

# STP - Polymer Modified Bitumen

*The properties of bitumen and bituminous mixtures can be modified by the incorporation of certain additives. These additives are known as modifiers and the bitumen treated with modifiers is known as modified bitumen. The use of modified bitumen is now a fairly established practice. It is covered under IS : 15462-2004.*

## Advantages

With a careful selection of modifiers, it is expected that the properties of bitumen and bituminous mixtures will get considerably improved. Life of periodical maintenance and overlays gets enhanced by about 1.5 times, resulting in reduced frequency of maintenance renewals. The choice thus will ultimately be based on the life-cycle costing of the construction using conventional bitumen and modified bitumen.

### The advantages of modified bitumen are:

- Lower susceptibility to temperature variations
- Higher resistance to deformation wear and tear
- Better adhesion between aggregates and binder
- Increase in fatigue life

### The bitumen modifiers/selected polymers should be:

- Compatible with bitumen
- Blended with bitumen so that they disperse thoroughly with bitumen prior to use
- Improve the temperature susceptibility of bitumen
- Resist degradation at bitumen mixing temperature

- Capable of being processed by conventional mixing plants and laying machinery
- Able to produce coating viscosity at application temperature
- Maintain premium properties during storage, application and in service
- Cost-effective considering life cycle cost

## Handling of STP-Polymer Modified Bitumen

During laying of various test stretches the experience has shown that a good circulation system is needed to ensure that modified bitumen retains its premium properties. Temperature of mixing and rolling should be slightly higher than conventional bituminous mixes. Requirement of temperature at different stages is given in table below:

**Table: Requirements of Temperature**

Stage	Temperature°C
Binder at mixing	170 - 180
Mix at plant	145 - 155
Mix at site	120 - 140
Rolling at site	110 - 135

The hot mix construction using modified bitumen should be done when atmospheric temperature is above 15°C.

## Requirements of STP-Polymer Modified Bitumen

Characteristics	Elastomeric Thermoplastic Based Grade & Requirement		Plastomeric Thermoplastic Based Grade & Requirement		Test Method
	PMB-40	PMB-70	PMB-40	PMB-70	
Penetration @25°C,0.1 mm, 100gm,5 secs	30-50	50-90	30-50	50-90	IS: 1203-1978
Softening Point,(R&B),°C,Min.	60	55	60	55	IS: 1205-1978
FRAASS Breaking Point°C,Min.	-12	-16	-12	16	IS: 9381-1978
Flash Point, by COC, °C,Min.	220	220	220	220	IS: 1209-1978
Elastic Recovery of Half Thread in Ductilometer @ 15°C,%, Min.	70	70	30	40	IS: 1208-1978/ IS: 15462:2004 Annex-A
Separation, Difference in Softening Point,R&B,°C,Min.	3	3	3	3	IS: 1203-1978/ IS: 15462:2004 Annex-B
Viscosity @ 150°C,Poise	3-9	2-6	3-9	2-6	IS: 1206-1978
<b>Thin Film Oven Test (TFOT) on Residue (IS 9382-1992)</b>					
Loss in Weight, %, Max.	1.0	1.0	1.0	1.0	IS: 9382-1982
Increase in Softening Point,°C, Max.	5	6	5	6	IS: 1205-1978
Reduction in Penetration of Residue@25°C, %, Max.	35	35	35	35	IS: 1203-1978
Elastic Recovery of Half Thread in Ductilometer @ 25°C,%,Max.	50	50	35	35	IS: 1208-1978/ ISC:SP:53:2002 Appendix-1

## SPECIFICATION: IRC:SP:53-2002

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	PMB-40	PMB-70	PMB-40	PMB-70	
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Softening Point,(R&B),°C,Min.	60	55	60	55	IS: 1205-1978
Fraass Breaking Point,°C,Min.	-12	-18	-12	-16	IS: 9381-1978
Flash Point. by COC,°C,Min.	220	220	220	220	IS: 1209-1978
Elastic Recovery of Half Thread in Ductilometer @ 15°C,%,Min.	75	75	50	50	IS: 1208-1978/ IRC:SP:53:2002, Appendix-1
Separation, Difference in Softening Point,R&B,°C,Min.	3	3	3	3	IS: 1203-1978/ IRC:SP:53:2002 Appendix-2
Viscosity @ 150°C,Poise	3-9	2-6	3-9	2-6	IS: 1206-1978
Ductility @27°C,Cn	50+	60+	30+	40+	IS: 1208-1978
Thin Film Oven Test (TFOT) on Residue (IS 9382-1992)					
Loss in Weight, %,Max.	1.0	1.0	1.0	1.0	IS: 9382-1982
Increase in Softening Point,° C, Max.	5	6	5	6	IS: 1205-1978
Reduction in Penetration of Residue@25°C,%, Max.	35	35	35	35	IS: 1203-1978
Elastic Recovery of Half Thread in Ductilometer @ 25°C,%,Max	50	50	35	35	IS: 1208-1978/ IRC:SP:53:2002, Appendix-1

## Blending of Modifier with Bitumen

Products based on modifiers like EVA, PE and Crumb Rubber can be easily blended with the molten bitumen at 140°C to 160°C using a suitable mechanical stirrer. The blending time is 20 to 40 minutes.

Natural rubber can be blended with bitumen at 140°C to 160°C, better equipped with paddle or sheet type stirrer. Blending usually is continued for a period of 2 hours.

SBS type modifiers are blended in shear type Stirrers: Bitumen is heated to a temperature of 160°C when the modifier is added. The stirring is continued for 90-120 minutes. The blending can be done in plant or in central plant or in the refinery.

## Specifications and Construction Methodology

The specifications and construction methodology for various items of work using modified bitumen are generally the same as that of ordinary bitumen, except for any special considerations which the manufacturer may indicate.

## Packaging

STP-Polymer Modified Bitumen is usually packed in 150 kg drums.

## OUR PRODUCT RANGE INCLUDES

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**STP Limited**

14-15 Farm Bhawan, 3rd Floor,  
Nehru Place, New Delhi - 110019  
Tel: 011 - 46561359 Fax: 011 - 46561358  
Email: waterproofing@stp ltd.com,  
Website: www.stpltd.com

### Regional Offices:

• Delhi Tel : 011-46561359 Fax : 011-46561358 • Kolkata Tel : 033-22821262  
Fax : 033-22826534 • Mumbai Tel : 022-28500136 Fax : 022-28500137  
• Chennai Tel : 044-26251637 Fax : 044-26253714

### Branch Offices:

**North:** • Lucknow Tel : 0522-4027084 Fax : 0522-2338688, • Ghaziabad Tel : 9310199980  
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Fax : 080-22121632 • Secunderabad Tel : 040-27905448 Fax : 040-27906397

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