

**San Antonio Water System Standard Specifications for Construction**

**ITEM NO. 300**

**Concrete (Natural Aggregate)**

**300.1 DESCRIPTION:** This item shall govern the storage, handling and usage of materials; and the proportioning, mixing and transportation of concrete for all concrete construction. This specification does not cover the placement, consolidation, curing, or protection of the concrete.

**300.2 REFERENCED STANDARDS:** Reference standards cited in this Specification Item No. 300 refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification Item No. 300, unless a date is specifically cited.

1. San Antonio Water System (SAWS):
  - a. Specifications for Water and Sanitary Sewer Construction
  - b. SAWS Materials Specifications
2. City of San Antonio (COSA) Specifications for Construction
3. American Concrete Institute
  - a. ACI 117 - Standard Tolerances for Concrete Construction and Materials.
  - b. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
  - c. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
  - d. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
  - e. ACI 308 - Standard Practice for Curing Concrete.
  - f. ACI 309R - Guide for Consolidation of Concrete.
  - g. ACI 311 - Guide for Concrete Plant Inspection and Field Testing of Ready-Mix Concrete.
  - h. ACI 315 - Details and Detailing of Concrete Reinforcement
  - i. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary.
  - j. ACI 544 - Guide for Specifying, Mixing, Placing, and Finishing Steel Fiber Reinforced Concrete.
4. American Society for Testing and Materials (ASTM) International:
  - a. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - b. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
  - c. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - d. ASTM A 767 - Standard Specifications for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
  - e. ASTM A 775 - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
  - f. ASTM A 820 - Standard Specification for Steel Fibers for Fiber-Reinforced Concrete.
  - g. ASTM A 884 - Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.
  - h. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  - i. ASTM C 33 - Standard Specification for Concrete Aggregates.

## **San Antonio Water System Standard Specifications for Construction**

- j. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- k. ASTM C 42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- l. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
- m. ASTM C 138 - Standard Test Method for Unit Weight Yield and Air Content (Gravimetric) of Concrete.
- n. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- o. ASTM C 150 - Standard Specification for Portland Cement.
- p. ASTM C 172 - Standard Practice for Sampling Freshly Mixed Concrete.

**300.3 SUBMITTALS:** Contractor shall submit manufacturer's product data, instructions recommendations, shop drawings, and certifications. All submittals shall be in accordance with Engineer's requirements and submittals shall be approved prior to delivery.

1. Submit proposed mix design and test data for each type and strength of concrete in Work.
2. Submit laboratory reports prepared by independent testing laboratory stating that materials used comply with requirements of this Section.
3. Submit manufacturer's mill certificates for reinforcing steel. Provide specimens for testing when required by Engineer.
4. Submit certification from concrete supplier that materials and equipment used to produce and deliver concrete comply with this Specification.
5. When required on Drawing, Submit shop drawings showing reinforcement type, quantity, size, length, location, spacing, bending, splicing, support, fabrication details, and other pertinent information.
6. For waterstops, submit product information sufficient to indicate compliance with this Section, including manufacturer's descriptive literature and specifications.

**300.4 MATERIAL:** The concrete shall be composed of Portland cement, mineral filler, if necessary, natural aggregates (fine and coarse), and water, proportioned and mixed as hereinafter provided in these specifications. Concrete shall meet all the requirements as set forth in the latest provision of ASTM C94 or the most applicable approved equal provision.

1. The minimum cement content, maximum allowable water content, and maximum slump of the various classes of concrete shall conform to Table 1.

**300.5 MEASUREMENT:** The quantities of concrete, of the various classifications which constitute the completed and accepted structure, will be measured by the cubic yard in place. Only accepted work will be included, and the dimensions used will be those shown in the contract documents or ordered in writing by the Engineer. Measurement will not include additional quantities due to over excavation, trench slides, and caving

**300.6 PAYMENT:** The concrete quantities, measured as provided above, will be paid for at the contract unit prices bid per cubic yard for the various classifications of concrete shown, which prices shall be full compensation for furnishing, hauling and mixing all concrete materials; placing, curing, and finishing all concrete; all grouting and pointing; furnishing and placing all drains and expansion joints, except as

**San Antonio Water System Standard Specifications for Construction**

hereinafter provided; furnishing and placing metal flashing strips; and for all forms and faux work, labor, tools, equipment, and incidentals necessary to complete the work.

1. The above provisions for payment for drains and expansion joints shall not be interpreted to provide payment for cast iron or structural steel shapes used in drains; for structural steel, cast iron or cast steel bearing plates; or for steel members used in armoring roadway joints.
2. Payment for these materials shall be full compensation for work herein specified, including the furnishing of all materials, equipment, tools, labor, and incidental necessary to complete the work.
3. No payment for additional quantities will be made due to over excavation, trench slides, and caving.
4. Payment for reinforcing an item which specifically includes the cost of reinforcement shall be paid for as provided in the specifications for those items
5. No direct measurement or payment will be made for Concrete Class "G," but shall be considered subsidiary to the particular items required by the contract documents.

<b>Table 1</b>				
<b>Class</b>	<b>Minimum compressive strength @ 28 days, psi (Mpa)</b>	<b>Maximum water/cement ratio</b>	<b>Slump range, inches</b>	<b>Min.-max. sacks cement, cubic yard</b>
A	4,000 (28)	4.5	2-4	5
B	2,500 (17)	8	2-5	4.5
C	2,000 (14)	9	1-4	4
D	1,000 (6)	11	1-4	2
G	(as specified in the contract documents)	5.5	2-3	6.0-8.0

**End of Specification**