



Designation: A849 – 15 (Reapproved 2021)

Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe¹

This standard is issued under the fixed designation A849; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification covers post-applied coatings, pavings, and linings for corrugated steel pipe and corrugated steel structural plate pipe, pipe-arches, and arches coated, paved, or lined with specified materials over either metallic coatings or metallic coatings with polymer coatings. This specification includes asphalt, polymerized asphalt, polymer, mastic, and emulsion coatings and asphalt and concrete pavements and linings applied to the pipe in the producing plant, as well as, asphalt and mastic coatings applied in the field. Field-applied concrete pavements and linings are covered by Specification A979/A979M. The pipe to which the coatings are applied is described in Specifications A760/A760M, A761/A761M, and A762/A762M.

1.2 There is no cleaning operation currently included in pipe coating practice. However, experience has shown that a clean substrate provides good adherence for both cold- and hot-applied post coatings. The performance of post coating or lining, or both, will depend on the surface cleanliness over which it is applied.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in brackets are for information only.

1.4 The following safety hazards caveat pertains only to the test methods portions, Sections 11 and 12, of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

- A185/A185M Specification for Steel Welded Wire Reinforcement, Plain, for Concrete (Withdrawn 2013)³
- A615/A615M Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- A742/A742M Specification for Steel Sheet, Metallic Coated and Polymer Precoated for Corrugated Steel Pipe
- A760/A760M Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
- A761/A761M Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
- A762/A762M Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
- A862/A862M Practice for Application of Asphalt Coatings to Corrugated Steel Sewer and Drainage Pipe
- A926 Test Method for Comparing the Abrasion Resistance of Coating Materials for Corrugated Metal Pipe (Withdrawn 2016)³
- A979/A979M Specification for Concrete Pavements and Linings Installed in Corrugated Steel Structures in the Field
- C31/C31M Practice for Making and Curing Concrete Test Specimens in the Field
- C33 Specification for Concrete Aggregates
- C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C150 Specification for Portland Cement
- C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- C595 Specification for Blended Hydraulic Cements
- C618 Specification for Coal Fly Ash and Raw or Calcined

¹ This specification is under the jurisdiction of ASTM Committee A05 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.17 on Corrugated Steel Pipe Specifications.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

*A Summary of Changes section appears at the end of this standard

Natural Pozzolan for Use in Concrete

C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

D5 Test Method for Penetration of Bituminous Materials

D6 Test Method for Loss on Heating of Oil and Asphaltic Compounds

D36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

D70 Test Method for Specific Gravity and Density of Semi-Solid Asphalt Binder (Pycnometer Method)

D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester

D1005 Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers

D1187 Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal

D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene

D4402 Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer

3. Terminology

3.1 Definitions:

3.1.1 *fabricator, n*—refers to the producer of the pipe who generally applies the post coatings, pavings, and linings, except for those pipes that are coated in the field.

3.1.2 *lining, n*—for corrugated metal pipe, a layer of non-metallic material applied to the interior of a fabricated pipe, of sufficient thickness to fill and cover the corrugations.

3.1.3 *manufacturer, n*—refers to the producer of the sheet.

3.1.4 *paving, n*—for corrugated metal pipe, a lining applied only to a portion of the interior circumference, usually the lower portion as installed.

3.1.5 *post coating, n*—for corrugated metal pipe, a layer of nonmetallic material applied to the interior or exterior surface of the pipe, or both, after fabrication of the pipe.

3.1.6 *Discussion—Coating* is generally used to refer to a layer or layers of material applied to the base metal in sheet form prior to fabrication into pipe. *Post coating* applies to a layer of nonmetallic material applied after fabrication into pipe. Where the context is clear, *coating* may be used in place of *post coating*.

3.1.7 *purchaser, n*—refers to the purchaser of the finished product.

4. Significance and Use

4.1 Post-applied coatings, linings, and pavements are used to improve hydraulic characteristics, corrosion resistance, or abrasion resistance, or a combination thereof. Generally, coatings improve corrosion resistance and are especially effective on the outside (soil side) of the pipe. While coatings improve abrasion resistance to varying degrees, pavements generally are used where abrasion is a significant consideration. Pavements improve abrasion resistance, protect the metallic and other coatings, and increase corrosion resistance. Smooth pavements, even though they typically cover only the invert of

the pipe, improve hydraulic flow characteristics. Full linings and pavements, generally, provide all three benefits.

4.2 Applications:

4.2.1 Asphalt, polymer-modified asphalt, and polymer provide excellent corrosion resistance to the outside (soil side) of the pipe. These materials provide varying degrees of internal (water side) corrosion protection depending on the severity of abrasive flow conditions. Polymer-modified asphalt and polymer coatings provide longer-term protection than asphalt in more abrasive conditions.

4.2.2 Asphalt pavements are used for abrasive conditions. Where conditions involve repeated high flow velocities moving a heavy bed load of gravel or rocks, or both, concrete pavements are appropriate (see Specification **A979/A979M**).

4.2.3 Full asphalt linings enhance hydraulics while providing a completely “paved” interior. Full concrete linings are high-strength concrete that provides a lining similar in thickness to asphalt linings. They enhance hydraulic performance and offer abrasion protection, which is not as effective as the abrasion protection offered by a thicker concrete pavement.

5. Classification

5.1 The post-applied coatings, pavings, and linings are described in this section as a two-step classification procedure. The first classification is the type of coating, paving, or lining material to be used, for example, hot-applied asphalt, concrete, cold-applied mastic, cold-applied emulsion, polymer, or combination thereof. The second is a coating, paving, and lining type giving the physical location of the coating or lining on the pipe (see **Table 1**).

5.2 Material Classes:

5.2.1 *Class A*—Asphalt,

5.2.2 *Class PA*—Polymer modified asphalt, hot applied,

5.2.3 *Class C*—Concrete,

5.2.4 *Class M*—Mastic, either asphalt base or tar base, cold applied,

5.2.5 *Class P*—Polymer, and

5.2.6 *Class E*—Asphaltic emulsion.

5.3 Coating, Paving, and Lining Types:

5.3.1 *Fully Coated*—A uniform coating applied to the interior and exterior of the pipe.

5.3.2 *Half Coated*—A uniform coating applied to the interior and exterior of the pipe covering at least 50 % of the circumference on the lower portion of the pipe as installed.

TABLE 1 Location and Material Class

Physical Location	A Asphalt, Hot- Applied	PA Polymerized Asphalt, Hot-Applied	C Concrete	M/E Cold- Applied ^a	P Polymer
Interior-coated	—	—	—	M/E	P
Exterior-coated	—	—	—	M/E	P
Fully-coated	A	PA	—	M/E	P
Half-coated	A	PA	—	M/E	P
Fully-lined	A	—	C	—	—
Invert-paved	A	PA	C	—	P
Invert-coated	—	PA	—	—	P

^aMay be plant or field applied.