Power Versa-Lock Connector Systems

1. INTRODUCTION

1.1 Purpose

Testing was performed on Power Versa-Lock connectors to determine its conformance related to the requirements of product specification 108-143081 Rev.15.
Scope of the test is the qualification with Power Versa-Lock product line. Not all test according to 108-143081 have been performed. Test group 12 was not tested because the housings submitted were not the glow wire version.

1.2 Scope

This report covers the electrical, mechanical and environmental performance of Power Versa-Lock connectors. Testing was performed at the Shanghai Electrical Components Test Laboratory between Mar. 4th, 2020 and May. 12th, 2020. The associated test number is TP-19-03264 and TP-20-00661.

1.3 Conclusion

Based on the test results, all tests meet the requirement according to applicant's requirement and product specification 108-143081 Rev.15.

1.4 Test Specimens

Specimens with the following part numbers were used for test:

Table 1

P/N	Description	Quantity (pcs)	Note
1-2325350-2	PWR VERSA-LOCK CAP, 1X2 KEY A	180	2P
1-2325350-3	WR VERSA-LOCK CAP, 1X3 KEY A	90	3P
1-2332040-2	PWR VERSA-LOCK PLUG, 1X2 KEY A	180	2P
1-2332040-3	PWR VERSA-LOCK PLUG, 1X3 KEY A	90	3P
1-2336229-6	PWR VERSA-LOCK PLUG, 2X3 KEY A	135	6P
1-2336231-6	PWR VERSA-LOCK TL CAP, 2X3 KEY A	135	6P
1-2345728-1	PWR VERSA-LOCK PLUG, 1X1 KEY A	150	1P
1-2345729-1	PWR VERSA-LOCK FH CAP, 1X1 KEY A	150	1P
2-2325350-2	PWR VERSA-LOCK CAP, 1X2 KEY B	30	2P
2-2332040-2	PWR VERSA-LOCK PLUG, 1X2 KEY B	30	2P
2325347-1	PWR VERSA-LOCK INTERFACE SEAL, 1X1	75	1P
2325347-2	PWR VERSA-LOCK INTERFACE SEAL, 1X2	120	2P
2325347-3	PWR VERSA-LOCK INTERFACE SEAL, 1X3	120	3P
2325349-1	PWR VERSA-LOCK REAR SEAL, 1X1, 2.45-3.60	150	
2325349-2	PWR VERSA-LOCK REAR SEAL, 1X2, 2.45-3.60	240	
2325349-3	PWR VERSA-LOCK REAR SEAL, 1X3, 2.45-3.60	270	
2329906-1	PWR VERSA-LOCK TAB, 18-20, 2X22 AWG	795	
2329907-1	PWR VERSA-LOCK SEAL TAB, 14-16 AWG	510	
2329908-1	PWR VERSA-LOCK SEAL TAB, 18-20 AWG	510	
2329909-1	PWR VERSA-LOCK TAB, 22-26 AWG	45	

2329912-1	PWR VERSA-LOCK RECPT, 18-20, 2X22 AWG	795	
2329914-1	PWR VERSA-LOCK SEAL RECPT, 18-20 AWG	510	
2329915-1	PWR VERSA-LOCK RECPT, 22-26 AWG	45	
2329916-1	PWR VERSA-LOCK SEAL RECPT, 14-16 AWG	510	
2334614-1	PWR VERSA-LOCK BACK COVER 1P	150	
2334614-2	PWR VERSA-LOCK BACK COVER 2P	240	
2334614-3	PWR VERSA-LOCK BACK COVER 3P	210	
2337218-6	PWR VERSA-LOCK TPA, 2X3	100	

Fig.1 Typical Specimen

1.5 Test Sequence

The specimens listed in Table 1 were subjected to the test sequences listed in Table 2.

Table 2

Test Item	Test Group (a)											
	1	2	3	4	5	6	7	8	9	10	11	12
			Test Sequence (b)									
Examination of Product	1, 9	1, 5	1, 9	1, 4	1, 4	1, 4	1, 5	1, 5	1, 5	1,5	1, 3	1, 3
Low Level Contact Resistance	3, 7	2, 4					2, 4	2, 4	2, 4	2, 4		
Insulation Resistance			2, 7									
Dielectric Withstanding Voltage			3, 8									
Temperature Rise vs. Current		3										
Sinusoidal Vibration	5									3		
Mechanical Shock	6											
Durability	4											

Connector Mating Force	2											
Connector Unmating Force	8											
Crimp Tensile Strength											2	
Housing Panel Retention Force					2							
Housing Lock Strength					3							
Contact Insertion Force				2								
Contact Retention Force				3								
Thermal Shock			4									
Humidity-Temperature Cycling			5					3(c)				
Temperature Life									3			
Water Immersion						2						
Dust Tightness						3						
Resistance to Cold			6									
Salt Spray							3					
Glow Wire												2

Note: a). Test group defined per customer requirement
b). Numbers indicate sequence in which tests are performed.
c). Connectors for these tests shall be preconditioned with 5 durability cycles.

1.6 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:
Temperature: 15°C to 35°C
Relative Humidity: 25% to 75%

2. TEST PROCEDUES

2.1 Visual Examination of Product
Before test, a certificate of conformance was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.
After test, there shall be no corrosive influence on the performance and no physical damage that would impair product performance.
Test Method: EIA-364-18.

2.2. Low Level Contact Resistance
Subject contacts assembled in a housing to 20mV (max.) open circuit at 10 mA. Subtract the resistance of the wire from the measurement. Connection per Figure 2.
Requirement: Initial: 10 mΩ (milliohm) maximum
Final: 20 mΩ (milliohm) maximum

Test Method: EIA-364-23.

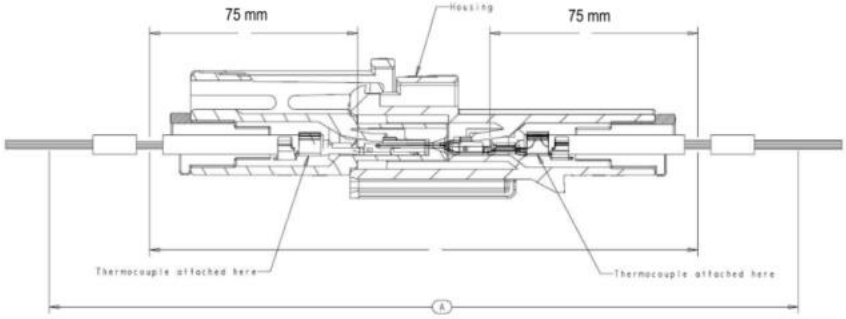

Fig.2

2.3. Insulation Resistance
Apply 500 VDC and hold for 2 minutes. Test between contacts in adjacent circuits and between housing and contacts in a mated connector.
Requirement: Initial: 1000 MΩ minimum
Final: 500 MΩ minimum
Test Method: EIA-364-21.

2.4. Dielectric Withstanding Voltage
Hold at 2.2 kV AC at sea level for 1 minute. Test between contacts in adjacent circuits and between housing and all contacts in a mated connector.
Requirement: 1 minute hold without a creep discharge or flashover.
Current Leakage: 5 mA (maximum)
Test Method: EIA-364-20, Method A, Condition 1.

2.5. Temperature Rise vs. Current
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.
Requirement: 30°C maximum when subjected to rated current
Test Method: EIA-364-70, Method 1

2.6. Sinusoidal Vibration
Subject mated connector to 10-55-10 Hz traversed in 1 minute at 1.52 mm amplitude. Apply 2 hours in each of 3 mutually perpendicular planes. 100 mA applied.
Requirement: No electrical discontinuity greater than 1 µs shall occur.
No physical damage that would impair product performance.
Test Method: EIA-364-28, Condition 1.

2.7. Mechanical Shock
Subject mated connector to 50G'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.
Requirement: No electrical discontinuity greater than 1 µs shall occur.
No physical damage that would impair product performance.
Test Method: EIA-364-27, Condition A.

2.8. Durability
Manually mate and unmate connectors for 25 cycles.
Requirement: No physical damage that would impair product performance.
Test Method: EIA-364-09.

2.9. Connector Mating Force
Measure the force required to mate connectors with locking latches. Operation Speed: 25.4 mm/min.
Requirement: Unsealed: (7.42 x # of Positions) N (maximum)
Sealed: (18 x # of Positions) N (maximum)
Test Method: EIA-364-13, Method A.

2.10. Connector Unmating Force
Measure the force required to unmate connectors without locking latches. Operation Speed: 25.4 mm/min.
Requirement: (1.25 x # of Positions) N (minimum)
Test Method: EIA-364-13, Method A.

2.11. Crimp Tensile Strength
Apply an axial pull force to the crimped wire. Contact to be secured to the tester. Insulation barrel crimp to be disabled. Operation Speed: 25.4 mm/min.
Requirement: See table 9.
Test Method: EIA-364-08.

2.12. Housing Panel Retention Force
Measure panel retention force using a panel cut with nominal dimensions as specified in the TE customer drawing. Operation Speed: 100 mm/min.
Requirement: 98N Minimum
Test Method: EIA-364-97.

2.13. Housing Locking Strength
Ensure that locking latches are fully engaged. Operation Speed: 13 mm/min.
Requirement: 66.7 N minimum
Test Method: EIA-364-98.

2.14. Contact Insertion Force
Measure the force required to insert contact into housing.
Requirement: 13.3N maximum
Test Method: EIA-364-05.

2.15. Contact Retention Force
Measure the axial force required to remove contact from the housing with and without a TPA accessory. Operation Speed: 25.4 mm/min.
Requirement: With TPA accessory: 66.7 N minimum
Without TPA accessory: 53.4 N minimum
Test Method: EIA-364-29.

2.16. Thermal Shock
Subject mated specimens to 25 cycles between ‑ 55°C and 85°C with 30 minute dwell time at temperature extremes and 5 minute transition (maximum) between temperatures.
Requirement: No physical damage that would impair product performance.
Test Method: EIA-364-32, Method A, Test Condition I.

2.17. Humidity-Temperature Cycling
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.
Requirement: No physical damage that would impair product performance.
Test Method: EIA-364-31, Method IV.

2.18. Temperature Life
Subject mated connector to 105°C for a duration of 96 hours. Measurements to be recorded after specimens are held for 3 hours at ambient temperature and humidity.

Requirement: No physical damage that would impair product performance.
Test Method: EIA-364-17 Method A

2.19. Water Immersion
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.
Requirement: No ingress of water or physical damage that would impair product performance.
Test Method: IEC 60529, Test Conditions per IP67

2. 20. Dust Tightness
Subject mated connector to 8 hours of circulating talcum powder dust. 2 kg of power per cubic meter of test chamber shall be used.
Requirement: No ingress of dust or physical damage that would impair product performance.
Test Method: IEC 60529, Test Conditions per IP67.

2. 21. Resistance to Cold
Subject mated connector to – 30°C ± 2°C for 96 hours.
Requirement: No physical damage that would impair product performance.
Test Method: IEC 60512-11-10.

2. 22. Salt Spray
Subject mated connectors to 5±1% salt concentration for 48 hours.
Requirement: No physical damage that would impair product performance.
Test Method: EIA-364-26, Condition B.

3. SUMMARY OF TESTING

3.1 Visual Examination
All group specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3.2. Low Level Contact Resistance
Test result are shown in Table 3.

Table 3

Unit: mΩ

Group	Quantity	Specimen Description	Condition	Low Level Contact Resistance			Requirement	Judgment
				Max.	Min.	Ave.		
1	15	1P Unsealed	Initial	3.10	2.65	2.85	10mΩ Max.	Meet spec.
	15	3P Unsealed		3.03	2.33	2.68	10mΩ Max.	Meet spec.
	15	6P Unsealed		3.33	1.96	2.62	10mΩ Max.	Meet spec.
	15	1P Sealed		2.23	2.02	2.10	10mΩ Max.	Meet spec.
	15	3P Sealed		2.17	1.82	2.01	10mΩ Max.	Meet spec.
	15	6P Sealed		2.69	1.30	2.08	10mΩ Max.	Meet spec.
	15	1P Unsealed	After Durability, Vibration and Mechanical Shock	6.36	2.48	4.46	20mΩ Max.	Meet spec.
	15	3P Unsealed		4.77	2.62	3.27	20mΩ Max.	Meet spec.
	15	6P Unsealed		5.79	3.02	4.06	20mΩ Max.	Meet spec.
	15	1P Sealed		4.43	2.25	3.27	20mΩ Max.	Meet spec.
	15	3P Sealed		3.63	1.60	2.70	20mΩ Max.	Meet spec.

2	30	1P with cover Sealed	Initial	2.22	1.88	2.02	10mΩ Max.	Meet spec.
	30	1P no cover Unsealed		2.40	1.43	1.90	10mΩ Max.	Meet spec.
	30	2P with cover Sealed		2.04	1.65	1.82	10mΩ Max.	Meet spec.
	30	3P with cover Sealed		3.27	1.13	2.08	10mΩ Max.	Meet spec.
	30	2P with cover Sealed		2.67	1.09	1.91	10mΩ Max.	Meet spec.
	30	3P with cover Sealed		2.27	1.59	1.84	10mΩ Max.	Meet spec.
	30	6P Unsealed with TPA		2.38	1.52	1.80	10mΩ Max.	Meet spec.
	30	1P with cover Sealed	After Temperature Rise	2.97	1.61	2.28	20mΩ Max.	Meet spec.
	30	1P no cover Unsealed		2.45	1.53	2.07	20mΩ Max.	Meet spec.
	30	2P with cover Sealed		2.01	1.52	1.76	20mΩ Max.	Meet spec.
	30	3P with cover Sealed		2.67	1.67	1.97	20mΩ Max.	Meet spec.
	30	2P with cover Sealed		2.09	1.57	1.78	20mΩ Max.	Meet spec.
	30	3P with cover Sealed		2.64	1.49	1.88	20mΩ Max.	Meet spec.
	30	6P Unsealed with TPA		2.29	1.58	1.78	20mΩ Max.	Meet spec.
7	10	2P with sealed terminals, no seals applied	Initial	2.34	1.62	2.15	10mΩ Max.	Meet spec.
	10	6P with unsealed terminals		4.08	1.93	2.70	10mΩ Max.	Meet spec.
	10	2P with sealed terminals, no seals applied	After Salt Spray	5.97	2.56	3.39	20mΩ Max.	Meet spec.
	10	6P with unsealed terminals		9.2	2.92	5.13	20mΩ Max.	Meet spec.
8	10	2P with sealed terminals, no seals applied	Initial	2.64	1.60	2.32	10mΩ Max.	Meet spec.
	10	6P with unsealed terminals		3.60	2.06	2.68	10mΩ Max.	Meet spec.
	10	2P with sealed terminals, no seals applied	After Humidity and Temperature Cycling	5.01	2.19	3.38	20mΩ Max.	Meet spec.
	10	6P with unsealed terminals		4.60	1.87	3.34	20mΩ Max.	Meet spec.
9	10	2P with sealed terminals, no seals applied	Initial	2.96	1.65	2.36	10mΩ Max.	Meet spec.
	10	6P with unsealed terminals		3.24	1.83	2.76	10mΩ Max.	Meet spec.
	10	2P with sealed terminals, no seals applied	After Temperature Life	5.46	2.7	3.72	20mΩ Max.	Meet spec.
	10	6P with unsealed terminals		7.99	2.87	4.36	20mΩ Max.	Meet spec.
10	10	2P with sealed terminals, no seals applied	Initial	3.35	2.15	2.58	10mΩ Max.	Meet spec.
	10	6P with unsealed terminals		3.98	2.47	3.14	10mΩ Max.	Meet spec.
	10	2P with sealed terminals, no seals applied	After Vibration	5.03	2.64	3.44	20mΩ Max.	Meet spec.
	10	6P with unsealed terminals		6.94	2.81	4.18	20mΩ Max.	Meet spec.

3.3. Insulation Resistance
Test result are shown in Table 4.

Table 4

Unit: $10^{11}\Omega$

Group	Quantity	Specimen Description	Condition	Insulation Resistance			Requirement	Judgment
				Max.	Min.	Ave.		
3	15	1P sealed terminals, no seals applied	Initial	9.21	0.90	3.12	1000MΩ min.	Meet spec.
	15	6P unsealed terminals		13.35	0.85	4.34	1000MΩ min.	Meet spec.
	15	1P sealed terminals, no seals applied	After Thermal Shock Humidity and Temperature Cycling	6.33	0.12	2.00	500MΩ min.	Meet spec.
	15	6P unsealed terminals		2.65	0.05	0.87	500MΩ min.	Meet spec.

3.4. Dielectric Withstanding Voltage
Test result are shown in Table 5.

Table 5

Group	Quantity	Specimen Description	Condition	Dielectric Withstanding Voltage			Requirement	Judgment
				Max.	Min.	Ave.		
3	15	1P sealed terminals, no seals applied	Initial	No breakdown, no flashover.			No breakdown or flashover.	Meet spec.
	15	6P unsealed terminals		No breakdown, no flashover.				Meet spec.
	15	1P sealed terminals, no seals applied	After Thermal Shock Humidity and Temperature Cycling	No breakdown, no flashover.				Meet spec.
	15	6P unsealed terminals		No breakdown, no flashover.				Meet spec.

3.5. Temperature Rise vs. Current
Test result are shown in Table 6.

Table 6

Unit: °C

Group	Quantity	Specimen Description	Wire Size	Current	Temperature Rise			Requirement	Judgment
					Max.	Min.	Ave.		
2	30	1P with cover Sealed	14 AWG	15.0A	29.70	20.60	23.31	30°C maximum	Meet spec.
	30	1P no cover Unsealed	14 AWG	15.0A	29.60	20.60	23.45		Meet spec.
	30	2P with cover Sealed	14 AWG	15.0A	29.20	23.40	25.94		Meet spec.
	30	3P with cover Sealed	14 AWG	11.0A	18.60	13.00	15.26		Meet spec.
	30	2P with cover Sealed	16 AWG	12.0A	25.70	21.00	23.21		Meet spec.
	30	3P with cover Sealed	16 AWG	9.0A	19.00	12.70	15.02		Meet spec.
	30	6P Unsealed with TPA	20 AWG	6.0A	22.10	15.00	18.52		Meet spec.

3.6. Sinusoidal Vibration
Both test group 1 and group 10: No physical damage and no electrical discontinuity greater than 1 μs were found during and after test.

3.7. Mechanical Shock
No physical damage and no electrical discontinuity greater than 1 µs were found during and after test.

3.8. Durability
No physical damage.

3.9. Connector Mating Force
Test result are shown in Table 7.

Table 7

Unit: N

Group	Quantity	Specimen Description	Condition	Connector Mating Force			Requirement	Judgment
				Max.	Min.	Ave.		
1	15	1P Unsealed	Initial	5.3	3.3	4.1	6.67N Max	Meet spec.
	15	3P Unsealed		14.5	10	11.9	20.01N Max.	Meet spec.
	15	6P Unsealed		26.9	17.7	21.1	40.02N Max	Meet spec.
	15	1P Sealed		17.7	8.1	13.8	18N Max.	Meet spec.
	15	3P Sealed		27.3	20.3	23.1	54N Max	Meet spec.
	15	6P Sealed		31.3	23.7	25.8	108N Max.	Meet spec.

3.10. Connector Unmating Force
Test result are shown in Table 8.

Table 8

Unit: N

Group	Quantity	Specimen Description	Condition	Connector Unmating Force			Requirement	Judgment
				Max.	Min.	Ave.		
1	15	1P Unsealed	After Durability, Vibration and Mechanical Shock	3.30	1.40	2.32	1.25N Min.	Meet spec.
	15	3P Unsealed		14.10	7.80	11.56	3.75N Min.	Meet spec.
	15	6P Unsealed		16.80	11.40	13.69	7.5N Min.	Meet spec.
	15	1P Sealed		4.30	2.60	3.09	1.25N Min.	Meet spec.
	15	3P Sealed		15.19	11.60	13.35	3.75N Min.	Meet spec.
	15	6P Sealed		22.00	16.90	18.75	7.5N Min.	Meet spec.

3.11. Crimp Tensile Strength
Test result are shown in Table 9.

Table 9

Unit: N

Group	Quantity	Part Number	Wire Size	Crimp Tensile Strength			Requirement	Judgment
				Max.	Min.	Ave.		
12	15	2329906-01	18AWG	193.5	138.8	175.1	90N Min.	Meet spec.
	15		20AWG	149.6	123.0	142.0	60N Min.	Meet spec.
	15		2*22AWG	92.9	82.7	88.6	49N Min.	Meet spec.
	15	2329907-1	14AWG	262.6	211.2	245.7	200N Min.	Meet spec.
	15		16AWG	272.3	233.8	259.7	135N Min.	Meet spec.
	15	2329908-1	18AWG	196.4	134.0	180.4	90N Min.	Meet spec.
	15		20AWG	138.7	125.1	132.0	60N Min.	Meet spec.
	15	2329909-1	22AWG	92.4	68.7	85.4	49N Min.	Meet spec.
	15		24AWG	66.6	53.2	59.7	29.4N Min.	Meet spec.
	15		26AWG	40.7	24.8	32.3	19.6N Min.	Meet spec.

	15	2329912-1	2*22AWG	89.7	60.5	84.0	49N Min.	Meet spec.
	15		18AWG	152.0	138.1	145.3	90N Min.	Meet spec.
	15		20AWG	133.3	124.2	128.5	60N Min.	Meet spec.
	15	2329914-1	18AWG	149.4	132.8	142.1	90N Min.	Meet spec.
	15		20AWG	137.1	103.7	128.2	60N Min.	Meet spec.
	15	2329915-1	22AWG	87.1	72.6	79.9	49N Min.	Meet spec.
	15		24AWG	58.8	52.6	56.3	29.4N Min.	Meet spec.
	15		26AWG	34.9	23.0	30.5	19.6N Min.	Meet spec.
	15	2329916-1	14AWG	266.9	211.9	251.1	200N Min.	Meet spec.
	15		16AWG	167.3	156.7	162.2	135N Min.	Meet spec.

3.12. Housing Panel Retention Force
Test result are shown in Table 10.

Table 10

Unit: N

Group	Quantity	Specimen Description	Housing Panel Retention Force			Requirement	Judgment
			Max.	Min.	Ave.		
5	15	2P Cap	Load force until 200N, no physical damage was found after test.			98N Min.	Meet spec.
	15	6P Cap	Load force until 200N, no physical damage was found after test.			98N Min.	Meet spec.

3.13. Housing Locking Strength
Test result are shown in Table 11.

Table 11

Unit: N

Group	Quantity	Specimen Description	Housing Locking Strength			Requirement	Judgment
			Max.	Min.	Ave.		
5	15	2P	129.3	118.9	124.2	66.7N Min.	Meet spec.
	15	6P	121.8	93.4	105.7	66.7N Min.	Meet spec.

3.14. Contact Insertion Force
Test result are shown in Table 12.

Table 12

Unit: N

Group	Quantity	Specimen Description	Contact Insertion Force			Requirement	Judgment
			Max.	Min.	Ave.		
4	15	1P Cap	4.70	3.50	4.18	13.3N Max.	Meet spec.
	15	1P Plug	8.10	5.90	6.97		Meet spec.
	15	2P Cap	3.30	2.50	2.91		Meet spec.
	15	2P Plug	4.50	3.30	3.89		Meet spec.
	15	3P Cap	3.60	2.30	2.97		Meet spec.
	15	3P Plug	6.50	4.20	5.21		Meet spec.
	15	6P Cap	3.90	2.90	3.47		Meet spec.
	15	6P Plug	6.70	4.60	5.53		Meet spec.

3.15. Contact Retention Force
Test without TPA. Test result are shown in Table 13.

Table 13

Unit: N

Group	Quantity	Specimen Description	Contact Retention Force			Requirement	Judgment
			Max.	Min.	Ave.		
4	15	1P Cap without TPA	74.7	70.3	72.4	53.4N Min.	Meet spec.
	15	1P Plug without TPA	100.9	93.3	97.9		Meet spec.
	15	2P Cap without TPA	67.1	58.3	63.4		Meet spec.
	15	2P Plug without TPA	102.3	88.2	94.5		Meet spec.
	15	3P Cap without TPA	69.3	59.3	64.0		Meet spec.
	15	3P Plug without TPA	104.5	83.4	94.0		Meet spec.
	15	6P Cap without TPA	72.5	63	66.9		Meet spec.
	15	6P Plug without TPA	113.6	83.4	98.9		Meet spec.
	15	6P Cap with TPA	179.3	88.6	123.8	66.7N Min.	Meet spec.
	15	6P Plug with TPA	127.9	95.5	106.4		Meet spec.

3.16. Thermal Shock
No physical damage was found after test.

3.17. Humidity-Temperature Cycling
No physical damage was found after test.

3.18. Temperature Life
No physical damage was found after test.

3.19. Water Immersion
No ingress of water nor physical damage.

3. 20. Dust Tightness
No ingress of dust nor physical damage.

3. 21. Resistance to Cold
No physical damage was found after test.

3. 22. Salt Spray
No corrosion was found after test.

4. CALIBRATION

4.1 Calibration Statement

All equipment containing a calibration number is calibrated and traceable through TE Connectivity (TE).

5. VALIDATION

Requested by:
Wright, Scott 2019 11 01
_____ ____/____/____
Product Engineer
TE Connectivity USA product engineer

Prepared by:
Wintan Feng 2020 05 15
_____ ____/____/____
Test Engineer
Shanghai Electrical Components Test Lab.

Approved by:
Coco Xu 2020 05 18
_____ ____/____/____
Manager
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