PART 25: SPECIFICATIONS FOR ALTITUDE VALVE VAULT
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CITY OF COLUMBIA REGULATIONS
PART 25
SPECIFICATIONS FOR ALTITUDE VALVE VAULT

25.1 GENERAL

25.1.1 The work under this section covers construction of an underground vault to house an altitude valve, a check valve and miscellaneous valves and fittings.

25.2 MATERIALS

25.2.1 Portland Cement Concrete

25.2.1.1 Portland cement concrete for structures shall conform to Section 701 of the SCDHPT Standard Specifications for Highway Construction, latest edition.

25.2.1.2 The 28-day compressive strength of concrete shall be not less than 3000 psi which shall be demonstrated by standard compressive tests. Each test shall consist of duplicate cylinders and not less than one test shall be made for each 50 cubic yards. One cylinder of each pair shall be tested after seven days and shall have a compressive strength of not less than 2000 psi.

25.2.1.3 Concrete shall contain not less than six sacks of cement per cubic yard and not more than six gallons of water per sack of cement, including water contained in aggregate.

25.2.2 Reinforcing Steel – Reinforcing steel shall be of new billet steel intermediate grade made by the open hearth process, conforming to the requirement of the "Standard Specification C15-33 of the ASTM Designation A615-80. In addition to the reinforcing indicated on the plans, the Contractor shall furnish all necessary support bars, tie bars, etc, required for properly supporting and spacing the bars in the forms. The reinforcement will be subject to field inspection for rust, shape and dimensions.

25.2.3 Horizontal Joint Reinforcement: Joint reinforcements shall be fabricated from cold drawn steel wire conforming to ASTM Specification A82. The wire shall be either, copper- clad steel, or zinc-coated after fabrication. Reinforcement shall consist of two or more parallel longitudinal wires, not less than 0.1620-inch in diameter, weld connected with cross wires, not less and 0.1483-inch diameter. The out-to-out spacing of the longitudinal wires shall be 1-1/2 to 1-3/4 inches less than the actual width of the masonry. The distance between welded contacts of cross wires with each longitudinal wire shall not exceed 6-inches for smooth wire and 16-inches for deformed wire. Joint reinforcement shall be provided in flat sections, not less than 10 feet in length, except that corner reinforcements and other special shapes may be less in length.

25.2.4 Concrete Masonry Units

25.2.4.1 Concrete Masonry Units shall be of modular dimensions, and shall be either air, water or steam cured. Units shall be stored before use a minimum of 28 days for air cured units; 10 days for steam or water cured units; and 3 days for units cured

with steam at a pressure of 120 to 150 psi and at a temperature of 350 to 365 degrees F for at least 5 hours. Surfaces of units which are to be left exposed in the finished work, or which are to be painted, shall be relatively smooth with a uniform texture. Surfaces of units to receive plaster or stucco shall be sufficiently rough to provide a suitable bond.

25.2.4.2 Hollow Load-Bearing Units: Units shall be made with normal weight aggregates and shall conform to ASTM C90. Grade N-I units shall be provided for exterior and foundation alls.

25.2.5 Portland Cement Mortar – Portland Cement Mortar shall consist of Portland cement, fine aggregate and water.

25.2.5.1 Ingredients – All materials for mortar shall conform to requirements of the SCDHPT Standard Specifications where applicable and the following specifications:

25.2.5.1.1 Portland Cement – ASTM Designation C150, SCDHPT Standard Specifications, Section 501, Concrete Materials.

25.2.5.1.2 Sand – ASTM Designation C144; SCDHPT Standard Specifications Section, 501.04 Fine Aggregate; Section 501, Concrete Materials.

25.2.5.1.3 Water – SCDHPT Standard Specifications Section, 501.06 Water; Section 501, Concrete Materials.

25.2.5.2 All equipment tools and machinery used in mixing and handling mortar shall be approved by the Engineer.

25.2.5.3 Composition – The proportions of Portland cement, fine aggregate and water shall be such as to produce a plastic mortar. The workability shall be consistent with the type of work for which it is used in order to secure the best results.

25.2.5.3.1 The mortar as specified for the several types of work, shall be proportioned one part cement and three parts fine aggregate.

25.2.5.3.2 Proportioning of batches shall be by volume unless otherwise shown on the plans or specified in the Special Provisions. One sack of cement weighing ninety-four (94) pounds shall be considered one (1) cubic foot. Correction for bulking of the fine aggregate shall be made as directed by the Engineer.

25.2.5.4 Admixture

25.2.5.4.1 Lime – Lime which has been thoroughly air slaked may be added in quantities up to ten (10) percent of the cement content of the mix to increase the workability of the mortar, upon approval of or at the direction of the Engineer. Lime shall conform to ASTM Specifications, Designations C 141.

25.2.5.4.2 Commercial Admixtures – Commercial admixtures to increase the workability of mortar or concrete will not be used unless specifically approved in writing by the Engineer.

25.2.6 All other materials, not herein specified shall conform to applicable sections of SCDHPT Standard Specifications for Highways Construction, latest edition.

25.3 CONCRETE MASONRY WORK

25.3.1 Delivery and Storage: Cement, line and other cementitious materials shall be delivered to the site and stored in unbroken bags, barrels, or other approved containers, plainly marked and labeled with the manufacturer's names and brands. Mortar materials shall be stored in dry weathertight sheds or enclosures, and shall be stored and handled in a manner which will prevent the inclusion of foreign materials and damage by water or dampness. Masonry units shall be handled with care to avoid chipping and breakage. Masonry materials shall be properly protected from contact with the earth and exposure to the weather, and shall be kept dry until used. Materials containing frost or ice, and cement and lime which have been wetted by rain or other water prior to incorporation in mortar, shall not be used.

25.3.2 Materials: Masonry work of the types indicated shall be provided. The source of supply for materials which will affect the appearance of the finished work shall not be changed after the work has started.

25.3.3 Erection Conditions: Masonry shall not be laid when the air temperature is below 40 degrees F on a falling thermometer, or when it appears probable that temperatures below 40 degrees F will be encountered before the mortar has set, unless adequate means are provided for protecting the work from freezing. Work will not be permitted with or on frozen materials. Masonry work may be started at 34 degrees F on a rising thermometer. Scaffolding shall be inspected regularly and shall be amply strong, well braced and securely tied in position. Overloading of scaffolding will not be permitted.

25.3.4 Workmanship: Masonry walls shall be carried up level and plumb all around. One section of the walls (other than reinforced walls) shall not be carried up in advance of the others, unless specifically approved. Unfinished work shall be stepped back for joining with new work. Toothing will not be permitted, except where specified or specifically approved. Masonry units shall be handled with care to avoid chipping, cracking and spalling of faces and edges. Drilling, cutting, fitting and patching to accommodate the work of others, shall be performed by masonry mechanics. Masonry shall be cut with masonry saws in exposed work, where directed. Chases of approved dimensions for pipes and other purposes shall be provided where indicated or necessary.

25.3.5 Erection

25.3.5.1 Mortar and Grout Mixing: Materials shall be measured in approved containers, which will insure that the specified proportions of materials will be controlled and accurately maintained during the progress of the work. Measuring materials with shovels will not be permitted. Unless specified otherwise, mortar and grout shall be mixed in proportions by volume. The aggregates shall be introduced and mixed in such a manner that the materials will be distributed uniformly throughout the mass. A sufficient otherwise, mortar and grout shall be mixed in proportions by volume. The aggregates shall be introduced and mixed in such a

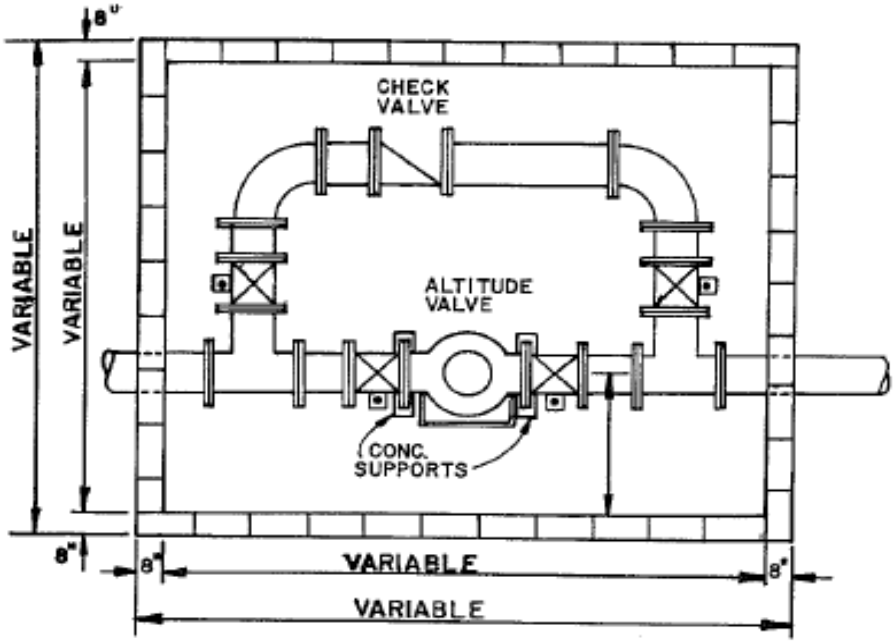
manner that the material will be distributed uniformly throughout the mass. A sufficient amount of water shall be added gradually and the mass further mixed, not less than 3 minutes, until a mix of the plasticity necessary for the purposes intended is obtained. The materials shall be machine mixed in approved mixers, of the type in which the quantity of water can be controlled accurately and uniformly. (Hand mixing may be used, only when specifically approved.) Mortar boxes, pans, and/or mixer drums shall be kept clean and free of debris or dried mortar. The mix shall be used before the initial setting of the cement has taken place. Anti-freeze compounds, salts, or any other substance used to lower the freezing point of the mix, will not be permitted. Mortar joints shall be 3/8 inch.

25.3.5.2 Concrete Masonry Unit Work: The first course of concrete masonry units shall be laid in a full bed of mortar for the full width of the units; the succeeding courses shall be laid with broken joints. The bed joints of concrete masonry unit shall be formed by applying the mortar to the entire top surfaces of the inner and outer face shells, and the head joints shall be formed by applying the mortar for a width of about one inch to the ends of the adjoining units laid previously. The mortar for joints shall be smooth, not furrowed, and shall be of such thickness that it will be forced out of the joints as the units are being placed in position. Where anchors, bolts and ties occur within the cells of the units, such cells shall be filled with mortar or grout as the work progresses. Metal lath shall be placed under cells before they are filled. Concrete brick shall be used for bonding walls, working out the coursing, toping out walls under sloping slabs, distributing concentrated loads, backing brick headers, and elsewhere as required. Concrete masonry units shall not be dampened before or during laying.

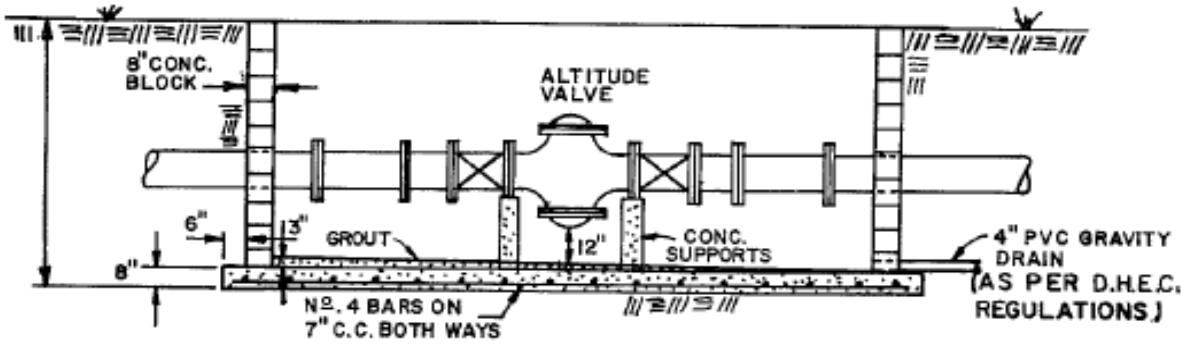
25.4 ALTITUDE VALVE VAULT COVER

25.4.1 Vault Cover: The vault's cover shall be ¼" floor plate, non-skid steel, with two hinged inspection lids to be placed as directed by the engineer. The plate shall be of adequate dimensions to completely cover the vault.

ALTITUDE VALVE VAULT DETAIL



PLAN VIEW



ELEVATION VIEW

David A. Johnson
10-13-86
CITY ENGINEER

DATE: 10-13-86

DEPARTMENT OF UTILITIES AND ENGINEERING, COLUMBIA, S.C.

STANDARD DETAIL AV NO. 1