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Mónashell

Air & Odour Abatement
 System for the Municipal,
 Utility and Industrial
 Markets

Meeting the Highest Standards
 Anua is committed to meeting and surpassing the highest quality standards required for each of its products. That's why you will always see national and/or international standards, accreditations for all Anua products.

- Patented
- Mónashell is a world-wide patented media.
- Free pre-planning and site reports
- Free no obligation quotations
- Nationwide maintenance call-out service.
- Expert customer support

Mónashell Applications

Mónashell (Incl Mónashell Dualpass and EBf) have been deployed globally across a wide variety of applications.

Wastewater Treatment Industry

Wastewater pumping stations
 Wastewater inlet works
 Solid waste handling, treatment and storage processes

Food/Agri Industry

Animal by-products processes
 Industrial effluent treatment

Pharmaceutical/Petro Chemical/ Printing & Coating/Other Industries

Industrial process emissions
 Industrial effluent treatment

Municipal Solid Waste

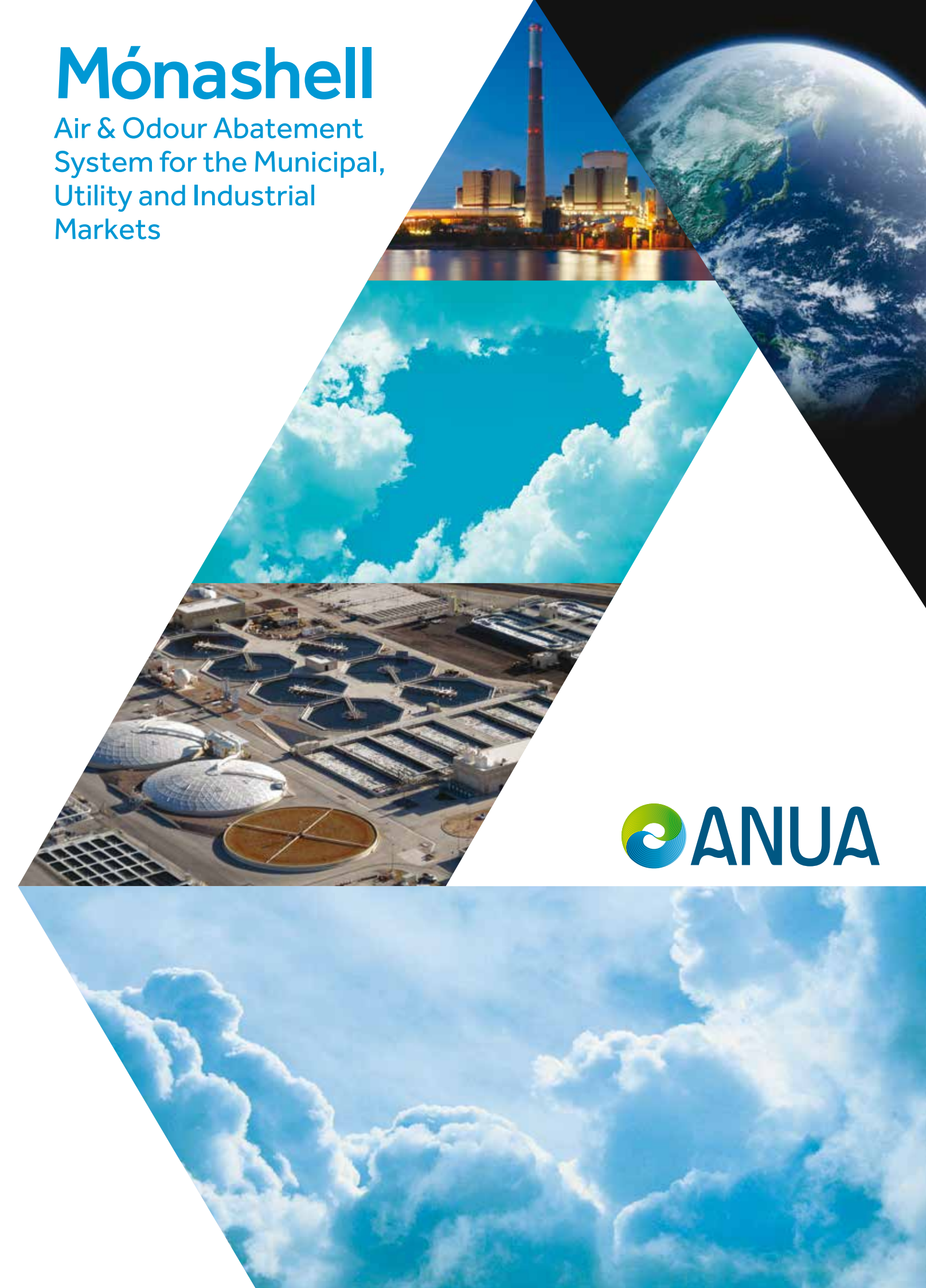
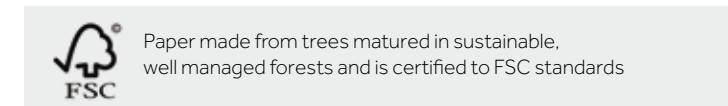
Green waste and MSW composting
 Mechanical Biological Treatment facilities
 Anaerobic Digestion centres

Mónashell EBf has also been used in the following industries

Semi-conductors
 Aircraft maintenance
 Metal coating
 Geotextiles

Renew	Recover	Re-direct	Recycle	Rarefy	Retain
Wastewater Treatment	Rainwater Harvesting	Pumps	SUDS	Odour Abatement	Holding Tanks

In keeping with company policy of continuing research and development and in order to offer our clients the most advanced products, Anua reserves the right to alter specifications and drawings without prior notice.



Technology that Serves Customers and the Planet

Anua means 'to renew'. It describes our renewed contract with nature and our renewed focus on the development of innovative environmental solutions. We continue to develop and produce the sustainable technologies that our customers demand. Anua is part of Bord na Móna, a highly successful organisation and Ireland's leading resources company for over 75 years, which has a unique heritage and understanding of the natural environment. Bord na Móna has used its expert insights into natural processes, allied to its excellent in-house research facilities, to develop sustainable solutions across a wide range of environmental challenges – odour abatement, wastewater treatment, land reclamation, power generation, resource recovery and renewable energy. This is both Anua's history and our mission for the future.

Anua enjoys the benefit of the support of its highly respected parent company. As part of this wider organisation, we adhere to their world-class standards and values for both the technology we provide and the service we give our customers.

Anua has developed odour treatment systems that are based on environmentally sound principles. We offer proven, patented clean air bio-technologies which are renowned for providing best-in-class system performance, while ensuring low life-cycle costs. Over the last 20 years Anua has been a leading designer, manufacturer and supplier of odour abatement technologies. We have provided solutions for customers around the world with more than 600 odour abatement and VOC treatment systems being installed in Europe, Asia, USA and Australia. But it is not just our technical capability that stands us apart, we offer our customers a comprehensive, flexible bespoke service which is supported by our team of experts with excellent project management and customer service skills.

We have a wealth of expertise and experience across a broad range of sectors such as Industrial, Municipal and Utility. Our customers trust us to deliver the best sustainable solutions. That is why we work with our clients throughout every project to achieve the best possible result, one that will build both our reputations.

Complete Solutions

We don't just sell technologies. With our extensive laboratories and innovation centres located in Europe and the USA, we understand new challenges, pioneer research and create new processes. We work with you to create the systems you require, ensure correct project implementation and offer the full services from project planning to project completion. Anua stands by its technology and its customers and we are there for the long haul.

Customised for Customers

Customers need a partner – and products – they can trust. Like nature itself, Anua must be adaptable and responsive to change. That means developing the solutions that best suit each individual project.

For Anua staff, understanding their customers' world is their business. That depth of understanding is matched by the depth of our customer support and focus. We work with clients to design technically superior solutions that focus on life cycle costs. We're with you every step of the way



The Mónashell Advantages	
Ability to treat high levels of H ₂ S and organic sulphides	No nutrient addition
Lower footprint than conventional biofilters	Reduces or may eliminate the need for chemicals
High efficiencies	Sustainable process, utilising naturally-occurring media
Low life cycle costs	High performance on a broad range of compounds
Low maintenance	Effective on variable inlet concentrations
Low water usage	High quality housing with proven long life
Low consumables required	Flexible modular design
	Offsite or onsite modular construction for ease of installation

The Mónashell Process

The Mónashell Biofiltration System from Anua is a unique patented technology, which allows for the biological treatment of airstreams.

Biofiltration is a biological process whereby microorganisms are immobilised on a filtration media, converting captured pollutants from an air stream into harmless, nonodorous by-products.

Mónashell is a natural biological system that utilises shells coated with a blend of specifically selected microorganisms with an ability to control variation in pH by neutralising the acid by-products. 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 organic sulphide compounds such as Alkyl Sulphides and Mercaptans.

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 are selected for their ability to degrade high levels of H₂S. The process is further enhanced by the physical structure and chemical properties of the media, which allow for smaller filters with high efficiencies and improved elimination capacities. The process has also proved to be effective for the treatment of Volatile Organic Compounds (VOCs) and nitrogen-based compounds.

Mónashell at Work

Contaminated air is captured and ventilated to the inlet of our Mónashell biological filters.

As air passes through the filter the chemical contaminants are captured by a combination of adsorption, absorption and chemisorption into the water layer on the surface of the filter where an active biofilm oxidises and breaks down the odorous compounds. Acidic oxidation by-products are neutralised by the calcium carbonate present in the shell media ensuring optimum pH for capture and break down of odorous compounds.

The Mónashell is continuously irrigated and pH is maintained by the media ensuring minimum top up requirements.

Treated air passes through the filter from which it is exhausted to atmosphere.

Anua also have two enhanced Mónashell offerings.

- Mónashell Dual pass for use on persistent, low solubility VOCs.
- Mónashell EBF for the biological treatment of difficult industrial emissions containing high levels of VOC, H₂S and organic sulphur groups VOCs.

Mónashell Typical System Performance*

Compounds	Concentration Range	Minimum Removal Efficiency
Odour	1,000 – 400,000 OUE/m ³	85 – 99%
VOC	1 – 200 MgC/m ³	50 – 80%
Hydrogen Sulphides	1 – 200 ppm	95 – 99%
Ammonia**	1 – 30 ppm	95 – 98%
Organic Sulphides	1 – 15 ppm	95 – 98%

*Specific guarantees will be agreed on each individual project depending on agreed criteria.

** High levels of ammonia will require increased supply of irrigation water

Installation

Mónashell can be supplied as a skid-mounted modular system or site-erected filter constructed on a prepared concrete plinth. Each Mónashell system is supplied complete with plenum floor, filter media, irrigation system, removable cover, inlet and outlet connections and access ports. All internal components are constructed from high-grade corrosion-resistant materials.

The Mónashell Dual Pass

Mónashell Dual Pass technology is for use on persistent, low solubility VOCs and for difficult wastewater treatment applications where activated carbon polishing has traditionally been required. By employing enhanced airflow dynamics, Mónashell Dual Pass achieves significant improvement in performance with the same overall contact time. The considerable performance improvement is achieved for minimal additional cost, providing clients with a very attractive alternative to activated carbon polishing, for reduced life cycle costs.

Mónashell EBF (Enhanced Technology for Enhanced Effectiveness)

Mónashell EBF's effectiveness for removing VOCs is achieved by employing two additional dynamics to enhance the existing processes and to create greater capture and catabolic breakdown of VOCs. Firstly, the technology utilises the recirculation of the air stream and this increases predilution of the inlet contaminants and acceleration of mass transfer. This results in increased efficiency (typically from 50>90%) and increased elimination capacity (typically by a factor of 4). Secondly, further dynamics (electromagnetic stimuli) are used to regulate and control the production of extra cellular polysaccharides by microbes, leading to a higher catabolic of VOCs.

Mónashell Typical Dual Pass System Performance*

Compounds	Concentration Range	Minimum Removal Efficiency
Odour	1,000 – 400,000 OUE/m ³	90 – 99.5%
VOC	1 – 200 MgC/m ³	70 – 85%
Hydrogen Sulphides	1 – 200 ppm	99 – 99.5%
Ammonia**	1 – 100 ppm	98 – 99%
Organic Sulphides	1 – 100 ppm	98 – 99%

The Mónashell Dual Pass Additional Advantages

- High odour removal efficiencies
- High elimination capacity on H₂S organic sulphides
- Primary and polishing stages in single unit reduces cost
- Configured as duty/duty or duty standby for maintenance

Mónashell Typical EBF System Performance*

Compounds	Concentration Range	Minimum Removal Efficiency
VOC	100 – 1,200 MgC/m ³	50 – 90%
Hydrogen Sulphides	100 – 2,000 ppm	99 – 99.99%
Organic Sulphides	50 – 200 ppm	98 – 99.9%

The Mónashell EBF Additional Advantages

- Ability to treat high levels of VOC, H₂S and organic sulphides
- Environmentally friendly alternative to thermal treatment
- Strong performance on wide range of compounds
- Adaptability and flexibility of operation

