# DEUTSCH* DRC16 Series Connector System IP68, IP6K9K

## 1. INTRODUCTION

### 1.1. Purpose

Testing was performed on DEUTSCH DRC16 series connector system to determine conformance to IP68 and IP6K9K. Test procedures are given in SAE J2030, dated 2009; 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 DRC16 series connector system. Testing was performed at the Hemet Product Test Laboratory in 2015. 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 | WE-20150167ACL |
| 2 | 150316-02<br>150316-10<br>150316-18<br>150316-26<br>150317-02<br>150317-10 |
| 3 | WE-20150327ACL<br>WE-20150329ACL<br>WE-20150330ACL |

**Figure 1**

### 1.3. Conclusion

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




| Indicates Change

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 |
|---|---|---|
| DRC14-24PA | 24pin Inline Receptacle, N-Seal | 1,2 |
| DRC14-24PAE | 24pin Inline Receptacle, E-Seal | 1,2,3 |
| DRC14-40PA | 40pin Inline Receptacle, N-Seal | 1,2 |
| DRC14-40PAE | 40pin Inline Receptacle, E-Seal | 1,2,3 |
| DRC14-70PA | 70pin Inline Receptacle, N-Seal | 1,2 |
| DRC14-70PAE | 70pin Inline Receptacle, E-Seal | 1,2,3 |
| DRC16-24SA | 24pin Plug, N-Seal | 1,2 |
| DRC16-24SAE | 24pin Plug, E-Seal | 1,2,3 |
| DRC18-40SA | 40pin Plug, N-Seal | 1,2 |
| DRC18-40SAE | 40pin Plug, E-Seal | 1,2,3 |
| DRC16-70SA | 70pin Plug, N-Seal | 1,2 |
| DRC16-70SAE | 70pin Plug, E-Seal | 1,2,3 |

**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 | 3 |
| | TEST SEQUENCE (b) | | |
| Visual Examination | 1,6 | 1,6 | 1,6 |
| Insulation Resistance | 2,5 | 2,5 | 2,5 |
| Thermal Shock | 3 | 3 | 3 |
| Protection Against Dust (IP6X) | 4 | | |
| Protection Against Water (IPX8) | | 4 | |
| Protection Against High Pressure/Steam Jet Cleaning (IPX9K) | | | 4 |

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

- Groups 1 and 3 specimens consisted of 24, 40, 70 position connectors with DEUTSCH stamped & formed size 16 gold pins and sockets with 16 AWG and 18 AWG wire.
- Groups 2 specimens consisted of 24, 40, 70 position connectors with DEUTSCH stamped & formed size 16 nickel pins and sockets with 16 AWG and 18 AWG wire.

(b) Numbers indicate sequence that tests were performed.

**Figure 3**

## 2. SUMMARY OF TESTING

2.1. Visual Examination (Groups 1-3)

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 1-3)

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 1-3)

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) (Group 1)

A. Procedure: DIN 40050, Part 9

B. Method: The mated assemblies were placed in a dust chamber at room ambient temperature with <35%±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/$m^2$.

C. Requirement: Insulation Resistance > 20 MΩ and no dust visible inside connector.

D. Result: **PASSED.**

2.5. Protection Against Water (IPX8) (Group 2)

A. Procedure: IEC 60529

B. Method: Test samples were first subject to thermal shock then submersed in ambient water to a depth of 1 meter for 30 hours.

C. Requirement: Insulation Resistance > 20 MΩ

D. Result: **PASSED.**

2.6. Protection Against High Pressure/Steam Jet Cleaning (IPX9K) (Group 3)

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°C ± 5°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 | 04-Oct-2019 | DM | DM |
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