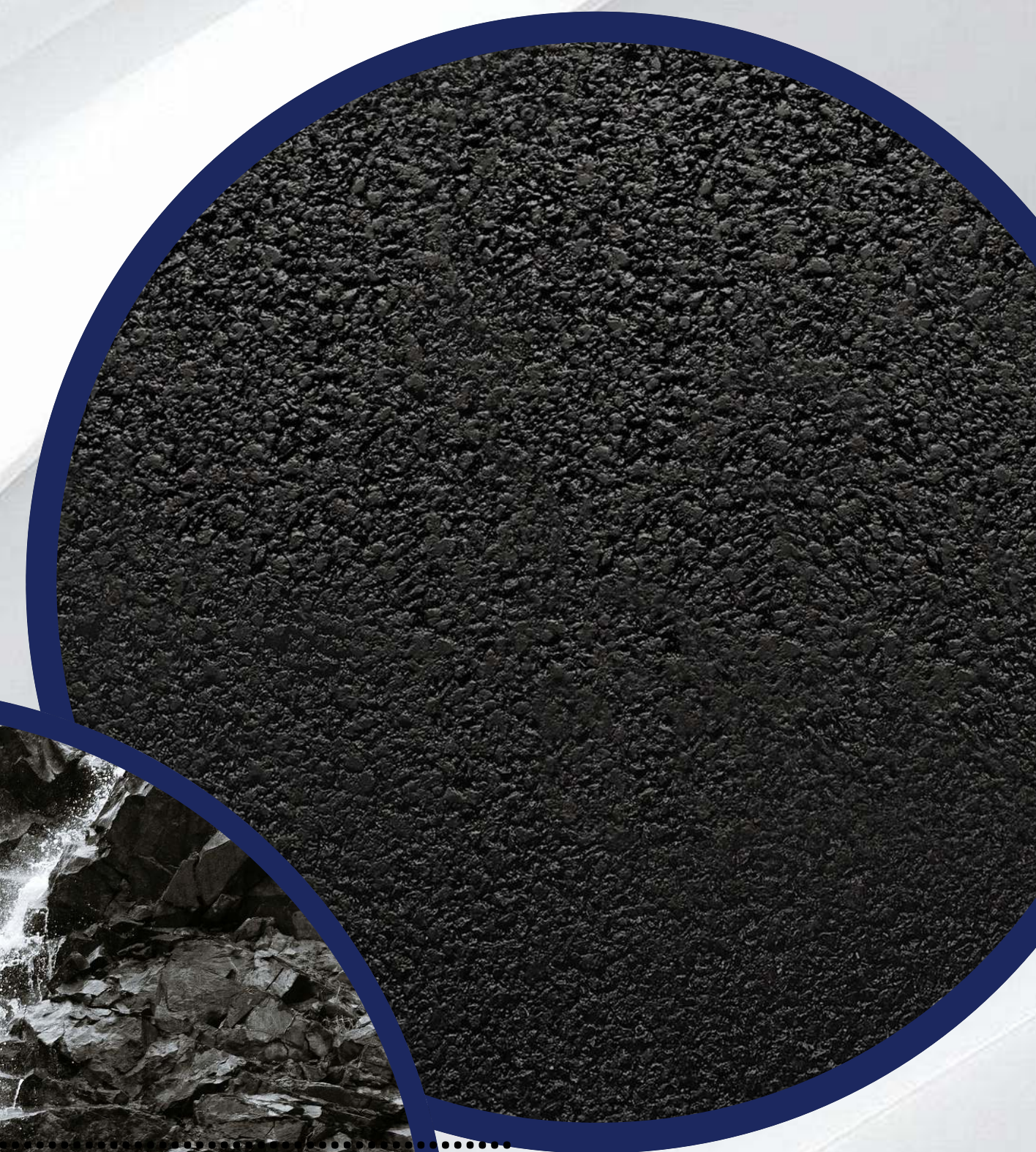
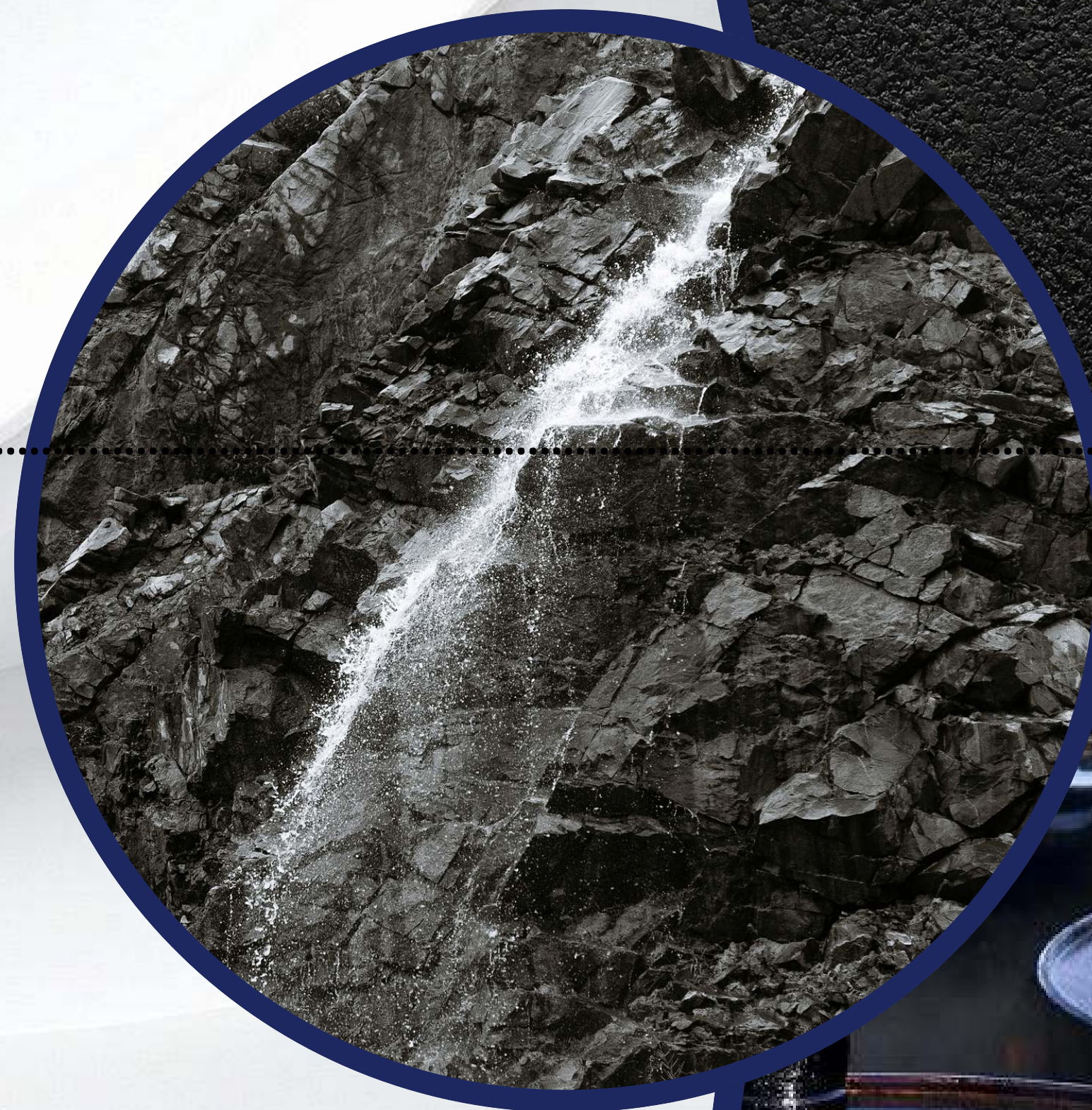








## Grades of Bitumen





## Penetration Grade

**Penetration grade bitumen** is the most widely used paving-grade bitumen globally. It is classified by the depth (in 0.1 mm) that a standard needle penetrates the bitumen sample at 25 °C, which directly indicates hardness.

| Characteristic                    | Unit              | 40/50     | 60/70     | 80/100    | 120/150   | Test Method |
|-----------------------------------|-------------------|-----------|-----------|-----------|-----------|-------------|
| Penetration @ 25 °C               | 0.1 mm            | 40–50     | 60–70     | 80–100    | 120–150   | ASTM D5     |
| Flash Point                       | °C                | >250      | >250      | >225      | >218      | ASTM D92    |
| Solubility in TCE                 | % wt              | >99.5     | >99.5     | >99.5     | >99       | ASTM D2040  |
| Specific Gravity @ 25 °C          | kg/m <sup>3</sup> | 1.01–1.06 | 1.01–1.06 | 1.01–1.05 | 1.00–1.05 | ASTM D70    |
| Ductility @ 25 °C                 | cm                | >100      | >100      | >100      | >100      | ASTM D113   |
| Softening Point                   | °C                | 52–60     | 49–56     | 42–52     | 38–45     | ASTM D36    |
| Loss on Heating                   | % wt              | <0.2      | <0.2      | <0.2      | <0.5      | ASTM D6     |
| Drop in Penetration after Heating | %                 | <20       | <20       | <20       | <20       | ASTM D5     |

- Lower PEN number → harder bitumen
- Higher PEN number → softer bitumen
- Common grades include 40/50, 60/70, 80/100, 85/100, 120/150.
- 40/50 = hardest
- 85/100 & 120/150 = softest



## Penetration Grade

PEN Grade → traditional, penetration-based hardness classification (ASTM / EN)

### Penetration Grade – EN Standard (Europe, EN 12591)

| Characteristic           | Unit              | 35/50     | 50/70     | 70/100    | 150/200   | Test Method |
|--------------------------|-------------------|-----------|-----------|-----------|-----------|-------------|
| Penetration @ 25 °C      | 0.1 mm            | 35–50     | 50–70     | 70–100    | 150–200   | EN 1426     |
| Viscosity @ 60 °C        | Poises            | 220–400   | 120–250   | 75–150    | 30–60     | EN 12595    |
| Viscosity @ 135 °C       | cSt               | 270–650   | 220–450   | 150–400   | 120–300   | EN 12595    |
| Ductility @ 25 °C        | cm                | >100      | >100      | >100      | >100      | EN 13589    |
| Flash Point              | °C                | >250      | >250      | >225      | >218      | EN 2595     |
| Specific Gravity @ 25 °C | kg/m <sup>3</sup> | 1.01–1.06 | 1.01–1.06 | 1.01–1.05 | 1.00–1.04 | EN 1427     |
| Softening Point          | °C                | 49–59     | 46–56     | 42–51     | 36–43     | EN 1427     |



## Viscosity Grade

**Viscosity Grade (VG) bitumen** is classified based on absolute viscosity at 60 °C, measured in Poise, and was developed by the Bureau of Indian Standards (BIS).

- Higher VG number → stiffer & more viscous bitumen
- Better performance under high temperatures and heavy traffic
- **Common grades:** VG10, VG20, VG30, VG40

| Characteristic      | Unit   | VG40      | VG30      | VG20      | VG10     | Test Method |
|---------------------|--------|-----------|-----------|-----------|----------|-------------|
| Penetration @ 25 °C | 0.1 mm | 40–60     | 50–70     | 60–80     | 80–100   | ASTM D5     |
| Viscosity @ 60 °C   | Pa·s   | 3200–4800 | 2400–3600 | 1600–2400 | 800–1200 | ASTM D2171  |
| Viscosity @ 135 °C  | cSt    | ≥400      | ≥350      | ≥300      | ≥250     | ASTM D2170  |
| Ductility @ 25 °C   | cm     | >100      | >100      | >100      | >100     | ASTM D113   |
| Solubility in TCE   | % wt   | >99       | >99       | >99       | >99      | ASTM D2040  |
| Flash Point         | °C     | >220      | >220      | >220      | >220     | ASTM D92    |
| Softening Point     | °C     | ≥50       | ≥47       | ≥45       | ≥40      | ASTM D36    |



## Viscosity Grade

**VG grades** provide better control against rutting, fatigue, and cracking, especially under heavy traffic and high temperatures

### Rolling Thin Film Oven Test (RTFOT) – Residue Requirements

| Test                    | VG40 | VG30 | VG20 | VG10 | Test Method |
|-------------------------|------|------|------|------|-------------|
| Viscosity Ratio @ 60 °C | ≤4   | ≤4   | ≤4   | ≤4   | ASTM D2171  |
| Ductility @ 25 °C (cm)  | ≥25  | ≥40  | ≥50  | ≥75  | ASTM D113   |

| Application                  | Recommended Grade     |
|------------------------------|-----------------------|
| Hot climates & heavy traffic | <b>VG40 / 40–50</b>   |
| General road construction    | <b>VG30 / 60–70</b>   |
| Moderate climate roads       | <b>VG20 / 80–100</b>  |
| Cold climates                | <b>VG10 / 120–150</b> |





## Emulsion Bitumen

**Emulsion bitumen** is an asphalt binder produced by dispersing bitumen droplets in water using an emulsifying agent.

| Characteristic                                       | Unit            | K1-60         | K1-70           |
|------------------------------------------------------|-----------------|---------------|-----------------|
| Particle charge                                      | –               | Positive      | Positive        |
| Residue on 710 µm KS sieve                           | % (m/m), Max    | 0.05          | –               |
| Residue on 150 µm KS sieve                           | g / 100 mL, Max | 0.15          | –               |
| Binder content                                       | % (m/m), Min    | 57            | 67              |
| Viscosity (°E) @ 20 °C                               | –               | Min 6 – Max 9 | –               |
| Viscosity Redwood @ 85 °C                            | –               | –             | Min 25 – Max 35 |
| Storage stability (1 day) – water content difference | % Max           | 2             | 1               |
| Sieve test                                           | % Max           | –             | 0.1             |

**PIt is classified according to the type emulsifier, commonly:**

- Cationic
- Anionic
- Non-ionic

**Emulsion bitumen is widely used for:**

- Surface treatments
- Prime coats
- Tack coats



## Emulsion Bitumen

### Bitumen Emulsion CRS1 / CSS1 Specification

| Characteristic                                     | Unit  | CRS1     | CSS1     | Test Method |
|----------------------------------------------------|-------|----------|----------|-------------|
| Viscosity Saybolt Furol @ 50 °C                    | SFS   | 20–100   | 20–100   | ASTM D4796  |
| Storage stability test, 24 h                       | % Vol | Max 1    | Max 1    | ASTM D6930  |
| Demulsibility (0.8% dioctyl sodium sulfosuccinate) | % Vol | Min 40   | –        | ASTM D6936  |
| Particle charge test                               | –     | Positive | Positive | ASTM D7402  |
| Cement mixing test                                 | % Vol | –        | Max 2    | ASTM D6935  |
| Sieve test                                         | % Vol | Max 0.1  | Max 0.1  | ASTM D6933  |
| Residue                                            | % Vol | Min 60   | Min 57   | ASTM D6997  |
| Oil distillate (by volume of emulsion)             | % Vol | Max 3    | –        | ASTM D6997  |

### Tests on Residue from Distillation

| Property            | Unit   | CRS1     | CSS1     | Test Method |
|---------------------|--------|----------|----------|-------------|
| Penetration @ 25 °C | 0.1 mm | 100–250  | 100–250  | ASTM D5     |
| Ductility @ 25 °C   | cm     | Min 40   | Min 40   | ASTM D113   |
| Solubility in TCE   | % wt   | Min 97.5 | Min 97.5 | ASTM D2040  |



## Applications Summary

| Emulsion Type        | Typical Use                                |
|----------------------|--------------------------------------------|
| <b>K1-60 / K1-70</b> | Prime coats, light surface treatments      |
| <b>CRS1</b>          | Rapid-setting surface dressing, chip seals |
| <b>CSS1</b>          | Slow-setting tack coats, slurry seals      |

- Emulsion bitumen allows cold application
- Environmentally friendlier than hot bitumen
- Selection depends on setting time (rapid vs slow) and aggregate compatibility
- Ideal for maintenance and light traffic applications



## Cutback Bitumen

**Cutback bitumen** is a blend of bitumen and petroleum solvent, formulated to reduce viscosity for easy application at lower temperatures. It is widely used in road construction and maintenance, especially where heating facilities are limited.

| Characteristic                     | Unit   | MC30    | MC70    | MC250   | MC3000    | Test Method |
|------------------------------------|--------|---------|---------|---------|-----------|-------------|
| Kinematic viscosity @ 60°C         | cSt    | 30–60   | 70–140  | 250–500 | 3000–6000 | ASTM D2170  |
| Flash point                        | °C     | 38      | 38      | 66      | 66        | ASTM D3143  |
| Water content (Max)                | % Vol  | 0.2     | 0.2     | 0.2     | 0.2       | ASTM D95    |
| <b>Distillate to 360°C</b>         |        |         |         |         |           |             |
| – at 225°C                         | % Vol  | 10      | 10      | 10      | 10        | ASTM D402   |
| – at 260°C                         | % Vol  | 40–70   | 25–65   | 15–55   | 15–75     | ASTM D402   |
| – at 315°C                         | % Vol  | 75–93   | 75–87   | 60–87   | ≥80       | ASTM D402   |
| Residue from distillation to 360°C | % Vol  | 50      | 55      | 67      | 67        | ASTM D402   |
| <b>Tests on residue bitumen</b>    |        |         |         |         |           |             |
| Penetration @ 25°C                 | 0.1 mm | 120–150 | 120–150 | 120–150 | 120–150   | ASTM D5     |
| Ductility @ 25°C                   | cm     | 100     | 100     | 100     | 100       | ASTM D113   |
| Solubility in TCE                  | % wt   | 99      | 99      | 99      | 99        | ASTM D2040  |



## Cutback Bitumen

### RC Cutback Bitumen Specification

| Characteristic                     | Unit   | RC30   | RC70   | RC250   | RC3000    | Test Method |
|------------------------------------|--------|--------|--------|---------|-----------|-------------|
| Kinematic viscosity @ 60°C         | cSt    | 30–60  | 70–140 | 250–500 | 3000–6000 | ASTM D2170  |
| Flash point                        | °C     | 27     | 27     | 27      | 27        | ASTM D3143  |
| Water content (Max)                | % Vol  | 0.2    | 0.2    | 0.2     | 0.2       | ASTM D95    |
| <b>Distillate to 360°C</b>         |        |        |        |         |           |             |
| – at 225°C                         | % Vol  | 55     | 50     | 35      | 10        | ASTM D402   |
| – at 260°C                         | % Vol  | 75     | 70     | 60      | 25        | ASTM D402   |
| – at 315°C                         | % Vol  | 90     | 85     | 80      | 70        | ASTM D402   |
| Residue from distillation to 360°C | % Vol  | 50     | 55     | 65      | 75        | ASTM D402   |
| <b>Tests on residue bitumen</b>    |        |        |        |         |           |             |
| Penetration @ 25°C                 | 0.1 mm | 80–120 | 80–120 | 80–120  | 80–120    | ASTM D5     |
| Ductility @ 25°C                   | cm     | 100    | 100    | 100     | 100       | ASTM D113   |
| Solubility in TCE                  | % wt   | 99     | 99     | 99      | 99        | ASTM D2040  |



## Typical Applications Summary

| Type           | Typical Use                             |
|----------------|-----------------------------------------|
| RC30 / RC70    | Surface dressing, spray seals           |
| RC250 / RC3000 | Heavy-duty surface treatments           |
| MC30 / MC70    | Prime coats                             |
| MC250 / MC3000 | Penetration macadam, base stabilization |

- Cutback bitumen enables cold or low-temperature application
- RC grades cure quickly due to volatile solvents
- MC grades offer controlled curing, ideal for priming
- Widely used in road maintenance and low-infrastructure environments



## Performance Grades

Performance Grade (PG) bitumen is designed to stay stable under both warm and freezing conditions. Its grade depends on tested qualities such as thickness, firmness, and temperature resistance. The PG system helps ensure the right binder is chosen for pavement projects. Ratings like PG 64-22 show the low and high temperatures the binder can handle.

| High-Temperature Grade (°C) | Compatible Low-Temperature Grades (°C) |
|-----------------------------|----------------------------------------|
| PG 46                       | -34, -40, -46                          |
| PG 52                       | -10, -16, -22                          |
| PG 58                       | -10, -16, -22                          |
| PG 64                       | -10, -16, -22                          |
| PG 70                       | -10, -16, -22                          |
| PG 76                       | -16                                    |





## Packaging





## New Steel Drums



### New Steel Drum Options

- Long new steel drum – 180 KG capacity
- Short new steel drum – 150 KG capacity
- Long new steel drum – 200 KG capacity

## New Steel Drums



| Item                    | 150 KG Bitumen Drum | 180 KG Bitumen Drum |
|-------------------------|---------------------|---------------------|
| Height (cm)             | $86 \pm 2$          | $98 \pm 2$          |
| Diameter (cm)           | 50                  | 50                  |
| Body Thickness (mm)     | $0.6 \pm 0.02$      | $0.6 \pm 0.02$      |
| Top/Base Thickness (mm) | $0.6 \pm 0.02$      | $0.6 \pm 0.02$      |
| Net Weight (kg)         | $150 \pm 2$         | $182 \pm 2$         |
| Gross Weight (kg)       | $158 \pm 2$         | $192 \pm 2$         |
| Empty Drum Weight (kg)  | $8.5 \pm 1$         | $9.5 \pm 1$         |



## Jumbo Bags



Jumbo bags offer a cost-effective and environmentally responsible packaging solution for bitumen transportation and storage. Compared to traditional steel drums, they reduce handling costs, improve logistics efficiency, and minimize environmental impact.

Our jumbo bags are manufactured with reinforced 0.9 cm-thick steel support, ensuring high strength and safe handling of heavy bitumen loads. All bags are placed on disinfected pallets compliant with international standards, making them suitable for industrial and regulated applications.

Designed with sustainability in mind, the materials used allow for easy recycling at temperatures below 150°C, supporting waste reduction and circular-economy practices.



## Bitutainer



Bitutainers are an excellent and secure method for transporting bitumen in a cooled state, eliminating the need for heat maintenance during transit. The primary purpose of these bitumen containers is to deliver bulk bitumen directly from the depot to customer sites.

They come fully equipped with insulation and heating facilities, ensuring the bitumen remains in the desired condition throughout the journey. This insulation and heating feature enables the transportation of bitumen even in colder climates, maintaining its quality and usability upon arrival at the destination.



# Thank You

For your attention

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