

# *Indian Standard*

## PAVING BITUMEN — SPECIFICATION

### ( *Fourth Revision* )

#### 1 SCOPE

This standard prescribes the requirements of various grades of paving grade bitumen for use as binders in the construction of pavements. Bitumen is graded by viscosity at 60°C.

#### 2 REFERENCES

The following standards contain provisions, which, through reference in the text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
334 : 2002	Glossary of terms relating to bitumen and tar ( <i>third revision</i> )
1201 : 1978	Methods for testing tar and bituminous materials: Sampling ( <i>first revision</i> )
1203 : 1978	Methods of testing tar and bituminous materials: Determination of penetration ( <i>first revision</i> )
1205 : 1978	Methods for testing tar and bituminous materials: Determination of softening point ( <i>first revision</i> )
1206	Methods for testing tar and bituminous materials: Determination of viscosity
(Part 2) : 1978	Absolute viscosity
(Part 3) : 1978	Kinematic viscosity
1208 : 1978	Methods for testing tar and bituminous materials: Determination of ductility ( <i>first revision</i> )
1216 : 1978	Methods for testing tar and bituminous materials: Determination of solubility in carbon disulphide or trichloroethylene ( <i>first revision</i> )
1448 [P : 69] : 1969	Methods of test for petroleum and its products: [P : 69] Flash and fire point by cleaveland (open) cup

#### 3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 334 and the following shall apply.

**3.1 Viscosity Ratio** — It is the ratio of viscosity of

residue from rolling thin film oven test to unaged bitumen, both measured at 60°C.

#### 4 DESCRIPTION

Bitumen shall be prepared by the refining of crude petroleum by suitable methods.

#### 5 GRADES

Bitumen shall be classified into four grades based on the viscosity, and suitability recommended for maximum air temperature as given below:

<i>Grade</i>	<i>Suitable for 7 day Average Maximum Air Temperature</i> °C
(1)	(2)
VG10	< 30
VG20	30-38
VG30	38-45
VG40	> 45

NOTE — This is the 7 day average maximum air temperature for a period not less than 5 years from the start of the design period.

#### 6 REQUIREMENTS

**6.1** The paving bitumen binder shall be homogenous and shall not foam when heated to 175°C.

**6.2** The various grades of bitumen shall conform to the requirements prescribed in Table 1.

#### 7 SAMPLING AND CRITERIA FOR CONFORMITY

##### 7.1 Lot

In any consignment, all the containers of paving grade bitumen binders of same category and grade from the same batch of manufacture shall be grouped to constitute a lot.

**7.2** The number of containers to be selected at random from the lot shall depend upon the size of the lot given in Table 2.

**7.3** From each of the containers selected in 7.2 an average sample representative of the material in the container shall be drawn in accordance with the methods prescribed in IS 1201, taking all the

**Table 1 Requirements for Paving Bitumen**  
(Clause 6.2)

Sl No.	Characteristics	Paving Grades				Method of Test, Ref to
		VG10	VG20	VG30	VG40	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Penetration at 25°C, 100 g, 5 s, 0.1 mm, <i>Min</i>	80	60	45	35	IS 1203
ii)	Absolute viscosity at 60°C, Poises	800-1 200	1 600-2400	2 400-3 600	3 200-4 800	IS 1206 (Part 2)
iii)	Kinematic viscosity at 135°C, cSt, <i>Min</i>	250	300	350	400	IS 1206 (Part 3)
iv)	Flash point (Cleveland open cup), °C, <i>Min</i>	220	220	220	220	IS 1448 [P : 69]
v)	Solubility in trichloroethylene, percent, <i>Min</i>	99.0	99.0	99.0	99.0	IS 1216
vi)	Softening point (R&B), °C, <i>Min</i>	40	45	47	50	IS 1205
vii)	Tests on residue from rolling thin film oven test:					
	a) Viscosity ratio at 60°C, <i>Max</i>	4.0	4.0	4.0	4.0	IS 1206 (Part 2)
	b) Ductility at 25°C, cm, <i>Min</i>	75	50	40	25	IS 1208

precautions mentioned therein. All these samples from individual containers shall be stored separately.

#### 7.4 Number of Tests

**7.4.1** All the individual samples shall be tested for absolute viscosity at 60°C, penetration and softening point tests.

**7.4.2** For the remaining characteristics, a composite sample prepared by mixing together equal quantities of paving grade bitumen, sampled, as the case may be, from all individual samples taken from each sample container, shall be tested.

#### 7.5 Criteria for Conformity

**7.5.1** The lot shall be considered as conforming to the requirements of this standard, if the conditions mentioned under **7.5.2** and **7.5.3** are satisfied.

**7.5.2** From the test results of absolute viscosity at 60°C, penetration and softening point, the mean ( $\bar{x}$ ) and the range ( $R$ ) shall be calculated. The following conditions shall be satisfied:

- $[\bar{x} - 0.6R]$  shall be greater than or equal to the minimum specification limit specified in Table 1, and
- $[\bar{x} + 0.6R]$  shall be less than or equal to the maximum specification limit specified in Table 1.

**7.5.3** The composite sample when tested for the characteristics mentioned in **7.4.2** shall satisfy the corresponding requirements of the characteristics given in Table 1.

## 8 PACKING AND MARKING

### 8.1 Packing

Bitumen of all types shall be suitably packed in a container as agreed to between the purchaser and the supplier.

### 8.2 Marking

Each container of viscosity grade bitumen shall be legibly and indelibly marked with the following:

- Manufacturer's name or trade-mark, if any;
- Month and year of manufacture;
- Type of material and grade; and
- Batch number.

### 8.3 BIS Certification Marking

The container may also be marked with the Standard Mark.

**8.3.1** The use of Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufactures or producers may be obtained from the Bureau of Indian Standards.

**Table 2 Scale of Sampling**  
(Clause 7.2)

Sl No.	Lot Size	No. of Containers to be Selected
(1)	(2)	(3)
i)	Up to 50	3
ii)	51-150	5
iii)	151-500	7
iv)	501 and above	10