

Emulsions for Cooled Bituminous Mixes



Emulsions



Repsol has developed the **ECOTEMP** and **RECITEMP** ranges of emulsions specifically for the manufacture and use of cooled bituminous mixes.

The use of special emulsions in the manufacture of cooled bituminous mixes has enabled, in recent years, a reduction in temperatures that leads to a decrease in emissions, an increase in work safety and health and energy savings in the performance of this activity.

The **ECOTEMP** range responds to the need for:

- Good wettability of the aggregate at the manufacturing temperature;
- Low percentage of water in its composition;
- Possibility to handle the mix in the application area;
- Base binder with properties suitable to the end use of the mix.

The **RECITEMP** range combines the aforementioned benefits with the ability to reuse ground or demolished material from the same road. With these emulsions and an adequate mix manufacture, it is possible to **reuse 100 % of the deteriorated material** in the manufacture of the new mix.

/ APPLICATIONS

The ECOTEMP emulsions to be used in the manufacture of cooled bituminous mixes, both open and close graded, are the following:

Emulsion type	Applicatio	Mix type
C69BF3 MBA ECOTEMP	Cooled open-graded bituminous emulsions for road maintenance and construction	BBTM
		SMA
		PA
C67BP3 MBA ECOTEMP	Cooled open-graded bituminous emulsions for road maintenance and construction	BBTM
		SMA
		PA
C67B2 MBC ECOTEMP	Cooled close-graded bituminous emulsions for road maintenance and construction	AC
C67B2 MBC RECITEMP R50	Cooled close-graded bituminous emulsions for road maintenance and construction	AC
C67B2 MBC RECITEMP R100	Cooled close-graded bituminous emulsions for road maintenance and construction	AC

/ PRODUCT CHARACTERISTICS

The following table shows the characteristics of the ECOTEMP and RECITEMP emulsion ranges:

• ECOTEMP Range

UNE EN 13808 DENOMINATION			C69BF3 MBA ECOTEMP	C67BPF3 MBA ECOTEMP	C67B2 MBC ECOTEMP
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 Class 2
Binder content [from content in water]	1428	%	67-71 Class 9	65-69 Class 8	65-69 Class 8
Residual binder after distillation	1431	%	≥ 67 Class 9	≥ 65 Class 8	≥ 65 Class 8
Content in fluidiser by distillation	1431	%	≤ 8 Class 5	≤ 8 Class 5	≤ 2 Class 2
Creep time [4 mm, 40 °C]	12846-1	s	40-100 Class 6	5-70 Class 5	40-100 Class 6
Sieving residue [0.5 mm sieve]	1429	%	≤ 0.1 Class 2	≤ 0.1 Class 2	≤ 0.1 Class 2
Sedimentation tendency [7d]	12847	%	≤ 10 Class 3	≤ 10 Class 3	≤ 10 Class 3
Adhesiveness	13614	%	≥ 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	≤ 220 Class 5	≤ 150 Class 4	≤ 100 Class 3
Softening Point	1427	°C	≥ 39 Class 7	≥ 43 Class 6	≥ 43 Class 6
Cohesion by pendulum testing	13588	J/cm ₂	-	≥ 0.5 Class 6	-
Elastic Recovery at 25 °C	13398	%	-	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 Class 5	≤ 100 Class 3	≤ 100 Class 3
Softening Point	1427	°C	≥ 39 Class 7	≥ 50 Class 4	≥ 43 Class 6
Cohesion by pendulum testing	13588	J/cm ₂	-	≥ 0.5 Class 6	-
Elastic Recovery at 25 °C	13398	%	-	DV Class 1	-

• RECITEMP Range

UNE EN 13808 DENOMINATION			C67B2 RECITEMP R50	C65B3 RECITEMP R100
Characteristics	UNE EN	Unit	Tests on original emulsion	
Polarity of the particles	1430	-	Positive	
Breaking Index [Forshamer filler]	13075-1	-	< 110 Class 2	70-155 Class 3
Binder content [from content in water]	1428	%	65-69 Class 8	63-67 Class 7
Residual binder after distillation	1431	%	≥ 65 Class 8	≥ 63 Class 7
Content in fluidiser by distillation	1431	%	≤ 2 Class 2	≤ 2 Class 2
Creep time [2 mm, 40 °C]	12846-1	s	40-130 Class 4	15-70 Class 3
Sieving residue [0.5 mm sieve]	1429	%	≤ 0.1 Class 2	≤ 0.1 Class 2
Sedimentation tendency [7d]	12847	%	≤ 10 Class 3	≤ 10 Class 3
Adhesiveness	13614	%	≥ 90 Class 3	≥ 90 Class 3
Recovered binder: by evaporation according to EN 13074-1				
Penetration at 25 °C	1426	0.1 mm	≤ 100 Class 3	≤ 10 Class 3
Softening Point	1427	°C	≥ 35 Class 8	≥ 35 Class 8
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	DV Class 1	DV Class 1
Softening Point	1427	°C	DV Class 1	DV Class 1

/ BEHAVIOUR OF THE PRODUCT IN THE MIX

The emulsions in the ECOTEMP and RECITEMP ranges allow for the manufacturing of cooled mixes with mechanical performance behaviour similar to that of hot mixes.

It should also be noted that, thanks to the reduction in manufacturing temperature, the ageing of the bitumen is less pronounced, contributing to an increase in the durability of the mix. In addition to these advantages, from the point of view of the manufacture of the cooled bituminous mix, the fuel savings and ability to adapt the manufacturing plant to the use of these techniques should be noted.

It should also be noted that the RECITEMP range creates savings in the consumption of raw materials thanks to the reuse of road materials.