

Polymer innovations for asphalt emulsions

Pavement preservation applications



The challenge

Increasing volumes of traffic and harsh climates necessitate durable, safer and more sustainable roads.

The challenges facing the road construction industry are to reduce the time and cost of maintenance, construction delays and traffic problems, and to advance occupational safety by minimizing the impact of emissions.

Consequently, the demand for modified asphalt is high, as it provides durable roads by delivering exceptional performance at low temperatures, excellent resistance to high temperatures, and easy mixing properties.

The mission

At BASF, we are committed to helping our customers create roads that are safer, long lasting, and more cost effective. We are proud to partner with the pavement industry to develop chemistry that meet the highest highway standards and preserves today's roads for tomorrow.

Polymer innovation is the driving force behind asphalt roads performing better and lasting longer. If you're in the country, city, or somewhere in between, pavement preservation with systematic scheduled maintenance programs are a must.

BASF polymers will help protect and extend pavement service life, promote safer road conditions, and help prevent structural failure.

BASF is the global leader in the supply of high solids styrene butadiene (SBR) polymer dispersions for all types of asphalt paving applications.

By providing consistent, high-quality products, customers can easily meet their binder and mix performance requirements.

(below) BASF plant producing latex for asphalt emulsions located in Chattanooga, TN



Global center of excellence for asphalt polymer and additives modification

At BASF, the Charlotte Technical Center (CTC) is a global center of excellence for asphalt latex polymer and additives modification. The CTC is the divisional headquarters for product and system research and development, and customer technical sales, service, and marketing support.

The CTC features technical customer service laboratories to provide a broad portfolio of services for asphalt emulsion and hot mix asphalt manufacturers, including:

- Formulation and production of unmodified and polymer-modified asphalt emulsions with a pilot mill
- Full performance testing of emulsion liquid and recovered residue properties
- Complete Superpave SHRP "Plus" hot mix asphalt binder testing
- Latex polymer evaluation for asphalt modification

Performance benefits of using polymer-modified asphalt emulsion

Polymer dispersions for asphalt modification are used to enhance the mechanical properties of pavements resulting in greater durability, increased driving comfort, reduced road maintenance costs, and less impact on the environment. Specifically, asphalt emulsions modified with BASF latex experiences improved binder properties, including:

- Improved low temperature properties
- Reduced rutting at high temperature
- Improved early adhesion and strength development

BASF offers high-performance BUTONAL® brand asphalt modifiers which set the industry standard and help customers meet and exceed agency specifications. Additionally, ACRONAL® technology is now recognized as a leading polymer modification for fog seals and reduced tracking bond coats.



Application of polymer-modified chip seal emulsion using BASF latex

Recommended polymers for pavement preservation applications

Pavement preservation includes a wide range of applications to protect engineered roads and extend service life. Whether you want high performing polymer-modified emulsions for micro surfacing, chip seal, fog seal, slurry applications, to make thin

overlays for maintenance, or want to improve strength and reduce tracking of bond coat emulsions, BASF technologies can help.

Application type	Recommended products	Key features of BASF polymer modification
Chip seals	BUTONAL NX 1129 (for anionic emulsions) BUTONAL NX 4190 (for cationic emulsions)	<ul style="list-style-type: none"> • Improves strength, ductility and flexibility to enhance chip retention • Enhances residue properties: elastic recovery, forced ductility, toughness and tenacity, torsional recovery, and softening point
Micro surfacing	BUTONAL NX 4190	<ul style="list-style-type: none"> • Enhances performance of micro surfacing to meet ISSA A-143 guidelines • Compatibility to cationic quick-set asphalt emulsion • Excellent cohesion and adhesion properties with aggregate • Enhances residue properties: elastic recovery, and softening point
Slurry seals	BUTONAL NX 1129 (for anionic emulsions) BUTONAL NX 4190 (for cationic emulsions)	<ul style="list-style-type: none"> • Enhances performance of slurry seals to meet ISSA A-115 guidelines • Compatibility to both slow-set and quick-set emulsifier systems • Excellent cohesion and adhesion properties with aggregate
Fog seals	ACRONAL NX 4627 X	<ul style="list-style-type: none"> • Improves durability of fog seals • Prevents raveling on pavements
Tack/bond coats	ACRONAL NX 4627 X	<ul style="list-style-type: none"> • Improves bond strength between old and new pavements • Reduces wheel tracking • Enhances flexibility and adhesive properties of tack/bond coat
Crack seals	BUTONAL NS 175 BUTONAL NS 198	<ul style="list-style-type: none"> • Improves flexibility in hot and cold climates • Increases softening point
Hot-mix asphalt (HMA)	BUTONAL NX 1129	<ul style="list-style-type: none"> • Improves asphalt binder to meet SHRP “Plus” specifications

About the Dispersions & Resins Business

The Dispersions & Resins division of BASF develops, produces and markets a range of high-quality resins, additives, colorants and polymer dispersions worldwide. These raw materials are used in formulations for a number of industries, including coatings, construction, adhesives, printing and packaging, nonwovens and composites, electronics, and paper. With its comprehensive product portfolio and its extensive knowledge of the industry, the Dispersions & Resins division offers its customers innovative and sustainable solutions and helps them advance their formulations. For further information about the Dispersions & Resins division, please visit www.basf.us/dpsolutions.

About BASF

BASF Corporation, headquartered in Florham Park, New Jersey, is the North American affiliate of BASF SE, Ludwigshafen, Germany. BASF has approximately 17,000 employees in North America and had sales of \$18.7 billion in 2020. For more information about BASF's North American operations, visit www.basf.com/us.

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. More than 110,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio is organized into six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. BASF generated sales of €59 billion in 2020. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the U.S. Further information at www.basf.com.

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