

ITEM 433

CEMENT STABILIZED SAND BEDDING AND BACKFILL MATERIAL

433.1 Description. This Item shall govern for cement stabilized sand to be used for backfill and bedding as called for on the Standard Civil Drawings, in other parts of the Standard Specifications, or as directed by the Engineer.

433.2 Materials. Cement shall be Type I Portland cement conforming to ASTM C150.

Sand shall be clean durable sand containing not more than the following:

A. Deleterious Materials

Clay lumps, when tested in accordance with ASTM C142 shall be less than 0.5 percent.

Lightweight pieces, when tested in accordance with ASTM C123 shall be less than 5.0 percent.

Organic impurities when tested in accordance with ASTM C40, shall not show a color darker than the standard color.

B. The plasticity index shall be 6 or less when tested in accordance with ASTM D4318.

C. Sand shall be free of organic matter and deleterious substances and shall meet the following gradation requirement.

Square Sieve Size	Percent Passing, By Weight
3/8"	100%
No. 200	5 - 30%

Water shall be clean and clear, free of oils, acids, alkalis, organic matter or other deleterious substances and shall conform to the requirements of ASTM C94.

433.3 Sand-cement Mixture Product. The mixture shall consist of not less than 1.5 sacks of Portland cement per ton of material mixture as placed. The mixture shall contain sufficient water to hydrate the cement.

The cement, sand and water shall be mixed in a pugmill type mixer, which meets the approval of the Engineer. It shall be mixed for a minimum period of two minutes per batch.

433.4 Submittals and Responsibilities of the Contractor:

- A. Submit the proposed design mix and test data for cement stabilized sand mixture.
- B. Facilitate testing and inspection, by furnishing any necessary labor to assist the designated Testing Laboratory in obtaining and handling samples at the project site.

433.5 Placing. The sand cement mixture shall be placed in maximum 8 inch thick lifts, loose measure around the pipe, boxes, structures, bridge approaches and paving sections. Placement and compaction shall be performed in a manner that will thoroughly fill all voids without placing undue strain on or displacement of the structure.

Cement stabilized sand backfill placed below the top of sewers, manholes, inlets or other structures shall be placed equally along all sides of the structure. Cement stabilized sand backfill/bedding shall be placed in a manner that will completely fill all voids in the trench. Hand operated tampers may be used for compaction.

Materials not placed and compacted within 4 hours after mixing shall be rejected. Do not place or compact sand-cement mixtures in standing or free water.

Cement stabilized sand bedding and backfill placed in trenches shall be compacted in accordance with Item 430 "Construction of Underground Utilities" and Item 480 "Precast Reinforced Concrete Box Sewers."

Provide excavation and trench safety system at locations and depths required for testing and retesting during construction, at no additional cost to Harris County.

In-place density tests shall be taken at each location, each day, to test the placement of bedding/backfill material. The minimum number of tests per day shall be 1 in-place density on the bedding and 2 in-place densities on backfill. The minimum number of tests shall be for each location at the rate of 1 in-place density test per 50 linear feet of bedding and 1 in-place density test per 50 linear feet of backfill per lift placed above the top of pipe. In-place densities shall be determined in accordance with ASTM D6938 or ASTM D1556 and ASTM D3017.

433.6 Performance. The sand cement mixtures shall produce a minimum unconfined compressive strength of 100 psi in 48 hours, when compacted to 95 percent of Standard Proctor density (ASTM D558), without additional moisture control and when cured in plastic bags at a temperature of 73.4° F. at plus or minus 3° F. and tested in accordance with ASTM D1633.

Random samples of the delivered product will be taken in the field at the direction of the Engineer and tested at Harris County's expense. A minimum of 1 sample per week shall be taken at random to represent a production that is less than 100 tons per week. Two samples per week

shall be taken at random to represent a production greater than 100 tons per week. The Engineer shall have the option to obtain additional samples for testing.

After the molding of the soil-cement cylinders, the specimens will be tested in accordance with ASTM D1633, Method A. Two specimens will be tested at 48 hours and two specimens will be tested at 7 days.

- 433.7 Notification. The Testing Laboratory's representative will notify the County, Engineer, Contractor and material supplier by facsimile of all tests indicating results falling below specified strength requirements.
- 433.8 Measurement. Cement stabilized sand shall be measured by the square yard of material, furnished and compacted in place to the thickness specified, or as shown in the plans or acceptable material mixture, as specified by this Item, shall be measured by the ton of 2,000 pounds. Measurement shall be made by tickets delivered to the Engineer. The dry tickets shall indicate the tare, gross and net weight of the load and the location of delivery.
- 433.9 Payment.
- A. The payment for cement stabilized sand, complete and in place, shall be at the contract unit price per square yard of the specified thickness, which unit price shall include all costs of materials, furnished, hauled, dumped, spread, shaped, and compacted.
 - B. Where the bid sheet specifies FOB the plant, the materials shall be loaded on Harris County vehicles and paid for by the ton of 2,000 pounds.
 - C. Where the bid sheet specifies FOB the job, materials shall be transported to the job site specified on the bid sheet, and paid for by the ton of 2,000 pounds.
 - D. When the Project Manual, plans or other specifications indicate the use of cement stabilized sand is incidental to another pay item, no direct payment for the material will be made.

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires other Standard Specifications

Item 430 "Construction of Underground Utilities"
Item 480 "Precast Reinforced Concrete Box Sewers"

END OF ITEM 433