

904-R-560 SMA COARSE AGGREGATE REQUIREMENTS

(Adopted 06-17-10)

The Standard Specifications are revised as follows:

SECTION 904, BEGIN LINE 210, INSERT AS FOLLOWS:

a) Classification of Aggregates

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	
Freeze and Thaw, AASHTO T 103, Procedure A, % Max (Note 3)	12.0	12.0	12.0	12.0	16.0	16.0	20.0	25.0
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 3)	30	30	30	30	40	40	50	60
Absorption, % Max. (Note 4)	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 5)	4.0	2.0 4.0	4.0	4.0	6.0	8.0		
Coke					(See	Note 6)		
Iron					(See	Note 6)		
Chert (Note 7)	3.0	3.0	3.0	5.0	8.0	10.0		
Weight per Cubic Foot for Slag, (lbs), Min. (Mass per Cubic Meter for Slag, (kg))	75.0 (1200)		75.0 (1200)	75.0 (1200)	70.0 (1120)	70.0 (1120)	70.0 (1120)	
Crushed Particles, % Min. (Note 8)								
Asphalt Seal Coats			70.0	70.0				
Compacted Aggregates			20.0	20.0	20.0	20.0		
Additional SMA Requirements								
Micro-Deval Abrasion, %, Max. (Note 9)		18.0						
Aggregate Degradation, %, Max. (Note 10) ...		3.0						

- Notes:
- Freeze and thaw beam expansion shall be tested and re-tested in accordance with ITM 210.
 - Los Angeles abrasion requirements shall not apply to BF.
 - Aggregates may, at the option of the Engineer, be accepted by the Sodium Sulfate Soundness or Brine Freeze and Thaw Soundness requirements.
 - 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.
 - 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 weight (mass) of material retained on the 3/8 in. (9.5 mm) sieve. Scratch Hardness Test shall not apply to crushed stone coarse aggregate.
 - ACBF and SF coarse aggregate shall be free of objectionable amounts of coke, iron, and lime agglomerates.
 - 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 weight (mass) of material retained on the 3/8 in. (9.5 mm) sieve for sizes 2 through 8, 43, 53, and 73 and on the total weight (mass) of material retained on the No. 4 (4.75 mm) sieve for sizes 9, 11, 12, and 91.
 - 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 No. 4 (4.75 mm) sieve in accordance with ASTM D 5821.
 - Micro-Deval abrasion requirements shall apply to each coarse aggregate. A blend of coarse aggregates shall have the abrasion loss value determined in accordance with ITM 220.
 - Aggregate degradation shall be determined in accordance with ITM 220.

SECTION 904, BEGIN LINE 246, DELETE AND INSERT AS FOLLOWS:

2. SMA Coarse Aggregate

Coarse Aggregate Type	Traffic ESALs		
	< 3,000,000	< 10,000,000	≥ 10,000,000
Air-Cooled Blast Furnace Slag	No	No	No
Steel Furnace Slag	Yes Note 1	Yes Note 1	Yes
Sandstone	Yes Note 1	Yes Note 1	Yes
Crushed Dolomite	No Note 1	No Note 1	No Note 2
Polish Resistant Aggregates	No Note 1	No Note 1	No Note 2
Crushed Stone	No	No	No
Gravel	No	No	No
<i>Notes:</i> 1. Steel furnace slag, sandstone, crushed dolomite, polish resistant aggregates or any blend of these aggregates may be used provided the aggregates are in accordance with 904.03(a). 2. Polish resistant aggregates or crushed dolomite may be used when blended with sandstone but shall not exceed 50% of the coarse aggregate by weight (mass), or shall not exceed 40% of the coarse aggregate by weight (mass) when blended with steel furnace slag. The aggregates shall be in accordance with 904.03(a).			

SECTION 904, BEGIN LINE 253, INSERT AS FOLLOWS:

(f) Sampling and Testing

Sampling and testing will be in accordance with the following AASHTO, ASTM, and ITMs.

Los Angeles Abrasion.....	AASHTO T 96
*Amount of Material finer than No. 200 (75 µm) Sieve	AASHTO T 11
Brine Freeze and Thaw Soundness.	ITM 209
Clay Lumps and Friable Particles.	AASHTO T 112
Control Procedures for Classification of Aggregates.....	ITM 203
Crushed Particles.....	ASTM D 5821
Dolomite Aggregates.	ITM 205
Flat and Elongated Particles.....	ASTM D 4791
Freeze and Thaw Beam Expansion.....	ITM 210
*Lightweight Pieces in Aggregates.....	AASHTO T 113
Micro-Deval Abrasion.	AASHTO T 327
Polished Resistant Aggregates	ITM 214
*Sampling Aggregates	AASHTO T 2
Sampling Stockpiled Aggregates	ITM 207
Scratch Hardness.....	ITM 206
*Sieve Analysis.....	AASHTO T 27
*Soundness.....	AASHTO T 103, T 104
*Specific Gravity and Absorption.....	AASHTO T 85
Unit Weight and Voids in Aggregates	AASHTO T 19

*Except as noted in 904.06