

DEPARTMENT OF COMMERCE

BUREAU OF STANDARDS

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UNITED STATES GOVERNMENT MASTER SPECIFICATION
FOR ASPHALT PREPARED ROOFING¹

FEDERAL SPECIFICATIONS BOARD STANDARD SPECIFICATION No. 214

This specification was officially promulgated by the Federal Specifications Board on September 30, 1924, for the use of the Departments and Independent Establishments of the Government in the purchase of asphalt prepared roofing.

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I. CLASSES

This asphalt prepared roofing shall be furnished in two weights—medium and heavy, as specified in the order, proposal, or contract.

II. MATERIAL AND WORKMANSHIP

This asphalt prepared roofing shall be composed of rag roofing felt saturated and coated on both sides with asphaltic compounds and surfaced with finely powdered talc or mica, which must prevent sticking in the rolls.

¹ This material is also known as smooth roll or ready roofing.

III. GENERAL REQUIREMENTS

No details.

IV. DETAIL REQUIREMENTS

(a) **APPEARANCE.**—The surface shall be smooth or finely veined in appearance. Deeply ribbed roofing will not be acceptable. The coating shall be uniformly applied on both sides and up to the edge of the sheet, and no uncoated spots or defects, such as blisters, or large lumps of coating, shall be perceptible.

(b) **WIDTH AND AREA OF ROLL.**—Width, 32 or 36 inches plus or minus one-fourth inch. Area, not less than 108 or 216 square feet, as specified in order.

(c) **AVERAGE GROSS WEIGHT PER 108 SQUARE FEET.**—Medium, 45 pounds; heavy, 55 pounds.

(d) **WEIGHT PER ROLL OF WRAPPING, PACKING, NAILS, AND CEMENT.**—Maximum, 3 pounds.

(e) **WEIGHT PER 108 SQUARE FEET OF ROOFING, EXCLUSIVE OF WRAPPINGS, PACKINGS, NAILS, AND CEMENT.**—

	Medium	Heavy
Average weight per 108 square feet.....	Pounds 42	Pounds 52
Minimum weight per 108 square feet.....	39.0	48.3

(f) **PLIABILITY AT 77° F.**—No cracking shall occur on bending through an arc of 180° over a two-fifths inch mandrel.

(g) **BEHAVIOR ON HEATING AT 176° F.**—No sliding, blistering, or absorption of the surface coating shall occur.

(h) **MINIMUM WEIGHT OF MOISTURE-FREE, DESATURATED FELT PER 108 SQUARE FEET.**—Medium, 10.8 pounds; heavy, 13.5 pounds.

(i) **THICKNESS OF DESATURATED FELT.**—Minimum: Medium, 0.048 inch; heavy, 0.060 inch.

(j) **ASH OF DESATURATED FELT.**—Maximum, 10 per cent.

(k) **SATURATION OF FELT.**—Minimum: Medium, 130 per cent; heavy, 140 per cent. The sheet of felt shall be thoroughly and uniformly saturated.

(l) **WEIGHT OF MINERAL SURFACING AND MINERAL MATTER IN COATING 108 SQUARE FEET.**—Maximum, 3 pounds.

(m) **NAILS.**—The gauge of the wire shall be 10 to 12, inclusive; the heads shall be not less than three-eighths inch in diameter and not less than 0.025 inch thick. The shank shall be between three-fourths and 1 inch long, and its lower end pointed. The nails shall be zinc coated.

Not less than an average of 250 nails shall be furnished for each 108 square feet of 36-inch roofing and not less than an average of 275 nails per 108 square feet of 32-inch roofing.

(n) LAP CEMENT.—The lap cement shall be of such nature as to firmly bind the laps without injurious effect upon the roofing. It shall consist of asphalt or coal-tar pitch dissolved in a volatile solvent. Three-fourths of a pint per 108 square feet shall be furnished for 36-inch roofing and 1 pint per 108 square feet for 32-inch roofing.

V. INSPECTION

If required, deliveries will, in general, be sampled and tested by the following methods, but the purchaser reserves the right to use any additional information to ascertain whether the material meets the specification:

(a) SAMPLING AND DETERMINATION OF WEIGHT OF ROOFING.—The weight per 108 square feet can be most accurately determined by the inspector at the time he takes the samples for transmittal to the laboratory.

(1) From each shipment select at random rolls of roofing equivalent to the cube root of the total number included in the lot. If the cube root is a fractional number, express it as the next higher digit.

(2) Remove the wrappers, other packing material, nails, and cement from each roll selected and weigh the roll and the packing material, etc., separately to the nearest one-fourth pound. Then unwind each roll and measure the length and width of the rectangular portion of the roll to the nearest one-fourth inch and reroll. Observe the appearance of the roofing while unrolling and rerolling. The roofing shall not stick and shall be free from visible external defects, such as holes, ragged or untrue edges, breaks, rents, cracks, indentations, or lumps of coating. The coating shall be applied on both sides and shall extend to the edge of the sheet.

Compute the area and weight per 108 square feet of each roll selected, and from these weights compute the average weight of the shipment. Should the weight of any 108 square feet be less than the minimum weight specified (39.0 pounds for medium and 48.3 pounds for heavy) it shall be cause for the rejection of the whole shipment. Compute also the average weight of the packing materials, nails, and cement.

(3) From the rolls examined for sampling, select one, the weight of which is near the average weight of the lot. Unroll, and at approximately 10 feet from the end cut two samples the full width of the roll and approximately 40 inches long, label, and carefully wrap, and transmit one to the testing laboratory. Retain the other for use in case of dispute.

(b) LABORATORY EXAMINATION.—(1) *Weight*.—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 108 square feet.

(2) *Appearance*.—Examine both sides of the sample and note the appearance. The coating shall extend to the edge of the sheet, which shall not be ragged. No uncoated spots or defects, such as blisters or large lumps of coating, shall be perceptible.

(3) *Pliability*.—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 from the water and immediately bend each strip over a mandrel two-fifths inch in diameter through an arc of 180° at a uniform speed in approximately two seconds' time. The roofing shall not crack when so bent.

(4) *Behavior on heating at 80° C. (176° F.) for five hours*.—Cut a strip of the roofing approximately 8 by 8 inches and suspend it vertically for five hours in an oven maintained at 80° C. (176° F.) plus or minus 3° C. (5° F.). Remove at the end of this period, and note any flowing, sagging, blistering, or absorption of the surface coating.

(5) *Weight of moisture-free, desaturated felt*.—Cut two strips 2 inches wide and approximately 8 inches long from the roofing, weigh, measure, and extract with benzol until the benzol runs through colorless and contains no soluble material. Remove the desaturated felt from the extractor, being careful not to lose any adhering mineral matter. Brush off any adhering mineral matter from the felt. Retain the matter brushed from the desaturated felt, that obtained from the extraction tube, and also the matter extracted with benzol for the determination of total mineral matter as in V (b) (6). Place the desaturated felt in a tared weighing bottle, dry at 100 to 105° C. (212 to 221° F.) for one-half hour and weigh. From the weight obtained and the area compute the percentage of desaturated felt and its weight per 108 square feet.

(6) *Total mineral matter per 108 square feet*.—Combine the mineral matter from the extractor and from the surface of the desaturated felt with that obtained by the evaporation and ignition of the benzol extract from V (b) (5), dry in air until free from the odor of benzol, heat for one-half hour at 100 to 105° C. (212 to 221° F.), and weigh. Calculate the total mineral matter.

(7) *Ash of desaturated felt*.—Cut the strips of felt obtained in V (b) (5) into squares about 1 centimeter on each side and thoroughly mix. Select at random pieces amounting to about 10 g, and after drying at 100 to 105° C. (212 to 221° F.) for one-half hour and cooling, weigh accurately and incinerate in a weighed crucible in a muffle or over an open flame until all the carbon is consumed, cool in a desiccator and weigh. Compute the percentage of ash in the moisture-free felt.

(8) *Saturation of felt.*—Cut two strips of the original roofing 2 inches wide and approximately 8 inches long and warm them in an oven at a temperature of approximately 80° C. (176° F.). Now strip off the surfacing and coatings, taking care that as little as possible of the saturated felt is removed with the coatings, and that none of the coatings adhere to the felt. Weigh the saturated felt obtained and extract in a suitable extractor with benzol until the benzol runs through colorless and contains no soluble material.

Remove the desaturated felt from the extractor. Place in a tared weighing bottle, dry at 100 to 105° C. (212 to 221° F.) for one-half hour and weigh. From the weight obtained and the original weight compute the percentage of saturation of the moisture-free felt as follows:

$$\frac{\text{Weight of saturated felt} - \text{weight of desaturated felt} \times 100}{\text{weight of desaturated felt}} = \left\{ \begin{array}{l} \text{percentage of saturation} \\ \text{of moisture-free felt.} \end{array} \right.$$

Cut three 2-inch strips of the roofing at random across the entire sheet, and split them open for their full length. The felt so exposed shall be uniformly saturated, showing no gray or unsaturated spots.

VI. PACKING AND MARKING

This asphalt prepared roofing shall be put up in rolls of 108 or 216 square feet as specified in the order. No roll shall contain more than two pieces of roofing nor shall there be more than 3 per cent of such rolls in a shipment. The rolls shall be tightly wound and their ends shall be protected with metal caps, scrap roofing cloth, or other suitable means. Each roll shall be wrapped with paper and shall be plainly marked with the manufacturer's name and brand and shall contain printed directions for laying. Nails and lap cement shall be furnished either in each roll or in bulk, as specified in the contract. Roofing for export shipment shall be packed as mutually agreed upon by purchaser and seller.

VII. ADDITIONAL INFORMATION

No details.

VIII. GENERAL SPECIFICATIONS

No details.

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