Surface area measurements will be based on the width of the base as specified in the Contract Documents and the actual length measured along the center line of the base surface.

The temporary graded aggregate base wedge constructed in conformance with Standard No. MD-104.92, maintaining the 4:1 or flatter slope, compaction, and removal of the material, will not be measured but the cost will be incidental to the Graded Aggregate Base Course item.

**501.04.02** The portland cement stabilizing agent and the emulsified asphalt for seal coat will not be measured but the cost will be incidental to the Graded Aggregate Base Course Stabilized with Cement item.

**501.04.03 Bank Run Gravel Base.** Material manipulation or addition of chemical additives will not be measured but the cost will be incidental to the Bank Run Gravel Base Course item.

**501.04.04** Calcium or Magnesium Chloride will be measured and paid for at the Contract unit price per square yard or if specified in the Contract Documents, at the Contract unit price per ton.

# SECTION 502 — SOIL-CEMENT BASE COURSE

**502.01 DESCRIPTION.** This work shall consist of constructing soil-cement base course using a combination of soil and portland cement, uniformly mixed, moistened, compacted, shaped and sealed. Unless otherwise specified in the Contract Documents, the soil, cement and water may be mixed in a plant or mixed in place, at the Contractor's option.

**502.02 MATERIALS.**

| | |
|---|---|
| Portland Cement | 902 |
| Emulsified Asphalts | 904.03 |
| Production Plant | 915 |
| Soil | 916; Capping shall not contain aggregate retained on 3 in. sieve, nor more than 45 percent retained on a No. 4 sieve |
| Water | 921.01 |

**502.03 CONSTRUCTION.** At least 30 days prior to the start of constructing the base course the Contractor shall submit proposed production plants, location of plants with respect to project site, equipment, and material sources to the Engineer for approval.

The Contractor shall protect the subgrade and base against damage from all causes. Any part of the subgrade or base that is damaged shall be repaired or replaced by the Contractor in a manner acceptable to the Engineer at no additional cost to the Administration.

**502.03.01 Equipment.** All equipment, including the production plant and on-site equipment, shall be subject to approval by the Engineer. The production plant shall be ready for inspection by the Engineer at least 48 hours before the start of construction operations.

**502.03.02 Weather Restrictions.**

**(a) Temperature and Surface Conditions.** Soil-cement base course shall be placed only when the ambient air and surface temperature is at least 40 F and rising. Placing material on a frozen subgrade is prohibited.

**(b) Cold Weather Protection.** The completed base shall be protected from freezing during the seven day curing period.

**(c) Precipitation.** Construction during precipitation is prohibited. When precipitation has occurred during the previous 24 hours, the Engineer will determine if the subgrade is sufficiently dry. If precipitation occurs during placement, material en route from the plant to the job site may be placed at the Contractor's risk.

**502.03.03 Subgrade Preparation.** The approved subgrade set to final line and grade shall be completed at least 500 ft ahead of the base course or as directed by the Engineer before the base course construction begins. The foundation shall be constructed as specified in Sections 204 and 208, the Contract Documents, and as approved by the Engineer. If traffic, including construction equipment, is allowed to use the subgrade foundation or preceding layer, it shall be distributed over the entire width of the course to aid in obtaining uniform and thorough compaction. If ruts are formed, they shall be removed by reshaping and recompacting the affected area as specified in Section 204.

**502.03.04 Design Mix.** At least 45 days prior to the start of constructing the base course, the Contractor shall submit to the Engineer, samples of the soil and portland cement from the proposed material sources. Materials shall be sampled as specified in the Materials Manual. The Engineer shall determine the exact proportions of soil and portland cement, and the optimum moisture content based on these samples. Proportions may be revised during construction to provide for changing conditions as directed by the Engineer. Plant mixed material shall be sampled at the plant. Mixed in place material shall be sampled from a 100 ft long control strip constructed on the site by the Contractor.

**502.03.05 Transportation.** Mixed materials shall be handled and transported to minimize segregation and loss of moisture. All loads shall be covered in conformance with State laws unless hauling is off road and is approved by the Engineer. Dumping into piles, hauling over the completed base course, and stockpiling of mixed material is prohibited unless approved by the Engineer.

**502.03.06 Spreading of Plant Mix Material.** The approved soil-cement mix shall be uniformly spread over the subgrade, without segregating the coarse and fine particles, in layers of approximately equal thickness, to provide the specified planned depth. Shoulders or berms not less than 2 ft wide shall be built up on each side of the base to the top elevation of each uncompacted layer unless the base is placed against concrete curbs or gutters.

**502.03.07 Mixed In Place Construction.** The soil base material shall be pulverized to ensure that, at the completion of moist mixing, 100 percent passes a 1 in. sieve and a minimum of 80 percent passes a No. 4 sieve. Moisture content of soil at the time of cement application shall not vary more than 2 percent from optimum. Portland cement shall then be spread on the soil at the approved spread rate. The Contractor shall use an accurate scale to verify the spread rate in the presence of the Engineer. The pulverized soil and cement shall then be thoroughly mixed. Immediately after the mixing operation is completed, the water shall be sprayed on the mixture at the approved rate using a pressurized distributor. The soil/cement/water combination shall be mixed until it is uniform, as determined by the Engineer.

**502.03.08 Grade or Finished Surface Control.** The surface of the base material shall be brought to line and grade and shaped to the specified cross section. Grades shall be set longitudinally and transversely with fixed controls having a maximum spacing of 25 ft. The surface material shall be compacted and smoothed over its full width using a smooth faced steel wheeled roller or if rolling is not feasible by mechanical tampers and vibratory compactors as approved by the Engineer. The finished grade shall not deviate more than 1/2 in. from the established grade.

**502.03.09 Finishing.** The surface of the base material shall be shaped to the required lines, grades and cross section specified in the Contract Documents.

**502.03.10 Compaction.** Immediately after placement, the soil-cement base shall be compacted to a density of not less than 100 percent of the maximum density as determined by T 134. In place density shall be measured as specified in MSMT 350. The Contractor shall provide a portland cement concrete compaction block as specified in 204.03.04.

At the start of compaction, the moisture in the mixture shall not be more than two percentage points above or below the specified optimum moisture content of the soil-cement mixture. Compaction operations, except on superelevated curves, shall begin at the sides of the course, overlap the shoulder or berm at least 1 ft and progress toward the center parallel to the center line of the roadway. Superelevated curve compaction shall begin at the low side of the superelevation and progress toward the high side. The compaction operation shall continue until all compaction marks are eliminated.

**502.03.11 Construction Joints.** At the end of each day's construction, a straight transverse construction joint shall be formed by cutting back into the completed work to form a vertical face. The base for large, wide areas shall be built in a series of parallel lanes of convenient length and width, complete with longitudinal joints, as approved by the Engineer.

**502.03.12 Protection and Curing.** All spreading, compacting and shaping shall be completed within three hours after the mixing water, cement and soil have come in contact. Any section not conforming to these requirements shall be reconstructed as directed by the Engineer. The surface of the base course shall be maintained in a moist condition until the emulsified asphalt is applied. The emulsified asphalt shall be applied by distributing equipment as specified in 503.03.01 at the rate of 0.2 gal/yd$^2$. Ponding of the emulsified asphalt shall be avoided. If ponding occurs, the Contractor shall use a sand blotter or an equivalent method as approved by the Engineer.

The soil cement base course shall be allowed to cure for a period of seven days. During this period the base course shall be closed to all traffic. Any portion of the base course that is damaged shall be repaired at no additional cost to the Administration.

**502.03.13 Maintenance.** During construction and after completion of the base course, the base shall be maintained by the Contractor until the surface course is placed. Unacceptable work that cannot be repaired shall be replaced for the full depth of the base course at no additional cost to the Administration.

**502.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for furnishing, hauling, mixing, placing, compacting, watering, control strip, emulsified asphalt, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**502.04.01** Soil-Cement Base Course will be measured and paid for at the Contract unit price per square yard.

Surface area measurements will be based on the width of the base as specified in the Contract Documents and the actual length measured along the center line of the base surface.

**502.04.02** Portland Cement for Soil-Cement Base Course will be measured and paid for at the Contract unit price per ton.

# SECTION 503 — CHIP SEAL SURFACE TREATMENT

**503.01 DESCRIPTION.** This work shall consist of applying one or two seal coats or a prime coat followed by one or two seal coats as specified in the Contract Documents or as directed by the Engineer. The seal coat shall consist of applying an emulsified asphalt followed by an application of aggregate. The prime coat, when required, shall consist of preparing and treating an existing surface with emulsified asphalt.

## 503.02 MATERIALS.

| MATERIAL | SECTION | APPLICATION | SIZE OR GRADE | SPREAD RATE lb/yd$^2$ | SPRAY TEMP F | SPRAY RATE SINGLE COAT OR FIRST COAT gal/yd$^2$ | SPRAY RATE FOR SECOND COAT (Double) gal/yd$^2$ |
|---|---|---|---|---|---|---|---|
| Aggregate | 901 | Single or First Coat | No. 7 | 25-50 | — | — | — |
| | | Second (Double Coat) | No. 8 | 20-35 | — | — | — |
| Emulsified Asphalts | 904.03 | Seal Coat | CRS-1 | — | 70-140 | 0.3-0.5 | 0.2-0.4 |
| | | | CRS-2 | — | 140-160 | 0.3-0.5 | 0.2-0.4 |
| | | | RS-1 | — | 70-140 | 0.3-0.5 | 0.2-0.4 |
| | | | RS-2 | — | 140-160 | 0.3-0.5 | 0.2-0.4 |

**503.03 CONSTRUCTION.** At least 30 days prior to the start of placement of the chip seal surface treatment, the Contractor shall submit a proposed plan, including equipment and material sources to the Engineer for approval.

The Contractor shall protect the treated pavement against damage from all causes. Any part of the pavement that is damaged shall be repaired or replaced by the Contractor in a manner acceptable to the Engineer at no additional cost to the Administration.

**503.03.01 Equipment.** All equipment shall be subject to approval by the Engineer.