

Modified Emulsions



Emulsions



Modified Emulsions are colloidal dispersions of globules of bitumen premodified with polymers within an aqueous phase or conventional bitumen emulsions modified with latex.

The residual binder used in the manufacture of modified bitumen emulsions has the same benefits as a Polymer-Modified Bitumen. In the case of modified conventional bitumen emulsions, the benefits are those provided by the latex.

These emulsions are suitable for use where there are heavy traffic and adverse weather conditions to guarantee an excellent bond between layers as well as improved cohesion with the aggregate.

With the demand for ever more ambitious products, Repsol responds by widening its range of modified emulsions to guarantee their behaviour in more demanding traffic routes.

/ APPLICATIONS

Surface treatments in roads with high ADT (Average Daily Traffic).

Application	Emulsion type
Tack coats	C60BP3 ADH
	C60BP3 ADH d
High-end tack coats	C69BP3 ADH d
Bitumen slurries and cold microsurfacing	C60BP4 MIC
	C60BP4 MIC b
	C65BP4 MIC d AP
Surface treatments using coats with gravel	C65BP2 TRG
	C65BP2 TRG d
	C69BP2 TRG
Open granulometry bitumen mixes	C67BPF3 MBA

Modified Emulsions behave very well in surface-coating treatments using high-quality gravel:

- High cohesion in very short times, even at low temperatures;
- Gravel losses are practically non-existent;
- The high cohesive power allows for higher macro-textures, very appropriate for applications where high roughness is required;

Furthermore, the greater cohesion obtained by using this type of emulsion allows for the manufacture of open-graded cold mixes with a high percentage of holes, high initial cohesion and high mechanical stability that allows them to withstand problems posed by heavy traffic without problems. These mixes are highly flexible and resistant to fatigue.

The use of modified emulsions for the application of cold microsurfacing and bitumen slurries is the most common, obtaining high-end layers for traffic.

/ PRODUCT CHARACTERISTICS

The following table shows the characteristics of Modified Emulsions:

UNE EN 13808 Denomination			C60BP3 ADH	C69BP3 ADH d	C60BP4 MIC	C65BP4 MIC d AP	C69BP2 TRG	C67BPF3 MBA
Previous denomination			ECR-1-m		ECL-2-m		ECR-3-m	ECM-m
Characteristics	UNE EN	Unit	Tests on original emulsion					
Polarity of the particles	1430	-	Positive					
Breaking Index (Forshamer filler)	13075-1	-	70-155 Class 3	70-155 Class 3	110-195 Class 4	110-195 Class 4	<110 Class 2	70-155 Class 3
Binder content (from content in water)	1428	%	58-62 Class 6	67-71 Class 9	58-62 Class 6	63-67 Class 7	67-71 Class 9	65-69 Class 8
Residual binder after distillation	1431	%	≥ 58 Class 6	≥ 67 Class 9	≥ 58 Class 6	≥ 63 Class 7	≥ 67 Class 9	≥ 65 Class 8
Content in fluidiser by distillation	1431	%	≤ 2 Class 2	≤ 2 Class 2	≤ 2 Class 2	≤ 2 Class 2	≤ 2 Class 2	≤ 10 Class 6
Creep time (2 mm, 40 °C)	12846-1	s	15-70 Class 3	5-70 ⁽⁴⁾ Class 5	15-70 Class 3	40-130 Class 4	5-70 ⁽⁴⁾ Class 5	5-70 ⁽⁴⁾ Class 5
Sieving residue (0.5 mm sieve)	1429	%	≤ 0.1 Class 2	≤ 0.1 Class 2	≤ 0.1 Class 2	≤ 0.5 Class 4	≤ 0.1 Class 2	≤ 0.1 Class 2
Sedimentation tendency (7d)	12847	%	≤ 10 Class 3	≤ 5 Class 2	≤ 10 Class 3	≤ 10 Class 3	≤ 5 Class 2	≤ 5 Class 2
Adhesiveness	13614	%	≥ 90 Class 3	≥ 90 Class 3	≥ 90 Class 3	≥ 90 Class 3	≥ 90 Class 3	≥ 90 Class 3
Recovered binder: by evaporation according to EN 13074-1								
Penetration at 25 °C	1426	0.1 mm	≤ 330 ⁽¹⁾ Class 7	≤ 150 Class 4	≤ 100 ⁽³⁾ Class 3	≤ 100 Class 3	≤ 330 Class 7	≤ 330 Class 7
Softening Point	1427	°C	≥ 35 ⁽¹⁾ Class 8	≥ 43 Class 6	≥ 50 ⁽³⁾ Class 4	≥ 50 Class 4	≥ 35 Class 8	≥ 35 Class 8
Cohesion by pendulum testing	13588	J/cm ²	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6
Elastic Recovery at 25 °C	13 398	%	DV Class 1	DV Class 1	DV Class 1	DV Class 1	DV Class 1	DV Class 1
Stabilised binder: by evaporation according to EN 13074-1, followed by stabilisation according to EN 13074-2								
Penetration at 25 °C	1426	0.1 mm	≤ 220 ⁽²⁾ Class 5	≤ 100 Class 3	≤ 100 Class 3	≤ 100 Class 3	≤ 220 Class 5	≤ 220 Class 5
Softening Point	1427	°C	≥ 43 ⁽²⁾ Class 6	≥ 50 Class 4	≥ 50 Class 4	≥ 50 Class 4	≥ 43 Class 6	≥ 39 Class 7
Cohesion by pendulum testing	13588	J/cm ²	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6	≥ 0.5 Class 6
Elastic Recovery at 25 °C	13398	%	DV Class 1	DV Class 1	DV Class 1	DV Class 1	DV Class 1	DV Class 1

[1] Emulsions manufactured with harder bitumens [Class 4 penetration (≤ 150 dmm) and class 6 Softening Point (≤ 43)] are accepted, to be used in warm areas or with heavy traffic.

[2] Emulsions manufactured with harder bitumens [Class 3 penetration (≤ 100 dmm) and class 4 Softening Point (≤ 50)] are accepted, to be used in warm areas or with heavy traffic.

[3] Emulsions manufactured with softer bitumens [Class 4 penetration (≤ 150 dmm) and class 6 Softening Point (≤ 43)] are accepted, for light traffic and/or temperate areas.

[4] 4 mm sieve time at 40 °C.

/ PRODUCT BEHAVIOUR IN THE MIX

Modified Emulsions manufactured by Repsol for asphalt road mixes have the following advantages over conventional emulsions:

- Greater cohesion (greater resistance to breakage under traction);
- Greater adhesiveness to aggregates;
- Improved resistance to ageing;
- Better performance at low temperatures;
- Wider range of plasticity (difference between ring-and-ball temperature and Fraass fragility temperature).

All of these characteristics significantly improve their behaviour during service.

