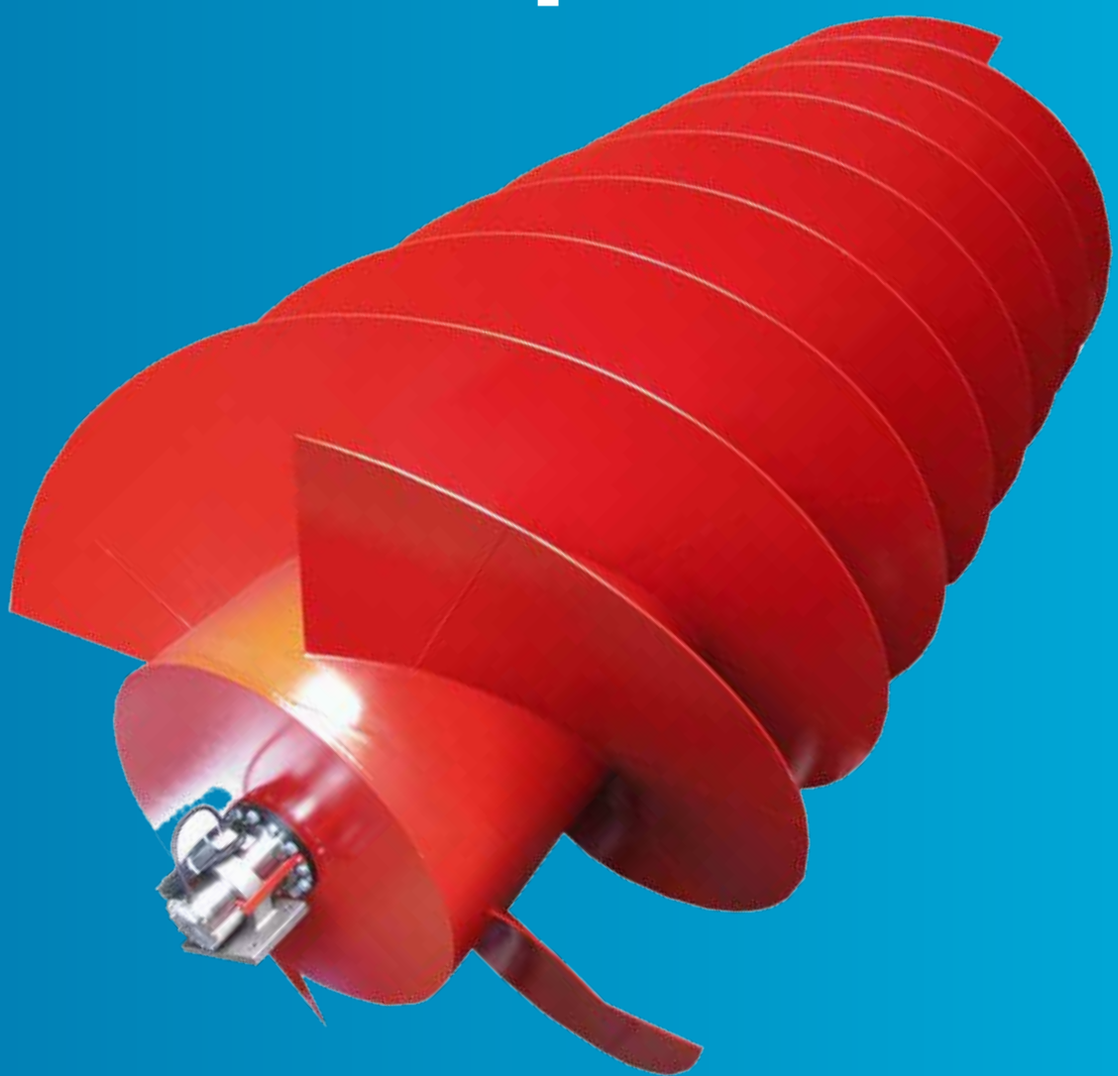
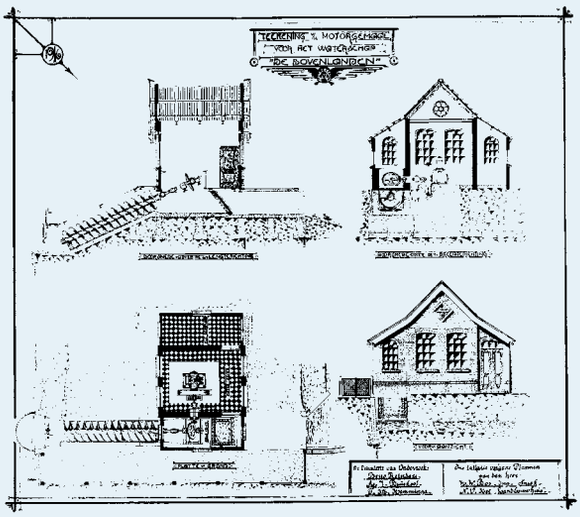
Landy

Archimedes Screw Pumps



desah HUBERT Landustrie



OVER 100 YEARS OF HISTORY

- In 2013 Landustrie celebrated its 100th anniversary.
- The foundations were laid around 1913, when the company was active in the agricultural sector and the evolving phases of polder drainage. As early as 1916, electrically driven pumping stations were installed with Landustrie Archimedes screw pumps alongside countless wind driven pumping stations. Screw pump design progressed rapidly and in addition to the polder drainage pumps, a range was developed to handle sewage. By the 1950s these advances contributed to wastewater purification units being used widely and efficiently.
- Today, Landustrie is a state of the art manufacturing and engineering company, combining traditional proven products and techniques, with high-tech innovations.

Landy Archimedes screw pumps

Based on the ancient design of the Greek scientist Archimedes, but introduced and altered for land reclamation projects in the 17th century, the Archimedes screw pump made its way into the Dutch minds, thanks to engineer Leeghwater.

Landustrie did step into this tradition of water technologies and made the LANDY Archimedes screw pump applicable for a wide variety of liquid pumping solutions.

For you as a customer, Landustrie can combine different roles from engineering, project guidance through to manufacturing, installation and maintenance for secure operation. Therefore, we are able to keep the costs low, and to work with you on efficient, qualitative solutions that improve the world!

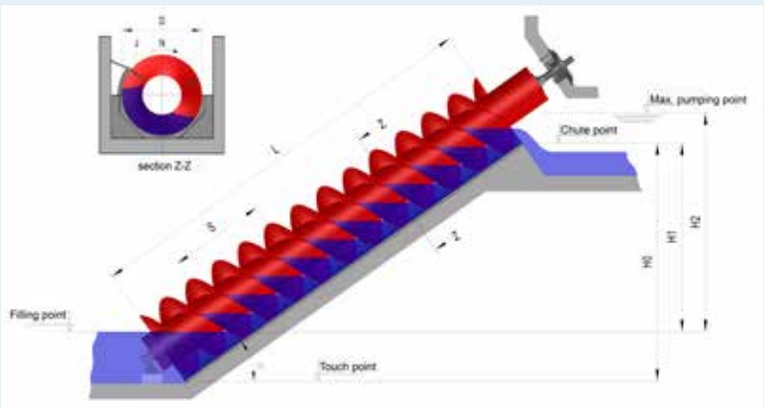
Over the years, Landustrie has collected much specific know-how about the performance of the screw pump. This knowledge makes it clear that there is no standard screw pump. fulfil your pump challenges in a satisfying way.

Veenhuizen, Netherlands

Design

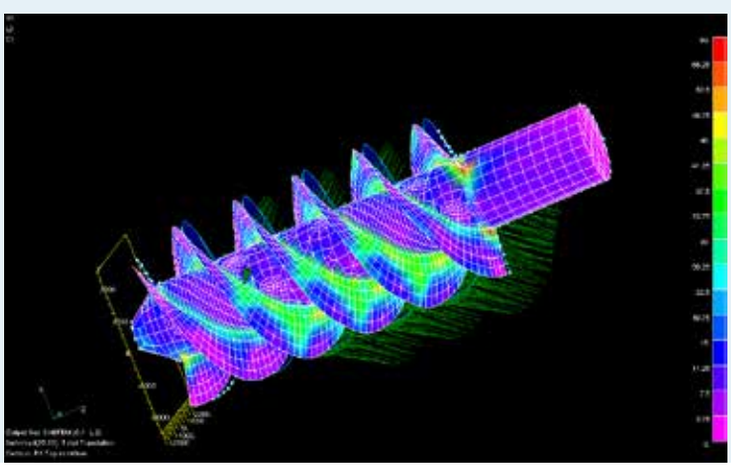
D = Diameter
J = No. of flights
S = Pitch
L = Flight length

H0 = Touch to Chute point
H1 = Filling to Chute point
H2 = Lift (dynamic)
α = inclination



Given the local requirements of flow and head of the screw pump system, the Landustrie engineering team will design the best solution possible. This can lead to a solution up to a 25 m long screw at a maximum angle of 40°. Based on a diameter between 250 mm up to 5000 mm! Landy screw pumps can be designed to lift up to 12 m in height with a maximum flow of 12.000 l/s.

Where the demands can't be met with one screw, the solution can be to place multiple screw pumps, either in series (stepped from one screw pump to another to achieve higher, virtually unlimited lifts) or in parallel (screw pumps next to each other to achieve higher flow rates with no upper limit in flow)! Every design will be according to the special selection software and analyzed using finite element analysis (FEA) software.



Research & development

Even though Landustrie builds the most durable and efficient screw pumps in the world today, we never rest. We have an indoor testing laboratory where we are able to develop new ideas into tested and proven products.

In our development laboratory, we configure full size screws and incorporate new designs and ideas, then run them through rigorous testing and analysis using digital monitoring systems. In this way Landustrie can produce real life results, not just computer generated theory and provide digital results made possible by the use of computational finite element methods.

The end result? The screw pump system we design and build for you will perform as expected thanks to years of experience and in-house development and testing.

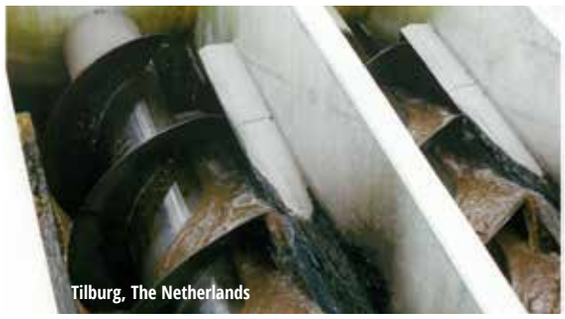
Manufacturing

To ensure the absolute highest quality product, we manufacture all of our screw pumps in our purpose built factory in Sneek, The Netherlands, which is equipped to build more than hundred screws per year.

In our 15,000 m2 state of the art manufacturing facility, all under one roof with our office buildings, we have all of the latest technology to build the most durable and best performing screw pumps currently available. From metal forming and welding to corrosion protective coatings and painting, through to final assembly, each step of the manufacturing process is under our roof and importantly, under our quality control programs.

In our facility for instance, we X-ray and/or perform ultrasonic tests in critical areas to further ensure your screw pump will be a robust and reliable system for decades to come. Landustrie have earned and operates under ISO 9001-2008 and SCC (Safety Checklist Contractors) certifications.

Schlitterbahn Kansas City Water Park, USA



Tilburg, The Netherlands

Operation

The LANDY Archimedes screw pump is the prime example of a positive displacement pump. The screw pump draws a fluid into a compartment (volume between two blades) at the inlet and by rotating it moves the fluid upwards, when the screw is placed on an angle. This principle always applies to a screw pump, disregarding size or design.

This simple and reliable way of pumping a fluid leads to possible high volumes being lifted with low rotational speeds and no chance of cavitation damage or undue wear.

The open, clog-free construction allows continuous operation, even when the fluid contains large particles or debris.

Applications

The LANDY Archimedes screw pump is suitable at any location where a need exists to pump a liquid to a higher level. Therefore, there is wide variety of locations where our screw pumps are currently operating, from the cleanest swimming water to the most filthy wastewater to be imaginable.

Examples are:

- Influent pumping stations in WWTP
- Intermediate pumping stations in WWTP
- Return sludge pumping stations
- Irrigation projects
- Drainage projects
- Reclamation of wetlands (polders)
- Storm water applications
- Industrial processes
- Wild water rides in fun parks

Screw vs. centrifugal pump

As the Archimedes screw pumps are positive displacement pumps, the centrifugal pumps are based on pressure. This essential difference results in a different approach on lifting fluids.

The working conditions for centrifugal pump are different, requiring a fine mesh screen to block large debris as they can't be handled. Also higher operating costs and a lower constant efficiency over the operating range are present compared to a screw pump.

Bugolobi Nakivubo, Uganda

Basel, Switzerland

Low operation costs

Landustrie strives to create economically efficient projects, with the LANDY Archimedes screw pump at the core of the project. This starts with a competitive installation cost, but continuous when operating. With the experience of over a century and installing thousands of screw pumps, Landustrie has been able to develop a complete system where the operation costs are kept low.

This is realized by the initial design of components, together with the pumping regime. Both of these elements are critical to ensure the low operation costs in the long term.

Low wear by the low rotational speed, high quality of the Landy manufactured and selected components are key. Finally, superior customer support, ensures that maintenance and replacement costs are limited.

Wide working range

When a LANDY Archimedes screw pump is selected for a specific location, the in-flow and out-flow levels are precisely set at the optimum points to ensure peak efficiency and lowest possible operating costs.

However, even when the lower water levels vary, the LANDY Archimedes screw pump maintains its high efficiency. The pumping capacity will automatically adjust based on the available flow and water level. Even if the flow drops to only 20% of the designed flow, the screw pump will maintain its high efficiency. In fact, the screw pump can run completely dry without damage to the pump!

Optionally a VFD can be installed to alter the speed of the screw, resulting in controlled change of pumped flow and upper and lower level.

Efficiency

Landustrie is renowned for manufacturing the most efficient screw pumps. Combining the best design with the best choice of equipment makes the LANDY Archimedes screw pump superior, both in effectiveness and energy consumption. The inherent advantage of a broad working range, whilst keeping the efficiency at a high level, is mastered by the Landustrie engineers.

The design of our Archimedes screw pump adds to the high efficiency: precision manufacturing processes result in minimal clearance between trough and screw and significantly reduced losses and operating costs. This craftsmanship of designing and manufacturing is both applicable on the screw and on the trough.


Quan Chout, Vietnam

Quiet & protected

Installing machinery into a new environment, should never result in detrimental sound levels.

Careful design, based on the flow and level, is one of the solutions to eliminate or reduce noise levels. Many years of experience in our laboratory has resulted in the quietest running screw pumps in the world. Additionally, covers over the screw and a proper powerhouse design can be applied, ensuring no significant impact on the surrounding sound levels and if necessary protection against environmental impact like sun or snow.

Lingen, Germany

Ras Laffan, Qatar

Fish friendly

All our screw pumps have a standard high level of fish friendliness based on the low rotational speed and large openings between the blades, as proven by several scientific tests on which Landustrie has cooperated.

In addition, a special “wristband” around the outside diameter of the screw has been developed by Landustrie. This “wristband” rotates in the trough with a small clearance. This unique LANDY design prevents damage to fish at the inlet where the blade and trough interface meet.. The diameter of the blades will be increased gradually from the tube towards the outside diameter of the screw pump. The blades will ultimately merge with the “wristband”.

A thicker round edge at the beginning of the blades cause pressure waves which are recognized by the fish, leading the fish away from the blades. Resulting in the most fish friendly screw pump available!

Harrison Hot Springs, Canada

Fish friendly “wristband” and rounded edges (red)

Durable & trouble free

The LANDY Archimedes screw pump operates at a relatively low rotational speed, resulting in very low levels of wear and tear on the mechanical components, ensuring decades of trouble free operation. The screw is able to cope with large debris, resulting in a system that operates trouble free and with a low level of maintenance.
As the screw pump can be applied in different fluid environments from clean to high grit or acidic conditions material selection is crucual to ensuring a long trouble free life time. Landustrie is able to apply different materials and coatings to guarantee trouble free operation in virtually all water conditions, for the years to come.

Lower bearing

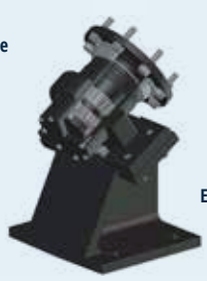
At the lower end of the screw, a bearing is installed to keep the screw in place and to absorb the radial forces. Landustrie has developed 3 types of lower bearings, suiting different demands.

The first type is the ECO-friendly bearing, where the lubrication occurs by an oil bath system, excluding contact between the lubricant and the fluid. Low installation costs and time and the 3D alignment are the other big advantages of this maintenance free bearing.

There are two grease type bearings: conventional and long life. These grease lubricated bearings have a similar installation time and operational costs. The long life bearing has a longer lifetime due to its special 3D alignment.

Conventional grease

Long life grease



ECO-friendly

Water-in-oil detection

As the lower bearing is placed under water, inspection is a difficult task to perform, therefore Landustrie invented the water-in-oil detection alarm.

This alarm system will give a signal when a certain amount of water, or other conducting medium, enters the lower bearing and has polluted the oil in the bearing housing. All LANDY ECO lower bearings can be fitted with the water-in-oil detection, as well as they can be retrofitted to existing bearings.

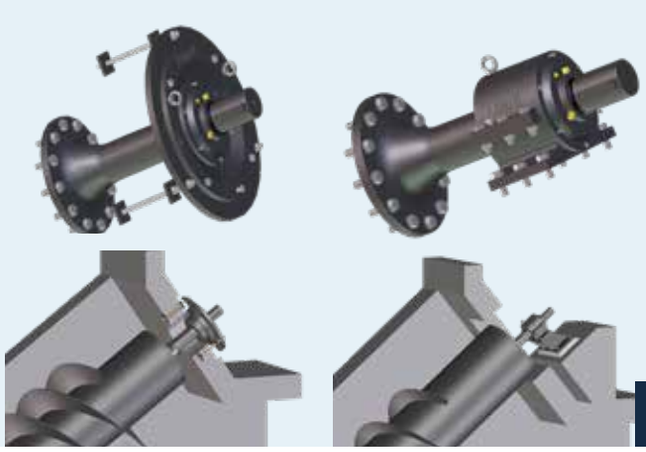
ECO- friendly lower bearing with water-in-oil detection

Upper bearing

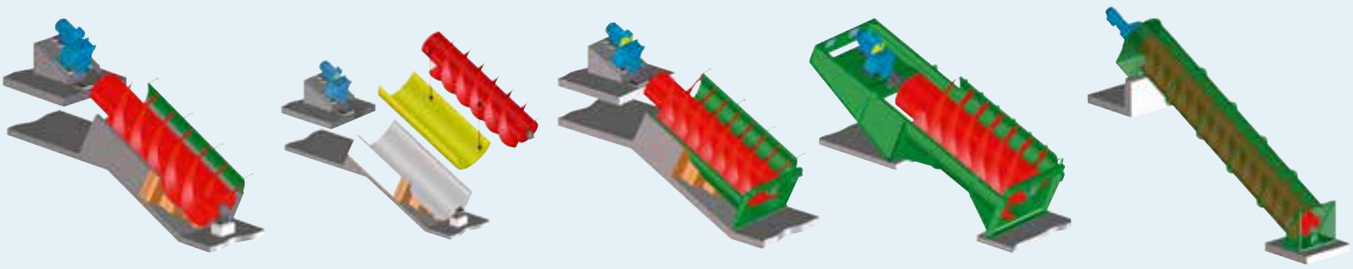
The standard upper bearing, is a LANDY foot-mounted bearing. This specially designed Landustrie bearing, is mounted on a foot at the inside of the drive unit room, leaving the tube of the screw rotating in the wall. If a watertight drive unit room is not required, a LANDY foot-mounted bearing is the bearing to choose.
The LANDY wall-mounted bearing is a unique bearing fully designed, tested and patented by Landustrie. The bearing is mounted to the wall with special anchors, instead of to the floor. Using a special seal on the outside and an extra concrete closure on the inside, the drive unit room can be made completely gas- and airtight.
This gives an advantage in hazardous areas (explosion proof). An extra advantage is that the forces on the civil construction will be absorbed over a larger area, reducing stress on the civil structure.

Wall-mounted

Foot-mounted



Type of trough



Concrete trough:

The trough shape is made of concrete. The screw is used to grout the exact shape, by rotating at low speed and using special mortar. The drive unit is attached to a concrete foundation.

Casting mould:

A Landustrie casting mould (yellow) is used for concreting the trough. After casting the mould is removed and the screw is placed into position. The drive unit is attached to a concrete foundation.

Steel trough suitable for grouting:

The steel trough is fastened at the structure and then casted with concrete. The drive unit is attached to a concrete foundation.

Compact trough:

This trough is fully self-supporting, including the drive unit. At both ends there will be a small foundation where the trough will be attached.

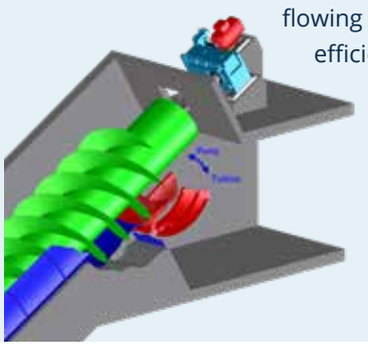
Tube trough:

A tube is functioning as a trough. Resulting in a fully self-supporting system. The drive unit can be either attached to a concrete foundation or to the steel tube trough.

Landy hydropower screwpump

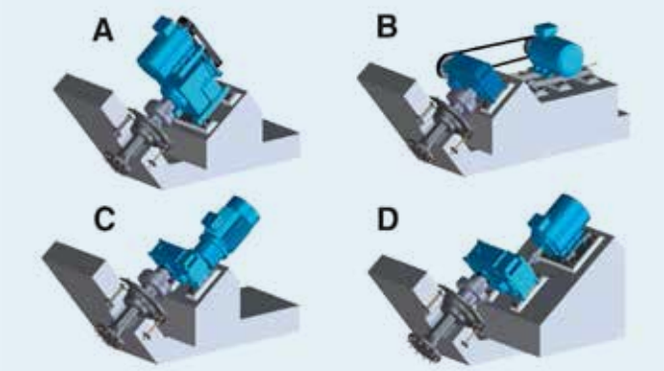
In some situations, where a combination pump storage/hydropower generation system is possible, we are able to provide a LANDY hydropower screw pump; all in one machine!

This is the result of having the technology of the LANDY Archimedes screw pump and the technology of the LANDY hydropower screw available in-house. Our engineering team combined the qualities and characteristics of both types of screws. In such projects a standard screw pump is equipped with a movable chute point in order to accommodate both functions. And for these cases the electric motor can also run as a generator. To minimise the project costs, and to yet harness the power that the flowing water contains in an efficient way, the screw is also designed with a special blade.



Hydropower screw pump for waterway Wilhelminakanaal, Tilburg, the Netherlands

Drive units



Depending on the local circumstances there is a choice of different drive unit arrangements as shown in the figures above. Arrangement A and B have an extra belt transmission between the gearbox and the motor. In option A the motor is located on top of the gearbox and in B, behind the gearbox. Arrangement C and D have a direct coupling between the motor and the gearbox. At option C, the motor is flange mounted to the gearbox, whereas at D, the motor is mounted to the concrete foundation. Our engineering team can help you to make the right choice in drives.

Preparation & design

Already from the first design, the Landustrie 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 projecst 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.

Zuid- en Noordeinderpolder, The Netherlands

Installation & commissioning

The Landustrie 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 LANDY Archimedes screw pumps can always be installed by our specialised installation teams. Another option is the use of Landustrie supervisors, who will ensure proper installation of the screw, together with a local team. Besides installing the Landustrie manufactured screw pumps, our teams are also capable of installing screws manufactured by others.

La Chapelle. France

Brunei, Brunei Darussalam

Refurbishment

Landustrie can restore the quality, performance and reliability of any screw pump installation, including those delivered by other manufacturers. 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 pump screw and parts will be advised or (a partially) renewal. The end result will be the same, an upgraded pump screw installation, running at high(er) efficiency and ready to serve you for the years to come!

After sales

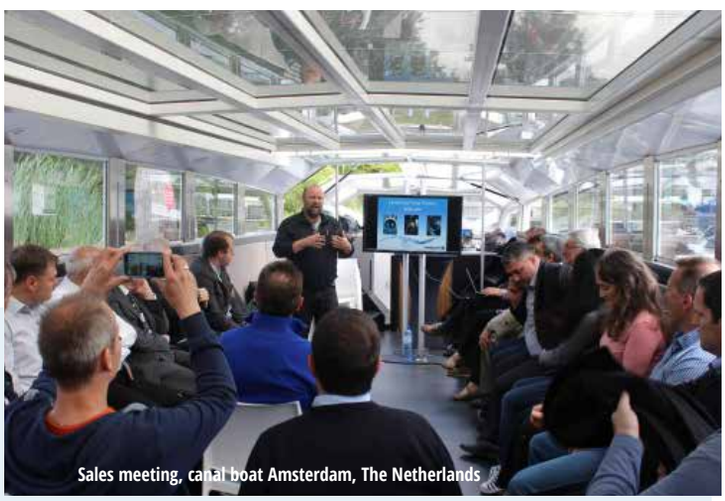
The knowledge of the manufacturing process and the decades of experience of operating and maintaining Archimedes screw pumps, makes Landustrie the clear choice to provide full after sales support for any screw pump. The after sales is not restraint to spare parts only, but includes all from repairs and problem solving, to maintenance, training and upgrades.

Even if the original Archimedes screw pump is not manufactured by Landustrie, we can assist with and supply the required after sales services and parts.

For more information:

aftersales@landustrie.nl

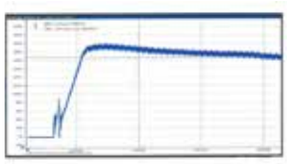

Baraki STP, Algeria

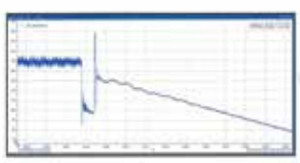

Sales meeting, canal boat Amsterdam, The Netherlands

Maintenance

Both preventive and if required, corrective maintenance for the installation, can be provided by Landustrie. With a special service department, maintenance routines can be scheduled together, likewise urgent repairs can be handled by Landustrie 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.





Expertise

Using the experience of installing hundreds of screw pumps each year, 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 Landustrie 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.

Over 250 years of experience in water handling and treatment

From water intake systems to water cooling, from water management to wastewater treatment, hydropower, pump installations, and award-winning innovations in decentralized wastewater treatment; DeSaH, Hubert, and Landustrie have joined forces. Based in Sneek, Friesland, our craftsmen develop and manufacture future-proof solutions with an above-average lifespan.

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