Butonal® NX 4190 is an aqueous, high-solids, cold-polymerized, cationic styrene-butadiene dispersion for modifying cationic bitumen emulsions.

**Physical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible condition</td>
<td>aqueous, white to light yellow</td>
</tr>
<tr>
<td>Solid content</td>
<td>approximately 64%</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>~ 250 – 2,000mPa·s (EN ISO 3219, 100 1/s, 23°C)</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>0.95 – 0.98g/cm³</td>
</tr>
<tr>
<td>pH</td>
<td>~ 5.4</td>
</tr>
<tr>
<td>Tg (DSC)</td>
<td>– 53°C</td>
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</tbody>
</table>

**Application**

A premium cationic SBR latex that provides excellent early strength development and adhesion for the following applications:

- Chip seal
- Slurry seal
- Micro surfacing

Butonal® NX 4190 can also be used to modify hot mix asphalt in order to meet modified binder specifications as well as to provide improvements in conventional properties such as an increased softening point and decreased penetration.

**Properties/advantages**

Butonal® NX 4190 is a mechanically stable latex polymer dispersion that is readily incorporated into cationic asphalt emulsions when added to the soap solution (batch process) or co-milling (continuous process). Butonal® NX 4190 provides excellent cohesion and adhesion properties with aggregate and significantly enhances the residue properties such as forced ductility, toughness and tenacity, elastic recovery and softening point compared to conventional cationic polymers.

**Dosage/handling**

In order to obtain the resulting 3% polymer in the application, we recommend adding 4.7% Butonal® NX 4190 dispersion to the bitumen content. Periodic mechanical stirring is required to maintain a homogeneous mixture. Some separation is possible due to the specific gravity and particle size distribution of latex polymer dispersion. Generally, the preferred means of stirring is with a separate propeller type stirrer. This low-speed, low-shear mechanical stirrer can be located off-center, set at an angle, or side-mounted near the tank bottom to prevent latex foaming or vortex formation. Center stirring requires tank baffles. It is recommended that the mixture be agitated for 10 to 20 minutes every 24 hours in storage.

**Sample formulation**

Modified bitumen emulsions such as C 69 BP3-OB-1, C 69 BP3-OB-2, C 70 BP3-OB-1 or C 70 BP3-OB-2 for application chip seal (surface dressing) contain:

- 30 – 31% water
- 69 – 70% bitumen
  - within 4.5 – 5% Butonal® NX 4190 to bitumen (= 3% polymer to bitumen)
  - ~ 1.0 – 1.5% emulsifier to bitumen
Modified bitumen emulsions such as C 65 BP6-DSK or ASTM 3910: CSS-1h (Cationic Slow Set), CQS-1h (Cationic Quick Set), LMCQS-1h (Latex-Modified Cationic Quick Set) for application slurry seal contain:

**ASTM Type 1** (filling small surface cracks and voids or to provide a thin surfacing to improve erosion resistance/skid resistance):
- 10 – 16 M. % bitumen to dry aggregates
- 4.5 – 5 % Butonal® NX 4190 to bitumen (= 3% polymer to bitumen)

Quantity requirement of the application on the surface: 3.3 – 5.4 kg/m²

**ASTM Type 2** (providing a thin surfacing to improve skid resistance of pavement and to treat old pavement that exhibits raveling):
- 7.5 – 13.5 M. % bitumen to dry aggregates
- 4.5 – 5 % Butonal® NX 4190 to bitumen (= 3% polymer to bitumen)

Quantity requirement of the application on the surface: 5.4 – 8.2 kg/m²

**ASTM Type 3** (providing a new wearing surface for pavement):
- 6.5 – 12 M. % bitumen to dry aggregates
- 4.5 – 5 % Butonal® NX 4190 to bitumen (= 3% polymer to bitumen)

Quantity requirement of the application on the surface: ≥ 8.2 kg/m²

All ASTM Type slurry seals may also contain cement.

Modified bitumen emulsions such as C 65 BP6-DSK or ASTM 3910: CSS-1h (Cationic Slow Set), CQS-1h (Cationic Quick Set), LMCQS-1h (Latex-Modified Cationic Quick Set) for application micro surfacing contain:

**ASTM Type 1** (filling small surface cracks and voids or to provide a thin surfacing to improve erosion resistance/skid resistance):
- 75 – 80% aggregates
- 0.5 – 1.5% filler (cement, lime)
- 10% water
- 10 – 15% bitumen emulsion
  - 35% water
  - 65% bitumen
  - 4.5 – 5 % Butonal® NX 4190 to bitumen (= 3% polymer to bitumen)
  - 1.5% emulsifier to bitumen

**ASTM Type 2** (providing a thin surfacing to improve skid resistance of pavement and to treat old pavement that exhibits raveling):
- 7.5 – 13.5 M. % bitumen to dry aggregates
- 4.5 – 5 % Butonal® NX 4190 to bitumen (= 3% polymer to bitumen)

Quantity requirement of the application on the surface: 5.4 – 8.2 kg/m²

**ASTM Type 3** (providing a new wearing surface for pavement):
- 6.5 – 12 M. % bitumen to dry aggregates
- 4.5 – 5 % Butonal® NX 4190 to bitumen (= 3% polymer to bitumen)

Quantity requirement of the application on the surface: 5.4 – 8.2 kg/m²

All ASTM Type slurry seals may also contain cement.

Safety regulations
When handling this product, please comply with the advice and information given in the safety data sheet and observe protective and workplace hygiene measures adequate for handling chemicals.

Storage
Butonal® NX 4190 has a shelf life of six months from delivery date, provided it is stored in accordance with the “Handling and Storage of Polymer Dispersions” brochure. The container must be protected from frost and prolonged exposure to temperatures higher than 40°C. The optimal storage temperature corresponds to normal room temperature, approximately 18 to 21°C. Storage inside closed buildings is preferred in order to avoid larger temperature fluctuations. Further technical information regarding the storage of BASF polymer dispersion products is available upon request.

Package
- IBC 950kg/1,000l
- Drum 190kg/200l

Hazard classification
According to Regulation (EC) No.1272/2008 [CLP]
Skin Corr./Irrit. 2, Eye Dam./Irrit. 2, Aquatic Chronic 3
H319 Causes serious eye irritation. H315 Causes skin irritation. H412 Harmful to aquatic life with long lasting effects.

Hazard determining component(s) for labeling: ETHANOL, QUATERNARY AMMONIUM COMPOUNDS, SULFUR, ALCOHOL ETHOXYLATE

No specific dangers are known if the regulations/instructions for storage and handling are followed. If the product adheres to skin, irritation may occur when it dries.

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