# SECTION 32 11 23

# AGGREGATE BASE COURSE

## PART 1 - GENERAL

### 1.01 SECTION INCLUDES

A. Aggregate base material.

B. Installation standards.

C. Spreading of material.

D. Compacting.

E. Field quality control.

### 1.02 RELATED SECTIONS

A. Aggregate subbase for pavements and foundations is specified in Section 32 11 17 - Aggregate Subbase Courses.

### 1.03 CLASSIFICATION

A. Aggregate bases are designated as Class 1 or Class 2. The class of aggregate base shall be as indicated.

### 1.04 MEASUREMENT AND PAYMENT

A. General: Measurement and payment for aggregate base course will be either by the lump-sum method or by the unit-price method as determined by the listing of the bid item for aggregate base course indicated in the Bid Schedule of the Bid Form.

B. Lump Sum: If the Bid Schedule indicates a lump sum for aggregate base course, the Lump-sum method of measurement and payment will be in accordance with Section 01 20 00 - Price and Payment Procedures, Article 1.03.

C. Unit Price:

1. If the Bid Schedule indicates a unit price for aggregate base course, the unit price method of measurement and payment will be as follows:

   a. Measurement: Aggregate base course will be measured for payment by the ton or cubic yard, as designated in the contract item, for each class of aggregate placed in the Work. If designated by cubic yard, the quantity for payment will be based on the dimensions, neat lines or pay lines, and sections indicated in the Contract Drawings.

   b. Payment: Aggregate base course will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.04.C.1.

## 1.05 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C136 — Test Method for Sieve Analysis of Fine and Coarse Aggregates
2. ASTM D421 — Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
3. ASTM D1241 — Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses
4. ASTM D1557 — Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
5. ASTM D2419 — Test Method for Sand Equivalent Value of Soils and Fine Aggregate
6. ASTM D2844 — Test Method for Resistance R-Value and Expansion Pressure of Compacted Soils
7. ASTM D2922 — Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
8. ASTM D3017 — Test Method for Moisture Content of Soil and Soil- Aggregate in Place by Nuclear Methods (Shallow Depth)
9. ASTM D3744 — Test Method for Aggregate Durability Index

B. State of California, Department of Transportation (Caltrans), Standard Specifications, 1992 edition:

1. Section 17 — Watering
2. Section 26 — Aggregate Bases

## 1.06 SUBMITTALS

A. General: Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Product Data: Submit source, gradation, R-value, sand equivalent, and durability for the proposed base course material.

C. Test Reports: Submit plant and field test reports as specified in Articles 2.02 and 3.05 herein.

# PART 2 - PRODUCTS

## 2.01 AGGREGATE BASE MATERIAL

A. Aggregate for the two classes of aggregate bases at the time the base material is deposited on the prepared sub grade or sub base shall conform with ASTM D1241 and the following requirements:

1. Class 1 Aggregate Base:

a. Class 1 aggregate base shall consist of crushed stone or gravel, free from vegetable matter and other deleterious substances. Aggregate shall consist of material of which 90 percent by weight shall be crushed particles. Composition of aggregate base, in percentages by weight, shall conform to one of the following gradings, determined in accordance with ASTM C136:

**Percentage Passing Sieves**

| Sieve Sizes | 1-1/2 inch Maximum | 3/4-inch Maximum |
|---|---|---|
| 2-inch | 100 | ----- |
| 1-1/2 inch | 90-100 | 100 |
| 3/4-inch | 50-85 | 90-100 |
| No. 4 | 30-45 | 35-55 |
| No. 30 | 10-25 | 10-30 |
| No. 200 | 2-9 | 2-9 |

b. Class 1 aggregate base shall conform to the following additional requirements:

| Tests | ASTM Test Method | Requirements |
|---|---|---|
| Resistance (R-Value) | D2844 | 80 min. |
| Sand Equivalent | D2419 | 50 min. |
| Durability Index | D3744 | 40 min. |

2. Class 2 Aggregate Base:

a. Class 2 aggregate base shall be free of vegetable matter and other deleterious substances. Coarse aggregate, material contained on the No. 4 sieve, shall consist of material of which 25 percent by weight shall be crushed particles. Class 2 aggregate base shall conform to one of the following gradings, determined in accordance with ASTM C136:

**Percentage Passing Sieves**

| Sieve Sizes | 1-1/2 inch Maximum | 3/4-inch Maximum |
|---|---|---|
| 2-inch | 100 | ----- |
| 1-1/2 inch | 90-100 | ----- |
| 1-inch | ----- | 100 |
| 3/4-inch | 50-85 | 90-100 |
| No. 4 | 25-45 | 35-55 |
| No. 30 | 10-25 | 10-30 |
| No. 200 | 2-9 | 3-9 |

b. Class 2 aggregate base shall conform to the following additional requirements:

| Tests | ASTM Test Method | Requirements |
|---|---|---|
| Resistance (R-Value) | D2844 | 78 min. |
| Sand Equivalent | D2419 | 30 min. |
| Durability Index | D3744 | 35 min. |

## 2.02 SOURCE QUALITY CONTROL

A. The Contractor shall perform sampling and tests of the aggregate base material in accordance with the ASTM Test Methods herein specified, to determine compliance with specified requirements. Samples shall be taken from material as delivered to the site, and shall be prepared in accordance with ASTM D421, as applicable.

B. Aggregate grading or sand equivalent test shall represent no more than 500 cubic yards of base course material or one day's production, whichever is the greater amount.

# PART 3 - EXECUTION

## 3.01 EXAMINATION

A. The Contractor shall call for an inspection by the Engineer and obtain written acceptance of the prepared sub grade or sub base before proceeding with the placement of aggregate base course.

B. The sub grade or sub base to receive aggregate base course, immediately prior to spreading, shall conform to the compaction and elevation tolerances indicated for the material involved and shall be free of standing water and loose or extraneous material.

## 3.02 INSTALLATION STANDARDS

A. Aggregate base course shall be applied over the prepared sub grade or sub base and compacted in accordance with Section 26 of the Caltrans Standard Specifications.

B. Aggregate base course shall have minimum uniform thickness after compaction of dimensions indicated. Where not indicated, compacted thickness shall be 6 inches.

C. All compaction expressed in percentages in this section refers to the maximum dry density as determined by ASTM D1557.

## 3.03 SPREADING OF MATERIAL

A. Aggregate for base course shall be delivered as uniform mixture of fine and coarse aggregate and shall be spread in layers without segregation.

B. Aggregate base course material shall be free from pockets of large and fine material. Segregated materials shall be remixed until uniform.

C. Aggregate base material shall be moisture-conditioned to near optimum moisture content in accordance with the applicable requirements of Section 17 of the Caltrans Standard Specifications.

D. Aggregate base course 6 inches and less in thickness may be spread and compacted in one layer. For thickness greater than 6 inches, the base course aggregate shall be spread and compacted in two or more layers of uniform thickness not greater than 6 inches each.

## 3.04 COMPACTING

A. Relative compaction of each layer of compacted aggregate base material shall be not less than 95 percent as determined by ASTM D1557.

B. Thickness of finished base course shall not vary more than 3/4 inch from the indicated thickness at any point. Base that does not conform to this requirement shall be reshaped or reworked, watered, and recompact to achieve compliance with specified requirements.

C. The surface of the finished aggregate base course at any point shall not vary more than 3/4 inch above or below the indicated grade.

## 3.05 FIELD QUALITY CONTROL

A. The Contractor shall perform field tests in accordance with ASTM D2922 to determine compliance with specified requirements for density and compaction of aggregate base material, and with ASTM D3017 to determine moisture-content compliance of the installed base course.

B. Testing frequency shall be not less than one test for every 2,000 square feet of base course material, per layer or lift.

**END OF SECTION 32 11 23**