

ShaliMulsion A / C / P

Cold Applied Anionic / Cationic / Polymer Modified Bituminous Emulsions



Description

ShaliMulsion A / ShaliMulsion C / ShaliMulsion P are cold applied Anionic / Cationic / Polymer Modified Bituminous Emulsions, each having three ranges - Rapid Setting (RS), Medium Setting (MS) and Slow Setting (SS). ShaliMulsion is very effective for Cold Mix Asphalt (CMA) concrete.

ShaliMulsion A is an Anionic Emulsion, and is most effective in coating positively charged aggregates such as lime stone and marble and works best in warm and dry conditions. It also has application in soil stabilisation and patching road surfaces.

ShaliMulsion C is a Cationic Emulsion, and is more popular due to its ability to absorb on to a wider range of mineral aggregates than its Anionic counterpart. It results in better adhesion to mineral aggregates, sets readily on all but the most electro-positive aggregates and is effective for use in all weather conditions.

ShaliMulsion P is Polymer Modified Bituminous Emulsion which is being used to improve physical properties, performance and durability over normal **ShaliMulsion A/C**.

Rapid Setting (RS) grades are designed to react quickly with aggregate and revert from the emulsion state to bitumen. They are used primarily for tack coat application and in spray applications, such as aggregate (chip) seals, surface treatments, asphalt penetration macadam and grouting.

Medium Setting (MS) grades are designed for mixing with coarse aggregates and are ideal in premix. Since these grades do not break immediately upon contact with aggregate, MS grade used in aggregates remain workable for a few minutes. The MS grades have high viscosity to prevent runoff. This type of emulsion is highly recommended for surface dressing work.

Slow Setting (SS) grades are designed for maximum mixing stability. They are used with very high fine dense - grade aggregates. All slow - setting grades have low viscosity that can be further reduced by adding water. These blends can be diluted (up to 50%) for prior coats, fog seals, slurry surfacing and dust palliatives.

Characteristics

Characteristics of **ShaliMulsion A**, **ShaliMulsion C** and **ShaliMulsion P** for rapid setting, medium setting and slow setting are given in the Annexure 1, 2, 3 and 4 respectively attached herewith.

Application

- Surface dressing is, by far, the largest use of **ShaliMulsion**; the most important properties of **ShaliMulsion** being stability, viscosity, breaking and adhesiveness.
- **ShaliMulsion** is used as a tack coat / grouting, lean mix curing, patching, sealing of formations and sub bases.
- It is stable under storage and transport conditions and will break on application leading to the bitumen content adhering strongly to the road / patches and/or chippings.
- It has low viscosity for ease of handling and application.
- **ShaliMulsion** flows to minimise irregular spraying but would not flow due to road irregularities, cambers or gradients.
- Emulsifiers change surface dependent properties like rate of breaking and adhesiveness.

Advantages

- Eco / user friendly, pollution free and non-toxic and economical to use.
- Being cold applied, no necessity of special equipments like boiler, pre-mix plant, etc. Saves fuel and labour for heating and avoids fire hazard.
- Applicable during all weather conditions including rain but excluding frost and heavy downfall.
- Retains fluidity until the penetration in the aggregate mass is completed and, hence, no possibility of using excess bitumen, which weakens the binder.

Application Methodology

- **ShaliMulsion** is applied cold at ambient temperature. Two bitumen particles in a **ShaliMulsion** will coalesce if they come into contact. Contact is prevented by electric charge repulsion and the mechanical protection offered by the emulsifier. Any effect that overcomes these forces will induce flocculation and coalescence. Flow of the **ShaliMulsion**, caused by pumping, heating (convection currents) or transport is one such effect. Some emulsifiers have a tendency to foam, which is, itself, a potential cause of coalescence since bitumen particles in the thin film of a bubble are subjected to the forces of surface tension.
- Prior to application, surface should be cleaned of loose aggregates and dust. For better results, the surface should be slightly dampened with clean water immediately before application. Fluidity remains until penetration is completed and no additional material is required to ensure penetration.
- Brushes, sprayers and other tools used in applications, should be cleaned with water prior to, and after their use to avoid contamination/breaking of **ShaliMulsion** on them. No brushing over **ShaliMulsion** shall be done till it turned black. Workers should not be allowed to walk over uncovered area where **ShaliMulsion** has been applied till it breaks and forms a black surface.

Health & Safety

- Keep adequate ventilation during application of the mix. Avoid deep breathing of vapours and skin contact.
- Use of gum boots, gloves, goggles, and nose covers is recommended.
- The **ShaliMulsion** barrels should be rolled well on the ground and thereafter the contents must be mixed thoroughly with a rod before drawing the emulsion for use.
- The cover should be replaced properly after drawing emulsion from the drum.
- Brushes, Sprayers, etc. should be cleaned thoroughly with water before **ShaliMulsion** sets on them.
- No brushing over **ShaliMulsion** is to be done after it has turned black.
- If it rains before the **ShaliMulsion** has set, spread the aggregate and wait until the surface is dry before rolling and opening to traffic.
- On no account should workmen be allowed to walk over uncovered area where Bitumen Emulsion has been applied.
- Do not heat and do not use them under frosty weather or in case of heavy downfall.
- Do not open to traffic unless **ShaliMulsion** is broken and top surface has turned black.
- Never mix two types of **ShaliMulsion** as this will cause coagulation.

Packing

In tankers and 200 Kg HMHDPE / Mild Steel second-hand drums.

Storage

Keep container sealed and under cover at temperature between 5 °C to 35 °C. Protect from frost.

Characteristics of ShaliMulsion A

Specification : IS – 3117/2004

SL	Characteristics	Grades of Emulsions		
		Rapid Setting	Medium Setting	Slow Setting
01	Viscosity in SFS unit at 25 °C	20-100	20-100	20-100
02	Bitumen content % by mass, Min	65	65	57
03	Settlement in 5 days % by mass, Max	3	3	3
04	Demulsibility as per IS:3117/04	60	NA	NA
05	Coagulation in 2 hr in water	NA	NIL	NA
06	Modified miscibility in water difference in Bitumen content, Max	NA	NA	4.5
07	Cement Mixing test, %, Max	NA	NA	2
08	Coating ability and water resistance <ul style="list-style-type: none"> • Dry aggregate • After spraying • Wet Aggregate • After Spraying 		Good Fair Fair Fair	
09	Sieve Test, %, Max	0.10	0.10	0.50
10	Charge	Negative	Negative	Negative
11	Drying time set to touch hr at 21 °C, Minutes	15-20	35-45	NA

Characteristics of ShaliMulsion C

Specification : IS – 8887/2004

S.No	Characteristic	Grade of Emulsion				
		RS – 1	RS – 2	MS	SS -1	SS – 2
01	Residue on 600 micron, Sieve, percent by mass, Max	0.05	0.05	0.05	0.05	0.05
02	Viscosity by Saybolt Furol viscometer, seconds: • At 25 °C • At 50 °C	- 20-100	- 100-300	- 50-300	20-100 -	30-150 -
03	Coagulation of emulsion at low temp	Nil	Nil	Nil	Nil	Nil
04	Storage stability after 24 hr, %	2	1	1	2	2
05	Particle charge	+ ve	+ ve	+ ve	Weak +	+ ve
06	Coating ability and water resistance: • Coating, dry aggregate • Coating, after spraying • Coating, wet aggregate • Coating, after spraying	- - - -	- - - -	Good Fair Fair Fair	- - - -	- - - -
07	Stability to mixing with cement (percentage coagulation), Max	-	-	-	2	2
08	Miscibility with water	No	No	No	-	No
09	Tests on residue: • By evaporation, %, Min • Penetration at 25 °C, 100 grm, 5 sec. • Ductility 25 °C C/Cm, Min • Trichloroethylene Solubility, mass, Min	60 80-150 50 98	67 80-150 50 98	65 60-150 50 98	50 60-350 50 98	60 60-120 50 98
10	Distillation in percent, by volume at, • 190 °C • 225 °C • 260 °C • 315 °C	- - - -	- - - -	- - - -	20-55 30-75 40-90 60-100	- - - -
11	Water content, percent by mass, max	-	-	-	20	-

Characteristics of ShaliMulsion C

Specification : ASTM D 2397 - 02

SL	Property	Rapid Setting				Medium Setting				Slow Setting				Quick Setting	
		CRS 1		CRS 2		CSM 2		CMS 2h		CSS 1		CSS 1h		CQS 1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
01	Test on Emulsions:														
	Viscosity, Saybold Furoll @ 25 °C SFS									20	100	20	100	10	100
	Viscosity, Saybold Furoll @ 50 °C SFS	20	100	100	400	50	450	50	450						
	Storage stability test, 24 hr, %A		1		1		1		1		1		1		
02	Demulsibility, 35 mL, 0.8 % dioctyl Sodium Sulfosuccinate, %	40	40										
03	Coating ability and water resistance coating:														
	Dry aggregate					Good		Good							
	After spraying					Fair		Fair							
	Wet aggregate					Fair		Fair							
	After spraying					Fair		Fair							
04	Particle charge test	Posi tive		Posi tive		Posi tive		Posi tive		Posi tive		Posi tive		Posi tive	
05	Sieve test, %A		0.10		0.10		0.10		0.10		0.10		0.10		0.10
06	Cement mixing test, %								2.0		2.0		2.0		N/A
07	Distillation:														
	Oil distillate, by volume		3		3		12		12						
	Residue, %	60		65		65		65		57		57		57	
08	Test on residue from distillation test:														
	Penetration, 25 °C, 100 gm, 5s	100	250	100	250	100	250	40	90	100	250	40	90	40	90
	Ductility, 25 °C, 5 cm/min, cm	40		40		40		40		40		40		40	
	Solubility in trichloroethylent, %	97.5		97.5		97.5		97.5		97.5		97.5		97.5	

Characteristics of ShaliMulsion P

SI No.	Property	Unit	Testing Method	Rapid setting Specification.	Medium Setting Specification	Slow Setting Specification
1	Polarity of Particles		EN 1430	Positive	Positive	Positive
2	Value at Breaking		EN 13075-1	70 - 130	50 - 100	120 - 180
3	Content in Binder (from content in water)	% in mass	EN 1428	58 - 62	63 - 67	58 - 62
4	Content in recovered binder (By distillation)	% in mass	EN 1431	≥ 58	≥ 63	≥ 58
5	Content in fluidiser by distillation	% in mass	EN 1431	≤ 2.0	≤ 2.0	≤ 2.0
6	CreepTime , 2 mm at 40 °C	s	EN 12846	15 - 45	10 - 45	35 - 80
7	Sieving residue, 05mm sieve	% in mass	EN 1429	≤ 0.1	≤ 0.1	≤ 0.2
8	Tendency for Sedimentation	% in mass	EN 12847	≤ 10	≤ 10	≤ 10
9	Adhesiveness	% in mass	EN 13614	≥ 90	≥ 90	≥ 90
Method of Recovery by Evaporation (EN 13074)						
10	Penetration at 25 °C	0.1 mm	EN 1426	≤ 330	≤ 330	≤ 150
11	Softening Point	° C	EN 1427	≥ 35	≥ 35	≥ 43
12	Pendulum Testing Cohesion	J/ Cm ²	EN 13588	≥ 0.5	≥ 0.5	≥ 0.5
13	Elastic Recovery at 25 °C	%	EN 13398	≥ 30	≥ 30	≥ 30



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