

DTP Series Connector System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) DTP 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. Qualification

Successful qualification testing on the subject product line was completed in 2000-2001. The Qualification Test Report number for testing is 501-151038. This documentation 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
- **408-151008:** Instruction Guide DEUTSCH Removal Tool DT-RT1
- **501-151038:** DTP Qualification Test Report
- **502-151099:** DEUTSCH* DT/DTP Ultraviolet effects Engineering Test Report
- Product Drawings

XXXX refers to product modification.

Wedge Lock PN's sold separately but are required for DTP functionality.

DTP04-2P-XXXX	2pin Receptacle	DTP06-2S-XXXX	2pin Plug
DTP04-4P-XXXX	4pin Receptacle	DTP06-4S-XXXX	4pin Plug
DTP10-4P	4pin Receptacle, 180° Header		
DTP13-4P-XXXX	4pin Receptacle, 90° Header	WP-2S-XXXX	2pin Plug Wedge Lock
DTP15-4P-XXXX	4pin Receptacle, 180° Header	WP-4S-XXXX	4pin Plug Wedge Lock
WP-2P-XXXX	2pin Rcpt Wedge Lock		
WP-4P-XXXX	4pin Rcpt Wedge Lock		

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
- ASTM G154: Accelerated weather testing
- ASTM G155: Xenon Arc Exposure for Non-Metallic Materials

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

Connector Loading	Wire Size AWG [mm ²]		
	10 [6.0-5.0]	12 [4.0-2.5]	14 [2.0]
All Circuits Energized	25.0	25.0	18.0

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.

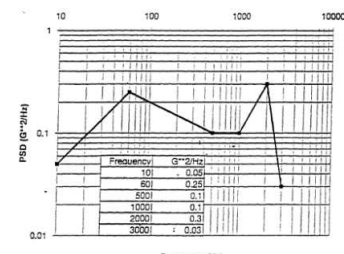
Test Description	Requirement	Procedure
3.3.1 Inspection to Applicable Drawing	Poor molding fabrication, loose materials, damaged or improperly manufactured contacts, galling of metal parts, nicks and burrs of metal parts, and torn seals or cracked plastic are considered adequate basis for rejection.	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.
3.3.2 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		
3.3.3 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.
3.3.4 Contact Resistance	10 mΩ max.	MIL-STD-1344, Method 3004.1 Test current shall be 25A 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.
3.3.5 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		
3.3.6 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.
3.3.7 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
3.3.8 Contact Retention	Contact shall not become disengaged	Apply an axial load at a rate of 1.00 inch per minute until a force of 30 lbs is reached. Maintain the axial load for 30 seconds.
3.3.9 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.
3.3.10 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		
3.3.11 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.
3.3.12 Fluid Thermal Shock	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.
3.3.13 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.
3.3.14 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.
3.3.15 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.
3.3.16 Thermal Cycle	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

Figure 2 Cont.

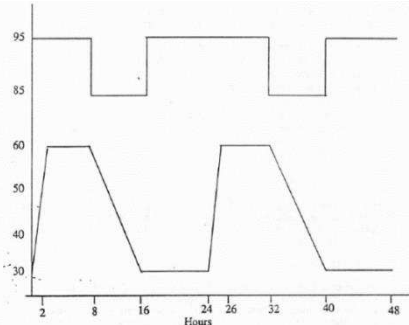
Test Description	Requirement	Procedure																														
3.3.17 Chemical Resistance	No evidence of physical damage after test and meet functional tests.	<p>Subject nonoperating mated samples per below table (chemicals, dip cycles, dip time and air-dry time). Before dipping process, apply 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.</p> <table border="1" data-bbox="938 470 1414 617"> <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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3.3.18 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.																														
3.3.19 Humidity	No evidence of physical damage after test and meet functional tests.	<p>Subject test sample to 24-hour cycles per below profile. Repeat 10 cycles.</p>  <p>Note: Relative humidity maintained above 85% during temperature drops.</p>																														
3.3.20 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.																														
3.3.21 Protection Against Water (IPX8)	Insulation Resistance: 20 MΩ minimum.	IEC 60529 Subject specimens to immersion in water: 1m for 4 hours.																														
3.3.22 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±1°/min, water flow 14- 16 l/min, water pressure 800-1000 kP, water temperature 80±5 °C for 30 seconds per position. Spray positions: 0°, 30°, 60°, 90°																														
3.3.23 Ultraviolet Effect	No evidence of cracking, distortion, or detrimental damage to the connector.	SAE J2030_201506 Completely assemble plug and receptacle with all applicable components, such as terminals. Test the mated connectors for 1000 hours per ASTM G155 with extended UV filter or ASTM G154 using an unfiltered UVA 340 lamp with 20 hours UV and 4 hours of condensation for each cycle.																														

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


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) Specimens shall consist of 2 and 4 position connectors with DEUTSCH solid terminal size 12 nickel plated pin and socket contacts 12 AWG GXL wire.
- d) Group 8. Specimens shall consist of 2 and 12 position connectors with DEUTSCH stamped & formed size 16 nickel pins and sockets with 14 SXL wire; 4 position

connectors with DEUTSCH stamped & formed size 12 nickel pins and sockets with 12 SXL 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
B	3.2 Rating Voltage (is) 200 VAC/DC (was) 250 VAC/DC	12-Sep-19	DM	DM
C	Page 1: Added new TE Document 502-151099. Page 2: Added new Industry Documents ASTM G154 & ASTM G155. Page 5: 3.3.23 Ultraviolet Effect test added to Test Requirements and Procedures Summary. Page 6: Ultraviolet Effect test added to Test Sequence Table. Added Note d).	02-Aug-24	RA	CB