

Landustrie

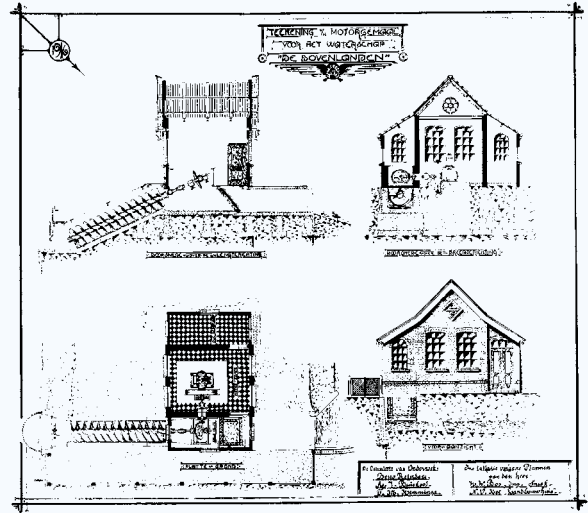
Landox flow boosters

Over 250 years of experience

2024 : a new chapter begins

The journey of our collective “water power” began in 1880 with the foundation of Hubert, followed by the establishment of Landustrie in 1913. Since the early days of our shared history, Frisian craftspeople have been developing sustainable solutions in our water world. In 2011, the addition of Desah’s innovative capabilities further strengthened our commitment to reliable quality.

As of 2024, we have begun a new chapter together. Noardling now combines the strength of three brands: Desah, Hubert, and Landustrie. This enables us to supply futureproof water technology solutions across the entire water cycle.



Landox flow boosters

Noardling is the world's leading solution provider for wastewater aeration. We have extensive knowledge and experience, and a strong track record in this field.

For more than half a century we have designed, manufactured, supplied, installed and maintained fine bubble aeration systems as well as surface aeration systems. These include low speed surface aeration impellers and horizontal brush aerators.

As a prominent manufacturer of innovative, durable, and highly efficient aeration systems, Landustrie introduced the vertical shaft LANDOX flow booster, in the 1980s. This flow booster offers the perfect solution for improving oxygen transfer, mixing, and propulsion in oxidation ditches fitted with fine bubble diffusers.



Aeration

Wastewater aeration is the process of adding air into wastewater to allow aerobic bio-degradation of pollutants.

The activated sludge process is the most common option in wastewater treatment. Aeration in an activated sludge process is based on transferring atmospheric air (O₂) into a liquid filled basin, promoting the cultivation and reproduction of micro-organisms which carry out the treatment process by breaking down organic matter.

Aeration also re-establishes dissolved oxygen levels in the final effluent in order to sustain plant and animal life when discharged into rivers and lakes.

Sustainable solutions

By supplying flow boosters that achieve an optimal water flow for increasing oxygen transfer and enabling a service life of 25 years or more, we provide a highly sustainable solution contributing to lower energy consumption, This results in a reduction of the carbon footprint and lowest possible total cost of ownership.

We can help you achieve a truly sustainable product by combining many years of aeration engineering experience with professional project guidance throughout the entire process.

Costs associated with processing are kept low by our specialists who provide expertise from the conceptual design phase through commissioning and start-up. This guarantees the delivery of environmentally friendly, sustainable and economically viable products.

Research & development

Even though we build the most durable and efficient vertical shaft flow boosters in the world today, we never rest.

We have our own in-house testing laboratory where we are able to develop new ideas into tested and proven products.

The LANDOX flow booster is the result of research in the field of aeration and extensive testing. We design and build customized LANDOX flow boosters to suit your needs. Each customized unit will perform as expected thanks to extensive knowledge, many years of experience and in-house development and testing.



Continuous aeration grids with LANDOX flow booster



Design

The LANDOX designed and manufactured flow boosters operate more efficiently and cost effectively than conventional horizontal shaft mixers. They stand out against conventional flow boosters due to their design, which combines operational benefits with self-cleaning capabilities, as well as ease of inspection and maintenance.

Once dimensioned with our proprietary software, Landustrie engineers utilize finite element analysis (FEA) software, which calculates all the stresses on the flow booster and civil structures to ensure a robust and reliable construction of the flow booster.

The LANDOX flow boosters are manufactured to include a hollow tube provided with 16 radially-mounted blades. This rotor is made of carbon steel, and held in place by a specially designed bearing, which is supported by the operating platform. A high efficiency motor and gearbox drive the rotor. The drive unit, bearings and lubrication points are accessible above the water level from the operating platform, which contributes to the ease of inspection and maintenance of the system.

Our engineers will incorporate the unique site-specific characteristics into the appropriate conceptual design. These site-specific variables can be accommodated through ingenuity and flexible engineering.

Manufacturing

To ensure the absolute highest quality product, we manufacture all of our LANDOX flow boosters at our factory in Sneek, The Netherlands. The factory is equipped to manufacture flow boosters in diameters of 700 up to 4000 mm in the required rotor length to suit water depths up to 10 m and channel widths up to 12 meter.

At our 15.000 m² state-of-the-art manufacturing facility, we have all of the latest technology to build the most durable and efficient flow boosters currently available.

From metal forming and welding, to application of corrosion protective coatings and paint, and through to the final assembly, each step of the manufacturing process is under our roof and importantly, under our quality control programs.

For example, in our facility we perform X-ray and/or ultrasonic tests in critical areas to further ensure your LANDOX flow booster will be a robust and reliable system for decades to come.

Noardling has earned and operates under ISO 9001 and SCC (Safety Checklist Contractor) certifications.



Oxidation ditch with fine bubble diffusers and Landox flow booster

Operation

In fine bubble aeration systems, mixing and aeration are two independent operations. In an oxidation ditch, the propulsion of the water can be achieved either by horizontal shaft boosters or by vertical shaft flow boosters.

The LANDOX vertical shaft flow booster ensures the required mixing of the medium and achieves a perfect plug flow operation of the wastewater over the entire water depth in straight or folded oxidation ditches. As a result, at least 10% better performance of diffusers is achieved. This performance superiority is achieved across a variety of flow systems, including aeration domes, strip-shaped diffusers or other similar systems. This leads to significant savings in required aeration energy, and in the reduction of CO₂ emissions.

Depending on the shape and the volume of an oxidation ditch the mixing and propulsion can be achieved using one or more LANDOX flow boosters. They are usually positioned in the bends of the oxidation ditch where propulsion energy can be utilised most efficiently. At that location flow resistance losses are the highest. By slowly rotating the flow booster (5 to 25 rpm) the water is pushed forward.

The required energy of propulsion (W/m³) for vertical shaft flow boosters is less than the required energy of propulsion for horizontal shaft flow boosters. The LANDOX flow booster achieves optimal mixing, ensuring that dead zones in the bends will not occur and therefore will be no settlement in the water.

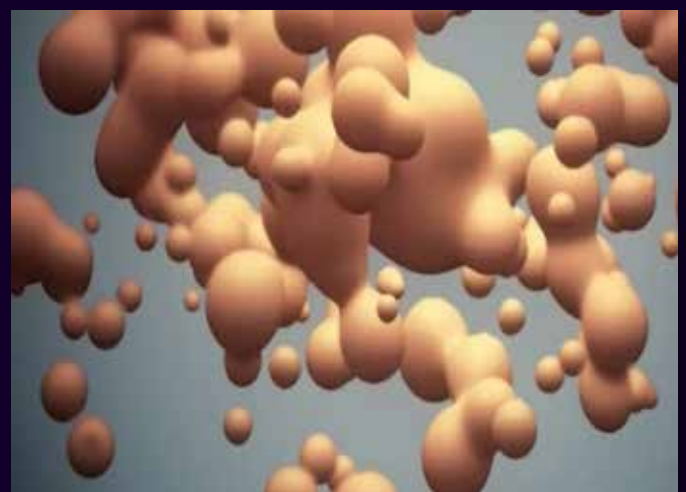
With conventional horizontal mixers, the direction of rotation is perpendicular to the flow direction, which leads to mixed zones and causes velocity gradients to occur.

As a result of these velocity gradients, the oxygen transfer efficiency of the fine bubble aeration decreases as the spiral flow pattern causes the fine bubbles to coalesce. Additionally, dead zones and short circuiting can be seen with the use of banana blade type mixers, as the mixing energy is not added to the areas in the ditch where the losses are the greatest.

LANDOX flow boosters stand out to conventional horizontal shaft flow boosters due to their unique design, positioning in the oxidation ditch, operational reliability, long service life and ease of maintenance.



No disturbance of air bubbles



Coalescence of air bubbles

Application

LANDOX flow boosters are used for the biological treatment of wastewater. They act to provide mixing and propulsion in oxidation ditches, thereby boosting oxygenation efficiency of fine bubble aeration.

A wastewater aeration system fitted with both fine bubble diffusers and LANDOX flow boosters will combine the oxygenation efficiency of fine bubble aeration, with the operational reinforcement and reliability of the flow boosters and the oxidation ditch stability.



Enhanced oxygenation capacity

The LANDOX flow booster acts to generate a plug-flow system that is distinctive in an oxidation ditch, thus achieving an almost laminar water flow through the channels across the whole depth of the oxidation ditch. This boosts efficiency of the fine bubble aeration system.

The LANDOX flow booster stands out against any other flow booster due to the distinctive plug flow conditions that it generates. As a result, fine bubbles originating from aeration domes or strip-shaped diffusers remain as fine bubbles over the total water depth.

The principle of a proper plug flow condition created by the LANDOX flow boosters ensures that coalescence of fine bubbles does not occur.

Therefore the oxygenation efficiency of the fine bubble aeration system increases significantly, saving at least 10% of the total aeration energy cost. Conventional horizontal shaft flow boosters generate a turbulent flow of the water rather than a plug flow, encouraging coalescence of fine bubbles and reducing the oxygenation efficiency.

The LANDOX flow boosters are ideal for use any form of fine bubble aeration, including aeration domes, strip-shaped diffusers or similar systems, as well as on any shape of oxidation ditch.

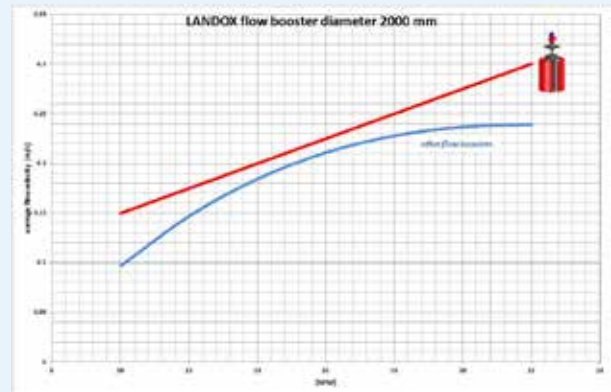
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Additional benefits



Ease of control

The degree of propulsion and of mixing power may be controlled by adjusting the rotation speed of the LANDOX flow booster. Variable Frequency Drives (VFDs) are a common method of adjusting the speed of rotation in order to optimize energy efficiency. This optimizes starting and stopping the LANDOX.



VFD control of Landox flow booster against conventional propulsor

Best use of space

Conventional horizontal shaft flow boosters require a substantial distance from bends and aeration grids, which reduces the maximum available space for the aeration grids.

LANDOX flow boosters are installed in the bends of an oxidation ditch, thereby allowing the use of continuous aeration grids throughout the full straight portions of the oxidation ditch.

This has a favourable effect on the oxygen transfer efficiency and also reduces the energy-consuming flow resistance, thus resulting in saving of propulsion energy and operating costs.

No settlement

The difference in velocity of the flow booster and the water velocity ensures optimal mixing. This ensures that dead zones in the bends do not occur, and prevents sedimentation from occurring in the water.

Optimisation

Fine bubble aeration systems can often be deployed more efficiently and effectively. A substantial amount of energy can be saved when the operation of the aerator is based on the real load of a treatment plant and not on the original design parameters.

Precise adjustment is very important in view of the fact that about 80% of the electric power at a wastewater treatment plant is consumed by aeration. In the design stage of a wastewater treatment plant, process calculations are based on the theoretical maximum load of the plant, including a projection of growth for the coming years. The conceptual design of a fine bubble aeration system is based on those initial values. But what happens when the actual load is much less than anticipated load, or when the circumstances are very different from those originally assumed?

By adjusting the operation of the aeration system to the actual plant load, the aeration efficiency can be improved considerably. This allows for energy savings as high as 30%, resulting in reduction of usage costs and consequently a reduction of the carbon footprint. We have developed a toolbox to evaluate and adjust the operation of an aeration system against the actual load of a treatment plant. The final objective of this scan is optimization of the aeration process, thus improving efficiency, power utilization, and durability. Whether employed in a new oxidation system or in a retrofit of an existing plant, Landustrie is the ideal partner to provide you the best technical and economic advice

Simple and robust

We guarantee simple and robust construction with the least possible material thicknesses by utilizing finite element analysis (FEA) software. This is performed for any steel grade from which the blades of the LANDOX flow booster are manufactured.

LANDOX flow boosters also lead the way in product quality, which is realized by superior reliability and longevity



Undesirable clogging of conventional mixers

Self cleaning and non-clogging

Conventional flow boosters are sensitive to clogging by means of fibres, rags or other kinds of fouling. Due to the unique design and method of propulsion of the LANDOX flow booster, the system is self-cleaning and insensitive to clogging.

Proven technology

The LANDOX flow booster is an advanced development based on proven technology. The proper and satisfactory functioning has been demonstrated worldwide at various wastewater treatment plants.

Preparation & design

Already from the first design, our engineers can guide you. Assisting with the design, layout, materials or the pumping regime, all can be done with the cooperation of the experienced engineers.

As no two sites or projects are alike, early engagement with Landustrie as a manufacturer, will in the end lead to a top class performing pump system, both in a cost effective and an energy efficient way. This can only be achieved by the tailor made designs, perfectly engineered for your projects.



Installation & commissioning

Our teams are renowned for the quality of work in the field. Under any condition, the installation teams are able to deliver high quality and fast solutions. On-site tuning to your specific site characteristics is one of the skills of the team.

The Landox flow booster can always be installed by our specialised installation teams. Another option is the use of our supervisors, who will ensure proper installation of the screw, together with a local team.

Refurbishment

We can restore the quality, performance and reliability of our Landox units.

This could also lead to a more cost and energy efficient installation than what was originally supplied.

The refurbishment route always starts with an analysis of the current system demands and status of the installation. Then either renovation of the current Landox and parts will be advised or (a partially) renewal. The end result will be the same, an upgraded Landox, running at high efficiency and ready to serve you for the years to come!

After sales

The knowledge of the manufacturing process and the decades of experience of operating and maintaining Ladox flow boosters, makes us the clear choice to provide full after sales support for any unit.

The after sales is not restraint to spare parts only, but includes all from repairs and problem solving, to maintenance, training and upgrades.

For more information:

AFTERSALES@NOARDLING.NL



Sales meeting, canal boat Amsterdam, The Netherlands

Expertise

Using the experience of installing numerous Ladox units, our team of experts is available for your service. Our staff understand and are able to analyse the complete plant processes in order to increase the effectiveness of any installed screw pump.

In case of any problems a Noardling expert can observe, analyse and find the root cause of the problem. Our experience learns that in general this can vary from an incorrect pumping regime, local conditions or design and manufacturing defects caused by third-party involvement.

Together with you as a client, the team of experts will work towards finding the solution and solving the issue.

Maintenance

Both preventive and if required, corrective maintenance for the installation, can be provided by us. With a special service department, maintenance routines can be scheduled together, likewise urgent repairs can be handled by us straight away, when and wherever they may occur.

Furthermore, replacement parts are easily available and can be quickly dispatched to your site for quick maintenance, ensuring the all important system up-time is achieved.





Landustrie

Water Treatment Solutions

Landustrie is part of Noardling

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Noardling

Futureproof Water Technology

The Noardling company is engaged in Futureproof Water Technology. With more than 250 years of experience in moving and treating of water.

Noardling brands:



Desah

Decentralised Wastewater
Solutions



Hubert

Water Screening
Solutions



Landustrie

Water Treatment
Solutions