

SECTION R8

Double Bituminous Surface Dressing

R8 01 Scope

The work covered by this Section of the Specification consists in furnishing all labor, equipment and materials, and in performing all operations in connection with the construction of a double bituminous surface dressing on a previously prepared and primed base course, complete, in strict accordance with this Section of the Specification and the applicable Drawings and subject to the Conditions of the Contract.

R8 02 Materials

1. **Aggregates:** The source of aggregate shall be approved by the Engineer's Representative prior to use of the material. Aggregate shall consist of clean, sound, durable pieces of crushed stone, free from adherent coatings and free from an excess of dust, dirt, organic matter, gypsum, or other objectionable foreign matter. The aggregate shall be dry, and drying may be required as directed by the Engineer's Representative. The weighted average magnesium sulphate soundness loss, as determined by AASHTO Standard Method T104-74 shall not exceed 15% and the percentage of wear, as determined by AASHTO Standard Method T96-74, shall not exceed 35%. Grading, as determined by AASHTO Standard Method T27-74, shall be as shown in Table R8/1 below :

TABLE R8/1
AGGREGATE GRADINGS

U.S.Sieve Size		Per Cent Passing by Weight	
mm	Imperial	1 st Course	2 nd Course
19·0	3/4in	100	-
12·5	1/2in	50-80	100
9·5	3/8in	25-55	80-95
4·75	No. 4	5-15	20-50
2·00	No. 10	0-3	0-5
0·85	No. 20	0-1	0-2

The aggregate to be used shall show no evidence of stripping when tested in accordance with AASHTO T182-70.

The use of adhesion promoting agents for control of stripping shall be used if necessary. The material will be accepted at the latest practical point for testing prior to incorporation into the work.

2. **Bituminous Binder:** The bituminous binder shall be proprietary cut-back bitumen, subject to the approval of the Engineer's Representative, which meets the requirements of AASHTO M81-70 and M82-73 for rapid and medium curing types respectively. The binder shall comply with the requirements of AASHTO T49-74, T50-69, T78-74 and T79-74 for the selected grades to suit the cut-back as approved by the Engineer's Representative, or cationic bituminous emulsion conforming to AASHTO M208 Grade CRS-2.

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R8 03 Sampling and testing

The sources of material shall be selected in advance of the time when the material will be required in the work, and adequate representative sample sub mined to the Engineer's Representative for testing and preliminary approval not less than 20 days before such material is required for use in the work. The Contractor will supply all samples for testing at his own expense and all tests will be carried out by the Employer at no cost to the Contractor. Sampling of the bituminous material will be in accordance with AASHTO T40 and aggregates in accordance with AASHTO T2. Testing for asphalt cement shall be in accordance with Table R912 and cationic bituminous emulsion in accordance with AASHTO T59 as amended by AASHTO M208. Any material found not to conform with requirements, then or later, will be cause for rejection. All rejected material shall be removed and replaced with material meeting the requirements, by the Contractor. at no cost to the Employer.

R8 04 Quantities to be applied

Quantities of bituminous binder and aggregate in the first and second courses may be varied to meet specific field conditions, as directed by the Engineer's Representative, without adjustment of the price tendered, but in all cases the total amount of bituminous binder shall be as follows, and the amounts of binder and aggregate in the first and second courses shall be within the limits shown in Table R8/2:

TABLE R8/2
BITUMINOUS BINDER

	Rate of Application	
	1st Course	2nd Course
Residual Bitumen Content liters/m ²	1.0-2.0	0.75-1.5
Aggregate kg/m ²	12 - 18	7 -12

R8 05 Equipment

1. All equipment, tools and machines used in the performance of the work covered by this Section of the Specification shall be subject to the approval of the Engineer's Representative, and shall be maintained in satisfactory working condition at all times.

2. **Pressure Distributor:** The distributor shall be self-propelled, pneumatic-tired and so designed and equipped as to distribute the bituminous binder uniformly on variable widths of surface at readily determined and controlled rates. Distributor equipment shall include an independently operated bituminous binder pump, tachometer, pressure gauges, volume measuring device, a thermometer for reading the temperature of tank contents, a spirit level and a hose and handspray attachment suitable for applying bituminous binder to spots unavoidably missed by the distributor. The distributor shall be equipped for circulation and

agitation of the bituminous binder during the heating process.

The Engineer's Representative may require the Contractor to provide a certificate stating that a particular binder distributor has been tested since the previous surface dressing and that the test indicated conformity of the distributor with the requirements of the Employer.

3. Heating Equipment: The equipment for heating the bituminous binder shall consist of steam coils and equipment for producing steam, so designed that steam will not be introduced into the material or of other suitable means so that no flame comes into direct contact with the material container, and there will be no local overheating of material. If storage tanks are used, an armoured thermometer with a range from 0° C to 120° C shall be fixed to the tank so that the temperature of the bituminous binder may be determined at all times. Bituminous binder which has been heated above 100°C will be rejected. All storage tanks, piping, retorts, booster tanks and distributors used in storing, handling or heating bituminous binder shall be kept clean and in good operating condition at all times, and shall be operated in such manner that there will be no contamination by foreign material. Attention is called to the fact that bituminous binders, particularly cut-back bitumen, are highly inflammable. The utmost care shall be taken to prevent open flames from coming in contact with the bituminous binder or gases therefrom.

The Contractor will be responsible for any fire or accident which may result from heating or handling the bituminous material.

4. Power Rollers: Power rollers shall be self-propelled tandem or three-wheel type rollers, weighing not less than 6 tons and shall be suitable for rolling bituminous pavements.

5. Pneumatic Tired Rollers: The pneumatic-tired rollers shall be self-propelled and shall have a minimum contact pressure of 3kgf per cm². The operating contact pressure will be specified by the Engineer's Representative.

6. Power Brooms and Power Blowers: Brooms and blowers of the power type shall be suitable for cleaning the surfaces to be treated effectively.

R8 06 Weather limitations

The double bituminous surface dressing shall be applied only when the existing primed surface is dry. It shall not be applied when the weather is rainy, or when the atmospheric temperature is below 15°C, unless otherwise directed by the Engineer's Representative.

R8 07 Preparation of surface

Immediately before applying the first course of surface dressing the primed base course surface shall be cleaned of all loose or foreign material, as directed by the Engineer's Representative. The first course of surface dressing will not be placed until the Engineer's Representative has inspected and approved the prepared surface.

R8 08 First application of bituminous binder

The bituminous binder shall be applied by means of a pressure distributor in a uniform continuous spread over the section to be treated.

The range of the spraying temperatures shall comply with the recommendations of the

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manufacturers of the approved proprietary cut-back bitumen and/or as directed by the Engineer's Representative after any trials.

A strip of building paper at least one meter in width and with a length equal to that of a spray bar of the distributor plus one meter shall be used at the beginning of each spread.

If the cut-off is not positive, the use of the paper may be required at the end of each spread, the paper shall be moved forward at proper application speed at the time the spray bar is opened. Any skipped areas or deficiencies shall be corrected. Junctions of spread shall be carefully made to assure a smooth riding surface. The length of spread of bituminous materials shall not be in excess of that which trucks loaded with cover aggregate materials can immediately cover.

The spread of bituminous binders shall not be more than 15cm wider than the width covered by the cover "material" from the spreading device. Under no circumstances shall operations proceed in such manner that the bituminous binder will be allowed to chill, set up, dry or otherwise impair retention of cover coal. The distributor when not spreading shall be parked so that the spray bar or mechanism will not drip bituminous binder on the surface of the traveled way.

R8 09 Application of aggregate

The application of aggregate shall follow the application of bituminous binders immediately after each spray of bituminous binder. The aggregate shall be uniformly spread with a mechanical spreader over the surface in the specified amount or as directed by the Engineer's Representative. Any areas thinly spread with aggregate left by the mechanical spreading machine shall have additional aggregate spread by hand to ensure shoulder to shoulder cover. Aggregate trucks shall be operated backwards so that the bituminous binder will be covered ahead of the truck wheels.

R8 10 Brooming and rolling first course

Immediately after spreading the aggregate the surface shall be rolled with pneumatic tired rollers and rolling shall continue until no more aggregate can be worked into the surface. The surface shall be broom-dragged as soon as possible after rolling, but not until the surface has set sufficiently to prevent excessive marking. Broom-dragging shall continue until the aggregate is uniformly distributed over the surface. Broom-dragging, back spotting, and rolling with both types of rollers shall continue until the surface is cured and rolled sufficiently to key and set the aggregate, as approved by the Engineer's Representative. In all places not accessible to the rollers, the aggregate shall be adequately compacted with hand-tampers weighing not less than 11 kg and with a tamping face area of not more than 320cm². Any aggregate that become coated or mixed with dirt or any other foreign matter shall be removed, replaced with clean aggregate, and re-rolled, as directed by the Engineer's Representative. The Contractor shall maintain and protect the treated area by barricades, if necessary, until the second application of bituminous material is applied.

R8 11 Second application of bituminous binder

The second application of bituminous binder shall follow immediately after completion and approval of the first course, or each completed and approved section of the first course, as directed by the Engineer's Representative. It shall be applied in the manner as specified in Clause R8 08.

R8 12 Shoulders

Immediately following completion and acceptance of the double bituminous surface dressing, or each section of the surface dressing, as directed by the Engineer's Representative, shoulders shall be formed of approved material similar to that used in embankment construction. The moisture content of the material shall be adjusted if necessary to facilitate compaction in accordance with Clause R5 11-4. After thorough compaction as specified the surface shall be finished by blading and rolling to conform to the side fall shown on the Drawings, so that the surface of the shoulder abutting the pavement shall be slightly lower than pavement surface in order to permit free drainage.

R8 13 Measurements

The unit of measurement for payment shall be the square meter. The area to be paid for shall be the square meters of completed and accepted double bituminous surface treatment, as measured along the centre line and upon the surface of the road, times the width as shown on the Drawings, plus any areas authorized and measured separately.

R8 14 Payment

The area, determined as provided in Clause R8 13, will be paid for at the price tendered per square meter, which payment will constitute full compensation for furnishing, delivering and placing all materials; for furnishing supplies, equipment and tools; for preparation of the primed surface; for brooming, back-spotting, compacting, and rolling; for construction of shoulders; for maintenance; and for furnishing all other labor and incidentals necessary to complete the work required by this Section of the Specification.

SECTION R8A

Bituminous Prime Coat

R8A 01 Scope

The work covered by this Section of the Specification consists in furnishing all plant, labor, equipment and materials and in performing all operations in connection with the application of a bituminous prime coat on a previously prepared base course, complete, subject to the Conditions of Contract and in strict accordance with this Section of the Specification and the applicable Drawings.

R8A 02 Bituminous binder

The bituminous binder shall be a medium curing-back bitumen MC 30, MC 70 or MC 250 conforming to AASHTO M82-73, produced by fluxing in an approved manner an 85/100 penetration bitumen with GOR "Kerosen". The cut-back bitumen shall be free from water, shall show no separation or curdling prior to use and shall be tested in accordance with the following standard AASHTO methods:

Sampling	T40-67
Water content	T55-70
Viscosity	T72-74
Distillation	T78-74

The approximate composition of the cut-back bitumen is one part kerosene to one and a half parts bituminous cement by Volume.

The bituminous binder may also be a cationic bituminous emulsion conforming to AASHTO M208 Grades CSS-1 or CSS-1h.

R8A 03 Sampling and testing

All bituminous binder will be sampled and tested as frequently as deemed necessary by the Engineer's Representative for conformance with the requirements of Clause R8A 02 of this Section of the Specification. All test samples shall be supplied by the Contractor at his expense and all tests will be made by the Employer at no cost to the Contractor.

Sampling of cationic bituminous emulsions shall be in accordance with AASHTO T40 and tested in accordance with AASHTO T59 as amended by AASHTO M208. All test samples shall be supplied by the Contractor at his expense and all tests will be made by the Employer at no cost to the Contractor.

R8A 04 Quantities to be applied

Bituminous binder shall be applied in quantities of not less than 0.50 liters/m² nor more than 1.20 liters/m² of base course. The exact quantities to be applied, which may be varied to suit field conditions, will be determined by the Engineer's Representative at no change in

the price tendered per meter

Cationic bituminous emulsion shall be applied at such rates as to leave a residual bitumen content of not less than 0.60liters/m² nor more than 1.20liters/m²

R8A 05 Weather limitations

The prime coat shall be applied only when the base course is dry, or contains moisture not in excess of that which will permit uniform distribution and the desired penetrations. It shall not be applied when atmospheric temperature is below 15°C unless otherwise directed by the Engineer's Representative.

R8A 06 Equipment

1. All equipment, tools and machines used in the performance of the work shall be subject to the approval of the Engineer's Representative, and shall be maintained in satisfactory working condition at all times.

2. Pressure Distributors, Heating Equipment, Power Brooms and Power Blowers shall be as specified in Clause R8 05.

R8A 07 Preparation of surface

The surface of the base course will be inspected and tested for finish in accordance with Clause R7 11.

Immediately before applying the prime coat, all loose material, dirt, or other objectionable material shall be removed from the surface to be primed by power brooms and/or blowers, supplemented by hand brooms as directed by the Engineer's Representative. Prior to application of the prime coat an inspection of the prepared surface will be made by the Engineer's Representative to determine its fitness to receive the bituminous binder, and no primary coat shall be applied until the surface has been approved. If the surface is excessively dry and/or dusty so that the bituminous surface ravel, it shall be lightly and uniformly sprinkled with water immediately in advance of priming, but bituminous binder shall not be applied until all free surface water has disappeared.

R8A 08 Application of bituminous binder

Following the application of prime material, the surface shall be allowed to cure for a period of at least 24 hours without being disturbed or for such additional period of time as may be necessary to attain penetration into the base course and aeration of the volatiles from the prime material. The Contractor shall furnish and spread sufficient approved sand on all areas which show an excess of bituminous material to effectively blot up the excess as directed by the Engineer's Representative.

R8A 09 Maintenance

The primed surface shall be maintained in satisfactory condition until the succeeding layer of pavement has been placed. During this interval the Contractor shall protect the primed surface against damage and shall repair all broken spots,

R8A 10 Measurement

The unit of measurement shall be the square meter as actually covered by a prime coat in accordance with this Specification unless otherwise called for in the Special Specification of Particular Application, Measurement for payment will not consider any bituminous material placed in excess of the specified maximum rate of application.

R8A 11 Payment

The area of prime coat, measured as specified in Clause R8A 10, will be paid for at the price tendered per square meter of prime coat, which payment shall constitute full compensation for furnishing, delivering and applying the materials; for furnishing and spreading absorbent material; for conditioning of base course and preparation of surface; for maintenance; and for all labor and incidentals necessary to complete the work required by this Section of Specification.

SECTION R8B

Bituminous Tack Coat

R8B 01 Scope

The work covered by this Section of the Specification consists in furnishing all plant, labor, equipment, and material, and in performing all operations in connection with the application of a bituminous tack coat on a previously prepared bituminous course, and where required, on a primed base course, complete subject to the Conditions of Contract, and in strict accordance with this Section of the Specification and the applicable Drawings.

R8B 02 Bituminous binder

The bituminous binder shall be a rapid curing cut-back bitumen RC 70 or RC 250 conforming to AASHTO M81-70, produced by fluxing in an approved manner an 85/ I 00 penetration bitumen with GOR standard "motor spirit" The cut-back bitumen shall be free from water, shall show no separation or curdling prior to use and shall be tested in accordance with the following standard AASHTO methods:

Sampling	T40-67
Water Content	T55-70
Viscosity	TI2-74
Distillation	T78-74

The approximate composition of the cut-back bitumen is one part motor spirit to two parts bitumen cement by volume.

The bituminous binder may also be cationic bituminous emulsion conforming to AASHTO M208 Grade CSS-1 or CSS-lh.

R8B 03 Sampling and testing

All bituminous binders will be sampled and tested as frequently as deemed necessary by the Engineer's Representative for conformance with the requirements of Clause R8B 02 of this Section of the Specification. All test samples shall be supplied by the Contractor at his expense, and all tests will be made by the Employer at no cost to the Contractor.

Sampling of cationic bituminous emulsion shall be in accordance with AASHTO T40 and tested in accordance with AASHTO T59 as amended by AASHTO M208. All test samples shall be supplied by the Contractor at his own expense and all tests will be made by the Employer at no cost to the Contractor.

R8B 04 Quantities to be applied

Bituminous binder shall be applied, by means of a pressure hand spray, in quantities of not less than 0.15 liters/m² nor more than 0.50 liters/m² of surface. The exact quantities to be applied, which may be varied to suit field conditions, will be as determined by the Engineer's Representative at no change in the price tendered per square meter.

Cationic bituminous emulsion shall be applied at such rates as to leave a residual bitumen content of not less than 0.10 liters / m² nor more than 0.35 liters / m²

R813 05 Equipment

All equipment, tools and machines used in the performance of the work shall be subject to the approval of the Engineer's Representative, and shall be maintained in a satisfactory working condition at all times.

1. **Hand Power Spray Attachment:** A hand power spray attachment to a bitumen pressure distributor or other container having an independently operated bitumen pump, pressure gauge, thermometer for determining the temperature of the asphalt tank contents and a hose connected to a hand power spray suitable for applying the bituminous tack coat in the amounts specified-all to be such as to meet the approval of the Engineer's Representative, shall be furnished.

2. The Heating Equipment, Power Brooms and Power Blowers shall be as specified in Clause R80S.

R8B 06 Weather limitations

The tack coat shall be applied only when the binder course or courses or primed base course is dry and free from dust. It shall not be applied when the atmospheric temperature is below 15°C unless otherwise directed by the Engineer's Representative.

R8B 07 Preparation of surface

Immediately before applying the tack coat all loose material, dirt or other objectionable material, shall be removed from the surface to be treated by power brooms and/or blowers, supplemented with hand brooms, as directed by the Engineer's Representative. Prior to the application of the tack coat, an inspection of the prepared surface will be made by the Engineer's Representative to determine its fitness to receive the bituminous binder, and no tack coat will be applied until the surface has been approved.

R8B 08 Application of bituminous binder

Immediately following the preparation of the surface, the bituminous binder shall be applied by means of a hand power spray at a temperature of 65°C to 85°C, and at the pressure and in the amounts as determined by the Engineer's Representative. The bituminous binder shall be applied so that uniform distribution is obtained over the entire surface to be treated, If necessary, it shall be hand broomed with wire brooms to obtain a more uniform cover. The tack coat shall be applied only a short distance and not more than two hours in advance of placing of the Bituminous binder course or surface course so as to provide a thin adhesive film of bituminous binder to ensure a good bond. The solvent shall have evaporated before the bituminous binder (asphaltic cement) is placed. The treated surface shall be maintained by the Contractor in a satisfactory condition until the succeeding layer of pavement has been placed. During this interval the Contractor shall protect the treated surface from traffic, and shall repair all damaged spots.

R8B 09 Measurement

The unit of measurement shall be the square meter as actually covered by a tack coat in accordance with this Specification unless otherwise called for in the Special Specification of Particular Application. Measurement will not take account of any bituminous on a previously prepared bituminous course placed in excess of the specified

maximum rate of application.

R8B 10 Payment

The number of square meters of tack coat, measured as specified in Clause R8B09 above, shall be paid for at the applicable price tendered per square meter of Tack Coat, which payment shall constitute full compensation for furnishing, delivering, and applying the material, for furnishing and spreading absorbent material, and for all labor and incidentals necessary to complete the work required by this Section of the Specification.