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Standard Specification for Perforated, Laminated-Wall Bituminized Fiber Pipe for Airport and Highway Drainage¹

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1. Scope

1.1 This specification covers laminated-wall bituminized fiber perforated drainage pipe for use in airport and highway drainage with infiltration and where relatively heavy wheel loadings will be experienced.

1.2 The values stated in SI units are to be regarded as the standard.

2. Referenced Document

- 2.1 *ASTM Standard:*
D 2315 Methods of Testing Laminated-Wall Bituminized Fiber Pipe²

3. Materials and Manufacture

3.1 *Pipe and Couplings*—Pipe and couplings shall be composed of a multi-ply laminated convolute or spiral fibrous structure, with the laminations being adhered with a heat and water-resistant adhesive and then thoroughly impregnated with a bituminous compound. The pipe shall have a smooth interior surface free of obstructions and rough or flaky areas. Fittings shall be of the same material as the pipe, or of a material having equal or better physical and chemical properties.

3.2 *Joint Systems*—Pipe and fittings shall use either of the following joint systems:

3.2.1 *Type TJ Joints*—Pipe and fittings shall be provided with accurately machined or molded tapered joints, and a taper-sleeve coupling shall be provided for each length of pipe and for each fitting where applicable. The slope of the taper in both pipe and coupling shall be 2° (4° including angle) (see Fig. 1).

3.2.2 *Type BJ Joints*—Pipe and fittings shall have squarely cut ends, and a split-collar coupling shall be provided for each length of pipe and for each fitting where applicable (see Fig. 2).

4. Physical and Chemical Requirements

4.1 *Resistance to Flattening Test*—The requirements for resistance to flattening shall be that the decrease in diameter shall not exceed 3 %, when loaded in accordance with Table 3.

4.2 *Crushing Strength Tests*—The pipe shall have a minimum three-edge-bearing crushing strength as prescribed in Table 4.

4.3 *Water Absorption Test*—The maximum water absorption shall be 2 % of the original weight.

4.4 *Boiling Water Resistance*—Specimens shall exhibit not less than 90 % of the crushing strength.

4.5 *Heat Resistance*—The heat shall not cause a weight loss over 1 % in the specimen due to the exudation of the impregnant.

4.6 *Chemical Resistance*—Specimens shall show no visible sign of chemical reaction or deterioration of the impregnant.

4.7 *Kerosine Resistance*—Specimens shall meet the dry crushing strength requirements.

5. Dimensions

5.1 *Pipe and Couplings*—The dimensions of the pipe and couplings shall be as specified in Figs. 1 and 2, and Table 1.

5.2 *Five-Degree Angle Couplings*—The dimensions of 5° angle couplings shall be as specified in Fig. 3 and Table 2.

5.3 *Bore*—The bore shall be straight and circular in cross section as determined by passing a 1-m (40-in.) long mandrel, 6.4 mm ($\frac{1}{4}$ in.) smaller in diameter than the nominal diameter of the pipe, freely through the pipe.

5.4 *Length*—Lengths other than standard shall be in increments of 152 mm (6 in.) from standard, and unless otherwise specified, up to 20 % of short lengths may be supplied in a shipment. No lengths shorter than 1.2 m (4 ft) shall be furnished, with no more than two different short lengths in any one shipment.

5.5 *Perforations*—The perforations shall be circular in shape and arranged in rows along the axis of the pipe. They shall be 7.9 ± 1.6 mm ($\frac{3}{16} \pm \frac{1}{16}$ in.) in diameter and shall be spaced approximately 76 mm (3 in.) center-to-center along the rows. The rows of perforations shall be arranged in equal groups placed symmetrically on each side of a segment corresponding to the flow line of the pipe. Where two rows are required, they shall be separated by an arc of $100 \pm 10^\circ$; where four rows are required, the inner rows shall be separated by an arc of $100 \pm 10^\circ$; and the outer rows by an arc of $150 \pm 10^\circ$. The number of rows shall be as follows:

Inside diameter of pipe, mm (in.) ¹	75 (3)	100 (4)	125 (5)	150 (6)	200 (8)	250 (10)	300 (12)	375 (15)
Number of rows of perforations	2	2	4	4	4	4	4	4

¹ This specification is under the jurisdiction of ASTM Committee D-8 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.16 on Bituminized Fiber Pipe.

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² *Annual Book of ASTM Standards*, Vol 04.04.