

CATEGORY 900 MATERIALS

900.01 GENERAL. All materials included in this Category will be sampled, tested, and inspected as specified in the most recently published cited standards. The specification limits for each material are established and no deviation from these limits will be permitted except when, in the judgment of the Engineer, the deviation will not be detrimental to the work. In these cases, refer to the appropriate specification governing price adjustments for nonconformance.

Within 30 days after receipt of notification of award of the Contract, the Contractor shall submit in writing, to the Regional Engineer, the sources from which the Contractor proposes to obtain all materials to be incorporated into the project. All nursery stock sources shall be updated and submitted to the Regional Engineer 45 days prior to the planting season in which the planting is to begin. No material shall be introduced into the work until approval of sources has been obtained. The Administration reserves the right to completely or partially test any material for Specification compliance.

Sampling shall conform to the Administration's Sample Testing and Frequency Guide unless otherwise directed by the Engineer. All source approvals are made subject to continuing production of materials conforming to these Specifications. Material sources may be rejected where it is evident that the material tends to be of marginal quality when compared to the Specification limits in any of its specified properties.

900.02 TECHNICIAN QUALIFICATION REQUIREMENTS. Technicians performing Quality Assurance/Quality Control sampling and testing on Administration projects shall be qualified through the certification program provided by the Administration. All private laboratories performing testing on Administration projects shall be in the AASHTO Accreditation Program or approved by the Administration.

Technicians include those who work for inspection agencies, Contractors, consultants, producers, private laboratories, as well as State and local government employees.

SECTION 901 — AGGREGATES

901.01 This section covers the material details, quality requirements, and test methods applicable to aggregates. Grading requirements are outlined in Tables 901 A and 901 C; physical properties in 901 B and

901 D. Force drying may be used in the preparation of samples for grading tests conducted in the field.

901.01.01 Steel Slag. Steel slag may be used for chip seal surface treatment, but it shall not be used for any other aggregate.

TABLE

AGGREGATE GRADING REQUIREMENTS

MATERIAL		SIEVE SIZE					
		2-1/2"	2"	1-1/2"	1"	3/4"	1/2"
CRUSHER RUN AGGREGATE CR -6 (f)(g)		—	100	90-100	—	60-90	—
BANK RUN GRAVEL— SUBBASE		100	—	—	90-100	—	60-100
GRADED AGGREGATE — BASE DESIGN RANGE (a)		—	100	95-100	—	70-92	—
TOLERANCE (b)		—	-2	±5	—	±8	—
BANK RUN GRAVEL — BASE		100	—	—	85-100	—	60-100
COARSE AGGREGATE - PORTLAND CEMENT CONCRETE	57 and UNDERDRAIN (h)	—	—	100	95-100	—	25-60
	67	—	—	—	100	90-100	—
	7	—	—	—	—	100	90-100
FINE AGGREGATE — PORTLAND CEMENT CONCRETE, UNDERDRAIN, and PNEUMATIC MORTAR (d)		—	—	—	—	—	—
COARSE AGGREGATE — LIGHTWEIGHT PORTLAND CEMENT CONCRETE		—	—	—	100	90-100	—
FINE AGGREGATE — LIGHTWEIGHT PORTLAND CEMENT CONCRETE (d)		—	—	—	—	—	—
FINE AGGREGATE/SAND MORTAR and EPOXIES (d)		—	—	—	—	—	—
MINERAL FILLER		—	—	—	—	—	—
CRUSHED GLASS (e)		—	—	—	—	100	—

(a) To establish target values for design.

(b) Production tolerance.

(c) ±2 for field grading (omitting T 11).

(d) Fine aggregate includes natural or manufactured sand.

(e) Crushed glass shall not contain more than one percent contaminants by weight.

(f) Not to be used in the structural part of any Administration project.

(g) Recycled asphalt pavement may be used as a component not to exceed 15 percent and is not subject to aggregate physical property requirements in TABLE 901 B.

(h) When this material is used for drainage applications, recycled concrete shall not be used.

901 A

TEST METHOD T 27

SIEVE SIZE									
3/8"	No. 4	No. 8	No. 10	No. 16	No. 30	No. 40	No. 50	No. 100	No. 200
—	30-60	—	—	—	—	—	—	—	0-15
—	—	—	35-90	—	—	20-55	—	—	5-25
50-70	35-55	—	—	—	12-25	—	—	—	0-8
±8	±8	—	—	—	±5	—	—	—	±3(c)
—	—	—	35-75	—	—	20-50	—	—	3-20
—	0-10	0-5	—	—	—	—	—	—	—
20-55	0-10	0-5	—	—	—	—	—	—	—
40-70	0-15	0-5	—	—	—	—	—	—	—
100	95-100	—	—	45-85	—	—	10-30	0-10	—
10-50	0-15	—	—	—	—	—	—	—	—
100	85-100	—	—	40-80	—	—	10-35	5-25	—
—	100	95-100	—	—	—	—	—	0-25	0-10
—	—	—	—	—	100	—	95-100	—	70-100
—	0-55	—	—	45-85	—	—	—	0-10	—

TABLE

AGGREGATE PHYSICAL

MATERIAL TYPE I	TEST METHOD				
	S P E C I F I C A T I O N	T 90	T 104	T 112	T 113
		PI	SODIUM SULFATE SOUNDNESS	CLAY LUMPS & FRIABLE PARTICLES	CHERT; LESS THAN 2.40 Sp Gr
	max	% max	% max	% max	
CRUSHER RUN AGGREGATE CR-6	D 2940 (h)	6	12	—	—
BANK RUN GRAVEL — SUBBASE	D 2940	9	12	—	—
GRADED AGGREGATE — BASE	D 2940	6	12	—	—
BANK RUN GRAVEL — BASE	D 2940	9	12	—	—
COARSE AGGREGATE — PCC (b)	M 80 CLASS A	—	12	2.0	3.0
FINE AGGREGATE — PCC (b)(d)	M 6 CLASS B	—	10	3.0	—
COARSE AGGREGATE — LIGHTWEIGHT PCC	M 195	—	—	2.0	—
FINE AGGREGATE — LIGHTWEIGHT PCC (f)	M 195	—	—	2.0	—
FINE AGGREGATE/SAND MORTAR & EPOXIES	M 45	—	10	1.0	—
MINERAL FILLER (g)	M 17	NP	—	—	—
CRUSHED GLASS	M 80	—	12	—	—

- (a) Dimensional ratio of calipers shall be 5:1.
- (b) Coarse and fine aggregate for PCC shall be tested for alkali silica reactivity (ASR) as specified in MSMT 212.
- (c) 1.5 if material passing No. 200 sieve is dust of fracture, free of clay or shale.
- (d) In areas exposed to traffic manufactured sand shall have a minimum ultimate polish value of 8, based on the parent rock.
- (e) 5.0 for concrete not subject to surface abrasion.
- (f) Fine aggregate conforming to M 6 may be used if the lightweight concrete does not exceed the maximum unit weight specified in the Contract Documents.
- (g) Fly ash shall have a maximum of 12 percent loss on ignition.
- (h) Other approved inert materials of similar characteristics may be used provided they conform to these provisions. When crushed reclaimed concrete is used, the soundness loss by five cycles of the magnesium sulfate test shall not exceed 18 percent when tested as specified in T 104.

901 B

PROPERTY REQUIREMENTS

TEST METHOD					
T 112 & T 113	T 11	T 113	D 4791 (a)	T 96	T 21
SUM OF CLAY LUMPS, FRIABLE PARTICLES & CHERT	MATERIAL FINER THAN No. 200 SIEVE	COAL & LIGNITE	FLAT & ELONGATED	LOS ANGELES ABRASION	ORGANIC IMPURITIES
% max	% max	% max	% max	% max	max
—	—	—	15	50	—
—	—	—	—	50	—
—	—	—	15	50	—
—	—	—	—	50	—
3.0	1.0(c)	0.5	12	50	—
—	4.0(e)	1.0	—	—	3.0
—	—	—	12	—	—
—	—	—	—	—	3.0
—	—	0.5	—	—	3.0
—	—	—	—	—	—
—	—	—	—	45	—

TABLE
ASPHALT

AGGREGATE GRADING REQUIREMENTS, % PASSING

MATERIAL		SIEVE SIZE		
		19.0 mm	12.5 mm	9.5 mm
HOT MIX ASPHALT SUPERPAVE- 4.75mm		—	—	100
GAP GRADED HOT MIX ASPHALT- 9.5mm		100	100	75-90
GAP GRADED HOT MIX ASPHALT-12.5mm		100	90-99	70-85
GAP GRADED HOT MIX ASPHALT-19.0mm		100	82-88	60 max
MATERIAL		SIEVE SIZE		
		3/4"	1/2"	3/8"
SLURRY SEAL (SS) AND LATEX MODIFIED SLURRY SEAL (LMSS)	MIX II	—	—	100
	MIX III	—	—	100
CHIP SEAL SURFACE TREATMENT	7	100	90-100	40-70
	8	—	100	85-100

Note: HMA Superpave 4.75 mm shall be designed with ESAL ranges of 0.3 to less than 3.0 million.

901 C**MIXES****FOR MIX DESIGN, TEST METHOD T 27**

SIEVE SIZE						
4.75 mm	2.36 mm	1.18 mm	600 μm	300 μm	150 μm	75 μm
80-100	36-76	—	—	—	—	2-12
30-50	20-30	—	—	—	—	8-13
28-40	18-30	—	—	—	—	8-11
22-30	14-20	—	—	—	—	9-11
SIEVE SIZE						
No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
90-100	65-90	45-70	30-50	18-30	10-21	5-15
70-95	45-70	28-50	19-34	12-25	7-18	5-15
0-15	0-5	—	—	—	—	—
10-30	0-10	0-5	—	—	—	—

TABLE

AGGREGATE PHYSICAL PROPERTY

MATERIAL	TEST METHOD				
	S P E C I F I C A T I O N	T 90	T 104	T 112	T 113
		PI	SODIUM SULFATE SOUNDNESS	CLAY LUMPS and FRIABLE PARTICLES	CHELT LESS THAN 2.40 Sp Gr
	max	% max	% max	% max	
HOT MIX ASPHALT SUPERPAVE— 4.75mm	MP2	NP	12	2.0	3.0
HOT MIX ASPHALT SUPERPAVE— 9.5, 12.5, & 19.0mm HIGH ESAL	MP2	NP	12	2.0	3.0
HOT MIX ASPHALT SUPERPAVE— 9.5, 12.5, & 19.0mm LOW ESAL	MP2	NP	12	2.0	3.0
HOT MIX ASPHALT SUPERPAVE—9.5, 12.5, & 19.0mm 8PV	MP2	NP	12	2.0	3.0
HOT MIX ASPHALT SUPERPAVE— 25.0 & 37.5mm	MP2	NP	12	2.0	3.0
GAP GRADED HOT MIX ASPHALT SUPERPAVE— 9.5, 12.5, & 19.0mm	MP2	NP	12	2.0	3.0
SLURRY SEAL (SS) & LATEX MODIFIED SLURRY SEAL (LMSS)	—	NP	12	—	—
CHIP SEAL SURFACE TREATMENT	M 80, CLASS A	—	—	2.0	3.0
CRUSHED GLASS	M 80	—	12	—	—

- (a) Dimensional ratio of calipers shall be 5:1.
- (b) 5.5 when aggregate from no more than two sources are blended. Proportions of blended aggregate shall be determined as specified in MSMT 416. Not applicable for Gap Graded surface mixes or any other surface mix requiring high polish aggregate.
- (c) Polish Value (PV) and British Pendulum Number (BPN) determined on parent rock. When recycled asphalt pavement (RAP) is used the PV shall be 4.
- (d) 1.0 for samples taken at the point of production. Samples taken at any point after shipment shall not have more than 1.5 percent finer than No. 200 sieve.
- (e) PV shall be 9 when the aggregate is blended. When carbonate rock is used it shall have a minimum of 25 percent insoluble residue retained on the No. 200 sieve.
- (f) No blending allowed.
- (g) Dimensional ratio of calipers shall be 3:1/5:1.
- (h) The test for flat and elongated particles (max/min) shall be conducted on the blend.
- (i) Test conducted on particles retained on the No. 4 sieve.

901 D

REQUIREMENTS FOR ASPHALT MIXES

TEST METHOD						
T 112 & T 113	T 11	T 113	D 4791 (a)	T 96	MSMT 411	T 279
SUM OF CLAY LUMPS, FRIABLE PARTICLES and CHERT	MATERIAL FINER THAN No. 200 SIEVE	COAL and LIGNITE	FLAT and ELONGATED (h)	LOS ANGELES ABRASION (LA)	PV (c)	BPN (c)
% max	% max	% max	% max	% max	min	min
3.0	—	0.5	10	45	5 (b)	—
3.0	—	0.5	10	45	5 (b)	—
3.0	—	0.5	10	45	5 (b)	—
3.0	—	0.5	10	45	8 (e)	—
3.0	—	0.5	10	45	—	—
3.0	—	0.5	20/5 (g)(i)	30	8 (e)	—
—	—	—	—	—	4 (f)	16
3.0	1.0(d)	0.5	—	45	—	—
—	—	—	—	45	—	—

901.02 STONE FOR RIPRAP, CHANNELS, DITCHES, SLOPES, AND GABIONS. The stone shall be field or quarry stone of approved quality and may be certified from a source previously approved. Maximum dimension shall not exceed four times the minimum dimension.

901.02.01 Stone for Riprap. Stone for riprap shall be uniformly graded from the smallest to the largest pieces as specified in the Contract Documents. The stone will be accepted upon visual inspection at the point of usage, and shall conform to the following:

CLASS OF RIPRAP	SIZE	PERCENT OF TOTAL by weight
0	Heavier than 33 lb Heavier than 10 lb Less than 1 lb	0 50 10 max
I	Heavier than 150 lb Heavier than 40 lb Less than 2 lb	0 50 10 max
II	Heavier than 700 lb Heavier than 200 lb Less than 20 lb	0 50 10 max
III	Heavier than 2000 lb Heavier than 600 lb Less than 40 lb	0 50 10 max

Note: Optimum gradation is 50 percent of the stone being above and 50 percent below the midsize. Reasonable visual tolerances will apply.

901.03 STONE FOR CHANNELS AND DITCHES. Stone for channels and ditches shall conform to the size requirements of Class I Riprap and the following:

QUALITY REQUIREMENTS	
TEST AND METHOD	SPECIFICATION LIMITS
Apparent Specific Gravity T 85, min	2.50
Absorption T 85, % max	3.0
Sodium Sulphate Soundness - 5 cycles, 2-1/2 to 1-1/2 in. Aggregate T 104, % loss max	20

901.04 STONE FOR SLOPES. Stone for slopes shall conform to M 43, size number 1 omitting T 11. The stone shall also conform to the quality requirements specified in 901.03.

901.05 STONE FOR GABIONS. Stone for gabions shall conform to the quality requirements specified in 901.03 and the following, except that the loss by sodium sulfate shall not be greater than 12 percent:

DEPTH OF BASKET in.	SIZE OF INDIVIDUAL PIECES * in.
6	3 – 6
9	4 – 7
12	4 – 7
18	4 – 7
36	4 –12

*Size of pieces will be determined visually.

SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS

902.01 STORAGE. Storage of materials shall conform to the Contract Documents and as directed by the Engineer.

902.02 CERTIFICATION OF PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT. The manufacturer shall furnish certification as specified in TC-1.02. The certification shall also include:

- (a) The mill shall report its quality control procedures, and submit a new report whenever there is a procedural change.
- (b) The mill's control laboratory shall be inspected by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology on their regularly scheduled visits. The Engineer shall be provided with copies of the reports of these inspections along with an account of the action taken to correct cited deficiencies.
- (c) Records of data accumulated by the quality control procedures shall be produced upon request.