



Designation: C877M – 21

Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections (Metric)¹

This standard is issued under the fixed designation C877M; 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 external sealing bands to be used in conjunction with concrete pipe as defined in Terminology C822 and conforming to Specifications C14M, C76M, C412M, C478/C478M, C506M, C507M, C655M, C985M, C1417M, and C1433M.

1.1.1 Type I, Rubber and Mastic Bands.

1.1.2 Type II, Plastic Film and Mesh Reinforced Mastic Bands.

1.1.3 Type III, Chemically Bonded Adhesive Butyl Bands.

1.2 This specification is the metric counterpart of Specification C877.

NOTE 1—This specification covers only the design and material of the sealing bands. Sealing bands covered by this specification are adequate, when properly installed, for external hydrostatic pressures up to 90 kPa, (9.14 m) without leakage. The amount of infiltration or exfiltration flow in an installed pipeline is dependent upon many factors other than the sealing bands; allowable quantities and suitable testing of the installed pipeline and system must be covered by other specifications.

1.3 *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 Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

A167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip (Withdrawn 2014)³

¹ This specification is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.08 on Joints for Precast Concrete Structures.

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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.

C14M Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe (Metric)

C76M Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric)

C412M Specification for Concrete Drain Tile (Metric)

C478/C478M Specification for Circular Precast Reinforced Concrete Manhole Sections

C506M Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe (Metric)

C507M Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe (Metric)

C655M Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe (Metric)

C681 Test Method for Volatility of Oil- and Resin-Based, Knife-Grade, Channel Glazing Compounds

C822 Terminology Relating to Concrete Pipe and Related Products

C985M Specification for Nonreinforced Concrete Specified Strength Culvert, Storm Drain, and Sewer Pipe (Metric)

C1417M Specification for Manufacture of Reinforced Concrete Sewer, Storm Drain, and Culvert Pipe for Direct Design (Metric)

C1433M Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers (Metric)

D36/D36M Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

D217 Test Methods for Cone Penetration of Lubricating Grease

D395 Test Methods for Rubber Property—Compression Set

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D471 Test Method for Rubber Property—Effect of Liquids

D570 Test Method for Water Absorption of Plastics

D573 Test Method for Rubber—Deterioration in an Air Oven

D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

D882 Test Method for Tensile Properties of Thin Plastic Sheeting

D903 Test Method for Peel or Stripping Strength of Adhesive Bonds

- D1171** Test Method for Rubber Deterioration—Surface Ozone Cracking Outdoors (Triangular Specimens)
D1278 Test Methods for Rubber from Natural Sources—Chemical Analysis
D1682 Test Method for Breaking Load and Elongation of Textile Fabric (Withdrawn 1992)³
D1963 Test Method for Specific Gravity of Drying Oils, Varnishes, Resins, and Related Materials at 25/25°C (Withdrawn 2004)³
D2202 Test Method for Slump of Sealants
D2240 Test Method for Rubber Property—Durometer Hardness
D3407 Test Methods for Joint Sealants, Hot-Poured, for Concrete and Asphalt Pavements (Withdrawn 1996)³
D3953 Specification for Strapping, Flat Steel and Seals

3. Terminology

3.1 Definitions—For definitions of terms relating to concrete pipe, see Terminology **C822**.

4. Basis of Acceptance

4.1 The acceptability of the sealing bands shall be determined by the results of the physical tests prescribed in this specification, if and when required, and by inspection to determine whether the sealing bands conform to this specification as to design and freedom from defects.

5. Materials and Manufacture for Sealing Bands

5.1 Type I, Rubber and Mastic Bands:

5.1.1 Sealing bands shall be composed of rubber, mastic, and protective film elements as schematically shown in **Fig. 1** and with dimensions as required in the following:

5.1.1.1 Length of Sealing Band—For a given pipe size, the length of the sealing band as furnished shall be such that after being stretched longitudinally 8 to 12 % as part of the installation procedure, the sealing band will encircle the outside perimeter of the pipe and overlap by an amount equal to, but not less than, the width of the sealing band. Sealing bands may be furnished in the required length or multiples thereof.

5.1.1.2 Width of Sealing Band—The width of the sealing band shall conform to the requirements of **Table 1**.

5.1.2 Rubber Element—The rubber element shall be extruded or molded from a high-grade rubber compound and shall be cured in such a manner that any cross section will be dense, homogeneous, and free of porosity, blisters, pitting, and

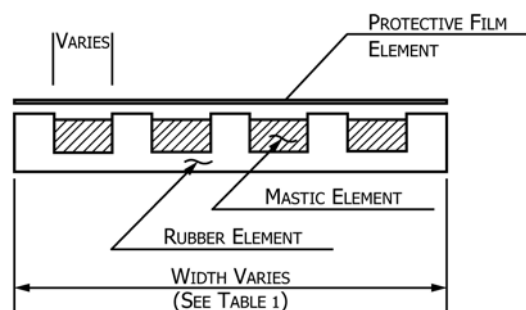


FIG. 1 Sealing Band Type I Schematic (Not to Scale)

TABLE 1 Required Minimum Sealing Band Width (Types I and II)

Equivalent Circular Pipe Diameter, mm	Sealing Band Width, mm
450 to 825	180
900 to 1950	230
2100 to 2700	280
2850 to 3600	330

other imperfections. The basic polymer shall be natural, synthetic, or a blend of both and shall meet the physical requirements prescribed in Section 6. The rubber element shall have ribs with a height of 4.8 mm, spaced 19 to 32 mm apart, and have a thickness between the ribs of 1.6 mm. The thickness of the ribs is not prohibited from varying from 3.2 mm at the base to 0.8 mm at the top.

5.1.3 Mastic Element—The mastic element shall contain rubber, reclaimed rubber and asphaltic derivatives, clay, and/or resin and shall meet the physical requirements prescribed in Section 6. The mastic element shall have a thickness of 3.2 mm and be free of porous areas, air pockets, and contamination by foreign matter.

5.1.4 Protective Film—The protective film shall be water soluble, have a 0.025-mm thickness, and meet the physical requirements prescribed in Section 6.

NOTE 2—The function of the film is to protect the mastic surface prior to installation. It is intended to dissolve away in the presence of moisture during installation and expose the mastic for sealing.

5.2 Type II Plastic Film and Mesh Reinforced Mastic Bands:

5.2.1 Sealing bands shall be composed of a plastic film, reinforced, rubberized, asphalt, mastic coating with steel straps as schematically shown in **Fig. 2** with dimensions as required in the following:

5.2.1.1 Length of Sealing Band for a Given Pipe Size—The length of the sealing band shall be equal to the outside perimeter of the joint plus 200 mm to provide for overlap.

5.2.1.2 Width of Sealing Band—The width of the sealing band shall conform to the requirements of **Table 1**.

5.2.2 Plastic Film Element—The plastic film element shall be an extruded polymer which provides external reinforcement and shall meet the physical requirements prescribed in Section 6.

5.2.3 Mesh Reinforcement Element—The mesh reinforcement shall consist of a woven plastic mesh and shall meet the physical requirements prescribed in Section 6.

5.2.4 Rubberized Asphalt Mastic Element—The rubberized, asphalt, mastic element shall be a self adhering composition and shall meet the requirements prescribed in Section 6.

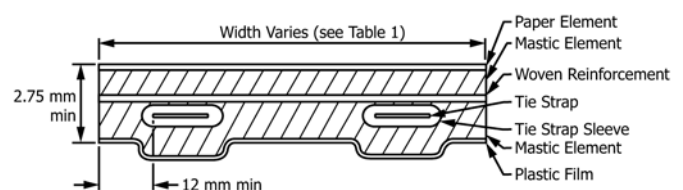


FIG. 2 Sealing Band Type II (Not to Scale)