

PIA-Technical Standard 108

Parachute Industry Association Publications

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Parachute Canopy Fabric Pull Test, Non-Destructive Method

Background:

The purpose of this test method is to provide a simple, standardized, non-destructive method of verifying the strength of parachute fabric. Although this test is non-destructive caution should be exercised as this test could be damaging to the fabric, if the clamps are not tight and it may affect the fabric permeability. This method is readily usable in the field and is designed to replace the old "Riggers' Thumb Test". This test was first devised in response to the "acid-mesh" discovery in the mid-1980's, but is now the accepted method for all parachutes requiring fabric strength tests. Reasons for testing may vary from fabric age, chemical contamination, UV exposure or discoloration of a suspicious origin, such as grease.

Tools Required and Possible Source:

(2 ea.) Locking Fabric Clamps:

Para-Gear Equipment Co. (800) 323-0437

Aerostar International, P/N 51406M, (605) 331-3500

Aero Store (609) 893-1722

(AR) MIL-I-6903C, Type IV Parachute Ink: See 5a, page 2.

(1 ea.) Spring Scale, 50 lb. (22 Kg.) minimum capacity:

Para-Gear or Aero Store.

This scale must be calibrated in an approved manner at least once a year. It must be identified with a serial number and written verification of calibration must be kept on file. A stick on label or something similar should be affixed to the scale showing the date calibrated and date due next calibration. If the scale is damaged in any manner, such as dropping, it must be pulled from service and tagged as unserviceable until such time as it's recalibrated and returned to service.

Test Procedures:

These test procedures were originally written to address the acid-mesh problem of the mid-1980's that came under factory service bulletins or FAA AD's. However the test is designed to be used on any canopy. The procedures for non-mesh related testing will be

the same only the areas being tested will differ. A minimum of 2 areas should be tested on a canopy, but not less than 2 pull tests on each separate color (1 in the warp direction and 1 in the fill direction). It is recommended that fabric pull tests begin when placing a canopy into service and continue every year thereafter, for the life of the parachute.

When testing fabric next to the mesh proceed as follows:

1. Locate the mesh vents in the canopy and determine the fabric areas which are in contact with the mesh when the canopy is packed. These areas are shown as the diagonally shaded lines in (figure 1), for typical tri-vent canopies.
2. This non-destructive test does not supersede service bulletins issued by canopy manufacturers for their products or FAA AD's. A minimum of 1 pull test should be performed on each panel of material that comes in contact with the mesh, when the canopy is packed. Alternate your tests from the warp to fill direction on the panels. This could be as few as four tests or as many as twelve tests on some bias constructed canopies, such as the G.Q. Security SAC. The area to be tested must be visibly marked for future reference and to insure that you do not retest the same area. Refer to (figure 4), for examples of how to mark the parachute to be tested.
3. After the marking ink has dried attach the locking fabric clamps (figure 2) to the ripstop fabric as shown in (figure 3). The distance between the clamps should be 3" plus or minus 1/4" (7.5 cm.) and the clamps must be aligned so that the ripstop pattern is parallel to the edge of the jaws. Lock the clamps very securely. This will prevent slippage and possible damage to the fabric.
 - a). If the area to be tested is too small to allow 3" plus or minus 1/4" between the jaws of the clamps, such as the apex area, you can reduce the distance between the jaws to 2" plus or minus 1/4" (7.5 cm.).
4. Pass a short length of suspension line or other suitable material through the eye of one clamp and secure it to the packing table or other object which will allow a 40 lb.(18 kg.) load without movement. Pass the hook from the spring scale through the other fabric clamp eye and slowly apply a gradual 40 lb.(18 kg.) load and hold for 3 seconds.
5. The area tested must be stamped with the results of your test, (see figure 5). The color must be in contrast to the area tested. It must include the pounds or kg. pulled to, the date tested, the word pass or fail and the loft or name and number of the individual performing the test. After completing the tests the remarks section of the packing data card should reflect your results. As an example: Passed 40 lb. pull tests, your name and number, date and where performed. In addition your master logbook should also be noted in a like manner.
 - a). The most common color parachute ink is **strata-blue**. Another color is **orange-yellow**. With these two colors you will be able to visibly mark any area to be tested. Use **only MIL-I-6903C, Type IV Parachute Ink**. A possible source for this ink is listed below:

American Writing Ink Co. (617) 482-9167
33 Farnsworth St.
Boston, MA. 02210

Strata-Blue-----P/N 7510-00-286-5362
Orange-Yellow----- P/N 7510-00-634-6583