

APPENDIX F

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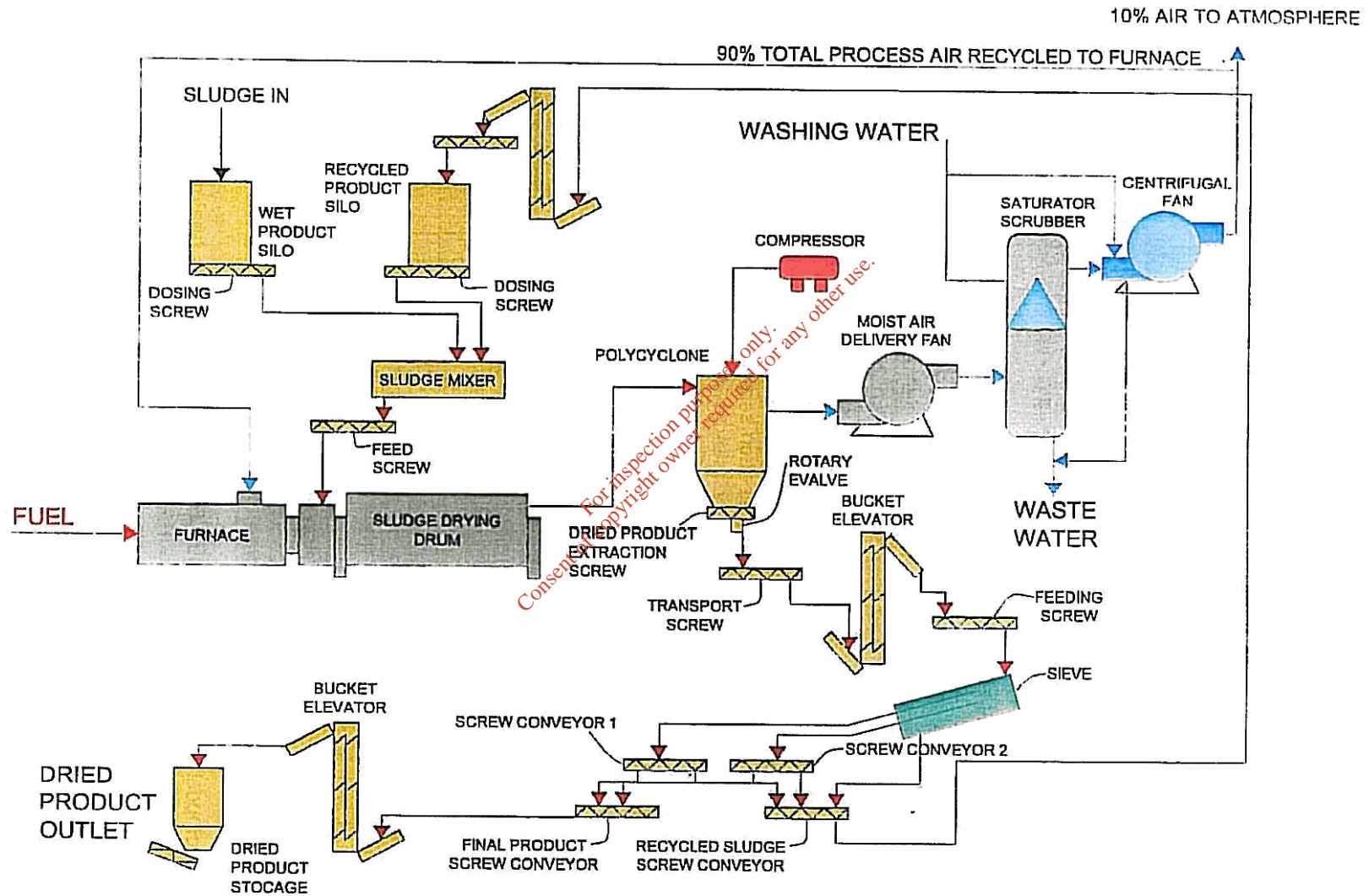


Figure 1 – Sludge Drying Plant – Flow Diagram

APPENDIX G

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MÓNASHELL

The MÓNASHELL Biofiltration System from Bord na Móna is a unique patented technology, which allows for the biological treatment of airstreams with high concentrations of reduced sulphur compounds.

Following extensive research and development in the early 90s, the MÓNASHELL process was developed in-house by Bord na Móna and patented worldwide in 1994.



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THE MÓNASHELL PROCESS

In all conventional biofilters, the biological conversion of H₂S results in the production of mild forms of sulphuric acid (H₂SO₃), which, if allowed to build up, will acidify the support media and result in lower abatement performance.

MÓNASHELL is a biological system which utilises media with an ability to control variation in pH by neutralising acid by-products which form as a result of biological oxidation of Sulphur compounds. This allows for

the treatment of high levels of H₂S and reduced Sulphur compounds. The process is also assisted by optimum pH ranges on the surface of the packing which enhances capture and breakdown of low solubility reduced sulphur compounds such as Alkyl Sulphide and Mercaptans.

Media
MÓNASHELL consists of shells coated with a blend of specifically selected micro-organisms. The shells contain a high level of CaCO₃, which neutralises acid as it is produced as a

result of bacterial oxidation of sulphides. The bacteria is selected for its ability to degrade high levels of H₂S. The process is further enhanced by the physical,



structural and chemical properties of the media which allows for smaller filters with high efficiencies and improved elimination capacities. The process is also proving extremely effective for treatment of VOCs and nitrogen-based compounds.

System Design
MÓNASHELL can be supplied either as a skid-mounted modular system or a site erected filter constructed on a prepared concrete plinth. The housings are constructed from glass reinforced

plastic (G.R.P.) bolted panels and supplied complete with plenum floor, filter media, irrigation system, heavy duty cover, inlet and outlet connections and access ports. The heavy duty covers are removable for media changes and irrigation nozzles are accessible from the filter cover. All internal components are constructed from high grade corrosion resistant materials.

Applications

- Wastewater pumping stations
- Wastewater inlet works
- Sludge handling and treatment processes
- Municipal solid waste treatment and storage facilities
- Animal by-products processes
- Industrial effluent treatment
- Industrial process emissions





MÓNASHELL Performance Criteria

COMPOUNDS	CONCENTRATION RANGE	REMOVAL EFFICIENCY
ODOUR	Up to 10^6 ouE/ m ³	99%
VOC	200 to 2000mg/ m ³	90%
HYDROGEN SULPHIDES	5 to 2000 mg/m ³	99%
AMMONIA	Up to 100ppm	98%
ORGANIC SULPHIDES	Up to 200mg	95%

Benefits

- Ability to treat high levels of H₂S & Organic Sulphides
- High efficiencies
- Low running costs
- Lower footprint than conventional biofilter
- Low maintenance
- Sustainable process utilising naturally occurring media
- Very high performance on broad range of compounds
- Ability to treat highly variable inlet concentrations
- Offsite or onsite modular construction for ease of installation

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

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MÓNAFIL

The MÓNAFIL technology from Bord na Móna is a biofiltration system utilising specialised patented peat media as a capture and support medium to treat air emissions. The peat media is durable and offers longevity and excellent removal efficiencies for a broad range of sulphur and nitrogen based compounds. It is also capable of treating low levels of Volatile Organic Compounds (VOCs). The MÓNAFIL system was developed in-house in the late 1980's and was awarded a patent in 1992.



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THE MÓNAFIL PROCESS

Biofiltration is a biological process whereby microorganisms immobilised on a filtration media capture and convert pollutants from an air stream into harmless non-odorous by-products.

The efficiency of the process is dependent on a number of factors, including the properties of the support media and the metabolic capabilities of the microorganisms. The properties of the media have repeatedly proven to be the

key factors in terms of capture of chemical pollutants and providing optimum conditions for biological oxidation.

Another parameter paramount to providing a low cost sustainable solution is the ability of the media to form an open homogenous matrix ideally self supporting to two metres and resistant to breakdown which also ensures long media life.

The Bord na Móna biofiltration media used in the MÓNAFIL system is a manufactured product which undergoes extensive quality control checks to ensure that it meets stringent requirements and is compliant with product specification. The MÓNAFIL systems are inoculated with specific microbiological cultures dependent on the nature and range of compounds in the air stream.

The media must exhibit the following characteristics:

- high porosity
- good water retention
- high cation exchange capacity
- high buffering capacity
- large pore volume
- large surface area

System Design

The MÓNAFIL biofilter is constructed in modular format from glass reinforced plastic (G.R.P.) bolted panels and can be either skid mounted or site erected. Alternatively, Bord na Móna can design the system and supply all filter internals for installation in a civil retaining structure provided by others.

Applications

- VOC emissions from process gases & wastewater treatment plants
- VOC & Odour control from composting & agricultural applications
- Odour control in
 - industrial plants
 - sewage applications
 - meat rendering





MÓNAFIL Performance Criteria

COMPOUNDS	CONCENTRATION RANGE	REMOVAL EFFICIENCY
ODOUR	50,000 ou _E / m ³	98%
VOC	100 mg/ m ³	95%
HYDROGEN SULPHIDE	30 mg/ m ³	98%
AMMONIA	50 ppm	98%
ORGANIC SULPHIDES	5 - 20 ppm	95%

Benefits

- Low running costs
- Long media life
- High performance
- No secondary waste
- Low maintenance
- Media can be recycled and reused
- Capable of handling odour from a wide range of sources

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

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