SHELL CARIPHALTE
Maximize Performance, Seize Opportunities

Shell Bitumen
AN INDUSTRY UNDER PRESSURE

THE CONSTRUCTION INDUSTRY IS PREDICTED TO GROW OVER THE COMING YEARS AND IS ANTICIPATED TO BRING NEW CHALLENGES TO ARCHITECTS, CIVIL ENGINEERS AND CONTRACTORS, SUCH AS:

- Higher traffic volumes, speeds and axle weights on all road types
- Increasingly adverse and unpredictable climate conditions
- Requirements for longer asset life
- Requirements for minimum disruptions and shorter maintenance windows
- Requirements for reduced environmental impact of products
Conventional Bitumen may not be able to help address all of these challenges, but Polymer Modified Bitumen (PMB) is a proven solution to deal effectively with some of them.

Conventional bitumens modified with carefully chosen polymers can greatly improve the properties of the asphalt mixture providing benefits such as:

- Improved rheology – elasticity recovery and viscosity
- Reduced chances of fatigue cracking
- Reduced chances of low temperature cracking
- Improved fuel resistance
- Improved adhesion/cohesion

Shell Bitumen has been a leading player in the development of PMB technology over last 40 years and has developed Shell Cariphalte range of PMBs that have been successfully applied to iconic projects across many different continents.

Shell Cariphalte PMBs can be formulated to overcome specific challenges such as improved resistance to deformation or to provide better adhesion between bitumen and aggregate than conventional bitumen.

Key benefits:

- **Durability** – Due to its resistance to permanent deformation and superior resistance to stress compared to conventional bitumen, Shell Cariphalte is the ideal choice for busy roads
- **Reliability** – The reassurance of knowing you have a reliable product created by one of the world’s leading technical specialists in bitumen manufacturing
- **Adaptability** – Specially formulated polymer modified bitumen gives Shell Cariphalte flexible qualities and an ability to adapt to wide ranging demands

<table>
<thead>
<tr>
<th></th>
<th>Conventional Bitumen Shell Bitumen 50/70</th>
<th>Polymer modified Bitumen Shell Cariphalte 25/55-55</th>
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</thead>
<tbody>
<tr>
<td>Penetration</td>
<td>53 1/10mm</td>
<td>37 1/10mm</td>
</tr>
<tr>
<td>Softening Point</td>
<td>50°C</td>
<td>59°C</td>
</tr>
<tr>
<td>Elastic Recovery</td>
<td>Ca. 15%</td>
<td>60%</td>
</tr>
<tr>
<td>Kin. Viscosity @135°C</td>
<td>450mm²/s</td>
<td>1500mm²/s</td>
</tr>
<tr>
<td>Fraass Breaking Point</td>
<td>-11°C</td>
<td>-14°C</td>
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<tr>
<td>BBR Stiffness @ -16°C</td>
<td>250MPa</td>
<td>230MPa</td>
</tr>
<tr>
<td>DSR @16°C</td>
<td>2500Pa</td>
<td>9500Pa</td>
</tr>
</tbody>
</table>

**CASE STUDY**

**HOCKENHEIM**

Germany’s Formula One™ famed Hockenheimring Baden-Württemberg racing circuit, which has hosted Formula One and Deutsche Tourenwagen Masters (DTM) races, seats 120,000 spectators. It was considered too long (6.8 km) and impractical for spectators because various sections ran through dense wooded areas. In 2002, a 62 million rebuild resulted in a shorter circuit and Shell Cariphalte Racetrack was chosen as the bitumen of choice for the resurfacing of the track. The Shell Cariphalte Racetrack used at Hockenheim was blended at a nearby plant to meet the track’s requirements. Product qualities such as elastic recovery, penetration and softening point were all carefully controlled to meet the needs of the circuit’s FIA Grade 1 licence.
WE ARE DIFFERENT, WE INNOVATE TO HELP ADD VALUE TO OUR CUSTOMERS AND PROVIDE TOP QUALITY PRODUCTS AND SERVICES. THIS IS WHY WE HAVE CREATED A FULL RANGE OF SHELL CARIPHALTE PRODUCTS TO MEET THE DEMANDS AND CHALLENGES OF DIFFERENT APPLICATIONS.

Shell Cariphalte High Performance
Enjoy a multitude of benefits
- Designed for use in the production of multiple asphalt types to increase the flexibility of your plant.
- Created to deliver improved resistance to deformation and cracking under high-stress conditions.
- Typical applications include busy roads, bus lanes, airfields, ports and industrial estates.

Shell Cariphalte Thin Surfacing
Designed to meet modern surfacing demands
- Specially formulated to help reduce the drainage of bitumen from the asphalt during mixing and transportation.
- Improved adhesion between the aggregates and binder, which improves resistance to moisture ingress.
- Typically used in thin surfacing and stone mastic asphalt (SMA) applications.

Shell Cariphalte Dense Mixture
Designed for heavy use
- Highly modified binder for use under heavy load conditions with demonstrated success in asphalt mixtures that require high resistance to permanent deformation and cracking.
- Extensively used in Clause 943 High performance Hot rolled Asphalt and a top performing PMB in UK for over 25 years.
- Also used on bridge decks, in crack relief systems, Stress Absorbing Membrane Interfaces and to overlay concrete pavements.

Shell Cariphalte Fuel Resisting
Increased resistance where it’s needed most
- Specially formulated to help provide increased resistance* to asphalt surfaces that may be exposed to petroleum based fuels (such as diesel and jet fuel).
- Internal Shell 28 day diesel immersion tests have shown that Shell Cariphalte Fuel Resisting can help reduce material loss by up to 60 times.*
- Typical applications include areas such as airfields, ports, car parks and bus lanes.

Shell Cariphalte Racetrack
A high performance surface for high performance vehicles
- Specially formulated for race tracks. The high cohesive strength of the binder is designed to allow it to withstand the horizontal shear forces generated when a race car accelerates or brakes into a corner, making Shell Cariphalte Racetrack an ideal solution for motorsports circuits.
- Shell Bitumen’s proven Shell Cariphalte Racetrack technology has already been used at the Formula One™ circuits of Yas Marina in Abu Dhabi, Marina Bay Street Circuit in Singapore, Sepang in Malaysia, Sakhir in Bahrain, Hockenheim in Germany, Ferrari’s own Fiorano test track in Italy and Nürburgring in Germany.

*compared to the equivalent penetration grade binder

ASPHALT WITH AND WITHOUT FUEL RESISTANCE
SHELL CARIPHALTE

The performance of the Shell Cariphalte range of polymer modified binders is the result of decades of research and expertise as a leading bitumen supplier. These advanced products, manufactured by blending selected high performing polymers with carefully chosen base bitumen, are designed to offer improved adaptability, durability and reliability compared to conventional bitumen – to provide you with the solution you want for the job you need to do.

- **Formula One racetracks:**
  Sepang (Malaysia), Sakhir (Bahrain), Marina Bay Street Circuit (Singapore), Hockenheim (Germany) and Yas Marina (Abu Dhabi).

- **Main roads:**
  A20 motorway, A2 motorway (Germany), A54 motorway (France), E17 motorway (Belgium), M25, M6 Toll, A38, A14, M1 (UK), Chang’an Avenue (China).

- **Airports & bridges:**
  Schiphol Airport, Amsterdam (Netherlands), Frankfurt Airport (Germany), Changi (Singapore), Edinburgh Airport (UK), Heathrow Airport (UK), Phnom Penh Airport (Cambodia), Zürich Kloten (Switzerland), Rion-Antirrion Bridge (Greece).

- **Safety Datasheets and technical data sheets:**
  Our technical information and safety data for all of our products, including the Shell Cariphalte product range, can be downloaded from the Shell electronic product catalogue [www.epc.shell.com](http://www.epc.shell.com).
ABOUT SHELL BITUMEN

Shell Bitumen is the world’s largest marketer of bitumen with over 1,600 customers across 28 countries. We supply enough bitumen to resurface 450km of road every day; that’s enough to travel around the world 4 times in one year. For over 90 years Shell has been a leader in bitumen solutions and has developed a broad portfolio of product and service offerings customised to the needs of the road, roofing and airport sectors and some specialty applications.

Our commitment to continued innovation and providing pre and post-sale technical support to customers is evidenced by our investment in an extensive network of technical experts based in our world class R&D centre, three solution centres and in the field. All products supplied through our network undergo robust quality testing and assurance to help our customers deliver on their commitments.

To find your local sales representative, please visit our website www.shell.com/bitumen