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UNITED STATES GOVERNMENT SPECIFICATION FOR COAL-TAR SATURATED RAG FELT FOR ROOFING AND WATERPROOFING.

FEDERAL SPECIFICATIONS BOARD.

STANDARD SPECIFICATION NO. 81.

This specification was officially adopted by the Federal Specifications Board on December 29, 1923, for the use of the Departments and Independent Establishments of the Government in the purchase of coal-tar saturated rag felt for roofing and waterproofing.

CONTENTS.

1. GENERAL.

This specification applies to coal-tar saturated rag felt intended for use with Coal-Tar Pitch for Roofing (F. S. B. Spec. No. 80) and Coal-Tar Pitch for Waterproofing and Damp proofing (F. S. B. Spec. No. 83) in the construction of built-up roofing and membrane waterproofing, respectively.

It shall be composed of rag roofing felt impregnated with a coal-tar saturant and when tested by the methods contained in this specification must meet the following requirements:

(*a*) APPEARANCE.—It shall be free from visible external defects and uniform throughout. When unrolled at temperatures between

50 and 90° F. it shall not stick to such an extent as to cause tearing.

(*b*) WIDTH.—32 or 36 inches $\pm \frac{1}{4}$ inch.

(*c*) GROSS WEIGHT OF ROLL.—50 to 80 pounds.

(*d*) WEIGHT OF WRAPPING, PACKING, ETC., PER ROLL.—Maximum one-half pound.

(*e*) WEIGHT PER 100 SQUARE FEET, EXCLUSIVE OF PACKING, ETC.—14 pounds, ± 1 pound.

(*f*) PLIABILITY AT 77° F.—No cracking on bending flat on itself.

(*g*) AVERAGE BREAKING STRENGTH.—With fiber grain, 30 pounds; across fiber grain, 15 pounds.

(*h*) THICKNESS OF DESATURATED FELT.—Minimum, 0.025 inch.

(*i*) ASH OF DESATURATED FELT.—Maximum, 8 per cent.

(*j*) PACKING AND LABELING.—The felt shall be properly wrapped and labeled with the manufacturer's name, brand, grade, weight, area of roll, and type of saturant.

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

2. SAMPLING AND DETERMINATION OF WEIGHT AND WIDTH.

The weight per 100 square feet of the material and its variation in weight can be most accurately determined by the inspector at the time he takes a sample for transmittal to the testing laboratory.

(*a*) From each shipment select at random a number of rolls of felt equivalent to the cube root of the total number included in the lot. If the cube root as calculated proves to be a fractional number, express it as the next higher digit.

(*b*) Remove wrappers, cores, and other packing material 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 the width of each end of the roll to the nearest one-fourth inch and reroll. Observe also the appearance of the material while unrolling and rerolling.

The finished material shall be free from visible external defects, such as holes, ragged or untrue edges, breaks, rents, cracks, or indentations. The rolls shall be capable of being unrolled at temperatures between 50 and 90° F. without sticking to such an extent as to injure the felt.

The surface of the felt shall not be coated or covered with talc or other substances which might tend to interfere with the adhesion between the felt and the plying cement. The surface shall be uniformly smooth and shall be free from areas or patches of unabsorbed saturant and superficial dry spots.

Compute the weight per 100 square feet of each roll examined and from these weights compute the average weight of the shipment. In no case shall this weight be less than 13 pounds per 100 square feet, and any roll examined whose weight per 100 square feet is below 13 pounds shall be cause for the rejection of the whole shipment. If the average weight is above 15 pounds per 100 square feet, the material shall be paid for on a basis of 15 pounds per 100 square feet.

(*c*) From the rolls examined for sampling, select one the weight of which is near the average weight of the whole lot. Unroll and at approximately 25 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 sample for check analysis in case of dispute.

3. LABORATORY EXAMINATION.

(*a*) APPEARANCE.—Examine both sides of the sheet of felt and note for uniformity of color. The felt shall be thoroughly and uniformly impregnated and shall show no unsaturated spots at any point upon cutting 2-inch strips at random across the entire sheet and splitting them open for their full length.

(*b*) 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 100 square feet.

(*c*) PLIABILITY.—Cut five strips 1 inch wide and 6 inches long in the direction of the fiber grain and immerse 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 one-sixteenth inch mandrel through an arc of 180° at a uniform rate in approximately two seconds time.

(*d*) BREAKING STRENGTH.—Cut 10 strips of the felt 1 inch by 6 inches with the fiber grain and 10 strips of the same size across the fiber grain. Test both sets of strips at 21° C. (70° F.) in a Scott or similar testing machine of the inclination balance type having a capacity of 100 to 150 pounds. The test strips shall be

gripped 1½ inches on each end leaving 3 inches between the clamps, and the lower jaw shall travel at the rate of 12 inches per minute. If any strip breaks nearer than one-half inch to either clamp, the reading shall be disregarded and an additional strip tested in its place. The average of the 10 readings from strips cut in one direction shall be taken as the breaking strength of the sample in that direction.

(*e*) THICKNESS OF DESATURATED FELT.—Cut a 2-inch strip the full width of the sample and extract with carbon bisulphide or benzol in a suitable extraction apparatus until the solvent contains not more than a trace of soluble matter. Remove the desaturated felt from the extractor, allow to stand in air until the odor of the solvent has disappeared, and brush off the free carbon and other insoluble matter adhering to the felt. Cut the strip into four equal portions and caliper each piece at 10 equally spaced points, at least three-fourths 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.—Cut the strips of felt obtained in 3 (*e*) into squares about 1 cm on each side and thoroughly mix. Select at random pieces amounting to about 10 g, and after drying at 105 to 110° C. (221 to 230° F.) for one-half hour and cooling, weigh accurately and incinerate in a weighed porcelain or quartz crucible in a muffle or over an open flame until all the carbon is consumed. Cool, weigh, and compute the percentage of ash in the moisture-free desaturated felt.

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