sasol
reaching new frontiers

SASOFLEX

1. What is SASOFLEX?

SASOFLEX is a unique combination of German and USA technologies that meet many of the Customers needs efficiently, effectively and economically in achieving target specifications for Polymer Modified Asphalts.

2. Why SASOFLEX?

In designing **SASOFLEX** the objective was to combine the desired effects of a Plastomer (stiffness) plus an Elastomer (flexibility) through a unique chemical linking mechanism that enables the asphalt formulator to work with ease to modify asphalts in a convenient manner and giving control over the PG range. **SASOFLEX** incorporates a chemical linking agent that effectively gets to work in the final modified asphalt blend in forming a unique chemical linkage of Polymer to asphalt and Plastomer to asphalt.

3. How does SASOFLEX work?

The Plastomer component of **SASOFLEX** (i.e. Sasobit) stiffens the asphalt and enhances the DSR or high temperature rutting resistance /high traffic loading performance whilst at the same time the Elastomer component of **SASOFLEX** (i.e. SBS) goes to work in maintaining flexibility at low temperatures. Since the actual mechanism is through a chemical linkage, lower quantities of Polymers are required produce the performance effect and with considerable ease and **without the need for high shear mixing**.
The fluorescent microscope slides provided below demonstrate he power of the **SASOFLEX** technology in producing finer chemically linked dispersions of a more consistent and reproducible quality.

4. Stretching the PG Box.

It is the aim of every asphalt formulator to be able to take the most economic source of asphalt and enhance the high temperature properties (DSR value) and comply with low temperature requirements (BBR/Direct Tension/Critical Cracking) in fulfilling PG targets. **Sasoflex** makes the achievement of this objective conveniently and facilitates the accommodation of other additives to target specific properties even in remote locations that do not have high-tech equipment.

5. The Power of the Combined Technology includes:

(a) Convenient to handle free flowing powder form.
(b) Ease of dispersion – does not require high shear mixer.
(c) Dispersion time is dramatically reduced from many hours (for SBS alone) to about 90 minutes.
(d) Since dispersion cycle times are minimized, Plant throughput is increased by a factor of at least 4 times coupled with significant labor and energy savings.
(e) Dispersion temperature is reduced by at least 50° F because of the lower viscosity i.e. lower equi-viscous temperature of SASOFLEX.
(f) This drop in temperature and shorter batch cycle times substantially reduces asphalt fume emissions.
(g) The viscosity of the modified asphalt is substantially reduced such that it may be easily handled and transported with consequent energy savings.
(h) The reduced viscosity of the modified asphalt means easier mixing with aggregate, more even aggregate coating, easier aggregate mix handling as well as easier paving at a temperature reduction of at least 50° F with consequent energy savings.
(i) The compaction resistance of the aggregate mix is reduced such that the target voids is achieved more easily with reduced compaction cycles.
(j) Reduction of aggregate mixing temperature also means reduced asphalt fume emissions and safer working conditions for the paving workforce.
(k) An anti-oxidant property is imparted to the binder and asphalt mix. Firstly, the double bonds in the asphalt and elastomer are broken chemically to form the chemical linkages so that the number of such bonds for attack by UV light are reduced. Secondly, the plastomer component shields the remaining double bonds from UV attack. Thirdly, the substantial reduction in mixing temperature means that the oxidation of the binder and aggregate mix is correspondingly reduced in the first instance (Note that for every 50°F above 210°F that asphalt is heated, the rate of oxidation is doubled).
(l) The reduction in the viscosity of the asphalt mix and reduction in compaction resistance means that the paving window is widened such that paving may be extended into early Fall and commence again earlier in Spring. This is an important benefit in completing urgent contracts in cold climates.
(m) The reduced viscosity of the binder coupled with the overall reduction in surface energy of the binder results in more effective coating of the aggregate and enhanced adhesive and cohesive strength thereby reducing need for anti-stripping agents.
(n) A stable modified asphalt blend is produced such that it is easy to handle, transport and use without the bother of phase separation and associated inconveniences.

6. Roofing Applications

Sasoflex is also recommended for roofing applications and has all of the benefits outlined above. The low viscosity improves workability substantially in both shingle and membrane applications and provides a higher capacity for fillers. Bleeding, deformation and high temperature wear is substantially reduced by the more effectively dispersed and cross-linked modifier system.

Since substantially higher polymer loading is employed in the Roofing Industry, SASOFLEX provides significant savings through more effective Polymer cross-linking and reduced overall levels to meet target specifications.

A key feature of the Sasoflex concept is that the ratio of Plastomer (Sasobit) to Elastomer (SBS or any Polymer) can be easily adjusted to give the desired properties of the final modified asphalt.

(A). UV MICROGRAPH OF ASPHALT SAMPLE MODIFIED WITHOUT SASOFLEX BUT MIXTURE OF 1% SASOBIT AND 2% SBS

The micrograph below is that of an asphalt sample modified with 1% Sasobit and 2% SBS without the Cross-Linking agent i.e. w**ithout SASOFLEX.**

The mixing temperature was 350°F for 90 minutes using a Silverson high shear mixer.

The yellow fluorescent spots clearly highlight the SBS double bonds that are still intact i.e. no mechanism present to break the bonds and promote cross-linking.

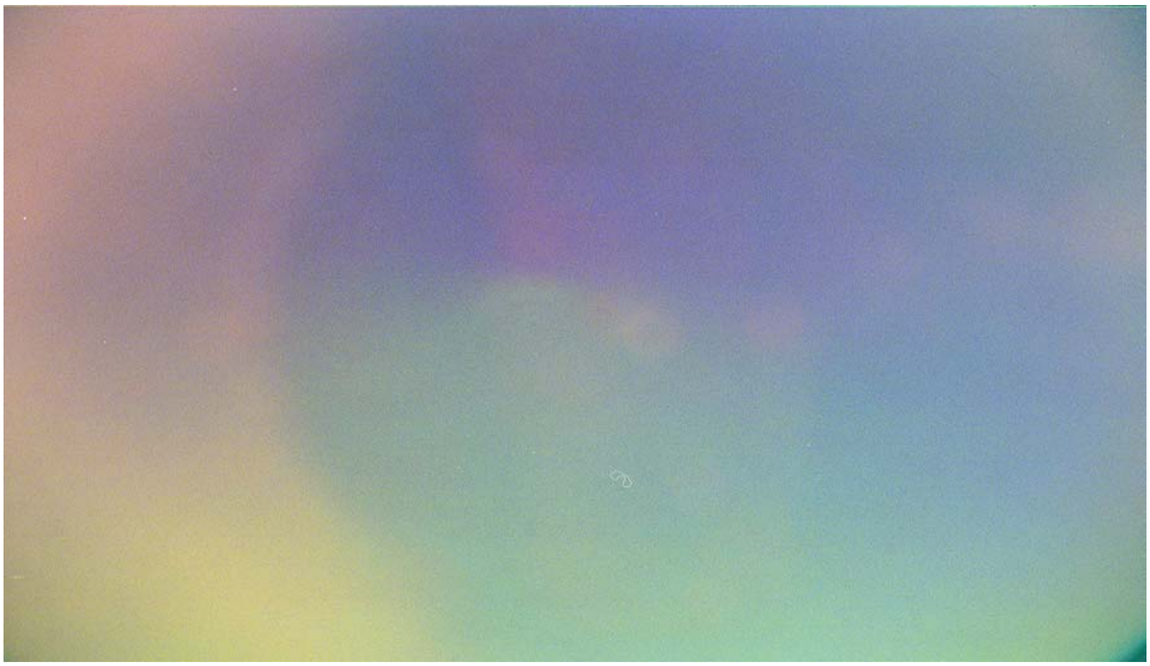
(B). UV MICROGRAPH OF ASPHALT SAMPLE MODIFIED WITH SASOFLEX

The micrograph below is that of an asphalt sample modified **with SASOFLEX** which is a one pack, free flowing easy to handle powder comprising 1% SASOBIT plus 2% SBS plus Cross-Linking Agent.

The mixing temperature was 350° F for 90 minutes using a Silverson high shear mixer to be comparative with the experiment without SASOFLEX.

However in practice, a high shear mixer is not necessary because of the unique easy dispersion of SASOFLEX in much shorter time usually necessary for Polymers.

The yellow fluorescent spots are no longer visible demonstrating that the double bonds on the SBS have been utilized to produce a complete network structure i.e. the SBS has been more effectively dispersed. In addition a second network structure is formed by the SASOBIT crystals at the asphalt performance temperature (e.g. 140° F) and below. This dual network structure is unique to SASOFLEX in contributing the high temperature and low temperature performance.



Prem Naidoo, Asphalt Additives Business Unit Manager.
Sasol Wax Americas, Inc.
Contact USA Office : Tel ++1.228.452.0009 ext. 103, Fax +1. 228.452.2201
Cell ++1.228.918.5577.
Email: prem.naidoo@sasolwax.us.com
Also reference group company at www.sasolwax.com

Jeremy A. Day, Technical Marketing Manager Asphalt Additives Business Unit.
Sasol Wax Americas, Inc.
Contact USA Office : Tel ++1.228.452.0009 ext. 104, Fax +1. 228.452.2201
Cell ++1.228.323.2582.
Email: jeremy.day@sasolwax.us.com
Also reference group company at www.sasolwax.com