




Illinois Department of Transportation

Memorandum

To: Regional Engineers
From: Jack A. Elston 
Subject: Special Provision for Bituminous Surface Treatment with Fog Seal
Date: January 9, 2026

This special provision was developed by the Bureau of Research and Central Bureau of Materials to replace the Recurring Special Provision, "Preventative Maintenance - Bituminous Surface Treatment (A-1)" and to include A-2 and A-3 treatments, as well as add a fog seal. It has been revised to remove fine aggregates and incorporate a mix design procedure to ensure proper embedment.

This special provision should be inserted into contracts involving bituminous surface treatment (aka chip seal) with fog seal.

Designer Note: The aggregate gradation must be specified in the plans as CA 14 or CA 15 for cover coat and CA 16 or CA 20 for seal coat. Additionally, the substrate surface condition of the existing pavement surface must be specified in the plans using one of the following ratings.

Existing Surface Condition
Flushed-Bleeding
Smooth, non-porous
Slightly porous, slightly oxidized
Slightly pocked, porous, oxidized
Badly pocked, porous, oxidized

The districts should include the BDE Check Sheet marked with the applicable special provisions for the April 24, 2026 and subsequent lettings. The Project Coordination and Implementation Section will include a copy in the contract.

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BITUMINOUS SURFACE TREATMENT WITH FOG SEAL (BDE)

Effective: January 1, 2020

Revised: April 1, 2026

Replace Section 403 of the Standard Specifications with the following:

“SECTION 403. BITUMINOUS SURFACE TREATMENT WITH FOG SEAL

403.01 Description. This work shall consist of constructing a single or multiple course bituminous surface treatment with fog seal.

- (a) A-1. A-1 shall consist of an emulsified asphalt and a seal coat aggregate with an emulsified asphalt fog seal.
- (b) A-2. A-2 shall consist of an emulsified asphalt and a cover coat aggregate, and an emulsified asphalt and seal coat aggregate with an emulsified asphalt fog seal.
- (c) A-3. A-3 shall consist of two separate applications of an emulsified asphalt and cover coat aggregate, and an emulsified asphalt and seal coat aggregate with an emulsified asphalt fog seal.

403.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cover Coat Aggregate (Note 1)	1004.03
(b) Seal Coat Aggregate (Note 1)	1004.03
(c) Emulsified Asphalts (Note 2) (Note 3)	1032

Note 1. The coarse aggregate shall be crushed gravel, crushed stone, wet bottom boiler slag, crushed slag, crushed sandstone, or crushed steel slag. The coarse aggregate material shall be selected from the table in Article 1004.03(a) based upon the friction aggregate mixture specified. The aggregate quality shall be Class B and the total chert count shall be no more than 25.0 percent by weight (mass) as determined by the ITP 203. The cover coat aggregate gradation shall be CA 14 or CA 15, as specified on the plans. The seal coat aggregate gradation shall be CA 16 or CA 20, as specified on the plans. The gradations for both cover coat and seal coat aggregates shall contain a maximum of 2.0 percent Minus No. 200 material.

Note 2. The emulsified asphalt used to construct the bituminous surface treatment shall be either CRS-2P or HFRS-2P.

Note 3. The emulsified asphalt used to construct the fog seal shall be either SS-1h or CSS-1h.

403.03 Equipment. Equipment shall be according to the following.

Item	Article/Section
(a) Self-Propelled Pneumatic-Tired Roller (Note 1)	1101.01
(b) Mechanical Sweeper (Note 2)	1101.03
(c) Aggregate Spreaders (Note 3)	1102.04
(d) General Use Pressure Distributor (Note 4)	1102.05(a)
(e) Heating Equipment	1102.07

Note 1. There shall be a minimum of two rollers, with the final number of rollers determined by the rollers' abilities to maintain proper spacing with the aggregate spreader as directed by the Engineer.

Note 2. The mechanical sweeper shall be power driven and self-propelled with the broom located between the axles. The mechanical sweeper shall not use a cantilever-mounted broom and the broom rotation shall not be operated by forward movement.

Note 3. The aggregate spreader shall be a self-propelled mechanical type with the receiving hopper in the rear and shall pull the aggregate truck. The spreader shall be fitted with an automated system which provides positive interconnected control of the aggregate flow with the forward speed of the spreader. The automated system shall provide uniform and consistent aggregate application at the rate specified.

The Engineer will check the spread roll of the aggregate spreader for straightness each day before operations begin. Should the surface of the spread roll vary off a straight line along its longitudinal dimension by more than 1/16 in. (1.5 mm), the Engineer will inspect the application of aggregate for corrugations and, should these occur, the machine shall be repaired or replaced. The forward speed of the spreader during calibration shall be the same as is to be used during construction. The equipment required for aggregate spreader calibration may consist of several sheets of canvas, each being exactly 1 sq yd (0.8 sq m), and a weight scale. By making several runs at different gate openings over the sheets of canvas, placed to cover the full width applied by the spreader, and carefully measuring the aggregate on each canvas sheet, the gate opening at the pre-established speed required to apply aggregate at the specified rate may be determined.

Note 4. The general use pressure distributor shall have a minimum capacity of 3000 gal (11,500 L). The application rate control shall be automated and shall control the application rate regardless of ground speed or spray bar width. The computer shall have the capability of recording the application rate, gallons sprayed, square yards, and feet traveled. The general use pressure distributor shall be capable of maintaining the asphalt emulsion at the specified temperature. The spray bar nozzles shall produce a uniform triple lap application fan spray, and the shutoff shall be instantaneous, with no dripping. The general use pressure distributor shall be capable of maintaining the specified application rate within ± 0.015 gal/sq yd (± 0.070 L/sq m) for each load. The spray-bar nozzles shall be turned to make the same angle with the longitudinal axis of the spray bar as recommended by the manufacturer.

Application rates shall be determined by the procedures listed in ASTM D 2995, except the sample may be taken on three 8 x 12 in. (200 x 300 mm) metal plates. The three plates shall be positioned as directed by the Engineer.

CONSTRUCTION REQUIREMENTS

403.04 Weather Limitations. This work shall be done between May 1 and August 31. Emulsified asphalt shall be applied only when the temperature of the air in the shade is above 55 °F (13 °C). No work shall be started if local conditions indicate that rain is imminent.

Fog seal operations shall be performed during daylight hours and not during foggy weather. The road surface may be damp but shall be free of standing water.

This work may be done between September 1 and September 15 provided both of the following conditions are met:

- (a) The temperature of the air in the shade is above 70 °F (20 °C) and the temperature of the surface to which the asphalt will be applied is 70 °F (20 °C) or above, and
- (b) The National Weather Service forecast for the area does not show any rain or any temperatures below 55 °F (13 °C) for the day the work is to be done or for the following five days.

403.05 Mix Design. Prior to beginning work, the Contractor shall submit designs for each required mixture to the Department for verification and approval. The mixture design shall be performed at a laboratory accredited for pavement preservation testing by AASHTO re:source in addition to the following.

The bituminous surface treatment design shall be according to the Bureau of Research's (BR) PT003 "Bituminous Surface Treatment Design Form". A minimum of four weeks prior to beginning construction, aggregate samples used in the proposed designs shall be submitted to the Central Bureau of Materials for verification and approval of the application rates. The sample quantities shall be 20 ± 5 lbs (9 ± 2 kg).

The Department will verify the samples and application rates according to the following acceptable limits.

AASHTO R 102	
Material	Acceptable Limits
Aggregate	± 1.0%
Emulsified Asphalt	± 0.5%

After the mix design is approved, no substitutions will be permitted unless approved by the Engineer.

403.06 Repair and Preparation of Base or Existing Surface. The base or existing surface shall be prepared according to Section 358.

403.07 Calibration. At least three days prior to starting the work, the Contractor shall provide the Engineer with a copy of the manufacturer's recommendations for the equipment to be used. The working day prior to starting construction, the general use pressure distributor and aggregate spreader shall be calibrated and adjusted according to the manufacturer's recommendations. Calibrations and adjustments shall be made in the presence of the Engineer on a level surface at a location approved by the Engineer. The Contractor shall maintain proper calibration and adjustment of the equipment and the Engineer reserves the right to check application rates as the work progresses. Should the equipment fail to consistently apply the specified rates, the work shall be stopped, and the Contractor shall recalibrate and readjust the equipment.

403.08 Preparation of Emulsified Asphalt. The temperature of the emulsified asphalt at the time of application shall be such that it sprays uniformly without clogging the spraying nozzles and is applied within the temperature range of 150 – 190 °F (65 – 90 °C).

403.09 Preparation of Aggregate. The aggregate shall be stockpiled near the jobsite according to Article 1003.01(e) or 1004.01(e). The aggregate used shall contain no free moisture, but the aggregate shall be slightly damp (saturated surface-dry or drier).

403.10 Application of Emulsified Asphalt. The emulsified asphalt shall be applied with a general use pressure distributor. The entire length of the spray bar shall be set at the height above the surface recommended by the manufacturer for even distribution of the emulsified asphalt. A hand spray bar shall be used at locations not covered by the distributor.

The distributor shall be operated in a manner such that missing or overlapping of transverse joints shall be avoided. To prevent overlapping of successive applications of emulsified asphalt at transverse joints, heavy paper shall be spread over the previously applied emulsified asphalt and aggregates. In order to obtain a uniform application of the emulsified asphalt, the distributor shall be traveling at the speed required for the specified rate of application when the spray bar crosses the paper.

Adjacent construction, such as concrete pavement, curb and gutter, bridge floors, raised reflective pavement markers, and bridge handrails, shall be protected by shields, covers or other means. If emulsified asphalt is applied to adjacent construction, the Contractor shall remove such material to the satisfaction of the Engineer.

The emulsified asphalt shall not be applied when the wind conditions will inhibit uniform coverage from the fans of asphalt being applied.

403.11 Application of Aggregates. The cover and seal coat aggregates shall be spread evenly with an aggregate spreader over the entire surface being treated. When treating one-half of the pavement width at a time, an inside strip of uncovered emulsified asphalt 3 in. (75 mm) wide shall be left during construction of the first half to provide center joint overlap when the second half of the treatment is placed. In all cases, the aggregate shall be applied ahead of the

truck or spreader wheels. Hand spreading will be permitted only when approved by the Engineer and, when so permitted, the aggregate shall be spread uniformly and at the approximate rate specified. Any ridges of aggregate left by the aggregate spreader shall be smoothed out with hand brooms immediately behind the aggregate spreader.

Equipment involved in the work shall operate as close to each other as practical. The aggregate spreader shall be within 150 ft (45 m) of the pressure distributor and the aggregate shall cover the asphalt emulsion within 30 seconds of application to ensure proper asphalt/aggregate adhesion.

Each aggregate truck shall be equipped with a suitable hitch for connection to the aggregate spreader while unloading. The trucks shall avoid contact between the truck body or bed and the aggregate spreader. The body or bed of the truck shall be modified, if necessary, to empty cleanly and completely into the receiving hopper of the aggregate spreader. No aggregate shall be allowed to spill onto the road surface when the truck is emptying into this hopper.

403.12 Cover Coat. Emulsified asphalt for the cover coat shall not be applied until the previous application is acceptable to the Engineer.

At the beginning of each day's work, no emulsified asphalt shall be applied until there is sufficient cover coat aggregate in the trucks at the work site to completely cover the first application of asphalt emulsion. The amount of surface area covered by each successive application of emulsified asphalt shall be determined by the Engineer. In no case shall this area be greater than can be covered with cover coat aggregate and given the initial rolling while the emulsified asphalt is still in condition to hold aggregate.

The emulsified asphalt shall be applied uniformly over the surface at the rate specified in the table above. Immediately following the application of the asphalt emulsion, the cover coat aggregate shall be spread over the treated surface at the rate specified in the table above.

The aggregate shall be rolled following spreading. A maximum time of five minutes will be allowed between the spreading of aggregate and completion of the initial rolling of the aggregate. The rollers shall proceed in a longitudinal direction at a speed less than or equal to 5 mph (8 km/h). Each roller will travel over the aggregate a minimum of two times. The entire surface shall be rolled immediately with a self-propelled pneumatic-tired roller. Rolling shall proceed in a longitudinal direction beginning at the edges and progressing toward the center, overlapping on successive trips by at least 1/2 the width of the roller. The aggregate shall then be rolled with a separate pneumatic-tired roller until the aggregate is properly seated in the asphalt emulsion.

403.13 Seal Coat. When constructing an A-2 or A-3 treatment, the seal coat shall not be started until the cover coat immediately preceding the seal coat is completed.

Application of the emulsified asphalt and aggregate and rolling of the seal coat shall be the same as specified above for the cover coat.

During the construction period, the Contractor shall maintain the completed work. If necessary, the Contractor shall apply additional seal coat aggregate to absorb excess bitumen appearing on the surface and shall repair any areas where pickup has occurred.

The Contractor shall use the appropriate sweeping equipment to perform an initial sweeping after a minimum of two hours curing and not less than one hour before sunset on the day the bituminous surface treatment is placed. The initial sweeping shall remove excess aggregate by lightly sweeping each pavement lane. The sweeping shall be sufficient to prevent migration of loose aggregate back onto any part of the pavement.

The Contractor shall sweep the pavement surface as needed to remove excess aggregate.

403.14 Application of Fog Seal. The emulsified asphalt for the fog seal shall not be applied to the treated surface until the seal coat has cured for at least 24 hours.

The emulsified asphalt shall be applied uniformly and at a rate that will provide a residual asphalt rate on the prepared surface of 0.03 to 0.08 lb/sq ft (0.146 to 0.391 kg/sq m). An application rate greater than 0.05 lb/sq ft (0.244 kg/sq m) shall be applied in two passes, one from each direction. The Contractor shall demonstrate the application will produce 100 percent coverage of the surface after curing. If the application demonstration does not meet the coverage requirements, the spray pattern shall be adjusted until approved by the Engineer. The emulsified asphalt shall be applied in a manner to minimize the amount of overspray.

A check shall be performed in the first 1,000 ft (300 m) to verify the application rate according to the test procedure for "Determination of Residual Asphalt in Prime and Tack Coat Materials".

403.15 Opening to Traffic. The road shall be opened to traffic according to Article 701.17(c)(4).

403.16 Method of Measurement. The bituminous surface treatment (A-1, A-2, or A-3) will be measured for payment in place and the area computed in square yards (square meters). The width for measurement will be the top width of the bituminous surface treatment as shown on the plans or as directed by the Engineer.

Emulsified asphalt for fog seal will be measured for payment as specified in Section 1032.

Preparation of the base or existing surface will be measured for payment according to Article 358.06.

403.17 Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for BITUMINOUS SURFACE TREATMENT, of the type specified.

Emulsified asphalt for fog seal will be paid for at the contract unit price per pound (kilogram) of residual asphalt for BITUMINOUS MATERIALS (FOG SEAL).

Preparation of the base or existing surface will be paid for according to Article 358.07.

When the contract does not contain a pay item for preparation of the base or existing surface and this item is required, it will be paid for according to Article 109.04.”

Replace Article 1004.03(c) of the Standard Specifications with the following:

“(c) Gradation. The coarse aggregate gradations shall be as listed in the following table.

Use	Size/Application	Gradation No.
Class A-1, A-2, & A-3	3/8 in. (10 mm) Seal	CA 16 or CA 20
Class A-2 & A-3	Cover Coat	CA 14 or CA 15
HMA High ESAL	IL-19.0	CA 11 ^{1/}
	SMA 12.5 ^{2/}	CA 13, CA 14, or CA 16 ^{3/}
	SMA 9.5 ^{2/}	CA 13, CA 14, or CA 16 ^{3/}
	IL-9.5	CA 16
	IL-9.5FG	CA 16
HMA Low ESAL	IL-19.0L	CA 11 ^{1/}
	IL-9.5L	CA 16

1/ CA 16 or CA 13 may be blended with CA 11.

2/ The coarse aggregates shall be capable of being combined with the fine aggregates and mineral filler to meet the approved mix design and the mix requirements noted herein.

3/ The specified coarse aggregate gradations may be blended.”