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**BITUMINOUS SEAL COAT****PART 1 - GENERAL****1.01 SECTION INCLUDES**

Bituminous Seal Coat Surface

**1.02 DESCRIPTION OF WORK**

Includes preparation of surface, heating of bituminous materials and placing of the seal coat bitumen, spreading aggregate, and rolling the aggregate.

**1.03 SUBMITTALS**

Comply with Division 1 - General Provisions and Covenants.

**1.04 SUBSTITUTIONS**

Comply with Division 1 - General Provisions and Covenants.

**1.05 DELIVERY, STORAGE, AND HANDLING**

Comply with Division 1 - General Provisions and Covenants.

**1.06 SCHEDULING AND CONFLICTS**

Comply with Division 1 - General Provisions and Covenants.

**1.07 SPECIAL REQUIREMENTS**

None.

**1.08 MEASUREMENT AND PAYMENT****A. Bituminous Seal Coat by Area:**

1. **Measurement:** Measurement will be in square yards for bituminous seal coat.
2. **Payment:** Payment will be at the unit price per square yard of bituminous seal coat.
3. **Includes:** Unit price includes, but is not limited to, surface preparation including protection of street fixtures; furnishing and placing of materials, including fillets at intersecting streets, driveways, and turnouts; and final clean up.

**B. Bituminous Seal Coat by Units:**

1. **Cover Aggregate:**
  - a. **Measurement:** Measurement will be in tons of cover aggregate. If sand is required for bleeding control, it will be measured the same as cover aggregate.
  - b. **Payment:** Payment will be at the unit price per ton of cover aggregate. If sand is required for bleeding control, it will be paid at 75% of the unit price as cover aggregate.
  - c. **Includes:** Unit price includes, but is not limited to, surface preparation including protection of street fixtures; furnishing and placing of materials, including fillets at intersecting streets, driveways, and turnouts; and final clean up.

**1.08 MEASUREMENT AND PAYMENT (Continued)****2. Binder Bitumen:**

- a. Measurement:** Measurement will be in gallons of binder bitumen furnished and incorporated, including street surface, fillets, and turnouts.
- b. Payment:** Payment will be at the unit price per gallon of binder bitumen furnished and incorporated.
- c. Includes:** Unit price includes, but is not limited to, furnishing and placing of materials, including fillets at intersecting streets, driveways, and turnouts; and final clean up.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Aggregates:** Use an aggregate cover that is washed and composed of crushed, hard durable gravel, crushed stone, or mixture with abrasion loss by AASHTO T 96 not exceeding 40%. Gradation complying with the following:

Sieve Size	Percent Passing									
	1/2"		3/8"		1/4"		No. 4		Sand	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
3/4"	100									
1/2"	97	100	100							
3/8"	40	90	90	100	100				100	
1/4"							100			
No. 4	0	30	10	55	55	85	85	100		
No. 8	0	15	0	20	0	10	10	40	60	90
No. 30			0	7			0	85		40
No. 200	0	2	0	1.5	0	1.5	0	1.5	0	1.5

- B. Bituminous Material:** Unless the contract documents specify a specific grade, use cationic emulsion CRS-2P binder bitumen complying with Iowa DOT Section 4140. Other grades include CRS-2 according to Iowa DOT Section 4140 or HFRS-2 complying with AASHTO T 59.

Use cut back asphalt MC-800 or MC 3000, meeting Iowa DOT Section 4138, if specified in the contract documents.

Use grade CSS-1, CSS-1H, or SS-1H, meeting Iowa DOT Section 4140, if specified in the contract documents for dust control. Dilute with water prior to application. Use an initial dilution rate of seven parts water to one part emulsion.

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**PART 3 - EXECUTION****3.01 EQUIPMENT****A. Aggregate Spreaders:****1. Spreader:**

- Self propelled, mounted on pneumatic tires, with a width of spread not less than 12 feet.
- Capable of spreading aggregate specified above at a rate desired from 3 to 50 pounds per square yard of surface covered without contact of the wheels of the spreader with the treated surface until the aggregate has been spread.
- Sufficient power to propel itself at uniform speed on gradients up to 6%.
- Have cutoff plates to allow the width of spread to be reduced in increments of 1 foot from the maximum width down to 4 feet wide.

**2. Hopper:** Minimum capacity of 5 tons.**B. Bitumen Distributors:**

- Mount on dependable motor trucks equipped with pneumatic tires.
- Provided with burners with heating coils and an accurate thermometer indicating temperature of the bitumen in the tank.
- Supply bitumen to spray bars to produce an even spray at rates varying from 0.03 gallon to 0.5 gallon per square yard in a smooth uniform coating at a forward speed of up to 20 mph.
- Adjust the spray bars vertically and provide a total spray width of no less than 12 feet.
- When emulsion binder bitumen is used, use a distributor spray bar equipped with nozzles specifically designed to apply emulsion.
- Before the work is started, provide the Engineer with a written statement indicating the size or part number of the nozzles recommended by the manufacturer and certifying the nozzles are installed on the distributor.
- Operate distributors according to manufacturer's instructions for use for spray bar height above surface, nozzle size, angle of spray fan, and tables of rates of distribution in gallons per square yard for tachometer readings. Verify distributor before using.

**C. Brooms:** A power-driven rotary or pick-up broom is required for cleaning surfaces before the bitumen is applied.

- Driven by an auxiliary motor or by power take-off.
- When using a power broom to remove loose aggregate from a newly seal coated surface, ensure it is capable of exerting uniform down pressure (for the full width of the broom and without vibration or bounce) sufficient to remove loose aggregate without dislodging particles that are stuck in the binder bitumen.

**D. Rollers:**

- Self-propelled, pneumatic tire rollers, with tires no smaller than 7.50 by 15 size.
- Load rollers to produce a compressive force of no less than 200 pounds per inch width of the roller.
- Ensure tire inflation is no less than 60 psi.
- Do not use steel rollers unless authorized by the Engineer.

**3.02 SURFACE PREPARATION****A. Hard Surfaced Streets:**

1. If specified, complete patching and joint filling according to Section 7040.
2. Immediately before bitumen is applied, clean the entire surface to be treated, as well as the adjacent gutters, of all foreign material, including dust and weeds.
3. Sweep, clean, and perform work required to produce a clean surface. If the power broom fails to remove dust from depressions and pockets, use hand brooms.
4. Remove the material that was cleaned from the surface. This material becomes the property of the Contractor.
5. Use a suitable covering to protect the items below from being soiled by bitumen. Leave the protective covering in place until the bitumen has set and no splashing occurs under traffic.
  - Curbs and handrails of bridges
  - Guardrails
  - Headwalls of culverts
  - Pavements
  - Curbs and gutters
  - Manholes and utility accesses
  - Intakes
  - Water and gas valves
  - Railroad flangeways
  - Other installations requiring protection
6. Place suitable covering, as required, to prevent cover aggregate from entering intakes or other similar structures during placement and while brooming excess cover aggregate.

**B. Rock Surfaced Streets:** Comply with Section 7050.**3.03 HEATING BITUMINOUS MATERIAL**

Heat bituminous materials to the temperature that allows uniform spreading. It is estimated that temperatures between the following limits will produce the desired viscosity. Material that has been damaged by overheating will be rejected.

<b>Designation</b>	<b>Temperature</b>
CRS-2	125-185
CRS-2P	125-185
HFRS-2	125-185
MC 800	175-255
MC 3000	215-290
MC 70	145-165

**3.04 SPREADING BITUMINOUS MATERIAL**

- A. General:** Do not apply seal coats after September 15 unless temperatures in the shade are 60°F and rising and the work is approved by the Engineer. Do not spread until the distributor has been tested to ensure a uniform distribution of bitumen. Minimize longitudinal overlap of adjacent bitumen applications. Spread between 95% and 105% of the bituminous material the Engineer prescribes. Correct the rate of application for temperature to deliver the desired volume at 60°F.

**3.04 SPREADING BITUMINOUS MATERIAL (Continued)**

- B. Spreading Binder Bitumen:** Do not place seal coat on a wet surface or in night conditions. Apply bitumen to the prepared base at the rate shown in the table below, if not otherwise specified in the contract documents.

Aggregate	Application rate (Gal/SY)
1/2"	0.27
3/8"	0.24
1/4"	0.21
No. 4	0.18
Sand	0.15

Close adjacent applications of bitumen with a minimum longitudinal lap. For CRS-2P and CRS-2, spread the binder bitumen on an area no greater than can be covered with aggregate and initially rolled within 2 minutes. Place the bitumen spreader and aggregate spreader as close as possible, but no more than 150 feet apart. Do not allow the length of spread to be greater than can be completely rolled within 30 minutes after the bitumen spread has been completed. Maintain initial roller coverage as close to the aggregate spreader as possible, not to exceed 200 feet.

For HFRS-2 emulsions, allow a slight skim to be formed on the surface before spreading aggregate.

**C. Joints:**

- Secure binder bitumen distribution at the specified rate of application using paper placed at the start of each distributor run. Use commercial grade building paper that is approved by the Engineer and is no less than 36 inches wide.
- When the end of the run joins newly placed seal coat, place paper at that joint also. Cut the joint straight along the off edge of the paper. Remove the seal coat material on the paper adjacent to the off edge from the roadbed surface. Ensure a smooth ride is obtained.

- D. Spreading Cover Aggregate:** Promptly after spreading bitumen on any section, spread cover aggregate of the size specified uniformly over the treated area as noted in the table below, if not otherwise specified in the contract documents.

Aggregate	Application Rate (lbs/SY)
1/2"	24
3/8"	21
1/4"	18
No. 4	18
Sand	18

- E. Maintenance During Construction Period:** If bleeding occurs during construction, cover area with 15 pounds of sand per square yard to control bleeding. Rolling is not required.

**3.05 ROLLING**

- Complete initial pass of pneumatic tired roller within 2 minutes after spreading the cover aggregate. Complete rolling operations within 30 minutes after binder bitumen has been sprayed. Operate rollers at a speed of no more than 5 mph.
- Five passes of a roller is required for cover aggregate; one pass is required for sand applied as cover.

**3.05 ROLLING (Continued)**

- C. Do not apply succeeding applications of binder bitumen until rolling operations are completed for the previous course.

**3.06 TWO COURSE SEAL COATS**

**A. First Course Construction:** Complete as specified above.

**B. Second Course Construction:**

**1. Preparation of Roadbed:**

- a. After completing the first course, prepare the roadbed for the second course either:
- With a vacuum machine, or
  - By lightly brooming the full surfaced width with the power sweeper to remove all loose material.
- b. After cleaning, roll the entire surface once with a roller.
- c. Complete the preparation of the roadbed in sections just prior to application of bitumen for the second course.

**2. Spreading Binder Bitumen:** Spread bitumen on the prepared surface at the rate specified in the contract documents.

**3. Spreading Cover Aggregate:** Spread cover aggregate of the size specified over the treated area at the rate specified in the contract documents, promptly after spreading bitumen on any section of roadbed.

**3.07 CLEAN UP**

After final rolling operation, use a sweeper with a dust suppressant system to pick up loose aggregate. Complete clean up as directed by the Engineer, but no more than 21 days after application. For rural-type pavements, the Engineer may determine that sweeping is not necessary.

END OF SECTION