

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 26, 2021

Special Provision No. 18-1024

EFFECTIVE DATE: June 1, 2021

SUBJECT: Tack Coat for HMA Pavement.

Alabama Standard Specifications, 2018 Edition, SECTION 405, SECTION 407 and SECTION 804 shall be revised as follows:

SECTION 405 TACK COAT

405.01 Description.

The work under this Section shall cover the furnishing and placing of a bituminous tack coat on a surface which is to be covered by a bituminous plant mix material in accordance with these specifications and in reasonably close conformity with the lines shown on the plans or directed by the Engineer.

The work shall include cleaning the surface prior to application of the tack coat.

The area of treatment and the rate of application of a tack coat shall be based on the plans and specifications after evaluating the actual surface condition on which the plant mix overlay is to be placed.

405.02 Materials.

(a) Tack Coat

Bituminous material for tack coat shall be Emulsified Asphalt or one of the Performance Graded (PG) Asphalt Binders shown in Article 804.07. Emulsified Asphalts shall not be diluted prior to application. The Contractor shall have the option of using the following materials for the tack coat:

- PG 58-22 performance graded asphalt binder
- PG 64-22 performance graded asphalt binder
- PG 67-22 performance graded asphalt binder
- PG 76-22 performance graded asphalt binder
- CRS-1H emulsified asphalt
- CRS-2 emulsified asphalt
- CRS-2H emulsified asphalt
- CMS-1HP emulsified asphalt
- CSS-1 emulsified asphalt
- CSS-1H emulsified asphalt
- CQS-1H emulsified asphalt
- CQS-1HP emulsified asphalt
- CRS-2P emulsified asphalt
- CRS-2L emulsified asphalt
- CBC-1HT emulsified asphalt
- CNTT-1HS emulsified asphalt
- BC-1HT emulsified asphalt (anionic)
- NTSS-1HM emulsified asphalt (anionic)
- NTQS-1HL emulsified asphalt (non-ionic)

In lieu of tack coat, materials listed in Subarticle 405.02(b) may be applied to adjacent pavement edges and joints as described in Item 2 of Subarticle 405.03(d).

Unless shown otherwise on the plans, the Contractor shall have the option of using any of the allowable bituminous materials, subject to other limitations of these specifications. In making the selection of materials, the Contractor shall take into consideration seasonal, weather, temperature, and other placement conditions, while keeping in mind that SS stands for slow setting, RS stands for rapid setting, and QS stands for quick setting (QS is the faster setting or breaking emulsion). Low temperatures and humid or damp conditions will retard the breaking or setting of all emulsions. The mixing of a cationic and an anionic emulsion will result in failure of emulsion materials. All materials shall meet the requirements of Section 804.

CQS-1HP shall be a cationic emulsion blended with a minimum of 1.2% polymer meeting the requirements given in Article 811.03 and the requirements given in the following table:

CQS-1HP MODIFIED ASPHALT EMULSION			
TEST OF EMULSION			
Parameter	Test Method	Value	
Residue % By Distillation	ALDOT 415	60 % Min.	-
Viscosity, SF @ 77 °F, sec.	AASHTO T 59	20 SF Min.	100 SF Max.
Sieve Test, %	AASHTO T 59	-	0.1 % Max.
Particle Charge	AASHTO T 59	Positive	
TEST OF RESIDUE FROM EMULSION			
Parameter	Test Method	Value	
Penetration, 100 g, 5 secs. @ 77 °F	AASHTO T 49	60 mm Min.	130 mm Max.
Ductility, cms., @ 39.2 °F	AASHTO T-51	40 cms Min.	-
Elastic Recovery @ 50 °F, %	AASHTO T-301	50 % Min.	-

(b) Additional Materials for Application on Adjacent Pavement Edges and Joints.

The Contractor may use the following materials in lieu of tack coat for application on adjacent pavement edges and joints.

- Pavon™;
- Crafcro™ Pavement Joint Adhesive Part No. 34524.

Pavon™ is a proprietary product that shall also meet the requirements given in the following tables.

REQUIRED PROPERTIES FROM THE TESTING OF Pavon™			
Parameter	Test Method	Value	
Residue % By Distillation	ALDOT 415	60 % Min.	-
Viscosity, SF @ 77 °F, sec.	AASHTO T 59	20 SF Min.	100 SF Max.
Sieve Test, %	AASHTO T 59	-	0.1 % Max.
Particle Charge	AASHTO T 59	Positive	

REQUIRED PROPERTIES FROM THE TESTING OF DISTILLATION RESIDUE FROM Pavon™			
Parameter	Test Method	Value	
Penetration, 100 g, 5 secs. @ 77 °F	AASHTO T 49	60 mm Min.	130 mm Max.
Ductility, cms., @ 39.2 °F	AASHTO T-51	40 cms Min.	-
Elastic Recovery @ 50 °F, %	AASHTO T-301	50 % Min.	-

Crafco™ Pavement Joint Adhesive Part No. 34524 is a proprietary product that shall meet the requirements given in the following table:

REQUIRED PROPERTIES FROM THE TESTING OF Crafco™ PAVEMENT JOINT ADHESIVE PART NO. 34524		
Parameter	Test Method	Value
Cone Penetration, 77 °F	ASTM D5329	60-100
Flow, 140 °F	ASTM D5329	5 mm-Maximum
Resilience, 77 °F	ASTM D5329	30 %-Minimum
Ductility, 77 °F	AASHTO T51	30 cm-Minimum
Ductility, 39.2 °F	AASHTO T51	30 cm-Minimum
Softening Point	AASHTO T53	170 °F Minimum

405.03 Construction Requirements.

(a) Equipment.

In general, it shall be the Contractor's responsibility to select the proper size and amount of equipment to provide the desired results. Equipment furnished shall meet the requirements of Subarticle 401.03(a).

(b) Seasonal, Nighttime, Weather, and Temperature Limitations.

1. Seasonal Limitations for the Placement of Tack.

Grades CSS-1 and CSS-1h Emulsified Asphalts shall not be placed between the dates of October 1 and May 1 in North Alabama and between the dates of November 1 and April 1 in South Alabama regardless of weather conditions. For the purpose of identification, South Alabama shall be referred to for projects lying partly or wholly in the area of the State lying south of latitude 33 °N, with North Alabama encompassing the remaining portion of the State. These seasonal limitations shall not apply to the placement of other bituminous materials for tack allowed by Article 405.02. The tack may be placed if allowed by the Engineer when the pavement temperature is 40 °F and rising.

2. Nighttime Limitations for the Placement of Tack.

Grade CSS-1 and CSS-1h Emulsified Asphalts shall not be used for tack during nighttime paving operations.

3. Weather Limitations for the Placement of Tack.

Tack material shall not be applied on a wet surface or when in the Engineer's opinion weather conditions are not suitable. NTSS-1HM may become slippery when wet.

4. Temperature Limitations for the Placement of Tack.

Temperature limitations for the placement of tack coat material shall be the same as specified in Subarticle 410.03(b) for plant mixed pavements. NTSS-1HM material shall not be used for cold applied asphalt pavement.

(c) Preparation of Surface.

Loose material, dust, dirt, and all foreign matter shall be removed from the surface to be treated. All surfaces (new pavement, milled pavement, old pavement, or concrete) shall be clean and dry prior to the tack coat application. Cleaning operations can be achieved either through mechanical brooming, by flushing with water, vacuuming, blowing off debris using high-pressure air or other methods as determined by the Contactor, unless otherwise shown on the plans. The surface must be approved by the Engineer before application of the tack material.

(d) Application.

1. General

Tack coat material application rates and temperatures shall meet the requirements given in the tables below:

UNDILUTED APPLICATION RATE BY SURFACE TYPE, gal/yd ²				
Tack Material	New HMA or New Surface Treatment	Existing HMA or Existing Surface Treatment	Milled Surface	PCC
Emulsions	0.03 - 0.07	0.06 - 0.11	0.06 - 0.12	0.05 - 0.08
PG Asphalt Binder	0.02 - 0.05	0.04 - 0.07	0.04 - 0.09	0.03 - 0.05

TACK APPLICATION TEMPERATURES, °F	
Cationic Emulsified Asphalt	130 - 170
Anionic Emulsified Asphalt	150 - 180
Non-Ionic Emulsified Asphalt	150 - 180
PG Asphalt Binder	275 - 375

Tack coat shall be applied uniformly to the pavement surface to obtain full coverage. Tack coat applications that are streaky or striped in appearance will not be allowed and shall be reapplied.

An asphalt distributor shall be provided for use on all accessible areas; inaccessible areas such as around manholes, etc. may be coated by other methods, approved by the Engineer.

Tack coat shall be applied to all contact surfaces of curbs, gutters and manholes. Tack shall also be applied to the adjacent pavement edges (transverse and longitudinal) of all new base layers of Section 424 (Superpave), binder and wearing layers of Section 424 (Superpave) and Section 423 (Stone Matrix Asphalt), and to the joints in the surface layers between existing HMA pavement and new HMA pavement. This tack may be applied with the pavement surface tacking operation or in a separate pass. In either case, the surfaces, edges, and joints shall be thoroughly coated with tack.

Adjacent surfaces, such as gutters and the like, that are not to be in contact with the mix shall be adequately protected from the spray by means of heavy paper securely fastened in place or by other satisfactory means. Any such surface soiled by tack coat material shall be cleaned and restored to its previous condition without additional compensation.

2. CrafcTM and PavonTM.

The following will apply if the Contractor uses CrafcTM or PavonTM for application on adjacent pavement edges and joints.

As a separate application from the tack coat, these products shall be applied by being sprayed or rolled on the face of the adjacent pavement edges and joints.

These products shall be placed at the rates and temperatures given in the following table.

APPLICATION RATES AND TEMPERATURES		
Product	Application Rate	Application Temperature
Pavon TM	40 gallons per mile per inch of lift with a +/- 10 % tolerance	Ambient Temperature
Crafc TM Pavement Joint Adhesive Part No. 34524	70 gallons per mile per inch of lift with a +/- 10 % tolerance	360 °F - 400 °F

The Engineer will limit the length of product placement ahead of the asphalt spreader (usually no more than 1000 feet) to reduce the possibility of damage. The Engineer will also require the placement of PavonTM far enough ahead of the asphalt spreader to allow the curing of the product.

(e) Curing

Tack coat materials shall be fully cured before application of the overlying asphalt pavement layer is placed. Emulsified asphalt materials are considered as cured when the emulsion color has completely turned black. The NTSS-1HM asphalt emulsion shall be covered as soon as practical.

Tack coat material shall be spread only far enough in advance to permit the construction to progress consistently, uniformly, and continuously after the curing period and shall not be applied so far in advance that the viscous quality will be reduced by traffic prior to construction thereon. Tack coat that is damaged, loses its viscous quality before being covered, or is tracked off the surface by construction equipment, shall be reapplied without extra compensation.

405.04 Method of Measurement.

The amount of bituminous material used as directed for tack coat will be measured in gallons {liters}, as specified in Article 109.02. **If Crafco or Pavon products are used, the Contractor shall provide a suitable means of measurement of the gallons of product used.**

405.05 Basis of Payment.

(a) Unit Price Coverage.

The amount of bituminous material used as directed for tack coat, measured as noted above, will be paid for at the contract unit price bid per gallon which shall be full compensation for furnishing the bituminous material, hauling, heating, application, curing, and maintaining and for all equipment, tools, labor, and incidentals necessary to complete the work.

(b) Payment will be made under Item No.:

405-A Tack Coat - per gallon

**SECTION 407
JOINT SEALANT FOR HMA PAVEMENT**

This Section shall be deleted from the Standard Specifications.

**SECTION 804
ASPHALT MATERIALS**

804.07 Tables of Asphalt Materials.

Table 5 in Subarticle 804.07(e) shall be replaced with the following:

(e) Asphalt Materials Table Number 5, Emulsified Asphalts.

ASPHALT MATERIALS TABLE NO. 5 SPECIFICATIONS FOR EMULSIFIED ASPHALTS											
VISCOSITY GRADE											
	NTSS-1HM Min-Max	NTQS-1HL Min-Max	GMS-2, CMS-2h, CSS-1, CSS-1h, CRS-2 CRS-2p* CRS-2l*	AE-P Min-Max	GMS-1hp Min-Max	CRS-1h Min-Max	CBC-1HT, BC-1HT Min-Max	CRS-2h CRS-2hp* Min-Max	CQS-1h CQS-1hp* Min-Max	CNTT-1hs Min-Max	AASHTO TESTS
AASHTO M 208			Meet								T 59
Elastic Recovery Minimum 50 % @ 50° F {10° C}	-- --	-- --	50 % for CRS-2p and CRS-2l	-- --	50%	-- --	-- --	50% for CRS-2hp	50% for CQS-1hp	-- --	T 301 **
Viscosity, Saybolt Furol: @ 77 ° F {25 ° C}, Sec @ 122 ° F {50 ° C}, Sec	25 500	-- 100	--	10 50	30 400	-- --	10 150	-- --	20 150	0 100	T 59 T 59 *See Note #4
Settlement, 5 days, %	-- 5	-- --	--	-- 5	-- --	-- --	-- --	-- --	-- --	-- --	T 59
Storage Stability Test 24 hr., %	-- 1.0	-- 1.0	--	-- --	-- 1.0	-- 1.0	-- 1.0	-- 1.0	-- 1.0	1.0 --	T 59
Demulsibility, 35 ml/0.8%	-- --	-- --	--	-- --	-- --	-- --	-- --	60	-- --	-- --	T 59
Sod. Dioctyl Sulfosuccinate, %	Negative	Non-ionic	Positive	-- --	Positive	Positive	-- --	Positive	Positive	Positive	T 59
Particle Charge	-- --	-- 0.10	--	-- 0.10	-- 0.10	-- 0.10	-- 0.30	-- 0.10	-- 0.10	0.10	T 59
Sieve Test, %	-- --	-- --	--	-- 0.10	-- 0.10	-- 0.10	-- 0.10	-- 0.10	-- 0.10	0.10	T 59
Distillation:											
Oil Distillate or Naphtha, by Volume of Emulsion, %	-- 1.0	-- --	--	-- 12	-- 3.0	-- 3.0	--	-- 3.0	-- --	3.0 --	T 59
Residue by Distillation, %	50 --	60 --	--	45 --	50 --	55 --	50 --	65 --	60 --	50 --	T 59
Stone Coating Test, % Coated	-- --	-- --	--	-- --	-- --	-- --	-- --	-- --	-- --	-- --	See Note #1
Modified Sand Coating	-- --	-- --	--	-- --	-- --	-- --	-- --	-- --	-- --	-- --	See Note #2
Tests on Residue from Distillation:											
Float Test @ 140 ° F {60 ° C}, Sec.	-- --	-- --	--	20	-- --	-- --	-- --	-- --	-- --	-- --	See Note #3
Solubility in Cl ₂ CH ₂ CCl ₂ , %	-- --	-- --	--	97.5	-- --	-- --	-- --	97.5 --	97.5 --	-- --	T 44
Ductility @ 77 ° F {25 ° C}, cm	-- --	-- --	--	--	--	--	--	60	40	--	T 51
Ash, % by Mass	-- --	-- --	--	--	--	--	--	--	--	--	T 111
Specific Gravity, 77 ° F / 77 ° F {25 ° C / 25 ° C}	-- --	-- --	--	--	--	--	--	--	--	--	T 228
Softening Point	65°C --	60°C --	--	--	40°C --	49°C --	--	--	--	49°C --	T 53
Dynamic Shear@76°C (G'/sinδ, 10rad/s), kPa	-- --	1.0 --	--	--	--	--	1.0 --	--	--	--	T 315
MSCR@64°C, J _{nr} @3.2/kPa	-- --	-- --	--	--	--	--	--	--	--	--	T 350
Penetration 77 ° F {25 ° C}, 100 g, 5s	-- 20	-- 20	--	--	45-90	40 90	--	70 100	60 110	40 90	T 49

* All CRS-2p, CRS-2hp, CRS-2l, and CQS-1hp shall contain a minimum of 3.0 % polymer by volume. CRS-2p shall meet the requirements given in AASHTO M 316 with the exception of polymer content. All polymers shall conform to the requirements given in Section 811. All Elastic Recovery failures will be subject to FTIR scans for acceptability.
** The following exceptions shall be made to the requirements given in AASHTO T 301: The statement given in Section 4.5 that reads "Attach the clips to the pins or hooks of the force adapter and the testing machine..." shall be disregarded. The mold shall be in accordance with the requirements given in ASTM D 6084 with dimensions noted in this method.