

SECTION 02244

CEMENT STABILIZED BASE COURSE (ROAD MIXED)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Foundation course of cement treated base constructed by in-place pulverization and blending of the existing flexible pavement, including existing base material, and the introduction of additives.

1.02 UNIT PRICES

- A. Measurement and payment for road mixed cement stabilized base is on a square yard basis, complete in place. Separate payment will be made for each different required thickness of base course.
- B. Measurement and payment for Portland cement is on a per ton basis.

1.03 REFERENCES

- A. ASTM C131 - Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- B. ASTM C150 - Specification for Portland cement.
- C. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil using Standard Effort.
- D. ASTM D1556 - Test Methods for Density and Unit Weight of Soil in Place by the Sand Cone Method.
- E. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- F. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- G. TxDOT Tex-101-E - Preparation of Soil and Flexible Base Materials for Testing.
- H. TxDOT Tex-110-E - Determination of Particle Size Analysis of Soils.
- I. TxDOT Tex-120-E - Unconfined Compressive Strength.

1.04 SUBMITTALS

- A. Submittals shall conform to requirements of all sections and provisions of these specifications. Submit Samples of pulverized road base and new aggregate for testing at least 14 days prior to start of construction.
- B. Submit manufacturer's mill certificates for all additives, such as Portland cement, proposed for use.

1.05 TESTS

- A. Testing shall be performed under the provisions of Section 01410 - Testing Laboratory Services.
- B. Laboratory and field tests shall be performed in accordance with the applicable ASTM and TxDOT standard test methods as described in this Section.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT

- A. Portland cement shall meet minimum material requirements for ATM C150 Type I.
- B. Portland cement may be delivered to the project site in bulk transports or in 1 c.f. sacks.

2.02 MIXING WATER

- A. Water shall be clean, potable, and free from oil, acids, alkali, or vegetable matter.

2.03 NEW AGREGATE

- A. New Aggregate shall meet the material requirements of TxDOT Item 247, Type A, Grade 1 Flexible Base.

2.04 ASPHALT SEAL CURE

- A. Cutback asphalt or emulsified petroleum resin meeting the material and applications requirements as per Section 02511 - Prime coat.

PART 3 EXECUTION

3.01 EQUIPMENT

- A. Pulverization of the existing pavement shall be accomplished with a self-propelled machine capable of pulverizing and mixing the existing materials to the plan depth in one pass.
- B. The mixing equipment shall be capable of mixing the pulverized material, any required new aggregate and additives to obtain a homogeneous mixture.
- C. Proof roller - Pneumatic tired roller with at least four wheels on axles carrying not more than two wheels. The proof roller shall have a rolling width of from 8 ft. to 10 ft. and having an operating gross load of from 25 to 50 tons.

3.02 PREPARATION

- A. Complete backfill of underground utilities, as required, below future grade.
- B. When directed by the Owner’s Representative, proof roll the existing flexible pavement to identify weak base or subgrade conditions. Weak areas shall be corrected as directed by the Owner’s Representative.

3.03 PLACEMENT

- A. When new aggregate is required, it shall be spread on the existing pavement evenly across the entire section before pulverization begins.
- B. Should the existing subgrade be exposed during the mixing process, it shall be firm and able to support, without displacement, the construction equipment. Soft or yielding subgrade shall be corrected as directed by the Owner’s Representative prior to replacement of base materials.
- C. The existing flexible pavement shall be pulverized to the depth specified and mixed to obtain a homogeneous mixture. After mixing, the pulverized material shall be spread and shaped to conform to the lines, grades, and cross-sections shown in the plans.
- D. The pulverized base, prior to the addition of cement, shall meet the following gradation requirements:

Sieve Size	Percent Retained (by Weight)
2"	0

1 ½"	0 to 5
1"	3 to 15

- E. Cement Content shall be selected by the Owner’s Representative based on compressive strength tests on pulverized samples of the existing pavement. The mix design shall be performed in accordance with Test Method Tex-120-E. The cement content shall be selected so the base material, when placed as described in this Section, shall have a minimum compressive strength of 650 psi at 7 days when tested in accordance with Tex-120-E.
- F. Cement shall be spread on the prepared base (as described above) only in that area where the mixing, compacting, and finishing operations can be completed during the same working day. Cement shall be spread by an approved spreader or by bag distribution at a uniform rate and in such a manner to reduce to a minimum the scattering of cement by wind. Should excessive wind conditions exist, or if excessive blowing of cement occurs due to inadequate spreading methods, the Owner’s Representative may direct the CONTRACTOR to cease operations until such time as the wind subsides, or adequate spreading equipment can be employed.
- G. The cement shall be dry-mixed with the prepared base materials prior to the addition of water. Immediately after dry-mixing, sufficient quantities of water shall be applied and mixed with the base to adjust the moisture content to within two (2) percentage points of the optimum moisture content as determined by the standard proctor method (ATM D698). After mixing, the loose mixture shall be spread and shaped to conform to the lines, grades and cross sections shown on the plans.

3.04 **COMPACTION**

- A. Compact the mixture to a minimum of 95% of the maximum dry density as determined by ASTM D698.
- B. Finish the compacted base course by skinning or blading by a maintainer, removing all loose material from the surface. The surface shall be sprinkled with small amounts of water as needed while rolling with a pneumatic tired roller. The pneumatic tired roller used for finish rolling shall be light enough to prevent surface cracking. Rework and recompact those areas where cracking develops.
- C. Maintain a smooth surface conforming to the lines, grades, and cross sections shown on the plans.

3.05 **CURING**

- A. The completed base shall be moist cured for a minimum of three (3) days or prevented from drying by addition of an asphalt material following the requirements of Section 02511 in these specifications.
- B. Completed sections may be opened immediately to local traffic and construction equipment only after the curing period, or as directed by the Owner's Representative, provided the material has hardened sufficiently to prevent damage to the base course by equipment or traffic.

3.06 MAINTENANCE

- A. The CONTRACTOR is required to maintain the base course in good condition until all work has been completed and accepted. Maintenance shall include immediate repairs to any defects that may occur. Repairs shall be performed for the full depth of the base. The addition of thin layers for any reason will not be permitted. This work shall be done by the CONTRACTOR at his own expense.

3.07 TOLERANCES

- A. Completed surface of the road base shall be smooth and conform to the specified cross section and established lines and grades.
- B. Top surface of base course shall be within plus or minus ¼ inch in cross section, or in 16-ft. length.

3.08 FIELD QUALITY CONTROL

- A. Testing will be performed under provisions of Section 01410 - Testing Laboratory Services.
- B. A minimum of one core will be taken at random locations per 500 linear feet per lane of roadway or 500 square yards of base, whichever is less, to determine in-place depth.
- C. CONTRACTOR may, at his own expense, request additional cores in the vicinity of cores indicating nonconforming in-place depths to determine limits of nonconformance. If the tests falls below the required depth, place and compact additional material at no additional cost to the OWNER.
- D. Compaction Testing will be performed in accordance with ASTM D1556 or ASTM D2922 and ASTM D3017 at a random location near each depth determination core. Rework and recompact areas that do not conform to compaction requirements.
- E. Fill core holes with new compacted crushed stone flexible base.

END OF SECTION