



## MacRebur Ltd

Unit 3, Broomhouses Industrial Estate,  
Lockerbie, DG11 2RZ  
Telephone: +44 (0)1576 204 318  
Email: info@macrebur.com

[www.macrebur.com](http://www.macrebur.com)

## Technical Data

### Effect of MR on Asphalt Fumes

#### Importance

Asphalt is typically produced and paved at 140-180°C and compaction rolling then occurs at around 80-120°C.

Fumes from asphalt production and paving can contain harmful chemicals. Minimising the exposure of asphalt workers to fumes can only improve their comfort and safety.

Similarly, when asphalt production and paving occurs in urban environments, minimising fume generation is also important for the public.

Recycled plastic has the potential to add to fume generation and to create a 'burning plastic' smell, which is also a fume-based annoyance. Consequently, ensuring MR products do not add to the fumes generated during asphalt production and paving is essential.

#### Method of Evaluation

There are no established test methods for measuring the fumes generated by asphalt production and paving. 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, MR 8 and MR 10 recycled plastic products.

The testing included thermal desorption gas chromatography mass spectrometry analysis to identify volatile organic chemicals, from nominally 1 g bitumen samples produced with and without 6% MR, generated at different temperatures.

To reflect the full range of asphalt production, paving and rolling temperatures, desorption (fuming) was repeated at 100°C (rolling), 150°C (paving), 180°C (production) and

200°C (over heated production). Each temperature was maintained for 30 minutes.

Chromatograms (graphs of counts of different volatile organic chemicals) were compared to determine toxic fume generation during asphalt production and paving, with MR modified asphalt and with unmodified asphalt.

#### Effect of MacRebur

The independent laboratory concluded that:

- The sample of bitumen and the three MR products generated similar (but not identical) volatile organic chemicals during thermal desorption (heating).
- The majority of the volatiles identified in both MR products and bituminous were aliphatic, cyclic and aromatic hydrocarbons - which are usually associated with bituminous materials.
- Cyclic siloxanes were also identified in bitumen and MR samples, likely associated with harmless silicon oil.
- Toluene and benzene (which can cause harm) were found in unmodified bitumen – it would therefore appear that the bitumen itself was the source of these two chemicals and they are not directly attributable to the MR materials.
- The risk to human health is not greater for MR products than that for unmodified bitumen.

Based on the findings of the independent laboratory, it was concluded that the use of MR modified asphalt mixtures at normal asphalt production, paving and rolling temperatures (100-200°C) would unlikely generate toxic fumes that are not covered by normal asphalt safety data involving 100-150 bitumen.



**MacRebur Ltd**

Unit 3, Broomhouses Industrial Estate,  
Lockerbie, DG11 2RZ  
Telephone: +44 (0)1576 204 318  
Email: [info@macrebur.com](mailto:info@macrebur.com)

**[www.macrebur.com](http://www.macrebur.com)**