

DRC26 Series Connector System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) DRC26 Series Connector System.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Successful qualification testing on the subject product line was completed in 1997 and 2000. The Qualification Test Report number for this testing is 501-151052. This document is on file at and available from Product Engineering, Industrial Commercial Transportation (ICT).

2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies.

2.1. TE Connectivity (TE) Documents

- [109-1](#) General Requirements for Testing
- [114-151003](#) Application Specification for DEUTSCH Size 20 S&F Pin & Socket
- [114-151004](#) Application Specification for DEUTSCH Solid Pin & Socket Contacts
- [408-151007](#) DEUTSCH Extraction Tools for Rear-Release Connectors
- [501-151052](#) DRC26 Series Qualification Test Report
- Product Drawings
 - X refers to A, B, C, D keys.
 - XX refers to 01 thru 10 keys.

DRC26-24SX	24 pin Plug	DRC22-40PX	40 pin Receptacle, 180°
DRC26-24SX-P017	24 pin Plug	DRC22-50PXX	50 pin Receptacle, 180°
DRC26-24SX-P019	24 pin Plug	DRC23-24PX	24 pin Receptacle, 90°
DRC26-40SX	40 pin Plug	DRC23-40PX	40 pin Receptacle, 90°
DRC26-40SX-L011	40 pin Plug	DRC23-40PX-N010	40 pin Receptacle, 90°
DRC26-40SX-P017	40 pin Plug	DRC23-40PX-N012	40 pin Receptacle, 90°
DRC26-40SX-P019	40 pin Plug	DRC20-50SXX	50 pin Receptacle, 180°
DRC26-40SX-PL01	40 pin Plug	DRC20-60SXX	60 pin Receptacle, 180°
DRC26-50SXX	50 pin Plug	0528-001-5005	50 pin Backshell, 90°
DRC26-50SXX-C026	50 pin Plug	0528-001-5005-P024	50 pin Backshell, 90°, Drain
DRC26-50SXX-C027	50 pin Plug	0528-002-6005	60 pin Backshell, 90°
DRC26-50SXX-C031	50 pin Plug	0528-002-6005-P024	60 pin Backshell, 90°, Drain
DRC26-60SXX	60 pin Plug	0528-007-6005	60 pin Backshell, 90°, Side

2.2. Industry Documents

- DIN 40050-9: Road vehicles Degrees of Protection (I P Code)
- DIN 72551-6: Road Vehicles—Low-Tension Cables—Part 6: Single-Core, Unscreened with Thin Insulation Wall; Dimensions, Materials, Marking
- IEC 60529: Degrees of Protection Provided by Enclosures (IP Code)
- ISO 6722: Road Vehicles—60 V and 600 V Single-Core Cables—Dimensions, Test Methods, and Requirements
- MIL-STD-202: Test Method Standard Electronic and Electrical Components Part
- MIL-STD-1344: Test Methods for Electrical Connectors
- SAE J1128: Low Voltage Primary Cable
- SAE J2030: Heavy-Duty Electrical Connector Performance Standard

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Ratings

- Voltage: 250 VAC/DC
- Current (Amp): See Figure 1

Connector Loading	Wire Size AWG [mm ²]			
	16 [1.5-1.0]	18 [0.80-0.75]	20 [0.50]	22 [0.35]
All Circuits Energized	7.5	7.5	7.5	5.0

Figure 1

- Temperature: -55°C to +125°C
- Ingress Protection (IP) Level: IP68 and IP6K9K (with rear protection, such as backshell)
- Flammability: UL Recognized. Parts have been successfully tested to the 20mm Flame Test per Standard UL-94.

3.3. Test Requirements and Procedures Summary.

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Test Description	Requirement	Procedure
Inspection to Applicable Drawing	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 are considered adequate basis for rejection.	Inspect the product for compliance to the engineering drawing for correct materials, proper construction, correct part number and insert markings, and over-all quality of workmanship.
Examination of Product	The connectors shall be correctly constructed, marked and shall show good quality and workmanship.	SAE J2030 Conduct a visual examination only for identification of product, torn seals, cracked plastic, etc.

ELECTRICAL

Low Level Contact Resistance	10 mΩ max.	MIL-STD-1344, Method 3002.1 Test current shall be 100 mA max with an open circuit test voltage of 20 mV maximum. The resistance of an equal length of wire shall be subtracted from all readings to determine the added resistance of the terminal.
Contact Resistance	10 mΩ max.	MIL-STD-1344, Method 3004.1 Test current shall be 7.5A max with applied voltage of 12 VDC max open circuit. The resistance of an equal length of wire shall be subtracted from all readings to determine the added resistance of the terminal.
Insulation Resistance	1000 MΩ min.	MIL-STD-1344, Method 3003.1 Check each contact to all other contacts and the shell, if the shell is conductive. Performed using a 100 VDC and 500 VDC megohmmeter.

MECHANICAL

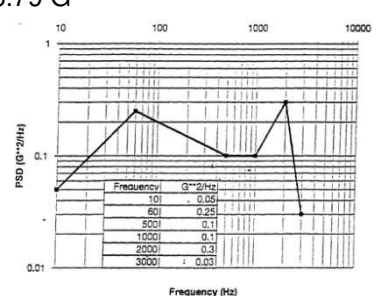
Crimp Tensile Strength	111 N min.	SAE J2030 The tensile strength of the crimped connection shall be tested using a suitable apparatus at a constant speed of 1.00 inch per minute.
Vibration	No visible contact wear which could be detrimental to reliable performance. Must meet functional tests.	Test samples to 20 hours of random vibration in each of three mutually perpendicular axes per the vibration profile. Amplitude of vibration shall be 16.79 G 

Figure 2 Cont.

Test Description	Requirement	Procedure
Contact Retention	Contact shall not become disengaged	Apply an axial load at a rate of 1.00 inch per minute until a force of 25 lbs is reached. Maintain the axial load for 30 seconds.
Drop	No detrimental damage to the reliable performance. Must meet functional tests.	Drop unmated samples on each of their 6 sides from a height of 1 meter onto a solid concrete surface. Repeated 3 times.
Durability	No evidence of damage to the contacts, the contact plating, the connector housing, seals which may be detrimental to reliable connector performance. Must meet functional tests.	Connectors shall be subjected to 25 cycles of mating and unmating at room temperature.
ENVIRONMENTAL		
Thermal Life	No evidence of physical damage which may be detrimental to reliable connector performance. Must meet functional tests.	MIL-STD-202, Method 108 Condition D Subject the wired mated connectors to 1000 hours at +125°C without current flowing.
Fluid Thermal Shock 1	No evidence of physical damage which may be detrimental to reliable connector performance or water inside. Must meet functional tests.	Subject mated test samples yo 10 cycles of thermal shock from 0°C to 100°C as follows. No wires, but with sealing plugs. Submerge samples in a pan of water 100°C for 10 minutes. Then place in a pan of water 0°C for 10 minutes. Transfer time not to exceed 15 seconds.
Fluid Thermal Shock 2	No evidence of physical damage which may be detrimental to reliable connector performance or water inside. Must meet functional tests.	Place mated samples in 125°C oven for 2 hours. Then submerged in a 0°C water bath to a depth less than 1 meter for 10 minutes. Repeat cycle 10 times.
Thermal Shock	There shall be no evidence of cracking, distortion or detrimental damage to the connector following the test.	SAE J2030 Subjected test sample to 10 cycles. One cycle is -55°C soak then transition within 2 min to +125°C soak then transition back to -55°C within 2 min. Soak times shall be the time needed to bring the internal connector temperature to within 5°C of each of the ambient temperatures.
Salt Spray	No evidence of corrosion after samples are cleaned with tap water.	Expose nonoperating mated samples to a 5% salt atmosphere at 35°C for 96 hours.
Sand and Dust	No evidence of physical damage after test and meet functional tests.	Subject nonoperating mated samples to a constant suspension, 8.5 grams/cubic meter minimum 80 mesh silica flour (i.e. air cleaner test dust) atmosphere for 24 hours. Test samples shall remain in a sealed chamber with the dust media for the duration of the test.

Figure 2 Cont.

Test Description	Requirement	Procedure																														
Thermal Cycle 1	No evidence of physical damage after test and meet functional tests.	Cycle mated connectors from -40° to +125°C. Connectors to remain at each temperature extreme for 1 hour followed by a 45-minute transition period of 3°/min. Repeat 100 cycles																														
Thermal Cycle 2	No evidence of physical damage after test and meet functional tests.	Cycle mated connectors from -40° to +125°C. Connectors to remain at each temperature extreme for 1 hour followed by a 45-minute transition period of 3°/min. Repeat 20 cycles																														
Chemical Resistance 1	No evidence of physical damage after test and meet functional tests.	Submerge test sample in the chemicals per below table at room temperature. Use same set of connectors for each chemical. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Test Chemical</th> <th>Dip Cycles</th> <th>Dip Time</th> <th>Air Dry Time</th> <th>Configuration</th> </tr> </thead> <tbody> <tr> <td>Motor Oil</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Diesel Fuel</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Brake Fluid</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Antifreeze</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Mineral Spirits</td> <td>1</td> <td>5 minutes</td> <td>4 hours</td> <td>Mated</td> </tr> </tbody> </table>	Test Chemical	Dip Cycles	Dip Time	Air Dry Time	Configuration	Motor Oil	80	3 seconds	3 minutes	Mated	Diesel Fuel	80	3 seconds	3 minutes	Mated	Brake Fluid	80	3 seconds	3 minutes	Mated	Antifreeze	80	3 seconds	3 minutes	Mated	Mineral Spirits	1	5 minutes	4 hours	Mated
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Chemical Resistance 2	No evidence of physical damage after test and meet functional tests.	Subject nonoperating mated samples per below table (chemicals, dip cycles, dip time and air-dry time). Before dipping process, apply lithium-based grease to the interface area of unmated samples then mate and stored for 48 hours. Next unmate the connectors and expose the unmated samples to contact cleaner for 5 seconds followed by a 24-hour dry time for 10 cycles. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Test Chemical</th> <th>Dip Cycles</th> <th>Dip Time</th> <th>Air Dry Time</th> <th>Configuration</th> </tr> </thead> <tbody> <tr> <td>Motor Oil</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Diesel Fuel</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Brake Fluid</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Antifreeze</td> <td>80</td> <td>3 seconds</td> <td>3 minutes</td> <td>Mated</td> </tr> <tr> <td>Mineral Spirits</td> <td>1</td> <td>5 minutes</td> <td>4 hours</td> <td>Mated</td> </tr> </tbody> </table>	Test Chemical	Dip Cycles	Dip Time	Air Dry Time	Configuration	Motor Oil	80	3 seconds	3 minutes	Mated	Diesel Fuel	80	3 seconds	3 minutes	Mated	Brake Fluid	80	3 seconds	3 minutes	Mated	Antifreeze	80	3 seconds	3 minutes	Mated	Mineral Spirits	1	5 minutes	4 hours	Mated
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Steam Cleaning/ Pressure Wash	No evidence of physical damage after test and meet functional tests.	Mount test samples in normal operating position and subjected to 1500 psi and +90°C water spray for 10 minutes with 10% detergent degreaser added to the water wash. Test stand shall provide 360° coverage with the nozzle 6-12 inches away.																														
Humidity	No evidence of physical damage after test and meet functional tests.	Subject test sample to 24-hour cycles per below profile. Repeat 10 cycles. <div style="text-align: center;"> <p>The graph shows a 24-hour cycle repeating twice. The temperature (top line) is constant at 95°C for 16 hours, drops to 85°C for 8 hours, and returns to 95°C. The humidity (bottom line) rises from 30% to 60% during the 16-hour 95°C period, stays at 60% for 8 hours, drops to 30% during the 8-hour 85°C period, and returns to 60% during the next 16-hour 95°C period.</p> </div> <p>Note: Relative humidity maintained above 55% during temperature drops.</p>																														

Figure 2 Cont.

Test Description	Requirement	Procedure
Protection Against Dust (IP6KX)	No dust visible inside mated connectors.	DIN 40050-9 Subject specimens to 20 cycles of 6seconds movement of air/dust mixture, pause of 15 minutes.
Protection Against Water (IPX8)	Insulation Resistance: 20 MΩ minimum.	IEC 60529 Subject specimens to immersion in water: 1m for 4 hours.
Protection Against High Pressure/Steam Jet Cleaning (IPX9K)	Insulation Resistance: 20 MΩ minimum.	DIN 40050-9 Subject specimens to water fan with rotational speed $5\pm 1^\circ/\text{min}$, water flow 14- 16 l/min, water pressure 800-1000 kP, water temperature $80\pm 5^\circ\text{C}$ for 30 seconds per position. Spray positions: 0°, 30°, 60°, 90°

Figure 2 end

3.4. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)											
	1	2	3	4	5	6	7	8	9	10	11	12
	TEST SEQUENCE (b)											
Inspection to Applicable Drawing	1					1						
Examination of Product										1,6	1,6	1,6
Low Level Contact Resistance	2	3	3,7,11	2,6,10,14	2,6	2,6	3,7,11	2,6,10,14	2,6			
Contact Resistance	3	4	4,8,12	3,7,11,15	3,7	3,7	4,8,12	3,7,11,15	3,7			
Insulation Resistance	4	5	5,9,13	4,8,12,16	4,8	4,8	5,9,13	4,8,12,16	4,8	2,5	2,5	2,5
Crimp Tensile Strength		6				9						
Vibration-Component Level			2				2					
Contact Retention		1				10						
Drop		2				5						
Durability			1				1					
Thermal Life					5				5			
Fluid Thermal Shock 1			6									
Fluid Thermal Shock 2							6					
Thermal Shock										3	3	3
Salt Spray				9				9				
Sand and Dust				5				5				
Thermal Cycle 1				1								
Thermal Cycle 2								1				
Chemical Resistance 1					1							
Chemical Resistance 2									1			
Steam Cleaning/Pressure Wash				13				13				
Humidity			10				10					
Protection Against Dust (IP6KX)										4		
Protection Against Water (IPX8)											4	
Protection Against High Pressure/Steam Jet Cleaning (IPX9K)												4



NOTE (See page 8)



NOTE

- a) *Specimens were prepared in accordance production drawings and were selected at random from current production.*
- b) *Numbers indicate sequence that tests were performed.*
- c) *Groups 1 - 5 specimens consisted of 50-position with DEUTSCH stamped and formed terminal system size 20 gold sockets with size 18 AWG GXL wire.*
- d) *Groups 6 - 9 specimens consisted of 60-position with DEUTSCH solid terminal system size 20 nickel sockets with size 18 AWG GXL wire.*
- e) *Crimp characteristics (i.e. height, width, etc.) shall be checked prior to testing.*
- f) *All unsealed cavities shall be secured with sealing plugs. To prevent capillary action on the sealed connector, all free wire ends and test points (i.e. millivolt test connection) shall be sealed with alcohol-based RTV silicone or equivalent and covered with heat shrink tubing.*

4. REVISION HISTORY

Rev	Brief Description of Change	Date	Dwn	Apvd
A	Initial Release	9-May-19	DD	DM