

# **THERMORHEOLOGICAL PROPERTIES OF BITUMENS MODIFIED BY THIOUREA-BASED COMPOUNDS**

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Today, with the increase of construction and the environmental awareness, the use of recycled pavements has become more and more important. Unfortunately during service in field, road bitumen properties undergo an important worsening, so that it cannot be used in new asphalt mixtures. Aiming to reverse the chemical changes induced on the binder by the in-service ageing, recently, physical rejuvenating agents have been proposed to be added during the recycling process, most of them only acting as diluents of the aged bitumen fractions. By contrast, this work studies the use thiourea-based compounds, as new chemical agents able to react with those bitumen fractions responsible for ageing. Rheological measurements, thermo-gravimetric and calorimetric tests and chemical characterization performed on bituminous samples showed the evidence of chemical changes due to rejuvenator addition. Such changes initially took place during the binder high temperature mixing (processing) and continued during its storage under ambient conditions. Thermo-gravimetric and TLF-FID analysis demonstrated the formation of new chemical compounds by reaction with the most polar bitumen molecules. As a result, an improvement in the high in-service temperature material performance was found, i.e. viscous and elastic properties were enhanced and binder thermal susceptibility was reduced. In addition, low in-service temperature flexibility is also improved, leading to a lower binder glass transition temperature, determined by both dynamic bending tests and differential scanning calorimetry.