
DEUTSCH* DRB Series Connector System IP67, IP68, IP6K9K

1. INTRODUCTION

1.1. Purpose

Testing was performed on DEUTSCH DRB series connector system to determine conformance to IP67, IP68 and IP6K9K. Test procedures are given in SAE J2030, dated 2015-06; IEC 60529, Edition 2.1 dated 2001-02; and DIN 40050 part 9, dated May 1993.

1.2. Scope

This report covers the environmental sealing performance of the DRB series connector system. Testing was performed at the Hemet Product Test Laboratory in 2018. 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	1806203
	1806206
	1806209
	1806212
2	1806204
	1806207
	1806210
	1806213

Figure 1

1.3. Conclusion

The DEUTSCH DRB series connector system conformed to the environmental sealing performance requirements for IP67, IP68 and IP6K9K when tested per the sequences shown in Figure 3 of this document.

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
DRB12-48PAE-L018	48pin, Receptacle	1 and 2
DRB12-60PAE-L018	60pin, Receptacle	
DRB12-102PAE-L018	102pin, Receptacle	
DRB12-128PAE-L018	128pin, Receptacle	
DRB16-48SAE-L018	48pin, Plug	
DRB16-60SAE-L018	60pin, Plug	
DRB16-102SAE-L018	102pin, Plug	
DRB16-128SAE-L018	128pin, Plug	
WB-48PA	48pin Receptacle Wedge Lock	
WB-51PAL	102pin Receptacle Wedge Lock, Left	
WB-51PAR	102pin Receptacle Wedge Lock, Right	
WB-60PA	60pin Receptacle Wedge Lock	
WB-64PA	128pin Receptacle Wedge Lock	
WB-48SA	48pin Plug Wedge Lock	
WB-51SAL	102pin Plug Wedge Lock, Left	
WB-51SAR	102pin Plug Wedge Lock, Right	
WB-60SA	60pin Plug Wedge Lock	
WB-64SA	128pin Plug Wedge Lock	
DRBF-1A	Interface Flange, Large	
DRBF-2A	Interface Flange, Small	
0460-204-04141	Size 4 Solid Pin, Nickel	
0460-204-08141	Size 8 Solid Pin, Nickel	
0460-204-12141	Size 12 Solid Pin, Nickel	
0460-202-16141	Size 16 Solid Pin, Nickel	
0460-202-20141	Size 20 Solid Pin, Nickel	
0462-203-04141	Size 4 Solid Socket, Nickel	
0462-203-08141	Size 8 Solid Socket, Nickel	
0462-203-12141	Size 12 Solid Socket, Nickel	
0462-201-16141	Size 16 Solid Socket, Nickel	
0462-201-20141	Size 20 Solid Socket, Nickel	
1060-12-0122	Size 12 S&F Pin, Nickel/Tin	
1060-16-0622	Size 16 S&F Pin, Nickel	
1060-20-0222	Size 20 S&F Pin, Nickel	
1062-12-0122	Size 12 S&F Socket, Nickel/Tin	
1062-16-0622	Size 16 S&F Socket, Nickel	
1062-20-0222	Size 20 S&F 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 Sequences

TEST OR EXAMINATION	TEST GROUP (a)	
	1	2
	TEST SEQUENCE (b)	
Visual Examination	1,5	1,9
Insulation Resistance	2	2,6,8
Thermal Shock	3	4
Protection Against Dust (IP6X)	4	
Protection Against Water (IPX7)		3
Protection Against Water (IPX8)		5
Protection Against High Pressure/Steam Jet Cleaning (IPX9K)		7

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

- Groups 1 and 2 specimens consisted of 48,60,102,128 position connectors with DEUTSCH solid size 4 nickel pins and sockets with 6 AWG wire, size 8 nickel pins and sockets with 12 AWG, size 12 nickel pins and sockets with 14 AWG, size 16 nickel pins and sockets with 20 AWG and size 20 nickel pins and sockets with 20 AWG.
- Groups 1 and 2 specimens consisted of 48,60,102,128 position connectors with DEUTSCH stamped and formed size 12 nickel/tin pins and sockets with 14 AWG, size 16 nickel pins and sockets with 20 AWG and size 20 nickel pins and sockets with 20 AWG.

(b) Numbers indicate sequence that tests were performed.

Figure 3

2. SUMMARY OF TESTING

- 2.1. Visual Examination (Groups 1,2)
- A. Procedure: SAE J2030
 - B. Method: The visual examination should be performed prior to testing, noting in detail any manufacturing or material defects such as cracks, tarnishing, deformities, etc.
 - C. Requirement: No physical defects detrimental to product performance.
 - D. Result: **PASSED**
- 2.2. Insulation Resistance (Groups 1,2)
- A. Procedure: SAE J2030
 - B. Method: Each contact was checked to all other contacts and the shell, if the shell is conductive. Test was performed using a 1000 VDC megohmmeter.
 - C. Requirement: > 20 MΩ
 - D. Result: **PASSED**
- 2.3. Thermal Shock (Groups 1,2)
- A. Procedure: SAE J2030
 - B. Method: Test samples subjected to 10 cycles of thermal shock. One cycle shall consist of a soak time at -55 °C ambient, then a transition within 2 min to an ambient of 125°C, with a soak time there and then a transition back to -55°C ambient within 2 minutes. The soak times shall be established as the time necessary to bring the internal connector temperature on test to within 5°C of each of the ambient temperatures.
 - C. Requirement: No evidence of cracking, chipping, or other damage detrimental to the normal operation of the connector
 - D. Result: **PASSED**
- 2.4. Protection Against Dust (IP6X) (Groups 1)
- A. Procedure: DIN 40050, Part 9
 - B. Method: The mated assemblies were placed in a dust chamber at room ambient temperature with $35\% \pm 5\%$ RH and exposed to 20 cycles. Each cycle consists of an air-blast for 6 seconds, creating dust/ air movement in the dust chamber, then followed by a 15-minute pause of the air-blast. The chamber size is 14.3 cubic ft. (36"x24"x23"H) which required 8.8 lbs. of dust to meet the dispersion rate below. Blast of air is produced by one nozzle at 58 psi downward toward the dust pile creating an upward or vertical plume of dust which then settles down onto the test samples. The dust does not circulate. Type of dust used was Arizona Fine Dust. The dispersion or suspensions rate of dust was approximately 0.25 grams/m².
 - C. Requirement: No dust visible inside mated connectors.
 - D. Result: **PASSED**
- 2.5. Protection Against Water (IPX7) (Groups 2)
- A. Procedure: IEC 60529
 - B. Method: The mated assemblies were submersed in ambient water to a depth of 1 meter for 30 minutes.
 - C. Requirement: Insulation Resistance > 20 MΩ after Thermal Shock
 - D. Result: **PASSED**

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- 2.6. Protection Against Water (IPX8) (Groups 2)
- A. Procedure: IEC 60529
 - B. Method: The mated assemblies were submersed in ambient water to a depth of 1 meter for 4 hours.
 - C. Requirement: Insulation Resistance > 20 MΩ
 - D. Result: **PASSED**
- 2.7. Protection Against High Pressure/Steam Jet Cleaning (IPX9K) (Groups 2)
- A. Procedure: DIN 40050, Part 9
 - B. Method: Mated assemblies were attached to a rotating table. The rotation speed of the table was set at 5 ± 1 RPM. The sample was sprayed with a flat fan type nozzle for 30 seconds from approximately 5 inches (127 mm) while rotating. The water temperature was approximately $80^{\circ}\text{C} \pm 5^{\circ}\text{C}$. The spray nozzle was positioned at an angle of 0° to the test sample. This procedure was repeated three more times with the spray nozzle repositioned each time to spray at an angle of 30° , 60° , and 90° to the test sample. The water flow rate was measured at approximately 14.5 LPM, and the water pressure measured at approximately 8274 KPa (1200 psi).
 - C. Requirement: Insulation Resistance > 20 MΩ
 - D. Result: **PASSED**

3.1 Revision History

Rev Ltr	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	30-Sep-2019	DM	DM