2356 BITUMINOUS SEAL COAT

2356.1 DESCRIPTION

This work consists of applying bituminous material, a single layer of aggregate, and a fog seal on a prepared surface.

2356.2 MATERIALS

A Bituminous Material

Provide CRS-2P bituminous material for seal coat meeting the requirements of 3151, "Bituminous Material":

Provide diluted CSS-1h bituminous material for fog seal meeting the requirements of 3151, "Bituminous Material".

B Seal Coat Aggregate

Provide aggregate meeting the gradation, job mix formula tolerance and quality requirements of Tables 3127-1 and 3127-2, for the gradation specified in the Contract. If no requirements are specified in the Contract, provide aggregate meeting the requirements of Tables 3127-1 and 3127-2 for FA-3.

C Blank

D Water

Use potable water compatible with the seal coat and meeting the requirements of 3906, "Water for Concrete and Mortar".

E Seal Coat Design

Use the Minnesota Seal Coat Handbook, MN/RC-2006-34 available on the MnDOT website, to design the seal coat and determine the starting application rate for the bituminous material and seal coat aggregate. Base the mix design on the traffic volume and pavement conditions.

Provide the following to the Engineer at least 2 weeks before beginning construction:

(1) Gradation and quality test results as specified in 3127.3,
(2) Seal coat aggregate design application rate,
(3) Bituminous material design application rate and
(4) 150 lb [70 kg] sample of aggregate from each proposed aggregate source.

The Department may postpone the start of work until receipt of the design and approval by the Engineer in accordance with the requirements of this section.

The Department considers the seal coat's design aggregate application rate as a target amount.

2356.3 CONSTRUCTION REQUIREMENTS

A Weather, Time and Date Limitations

Apply the bituminous seal coat in accordance with the following:

(1) From May 15 to August 10, if located in the North or North-Central Road Spring Restriction Zone (Zones are defined on the MnDOT Pavement Design Website),
(2) From May 15 to August 31, if located south of the North and North-Central Spring Road Restriction Zone,
(3) Work only during daylight hours,
(4) Begin work when the pavement and air temperatures are 60° F [15.5° C] and rising.
(5) The road surface may be damp, but ensure that the road is free of standing water and
(6) Do not perform work during foggy weather.

B Equipment

B.1 Distributor
Use a distributor in accordance with 2360.3.B.2.d, "Distributor."

B.2 Aggregate Spreader
Use a self-propelled mechanical type aggregate spreader, mounted on pneumatic-tired wheels, capable of distributing the aggregate uniformly to the width required by the contract and at the design application rate.

B.3 Pneumatic-Tired Rollers
Provide at least three self-propelled pneumatic-tired rollers in accordance with 2360.3.B.2.e(2), "Pneumatic Tired Rollers."

B.4 Brooms
Provide motorized brooms with the following characteristics:

(1) Positive means of controlling vertical pressure,
(2) Capable of cleaning the road surface before applying bituminous material and
(3) Capable of removing loose aggregate after seal coating.

C Road Surface Preparation
Clean pavements, including depressions, before seal coating.

Cover iron fixtures in or near the pavement to prevent adherence of the bituminous material.

Remove the protective coverings before opening the road to traffic.

D Application of Bituminous Material
Begin the rate of application for the bituminous material as determined by the mix design. Construct a test strip 200 ft [60 m] long to ensure the bituminous material application rate is adequate given the field conditions. After applying the bituminous material to this test strip, place the seal coat aggregate at the design application rate. Inspect the aggregate in the wheel paths for proper embedment. Make adjustments to the rate of application, if necessary. Construct one full lane width at a time. Make additional adjustments to the rate of application, if necessary.

Apply the bituminous material in accordance with Table 2356-2:

Table 2356-2
Recommended Application Temperatures

Bituminous Material	Minimum Temperature
CRS-2P	140 F [60 C]*
CSS-1h	100 F [38 C]

* Intended for uniform lay down of emulsion

E Application of Seal Coat
Before construction, calibrate the aggregate spreader to meet the requirements of ASTM D 5624, in the presence of the Engineer. Maintain the aggregate application rate within ±1 lb per square yard [±0.5 kg/m^2] of the design.

Provide uniformly moistened aggregates at the time of placement. Place aggregate within 1 min after applying the bituminous material. Do not use previously applied aggregates.

F Rolling Operations
Complete the initial rolling within 2 min after applying the aggregate at a speed no greater than 5 mph [8 km/h] to prevent turning over aggregate. Make at least three complete passes over the aggregate. Roll the aggregate so the entire width of the treatment area is covered in one pass by all the rollers.

G Sweeping

Remove surplus aggregate on the same day as the seal coat construction. Re-sweep areas the day after the initial sweeping. Dispose of the surplus seal coat aggregate as approved by the Engineer.

H Protection of the Surface

Do not allow traffic on the seal coated road surface until after rolling is completed and the bituminous material has set.

I Protection of Motor Vehicles

The Contractor is responsible for claims of damage to vehicles until the roadways and shoulders have been swept free of loose aggregate and permanent pavement markings have been applied. If the Department applies the permanent pavement markings, the Contractor's responsibility ends after completion of the fog seal and placement of temporary pavement markings.

J Application of Bituminous Material for Fog Sealing

Apply fog seal to seal coated areas, after sweeping and before placement of permanent pavement markings.

Apply the fog seal in accordance with 2355, "Bituminous Fog Seal," and as modified as follows:

(1) Construct a 200 ft [60 m] test strip,
(2) Review the application of diluted bituminous material and adjust the application rate as necessary to yield a uniform and full coverage of the underlying seal coat,
(3) Apply from 0.07gal to 0.18 gal per sq. yd [0.3 L to 0.8 L per sq. m] diluted,
(4) Apply the fog seal to minimize the amount of overspray and
(5) Do not allow traffic on the fog seal until it has cured.

K Progress of Work

Allow the seal coat to cure for at least one day before fogging. Place interim pavement markings after the fog seal cures and before removal of traffic control. Do not place permanent pavement markings using latex paint before three days after placing the fog seal. Place all other types of permanent pavement markings at least 14 days after placement of the fog seal.

L Contractor Quality Control Testing

Sample and test according to the rates in the Schedule of Materials Control.

Submit test results to the Engineer within 24 hours of test completion.

Verify and report the average daily bituminous material application rate by dividing the volume used by the area covered.

If gradations fall outside of the Job Mix Formula Tolerance of Table 3127-1, but within specifications, stop placement and submit a new mix design.

M Agency Quality Assurance (QA) Sampling and Testing

Sample and test according to the rates in the Schedule of Materials Control.

2356.4 METHOD OF MEASUREMENT

The Engineer will measure the bituminous material for fog seal by volume, at 60° F [15° C], undiluted. Conversion factors are located in the MnDOT Bituminous Manual. Dilute the material at a ratio of 1:1 before application at place of manufacture.

The Engineer will measure the bituminous material for seal coat by volume at 60° F [15° C].

The Engineer will measure the seal coat by area of pavement surfaced.

2356.5 BASIS OF PAYMENT

The Department will pay for bituminous material for fog seal in accordance with 2355.5, "Basis of Payment."

The contract gallon [liter] price for accepted quantities of *Bituminous Material for Seal Coat,* including necessary additives, includes the costs of providing and applying the material as required by the contract.

The contract square yard [square meter] unit price for *Bituminous Seal Coat* includes the cost of providing and applying the material as required by the contract. The contract square yard [square meter] price for *Bituminous Seal Coat* includes the cost of all applied aggregate.

A Monetary Price Adjustments

The Engineer may allow the Contractor to accept a monetary price adjustment instead of removing and replacing failing materials in accordance with the following:

1) The Department will assess a monetary price adjustment of $2,000 for each failing QA flakiness test.
2) The Department will reduce the contract unit price for bituminous seal coat by 0.5 percent for each 1 percent passing outside of the requirements for any sieve as specified in 3127, "Fine Aggregate for Bituminous Seal Coat", except for the #200 sieve, as determined by QA testing.
3) The Department will reduce the contract unit price for bituminous seal coat by 2 percent for each 0.1 percent passing outside of the requirements for the #200 sieve as specified in 3127, "Fine Aggregate for Bituminous Seal Coat", as determined by QA testing..

The monetary price adjustment for 2356.5A2 and 2356.5A3 are based upon the contract bid price for bituminous seal coat, however if the contract bid price is less than 75% of the Department's average bid price for bituminous Seal Coat, the Engineer may use the average bid price to assess the monetary price adjustment.

The Department will add the monetary price adjustments for all failing test results together.

The Department will pay for bituminous seal coat on the basis of the following schedule:

Item No.:	Item:	Unit:
2356.505	Bituminous Material for Seal Coat	gallon [liter]
2356.506	Bituminous Seal Coat	square yard [square meter]

2357 BITUMINOUS TACK COAT

2357.1 DESCRIPTION

This work consists of applying bituminous material (emulsion or cutback asphalt) on a bituminous or concrete pavement prior to paving a new lift of Plant Mixed Asphalt.

2357.2 MATERIALS

A Bituminous Material 3151

The bituminous material for tack coat will be limited to one of the following kinds of emulsified asphalt. Use of medium cure cutback asphalt (MC-250) is allowed during the early and late construction season when it is anticipated the air temperature may drop below 32 degrees Fahrenheit.

Allowable grades are as follows:

Emulsified Asphalt

AASHTO 208 Dilution of the emulsion to 7 parts emulsion to 3 parts water is only allowed by the supplier. **No field dilution is allowed.** The storage tank for diluted emulsion must have a recirculation system or agitator that will prevent settlement or separation of the material.