

SECTION 625

MANHOLE CONSTRUCTION AND DROP SEWER CONNECTIONS

625.1 DESCRIPTION:

625.1.1 ~~Sewer~~ Manholes: Construction shall consist of furnishing all materials and constructing manholes complete in place, as detailed or specified, including foundation walls, manhole frames, covers, and any incidentals thereto, at locations shown on the plans.

625.1.2 Sanitary Drop Sewer Connections: Construction shall consist of furnishing all materials and constructing drop sewer connections complete in place as detailed, including foundation materials, pipe, and any incidentals thereto, at locations shown on the plans.

625.2 MATERIALS:

Unless otherwise shown on the plans or specified in the special provisions, materials to be used shall conform with the following:

If allowed by the contracting agency, brick may be used for maintenance and adjustment of the existing sanitary sewer manhole or ring and cover. Bricks for manholes see Section 775.

Cement mortar for manholes Class D, see per Section 776.

Concrete for manholes Class A, for drop sewer connection Class C, Section 725.

Pipe used in manholes or drop sewer connections shall comply with pipe requirements of Section 615.

Manhole frame, cover Section 787 and cast in accordance with standard details.

~~Manhole steps shall conform to ASTM C478 requirements. The manufacturer shall furnish the Engineer a certification indicating conformance.~~

Manhole steps shall not be used in sanitary or storm sewer manholes.

625.3 CONSTRUCTION METHODS:

625.3.1 Manholes: Manholes shall be constructed of precast concrete sections, or cast in place concrete.

The invert channels shall be smooth and semi-circular in shape, conforming to the inside of the adjacent sewer sections. Changes in direction of flow shall be made with a smooth curve, having a consistent radius as large as the manhole will permit with no angle points. Changes in size and grade of the channels shall be made gradually, evenly, and uniformly throughout the manhole base.

Invert channels shall be formed of concrete and have a smooth mortared surface, may or may not be half tile laid in concrete, or may be constructed by laying a full section of sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. The bench of the manhole outside the channels shall be smoothed and shall slope towards the channels.

The excavation shall be in such a manor, access is maintained around the manhole base before, during, and after placement of the manhole.

Comment [RTH1]: This section is referenced for the construction of various types of manholes: water line construction (section 610.8 Manholes and Vaults, used for butterfly valves), sanitary sewer construction (section 615.9), reclaimed waterline construction (section 616.2) and for storm drains. When a subsection does not apply to all types of manholes it should identify which types of manholes it apply to.

Comment [RTH2]: Sewer is deleted since this section applies to all manhole types.

Comment [RTH3]: Sanitary added since this section only applies to sanitary sewers, not storm sewers.

Comment [RTH4]: Added previously deleted requirement for manhole steps. Manhole steps are required in at least some water line manholes (for butterfly valves).

Scottsdale Butterfly Valve Operator Manhole Detail 2305 requires steps and references MAG Detail 428 MANHOLE STEPS, the MAG detail references ASTM D2146 which has been withdrawn.

This defines requirements for manhole steps; requirements are given in section 16 of ASTM C478.

Comment [RTH5]: Added the types of manholes where steps are not to be used.

Comment [RTH6]: Deleted the requirement for concrete inverts to be mortar surfaced.

~~Cast in place~~ A concrete foundations ~~shall be of~~ Class A concrete ~~shall be poured~~ constructed in accordance with the Standard Details and Section 505.

Comment [RTH7]: This requirement is only for Cast in place concrete foundations. Precast elements require Class AA concrete and the foundation is to be part of the manhole base.

No brickwork shall be laid in water, nor, except as prescribed for curing, shall water be allowed to stand or run on any brickwork until the mortar has thoroughly set. Where new work is joined to existing unfinished work, the contact surfaces of the latter shall be thoroughly cleaned and moistened.

Bricks shall be thoroughly moistened prior to placing, and shall be laid in full cement mortar beds. Every course may be a header course, but at least every fourth course shall be a header course. The horizontal cross-section of the manhole shall be circular unless otherwise called for on the plans or standard details. An oval or egg-shaped section will not be permitted. The brick manholes shall be mortared outside with ½ inch of cement mortar as shown. Inside of the brick wall shall be neatly pointed. The mortar coat shall be cured with a liquid membrane-forming compound conforming with Section 726 immediately after mortar has been placed and finished.

All machined surfaces on the frame and cover shall be such that the cover will lie flat in any position in the frame and have a uniform bearing through its entire circumference. Any frame and cover which creates any noise when passed over by automobiles shall be replaced. Frames shall be set firmly in a bed of mortar true to line and grade, all as shown on the plans and as called for in these specifications.

Backfilling shall be done in accordance with the requirements for trench backfilling as stated in Section 601.

625.3.2 Sanitary Drop Sewer Connections: Drop sewer connections shall be constructed in conformance with standard details ~~426~~.

Comment [RTH8]: Sanitary added since this section only applies to sanitary sewers, not storm sewers.

Backfilling shall be done in accordance with the requirements for trench backfilling as stated in Section 601.

Comment [RTH9]: It is best to not reference specific detail numbers.

625.4 MEASUREMENT:

Each type of ~~Measurement will be per~~ manhole installed, shall be measured as a complete unit in place, no distinction shall be made based on manhole regardless of depth.

625.5 PAYMENT:

Payment will be made at the contract unit price ~~for each accepted manhole~~, and shall be compensation in full for furnishing and installing the manhole, complete in place, with formed or pre-cast inverts, concrete foundation, sanitary sewer drop connections, sheeting and bracing, removal of obstructions cast iron frame and cover, excavation and backfill, paving cut replacement in excess of the applicable pay widths authorized in Section 336, and any incidentals thereto, in conformance with the plans and specifications.

- End of Section -

SECTION 775

BRICK AND CONCRETE MASONRY UNITS (BLOCKS)

775.1 BRICK:

~~If allowed by the contracting agency, brick may be used for maintenance and adjustment of the existing sanitary sewer manholes or rings and covers.~~

Brick shall be whole, sound, and hard burned and shall give a clear ringing sound when struck together. They shall be uniform in quality and shall be culled or sorted before delivery to the work.

Comment [RTH10]: This only applies to manholes therefore moved to section 775.1.1 Manhole Brick. Adjusted wording after relocating sentence – did not change requirement.

775.1.1 Manhole Brick: If allowed by the contracting agency approval is required prior to using brick within manholes. When approved brick may be used for maintenance and adjustment of the existing sanitary sewer manholes or rings and covers.

Sewer and water manhole brick shall conform, except for dimensional tolerances, to the requirements of ASTM C32, Grade MM.

Manhole brick shall conform to Table 775-1.

TABLE 775-1			
MANHOLE BRICK DIMENSIONS			
Brick	Inches Depth	Inches Width	Inches Length
Standard Size	2 1/4	3 1/2	7 1/2
Allowable Variations	±1/8	±1/8	±1/4

The following paragraphs shall be added to the section on visual inspection:

No individual brick shall be rejected unless it shows visual evidence of major cracking. A major crack is defined as one that has at least one complete separation, for a distance of 1 3/4 inches, through the brick in any direction, including any cored area. Such a crack shall be regarded as affecting the serviceability of the brick and shall be rejected and not used in the structure.

Fifty bricks may be sampled at random intervals from any cube for visual inspection. Of the 50 samples, 45 must pass visual inspection for major cracks. Should less than 45 pass, the cube of brick shall be rejected and the brick must not be used in the structure.

775.1.2 Building Brick: Building brick shall conform to the requirements of ASTM C62, grade MW.

775.1.3 Facing Brick: Facing brick shall conform to the requirements of ASTM C216, Grade MW, Type FBS. The size, color, and texture shall be as specified on the plans or as approved by the Engineer.

775.2 CONCRETE MASONRY UNITS:

Unless otherwise noted on the plans or special provisions, concrete masonry units shall conform to ASTM C90, Normal Weight, Type I with a minimum compressive strength of 1900 psi.

The units shall be fully cured and shall have been made not less than 28 days prior to delivery.

The moisture content at the time of delivery shall not exceed 30 percent of the minimum absorption value of the units. The Contractor shall provide any protection he deems necessary to maintain the units in this condition until time of use.

The linear change from saturated to cool oven dry shall not exceed 0.0054 inches per linear foot or 0.045 of 1 percent conducted in accordance with test method in ASTM C426.

The units shall be made with normal weight aggregate conforming to ASTM C33.

The nominal size of the units shall be as indicated on the plans. The overall dimensions for width, height and length shall differ by not more than $\pm 1/8$ inch from the specified standard dimensions. Standard dimensions of units are the manufacturer's designated dimensions. Nominal dimensions of units are equal to the standard dimensions plus the thickness of one mortar joint.

No less than 5 samples of the units shall be submitted to the Engineer for approval and to show the full variance of texture and full range of color. Units used in the work shall match the approved samples. These samples may be tested for strength. All units shall be sound and free of cracks or other defects that would interfere with the proper placing of the unit or would significantly impair the strength or permanence of the construction. When units are to be used in an exposed setting, the face or faces that are to be exposed shall not show chips or cracks, not otherwise permitted, or other imperfections when viewed from a distance of not less than 6 feet under diffused lighting.

Units that are intended to serve as a base for plaster or stucco shall have a sufficiently rough surface to afford a good bond.

- End of Section -