

**SUGGESTED MANHOLE FRAME SEAL SPECIFICATION**  
(New Construction w/LSS Internal Seal)

**PART 1 GENERAL**

**1.01 SCOPE**

This specification includes the materials and procedures required for the internal sealing of the entire chimney area of all new sanitary manholes, as shown on the attached drawings.

**1.02 WORK REQUIRED**

- A. An internal flexible rubber frame seal meeting the requirements of this section shall be used to seal the entire chimney of all sanitary manholes included in this project. The seal shall extend from the frame casting down to the top of the manhole 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 cone to the base of the manhole frame.
- B. Cone - That portion of the manhole structure which slopes upward and inward from the barrel of the manhole to the required chimney or frame diameter.

**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 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 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 sealing surfaces shall be reasonably smooth, clean and free of any form offsets or excessive honeycomb. The top internal portion of the manhole cone shall have a minimum 3 inch high vertical surface. The preparation of this vertical surface when none exists shall be in accordance with the frame seal manufacturer's instructions.

### 3.03 INSTALLATION OF FRAME SEAL

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

#### **4.01 MANHOLE FRAME SEAL**

All costs for furnishing and installing a internal frame seal shall be included in the unit price bid for sanitary manholes.

**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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