RBSP-EFW-TN-032
STRENGTH TEST OF SPB POLYMERIC ASSEMBLIES

Rev -
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A. Introduction

The RBSP SPB (RBSP-SPB-MEC-001) has one assembly that utilizes a polymeric to transfer stresses from one component to another. A strength test is required to verify that the polymeric has been mixed and applied properly to prevent failure of the SPB instrument.

B. Requirement

A tensile test will be conducted that will statically load the SPB cable to 45 lbf on the inboard (Airborne connector) end. This provides a margin of 1.5x from the tension required to break the shear pin in the metering wheel (30 lbf). The shear pin is a design feature that protects the Gore composite cable from damage in the event that the End of Wire switch does not secure Meter Wheel Motor power during an over-tension condition.

C. Description

The inboard end of the SPB cable is manufactured per RBSP-SPB-PRO-101 Cable Fabrication procedure. The Gore cable is terminated on the inboard end at the 9-pin Airborne connector. The cable enters a PEEK backshell through a hole where the conductors are soldered to the connector. The Kevlar stress relief member of the cable is anchored around a stainless steel dowel pin inside the backshell cavity. EN-11 potting material is then mixed and poured in the backshell cavity to secure the Kevlar (see Fig. 1) and protect the conductors from damage.

D. Testing

The mating connector on the test fixture is harnessed to a breakout board which allows testing of individual cable circuit conductivity during the test. The preamplifier end of the cable under test has a shorting plug installed that ties all the circuits together for performing the conductivity test.

Two strain relief screws secure the cable backshell to the test fixture. These #4-40 screws are torqued to 5 in-lb prior to the test. A clamshell tensile test fixture is attached to the test cable approximately 10 inches below the fixed test fixture. The

45 lb test mass is then hung from this fixture and places a static load on the test cable for 10 minutes (see Fig. 3).

A digital multimeter is used to monitor all circuit continuity at the beginning and ending of the 10 minute period. Circuit isolation from the cable's outer silver plated copper (SPC) braid (pin-9) is also checked. Grounding of the outer SPC braid to pin-9 is monitored, and continuity of the entire length of SPC braid is checked by testing pin-9 to the Cable Holder Nut on the outboard cable end (see Fig. 2).

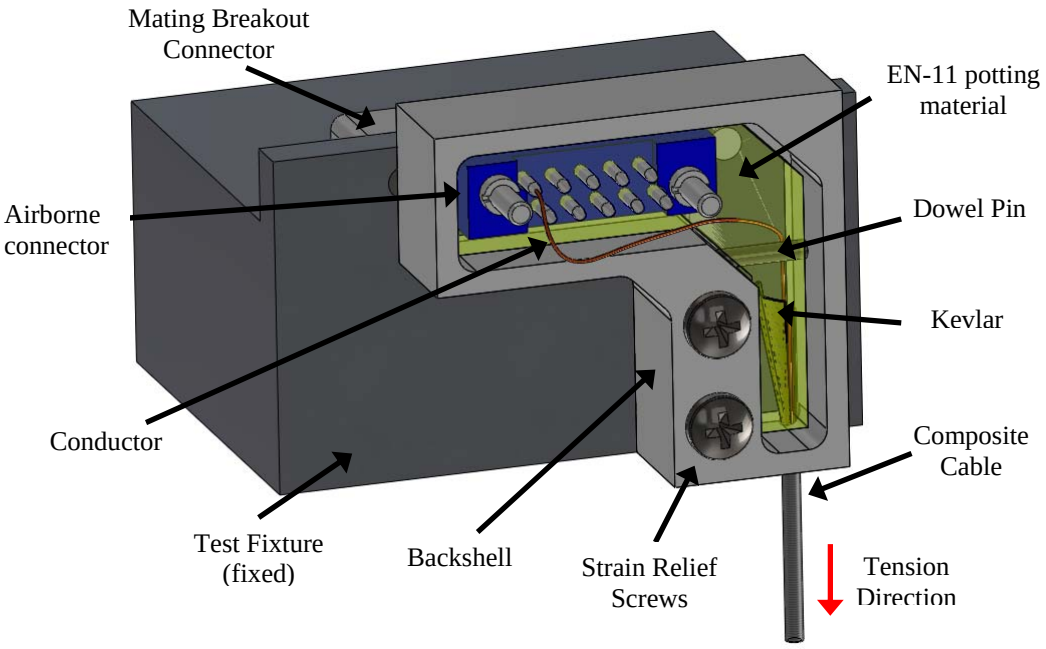

Figure 1. Airborne Connector Tensile Test Fixture

E. Passing Criteria

The test is considered successful if after 10 minutes at 45 lbf tension:

- All circuits maintain continuity
- All circuits maintain isolation from outer SPC braid
- SPB braid maintains continuity from pin-9 to Cable Holder Nut

F. SPB ETU Results

The RBSP SPB ETU cable met all passing criteria and was installed in the RBSP-SPB-MEC-001 ETU assembly.

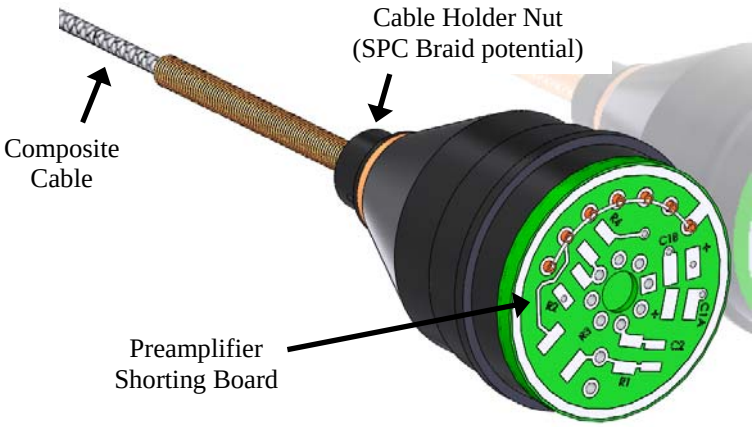

Figure 2. Outboard (Preamplifier) Cable End

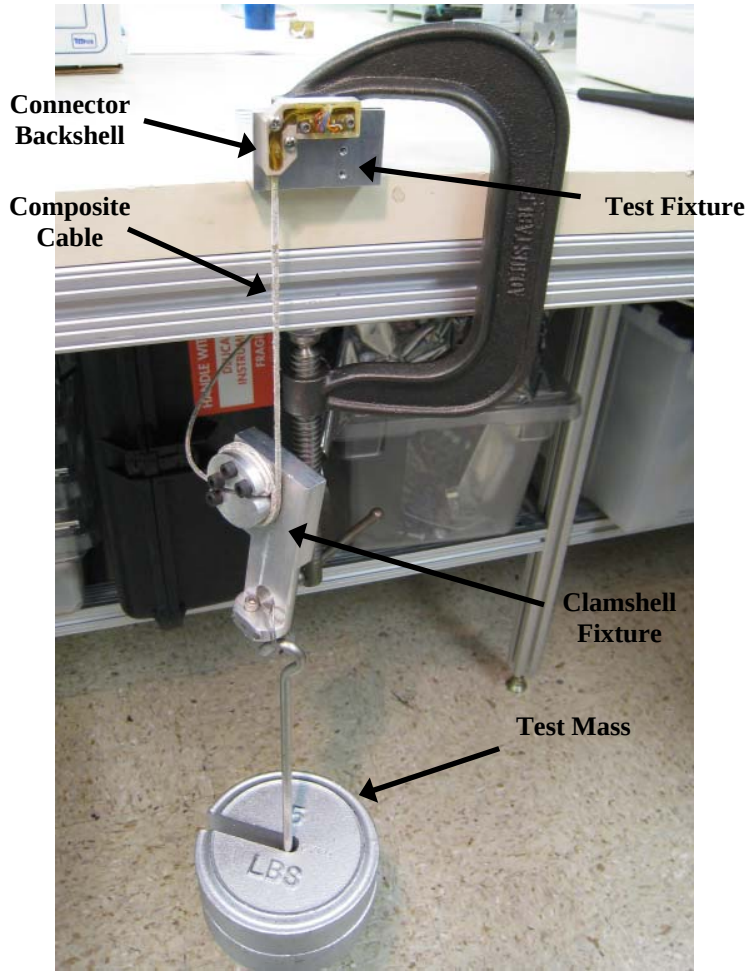

Figure 3. Strength test on bench (THEMIS cable)