



## Standard Test Method for Rubber Thread—Deterioration Due to Standard Washing Solution Treatment<sup>1</sup>

This standard is issued under the fixed designation D 3855; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method is used to measure the relative deterioration resistance of bare rubber threads subjected to a standard washing solution when they are dried at room temperature and heat aged.

1.2 The results obtained by this test method are only comparative since it may not be possible to absolutely correlate such results with actual service life of the threads or of an article containing the threads.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 2433 Test Methods for Testing Rubber Thread<sup>2</sup>

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens<sup>3</sup>

### 3. Summary of Test Method

3.1 The initial properties of the thread are determined by the appropriate test methods in accordance with Test Methods D 2433. The same test specimens, extended to 100 % elongation, are subjected to one cycle of washing, drying, and air-oven aging.

3.2 The physical property measured in the test may be any one of those described in Sections 18 to 37 of Test Methods D 2433; however, the most suitable are the Schwartz value (Section 25) or stress retention (Section 35).

### 4. Significance and Use

#### 4.1 Rubber threads or garments containing rubber threads

are very often subjected to washing treatments that differ considerably in the composition and temperature of the washing solution used. Information on the composition of commercial detergents used is not readily available, and the same brand name may contain variations in composition.

### 5. Apparatus

5.1 *Constant-Rate-Of-Extension (CRE) Type Tensile Testing Machine*, with a load capacity from 0.1 to 20 N (10 to 2000 gf), equipped with hooks.

5.2 *Masonite and a Stainless Steel or Glass Form*, of suitable dimensions to hold the thread loops elongated to 100 %.

NOTE 1—If the Schwartz value is used, it is advisable to restrict the maximum massaging extension to 300 % to avoid excessive specimen breakage during massaging after aging. If the stress retention at 100 % elongation is used, massage the thread to 300 % extension for six cycles immediately before extending to the stress to be measured.

5.2.1 *Form*—A form, 100 by 300 by 3 mm (4 by 12 by 1/8 in.), with the center section cut out as illustrated in Fig. 1, and with the outside edges rounded, is suitable for this purpose.

5.3 *Constant-Temperature Water Bath*.

5.4 *Thermometer*, with a range from 0 to 100°C in 0.2°C divisions.

5.5 *Circulating Hot-Air Oven*, conforming to Specification E 145, capable of maintaining a temperature of 125 ± 2°C.

5.6 *Beakers*, 1500-cm<sup>3</sup>.

### 6. Standard Washing Solution

6.1 The standard washing solution shall be prepared as follows:

6.1.1 Dissolve the following ingredients in 1 L of distilled water:

|                                                                      |          |
|----------------------------------------------------------------------|----------|
| dodecyl benzene sodium sulfonate                                     | 1.0 g    |
| anhydrous sodium tripolyphosphate                                    | 1.5 g    |
| sodium perborate                                                     | 0.5 g    |
| sodium silicate (Na <sub>2</sub> O:SiO <sub>2</sub> = 1:2 anhydrous) | 0.5 g    |
| anhydrous sodium sulfate                                             | 1.0 g    |
| cupric sulfate pentahydrate                                          | 0.0086 g |

6.1.2 Within 1 h prior to the wash test, dissolve 2.0 g of sodium perborate in 98.0 g of distilled water at room temperature. Add 25 g of this solution to 975 g of the solution described in 6.1.1 heated to the wash temperature immediately before immersing the specimens.

6.2 Use 100 g of the standard wash solution for each gram

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.37 on Coated Fabrics and Rubber Thread.

Current edition approved Sept. 28, 1984. Published November 1984. Originally published as D 3855 – 79. Last previous edition D 3855 – 79.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 09.02.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 14.02.