

## TECHNICAL DATA SHEET

### NATURAL RUBBER MODIFIED BITUMEN, NRMB

#### DESCRIPTION

Modified Bitumen Introduced in Eighties to combat with common pavement distress. There are about 4 different specifications based on type of modifier used as per ASTM specifications for modified bitumen. Many Authorities advises for use of minimum 10% modified Bitumen.

NATURAL RUBBER BASED Type-C (NRMB 45, 50, 55) –PENETRATION BASED  
Latex or Rubber powder used.

#### Technical Data

S.NO	Characteristic	Requirement			ASTM Standards
		NRMB45	NRMB50	NRMB55	
1	Penetration at 25°C, 1/10mm, 100g, 5 sec	90-150	50-90	30-50	D 5
2	Softening Point, (R&B), °C, Min	45	50	55	D 36
3	Fraass Breaking Point # °C, Min	-20	-16	-12	-
4	Elastic Recovery at 15°C, %, Min	50	40	30	D 6084
5	Flash Point, COC, °C, Min	220	220	220	D 92
6	Separation, Difference in Softening Point, (R&B), °C, Max	3	3	3	-
7	Viscosity at 150°C, Poises	1-3	2-6	3-9	D 2170/D4402
8	Thin Film Oven Test & Tests on Residue				D 2872
8a	Loss in Mass, %, Max	1.0	1.0	1.0	D 6
8b	Reduction in Penetration of residue at 25°C, 100g, 5 s, %, Max	35	35	35	-
8c	Increase in Softening Point, °C, Max	7	6	5	-
8d	Elastic Recovery at 25°C, %, Min	35	25	20	D 6085

# Relevant to snow bound cold climate

#### Selection Criteria for Grades of Modified Bitumen

Lowest Mean Air Temperature °C	Highest Air Mean Temperature °C		
	Less than 20°C	20°C to 30°C	More than 30°C
More than -10°C	PMB / NRMB 55	PMB / NRMB 45	PMB / NRMB 50
	CRMB 50	CRMB 55	CRMB 60
-10°C or lower	PMB / NRMB 55	PMB / NRMB 120	PMB / NRMB 45
	CRMB 50	CRMB 50	CRMB 55

- PMB = Polymer Modified Bitumen, \* NRMB = Natural Rubber Modified Bitumen
- CRMB = Crumb Rubber Modified Bitumen

### Working Temperature Requirement for Modified Bitumen

STAGE OF WORK	INDICATED TEMPERATURE °C
BITUMEN AT MIXING TEMPERATURE	165 - 185
AGGREGATE AT MIXING	165 - 185
MIX AT MIXING PLANT	150 - 170
MIX AT LAYING	130 - 160
ROLLING AT LAYING SITE	115 - 145

### Guidelines for Storage of Modified Bitumen

Modified binder Temperature °C at point of Mixing	Holding Time at Mixing Temperature (max)	Medium storage Temp.°C	Safe Medium Storage Time Period
165-185	4 days	130-140	14 days

### Requirements of Mix Prepared with Modified Bitumen

S.No	Properties	Requirement		
		Hot Climate	Cold Climate	High Rainfall
1	Marshall Stability (75 blows) at 60°C, kN, Max	12	10	12
2	Marshall Flow at 60°C, mm	2.5-4.0	3.5-5.0	3.0-4.5
3	Marshall Quotient, kg/mm		250-500	
4	Voids in Compacted Mix, %		3.0-5.0	
5	Modified Binder Content by weight of mix-min*		5.4% - 5.6% 4.7% - 5.2% 4.3% - 4.7%	
6	Retained stability after 24 hrs. in water at 60°C %, min	90	95	100
7	Coating with aggregate, %	95	95	100

\*Corresponded to specific gravity of the aggregate being 2.7. In case Specific gravity more than 2.7, bitumen content can be reduced proportionately.

The bitumen content may be increased up to 0.5% in case highest Mean air temperature is 30 °C or lower & lowest Mean air temperature is -10 °C or lower.

### Packing

Steel drums