

Economic Treatment of Industrial Air Emissions

Odour Assessment

ThyssenKrupp Automotive produce body pressings for prestigious automotive manufacturers including BMW, General Motors and Honda. The pressings, including subframes, dashes and seats, are painted using an electrocathodic dip process.

from the oven used to ensure the correct adhesion of the paint to the components. In consultation with the local environmental health officer they commissioned an independent analysis of the gases.

In August 1996, ThyssenKrupp Automotive updated their paint plant and became aware of an odour problem emanating

They needed a rapid and economically viable treatment solution and turned to Bord na Móna for assistance.



MÓNASHELL Biofilter

Successful treatment of hot gases from an automotive pressing plant using a biofilter has led to reduced maintenance costs and lower running costs than conventional treatment or recovery processes. Working in partnership with industry Bord na Móna's specialists provide a comprehensive range of services from odour monitoring and assessment through to odour control systems on a turnkey basis. The application at ThyssenKrupp Automotive has operated reliably since commissioning in 1996 and saves them an estimated stg£20,000 per annum in operating costs alone compared to other treatment technologies.

Technology

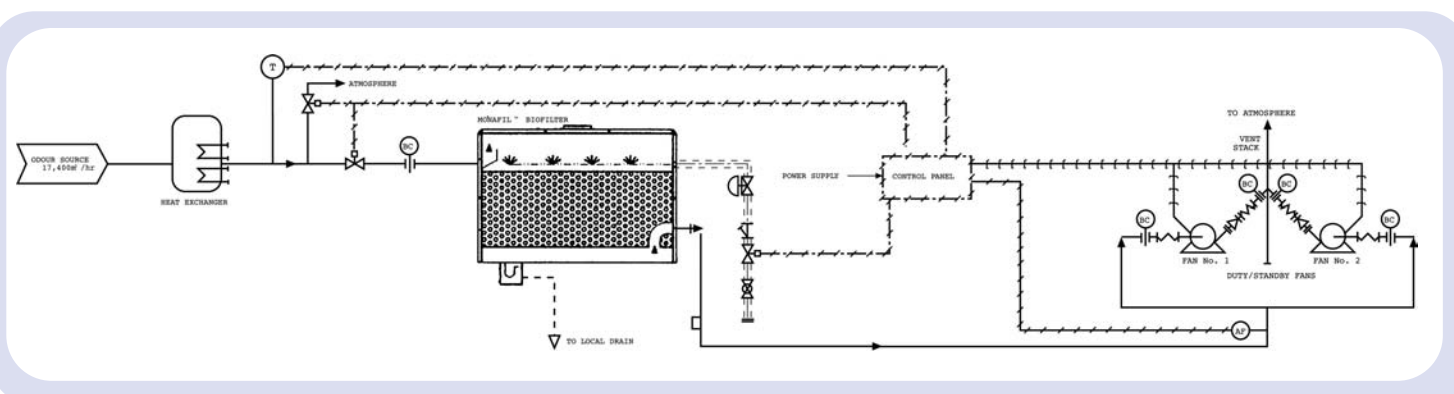
Bord na Móna designed a biofilter treatment system to remove the VOCs identified in the gas emissions. There were five critical compounds and it was important to ensure these were significantly reduced to protect the environment and remove any offensive odour.

Biofilters remove VOCs by providing an enclosed environment in which selected bacteria rapidly degrade the compounds. These bacteria are held within an appropriate carrier material, called media, which is packed into the reactor. The media is kept wet through an irrigation system built within the biofilter and air is

drawn through the biofilter by fans. To ensure consistent optimum removal rates and long term reliable operation the biofilter must be carefully designed. This requires specific attention to the type of media used within the biofilter, the appropriate size of the biofilter and the types of bacteria cultivated and supported within it.

The designers at Bord na Móna developed a biofilter 15 metres long by 3 metres wide and 3 metres high. It was filled with 174 m³ of MÓNAFIL media. This media was selected for its absorptive and adsorptive properties and its high moisture retention capacity. The media is also

self supporting to a depth of 3 m and has low back pressure drop characteristics, ensuring that flow through the biofilter is optimised. The temperature of the gases exiting the stoving oven were 180°C which would have killed the bacteria in the biofilter and damaged the fans. Knowing this, the designers incorporated a heat exchanger to bring the temperature down to 35°C. To ensure that this temperature was maintained a temperature gauge, flow meter, alarm and bypass system were incorporated. Attention was also given to the size of the fans required and acoustic hoods fitted to ensure noise was reduced to a minimum.



Technology continued

Reliability of Treatment

The reliability of the biofilter is backed by a performance guarantee as are all other Bord na Móna installations. The guarantee provides for a 95% odour removal rate based on olfactory testing and a 90% reducing in total VOC concentration. This provided ThyssenKrupp Automotive with an effective assurance of continually meeting legal

odour emission requirements. The media bed in the biofilter also has a performance guarantee over its life span which can be up to 5 years depending on the compounds being treated. The biofilter has been effectively and reliably treating the gases from the oven at ThyssenKrupp Automotive since 27th January 1997. It treats a range of odourous compounds from the oven

inlet, the oven exhaust and the oven's air curtain. Gas flows through the biofilter at 17,400 m³ per hour, drawn across the bed at a pressure of 2000 pa by CHVN fans fitted with acoustic hoods. Drawing the gas through the filter ensures that in the unlikely event of a leak no odourous compounds are emitted from the biofilter. Excess gas would simply be pulled into the biofilter at the point of



MÓNASHELL Biofilter

the leak. 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.

ThyssenKrupp Automotive to meet Part B authorisation for the site. The absence of odour at the site boundary is tested daily by ThyssenKrupp Automotive to confirm the biofilter operates effectively during the course of the year.

Removal of the major VOCs identified by the independent analysis commissioned by ThyssenKrupp Automotive are shown in the table.

Overall Removal Rate

Odour removal is measured annually by olfactory testing and consistently shows greater than 95% reduction in olfactory units from the biofilter inlet to the outlet. This test is one of the measurements required by

COMPOUND	CONCENTRATION OF VOC (MG/M ³)		REDUCTION IN CONCENTRATION (%)
	INLET	OUTLET	
TETRAHYDROFURAN	0.23	0.018	92.2
DICHLOROMETHANE	1.27	ND	99.9
METHYL ISO-BUTYL KETONE	0.699	0.018	97.4
TOLUENE	1.36	0.04	96.8
CYCLOHEXANE	0.063	ND	99.9
ACETONE	0.182	0.015	91.8
OVERALL REMOVAL RATE			95.9

Client Comments

"Bord na Móna offered us a cost effective practical solution with a high level of industry expertise, design capability and customer service. Importantly, they backed this with a performance guarantee."



John Wynne Evans
Facilities & Environmental Manager

"ThyssenKrupp Automotive takes its environmental responsibilities very seriously. As a world leader in the production of body pressings for major automotive manufacturers, we understand the importance of caring for the environment. Our commitment was demonstrated by achieving ISO14001 accreditation in 1998. As a respected company in Llanelli we take care to ensure we protect the local environment and

manage our environmental impact in the local community. After analysing our emissions to atmosphere we sought a company that could ensure we met exacting standards of VOC reduction consistently and cost effectively. We sought a company that would work in conjunction with us and the Local Environmental Health Officer to provide a reliable, long term solution to VOC treatment.

Bord na Móna offered us a cost effective practical solution with a high level of industry expertise, design capability and customer service. Importantly, they backed this with a performance guarantee. In addition, the technology that accomplished our objectives was intrinsically green. It continues to work reliably, has been cost effective and importantly helps us to meet the high environmental standards set by the company."

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

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