# SDL2.5 Water Proof Connector Qualification Test Report

## 1. INTRODUCTION

### 1.1. Purpose

Testing was performed on the TE Connectivity (TE) SDL2.5 water proof connector to determine its conformance to the requirements of 108-143069, Revision A1.

### 1.2. Scope

This report covers the electrical, mechanical, and environmental performance of SDL2.5 water proof connector. Testing was performed at Shanghai Electrical Components Test Laboratory. The test file numbers below for this testing are on file and maintained at TE Shanghai Electrical Components Test Laboratory

- TP-19-00008-RECORD
- TP-19-00894-RECORD
- TP-19-01578-RECORD
- TP-19-02792-RECORD
- TP-19-03023-RECORD
- TP-19-03091-RECORD

### 1.3. Conclusion

All part numbers listed in paragraph 1.5 conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-143069, Revision A1.

### 1.4. Product Description

The SDL2.5 Water Proof Connectors are designed to accept 22-26 AWG wires and are available in 2-6 position configurations.

### 1.5. Test Specimens

The test specimens were representative of normal production lots, and the following part numbers were used for testing (See table 1).

### 1.6. Revision History

- Update test sequence in Paragraphs 1.7
- Add contact insertion force result in Paragraphs 2.10
- Add contact retention force result in Paragraphs 2.11
- Add GWT test result in Paragraphs 2.22

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**Table 1 – Specimen Identification**

| Test Group | Qty | Part Number | Description |
|---|---|---|---|
| 1 | 5 | 2321918-2 | SDL water proof plug housing 2pos |
| | 5 | 2321918-4 | SDL water proof plug housing 4pos |
| | 5 | 2321918-6 | SDL water proof plug housing 6pos |
| | 5 | 2321926-2 | SDL water proof receptacle housing 2pos |
| | 5 | 2321926-4 | SDL water proof receptacle housing 4pos |
| | 5 | 2321926-6 | SDL water proof receptacle housing 6pos |
| | 60 | 2321921-1 | Receptacle terminal |
| | 60 | 2321928-1 | Tab terminal |
| | 5 | 2321920-2 | Perimeter seal 2pos |
| | 5 | 2321920-4 | Perimeter seal 4pos |
| | 5 | 2321920-6 | Perimeter seal 6pos |
| | 10 | 2321922-2 | Rear seal 2pos |
| | 10 | 2321922-4 | Rear seal 4pos |
| | 10 | 2321922-6 | Rear seal 6pos |
| 2 | 5 | 2321918-2 | SDL water proof plug housing 2pos |
| | 5 | 2321918-4 | SDL water proof plug housing 4pos |
| | 5 | 2321918-6 | SDL water proof plug housing 6pos |
| | 5 | 2321926-2 | SDL water proof receptacle housing 2pos |
| | 5 | 2321926-4 | SDL water proof receptacle housing 4pos |
| | 5 | 2321926-6 | SDL water proof receptacle housing 6pos |
| | 10 | 2321921-1 | Receptacle terminal |
| | 10 | 2321928-1 | Tab terminal |
| | 5 | 2321920-2 | Perimeter seal 2pos |
| | 5 | 2321920-4 | Perimeter seal 4pos |
| | 5 | 2321920-6 | Perimeter seal 6pos |
| 3 | 15 | 2321918-2 | SDL water proof plug housing 6pos |
| | 15 | 2321926-6 | SDL water proof receptacle housing 6pos |
| | 90 | 2321921-1 | Receptacle terminal |
| | 90 | 2321928-1 | Tab terminal |
| | 15 | 2321920-6 | Perimeter seal 6pos |
| | 30 | 2321922-6 | Rear seal 6pos |
| 4 | 5 | 2321918-2 | SDL water proof plug housing 2pos |
| | 5 | 2321918-4 | SDL water proof plug housing 4pos |
| | 5 | 2321918-6 | SDL water proof plug housing 6pos |
| | 5 | 2321926-2 | SDL water proof receptacle housing 2pos |
| | 5 | 2321926-4 | SDL water proof receptacle housing 4pos |
| | 5 | 2321926-6 | SDL water proof receptacle housing 6pos |
| | 60 | 2321921-1 | Receptacle terminal |
| | 60 | 2321928-1 | Tab terminal |
| | 5 | 2321920-2 | Perimeter seal 2pos |
| | 5 | 2321920-4 | Perimeter seal 4pos |
| | 5 | 2321920-6 | Perimeter seal 6pos |
| | 10 | 2321922-2 | Rear seal 2pos |
| | 10 | 2321922-4 | Rear seal 4pos |
| | 10 | 2321922-6 | Rear seal 6pos |
| 5 | 5 | 2321918-2 | SDL water proof plug housing 2pos |
| | 5 | 2321918-4 | SDL water proof plug housing 4pos |
| | 5 | 2321918-6 | SDL water proof plug housing 6pos |
| | 5 | 2321926-2 | SDL water proof receptacle housing 2pos |
| | 5 | 2321926-4 | SDL water proof receptacle housing 4pos |
| | 5 | 2321926-6 | SDL water proof receptacle housing 6pos |
| | 60 | 2321921-1 | Receptacle terminal |

| | | | |
|---|---|---|---|
| | 60 | 2321928-1 | Tab terminal |
| | 5 | 2321920-2 | Perimeter seal 2pos |
| | 5 | 2321920-4 | Perimeter seal 4pos |
| | 5 | 2321920-6 | Perimeter seal 6pos |
| | 10 | 2321922-2 | Rear seal 2pos |
| | 10 | 2321922-4 | Rear seal 4pos |
| | 10 | 2321922-6 | Rear seal 6pos |
| 6 | 30 | 2321921-1 | Receptacle terminal |
| | 30 | 2321928-1 | Tab terminal |
| 7 | 5 | 2321926-2 | SDL water proof receptacle housing 2pos |
| | 5 | 2321926-4 | SDL water proof receptacle housing 4pos |
| | 5 | 2321926-6 | SDL water proof receptacle housing 6pos |
| 8 | 5 | 2321918-2 | SDL water proof plug housing 2pos |
| | 5 | 2321918-4 | SDL water proof plug housing 4pos |
| | 5 | 2321918-6 | SDL water proof plug housing 6pos |
| | 5 | 2321926-2 | SDL water proof receptacle housing 2pos |
| | 5 | 2321926-4 | SDL water proof receptacle housing 4pos |
| | 5 | 2321926-6 | SDL water proof receptacle housing 6pos |
| | 60 | 2321921-1 | Receptacle terminal |
| | 60 | 2321928-1 | Tab terminal |
| | 5 | 2321920-2 | Perimeter seal 2pos |
| | 5 | 2321920-4 | Perimeter seal 4pos |
| | 5 | 2321920-6 | Perimeter seal 6pos |
| | 10 | 2321922-2 | Rear seal 2pos |
| | 10 | 2321922-4 | Rear seal 4pos |
| | 10 | 2321922-6 | Rear seal 6pos |
| 9 | 5 | 2321918-3 | SDL water proof plug housing 3pos |
| | 5 | 2321926-3 | SDL water proof receptacle housing 3pos |

1.7. Qualification Test Sequence

**Table 2 – Test Sequence**

| TEST OR EXAMINATION | TEST GROUP (a) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 Mechanical | 2 Mechanical | 3 Electrical | 4 Environmental | 5 Housing Electricals | 6 Crimp | 7 Panel Retention | 8 Dust/Water Tightness | 9 Glow Wire |
| | TEST SEQUENCE (b) | | | | | | | | |
| Examination of Product | 1, 9 | 1, 5 | 1, 11 | 1, 5 | 1, 8 | 1, 3 | 1, 3 | 1, 6 | 1, 3 |
| Termination Resistance | 3, 7 | | 2, 5, 7, 9 | 2, 4 | | | | | |
| Insulation Resistance | | | | | 2, 6 | | | 2, 4 | |
| Dielectric Withstanding Voltage | | | | | 3, 7 | | | | |
| Random Vibration | 5 | | 8 | | | | | | |
| Mechanical Shock | 6 | | | | | | | | |
| Durability | 4 | | | | | | | | |
| Mating Force | 2 | | | | | | | | |
| Unmating Force | 8 | | | | | | | | |
| Contact Insertion Force | | 2 | | | | | | | |
| Contact Retention Force | | 3 | | | | | | | |
| Housing Locking Strength | | 4 | | | | | | | |
| Crimp Tensile Strength | | | | | | 2 | | | |
| Housing Panel Retention Force | | | | | | | 2 | | |
| Thermal Shock | | | | | 4 | | | | |
| Humidity-Temperature Cycling | | | 4 | | 5 | | | | |
| Temperature Life | | | 6 | | | | | | |
| Salt Spray | | | | 3 | | | | | |
| Water Immersion | | | | | | | | 3 | |
| Dust Tightness | | | | | | | | 5 | |
| Temperature Rise | | | 3, 10 | | | | | | |
| Glow Wire | | | | | | | | | 3 |

***NOTE***

(a) See Paragraph 1.5

(b) Numbers indicate sequence which tests were performed.

1.8. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15°C to 35°C
Relative Humidity: 20% to 80%

## 2. SUMMARY OF TESTING

2.1. Confirmation of Product – All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance (Low Level) – Groups 1, 3, 4

All specimens met the 10 milliohm (mΩ) initial resistance requirement or 20 milliohm (mΩ) final resistance requirement. LLCR summary data for each interval is shown in table 3 through table 7.

**Table 3 – Group 1, Termination Resistance (mΩ) – 2, 4, 6 pos**

| | Test Data | | | | | |
|---|---|---|---|---|---|---|
| | 2 pos | | 4 pos | | 6 pos | |
| | Initial | Final | Initial | Final | Initial | Final |
| **Maximum** | 5.43 | 5.75 | 5.51 | 6.65 | 6.12 | 6.77 |
| **Minimum** | 4.42 | 4.63 | 4.43 | 4.69 | 4.42 | 4.83 |
| **Average** | 4.78 | 5.13 | 5.03 | 5.64 | 5.28 | 5.61 |
| **N** | 10 | 10 | 20 | 20 | 30 | 30 |
| **Requirement** | 10 (max) | 20 (max) | 10 (max) | 20 (max) | 10 (max) | 20 (max) |

**Table 4 – Group 3, Termination Resistance (mΩ) – 22AWG**

| | Test Data | | | |
|---|---|---|---|---|
| | Initial | After Temperature Rise & Humidity-Temperature Cycling | After Temperature Life | After Vibration |
| **Maximum** | 4.94 | 6.64 | 13.72 | 11.27 |
| **Minimum** | 4.17 | 3.85 | 4.00 | 4.72 |
| **Average** | 4.55 | 4.68 | 6.16 | 6.67 |
| **N** | 30 | 30 | 30 | 30 |
| **Requirement** | 10 (max) | 20 (max) | 20 (max) | 20 (max) |

**Table 5 – Group 3, Termination Resistance (mΩ) – 24AWG**

| | Test Data | | | |
|---|---|---|---|---|
| | Initial | After Temperature Rise & Humidity-Temperature Cycling | After Temperature Life | After Vibration |
| **Maximum** | 6.26 | 7.98 | 10.30 | 10.55 |
| **Minimum** | 5.04 | 5.09 | 5.30 | 5.31 |
| **Average** | 5.65 | 6.23 | 6.80 | 6.90 |
| **N** | 30 | 30 | 30 | 30 |
| **Requirement** | 10 (max) | 20 (max) | 20 (max) | 20 (max) |

**Table 6 – Group 3, Termination Resistance (mΩ) – 26AWG**

| | Test Data | | | |
|---|---|---|---|---|
| | **Initial** | **After Temperature Rise & Humidity-Temperature Cycling** | **After Temperature Life** | **After Vibration** |
| **Maximum** | 6.66 | 6.95 | 10.94 | 14.56 |
| **Minimum** | 5.34 | 5.41 | 5.40 | 2.82 |
| **Average** | 6.05 | 6.15 | 7.57 | 7.58 |
| **N** | 30 | 30 | 30 | 30 |
| **Requirement** | 10 (max) | 20 (max) | 20 (max) | 20 (max) |

**Table 7 – Group 4, Termination Resistance (mΩ) – 2, 4, 6 pos**

| | Test Data | | | | | |
|---|---|---|---|---|---|---|
| | **2 pos** | | **4 pos** | | **6 pos** | |
| | **Initial** | **Final** | **Initial** | **Final** | **Initial** | **Final** |
| **Maximum** | 4.93 | 6.21 | 5.69 | 6.33 | 5.75 | 6.65 |
| **Minimum** | 4.32 | 4.66 | 4.73 | 5.01 | 4.58 | 4.59 |
| **Average** | 4.59 | 5.42 | 5.14 | 5.55 | 5.01 | 5.36 |
| **N** | 10 | 10 | 20 | 20 | 30 | 30 |
| **Requirement** | 10 (max) | 20 (max) | 10 (max) | 20 (max) | 10 (max) | 20 (max) |

**Figure 1 – Termination Resistance**

2.3. Insulation Resistance – Group 5, 8

Measure and record the insulation resistance separately between the closest adjacent contacts at 500VDC for 2 minutes. Insulation resistance summary data is shown in table 8 and 9.

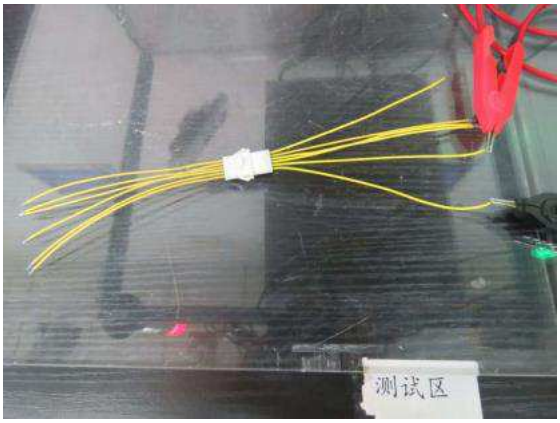
**Table 8 – Group 5, Insulation Resistance ($10^9$ Ω) – 2, 4, 6 pos**

| | Test Data | | | | | |
|---|---|---|---|---|---|---|
| | **2 pos** | | **4 pos** | | **6 pos** | |
| | **Initial** | **Final** | **Initial** | **Final** | **Initial** | **Final** |
| **Maximum** | 232 | 3.57 | 299 | 4.10 | 256 | 9.33 |
| **Minimum** | 83 | 2.73 | 62 | 1.26 | 61 | 1.36 |
| **Average** | 156 | 3.15 | 148 | 2.37 | 119 | 4.04 |
| **N** | 5 | 5 | 15 | 15 | 25 | 25 |
| **Requirement** | 1 | 1 | 1 | 1 | 1 | 1 |

**Table 9 – Group 8, Insulation Resistance ($10^9$ Ω) – 2, 4, 6 pos**

| | Test Data | | |
|---|---|---|---|
| | **2 pos** | **4 pos** | **6 pos** |
| **Maximum** | 59.4 | 59.8 | 56.8 |
| **Minimum** | 31.5 | 26.2 | 2.4 |
| **Average** | 45.0 | 40.7 | 30.5 |
| **N** | 5 | 15 | 25 |
| **Requirement** | 0.5 | 0.5 | 0.5 |

**Figure 2 – Insulation Resistance**

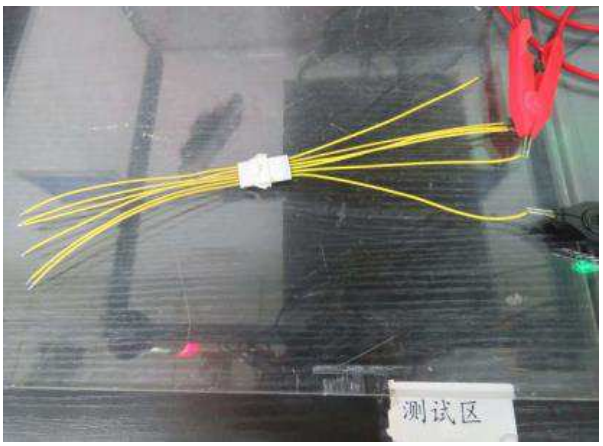



2.4. Dielectric Withstanding Voltage – Group 5

The test voltage shall be raised from zero to the specified value as uniformly as possible, at a rate of approximately 500 volts AC per second.

Dielectric withstanding voltage was measured separately between the closest adjacent contacts at 1100V AC for 1 minute. No breakdown or arcing is observed.

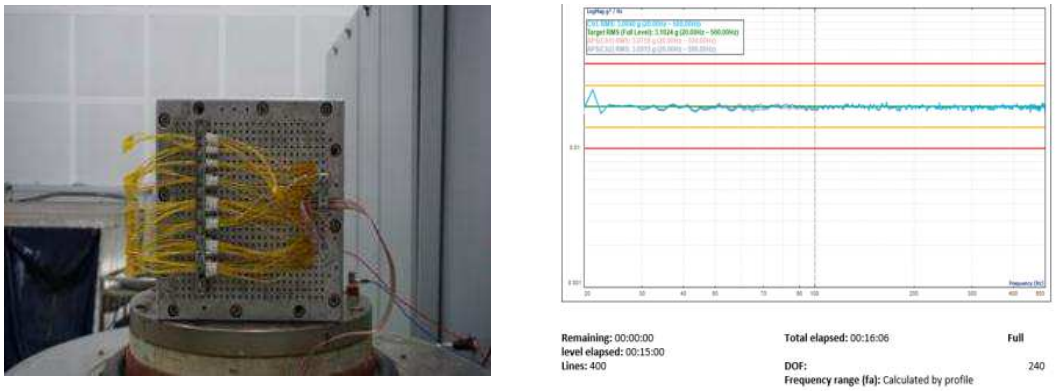
**Figure 3 – Dielectric Withstanding Voltage**




2.5. Vibration (Low Frequency) – Group 1, 3

No evident of physical damage was visible on any specimen after exposure to vibration.

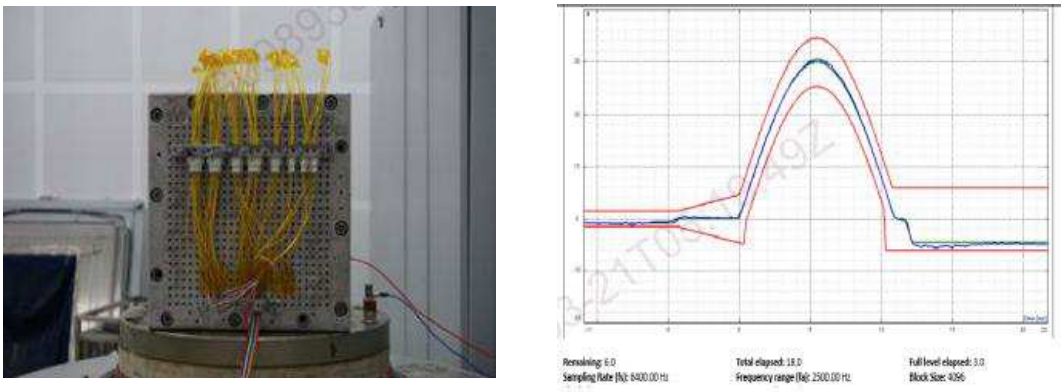
**Figure 4 – Vibration**




2.6. Mechanical Shock – Group 1

No discontinuities greater than 1 µs were detected during mechanical shock testing. Following physical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

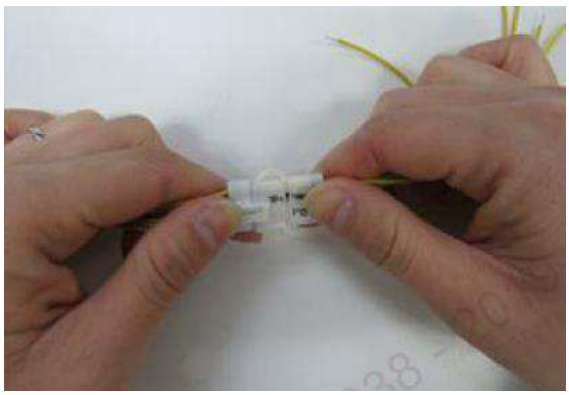
**Figure 5 – Mechanical Shock**



2.7. Durability (Repeated Mating/Unmating) – Group 1

No evidence of physical damage detrimental to product performance was visible as a result of repeated mating and unmating for 30 cycles.

**Figure 6 – Durability**



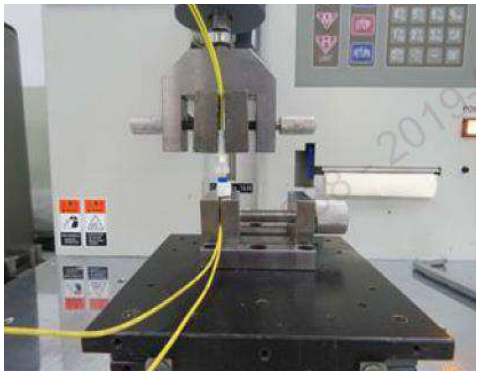
2.8. Mating Force – Group 1

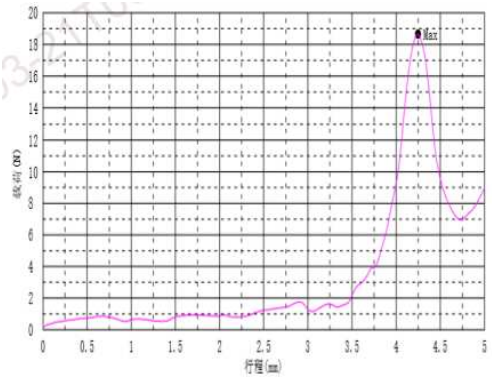
All mating force measurements were less than maximum requirement of 5.88 N per position. Connector mating force data is shown in table 10.

**Table 30 – Group 1, Connector Mating Force (N) – 2, 4, 6 pos**

| | Test Data | | |
|---|---|---|---|
| | **2 pos** | **4 pos** | **6 pos** |
| **Maximum** | 9.55 | 16.08 | 18.66 |
| **Minimum** | 6.94 | 11.08 | 13.97 |
| **Average** | 8.54 | 13.76 | 16.11 |
| **N** | 5 | 5 | 5 |
| **Requirement** | 11.76 (max) | 23.52 (max) | 35.28 (max) |

**Figure 7 – Mating Force**





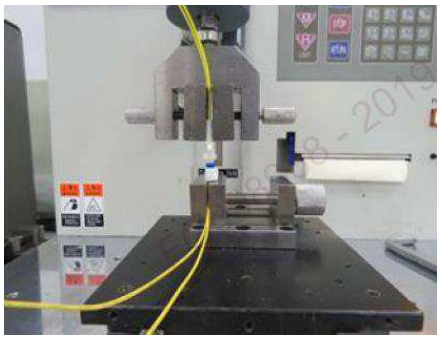
2.9. Unmating Force – Group 1

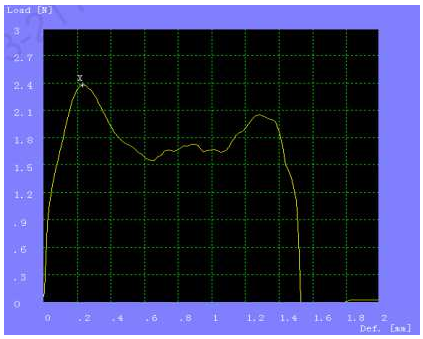
All unmating force measurements were greater than the minimum requirement of 0.59 N per position. Connector unmating force data is shown in table 11.

**Table 41 – Group 1, Connector Unmating Force (N) – 2, 4, 6 pos**

| | Test Data | | |
|---|---|---|---|
| | **2 pos** | **4 pos** | **6 pos** |
| **Maximum** | 2.38 | 4.66 | 6.02 |
| **Minimum** | 1.94 | 3.75 | 4.28 |
| **Average** | 2.09 | 4.07 | 5.43 |
| **N** | 5 | 5 | 5 |
| **Requirement** | 1.18 (min) | 2.36 (min) | 3.54 (min) |

**Figure 8 – Unmating Force**





2.10. Contact Insertion Force – Group 2

All receptacle or tab contact insertion force values were less than the maximum requirement of 7.84 N per contact. Contact insertion force data is shown in table 12.

**Table 52 – Group 2, Contact Insertion Force (N) – 6 pos**

| | Test Data | |
|---|---|---|
| | **Receptacle Terminal** | **Tab Terminal** |
| **Maximum** | 2.77 | 2.28 |
| **Minimum** | 1.90 | 1.87 |
| **Average** | 2.29 | 2.08 |
| **N** | 10 | 10 |
| **Requirement** | 7.84 (max) | 7.84 (max) |

Contact insertion force were subsequently conducted on latest version of housing, test data is shown in table 13.

**Table 63 – Group 2, Contact Insertion Force (N)**

| | Test Data | |
|---|---|---|
| | **Receptacle Terminal** | **Tab Terminal** |
| **Maximum** | 4.34 | 3.24 |
| **Minimum** | 2.14 | 2.85 |
| **Average** | 3.52 | 2.89 |
| **N** | 18 | 15 |
| **Requirement** | 7.84 (max) | 7.84 (max) |

**Figure 9 – Contact Insertion Force**


2.11. Contact Retention Force – Group 2

All receptacle or tab contact retention force values were greater than the minimum requirement of 20 N. Contact retention force data is shown in table 1**Error! Reference source not found.**4.

**Table 74 – Group 2, Contact Retention Force (N) – 6 pos**

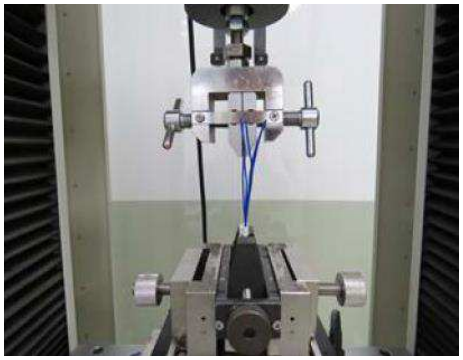
| | Test Data | |
|---|---|---|
| | **Receptacle Terminal** | **Tab Terminal** |
| **Maximum** | 34.01 | 30.59 |
| **Minimum** | 31.01 | 28.53 |
| **Average** | 32.29 | 29.11 |
| **N** | 10 | 10 |
| **Requirement** | 20 (min) | 20 (min) |

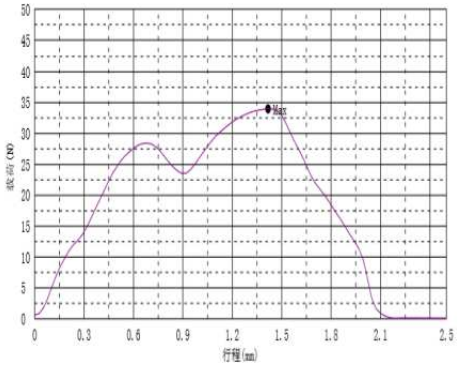
Contact retention force were subsequently conducted on latest version of housing, test data is shown in table 15.

**Table 85 – Contact Retention Force (N)**

| | Test Data | |
|---|---|---|
| | **Receptacle Terminal** | **Tab Terminal** |
| **Maximum** | 41.52 | 36.13 |
| **Minimum** | 34.23 | 31.72 |
| **Average** | 38.03 | 33.54 |
| **N** | 18 | 15 |
| **Requirement** | 25 (min) | 25 (min) |

**Figure 10 – Contact Retention Force**





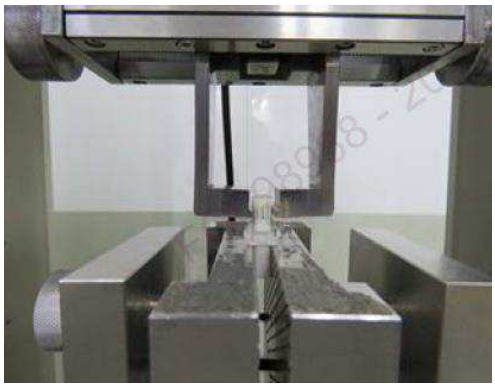
2.12. Housing Locking Strength – Group 2

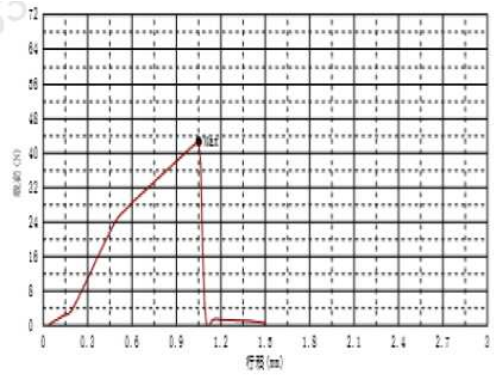
The housing locking strength met the minimum requirement of 35.3N. Housing locking strength summary data is shown in table 16.

**Table 16 – Group 2, Housing Locking Strength (N) – 2, 4, 6 pos**

| | Test Data | | |
|---|---|---|---|
| | **2 pos** | **4 pos** | **6 pos** |
| **Maximum** | 49.03 | 51.47 | 45.67 |
| **Minimum** | 47.28 | 49.00 | 42.73 |
| **Average** | 48.30 | 50.65 | 44.62 |
| **N** | 5 | 5 | 5 |
| **Requirement** | 35.3 (max) | 35.3 (max) | 35.3 (max) |

**Figure 11 – Housing Locking Strength**





2.13. Crimping Tensile Strength – Group 6

All specimens met the minimum crimp tensile strength requirement below. Crimp tensile strength summary data is shown in table 17 and 18.

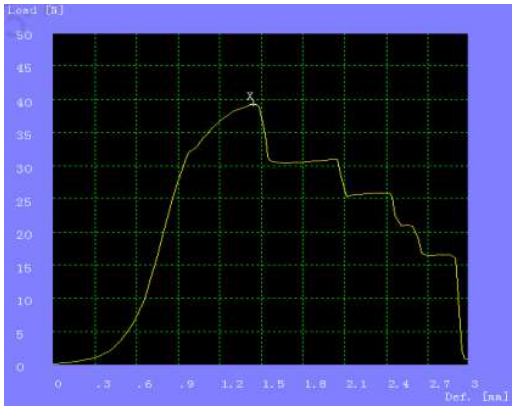
**Table 97 – Group 6, Receptacle Terminal Crimping Tensile Strength (N)**

| | Test Data | | |
|---|---|---|---|
| | **22 AWG** | **24 AWG** | **26 AWG** |
| **Maximum** | 80.86 | 52.94 | 39.19 |
| **Minimum** | 53.53 | 44.05 | 29.87 |
| **Average** | 64.08 | 47.96 | 35.19 |
| **N** | 10 | 10 | 10 |
| **Requirement** | 49 (min) | 29.4 (min) | 19.6 (min) |

**Table 18 – Group 6, Tab Terminal Crimping Tensile Strength (N)**

| | Test Data | | |
|---|---|---|---|
| | **22 AWG** | **24 AWG** | **26 AWG** |
| **Maximum** | 77.30 | 48.88 | 37.61 |
| **Minimum** | 69.46 | 39.34 | 31.25 |
| **Average** | 72.33 | 45.16 | 34.73 |
| **N** | 10 | 10 | 10 |
| **Requirement** | 49 (min) | 29.4 (min) | 19.6 (min) |

**Figure 12 – Crimping Tensile Strength**



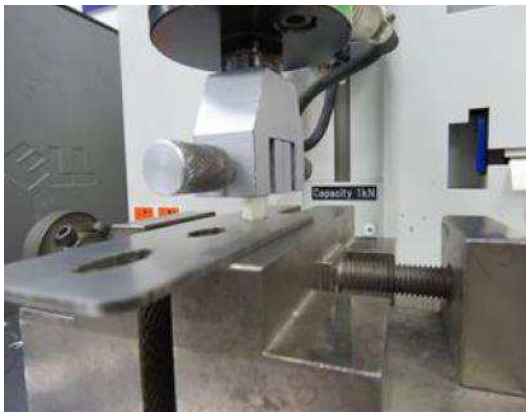

2.14. Housing Panel Retention Force – Group 7

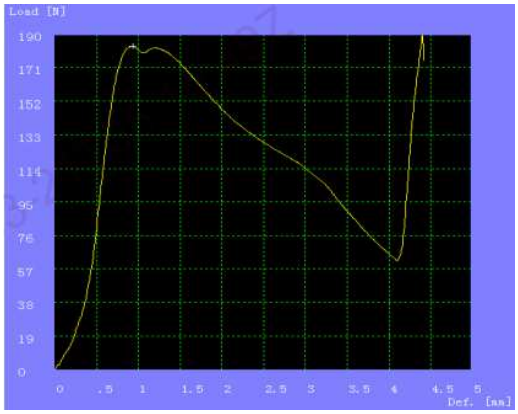
The housing panel retention force met the minimum requirement of 98N. Housing panel retention force summary data is shown in table 19.

**Table 19 – Group 7, Housing Panel Retention Force (N) – 2, 4, 6 pos**

| | Test Data | | |
|---|---|---|---|
| | **2 pos** | **4 pos** | **6 pos** |
| **Maximum** | 182.85 | 186.57 | 179.20 |
| **Minimum** | 171.41 | 180.09 | 172.70 |
| **Average** | 174.74 | 184.26 | 175.40 |
| **N** | 5 | 5 | 5 |
| **Requirement** | 98 (min) | 98 (min) | 98 (min) |

**Figure 13 – Housing Panel Retention Force**




2.15. Thermal Shock – Group 5

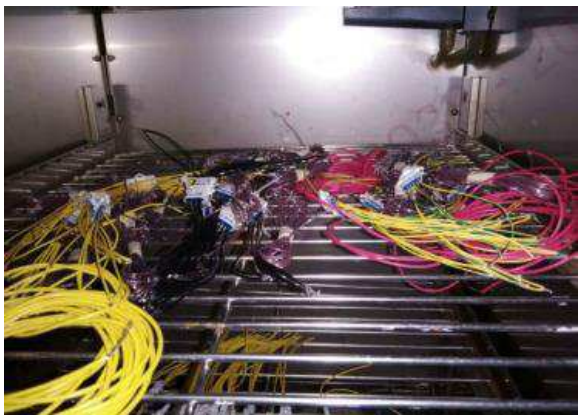
No evidence of physical damage was visible after thermal shock testing.

**Figure 14 – Thermal Shock**

2.16. Humidity-Temperature Cycling – Group 3, 5

No evidence of physical damage was visible after humidity temperature cycling testing.

**Figure 15 – Humidity Temperature Cycling**



2.17. Temperature Life – Group 3

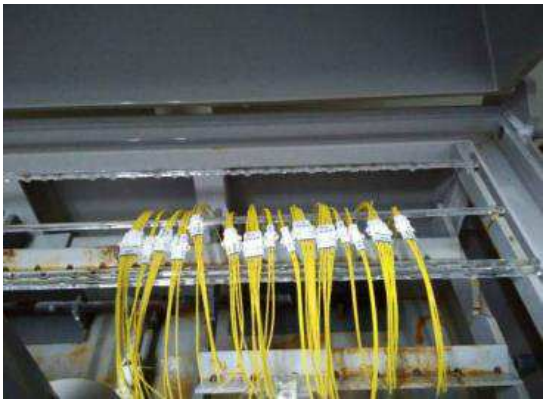
No evidence of physical damage was visible after temperature life testing.

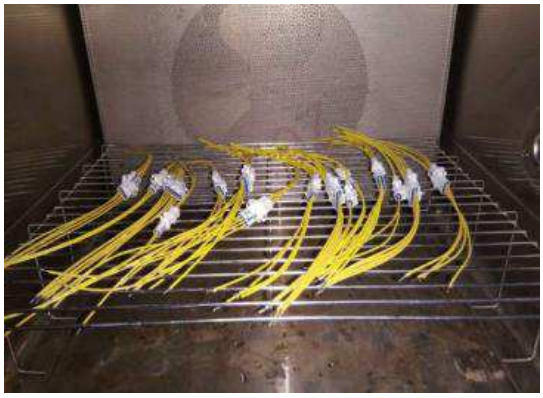
**Figure 16 – Temperature Life**

2.18. Salt Spray – Group 4

No evidence of physical damage detrimental to product performance was visible as a result of exposure to salt spray solution.

**Figure 17 – Salt Spray**





2.19. Water Immersion – Group 8

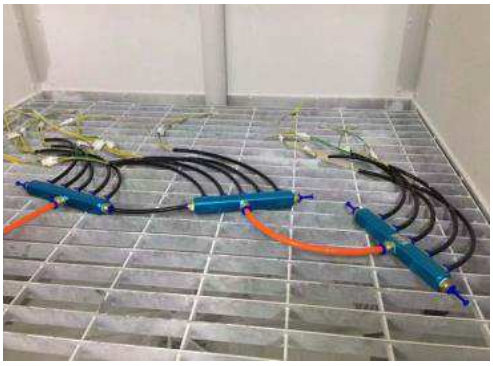
No ingress of water or physical damage that would impact product performance. Insulation resistance can meet 500 MΩ minimum after water immersion.

**Figure 18 – Water Immersion**

2.20. Dust Tightness – Group 8

No ingress of dust or physical damage that would impact product performance.

**Figure 19 – Dust Tightness**



2.21. Temperature Rising – Group 3

All specimens met the 30°C maximum requirement for temperature rise when tested at their rated current. Temperature rising test summary data is shown in table 20 and 21.

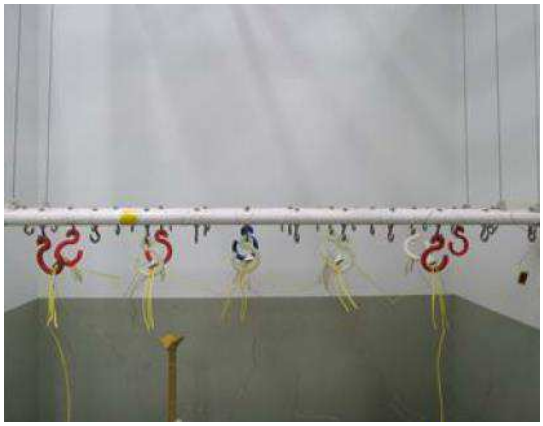
**Table 20 – Group 3, Temperature Rising (°C) - Initial**

| | Test Data | | |
|---|---|---|---|
| | **22 AWG** | **24 AWG** | **26 AWG** |
| **Maximum** | 8.72 | 9.39 | 10.12 |
| **Minimum** | 7.39 | 8.69 | 8.8 |
| **Average** | 8.01 | 9.05 | 9.38 |
| **N** | 10 | 10 | 10 |
| **Requirement** | 30 (max) | 30 (max) | 30 (max) |

**Table 21 – Group 3, Temperature Rising (°C) - Final**

| | Test Data | | |
|---|---|---|---|
| | **22 AWG** | **24 AWG** | **26 AWG** |
| **Maximum** | 18.39 | 13.81 | 13.04 |
| **Minimum** | 10.60 | 10.31 | 9.90 |
| **Average** | 13.59 | 11.28 | 11.22 |
| **N** | 10 | 10 | 10 |
| **Requirement** | 30 (max) | 30 (max) | 30 (max) |

**Figure 20 – Temperature Rising**



2.22. Glow Wire – Group 9

All specimens met glow wire test at 750°C according to IEC 60695-2-11 and IEC 60335-1, no flame or Te - Ti < 2s.

## 3. TEST METHODS

3.1. Confirmation of Product

Testing was performed in accordance with EIA-364-18. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3.2. Termination Resistance (Low Level)

Testing was performed in accordance with EIA 364-23 using a test current of 100 mA and a test voltage limited to 20mV.

3.3. Insulation Resistance

Measure and record the insulation resistance separately between the closest adjacent contacts at 500VDC for 2 minutes. Measure and record the performance of the specimens. Execute visual check after test.

3.4. Dielectric Withstanding Voltage

The test voltage shall be raised from zero to the specified value as uniformly as possible, at a rate of approximately 500 volts AC per second. Dielectric withstanding voltage was measured separately between the closest adjacent contacts at 1.1kv AC for 1 minute. Measure and record the performance of the specimens. Execute visual check after test.

3.5. Vibration (Low Frequency)

Testing was performed in accordance with EIA-364-28, Condition VII, level D. Subject mated connector to 3.10G's RMS between 20 and 500 Hz. Apply 15 minutes in each of 3 mutually perpendicular planes.

3.6. Physical Shock

Testing was performed in accordance with EIA-364-27, Condition H. Subject mated connector to 30G's half -sine shock pulse of 11 ms duration. 3 drops each to normal and reversed directions of X, Y and Z axis. Total of 18 drops.

3.7. Durability (Repeated Mating/Unmating)

Testing was performed by mating and unmating test specimens for 30 cycles.

3.8. Mating Force

Testing was performed in accordance with EIA-364-13, method A. Mating force was measured with a tensile/compression machine. The cap housing was held in a vice mounted to an X-Y table rigidly clamped to the base of the tensile/compression testing machine. The moveable crosshead was lowered at a rate of 25.4 mm/min until the specimen was fully mated. The peak force required to mate the connector was recorded.

3.9. Unmating Force

Testing was performed in accordance with EIA-364-13, method A. Unmating force was measured with a tensile/compression machine. The cap housing was held in a vice mounted to an X-Y table rigidly clamped to the base of the tensile/compression testing machine with the latch disengaged. The moveable crosshead was raised at a rate of 25.4 mm/min until the specimen was fully unmated. The peak force required to unmate the connector was recorded.

3.10. Contact Insertion Force

Testing was performed in accordance with IEC-364-5. Contact insertion force was measured by applying an increasing force to each contact using a tensile/compression device with a rate of travel at 25.4 mm per minute until the contact was properly seated in the housing.

3.11. Contact Retention Force

Testing was performed in accordance with EIA-364-29, method A. Contact retention force was measured by applying an increasing force to each contact using a tensile/compression device with a rate of travel at 25.4 mm per minute until the contact was dislodged from the housing.

3.12. Housing Locking Strength

Testing was performed in accordance with EIA-364-98. Housing locking force was measured by applying an increasing force to plug housing using a tensile/compression device with a rate of travel at 12.7 mm per minute until the plug housing was dislodged from the receptacle housing.

3.13. Crimping Tensile Strength

Testing was performed in accordance with EIA-364-8. The force load was applied to each specimen was applied to each specimen using a tensile/compression device with the rate of travel at 25.4 mm per minute.

3.14. Housing Panel Retention Force

Testing was performed in accordance with EIA-364-97. Measure panel retention force using a panel cut with nominal dimensions as specified in the TE customer drawing. Housing panel retention force was measured by applying an increasing force to receptacle using a tensile/compression device with a rate of travel at 12.7mm per minute until the receptacle housing was dislodged from the panel.

3.15. Thermal Shock

Testing was performed in accordance with EIA-364-32, method A. Mated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at –55°C and 85°C. The transition between temperature was less than 5 minutes.

3.16. Humidity-Temperature Cycling

Testing was performed in accordance with EIA-364-31, method III. Subject mated specimen to 10 cycles between 25°C and 65°C at 80-100% RH. Measurements to be recorded after specimens are held for 3 hours at ambient temperature and humidity. 1 cycle is 24 hours.

3.17. Temperature Life

Testing was performed in accordance with EIA-364-17, method A. Subject mated connector to 105 ± 2°C for a duration of 96 hours. Measurements to be recorded after specimens are held for 3 hours at ambient temperature and humidity.

3.18. Salt Spray

Testing was performed in accordance with EIA-364-26, test condition B. Mated specimens were subjected to a 5% salt spray environment for 48 hours. The temperature of the box was maintained at 35°C while the pH of the salt solution was between 6.5 and 7.2.

3.19. Water Immersion

Testing was performed in accordance with IEC 60529, test condition 14.2.7. Immerse mated samples in water for 30 minutes with the lowest point of the sample 1 meter below the surface. Tank must be 8 inches (minimum) in diameter.

3.20. Dust Tightness

Testing was performed in accordance with IEC 60529, test conditions per IP6X requirement. Subject mated connector to 8 hours of circulating talcum powder dust. 2 kg of power per cubic meter of test chamber shall be used.

3.21. Temperature Rising

Testing was performed in accordance with EIA-364-70, method 1. Measure the temperature rise above ambient created by the energizing current. Measurement must be taken at a place where there is no influence from air convection. Contacts to be assembled in housing with all circuits connected. The thermocouple is to be attached to the contact in the center circuit. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.

3.22. Glow Wire

The extremity of the wire was positioned horizontally and brought into contact with the specimen with a force between 0.8N and 1.05N for a period of 30s. Penetration depth was less than 7mm, and wrapping tissue was positioned at a distance of (200±5) mm below the place where the glow-wire was applied to the specimen. Test temperature: 750°C. Duration of glow tip application Ta: 30s.