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77 WEST BEAVER CREEK ROAD  
RICHMOND HILL, ONTARIO  
CANADA L4B 3A7

TEST REPORT NUMBER 01-26  
PROJECT NUMBER D-17

NO. OF PAGES 15  
DATE 24-Aug-2001

**REPORT OF TEST ON**


**52 Super Series Primary Connector Kits  
FAA AC #150/5345-26C L-823 Type I Class B, Style 3/10  
Amerace Engineering Specification ES-037**

**For**

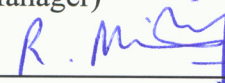
**AMERACE**

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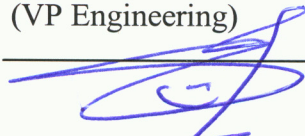
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08/24/01

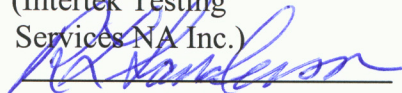
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Witnessed by:  
Dick Sanderson  
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Services NA Inc.)

  
8-24-01

STATEMENTS MADE AND DATA SHOWN, ARE TO THE BEST OF OUR  
KNOWLEDGE AND BELIEF, CORRECT AND WITHIN THE USUAL LIMITS  
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<b>ADMINISTRATIVE DATA</b>
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<b>1.0 PURPOSE OF TEST</b>	For compliance to FAA-AC #150/5345-26C dated 04/17/00, classification L-823, on Plug and Receptacle, Cable Connectors and to Amerace ES-037
<b>2.0 MANUFACTURER AND SPONSOR</b>	Amerace A Division of Thomas & Betts
<b>3.0 TYPE, PART OR MODELS NO.</b>	52 Super Series Type I, Style 3/10, Class B
<b>4.0 DRAWING, SPECIFICATION OR EXHIBIT</b>	FAA –type L-823 Connectors
<b>5.0 QUANTITY OF ITEMS TESTED</b>	Six (6) 52Super I CC4-CC4 Six (6) 52Super I ED4-ED4 Six (6) 52Super I EE4-EE4 Six (6) 52Super I FF3-FF3
<b>6.0 SECURITY CLASSIFICATION OF ITEMS</b>	Open
<b>7.0 DATE (S) TEST CONDUCTED</b>	23-Jul-2001 to 24-Aug-2001
<b>8.0 PLACE (S) TEST CONDUCTED</b>	Amerace, Richmond Hill, Ontario
<b>9.0 DISPOSITION OF SPECIMENS</b>	Store for 90 days.
<b>10.0 REFERENCES</b>	FAA-AC 150/5345-26C and Amerace ES-037
<b>11.0 REPORT DISTRIBION</b>	N/A
<b>12.0 TEST EQUIPMENT</b>	

<b>Sine Wave Power Sources:</b>	
(1)	Mechanical test fixtures
(2)	Inserts - Plugs
<b>Metering:</b>	
(3)	Associated Research Model 05220A portable DC Hipot 0-15 kVDC, S.R.#2829, Calibrated February 2001.
(4)	Instek Model DM-8145 Multimeter, S.R. # 9502117, calibrated February 2001.
(4)	Fluke Type K Thermocouple model 80PK-2A
(5)	Fluke Thermometer Model 52 serial # 6461267, calibrated, February 2001.
(6)	Weston, Ammeter, Model 433, S.R. #131220, calibrated January 1996.
(7)	Megger BM80, Series #950535, Calibrated February 2001.
(8)	Force gauges, Calibrated February 2001.
(9)	Continuity tester
<b>Go/No-Go Gauges:</b>	
(10)	Hilco gauges, S.R. #39993, Calibrated March 2001.

### 13.0 TESTS PERFORMED

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

- 4.2.2 Dielectric Test
  - 4.2.2.1 Plugs and Receptacles
  - 4.2.2.2 Connector Assembly
- 4.2.4 Mechanical Connection Test
- 4.2.5 Electrical Connection Test

#### B. As per Amerace Engineering Specification ES-037

- 1. Sheath Electrical connection Test
- 2. Water Tightness Test
- 3. Ground Wire and Shield Connection Resistance Test.

### 14.0 CONCLUSION

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

### 15.0 RECOMMENDATION

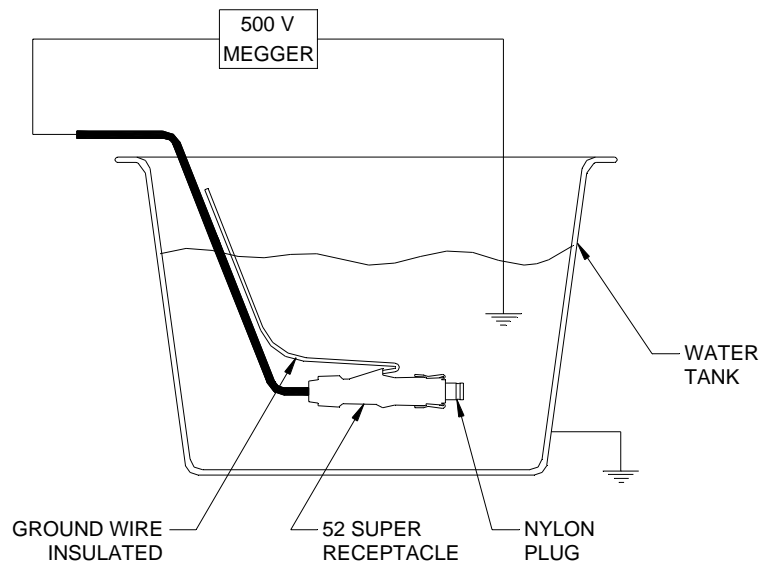
Based on the positive results from the design tests, these products are appropriate for use in AFL circuits.

## **A. FAA L-823 Primary Connectors Tests.**

### **4.2.1 Dielectric Tests**

#### **4.2.2.1 Plugs and Receptacles**

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, 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**

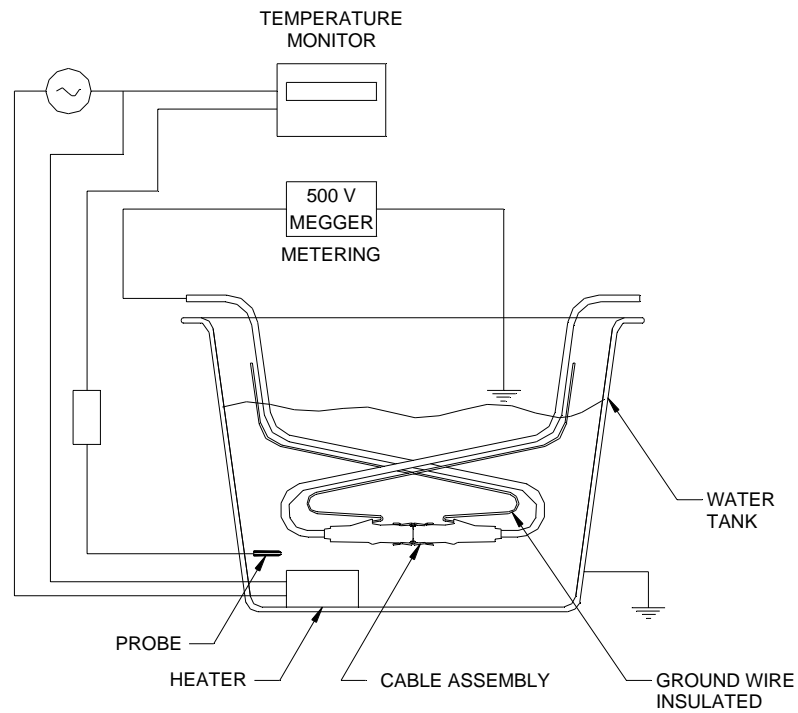
**Plugs & Receptacles (Continued)**

Sample #	Measured Ins. Resistance [MΩ]	Minimum Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I CC4-CC4			
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
52Super I EE4-EE4			
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 FF3-FF3			
1	>40,000	25,000	Pass
2	>100,000		Pass
3	>40,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>39,000		Pass

**Table 1**

#### 4.2.2.2 Cable Assembly

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, then the insulation resistance was measured between the conductor and water using a 500 V DC megger as shown in Figure. 2. The results are given in Table 2.



**Figure 2**

**Cable Assembly (Continued)**

<b>Sample #</b>	<b>Measured Ins. Resistance [MΩ]</b>	<b>Minimum Ins. Resistance Required [MΩ]</b>	<b>Test Results (Pass or Fail)</b>
<b>52Super I CC4-CC4</b>			
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
<b>52Super I ED4-ED4</b>			
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
<b>52Super I EE4-EE4</b>			
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
<b>52Super I FF3-FF3</b>			
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

**Table 2**

**Cable Assembly (Continued)**

To conclude this test, the water was heated to 65°C, and maintained for one (1) hour, then the insulation resistance was measured using a 500 V DC megger as shown in Fig. 2. The results are given in Table 3.

Sample #	Measured Ins. Resistance [MΩ]	Minimum Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
<b>52Super I CC4-CC4</b>			
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
<b>52Super I ED4-ED4</b>			
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
<b>52Super I EE4-EE4</b>			
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
<b>52Super I FF3-FF3</b>			
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

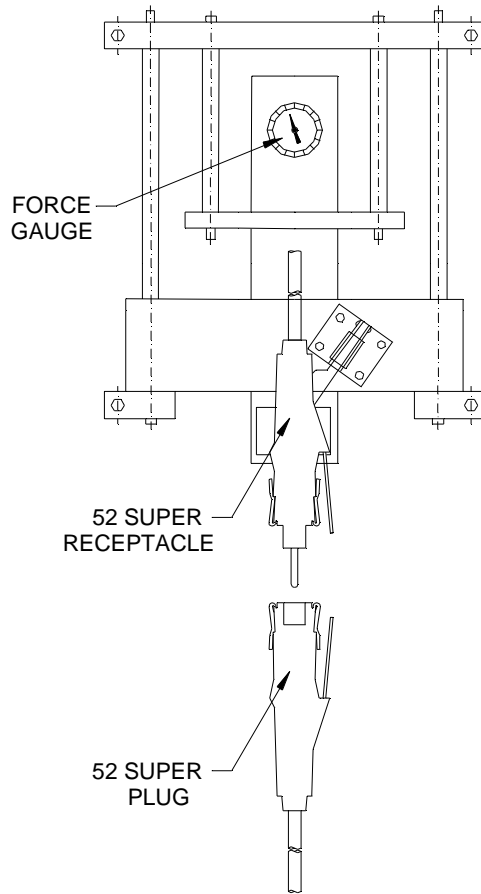
**Table 3**

### Cl. 4.2.4 Mechanical Connection Test

Each receptacle was mated with a plug and tested for its mechanical strength as shown in Figure 3. The results are given in Table 4.

Sample #	Separation Static Pull Load (Lbs.)	Min. Static Pull Load Required (Lbs.)	Test Results (Pass or Fail)
52Super I CC4-CC4			
1	25	10	Pass
2	17	10	Pass
3	24	10	Pass
4	21	10	Pass
5	16	10	Pass
6	20.5	10	Pass
52Super I ED4-ED4			
1	23	10	Pass
2	21	10	Pass
3	22	10	Pass
4	30.5	10	Pass
5	30.5	10	Pass
6	29	10	Pass
52Super I CC4-CC4			
1	23	10	Pass
2	13.5	10	Pass
3	18.5	10	Pass
4	13	10	Pass
5	12.5	10	Pass
6	14.5	10	Pass
52Super I FF3-FF3			
1	20	10	Pass
2	24.5	10	Pass
3	23	10	Pass
4	25	10	Pass
5	30	10	Pass
6	22.5	10	Pass

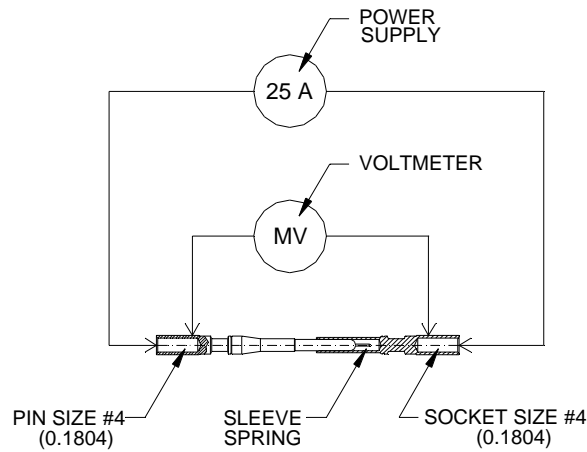
**Table 4**



**Figure 3**

### Cl. 4.2.5 Electrical Connection Test

The voltage drop was measured across the mated metal contacts assembly while conducting a rated current of 25 Amps as shown on Figure 4. The results are given in Table 5.



**Figure 4**

Sample #	Measured Voltage Drop (mV)	Max. Voltage Drop Required (mV)	Test Results (Pass or Fail)
1	1.85	7.5	Pass
2	1.37	7.5	Pass
3	1.43	7.5	Pass
4	1.56	7.5	Pass
5	1.87	7.5	Pass
6	1.65	7.5	Pass

**Table 5**

## **B. Amerace Engineering Specification ES-037**

### **Tests Additional to the Requirements of AC 150/5345-26C**

The AC explicitly covers only connectors for unshielded 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-077.

#### **1. Sheath Electrical Connection Test.**

A continuity tester 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 6.

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

**Table 6**

## 2. Water Tightness Test

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 4.2.2.2 FAA AC 150/5345-26C.

At the end of the 24 hour soaking period, a test voltage of 4.7 kV DC was applied for 5 minutes to the ground wire, and then the insulation resistance was measured using a 500 V DC megger as shown in Figure 2., between the ground wire and the water. The results are shown in Table 7.

Sample #	Measured Ins. Resistance [MΩ]	Minimum Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
<b>52Super I CC4-CC4</b>			
1	>100,000	1000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
<b>52Super I ED4-ED4</b>			
1	>100,000	1000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
<b>52Super I EE4-EE4</b>			
1	>100,000	1000	Pass
2	>100,000		Pass
3	>100,000		Pass
4	>100,000		Pass
5	>100,000		Pass
6	>100,000		Pass
<b>52Super I FF3-FF3</b>			
1	1330	1000	Pass
2	2510		Pass
3	1290		Pass
4	1010		Pass
5	1090		Pass
6	1130		Pass

**Table 7**

To conclude this test, the water was heated to 65°C, and maintained for one (1) hour, then the insulation resistance was measured between the ground wire and the water, using a 500 V DC megger. The results are shown in Table 8.

Sample #	Measured Ins. Resistance [MΩ]	Minimum Ins. Resistance Required [MΩ]	Test Results (Pass or Fail)
52Super I CC4-CC4			
1	1630	750	Pass
2	1470		Pass
3	1850		Pass
4	1370		Pass
5	1530		Pass
6	1610		Pass
52Super I ED4-ED4			
1	1890	750	Pass
2	1820		Pass
3	1970		Pass
4	1930		Pass
5	1880		Pass
6	1940		Pass
52Super I EE4-EE4			
1	3060	750	Pass
2	2390		Pass
3	2720		Pass
4	2750		Pass
5	1210		Pass
6	2460		Pass
52Super I FF3-FF3			
1	1040	750	Pass
2	10350		Pass
3	10750		Pass
4	10250		Pass
5	1010		Pass
6	1050		Pass

**Table 8**

### 3. Ground Wire and Shield Connection Resistance Test

This test ensure that the connection between the shield (screen) and the ground wire provides a minimum ohmic resistance. The maximum acceptable ohmic resistance is 0.015 Ohms. The results are given in Table 9.

Sample #	Measured Resistance [ $\Omega$ ]	Min. Ohmic Resistance Required [ $\Omega$ ]
	52Super I ED4-ED4	
1	0.00737	0.015
2	0.00648	
3	0.00643	
4	0.00654	
5	0.00647	
6	0.00630	

**Table 9**