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BUREAU OF STANDARDS

George K. Burgess, Director

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UNITED STATES GOVERNMENT MASTER SPECIFICATION FOR SLATE-SURFACED ASPHALT PREPARED ROOFING AND SHINGLES

FEDERAL SPECIFICATIONS BOARD SPECIFICATION No. 296

This specification was officially promulgated by the Federal Specifications Board on May 20, 1925, for the use of the Departments and Independent Establishments of the Government in the purchase of slate-surfaced asphalt prepared roofing and shingles.

[The latest date on which the technical and inspection requirements of this specification shall become mandatory for all Departments and Independent Establishments of the Government is August 20, 1925. They may be put into effect, however, at any earlier date after promulgation]

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I. TYPES

This specification covers: (*a*) Slate-surfaced asphalt prepared ready or roll roofing; (*b*) slate-surfaced asphalt shingles.

II. MATERIAL AND WORKMANSHIP

Slate-surfaced asphalt prepared roofing and shingles shall be composed of rag roofing felt saturated and coated on both sides with asphalt and surfaced on the side to be exposed to the weather with granulated slate or similar material. The other side may be dusted with talc or mica to prevent sticking in the package.

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III. GENERAL REQUIREMENTS

1. Color and Appearance.—The color and distribution of the slate shall be uniform over the entire surface and when so specified shall substantially match a sample mutually agreed upon by buyer and seller. The coating and surfacing must extend to the edge of the sheet of roofing or of the shingles, except that roll roofing may have an unsurfaced lapping edge approximately 2 inches wide along one side of the sheet. The edges of the sheet of roofing or of the shingle shall not be ragged.

2. Behavior on Heating to 80° C. (176° F.) for Two Hours.—There shall be no flowing, sagging, blistering, or absorption of the coating. The slate shall not become detached and fall off.

3. Volatile Matter at 80° C. (176° F.) for Two Hours.—Maximum, 1½ per cent.

4. Weight of Moisture-Free Desaturated Felt per 108 Square Feet.—Minimum, 10.8 pounds.

5. Thickness of Moisture-Free Desaturated Felt.—Minimum, 0.05 inch.

6. Ash of Moisture-Free Desaturated Felt.—Maximum, 10 per cent.

7. Weight of Granulated Slate and Other Mineral Matter per 108 Square Feet of Fabric.—Not more than 35 pounds.

8. Trimmings.—If desired, trimmings shall be as specified in order.

IV. DETAIL REQUIREMENTS

1. Slate-Surfaced Asphalt Prepared Roofing.—(*a*) *Width of roll.*—32 or 36 inches plus or minus one-fourth inch.

(*b*) *Area.*—Not less than 108 square feet.

(*c*) *Weight per 108 square feet exclusive of wrapping, packing, nails, cement, etc.*—Minimum, 80 pounds.

(*d*) *Weight per roll of wrapping, packing, etc.*—Maximum, 5 pounds.

(*e*) *Saturation of moisture-free felt.*—Minimum, 140 per cent.

2. Slate-Surfaced Asphalt Shingles.—(*a*) *Size and form.*—The size and form of the shingles shall be that mutually agreed upon by buyer and seller.[1]

(*b*) *Weight per 108 square feet of prepared roll roofing from which shingles are cut.*—Minimum, 80 pounds.

(*c*) *Saturation of moisture-free felt.*—Minimum, 150 per cent.

[1] The two most common varieties of shingles are the single or individual shingle, 8 by 12¾ inches, and the strip, or four-in-one shingle, 10 by 32⅔ inches, with four cut-outs ½ by 4 inches.

V. METHODS OF INSPECTION AND TESTING

When inspection is 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.

1. SAMPLING AND DETERMINATION OF WEIGHT

(*a*) SAMPLING FOR INSPECTION.—From each shipment of more than 1,000 rolls, take at random rolls of roofing or packages of shingles equivalent to one-half the cube root of the total number of rolls or packages included in the lot. If the cube root is a fractional number, express it as the next higher digit. From each shipment of 1,000 rolls or less take at random five in each case.

(*b*) DETERMINATION OF WEIGHT.—The weight of the roofing and shingles can be most accurately determined by the inspector at the time he takes the samples for transmittal to the testing laboratory.

1. *Slate-surfaced asphalt prepared roofing.*—Remove the wrappers and other packing materials, nails, and cement from each roll taken and weigh the roll and packing materials, etc., separately to the nearest quarter pound. Then unwind each roll and measure the length and width of the rectangular portion to the nearest quarter inch. Observe the color and general appearance of the roofing. The color and distribution of the slate shall be uniform over the entire surface and shall substantially match a mutually agreed upon sample. The coating and surfacing may extend to the edge of the sheet of roofing, but an unsurfaced lapping edge approximately 2 inches wide along one side is permissible. The edges of the sheet shall not be ragged. Compute the area, and the weight per 108 square feet of each roll taken. Should the weight of any roll per 108 square feet be less than the minimum weight specified, 80 pounds, it shall be cause for the rejection of the whole shipment. Compute also the weight of the packing materials, nails, and cement.

2. *Slate-surfaced asphalt shingles.*—Remove the wrappers and other packing material from each package of shingles taken and weigh the shingles and also the packing material to the nearest quarter pound. Count the number of shingles or strips in each package taken, compute the area, and from these results and the weight compute the weight per 108 square feet. A minimum weight of less than 80 pounds shall be cause for rejection of the whole shipment. Observe the color and general appearance of the shingles while counting them and compare with the mutually agreed upon sample. The color and distribution of the slate shall be uniform over the entire surface of the shingles. The coating and surfacing must extend to the edge of each shingle. The edges shall not be ragged. No patches of coating shall show through the slate surfacing nor shall the slate and

coating be broken from the edges. The shingles shall be of the specified shape and shall not stick together in the package to such an extent as to tear off or loosen the coating when unpacked.

2. SAMPLING FOR LABORATORY EXAMINATION.

(*a*) Slate-Surfaced Asphalt Prepared Roofing.—From each roll examined, at approximately 10 feet from the end, cut two samples the full width of the roll and approximately 40 inches long. Label carefully, wrap, and transmit one to the testing laboratory. Retain the other for use in case of dispute.

(*b*) Slate-Surfaced Asphalt Shingles.—For sampling take, in the case of individual shingles, two shingles from each package examined, or, in the case of strip shingles, one strip from each two packages examined. Carefully wrap, label, and transmit to the testing laboratory. The sample submitted to the laboratory shall contain at least six individual shingles or two strips. Samples similar to those transmitted to the testing laboratory should be taken and retained for use in case of dispute.

3. LABORATORY EXAMINATION.

(*a*) Color and Appearance.—Examine both sides of the roofing or shingles and note the color and general appearance and compare them with the mutually agreed upon sample.

(*b*) Weight.—1. *Slate-surfaced asphalt prepared roofing.*—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 weights so obtained compute the weight per 108 square feet.

2. *Slate-surfaced asphalt shingles.*—Weigh each shingle or strip submitted to the nearest gram (15 grains); measure to the nearest one-sixteenth inch and from the weights and area so obtained compute the weight per 108 square feet of the roofing fabric represented by each shingle or strip.

(*c*) Behavior on Heating at 80° C. (176° F.) for Two Hours.—Cut two strips from the roofing or shingles approximately 8 inches by 8 inches, weigh, and suspend vertically for two 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. Cool, weigh, and compute the loss in weight.

(*d*) Weight of Moisture-Free Desaturated Felt.—Cut two strips from the roofing or shingles 2 inches wide and approximately 8 inches long, weigh, measure, and extract with benzol [2] until the

[2] In extracting the saturant from asphalt felts comparable results may be obtained by the use of carbon bisulphide, carbon tetrachloride, or chloroform, but in case of dispute benzol shall be used.

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 particles of slate from the felt. Retain the particles of slate 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. 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.

(*e*) Thickness of Moisture-Free Desaturated Felt.—Cut the strip of felt obtained in V, 3 (*d*) into four equal portions and caliper each piece at four equally spaced points at least three-fourths of an inch from a cut edge with a micrometer having a flat bearing surface of at least one-half inch in diameter at each contact point. Average the readings.

(*f*) Ash of Moisture-Free Desaturated Felt.—After measuring as in V, 3 (*e*) cut the strips of felt into squares about 2 cm. on each side and thoroughly mix. Take 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 and compute the percentage of ash in the moisture-free felt.

(*g*) Total Mineral Matter.—Combine the slate and other 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, 3 (*d*) 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. Compute the total mineral matter.

(*h*) Saturation of Moisture-Free Felt.—Cut two strips from the original roofing or shingles 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 slate surfacing and front and back coatings. In doing this care should be taken 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 so obtained and extract in a suitable extractor with benzol until the benzol runs through colorless. Remove the desaturated felt from the extractor, place in a tared weighing bottle, dry for one-half hour and weigh. From the weight obtained and the original weight compute the percentage of saturation of moisture-free felt as follows:

$$\frac{\text{Wt. saturated felt minus wt. desaturated felt} \times 100}{\text{wt. desaturated felt}} = \text{per cent saturation, moisture-free felt}$$

VI. PACKING AND MARKING

1. Slate-Surfaced Asphalt-Prepared Roofing.—Slate-surfaced asphalt-prepared roofing shall be put up in rolls containing not less than 108 square feet. No rolls shall contain more than two pieces of roofing, nor shall there be more than 3 per cent of two-piece rolls in the 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 cement shall be furnished either in each roll or in bulk as specified in the proposal or contract. Roofing for export shipment shall be packed as mutually agreed upon by the purchaser and seller.

2. Slate-Surfaced Asphalt Shingles.—Slate-surfaced asphalt shingles shall be packed in one-quarter or one-half square cartons or, as an alternative, shall be wrapped in heavy paper or board ends and tied with substantial rope, wire, or steel bands. The packages shall be plainly labeled with the manufacturers' name and brand and shall contain printed directions for laying. Shingles for export shipment shall be packed as mutually agreed upon by the purchaser and seller.

VII. ADDITIONAL INFORMATION

No details specified.

VIII. GENERAL SPECIFICATIONS

No details specified.

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