

**EVALUATION OF TRIM MATERIALS AFTER ACCELERATED EXPOSURE
IN A CONTROLLED IRRADIANCE WATER COOLED XENON ARC APPARATUS**

Application

This procedure is used to determine the effects of ultraviolet radiation on deterioration of fabrics after controlled irradiance water cooled xenon arc weatherometer exposure.

Scope

This procedure provides for two methods of evaluating deterioration after weatherometer exposure. These involve measuring either retained tensile strength or surface fiber deterioration.

Apparatus Required

Weatherometer

Atlas CI Series Xenon Arc Weatherometer with 3 tier rack or equivalent.

Sample Holder

Atlas SL-3 holder or equivalent.

Tensile Testing Machine

Instron Model 7M or equivalent constant rate of extension type tensile tester.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

A. Method A - Retained Tensile Strength

1. Measure and cut 8 samples - 70 x 145 mm, 4 with the long dimension in the warp direction and 4 with the long dimension in the fill direction.

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2. Mount 2 warp and 2 fill samples in sample holders with an exposure area of 50 x 120 mm. Back weatherometer samples with white card stock as described in SAE J1885. The other 4 samples, 2 in each direction, will be used for original tensile strength values.
3. Expose the fabrics in a xenon arc weatherometer as specified in the relevant material specification, under the operating conditions described in SAE J1885.
4. Test the tensile strength of the original and exposed samples as follows:
 - (a) Secure test specimen centrally in the clamps of a constant rate of extension type of tensile machine having an initial jaw separation of 75 mm. The face of one jaw of each clamp shall be 25 x 25 mm; the other jaw face of each clamp shall be at least as large. All jaws shall be rubber faced. Cross-head speed shall be 305 mm/min.
 - (b) Compute the average tensile strength in each direction for the two aged and the two original samples.
5. Calculate the percent retained tensile (in each direction) as follows:

$$\% \text{ Retained Tensile} = \frac{\text{Aged Tensile (Avg)}}{\text{Original Tensile (Avg)}} \times 100$$

B. Method B - Surface Fiber Deterioration

1. Expose the fabrics in a xenon arc weatherometer for the exposure time specified in the applicable material specification, under the operating conditions described in SAE J1885.
2. Firmly apply a piece of 3M's Highland Brand 6200 Permanent Mending Tape or equivalent to the surface of the exposed fabric (yarn). Then rapidly strip the tape and mount it on a sheet of light or dark cardstock which contrasts with the color of the fiber.
3. Repeat the test with a new piece of tape on an unexposed sample and compare the length and quantity of fibers removed by the tape.
4. Report fiber deterioration if a significantly larger number of fibers (usually of shorter lengths) are removed from the exposed versus unexposed sample.

Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities.