TEST REPORT

COVERING

EVALUATION TESTING

OF THE

DRC 40-PIN CONNECTOR

October 1986

DEUTSCH

Deutsch Test Report
October 1986

ABSTRACT

This report summarizes the results of the inhouse qualification testing of Deutsch's DRC electrical connectors. These connectors were tested in accordance with Deutsch Test Procedure #51712. This procedure, which is derived from automotive and aerospace industrial requirements, simulates extreme environmental and electrical conditions.

The following part numbers were subjected to testing in accordance with Deutsch Test Procedure #51712 as described herein.

Deutsch Part Number	Description
DRC 10-40 P	40 Pin Receptacle
DRC 16-40 P	40 Pin Plug
0462-201-16141	Socket Contact, Size 16

The results of the testing described herein indicate that the Deutsch DRC electrical connectors are capable of performing to specified standards.

DEUTSCH

SIGNATURE PAGE

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DEUTSCH HEAVY DUTY

1.0 SAMPLE DESIGN

Sample will be six mated pairs made on production tooling.

2.0 ASSEMBLY

All cavities to be wired 100% with wire supplied in lengths sufficient to accommodate testing. Crimp contacts with a Deutsch supplied crimp tool.

3.0 TEST SEQUENCE

Test samples shall be subjected to the following tests in the order shown:

TEST	SAMPLE NUMBER 1	2	3	4	5	6
1. Examination of Product (11.1)	X	X	X	X	X	X
2. Insulation Resistance (11.2)	X	X	X	X	X	X
3. Dielectric Withstanding Voltage (11.3)	X	X	X	X	X	X
4. Maintenance Aging (11.4)	X		X			
5. Temperature Life (11.5)		X		X		X
6. Contact Retention (11.6)	X		X			
7. Durability (11.7)		X	X		X	
8. Tool Abuse (11.8)				X	X	
9. Salt Spray (11.9)		X	X			X
10. Altitude Immersion (11.10)				X	X	X
11. Fluid Immersion (11.11)	X	X	X	X	X	X

4.0 TEST METHODS

4.1 Examination of Product: Conduct a visual examination only, i.e. identification of product, torn seals, cracked plastic.

5.0 SPECIFICATION REFERENCES

5.1 Deutsch Test Procedure #51712

General specification for the Deutsch DRC electrical connector

5.2 MIL-STD-1344

Test methods for electrical connectors

5.3 MIL-STD-39029

Test methods for electrical connector contacts

5.4 DCPM 2000

Deutsch calibration procedure manual

6.0 TEST CONDITIONS AND EQUIPMENT:

6.1 Test Conditions

Unless otherwise specified all tests and measurements were conducted within the following ambient limitations:

Temperature	+18°C to +35°C (+65°F to +95°F)
Relative Humidity	5% to 95%
Barometric Pressure	650 to 800 mm of mercury

6.2 Test Equipment

Instrument calibration was performed in accordance with Deutsch Calibration Procedure Manual DCPM 2000 prior to using the instrument for testing. Calibration records are maintained and are directly traceable to the National Bureau of Standards with no more than three levels of separation.

The following data concerning the test equipment was recorded on the data format for each test:

A) Descriptive name

B) Laboratory identification

C) Date of last calibration prior to use

7.0 DOCUMENTATION:

7.1 Recorded Data

All measurements were recorded to as many significant digits as are meaningful under the accuracy limits of the equipment used. All data was recorded on 8½"x11" data forms.

The ambient test conditions (temperature and relative humidity) and the data were recorded on the data form.

If a test was conducted on more than one (1) day, the ambient test conditions and the dates were recorded for each testing day.

Only original laboratory test data or a direct image thereof was submitted as the final report document. Data sheets were not rewritten. In the case of errors accidentally recorded on the data forms, the erroneous data was lined out by a single line and the corrected information was inserted and initialed by the technician making the change.

The data includes, whenever applicable, any diagrams and sketches of the following:

A) Electrical hookups that are peculiar to this test program or might prohibit duplication of the test method and results involved, if not supplied.

B) The orientation of samples to the direct force imparted during any phsical shock or vibration testing.

C) Any fixturing that would be used as a method of mounting the test samples that is fabricated exclusively for this test sequence.

8.0 SAMPLE DESCRIPTION AND SELECTION

8.1 Sample Description

The six (6) mated connector pairs tested for this report were assigned the consecutive numbers 1 - 6. The following part numbers constituted the qualification sample lot:

Deutsch Part Number	Qty.	Description
DRC 10-40 P	6	40 Pin Receptacle
DRC 16-40 P	6	40 Pin Plug
0462-201-16141	480	Socket Contact, Size 16

8.2 Sample Selection

The six (6) mated pairs selected for this test were manufactured utilizing Deutsch Company production methods, procedures, and tooling.

11.0 TEST METHODS AND RESULTS

11.1 EXAMINATION OF PRODUCT (Items 1 - 6)

11.1.1 Test Method

1. The connectors were visually inspected for correct use of materials, proper construction, correct part number and insert markings, and over-all quality of workmanship.

2. Poor molding fabrication, loose materials, damaged or improperly manufactured contacts, torn seals, flash, or cracked plastic were considered adequate basis for rejection.

11.1.2 Requirements

The connectors shall be correctly constructed, marked, and shall show good quality and workmanship.

11.1.3 Results

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.

11.2 INSULATION RESISTANCE (Items 1 - 6)

11.2.1 Test Method

The test samples were subjected to the Insulation Resistance Test which was performed in the following manner:

1. The wired, mated connector plugs and receptacles were connected to a megohmmeter and a switching system.

2. The insulation resistance was measured between each wired contact and all other wired contacts and the shells electrically connected together.

3. The test potential of 500 VDC was applied to each test point of the specimen and each reading was taken after the meter was stabilized. All forty contact points were tested for each connector.

11.2.2 Requirements

The insulation resistance shall be greater than 1000 megohms.

11.2.3 Results

The insulation resistance at each test point of all specimens was greater than 1000 megohms. All samples met the requirements of insulation resistance.

11.3 DIELECTRIC WITHSTANDING VOLTAGE (Items 1 - 6)

11.3.1 Test Method

The test samples were subjected to the Dielectric Withstanding Voltage Test, which was performed in the following manner:

1. The wired, mated connector plugs and receptacles were connected to a hypot tester and switching system.

2. The test potential of 1500 VAC was applied between each contact and all other contacts for a period of sixty seconds. All forty mated contacts were tested for each connector pair.

3. At each test point the voltage was increased from zero to 1500 volts at a rate of 500 volts per second. The voltage was decreased to zero before switching to the next test point.

11.3.2 Requirements

The connectors shall show no evidence of breakdown or flashover. There shall be no current leakage in excess of 2.0 milliamperes.

11.3.3 Results

There was no evidence of breakdown, flashover or current leakage in excess of 2.0 milliamperes in any of the test samples. All samples met the requirements specified for dielectric withstanding voltage.

11.4 MAINTENANCE AGING (Items 1 and 3)

11.4.1 Test Method

The test samples were subjected to the Maintenance Aging Test which was performed in the following manner:

1. The wired, unmated connector receptacles had 10% of their contacts (selected at random) completely removed and reinserted ten times.

2. Each contact cavity was visually inspected for damage.

3. All contact removal was done by hand, using the Deutsch #0411-204-1605 (size 16) tool for contact removal. Insertion of contacts was done by hand without an insertion tool.

11.4.2 Requirements

There shall be no visible change or damage to the contact cavities.

11.4.3 Results

There was no visible change or damage to the contact cavities. All samples met the required specifications for maintenance aging.

11.5 TEMPERATURE LIFE (Items 2, 4, and 6)

11.5.1 Test Method

The test samples were subjected to the Temperature Life Test which was performed in the following manner:

1. The wired, mated connectors were subjected to 100 hours of heat in a circulating air oven at 125°C (257°F).

2. After removal from the oven, the mated connectors shall be subjected to an insulation resistance test as per paragraph 11.2.

11.5.2 Requirements

There shall be no evidence of cracking, distortion, or other damage detrimental to the normal operation of the connectors. The insulation resistance shall be no less than 500 megohms.

11.5.3 Results

There was no evidence of cracking, distortion, or other damage detrimental to the normal operation of the connector. The insulation resistance was greater than 500 megohms. All items met the requirements specified for temperature life and the subsequent insulation resistance test.

11.6 CONTACT RETENTION (Items 1 and 3)

11.6.1 Test Method

The test samples were subjected to the Contact Retention Test which was performed in the following manner:

1. All the contacts in each unmated connector were tested. The connectors tested had all contacts in place during the test.

2. An axial load of 30 lbs. for size 16 contacts was applied to the individual contacts in a direction tending to push the contact out of the rear of the connector. The axial load was applied for a period of 15 seconds.

11.6.2 Requirements

The contacts shall not be dislodged from the connector when the specified axial load is applied.

11.6.3 Results

The contacts were not dislodged from the connector when the specified axial load was applied. All samples met the requirements specified for contact retention.

11.7 DURABILITY (Items 2, 3, and 5)

11.7.1 Test Method

The test samples were subjected to the Durability Test which was performed in the following manner:

Fully wired counterpart plugs and receptacles were mated and unmated by hand 100 times, in a way as to simulate actual service. The plugs and receptacles were completely separated during each cycle.

11.7.2 Requirements

The connectors shall show no evidence of damage detrimental to their normal operation.

11.7.3 Results

There was no evidence of damage detrimental to the normal operation of the test samples. All the samples met the requirements specified for durability.

11.8 TOOL ABUSE (Items 4 and 5)

11.8.1 Tested Method

The test samples were subjected to the Tool Abuse Test which was performed in the following manner:

1. Five cavities from each sample mated pair were selected for testing. Deutsch removal tool #0411-204-1605 (size 16) was used for the contact size used in the test.

2. The removal tool shall be inserted as if to remove the contact and an axial load of 5 pounds shall be applied. With the force applied, the tool shall be rotated 180° and then removed, also removing the contact. The contact shall then be reinserted into the cavity by hand.

3. This constitutes one cycle. There was a total of three cycles to each of the five selected cavities in each mated sample.

11.8.2 Requirements

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

11.8.3 Results

There was no visible damage to the connector seals or contact cavities. All samples met the requirements specified for tool abuse.

11.9 SALT SPRAY - CORROSION (Items 2, 3, and 6)

11.9.1 Test Method

The test samples were subjected to the Salt Spray-Corrosion Test which was performed in the following manner:

1. The salt solution concentration was 5% salt by weight.
2. The mated connectors were placed in the chamber so that they were completely engulfed by the salt spray.
3. The connectors were subjected to 96 continuous hours of exposure.
4. Immediately following the 96 hours exposure, the connectors were removed from the chamber and thoroughly washed with tap water. A soft bristle brush was used to aid cleaning.
5. The connectors were dried in an air circulating oven at a temperature of 38°C ±3°C for a maximum of twelve hours. They were then removed and inspected.

11.9.2 Requirements

The connectors shall show no evidence of corrosion which will affect performance in subsequent tests.

11.9.3 Results

The connectors showed no evidence of corrosion. The samples met the requirements of subsequent tests. All samples met the requirements specified for salt spray.

11.10 ALTITUDE IMMERSION (Items 4,5, and 6)

11.10.1 Test Method

The test samples were subjected to the Altitude Immersion Test which was performed in the following manner:

1. The wired and mated connectors were placed in a test container and completely covered with tap water such that the water covers the connectors being tested. The container shall then be placed in an altitude chamber and the pressure reduced to 32.68 torr and maintained for 30 minutes. The pressure in the chamber shall then be returned to standard room pressure and maintained for 30 minutes. The above cycle shall be repeated for a total of 3 minutes. After the third cycle, samples shall be tested for DWV per paragraph 11.3.

2. The test connectors will then be removed from the water, unmated to check for water, and dried in an air circulating oven for a minimum of 8 hours at 100°C.

11.10.2 Requirements

The connectors shall show no evidence of breakdown or flashover. There shall be no current leakage in excess of 2.0 milliamperes.

11.10.3 Results

There was no evidence of breakdown or flashover nor was there current leakage in excess of 2.0 milliamperes in any of the test samples. All samples met the requirements specified for altitude immersion.

11.11 FLUID IMMERSION (Items 1 - 6)

11.11.1 Test Method

The test samples were subjected to the Fluid Immersion Test which was performed in the following manner:

1. Each wired, mated connector was subjected to immersion in one fluid only. The connectors were subjected to the following fluids in the order shown:

ITEM NO.	TEST FLUID
1	Motor Oil 30W (detergent)
2	Hydraulic Brake Fluid (disc type 1)
3	5% Soap Solution
4	Diesel Fuel #2
5	Antifreeze Solution (max. protection)
6	Gear Oil 90W

2. The mated, wired connectors were subjected to five consecutive cycles of fluid immersion. Each cycle was performed as follows:

   A) The mated connector was submerged in its corresponding fluid at ambient conditions for five minutes.

   B) The mated connector was then removed and allowed to dry for 24 ±2 hours.

3. After completion of the fifth cycle of fluid immersion, the connector was visually inspected for any damage.

11.11.2 Requirements

The connectors shall show no visible evidence of damage detrimental to their normal operation.

11.11.3 Results

There was no visible evidence of damage detrimental to the normal operation of the connectors. All samples met the requirements specified for fluid immersion.