

Influence copolymers of ethylene with vinyl acetate on the physicochemical properties of Bitumen

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Abstract

The results of experiments are presented concerning the modification of road bitumen by ethylene copolymer with vinyl acetate (EVA). This polymeric additive make a strong structure-forming influence on bitumen. At that the penetration value changes most rapidly at 25 °C. The higher the concentration of copolymer and the content of the ester groups in it, the less the penetration depth of the binder needle. The introduction of excess amount of copolymers with vinyl acetate groups develops a spatial structure conjugated with asphaltene associates, and providing the stability of all bitumen heterogeneous system. The reduction of elongation and brittleness temperature is revealed at the introduction of low molecular EVA, which allows to obtain the binders with improved low temperature properties. The most intensive change of properties is achieved by the introduction of EVA into bitumen with the molecular weight of 25,000, which is manifested in softening temperature increase with brittleness temperature reduction, and the extension of plasticity range by 8-20 °C. At the same time the introduction of granulated EVA into bitumen with high molecular weight leads to a significant increase of softening and brittleness temperature and ductility interval decrease. The study results showed that the bituminous compositions modified by EVA with a high content of vinyl acetate groups are somewhat inferior to the softening temperature and the extensibility of the compositions, modified by EVA with a low content of ester groups, because of the greater initial plasticity of the copolymer in the second case.

Keywords

Ethylene-vinyl acetate copolymer, Road bitumen modifiers