



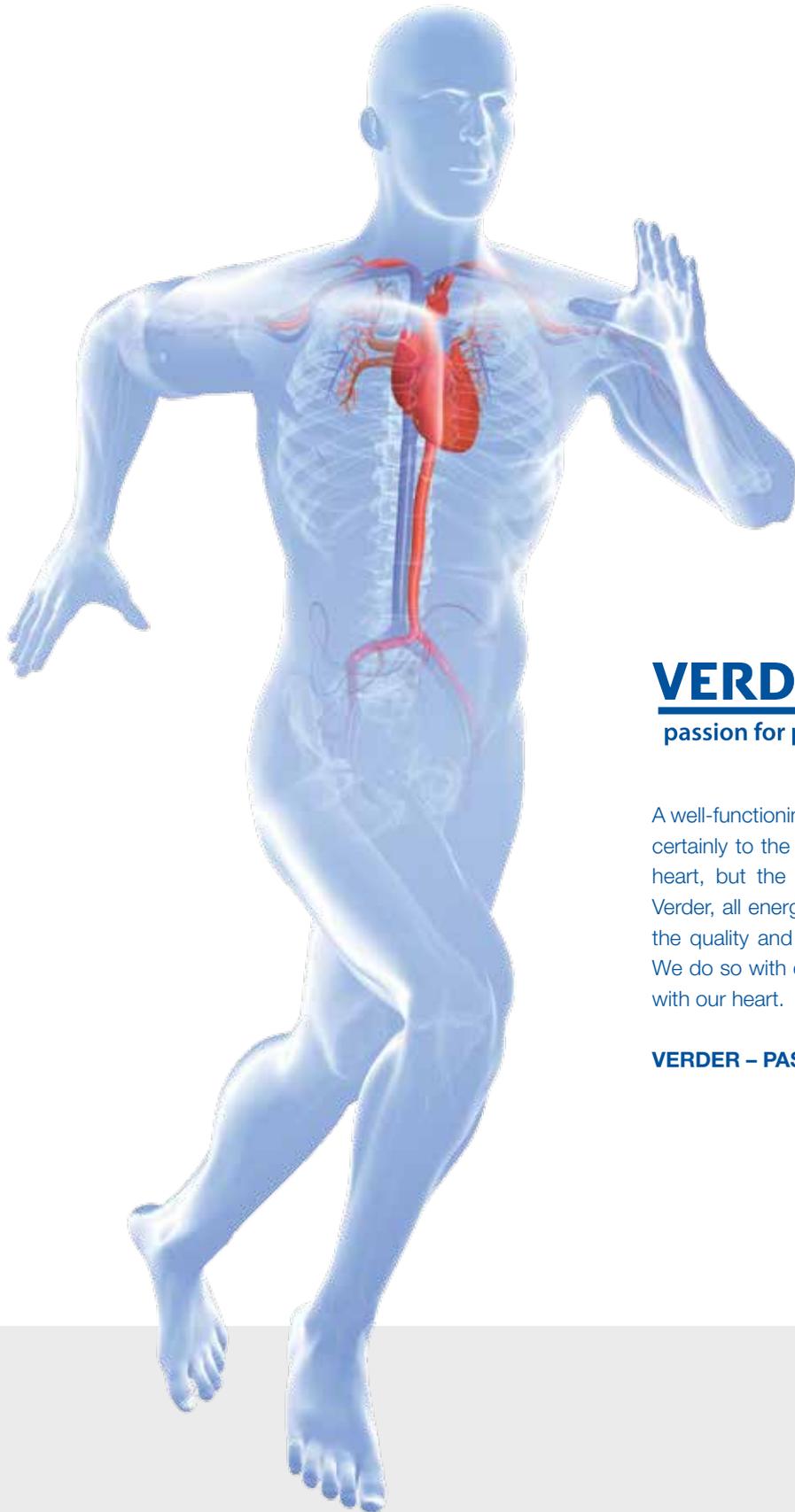
VERDERGEAR **PRODUCT OVERVIEW**

Gear pumps made by *Liquiflo*



Benefits

- *Mag-drive pumps – Safe and leak-free*
- *Virtually no pulsation – ideal for metering applications*
- *Low NPSH_r – smaller pipe diameters are required*



VERDER

passion for pumps

A well-functioning pump helps you succeed. That applies certainly to the most important pump in life, the human heart, but the same goes for pumps in business. At Verder, all energy and attention is focused on improving the quality and performance of our pump and service. We do so with energy, dedication and most importantly, with our heart.

VERDER – PASSION FOR PUMPS



THE VERDER GROUP

- 1 Company
- 27 Countries
- > 55 Years of expertise
- Global network
- Local distributors
- In-house service & maintenance
- A solution for every application

The Verder group is a family owned business formed over 55 years ago in the Netherlands; the group consists of a worldwide network of production and distribution companies. Group companies are involved in the development and distribution of industrial pumps, pumping systems, high-tech equipment for quality control, research and development into solid material (solids sample preparation and analytical technologies). The Verder Group employs over 1600 people and has an annual turnover in excess of 380 million Euros.

One of the successful Verder technologies is the innovative Verdergear mag-driven external gear pumps range.

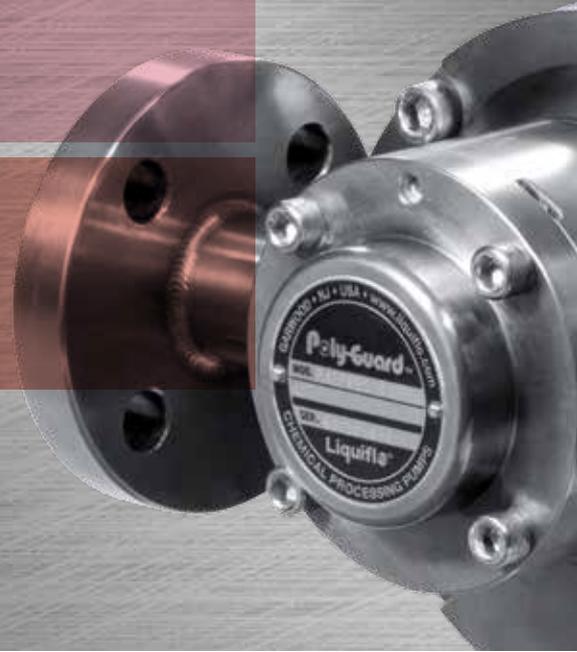
Verdergear external gear pumps

Verdergear is a core Verder group product, solving pumping problems in a wide variety of industries. A gear pump is often used for pumping very low to very high viscous liquids. Gear pump are also used for transferring and dosing expensive media. Thanks to the magnetic coupling it is safe and leak-free.

Application areas are found at purification and treatment for the dosing of polymer solutions and cleaning agents, in the pharmaceutical industry for transfer of peroxide solutions, dyes, fragrances and perfumes, in refineries and chemical industry as well as for OEM applications such as analysis equipment, cooling units or X-ray equipment.

Verdergear pumps have been developed for precise metering and dosing applications. Since 1972 the Verdergear process range has been produced by Liquiflo – a well known US manufacturer.

VERDERGEAR **GEAR PUMPS**

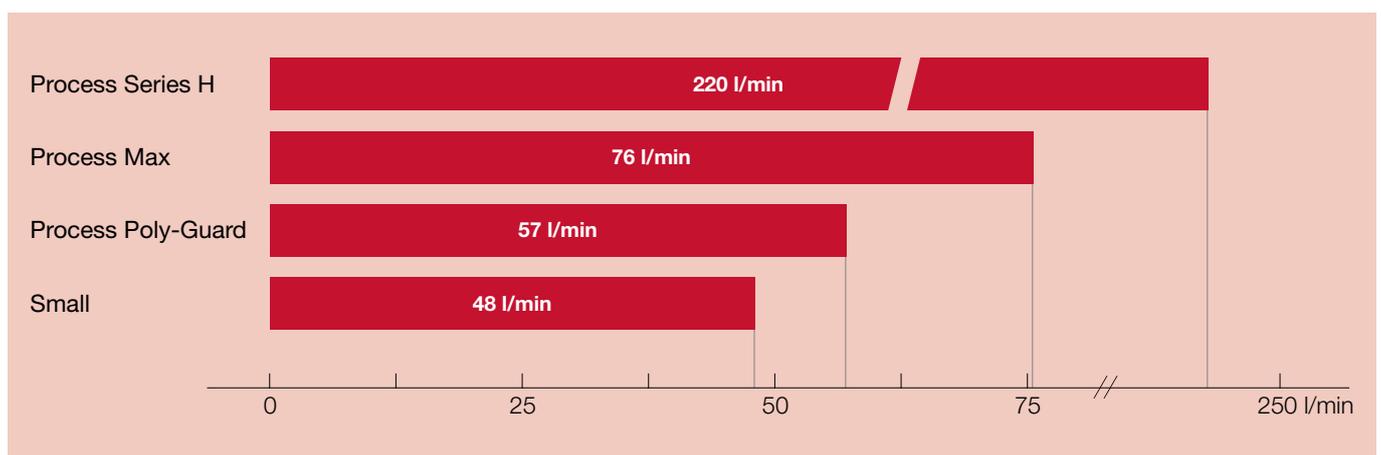


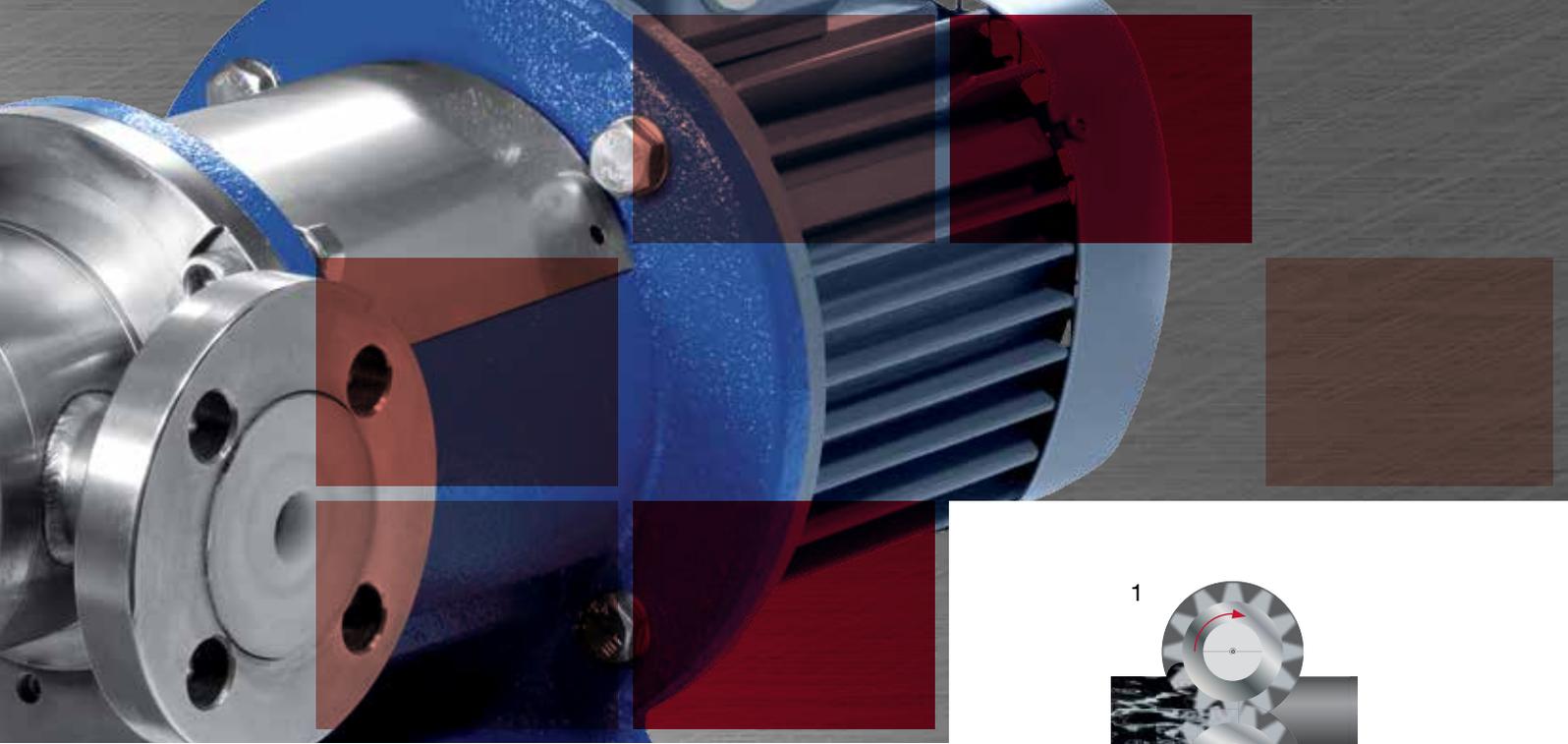
Verdergear mag-drive external gear pumps are made for the safe and leak-free pumping of high and low viscous fluids. They are the best solution for pumping a wide variety of media like additives, oils or polymers. Due to the virtually pulse free flow they are perfect for metering and dosing applications.

Verdergear characteristics

- Virtually no pulsation – ideal for metering applications
- A flow accuracy of 0,5 % can be achieved
- Magnetically-coupled pumps are safe and leak free
- Smaller pipe diameter due to low NPSHr
- A wide range of viscosity (0,3-100.000 mPas)

Verdergear **Performance Overview**

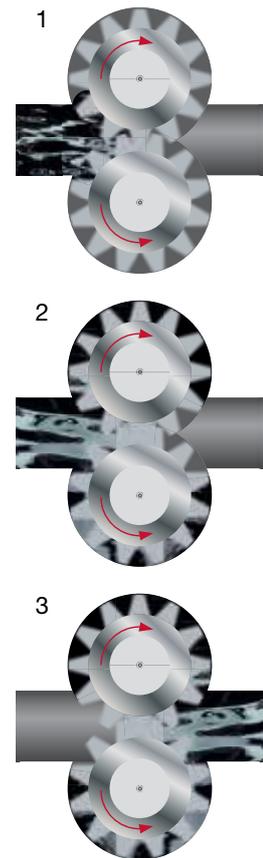




How does a **gear pump** work?

The external gear pump employs a positive displacement working principle, generally used for the transfer and metering of liquids. A drive gear rotates an idler gear in the opposite direction. As the gear rotates, the liquid is trapped in between the gear teeth and transferred from the inlet side to the outlet side. As the fluid is moved around the gears at a constant speed, a pulsation-free flow is maintained.

- 1 The pump is primed with the fluid filling the empty space between the two gears.
- 2 The fluid is then caught between the gears and is transported to the discharge side.
- 3 The fluid exits from the discharge side.



What are **your benefits** using a Verdergear gear pump?

Mag-drive pumps – safe and leak-free

Mag-drive pumps are ideal to use for difficult-to-seal applications that involve hazardous or volatile chemicals. The patented Dual-Kan controls the temperature and compensates eventual eddy current losses.

Virtually no pulsation - ideal for metering applications

This allows flows to be easily and accurately measured with standard flow meters. Pipe diameters can be much smaller in relation to those used with pulsating pumps, whose pipe diameters are based on high instantaneous flow rates.

Low NPSHr – smaller pipe diameters are required

Gear pumps require less NPSH because of their steady non-pulsating flow characteristics. Pumps with a pulsating flow characteristic like air operated diaphragm pumps or piston pumps require a higher NPSH because of their pulsation. The NPSHa decreases further as the viscosity of the fluid increases. No ancillary components such as pulsation dampeners are needed.

THE VERDERGEAR PROGRAM

An overview

The Verdergear gear mag-drive external pump program offers you a wide range of possibilities. From low to high viscosities, temperatures and pressures.



Verdergear Small

Small, compact and powerful gear pump

These mag-drive gear pumps have no shaft seals and are therefore absolutely leak-free. These pumps are ideal as an OEM pump. The pumps are dosing very small quantities precise and reproducible.

Max. flow	48 l/min	Max. pressure	17 bar
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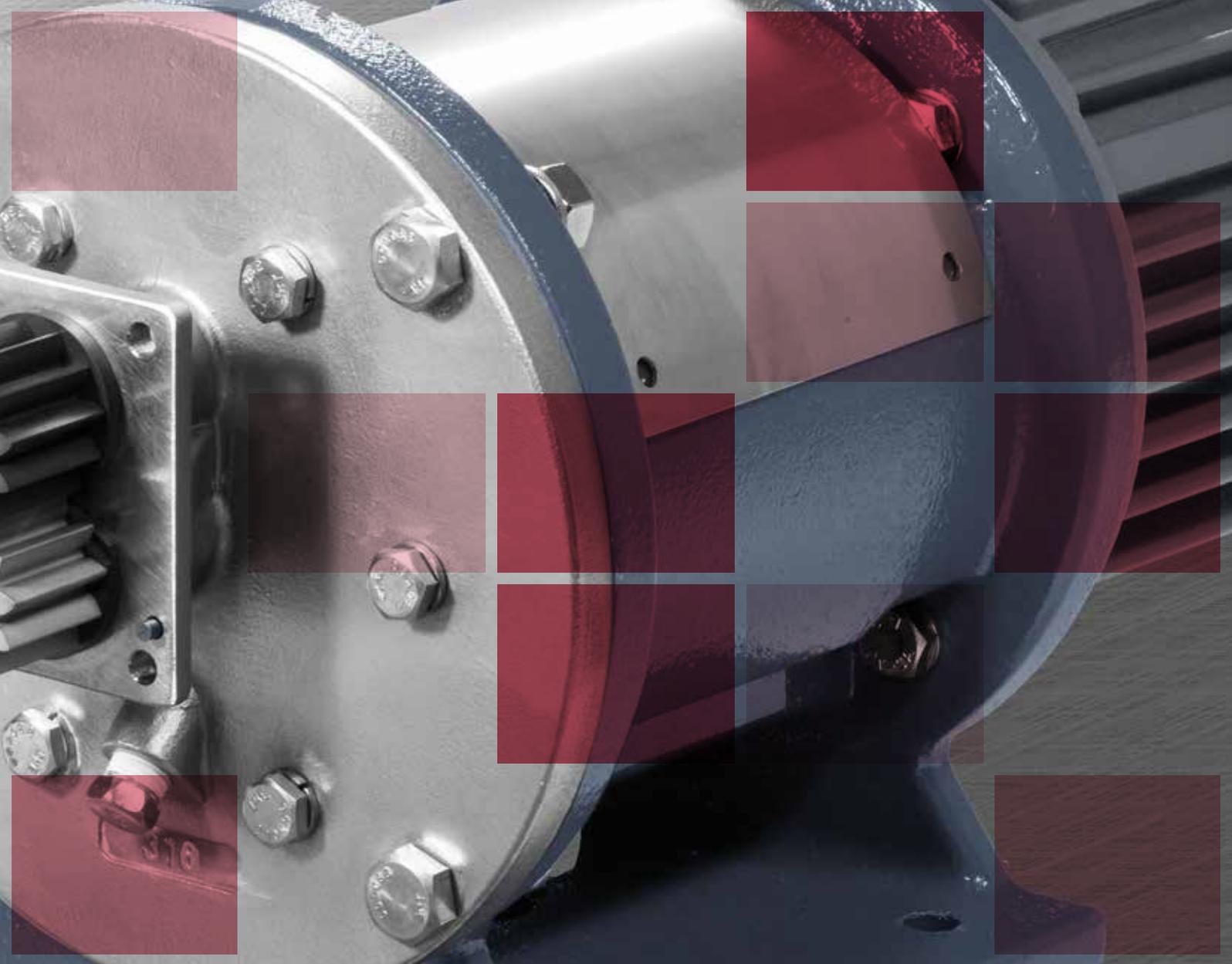


Verdergear Process H

Powerful process gear pump

The Verdergear Process series consists of twelve models for a wide variety of performance areas. The over-dimensioned bearings, shafts and screws guarantee a long life.

Max. flow	220 l/min	Max. pressure	15 bar
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Verdergear Process Poly-Guard

Polymer-lined stainless steel gear pump

The PFA lined gear pump is the best choice for inorganic acids, alkalis and salts. The PFA lining provides an excellent chemical resistance against corrosion, and makes the use of an expensive metal alloy pump superfluous.

Max. flow	57 l/min	Max. pressure	7 bar
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Verdergear Process Max

High pressure gear pump

The Verdergear Max series is designed for high pressures up to 24 bar. The newly developed helical gears reduce the tooth flank forces to create a calmer and quieter pumping action.

Max. flow	76 l/min	Max. pressure	24 bar
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VERDERGEAR **KEY FACTS**

With an extensive selection of corrosion-resistant and wear-resistant materials, sealing configurations and ancillary options, Verdergear gear pumps can be custom engineered to handle a wide range of chemical pumping applications.

Metering

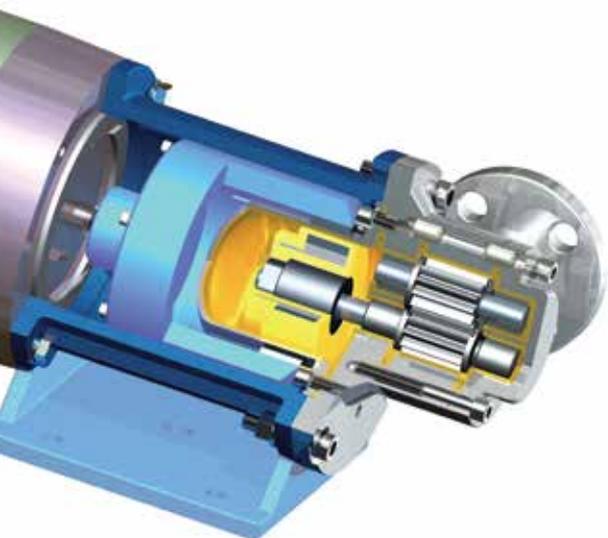
Liquiflo gear pumps are used in metering systems where the motor rpm is controlled to regulate the pump output. Flow rate, pH levels or rpm can trigger the control of feedback signals.

High-viscous Fluids

Water treatment polymers and food materials up to 100,000 mPas are typical of the high-viscosity service of the H-Series gear pumps. When pumping high-viscosity materials, it is normally preferred to use larger size pumps running at slower speed to allow these thicker materials to enter the pump and fully fill the gear teeth cavities. Since slip is not a concern with high-viscosity fluids, gear outer diameters are usually trimmed to increase the pump efficiency. Running larger pumps at lower speed has the additional benefit of extending pump life, decreasing pipe friction losses and reducing fluid shear.

Low-viscous Fluids

Liquiflo specializes in pumping low viscosity liquids using gear pumps. Since low viscosity fluids have little to no lubricating properties, Liquiflo uses gears made from carefully chosen engineered plastics such as PEEK or Teflon that have substantial self-lubricating properties as well as excellent wear and corrosion resistant properties. In addition, we use hard-coated shafts that exhibit extreme resistance to wear in the journal-bearing areas even when pumping extremely thin fluids. Liquiflo has pumped liquids with viscosities as low as 0.3 mPas with impressive results. We have documented applications of pumps running in excess of 24,000 hours on 0.6 mPas liquids.





Crystallizing Fluids

Crystallizing fluids can be problematic for pumps with single mechanical seals. Fluids that crystallize when exposed to air can cause a crystal build-up around the edges of the seal faces, causing damage and premature seal failure. For this service, Liquiflo offers pumps with double mechanical seals or sealless magnetic drives. In both cases, the pumped fluid is isolated from the air, preventing crystallization. The double seal uses a pressurized barrier fluid system to contain the pumpage and flush the seal faces.

High-Temperature Fluids

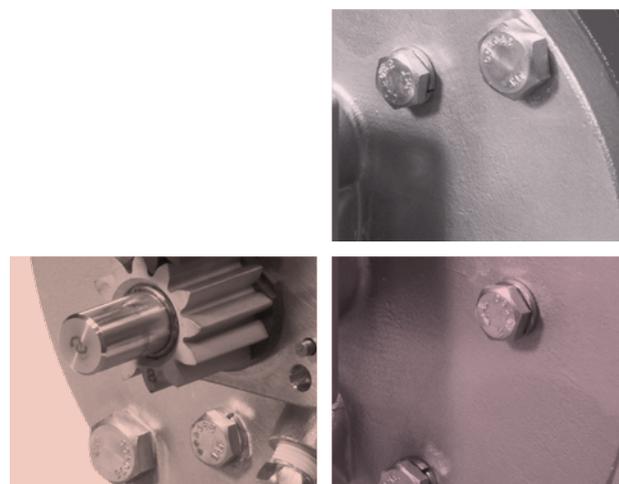
Solid or high viscous chemicals at room temperature can be effectively pumped once they are heated to a more fluid state. Liquiflo offers several materials and ancillary options for this purpose. Liquiflo's pump selection process evaluates the effect of temperature on any nonmetallic components inside the pump. If necessary, these parts will be trimmed to ensure effective and efficient operation at the pumping temperature. The ancillary options include the Liquiflo Temperature Control Jacket, Dual Kan® and Power Frame.

Low-Temperature Fluids

Antifreeze, refrigerants or liquefied gases are typically pumped at temperatures below 20 °C. Liquiflo has successfully pumped cold or cryogenic liquids with mag-drive pumps using special purpose materials and equipment. The Liquiflo Temperature Control Jacket and Dual Kan® are available for applications where low liquid temperatures must be precisely controlled.

Hazardous Fluids

Toxic, noxious, flammable, corrosive or other dangerous liquids are best handled using sealless mag-drive pumps. These pumps have no dynamic seals and therefore completely contain the pumpage. Liquiflo was one of the first companies to apply magnetic-drive technology to gear pumps. Because of their simplicity, and importance to safety and the environment, all Liquiflo pump models are available in mag-drive configuration.



VERDERGEAR **SMALL**

Small, compact and powerful gear pump



Verdergear Small pumps are compact yet having a robust design. They are ideal for demanding fluids and can pump viscous liquids up to 10,000 mPas. With their precisely manufactured gears these pumps can overcome a suction height of up to 9 meters. Available in 15 sizes they offer up to 2,880 l/h (48 l/min).

Within the range there are also pumps available for reliable and reproducible dosing of very small quantities. An internal bypass prevents overpressure. The maximum pressure can be set directly on the pump head, no additional overflow valves are required. Various drive options are available.

Features

- Magnetic coupling for safe and reliable transfer of hazardous liquids
- Great flexibility, even for OEM applications
- Internal bypass to protect pump and pipe work
- Precise dosage thanks to pulsation-free flow
- Various drive options

Verdergear gear pumps are ideal for OEM applications. The Verdergear Small series offers a variety of models with flow ranges up to 48 l/min, flexible and reliable. Successful applications are found in various industries, from cooling systems through medical technology to fuel cell technology.

Max. flow	48 l/min	Max. pressure	34 bar
Max. viscosity	10,000 mPas	Max. suction height	9 m

VERDERGEAR **PROCESS H**

Powerful process gear pump



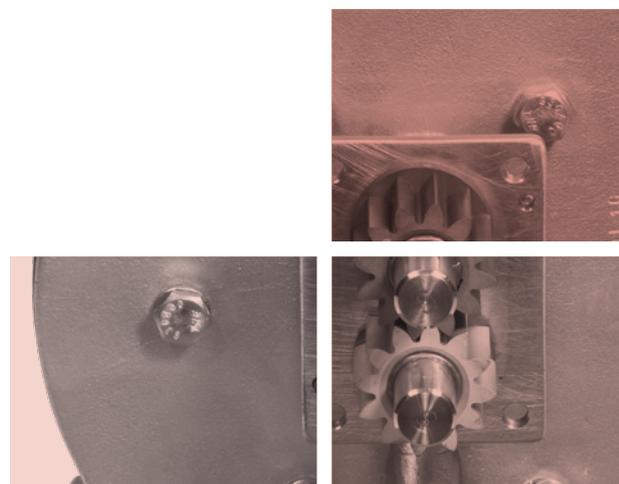
For heavy-duty, industrial applications, the H series provides a robust pump for medium-flow transfer and dosing applications.

The pump is constructed to provide a long service life with sturdy flange connections configured to industrial standards and a robust pump housing and bearing-shaft assemblies sized for significant loads. The 'H' series can handle fluids of up to 100,000 mPas. The gear mechanism is available in different tolerances and in high-grade alloy material.

Features:

- Pulse-free flow
- Corrosion-resistant materials
- Self-priming
- Very easy to operate
- Sealless, magnetic-coupled construction
- Ideal for high pressures and low flow rates
- Accurate dosing up to $\pm 0.5\%$
- Low maintenance
- Suitable for viscosities up to 100,000 mPas
- The direction of the pump can be reversed

Max. flow	220 l/min	Max. pressure	15 bar
Max. viscosity	100,000 mPas	Max. temperature	260 °C



VERDERGEAR **PROCESS POLY-GUARD**

Polymer-lined stainless steel gear pump



Liquiflo's PFA-Lined Gear Pump is an excellent choice for inorganic acids, bases and salts, that are difficult to handle with or require expensive alloys in metallic pumps, such as: Hydrochloric Acid, Ferric Chloride, Sulfuric Acid, Hydrofluoric Acid, Sodium Hypochlorite, Nitric Acid, Sodium Hydroxide and Chromic Acid to name a few. Another key application area is for high purity services where contact with metallic components must be avoided.

This combination of the toughest exterior and the most chemically resistant interior is the ultimate solution for your most difficult pumping applications.

Features:

- Traditional pressure integrity expected of metal pumps
- Exempt from wicking problems associated with fiber reinforced housings
- Limits the effects of heat entrapment and corresponding thermal expansion issues
- Limits the effects of fluid absorption
- Increases strength and durability required for process pump services

Max. flow	57 l/min	Max. pressure	7 bar
Max. viscosity	100,000 mPas	Max. temperature	93 °C

VERDERGEAR **PROCESS MAX**

High pressure gear pump



The unique and robust design of the Verdergear Liquiflo Max range pump assures extended life even in high pressure pumping applications where other gear pumps could fail. The pumps in the Max range will handle differential pressures up to 24 bar and flows up to 76 l/min.

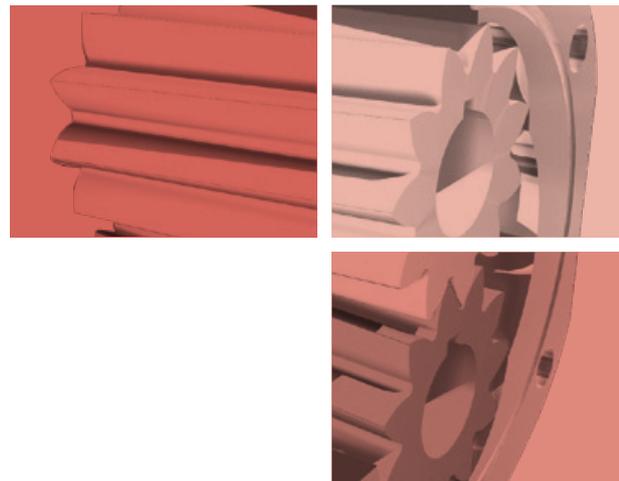
The Max Series pump features helical gears with a new design to reduce separation forces placed on the the gear mechanism, creating a smoother and quieter operation.

The shaft and bearing assembly are built to operate at high differential pressures for extended periods of time. To avoid any possibility of the pipeline being distorted, the flange connections are joined with oversized bolts. The pump mounting bracket is made from stainless steel to eliminate corrosion even when exposed to the harshest environments.

Features:

- Extremely durable thanks to heavy duty construction
- Easy to maintain
- The most compact heavy duty gear pump on the market
- Quieter operating volume because of the helical gear design

Max. flow	76 l/min	Max. pressure	24 bar
Max. viscosity	100,000 mPas	Max. temperature	260 °C



VERDERGEAR **ACCESSORIES AND OPTIONS**

There is an extensive program of accessories and spare parts available for Verdergear process pumps.

Bypass valve

For safety within the process, there should be a relief valve installed in the discharge line. This protects the pump and the pipeline for pumping against closed discharge valves. Using a bypass removes the risk of overpressure and a breakdown of the pump will be avoided.

Relief valve

Verdergear Liquiflo pumps should always be installed with a relief valve in the discharge line, to protect the pump and piping against any type of line blockage, including the inadvertent closing of an isolation valve.

Heating jacket

To avoid changes in the characteristics of the medium from fluctuations in temperature, a heating jacket can be mounted at the pump head. This reduces the risk in changes of viscosity and/or degradation, particularly for temperature sensitive media.

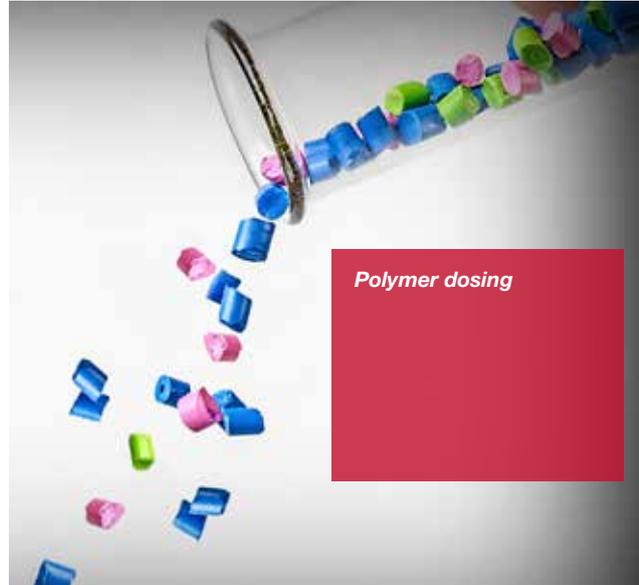
Multiple flange

Verdergear Liquiflo gear pumps can be installed very easily as the large number of flange options allows compatibility with most major industry standards.

VERDERGEAR: A **PUMP SOLUTION** FOR EVERY APPLICATION



Cooling agents



Polymer dosing



Chemical



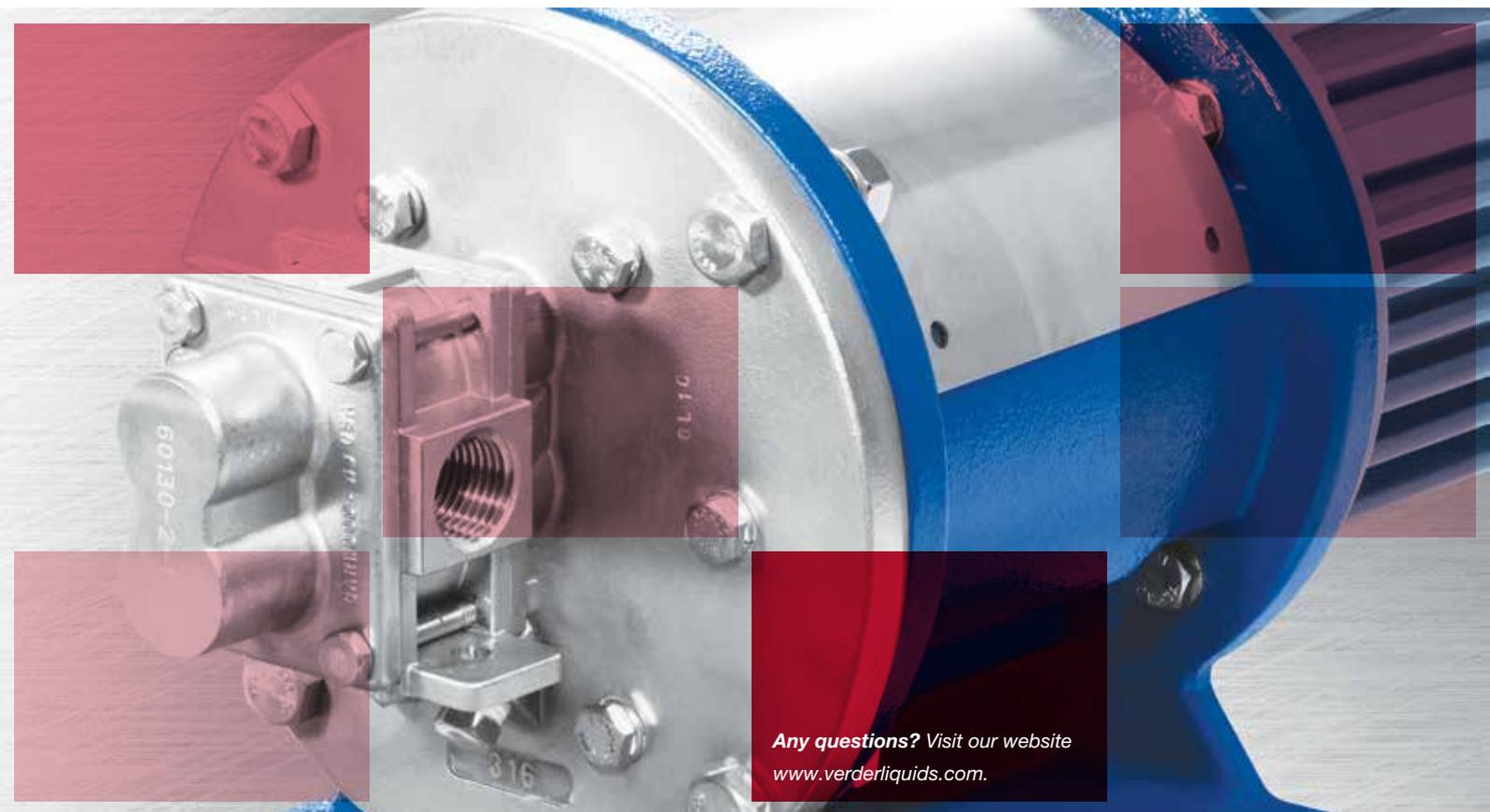
Pulp & Paper



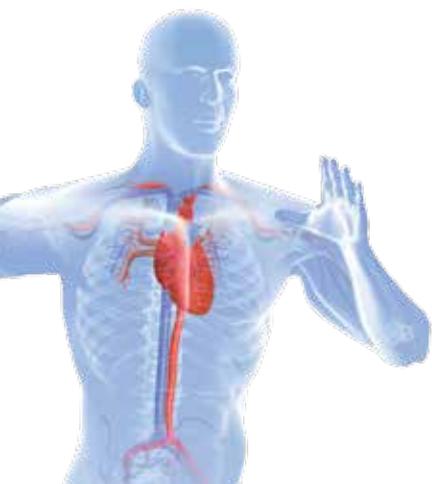
Adhesives & Coatings.



Pesticides



*Any questions? Visit our website
www.verderliquids.com.*



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