

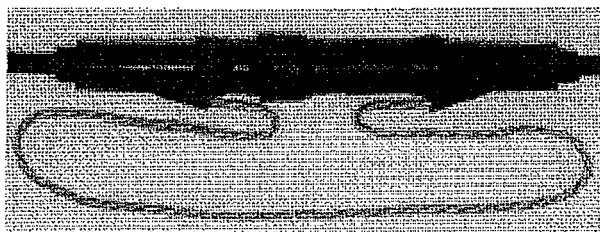
TEST REPORT NUMBER 21-13
PROJECT NUMBER D-17

NO. OF PAGES 17
DATE September 20, 2013

**Test Report
ON**

**52 Super Series AGL Primary Connector Kits for Shielded Cable
FAA AC #150/5345-26D L-823
Type I Class B, Style 3/10 (Reference)**

For
Thomas&Betts
A Member of the ABB Group



Performed by:
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Witnessed by:
Christopher Metcalf
(Intertek ETL SEMKO Representative)

STATEMENTS MADE AND DATA SHOWN, ARE TO THE BEST OF OUR
KNOWLEDGE AND BELIEF, CORRECT AND WITHIN THE USUAL LIMITS
OF COMMERCIAL TESTING PRACTICES.

ADMINISTRATIVE DATA

- 1.0 **PURPOSE OF TEST** For compliance in reference to FAA-AC #150/5345-26D dated 09/30/08, classification L-823, on Plug and Receptacle, Cable Connectors and to Amerace ES-037
- 2.0 **MANUFACTURER AND SPONSOR** Thomas & Betts (Ontario) Ltd.
- 3.0 **TYPE, PART OR MODELS NO.** 52 Super Series Type I, Style 3/10, Class B
- 4.0 **DRAWING, SPECIFICATION OR EXHIBIT** FAA -type L-823 Connectors
- 5.0 **QUANTITY OF ITEMS TESTED** Six (6) 52Super I EC6-EC6
Six (6) 52Super I ED4-ED4
- 6.0 **SECURITY CLASSIFICATION OF ITEMS** Open
- 7.0 **DATE (S) TEST CONDUCTED** July 22, 2013 to September 06, 2013
- 8.0 **PLACE (S) TEST CONDUCTED** Thomas & Betts - (Amerace)
120 Nashdene Road
Scarborough, Ontario M1V 2W3 , Canada
- 9.0 **DISPOSITION OF SPECIMENS** Store for 90 days.
- 10.0 **REFERENCES** FAA-AC 150/5345-26D and Amerace ES-037
- 11.0 **REPORT DISTRIBION** ITS - Intertek Testing Services, (third party testing and certification services FAA approved.)

12.0 TEST EQUIPMENT

12.1 Mechanical Fixtures:	
(1)	Mechanical test fixtures
(2)	Inserts - Plugs
12.2 Metering:	
(3)	HiPot Tester Model 815PL-A portable DC HiPot 0 - 15 kV DC, S.R. #P0812041, Calibrated February 2013.
(4)	Instek Model DM-8145 Multimeter, S.R. # 9502117, Calibrated January 2013.
(4)	Fluke Type K Thermocouple model 80PK-2A
(5)	Fluke, Digital Thermometer, series #6461267, Calibrated January 2013.
(6)	Weston Model 904 AC Ammeter, S.R. #12853, Calibrated January 2013.
(7)	Megger BM80, Series #95093510410995, Calibrated January 2013.
(8)	Force gauges, Calibrated April 2013.
12.3 Go/No-Go Gauges:	
(9)	Hilco gauges, Tool #6-10, Calibrated January 2013.

13.0 TESTS PERFORMED

A. As per FAA-AC #150/5345-26D advisory paragraphs:

Para	Description	Test Result (Pass/Fail)
3.4	Visual Test	Pass
4.2.2	Dielectric test	Pass
4.2.2.1	Plugs and receptacles	Pass
4.2.2.2	Connector assembly	Pass
4.2.4	Mechanical connection test	Pass
4.2.5	Electrical connection test	Pass

B. As per Amerace Engineering Specification ES-037

#	Description	Test Result (Pass/Fail)
1.	Sheath electrical connection Test	Pass

14.0 CONCLUSION

The tests of the six plugs and six receptacles showed that they met all requirements of the FAA Advisory Circular 150/5345-26D and Amerace ES-037 within the tolerances specified.

15.0 RECOMMENDATION

Based on the positive results from the design tests, these products are appropriate for use in AFL circuits.

A. FAA L-823 Primary Connectors Tests

3.4 (Fabrication and Materials) Visual Inspection

3.4.1 General

3.4.4.1 Connector Assembly – Class B, Type I.

#	Requirement	Acceptable (Yes/No)
1.	Dimensional/Construction – all dimensions were within tolerance as specified on Appendix 1 of the L823 AC Figure 2, Class B, Type 1, Plugs and Receptacles –Single Conductor, 25 Ampere, 5000 Volts to Ground	Yes
2	Each receptacle must be equipped with a disposable sleeve fitted into the receptacle’s water seal to catch surplus silicone compound upon assembly.	Yes
3	Each socket must be equipped with a disposable sleeve fitted into the pin end of the socket to prevent entry of silicone compound on assembly and to provide a visual indication of proper socket position after assembly.	Yes
4	The pin design must be such that proper internal dispersion of silicone compound in the assembly is assured.	Yes
5	An adequate amount of silicone insulating compound must be finished with each connector to insure filling all internal voids when the connector is assembled.	Yes
6	Each housing must be capped with a disposable shipping cap on the cable entrance end.	Yes
7	Each plug and receptacle must be marked with manufacturer’s identification and L-823 designation with style, e.g., L-823, Style 3.	Yes
8	Installation instructions must be finished by the manufacturer with each Class B connector.	Yes

A. FAA L-823 Primary Connectors Tests.

4.2.1 Dielectric test

4.2.2.1 Plugs and Receptacles

- a) Six test samples of each receptacle were gauged, mated with test inserts and allowed to soak for 24 hours in a tap water bath at room temperature, 20-25°C. At the end of the soaking period, a test voltage of 15 kV DC was applied for 5 minutes (to the primary wire), and then the insulation resistance was measured between the connector and water using a 500 V DC megger as shown in Figure 1. The results are given in Table 1.

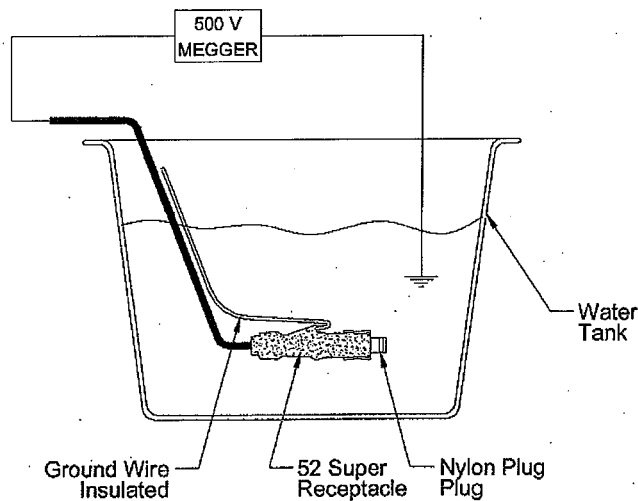


Figure 1

Table 1

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
52Super I ED4-ED4			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass

Plugs and Receptacles (continues)

Test done in reference to Standard FAA-AC #150/5345-26D based on ES-037

- b) This test ensures that primary wire must be insulating from insulated wire. On this step insulation resistance was measured between the connector and ground wire using a 500 V DC megger as shown in Figure 2. The results are given in Table 2.

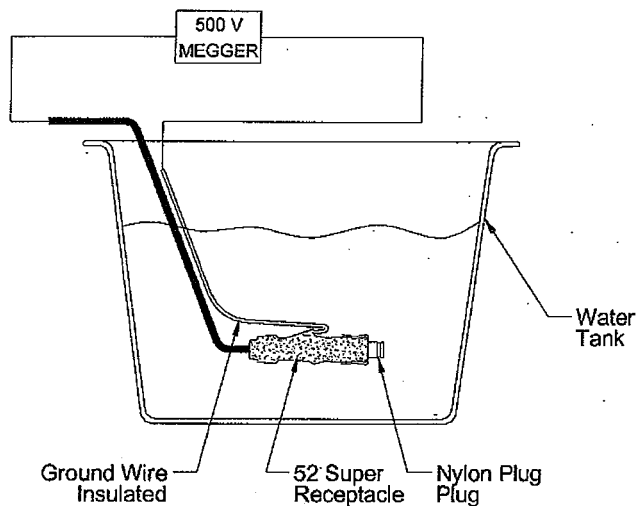


Figure 2

Table 2

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
52Super I ED4-ED4			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass

Plugs and Receptacles (continues)

Test done in reference to Standard FAA-AC #150/5345-26D based on ES-037

- c) This test ensures that there is a watertight seal between the kit housing and the cable sheath, as well as where the continuity wire enters the kit housing. The continuity wire must be insulated from the water. This test shall be carried out during the Connector Assembly tests of 4.2.2.1 FAA AC 150/5345-26D. On this test voltage of 4.7 kV DC was applied for 5 minutes (to the ground wire), and then the insulation resistance was measured between the connector and water using a 500 V DC megger as shown in Figure 3. The results are given in Table 3.

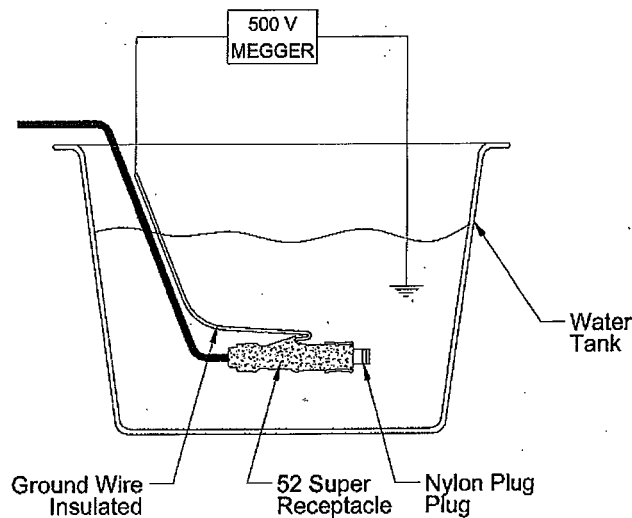


Figure 3

Table 3

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	100,000	1,000	Pass
2	100,000		Pass
3	100,000		Pass
4	100,000		Pass
5	100,000		Pass
6	100,000		Pass
52Super I ED4-ED4			
1	100,000	1,000	Pass
2	100,000		Pass
3	100,000		Pass
4	100,000		Pass
5	100,000		Pass
6	100,000		Pass

4.2.2.2 Connector Assembly

- a) After the conclusion of the previous test, the plugs were mated with receptacles and immersed in tap water. While immersed, each connector assembly was manually flexed for 2 minutes and left immersed for 24 hours. At the end of the 24 hours soaking period, a test voltage of 15 kV DC was applied for 5 minutes, and then the insulation resistance was measured between the conductor and water using a 500 V DC megger as shown in Figure 4. The results are given in Table 4.

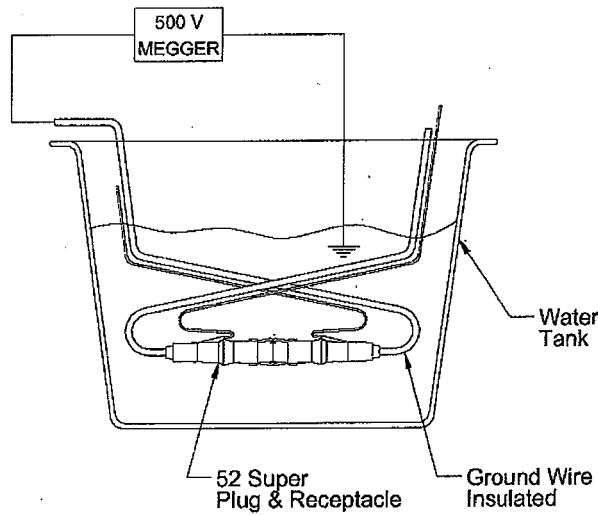


Figure 4

Table 4

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
52Super I ED4-ED4			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass

Connector Assembly (continues)

Test done in reference to Standard FAA-AC #150/5345-26D based on ES-037

- b) On this step insulation resistance was measured between the connector and ground wire using a 500 V DC megger as shown in Figure 5. The results are given in Table 5.

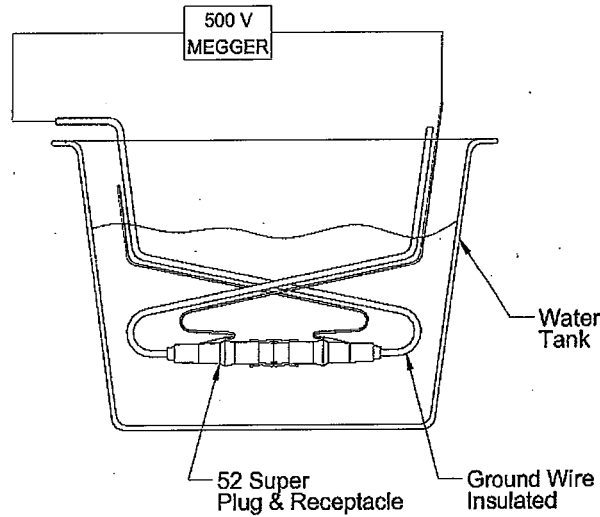


Figure 5

Table 5

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
52Super I ED4-ED4			
1	>100,000	25,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass

Connector Assembly (continues)

Test done in reference to Standard FAA-AC #150/5345-26D based on ES-037

- c) This Test done in reference to Standard FAA-AC #150/5345-26D. On the step three test voltage of 4.7 kV DC was applied for 5 minutes (to the ground wire), and then the insulation resistance was measured between the connector and water using a 500 V DC megger as shown in Figure 6. The results are given in Table 6.

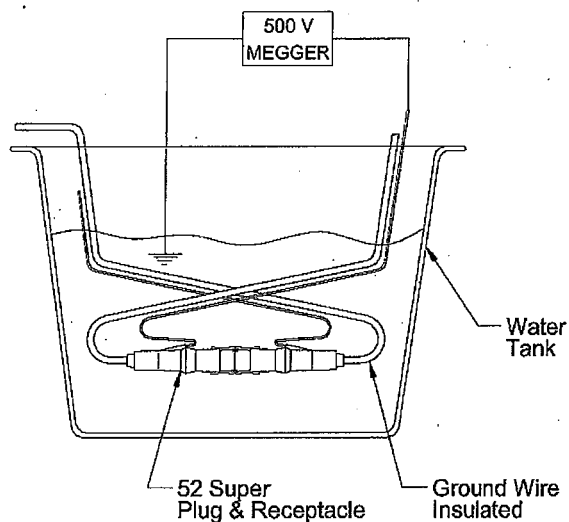


Figure 6

Table 6

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	100,000	1,000	Pass
2	100,000		Pass
3	100,000		Pass
4	100,000		Pass
5	100,000		Pass
6	100,000		Pass
52Super I ED4-ED4			
1	100,000	1,000	Pass
2	100,000		Pass
3	100,000		Pass
4	100,000		Pass
5	100,000		Pass
6	100,000		Pass

4.2.2.2 Connector Assembly

- a) To conclude this test, the water was heated to 65°C, and maintained for one (1) hour, and then the insulation resistance was measured using a 500 V DC megger as shown in Figure 7. The results are given in Table 7.

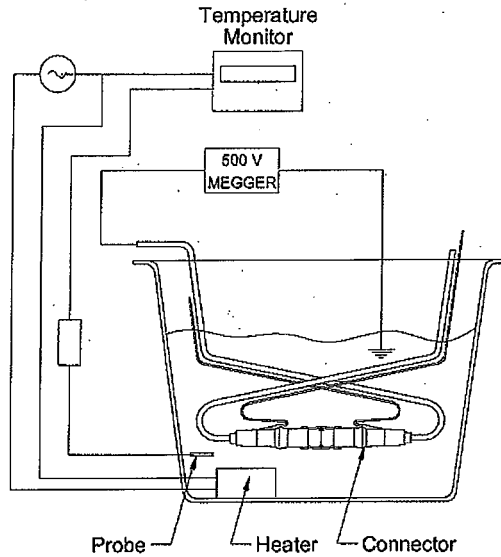


Figure 7

Table 7

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	>100,000	10,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
52Super I ED4-ED4			
1	>100,000	10,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass

4.2.2.2 **Connector Assembly (continues)**

Test done in reference to Standard FAA-AC #150/5345-26D based on ES-037

- b) On this step insulation resistance was measured between the connector and ground wire using a 500 V DC megger as shown in Figure 8. The results are given in Table 8.

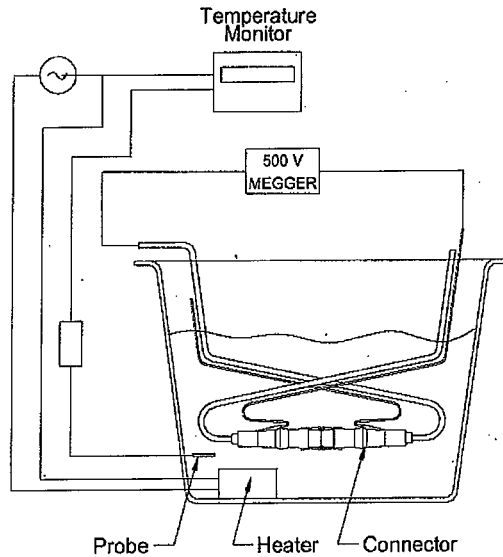


Figure 8

Table 8

Sample #	Measured Ins. Resistance [$M\Omega$]	Min. Ins. Resistance Required [$M\Omega$]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	>100,000	10,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
52Super I ED4-ED4			
1	>100,000	10,000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass

4.2.2.2 **Connector Assembly (continues)**

- c) This Test done in reference to Standard FAA-AC #150/5345-26D.
On the step three test voltage of 4.7 kV DC was applied for 5 minutes (to the ground wire), and then the insulation resistance was measured between the connector and water using a 500 V DC megger as shown in Figure 9.
The results are given in Table 9.

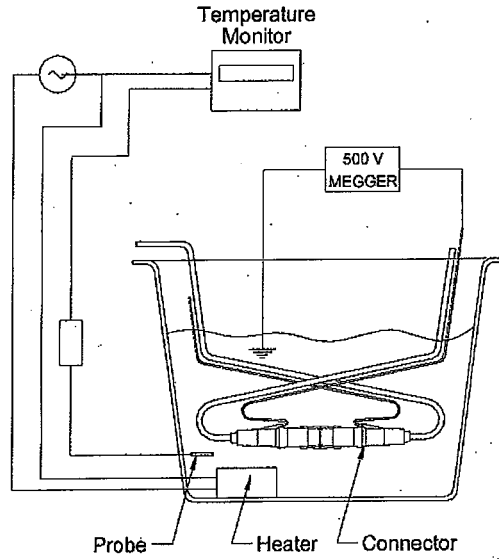


Figure 9

Table 9

Sample #	Measured Ins. Resistance [MΩ]	Min. Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I EC6-EC6			
1	1950	750	Pass
2	1740		Pass
3	1800		Pass
4	1950		Pass
5	2300		Pass
6	2050		Pass
52Super I ED4-ED4			
1	2270	750	Pass
2	2000		Pass
3	2140		Pass
4	1770		Pass
5	1970		Pass
6	2430		Pass

B. Amerace Engineering Specification ES-037

Tests Additional to the Requirements of AC 150/5345-26D

The AC explicitly covers only connectors for unscreened primary cable, and therefore, does not cover the use of connectors such as the Amerace 52Super kit. The 52Super kit is designed and built to be fully in conformance with the AC, as well as providing a screen connection and continuity wire. In the view of Amerace all of the Qualification tests in the AC are applicable to the 52Super kit as well as the tests in Amerace Engineering Specification ES-037.

Sheath Electrical Connection Test

A continuity tester (Megger) delivering at least 10 A at less than 6 V was used to ensure that there is a suitable electrical connection between the metallic screen of the cable and the continuity wire for each sample.

The results are given in Table 12.

Table 12

Sample #	Electrical connection	Test Results (Pass or Fail)	Electrical connection	Test Results (Pass or Fail)
	52Super I EC6-EC6		52Super I ED4-ED4	
1	Yes	Pass	Yes	Pass
2	Yes	Pass	Yes	Pass
3	Yes	Pass	Yes	Pass
4	Yes	Pass	Yes	Pass
5	Yes	Pass	Yes	Pass
6	Yes	Pass	Yes	Pass