AGGREGATES

The Standard Specifications are revised as follows:

SECTION 904, BEGIN LINE 453, INSERT AS FOLLOWS:

Aggregates, except those used for precast concrete units or fine aggregates used for snow and ice abrasive, shall be supplied by a Certified Aggregate Producer in accordance with 917. Structure backfill may be obtained from a non-CAPP source in accordance with 211.02. SF for SMA mixtures shall also require the following.

(a) Specific gravity quality control tests shall be completed at a frequency of one test per 2000 Mg (ton) produced.

(b) Target bulk specific gravity shall be established using the average of the first four tests.

(c) Subsequent individual tests shall be within 0.050 of the target bulk specific gravity.

(d) Moving average of four consecutive tests shall be within 0.040 of the target bulk specific gravity.

(e) Tests outside these ranges shall require the material to be isolated from the approved stockpile until action has been taken to eliminate the cause of the nonconformity. Any nonconforming test shall be followed immediately by a corrective action. Corrective actions shall include, but are not limited to, investigation for assignable cause, correction of known assignable cause, and retesting.

(f) If it is determined that a new target is necessary, a request shall be made in writing to the District Materials and Tests Engineer to establish the new target.

Dolomite aggregates are defined as carbonate rock containing at least 10.3% elemental magnesium when tested in accordance with ITM 205.

Polish resistant aggregates are defined as those aggregates in accordance with ITM 214. Aggregates meeting these requirements will be maintained on the Department's list of approved Polish Resistant Aggregates.

Sandstone aggregates shall only be used in HMA surface or SMA surface mixtures. Sandstone aggregates are defined as a sedimentary rock composed of siliceous sandgrains containing quartz, chert, and quartzose rock fragments in a carbonate matrix or cemented with silica, calcite, or dolomite. The Materials and Tests Division will determine identification of sandstone.

Steel furnace (SF) slag shall only be used in aggregate shoulders, HMA surface or SMA surface mixtures, dumped riprap, and snow and ice abrasives.

SECTION 904, BEGIN LINE 493a, INSERT AS FOLLOWS:

Characteristic	*PCC*	*HMA*	*SMA*
Physical			
Organic Impurities, AASHTO T 21, lighter than or equal to, Color Standard (Note 1)	*3*		
Acid Insoluble, ITM 202 (Note 2)		*40*	
Soundness			
Freeze and Thaw, AASHTO T 103, Method A, % Max. (Note 3)	*10.0%*	*10.0%*	*10.0%*
Brine Freeze-and-Thaw, ITM 209, % Max. (Note 3)	*12.0%*	*12.0%*	*12.0%*
Sodium Sulfate Soundness, AASHTO T 104, % Max. (Note 3)	*10.0%*	*10.0%*	*10.0%*

NOTES: 1. When subjected to the colorimetric test for organic impurities and a color darker than the standard is produced, it shall be tested for effect of organic impurities on strength of mortar in accordance with AASHTO T 71. If the relative strength at seven days is less than 95% it shall be rejected.

2. For ACBF or GBF slag sands, the minimum acid insoluble content shall be 25%. Acid insoluble requirements shall not apply to crushed limestone or dolomite sands.

3. AASHTO T 104 and ITM 209 may be run at the option of the Engineer, in-lieu of AASHTO T 103.

SECTION 904, BEGIN LINE 539, DELETE AND INSERT AS FOLLOWS:

(c) For SMA Mixtures. Fine aggregate for SMA shall be limestone, dolomite, crushed gravel, SF, or ACBF. SF sand may be used only when the coarse aggregate is SF. Crushed gravels shall have a minimum fine aggregate angularity of 45 in accordance with AASHTO T 304 Method A. Fine aggregates shall be non-plastic in accordance with AASHTO T 90.

(c d) For Pneumatically Placed Mortar. Fine aggregate shall be natural sand suitable for use with a pneumatic cement gun. Fine aggregate shall be size No. 15, or size PP in accordance with 904.02(g h), or an approved gradation from a CAPP source.

(d e) Mortar Sand. Fine aggregate for mortar shall consist of uniformly graded natural sand in accordance with gradation requirements of 904.02(g h) for size No. 15 or an approved gradation from a CAPP source.

(e f) ~~Blank.~~ Mineral Filler for SMA. Mineral filler shall consist of dust produced by crushing stone, portland cement, or other inert mineral matter having similar characteristics. Mineral filler shall be in accordance with the gradation requirements of 904.02(h) for size No. 16. Mineral filler shall be in accordance with ITM 203 or from an ABF slag source. The sieve analysis of mineral filler shall be conducted in accordance with AASHTO T 37 except as noted in 904.06. Mineral filler shall be non-plastic in accordance with AASHTO T 90.

(f g) Snow and Ice Abrasives. Snow and ice abrasives shall be fine aggregates or cinders in accordance with the gradation requirements of 904.02(g h) for size S&I.

When steel slag is used as snow and ice abrasives, and payment is on a tonnage basis, the pay quantity shall be adjusted in accordance with 904.01.

(g h) Sizes of Fine Aggregates.

	SIZES (PERCENT PASSING)					
Sieve Sizes	23 Note 1	24 Note 1	15 Note 1	16	PP	S&I
9.5 mm (3/8 in.)	100	100				100
4.75 mm (No. 4)	95-100	95-100			100	
3.35 mm (No. 6)			100			
2.36 mm (No. 8)	80-100	70-100	90-100		85-95	
1.18 mm (No. 16)	50-85	40-80				
600 μm (No. 30)	25-60	20-60	50-75	100	50-65	
300 μm (No. 50)	5-30	7-40	15-40		15-25	0-30
180 μm (No. 80)				95-100		
150 μm (No. 100)	0-10	1-20	0-10		0-10	
75 μm (No. 200)	0-3	0-6	0-3	65-100		0-7

Note 1: The fine aggregate shall have not more than 45% retained between any 2 consecutive sieves.

(h i) Sampling and Testing. *Sampling and testing shall be conducted in accordance with the following AASHTO and ITMs:*

Acid Insoluble Content ..... ITM 202
**Amount of Material Finer than 75 μm (No. 200) sieve ..... AASHTO T 11*
Brine Freeze-and-Thaw Soundness ..... ITM 209
Control Procedures for Classification of Aggregates ..... ITM 203
Determining the Plastic Limit and Plasticity Index of Soils ..... AASHTO T 90
Mortar Strength ..... AASHTO T 71
Organic Impurities ..... AASHTO T 21
Sampling Aggregates ..... AASHTO T 2
Sampling Stockpiled Aggregates ..... ITM 207
**Sieve Analysis of Aggregate ..... AASHTO T 27*
**Sieve Analysis of Mineral Filler ..... AASHTO T 37*
**Soundness ..... AASHTO T 103, T 104*
Specific Gravity and Absorption, Fine Aggregate ..... AASHTO T 84

**Except as noted in 904.06.*

SECTION 904, BEGIN LINE 589a, DELETE AND INSERT AS FOLLOWS:

Characteristic Classes	AP	AS	A	B	C	D	E	F
Quality Requirements								
Freeze-and-Thaw Beam Expansion, % Max. (Note 1)	.060							
Los Angeles Abrasion, %, Max (Note 2)	40.0	30.0	40.0	40.0	45.0	45.0	50.0	
Sodium Sulfate Soundness, %, Max. (Note 3)	12.0	12.0	12.0	12.0	16.0	16.0	20.0	25.0
Brine Freeze-and-Thaw Soundness, % Max. (Note 4)	30	30	30	30	40	40	50	60
Absorption, %, Max. (Note 5)	5.0	5.0	5.0	5.0	5.0			
Additional Requirements								

Deleterious, %, Max.								
Clay Lumps and Friable Particles	*1.0*	*1.0*	*1.0*	*1.0*	*2.0*	*4.0*		
Non-Durable (Note 6)	*4.0*	*4.0*	*4.0*	*4.0*	*6.0*	*8.0*		
Coke					*(See*	*Note 7)*		
Iron					*(See*	*Note 7)*		
Chert (Note 8)	*3.0*	*3.0*	*3.0*	*5.0*	*8.0*	*10.0*		
Mass Per Cubic Meter for Slag, kg	*1200*		*1200*	*1200*	*1120*	*1120*	*1120*	
Weight Per Cubic Foot for Slag, (lbs), Min	*(75.0)*		*(75.0)*	*(75.0)*	*(70.0)*	*(70.0)*	*(70.0)*	
Crushed Particles, %, Min. (Note 9)								
Asphalt Seal Coats			*70.0*	*70.0*				
Compacted Aggregates			*20.0*	*20.0*	*20.0*	*20.0*		

NOTES: 1. Freeze-and-thaw beam expansion shall be tested and retested in accordance with ITM 210.

2. Los Angeles abrasion requirements shall not apply to BF.

3. Aggregates may, at the option of the Engineer, be subjected to 50 cycles of freezing and thawing in accordance with AASHTO T 103, Procedure A, and may be accepted, provided they do not have a loss greater than specified for Sodium Sulfate Soundness.

4. Brine freeze-and-thaw soundness requirements are subject to the conditions stated in Note 3.

5. Absorption requirements apply only to aggregates used in PCC and HMA mixtures except they shall not apply to BF. When crushed stone coarse aggregates from Category I sources consist of production from ledges whose absorptions differ by more than two percentage points, the absorption test will be performed every three months on each size of material proposed for use in PCC or HMA mixtures. Materials having absorption values between 5.0 and 6.0 that pass AP testing may be used in PCC. If variations in absorption preclude satisfactory production of PCC or HMA mixtures, independent stockpiles of materials will be sampled, tested, and approved prior to use.

6. Non-durable particles include soft particles as determined by ITM 206 and other particles which are structurally weak, such as soft sandstone, shale, limonite concretions, coal, weathered schist, cemented gravel, ocher, shells, wood, or other objectionable material. Determination of non-durable particles shall be made from the total mass (weight) of material retained on the 9.5 mm (3/8 in.) sieve. Scratch Hardness Test shall not apply to crushed stone coarse aggregate.

7. ACBF and SF coarse aggregate shall be free of objectionable amounts of coke, ~~and~~ iron, and lime agglomerates.

8. The bulk specific gravity of chert shall be based on the saturated surface dry condition. The amount of chert less than 2.45 bulk specific gravity shall be determined on the total mass (weight) of material retained on the 9.5 mm (3/8 in.) sieve for sizes 2 through 8, 43, 53, and 73, and on the total mass (weight) of material retained on the 4.75 mm (No. 4) sieve for sizes 9, 11, 12, and 91.

9. Crushed particle requirements apply to gravel coarse aggregates used in compacted aggregates, and seal coats except seal coats used on shoulders. Determination of crushed particles shall be made from the weight (mass) of material retained on the 4.75 mm (No. 4) sieve in accordance with ASTM D 5821.

SECTION 904, BEGIN LINE 618, DELETE AND INSERT AS FOLLOWS:

(b) Coarse Aggregate Angularity for HMA and SMA. *The coarse aggregate angularity (CAA) ~~value~~ of the total blended aggregate ~~material~~, including recycled materials, shall meet or exceed the minimum values for the appropriate ESAL category and position within the pavement structure as follows:*

SECTION 904, AFTER LINE 623, INSERT AS FOLLOWS:

For SMA mixtures, the total blended aggregate shall be 100% one face and 95% two face crushed.

SECTION 904, BEGIN LINE 641, DELETE AND INSERT AS FOLLOWS:

(d) Surface Aggregate Requirements for HMA and SMA. *The surface mixture aggregate selection shall be based on the ESAL category as follows:*

Coarse Aggregate Type	*Traffic ESAL*		
	< 3,000,000	*< 10,000,000*	*≥ 10,000,000*
Air-Cooled Blast Furnace Slag (Note 1)	*Yes*	*Yes*	*Yes*
Steel Furnace Slag	*Yes*	*Yes*	*Yes*

Sandstone	*Yes*	*Yes*	*Yes*
Crushed Dolomite	*Yes*	*Yes*	*Note ~~1~~ 2*
Polished Resistant Aggregates (Note 1)	*Yes*	*Yes*	*Note 2*
Crushed Stone	*Yes*	*No*	*No*
Gravel (Note 1)	*Yes*	*No*	*No*

Note 1. ACBF or Gravel may not be used in SMA mixtures.

Note ~~1~~2. Polish resistant aggregates or crushed dolomite may be used for HMA mixtures when blended with ACBF or sandstone but cannot exceed 50% of the coarse aggregate by mass (weight), or cannot exceed 40% of the coarse aggregate by mass (weight) when blended with steel furnace slag. Polish resistant aggregates or crushed dolomite may not be used in SMA mixtures.