attached and the other end exiting the chamber and immersed in 21°C±5°C water. Apply a 35±5 kPa dry compressed air source to the pressure chamber. Allow the pressure to stabilize for one (1) minute before observing any bubbles. Observe the water vessel for 5 minutes. No bubbles allowed.

2.11. Temperature Life

The wired mated connectors shall be subject for 500 hours of 140±3°C without current flowing. There shall be evidence of cracking, distortion or detrimental damage

2.12. Fluid Resistance

Test samples to be tested in a temperature chamber with the fluid stabilized to the chamber temperature per Figure 6. The test shall begin with properly assembled and mated connectors. One connector per fluid. On day one, the connector shall be dipped in fluid for five (5) seconds. Remove and allow to drip-dry for one (1) hour per Figure 6. Repeat six (6) times and allow samples to drip-dry overnight at temperature per Figure 6. Fluid shall not be drained from recesses. Repeat the seven (7) immersions for four (4) more days.

Fluid	Fluid & Chamber Temperature
Motor Oil (30 wt)	100°C
50/50 Ethylene Glycol	100°C
Diesel Fluid #2	60°C
Brake Fluid (Disk Type 1)	25°C

Figure 6

2.13. Crimp Tensile

Each wired contact shall be placed in an appropriate test fixture of a tensile tester. An axial force shall be applied to the wire and contact at 25.4±6 mm/min. The minimum tensile strength is 156 N (35 lbs.).

2.14. Terminal Retention Assurance

Using a plug or receptacle loaded with contacts, use a force gage to measure the force required to fully seat the wedge lock. Remove the wedge lock and back out one (1) contact so the retention finger associated with the contact is in the full open position. Use a force gage to measure the force required to fully seat the wedge lock with the contact finger backed out. The applied force should not exceed 30 lbs. Remove the wedge lock and inspect for broken retention fingers. Repeat step of backing out one (1) contact and measuring the force to seat the wedge lock six (6) times.

2.15. Audible Confirmation

Position unmated plug and receptacle within 12.0 ± 1.0 inches from the dB meter microphone. Push the connector together until there is an audible snap. Record and compare to DT control samples

3. SUMMARY OF TESTING

3.1. Visual Inspection—All Test Groups

Specimens were visually inspected and no evidence of physical damage detrimental to product performance was observed.

3.2. Insulation Resistance – Test Groups 1 to 4

All insulation resistance measurements were greater than 10 M Ω .

3.3. Contact Resistance—Test Groups 3 and 4

All contact resistance measurements were less than 100 mV.

3.4. Low Level Contact Resistance—Test Group 3

All low level contact resistance measurements were less than 6.0 m Ω .

3.5. Contact Retention—Test Group 4

All samples met the test specification requirement.

3.6. Thermal Cycle—Test Groups 1 and 3

No evidence of physical damage was visible as a result of thermal cycle testing.

3.7. Maintenance Aging—Test Group 3

All contacts met the test specification requirement.

3.8. Durability & Mating/Unmating Force—Test Group 3

All test samples met the test specification requirement. Mating and unmating force did not exceed 40 lbs.

3.9. Vibration —Test Groups 1 and 4

No discontinuities were detected during vibration testing. Following vibration testing, no cracks, breaks, or loose parts on the specimens were visible.

3.10. 5 psi Sealing—Test Groups 1 to 4

All samples met the test specification requirement.

3.11. Temperature Life—Test Group 4

No evidence of physical damage was visible as a result of conditioning of sample testing.

3.12. Fluid Resistance—Test Group 2

No evidence of physical damage was visible as a result of exposure to chemicals.

3.13. Crimp Tensile—Test Group 4

All tensile strength measurements were greater than 156 N (35 lbs.) for 16 AWG.

3.14. Terminal Retention Assurance —Test Group 5

When contacts are not fully seated in the retention fingers, it takes more than 20 lbs. to install wedge lock. Applied force greater than 30 lbs. to seat the wedge lock will damage the retention fingers. With contacts seated correctly it takes 15 lbs. maximum to install the wedge lock.

3.15. Audible Confirmation —Test Group 6

DTV test samples were 26-46 dB. DT test samples were 48-54 dB. Ambient sound 39-49 dB. For comparison, average conversation is about 45 dB and rustling of leaves is about 20 dB.