

## SECTION 32 11 17

### AGGREGATE SUBBASE COURSES

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Subbase materials.
- B. Installation standards.
- C. Spreading of material.
- D. Compacting.
- E. Field quality control.

##### 1.02 RELATED SECTIONS

- A. Aggregate base course for pavements is specified in Section 32 11 23 - Aggregate Base Courses.

##### 1.03 CLASSIFICATION

- A. Aggregate subbases are designated as Class 1, Class 2, or Class 3. The class of aggregate subbase shall be indicated.

##### 1.04 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for aggregate subbase 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 subbase indicated in the Bid Schedule of the Bid Form.
- B. Lump Sum: If the Bid Schedule indicates a lump sum for aggregate subbase, 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 subbase, the unit price method of measurement and payment will be as follows:
    - a. Measurement: Aggregate subbase will be measured for payment by the cubic yard of each class of aggregate placed in the Work. The quantity for payment will be the square area placed multiplied by the thickness, and divided by the cubic yard, based on the dimensions, neat lines or pay lines, and sections indicated on the Contract Drawings.
    - b. Payment: Aggregate subbase will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method

**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)

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

1. Section 17 Watering
2. Section 25 Aggregate Subbases

**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, and sand equivalent for the proposed subbase 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 SUBBASE MATERIAL**

- A. Aggregate for the various classes of aggregate subbases at the time the subbase material is deposited on the prepared sub grade shall conform with ASTM D1241 and the following

requirements:

1. Aggregate for Class 1, Class 2, and Class 3 aggregate subbases shall be clean and free from vegetable matter and other deleterious substances, and shall be of such composition that it can be compacted readily under watering and rolling to form a firm, stable base.
2. The percentage composition by weight of Class 1, Class 2, and Class 3 aggregate subbases shall conform to the grading requirements of the following table for the class specified when determined by ASTM C136:

**Percentage Passing**

<u>Sieve Sizes</u>	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>
3 inches	100	100	100
2-1/2 inches	90-100	90-100	90-100
No. 4	35-70	40-90	50-100
No. 200	0-20	0-25	0-30

- B. Class 1, Class 2, and Class 3 aggregate subbases shall also conform to the quality requirements of the following table for the class specified:

**ASTM Test**

<u>Tests</u>	<u>Method</u>	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>
Sand Equivalent	D2419	20 min.	20 min.	20 min.
Resistance (R-value)	D2844	60 min.	50 min.	40 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 subbase material or one day's production, whichever is the greater amount.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. The Contractor shall request an inspection by the Engineer and obtain acceptance of the prepared sub grade before proceeding with placement of the aggregate subbase.

- B. The sub grade to receive aggregate subbase, 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 subbase shall be applied over the prepared sub grade and compacted in accordance with Section 25 of the Caltrans Standard Specifications.
- B. Aggregate subbase shall be minimum uniform thickness after compaction of dimensions indicated. Where not indicated, compacted thickness shall be six inches.
- C. Compaction expressed in percentage in this Section refers to the maximum dry density as determined by ASTM D1557.

**3.03 SPREADING OF MATERIAL**

- A. Aggregate for subbase shall be delivered as uniform mixtures of fine and coarse aggregate and shall be spread in layers or windrows without segregation.
- B. When approved by the Engineer, aggregate subbase may be dumped in piles on the sub grade and spread ahead to stabilize the sub grade.
- C. Aggregate subbase shall be free from pockets of large and fine material. Segregated materials shall be remixed until uniform.
- D. Aggregate subbase material shall be moisture-conditioned to near optimum moisture content in accordance with the applicable requirements of Section 17 of the Caltrans Standard Specifications.
- E. Aggregate subbase 6 inches and less in thickness may be spread and compacted in one layer. For thickness greater than 6 inches, the subbase 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 subbase material shall be not less than 95 percent as determined by ASTM D1557.
- B. Thickness of finished subbase shall not vary more than one inch from the indicated thickness at any point. Subbase 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 subbase at any point shall not vary more than one 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 subbase material, and with ASTM D3017 to determine moisture-content compliance of the installed subbase

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material.

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

**END OF SECTION 32 11 17**