



Product Descriptions

A. Asphalt Performance Modifiers

Chemistries based on renewable resources or derived from natural gas chemistries, provide options to improve asphalt binder quality and performance including PG grade, APA, Overlay and MSCR results, reduce asphalt viscosity or compound viscosity in paving and roofing formulations, expand supply options, save energy by reduced application temperatures, reduce emissions and achieve more durable pavement or roofing products:

- BituTech RAP®
- BituTech WA1
- BituTech VPW
- ReLIXER™
- NuMIXER™
- ReNUBIT™
- PGXtend™
- PGXpand™

These materials offer the ability to change the Penetration and Softening Point relationship or PG grade of any asphalt or asphalt compound, and they provide the means to reduce the amount of conventional polymer that may normally be required, thereby reducing your costs.

A small addition of one of our GREEN and 100% renewable chemistries offers significant improvement in m-Value for those binders with high asphaltene content, and at nominal cost to the refiner, terminal or the contractor.

B. Warm-Mix and High RAP Additives

Chemistry based on renewable resources or developed within our proprietary family of compounds will save substantial energy and material costs in producing a new virgin mix or High RAP paving mix, significantly improve the handling and compaction characteristics of that mix and extend the pavement lay-down time with no adverse effects on compaction or voids:

- BituTech RAP®
- BituTech WA1
- BituTech VPW
- ReLIXER™
- NuMIXER™

As Warm-Mix additives, these unique chemistries allow processing temperature reductions of 50° F or more in the mix drum and reductions of 50° F or more in pavement lay-down, allowing for immediate rolling compaction rather than being delayed as the freshly laid pavement cools. Each of these additives will yield significant energy savings at the mix plant and substantial time savings at the construction site. Less emissions and therefore less noxious fumes are released at these lower temperatures, resulting in a better working environment.



Use of BituTech RAP®, ReLIXER™ or NuMIXER™ in Warm-mix paving formulations which also include RAP offers the dual benefit of achieving High RAP content and yielding full Warm-mix benefits with a single dose additive.

The proven rejuvenating power of BituTech RAP®, ReLIXER™ or NuMIXER™, all three based on 100% renewable chemistries, supports the use of high and ultra-high RAP/RAS in a pavement mix, renewing the PG of the aged binder as a true useful component in the mix. Many recycling operations use these additives to generate up to 100% RAP/RAS mixes for pothole patch, utility trench repair and private paving applications.

C. Enhanced Water-Foaming

Chemistry based on renewable resources, with flash point over 425°F, will generate a more manageable virgin mix and allow more effective use of RAP (Recycled Asphalt Pavement) or RAS (Recovered Asphalt Shingles) in highway paving formulations generated with use of water-foaming technology:

- BituTech RAP®
- ReLIXER™
- NuMIXER™

The #1 complaint with all water-foaming today is the rapid stiffening of the mix as it's hauled to the job site. If the contractor cannot place and roll the mix quickly enough, it doesn't compact effectively. Many contractors will tell you that foamed asphalt can be hauled only about 75 miles from the plant before it becomes difficult to lay and compact. Long-haul paving has not been possible with water-foaming warm-mix...until now.

Adding either of these unique chemistries to the binder at 0.5%-0.6%, prior to foaming, extends the half-life of the water foamed binder by 3.5 times, significantly extending hauling distance from the mix plant, improving compaction and laydown, and enabling early spring and late fall paving windows. The treated foamed binder consists of more stable and more consistent bubbles and results in substantially extended half-life of the untreated foamed binder and the resulting mix retains the proven rejuvenating benefits of these chemistries for improved performance.

D. Polymer Compatibilizers

Chemistries based on renewable resources or developed within our proprietary family of compounds, improve the affinity of the asphalt system for the polymers you choose to use, potentially reducing the total quantity of polymer required:

- BituTech RAP®
- ReLIXER™
- NuMIXER™

Use of BituTech RAP®, ReLIXER™ or NuMIXER™, allows the hot-mix contractor or roofing manufacturer an additional means to optimize the performance of the polymers in his Polymer Modified Asphalt (PMA) mix. When combined with SBS in a PMA mix, BituTech RAP®, ReLIXER™



or NuMIXER™, will enable more efficient conversion of PG64-22 base asphalt to PG70-28 or PG76-28 and also provide an effective conveying medium for use of our cross-linkers for further savings opportunities.

E. Pavement Performance Modifiers

Chemistry developed within our proprietary family of compounds provides the ability to extend the high PG temperature range of a given asphalt without need of high shear processing:

- BituTech WA1
- BituTech VPW
- PGXtend™
- PGXpand™

These chemistries enhance the stiffness modulus to improve the load bearing properties of the PG binder through improved adhesive strength. Once dispersed into the asphalt, it will not separate, even if the binder is cooled and reheated.

BituTech WA1 is a low-melt warm-mix additive that improves high temperature PG performance of the mix and at the same time, allows easier handling at lower lay-down temperatures. This is a special asphalt additive that has been specifically designed for high RAP and warm-mix applications. BituTech WA1 melts quickly and incorporates easily in a recycle mix of up to 100% RAP.

BituTech VPW is a higher melting warm-mix additive that improves high temperature PG performance of the mix and at the same time, allows easier handling at lower lay-down temperatures.

PGXtend™ is also a higher melting warm-mix additive that improves high temperature PG performance of the mix and at the same time, allows easier handling at lower lay-down temperatures.

When used at levels of 0.5% to 1.0%, in combination with conventional polymers such as SBS or SBR, BituTech WA1 or BituTech VPW will function as excellent dispersing aids, allowing the PMA plant operator to further optimize his polymer content.

PGXpand™ will increase high temperature PG performance with little to no change in low temperature performance, effectively expanding the UTI (Useful Temperature Interval) of your binder with a single dose additive.

F. Reduced-Odor Cross-linking Agents

Chemistries developed within our proprietary family of compounds include efficient and predictable asphalt cross-linkers that will improve effectiveness at lower costs than conventional sulfur-based cross-linkers and at far less risk than the use of raw sulfur:

- ReactiBOND
- ReactiLINK



- ReactiLINK XP

These products are faster acting, less corrosive, free-flowing powders that are more effective than competitive cross-linkers. These materials offer the option for reducing polymer usage and at less cost than alternative cross-linkers and enable PMA production in containment areas with ease.

Our 3rd generation ReactiLINK XP is an even more efficient asphalt cross-linker, yielding very rapid conversion, with reaction with PMA batches being complete in as little as 1 hour and with reduced sulfur emissions. When ReactiLINK XP is coupled with the use of the newer melt-type SBS, you will see very rapid and very predictable PMA reaction without the need of high shear, potentially a huge savings in capital investment.

The unique and proprietary chemistry of these cross-linkers will scavenge much of the hydrogen sulfide emissions which are characteristic of most sulfur and sulfur based cross-linkers.

The use of raw sulfur and sulfur based cross-linking typically results in a continuing increase in PMA cross-link density and change in modulus with post-reaction storage time. ReactiBOND, ReactiLINK or ReactiLINK XP are largely exhausted at the end of the cross-linking reaction such that any such ongoing post reaction and changes in PMA properties are minimized.

A clear advantage of these cross-linkers over raw sulfur and other sulfur cross-linking agents is the threshold for the PMA to form a gel is much higher. A gross error (magnitudes) in the quantity of our cross-linker is required for gel to form, thereby making it safer to process as well as minimizing risk of post reaction and gelatin in storage.

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