

Special Bitumens for Recycling



Special binders



The special bitumens for recycling developed by Repsol are custom-made binders that provide the components that have been lost in the bitumen as a consequence of its ageing, returning it its original characteristics and properties (physical and chemical).

Existing social concern around environmental issues and the exploitation of natural resources has made it an ever more necessary priority to recycle paving materials.

The preliminary study of the surface to be recycled, carried out at the Repsol Technology Centre (RTC) by our researchers, is fundamental for the ad hoc formulation and manufacture of the product.

/ APPLICATIONS

The rejuvenating binder is used to manufacture recycled hot mixes, in both continuous and discontinuous installations, and preferably with high and medium RAP rates of use.

/ PRODUCT CHARACTERISTICS

Bitumen consists of numerous types of hydrocarbons that can be grouped into four groups of components: saturates, aromatics, resins and asphaltenes. To maintain its physical and chemical structure, it is important that each of these groups is present in very specific relationships, which will ensure good behaviour on the road. The rejuvenated bitumen is therefore especially designed to provide those fractions that the aged bitumen has lost, regenerating and restoring its original features.

CHARACTERISTICS	TYPICAL VALUE
CRR [Durability]	0,4 - 1,0
C [Compatibility]	> 0,5
CI [Colloidal Instability]	< 1

Table 1 Adequate ranges for the CRR CI and C indices. Indicative data, not contractual and not subject to specifications.

The composition of rejuvenating bitumens must be adjusted so that the required values simultaneously achieve the required values for levels that provide an approximate idea of the possibilities of the bitumen regarding its durability (stability of the bitumen against oxidation), colloidal stability, etc. These levels are:

- Chemical Reactivity Relationship (CRR) indicating the influence of maltha in the stability of the bitumen against oxidation (durability parameter).
- Compatibility (C) that relates the nitrogenised components of the maltha with the saturated hydrocarbons or paraffin.
- Colloidal Instability (CI) that relates the solid components present in the system (asphaltenes and paraffins) with the dispersant liquid components.

The composition of bitumen with rejuvenators is determined by two factors:

- Working formula for the mix to recompose, which is influenced by the recycling rate and physical characteristics (penetration, softening point, etc) of the recovered binder.
- The components (lost fractions) to provide to the aged binder to give it the ideal characteristics.

/ PRODUCT BEHAVIOUR IN THE MIX

The adequate design of the special bitumen for recycling must simultaneously fulfil the following premises:

- Restore the optimum composition of the aged bitumen to maintain the durability of the mix.
- Bring the aged bitumen to an adequate consistency (penetration).
- Provide the adequate binder content to the mix.

Repsol offers its Technical Support and Development Department that can offer advice regarding the best possible conditions of use.

