

Cost Effective VOC Abatement for an Automotive Manufacturer

Odour Assessment

Mayflower Vehicle Systems designs, engineers and manufacturers large scale assemblies and bodies-in-white. Their Coventry facility offers a full service capability from design to manufacture for low and medium volume vehicles. With a reputation for sophisticated prototype tooling and testing systems, and an ability to add value at all stages, they work for some of the most prestigious names in the industry including Aston Martin, Jaguar and MG. Mayflower Vehicle Systems' environmental management team began to look for a VOC abatement technology that would ensure they met



Spray Booth

their environmental obligations. They needed to treat VOCs emitted from two paint spray booths where the top coat is applied to vehicle body components. Bord na Móna were invited to provide a rapid and economically viable solution.

Abatement of Volatile Organic Compounds (VOCs) using a biofilter has significantly reduced treatment costs for a leading automotive manufacturer. Mayflower Vehicle Systems assessed abatement technologies against Best Available Techniques (BAT) criteria under the new Integrated Pollution And Prevention Control Regulations. Reduced environmental impact and significantly lower running costs over the life of the technology contributed to Mayflower Vehicle Systems' decision to install a biofilter to treat their VOC emissions.

Bord na Móna's specialists were able to provide a comprehensive range of services from odour monitoring and VOC assessment through to odour and VOC abatement systems on a turnkey basis. Bord na Móna worked with Mayflower Vehicle Systems to provide BAT options and installed a pilot plant biofilter to assess biofiltration as an appropriate technology for their application. The full scale biofilter was installed during the summer production shut down.



Technology

Bord na Móna's technical experts met with managers at Mayflower Vehicle Systems to discuss treatment options and assess the benefits of catalytic oxidation, biofiltration and regenerative thermal oxidation. Biofiltration offered the most cost effective option with low capital and running costs. A biological single stage system operating at ambient temperature was recommended. This offered effective VOC abatement at the low concentrations being emitted from the spray booths together with the ability to eliminate any associated odours. Following the success of the

pilot plant demonstration, Bord na Móna installed a biofilter to treat 17,200m³/h VOC laden air from the two paint spray booths. Positioning of the Bord na Móna Biofilter within the factory was addressed and site plans studied so the biofilter could take power and water from local site services. Treated air is delivered to a discrete stack in the original location on the roof of the building. The biofilter is built from corrosion resistant Glass Reinforced Plastic (GRP) and fully enclosed to prevent any carry over for the irrigation system. It is filled with a patented biological media supported on a raised

plenum floor to ensure uniform air flow across the media bed. Operating in a down flow configuration air is drawn across the bed by a robust duty fan supported by a standby fan. Drawing the air through the filter ensures that in the unlikely event of a leak no odourous compounds are emitted from the biofilter. Excess air would simply be pulled into the biofilter at the point of the leak.

The biofilter is irrigated by an intermittent recirculation water system. This keeps bacteria supported on the media at optimum performance conditions. The media is self supporting to a depth of 3m and

creates a low back pressure, ensuring that flow through the biofilter is optimised. The biofilter is 15m long 3.7m wide and 3.7m high, making it a highly impressive unit. A four year media replacement guarantee and a

performance guarantee that delivers a maximum VOC exhaust concentration of 25mg C/m³ from a maximum inlet concentration of 94 mg/m³ brings Mayflower Vehicle Systems complete peace of mind.



MÓNASHELL Biofilter

Pilot Plant

To demonstrate the effectiveness of biofiltration at treating the VOCs from the spray booths a pilot plant was commissioned. A unit 1.5m wide and 3m high was connected to temporary ductwork and an irrigation system attached to provide water at 1.5 bar g.

The pilot plant contained 1.3 m³ of media and was inoculated with bacteria and run for three weeks to establish optimum

performance. A five week trial followed with air samples being abstracted for analysis. Following inoculation of the biofilter, Bord na Móna analysed the VOC compounds entering and exiting the biofilter. Tests were conducted in accordance with ASTM standard methodology.

VOCs were identified and their concentrations measured by GC mass spectrometry. The pilot plant successfully treated VOCs and formaldehyde

from the primers and thinners in the gases from the spray booths. The biofilter demonstrated its ability to reduce VOC concentration from the inlet to the outlet of the biofilter by significantly higher concentrations than the standard required by the plant.



Pilot Plant

Client Comments

"Bord na Móna offered to demonstrate the technology using a pilot plant. It ran for two months very successfully so we ordered a biofilter. Initially we had a few teething problems and Bord na Móna were excellent in solving them and standing by their performance promises."



Peter Redhead
Facilities Engineer

"Mayflower Vehicle Systems take great care to protect the environment. We are proud to be one of the first companies in our sector to achieve ISO14001. Our approach to treating VOCs from the top coat of our painting process needed to be effective and sustainable. Our other paints and primers are aqueous based so we originally investigated use of other aqueous based paint materials for the top coat but this was not a viable solution.

We embarked on a programme to assess available abatement technologies. Originally we believed incineration was the most appropriate technology and we explored this option with Bord na Móna. However, it was clear that catalytic oxidation not only had high capital costs but its environmental impact in terms of energy efficiency precluded it as BAT in this application. Bord na Móna presented biofiltration as another technology in their portfolio worth considering. The environmental impact

was low, performance guarantees were presented and the running costs were favourable.

Over the lifetime of the unit this technology looked sustainable. However, we were sceptical. We visited a similar plant in Wales and talked with our local environmental health officer. She seemed quite enthusiastic about the technology and on paper the running costs were very low in comparison to incineration.

Bord na Móna offered to demonstrate the technology using a pilot plant. It ran for two months very successfully so we ordered a biofilter. Initially we had a few teething problems and Bord na Móna were excellent in solving them and standing by their performance promises. We had their full support.

Bord na Móna's training programme was comprehensive and we know we can rely on their support. We were particularly impressed by the speed with which the

technology was installed and commissioned. I doubt we would have installed an incinerator in this time scale. Looking at whole life costs, without considering increases in gas prices, biofiltration not only provided us with BAT, it was also very cost effective. Other companies should consider this technology seriously for VOC abatement."

Contact us for more details or visit our website on www.bnm.ie/environmental

Ireland
Bord na Móna
Environmental Ltd.,
Main Street,
Newbridge,
Co. Kildare,
Ireland.
Tel: 00 353 (0)45 431 201
Fax: 00 353 (0)45 432 312
Email: cleanairsolutions@bnm.ie

UK
Bord na Móna Environmental
Products UK Ltd.,
4 Harbour Buildings,
Waterfront West,
Dudley Road, Brierley Hill,
West Midlands DY5 1LN,
England
Tel: 0044 (0)1384 486 978
Fax: 0044 (0)1384 486 979
Email: enquiriesuk@bnm.ie

France
Bord na Móna
Environmental France SA,
90 Avenue Lanessian,
69410 Champagne au Mont d'Or,
France.
Tel: 00 33 (0)4 37 49 13 69
Fax: 00 33 (0)4 37 49 13 38
Email: contact@bordnamona.fr

Italy
Air Clean S.R.L.,
Via Trento, 37
20017 RHO (Milano)
Italy
Tel: 0039 (0)2 9311 989
Fax: 0039 (0)2 9350 4303
Email: airclean@tin.it

USA
Bord na Móna Environmental
Products U.S. INC.,
P.O. Box 77457, Greensboro,
NC 27417, USA
Tel: 001 336 547 9338
Fax: 001 336 547 8559
Email: bnm-us@bnm-us.com