Lighting Circular Plastic Connector

1. Purpose:

This is qualification test. The purpose of this test is to evaluate the performance of Lighting Circular Plastic Connector Connector.

Testing was performed on below products to determine it compliance with the requirements of product specification 108-137041.

2. Scope:

This is test report for Lighting Circular Plastic Connector. Testing was performed at TE Connectivity Shanghai Electrical Components Test Laboratory between Oct.17th, 2014 and Jan.20th, 2015.

3. Conclusion:

The product met the electrical, mechanical, and environmental performance requirements of TE product specification 108-137041.

4. Test samples:

Samples were taken randomly from current production. The following part numbers were used for test:

Description	Product Part No.
2P Male cable assembly	2834000-1
2P Female cable assembly	2834001-1
4P Male cable assembly	2834004-1
4P Female cable assembly	2834005-1

5. Test Method

5.1 Examination of Product

Visual, dimensional and functional per applicable inspection plan.

Requirements: Meets requirements of product drawing

Test Method: In accordance with EIA-364-18

5.2 Contact Resistance

Subject the specimen to maximum allowed rating current and measure the contact resistance.

Requirements: 20mΩ Max.

Test Method: EIA-364-06

5.3 Insulation resistance

Mated connector with 500V DC between adjacent contacts for 1 min.

Requirements: Initial 1000 MΩMin. Final: 500 MΩMin.

Test Method: EIA-364-21

5.4 Dielectric strength

Mated connector with 2200 V AC between adjacent contacts for 1 min. Leakage current 5mA

Requirements: No breakdown.

Test Method: EIA-364-70

5.5 Temperature rise vs current

Measured at maximum rated current with series all contacts.

Current: 7A (2 Position), 6A (3, 4 Position)

Requirement: Temperature rise should be 30℃ Max.

Test method: EIA-364-70

5.6 Durability

Mating and unmating specimens for 50 cycles at a max rate of 500 cycles per hour.

Requirement: No mechanical damage; No change to performance;

Test method: EIA-364-09

5.7 Vibration

Subject mated specimens to 10-55-10 Hz traversed in 1 minute with 1.52mm max amplitude. 2 hours in each of 3 mutually perpendicular planes.

Requirements: Discontinuity max 1 μs

Test method: EIA-364-28

5.8 Mechanical shock

Subject mated specimens to 50 G's half sine chock pulse of 11 ms duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, total 18 shocks.

Requirements: Discontinuity max 1 μs

Test method: EIA-364-27, Condition H

5.9 Mating force

Measure force when mate specimens at a max rate of 12.7mm/min.

Requirements: 30N Max.

Test method: EIA-364-13

5.10 Unmating force

Measure force when mate specimens at a max rate of 12.7mm/min.

Requirements: 30N Max.

Test method: EIA-364-13

5.11 Mechanical strength impact

Dropping height:

-750mm for specimens of mass≤ 250g,

-500mm for specimens of mass >250g,

Dropping cycles: 8

Positions in 45°steps, one cycle per position.

Requirements: No physical damages allowed, A reduction of clearances and creepage distances is not allowed.

Test method: IEC61984—7.5 (A9)

5.12 Flexing test of cord

Current of 6A, Mechanical load of 20N, as Figure1 in product specification. Numbers of bending: 100 cycles

Requirements: No damage is allowed. The cable support sleeve shall not be loosened from the body and the insulation shall show no signs of abrasion or of wear and tear. Broken strands shall not pierce the insulation.

Test method: IEC61987------7.3.9

5.13 Thermal Shock

Subject mated connector to 10 cycles. 1cycle: -55ºC/30 minutes, 85ºC/30minutes. Measurement is held after samples has been put in room temperature for 1~2 hours.

Requirements: No physical damage, and meet requirements of additional tests specified in Product Qualification Test Sequence.

Test method: EIA-364-32, Test Condition I

5.14 Humidity (cycling Temperature)

Subject mated connector to 10 cycles. 1 cycle is at 25~65ºC, 80~98% RH last for 24 hours. Measurement is held after samples has been put in room temperature for 1~2 hours.

Requirements: No physical damage, and meet requirements of additional test specified in Product Qualification Test Sequence.

Test method: EIA-364-31, Method III

5.15 Temperature life

Subject mated cable assemble to 85ºC for 250 hours. Measurement is held after samples has been put in room temperature for 1~2 hours.

Requirements: No physical damage, and meet requirements of additional test specified in Product Qualification Test Sequence.

Test method: EIA-364-17, Method A, Test Condition 3.

5.16 Resistance to cold

Subject mated connector to -25ºC for 240 hour. Measurement is held after samples has been put in room temperature for 1~2 hours.

Requirements: No physical damage, and meet requirements of additional test specified in Product Qualification Test Sequence.

Test method: EIA-364-59, Condition 3.

5.17 Temporary immersion (IPX7)

Immerse specimens at 1m below the water surface for 30 minutes.

Requirements: Can meet requirements of additional tests specified in Product Qualification Test Sequence.

Test method: IEC 60529, IP67 level, paragraph 14.2.7.

5.18 Temporary immersion (IPX8)

Immerse specimens at 1.5 m below the water surface for 24hours.

Requirements: Can meet requirements of additional tests specified in Product Qualification Test Sequence.

Test method: Refer to IEC 60529

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

Temperature:15℃ to 35℃ Relative Humidity: 2 5% to 75%

7. Test Sequence

Test group	1	2	3	4	5	6	7	8	9
Examination of the product	1,6	1,13	1,9	1,9	1,3	1,7	1,3	1,3	1,7
Contact resistance	2,5	2,8,10,12	4,8	4,8					
Insulation resistance						2,5			2,5
Dielectric withstanding Voltage						3,6			3,6
Temperature rise vs current					2				
Durability		5							
Mating force		3,6	2,6	2,6					
Unmating force		4,7	3,7	3,7					
Mechanical strength impact							2		
Flexing test of cord								2	
Vibration	3								
Physical Shock	4								
Thermal shock		9							
Temperature life			5						
Resistance to cold				5					
Humidity (Temperature cycling)		11							
Temporary immersion (IPX7)						4			
Temporary immersion (IPX8)									4

8. Test Result

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
1	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Contact resistance	5	Initial	5.08	4.60	4.86	<20mΩ	Pass
	Vibration	5	Final	No discontinuities of 1 microsecond or longer duration occurred			No abnormalities	Pass
	Mechanical Shock	5	Final	No discontinuities of 1 microsecond or longer duration occurred			No abnormal	Pass

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	Contact resistance	5	Final	6.21	4.15	5.04	<20mΩ	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormal ities	Pass
2	Examination of Product	5	Initial	No physical damage occurred			No abnormal ities	Pass
	Contact resistance	5	Initial	5.09	4.49	4.85	<20mΩ	Pass
	Mating force	5	Initial	13.47	11.31	12.73	<30N	Pass
	Unmating force	5	Initial	7.95	7.33	7.65	<30N	Pass
	Durability	5	Initial	No physical damage occurred			No abnormal ities	Pass
	Mating force	5	Final	24.68	15.55	20.38	<30N	Pass
	Unmating force	5	Final	11.33	7.29	9.61	<30N	Pass
	Contact resistance	5	Final	19.39	9.09	11.05	<20mΩ	Pass
	Thermal shock	5	Final	No physical damage occurred			No abnormal ities	Pass
	Contact resistance	5	Final	13.67	4.89	7.34	<20mΩ	Pass
	Humidity (cycling Temperature	5	Final	No physical damage occurred			No abnormal ities	Pass
	Contact resistance	5	Final	16.49	6.19	9.44	<20mΩ	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormal ities	Pass
3	Examination of Product	5	Initial	No physical damage occurred			No abnormal ities	Pass
	Mating force	5	Initial	29.65	17.96	24.35	<30N	Pass
	Unmating force	5	Initial	13.87	8.91	11.29	<30N	Pass
	Contact resistance	5	Initial	6.18	4.92	5.45	<20mΩ	Pass
	Temperature life	5	Initial	No physical damage occurred			No abnormal ities	Pass
	Mating force	5	Final	12.98	7.21	10.47	<30N	Pass
	Unmating force	5	Final	9.24	5.15	8.03	<30N	Pass
	Contact resistance	5	Final	11.38	5.54	7.38	<20mΩ	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormal ities	Pass
4	Examination of Product	5	Initial	No physical damage occurred			No abnormal ities	Pass
	Mating force	5	Initial	15.43	10.59	13.13	<30N	Pass
	Unmating force	5	Initial	10.07	7.84	8.85	<30N	Pass
	Contact resistance	5	Initial	9.87	9.02	9.45	<20mΩ	Pass

	Resistance to cold	5	Initial	No physical damage occurred			No abnormalities	Pass
	Mating force	5	Final	13.99	9.22	11.82	<30N	Pass
	Unmating force	5	Final	9.12	7.42	8.09	<30N	Pass
	Contact resistance	5	Final	10.92	9.06	9.76	<20mΩ	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
5	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Temperature rise us current	5	Final	19.48	17.31	18.44	<30℃	Pass
	Contact resistance	5	Final	6.82	3.25	4.60	<20mΩ	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
6	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Insulation resistance	5	Initial	6.82 $x10^9\Omega$	3.25 $x10^9\Omega$	4.60 $x10^9\Omega$	>1000MΩ	Pass
	Dielectric withstanding Voltage	5	Initial	No Breakdown			No Breakdown	Pass
	Temporary immersion (IPX7)	5	Initial	No water ingress			No abnormalities	Pass
	Insulation resistance	5	Final	$7.84x10^9$ Ω	0.20 $x10^9\Omega$	$6.24x10^9$ Ω	>500MΩ	Pass
	Dielectric withstanding Voltage	5	Final	No Breakdown			No Breakdown	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
7	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Mechanical strength impact	5	Final	No physical damage occurred			No abnormalities	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
8	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Flexing test of cord	5	Initial	No physical damage occurred			No abnormalities	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
9	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Insulation resistance	5	Initial	5.30 $x10^9\Omega$	2.92 $x10^9\Omega$	4.15 $x10^9\Omega$	>1000MΩ	Pass

	Dielectric withstanding Voltage	5	Initial	No Breakdown			No Breakdown	Pass
	Temporary immersion (IPX8)	5	Initial	No water ingress			No abnormalities	Pass
	Insulation resistance	5	Final	8.96 $x10^9\Omega$	1.08 $x10^9\Omega$	$3.85x10^9$ Ω	>500MΩ	Pass
	Dielectric withstanding Voltage	5	Final	No Breakdown			No Breakdown	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass

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