

CRUMRUBBER™ MÓNAFIL & MÓNASHELL

Odour Control Units

Using recovered materials to provide patented high performing solutions for odour abatement and treating VOC air emissions for the Municipal, Utility and Industrial markets.



ANUA Clean Air
INTERNATIONAL



We aim to provide high performing patented biological technologies for the treatment of air pollution, providing best in class performance with the lowest utility and life cycle cost. We are committed to providing low cost, robust, sustainable solutions bringing benefits to Industry and the local communities they serve. We will enable our people to realise their potential and that of our business through open communication, scientific excellence, and ethical business practices. Our technology goal is the use of recovered materials to provide high performing solutions.

COMPANY BACKGROUND



Anua Clean Air International Ltd is a new trading company which is incorporated in Ireland. The company acquired Bord na Móna Mónashell and Mónafil brands and the associated patent portfolio for these and new emerging technologies. The company was founded by Ian Phillips who spent much of his working career developing and deploying these technologies for Bord na Móna.

Anua Clean Air International is located in the Eolas Building in NUI Maynooth and has leased additional manufacturing facilities from Bord na Móna. The company owns and operates the manufacturing equipment for Mónafil and Mónashell media. Anua core focus will remain on utilising recovered materials to provide best in class biological treatment technologies. The company is uniquely positioned to provide back-up and after sales service including technical support, replacement media, system upgrades and new skid mounted or site erected Mónashell, Mónafil and CrumRubber™ systems.



Anua Clean Air International will operate through historic International sales channels. Closer co-operation with Airclean srl (Bord na Móna's long standing Italian distributor) will allow for full turnkey contracting and the utilisation of a combination of biological (Mónafil, Mónashell, CrumRubber™) and conventional technologies (activated carbon, chemical scrubbers, bag filters etc) where required.

› anucleanair.com

Bord na Móna

Bord na Móna is an Irish State owned company who's gaelic name translates to "The Irish Peat Board". The company was established in 1946 by the "1946 Turf Development Act". The company has been responsible for the commercial exploitation of large areas of Irish Peat lands. In the early years the companies activities were largely focused on the mechanical harvesting of Peat for power generation, domestic fuel and horticulture. Laterally the company has switched its focus to becoming a leader in the field of renewable energy (biomass, wind, solar, waste to energy). The initial transformation to an Environmental Company was platformed on the development of largely peat based biological treatment systems for air and waste water treatment (Puraflo, Biophore, Mónafil, Mónashell). All of these technologies were developed in-house, patented and commercialised by the Company.

› bordnamona.ie



Air Clean SRL is a company specialising in environmental rehabilitation of polluted air streams, primarily from industrial emissions, waste water and solid waste treatment processes. Air Clean SRL operates on a worldwide basis, offering the full range of air treatment technologies including; biological, chemical and physical technologies.

Air Clean is a fully integrated company performing all of the production functions in-house including design, manufacture, assembly, installation and final testing.

Access to the latest technology coupled with continuous research and collaboration with Universities and Key Partners ensures Air Clean SRL provide the optimum solution for each individual application by using stand alone or multi – stage technologies (systems integration).

The partnership with Anua Clean Air International ensures Air Clean SRL can offer best in class, patented, Mónashell, Mónafil and CrumRubber™ bio-technologies for the treatment of municipal and industrial odour including VOC emissions.

› aircleansrl.com

CRUMRUBBER™

In the early 2000's, Bord na Móna identified CrumRubber™ as an ideal media with the capability to catalytically remove and convert H₂S to sulphate (origin of material waste automobile tyres). The media could be regenerated by continuous or intermittent flushing with water. Typical removal efficiencies for levels from 10 to 200 ppm of H₂S ranged from 30 to 70 percent. The concept was patented but never fully commercialised. In 2009 a new research program was commenced to identify an inert recovered biotrickling media for treatment of H₂S. The testing of CrumRubber™ was resumed, the initial work demonstrated the CrumRubber™ media had an excellent affinity for capture of H₂S and conversion to sulphate, however it was not ideal for establishing biological activity. Critical parameters were optimised and a means of developing successful biological treatment was perfected. Treatment efficiencies in excess of 98% was achieved on high H₂S levels. Following carried out on Landfill gas treatment levels in excess of 2000 ppm were successfully treated with this technology. Two separate patents have been applied for using this technology, one for treatment of air and one for treatment of landfill gas and biogas. Anua Clean Air International Ltd has acquired the rights to these air cleaning patents.

THE MÓNAFIL PROCESS

Mónafil is a biofiltration process utilising specialised peat media as a capture and support medium to treat air emissions. Microorganisms are immobilised on the liquid layer on the surface of the filtration media, as air passes through the filter, odorous compounds are removed and oxidised biologically. An irrigation system is employed to maintain optimum conditions in the filter. The media is engineered to enhance its physical and chemical properties and to achieve optimum air treatment performance in terms of:

- Removal efficiency
- Reduced footprint
- Optimised effective contact
- Minimum pressure loss
- Enhanced media life

Every Mónafil system is designed to best meet the client's specific requirements and to provide the optimum odour abatement solution.

THE MÓNASHELL PROCESS

The Mónashell Biofiltration System from Anua is a unique patented technology, which allows for the biological treatment of contaminated airstreams. Microorganisms immobilised on a filtration media oxidise captured pollutants. Mónashell is a natural biological system that utilises selected microorganisms capable of degrading high levels of H₂S and organic sulphur compounds. The media assists in controlling pH by neutralising the acid by-products. This allows for the treatment of high levels of H₂S and reduced sulphur compounds. The process is further enhanced by the physical structure and chemical properties of the media. This allows for smaller filters with higher 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

As air passes through the Mónashell filter the chemical contaminants are captured by a combination of physical processes into the liquid layer on the surface of the media where an active biofilm breaks down the odorous compounds. Acidic by-products are neutralised by the shell media ensuring optimum pH conditions. The Mónashell is continuously irrigated ensuring minimum top up requirements.

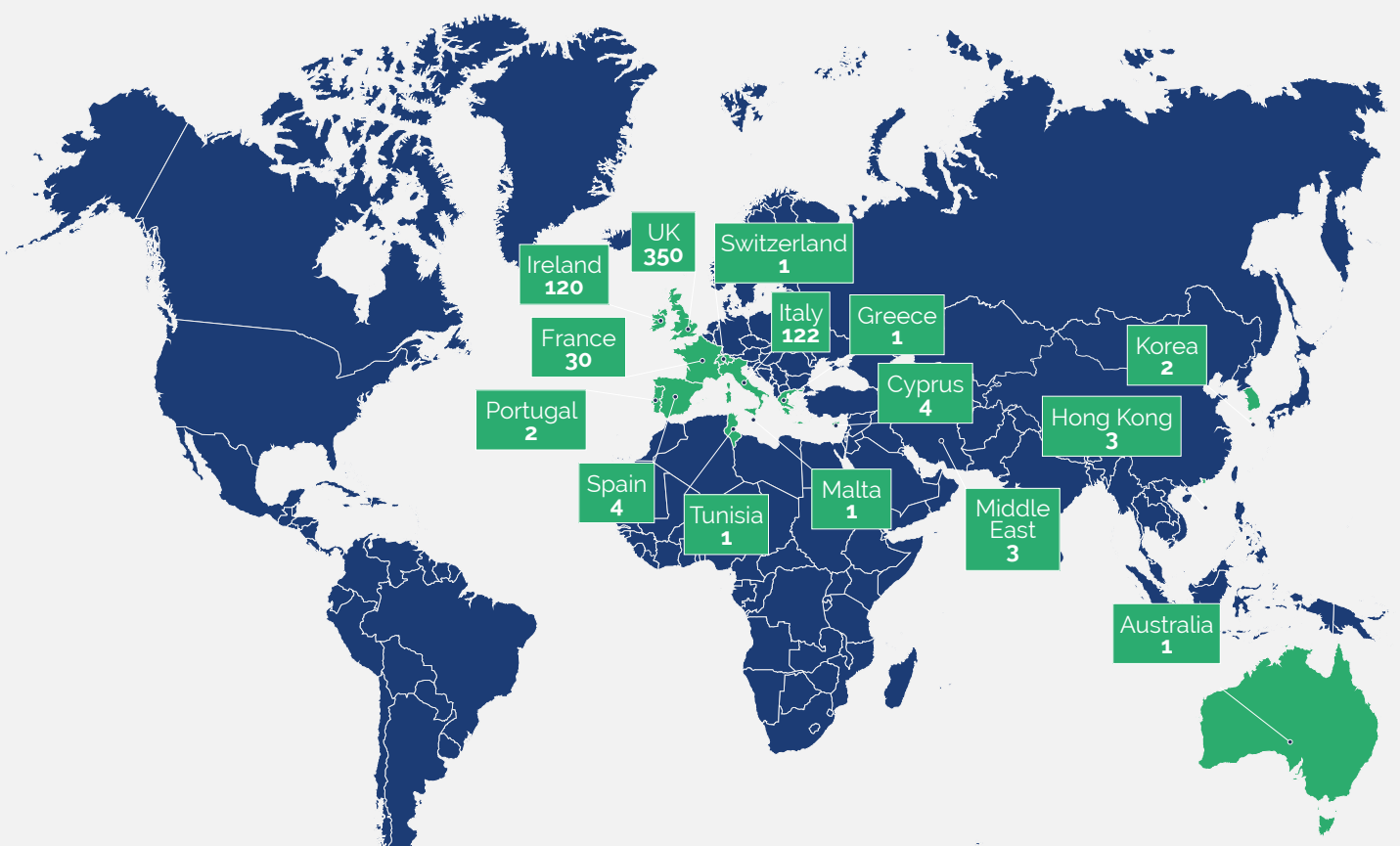
Anua have two further patented enhanced Mónashell offerings.

- Mónashell Multi Media Multi Pass. Utilises different shell media in different stages to optimise performance, media life and utilisation of different shell media on H₂S applications.
- Mónashell EBF for the biological treatment of difficult industrial emissions containing high levels of VOC, H₂S and organic sulphur groups VOCs. The technology utilises enhanced airflow dynamics and electro magnetic stimulation of the water to enhance capture and treatment of low solubility VOCs.



WORLDWIDE DISTRIBUTION OF ANUA CLEAN AIR SOLUTIONS

We offer proven, patented clean air bio-technologies, which provide best-in-class process performance with the lowest utility and life cycle costs.



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- **Odour control for waste water treatment plants:**
650 plants, more than 3000000 m³/hr of treated air
- **Odour control for solid waste treatment plants:**
20 plants, more than 2500000 m³/hr of treated air
- **Odour control for VOC treatment and food industry:**
150 plants, more than 1000000 m³/hr of treated air



Sister Company

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