

SUGGESTED MANHOLE FRAME SEALING SPECIFICATION
(Rehabilitation w/LSS Internal Seal)

PART 1 GENERAL

1.01 SCOPE

This specification includes the materials and procedures required for the internal sealing of the frame-chimney joint area of brick and block manholes and the entire chimney area of precast, fiberglass and plastic manholes, as shown on the attached drawings.

1.02 WORK REQUIRED

- A. An internal manhole frame seal, as specified herein shall be installed in all manholes within the areas included in this project. If excavation is required to repair, rebuild, or replace a manhole; or if manhole linings or coatings are required, the seal shall be installed after that work has been completed.
- B. Brick or Block Manholes - When frame sealing is required on brick or block manholes, an internal flexible rubber frame seal, meeting the requirements of this specification, shall be used to seal the frame-chimney joint area of the manhole.
- C. Precast, Fiberglass or Plastic Manholes - When frame sealing is required on precast, fiberglass or plastic manholes, a internal flexible rubber frame seal meeting the requirements of this section, shall be used to seal the entire chimney of the manhole. The seal shall extend from the frame down to the top of the cone.

1.03 DEFINITIONS

- A. Chimney - The cylindrical variable height portion of the manhole structure used to support and adjust the finished grade of the manhole frame. The chimney extends from the top of the corbel or cone to the base of the manhole frame.
- B. Cone or Corbel - That portion of the manhole structure which slopes upward and inward from the barrel of the manhole to the required chimney or frame diameter. "Corbel" refers to a section built of brick or block, while "cone" refers to a precast, fiberglass or plastic section.

1.04 SYSTEM DESCRIPTION

- A. Design Requirements - The manhole frame seal shall be designed to prevent leakage of water through the above described portions of the manhole throughout a 50 year design life. The seal shall also be designed so that it can be installed in manholes where the diameters of the frame and chimney differ by up to 20%.
- B. Performance Requirements - The frame seal shall be capable of repeated vertical movement of the frame of not less than 2 inches and/or repeated horizontal movement of not less than 1/2 inch after installation and throughout its design life.

1.05 QUALITY ASSURANCE

- A. Acceptance Testing - Manhole frame seals shall be visually inspected after installation to insure that the seal is properly positioned, tight against the manhole and frame surfaces, that no voids or leakage points exist and that the bands are securely locked in place. Any seals failing this test shall be reworked as necessary and retested at no additional cost to the owner. Any seals not

passing this visual inspection may, at the Contractor's option, be tested for leakage using a method approved by the Engineer.

PART 2 PRODUCTS

2.01 FRAME SEAL

Frame seals shall consist of a flexible internal rubber sleeve and stainless steel expansion bands, all conforming to the following requirements:

- A. Rubber Sleeve - The flexible rubber sleeve shall be extruded or molded from a high grade rubber conforming to the applicable material requirements of ASTM C-923, with a minimum 1500 psi tensile strength, a maximum 18% compression set and a hardness (durometer) of 48 ± 5 . The sleeve shall be corrugated and available in four widths with unexpanded vertical heights of 8 inches (LSS 0-6), 10 inches (LSS 6-12), 14 inches (LSS 12-18) and 18 inches (LSS 18-24). The sleeve shall have a minimum thickness of .130 inches and a range of coverage which allows a span of up to 24 vertical inches of chimney without the use of an extension. The area of the seal that compresses against the manhole frame casting and the chimney/cone shall have a series of sealing fins to facilitate a watertight seal.

Any splice used to fabricate the sleeve shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180 degree bend with no visible separation.

- B. Expansion Bands - The expansion bands used to compress the sleeve against the manhole shall be integrally formed from 16 gauge stainless steel conforming to the applicable material requirements of ASTM C-923, Type 304, with no welded attachments and shall have a minimum width of 1-3/4 inches.

The bands shall have a minimum adjustment range of 2-1/2 diameter inches and the mechanism used to expand the band shall have the capacity to develop the pressures necessary to make a watertight seal. The band shall be permanently held in place with a positive locking mechanism which secures the band in its expanded position after tightening.

- C. Acceptable Manufacturers
1. Cretex Specialty Products

2.02 EQUIPMENT

The contractor shall have a manufacturer's recommended expansion tool and all other equipment/tools necessary to prepare the surfaces of the manhole and install the frame seals.

2.03 REPAIR MORTAR

Repair mortar shall be a one component, quick set, high strength, non shrink; polymer modified cementitious patching mortar, which has been formulated for vertical or overhead use meeting the requirements of ASTM C-109 for Compressive Strength, C-348 and C-78 for Flexural Strength and C-882 for Slant Shear Bond Strength. Repair mortar shall not contain any chlorides, gypsums, plasters, iron particles, aluminum powder or gas-forming agents nor shall it promote the corrosion of any steel that it may come in contact with.

2.04 CEMENTITIOUS GROUT

Cementitious grout shall be a premixed, non metallic, high strength, non-shrink grout which meets the requirements of ASTM C-191 and C-827 as well as CRD-C-588 and C-621. When mixed to a mortar or "plastic" consistency, it shall have minimum one day and 28 day compressive strength of 6,000 and 9,000 psi, respectively.

PART 3 EXECUTION

3.01 FIELD MEASUREMENTS

The Contractor shall field measure the manholes to determine the information required on the manufacturer's "Sizing and Ordering" procedure. This information is needed to obtain the proper size of bands and size and width of the rubber sleeve.

3.02 SURFACE PREPARATION

All loose and protruding mortar and brick that would interfere with the seal's performance shall be removed and the appropriate areas of the manhole frame, chimney and or cone/corbel cleaned by wire brushing. All sealing surfaces shall be reasonably smooth and circular, clean and free of any loose material or excessive voids. If an adequate sealing surface does not exist on the masonry, a repair mortar conforming to the requirements of Section 2.03 shall be used to prepare a uniformly vertical 3"-4" wide surface for the sleeve and extensions to seal against.

Detailed surface preparation, including providing a vertical surface on a cone when none exists, shall be in accordance with the frame seal manufacturer's instructions.

3.03 REALIGN MANHOLE FRAME

All manhole frames that are misaligned from the chimney or cone/corbel by 3 inches or more shall be excavated and realigned. All existing frames shall be thoroughly cleaned before reinstallation. The frames shall be set in a bed of cementitious grout conforming to the requirements of Section 2.04, mixed to a mortar or "plastic" consistency. The frames shall be set so that the tops of the covers are flush with the adjoining pavement or ground surface.

3.04 INSTALLATION OF FRAME SEAL

The internal frame seal shall be installed in accordance with the manufacturer's instructions.

PART 4 MEASUREMENT AND PAYMENT

4.01 MANHOLE FRAME SEAL

This item shall be paid at the unit price bid per manhole frame seal and shall include the cost of furnishing and installing an internal rubber seal along with the surface preparation work needed to facilitate its installation. Measurement shall be based on the actual number of seals installed.

4.02 REALIGN MANHOLE FRAME

- A. Paved Areas - This item shall be paid at the unit price bid for frame realignment-paved, and shall include the cost of all saw cutting, pavement removal, disposal and replacement, excavation, backfill and the cleaning and reinstallation of the existing frame.
- B. Unpaved Areas - This item shall be paid at the unit price bid for frame realignment-unpaved, and shall include the cost of excavation, cleaning and reinstallation of the frame, backfill and surface restoration.

Measurement of each item shall be based on the actual number of each type of frame realignment.

NOTE: A specifier is within his rights to issue a proprietary specification that names only one brand. If in the informed and professional judgment of the specifier, his client's needs will be best served by naming a particular brand, then he has the responsibility to limit his specification to one source. This practice is even acceptable on publicly funded projects. This principle of proprietary specification has found legal support in the case of Whitten Corp v. Paddock Pool Builders, Inc., a Federal District Court case from Massachusetts (376 F. Supp125). Further support came in 1975 when the U.S. Supreme Court rejected further appeal and review.

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