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SPECIFICATION NO. 10-K
SOMASTIC* PIPE COATING
(Revised 7/23/58)

Section I - General Specifications

Scope

The following section covers the general requirements of Somastic Pipe Coating for protection against external corrosion.

General

- .1 The mastic coating, consisting of a dense, seamless, and essentially voidless mixture of asphalt, mineral aggregate, and fibrous ingredients, shall be securely bonded to the pipe by a separately applied primer; and shall be free of blow holes, bubbles, and surface defects. An exterior white coating shall be applied over the finished mastic.
- .2 The coating shall be prepared in the following proportions:

	<u>Formula A</u>	<u>Formula B (Alternate)</u>
Asphalt, % by wt.	12-14	12-14
Mineral Aggregate, % by wt.	87-85	87.67-85.67
Asbestos Fiber, % by wt.	1	-
Amosite Fiber, % by wt.	-	0.33

- 3 The asphalt content (per cent by weight) shall be as follows:

<u>Type of Aggregate Used</u>	<u>Operating Temperatures</u>			
	<u>Below 80°F.</u>	<u>Below 125°F.</u>	<u>Below 160°F.</u>	<u>Below 210°F.</u>
8 Mesh	12-14%	12-13.5%	12-13.5%	12-12.5%
6 Mesh	12-14%	12-13%	12-13%	12-12.5%

Coating Thickness

The coating thickness shall be a minimum of 1/4 inch. Where coatings thicker than 7/16 inch are used, 6 mesh aggregate will be permitted; otherwise, the 8 mesh aggregate is required.

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	Per Cent Weight...
Passing 3/8 Inch	100
Passing 10 Mesh, max.	60
Passing 40 Mesh, max.	20

6.3b. Amosite fiber - The fiber shall consist of Grade No. 505 which shall not differ appreciably from past production.

7.0 Exterior White Coating

7.1 The exterior white coating shall be coated with whitewash as defined below:

2 pounds quicklime
1 gallon water

(In preparing this whitewash, add the quicklime slowly to the water.)

Note: Water soluble salts in the whitewash, such as sodium or calcium chloride, shall be prohibited because they prevent detection of holidays under certain conditions.

7.2 When a Somastic coated pipe is stock piled for a period in excess of the life of the exterior white coating, a second coat of whitewash shall be applied.

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Section III - Application Procedure

1.0 Scope

The following section covers the application procedure for portable or central yard plant application for Somastic Pipe Coating.

2.0 Preparation of Pipe

- 2.1 The exterior of the pipe shall be free of all mill scale, rust, rust preventives, or other foreign matter, before any priming is done. This shall be accomplished by thoroughly blasting the pipe's surface with sand or metal grit.
- 2.2 The pipe shall be dried and immediately spray coated with primer applied at a temperature of 140°F to 170°F. The application of the primer shall be such that a minimum of 0.35 gallon of unthinned primer shall cover 100 square feet of pipe surface.

3.0 Mixing Ingredients for Somastic Pipe Coating

- 3.1 When it is necessary to blend two or more sands to produce an aggregate conforming to this specification, each sand shall be weighed separately to insure control of the final mixture. Each sand shall be thoroughly dried before weighing.
- 3.2 All sands shall be heated (not over 450°F) so that when run into the pug mill and mixed thoroughly with the proper amount of asphalt and mineral filler the resulting temperature of the mastic mix shall be between 280°F to 400°F.
- 3.3 The fibrous ingredients shall be weighed out and willowed to give a density less than 10.5 lb/cu.ft. just before it is added to the hot aggregate and mineral filler in the pug mill. Dry mixing in the pug mill shall continue for at least 35 seconds in order that the fiber will be thoroughly dispersed in the mass before the asphalt is added.

- 3.4 The asphalt shall be heated to not over 425°F. before it is weighed and run into the pug mill. After the addition of the asphalt is completed, it shall be mixed into the aggregate for at least 2-1/2 additional minutes and not more than eight minutes.

4.0 Coating of Prepared Pipe

- 4.1 The coating shall be applied after the primer has dried to an acceptable extent. If the Somastic is applied over wet or tacky primer, retaining clips may be used on the ends of the hot Somastic to prevent sagging until it is cool. The coating shall extend to within seven to ten inches from the end of the pipe.
- 4.2 An exterior white coating shall be applied over the finished coating.
- 4.3 Each section of pipe coated in the United States with Somastic Pipe Coating shall bear the notations, "Mfg. Under Pat. 2,287,830" and "Reg. U.S. Pat. Off. Somastic Coated Pipe." In foreign countries, the corresponding patent number shall be used instead.

5.0 Stock Piling of Coated Pipe

- 5.1 The freshly coated pipe shall be cooled on supporting end blocks or cooling tables until approximately atmospheric temperature is reached and before it is stock piled.
- 5.2 The surface of the ground upon which the cold pipe is to be piled shall be level and free of rocks, clods, etc., which might damage the coating. In the event the pipe must be piled on a hard surface, this surface must be flat.
- 5.3 The coated pipe shall be piled parallel and evenly in nested formation with sides of adjacent joints touching. The ends of the pile shall taper off at 60 degrees, and no length of pipe shall be greater than the pipe below it. The recommended pile heights may be computed from the following formulas which are based on a maximum ambient temperature of 100°F. When the ambient temperature may be higher than 100°F., the pile heights should be modified downward to prevent excessive coating deformation.

Formula A: $y = 17.5 \frac{D}{W} + 1$ for piling on a soft level surface

Formula B: $y = 10.1 \frac{D}{W}$ for piling on a hard flat surface

Where y = total allowable number of tiers in 60 degrees nested formation

D = outside diameter of coated pipe, inches

W = weight of coated pipe, lb/lin.ft.

The weight of coated pipe per linear foot, W , may be determined as follows:

Formula C: $W = w + 2.95 (dt + t^2)$

Where w = weight of bare pipe, lb/lin.ft.

d = outside diameter of bare pipe, inches

t = thickness of coating, inches

6.0 Field Joint Application

- 6.1 All materials used shall conform to the requirements of Section I of this specification, except that asphalt may be added during melting of Somastic up to a maximum of 15%.
- 6.2 All bare pipe adjoining the field weld shall be thoroughly cleaned of dirt, rust, or any other material except unburned mill-applied Somastic Pipe Coating Primer. Not less than two inches of the ends of the Somastic coating on the pipe shall also be cleaned of whitewash where it will be overlapped by the field joint.
- 6.3 All bare pipe, exposed mill applied primer, and the ends of the Somastic coating to be overlapped by the field joint, shall be primed with one coat of Somastic pipe coating primer. The primer shall be thoroughly dry before the Somastic joint is made.
- 6.4 The Somastic joint shall be applied under pressure at a temperature of 275°F. to 400°F. with an overlap of not less than one inch and a thickness of 1-1/2 times the nominal thickness of the pipe coating used.
- 6.5 Somastic melted from briquettes or hauled fresh from a central mixing plant shall not be held in the molten state for more than two hours.

- 6.6 Small holes (less than 1-1/2 inch in diameter) may be repaired under the direction of the Inspector in the following manner: They shall first be cleaned, freshly primed as in Section III, Item 6.3, and then filled with a hot troweled Somastic patch. The surrounding Somastic may be warmed with a torch, if desired, before the patch is applied in order to insure a proper bond.
- 6.7 Larger holes may be repaired as above at the discretion of the Inspector, except that the patch shall be applied under pressure. When this cannot be done, the joint shall be replaced.
- 6.8 Any joint considered defective for any reason by the Inspector shall be replaced.
- 6.9 No field joint shall be lowered into the ditch or back-filled until approved by the Inspector.

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Section IV - Methods of Test

1.0 Scope

The following specifications cover the methods of test for the physical properties and materials for Somastic Pipe Coating.

2.0 Preparation of Test Specimens

- 2.1 A mixing bowl containing the mineral aggregate, mineral filler, and fibrous ingredients, as selected, shall be heated to 375°F in a temperature controlled oven. The heated bowl and paddle are then attached to a Kitchen-Aid dough mixer after which time the required amount of asphalt (heated to 375°F) shall be added. The admixture shall be stirred over a period of three to five minutes. The bowl containing the mastic shall then be placed in a 375°F oven and allowed to stand for ten minutes. A minimum of 500 grams of total mastic shall be prepared for each mix.
- 2.2 Portions of the mastic shall be removed as needed to prepare the test specimens; however, the total elapsed time in the oven should not extend over a period longer than 30 minutes. For routine analysis of a mastic mix, the bending, impact, and tensile strength specimens shall be prepared in the order named. Briquettes for testing shall be compressed at 1500 pounds per square inch in molds to which have been added the desired amount of mastic. After cooling and curing at room temperature overnight, briquettes are immersed in a constant temperature ($\pm 1^\circ\text{F}$) water bath of the specified temperature for at least one hour before testing.

3.0 Tensile Strength

Specimens of 1.0 square inch cross sectional area, as described in the ASTM C 190 Method of Test for Tensile Strength of Hydraulic-Cement Mortars, shall be tested in a suitable tensile testing machine which is loaded at the rate of 50 pounds per minute. After each test the jaws which hold the specimen shall be removed from the machine and immersed in the water bath until the next briquette is tested (usually about one minute).

4.0 Bending

The resistance to cracking during bending shall be measured by the Purdue Test where a 1 in. by 4 in. by 1/4 in. specimen is bent over a 3/4 in. mandrel at the rate of 12 degrees per minute. Elapsed time in seconds from the start of the test until the first crack appears in the specimen shall be measured.

5.0 Impact Resistance

A Page Impact Machine having a 2 kg. hammer shall be used. Beginning at 1 cm. height, the hammer shall be raised 1 cm. additional before each succeeding blow is struck. The height to which the hammer must be raised in this manner to produce a crack in a 2.5 cm. by 3.5 cm. diameter cylindrical specimen shall be determined.

6.0 Strength of Somastic Pipe Coating Primer Bond

A mastic, as selected, shall be prepared according to the recommended procedure and compressed between circular steel pistons 1 square inch in area. The asphalt used in the test mastic shall be that employed in the mastic which is to be bonded to the pipe by the primer being investigated. The contacting surfaces of the pistons shall be sand blasted and primed in the same manner as the mastic coated pipe and allowed to cure for 24 hours. The prepared pistons shall be preheated to 220°F for 30 minutes before compressing the test specimens. These pistons, having a resultant 1/2 to 1 inch layer of mastic between them, shall be brought to the desired temperature ($\pm 1^\circ\text{F}$) in a water bath, fitted into a suitable tensile testing machine, and tested as described in the tensile strength procedure above.

7.0 Test Methods for Fibrous Additive Agent

7.1 Foreign Materials - A 100 g. sample of the fibrous ingredients shall be taken at random and agitated with water in a large beaker. The suspended fiber shall be decanted until the liquid above the gravel, etc., in the bottom of the beaker is clear and free of fiber. The dried residue in the bottom of the beaker shall be weighed and calculated as foreign material.

7.2 Moisture - A weighed sample of fiber shall be dried at 105°F for eight hours. The loss in weight shall be calculated as free moisture.

- 7.3 Screen Analysis for Asbestos Fiber - A 100 g. sample shall be shaken for 15 minutes on a set of 3/8 inch, 10 mesh, and 40 mesh Tyler Standard Screens in a Rotap or similar shaker.

8.0 Spark Gap Test on Final Coating

The coating shall be tested by a spark gap tester regulated to produce a test spark between electrode and pipe at least 1/4 inch longer than coating thickness. No spark shall be observed when a spark gap tester is applied in this manner to the coating. Field joints shall also pass this test.