

The OMEX group is active internationally in a wide range of markets, from food production and energy generation to environmental protection and water clean-up, with a product offering designed to reduce nitrate leaching and nitrous oxide emissions from soil and reduce NOx emissions from flue gasses

The origins of the OMEX group date back to February 1976, when Olof Winkler, current chairman of the group, was looking for a site to set up a suspension fertiliser factory. A site was found on Bardney Airfield, 12 miles east of Lincoln, taking over a fledgling fluid fertiliser business that had been started by Calor Agriculture some 7 years earlier. Fast forward 40 years and the group has grown to a diverse set of businesses remaining under the same family control, with day-to-day operations overseen by Max and Nils Winkler.

The original mission was to provide Lincolnshire farmers with an accurate, bespoke contractor applied fertiliser system, offering improved accuracy over existing bulk blend offers and the ability to tailor make products to match soil and crop requirements.

In the late 1980's the company developed the world's first flowable dicyandiamide (DCD) plus urease inhibitor formulation and the group's commitment to environmental protection was born.

DCD is the longest-established nitrification inhibitors in use in the UK, originally tested at Rothamsted in the early 1980's, where its potential to improve nitrogen utilisation efficiency was established. Large scale production of the OMEX formulation (Didin) commenced in 1989 and expanded to over 1 million litres per annum. Didin is added to liquid fertiliser or directly sprayed onto soils and controls the release of nitrate nitrogen in the soil, phasing the delivery of nitrate according to soil temperature and crop demand. The phased release means there is less free nitrate in the soil than with conventional top-dressing, so less chance of nitrate leaching and less risk of nitrous oxide losses. In 1991, the EU introduced the Nitrates Directive, which required member states to take action to reduce the levels of nitrate leaching from farming operations and to set up nitrate vulnerable zones and nitrate action plans. Trial work demonstrated the potential for Didin to reduce nitrate leaching by 50% and its use became recommended in a number of EU member states. More recently, work has shown that the use of Didin can reduce nitrous oxide emissions by around 60%, controlling emissions of the potent greenhouse gas which is almost 300 times more powerful than carbon dioxide.

From those early days at the end of the last century, the commitment to facing environmental issues and trying to develop solutions to ensure a better future world have grown with the business. The current boards of the OMEX group businesses are focussed on a Sustainability Strategy to minimise the impact of its operations on the greater environment and a mission to work with agencies, customers and stakeholders to address issues and find innovative solutions to both current and emerging environmental challenges.

Carbon emissions from the production, distribution, application and use of OMEX fluid fertilisers

OMEX Agriculture continuously reviews production systems and logistics to minimise energy use. It has commissioned ESOS reports and is working towards

reducing the carbon footprint that operations have on the environment as part of its Sustainability Strategy. Within the OMEX Group, OMEX Environmental offers products and solutions to help business managers reduce the environmental impact of manufacturing and processing operations and the company continues to develop products for use in the Anaerobic Digestion industry.

The group manufactures urea solutions for use by industry to reduce nitrogen dioxide and other NO_x gas flue emissions, reducing the risk of impact on air quality and the risk of producing acid rain. The reduction of NO_x, in association with the reduction of ammonia emissions has the potential to reduce the creation of particulates in the atmosphere, which have an increasingly understood effect on human health.

Development work by OMEX Agriculture and within the group has considered the potential of calcium and magnesium acetate brines to reduce the aerosol of particulates in urban environments, particularly arising from road traffic. The brines can be sprayed onto heavily trafficked roads to suppress the level of particulates in the local environment and have the added benefit of acting as ice control agents in the winter.

Greenhouse gas emissions remain one of the most important threats to the future of a stable world climate and there are a number of areas where the use of OMEX fluid fertiliser products offers reduced carbon emissions, compared to other fertiliser systems:

Suspension Fertilisers

- Unlike solid fertilisers; no heat is used to granulate and dry the product
- The suspension production plants are geographically sited in the centre of arable production areas, reducing delivery road miles
- One site has connections to dockside offloading to reduce delivery road miles
- Large raw material stockholding capacity allows raw material delivery logistics to be well planned, offering flexibility to hauliers, giving time to arrange return loads
- Heat energy created by exothermic reactions is captured and re-used wherever possible, reducing the energy requirement for heat input for endothermic reactions
- In specific field situations, where phosphate is applied for maintenance of soil reserves, low-energy P sources are used
- Potash is added as 'damp-cake' eliminating the need for high drying emissions
- Suspension fertiliser production is flexible and adaptable, allowing recycled nutrients to be incorporated, such as Struvite recovered from water treatment farms
- Any un-used fertiliser is re-formulated into new product in a very low energy process; eliminating wastage and reducing energy input
- No packaging is required, eliminating petrochem-based plastic usage
- Tanker deliveries are rotated wherever possible, minimising 'solo' movements
- The contract application network has strategically placed operators, central to intensive arable production

Solution fertilisers

- In basic production, no additional heat input is required
- Minimal handling to field; no additional handling equipment required
- No bag disposal from farm usage; no recycling of fertiliser packaging
- Accurate, avoiding application of carbon-input material on non-target areas
- UAN sourced from abated (low nitrous oxide emitting) processes

Nitrous oxide emission reduction

Nitrous oxide is a potent greenhouse gas, with 300 times the greenhouse gas potential of carbon dioxide. It is emitted during the production of nitrate fertiliser precursors and the conversion of both manufactured and natural nitrogen sources in the soil. OMEX sources nitrate fertilisers from nitrous oxide abated factories and supply additives which can significantly reduce the emissions of nitrous oxide from the soil, offering significant reductions in carbon dioxide equivalent emissions.

Greenhouse gas comparisons

Assessing the carbon footprint of different fertiliser materials is difficult beyond the factory gate as there are many different routes to field, from direct delivery from factory to farm or delivery via storage at distribution centres, to distribution involving intercontinental transport. The Intergovernmental Panel on Climate Change (IPCC) has agreed the GHG emissions of some standard materials up to the point of the factory gate, declared as carbon dioxide equivalents (in kg CO₂e/kg product), calculated as per kg of nitrogen below:

Fertiliser	kg CO ₂ e/kg nitrogen
Urea	1.98
UAN (30%N)	2.73
Ammonium sulphate	2.76
Ammonium nitrate (33.5%N)	3.52

The calculations do not include the carbon footprint of any packaging or palletising and are just the footprint in carbon dioxide equivalent terms for the products alone.

Foliar nutrition

Applying crop nutrients directly to plants for rapid absorption offers the potential to reduce the impact of crop inputs on soils and reduce the carbon footprint of crop production by increasing nutrient use efficiency.

Forestation

Trees offer major scope to capture and store carbon, potentially for many decades after harvest when used to replace non-renewable materials (eg buildings and particulate board). Within the origins of the OMEX group, the business gained experience and commitment to planting and living with forests and the current OMEX businesses supply products to the forestry industry to reduce the risk of disease spread in mature tree stands and to help nurture young trees to establish rapidly.

Summary

The OMEX group is already tackling some of the threats to our global environment but appreciates this is just the start. We have much to do in terms of renewable energy, ammonia emissions, watercourse protection, reducing plastic packaging and much we can help with in terms of preserving and enhancing soil health, reducing particulates, recycling nutrients and perhaps even re-forestation.