

2025 ODOT Standard Specifications for Asphalt Materials



2025 Oregon Department of Transportation Standard Specifications for Asphalt Materials

The requirements in this document are effective for contracts and purchase orders advertised after December 1, 2024.

Revisions – Several emulsified asphalts have either been added or updated to reflect current practices and material performance requirements.

Scope

These specifications cover asphalt cements, emulsified asphalts, and recycling agents used on ODOT highway construction contracts or maintenance purchase orders.

Temperatures

The loading temperature of the asphalt materials when loaded into tank cars or trucks for shipment shall not exceed the Flash Point specified for the grade.

Documentation

- 1. Shipping Document** – A Bill of Lading shall accompany each shipment and shall include the following information:
 - (a) Consignee
 - (b) Department contract number or purchase order number
 - (c) Date of shipment
 - (d) Type and grade of material
 - (e) Car initial or number of truck transport
 - (f) Delivery point or destination
 - (g) Quantity loaded
 - (h) Loading temperature
 - (i) Flash Point and Specific Gravity for PG Grades
 - (j) Net quantity in Mg (Tons)
 - (k) Brand, type, and amount (% or p.p.m.) of additive such as anti-stripping additive blended with asphalt.
 - (l) Name and location of the asphalt supplier
 - (m) Signature of shipper or authorized representative
- 2. Additional Information** – Provide the percent of oil distillate added to CMS-2, CMS-2s, HFMS-2, and HFMS-2s emulsified asphalts.
- 3. Certification of Compliance** – A statement certifying that the product in the shipment complies with applicable Oregon DOT specifications shall be on or accompany the bill of lading. An authorized representative of the asphalt supplier shall sign the certification.

Acceptance

Asphalt materials will be conditionally accepted for immediate use upon receipt at the point of delivery of a satisfactory certification of compliance and the Materials Safety Data Sheet (MSDS). Final acceptance of asphalt materials will be determined by Agency testing at the Central Materials Laboratory according to the sampling and testing requirements in the Manual of Field Test Procedures (MFTP). The Engineer will determine the extent of any additional sampling and testing.

Performance Graded (PG) Binder

The asphalt cement furnished under this specification shall be petroleum asphalt prepared by the refining of crude petroleum and, when necessary, by the addition of modifiers designed to provide the asphalt characteristics specified. It shall be homogeneous and free from water, and it shall not have been distilled at a temperature high enough to produce flecks of carbonaceous matter. It shall meet the requirements of Table 1 of AASHTO M320, Standard Specification for Performance Graded Asphalt Binder, at the time of use when tested according to the methods specified.

The PG grade with the additional designation of "ER" (e.g., PG70-28ER) per the project schedule of items shall meet the following limit when tested according to AASHTO T 301 "Standard Method of Test for Elastic Recovery Test of Asphalt Materials by Means of a Ductilometer":

% Elastic Recovery – 50 minimum

Condition the asphalt binder samples per AASHTO T 240 "Standard Method of Test for Effect of Heat and Air on a Moving Film of Asphalt (RTFOT) prior to testing per AASHTO T 301.

Cationic Emulsified Asphalt

The cationic emulsified asphalt furnished under this specification shall be an emulsion of asphalt cement, water, and emulsifying agent. The emulsified asphalt shall be homogeneous. It shall show no separation of asphalt after thorough mixing within 30 days after delivery. It shall meet the following requirements when tested within 30 days of sampling according to AASHTO T 59.

Emulsion		Test Method ⁵	Rapid Setting		Medium Setting			Slow Setting		Quick Setting	
			CRS-1 ⁽²⁾	CRS-2 ⁽²⁾	CMS-2	CMS-2s	CMS-2h	CSS-1	CSS-1h	CQS-1	CQS-1h
Saybolt Viscosity, SFS	25°C	T 59	-	-	-	-	-	20-100	20-100	-	-
Saybolt Viscosity, SFS	50°C	T 59	20-100	100 - 400	50 - 450	50 - 450	50 - 450	-	-	20-100	20-100
Storage Stability, %	24 hr.	T 59	1 max.	1 max.	1 max.	1 max.	1 max.	1 max.	1 max.	1 max.	1 max.
Sieve, % ⁽⁴⁾		T 59	0.1 max.	0.1 max.	0.1 max.	0.1 max.	0.1 max.	0.1 max.	0.1 max.	0.1 max.	0.1 max.
Particle Charge, pH		T 59	positive	positive	positive	positive	positive	positive	positive	positive	positive
Demulsibility, % ⁽¹⁾		T 59	40 min.	40 min.							
Cement Mixing Test, %		T 59						2.0 max.	2.0 max.		
Residue, % (by weight)		T 59	60 min.	65 min.	65 min.	60 min.	65 min.	57 min.	57 min.	62 min.	62 min.
Oil distillate, % (by volume)		T 59	3 max. ⁽³⁾	3 max. ⁽³⁾	8 max. ⁽³⁾	12 max. ⁽³⁾	8 max. ⁽³⁾	3 max. ⁽³⁾	3 max. ⁽³⁾		
Coating Ability and Water Resistance	Dry Aggregate	T 59			Good	Good	Good				
	After Spraying	T 59			Fair	Fair	Fair				
	Wet Aggregate	T 59			Fair	Fair	Fair				
	After Spraying	T 59			Fair	Fair	Fair				
Distillation Residue											
Penetration, 100 g, 5s, dmm	25°C	T 49	90-250 ⁽²⁾	90-250 ⁽²⁾	90-250	90-250	40-90	90-250	40-90	90-250	40-90
Ductility, cm	25°C	T 51	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.	40 min.
Solubility in Trichloroethylene, %		T 44	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.	97.5 min.

Notes

1. Perform the demulsibility test within 30 days of shipment date.
2. When CRS-1h or CRS-2h is specified, only the penetration range is changed from 90-250 dmm to 40-90 dmm.
3. Required under Oregon Administrative Rules, Chapter 340, Division 232-0120 - Department of Environmental Quality.
4. Per AASHTO M 140, this test requirement is waived if successful application of the material has been achieved in the field.
5. Test methods are the current version of either AASHTO (T), ASTM (D), or ODOT (TM) publications.

Anionic Emulsified Asphalt

The anionic emulsified asphalt furnished under this specification shall be an emulsion of asphalt cement, water, and emulsifying agent. The emulsified asphalt shall be homogeneous. It shall show no separation of asphalt after thorough mixing within 30 calendar days after delivery. It shall meet the following requirements when tested within 30 calendar days of sampling according to AASHTO T 59 as modified.

Requirements for Anionic Emulsified Asphalts

Emulsion		Test Method ¹	Rapid Setting	Medium Setting	
			HFRS-2	HFMS-2	HFMS-2S
Saybolt Viscosity, SFS	25°C	T 59			
	50°C	T 59	50 min.	100 min.	100 min.
Storage Stability, %	24 hr.	T 59	1 max.	1 max.	1 max.
Sieve, %		T 59	0.10 max.	0.10 max.	0.10 max.
Demulsibility, %		T 59	30 min.		
Residue, % (by weight)		T 59	63	65	65
Oil distillate, % (by volume)		T 59	7 max.*	7 max.*	1-7
Distillation Residue					
Penetration, 100 g, 5s, dmm	25°C	T 49	90 - 200	100 - 300	200 min.
Ductility, cm	25°C	T 51	40 min.	40 min.	-
Float Test, seconds	60°C	T 50	1200	1200	1200

Note

1. Test methods are the current version of either AASHTO (T), ASTM (D), or ODOT publications.

Polymer-Modified Cationic Emulsified Asphalt

This specification has been designed to yield a set of distinguishing characteristics for a polymer-modified emulsion. It is for use in chip seal projects where early chip retention and resistance to chip loss is an important objective. The binder is not a conventional asphalt cement. The asphalt must be polymerized before shipment. It shall show no separation of asphalt after thorough mixing within 14 calendar days after delivery. It shall meet the following requirements when tested within 14 calendar days of sampling according to AASHTO T 59 as modified.

Requirements for Cationic Polymer-Modified Emulsified Asphalts

Emulsion		Test Method	Rapid Setting			Quick Setting
			CRS-2P	CRS-3P*	PMCRS-2h*	CQS-1hP
Saybolt Viscosity, SFS	25°C	T 59				20 - 100
	50°C	T 59	100 - 400	100 - 400	100 - 400	
Storage Stability, %	24 hr.	T 59	1 max.	1 max.	1 max.	
Sieve, %		T 59	0.10 max.	0.10 max.	0.30 max.	0.10 max.
Particle Charge		T 59	positive	positive	positive	positive
Demulsibility, %		T 59	40	40		
Residue, % (by weight)		T 59	65 min. ⁽¹⁾	65 min. ⁽¹⁾	65 min. ⁽¹⁾	64 min. ⁽¹⁾
Oil distillate, % (by volume)		T 59	3.0 max.	3.0 max.		
Distillation Residue						
Penetration, 100 g, 5s, dmm	25°C	T 49	90 - 150	80 - 150	40 - 90	40 - 90
Elastic Recovery, % ⁽³⁾	10°C	TM 429	45 min.	60 min.	50 min.	50 min.
Solubility in Trichloroethylene, % ⁽²⁾		T 44	97.5 min.	97.5 min.	97.5 min.	97.0 min.
Softening Point, °F		T 53				142

* Not common AASHTO nomenclature.

Notes

1. T 59 modified to include 300 grams of emulsion and 177 ± 5°C max. temp. to be held for 15 minutes.
2. T 44 may be waived if polymer modification interferes with test accuracy.
3. ODOT TM 429 on file at ODOT Materials Laboratory in Salem, Oregon.
4. Test methods are the current version of either AASHTO (T), ASTM (D), or ODOT (TM) publications.

Polymer-Modified Anionic Emulsified Asphalt

This specification has been designed to yield a set of distinguishing characteristics for a polymer-modified emulsion. The binder is not a conventional asphalt cement. The asphalt must be polymerized before emulsification. It shall show no separation of asphalt after thorough mixing within 14 calendar days after delivery. It shall meet the following requirements when tested within 14 calendar days of sampling according to AASHTO T 59 as modified.

Requirements for Polymer-Modified Anionic Emulsified Asphalts

Emulsion		Test Method	Medium Setting	Rapid Setting		
			HFMS-2sP	HFRS-1P	HFRS-2P	RS-LTP
Saybolt Viscosity, SFS	50°C	T 59	50 min.	100 min.	100 min.	50 min.
Storage Stability, %	24 hr.	T 59	*	1 max.	1 max.	1 max.
Sieve, %		T 59	0.10 max.	0.10 max.	0.10 max.	0.10 max.
Demulsibility, %		T 59		30	40	60
Residue, % (by weight)		T 59	65 min. ^(1,3)	65 min. ⁽¹⁾	65 min. ⁽¹⁾	65 min. ⁽¹⁾
Oil distillate, % (by volume)		T 59	7.0 max.	3.0 max.	2.0 max.	3.0 max.
Distillation Residue						
Penetration, 100 g, 5s, dmm	25°C	T 49	300 min.	90 - 200	90 - 200	150 - 300
Elastic Recovery, % ^(2,4)		TM 429	25 min.	30 min.	58 min.	45 min.
Solubility in Trichloroethylene, % ⁽⁵⁾		T 44	97.0 min.	97.5 min.	97.5 min.	
Float Test, seconds	60°C	T 50	1200	1200	1200	

* Provide an emulsion that shows no signs of separation (milky appearance) after setting undisturbed for 24 hours.

Notes

1. T 59 modified to include a $204 \pm 5^{\circ}\text{C}$ max. temp. to be held for 15 minutes.
2. Distillation residue tested according to T 240 (RTFO) prior to TM 429.
3. The combined residue and oil from the distillation must be 70.0% min.
4. ODOT TM 429 on file at ODOT Materials Laboratory in Salem, Oregon.
5. T 44 may be waived if polymer modification interferes with test accuracy.

Polymer-Modified Rejuvenating Emulsified (PMRE) Asphalt

This specification has been designed to yield a set of distinguishing characteristics for a polymer-modified rejuvenating emulsion to be used in scrub seal applications. The binder is not a conventional asphalt cement. The asphalt must be polymerized before emulsification. It shall show no separation of asphalt after thorough mixing within 14 calendar days after delivery. It shall meet the following requirements when tested within 14 calendar days of sampling according to AASHTO T 59 as modified.

Requirements for Polymer-Modified Rejuvenating Emulsified Asphalts

Emulsion		Test Method ²	Cationic	Anionic
			PMRE	PMRE
Saybolt Viscosity, SFS	50°C	T 59	50 - 400	50 min.
Storage Stability, %	24 hr.	T 59	1.0 max.	1.0 max.
Sieve, %		T 59	0.10 max.	0.10 max.
Demulsibility, %		T 59	40 max.	40 max.
Particle Charge		T 59	positive	
Residue, % (by weight)		T 59	65 min. ⁽¹⁾	65 min. ⁽¹⁾
Oil distillate, % (by volume)		T 59	1.0 max.	1.0 max.
Distillation Residue				
Penetration, 200 g, 60s, dmm	4°C	T 49	40 min.	40 min.
Elastic Recovery, %	10°C	T 301	60 min.	60 min.
Float Test, seconds	60°C	T 50		1200
Rejuvenating Agent				
Kinematic Viscosity, CST	60°C	T 201	15 - 300	200 - 750
Flash Point, °C		T 48	182 min.	193 min.
Saturates, %		D4124	30 max.	30 max.

Notes

1. T 59 modified to include a $175 \pm 5^\circ\text{C}$ distillation temperature.
2. Test methods are the current version of either AASHTO (T), ASTM (D), or ODOT (TM) publications.

High Performance Tack Coat (HPTC)

This specification has been designed to yield a set of distinguishing characteristics for an emulsified asphalt tack coat. It shall meet the following requirements when tested within 30 calendar days of sampling according to AASHTO T 59 as modified.

Requirements for High Performance Tack Coats (HPTCs)

Emulsion		Test Method ²	HPTC
Saybolt Viscosity, SFS	25°C	T 59	20 - 100
Storage Stability, % ⁽¹⁾	24 hr.	T 59	1 max.
Sieve, %		T 59	0.3 max.
Residue, % (by weight)		T 59	50 min.
Diluted Residue, % (by weight)		T 59	33 min.
Oil distillate, % (by volume)		T 59	1.0 max.
Distillation Residue			
Penetration, 100 g, 5s, dmm	25°C	T 49	70 max.
Softening Point, °C		T 53	55 min.

Notes

1. The storage stability requirement may be waived if successful application of the material has been achieved.
2. Test methods are the current version of either AASHTO (T), ASTM (D), or ODOT (TM) publications.

Cold-In-Place Recycling Agents

The emulsified asphalt furnished under this specification shall be an emulsion of asphalt cement, water, and emulsifying agent. The emulsified asphalt shall be homogeneous. It shall show no separation of asphalt after thorough mixing within 30 calendar days after delivery. It shall meet the following requirements when tested within 30 calendar days of sampling according to AASHTO T 59 as modified.

Requirements for Cold In-Place Recycling Agents

Emulsion		Test Method ¹	Medium Setting	
			CMS-2RA	HFMS-2RA
Saybolt Viscosity, SFS	50°C	T 59	50 - 450	50 min.
Storage Stability, %	24 hr.	T 59	1 max.	1 max.
Sieve, %		T 59	0.10 max.	0.10 max.
Residue, % (by weight)		T 59	60 min.	65 min.
Oil distillate, % (by volume)		T 59	5-15	7.0 max.
Particle Charge		T 59	Pos.	Neg.
Distillation Residue				
Penetration, 100 g, 5s, dmm	25°C	T 49	100 - 250	200 - 350
Solubility in Trichloroethylene, %		T 44	97.5 min.	97.5 min.
Float Test, seconds	60°C	T 50	-	1200

Note

1. Test methods are the current version of either AASHTO (T), ASTM (D), or ODOT (TM) publications.

Hot-Mix Recycling Agents

The asphalt cement furnished under this specification shall be petroleum asphalt prepared by the refining of crude petroleum. Recycling Agents RA 1, RA 5, RA 25, RA 75, RA 250, and RA 500 shall meet the requirements of ASTM D4552/D4552M except for Section 5.2 and the note below Table 1 which do not apply.

Pre-Coated Aggregate Asphalt Surface Treatment Asphalt Binder

The following materials specification is for asphalt products manufactured specifically for use in Pre-coated Aggregate Asphalt Surface Treatment. AC15-5TR must contain 5% scrap tire rubber.

Requirements for Asphalt Binders Used in Bituminous Surface Treatments

Binder		Test Method ¹	AC-15P	AC-15-5TR
Absolute Viscosity, poise	60°C	TM 430	1500 - 3500	1500 min.
Viscosity, Pa*s	135°C	T 316	2.0 max.	2.0 max.
Penetration, 100 g, 5s, dmm	25°C	T 49	100-150	90-140
Elastic Recovery, %	10°C	TM 429	70 min.	55 min.
Cleveland Open Cup Flash Point, °C		T 48	260 min.	260 min.

Note

1. Test methods are the current version of either AASHTO (T), ASTM (D), or ODOT (TM) publications.