

**Item No. 522
Pre-Cast Concrete Vaults****522.1 Description**

This item shall govern the furnishing of all labor, materials, equipment, incidentals, and transportation necessary for placing precast reinforced concrete valve vault.

522.2 Quality Assurance**A. Design Criteria:**

1. Precast reinforced concrete valve vault shall conform:
 - a. To the requirements of ASTM C857 and C858 for underground precast concrete utility structures.
 - b. Be designed for the specific site conditions and construction document requirements.
 - c. Be designed to resist buoyant forces due saturated soil.
2. Wall and slab minimum thicknesses shall be as calculated to resist design forces but shall not be less than that required for: manufacture and handling; proper embedment of access hatch; proper installation of pipe penetration seal.

B. Test Requirements: Refer to ASTM C858 for testing requirements.**C. Permissible Variations:**

1. Tolerances for precast sections shall conform to ASTM C858.
 - a. Deviations from the above tolerances will be acceptable if the sections can be fitted at the plant or job site and it is determined that an acceptable joint can be made. For this condition an acceptable joint is:
 - i. When two sections are fitted together on a flat surface, in proper alignment and in the position they will be installed, the longitudinal opening at any point shall not exceed 1 inch. Sections fitted together at the plant and accepted in this manner shall be match-marked for installation.

D. Inspection:

1. The quality of materials, the process of manufacture, and the finished valve vault shall be subject to inspection and approval by the Owner or an authorized representative at the manufacturing plant. In addition, the valve vault shall be subject to further inspection by the Owner at the Project Site prior to and during installation.

E. Cause for Rejection:

1. The valve vault shall be subject to rejection on account of failure to conform to any of the specification requirements. Individual sections of valve vault may be rejected because of the following:
 - a. Fractures or cracks in the vault.

- b. Defects that indicate imperfect proportioning, mixing and molding.
- c. Surface defects indicating honeycombed or open texture.
- d. Damaged ends, where such damage would prevent making a structurally sound and water tight joint.

522.3 Submittals

The submittal requirements of this specification item must include:

- A. Manufacturer’s product data sheets.
- B. Concrete mix and test results.

522.4 Standards

The applicable provisions of the following standards shall apply as if written here in their entirety:

- A. American Society of Testing and Materials (ASTM) Standards:

ASTM C857	Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
ASTM C858	Standard Specification for Underground Precast Concrete Utility Structures
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field

- B. American Association of State Highway and Transportation Officials (AASHTO) Standards:

AASHTO M198-08	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections using Preformed Flexible Joint Sealants
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- C. State Department of Highways and Public Transportation, Austin, Texas.

522.5 Delivery and Storage

- A. Coordinate delivery with installation where possible to avoid unnecessary handling and equipment movement. When stockpiling is required, storage shall be made as close as possible to the point of installation.
- B. Store precast sections on level blocking in a manner acceptable to the Engineer. No load shall be placed upon them until design strength is reached and curing completed. Shipment of sections may be made when the design strength and curing requirements have been met.

- C. Store flexible gasket materials not on the box section, and joint lubricating compounds in a cool dry place. Gaskets and preformed plastic materials for pipe joint construction shall be kept clean, away from oil, grease, excessive heat and out of the direct rays of the sun.

522.6 Materials

A. Mixes

1. Concrete: Mixed in a central batch plant or other approved batching facility from which the quality and uniformity of the concrete can be assured. Transit mixed concrete will not be acceptable. Concrete shall be 5000 psi minimum.

B. Manufactured Products

1. Valve Vault: Materials, manufacture and curing of precast reinforced concrete valve vault shall conform to ASTM C858. Vault shall be a precast concrete structure in accordance with the Drawings and Specifications.
2. Cold Applied Preformed Gaskets:
 - a. Cold applied preformed gaskets shall be suitable for sealing joints of tongue and groove concrete box sections. The gasket sealing the joint shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler and shall contain no solvents, irritating fumes, or obnoxious odors. The gasket joint sealer shall not depend on oxidizing, evaporating, or chemical action for its adhesive or cohesive strength, and shall be supplied in extruded rope-form of suitable cross-section. The size of the gasket joint sealer shall be in accordance with the manufacturer's recommendations and sufficient to obtain the squeeze-out as described in Paragraph 3.02.
 - b. Gasket joint sealer shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that half may be removed longitudinally without disturbing the other half to facilitate application as noted below.
 - c. The chemical composition of the gasket joint sealing compound shall conform to the requirements of AASHTO M198-08 1, Type B, Flexible Plastic Gasket (Bitumen).
3. Workmanship and Finish: Valve Vault shall be substantially free from fractures, large or deep cracks and surface roughness. The ends of the valve vault shall be normal to the walls and centerline of the valve vault within the limits of Permissible Variations specified above. The vault exterior shall be coated with a bituminous coating for areas to be install below grade.
4. Markings: The following information shall be clearly marked on each section. Markings shall be indented on the valve vault or painted thereon with waterproof paint.
 - a. The load rating and ASTM Designation No. of the valve vault.
 - b. The date of manufacture.
 - c. The name or trade name of the manufacturer.
5. Manufacturers: Vault shall be manufactured by one of the following:
 - a. Oldcastle Infrastructure, 1900 Rilling Rd, San Antonio, TX 78214.

- b. Capital Precast, 6905 South Old Bastrop Highway, San Marcos, TX 78666
- c. Forterra Pipe & Precast, 11710 Chapel Road, Lorena, TX 78655
- d. Capital Concrete Products, 5624 Highway 71 East, Del Walle, TX 78617
- e. ParkUSA, 8491 US Highway 87 E, San Antonio, TX 78263
- f. Approved Equal.

522.7 Construction Methods

A. Excavation and Embedment

1. Excavation and embedment shall conform to the requirements in TXDOT Standard Specification Item No. 400 "Excavation and Backfill for Structures."

B. Installation

1. Laying:

- a. Valve vault sections shall be installed such that the bottom section(s) shall be full sections. Partial sections, if necessary, shall be utilized for the topmost section only. Valve vault cover shall be separate from the vault walls.

2. Jointing:

- a. Joints using cold applied preformed plastic gaskets shall be made as follows:

- i. A suitable primer of the type recommended by the manufacturer of the gasket joint sealer shall be brush- applied to the tongue and groove joint surfaces and the end surfaces and allowed to dry and harden. No primer shall be applied over mud, sand, dirt or sharp cement protrusions. Clean and dry the surface to the primed when primer is applied.
- ii. Before laying the valve vault in the trench, attach the plastic gasket sealer around the tapered tongue or tapered groove near the shoulder or hub of each joint. Remove the paper wrapper from one side only of the two-piece wrapper on the gasket and press firmly to the clean, dry valve vault joint surface. Do not remove the outside wrapper until immediately before pushing the valve vault into its final position.
- iii. When the tongue is correctly aligned with the flare of the groove, remove the outside wrapper on the gasket and pull or push home the valve vault with sufficient force and power (Backhoe shovel, chain hoist, ratchet hoist or winch) to cause the evidence of squeeze-out of the gasket material on the side of outside around the complex valve vault joint perimeter.
- iv. When the atmospheric temperature is below 60 F, plastic joint seal gaskets shall either be stored in an area warmed to above 70 F, or artificially warmed to this temperature in a manner satisfactory to the Engineer. Apply gaskets to valve vault joints immediately prior to placing valve vault in trench, followed by connection to previously laid box section.

C. Backfill

1. After the valve vault has been placed, bedded, and jointed as specified and approved by the Owner or his authorized representative, perform backfilling in accordance with TXDOT Standard Specification Item No. 400 "Excavation and Backfill for Structures." Take special precautions in placing and compacting the backfill to avoid any movement of the valve vault or damage to the joints.

522.8 Measurement

Pre-cast concrete vaults of each size and type shall be measured per each. The measurement will be made between the ends of the vault along the central axis. For concrete vaults used in multiple barrel structures, the measured length will be the sum of the lengths of all barrels measured as described above.

522.9 Payment

"Pre-Cast Concrete Vault" shall be full compensation for constructing, furnishing and transporting vaults; excavation; disposal of surplus or unusable excavated material; providing, hauling, placing, preparing and shaping bedding material and leveling courses; concrete, reinforcing steel; jointing of vaults; connections to existing systems or structures; connections to new systems or structures; hauling, moving, placing and compacting backfill materials; installation and maintenance of temporary pavement repairs; temporary removal and replacement of pavement, curb, drainage structures, driveways, sidewalks, and any other improvements damaged or removed during construction;; and all other items of material, labor, equipment, tools and incidentals necessary to complete this work in accordance with the Drawings and specifications.

Payment will be made under one of the following:

Pay Item: Pre-Cast Concrete Vault, ___ ft. x ___ ft. Per Each

End