



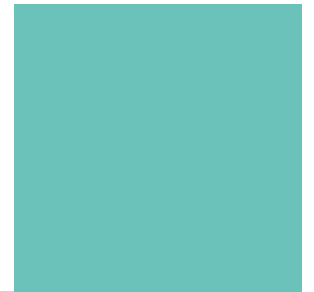
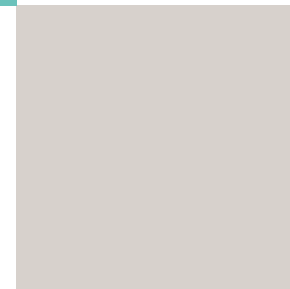
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Instructor

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ASTM D1230

Flammability of Apparel Textiles



- Scope: This test method covers the evaluation of the flammability of apparel textile products other than children's sleepwear
- This test method is not identical to 16CFR 1610, Flammability of Clothing Textiles
- Apparel Flammability- the characteristics of a textile apparel to ignite and sustain combustion

Summary of Method



- This method provides methods for testing the flammability of apparel textiles, explains the three classes of apparel flammability and sets the requirements for classifying textiles. The method also warns against the use of textile apparel fabrics that have burning characteristics considered unsuitable.
- Test specimens cut from textile products designed for apparel and prepared. The specimens are placed into a test frame and a flame is applied, noting the time required for the flame to spread the test length

Significance and Use



- Test Method D1230 cannot be recommended for acceptance testing of commercial textile apparel materials since Federal regulations require that these materials meet the 16 CFR 1610
- ASTM D1230 may still be used because it provides a less expensive and time consuming research and internal product control method
- This method measures two factors of apparel flammability: ignition and flame spread
- Due to the inherent variability of fabric and other factors, test results are not always closely reproducible in or between labs



Materials and Apparatus

- Flammability test chamber with a separate calibrated timer capable of timing 1 ± 0.01 sec.; specimen holders supplied with test chamber; specimen rack at an angle of 45 degrees; No. 50 cotton sewing thread
- Brushing device for raised surface materials
- Lab drying oven and desiccator with silica gel
- Washer, dryer and dry cleaning machine. Detergent and dry cleaning solvent
- Butane, CP for ignition source

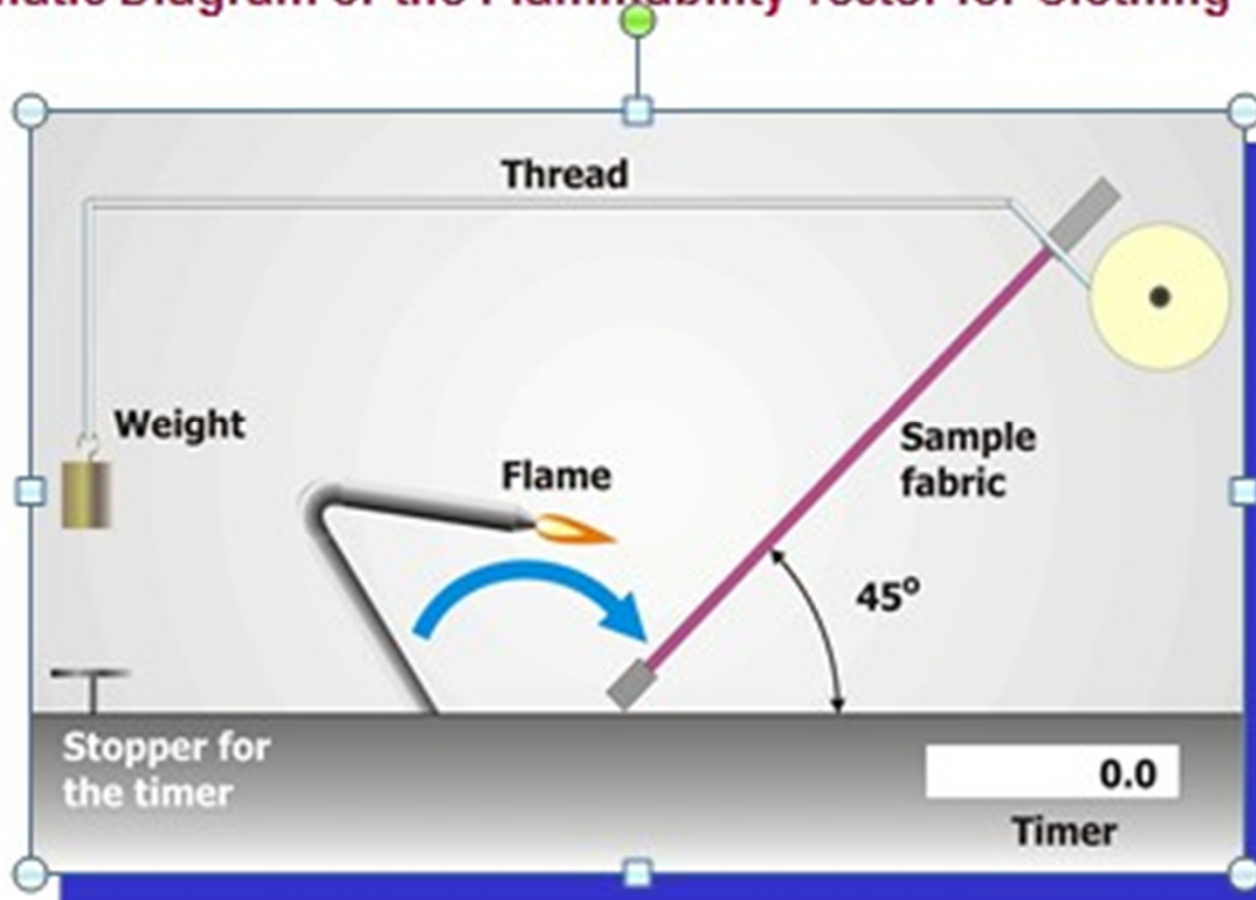
Materials and Apparatus

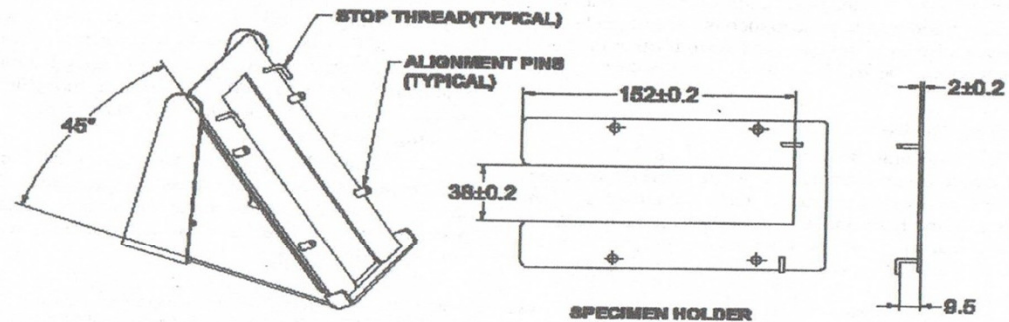


Materials and Apparatus



Schematic Diagram of the Flammability Tester for Clothing Textiles

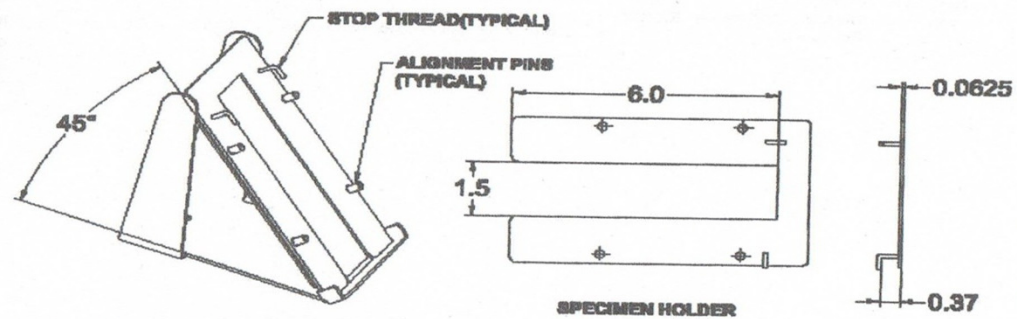




SPECIMEN HOLDER SUPPORTED IN SPECIMEN RACK

**NOTE: DIMENSIONS IN MILLIMETERS
TOLERANCE ± 0.5
UNLESS OTHERWISE NOTED**

FIG. A1.3 Specimen Holder (SI)

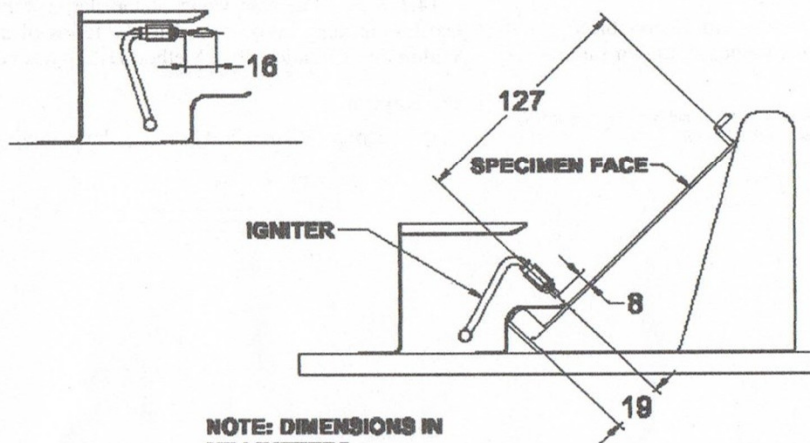


SPECIMEN HOLDER SUPPORTED IN SPECIMEN RACK

**NOTE: DIMENSIONS IN INCHES
TOLERANCE ± 0.010
UNLESS OTHERWISE NOTED**

FIG. A1.4 Specimen Holder (in./lb)

IGNITING FLAME LENGTH



**NOTE: DIMENSIONS IN
MILLIMETERS
TOLERANCE ± 0.5
UNLESS OTHERWISE NOTED**

Sampling and Sample Preparation



- From each unit of the Laboratory Sample (full width of fabric roll or number of garments detailed in specification), cut 5 specimens in the warp and 5 specimens in the filling direction- each 2X6 in (50X150mm) with the long dimension in the direction of test. Include all surfaces and patterns. Prepare the test materials as directed if refurbishing is stated in specification. If the material has a raised surface, brush as directed
- Prepare the specimens as it will reach customer

Procedure



- Verify the calibration accuracy of the timer
- Mount each test specimen into the test frame and dry for $30_{\pm 1}$ min at $105_{\pm 5}C$ and place in desiccator until cool
- Open gas control valve, ignite burner and adjust the flame to a length of 16mm
- Remove the specimen from the desiccator and place onto the test rack; position the stop cord with weight
- Activate the start of test and record the time of burn

Procedure



Test Fabric before and after refurbishing: Defined as “One DC and Laundering cycle”

- Procedure:
 - Dry clean one cycle: *Perchloroethylene, commercial grade*
 - Detergent class: Cationic.
 - Cleaning time: 10 to 15 min.
 - Extraction time: 3 min.
 - Drying Temperature: 60 to 66 °C (140 to 150 °F).
 - Drying Time: 18 to 20 min.
 - Cool Down/Deodorization time: 5 min.
 - Launder: AATCC 124 – 2011
 - Wash water temperature (IV), 49.6 ± 3 °C, (120.6 ± 5 °F); Normal / Cotton Sturdy Cycle 18 ± 6 l gal water level. A maximum wash load of 3.63 kg (8 lbs) shall be used. Tumble
 - dry, Durable Press, using an exhaust temperature of 66.5 ± 5 °C (150 ± 10 °F), and a cool down time of 10 min.

Calculation



- Calculate the arithmetic mean of the burn times for each direction of the material. If the burn time is less than 3.5s or if some specimens do not burn, test 5 additional samples. Average the 5 or 10 test times. Test before and after refurbishing.
- Classify the results used by 16 CFR 1610 as follows: Class 1 material do not have raised surface and flame spread is <3.5 s or more or raised surface burn time >7 sec and are usually acceptable for use; Class 2 material fall between Class 1 and 3; Class 3 materials are considered unsuitable for the trade and have a flame spread of <3.5 s for unraised material and < 4 s for raised surface material
- Refer to 16 CFR 1610 if applicable

Reporting



- Report that the materials were tested as directed by ASTM D1230
- Describe the product and specimen identification
- The average burn time for each direction
-
- The number of specimens tested before and after refurbishment
- The classification of the specimens before and after refurbishment (washing and/or dry cleaning)



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Questions?

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