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Polymer Modified Bitumen 86-22

Polymer modified bitumen (PMB) is one of the specially designed and engineered bitumen grades that are used in making pavement, roads for heavy duty traffic and home roofing solutions to withstand extreme weather conditions. PMB is a normal bitumen with the added polymer, which gives it extra strength, high cohesiveness and resistance to fatigue, stripping and deformations, making it a favorable material for infrastructure.

Pavements designed and constructed for heavy-duty traffic and extreme weather conditions require specially designed engineered Bitumen Grades. By changing the characteristics of normal bitumen with the addition of a polymer, either they are of elastomeric nature or elastomeric, we succeed to obtain bitumen that allows the mixture to be more cohesive, with much more strength and significant higher resistance to parameters like fatigue and permanent deformations for road pavements.

The polymer that is added is styrene butadiene styrene (SBS), which acts as a binder modification agent. The primary objective of SBS polymer modified bitumen is to provide extra life to pavement, roads and construction designs. With addition of either synthetic polymers or synthetic rubbers to various penetration or viscosity grades, results in a product, which allows the mixture to be more cohesive, having strength and significant higher resistance to parameters like fatigue and permanent deformations for road pavements. These bitumen binders are also found to be capable to seal cracks effectively, when applied over extensively cracked flexible or rigid pavement.

Polymer and Rubber modified binders are classified as per type of modifier as under:

Type	Modifiers	Examples
Synthetic Polymers	Plastomeric Thermoplastics	Polyethylene (PE), Ethylene Vinyl Acetate (EVA), Ethylene Butyl Acrylate (EBA) and Ethylene Ter Polymer (ETP), etc.
	Elastomeric Thermoplastics	Styrene Isoprene Styrene (SIS), Styrene-Butadiene Styrene (SBS) Block Copolymer, etc.
Synthetic Rubbers	Synthetic Rubber Latex	Styrene-Butadiene Rubber (SBR) latex and any other Suitable synthetic Rubber
Other Rubbers	Natural Rubber	Latex or Rubber Powder
	Crumb Rubber	Crumb Rubber Modifier

BUOYANCY® exports Polymer modified Bitumen as per EN 14023-2012, ASTM D5976-00, AASHTO M 320 and PG Grading System like PG 80-10, PG 74-10, PG 70-26, PG 70-28, etc. or SUPERPAVE™

Accredited: ISO9001:2015 | ISO 14001:2015 | ISO45001:2018

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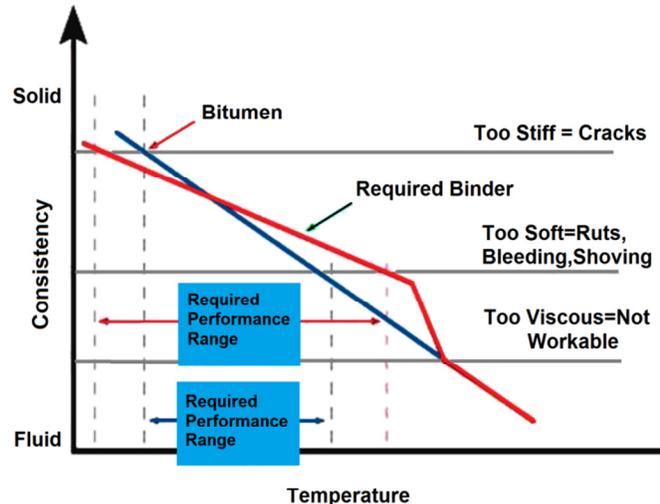
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Test Parameter	Results
Average 7 Day maximum pavement design temperature, °C	<82
Minimum pavement design temperature, °C	>22
Properties of the Original Binder	
Cleveland Open Cup Flash Point, °C(AASHTO T 48)	>230
Viscosity at 135°	<3.0
Dynamic Shear, G*/sin δ at 76°C AT 10 RAD/S,kPa(AASHTO T 315)	>1.0
Properties of the Residual Binder from Rolling Thin Film Over Test (AASHTO T240)	
Mass change, % weight (AASHTO T240)	<1.0
Dynamic Shear, G*/sin δ at 76 °C at 10rad/s,kPa(AASHTO T315)	>2.2
Properties of the Residual Binder from Pressure Aging Vessel (PAV) Test (AASHTO R29)	
Dynamic Shear, G*.sin δ at 28°C at 10rad/s,kPa(AASHTO T315)	<5000
Creep Stiffness at -12°C(AASHTO T 313)	
S value, MPa	<300
m Value (Slope)	>0.30

When a polymer is added to regular bitumen, it becomes more elastomeric, which provides it with additional elasticity. The polymer that is added is styrene butadiene styrene (SBS), which acts as a binder modification agent. The primary objective of SBS polymer modified bitumen is to provide extra life to pavement, roads and construction designs. Some of the qualities exhibited by PMB are

- 1) Higher rigidity
- 2) Increased resistance to deformation
- 3) Increased resistance to cracks and stripping
- 4) Better water resistance properties
- 5) High durability



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Advantage of using polymer modified bitumen

- 1) Stronger road with increased marshall stability value and greater Rigidity.
- 2) Better resistant towards rainwater and water stagnation.
- 3) No stripping and no potholes.
- 4) Better resistance to permanent deformation
- 5) Reduction in pores in aggregate and hence less rutting and raveling.
- 6) Much higher durability

Use as needed

While the benefits of using modified asphalts are widely acknowledged, not all asphalt mixes or treatments need to be modified. Each application should be evaluated to determine if the traffic loading, anticipated service life, environmental conditions and desired performance justify the use of modifiers. Modified asphalts can be a good investment.

In addition to the primary aims above, the range of properties improved include

- 1) Durability
- 2) Aggregate retention
- 3) Resistance to permanent deformation
- 4) Resistance to fatigue cracking
- 5) Cohesion (internal strength)
- 6) Elasticity
- 7) Viscosity less susceptible to temperature changes
- 8) Modification agents

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