STRIKE Series Connector System

1. INTRODUCTION

1.1. Purpose

This report summarizes the results performed on DEUTSCH STRIKE series connector system to determine conformance to the requirements of product specification 108-151023, rev A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the DEUTSCH STRIKE series connector system. Testing was performed at the TE Connectivity Industrial Commercial Transportation Laboratory in 2016. The test file numbers for this testing are listed in Figure 1. This documentation is on file at, and available from, TE Connectivity Industrial Commercial Transportation Laboratory.

Test Group	Test Report
1	20150300ACL / 20150301ACL
2	20150300ACL / 20150301ACL
3	IPD151001-01 / IPD151006-01
4	IPD151001-02 / IPD151006-02
5	IPD151001-03 / IPD151006-03
6	IPD151001-04 / IPD151006-04
7	IPD151001-05

Figure 1

1.3. Conclusion

The DEUTSCH STRIKE series connectors listed in Paragraph 1.4 conform to the electrical, mechanical, and environmental performance requirements given in product specification 108-151023, 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.

Part Number	Description	Test Group
SRK02-MDA-32A-001	32-pin Receptacle, Flange, Medium, “A” key	1-6
SRK06-MDA-32A-001	32-pin Plug, Medium, “A” key	1-6
SRK02-FLA-64A-001	64-pin Receptacle, Flange, Full, “A” key	1-6
SRK06-FLA-64A-001	64-pin Plug, Full, “A” key	1-6
SRK02-MDC-32A-001	32-pin Receptacle, Flange, Medium, “C” key	3
SRK06-MDC-32A-001	32-pin Plug, Medium, “C” key	3
SRK02-FLC-64A-001	64-pin Receptacle, Flange, Full, “C” key	3
SRK06-FLC-64A-001	64-pin Plug, Full, “C” key	3
1060-16-0122	Size 16 Pins, Nickel, 16AWG	1,3
1060-16-0622	Size 16 Pins, Nickel, 20AWG	2,4,6
1062-16-0122	Size 16 Sockets, Nickel, 16AWG	1,3
1060-16-0622	Size 16 Sockets, Nickel, 20AWG	2,4,6
1060-20-0122	Size 20 Pins, Nickel	2-4,6
1060-20-0144	Size 20 Pins, Gold	1
1062-20-0122	Size 20 Sockets, Nickel	2-4,6
1062-20-0144	Size 20 Sockets, Gold	1

Figure 2

1.5. Environmental Conditions

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

Temperature: 18° to 35°C [65° to 95°F]

Relative humidity: 5 to 95%

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)						
	1	2	3	4	5	6	7
	Test Sequence (b)						
Examination of Product	1	1	1	1	1	1	1
Fluid Immersion					2		2
Maintenance Aging			2				
Water Immersion				2,5		2	
Insulation Resistance		2,7		3,6		3	
Low-Voltage Resistance	2,4,6,8						
Thermal Shock	3	3	3				
Temperature Life				4		4	
Vibration	5	4					
Mating / Unmating Forces			4,6				
Shock	7	5					
Pressure Spray		6				5	
Durability			5,9				
Dust Test				8			
Terminal Retention in Connector			7				
Connector Retention			8,10	7			
Drop Test		8					
Mismating			11				
Visual Examination	9	9	12	9	3	6	3

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

1) Group 1 consisted of 32 and 64-pin connectors with DEUTSCH Stamped and Formed Size 16 Nickel contacts with 16AWG wire and Size 20 Nickel and Gold contacts with 20AWG wire.

2) Groups 2, 4, and 6 consisted of 32 and 64-pin connectors with DEUTSCH Stamped & Formed Size 16 and 20 Nickel contacts both with 20 AWG wire.

3) Group 3 consisted of 32 and 64-pin connectors with DEUTSCH Stamped and Formed Size 16 Nickel contacts with 16AWG wire and Size 20 Nickel contacts with 20AWG wire.

4) Group 5 consisted of 32 and 64-pin connectors with sealing plugs.

5) Group 7 consisted of 32-pin connectors with sealing plugs.

b) Numbers indicate sequence in which tests were performed

Figure 3

2. TEST METHODS AND RESULTS

2.1. Examination of Product (Groups 1 through 7)

A. Test Method

1. The connectors were visually inspected for correct use of materials, proper construction, correct part number and insert markings, and overall quality of workmanship.
2. 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 were considered adequate basis for rejection.

B. Requirements

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

C. 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 prior to start of testing.

2.2. Fluid Immersion (Groups 5 & 7)

A. 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:

Fluid	Temperature ±3°C (±5°F)
Motor Oil 30 weight	+60 [140]
Brake Fluid (disc type 1)	+60 [140]
50/50 Antifreeze/Water mixture	+60 [140]
Transmission Oil 90 weight	+60 [140]

Figure 4

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 air dry 24 ± 2 hours.
3. After completion of the fifth cycle of fluid immersion, the connector was visually inspected.

B. Requirements

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

C. Results

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

2.3. Maintenance Aging (Group 3)

A. Test Method

The test samples were subjected to the maintenance aging test, which was performed in the following manner:

1. For each sample, subject at least 10% of the cavities to 5 cycles of inserting and removing its respective contact. Each contact size will be represented.
2. Each contact cavity tested was visually inspected for damage.
3. All contact removal was done by hand. Insertion of contacts was done by hand with no insertion tool.

B. Requirements

The connectors shall meet visual requirements and show no physical damage.

C. Results

All test samples met visual requirements and showed no physical damage. All samples met required specifications for maintenance aging.

2.4. Water Immersion (Groups 4 & 6)

A. Test Method

The test samples were subjected to the water immersion test, which was performed in the following manner:

1. The wired mated connectors shall be placed in an oven at 125 °C ± 3 °C for 1 h then immediately be placed in water with a 5% salt in weight content and 0.1 g/L wetting agent, to a depth of 1 m for 4 h.
2. Water temperature is to be 23 °C ± 3 °C. The ends of the cable are to be sealed during this test.

B. Requirements

Pass Insulation Resistance (see paragraph 2.5) and no moisture should be detected inside the connector after a visual inspection.

C. Results

All samples had insulation resistance measurements that were greater than 20 MΩ. All samples met required specifications for water immersion.

2.5. Insulation Resistance (Group 2, 4, & 6)

A. Test Method

The test samples were subjected to the insulation resistance test, which was performed in the following manner:

1. Using a 1000 VDC insulation resistance test measurement device or equivalent, check insulation resistance between each contact to each adjacent contact or housing edge.

B. Requirements

The insulation resistance shall be greater than 20 MΩ.

C. Results

All samples had insulation resistance measurements that were greater than 20 MΩ. All samples met required specifications for insulation resistance.

2.6. Low-Voltage Resistance (Group 1)

A. Test Method

The test samples were subjected to the low-voltage resistance test, which was performed in the following manner:

1. The test connectors were tested with applied voltage not exceeding 20 mV open circuit and the test current was limited to 100 mA.
2. Connection resistance was measured.

B. Requirements

Maximum resistance values are shown in Figure 5.

Cable Size	Maximum Resistance
AWG [mm²]	(mΩ max)
16 [1.0]	6.0
18 [0.80]	7.5
20 [0.50]	11.0
22 [0.35]	17.0

Figure 5

C. Results

All samples met the requirements of low-voltage resistance.

2.7. Thermal Shock (Groups 1 through 3)

A. Test Method

The test samples were subjected to the thermal shock test, which was performed in the following manner:

1. The cabled-mated connector shall be subjected to 10 cycles of thermal shock.
2. 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 min.
3. 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.

B. Requirements

There shall be no evidence of cracking, chipping or other damage detrimental to the normal operation of the connectors.

C. Results

There was no visible evidence of cracking, chipping, or other damage detrimental to the normal operation of any connector. All the groups met the requirements specified for thermal shock.

2.8. Temperature Life (Groups 4 & 6)

A. 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 1000 hours of heat in a circulating air oven at 125°C [257°F].

B. Requirements

There shall be no evidence of cracking, distortion, or other damage detrimental to the normal operation of the connectors.

C. Results

There was no evidence of cracking, distortion, or other damage detrimental to the normal operation of the connector. All groups met the requirements specified for temperature life.

2.9. Vibration (Groups 1 & 2)

A. Test Method

The test samples were subjected to the vibration test, which was performed in the following manner:

1. The test samples were mounted to a fixture capable of transmitting the vibration conditions specified and designed so that there was no resonant vibration inherent in the fixture within the specified frequency range. Vibration input was monitored on the mounting fixture in the proximity of the support points of the test samples.
2. Sine vibration test levels were applied in each of the three mutually perpendicular directions using the following parameters:

Parameter	Requirement
Sine Sweep	10 to 2000 Hz
Initial Displacement	0.07 in [1.78 mm] DA
Maximum Acceleration	20 G's
Test Duration	12 hours
Time Per Axis X, Y, Z	4 hours
Test Current	See Paragraph 2.6
(first 3 hours each axis)	
Monitor for Discontinuity (last hour each axis)	-

Figure 6

3. During the first three hours of vibration in each axis, 10 amps for size 16 contacts and 5 amps for size 20 contacts must be applied.
4. During the last hours of vibration in each axis discontinuity must be monitored. There shall be no discontinuity greater than 1.0 microsecond with a current of 100 milliamps.

B. Requirements

The test samples shall have no electrical discontinuity in excess of 1.0 microsecond, no disengagement of the mated connectors, no backing off of the coupling mechanism, and no evidence of cracking, breaking, or loosening of parts.

C. Results

There was no electrical discontinuity in excess of 1.0 microsecond and had no disengagement of the mated connectors, no backing off of the coupling mechanism, and no evidence of cracking, breaking, or loosening of parts. All groups met the requirements for vibration.

2.10. Mating / Unmating Forces (Group 3)

A. Test Method

The test samples were subjected to the mating/unmating forces test, which was performed in the following manner:

1. For connectors without mechanical assist, test the maximum required force to mate the plug and receptacle pair and engage the latching mechanism.
2. For connectors without mechanical assist, test the maximum force required to separate the plug and receptacle with the latch mechanism fully disengaged.

B. Requirements

Required force to mate the plug and receptacle pair and engage latching mechanism shall not exceed 100 N. Required force to separate the plug and receptacle pair and fully disengage latching mechanism shall not exceed 100 N.

C. Results

All connector plug and receptacle pairs were to mate and unmate without exceeding the maximum force of 100 N. All groups met requirements for mating / unmating forces.

2.11. Shock (Groups 1 & 2)

A. Test Method

The test samples were subjected to the shock test, which was performed in the following manner:

1. The test samples were subjected to 10 shocks in each of two perpendicular axis. The pulse was an approximate half sine wave of 50 g±15 percent with a duration of 11±1 milliseconds.
2. The test samples were mounted on a shock fixture by normal means. The wire bundle was clamped to non-shocked objects no closer than 100 mm and not farther than 300 mm from the rear of the connector.
3. All contacts had a maximum of 100 milliamperes flowing through them and were individually monitored for discontinuities in excess of 1.0 microsecond.

B. Requirements

The test samples shall show no electrical discontinuity, no disengagement of the mated connectors, and no evidence of cracking, breaking, or loosening of parts.

C. Results

There was no electrical discontinuity, no disengagement of the mated connectors, and no evidence of cracking, breaking, or loosening of parts. All groups met the requirements for shock.

2.12. Pressure Spray (Group 2 & 6)

A. Test Method

The test samples were subjected to the pressure spray test, which was performed in the following manner:

1. The mated and cabled connectors under test shall be mounted in its normal operating position.
2. The part rotated at 5 rpm and sprayed with a fan nozzle from 10 cm to 15 cm distance from the sample.
3. Parts were sprayed with 14 to 16 L/min water flow and a pressure of approximately 80 to 100 bar water pressure for 30 seconds in each of four positions (0, 30, 60 and 90°) with the water temperature at 80°C.

B. Requirements

There shall be no evidence of water ingress into the connector housing.

C. Results

There was no evidence of water ingress into the connector housing. All groups met the requirements for pressure spray.

2.13. Durability (Group 3)

A. Test Method

The test samples were subjected to the durability test, which was performed in the following manner:

1. The connector were mated and unmated for a total of 20 complete cycles at room temperature.

B. Requirements

The test samples shall show no evidence of damage to the contacts, contact plating, connector housing or seals which may be detrimental to reliable connector performance.

C. Results

The test samples showed no evidence of damage to the contacts, contact plating, connector housing or seals which may be detrimental to reliable connector performance. All groups met the requirements for durability.

2.14. Dust Test (Group 4)

A. Test Method

The test samples were subjected to the dust test, which was performed in the following manner:

1. The samples are placed about 15 cm (6 in) from one wall in a 91.4 cm (3 ft) cubical box.
2. The box should contain 4.54 kg (10 lbf) of fine powdered cement in accordance with ASTM C 150–56.
3. At intervals of 15 min, the dust must be agitated by compressed air or fan blower. Blasts of air for a 2 s period in a downward direction assure that the dust is completely and uniformly diffused throughout the entire cube. The dust is then allowed to settle.
4. The cycle is repeated for 5 h.

B. Requirements

There shall be no evidence of dust ingress into the connector housing.

D. Results

There was no evidence of dust ingress into the connector housing. All groups met the requirements for dust test.

2.15. Terminal Retention in Connector (Group 3)

A. Test Method

The test samples were subjected to the terminal retention in connector test, which was performed in the following manner:

1. The contacts were subjected to a direct pull. The minimum value specified in Figure 7 was applied for 1 minute.

Contact Size	Minimum Pull Out Force lbf [N]
16	25 [111]
20	20 [89]

Figure 7

2. The pull was exerted on the conductor by means of a tension-testing machine or equivalent to prevent sudden or jerking force during test.

B. Requirements

The terminal shall maintain its original position in the connector throughout the test.

C. Results

The test samples maintained their original position in the connector throughout the test. All sampled met the requirements for terminal retention in connector.

2.16. Connector Retention (Groups 3 & 4)

A. Test Method

The test samples were subjected to the connector retention test, which was performed in the following manner:

1. A pulling force was applied to the wire bundle of the mated connector at 111 N times the number of contacts or a maximum of 444 N. The load was applied for 30 seconds.

B. Requirements

There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.

C. Results

The test samples showed no evidence of cracking, distortion or detrimental damage to the connector following the test. All samples met the requirements for connector retention.

2.17. Drop Test (Group 2)

A. Test Method

The test samples were subjected to the drop test, which was performed in the following manner:

1. The free end of the cord or cable, which was 1500 mm ± 25 mm long, was fixed to a wall at a height of 750 mm ± 25 mm above a concrete floor, as shown in Figure 8.
2. The specimen was held so that the cord or cable is horizontal and allowed to fall to a concrete floor eight times. The specimens were rotated through approximately 45 degrees at its fixing each time.

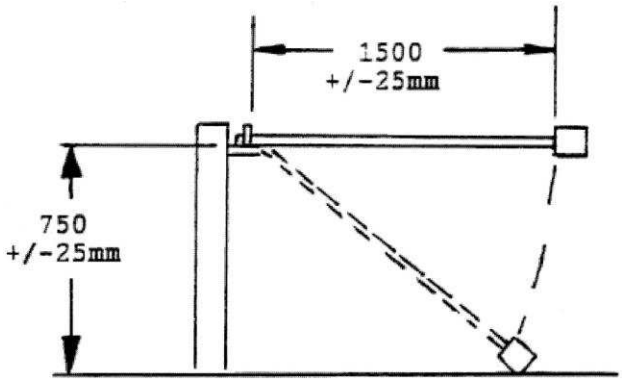

Figure 8

B. Requirements

There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test. Small chips and dents that do not adversely affect the connector shall be disregarded.

C. Results

The test samples showed no evidence of cracking, distortion or detrimental damage to the connector following the test. All samples met the requirements for drop test.

2.18. Mismating (Group 3)

A. Test Method

The test samples were subjected to the mismating test, which was performed in the following manner:

1. Intended polarization for connectors was tested with a 178 N minimum axial force to determine resistance to damage due to improper assembly during installation.

B. Requirements

Polarization and different keys shall resist a minimum of 178 N axial force without damage.

C. Results

The test samples showed no evidence of cracking, distortion, or detrimental damage to the connector following the test. All samples met the requirements for mismating.

2.19. Visual Examination (Groups 1 through 7)

A. Test Method

1. The tested connectors were examined to determine the effects of previous testing.
2. Any evidence of torn seals, cracked plastic, loosening of parts, excessive wear, carbon tracking, or missing parts was recorded.

B. Requirements

The test connectors shall show no evidence of damage detrimental to normal operation. All markings shall be legible.

C. Results

The test samples showed no evidence of any damage detrimental to normal operation and all markings were legible. All test samples met the requirements for the visual examination.