Repsol PERFORM and Repsol EFI-PERFORM

Repsol has a complete range of Repsol PERFORM and EFI-PERFORM polymer modified bitumens that meet CE Marking requirements, described in standard EN 14023 and included in Article 212 of the Spanish General Technical Specifications for Road and Bridge Works (PG-3), in addition to other specific products. Most of our modified bitumen products are produced using a self-developed chemical crosslinking system that provides a uniform structure that guarantees its properties and storage stability.

Modifier bitumen makes it possible to manufacture bituminous mixtures with greater mechanical and functional performance that allow bituminous mixtures for roads to be adapted to the increase in traffic and the greater demands stemming from it, which results in **greater durability** and **savings in maintenance costs**.

APPLICATIONS

The following table shows the main uses of the different types of Repsol PERFORM and EFI-PERFORM polymer modified bitumens to manufacture hot bituminous mixtures.

Repsol EFI-PERFORM PMB 10/40-70[1]	High modulus mixtures with better resistance to fatigue.
Repsol PERFORM PMB 25/55-65	Mixtures in the rolling course and intermediate layer in hot summer areas with T00 and T1[2] category traffic, resistant to plastic deformation on slow roads, improving resistance to fatigue in reinforcement and new construction.
Repsol PERFORM PMB 45/80-60	Asphalt Concrete mixtures for surface courses and intermediate layers for T1, T2 and T3 category traffic in all climate zones and T00 and T0 in mean and temperate climate zones, resistant to plastic deformation and with better fatigue properties. Asphalt concrete for very thin layers and porous asphalt for T1 and T2 traffic.
Repsol PERFORM PMB 45/80-65	Asphalt Concrete mixtures for T00 and T0 category traffic in all climate zones, including T1 for the hot summer zone, resistant to plastic deformation and better fatigue. Asphalt concrete for very thin layers and porous surface courses, including stone mastic asphalt (SMA) mixtures. Porous asphalt mixtures with a high percentage of air voids. Asphalt for Ultra Thin layer.
Repsol EFI-PERFORM PMB 45/80-75	Anti-fissure mixtures for surface courses. Anti-fissure mixtures for intermediate or thin layers. High-performance SMA and Asphalt concrete for very thin layers. High-performance porous asphalt. Asphalt for Ultra Thin layer.
Repsol PERFORM PMB 75/130-60	High quality surface course treatments. Reflective cracking prevention membranes.

(1) See specific data sheet for Repsol EFI-PERFORM PMB 10/40-70 BUS
(2) The traffic categories described correspond to the Spanish regulations.

All polymer modified bitumens have their version with tyre powder outside their useful life. And its version for low paving temperatures. See specific data sheet.

PRODUCT CHARACTERISTICS

All the bitumens modified with polymers REPSOL that Repsol sells meet CE Marking requirements according to the EN 14023 standard. The table below shows the characteristics of the most commonly used Repsol PERFORM and EFI-PERFORM polymer modified bitumens in Spain, reported in the Spanish General Technical Specifications for Road and Bridge Works (PG-3):

EN 14023 NAME				Repsol EFI-PERFORM PMB 10/ 40-70	Repsol PERFORM PMB 25/ 55-65	Repsol PERFORM PMB 45/ 80-60	Repsol PERFORM PMB 45/ 80-65	Repsol EFI-PERFORM PMB 45/ 80-75	Repsol PERFORM PMB 75/ 130-60
CHARACTERISTICS		EN STANDARD	UNIT	TESTS ON THE ORIGINAL BITUMEN					
Penetration at 25ºC		1426	0,1 mm	10-40	25-55	45-80	45-80	45-80	75-130
Softening point		1427	ºC	≥ 70	≥ 65	≥ 60	≥ 65	≥ 75	≥ 60
Cohesion. Force-ductility		13589	J/cm²	≥ 2 to 15ºC	≥ 2 to 10ºC	≥ 2 to 5ºC	≥ 3 to 5ºC	≥ 3 to 5ºC	≥ 1 to 5ºC
Fraass breaking point		12593	ºC	≤ -5	≤ -7	≤ -12	≤ -15	≤ -15	≤ -15
Elastic recovery at 25ºC		13398	%	TBR	≥ 50	≥ 50	≥ 70	≥ 80	≥ 60
Storage stability	Softening point difference	13399 1427	ºC	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
	Needle penetration difference	13399 1426	0,1 mm	≤ 9	≤ 9	≤ 9	≤ 9	≤ 13	≤ 13
Flash point		ISO 2592	ºC	≥ 235	≥ 235	≥ 235	≥ 235	≥ 235	≥ 220
DURABILITY-AGEING RESISTANCE, ACCORDING TO EN 12607-1									
Mass change		12607-1	%	≤ 0,8	≤ 0,8	≤ 1,0	≤ 1,0	≤ 1,0	≤ 1,0
Retained penetration		1426	%	≥ 60	≥ 60	≥ 60	≥ 60	≥ 60	≥ 60
Increased softening point		1427	ºC	≤ 8	≤ 8	≤ 10	≤ 10	≤ 10	≤ 10
Decreased the softening point		1427	ºC	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5

Specifications reported in Article 212 of the Spanish General Technical Specifications for Road and Bridge Works (PG-3).
To Be Reported (TBR).

The use of polymers significantly improves the properties of bitumens, particularly:

- Increased softening point.
- Lower temperature susceptibility.
- Increased penetration index.
- Increased plasticity range.
- Increased viscosity.
- Greater ductility.
- Better performance at low temperatures.
- Higher resistance to ageing.

RECOMMENDATIONS FOR USE

Due to their rheological behaviour and configuration, the recommendations for use for Repsol PAVE conventional bitumens cannot be applied to Repsol PERFORM and EFI-PERFORM polymer modified bitumens.

Repsol's Technical Support and Development Department can advise customers on the best conditions of use in each case.

PRODUCT BEHAVIOUR IN THE MIXTURE

Repsol PERFORM and EFI-PERFORM polymer modified bitumens greatly improve the performance of bituminous mixtures:

- Greater cohesion and ductility, allowing for more critical particle size structures of bituminous mixtures.
- Greater resistance to fatigue, reducing the risk of cracking.
- Greater resistance to ageing in the most adverse conditions (greater service durability).
- Greater adhesion to aggregates.
- Increased service temperature range.
- Greater resistance to plastic deformations (wheel track).