DIVISION C300 – BASES

SECTION C300 – AGGREGATES AND BASES

C300.01 Summary. This Division covers the utilization of aggregates as base coarses, in Portland cement concrete, in hot-mix asphalt, and various other items. Aggregates are used in many aspects of road, bridge, and other infrastructure construction, and are an important foundation for any infrastructure system.

C300.02 Production and Operations. For an aggregate source to be approved for use, it must first be established that the source meets all specification requirements for material quality. Verification of conformance to specifications occurs after the contractor submits information that identifies the proposed aggregate supplier. The contractor shall ensure that only a single source of aggregate is used for the full depth, width, and length of placement of aggregate base as referenced in the plans or as approved by the Engineer. Aggregates used for hot-mix asphalt and Portland cement production shall conform to all applicable specifications and approved mix designs.

The Materials & Research Section is to be contacted by the contractor prior to bulk shipment from the aggregate supplier to the project site so that the Materials & Research Section can take samples from the source for conformance testing. After this process has been completed, and the Materials & Research Section has verified that the material can conform to the Specification, the aggregate can be shipped to the project where further sampling and testing may be performed to verify specification conformance. Acceptance of an aggregate source does not constitute acceptance at the project site. If the material shipped is tested at the job site and does not meet Specifications it will be rejected for use based on field tests. Additional information pertaining to specific sampling and testing includes:

(a) *Shipment to a Specific Contract.* Materials may be sampled and tested for a specific contract to ensure that the specified material arrives at the project site and that the material conforms to the Specification requirements.

(b) *Shipment to a Portland Cement Concrete Plant.* Aggregates are sampled and tested to ensure that they conform to the Specifications for fine and coarse aggregates for Portland cement concrete. Further Quality Assurance testing is performed at the production plant. For more details, see Division 500.

(c) *Reference Tests.* These occur when it is impractical to test aggregate on site because a small quantity is being used. Aggregate samples are obtained and tested to ensure that they meet the specifications for a number of contracts using small quantities from the same source.

C300.03 Obtaining Samples. The method used to obtain an aggregate sample depends on the type of aggregate being sampled, the location from which the aggregate is to be sampled, and the proposed use of the aggregate.

Fine aggregate samples are normally taken at the project site or production facility where the material is being used. On some occasions, depending on job specifics, the fine aggregate samples may be taken from the source. Coarse aggregate samples may be taken at the project site or production facility.

There are numerous circumstances under which aggregate materials are sampled in the field. Aggregate base material should be sampled after spreading the material. Additionally, aggregates used in surface treatment operations should be sampled from the stockpiled materials, along with aggregate used for backfill.

The sampling procedures followed for aggregate materials and other items included in Division 300 are listed in Table C-6. Recommended quantities for sampling and testing, based on total usage at the site, are listed in Table B-1.

C300.04 Handling, Packaging, and Shipping. Aggregate samples taken in the field are carefully transported to the Materials & Research Laboratory for testing. A great deal of care is taken to ensure that the material arrives at the Laboratory in the same condition as it was taken in the field. Upon arrival at the Laboratory, the samples are given identification numbers that can be used to reference the location, date, what the sample is being tested for, and the project. The identification system used for aggregate samples is described in Table C-7.

C300.05 Tests Performed. Upon receiving the sample, the Materials & Research Laboratory initiates the test procedures pertinent to the project from which the sample was obtained. Test procedures that may be performed on a specific aggregate sample are listed in Table C-8. Specific worksheets are used for AASHTO T-84 (Form LB-51) and AASHTO T85 (Form LB-58) tests, which are provided in Part E.

In addition to testing aggregate samples, the Materials & Research Laboratory may also certify or test other items that are included in the Division 300 Items list. Materials to be certified, such as some asphalt binder materials, are verified for their physical properties according to the standards and test methods that are listed in Table C-9. Portland cement concrete items are tested according to procedures specified in Table C-8.

C300.06 Test Report Evaluations and Distributions. The distribution of aggregate test results depends on where the sample was obtained, the purpose of the test, and the Materials & Research Section that obtained the sample. Table C-5 shows the distribution of test reports.

Table C-5: Division 300 - Distribution of Test Results

Sample Type	Fine Aggregate (LB-50)	Coarse Aggregate (LB-59)
PCC Plant	PCC Supervisor Sample Location Supplier Original to Plant File	PCC Supervisor PCC Plant Supplier Plant File Original to Aggregate Supervisor
Random	District PCC Section Contract File Original to QA Supervisor	District Job Control Supervisor Plant File Original to QA Supervisor
PCC Plant Random		(1) Job Control Supervisor Plant File Original to QA Supervisor
Reference	Supplier Plant File Original to Aggregate Supervisor	
Quarry		Supplier Quarry File Original to Aggregate Supervisor
GABC – Jobsite	District Supplier Job Control Supervisor Contract File Original to Aggregate Supervisor	

Table C-6: Division 300 - Sampling Methods	
Method ID	**Method Name**
DOH 3	Sampling Soil and Aggregate Base
DOH 4	Borrow Pit Sampling for Source Approval
DOH 5	Sampling Stone, Slag, Gravel, Sand, and Stone Block for Use as Highway Materials
AASHTO T2	Sampling of Aggregates
AASHTO T40	Sampling Bituminous Material
AASHTO T248	Reducing Samples of Aggregate to Testing Size

Table C-7: Division 300 - Sample Identification Numbering
Coarse aggregate samples start with Test # 1 on January 1 and are numbered consecutively until December 31. Example: D-1-02 D = Delaware , 1 = test number, 02 = Year 2002
Fine aggregate samples are numbered consecutively from the start of the fiscal year, July 1, until June 30 the following year
Fine and coarse aggregate specific gravity tests numbers are numbered consecutively from initiation of the computer program storing data to now.
Soil survey and borings are numbered consecutively by the computer tracking system. For example, 02001, 02 indicates the year 2002, 001 represents the data number

Table C-8: Division 300 - Test Methods	
Test ID	**Test Name**
DOH 6	Approval of Sources of Fine and Coarse Aggregate
DOH 16	Determining Maximum Density for Bituminous Concrete Utilizing the Control Strip Procedure
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM D2901	Cement Content of Freshly Mixed Soil-Cement
AASHTO R15	Asphalt Additives and Modifiers
AASTHO T11	Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
AASHTO T19	Bulk Density ("Unit Weight") and Voids in Aggregate
AASHTO T21	Organic Impurities in Fine Aggregates for Concrete
AASHTO T22	Compressive Strength of Cylindrical Concrete Specimens
AASHTO T23	Making and Curing Concrete Test Specimens in the Field
AASHTO T27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T49	Penetration of Bituminous Materials
AASHTO T59	Testing Emulsified Asphalts
AASHTO T72	Saybolt Viscosity
AASHTO T84	Specific Gravity and Absorption of Fine Aggregate
AASHTO T85	Specific Gravity and Absorption of Coarse Aggregate
AASHTO T88	Particle Size Analysis of Soils
AASHTO T89	Determining the Liquid Limit of Soils
AASHTO T90	Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T96	Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T99	Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in) Drop
AASHTO T164	Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
AASHTO T166	Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens
AASHTO T191	Density of Soil In-Place by the Sand-Cone Method
AASHTO T209	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
AASHTO T224	Correction for Coarse Particles in the Soil Compaction Test
AASHTO T255	Total Evaporable Moisture Content of Aggregate by Drying
AASHTO T269	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures

Table C-9: Division 300 - Certification Test Procedures / Material Standards	
Test ID	**Test Name**
AASHTO M43	Sizes of Aggregate for Road and Bridge Construction
AASHTO M85	Portland Cement
AASHTO M208	Cationic Emulsified Asphalt
AASHTO M226	Viscosity-Graded Asphalt Cement
AASHTO M283	Coarse Aggregate for Highway and Airport Construction