



MacRebur Ltd

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Technical Data

Leaching of MR modified asphalt

Importance

Asphalt is used in the construction of road, airport and port pavements, as well as for periodic resurfacing and maintenance activities. It is also exposed to the environment, including flooding and rainfall events.

Rain and flood water that contacts the asphalt layers in pavement structures usually then enters drainage systems, waterways and eventually the ocean. Therefore, any hazardous organic chemicals that leach out of the asphalt materials have the potential to find their way into waterways and cause harm to aquatic life.

Recycled plastic has the potential to add to hazardous organic chemical leachate from asphalt materials in pavements, adversely impacting the environment. Consequently, ensuring MR products do not add to asphalt leachate is essential.

Method of Evaluation

There are no established test methods for measuring the chemical leachate from asphalt samples. Consequently, a specialist and independent laboratory was appointed to develop a test method and to perform comparative tests on unmodified bitumen and on bitumen with 6% MR 6 and 6% MR 10 recycled plastic products.

The testing was conducted in two phases. The first phase included placing samples of bituminous binder in water to allow organic chemicals to leach out. The second phase included comparative - mass spectrometry analysis of gas chromatography of the water extracts. Samples included a

control of unmodified (50-70) bitumen, as well as the same bitumen modified with MR 6 and MR 10.

For the first phase, duplicate samples, nominally 2.5 grams each, of binder were immersed in nominally 50 grams of deionised water and incubated at 40°C for 18 hours. The binder samples were removed and the water was cold-evaporated under nitrogen and the residual was then redissolved in nominally 5 ml of high grade ethanol. The ethanol-residue samples were then tested using liquid injection GCMA in the second phase of the analysis.

During the second phase, the water extract samples were conditioned to 30°C for 10 minutes before being heated up to 350°C at a rate of 10°C per minute. The samples were held at 350°C for 30 minutes. During the second phase, the organic leachate contained in the ethanol-water extract was directly injected into a Gas Chromatograph and subjected to mass spectrometry in order to assess for the presence of leached organic chemicals.

Chromatograms (graphs of counts of different volatile chemicals) were generated and compared for the MR modified binder and the unmodified binder.

Effect of MacRebur

Based on the findings of the independent laboratory, it was concluded (Under specific laboratory conditions) that the use of MR modified binder in asphalt mixtures did not leach any GCMS detectable organic chemicals. This proved to be similar to the experiment involving other conventional binders such as 50-70 bitumen.



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