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**TENTATIVE SPECIFICATION
FOR
BITUMINOUS SURFACE
DRESSING USING PRECOATED
AGGREGATES**



**THE INDIAN ROADS CONGRESS
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TENTATIVE SPECIFICATION FOR BITUMINOUS SURFACE DRESSING USING PRECOATED AGGREGATES

1. INTRODUCTION

This standard was prepared by the Bituminous Pavements Committee (personnel given below) in their meeting held on the 8th September 1971. Later it was approved by the Specifications and Standards Committee and then by the Executive Committee. Finally it was approved by the Council in their 79th meeting held at Gandhinagar on the 25th November, 1972.

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—(Ex-officio)

2. SCOPE

This specification may be adopted in lieu of the conventional surface dressing, in situations where better adhesion is required between the aggregates and binder both during construction and later in service.

The technique is basically the same as conventional surface dressing except that a small quantity of binder is used for precoating

the aggregates. However, it is quite different from premix constructions.

3. DESCRIPTION

The work covered by this specification consists of application of either a single or two coats of surface dressing over a previously prepared base, each coat consisting of a single application of bituminous material followed by pre-coated cover material of the size given in para 4.2.3.

4. MATERIALS

4.1. **Binder :** The binder shall be one of the following :

- (i) a straight-run bitumen of suitable penetration grade complying with IS : 73;
- (ii) a road tar of suitable grade complying with IS : 215; or
- (iii) a cutback bitumen of suitable viscosity complying with IS: 217 or IS : 454 or other approved cutback.

The grade of binder to be used would depend upon the climate conditions. The suggested binders are straight-run bitumen 80/100, road tar grade RT-3/ RT-4 or approved cutbacks.

4.2. Cover Material

4.2.1. The cover material shall consist of crushed stone, crushed slag, crushed gravel (shingle) or other crushed aggregate as specified having clean, strong, durable and fairly cubical fragments, free of disintegrated pieces, salt, alkali, vegetable matter, dust and adherent coatings. In case crushed gravel is not available at reasonable cost, rounded gravel (shingle) or water borne shingle may be used.

The aggregates shall preferably be hydrophobic in nature and of low porosity.

4.2.2. **Physical requirements :** The aggregates shall satisfy the physical requirements given in Table 1.

TABLE 1

Property	Value	Method of Test
(1) Abrasion value, using Los Angeles machine or Aggregate impact value	Max. 35% Max. 30%	IS : 2386 (Part IV) —do—
(2) Flakiness index	Max. 25%	IS : 2386 (Part I)
(3) Stripping value	Max. 25%	IS : 6241
(4) Water absorption (except in case of slag)	Max. 1%	IS : 2386 (Part III)
(5) Soundness : Loss with sodium sulphate—5 cycles (in case of slag only)	Max. 12%	IS : 2386 (Part V)
(6) Unit weight or bulk density (in case of slag only)	Min. 1120 kg per m ³	IS : 2386 (Part III)

4.2.3. **Size :** The size of aggregates to be used shall depend on whether the treatment is for the first coat or second or renewal coat and shall be as indicated in Table 2.

TABLE 2. SIZE REQUIREMENTS OF AGGREGATES

Type of Construction	Nominal size of aggregates	Sieve Designation of Aggregates
(1) First coat	13.2 mm	Passing through 22.4 mm sieve and retained on 11.2 mm sieve.
(2) Second or renewal coat	11.2 mm	Passing through 13.2 mm sieve and retained on 6.7 mm sieve.

Notes : (i) The sieves are as per IS : 460

(ii) It is essential to screen the aggregates through proper size sieves to ensure the size stipulated in the specification.

4.2.4. Precoating : The aggregates shall be precoated with 0.75 to 1 per cent of its weight of binder and shall not be precoated simultaneously with the painting operation. The precoated aggregates shall be allowed to cure for at least one week so that these become non-sticky and can be broadcast easily from the baskets like normal aggregates and could even be stored for a few months if so required.

The aggregates free of dust or fine particles shall be preheated to 60°C for precoating except for cutbacks such as RC-3 and then mixed with binder heated to its application temperature. The aggregate and binder should be thoroughly mixed in a mixer of approved type till all the aggregates are uniformly coated.

5. CONSTRUCTION

5.1. Weather and Seasonal Limitations

Preferably, the surface dressing work shall be carried out only when the atmospheric temperature in shade is 16°C or above. If, however, the work has to be done during when the temperature is lower, suitable precautions such as using appropriate cutbacks, shall be taken. Normally no bituminous material shall be applied when the surface or cover material is damp, when the weather is foggy or rainy, or during dust storm.

5.2. Arrangements for Traffic

The road so treated shall be closed in length equal to a day's work. Suitable diversions shall be constructed to divert the traffic. Adequate arrangements of barriers, flags, traffic signs for diversion, red warning lights etc. shall be made for the convenience and safety of traffic. All diversions shall be kept watered so as to prevent dust getting on to the cleaned or painted surface.

5.3. Preparation of Road Surface

The underlying course on which surface dressing is to be laid shall be prepared, shaped and conditioned to a uniform grade and section as specified. Any depressions or pot-holes shall be properly made up and thoroughly compacted sufficiently in advance. The defective parts shall be cleanly cut and patched with new material. Where the existing surface shows signs of "fatting up", such portions shall be suitably rectified.

It is important the surface be dry and thoroughly cleaned of caked earth and other foreign matter immediately before applying

the binder. The surface shall be cleaned first with hard brushes, then with softer brushes, and finally by blowing with sacks or gunny bags in order to remove the fine dust. If the base to be treated consists of stabilised soil or porous aggregates, a suitable bituminous primer vide IRC: 16*, shall be applied and cured before the construction is started.

If the base to be covered is an old blacktop surface, it shall be swept clean of sand, dirt, dust and other loose deleterious foreign matter, by means of mechanical brooms and blowers if available, supplemented by hand brooms, or by means of wire brushes, small picks, hand brooms etc., and shall be dry. All pot-holes and depressions shall be filled up with a suitable premix rammed properly and brought to shape.

5.4. First Coat

5.4.1. Application of binder : After the underlying surface has been prepared as specified in para 4.3, the binder heated to appropriate temperature shall be sprayed uniformly over the dry surface preferably using mechanical sprayers. The rate of application shall be 15 to 17.5 kg. per 10 m² for straight run bitumen and 17.5 to 20 kg. per 10 m² for cutbacks and road tars. Excessive deposits of bituminous material upon the road surface caused by stopping or starting the sprayer or by leakage, shall be immediately removed.

5.4.2. Application of cover material : Immediately after application of binder, precoated cover material of 13.2 mm size (see para 3.2.3.) at the rate of 0.14 to 0.15 m³ per 10 m², shall be spread uniformly by hand or preferably by means of a mechanical grit spreader or so as to cover the surface completely.

Before commencing rolling, the surface shall be broomed with a view to ensure uniform coverage of aggregates.

5.4.3. Rolling : Right after the application of cover material, the entire surface shall be rolled with a 6 to 8 tonne smooth wheeled roller. Rolling shall commence at the edges and progress towards the centre except in superelevated portions where it shall proceed from the inner edge to the outer. Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding

*Tentative Specification for Priming of Base Course with Bituminous Primers.

pass. While rolling is in progress, additional aggregates shall be spread by hand in whatever quantities required to make up irregularities. Rolling shall be continued until all aggregate particles are firmly embedded in the binder and present a uniform closed surface. Excessive rolling resulting in the crushing of aggregates shall be avoided.

5.5. Second or Renewal Coat

5.5.1. **Time interval :** The second coat of surface dressing where specified, shall be applied either immediately after the first coat or soon after depending on the conditions at site and type of binder used. Where road tar is the binder, the second coat should be completed right after the first coat.

5.5.2. **Application of binder :** Where the binder application is for renewal coat, the receiving surface shall be prepared, shaped and conditioned to specified grade and camber as described in para 5.3.

The binder heated to a temperature appropriate to its application shall be sprayed uniformly on the clean dry surface, preferably using mechanical sprayers. The rate of application shall be 9.4 to 10.8 kg per 10 m² in the case of straight-run bitumen and 10.8 to 13.2 kg per 10 m² in the case of cutbacks and road tar.

5.5.3. **Application of cover material :** Immediately after application of the binder, precoated cover material of 11.2mm size (see para 4.2.3), at the rate of 0.09 to 0.11 m³ per 10 m², shall be spread uniformly by hand or preferably by means of a mechanical grit spreader so as to cover the surface completely.

Before starting rolling, the surface shall be broomed with a view to ensure uniform spreading of aggregates.

5.5.4. **Rolling :** Soon after the aggregate is spread uniformly, rolling with a 6 to 8 tonne road roller shall be done in the same manner as described in para 5.4.3.

5.6. Surface Finish

Surface evenness of the completed work in longitudinal and transverse directions shall be within the tolerances indicated in Table 3.

TABLE 3. PERMITTED TOLERANCES OF SURFACE EVENNESS FOR SURFACE DRESSING

Type of base on which surface dressing is applied	Longitudinal profile	Cross profile
	Max. permissible undulation when measured with a 3-metre straight edge	Max. permissible variation from specified profile when measured with a camber template
(1) WBM, penetration macadam or built-up spray grout	12 mm	8 mm
(2) Bituminous macadam	10 mm	6 mm

The longitudinal profile shall be checked with a 3-metre long straight edge, at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with a series of three camber boards at intervals of 10 metres.

It is emphasised that surface dressing by itself cannot remove any undulations present in the base or the surface on which it is applied. It is, therefore, essential that all operations of rectifications to meet the requirements set out above be carried out on the receiving surface before the work of surface dressing is begun.

5.7. Opening to Traffic

When straight-run bitumen or road tar is used as the binder, the finished surface may be thrown open to traffic on the following day, but if in special circumstances, the road is required to be opened to traffic immediately after rolling, the speed of traffic shall be restricted to 16 km per hour till the following day.

Where cutback bitumen is used, the finished surface shall be closed to traffic until it is sufficiently cured to hold the cover aggregates in place. Control of traffic shall be ensured by appropriate devices, such as barricades and posting of watchmen.