

SECTION 3100 MANHOLE AND SPECIAL STRUCTURES - SANITARY SEWERS

3101 SCOPE. This section governs the furnishing of all labor, equipment, tools, and materials, and the performance of all work incidental to the construction of manholes, drop manholes and special sewer structures complete with covers, steps, fittings and appurtenances as required for sanitary sewer construction.

3102 GENERAL. As used herein special structures refers to manholes on large sewers, special junction structures, metering stations, siphons and similar structures constructed on the pipeline.

Manholes and special structures may be constructed of precast concrete sections or cast-in-place concrete. Construction of brick or concrete/hydite block masonry will not be allowed.

Outside manhole drops are not allowed. If a drop manhole is necessary, an inside drop shall be installed, and the minimum inside diameter of the manhole shall be five (5) feet.

3103 CONSTRUCTION.

- A. General. Manholes and special structures shall be constructed at locations indicated and in accordance with details as shown on the plans or City Standard Drawings. Manholes will be constructed with eccentric cones unless otherwise approved by the City Engineer.
- B. Precast Wall and Reducing Cone Sections. Handle with care to avoid damage to joint ends of each section. Damaged sections may be subject to rejection at the discretion of the Engineer.

When using bitumastic joints, both spigot and bell end shall be primed with solvent material compatible to the adhesive in the mastic. Approved bitumastic material shall completely fill the joints so that a minimum of one-fourth (1/4) inch bead of material is visible after jointing, to be smoothed off after completion of the jointing operation.

When a flexible preformed butyl rubber or bituminous polymer compounded with modifiers is used to seal jointed sections of manholes, the extrusion of sealant from the joint is not required. The vertical spacing between manhole section shall not exceed one-fourth (1/4) inch. Preformed joint sealers shall remain flexible at temperatures as low as 0 deg. F.

All bitumastic materials or preformed flexible joint sealants shall not be applied to wet or damp surfaces.

When using precast manholes, drop connections must not enter the manhole at a joint.

- C. Cast-in-Place. Consolidate concrete with mechanical vibrators to eliminate entrapped air voids and rock pockets. Forms shall be supported in such a manner as to prevent any movement of the forms while concrete is being cured. Any movement of the forms may be cause for rejection.

- D. Invert Channels. Alignment of the invert channels shall be as shown on the Contract Drawings. When no specific details and dimensions are given, changes in flow direction shall be smooth, uniform and made with the longest radius possible. The cross sectional shape of invert channels shall match the lower halves of the entering and exiting pipes. The surfaces of the channels shall be troweled to produce a dense, smooth surface.

Bench. A bench shall be provided on each side of any manhole channel when the pipe diameter(s) are less than the manhole diameter. The bench should be sloped no less than a one-half inch per foot (0.5 in/ft) (12.7 mm/m). No pipe shall discharge onto the surface of the bench.

- E. Manhole Penetrations. All manhole penetrations shall have waterstop gaskets as shown in exhibit D31-4.

3104 CURING. All masonry, plaster coating and cast-in-place concrete shall be adequately protected from freezing and loss of moisture for the first 24 hours. The curing methods and materials to be used shall be approved by the Engineer.

3105 MANHOLE RINGS. All rings for manhole covers shall be set to match elevations indicated on the City approved plans. Each ring shall be set on one 4-inch and one 6-inch adjusting ring as indicated on the Standard Details. Mastic sealant shall be provided between all joints.

Recycled rubber grade adjustment rings (flat or tapered), as manufactured by Sealing Systems Inc. or approved equal, may be used.

A minimum access diameter of twenty-two inches (22") (56 cm) shall be provided.

3106 WATER-PROOFING. Waterproofing will be required on the exterior surface of manhole structures from base to manhole rings. Precast manholes will be shop coated. The waterproof coating shall be Koppers Company, Inc. Bitumastic No. 50 or Tnemec Company, Inc. asphalt base foundation coat and shall consist of two coats wet thickness of 22-26 mils with a combined dry thickness of 31 mils. The coating shall be applied in sufficient quantity so that no bare or thin spots show. The coating shall be applied in sufficient time to permit proper curing prior to backfilling the excavation. Proper methods and material shall be used during backfilling to prevent damage to the coating. Any damage to the coating which does occur shall be immediately repaired.

3107 INTERNAL OR EXTERNAL RUBBER CHIMNEY SEAL. An internal rubber chimney seal as manufactured by Cretex Specialty Products or approved equal shall be installed, sealing all joints from the manhole frame to the corbel cone. Internal rubber chimney seal extension shall be used if necessary.

3108 EXTERIOR MANHOLE JOINT SEAL. Each manhole shall be sealed with an external rubber sleeve, Infi-Shield Gator Wrap as manufactured by Sealing Systems, Inc. or approved equal, to form a continuous rubber seal on the manhole joint preventing water and soil from infiltrating through the manhole. The seal shall be made of a stretchable, self-shrinking, intra-curing halogenated base rubber with a minimum thickness of 30 mils. The back side each unit shall be coated with a cross-linked re-inforced butyl adhesive. The butyl adhesive shall be non-hardening sealant with a

minimum thickness of 30 mils. The seal shall be designed to stretch around the joint and then overlapped creating a cross-link and fused bond between the rubber and butyl adhesive.

A. Rubber Specifications:

Physical Properties	ASTM Test Method	Typical Value
Sheer Strength	D816	20 lb. PSI min
Tesile, PSI	D412	50 PSI
Elongation %	D412	500%
Penetration	D217	60/140 MM
Low Temperature	D746	Minus 49 degrees F flexibility
Heat Aging	D573 7 days @ 90 degrees C	
Tensile Strength	Minimum, PSI (MPa) > 100 PSI	Pass
Fusion	5/64" (0.2) max	Pass
Elongation %	Minimum 300% at break	Pass
Ozone Resistance	No visible signs of cracking	Pass
Aging and Storage	300% elongation applied (10 years)	Pass
UV Resistance	No visible signs of cracking	Pass

B. Installation:

1. Expose the area that is to be sealed. Clean the entire area around the joint with a wire brush and whisk broom. Remove any sharp protruding edges around the joint with an abrasive tool. When finished cleaning, the entire area must be dry and free of any dirt.
2. Remove the first foot of paper backing from the mastic. Center and place the wrap around the joint. Continue to remove the paper backing as you apply the wrap around the entire structure.
3. Seal the overlapping area with a 6" overlap. Be sure to stretch material at the overlap area.
4. Cut excess material using a utility knife. Using a rubber mallet or hand held roller, firmly flatten the wrap 360 degrees around the joint.