

Type A Certifications



April 2014

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916.02(a) Type A

Type A certification shall be prepared by the manufacturer. It shall consist of a certified copy of a laboratory report which lists results of the specified tests and shall certify that the materials furnished comply with the specifications. The applicable specification shall be referred to in the certification. The tests may be conducted in the laboratory of the manufacturer or in another qualified laboratory. Such tests shall have been conducted on samples obtained from the lot or lots of material in the shipment.

916.03(a) Sample Type A Certification Form

INDIANA DEPARTMENT OF TRANSPORTATION
TYPE A CERTIFICATION OF COMPLIANCE

CONTRACTOR NUMBER _____
PROJECT NUMBER _____
CONTRACTOR'S NAME _____
MANUFACTURER'S NAME _____
B/L or INVOICE NUMBER _____
MATERIAL DESTINATION _____

This is to certify that for the contract described above, the materials supplied are as follows:

**Material Name	Quantity
_____	_____
_____	_____

***Conform to: _____

The materials listed above comply with the following Test Methods and are within the acceptable limits of said Test Methods:

TEST METHOD	LIMITS OF TEST VALUE	ACTUAL TEST RESULTS
_____	_____	_____
_____	_____	_____
_____	_____	_____

_____ Date _____ Company of Manufacture

*Signature of Company Official/Title

- * This Certification shall be prepared by the manufacturer of the material being supplied for this contract.
- ** Identifying information such as Alloy, Grade, Type, Class, or other similar designation shall also be shown when appropriate.
- *** Applicable material specification reference shall be listed.

Note that material specific example forms may be found in ITM 804.

Anchor Bolts



Certification: Type A

Frequency Manual Reference No.: 34, 01 of 02

Specification: 910.20 (h)

Requirements:

Anchor bolts used for bridge railings shall be stainless steel in accordance with ASTM A276, Type 305 or 430 and have a minimum ultimate strength of 100 ksi (690 MPa). Threads may be cut or rolled.

Chemical Requirements:

Type	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Chromium	Nickel
Austenitic Grade 305	0.12	2.00	0.045	0.030	1.00	17.0-19.0	11.0-13.0
Ferritic Grade 430	0.12	1.00	0.040	0.030	1.00	16.0-18.0	NA

Mechanical Requirements:

Type	Condition	Finish	Diameter or Thickness inches (mm)	Yield Strength min ksi (MPa)	Elongation in 2 in. (50 mm) ^B or 4D min %	Reduction of Area ^{C,D} min %
Austenitic Grade 305	A	Cold	Up to 1/2 in. (12.70 mm) including over 1/2 in. (12.70 mm)	90 (620)	30	40
Ferritic Grade 430	A	Hot or Cold	all	60 (415)	20	4

^B For some specific products, it may not be practicable to use a 2-in (50mm) gage length. The use of sub-size test specimens, when necessary, is permissible in accordance with the Test Methods and Definitions A370.

^C Reduction of area does not apply on flat bars 3/16in. (4.76mm) and under in thickness as this determination is not generally made in the product size.

^D The material shall be capable of meeting the required reduction of area where listed, but actual measurement and reporting of the reduction of area are not required unless specified in the purchase order.

Asphalt Materials, Non-Paving Grades



Certification: Type A

Frequency Manual Reference No.: 1, 03 of 03

Specification: 902.01(b) through (e)

Requirements:

(b) Asphalt Emulsions

Asphalt emulsions shall be composed of an intimate homogeneous suspension of a base asphalt, an emulsifying agent, and water. Asphalt emulsions may contain additives to improve handling and performance characteristics. Failure of an emulsion to perform satisfactorily in the field shall be cause for rejection, even though it passes laboratory tests. The grade used shall be in accordance with the table for asphalt emulsions as shown herein.

AE-90 is a medium breaking, low-penetration, high-asphalt content type, intended for hot and cold plant mixing, road mixing, and seal coats or as otherwise specified.

AE-90S is a rapid setting, anionic type emulsion for seal coat applications.

AE-150 is a medium breaking, moderately soft penetration type, intended for use in surface treating, tack coats, and coating open and dense graded aggregate, or as otherwise specified.

AE-150-L is a medium-breaking, relatively low-viscosity type. It may be specified in lieu of AE-T or AE-150 when a softer asphalt or greater aggregate penetration is desired. AE-150-L is suitable for sand seals.

AE-PL is a medium-slow-breaking, low-viscosity, low-asphalt content type, intended for use as a prime or as dust palative.

AE-T is a medium-breaking, comparatively low penetration type, intended for tack coats, seed mulching, or as otherwise specified.

HFRS-2 is a quick-breaking, high-viscosity, high-float, relatively high asphalt content type, intended for seal coats.

RS-2 is a quick-breaking, high-viscosity, relatively high-asphalt content type, intended for seal coats.

AE-PMP is a polymerized modified asphalt emulsion intended for use as a prime coat material.

AE-PMT is a polymerized modified asphalt emulsion intended for use as a tack coat material.

SS-1h is a slow setting, hard penetration type, intended for tack coats.

AE-F is a medium setting, hard penetration, diluted emulsion intended for fog sealing.

AE-NT is a fast setting, hard penetration type, intended for tack coats and base seal.

The requirements for asphalt emulsions shall be in accordance with the following:

Characteristic (1) (2)	AASHTO Test Method	RS-2	HFRS-2	AE-90	AE-90S	AE-T	AE-NT	AE-F	SS-1h	AE-150	AE-150L	AE-PL	AE-PMT ⁽⁶⁾	AE-PMP ⁽⁶⁾
Test on Emulsion														
Viscosity, Saybolt Furol at 25°C, min.	T 59			50			15		20	50				20+
Viscosity, Saybolt Furol at 25°C, max.	T 59					100	100	100	100		100	115	100	
Viscosity, Saybolt Furol at 50°C, min.	T 59	75	75		50					75				
Viscosity, Saybolt Furol at 50°C, max.	T 59	400	400							300				
Demulsibility w/35mL, 0.02N CaCl ₂ %, %min.	T 59	50	50		30			25						
Demulsibility w/50mL, 0.10N CaCl ₂ %, %min.	T 59			75		75							25+	25+
Oil Distillate by Distillation, mL/100g Emul ⁽³⁾	T 59	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	7.0	7.0	3.0	3.0	3.0
Residue by Distillation, % min.	T 59	68	68	68	65 ⁽⁵⁾	54	50	27	57	68	60	30		
Residue by Distillation, % max.	T 59					62		35			65			
Sieve Test, % max.	T 59	0.10	0.10	0.10	0.10	0.10	0.30	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.	T59	5	5	5			5							
Storage Stability, % max	T59				1									
Asphalt Content by Distillation at 204°C, %min.													54	45
Asphalt Content by Distillation at 204°C, %max													62	
Tests on Residue														
Penetration (0.1 mm) at 25°C, 100g, 5 s, min ⁽⁴⁾	T 49	100	100	100	90	50		40	40				50	300+
Penetration (0.1 mm) at 25°C, 100g, 5 s, max ⁽⁴⁾	T 49	200	200	200	150	200	40	90	90				200	
Penetration (0.1 mm) at 25°C, 50g, 5 s, min ⁽⁴⁾	T 49									100	100			
Penetration (0.1 mm) at 25°C, 50g, 5 s, max ⁽⁴⁾	T 49									300	300			
Ductility at 25°C, mm, min.	T 51	400	400	400		400			400					
Solubility in Org. Sol., % min.	T 44	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
Float Test at 60°C, s, min ⁽⁴⁾	T 50		1200	1200	1200	1200				1200	1200			
Force Ratio	T 300				0.3									
Elastic Recovery, at 4°C	T 301				58									
Polymer Content by Infrared													1.5+	1.5+
<p>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 min 200 ± 5°C. (6) Asphalt shall be polymerized prior to emulsification.</p>														

INDIANA DEPARTMENT OF TRANSPORTATION

**TYPE A CERTIFICATION
FOR
ASPHALT EMULSION**

Emulsion Supplier and Source Number: _____
Name *Source Number*

Sample Identification: _____

Represented Quantity: _____ Sample Date: _____
Gallons

TestMethod	Asphalt Emulsion		
	Property	*Limits	Results
AASHTO T 59	Viscosity, Saybolt Furol		
AASHTO T 59	Demulsibility		
AASHTO T 59	Oil Distillate by Distillation		
AASHTO T 59	Residue by Distillation		
AASHTO T 59	Sieve Test		
AASHTO T 49	Penetration @ 25°C		
AASHTO T 50	Float Test @ 60°C		
AASHTO T 301	Elastic Recovery @ 4°C (if applicable)		

*Standard Specification section 902.01(b)

The represented quantity (gallons) noted for this asphalt emulsion conform to Standard Specification section 902.01(b).

Signature: _____
Representative

Date: _____

(c) Cutback Asphalts

Cutback asphalts shall be composed of an intimate homogeneous mixture of an asphalt base and a suitable distillate designed for medium, or slow curing. Cutback asphalts may also contain an additive as an aid in uniformly coating wet, damp, or dry aggregates used in patching mixtures or HMA pavements. These asphalts shall not contain more than 0.3% water as determined by AASHTO T 55, shall not separate when allowed to stand, and shall not foam when heated to permissible temperatures. When an additive is used, it shall be incorporated homogeneously in the asphalt at the point of manufacture. The temperature of the cutback asphalt shall not be higher than shown for that grade in 902.03.

1. Medium Curing Asphalts With and Without Additives

Medium curing asphalts with and without additives shall be in accordance with the following:

Characteristics	Grades			
	MC-70 MCA-70	MC-250 MCA-250	MC-800 MCA-800	MC-3000 MCA-3000
Flash Point (Open Tag), °C ⁽⁴⁾	38+	66+	66+	66+
Kinematic Viscosity at 60° C, (cSt) ⁽²⁾	70-140	250-500	800-1600	3000-6000
Saybolt-Furol Viscosity at 50°C (s)	60-120			
Saybolt-Furol Viscosity at 60°C (s)		125-250		
Saybolt-Furol Viscosity at 83°C (s)			100-200	300-600
Distillation ⁽¹⁾				
Distillate (% of total distillate to 360°C MC-70 @ 225 °C):				
to 225°C	0-20	0-10		
to 260°C	20-60	15-55	35+	15+
to 316°C	65-90	60-87	45-80	15-75
Residue from distillation to 360°C (volume % by difference)	55+	67+	75+	80+
Tests on Residue from Distillation ⁽¹⁾				
Penetration, 25°C, 100g, 5 s, - (0.1 mm)				
(without additive)	120-250	120-250	120-250	120-250
(with additive)	120-300	120-300	120-300	120-300
Ductility at 25°C (10mm) ⁽³⁾	100+	100+	100+	100+
Solubility in organic solvents, %	99.5+	99.5+	99.5+	99.5+
<p>(1) Test may be waived when approved</p> <p>(2) Viscosity may be determined by either the Saybolt-Furol or Kinematic test. In case of dispute, the Kinematic viscosity test shall prevail.</p> <p>(3) If the ductility at 25°C is less than 100, the material will be acceptable if its ductility at 16°C is 100+</p> <p>(4) Flash point by Cleveland Open Cup may be used for products having a flash point greater than 80°C</p>				

2. Slow Curing Asphalts With and Without Additives

Slow curing asphalts with and without additives shall be in accordance with the following:

Characteristics	Grades			
	SC-70 SCA-70	SC-250 SCA-250	SC-800 SCA-800	SC-3000 SCA-3000
Flash Point (Cleveland Open Cup), °C	66+	79+	93+	107+
Kinematic Viscosity at 60° C, (cSt) ⁽²⁾	70-140	250-500	800-1600	3000-6000
Saybolt-Furol Viscosity at 50°C (s)	60-120	125-250	100-200	300-600
Saybolt-Furol Viscosity at 60°C (s)				
Saybolt-Furol Viscosity at 83°C (s)				
Distillation				
Total Distillate to 360 °C (% by Volume)	10-30	4-20	2-12	5
Float Test of Distillation Residue at 50°C (s)	20-100	25-110	50-140	75-200
Ductility of Asphalt Residue at 25°C (10mm) ⁽¹⁾	100+	100+	100+	100+
Solubility in Organic Solvents, % ⁽¹⁾	99.5+	99.5+	99.5+	99.5+
(5) Test may be waived when approved				
(6) Viscosity may be determined by either the Saybolt-Furol or Kinematic test. In case of dispute, the Kinematic viscosity test shall prevail.				

(d) Utility Asphalt

The asphalts shall be uniform in character and shall not foam when heated to 350°F (177°C). Utility asphalts shall be in accordance with the following:

Physical Properties	UA-I	UA-II	UA-III
Softening Point (Ring & Ball), °C	46-63	63-85	79.5-96
Penetration of Original Samples (0.1 mm)			
at 4°C, 200 g, 60 s	10	10	10
at 25°C, 100 g, 5 s	50-100	25-45	15-35
at 46°C, 50 g, 5 s	100 Min.	130 Max.	90 Max.
Ductility at 25°C, 50 mm/min., 10 mm, Min.	30	10	2.5
Solubility in Organic Solvents, % Min.	99.0	99.0	99.0
Flash Point (Cleveland Open Cup), °C, Min.	225	225	225
Penetration of Residue from Thin Film Oven Test, 25°C, 100 g, 5 s, (0.1 mm) Min. ⁽¹⁾	30	15	10
(7) Test will be performed when complete physical characteristics are needed or desired			

(e) Asphalt for Coating Corrugated Metal Pipe

Asphalt for coating corrugated metal pipe shall be in accordance with the following:

Physical Properties	Minimum	Maximum
Softening Point (Ring & Ball), °C	93	110
Penetration of Original Samples (0.1 mm) at 4°C, 200 g, 60 s at 25°C, 100 g, 5 s	20 35 ⁽¹⁾	
Solubility in Organic Solvents, %	99.0	
Flash Point (Cleveland Open Cup), °C	232	
Flow Test, mm		6.4
Shock Test	3 of 4 specimens shall pass	
(8) May be 30 minimum provided all 4 shock test specimens pass		

Asphalt Materials, PG 64-22 & PG 58-28



Certification: Type A

Frequency Manual Reference No.: 1, 01 of 03

Specifications: 902.01a

Requirements: The testing requirements are as follows:

GRADE	PG 58-28	PG 64-22
ORIGINAL BINDER		
Flash Point, minimum °C	230	
Viscosity, maximum 3 Pa·s, Test Temp, °C	135	
DSR, G*/sin δ (delta), minimum, 1.00 kPa, Test Temp. @ 10 rad/s, °C	58	64
ROLLING THIN FILM OVEN RESIDUE		
Mass Loss, maximum	1.00	
DSR, G*/sin δ (delta), minimum, 2.20 kPa, Test Temp. @ 10 rad/s, °C	58	64
PRESSURE AGING VESSEL (PAV) RESIDUE		
PAV Aging Temperature °C	100 (Note 1)	
DSR, G*/sin δ (delta), minimum, 5,000 kPa, Test Temp. @ 10 rad/s, °C	19	25
Physical Hardening	Report (Note 2)	
Creep Stiffness, S, maximum, 300 MPa, m-value, minimum, 0.300 Test Temp. @ 60 s, °C	-18	-12
Notes: 1. Oven temperature tolerance shall be ± 0.5 °C 2. Physical Hardening is performed on a set of asphalt beams according to AASHTO T 313, Section 12.1, 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.		

Asphalt Material for Pipe Coating



Certification: Type A

Frequency Manual Reference No.: 72, 01 of 01

Specification: 908.07

Requirements:

The material, fabrication, manufacturer certified mill report, and fabricator certification shall be in accordance with the applicable requirements of 908.02. Coupling bands shall be fully bituminous coated.

After fabrication, the pipe or pipe-arch shall be fully bituminous coated.

Connecting or coupling bands shall be of the 2-piece type when used with coated pipe of 36 in. (900 mm) diameter or larger.

The asphalt material for coating shall be in accordance with 902.01(e).

Physical Properties	Minimum	Maximum
Softening Point (Ring and Ball), °C	93	110
Penetration of Original Samples (0.1 mm) at 4°C, 200g, 60s at 25°C, 100g, 5s	20 35 (1)	
Solubility in Organic Solvents, %	99.0	
Flash Point (Cleveland Open Cup), °C	232	
Flow Test, mm		6.4
Shock Test	3 or 4 specimens shall pass	

(1) May be 30 minimum provided all 4 shock test specimens pass

Samples of the asphalt material shall be obtained from the working tank prior to or during coating of the pipe, or from strippings off the pipe after coating. When applied to the pipe, the asphalt material shall be free from impurities. The metal shall be free from grease, dust, or moisture. Either process set out below may be used for application.

- (a) When the pipe is not preheated, the temperature of the asphalt at the time of immersion shall be $400^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ($204^{\circ}\text{C} \pm 3^{\circ}\text{C}$). The duration of the immersion in the asphalt shall be in accordance with the following:

Thickness	0.052 in.	0.064 in.	0.079 in.	0.109 in.	0.138 in.	0.168 in.
Minimum Immersion Time for First Dip (min)	2.0	2.5	3.0	5.0	6.5	8.0

- (b) When the pipe is preheated, the pipe shall be brought to a temperature of 300°F (149°C) and the asphalt shall be heated to a temperature of $380^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ($193^{\circ}\text{C} \pm 3^{\circ}\text{C}$) before the pipe is dipped.

In either process, the pipe shall be dipped a second time or more, if necessary, to give a minimum thickness of 0.05 in. (1.3 mm).

If a paved invert is specified, the pipe or pipe-arch shall first be fully coated as required. Additional bituminous material shall be applied in the bottom section to form a smooth pavement. Except where the upper edges intersect the corrugations, the pavement shall have a minimum thickness of 1/8 in. (3 mm) above the crests of the corrugations. The pavement shall be applied to the lower quarter of the circumference.

The manufacturer of the asphalt material shall furnish to the pipe fabricator the type of certification specified in the Frequency Manual and in accordance with 916 for each shipment or lot of asphalt material. The pipe fabricator shall keep these certifications on file and available to review for 5 years. In addition, samples from the working tank will be obtained for verification of requirements.

Asphalt Material for Waterproofing Concrete

Certification: Type A

Frequency Manual Reference No.: 14, 02 of 02

Specification: 702.23, 902.01(d)

Requirements: Utility Asphalt (UA I)

Characteristic	UA-I
Softening Point (Ring and Ball), °C	46-63
Penetration of Original Samples ⁽¹⁾ (0.1 mm) at 4°C, 200g, 60s, Min. at 25°C, 100g, 5s at 46 °C, 50 g, 5 s	10 50-100 100 Min.
Ductility @ 25°C, 50 mm/min., 10 mm, min. ⁽¹⁾	30
Solubility in Organic Solvents, % min ⁽¹⁾	99.0
Flash Point (Cleveland Open Cup), °C, min.	225
Penetration of Residue from Thin Film Oven Test, 25°C, 100 g, 5 s, (0.1 mm) Min. ⁽¹⁾	30

(1) Test will be performed when complete physical characteristics are needed or desired

Bronze Castings



Certification: Type A

Frequency Manual Reference No.: 105, 01 of 01

Specification: 910.06(a)

Requirements:

Bronze castings shall be in accordance with ASTM B 22, alloys 911 or 913.

Material Requirements: The material shall be a casting of Copper Alloy UNS No. C91100 or C91300.

Chemical requirements:

Copper alloy UNS No.	Composition, % max, except as indicated										
	Major Elements					Residual Elements					
	Copper	Tin	Lead	Zinc	Nickel Including Cobalt	Iron	Antimony	Sulfur	Phosphorus	Aluminum	Silicon
C91100	82-85*	15-17	0.25	0.25	5.0	0.25	0.20	0.05	1.0**	0.005	0.005
C91300	79-82*	18-20	0.25	0.25	5.0	0.25	0.20	0.05	1.0**	0.005	0.005

*In determining copper minimum, copper may be calculated as copper plus nickel

**For continuous castings, phosphorus shall be 1.5 % max

Mechanical Requirements:

Temper	Copper alloy UNS No.	A Mechanical Requirements (As Sand Cast)							
		Tensile Strength, min		Yield Strength, at 0.5% Extension Under Load, min		Elongation in 2 in. (50 mm), %	Brinell Hardness, min	Compression Deformation limit, min	
		ksi	(MPa)	ksi	(MPa)			ksi	(MPa)
M01	C91100	35*	(240)*	25*	(170)*	2*	135*	18	(125)
M01	C91300	35*	(240)*	30*	(205)*	0*	170*	24	(165)

*TYP value

Temper	Copper alloy UNS No.	B Mechanical Requirements (As Centrifugal Cast)	
		Compression Deformation Limit, min	
		ksi	(MPa)
M01	C91100	18	(125)
M01	C91300	24	(165)

Temper	Copper alloy UNS No.	C Mechanical Requirements (As Continuous Cast)		
		Brinell Hardness, min	Compression Deformation limit, min	
			ksi	(MPa)
M01	C91100		18	(125)
M01	C91300	160	24	(165)

Cellular Concrete Grout



Certification: Type A

Frequency Manual Reference No.: 112, 01 of 01

Specification: 725.07

Requirements:

The cellular concrete grout shall be designed in accordance with ASTM C 796 except as herein modified. The admixtures, retarders, and plasticizers used in the grout shall be in accordance with the foam concentrate supplier's specifications. The mix shall have a minimum 28-day compressive strength of 150 psi (1040 kPa). The mix shall be tested by a laboratory approved by the Department or shall be approved based on prior acceptable performance on Department contracts. The Contractor shall provide a Type A certification in accordance with 916 that provides the compressive strength results.

Cold Patching Mix



Certification: Type A

Frequency Manual Reference No.: 2, 07 of 07

Specification: 403.05

Requirements: Preparation of Mixtures

The size of the aggregate and the grade of asphalt materials shall be as specified. The gradations and percent of asphalt shall be as follows:

COMPOSITION LIMITS FOR CMA MIXTURES						
Sieve Size	Total % of Aggregates Passing Sieves Based on Total Weight of Aggregates					
	Size 2	Size 5	Size 8	Size 9	Size 11	Size 5D
2.5 in. (63 mm)	100					
2 in. (50 mm)	95-100					
1.5 in. (37.5 mm)		100				100
1 in. (25 mm)	0-25	85-100	100			80-99
3/4 in. (19.0 mm)	0-10	60-90	75-100	100		68-90
1/2 in. (12.5 mm)	0-7	30-65	40-75	65-90	100	54-76
3/8 in. (9.5 mm)		15-50	20-55	30-65	75-100	45-67
No. 4 (4.75 mm)		0-20	0-20	0-20	10-35	30-50
No. 8 (2.36 mm)		0-15	0-15	0-15	0-15	20-45
No. 30 (600 μm)						7-28
No. 200 (75 μm)	0-5	0-5	0-5	0-6	0-6	0-6
Minimum % Crushed	95	95	95	95	95	95
% of Asphalt*	2.0-3.5	2.5-4.0	3.0-4.5	3.5-5.0	4.0-6.0	3.5-5.0
* Percent of asphalt shall be calculated on the basis of the total weight (mass) of the mixture, exclusive of water or solvent. When slag is used, the asphalt content will be adjusted to compensate for the specific gravity and surface area.						

The moisture condition of the aggregate shall be such that the aggregate is uniformly coated and satisfactorily retains the required amount of asphalt during the stockpiling, hauling, and spreading operations. Mixtures shall not be produced at temperatures exceeding 180°F.

Expansion Joint Sealing System



Certification: Type A

Frequency Manual Reference No.: 7, 03 of 03

Specification: RSP 724-B-145

Silicone Sealant Requirements:

Test	Limits	Test Method
Extrusion Rate	200-550 G/minute	MILS S 8802
Specific Gravity	1.23-1.35	ASTM D 1475
Nonvolatile	93% minimum	

As installed at 77°F (25°C) and 50% relative humidity, after 48 h cure:

Test	Limits	Test Method
Skin-over time	20 minutes, max	
Joint Elongation	600% minimum	ASTM D 3583 ^{1,2}
Joint Modulus	3-12 psi (20.7-82.7 kPa)	ASTM D 3583 ^{1,2}

¹ Section 114, modified with pull rate of 2 in./minimum (50 mm/minimum)

² Joint size 1/2 in. by 1/2 in. by 2 in. (13 mm by 13 mm by 50 mm)

Binder Requirements:

Test	Limits	Test Method
Mixing Ratio	1:1 by volume of weight	ASTM D 2393
Viscosity	9-20 poises, Brookfield Model LVT Spindle #2, 30 rpm, 75°F, ± 2°F (24°C, ± 1°C)	
Color	Black	
Gel Time	25-50 minutes	AASHTO M-200

As cured:

Test	Limits	Test Method
Elongation	40-55%	ASTM D 638 ¹
Tensile Strength	900 psi min. (6,205 kPa min.)	ASTM D 638 ¹
Shore Hardness at 25°C (77°F)	45	ASTM D 2240

¹ Test method Type 1, molded specimens, 0.25 in. (6.4 mm) thick

Polymer Nosing System Mortar Requirements:

Test	Limits	Test Method
Compressive Strength	2,200 psi min. (15,170 kPa min.)	ASTM C 579 ¹
Bond Shear Strength	900 psi min. (4,825 kPa min)	ASTM C 882
Abrasion Resistance, Water Index Table H 22	1.0 maximum	ASTM C 502
Compressive Stress	350 psi min. (2,415 kPa min.)	
Resilience	70% minimum	

¹ at 24 hours, Method B

High Strength Bolts



Certification: Type A

Frequency Manual Reference No.: 100, 02 of 03

Specification: 910.02(g)

Requirements:

The manufacturer or supplier shall provide a certification of compliance with all requirements for high strength bolts used in the assembly of structural steel applications. The certification shall include the lot and heat numbers of the fasteners on the shipping package and indicate when and where all testing was performed.

Requirement	Test Method	Specification Limits
Chemical Composition ASTM A 325	ASTM A 325 Type 1 Bolts – Table 1 Type 3 Bolts – Table 2	Refer to District Lab
Hardness ASTM A 325	ASTM A 325 Type 1 & Type 3 Bolts – Table 3	Refer to District Lab
Tensile Properties ASTM A 325	ASTM A 606-11a & ASTM A 325- Table 4	Refer to District Lab
Proof Load ASTM A 325	ASTM A 606-11a & ASTM A 325 - Table 5	Refer to District Lab
Zinc Coating (Hot Dip Process)	ASTM F 2329 (Hot Dip)	Hot Dip= 1.0 oz./ft ² (minimum coating thickness of any individual specimen)
Zinc Coating (Mechanically Deposited)	ASTM B 695 Class 55	Minimum Thickness = 53 μm
Rotational Capacity Testing (Type 3 Bolt)	ASTM A 325 (Section 6.3 & 10.2)	Refer to District Lab

High Strength Nuts



Certification: Type A

Frequency Manual Reference No.: 100, 02 of 03

Specification: 910.02g

Requirements:

The manufacturer or supplier shall provide a certification of compliance with all requirements for high strength nuts used in the assembly of structural steel applications. The certification shall include the lot and heat numbers of the fasteners on the shipping package and indicate when and where all testing was performed.

Requirement	Test Method	Specification Limits
Chemical Composition A 563, DH & DH3 A 194, 2H	DH - ASTM A 563-a Table 1 DH3 - ASTM A 563-a Table 2 2H - ASTM A 194-a Table 1	Refer to District Testing
Hardness	ASTM A 563-a Table 3 ASTM A 194-a Table 2	DH & DH3 = 24- 38 HRC 2H = 24- 35 HRC
Proof Load	DH & DH3 - ASTM A 563-a	DH & DH3= 175 ksi min. (non-coated) DH & DH3= 150 ksi min. (coated)
Proof Load	2H - ASTM A 194-a Table 3	Refer to District Testing
Zinc Coating ASTM A563-07a DH & DH3	ASTM F 2329 (Hot Dip) ASTM B 695 (Mech. Dep.) Class 55	Hot Dip= 1.0 oz./ft ² (avg. of all specimens) Mechanical Deposition = 53 μm min.
Zinc Coating ASTM A194-08a 2H	ASTM A 194-a	Not Allowed
Rotational Capacity Testing (Type 3 Bolt)	ASTM A 325 (Section 6.3 & 10.2)	Refer to District Testing

High Strength Washers



Certification: Type A

Frequency Manual Reference No.: 100, 02 of 03

Specification: 910.02g

Requirements:

The manufacturer or supplier shall provide a certification of compliance with all requirements for high strength washers used in the assembly of structural steel applications. The certification shall include the lot and heat numbers of the fasteners on the shipping package and indicate when and where all testing was performed.

Requirement	Test Method	Specification Limits
Chemical Composition (Type I or Type 3)	ASTM F 436, Table I	Refer to District Testing
Zinc Coating (Hot Dip Process)	ASTM A 153, Class C or ASTM F 2329	Minimum Coating Thickness, (mils) Specimen Average= 2.1 Any Single Specimen = 1.7
Zinc Coating (Mechanical Deposition)	ASTM B 695, Class 55 (AASHTO M 298, Class 55)	Minimum Coating Thickness, (µm) Any Single Specimen = 53
Hardness	ASTM F 436	All Washers (except HDG) = 38 – 45HRC Hot Dipped Galv. Washers = 26 - 45 HRC
Rotational Capacity (Type 3 Bolt)	ASTM A 325 (Section 6.3 & 10.2)	Refer to District Testing

Hot Poured Joint Adhesive



Certification: Type A

Frequency Manual Reference No.: 17, 2 of 8

Specifications: RSP 401-R-581

Requirements:

Hot poured joint adhesive is an asphalt material that is used to seal the longitudinal construction joint formed between the adjacent HMA pavement courses. The joint adhesive shall be in accordance with the following:

Test	Method	Test Results
Softening Point, °F (°C)	AASHTO T 53	> 170 (77)
Ductility @ 77°F (25°C), mm	AASHTO T 51	> 300
Ductility @ 39°F (4°C), mm	AASHTO T 51	> 300
Apparent Viscosity @ 400°F (204°C), cp	ASTM D 2669	4,000 – 11,000
Asphalt Compatibility	ASTM D 5329	Pass
Cone Penetration @ 77°F (25°C), mm	ASTM D 5329	50.0 – 100.0
Flow @ 140°F (60°C), mm	ASTM D 5329	< 5
Resilience @ 77°F (25°C), %	ASTM D 5329	> 30
Tensile Adhesion @ 77°F (25°C), mm	ASTM D 5329	> 500
Flexibility @ 0°F (-18°C)	ASTM D 3111	Pass
Flash Point, °F (°C)	AASHTO T 48	> 410 (210)

Pipe Liners



Certification: Type A

Frequency Manual Reference No.: 63, 05 of 07

Specification: 907.25

Requirements:

Thermoplastic liner pipe may be solid wall HDPE in accordance with ASTM F714, profile wall HDPE in accordance with ASTM F894 or profile wall PVC in accordance with ASTM F949. Permissible joints are those listed in 725.02. In the photo above, solid wall HDPE with a grooved press-on joint appears to the left while profile wall HDPE is to the right. Typically, profile wall HDPE as shown here is joined with an extrusion weld. A joint type not listed in 725.02 may be used if approved by the Engineer. Acceptance of pipe liners is by approval list or by Type A Certification as stated in 725.02. For acceptance of liner pipe by Type A Certification, the following information are required to be included:

Solid Wall HDPE Liner

Property	Test Method	Specification Limits
Resin Density	ASTM D3350	0.940 min.
Resin Melt Index	ASTM D3350 Condition (190, 2.16)	0.15 max.
Liner OD	AASHTO M326	Size and tolerance vary, contact District Testing
Liner Wall Thickness or ID	AASHTO M326	Nominal OD, in inches, divided by 32.5, minimum (For 12 in., use 12.750 in. and for 13 in., use 13.375 in.) Given ID, subtract from OD provided and divide by 2 to determine wall thickness, then use spec above
Liner DR (Actual Calculated)	AASHTO M326	30.0, minimum (Calculated by OD divided by wall thickness)
Length	AASHTO M326	99% specified length, min. or ½” less than specified length, min., whichever is shorter

Profile Wall HDPE Liner

Property	Test Method	Specification Limits
Resin Density	ASTM D3350	0.940 min.
Resin Melt Index	ASTM D3350 Condition (190, 2.16)	0.4 max.
RSC (or Pipe Stiffness , PS, at 5% Deflection)	ASTM F894 @ 3% Deflection	160 min. for circular installations, 250 min. for deformed installations (If PS at 5% deflection is provided in lieu of RSC, contact District Testing)
ID	ASTM F894	Varies on size and profile, contact District Testing
Wall Thickness (Pipe)	ASTM F894	Varies on size and profile, contact District Testing
Wall Thickness (Bell)	ASTM F894	Varies on size and profile, contact District Testing
Wall Thickness (Spigot)	ASTM F894	Varies on size and profile, contact District Testing
Flattening	ASTM F894	Pass (no splitting, cracking or breaking)
Length	ASTM F894	±2 in. of specified or nominal length

Profile Wall PVC Liner

Property	Test Method	Specification Limits
Cell Classification	ASTM D1784	12454 min.
Pipe Stiffness	ASTM F949 @ 5% Deflection	46 psi min.
OD, ID	ASTM F949, ASTM D2122	Varies on size, contact District Testing
Wall Thickness (Pipe)	ASTM F949	Varies on size, contact District Testing
Socket/Bell Dimensions	ASTM F949	Varies on size, contact District Testing
Impact Resistance	ASTM F949	Pass (no cracks, splits or shatter of wall or waterway; no wall separation)
Flattening	ASTM F949	Pass (no splitting, cracking, breaking or wall separation)
Bond	ASTM F949	Pass (no separation between inner and outer wall)
Length	ASTM F949	No required limits or tolerance

Precast Median Barriers



Certification: Type A

Frequency Manual Reference No: 78, 02 of 02

Specification: 602.03 (a)

Requirements:

602.03 Concrete Barrier and Concrete Glare Screen

Concrete barrier and concrete glare screen may be precast or cast-in-place. The option selected shall be used continuously throughout the project. Irregular sections shall be cast-in-place regardless of the option selected.

Concrete glare screen may only be precast when constructed in combination with new precast barrier. Concrete glare screen shall be cast-in-place when constructed in combination with cast-in-place barrier, and also when constructed on top of existing concrete barrier.

Excavation and compaction shall be in accordance with 605.03(a). Backfilling shall be in accordance with applicable requirements of 605.03(d).

(a) Precast Concrete Barrier and Concrete Glare Screen

Precast concrete barrier and concrete glare screen shall be constructed in accordance with applicable requirements of 707, except the minimum 28-day compressive strength shall be 3,000 psi (20.7 MPa). The precast units shall not be shipped or used until this strength is attained. The surfaces of individual precast units shall vary no more than 1/4 in. in 10 ft (6 mm in 3 m) from the specified cross section, as measured from a longitudinal straightedge. The maximum variation in the vertical and horizontal alignment of adjacent units shall be 1/4 in. (6 mm) across the joint, as measured from a 10 ft (3 m) longitudinal straightedge. Approved bedding may be used to obtain proper alignment of the concrete barrier sections.

Precast/Prestressed Concrete Member Strands (7 Strand Wire)



Certification: Type A

Frequency Manual Reference No.: 80, 05 of 05

Specification: 707.02; 910.01(b) 7, ASTM A416

Requirements:

Uncoated 7 Wire Strand

Uncoated 7 wire strand shall be in accordance with ASTM A 416. The strand shall have the minimum tensile strength and initial tension shown on the plans. The Design Manual requires a minimum Grade 270 (1860), which represents a 270 ksi (1860 MPa) ultimate tensile strength. The Design Manual also requires the use of Low Relaxation (LoLax) wire.

Uncoated 7 wire strand shall be covered by a type A certification in accordance with 916. The certification shall include the lot number, size, cross-sectional area, yield strength, breaking strength, strand composition, modulus of elasticity, as noted in the table below. In addition, a load-elongation curve for each size of strand supplied.

Property	Specification Reference	Nominal Diameter, in. (mm)							
		0.375 (9.53)	0.438 (11.1)	0.500 (12.7)	0.520 (13.2)	0.563 (14.3)	0.600 (15.2)	0.620 (15.7)	0.700 (17.8)
Lot Number	None	As stated							
Size, in. (mm)	ASTM A416	0.369- 0.401 (9.38- 10.18)	0.432- 0.464 (10.95- 11.75)	0.494- 0.526 (12.55- 13.35)	0.514- 0.546 (13.05- 13.85)	0.557- 0.589 (14.15- 14.95)	0.594- 0.626 (15.05- 15.85)	0.614- 0.646 (15.55- 16.35)	0.694- 0.726 (17.65- 18.45)
Minimum Yield Strength @ 1% extension, lb _f (kN)	ASTM A416, ASTM A1061	20,700 (92.1)	27,900 (124.1)	37,170 (165.3)	40,500 (180.1)	46,530 (207.0)	52,740 (234.6)	56,520 (251.4)	71,500 (318.0)
Breaking Strength, lb _f (kN)	ASTM A416, ASTM A1061	23,000 (102.3)	31,000 (137.9)	41,300 (183.7)	45,000 (200.2)	51,700 (230.0)	58,600 (260.7)	62,800 (279)	79,400 (353.2)

Preformed Elastic Joint Seal

Certification: Type A

Frequency Manual Reference No.: 17, 4 of 8

Specifications: 906.02(a) 3

Requirements: Preformed elastomeric joint seals are used for concrete pavements and are designed to seal the joint and reject incompressibles. The material shall conform to the physical properties as follows:

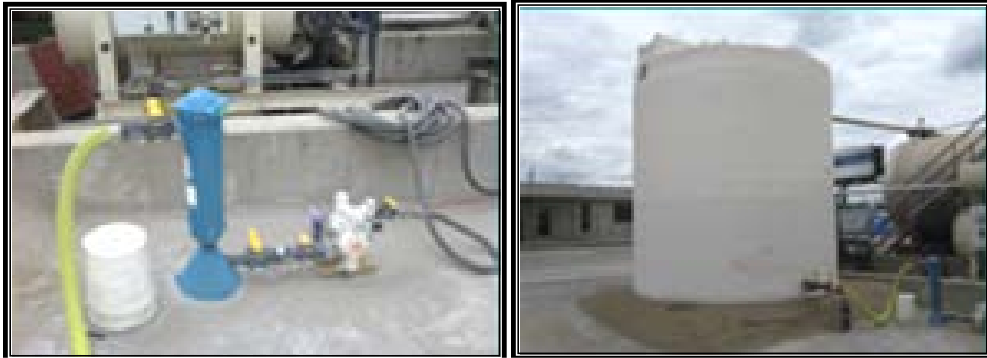
Property	Test Method	Requirement
Tensile Strength, min., psi (MPa)	ASTM D 412	2000 (13.8)
Elongation at Break, min. %	ASTM D 412	250
Hardness, Type A durometer, points	ASTM D 2240 (modified) ^A	55 ± 5
Oven aging, 70 h at 212°F (100°C) Tensile strength, loss, max. % Elongation, loss, max. % Hardness, Type a durometer, points change	ASTM D 573	20 max. 20 max. 0 to +10
Oil swell, ASTM Oil 3, 70 h at 212°F (100°C) Weight change, max. %	ASTM D 471	45 max.
Ozone resistance 20% strain, 300 pphm in air, 70 h at 104°F	ASTM D 1149 (modified) ^B	no cracks
Low-stiffening, 7 days at 14°F (-10°C) Hardness, Type A durometer, points charge	ASTM D 2240	0 to +15
Low temperature recovery, ^C 72h at 14°F (-10°C) 50 % deflection, min. %	ASTM D 2628, Section 9.2	88
Low temperature recovery, ^C 22 h at -20°F (-29°C), 50 % deflection, min. %	ASTM D 2628, Section 9.2	83
High temperature recovery, ^C 70 h at 212°F (100°C), 50 % deflection, min. %	ASTM D 2628, Section 9.2	85
Compression-deflection, at 80 % of nominal width, min., lb/in. (N/m)	ASTM D 2628, Section 9.3	3.5 (613)

^A The term “modified” in the table relates to the specimen preparation. The use of joint seal as the specimen source requires that more plies than specified in either of the modified test procedures be used. Such specimen modification shall be agreed upon by the purchaser and seller prior to testing. The hardness test shall be made with the durometer in a durometer stand as recommended in Test Method D 2240.

^B Test is accordance with Procedure A of Test Method D 518.

^C Cracking, splitting, or sticking of a specimen during a recovery test shall mean that the specimen has failed the test.

SBR Polymer Latex



Certification: Type A

Frequency Manual Reference No.: 1, 01 of 03

Specifications: 902.01a

Requirements:

A PG 58-28 or PG 64-22 binder may be modified by in-line blending with styrene butadiene rubber, SBR, polymer latex at the HMA plant in accordance with ITM 581. A PG 58-28 may be modified to a PG 64-28 and a PG 64-22 may be modified to a PG 70-22.

The SBR polymer latex shall be in accordance with the following:

SBR POLYMER LATEX	
Total Polymer Solids, % by weight	60-72
Butadiene, % by weight, minimum	68
Residual Styrene, % by weight, maximum	0.1
Ash, % of total polymer solids by weight, maximum	3.5
pH	9-11
Viscosity, Brookfield model RVF, Spindle No. 2 @ 20 rpm @ 25°C, maximum	2,000

Structural Backfill for Retaining Wall Systems



Certification: Type A

Frequency Manual Reference No.: 22, 5 of 5

Specification: RSP 732-R-310, RSP 731-B-205, Section 211.03.1 (c)

Requirements:

All Retaining Walls

Structural backfill shall be in accordance with the following criteria:

Property	Criteria	Test Method
pH	$5 < \text{pH} < 10$	AASHTO T 289
Organic Content	1 % max.	AASHTO T 267
Permeability, min.	30 ft/day	AASHTO T 215

Structural backfill sizes 1 in., 1/2 in., No 4, and No. 30, or coarse aggregate sizes No. 5, No. 8, No. 9, No. 11, or No. 12 may be used. Where ground reinforcement is required, size No. 30 shall not be used. Stone aggregate is required. ACBF meeting the size requirements for coarse aggregate No. 5 or No. 8 may also be used.

Testing is required a minimum of once per 12 months from an approved geotechnical laboratory as follows:

1. One pH test is required for each bench of stone regardless of the number of sizes of aggregates produced from that bench. One pH test is required for air cooled blast furnace slag. One pH test is required for each source of gravel.
2. One organic content test is required for each source of gravel.
3. The permeability test is required on the smallest size being supplied from a source. For example, if structural backfill sizes 1 in., 1/2 in. and No. 4 are being supplied from a source then only the No. 4 size would require the permeability test. If coarse aggregate sizes 5, 8, 9, 11, and 12 are being supplied from a source then only the No. 12 size would require permeability testing.

MSE, Steel Bin-Type, Cut-Wall, and Temporary Wire-Faced Retaining Wall Systems

In addition to the above criteria for all retaining walls, structure backfill for retaining wall systems containing metal components in contact with structure backfill shall also be in accordance with the following criteria:

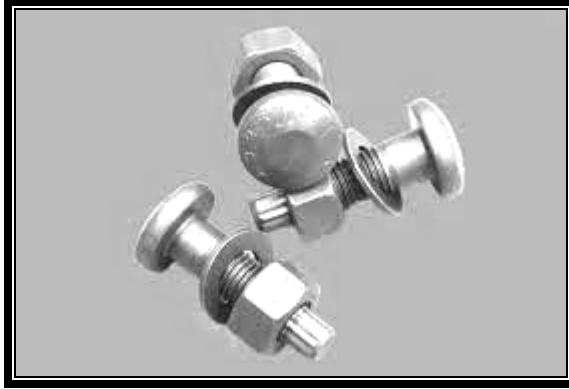
Property	Criteria	Test Method
Chlorides	< 100 ppm	AASHTO T 291
Sulfates	< 200 ppm	AASHTO T 290
Resistivity, min.	3000 Ω cm	AASHTO T 288
Internal friction angle, ϕ , min.	34°	AASHTO T 236* or T 297*

* Under consolidated drained conditions

Testing is required a minimum of once per 12 months from an approved geotechnical laboratory as follows:

1. The resistivity shall be tested at 100% saturation.
2. For MSE, concrete block, and wire-faced retaining walls, testing for internal friction angle shall be performed on the portion that passes the No. 8 sieve using a sample of the material compacted to 95% in accordance with AASHTO T 99, Method C or D.
3. The resistivity, chlorides, and sulfates tests shall be conducted on all sizes of allowable materials except that the requirements for the testing of chlorides and sulfates will be waived if the minimum resistivity exceeds 5000 Ω cm.
4. The internal friction test is required only for the No. 4, No. 11 and No. 12 sizes.

Torsion Control Bolts



Certification: Type A

Frequency Manual Reference No.: 100, 03 of 03

Specification: 910.02g

Requirements:

The manufacturer or supplier, whichever is the responsible, shall furnish a test report of each lot that includes the following.

Requirement	Test Method	Specification Limits
Hardness	ASTM F 1852 Table 3	Refer to District Lab
Tensile Strength	ASTM F 1852 Table 4	Refer to District Lab
Proof Load	ASTM F 1852 Table 4	Refer to District Lab
Zinc Coating (Only Mechanically Coated)	ASTM B 695 Class 55, Type I	Minimum Thickness = 53 μm (hot dip not allowed)
Chemical Composition (Type I Bolt)	ASTM F 1852 Table 1	Refer to District Lab
Chemical Composition (Type 3 Bolt)	ASTM F 1852 Table 2	Refer to District Lab

Wire Rope for Cable Barrier Systems (Zinc-Coated Steel Wire Rope)



Certification: Type A

Frequency Manual Reference No.: 117, 02 of 03

Specification: RSP 627-R-546; AASHTO M30

Requirements:

Zinc-Coated Steel Wire Rope for Highway Guardrail

Zinc-Coated Wire Rope shall be in accordance with RSP 627-R-546 and AASHTO M30. Three strands of seven wires each shall constitute the wire rope in accordance with Type I of AASHTO M30 and shall have a nominal diameter of 3/4 in. (19mm). The wires shall be zinc-coated to Class A in accordance with ASSHTO M30.

The Type A Certification for wire rope, as stated in RSP 627-R-546, shall include zinc coating, the minimum breaking strength, the modulus of elasticity and the force applied to pre-stretch the wire rope. A Type A Certification shall be provided for every spool of wire rope installed on the project.

Property	Specification Reference	Specification Limits
Zinc Coating, oz/ft ² (g/m ²)	AASHTO M 30	0.85 (259), min.
Minimum Breaking Strength, lb _f (kN)	RSP 627-R-546	39,000 (173.5), min.
Modulus of Elasticity, psi (MPa)	RSP 627-R-546	11,805,000 (81,393), min.
Pre-stretching Force, lb _f (kN)	RSP 627-R-546	*

* No specification requirement. Value is reported.