

## SECTION 03600

## STRUCTURAL GROUT

## PART 1 GENERAL

## 1.01 SECTION INCLUDES

- A. Non-shrink grout used wherever grout is shown in the Documents, unless another type is specifically referenced. Two classes of non-shrink grout (Class I and II) and areas of application are specified.

## 1.02 UNIT PRICES

- A. Include the cost for grout in the lump sum for each structure in which it will be used. No separate payment will be made for grout.
- B. Measurement for extra grout (Class I and II) is on cubic foot basis. Payment includes associated work performed in accordance with related sections included in the Contract Documents.

## 1.03 SUBMITTALS

- A. Conform to all provisions and sections of these specifications.
- B. Quality Control:
  - 1. The Contractor shall submit manufacturer's literature certifying compliance with the specified properties for Class I and II grouts.
  - 2. The Contractor shall submit manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the work.
- C. The Contractor shall submit manufacturer's written warranty as specified.

## 1.04 QUALITY ASSURANCE

- A. Field Tests:
  - 1. Compression test specimens will be taken during construction from the first placement of each type of grout, and at intervals thereafter as selected by the Engineer to ensure continued compliance with these Specifications. The specimens will be made by the Owner's Representative or its representative.
  - 2. Compression tests and fabrication of specimens for non-shrink grout will be performed as specified in ASTM C109 at intervals during construction as selected by the Owner's Representative. A set of three specimens will be

made for testing at 7 days, 28 days, and each additional time period as appropriate.

3. Grout already placed which fails to meet the requirements of these Specifications is subject to removal and replacement no additional cost to the Owner.
4. The cost of laboratory tests on grout will be borne by the Owner, but the Contractor shall assist the Owner’s Representative obtaining specimens for testing. However, the Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the Specifications. The Contractor shall supply materials necessary for fabricating the test specimens.

B. Warranty:

1. Provide 1-year warranty for work provided under this Section.
2. Manufacturer's warranty shall not contain a disclaimer limiting responsibility to only the purchase price of products or materials furnished.
3. Manufacturer shall warrant participation with Contractor in replacing or repairing grout found to be defective due to faulty materials, as determined by industry standard test methods.

PART 2 PRODUCTS

2.01 APPLICATION

- A. The following is a listing of typical applications and the corresponding type of grout which is to be used. Unless indicated otherwise, grouts shall be provided as listed below whether or not called for on the Drawings.

Application:	Type of Grout
Structural member base plates	Non-shrink Class II
Storage tanks and other equipment	Non-shrink Class I
Filling blockout spaces for embedded items such as railing posts, gate guide frames, etc.	Non-shrink Class II (Class I where placement time exceeds 15 minutes)
Under precast concrete elements	Non-shrink Class I

Toppings and concrete fill less than 3 inches thick	Concrete Topping per Section 03310 and Section 03345
Toppings and concrete fill greater than 3 inches thick	Concrete Fill per Section 03310 and Section 03345
Any application not listed above, where grout is called for on the Drawing.	Non-shrink Class I, unless noted otherwise

## 2.02 PREPACKAGED GROUTS

### A. Basic Requirements for Cementitious Non-Shrink Grout

1. Provide prepackaged non-shrink grout that is inorganic, flowable, non-gas-liberating, non-metallic, and cement-based, requiring only the addition of water.
2. Deliver grout in original packaging with manufacturer's instructions printed on each container.
3. Select the specific formulation for each class of non-shrink grout specified to conform to that recommended by the manufacturer for the particular application.
4. Compressive strength at 28 days: 7000 psi minimum.
5. Do not use a grout for which the non-shrink property is based on a chemically generated gas or gypsum expansion.

### B. Class I Non-Shrink Grout:

1. Supply Class I Grout conforming to these specifications and to CRD-C621 and ASTM C1107 Grade C and B (as modified below) when tested using the amount of water needed to achieve the following properties:
  - a. Fluid consistency (20 to 30 seconds) per CRD-C611 at initial testing.
  - b. Fluid consistency (45 seconds) per CRD-C611 at 30 minutes after mixing.
  - c. At temperatures of 45, 73.4, and 95 degrees F.

2. To satisfy non-shrink requirements, the length change from placement to time of final set shall not have a shrinkage greater than the amount of expansion measured after final set at 3 and 14 days. The expansion at 3 and 14 days shall not exceed the 28-day expansion.
3. Fluid grout shall pass through the flow cone, with a continuous flow, 1 hour after mixing.
4. Demonstrate in tests that grout maintains contact with the base plate to provide a minimum effective bearing area of 95 percent of the gross contact area after final set.
5. The grout packaging shall list weight, maximum amount of mixing water to be used, maximum usable working time (pot life) at flowable consistency, and temperature restrictions for preparation and placement within which grout will meet specified requirements.

C. Class II Non-Shrink Grout:

1. Supply Class II Grout confirming to ASTM C1107 and the following requirements when tested using the amount of water needed to achieve the following properties:
  - a. Flowable consistency: 140 percent flow on ASTM C230, five drops in 30 seconds.
  - b. Fluid working time: 15 minutes, minimum.
  - c. Flowable duration: 30 minutes, minimum.
2. When tested, the grout shall not bleed at maximum allowed water.

## 2.03 CURING MATERIALS

- A. Curing materials: As specified in Section 03370 - Concrete Curing and as recommended by the manufacturer of prepackaged grouts.

## 2.04 CONSISTENCY

- A. Mix grouts to the consistency necessary to completely fill the space to be grouted. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as specified herein for the particular application.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Verify that base concrete or masonry has attained design strength before grout is placed.
- B. When cementitious grouts are used on concrete surfaces, saturate the concrete surface with water for 24 hours prior to placement of cement-based grout. Upon completion of saturation period remove excess water prior to grouting.

### 3.02 GROUTING PROCEDURES

- A. **Prepackaged Grouts:** Perform mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts according to the written instructions of the manufacturer. Use prepackaged materials in the quantities and proportions as directed by the manufacturer unless there is certified test data verifying that the specified properties are attained by modified mix.

### 3.03 CONSOLIDATION

- A. Place grout in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

END OF SECTION