

(B) Chemical Admixtures

Use a quantity of chemical admixture within the range shown on the current list of approved admixtures issued by the Materials and Tests Unit.

(C) Strength of Grout

Provide grout with a compressive strength at 3 and 28 days of at least 2,500 psi and 4,500 psi, respectively, unless required otherwise in the *Standard Specifications*. The compressive strength of the grout will be considered the average compressive strength test results of three 2" cubes at each age. Make cubes that meet AASHTO T 106 from the grout delivered for the work or mixed on-site. Make cubes at such frequencies as the Engineer may determine and cure them in accordance with AASHTO T 106.

(D) Height Change

Provide nonshrink grout with a height change at 28 days between 0% and 0.3%.

(E) Durability

Provide freeze-thaw durable grout with a durability factor of at least 80.

(F) Temperature Requirements

The grout temperature at the time of placement shall be not less than 50°F nor more than 90°F. Do not place grout when the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 40°F.

(G) Elapsed Time for Placing Grout

Agitate grout continuously before placement. Regulate the delivery so the maximum interval between the placing of batches at the work site does not exceed 20 minutes. Place grout before exceeding the times in Table 1003-1. Measure the elapsed time as the time between adding the mixing water to the grout mix and placing the grout.

Air or Grout Temperature, Whichever is Higher	Maximum Elapsed Time	
	No Retarding Admixture Used	Retarding Admixture Used
90°F or above	30 minutes	1 hr. 15 minutes
80°F through 89°F	45 minutes	1 hr. 30 minutes
79°F or below	60 minutes	1 hr. 45 minutes

(H) Mixing and Delivery

Use grout free of any lumps and undispersed cement. Comply with Articles 1000-9 through 1000-12 to the extent applicable for grout instead of concrete.

SECTION 1005 GENERAL REQUIREMENTS FOR AGGREGATE

1005-1 GENERAL

Obtain aggregates from sources participating in the Department's Aggregate QC/QA Program as described in Section 1006. Obtain aggregates from pre-approved sources, or have the source approved before use. Approval of such sources is based not only on the quality of the aggregate, but also on satisfactory production facilities and procedures. A list of approved aggregate sources participating in the Department's Aggregate QC/QA Program in

Section 1005

1 North Carolina and adjoining states is available from the Materials and Tests Unit. This list
2 includes aggregates meeting Specification requirements but whose use is restricted due to
3 history of unsatisfactory service performance. Use of aggregates is allowed in the work
4 provided they have been properly stockpiled in units of not less than 300 tons, tests of
5 representative samples of these aggregates indicate satisfactory compliance with the
6 Specifications and the source meets all the requirements of the Aggregate QC/QA Program.

7 Separate aggregate containing rock of more than one identifiable rock type or particles of
8 visibly different degrees of weathering in amounts of 10% or more into each individual type.
9 Aggregate is acceptable only if each type does not exceed the percentage of wear specified for
10 a particular use.

11 Blended aggregates from different sources are allowed if all aggregates meet the
12 Specifications for soundness or resistance to abrasion.

13 **1005-2 HANDLING AND STORING AGGREGATES**

14 Handle and stockpile aggregates in such a manner to minimize segregation.

15 Provide sites for aggregate stockpiles that are cleared, grubbed and cleaned with a firm,
16 smooth and well drained ground surface. Maintain a cover of at least 3" of aggregate over the
17 ground surface to avoid the inclusion of soil or foreign material. Operate trucks or other
18 equipment on a stockpile in an acceptable manner.

19 Space or separate with suitable walls or partitions stockpiles of different types or sizes of
20 aggregates to prevent the mixing of the aggregates. Identify stockpiles with signs that can be
21 read from a distance of at least 50 ft from the pile.

22 Do not allow the stockpile to become contaminated with foreign matter or degrade
23 excessively. Failure of aggregate samples to meet all gradation requirements due to excessive
24 degradation will be determined by sieve tests of samples taken from any portion of the
25 stockpile and is cause for discontinuance of such stockpiling procedure.

26 Use material that consists mainly of rock dust produced through normal handling of the
27 aggregate and that is essentially free from clay or shale.

28 **1005-3 GRADATION**

29 Grade all standard sizes of aggregate to meet Tables 1005-1 or 1005-2.

30 **1005-4 TESTING**

31 Aggregates will be tested in accordance with the test methods below except where other test
32 procedures are required by other articles covering a particular application.

Property	Test Method
Gradation	AASHTO T 27 and T11, AASHTO T 88 as Modified for Base Course and Stabilizer
Liquid Limit	AASHTO T 89 as Modified
Plasticity Index	AASHTO T 90
Resistance to Abrasion (Percentage of Wear)	AASHTO T 96
Soundness	AASHTO T 104 Using Sodium Sulfate

33 Copies of modified test procedures are available from the Materials and Tests Unit.

**TABLE 1005-1
AGGREGATE GRADATION - COARSE AGGREGATE**

Std. Size #	Percentage of Total by Weight Passing																Remarks
	2"	1 1/2"	1"	3/4"	1/2"	#4	#8	1/2"	#10	#16	#40	#200					
4	100	90-100	20-55	0-15	-	-	-	-	-	-	-	0-0.6 ^A	-	-	-	-	Asphalt Plant Mix
467M	100	95-100	-	35-70	-	0-5	-	-	-	-	-	0-0.6 ^A	-	-	-	-	Asphalt Plant Mix
5	-	100	90-100	20-55	0-10	-	-	0-10	-	-	-	0-0.6 ^A	-	-	-	-	AST Mat Coat, Sediment Control Stone
57	-	100	95-100	-	25-60	0-10	0-5	25-60	-	-	-	0-0.6 ^A	-	-	-	-	AST, Str. Conc., Shoulder Drain, Sediment Control Stone
57M	-	100	95-100	-	25-45	0-10	0-5	25-45	-	-	-	0-0.6 ^A	-	-	-	-	AST, Portland Cement
6M	-	-	100	90-100	20-55	0-8	-	20-55	-	-	-	-	-	-	-	-	AST, Concrete Pavement
67	-	-	100	90-100	-	0-10	0-5	-	-	-	-	0-0.6 ^A	-	-	-	-	AST
78M	-	-	-	100	98-100	20-45	0-15	98-100	-	-	-	0-0.6 ^A	-	-	-	-	AST, Str. Conc., Drilled Piers, Asphalt Plant Mix
14M	-	-	-	-	-	35-70	5-20	-	-	0-8	-	0-0.6 ^A	-	-	-	-	AST, Weep Hole Drains, Str. Concrete
9	-	-	-	-	-	85-100	10-40	-	-	0-10	-	0-0.6 ^A	-	-	-	-	AST
ABC	-	100	75-97	-	55-80	35-55	-	55-80	25-45	-	14-30	4-12 ^B	-	-	-	-	-
ABC (M)	-	-	-	-	100	5-40	0-20	100	-	0-10	-	0-2.5 ^B	-	-	-	-	Aggregate Stabilization, Aggregate/Base Course, Asphalt Plant Mix
Light-weight	-	100	75-100	-	45-79	20-40	-	45-79	0-25	-	-	0-12	-	-	-	-	AST

A. See Subarticle 1005-4(A).

B. See Subarticle 1005-4(B).

Section 1005

- 1 (A) When aggregates are used for Portland cement concrete, asphalt treatment and asphalt
 2 plant mix, the requirements pertaining to material passing the No. 200 sieve are as
 3 follows:
- 4 (1) When tested during production, the amount of material passing the No. 200 sieve
 5 shall be no greater than 0.6%. When tested in a stockpile at the quarry site, the
 6 amount of material passing the No. 200 sieve shall be no greater than 1.0%.
- 7 (2) When tested at the job site before use, the amount of material passing the
 8 No. 200 sieve shall:
- 9 (a) Be no greater than 1.5% for aggregate used in Portland cement concrete or
 10 asphalt surface treatment.
- 11 (b) Be no greater than 2.0% for aggregate used in asphalt plant mix.
- 12 (3) If a stockpile at the job site is found to contain in excess of the specified amount of
 13 material passing the No. 200 sieve before use, the Engineer may approve its use
 14 provided:
- 15 (a) For aggregate used in Portland cement concrete, the total percentage by weight
 16 passing the No. 200 sieve in the combined coarse and fine aggregate in the mix
 17 does not exceed 2.0%, and provided no increase in water-cement ratio is
 18 required by the use of this aggregate.
- 19 (b) For aggregate used in asphalt plant mix, the total percentage by weight of minus
 20 No. 200 material in the plant mix being produced, as determined by the
 21 extraction test, can be maintained within the limits allowed by the job mix
 22 formula.
- 23 (B) For ABC and ABC(M), in addition to the gradation requirements, the material passing
 24 the No. 40 sieve shall not have a LL in excess of 30 nor a PI in excess of 6. For ABC
 25 used in asphalt plant mix, when tested during production, in a stockpile at the quarry site
 26 or at the job site before use, the amount of material passing the No. 200 sieve shall be
 27 from 0.0% to 12.0% by weight and the gradation requirements for material passing the
 28 No. 10 sieve (soil mortar) required in Section 1010 for ABC will not apply. For ABC not
 29 used in asphalt plant mix, the gradation requirements for material passing the
 30 No. 10 sieve (soil mortar) will be as required in Section 1010.

TABLE 1005-2									
AGGREGATE GRADATION FINE AGGREGATE									
Std. Size #	Percentage of Total by Weight Passing								Remarks
	3/8"	#4	#8	#16	#30	#50	#100	#200	
1S	100	90- 100		40- 85		0-20		0-3	Blotting Sand, Asphalt Retreatment
2S	100	95- 100	80- 100	45- 95	25- 75	5-30	0-10	0-3	Concrete, Shotcrete, Grout, Subsurface Drainage, Blotting Sand
2MS		95- 100	80- 100	45- 95	25- 75	5-35	0-20	0-8 ^A	Concrete, Shotcrete, Grout, Subsurface Drainage
4S		100	95- 100			15- 45	0-10	0-5	Mortar

- 31 A. When tested at the job site before use, the amount of material passing the
 32 No. 200 sieve shall not be greater than 10%.