



# Standard Specification for Fire Suppression Towels<sup>1</sup>

This standard is issued under the fixed designation F 1989; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers requirements for fire suppression towels intended for use by consumers in and around the home.

1.2 This specification does not apply to fire towels that: are made from asbestos; have sides of differing appearance, finish or color; have a performance that differs according to which side is used; or, are of metallic construction or component.

1.3 This specification covers fire suppression towels intended for use in extinguishing small fires in and around containers during cooking.

1.4 This specification replaces Provisional Standard Specification PS 114.

1.5 The values stated in SI units are to be regarded as the standard.

1.6 The following safety hazards caveat pertains only to the test methods portion of this specification, Section 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. Terminology

2.1 *Definitions*—For the purpose of this specification, the following definition applies:

2.1.1 *fire towel, n*—a flexible sheet(s) of material intended to be used to extinguish small fires by smothering.

## 3. Physical Properties

3.1 *Size and Shape*—Fire towels shall be rectangular or square, with no edge less than 0.9 m or longer than 1.8 m.

3.2 *Mass*—Fire towels shall have a mass not exceeding 2 kg.

### 3.3 Hand Holding Devices:

3.3.1 Hand holding devices, if provided, shall comprise loops or pockets and shall not become detached from the towel during testing for compliance with Section 4.

3.3.2 Attention shall be paid to the design of any holding device to ensure ease of handling and hand release.

3.4 *Appearance and Bi-Lateral Use*—The two sides of a fire

towel shall be of identical appearance, finish or color and shall give the equivalent results when tested for compliance with Section 4.

NOTE 1—It is important not only that either side of fire towel can be exposed to the fire or other hazard with equal effectiveness, but also that no doubt be created in the mind of the user at the moment of emergency use as to which side of the fire towel to apply to the hazard.

3.5 *Resistance to Fraying or Tearing*—The edges of fire towels shall not fray or tear during testing for compliance with 4.3.1, 4.3.2, 4.4.4, and 4.5.1.5.

## 4. Test Methods

### 4.1 Sampling and Sequence of Testing:

4.1.1 A minimum of 9 fire towels is required. Identify and mark the fire towels as No. 1 to 9 and the two sides as (a) and (b).

4.1.1.1 Fire towels which contain a seam shall be tested both on and off the seam and, where the seam is tested, in the most unfavorable condition. Tests shall be carried out using a single thickness of fire towels.

4.1.2 Use any fire towel as required for the nondestructive examinations required in Section 4. Use fire towels No. 1, 2, and 3 for testing to 4.5.1 in the sequence of 1(a), 2(b), 3(a). Use fire towels 4, 5 and 6 for testing to 4.4 in sequence of 4(a), 5(b), and 6(a). Use fire towels 7, 8 and 9 for testing to 4.5.2 in sequence of 7(a), 8(b), and 9(a).

### 4.2 Conditioning:

4.2.1 Condition fire towels for testing for 48 h so that they are in equilibrium with air at  $20 \pm 5^\circ\text{C}$  and at a relative humidity of 50 to 70 %. After conditioning do not expose the towel to air at different temperature or relative humidity for longer than 5 min before testing. Keep the fire towel in a sealed plastic bag or other conditioning container until testing if it is necessary to transport it any distance to the test site.

4.2.2 Store fire towel for testing in their containers, or in the recommended storage condition for 24 h immediately prior to the testing for conformity with the requirements of Section 4.

4.2.3 Except where otherwise specified, tests shall be carried out at  $20 \pm 10^\circ\text{C}$ .

### 4.3 General Tests:

4.3.1 *Flexibility Test*—Towels shall be capable of being rolled without permanent deformation along any axis completely around a 50-mm diameter bar.

4.3.2 *Ease of Removal Test*—Fire towels shall be designed and located in such a way that the user can remove, unfold and

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make ready for use in not more than 4 s. The force required to remove the fire towel from its container (if used) shall not exceed 80 N.

4.4 Electrical Resistance Test:

4.4.1 Principle—The electrical resistance of the fire towel is measured between a negative electrode formed by a steel or aluminum-topped table and a flat rectangular conducting positive electrode.

4.4.2 Apparatus:

4.4.2.1 Table, with a steel or aluminum top.

4.4.2.2 Megohmmeter, 500 V, dc.

4.4.2.3 Flat Rectangular Conducting Positive Electrode, 450 by 150 mm, total mass of 5 kg (including metal base, backing support and insulating handle) (see Fig. 1).

4.4.3 Procedure—Arrange the apparatus as shown in Fig. 1. Lay the fire towel flat on the table and zero and operate the megohmmeter in accordance with the manufacturer's instructions. Move the instrument and the fire towel as necessary then check the whole surface area of the towel. Test three fire towels.

4.4.4 Interpretation of Results—A fire towel is considered to be in conformance with this specification if the electrical resistance of the fire towel is not less than 1 MΩ at any point.

4.5 Fire Performance Tests:

4.5.1 Volatile Liquid Test Fires:

4.5.1.1 Fuel—The fuel shall be an aliphatic hydrocarbon of initial boiling point not less than 88°C and final boiling point not more than 105°C. It is not necessary to use fresh fuel for each test provided that the initial fuel temperature is 20 ± 5°C.

4.5.1.2 Tray Dimensions and Quantity of Fuel—The dimen-

sions of the welded 2-mm sheet steel circular cylindrical trays are given in Table 1.

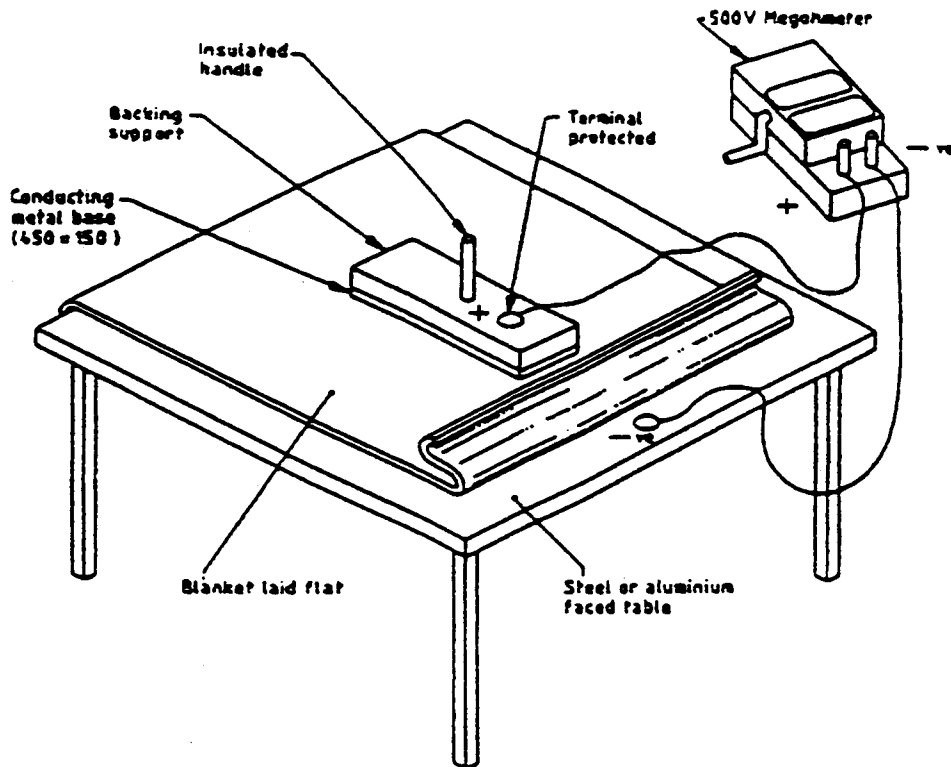
4.5.1.3 Siting—Position the test tray on a 0.8-m high horizontal metal table, not smaller than the fire towel to be tested and between 1.45 and 1.8 m square, equidistant from two opposite sides and so that the distance from one of the other two sides (Side (a)) to the far edge of the tray is 900 ± 5 mm (see Fig. 2). Place the table in a room free from drafts, with sufficient ventilation to allow the fire to develop freely and to remove products of combustion. Ensure that the ambient temperature is between 10 and 30°C.

4.5.1.4 Procedure—Place in the tray sufficient water (half the fuel volume) to give an average depth of 15 mm. This is to counter any irregularities in the base. Place the fuel in the tray. After ignition, allow the fire to burn freely for 1 min, then apply the fire towel under test as symmetrically as possible to the fire from Side (a) of the table.<sup>2</sup> The fire is considered to be extinguished if no flames are visible 3 min after ignition. Some fuel shall remain at the end of the test, indicating that the fire has extinguished, not merely starved of fuel. Test three fire towels each once.

NOTE 2—Attention is drawn to the necessity for taking precautions to safeguard the health of personnel conducting the tests against the risk of fire and inhalation of smoke or any toxic products of combustion.

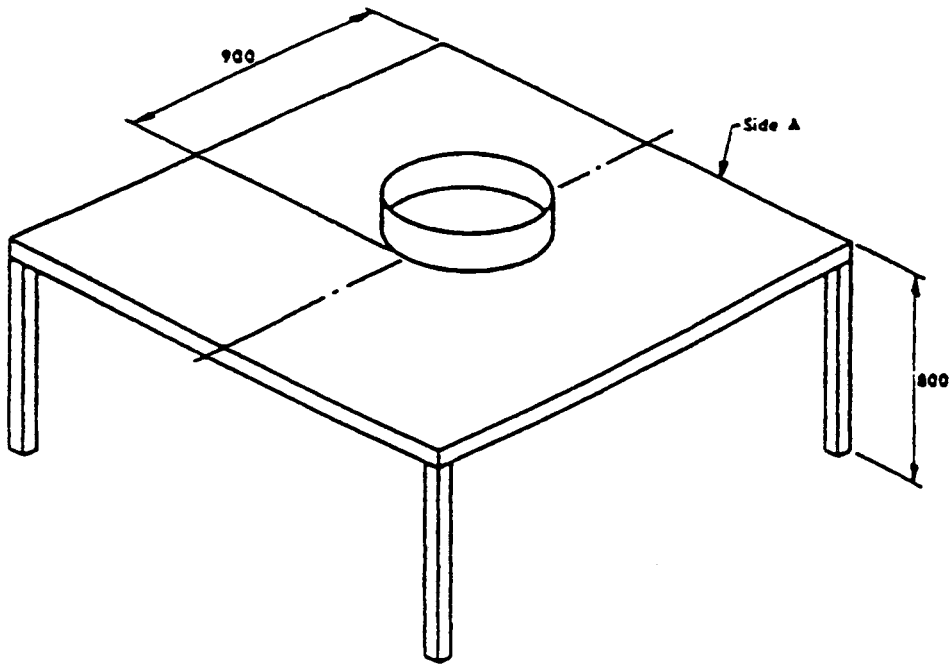
4.5.1.5 Interpretation of Results—Fire towels shall be capable of extinguishing the volatile liquid fire. All three tests

<sup>2</sup> See Appendix X1 for a device that can be used as an alternative to manual placement of the fire towel over the fire.



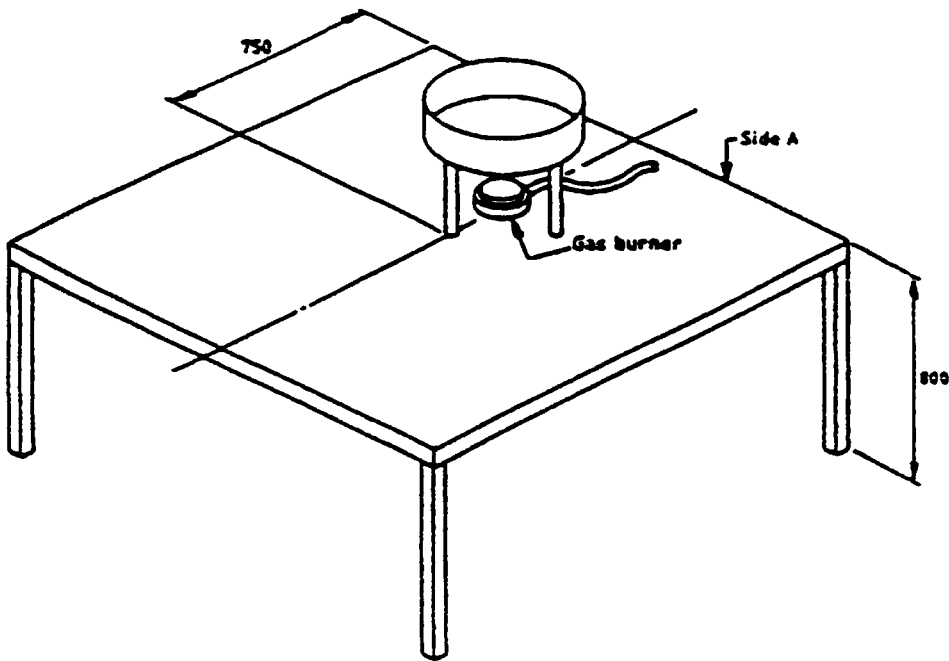
NOTE—All dimensions are in millimetres.

FIG. 1 Typical Arrangement for the Electrical Test



NOTE—All dimensions are in millimetres.

FIG. 2 Typical Arrangement for Volatile Liquid Test Fire



NOTE—All dimensions are in millimetres.

FIG. 3 Typical Arrangement for Cooking Oil Test

shall be successful and the fire towels shall remain whole and not ignite during the test.

4.5.2 *Home Cooking Fire*—Repeat test as outlined in 4.5.1, except:

4.5.2.1 Use a 30 in. electrical residential cooking stove,

4.5.2.2 Place the pan on larger back electrical burner,

4.5.2.3 Ensure that range is flush with 5/8 in. gypsum wall behind range,

Designation	Fuel Volume, L	Tray Diameter, mm	Tray Depth, mm	Approximate Surface Area of Fire, m <sup>2</sup>
Fire towels	3	348 ± 5	100 ± 5	0.094

4.5.2.4 Use a standard commercial cooking pan with a handle, 7 in. diameter, 3 1/2 in. deep, with a 5 to 7 in. handle,

4.5.2.5 Fill pan half full with cooking oil,

4.5.2.6 Position pan so that the handle is pointing 90° to the front, and

4.5.2.7 A 30 in. wide by 18 in. deep exhaust vent hood is located 24 in. directly above the stove.

4.5.2.8 *Interpretation of Results*—Fire towels shall be capable of extinguishing the home cooking oil fire. All three tests shall be successful and the fire towel shall remain whole and not ignite during the test.

4.5.3 *Cooking Oil Test Fires:*

4.5.3.1 *Fuel*—The fuel shall be 100 % edible Soya bean oil, free from additives with a minimum auto-ignition temperature of 600°F. Fresh fuel shall be used for each test.

4.5.3.2 *Tray Dimensions and Quantity of Fuel*—As defined in 4.5.1.1 and Table 1.

4.5.3.3 *Tray Support Stand*—The tray support stand shall be of square four-legged form, constructed of 25 by 25 mm metal angle. The height shall be  $140 \pm 5$  mm. The square side shall be  $240 \pm 5$  mm for the tray, but the diagonal dimension shall not exceed the diameter of the tray used.

4.5.3.4 *Siting*—Position the test tray centrally on the supporting stand shown in Fig. 3, on a 0.8 m high horizontal metal table, not smaller than the blanket to be tested and between 1.45 and 1.8 m square, equidistant from two opposite sides and so that the distance from one of the other sides (Side (a)) to the far edge of the tray is 750 mm (see Fig. 3). Place the table in a room free from drafts, with sufficient ventilation to allow the fire to develop freely and to remove products of combustion. The ambient temperature shall be between 10 and 30°C.

4.5.3.5 *Procedure*—Place the fuel in the tray, free of residue from previous tests. Using a gas burner centrally positioned under the tray, heat the oil so that its temperature, measured centrally, increases at about 10°C per min and self-ignites within 25 to 35 min. Turn off the gas supply. Allow the fire to burn freely for 2 min after ignition. Immediately apply the towel under test as symmetrically as possible to the fire from Side (a) of the table.<sup>2</sup> Test three towels each once. The fire is considered to be extinguished if there are no visible flames 17 min after ignition. Some fuel shall remain at the end of the test, that is, the fire shall be extinguished and not merely starved of fuel.

NOTE 3—Attention is drawn to the necessity for taking precautions to safeguard the health of personnel conducting the tests against the risk of fire, spillage of the hot oil, and the inhalation of smoke or toxic products of combustion.

4.5.3.6 *Interpretation of Results*—Fire towels shall be capable of extinguishing the cooking oil fire. All three tests shall be successful and the fire towel shall remain whole and not ignite during the test.

## 5. Product and Package Marking

5.1 *Towel*—Each fire towel shall be marked with the words *fire suppression towel*. Letters shall be 2 in. or greater in height.

5.2 *Shipping Container*—The shipping container shall include:

5.2.1 The manufacturer's or vendor's name and address,

5.2.2 The information specified in or wording which relates the fire towel to the container or the instruction sheet, or both, and

5.2.3 The number and date of this ASTM specification.

5.3 *Fire Towel Container*—Each container, if used, shall be marked with the words *fire suppression towel*, in white letters not less than 15 mm high on a rectangular red background. The letter style used shall be san serifs block letters.

5.4 *Shipping or Instruction Sheet*—Each shipping container, or instruction sheet, for fixing near to the storage position of the fire towel, shall be marked with the following:

5.4.1 The words *fire towel* on the front,

5.4.2 Instructions for use and mounting, preferably incorporating pictograms on the front,

5.4.3 Minimum time for removal from the fire of 20 min,

5.4.4 The manufacturer's or vendor's name and address,

5.4.5 The model or other identification of the fire towel,

5.4.6 The size of the fire towel, m by m,

5.4.7 Indication that the fire towel is not reusable and should be discarded after use,

5.4.8 Checking, maintenance and servicing instructions, including when to discard if damaged or contaminated, and

5.4.9 The designation and date of this ASTM specification.

## 6. Keywords

6.1 cooking fires; fire blankets; fire suppression; fire towels; safety standards

APPENDIX

(Nonmandatory Information)

X1. SUGGESTED ALTERNATE DEVICE

X1.1 The idea behind the holding device shown in Fig. X1.1 is to permit both uniformity and greater personnel safety. The specimen is held by the grips on the sliding bar and placed over the appropriate burning tray by pushing forward. This simulates reaching over the stove-top. When the bar hits the end it automatically releases the specimen to drop down.

X1.2 To further eliminate variability in placement time, the sliding action could even be accomplished by reciprocating mechanism instead of laboratory personnel.

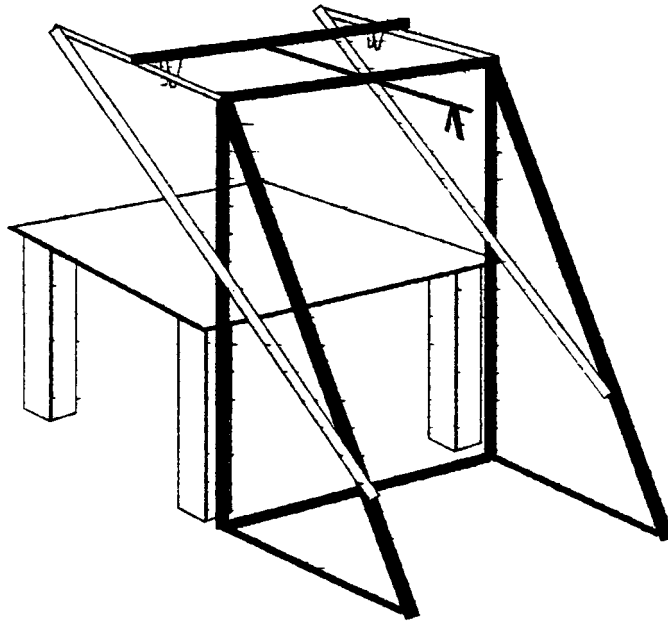


FIG. X1.1 Grip With Auto-Release

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