

Butaphalt® Cross-Linking Products

from

Asphalt Products, LLC

August 2015
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The following descriptions are to help make clear the differences between each product in the Butaphalt® Cross-Linking product line.

Advantages of Using the Butaphalt® Product Line:

The Butaphalt® PMA Cross-Linking product line will have a positive effect on all or some of the following depending upon related formula component selection;

- Defining Cross-Link Chemistry is Based Upon Phenolic Resins
- Improve Hot Storage Stability of PMA against Drift in Product Test Values
- Hold or Limit Drift of Product Test Values During Hot / Cold Cycling of Product Due to Seasonal or Weather Conditions
- Reduce or eliminate separation of Polymer (SBS) from the Asphalt Products, LLC
- Lower BBR Values in Performance Grade (PG) Testing
- Lower Phase Angle in Performance Grade (PG) Testing
- Increase or Hold DSR Values in Performance Grade (PG) Testing
- Resists Gelling During Critical Process Stages and in Hot Storage
- Generally Lowers Polymer Requirements to Those Formulas Not Using
- Butaphalt Improves Emulsion Viscosity to Residue Relationship – Higher Viscosity at Residue
- Has Been Shown to Increase Demulsibility in High Float Rapid Set Emulsions
- Lower Hydrogen Sulfide (H₂S) Generation Than Conventional Sulfur Systems

Definitions:

N = Number from 0 to 9

B-NNN = Powdered Product of Formula or Formula Number “NNN”

LXL-NNN = Liquid or Liquid Slurry Product of Formula Number “NNN”

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Product Descriptions:

B-NNN Series - Powder products in 2-lb or 4-lb melt bags. Most common purchase is 4-lb bags. Product delivered in Gaylord box of about 1,024-lb/box with cardboard liner between single flat layers of bags.

B-701 – This product is an extremely fast acting product based on the first product developed, B-720. See the description for B-720 for more information.

B-720 – First product developed and marketed. Its advantages are that it will reduce or eliminate SBS separation, may lower SBS requirements and help keep the BBR values as low as or lower than the starting AC values while holding or raising the DSR values. About 90% of the cross-linking reaction will take place within the first 4-hrs after addition to the digested PMA mixture. The balance of the reaction will take place during the next 18 to 24 hours after the Butaphalt addition.

B-975 – Product was introduced late in 2009. This is the first full year in the market place for B-975. This product has the same attributes as B-720 with the addition of slightly lower odor, easier dispersion into the PMA, limit or eliminate precipitant that sometimes occurs with B-720 in certain asphalts plus is more forgiving and versatile to a wider family of asphalt supplies or types.

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LXL-NNN Series - Liquid and or Liquid Slurry products in 330-gal (US) Plastic Returnable Chemical Totes having about 3,000-lbs (US) Product per Tote.

LXL-393 – Product was first developed to have very low to non-existent H₂S generation during the cross-linking process. LXL-393 has also been found to cross-link asphalt(s) that normally are sensitive to such cross-linking processes. It should be noted that LXL-391 has a broad application to various asphalt types. LXL-393 is also the slowest reacting of the current Butaphalt products but still achieves most (about 90% or more) of its reaction within the first 5 to 6 hours after addition to a PMA.

LXL-720 – This product is an oil dispersed form of B-720. Please see B-720 for more information.

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General Process Procedure for Making PMA by Butaphalt® Process

- Heat Formula Amount of Asphalt to 360°F - 380°F in Suitable Container with Stirring
- Add Formula Amount of SBS and Maintain both Temperature and Stirring
- Continue Stirring until SBS Digested in Asphalt
- Slowly Trickle Formula Amount of Butaphalt (B-NNN or LXL-NNN) Product into SBS/Asphalt Over 5 Minute Period
- Continue Mixing at Temperature for 4-hr Minimum to React Butaphalt into SBS/Asphalt
- Discontinue Mixing after 4-hr Butaphalt / SBS / Asphalt Mixing Time Minimum is Complete
- Store Butaphalt Cross-Linked Product in Sealed Container in Oven Overnight at about 325°F
- Perform Testing After Overnight Oven Storage

Table of Butaphalt® General Product Use Levels

<u>Series & Product No</u>	<u>Usage Range*</u>	<u>Typical Use Level*</u>
B-NNN Series		
B-701	0.08 – 0.15	0.10
B-720	0.08 – 0.15	0.10
B-975	0.08 – 0.15	0.10
LXL-NNN Series		
LXL-393	0.13 – 0.22	0.18
LXL-720	0.13 – 0.22	0.16

Dennis Krivohlavek

Butaphalt® Cross-Linking Agents - Asphalt Products, LLC

FedEx/UPS

25615 Briar Drive

Claremore, OK

74019-4512

US Mail

P. O. Box 549

Catoosa, OK

74015-0549

Electronic

f) 918-266-1285

e) cdkriv@aol.com

m) 918-740-7290