

NETZSCH

Proven Excellence.



NEMO[®] - The Perfect Pipeline Pump

LACT Unit Progressing Cavity Pumps

NEMO® Progressing Cavity Pumps

Your Choice for LACT Unit Pipeline Pumps

NEMO® Progressing Cavity Pump for extremely high requirements

LACT units or Lease Automatic Custody Transfer units are critical systems designed for the automatic transfer of ownership of liquid hydrocarbons (crude oil and petroleum products) between the buyer and seller. The main objective of LACT unit is to measure, sample and transfer the hydrocarbons from the production site to trucks, pipelines and / or storage tanks. A crucial component of the LACT system is the appropriately named "pipeline pump". It is key to ensure efficient and reliable operation.

The pump requirements are extremely high because it must accommodate a wide range of crude oil types and properties including:

- Various temperatures
- API Grades – from extra heavy oil with API gravity < 10 up to light sweet crude oil with a typical stream quality of 0.17 - 0.20% sulfur and 40 - 42° API gravity.
- Presence of entrained gases (H₂S, CO₂)
- Various BS & W contents
- Wax contents, contaminants, corrosives and deposits.

This equipment must also withstand harsh conditions such as wind, rain, snow and low or extremely high ambient temperatures. On top of these conditions, the units, either as stationary or skid mounted designs, are very often installed in isolated areas without close maintenance or operator attendance.

A LACT unit can be likened to a cash register – and a failure of the pipeline pump would lead to interruption of the production combined with substantial loss of revenues, therefore, your LACT system is just as good as the pipeline pump in the system.

Why NEMO® PUMPS

NETZSCH NEMO® Progressing Cavity Pumps are the best choice for LACT systems. They are efficient, extremely reliable and modular. Our field-proven advanced technology can effectively handle a wide range of hydrocarbons. NEMO® pumps provide a constant, smooth and non-pulsating flow. The volume practically remains unaffected by viscosity changes which ensures accurate flow readings downstream and eliminates the need for costly pulsation dampeners (which are required in combination with reciprocating pumps).

Unlike many other rotary positive displacement pumps, such as gear or external screw pumps, NEMO® progressing cavity pumps have only one mechanical seal, which is located on the low pressure, suction side of the pump. In addition, NEMO® progressing cavity pumps have no close metal-to-metal clearances or internal bushings, and operate at low speeds with lower shear and NPSH requirements. Repairs are easier and less expensive with only one major wearing part, the rubber stator. NEMO® pumps are engineered for

operational flexibility, efficiency and durability and provide significant cost-saving benefits. Our patented, doubled-sealed, oil-lubricated gear joints have two times the life time of conventional grease-lubricated gear joints and outperform grease-lubricated pin joints by five fold.

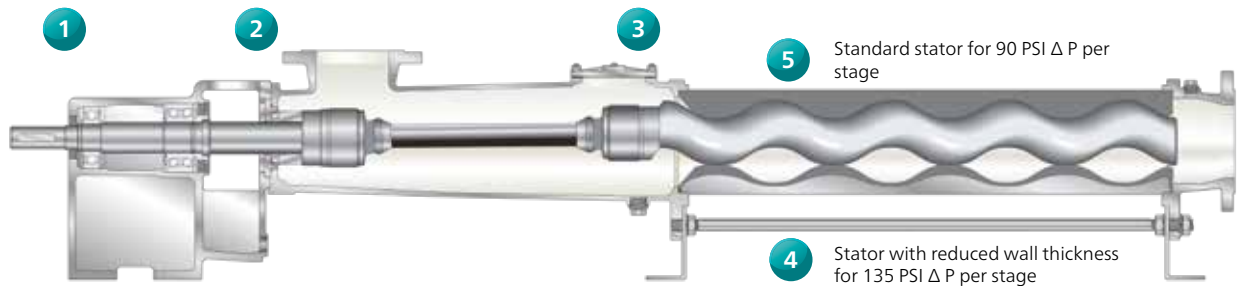
Wetted parts are available in numerous materials such as cast iron, Carbon steel, stainless steel Cr-Ni-Mo 17-12-2, Duplex stainless, Super Duplex, Hastelloy and Titanium.

A wide range of rubber compounds, developed, tested and produced in our own factories and designed for challenging artificial lift pump applications are also available for surface LACT pumps and enable us to provide the best and most economical solution. Whether the application requires a standard BUNA, or a BUNA with a higher ACN content, HNBR or different Viton grades, NETZSCH can match the specifics of any application.

The range of capabilities and pressures is wide enough to meet your needs:

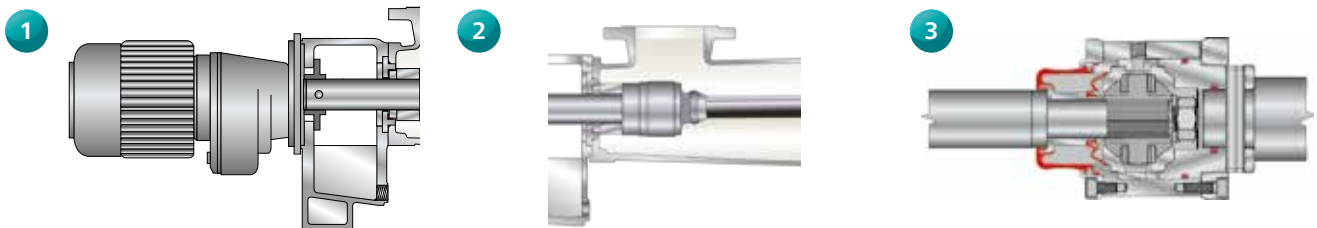
- Flow rates up to 2,200 gpm / 75,000 BPD
- Pressures up to 1080 psi / 72 bar
- Special designs up to 3000 psi / 207 bar
- Reduced wall stators produce up to 50% more pressure per stage

Five Key Features of the NEMO® Progressing Cavity Pump



NEMO® SY Bearing Housing Pump

Heavy-duty pumps with double bearings designed to handle high torques. Drive connections through flexible couplings with spacer according to DIN or API.



NEMO® BY - Close Coupled

Block construction pump series are available, providing a compact design with flanged drive to reduce overall length and to eliminate the need for coupling alignment.

The NEMO® NM Series

This design includes a solid shaft that is more robust, offering minimal shaft deflection, with fewer parts and does not require more expensive oversized mechanical seals.

The solid shaft design also eliminates the dead zone near the vulnerable rear joint and provides less loading on the universal joint resulting in longer joint life, less maintenance and downtime.

NEMO® NM Series with Mechanical Seals

Unlike other progressing cavity pumps (which were originally designed for packing shaft sealing) this series has been designed for mechanical seals, locating the seal directly in the flow path with open space for optimum flushing by the pumpage. As a result the mechanical seal in a NM series pump will last much longer. This design is easy to service due to the two-piece shaft design. There is no need to press out the entire shaft from the bearing housing in order to replace the seal.

The following seal arrangements fit into the pump: single seal, single seal with quench, double seals in back-to-back or tandem seals.

Gear Joint (K)

The patented gear joint has been designed for extremely tough industrial applications involving constant pump operation, frequent stop/starts or shock loads. It is kinematically designed so that the torque and axial loads are borne by separate elements within the joint. The joint is oil filled and hermetically sealed by two seals which are resistant (compatible) to the lubricant and the pumpage. Filling the space between the two seals with oil allows the use of the joints at suction pressures up to 170 psi / 12 bar.

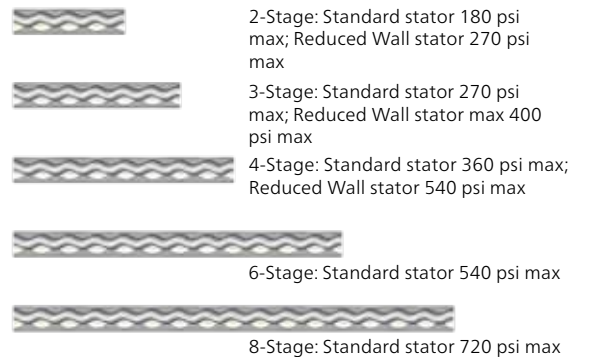
Oil provides superior lubrication and longer life overall for these services versus grease lubricated gear or pin joints.

4 Stators with reduced wall thickness

Patented stator with reduced wall thickness for higher pressure capabilities of 135 PSI ΔP per stage to reduce the number of stages and overall length of the pump assembly.



Pump Pressure Capabilities



Multi-stage pumps with pressure capabilities up to 3000 psi are available.

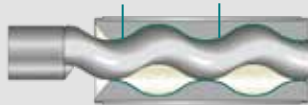
5 Advantages of NEMOLAST® Stators

NEMOLAST® stators are molded to specific lengths based on pressure ratings, not cut to length after manufacturing. This results in closer tolerances and superior performance.

NEMOLAST® also includes a concave inlet on the stator which reduces NPSH values and improves performance and makes maintenance much easier.

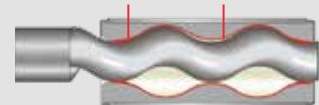
The elastomer is molded around the metal tube at both ends of the stator. This allows the elastomer itself to seal against leaks without using a separate gasket and inherently limits the pumpage from contacting the elastomer-stator tube bond.

NETZSCH Stator



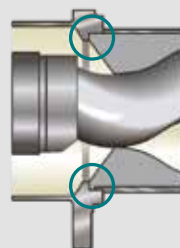
Uniform tolerance along the entire stator length irrespective of the elastomer mixture used. This is achieved by the exclusive use of precision tubes and high-precision, custom-made, concave stator cores and custom elastomer mixtures.

Non - NETZSCH Stator



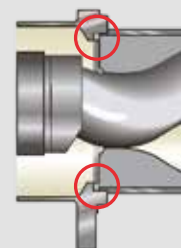
Stator made from a cylindrical core results in non-uniform stator tolerance — compression being too high at the stator ends and too low in the center region. This leads to higher starting and operating torques, low pressure stability, high pulsation and decreased service life.

NETZSCH Stator



Integrated seal is molded in at both ends of the stator and guards against leakage.

Non - NETZSCH Stator




Design requires a separate, flat, ring gasket at either end of the stator.

Other Applications in the oil industry

- drilling mud
- kerosene slurry
- skimmer oil from API separator
- calcium cup grease
- waste sludges
- cutting oils
- lube oil
- oil and wax mixture
- wax slurry
- crude oil and water
- oil slurry with fine chips
- polymer
- oily water
- waste oil
- skimmings
- grease
- refinery waste
- oil sludge
- crude oil
- oil waste
- mineral oil and ammonia
- produced water

Some of our Customers

ExxonMobil Corporation (US)
Hess Corp. (US)
Marathon Oil Corp. (US)
Pioneer Natural Resources (US)
Anadarko Petroleum Corp. (US)
Chesapeake Energy Corp. (US)
EOG Resources (US)
Chevron Corporation (US)
ConocoPhillips (US)
Occidental Petroleum Corp. (US)
Apache Corp. (US)
Devon Energy Corporation (US)
ConocoPhillips (Canada)
Suncor Energy Inc. (Canada)
Talisman Energy Ltd. (Canada)
Canadian Natural Resources (Canada)
EnCana Corp. (Canada)
BP Corporation (United Kingdom)
BG Group PLC (United Kingdom)
National Iranian Oil Company (Iran)
Saudi Arabian Oil Company (Saudi Arabia)
Petroleos de Venezuela S.A. (Venezuela)
Qatar General Petroleum Corporation (Qatar)
Iraq National Oil Company (Iraq)
Abu Dhabi National Oil Company (UAE)
Kuwait Petroleum Corporation (Kuwait)
Nigerian National Petroleum Corp. (Nigeria)
National Oil Company (Libya)
Sonatrach (Algeria)
OAQ Gazprom (Russia)
OAQ Rosneft (Russia)
PetroChina Co. Ltd. (China)
Egyptian General Petroleum Corp. (Egypt)
Petroleos Mexicanos (Mexico)
OAQ Lukoil (Russia)
Royal Dutch/Shell (Netherlands)
Petroleo Brasileiro S.A. (Brazil)
Sonangol (Angola)
Petroleum Development Oman LLC (Oman)
Total (France)
ENI (Italy)
Petroleos de Ecuador (Ecuador)
Petronas (Malaysia)
Statoil (Norway)
Dubai Petroleum Company (UAE)
Pertamina (Indonesia)
China National Offshore Oil Corp. (China)
Repsol YPF (Spain)
Ecopetrol (Colombia)
Myanma Oil & Gas Enterprise (Myanmar)



The NETZSCH Group is an owner-managed, international technology company with headquarters in Germany. The Business Units Analyzing & Testing, Grinding & Dispersing and Pumps & Systems represent customized solutions at the highest level. More than 4,000 employees in 36 countries and a worldwide sales and service network ensure customer proximity and competent service.

Our performance standards are high. We promise our customers Proven Excellence - exceptional performance in everything we do, proven time and again since 1873.

The NETZSCH Business Unit Pumps & Systems offers NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, NOTOS® multi screw pumps, PERIPRO™ peristaltic pumps, macerators/grinders, metering technology and equipment custom built for challenging solutions for different applications globally.

Proven Excellence.■

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