



Ultra-Fast Resin Evaluation

1. INTRODUCTION

1.1 Purpose

Testing was performed on the ULTRA-FAST PLUS to determine its conformance to the requirements of Design Objective 108-2044, Rev. C and the Test Request.

1.2 Scope

This report covers the electrical and environmental performance of the ULTRA-FAST PLUS. Testing was performed at the Harrisburg Electrical Components Test Laboratory between May 5, 2020 and May 13, 2020. Detailed test data is on file and maintained at HECTL under test numbers EA200162T and WE-20200267.

1.3 Conclusion

All specimens passed testing in accordance with 108-2044, Rev. C and the Test Request.

1.4 Test Specimens

Specimens identified in Table 1 with the following part numbers were used for test:

Table 1 – Test Specimens

Test Set	Qty	Part Number	Description
1	5	2-520932-2	Receptacle Assy, Ultra-Fast Plus, .110 Series, 22 AWG
2	5	2-520932-2	Receptacle Assy, Ultra-Fast Plus,.110 Series, 18 AWG
3	5	2-520401-2	Receptacle Assy, Ultra-Fast Plus, .187 Series, 22 AWG
4	5	2-520401-2	Receptacle Assy, Ultra-Fast Plus, .187 Series, 18 AWG
5	5	3-520402-2	Receptacle Assy, Ultra-Fast Plus, .187 Series,16 AWG
6	5	3-520402-2	Receptacle Assy, Ultra-Fast Plus, .187 Series, 14 AWG
7	5	2-520405-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 22 AWG
8	5	2-520405-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 18 AWG
9	5	3-520406-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 16 AWG
10	5	3-520406-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 14 AWG
11	5	2-520932-2	Receptacle Assy, Ultra-Fast Plus,.110 Series, 22 AWG (With Faston Tab .110, PN 62628-1)
12	5	2-520932-2	Receptacle Assy, Ultra-Fast Plus,.110 Series, 18 AWG (With Faston Tab .110, PN 62628-1)
13	5	2-520401-2	Receptacle Assy, Ultra-Fast Plus, .187 Series, 22 AWG(With Faston Tab .187, PN 60920-5)
14	5	2-520401-2	Receptacle Assy, Ultra-Fast Plus, .187 Series, 18 AWG(With Faston Tab .187, PN 60920-5)
15	5	3-520402-2	Receptacle Assy, Ultra-Fast Plus, .187 Series, 16 AWG(With Faston Tab .187, PN 60920-5)
16	5	3-520402-2	Receptacle Assy, Ultra-Fast Plus, .187 Series, 14 AWG(With Faston Tab .187, PN 60920-5)
17	5	2-520405-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 22 AWG (With Faston Tab .250, PN 62627-2)
18	5	2-520405-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 18 AWG((With Faston Tab .250, PN 62627-2)
19	5	3-520406-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 16 AWG((With Faston Tab .250, PN 62627-2)
20	5	3-520406-2	Receptacle Assy, Ultra-Fast Plus, .250 Series, 14 AWG((With Faston Tab .250, PN 62627-2)

1.5 Test Sequence

The specimens listed in Table 1 were tested as outlined in Table 2.

Table 2 –Test Sequence

Test or Examination	Test Sets	
	1 thru 10	11 thru 20
	Test Sequence(a)	
Initial Examination of Product	1	1
Precondition @ 136° C for 168 hours	2	
Dielectric Withstanding Voltage	3	
Heating (T- Rise)		2
Crimp Tensile		3
Final Examination of Product	4	4

(a) Numbers indicate sequence in which testing was 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 Initial Visual Examination

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Precondition @ 136° C for 168 hours

The plastic insulation of the specimens had melted slightly due to oven conditioning but was not detrimental to product performance.

2.3 Dielectric Withstanding Voltage

All specimens passed testing with no dielectric breakdown or flashover occurring.

2.4 Heating (T- Rise)

All specimens passed heating testing. See Table 3 for testing results for T-Rise.

Table 3 – Heating (T-Rise) Test Results Summary

Test Set	Current	Max. T-Rise
11	2A	0.39°C
12	4A	1.76°C
13	3A	0.82°C
14	7A	4.13°C
15	10A	5.60°C
16	15A	9.98°C
17	3A	0.91°C
18	7A	2.81°C
19	10A	5.11°C
20	15A	8.47°C

2.5 Pull Out (Crimp Tensile)

All specimens passed pull out testing. See Table 4 for summary of pull out data.

Table 4 – Pull Out Test Results Summary

Test Set	Max Force During Test	Max Force During Hold
11	10.71 lbf	10.06 lbf
12	20.72 lbf	20.05 lbf
13	10.69 lbf	10.05 lbf
14	20.89 lbf	20.05 lbf
15	31.30 lbf	30.18 lbf
16	61.23 lbf	60.24 lbf
17	10.98 lbf	10.26 lbf
18	20.79 lbf	20.24 lbf
19	31.12 lbf	30.24 lbf
20	61.04 lbf	60.23 lbf

2.6 Final Visual Examination

Specimens were visually examined and found that the plastic insulation in Test Sets 1 through 10 had melted slightly due to oven conditioning but was not detrimental to product performance.

3. TEST METHODS

3.1 Initial Visual Examination

Specimens were visually examined for any evidence of physical damage that would be detrimental to product performance.

3.2 Precondition @ 136° C for 168 hours

Specimens were preconditioned by being placed in an air circulating oven and exposed to a temperature of 136°C for 168 hours.

3.3 Dielectric Withstanding Voltage

Testing was conducted in accordance with UL310 – 9th edition October 2014, with the exception of using #12 lead shot instead of #7.5 shot per the 108-2044 Rev C. The ends of the specimens were coated a non-conductive wax to prevent any lead shot from entering the terminal. Specimens were placed in the shot and a test potential of 3,400 volts AC was applied with a hold for 1 minute. Voltage was applied between the conductor and the lead shot, which serves as the outer electrode, and to the wire on the specimen.

3.4 Heating (T-Rise)

All Test Groups were prepared the same way. An epoxy-dipped thermocouple was placed between the plastic terminal cover and the back of each receptacle, as per the 108-2044 Rev C. Specification.

Each Test Group had a specific Tab the samples were mated to. These Tabs were bolted to pegs on a board, provided by the requestor, to elevate samples from a flat surface. The samples were then mated to the Tabs and the wire ends were stripped and soldered together to put samples in series. Test Set that required the same Tab and same current level were put in series to have a total of 10 samples.

Each T-Rise applied the specified current level until samples reached thermal stability, or until a T-Rise of 20°C was achieved. Temperature measurements were taken once every minute. Stability checks were performed once every 5 minutes. Once three consecutive stability checks were within 1°C, the samples were considered to have stabilized.

3.5 Pull Out (Crimp Tensile)

The Instron was used to pull on the terminal wire until a specified force was reached and held for a total of 1 minute. See below for parameters. Testing was done in accordance with 108-2044 Rev C.

- Instron Crosshead: 1kN pneumatic grips
- Instron Base: L-vise mounted to a Free-Floating table
- Test Speed / Mode: 1 in/min / Tensile

3.6 Final Visual Examination

Specimens were visually examined with the unaided eye for evidence of physical damage detrimental to product performance.