

HH-P-182

JUNE 20, 1947

## FEDERAL STANDARD STOCK CATALOG

## Section IV

(Part 5)

## FEDERAL SPECIFICATION

FOR

## FELT, ASBESTOS, ASPHALT-SATURATED, AND ASPHALT-COATED, FOR BUILT-UP ROOFING

"This specification was approved on the above date by the Director, Bureau of Federal Supply, for the use of all departments and establishments of the Government, and shall become effective not later than September 15, 1947 for use in procurement initiated on or after that date. It may be put into effect, however, at any earlier date after promulgation."

## A. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS

A-1. There are no other Federal specifications applicable to this specification.

A-2. The following Underwriters' Laboratories, Inc. publications of the issue in effect on date of invitation for bids, shall form a part of this specification:

List of Inspected Fire Protection Equipment and Materials

## B. CLASSES, WIDTHS, AND GRADE

B-1. *Classes.*—Coated asphalt-saturated asbestos felt in accordance with this specification shall be furnished in the following classes, as specified in the invitation for bids, contract, or purchase order.

Class A.—20-pound (one side coated).

Class B.—50-pound (both sides coated).

B-2. *Width of felt.*—Unless otherwise specified, coated asphalt-saturated asbestos felt in accordance with this specification shall be furnished in rolls 36 inches  $\pm$   $\frac{1}{4}$  inch or 32 inches  $\pm$   $\frac{1}{4}$  inch wide, as specified in the invitation for bids, contract, or purchase order.

B-3. *Grade.*—Coated asphalt-saturated asbestos felt in accordance with this specification shall be furnished in one grade only.

## C. MATERIAL AND WORKMANSHIP

C-1. *Material.*—The material shall be a felt made essentially of asbestos fibers, impregnated with asphalt, and coated (on one side for class A felt and on both sides for class B felt) with asphalt. The coated surfaces may have a light surfacing of silica or other mineral matter which will not interfere with adhesion between the felt and the plying cement, to prevent sticking in the rolls.

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C-2. *Workmanship.*—Coated asphalt-saturated asbestos felt shall be uniform throughout and shall be free from visible defects such as holes, ragged or untrue edges, blisters, breaks, rents, cracks, and indentations. The coating and mineral surfacing shall be uniformly applied and shall extend to the edge of the sheet. The surface shall be free from areas or patches of unabsorbed saturant, unequally distributed coating, and superficial dry spots.

D. GENERAL REQUIREMENTS

D-1. *Underwriters' Laboratories requirements.*—

D-1a. The contractor shall submit proof to the purchasing agency that the material he furnishes under this specification conforms to the requirements of the Underwriters' Laboratories, Inc., regarding fire and casualty hazards. The label, listing, marker, or certified report of the Underwriters' Laboratories, Inc., will be accepted as evidence of compliance with this requirement.

D-1b. In lieu of Underwriters' Laboratories evidence, the contractor may submit evidence from other sources that his material conforms to the Underwriters' Laboratories requirements. The acceptance or rejection of such proof of conformance shall be decided by the purchasing agency.

D-1c. Compliance with the Underwriters' Laboratories requirements regarding fire and casualty hazards does not absolve the contractor from complete compliance with the requirements of this specification in order to secure the acceptance of his material. In the event of difference between any of the requirements of this specification and those of Underwriters' Laboratories, Inc., the requirements of this specification shall govern.

D-2. *Fabrication.*—The unsaturated felt shall be produced by "felting" at least 85 percent by weight of asbestos fiber.

D-3. *Condition.*—The felt shall not crack or be so sticky as to be damaged when unrolled at temperatures between 50° and 90° F.

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**E. DETAIL REQUIREMENTS**

E-1. The felt shall comply with the requirements shown in table I.

TABLE I.—Physical requirements.

|                                                                | Class A, 20-pound |                  | Class B, 50-pound |         |
|----------------------------------------------------------------|-------------------|------------------|-------------------|---------|
|                                                                | Maximum           | Minimum          | Maximum           | Minimum |
| Net weight per roll <sup>1</sup> .....pounds                   | 70                | 55               | 65                | 54      |
| Saturated and coated felt:                                     |                   |                  |                   |         |
| Weight per 100 square feet (par. F-2a) .....pounds             | ...               | 17               | ...               | 50      |
| Pliability at 25° C. (par. F-4c)                               |                   | Shall pass test. |                   |         |
| Volatile matter (105° to 110° C.) .....percent by weight       | 5                 | ...              | 5                 | ...     |
| Saturation of felt (coating-free basis) .....percent by weight | ...               | 40               | ...               | 50      |
| Desaturated felt:                                              |                   |                  |                   |         |
| Weight per 100 square feet .....pounds                         | ...               | 8.5              | ...               | 17.5    |
| Ash .....percent by weight                                     | ...               | 70.0             | ...               | 70.0    |
| Thickness .....inch                                            | ...               | 0.02             | ...               | 0.04    |
| Weight of mineral surfacing per 100 square feet .....pounds    | 3                 | ...              | 10                | ...     |

<sup>1</sup> The net weight per roll is computed on a basis of 324 square feet per roll of 20-pound felt, and 108 square feet per roll of 50-pound felt.

<sup>2</sup> Equivalent to an asbestos content of approximately 85 percent by weight.

**E-2. Piecing.—**

E-2a. *Class A.*—No roll shall contain more than two pieces, and not more than 3 percent of the rolls in any one shipment shall contain two pieces.

E-2b. *Class B.*—Rolls may be scored or cut into pieces approximately 20 feet in length.

**F. METHODS OF SAMPLING, INSPECTION, AND TESTS**

**F-1. Sampling for inspection.**—From each shipment or fraction thereof representing a product of the same class, a number of rolls shall be taken at random, equivalent to one-half the cube root of the total number of rolls included in the lot, except that in lots of 1,000 or less five rolls shall be taken. If the cube root as calculated proves to be a fractional number, it shall be expressed as the next higher whole number. For convenience, the following table is given, showing the number of rolls to be taken from shipments of various sizes:

| Rolls in shipment: | Number of rolls taken |
|--------------------|-----------------------|
| Up to 1000         | 5                     |
| 1001-1723          | 6                     |
| 1723-2744          | 7                     |
| 2745-4096          | 8                     |
| 4097-5832          | 9                     |
| 5833-8000          | 10                    |
| 8001-10648         | 11                    |
| 10649 and over     | 12                    |

**F-2. Inspection.**—The sample rolls taken shall be inspected to determine compliance with this specification with respect to workmanship, condition, width, and weight.

**F-2a. Net weight of roll.**—Each sample roll taken shall be weighed intact to the nearest  $\frac{1}{4}$  pound, numbered, and its weight recorded.

**F-2b. Weight per 100 square feet of saturated and coated felt.**—The width and length of each sample roll taken shall be measured to the nearest  $\frac{1}{4}$  inch. From these measurements and the weight obtained in paragraph F-2a, calculate the weight per 100 square feet of saturated and coated felt by the following formula:

$$\frac{\text{Weight in pounds} \times 100}{\text{Length in feet} \times \frac{\text{width in inches}}{12}} = \text{Weight per 100 square feet}$$

If the calculated weight per 100 square feet of saturated and coated felt of any sample roll is less than 17 pounds for the 20-pound class (class A) or less than 50 pounds for the 50-pound class (class B), additional rolls equal to twice the number originally sampled shall be inspected. If the calculated weight per 100 square feet of any of these additional rolls is less than the minimum specified, the entire lot shall be rejected by the inspector and no samples taken for laboratory examination.

**F-3. Sampling for laboratory examination.**—From the sample rolls, examined in sampling for inspection, select one the weight of which is nearest the average weight of the whole lot. Unroll, and at approximately 10 feet from the outside end cut two samples the full width of the roll and approximately 40 inches long. The sheet shall be cut at right angles to the edge of the roll. Measure and weigh the strips and calculate the weight per 100 square feet of each. Discard any strip whose weight varies by more than 0.5 pound from the weight obtained in paragraph F-2b. Divide each strip into four equal parts, identifying the inside of the roll and

the direction of the fiber grain on each section. (The direction of the fiber grain is parallel to the edge of the roll.) Label and pack flat between supports wide and stiff enough to prevent crushing. Transmit one sample (the four sections cut from one sheet) to the testing laboratory and retain the other for check tests if necessary.

**F-4. Laboratory examination.**

**F-4a. Weight.**—Assemble the pieces and trim the sample so that it is 36 inches long and the full width of the roll. Measure accurately and weigh to the nearest gram (15 grains). From the measurements and weight so obtained compute the weight per 100 square feet by the following formula:

$$\frac{\text{Weight in grams} \times 31.7}{\text{Area in square inches}} = \text{Weight in pounds per 100 square feet.}$$

The weight so determined is to be used in selecting samples for laboratory examination and shall not be used as a basis for acceptance or rejection. (See par. F-2b.)

**F-4b. Appearance.**—Examine both sides of the sample to determine compliance with the requirements of paragraph C-2.

**F-4c. Pliability.**—At a distance not less than 3 inches from the edge of the sample cut five strips 1 inch wide and 6 inches long in the direction of the fiber grain, and immerse them in water at 25° C. (77° F.) for 10 to 15 minutes. Remove the strips individually from the water and immediately bend each strip, with the surface corresponding to the inside of the roll uppermost, through an arc of 90° over the rounded corner of a block (radius as specified below) at a uniform speed in approximately 2 seconds' time. Dry thoroughly and examine. If one or more of these five strips crack on this test, cut 10 strips from another part of the sample and repeat the test. If one or more of these strips crack, the material shall be reported as failing in the pliability test. Cracks less than 1/8 inch in length at the edge of the test strip shall be disregarded.

Class A—1/4-inch radius.

Class B—1/2-inch radius.

**F-4d. Volatile matter at 105° to 110° C. (221° to 230° F.).**—Cut two strips of the felt 6 inches wide and 12 inches long, weigh the strips separately to the nearest 0.1 gram and suspend them for 5 hours in an oven at 105° to 110° C. (221° to 230° F.). Remove from the oven, cool in a desiccator, and weigh. Compute the loss in weight for each strip and report the average as the percentage of volatile matter in the sample.

**F-4e. Weight of desaturated felt.**—Cut a strip 2 inches wide representing the full width of the sample, measure to the nearest 1/8 inch, and weigh to the nearest milligram. From this data calculate the weight of 100 square feet of material. If this weight varies by more than 0.5 pound from that determined in paragraph F-4a, discard and cut additional strips until one within this limit is obtained.

**F-4e(1).** Extract with benzol (carbon tetrachloride, chloroform, or carbon bisulfide will usually give the same result, but benzol shall be used in case of dispute) in a suitable extractor until the solvent runs through colorless. Remove the desaturated felt from the extraction apparatus, dry in air until free from solvent, and carefully brush off any adhering particles of foreign matter. Place the desaturated felt in a tared weighing bottle, heat in an oven at 105° to 110° C. (221° to 230° F.) for not less than 1 hour, cool in a desiccator, and weigh. Compute the weight of the moisture-free desaturated felt by the following formula:

$$\frac{\text{Weight of desaturated felt in grams} \times 31.7}{\text{Area in square inches}} = \frac{\text{Weight in pounds per 100 square feet}}{100}$$

**F-4f. Ash content of moisture-free desaturated felt.**—Incinerate 10 grams of desaturated felt as obtained in paragraph F-4e(1) to constant weight in a weighed crucible in a muffle furnace or over an open flame at a temperature of not less than 800° C. Cool in a desiccator, weigh, and compute the percentage ash in the desaturated felt.

**F-4g. Thickness of moisture-free desaturated felt.**—Determine the thickness of the desaturated felt as obtained in F-4e(1) at not less than 10 points equally spaced along the strip by any acceptable method. Report the average of these readings.

**F-4h. Saturation of felt.**—Cut three strips 2 inches wide and 8 inches long at random from the sheet and warm in an oven at about 80° C. (176° F.) until the coating asphalt can be easily stripped from the saturated felt. In removing the coating asphalt care should be taken to remove as little felt as possible and that none of the coating asphalt remains on the felt. Weigh the coating-free felt and extract with benzol (carbon tetrachloride, chloroform or carbon bisulfide will usually give the same results, but benzol should be used in case of dispute) in a suitable extraction apparatus until the solvent runs through colorless. Place the desaturated felt in a tared weighing bottle, heat in an oven at 105° to 110° C. (221° to 230° F.) for not less than 1 hour, cool in a desiccator, and weigh. The percentage saturation of the moisture-free felt is calculated as follows:

$$\text{Percentage saturation} = \frac{\text{Weight of extracted material}}{\text{Weight of moisture-free desaturated felt}} \times 100$$

**F-4i. Mineral surfacing.**—Cut a strip 2 inches wide representing the full width of the sample, measure to the nearest 1/8 inch, and weigh to the nearest milligram. From this data calculate the weight of 100 square feet of material. If this weight varies by more than 0.5 pound from that determined in paragraph F-4a, discard and cut additional strips until one within the limit is obtained.

**F-4i(1).** Incinerate in a 3-inch evaporating dish in a muffle furnace or over an open flame until all organic matter is destroyed. Brush adhering mineral from the felt, taking care to exclude any asbestos fiber. Combine all mineral matter (other than felt) and weigh. Calculate its weight per 100 square feet by the following formula:

$$\frac{\text{Weight of mineral matter in grams} \times 31.7}{\text{Area in square inches}} = \frac{\text{Weight of mineral surfacing in pounds per 100 square feet}}{\text{Area in square inches}}$$

**G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT**

**G-1. Packaging.**—Unless otherwise specified, commercial packages are acceptable under this specification.

**G-2. Packing.**—Unless otherwise specified, the rolls shall be securely taped or some other equally protective wrapping shall be employed. A standard label shall be attached to each roll to identify the material. The ends of the rolls need not be covered.

**G-3. Marking.**—Unless otherwise specified, each package shall be marked with the name of the material, the class, width, and quantity contained therein, as defined by the contract or order under which the shipment is made, the name of the contractor, and the number of the contract or order.

**H. REQUIREMENTS APPLICABLE TO INDIVIDUAL DEPARTMENTS**

**H-1.** The following departmental specifications and other publications, of the issues in effect on date of invitation for bids, and special requirements, shall form a part of this specification and shall be applicable to purchases made under this specification by the respective departments.

**H-2. Army.**—U. S. Army Specification No. 100-2; Standard Specification for Marking Shipments by Contractors, copies of which may be obtained without cost upon application to the procuring agency.

**H-3. Navy.**—

**H-3a. Applicable specifications and other publications.**—

*Joint Army-Navy Specifications:*

**JAN-P-106**—Packaging and Packing for Overseas Shipment—Boxes; Wood, Nailed.

**JAN-P-132**—Packaging and Packing for Overseas Shipment—Crates, Unsheathed, Wood, Nailed (for Maximum Net Load of 2,500 Pounds).

*Navy Department Specification:*

General Specifications for Inspection of Material.

*Bureau of Supplies and Accounts Publication:*

Navy Shipment Marking Handbook.

Copies of Federal and Joint Army-Navy specifications (required for Navy purchases), Navy Department specifications, and the Navy Shipment Marking Handbook may be obtained without cost upon application to the Bureau of Supplies and Accounts, Navy

Department, Washington 25, D. C., except that Naval activities should make application to the Supply Officer in Command, Naval Supply Depot, Bayonne, N. J.

**H-3b. Packing.**

**H-3b(1). For domestic shipment.**—Unless otherwise specified, felt packaged as described in paragraph G-1 shall be packed in substantial commercial containers of the type, size, and kind commonly used for the purpose, so constructed as to insure acceptance and safe delivery by common or other carriers, at the lowest rate, to the point of delivery.

**H-3b(2). For overseas shipment.**—Unless otherwise specified, felt packaged as described in paragraph G-1 shall be packed in nailed wood boxes or unsheathed nailed wood crates conforming to the requirements of Joint Army-Navy Specifications JAN-P-106 and JAN-P-132, respectively.

**H-3b(3). For domestic and overseas shipment.**—Where practicable, shipping containers shall be of uniform size, and shall contain the same number of items. Containers shall be designed to fit the contents in a compact manner.

**H-3c. Marking.**—In addition to any special marking required by the contract or order, marking of interior packages and shipping containers shall conform to the requirements of the Navy Shipment Marking Handbook.

**H-3d. Ordering information.**—Requests, requisitions, schedules, and contracts or orders should specify whether the subject commodity is to be packed and shipping containers marked for domestic or overseas shipment. (See pars. H-3b and H-3c.)

**I. NOTES**

**I-1. Purchasers** should exercise any desired options offered herein, and should specify the class and width required. (See pars. B-1, B-2, G-1, G-2, G-3, H-3b(1), and H-3b(2).)

**I-2. Basis of purchase** should be by the roll or the weight as may be agreed between purchaser and seller. (See par. E-1.)

**I-3. Coated asphalt-saturated asbestos felt** is intended for use with asphalt in the construction of built-up roofing.

**I-4.** It is believed that this specification adequately describes the characteristics necessary to secure the desired material, and that normally no samples will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary, they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the bid sample should be definitely stated, the specification to apply in all other respects.

**I-5.** Federal specifications do not include all types, classes, grades, sizes, etc., of the commodities indicated by the titles of the specifications, or which are commercially available, but are intended to cover the types, etc., which are suitable for Federal Government requirements.

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I-6. An Index of Federal Specifications may be purchased as noted in the paragraph below, price to be obtained from the Superintendent of Documents.

I-7. Copies of the listings of the Underwriters' Laboratories, Inc., referred to herein, may be obtained without cost from the Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago 11, Illinois.

I-8. Copies of this specification may be obtained upon application, accompanied by postal note, money order, coupon, or cash, to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price 5 cents.

Notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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