

Activated Bitumens



Special Binders



With certain types of aggregates, bitumens, both conventional and modified, can present adhesion problems due to a lack of physical-chemical affinity.

The use of quality fillers, such as lime or cement, can in some cases improve the behaviour of the mix towards water. Another solution is to add adhesive activators.

Repsol, aware of this problem, has developed a wide range of additives which, together with a selection of the most suitable bitumens, ensures reliable aggregate-binder behaviour in the mix

The activating additive is incorporated in the bitumen on the refining line, guaranteeing the complete standardisation of the final product.

/ APPLICATIONS

Activated bitumens are used for **manufacturing asphalt mixes that present a lack of adhesion between aggregate and binder**. Therefore, all applications are the same as those for asphalt bitumens and polymer modified bitumens.

/ PRODUCT CHARACTERISTICS

Activated bitumens present the following characteristics:

- They provide the necessary cohesion in hot bituminous mixes.
- Wide range of available aggregates.
- Reduction in the use of fillers, usually allowing the use of the recovery filler itself.

The following table shows the characteristics of the activated bitumens:

CHARACTERISTICS	UNE EN	UNIT	35/50 ACTIV	50/70 ACTIV	
Penetration at 25°C	1426	0,1 mm	35-50	50-70	
Softening point	1427	°C	50-58	46-54	
Durability-Resistance to ageing UNE EN 12607-1	Change of mass	12607-1	%	≤ 0,5	≤ 0,5
	Retained penetration	1426	%	≥ 53	≥ 50
	Increase in softening point	1427	°C	≤ 8 [sev 1] ≤ 11 [sev 2]	≤ 9 [sev 1] ≤ 11 [sev 2]
Penetration ratio	12591 13924 Anexo A	-	De -1,5 a +0,7	De -1,5 a +0,7	
Fraass breaking point	12593	°C	≤ -5	≤ -8	
Flash point in open cup	ISO 2592	°C	≥ 240	≥ 230	
Solubility	12592	%	≥ 99,0	≥ 99,0	

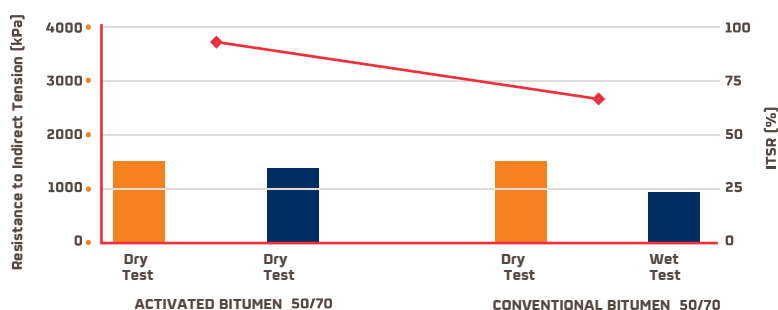
CHARACTERISTICS		UNE EN	UNIT	PMB 45/80-65 ACTIV
Tests on original bitumen				
Penetration at 25°C		1426	0,1 mm	45-80
Softening point		1427	°C	≥ 65
Cohesion. Strength-ductility		13589 13703	J/cm ²	≥ 3 a 5°C
Fraass breaking point		12593	°C	≤ -15
Elastic recovery a 25°C		13398	%	≥ 70
Stability in storage	Difference in softening point	13399	°C	≤ 5
	Difference in penetration point	1427	0,1 mm	≤ 9
		13399		
Flash point in open cup		ISO 2592	°C	≥ 235
Durability-Resistance to ageing EN 12607-1				
Change of mass		12607-1	%	≤ 1,0
Retained penetration		1426	%	≥ 60
Increase in softening point		1427	°C	≤ 10
Decrease in softening point		1427	°C	≤ 5

/ PRODUCT BEHAVIOUR IN THE MIX

The additives used are adhesion promoters that improve the chemical reaction between aggregate and bitumen, giving the mixes excellent cohesion, durability, reduced ageing and a greater ease in covering the binder on the surface of the aggregate.

The binder-aggregate adhesion is tested with the Water sensitivity test (UNE-EN 12697-12) in accordance with the A method, which is used in the Indirect Tensile Strength Test.

The figure below shows for the same type of aggregate, the results of this test, comparing a conventional bitumen with an activated bitumen.



Water sensitivity test results (UNE-EN 12697-12)
[AC22 G mix, with Porphyry Aggregate and 4.1 % of bitumen 50/70 s/a]

Guidance values, not contractual and not subject to specifications

Valores mínimos según normativa española:

- 80% para capas de base e intermedia
- 85% para capas de rodadura (incluso mezclas drenantes)
- 90% para capas de rodadura con mezclas discontinuas

This binder improves both **active adhesiveness** (ability of the binder to make contact with the aggregate) and **passive adhesiveness** (ability not to separate due to the effect of aggregate water and binder, once they come into contact).

