

Nuisance Odour Control for Municipal Waste Water Treatment Plants

Odour Assessment

This project profile examines the approach taken to prevent nuisance odours at three sewage treatment plants, Bridlington, Lundwood near Barnsley and Minehead.

At each of these works, sludge is thickened prior to its disposal or reuse as material for the reclamation of land. This process can lead to the production of nuisance odours.



MÓNASHELL Biofilter at Minehead

Enhanced biofiltration provides reliable cost effective control of nuisance odours from wastewater treatment plants. In this project profile, Yorkshire Water and Wessex Water demonstrate their commitment to ensure that residents local to their wastewater treatment plants do not experience nuisance odours. Operational reliability, significantly lower running costs compared to other technologies and low environmental impact were all factors that led Yorkshire Water and Wessex Water to select enhanced biofiltration as the most appropriate treatment technology.

Bord na Móna's specialists were able to provide a comprehensive range of services from odour monitoring and assessment through to odour control systems on a turnkey basis. Bord na Móna worked closely with both Yorkshire Water and Wessex Water to design and install enhanced biofiltration plants to meet stringent odour control limits on their sludge treatment facilities. They supported these plants with performance guarantees, operator training and maintenance programmes.

Technology

At all three sites the fully enclosed enhanced biofilters are constructed from corrosion resistant Glass Reinforced Plastic (GRP). They are packed with Bord na Móna's patented MÓNASHELL media supported on a raised plenum floor to ensure uniform air flow through the media. Operating in a co-current configuration air is drawn through the MÓNASHELL media by a duty standby fan. The negative pressure design of the system allows better control of airflow through the unit and ensures total capture of all the odorous gasses. The biofilter is irrigated by a continuous irrigation water system that ensures continuous scrubbing of odours by optimizing the mass transfer

characteristics even at variable peak loadings. The buffering capacity of the MÓNASHELL media allows recirculation of the water, thereby minimizing on water usage through its lifetime. The media is self supporting to a depth of 3m, reducing the footprint of the system.

Lundwood

At Lundwood the design specification required treatment of an inlet concentration of 75 ppm of Hydrogen Sulphide from a primary and imported sludge holding tank and an associated belt thickener. The total extraction rate was 850 m³/h and a guaranteed removal efficiency of 98 per cent was required. Subsequently, Bord na Móna have



The MÓNASHELL Biofilter and MÓNASORB unit at Bridlington

measured average Hydrogen Sulphide inlet concentrations between 150 and 250 ppm, yet the MÓNASHELL unit still reduces the Hydrogen Sulphide concentration to below 100 ppb (>99.9%

removal). The MÓNASHELL unit not only treats a significantly higher load than was originally specified, but a higher flow rate by virtue of an increased extraction rate to reduce odour concentration

within the thickener building. The odour removal performance of the MÓNASHELL unit is even maintained during the weekends when the thickener is not in service.

Technology continued

Bridlington

Bridlington has two enhanced biofilters each with secondary polishing units. The first MÓNASHELL unit treats the headspace in the digested sludge storage tanks. These tanks each have a volume capacity of 25 m³ and give rise to a total airflow of 2502 m³/h. They are serviced by a biofilter 6.25m long, 5.03m wide and 2.51m high packed with MÓNASHELL media. A

second MÓNASHELL unit treats an airflow of 2946 m³/h from various sources in the sludge treatment building. The air from the biofilters is passed through a dedicated MÓNASORB activated carbon system for final polishing. Two MÓNASORB RAD9 units 1.27 m diameter and 2 m high ensure near to 100 percent removal of Hydrogen Sulphide is achieved from the digested sludge holding tanks while

one unit is sufficient to polish air from the biofilter servicing the sludge treatment building. The specified performance standard is currently being achieved solely by the MÓNASHELL units, thus prolonging the life of the MÓNASORB units. The biofilters are guaranteed to reduce Hydrogen Sulphide by 98% provided the inlet concentration does not exceed 750ppm.

Minehead

At the Minehead plant a single biofilter treats foul air from the four sludge storage tanks and the centrifuge room in the sludge treatment building. In total a flow of 8036 m³/h is treated primarily by a MÓNASHELL biofilter with an additional MÓNASORB polishing system. Air from the biofilter is passed into a MÓNASORB reactor

containing two concentric beds of MÓNASORB IGC3 type 2 impregnated media. This is configured to minimise the pressure drop across the media bed. The system is guaranteed to ensure that the maximum outlet concentration of 100ppb Hydrogen Sulphide is achieved. Similar to the Bridlington Unit the MÓNASHELL unit achieves the specified performance standards as a stand alone unit.

Clients Comments



"Bord na Móna provided us with reliable state of the art technology backed by performance guarantees that we can count on. Bord na Móna are knowledgeable and have a lot of experience. In my experience Bord na Móna are very good and a preferred supplier for Yorkshire Water."

Alan Fletcher
Operations Manager - Barnsley Area

"Yorkshire Water take great care to protect the environment. We have a duty to our customers and our neighbours outside the gate to ensure we do not create nuisance odours. When we refurbished our sludge treatment plant odour control was a key consideration. We needed a company that understood the available technologies and could offer us a total solution. Bord na Móna provided us with reliable state of the art technology backed by performance guarantees that we can count on. We find that the

MÓNASHELL units tend to be more adaptable to changes in Hydrogen Sulphide levels. Often, treating odours from sludges the biofilter sees a high stable loading so I would expect the unit to work well but recently we have started using them at inlet works where Hydrogen Sulphide levels can exhibit a diurnal flow pattern from nothing to 10-12 ppm. The MÓNASHELL units appear to be able to cope with that. Bord na Móna are knowledgeable and have a lot of experience. This is the consensus across Yorkshire

Water based on the performance of the units supplied by them. We've never had any major problems and they are always at the end of the phone. Importantly, they understand that odour control is a big issue and that the period of time a unit is out of service needs to be as short a period as possible. So installation and servicing is always rapid but thorough. In my experience Bord na Móna are very good and a preferred supplier for Yorkshire Water."



"We have had no maintenance problems since the unit was installed and it consistently meets its performance guarantees. Bord na Móna's training programme on operating the biofilter was comprehensive and we know we can rely on their support."

Mark Hewitt -
Leading Operator, Minehead

"Wessex Water are committed to meeting high environmental standards. The Minehead works treats domestic sewage sludge from the local population and the local Butlins Holiday camp so its capacity is very seasonal. As a works servicing a coastal holiday resort preventing nuisance odours, particularly during the holiday season, is a priority. The enhanced biofiltration unit treats the odours from our sludge holding tanks and sludge treatment building efficiently and effectively. We have had no maintenance problems

since the unit was installed and it consistently meets its performance guarantees. Bord na Móna's training programme on operating the biofilter was comprehensive and we know we can rely on their support. Looking at whole life costs, enhanced biofiltration not only provides us with BAT, it is also very cost effective. We are very impressed with Bord na Móna and their agents Northern Environmental Services' delivery of this nuisance odour prevention technology."

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

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