

## CATEGORY 500 PAVING

### SECTION 501 — AGGREGATE BASE COURSES

**501.01 DESCRIPTION.** This work shall consist of constructing base courses using one of the following as specified in the Contract Documents or as directed by the Engineer:

- (a) Graded aggregate without a stabilizing agent.
- (b) Plant mixed graded aggregate with a portland cement stabilizing agent.
- (c) Bank run gravel.
- (d) Sand aggregate.

#### 501.02 MATERIALS.

Graded Aggregate for Base Course	901.01
Bank Run Gravel for Base Course	901.01
Sand Aggregate Base Course	
Coarse Aggregate	901.01, Size No. 57
Fine Aggregate	916.01.01
Portland Cement	902 Type I or IA
Emulsified Asphalt	904.03
Production Plant	915
Water	921.01
Moisture and Dust Control Agents	921.02

**501.03 CONSTRUCTION.** At least 30 days prior to the start of constructing the base course, the Contractor shall submit the proposed plants, 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.

Excavation for widening shall be limited to an area which can be backfilled the same working day using graded aggregate base course. Refer to Standard No. MD-104.92 for the area to be backfilled. The temporary graded aggregate base wedge shall be maintained with a 4:1 or flatter fill slope. The material shall be compacted as directed by the

Engineer. The graded aggregate base wedge shall remain in place until placement of the hot mix asphalt base.

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

**501.03.02 Weather Restrictions.**

- (a) **Temperature and Surface Conditions.** Graded aggregate stabilized with portland cement shall be placed only when the ambient air and surface temperature is at least 40 F and rising. Graded aggregate, bank run gravel and sand aggregate base shall be placed only when the ambient air and surface temperature is at least 32 F and rising. Placing material on a frozen subgrade is prohibited.
- (b) **Cold Weather Protection.** The plant mixed graded aggregate stabilized 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. Any material en route from the plant to the job site may be placed at the Contractor's risk.

**501.03.03 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.

**501.03.04 Stabilized Graded Aggregate Base Mix.** The amount of portland cement shall be determined as specified in MSMT 321.

**501.03.05 Bank Run Gravel Base Mix.** The Contractor will be permitted to mix or blend materials using chemical additives approved by the Engineer.

**501.03.06 Sand Aggregate Base Mix.** The mixture shall contain 35 to 40 percent coarse material as measured by dry weight of the total mix.

**501.03.07 Transportation.** Mixed base materials shall be handled and transported in a manner that minimizes 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 material on the job site is prohibited unless approved by the Engineer.

**501.03.08 Spreading.** The base material shall be uniformly spread 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.

**501.03.09 Grade or Finished Surface Control.** The surface of the base material shall be shaped to the required lines, grades and cross section specified in the Contract Documents. 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.

**501.03.10 Compaction.** Immediately after placement, the base material shall be compacted to the required density. During compaction operations, the moisture content of the material shall be maintained within 2 percent of the materials optimum moisture. The optimum moisture content and maximum dry density shall be determined as follows:

- (a) Sand Aggregate Base and Bank Run Gravel Base: T 180
- (b) Graded Aggregate Base and Graded Stabilized Aggregate Base: MSMT 321

Graded aggregate for base, bank run gravel base, and sand aggregate base shall be compacted to a minimum density of 97 percent of the maximum dry density. Graded stabilized aggregate base shall be compacted to a minimum dry density of 95 percent of the maximum dry density. In place density shall be measured as specified in MSMT 350 or 352.

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.

**501.03.11 Graded Stabilized Aggregate Base Protection and Curing.**

When graded stabilized aggregate base is used, the spreading, compacting and shaping shall be completed within three hours after the mixing water, cement and aggregate have come in contact. Any section not conforming to these requirements shall be reconstructed as directed by the Engineer at no additional cost to the Administration. The surface of the stabilized aggregate base course shall be maintained in a moist condition until the emulsified asphalt seal coat 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<sup>2</sup>. 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 stabilized aggregate 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 seal coat that is damaged shall be repaired at no additional cost to the Administration.

**501.03.12 Moisture and Dust Control Agents.** When specified in the Contract Documents or as directed by the Engineer, calcium or magnesium chloride shall be added at the plant or applied to the surface of the graded aggregate, bank run gravel, or sand aggregate base at the project site. Calcium chloride shall be applied at the rate of 1 lb/yd<sup>2</sup>. Magnesium chloride shall be applied at the rate of 1 lb/yd<sup>2</sup> or as a solution at the rate of 1/2 gal/yd<sup>2</sup>.

**501.03.13 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 at no additional cost to the Administration.

**501.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for all aggregate, furnishing, hauling, placing, curing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**501.04.01** Graded Aggregate Base Course, Graded Aggregate Base Course Stabilized with Cement, Bank Run Gravel Base Course, and Sand Aggregate 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.

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.