

A RATE-OF-BURN STANDARD FOR SLEEPING BAGS

CPAI-75

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1. Scope

1.1 Scope. This standard provides a test method and performance requirements for measuring the flammability, i.e. burn rate, of multi-component sleeping bags, and provides labeling requirements to facilitate the identification of products conforming to this specification.

1.2 Application. This standard is applicable to all sleeping bags.

2. Performance Requirements

2.1 Performance Requirements. When subjected to the test described in Section 8 the average burn rate for a sample unit shall not exceed 6.0 inches per minute. No individual specimen shall have a burn rate of more than 8.0 inches per minute.

3. Labeling

3.1 Labeling. Bags shall be labeled as conforming to CPAI-75 Rate-of-Burn Standard for Sleeping Bags.

4. Specimens and Sampling

4.1 Specimen. The specimen shall be taken from the bag as shown in Figure I and shall have a finished size of 12" X 14". In the event that it is impossible to cut an actual sample from a bag due to its construction, a 12" X 28" facsimile may be constructed and folded. All components shall be used in their correct positions and amounts.

4.2 Sample Unit. A sample unit shall consist of ten specimens, five to be subjected to three cycles of washing following the procedures recommended by the manufacturer. (Samples should be dried between washings and thoroughly dry before testing.)

5. Conditions for Testing

5.1 Ambient Conditions. Tests shall be conducted under ambient conditions. In the case of a dispute, tests shall be conducted under conditions of 55 percent maximum relative humidity and a temperature of $70^{\circ} + 2^{\circ}$ F, and specimens shall be in moisture equilibrium under the above conditions.

5.2 Draft. Tests shall be conducted in a draft-free environment.

6. Apparatus

6.1 Test Cabinet. A test cabinet similar to that shown in Figure IV shall be used.

6.2 Support Frame. A support frame conforming to Figure II shall be used. It shall be constructed of 1/8" steel.

6.3 Hold-Down Plate. A hold-down plate conforming to Figure III shall be used. It shall be constructed of 1/8" steel.

6.4 Spacers and Clamps. A spacer and clamping arrangement shall be used which is capable of positioning the hold-down plate with its bottom surface one inch above the top surface of the support frame, so that it holds the test specimen at a one-inch thickness on the two sides and the back.

6.5 Thread. #50 White mercerized cotton thread.

6.6 Tape. Tape for fastening the thread to the frame. (Alternate methods of accomplishing this, such as small clips, may also be used.)

6.7 Weights. Weights for attachment to the timing threads. (See Note 9.1)

6.8 Burner. A Bunsen burner with a tube of 3/8" inside diameter shall be used. The gas adjusting valve is set to provide a flame, with the tube vertical, 1 1/2" in height. The air inlet to the burner is closed.

6.9 Gas. The gas used shall be Matheson Manufactured Gas Type B or the equivalent.

6.10 Stop Watch. A stop watch or other timing device shall be used capable of measuring the burning time to 0.2 second.

7. Sample Preparation

7.1 Compression. Samples shall be compressed to 1/2 their original loft for 24 hours prior to testing. (See Note 9.2)

7.2 Re-Lofting. Following the 24 hour compression period, specimens shall be allowed a minimum of one hour to regain their loft before tests are conducted.

8. Procedure

8.1 Mount the specimen horizontally on the support frame with the sewn sides and end held at one-inch thickness by the U-shaped hold-down frame, spacers and clamps.

8.2 Attach two #50 White Mercerized Cotton Threads to one edge of the frame at points 1 1/2" and 11 1/2 inches back from the open end, i.e. with 10" in between, and stretch across the sample, attaching small weights to the overhanging ends of the threads. Timing will begin and end as the respective threads burn through and their weights drop.

8.3 With the flame adjusted as in Section 6.8 and the frame with mounted specimen in the test cabinet, position the burner so that the center of the burner tip is 3/4" below the center of the edge of the exposed end of the specimen.

8.4 Lower the door of the test cabinet.

8.5 Expose the sample to the flame for 30 seconds to force ignition. (See Note 9.3)

8.6 Begin timing when the first weight drops and continue until the second weight drops or until the flaming stops.

8.7 Calculate the burn rate using the following formula:

$$B = 60 \times \frac{D}{T}$$

Where:

B = Burn rate in inches per minute

D = Distance the flame travels in inches,
and

T = Time in seconds for the flame to travel D inches.

9. Notes

9.1 Small clamp-type paper clips work well as weights.

9.2 An easy method of accomplishing this is to stack a number of specimens in a box and compress them all to half their original height under a board or plate held down by pins through the side of the box, etc.

9.3 The most reproducible results are produced when the fan in the hood is turned off, or down if a variable speed fan is used, during the 30-second ignition period.

During this time it is desirable that the burner flame not flicker. Following the ignition period the fan should be turned back up to exhaust fumes, yet not cause a draft in the test cabinet.

Figure I - Test Specimen

sample to be ignited here at folded edge
not at zipper or sewn edges

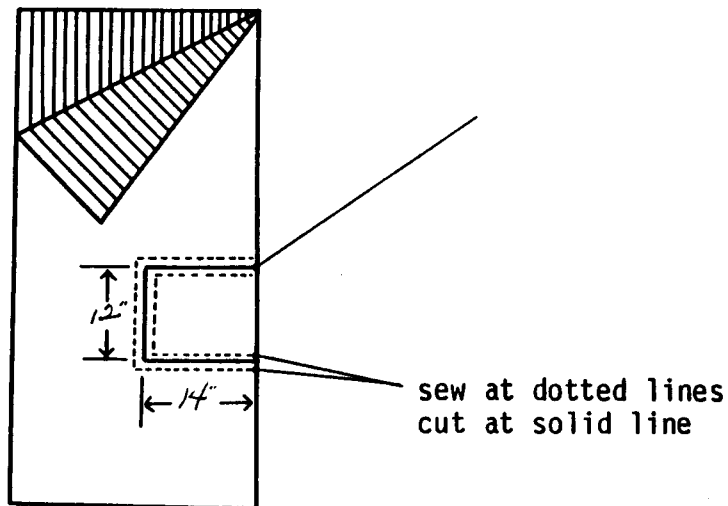
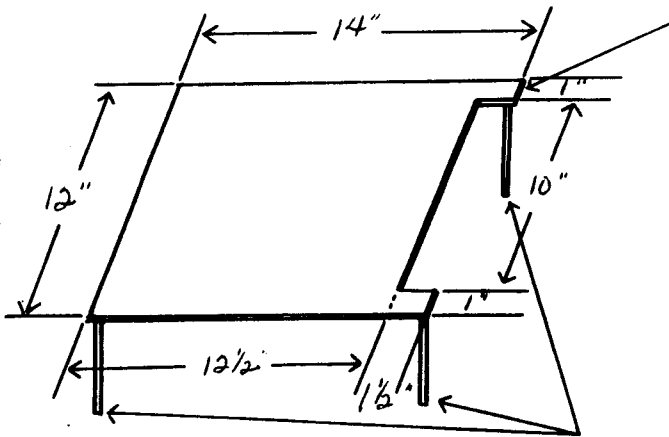


Figure II - Support Frame

folded edge of sample to be even with this edge of frame for testing



legs correct height to allow placement of burner

plate constructed of 1/8" steel

CPAI-75 Test Cabinet
Materials List

All Items 1/8" Stainless
Except as Noted

<u>Item</u>	<u>No. Required</u>	<u>Description</u>
1.	4	Corner Angle, 1x28"
2.	4	Window Frame, 3x28"
3.	4	Frame Spacer, 1-3/4x4"
4.	4	Window Seat, 1-1/4x4"
5.	1	Window, Heat Resistant Glass, 3/16x20x20"
6.	3	Panel, 24x24"
7.	1	Top Plate, 24-1/2x26"
8.	2	Chain, 24"
9.	2	Window Stop Rods, 1/4 dia. x 4"
10.	4	S-Hooks
11.	22	Bolt w/nut, 1/4-20x3/4"
12.	6	Bolt w/nut, 10-24x1/2"
13.	2	Hole, 1/4 dia.

Notes: The window glass slides up and down; its edges are taped to avoid cuts; rubber tubing on top of seat acts as cushion.

Figure III - Hold-Down Plate

plate constructed of 1/8" steel

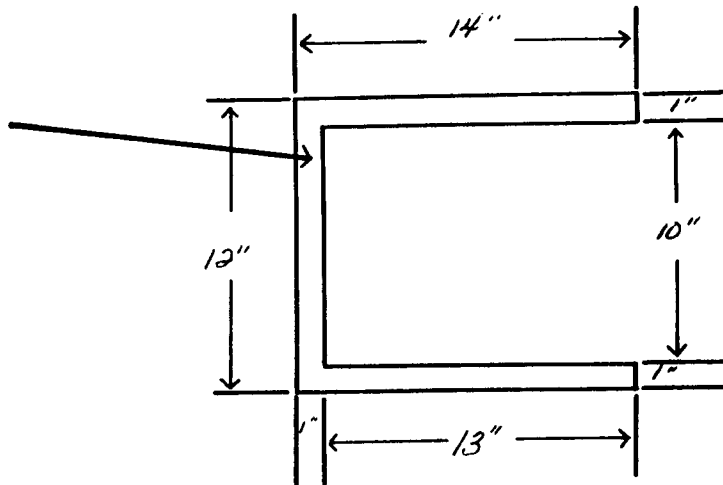


Figure IV - Test Cabinet

