

Special Emulsion for Cold-Mix Recycling



Emulsions



The emulsion **C60B5 REC REJUV**, specially developed by Repsol for the **cold-mix recycling of aged surfaces**, is a super-stabilised emulsion, formulated with rejuvenating binders, that meets the General Technical Specifications for Roads and Bridge Works (PG-3) for type C60B7 REC emulsions. This product is specially designed for each project **and provides the components lost by the original bitumen on the road** as a result of its ageing, restoring its initial characteristics.

Repsol has extensive experience in the use of the special emulsion for cold-mix recycling with rejuvenating binders (C60B5 REC REJUV), **achieving excellent results** in its installation.

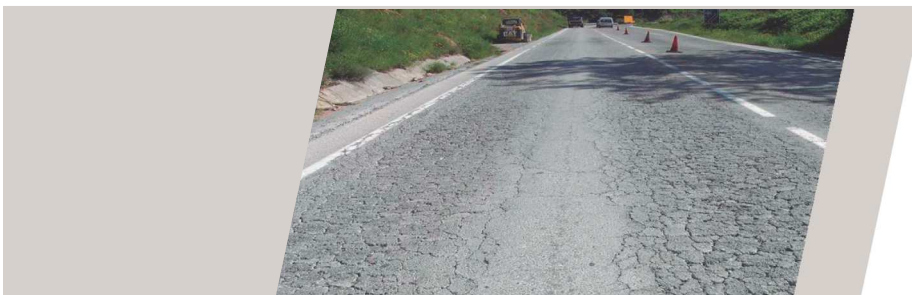
/ APPLICATIONS

The C60B5 REC REJUV emulsion is specifically designed for application in cold-mix recycling that requires high standards of quality.

The use of cold-mix recycling is recommended with REC REJUV C60B5 as a binder in the following situations:

- Cracked surfaces due to fatigue or reflection;
- Surfaces with separations due to ageing;
- Irregular road surfaces;
- When selective rehabilitation is needed (such as in lanes for heavy traffic).

On the basis of the problem to be treated, the technical team at Repsol designs the emulsion specifically, establishing the best formula for the emulsion in order to ensure the optimal design of the end mix.



/ PRODUCT CHARACTERISTICS

The following table shows the characteristics of the C60B5 REC REJUV emulsion:

UNE EN 13908 DENOMINATION			C60B5 REC REJUV
Characteristics	UNE EN	Unit	Tests on original emulsion
Polarity of the particles	1430	-	Positive
Breaking Index (Forshamer filler)	13075-1	-	> 170 Class 5
Binder content (from content in water)	1428	%	58-62 Class 6
Residual binder after distillation	1431	%	≥ 58 Class 6
Content in fluidiser by distillation	1431	%	≤ 2 Class 2
Creep time [2 mm, 40 °C]	12846-1	s	15-70 Class 3
Sieving residue [0.5 mm sieve]	1429	%	≤ 0.1 Class 2
Sedimentation tendency [7d]	12847	%	≤ 10 Class 3
Adhesiveness	13614	%	≥ 90 Class 3
Recovered binder: by evaporation according to EN 13074-1			
Penetration at 25 °C	1426	0.1 mm	≤ 330 Class 7
Softening Point	1427	°C	≥ 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	≤ 270 Class 6
Softening Point	1427	°C	≥ 35 Class 8

/ BEHAVIOUR OF PRODUCT IN THE MIX

The Repsol **C60B5 REC REJUV** emulsion gives the mix an excellent initial cohesion, allowing for fast opening to traffic with no need for a prime coat, which results in quick and efficient work organisation, reducing execution times.

To obtain the work formula, tests are carried out to evaluate the resistance of the recycled mix and the effect of water on it, following the NLT 161 and 162 Standards. Using these tests, the optimal emulsion content with rejuvenating agents to use in the mix is obtained. The following table shows the minimum values required in the immersion-compression test (art. 20 of PG-4):

HEAVY TRAFFIC CATEGORY	DRY [MPa]	AFTER IMMERSION [MPa]	R. MAINTAINED [R]
T1 (Only base layers) and T3 (1)	3	2.5	75
T3, T4 and hard	2.5	2	70

Minimum resistance values in the immersion-compression test (NLT-162). (1) Non-agricultural service roads for motorways and dual carriageways.

The points that should be given special attention in order for the technique to be successful are the following:

- Design of a custom emulsion according to the material to be treated and the development of an adequate working formula
- Careful installation and strict control of the evolution of the mix over time.

/ ADVANTAGES

The advantages of the on-site cold-mix recycling technique using emulsion for a road surface can be summarised as: the attainment of progressive mechanical resistance; improvement of fatigue behaviour; savings in processing [energy and resources]; and efficiency in execution.

Additionally, the use of the C60B5 REC REJUV emulsion provides:

- Fast opening to traffic facilitated by the excellent initial cohesion of the mix;
- Quick gains in stability, shortening wait times for the execution of the top layer;
- Improvements in traffic safety by preventing the detachment and spray of debris;
- It also makes the application of a sealing treatment unnecessary, it being recommended only for adverse weather conditions.