

CPAI-84

A
Specification for

Flame-Resistant Materials

Used in Camping Tentage

CPAI-84:
A SPECIFICATION FOR
FLAME-RESISTANT MATERIALS USED IN CAMPING TENTAGE
(1995 Revision)

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Materials Used in Camping Tentage
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1.

Scope

1.1 Scope This standard provides test methods for evaluating flame resistance of fabric and other pliable materials in camping tentage. It also provides performance criteria and certification guidelines for suppliers. Finally, it describes labeling programs to caution the user against actions detrimental to flame-retardant finishes, as well as to facilitate the identification of tentage as being constructed of flame-resistant materials and to identify the manufacturer.

NOTE: This standard is not applicable to packaging materials such as tent bags, pole bags, bivouac sacks, stake bags or carrying bags, or rope, shock cord or cordage materials used for anchoring. Nor does the scope of this test include labeling materials, unless the labels have a surface area in excess of 1 ft.

1.2 Caveat This standard should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions, and should not be used to describe or appraise the fire hazard or fire-risk of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire-risk assessment, which considers factors pertinent to an assessment of the fire hazard of a particular end use.

2.

Definitions

2.1 Camping Tentage Any portable temporary shelter or structure designed to protect people from the elements. This includes, though not exclusively, the following: camping tents; play tents (indoor and outdoor); recreational vehicle awnings; dining flies

and canopies; fabric screen houses; add-a-rooms; and ice fishing tents.

NOTE: Play tents and indoor tent products are included within the scope of this standard because of the possibility of inadvertent contact with flame sources such as resistance heaters, fireplaces, etc.

NOTE: This standard is not intended for casual furniture fabrics such as those used in shading applications.

2.2 Material Classifications All materials covered in this standard fall under one of the following definitions:

2.2.1 Flooring Material Any pliable material used for flooring in camping tentage, but excluding items such as rugs or carpets placed in the tent that are not integral parts of the item.

2.2.2 Wall and Top Material Any pliable material used in camping tentage for other than flooring including walls, roofs, tops, doors, windows, screens, "no-see-um netting," awnings, flies and dining canopies.

NOTE: "No-see-um"-type netting or mesh materials weighing 50 g/m² or less are exempted from the flammability requirements of CPAI-84. This netting material has not been shown to add appreciably to the flammability of a tent.

2.3 Sample Unit A sample unit shall consist of the following:

2.3.1 Flooring Material Four individual specimens, no two specimens containing the same warp or fill yarns.

2.3.2 Wall and Top Material Eight individual specimens, four taken from the warp and four from the fill direction of the test material. No two warp specimens shall contain the same warp yarns or filaments and no two fill specimens shall contain the same fill yarns.

3.

Performance Requirements

3.1 Flooring Material When subjected to the test

described in Section 5, no specimen from a sample unit of flooring material shall be damaged within 25 mm of the edge of the hole in the flattening frame. This requirement includes:

- specimens that were unleached and unweathered
- specimens that were leached but unweathered
- specimens that were weathered but unleached

3.2 Wall and Top Material When subjected to the test described in Section 6, no specimen from a sample unit of wall and top material shall have an after-flame time (length of time a specimen continues to flame after removal of the test flame source) of more than 4 seconds; the average after-flame time for all specimens in a sample unit shall not exceed 2 seconds.

Portions or residues that break or drip from the test specimens shall not continue to flame after they reach the floor of the test cabinet. They should self-extinguish before (or as) they contact the floor of the test cabinet.

These requirements include:

- specimens that were unleached and unweathered
- specimens that were leached but unweathered
- specimens that were weathered but unleached.

3.2.1 Damaged Length Using the procedure described in Sections 6.4.5 and 6.4.6, the maximum permissible damaged length (distance from the bottom of the specimen to a point above which all material is sound) for the sample unit and individual specimens shall not exceed the values shown as follows in Table I.

3.2.2 *Lightweight Fabric Mass Loss Criteria Any wall or top material with a mass of less than 100 g/m² will be considered acceptable if the mass loss during the test is no greater than 5 percent of the original test specimen mass, regardless of the damaged length measurement.

NOTE: Weight loss is considered a significant measure of flammability for lightweight textile materials.

4.

Conditioning

4.1 Leaching Tests in Sections 6 and 7 shall be performed both before and after leaching. Leach four specimens of flooring material per sample lot prior to testing. Handle specimens of wall and top materials in a similar manner, in each of the warp and fill directions.

4.1.1 Test Specimen Test specimens to be leached shall be of the following dimensions:

4.1.1.1 Flooring Material. Each test specimen shall be a 230 mm by 230 mm (±3 mm) section of the flooring material to be tested.

4.1.1.2 Wall and Top Material Test specimens shall be rectangles of cloth 70 mm by 300 mm (±3 mm) with the long dimensions parallel to either the warp or filling directions of the material.

4.1.2 Apparatus

4.1.2.1 This test requires a water container or tank of such shape and size that the specimen can be submerged therein with all surfaces of each specimen having full access to the water. For cloth specimens the container shall allow not less than 2 liters of water for each 0.1 square meter of fabric specimen. The water shall be changed by a continuous flow or by emptying and refilling so that there shall be at least six complete changes of water in a 72-hour period.

Roll Material Weight (g/m ²)	Maximum Average Damaged Length for Sample Unit - mm	Maximum Damaged Length for an Individual Specimen - mm
More than 340	115	255
More than 270 but not more than 340	140	255
More than 200 but not more than 270	165	255
More than 135 but not more than 200	190	255
More than 50 but not more than 135	215*	255*
50 or less	230*	255*

4.1.2.2 This test requires a means of maintaining water at a temperature of 15.5 C to 21 C (60 F to 70 F) and a pH of between 6 and 8 during the test.

4.1.2.3 This test requires a means for holding the specimen submerged throughout the leaching period.

4.1.3 Procedure The specimens shall be immersed in water at a temperature of 15.5 C to 21.1 C (60 F to 70 F) and a pH of between 6 and 8 for 72 hours. The specimen shall then be removed, air-dried and brought to Standard Atmospheric Conditions prior to further testing.

4.2 Accelerated Weathering Tests in Sections 6 and 7 shall be performed before and after accelerated weathering, and after water leaching only. Weather four specimens of flooring material per sample lot prior to testing. Handle specimens of wall and top materials in a similar manner, in each of the warp and fill directions.

NOTE: CPAI-84 requires accelerated weathering, and permits the use of any one of three weathering methods discussed in Section 4.2.2. All products subject to testing under the provisions of CPAI-84 must be exposed to accelerated weathering, even play tents intended for indoor use. Identify which weathering method was used on the test report.

4.2.1 Test Specimen Test specimens to be weathered shall be of the following dimensions:

4.2.1.1 Flooring Material Each test specimen shall measure 230 mm by 230 mm (± 3 mm).

4.2.1.2 Wall and Top Material Test specimens shall measure 90 mm by 300 mm (± 3 mm) with the long dimensions parallel to either the warp or filling directions of the material.

4.2.2 Accelerated Weathering Procedure The accelerated weathering procedure shall be one of the following methods: carbon arc method (as specified in 4.2.2.1), xenon arc lamp method (as specified in 4.2.2.2), or UV fluorescent and condensation method (as specified in 4.2.2.3). The method selected shall be reported.

4.2.2.1 Accelerated Weathering Procedure (Carbon Arc) The apparatus and procedure shall be in accordance with method 5804 of Fed-Std 191, except that the filters shall be removed and the weathering procedure shall be as follows. Two

swatches, each 330 mm by 560 mm, shall be cut from the sample unit. One swatch shall be cut with the long dimension in the direction of the warp; the other with the long dimension in the direction of the filling. The exterior (face) side of the cloth shall be exposed to the light source. The swatches shall be exposed one above the other, in the quadrant of the accelerated weathering apparatus for 100 hours. The swatches shall be changed from the top to bottom racks and viceversa each time the carbons are changed (approximately 17 to 20 hours) during a 100-hour exposure period. Then the swatches shall be removed from the apparatus and allowed to dry and condition at Standard Atmospheric Conditions.

Four specimens for the fire-resistance test shall have been exposed to accelerated weathering in the vertical position.

4.2.2.2 Accelerated Weathering Procedure (Xenon Lamp Exposure) The test procedure shall be in accordance with AATCC Method 169, except that the following deviations shall apply:

a. The apparatus shall be equipped with an automatic light monitor and shall be capable of automatically controlling irradiance, temperature and humidity. The apparatus shall be maintained in accordance with the manufacturer's recommendations, and all safety requirements shall be implemented.

b. The exterior (face) side of the cloth shall be exposed to the light source. The weathering test cycle shall be 40 minutes of light, 20 minutes of light with water spray on the fabric face, 60 minutes of light, 60 minutes of darkness. The test cycle shall be repeated until the total energy exposure is equal to 100 kJ/m² at 340 nm (or 12.2 mJ/m² at 300 nm - 400 nm).

c. The irradiance level shall be either:

0.40 +/- 0.01 W/m² bandpass at 340 nm, or

46 +/- 1.0 W/m² at 300 nm - 400 nm

d. The glass filter combination shall be a borosilicate type "S" filter in the inner position and a borosilicate type "S" in the outer position. Alternate filter combinations are acceptable, provided that the equipment manufacturer provides a letter certifying that the irradiance levels are comparable to those specified within ± 10 percent.

e. The relative humidity shall be 50 percent \pm 5 percent during the light cycle and not lower than 95 percent during the dark cycle.

f. The control set points shall be as follows:

	Dark Cycle	Light Cycle
Black panel	38 C	77 C
Black Standard	38 C	84 C
Wet bulb depression	0 C	10 C

(see Note 1)

NOTE: As a guide only; adjust to achieve required relative humidity (see section c above).

g. The test specimens shall fit the specimen rack of the apparatus with no wrinkles or gaps. The test specimen shall be mounted on the outside of the rack with the use of appropriate stainless steel spring clips. After the required exposure period, the specimens shall be removed from the apparatus and allowed to dry and condition at Standard Atmospheric Conditions. Then, test specimens for each required test shall be cut and tested appropriately.

NOTE: Monitoring of dry bulb temperature, wet bulb depression or humidity, irradiance and black panel temperature is recommended through the use of chart recorders.

4.2.2.3 Accelerated Weathering Procedure (Fluorescent UV and Condensation Method).

The test procedure shall be performed in accordance with ASTM D 4329, summarized as follows:

a. The apparatus shall be equipped with an automatic light monitor and shall be capable of automatically controlling irradiance and temperature. Monitoring and controlling of relative humidity is recommended but not mandatory. The apparatus shall be maintained in accordance with the manufacturers' recommendations, and all safety requirements shall be implemented.

b. The exterior (face) side of the cloth shall be exposed to the light source. The weathering test cycle shall consist of 8 hours of UV exposure at 60 C, followed by 4 hours of condensation at 50 C using UVA-340 lamps. The test shall begin at the start of the 8-hour cycle. The duration of the test shall be a minimum of 54 hours.

c. For operators using irradiance-controlled devices, the irradiance setpoint should be 0.77 W/m² @ 340 nm.

d. If a device with spray capability is employed, a 5 minute spray after 4 hours and 8

hours of UV exposure is optional.

e. The test specimens shall fit the specimen rack of the apparatus with no wrinkles or gaps. The test specimen shall be backed by aluminum panels 75 mm by 150 mm by 0.6 mm. The specimens and backer panels shall be held in place with stainless steel retainer rings. After the required exposure period, the specimens shall be removed from the apparatus and allowed to dry and condition at Standard Atmospheric Conditions. Then, test specimens for each required test shall be cut and tested appropriately.

NOTE: Monitoring black panel temperature and cycle change is recommended through the use of a chart recorder.

4.3 Standard Conditions for Testing Flame tests shall be performed at Standard Atmospheric Conditions, or else upon immediate removal from Standard Atmospheric Conditions and on specimens in moisture equilibrium under Standard Atmospheric Conditions.

4.3.1 Standard Atmospheric Conditions. Standard Atmospheric Conditions for testing are 65 percent RH (relative humidity) ± 2 percent RH at a temperature of 21C ± 1.0C. Testing conducted at 50 percent RH ± 2 percent RH is also acceptable provided this condition is noted on the test report.

NOTE: Although many laboratories are benchmarked at 50% RH, many U.S. federal and military standards still require 65% RH. One of the objectives of this revision of CPAI-84 is to reduce the burden imposed on the test laboratory, and thus the cost of the testing. For this reason, either of these common Standard Atmospheric Conditions for textile testing is acceptable.

4.3.2 Moisture Equilibrium Moisture equilibrium is considered to have been reached when, after free exposure of the material to air in motion controlled at Standard Atmospheric Conditions as defined above, the change in mass of successive weighings made at intervals of 1 hour is no greater than 0.25 percent.

4.3.3 Preconditioning In the event of a dispute concerning the results of tests that may be affected by the moisture content, the material shall be preconditioned by being brought to moisture equilibrium with an atmosphere having a relative humidity of not more than 10 percent and a temperature not more than 52 C. The material shall then

be brought to moisture equilibrium under Standard Atmospheric Conditions as defined above and then tested.

5.

Flammability Test Method, Flooring Material

5.1 Test Specimen Each test specimen shall measure 230 mm by 230 mm (± 3 mm), as described in Section 4.1.1.1.

5.2 Apparatus

5.2.1 Test Chamber The test chamber shall consist of an open-top hollow cube made of non-combustible material with inside dimensions 305 mm by 305 mm by 305 mm and a minimum of 6 mm wall thickness. The flat bottom of the box shall be made of the same material as the sides and shall be easily removable. The sides shall be fastened together with screws or brackets and taped to prevent air leakage into the box during use (the box shall be draft-free).

NOTE: Other larger volume chambers, using the specimen holder described in this document, have been found to be acceptable.

5.2.2 Supporting Frame A steel plate, 230 mm by 230 mm, 6 mm thick with an 200 mm-diameter hole in its center and a 25 mm by 25 mm by 1.5 mm-thick shim affixed to the underside of each corner, is required to support the material above the floor of the chamber during the course of the test. The edge of the supporting frame must be kept clean. See Figure E.

5.2.3 Flattening Frame A steel plate 230 mm by 230 mm, 6 mm thick with an 200-mm diameter hole in its center is required to hold the flooring material flat during the course of the test.

5.2.4 Punch The test requires a punch capable of making a 6 mm-diameter hole in the center of the specimen of flooring material to be tested.

5.2.5 Standard Igniting Source A Number 1588 methenamine-timed burning tablet or an equal tablet shall be used. These tablets shall be stored in a desiccator over a desiccant for 24 hours prior to use. (Small quantities of absorbed water may cause the tablets to fracture when first ignited. If a major fracture occurs, any results from the test shall be

ignored, and the test shall be repeated.)

5.2.6 Hood A hood capable of being closed and having its draft turned off during each test and capable of rapidly removing the products of combustion following each test shall be used. The front or sides of the hood should be transparent to permit observation of the tests in progress.

5.2.7 Mirror The test requires a small mirror mounted above the test chamber at an angle to permit observation of the specimen from the outside of the hood.

5.3 Sampling

5.3.1 Lot Size A lot is defined as a type of fabric produced in a single manufacturing run.

5.3.2 Sampling Plan Unless otherwise specified, Use Table II to determine the appropriate number of samples:

Lot Size in Linear (Running) Meters	Sample Quantity
800 or less	2 meters
801 up to and including 22,000	3 meters
22,001 and above	5 meters

5.3.3 Laboratory Sample Open the roll of fabric. Discard the first 1 meter of fabric from the roll. Then begin obtaining samples from each roll.

5.4 Procedure

5.4.1 Place the test chamber in the draft-protected environment (hood with draft off) with the bottom plate in place and the supporting frame centered in the bottom of the chamber, shimmed side down.

5.4.2 Punch a 6 mm-diameter hole in the center of the specimen of flooring material.

5.4.3 Place the specimen on the supporting frame in the position in which it will be used, exercising care to keep the specimen horizontal and flat. Place the flattening frame on the specimen and position a methenamine tablet on one of its flat sides with its edge within 3 mm of the hole in the center of the specimen.

5.4.4 Ignite the tablet by touching a lighted match or an equivalent igniting source carefully to the top of the tablet.

5.4.5 Continue each test until the last vestige of flame or glow disappears (this is frequently accompanied by a final puff of smoke) or the flaming or smoldering has approached within 25 mm of the edge of the hole in the flattening frame at any point. (Any test in which the tablet is extinguished by physical action of the specimen or flooring material shall be disregarded, and the test repeated.)

5.4.6 When all combustion has ceased, ventilate the hood and measure the shortest distance between the edge of the hole in the flattening frame and the damaged area. Record the distance measured for each specimen.

5.4.7 Remove the specimen from the chamber and remove any burn residue from the chamber floor. Before proceeding to the next test, the chamber floor must be cooled to normal room temperature or replaced with one that is at normal room temperature.

5.5 Report The number of specimens (of the four specimens tested) in which the damaged area does not extend to within 25 mm of the edge of the hole in the flattening frame shall be reported.

5.6 Notes

5.6.1 The Number 1588 methenamine tablet may be procured from a local pharmacy or from Eli Lilly & Co., 740 S. Alabama, Indianapolis, IN 46206 USA +(317) 634-8512.

6.

Flammability Test Method, Wall and Top Material

6.1 Test Specimen The test specimens shall measure 70 mm by 300 mm (± 3 mm) with the long dimensions parallel to either the warp or filling directions of the material (don't cut the fabric along the bias [diagonal direction]).

In conducting this test, the test specimens shall be subjected to the flame at the bottom of the specimen. The lower edges of the fire-resistance test specimens shall be trimmed, if necessary, to ensure that a freshly cut end is exposed to the test flame.

6.2 Apparatus

6.2.1 Cabinet The test requires a cabinet and accessories, fabricated in accordance with the spec-

ifications in Figures A, B and C. Galvanized sheet metal or other suitable metal shall be used. The entire inside back wall of the cabinet shall be painted black to facilitate the viewing of the test specimen and pilot flame.

NOTE: Other larger volume chambers, using the burner and specimen holder mentioned in this document, have been found to be acceptable.

NOTE: The cabinet for the Children's Sleepwear Standard FF 3-71 or FF 5-74 (the standard test cabinet used to test flammability of children's sleepwear) is an acceptable alternative for CPAI-84 wall and top material testing.

6.2.2 Burner The burner shall be equipped with a variable orifice to adjust the flame height, a barrel having a 5 mm inside-diameter, and a pilot light.

6.2.2.1 The burner may be constructed by combining a 5 mm inside-diameter barrel 75 mm long ± 6 mm from a fixed-orifice burner with a base from a variable-orifice burner.

6.2.2.2 The pilot light tube shall have a diameter of approximately 1.6 mm and shall be spaced 3 mm away from the burner edge with a pilot flame 3 mm long.

6.2.2.3 The necessary gas connections and the applicable plumbing shall be as specified in Figure D except that a solenoid valve may be used in lieu of the stopcock valve to which the burner is attached. The stopcock valve or solenoid valve, whichever is used, shall be capable of being fully opened or fully closed in 0.1 second.

6.2.2.4 On the side of the burner's barrel, opposite the pilot light, there shall be a metal rod of approximately 3 mm diameter spaced 13 mm from the barrel and extending above the burner. The rod shall have two 8 mm prongs marking the distance of 19 mm and 38 mm above the top of the burner.

6.2.2.5 The burner shall be fixed in a position so that the center of the burner's barrel is directly below the center of the specimen.

6.2.3 A control valve system with a delivery rate designed to furnish gas to the burner under a pressure of 2.5 psi \pm 0.25 psi at the burner inlet shall be used (see 6.6.1). The manufacturer's recommended delivery rate for the valve system shall include the required pressure.

6.2.4 The methane gas used for this test shall have a purity of 97 percent or greater.

NOTE: Matheson B Gas is no longer considered a reliable fuel source for CPAI-84.

6.2.5 The test requires metal hooks and masses to produce a series of total loads to determine damaged length. The metal hooks shall consist of 19-gauge steel wire or equivalent and shall be made from 75 mm lengths of the wire, and bent 13 mm from one end to a 45-degree hook. One end of the hook shall be fastened around the neck of the mass to be used.

6.2.6 The test requires a stopwatch or other device to allow accurate reasurement of the burning time.

6.2.7 The test requires a scale, graduated in 1 mm intervals to measure the damaged length.

6.2.8 Clamps The test requires clamps for holding the specimen to the supporting frame. They shall be Acco no. 325, Hunt Bulldog Clips no. 2, or equivalent. A total of four clamps, two on each side, are used: two clamps 20 mm above the bottom edge and two clamps 38 mm above the first two.

6.3 Sampling

6.3.1. Lot Size A lot is defined as all the fabric in a single manufacturing run of one type of fabric.

6.3.2 Lot Sample Unless otherwise agreed on, as when specified in an applicable material specification, randomly take as the lot sample the number of samples defined in Table II in Section 5.3.2.

6.3.3 Laboratory Sample - For fabric rolls, take as a laboratory sample a full-width swatch 1 meter long from the outside of each roll in the lot sample. Discarding the first full-width length from the end of the roll prior to taking the lot samples is acceptable and optional.

6.4 Procedure

6.4.1 The specimen in its holder shall be suspended vertically in the cabinet in such a manner that the entire lower length of the specimen is exposed and the lower end is 20 mm above the top of the gas burner. The apparatus shall be set up in a draft-free area.

6.4.2 Prior to inserting the specimen, the pilot flame shall be adjusted to approximately 3.5 mm in

height measured from its lowest point to the tip. The burner flame shall be adjusted by means of the needle valve in the base of the burner to give a flame height of 38 mm (± 3 mm) with the stopcock fully open and the air supply to the burner shut off and taped. The 38 mm flame height is obtained by adjusting the valve so that the uppermost portion (top) of the flame is level with the tip of the metal prong (see Figure B) specified for adjustment of flame height. It is an important aspect of the evaluation that the flame height be adjusted with the tip of the flame level with the tip of the metal prong. After inserting the specimen, the stopcock shall be fully opened, and the burner flame applied vertically at the middle of the lower edge of the specimen for 12 seconds (± 0.2 second) and the burner turned off. The cabinet door shall remain shut during testing.

6.4.3 The after-flame time for each specimen shall be recorded to the nearest 0.2 seconds. After flaming and glowing have ceased, the specimen shall be removed from the cabinet.

6.4.4 After each specimen is removed, the test cabinet shall be cleared of fumes and smoke prior to testing the next specimen.

6.4.5 After both flaming and glowing have ceased, the damaged length shall be measured. The damaged length shall be the distance from the end of the specimen, which was exposed to the flame, to the end of a tear (made lengthwise) of the specimen through the center of the damaged areas as follows: The specimen shall be folded lengthwise and creased by hand along a line through the highest peak of the damaged area. The hook (as described in 6.2.5) shall be inserted in the specimen (or in a hole, 6 mm in diameter or less, punched out for the hook) at one side of the damaged area 6 mm from the adjacent outside edge and 6 mm in from the lower end. A mass of sufficient size such that the mass and hook together shall equal the total tearing load required in 6.4.6.1 shall be attached to the specimen.

6.4.6 A tearing force shall be applied gently to the specimen by grasping the corner of the cloth at the opposite edge of the char from the load and raising the specimen and mass clear of the supporting surface. The end of the tear shall be marked off on the edge and the damaged length measurement made along the undamaged edge.

6.4.6.1 Loads for Determining Damaged Length. The specific load applicable to the weight of the test material shall be as shown in Table III.

Table III Untreated Weight of Material Being Tested - g/m ²	Total Tear Force for Determining the Damaged Length - g
Not exceeding 100	50
More than 100 and not more than 200	100
More than 200 and not more than 340	200
More than 340	350

6.4.7 The damaged length for each specimen shall be recorded to the nearest 1 mm.

6.5 Report

6.5.1 The after-flame time and damaged length of the sample unit shall be the average of the results obtained from the individual specimens tested. All values obtained from the individual specimens shall be recorded.

6.5.2 The after-flame time shall be reported to the nearest 0.2 second and the damaged length to the nearest 1 mm.

6.6 Notes

6.6.1 The gas and the regulator valve system, Models IL-350 and 70 with hose and fittings connected in series, may be obtained from Matheson Gas Products, P.O. Box 85, East Rutherford, NJ 07073 USA, +(201) 867-4100

6.6.2 Test cabinets of the type described in this test method may be obtained from Atlas Electric Devices Co., 4114 North Ravenswood Ave., Chicago, IL 60613 USA, +(312) 327-4520, The Govmark Organization Inc., P.O. Box 807, Bellmore, NY 11710 USA, +(516) 293-8944, or U.S. Testing Co., 1941 Park Ave., Hoboken, NJ 07030 USA, +(201) 792-0636.

ing the certification of materials used in their camping tent products.

7.1 Material Certification Each lot of flame-resistant material supplied to a manufacturer of camping tentage shall be accompanied by a written certification from the supplier stating it meets the flame-retardance requirements of CPAI-84 and providing the lot number and the flammability test results.

7.2 Labeling of Camping Tentage Label(s) shall be permanently affixed and contain the following information:

7.2.1 Certification A statement that the materials used in the manufacture of the item meet the flame-resistance requirements of CPAI-84.

7.2.2 Manufacturer Identification An identification of the manufacturer of the item, unless the item bears a private label, in which case, it shall identify the private labeler and shall also contain a code mark that will permit the seller of the item to identify the manufacturer to the purchaser on request.

7.2.3 Code Number A number enabling the manufacturer to identify from its records the suppliers and suppliers' lot numbers of the certified materials used in the item. The manufacturer shall also maintain records to identify the parties to whom the tents were sold. Further, the manufacturer shall maintain records identifying items manufactured from lots of certified material for 4 years after date of tent manufacture.

7.2.4 Warning Labeling **"WARNING: KEEP ALL FLAME AND HEAT SOURCES AWAY FROM THIS TENT FABRIC**

This tent meets the flammability requirements of CPAI-84. The fabric may burn if left in continuous contact with any flame source. The application of any foreign substance to the tent fabric may render the flame-resistant properties ineffective."

7.2.4.1 This warning label or its equivalent must be permanently affixed to the tent at one conspicuous location, and must contain block letters on a contrasting background.

7.2.4.2 Warning Labeling - Packaging The above warning statement (except the last sentence) must appear in a conspicuous location on each carton containing the tent. The size of the letters of the above warning statement should be reasonably related to the area of the carton display panel on which it appears, but must not be less than 12 point type. The word "Warning" must be in bold type.

7.

Certification and Labeling

NOTE: Tent manufacturers and importers are responsible for maintaining records concern-

7.2.4.3 Warning Labeling - Instructions

The warning statement of section 7.2.4 above must appear on any included instructions for assembling the tent. The type size should be reasonably related to any adjacent printing. The word "Warning" must be in bold type.

Appendix A

Conditioning Rationale

The purpose of leaching is to simulate "real world" effects of laundering, rain, outdoor exposure, handling and cleaning on the tent materials, which might tend to reduce flame-retardancy properties over time.

NOTE: All products subject to testing under the provisions of CPAI-84 must include leaching, including "indoor" products, because "indoor" tent products may be exposed to laundering, cleaning, water exposure or rain, and may be placed into use outdoors.

The purpose of accelerated weathering is to simulate the UV exposure of sunlight on the tent materials, which might tend to reduce flame-retardancy properties over time.

Selection of UV bandwidth exposure is not for the purpose of correlating tests with actual expected performance. Rather, the purpose is to provide a uniform test condition near the worst-case boundaries of what may be expected in the field.

Appendix B

Future Work on CPAI-84

In September 1995, a group of tent manufacturers submitted a proposal to exempt lightweight backpacking and mountaineering tents from CPAI-84 requirements. This proposal has merit, but requires test data to demonstrate its validity. Future work on CPAI-84 may result in a weight range for which flammability testing is conducted differently.

Appendix C

Other Standards Relating to Camping Tent Flammability

British Standards Institute

- BS 5576 "1985 Safety Features of Camping Tents..."
- BS 6341 "1983 Fabrics for Camping Tents"
- BS 6341 "Amendment One (AMD 7645), May 15, 1993"

French Standards Association (AFNOR)

- NF S 52-800 "Tentes de Camping"

European Standards Commission (CEN)

- CEN PREN 12008 "Textiles—Burning Behavior of Marquees, Large Tents..."

German Institute for Standardization (DIN)

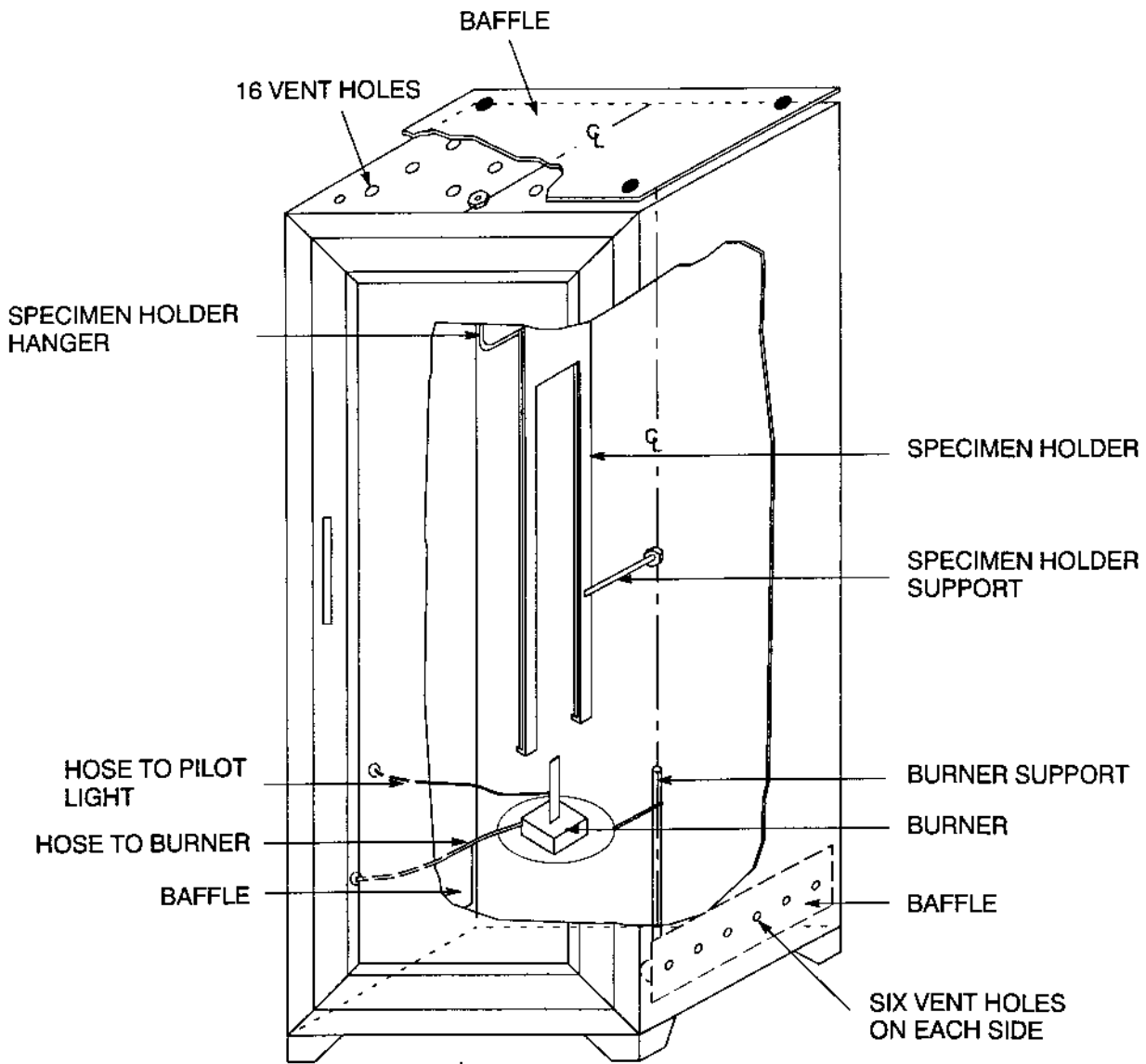
- DIN ISO 5912 "Campingzelte; Anforderungen, P rufung und Begriffe - 1993"
- DIN ISO 10966 "Textilien—FlaechengeGilde fuer Vorzelte und Campingzelte—Anforderungen - 1994"

International Standards Organization

- ISO 5912 "Camping Tents Second Edition"
- ISO 10966 "Textiles—Fabrics for Awnings and Camping Tents..."

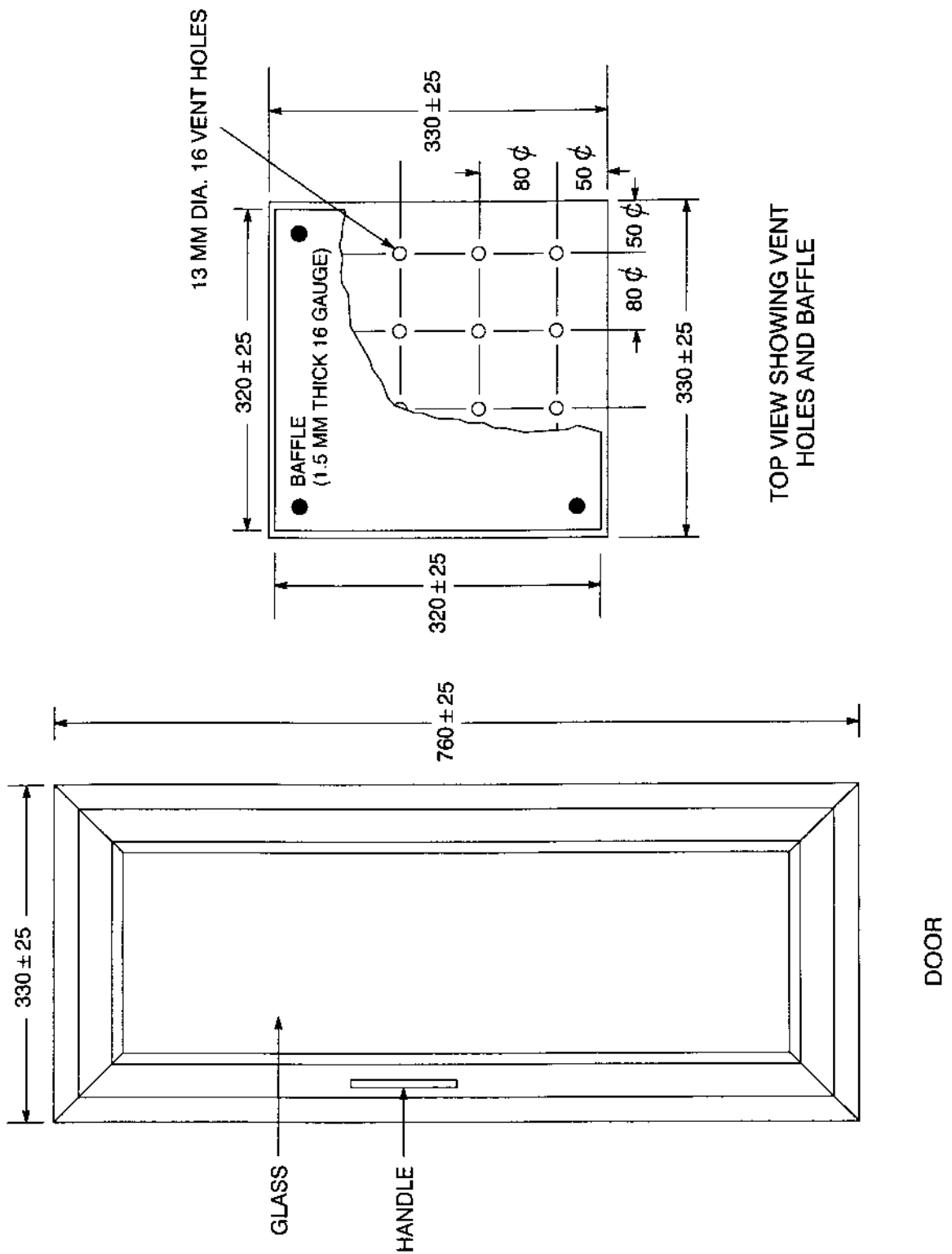
Appendix D

Figures A, B, C, D, E



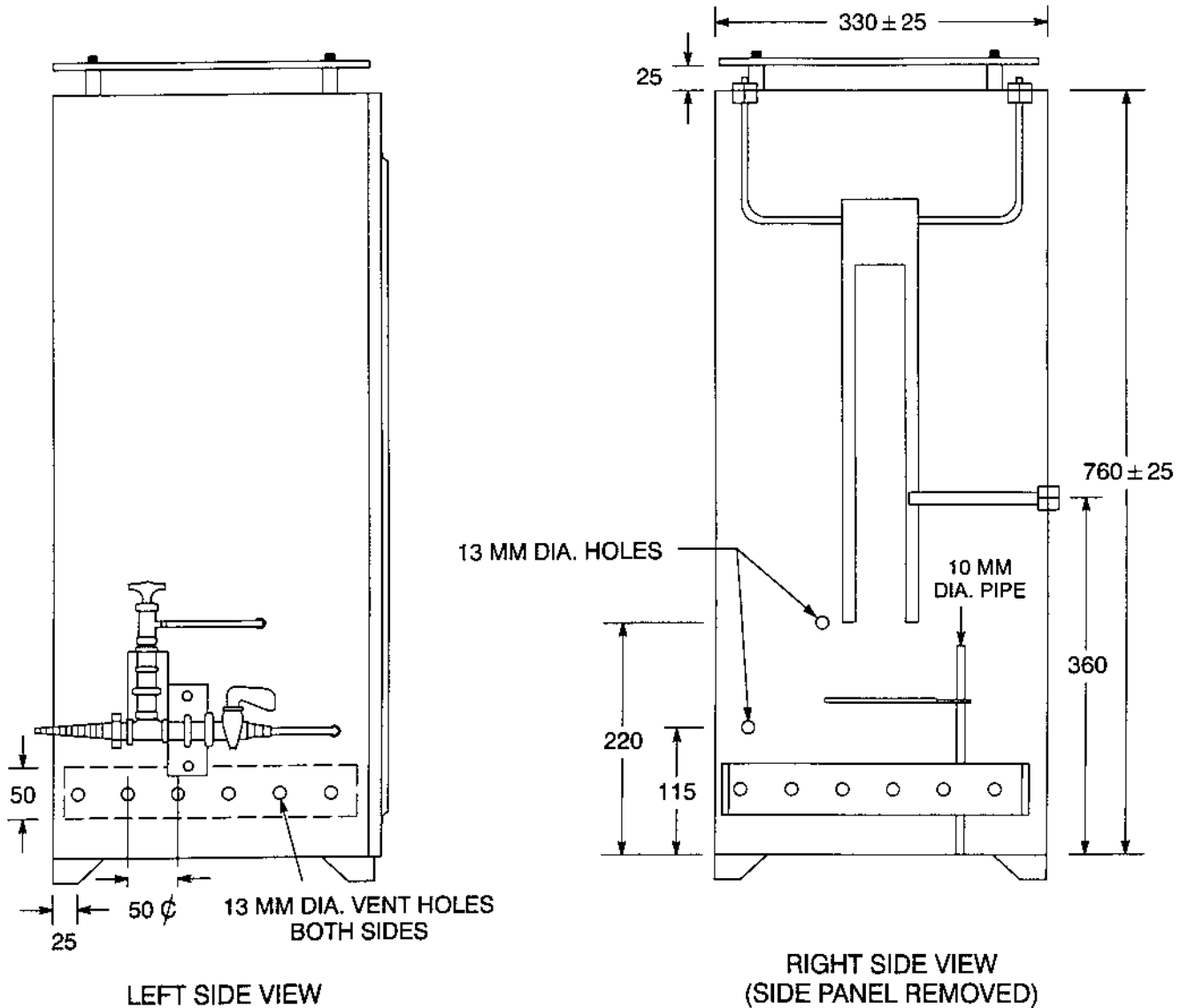
NOT TO SCALE

Figure A
Vertical Flame Resistance Textile Apparatus



NOTE: ALL DIMENSIONS IN MM
NOT TO SCALE

Figure B
Vertical Flame Resistance Textile Apparatus, Door and Top View



NOTE: ALL DIMENSIONS IN MM
NOT TO SCALE

Figure C
Vertical Flame Resistance Textile Apparatus, Right and Left Views

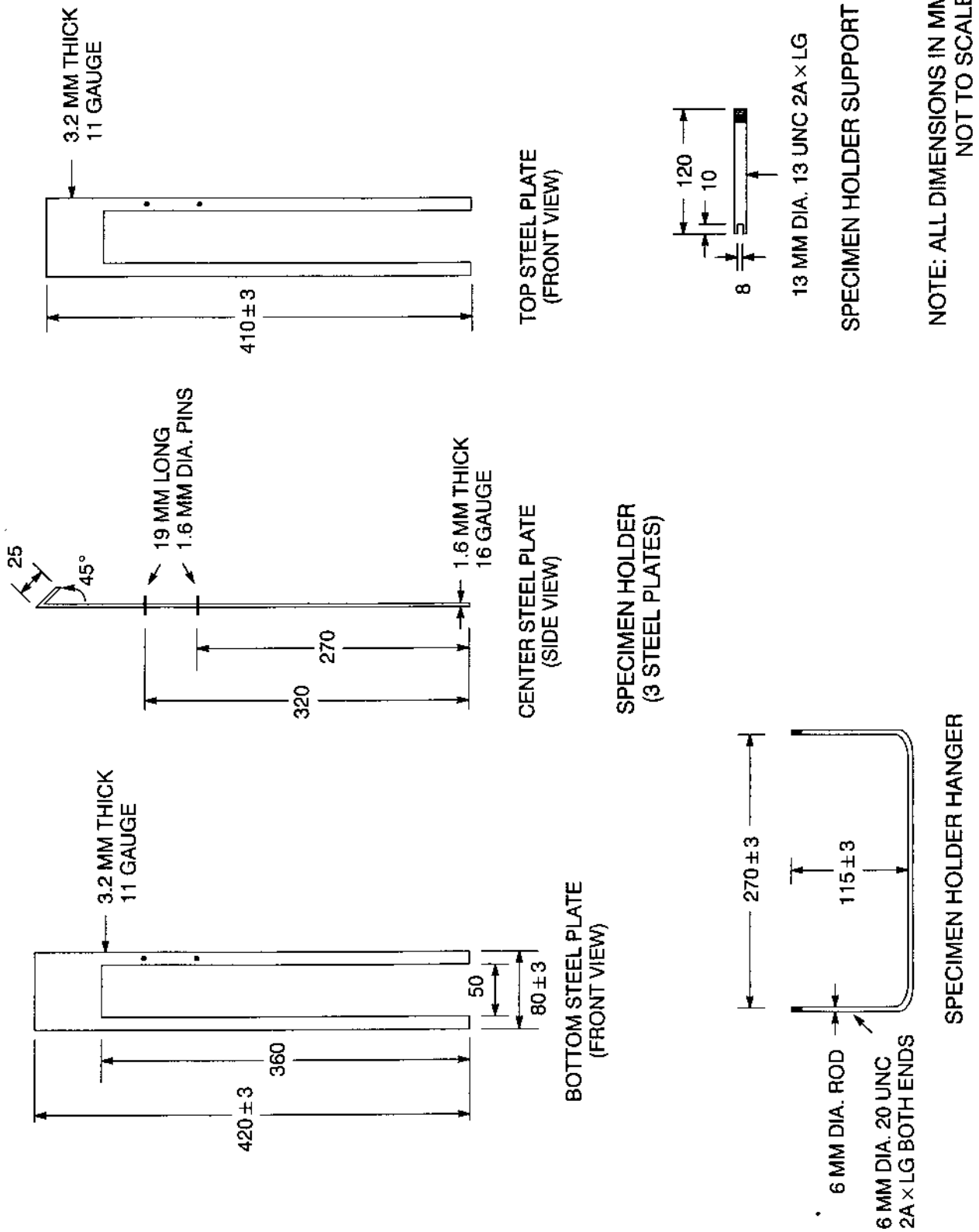
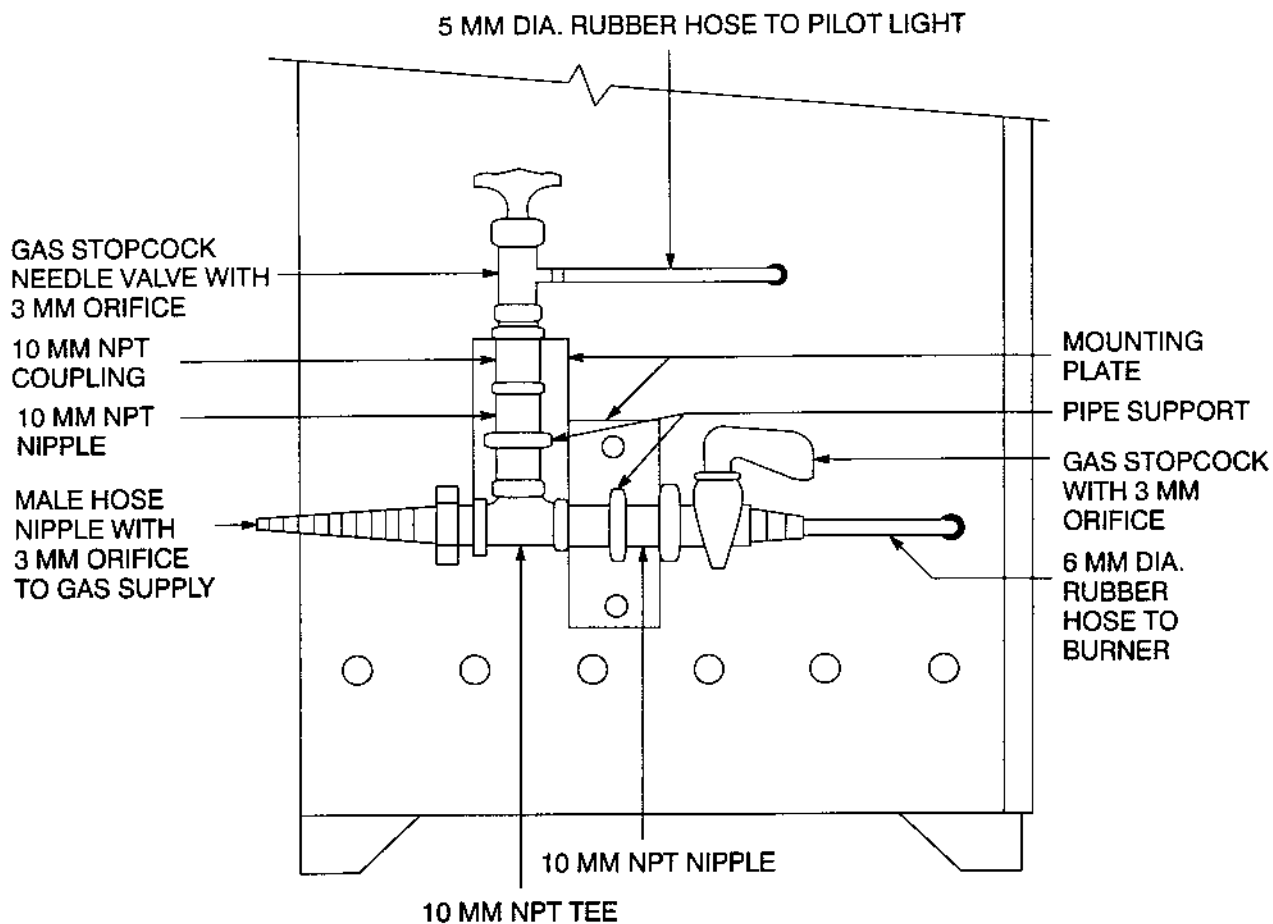


Figure D
Specimen Holder Details



SIDE VIEW SHOWING GAS HOSE CONNECTION

NOTE: ALL PIPE FITTINGS TO BE BLACK IRON PIPE

NOTE: ALL DIMENSIONS IN MM

NOT TO SCALE

Figure E
Vertical Flame Resistance Textile Apparatus, Gas Hose Connection Detail