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CWS:EMM

DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
WASHINGTON

Letter
Circular
LC 161

(Revised to April 15, 1926)

WATERPROOFING COTTON GOODS

The following information in regard to waterproofing cotton goods was taken from the Textile World of March 21, 1925, page 73:

Technical Editor:

Will you please give me some information with formulas for waterproofing cotton piece goods, such as 8 oz. olive, and black and blue ducks, which are dyed with sulphur colors. We wish to waterproof these goods in the piece and will appreciate information showing each process step by step.

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Several methods of waterproofing fabrics of this class are known. One process in common use in finishing plants is to saturate the goods with a solution of aluminum acetate and then treat with a wax emulsion. The details of this process are modified considerably by different finishers; some reverse the order of the treatment given above, and some prefer a soap solution in place of the wax emulsion.

The following method is used in one of the largest finishing plants with excellent results:

(1) Pad the dyed goods through a three-bowl padder containing 50 lbs. per 100 gals. of a wax emulsion at 180 deg. F.

(2) Dry on cans.

(3) Pad through a solution of aluminum acetate at 3 deg. Tw. at 120 deg. F., squeeze and dry.

The aluminum acetate solution can be made as follows:

(1) Dissolve 225 lbs. of sugar of lead in 50 gals. of boiling water.

(2) Dissolve 125 lbs. of aluminum sulphate in 50 gals. of boiling water.

(3) Mix the two solutions and let stand until the white precipitate of lead sulphate has settled.

(4) Syphon off the clear solution of aluminum acetate and dilute to 3 deg. Tw.

A suitable wax emulsion may be purchased from any manufacturer of textile soaps and softeners by specifying the use for which it is intended. If the inquirer prefers to make his own product, the following formula should prove satisfactory:

(1) Melt 80 lbs. of stearic acid and 80 lbs. of Japan wax in 70 gals. of hot water.

(2) Allow to cool until just above the solidifying point of the mixed fatty acids (about 160 deg. F.).

(3) Add slowly with constant stirring 2 gals. of ammonia.

(4) Allow to cool and solidify.

A cotton goods finisher sends the following in reply to this question: To waterproof cotton piece goods such as 8 oz. duck dyed with sulphur colors, proceed as follows: After the goods have been dyed and dried up, they should be passed through the following mixture:

20 gals. of boiling water
5 lbs. of gelatine
5 lbs. of tallow soap

This is to be thoroughly mixed to get in proper solution. After the soap and gelatine have been properly dissolved, add slowly 7 1/2 lbs. alum, which should be thoroughly stirred up for dissolving. The writer would suggest that the inquirer use only the best grades of tallow soap.

After the mixture as above is properly made, it should be allowed to cool to approximately 95 deg. F. The goods should be passed through this liquor at full width over a 2-roll padding machine, with rolls about 12 in. diameter, rubber covered. The liquor box should be of wood with brass immersion roll, and brass fittings should be of the regular type such as used for starching, with the possible exception that it is policy to use possibly three immersion rolls to give the goods a thorough saturation. They should be squeezed at the padder with compound levers on the padder properly functioning with about 20 to 25 lbs. of weight on each side. After padding, it is policy to dry the goods over a hot air tenter; that is, an automatic clip type tenter with a very efficient heating system circulating hot air. From here the goods can be wound on rolls and are ready for making up.

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The following solution using rubber was taken from Kirk Book 4 of the Textile World:

Melt 5 pounds of paraffin wax in an iron pot, then add 1 1/4 pounds of scrap rubber and continue heating until the rubber is dissolved, allow to cool and solidify, and then cut into blocks for use.

The material to be proofed is weighed in the dry state. For every 8 pounds allow 1 gallon of gasoline in which is dissolved 3 ounces of the above paraffin-rubber mixture. The material to be proofed is immersed in this solution, which it soaks up in a very short time, after which the gasoline is allowed to evaporate, leaving a thoroughly waterproof deposit on the material treated.

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