Mini-UMNL Plug Housing Evaluation for RM #2136597

1. INTRODUCTION

1.1 Purpose

The purpose of this test was to evaluate Mini-UMNL Plug housing' made from new additional resin (Raw material #2136597, 50% regrind) to determine its conformance to the requirements of Product Specification 108-1542, Rev D.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the TE Mini-UMNL Plug housing. Testing was performed at the Harrisburg Electrical Components Test Laboratory, associated test request is EA20220166T.

Re-tested 16P Plug housing at Medway Electrical Components Test Laboratory for 'Housing Locking Mechanism Strength Test' under EA20230216T.

1.3 Conclusion

All specimens listed in Paragraph 1.4 met the requirements listed in the Product Specification.

1.4 First Specimens

Specimens with the following part numbers were used for test:

Table 1 – Specimen Identification

Test Group	Quantity	Part Number	Description
1	3	770583-1	16P MINI UMNL PLUG HSG (RM #2136597)
	3	1-794068-0	16P MINI UMNL HDR W/DH SN
	48	794407-1	MINI UNML SCKT 20-16 AWG SN
2	3	770583-1	16P MINI UMNL PLUG HSG (RM #2136597)
	3	1-794068-0	16P MINI UMNL HDR W/DH SN
	48	794407-1	MINI UNML SCKT 20-16 AWG SN

1.5 Test Sequence

The specimens identified in Paragraph 1.4, Table 1 were subjected to the sequence listed in Table 2.

Table 2 – Test Sequence

Test or Examination	Test Group	
	1	2
	Test Sequence (a)	
Initial Examination of Product	1	1
Dry circuit resistance	3,7	
Insulation resistance		3,7
Dielectric Withstanding Voltage		4,8
Vibration, Sinusoidal	5	
Mechanical shock	6	
Durability	4	
Contact Retention		9
Contact insertion force		2
Mating force	2	
Un-mating force	8	
Housing Locking Strength		10
Thermal shock		5
Humidity Temperature Cycling		6
Final examination of Product	9	11

NOTE

(a) Numbers indicate sequence in which tests shall be performed.

1.6 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 Examination of Product – Test group 1,2

Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Dry circuit resistance – Test group 1

All low level contact resistance measurements taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage met the initial requirement of 10 milliohms maximum and final requirement of 20 milliohms maximum after mechanical shock.

2.3 Insulation Resistance - Test Group 2

All insulation resistance measurements were greater than the specified minimum requirement of 1,000 megohms initial and 100 megohms final.

2.4 Dielectric Withstanding Voltage - Test Group 2

No dielectric breakdown or flashover occurred.

2.5 Vibration, Sinusoidal – Test Group 1

All test specimens had no apparent physical damage occur during vibration testing.

2.6 Mechanical Shock - Test Group 1

All test specimens had no apparent physical damage occur during shock testing.

2.7 Durability - Test Group 1

No evidence of physical damage that would impair product performance was visible as a result of durability.

2.8 Contact Retention - Test Group 2

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of supplying an axial load of 35.6 N [8 lbf] to the contacts for 60 seconds.

2.9 Contact Insertion Force - Test Group 2

All specimens met the requirement of 13.3N maximum contact insertion force requirement as stated in TE product specification 108-1542, Rev D.

2.10 Mating Force - Test Group 1

All specimens met the 107.2N (6.7N x 16 positions) maximum mating force requirement as stated in TE product specification 108-1542, Rev D

2.11 Un-mating Force - Test Group 1

All specimens met the 11.2N (0.7N x 16 positions) minimum un-mating force requirement as stated in TE Product specification 108-1542, Rev D.

2.12 Housing Lock Strength - Test Group 2

All specimen's met the requirement of 40N minimum housing lock strength force requirements as stated in TE Product specification 108-1542, Rev D.

2.13 Thermal Shock - Test Group 2

After exposure to thermal shock, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.14 Humidity Temperature Cycling - Test Group 2

After exposure to humidity / temperature cycling, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed

3. TEST PROCEDUES

3.1 Examination of Product

Specimens were visually examined for any damage that would be detrimental to product performance. Testing was done in accordance with EIA 364-18B and the test request.

3.2 Dry Circuit Resistance

Dry circuit resistance measurements at low level current were made using a four terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage. Testing was performed in accordance with EIA 364-23D and the test request.

3.3 Insulation Resistance

Insulation resistance was measured between adjacent contacts. A test voltage of 500 volts DC was applied for two minutes before the resistance was measured. Testing was performed in accordance with EIA 364-21F.

3.4 Dielectric Withstanding Voltage

A test potential of 1500 volts AC was applied between adjacent contacts. This potential was applied for one minute and then returned to zero. Testing was performed in accordance with EIA 364-20F, Method A, Condition 1 and the test request.

3.5 Vibration Test

specimens were subjected to a Sinusoidal Vibration test in accordance with TE specification 108-1542 and EIA-364-28F, Test Condition "I".

3.6 Mechanical Shock

Test specimens were subjected to a Mechanical Shock test in accordance with TE specification 108-1542 and EIA-364-27C, test condition "A".

3.7 Durability Test

Specimens were mated and unmated for 20 cycles at less than a maximum rate of 500 cycles per hour. Testing was performed in accordance with EIA 364-09D and the test request.

3.8 Contact Retention Force

The wires on the terminals in the housing were individually grasped in the pneumatic jaws that were mounted to the load cell on the cross head of the machine. The cross head was then started in the tensile direction at a rate of 12.7mm per minute until an axial load of 35.6N was reached. This load was held for 60 seconds in accordance with EIA 364-29D and the test request.

3.9 Contact Insertion Force

The wires crimped to the terminals were held in a drill chuck that was attached to the load cell on the cross head of the machine. The terminal was manually lined up with the cavity in the housing to a point just prior to where the insertion force would begin. The cross head was started in the compression direction at a rate of 12.7 millimeters per minute until the terminal was fully seated in the housing, and the forces were recorded. Testing was performed in accordance with EIA 364-5C and the test request.

3.10 Mating Force

This test is for “Connector Mating force”. Specimens were subjected to mating force using a tensile / compression device with a free floating fixture and a rate of travel of 0.5 inch per minute in accordance with EIA 364-13E.

3.11 Unmating Force

This test is for “Connector Unmating force”. Specimens were subjected to unmating force using a tensile / compression device with a free floating fixture and a rate of travel of 0.5 inch per minute in accordance with EIA 364-13E

3.12 Housing Locking Mechanism Strength

An axial load was applied to mated specimens using a tensile / compression machine in a manner which would cause the specimen locking latches to disengage in accordance with EIA 364-98 and the test request.

3.13 Thermal Shock

Mated specimens were subjected to 25 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and +105°C. The transition between temperatures was less than one minute. Testing was performed in accordance with EIA 364-32G, Method A, Condition VII and the test request

3.14 Humidity-Temperature Cycling

Mated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while maintaining high humidity. Testing was performed in accordance with EIA 364-31F, Method III and the test request.