SECTION 900 REVISIONS

The Standard Specifications are revised as follows:

SECTION 902, BEGIN LINE 7, DELETE AND INSERT AS FOLLOWS: [902.01(a)]

(a) Performance Graded Asphalt Binders. *Performance graded asphalt binders shall be supplied by an approved supplier in accordance with ITM 581.* ~~Performance graded, PG, asphalt binders shall be supplied with a type A certification in accordance with 916 or unless otherwise qualified under the Approved Suppler Certification, ASC, program in accordance with ITM 581. Type A certifications shall be valid for all shipments made for the next 14 calendar days after the sample has been taken, provided no material has been added to the storage tank originally represented by the sample. The type A certification requirements shall remain in effect unless the specified binders have been qualified in accordance with ITM 581.~~

Performance graded, PG asphalt binders shall be in accordance with the following:

GRADE	~~PG 52-34~~	PG 58-28	~~PG 58-34~~	PG 64-22	PG 64-28	~~PG 64-34~~	PG 70-22	PG 70-28	PG 76-22
ORIGINAL BINDER									
Flash Point, minimum ^{O}C	230								
Viscosity, maximum, 3 Pa-s, Test Temp., ^{O}C	135								
DSR, G*/sin ä (delta), minimum, 1.00 kPa, Test Temp. @ 10 rad/s, ^{O}C	~~52~~	58	~~58~~	64	64	~~64~~	70	70	76
ROLLING THIN FILM OVEN RESIDUE									
Mass Loss, maximum, %	1.00								
DSR, G*/sin ä (delta), minimum, 2.20 kPa, Test Temp. @ 10 rad/s, ^{O}C	~~52~~	58	~~58~~	64	64	~~64~~	70	70	76
PRESSURE AGING VESSEL (PAV) RESIDUE									
PAV Aging Temperature ^{O}C~~(1)~~ *(Note 1)*	~~90~~	100	~~100~~	100	100	~~100~~	100	100	100
DSR, G*sin δ (delta), maximum, 5000 kPa, Test Temp. @ 10 rad/s, ^{O}C	~~13~~	19	~~16~~	25	22	~~19~~	28	25	31
Physical Hardening ~~(2)~~ *(Note 2)*	Report								
Creep Stiffness, S, maximum, 300 MPa, m-value, minimum, 0.300 Test Temp. @ 60 s, ^{O}C	~~-24~~	-18	~~-24~~	-12	-18	~~-24~~	-12	-18	-12

~~(1)~~ *NOTES 1.* Oven temperature tolerance shall be ± 0.5°C.

(2) *2*. Physical Hardening is performed on a set of asphalt beams according to AASHTO TP 1, Section 13.1, except the conditioning time is extended to 24 h ± 10 min at 10°C above the minimum performance temperature. The 24 h stiffness and m-value are reported for information purposes only.

SECTION 902, DELETE LINES 95 THROUGH 103.

SECTION 902, AFTER LINE 103, INSERT AS FOLLOWS:

Characteristic (1) (2)	*Test Method*	*RS-2*	*HFRS-2*	*AE-90*	*AE-90S*	*AE-T*	*AE-150*	*AE-150L*	*AE-P*	*AE-PL*
Test on Emulsion										
Viscosity, Saybolt Furol at 25°C, min.	*AASHTO T 72*			*50*			*50*			
Viscosity, Saybolt Furol at 25°C, max.	*AASHTO T 72*					*100*		*100*		*115*
Viscosity, Saybolt Furol at 50°C, min.	*AASHTO T 72*	*75*	*75*		*50*		*75*		*15*	
Viscosity, Saybolt Furol at 50°C, max.	*AASHTO T 72*	*400*	*400*				*300*		*150*	
Demulsibility w/35 mL, 0.02N CaC12, %, min.	*AASHTO T 59*	*50*	*50*		*30*					
Demulsibility w/50 mL, 0.10N CaC12, %, min.	*AASHTO T 59*			*75*		*75*				
Oil Distillate by Distillation, mL/100 g Emul. (3)	*AASHTO T 59*	*4.0*	*4.0*	*4.0*	*3.0*	*4.0*	*7.0*	*7.0*	*25.0*	*3.0*
Residue by Distillation, %, min.	*AASHTO T 59*	*68*	*68*	*68*	*65 (5)*	*54*	*68*	*60*	*65*	*30*
Residue by Distillation, %, max.	*AASHTO T 59*					*62*		*65*		
Sieve Test, %, max.	*AASHTO T 59*	*0.10*	*0.10*	*0.10*	*0.10*	*0.10*	*0.10*	*0.10*	*0.10*	*0.10*
Penetrating Ability, mm, min.	*902.02(w)*									*6*
Stone Coating Test, %	*902.02(t)3a*			*90*			*90*	*90*		
Settlement, %, max.	*AASHTO T 59*	*5*	*5*	*5*						
Storage Stability, %, max.	*AASHTO T 59*				*1*					
Tests on Residue										
Penetration (0.1 mm) at 25°C, 100g, 5 s, min. (4)	*AASHTO T 49*	*100*	*100*	*100*	*90*	*50*				
Penetration (0.1 mm) at 25°C, 100g, 5 s, max. (4)	*AASHTO T 49*	*200*	*200*	*200*	*150*	*200*				
Penetration (0.1 mm) at 25°C, 50g, 5 s, min. (4)	*AASHTO T 49*						*100*	*100*		
Penetration (0.1 mm) at 25°C, 50g, 5 s, max. (4)	*AASHTO T 49*						*300*	*300*		
Ductility at 25°C, mm, min.	*AASHTO T 51*	*400*	*400*	*400*		*400*				
Solubility in Org. Sol., %, min.	*AASHTO T 44*	*97.5*	*97.5*	*97.5*	*97.5*	*97.5*	*97.5*	*97.5*	*97.5*	*97.5*
Float Test at 50°C, s, max. (4)	*AASHTO T 50*								*200*	
Float Test at 60°C, s, min. (4)	*AASHTO T 50*		*1200*	*1200*	*1200*	*1200*	*1200*	*1200*		
Force Ratio	*AASHTO T 300*				*0.3*					
Elastic Recovery, at 4°C	*AASHTO T 301*				*58*					

NOTES: (1) Broken samples or samples more than 10 days old will not be tested.
(2) Combined percentage of the residue and oil distillate by distillation shall be at least 70% (note the different units – ml for oil and % for residue).
(3) Oil distillate shall be in accordance with ASTM D 396, table 1, grade no. 1.
(4) The Engineer may waive the test.
(5) Maximum temperature to be held for 15 minutes 200 ± 5°C.

SECTION 904, DELETE LINES 1 THROUGH 429.

SECTION 904, AFTER LINE 430 INSERT AS FOLLOWS:

SECTION 904 -- AGGREGATES

904.01 Aggregates. *Aggregates shall consist of natural or manufactured materials produced from but not limited to limestone, dolomite, gravels, sandstones, steel furnace slag (SF), air-cooled blast furnace slag (ACBF), granulated blast furnace (GBF), or wet bottom boiler slag.*

A source will not be considered for acceptance of material until a preliminary investigation has been made. As part of this investigation, samples will be obtained and tests conducted to determine the quality and classification of the aggregates in accordance with ITM 203.

Two types of samples are required for the preliminary investigation; ledge samples for crushed stone sources and production samples for crushed stone, natural sand and gravel, and slag sources.

Ledge samples will be obtained from bedrock units as they naturally occur in the proposed working face of the quarry. Ledges will be identified by their differences in color, texture, geological formation, etc.

Production samples will be obtained from stockpiles of finished materials.

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.

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 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 mixtures, dumped riprap, and snow and ice abrasives.

Adjustments in mass (weight) shall be made to compensate for the difference in specific gravity of slag compared to natural aggregate when payment is on a mass (weight) basis. The following typical values for specific gravity will be used: natural aggregate both fine and coarse, 2.6; ACBF slag coarse aggregate, 2.3; ACBF slag fine aggregate, 2.6; GBF slag fine aggregate, 2.1; and SF slag both fine and coarse, 3.4. The contract quantity shall not be adjusted on any pay item less than 500 Mg (500 t).

When slag is furnished as an aggregate, the approximate quantity of megagrams (tons) to be supplied will be determined by multiplying the pay item quantity of megagrams (tons) by the specific gravity of slag divided by 2.6. The adjusted contract quantities will be determined by multiplying the accepted quantity of megagrams (tons) by 2.6 divided by the specific gravity of the slag.

At time of use, aggregates shall be free from lumps or crusts of hardened or frozen materials.

904.02 Fine Aggregates. *Fine aggregates are defined as 100% passing the 9.5 mm (3/8 in.) sieve and a minimum of 80% passing the 4.75 mm (No.4) sieve. Characteristics of fine aggregates are as follows:*

Characteristic	*PCC*	*HMA*
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%*	*10%*
Brine Freeze-and-Thaw, ITM 209, % Max. (Note 3)……	*12%*	*12%*
Sodium Sulfate Soundness, AASHTO T 104, % Max. (Note 3)……	*10%*	*10%*

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

(a) For Portland Cement Concrete. *Fine aggregate for use in PCCP or bridge decks shall be natural sand. Fine aggregate for other PCC shall be natural sand or crushed limestone, dolomite, gravel, or ACBF.*

Natural sand which has been used as foundry sand when tested in accordance with ITM 215, and complying with IDEM Class III or Class IV in accordance with 329 IAC 10-7-4 may be used in precast concrete units or precast concrete pipe. When foundry sand is used, the precast concrete manufacturer shall maintain a copy of the

Waste Classification issued by IDEM and an indemnification statement shall accompany the precast items to each contract.

(b) For HMA Mixtures. *Fine aggregate for use in HMA shall be natural sand or crushed limestone, dolomite, gravel, or ACBF. SF sand may be used only when the coarse aggregate is SF. The amount of crushed limestone sand shall not exceed 20% of the total aggregate used in HMA surface mixtures with ESAL equal to or greater than 3,000,000, except limestone sands manufactured from aggregates on the Department's list of approved Polish Resistant Aggregates will not be limited. If soundness testing cannot be conducted, the aggregate shall come from a Category I source in accordance with ITM 203.*

The fine aggregate angularity value of the total blended aggregate material from the fine and coarse aggregates, and recycled materials shall meet or exceed the minimum values for the appropriate ESAL category and position within the pavement structure as follows:

FINE AGGREGATE ANGULARITY		
TRAFFIC, ESAL	DEPTH FROM SURFACE	
	100 mm	> 100 mm
< 300,000		
300,000 to < 3,000,000	40	40
3,000,000 to < 10,000,000	45	40
10,000,000 to < 30,000,000	45	40
30,000,000	45	45

Fine Aggregate Angularity, Method A ..... AASHTO T 304

The clay content of the blended aggregate material from the fine and coarse aggregates shall meet or exceed the minimum values for the appropriate ESAL category as follows:

CLAY CONTENT	
TRAFFIC, ESAL	SAND EQUIVALENT, MINIMUM
< 300,000	40
300,000 to < 3,000,000	40
3,000,000 to < 10,000,000	45
10,000,000 to < 30,000,000	45
30,000,000	50

Clay Content, Sand Equivalency ..... AASHTO T 176

(c) 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), or an approved gradation from a CAPP source.*

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

(e) Blank.

(f) Snow and Ice Abrasives. *Snow and ice abrasives shall be fine aggregates or cinders in accordance with the gradation requirements of 904.02(g) 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) 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) 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
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*
**Soundness ..... AASHTO T 103, T 104*
Specific Gravity and Absorption, Fine Aggregate ..... AASHTO T 84

**Except as noted in 904.06.*

904.03 Coarse Aggregates. *Coarse aggregates are defined as having a minimum of 20% retained on the 4.75 mm (No.4) sieve. Coarse aggregates shall not contain an adherent coating that is detrimental to the end product as defined in ITM 211.*

The coarse aggregate shall comply with the quality requirements and the additional requirements in accordance with 904.03(a). However, coarse aggregate may be rejected based on previous performance service records. Class AP is defined as the highest classification and Class F the lowest. Blending of material for compliance with gradation or crushed particle requirements may be permitted when requested in writing. Blending of aggregate products to improve the quality classification of the finished product will not be permitted.

(a) Classification of Aggregates.

Characteristic Classes	*AP*	*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*	*40.0*	*40.0*	*45.0*	*45.0*	*50.0*	
Sodium Sulfate Soundness, %, Max. (Note 3)	*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*	*40*	*40*	*50*	*60*
Absorption, %, Max. (Note 5)	*5.0*	*5.0*	*5.0*	*5.0*			
Additional Requirements							
Deleterious, %, Max.							
Clay Lumps and Friable Particles	*1.0*	*1.0*	*1.0*	*2.0*	*4.0*		
Non-Durable (Note 6)	*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*	*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.*

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.*

(b) Coarse Aggregate Angularity. *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:*

COARSE AGGREGATE ANGULARITY		
TRAFFIC, ESAL	DEPTH FROM SURFACE	
	100 mm (4 in.)	> 100 mm (4 in.)
< 300,000	55	
300,000 to < 3,000,000	75	50
3,000,000 to < 10,000,000	85/80*	60
10,000,000 to < 30,000,000	95/90*	80/75*
30,000,000	100/100*	100/100*

* Denotes two faced crush requirements

Coarse Aggregate Angularity..... ASTM D 5821

(c) Flat and Elongated. *The coarse aggregate shall contain 10% or less flat and elongated particles. A flat and elongated piece is defined as a particle having a ratio of length to thickness greater than five. Determination of flat and elongated particles shall be made from the weight (mass) of material retained on the 9.5 mm (3/8 in.) sieve and each sieve size greater than the 9.5 mm (3/8 in.) sieve.*

Flat and Elongated ..... ASTM D 4791

(d) Surface Aggregate Requirements. *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	Yes	Yes	Yes
Steel Furnace Slag	Yes	Yes	Yes
Sandstone	Yes	Yes	Yes
Crushed Dolomite	Yes	Yes	Note 1
Polished Resistant Aggregates	Yes	Yes	Note 1
Crushed Stone	Yes	No	No
Gravel	Yes	No	No

Note 1. Polish resistant aggregates or crushed dolomite may be used 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.

(e) Sizes of Coarse Aggregates.

Sieve Sizes	COARSE AGGREGATE SIZES (PERCENTS PASSING)									
	COARSE GRADED								DENSE GRADED	
	2	5	8	9	11	12	43(1)	91	53(1)	73(1)
100 mm (4 in.)										
90 mm (3 1/2 in.)										
63 mm (2 1/2 in.)	100									
50 mm (2 in.)	80-100									
37.5 mm (1 1/2 in.)		100					100		100	
25 mm (1 in.)	0-25	85-98	100				70-90	100	80-100	100
19 mm (3/4 in.)	0-10	60-85	75-95	100			50-70		70-90	90-100
12.5 mm (1/2 in.)	0-7	30-60	40-70	60-85	100	100	35-50		55-80	60-90
9.5 mm (3/8 in.)		15-45	20-50	30-60	75-95	95-100				
4.75 mm (No. 4)		0-15	0-15	0-15	10-30	50-80	20-40		35-60	35-60
2.36 mm (No. 8)		0-10	0-10	0-10	0-10	0-35	15-35		25-50	
600 µm (No. 30)						0-4	5-20		12-30	12-30
75 µm (No. 200)(2)							0-6.0		5.0-10.0(4)	5.0-12.0
Decant (PCC) (3)		0-1.5	0-1.5	0-1.5	0-1.5	0-1.5		0-1.5		
Decant (Non-PCC)	0-2.5	0-2.5	0-3.0	0-2.5	0-2.5	0-2.0		0-2.5		

NOTES: 1. The fraction passing the 75 µm (No. 200) sieve shall not exceed 2/3 the fraction passing the 600 µm (No. 30) sieve. The liquid limit shall not exceed 25 (35 if slag) and the plasticity index shall not exceed 5. The liquid limit shall be determined in accordance with AASHTO T 89 and the plasticity index in accordance with AASHTO T 90.

2. Includes the total amount passing the 75 µm (No. 200) sieve as determined by AASHTO T 11 and T 27.

3. Decant may be 0-2.5 for stone and slag

4. When slag is used for separation layers as defined in 302.01, the total amount passing the 75 µm (No. 200) sieve shall be 10.0 to 12.0.

(f) Sampling and Testing. *Sampling and testing shall be in accordance with the following AASHTO, ASTM, and ITMs:*

Abrasion ..... AASHTO T 96
* *Amount of Material finer than 75 µm (No. 200) 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*
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.*

904.04 Riprap. *Riprap shall consist of SF for dumped riprap only, sound stone, stone masonry, or other approved material, free from structural defects and of approved quality. Stone containing shale, unsound sandstone, or other material that will disintegrate readily, shall not be used.*

(a) Dumped Riprap. *Dumped riprap shall be broken concrete, masonry, or stone removed from an old structure; broken pieces removed from concrete pavement, base, or monolithic brick pavement; or broken rock from class X, class Y, unclassified excavation, or solid rock excavation. Material provided from sources outside the right-of-way shall be coarse aggregate, Class F or higher.*

(d) Grouted Riprap. *Grouted riprap material shall be in accordance with Dumped riprap or Revetment riprap.*

(c) Revetment, Class 1, and Class 2 Riprap. *The material shall be coarse aggregate, Class F or higher. Gradation shall be in accordance with 904.04(e).*

(d) Uniform Riprap. *The material shall be coarse aggregate, Class F or higher in accordance with 904.03(a). Gradation shall be in accordance with 904.04(e).*

(e) Sizes of Riprap.

GRADATION REQUIREMENTS				
Percent Smaller				
Size, mm (in.)	Revetment	Class 1	Class 2	Uniform
750 (30)			100	
600 (24)		100	85-100	
450 (18)	100	85-100	60-80	
300 (12)	90-100	35-50	20-40	
200 (8)				100
150 (6)	20-40	10-30	0-20	35-80
75 (3)	0-10	0-10	0-10	
25 (1)				0-20
Depth of Riprap, minimum	450 mm (18 in.)	600 mm (24 in.)	750 mm (30 in.)	

The maximum dimension of individual pieces shall not be greater than three times the minimum dimension. The riprap will be visually inspected for size, shape, and consistency.

904.05 Structure Backfill. *The material shall be of acceptable quality, free from large or frozen lumps, wood, or other extraneous matter. It shall consist of suitable sand, gravel, crushed stone, ACBF, or GBF. Coarse aggregate used for backfilling end bents on beam structures shall be No. 8 or No. 9 crushed stone or BF slag, Class D or higher, in accordance with 904. Structure backfill shall be in accordance with one of the following gradations.*

Sieve Sizes	NOMINAL SIZES AND PERCENTS PASSING					
	50 mm (2 in.)	37.5 mm (1 1/2 in.)	25.0 mm (1 in.)	12.5 mm (1/2 in.)	4.75 mm (No. 4)	600 µm (No. 30)
63 mm (2 1/2 in.)	100					
50 mm (2 in.)	90-100	100				
37.5 mm (1 1/2 in.)	70-100	90-100	100	100		
25.0 mm (1 in.)	55-95	70-100	85-100			
19.0 mm (3/4 in.)	45-90	55-95	70-100			
12.5 mm (1/2 in.)	35-85	40-90	55-95	85-100	100	100
4.75 mm (No. 4)	20-65	20-70	25-75	45-85	90-100	
2.36 mm (No. 8)	10-50	10-55	15-60	25-75	75-100	
600 µm (No. 30)	3-35	3-35	3-35	5-45	15-70	70-100
75 µm (No. 200)	0-8.0	0-8.0	0-8.0	0-8.0	0-8.0	0-8.0

904.06 Exceptions to AASHTO Standard Methods.

(a) Exceptions to AASHTO T 2. *Stockpile sampling shall be in accordance with ITM 207, unless otherwise permitted.*

(b) Exceptions to AASHTO T 11, T 27, and T 37.

1. *When tests are performed in the field where ovens are not available, test samples may be dried in suitable containers over open flame or electric hot plates with sufficient stirring to prevent overheating, then cooled to constant mass (weight).*

2. *The balance shall be a Class G2 general purpose balance in accordance with AASHTO M 231.*

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(c) Exceptions to AASHTO T 27 for Coarse Aggregates.

The size of test samples for coarse aggregate shall be as follows:

Aggregate Size	***Minimum Mass (Weight) of Test Sample***
No. 2	*11.3 kg (25 lb)*
No. 5, 8, 43, 53, 73, and 91	*6-8 kg (13-18 lb)*
No. 9	*4-6 kg (9-13 lb)*
** Subbase*	*4-6 kg (9-13 lb)*
** B Borrow*	*4-6 kg (9-13 lb)*

** The minimum mass (weight) of the test sample for 4.75 mm (No. 4) and 600 µm (No. 30) B borrow shall be 300 grams (10 oz).*

740

(d) Exceptions to AASHTO T 85. *The in-water mass (weight) shall be determined following the 15 h soaking period prior to determining the SSD mass (weight).*

750

(e) Exceptions to AASHTO T 103 and T 104.

1. *Counting the number of individual particles coarser than the 19.0 mm (3/4 in.) sieve will not be required.*

2. *For testing ledge rock, the ledge samples shall be crushed to obtain test samples for the designated increments passing the 37.5 mm (1 1/2 in.) sieve and retained on the 4.75 mm (No. 4) sieve. The factors used to calculate the weighted average loss are 30%, 40% and 30% of the 37.5 mm (1 1/2 in.) - 19.0 mm (3/4 in.), 19.0 mm (3/4 in.) - 9.5 mm (3/8), and 9.5 mm (3/8) - 4.75 mm (No. 4) increments, respectively.*

760

3. *In the case of ledge rock, modify sections 3.3 and 6.2 of AASHTO T 103 and AASHTO T 104 respectively. When the sample received is deficient in material of a component size of any test portion, that material will be supplemented with the available component size to provide the test portion.*

4. *Modify section 8 of AASHTO T 103 and section 10 of AASHTO T 104. For materials designated as a coarse aggregate, the weighted*

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loss will be calculated considering the material retained on the 4.75 mm (No. 4) sieve as 100% of the sample, and only the total weighted loss reported. In AASHTO T 104 sections 10.1.3.2 and 10.1.3.3 shall not apply, and unless otherwise noted only new solution will be used.

SECTION 905, AFTER LINE 22 INSERT AS FOLLOWS:

905.04 Precast Concrete Riprap. *Precast concrete riprap shall consist of unreinforced concrete units of the thickness specified and shall be in accordance with the details shown on the plans. The precast concrete units shall be in accordance with ASTM C 139 except the fine aggregates shall be in accordance with 904.02(a) and the coarse aggregates, class A or higher, shall be in accordance with 904.03. The minimum compressive strength shall be 17 MPa (2500 psi) for an average of three units and 16 MPa (2300 psi) for individual units. The maximum water absorption shall be 190 kg/m^3 (12 lb/cu ft) for an average of three units.*

SECTION 906, BEGIN LINE 3, DELETE AS FOLLOWS:

906.01 Joint Fillers. Joint fillers shall be preformed materials intended to be used in ~~cement concrete pavement~~ *PCCP* and bridge joints or as otherwise specified. Joint fillers shall be in accordance with AASHTO M 153~~, or AASHTO M 213~~. ~~However, the~~ *The* asphalt content will be determined ~~by~~ *in accordance with* ITM 801. ~~rather than by AASHTO T 42.~~

SECTION 906, BEGIN LINE 93, DELETE AS FOLLOWS:

906.05 Bituminous Mastic Pipe Joint Sealer. This is a cold applied, mineral filled, joint sealing compound for joints of bell and spigot or tongue and groove concrete or clay pipe. It shall be a steam refined petroleum asphalt, plasticized to a homogeneous consistency ~~with mineral fillers~~.

SECTION 909, BEGIN LINE 706, DELETE AND INSERT AS FOLLOWS: [909.09(a)]

~~Mineral fillers,~~ ~~non-~~*Non*-volatile, or non-reactive extenders shall not be permitted in either component. Each component shall have a usable shelf life of at least six months from the date of delivery.

SECTION 909, BEGIN LINE 721, DELETE AND INSERT AS FOLLOWS: [909.09(b)]

Neither component shall contain a residual constituent which is unreactive with the epoxy resin. ~~Mineral fillers,~~ ~~non-~~*Non*-volatile extenders ~~shall~~ *will* not be permitted in either
component. Each component shall have a usable shelf life of at least six months from the date of delivery.

SECTION 910 BEGIN LINE 5, DELETE AS FOLLOWS:

(a) General. Unless otherwise specified, bars for concrete reinforcement shall be deformed billet steel, grade 420 (60). ~~The bars for cement concrete pavement shall be deformed billet steel, except tie bars that shall be bent and subsequently straightened during construction shall be deformed bars in accordance with ASTM A615/A615M, grade 300 (40).~~ Tie bar assemblies used in lieu of bent tie bars shall be in accordance with the minimum total ultimate strength and minimum total yield

strength requirements specified for bent tie bars; bend test and elongation will not be required.

SECTION 913, BEGIN LINE 1841, DELETE AND INSERT AS FOLLOWS:

The plastic material shall be capable of being affixed to either ~~bituminous concrete pavement~~ *HMA* or ~~cement concrete pavement~~ *PCCP* by means of the precoated adhesive and, following the initial application of pressure, shall mold itself to pavement contours, breaks, and faults by traffic action at normal pavement temperatures.