

NETZSCH



NETZSCH

The heart of your process

Individual solutions for your
manufacturing processes

omd ■ 800-648-3326
oliver m. dean, inc. ■ www.omdean.com

NETZSCH



Our way to success

Based on

- **applications knowledge**
- **professionalism**
- **committment**

we want to profitably expand our leading role as the worldwide largest manufacturer of Progressing Cavity Pumps in defined markets.

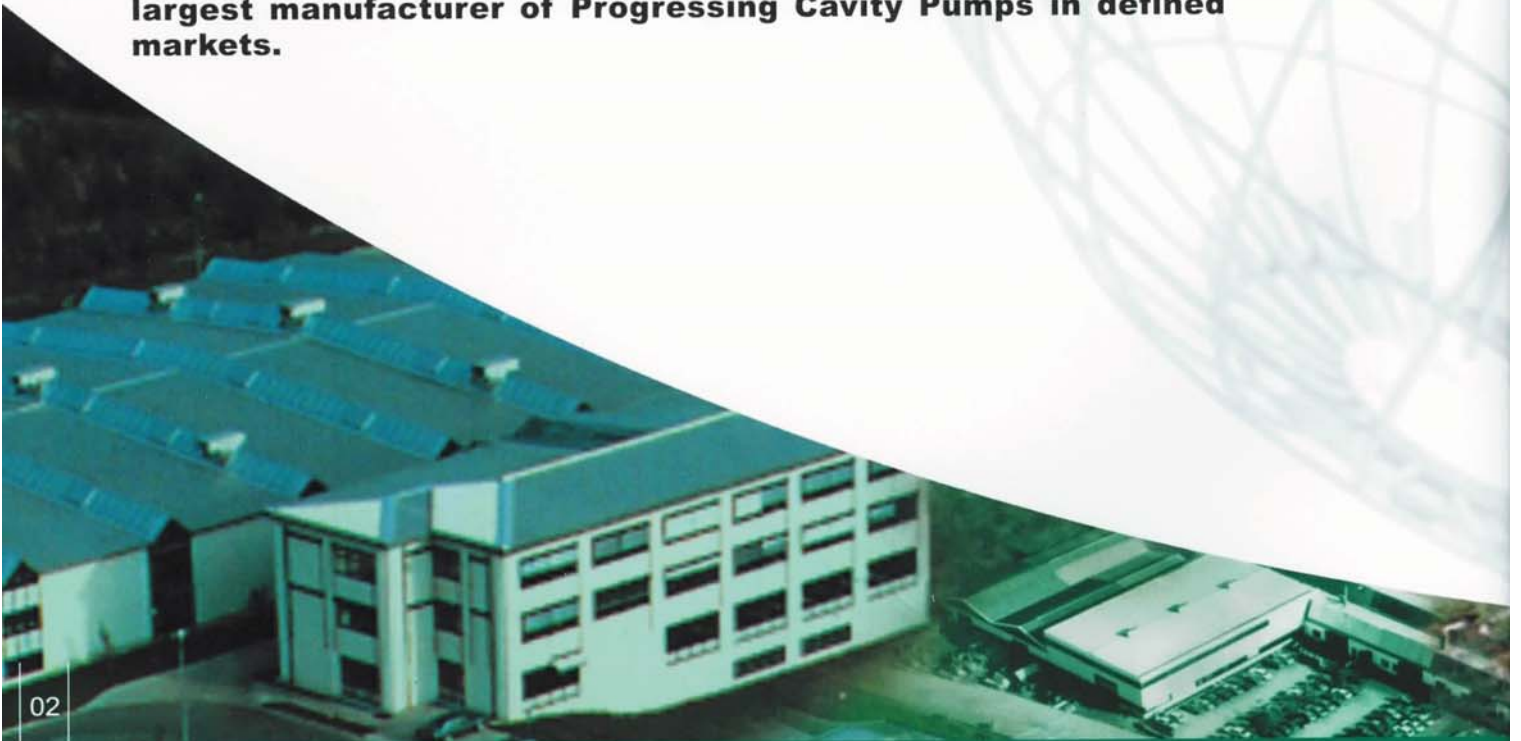


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Brazil

China

Company Capabilities and Competencies...

Innovation is our strength

For over five decades, NETZSCH has developed, manufactured and marketed NEMO® Progressing Cavity Pumps worldwide. These accumulated capabilities are supplemented by partnerships with our national and international customers from all types of industries. In cooperation with them we optimise existing models and develop new products. Our experience in designing and manufacturing Progressing Cavity Pumps is exemplified in our latest product – the TORNADO® Rotary Lobe Pump. This pump is an ideal addition to our positive displacement pump programme.

Modern manufacturing facilities

With state-of-the-art manufacturing facilities, we meet and exceed consistent quality standards.

Customer benefits

You can be assured that all pump types are optimized for your specific application through reliable, quality engineering.

...the Optimal Solution for every Application!

Our products for your processes

- NEMO® Progressing Cavity Pumps
- TORNADO® Rotary Lobe Pumps
- NETZSCH Grinding Systems
- NETZSCH Accessories and Optional Equipment
- NETZSCH Genuine Spare Parts and Service

Our sales structure for competent advice and close customer relationships worldwide



Your requirements and requests are the focal point of our actions.

Through our market-oriented sales organisation and production facilities in Germany, Brazil and China, we provide you competent advice for your application.

Our motivation:
First rate performance for your process

NETZSCH-Range of Applications

Agriculture

Liquid manure, pig swill, application in biogas plants, waste from poultry slaughterhouses, wastewater and similar.



Beverages and wine

Beer, concentrates, yeast, undiluted malt grains, wine, hot sludge, whole bunches of grapes and de-stalked grapes, mash, red wine mash and similar.



Breweries

Yeast, cooler sludge, wet grist, grains, residual yeast, diatomaceous earth, mash and similar.



Ceramics industry

Porcelain slip, fireclay, alumina, glazes, lime sludge, casting slips, iron oxide sludge, spent sulfite liquor and similar.



Chemical industry

Acids, bases, filter waste, viscous pastes, sensitive dispersions, emulsions, viscous adhesives and similar.



Civil engineering

Plaster, cement mortar, liquid cement mortar, emulsion paints, bitumen, bentonite, lime solutions and similar.



Confectioneries and bakeries

Glucose, honey, waffle fillings, dough, chocolate mass, marzipan, caramel, jams, nut pastes and similar.



Cosmetics industry

Soaps, raw products for soap production, ointments, cream, tooth pastes, alkaline solutions and similar.



Dairies

Cream yogurt, yogurt with fruit pieces, cream cheese, soft cheese, cream, sugar mass, milk, butter and similar.



Fish-processing industry

Cod-liver oil, guts, waste from fish-processing, washing water with blood, residual sludge after centrifuging, fish spawn, fish meal, vegetable oil, soapstock and similar.

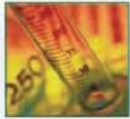


NETZSCH-Range of Applications



Fruit and vegetable

Fruit and vegetable mash, carrot mash, tomato mash and concentrate, juice concentrates and similar.



Laboratories

Delivery and dosing of very small quantities of material, acids, bases, pastes, emulsions and similar.



Meat-processing industry and slaughterhouses

Minced meat, bone mash, sausage dough, sausage mixtures, lard, soups, salt solutions, feces, wastewater and similar.



Mining

Mine water of any content, flotation sludge, other types of sludge and suspensions, lime water, lime sludge, wastewater and similar.



Paints and varnishes

Print colors, pigment varnishes, emulsion paints, color pastes, transparent varnishes, solvents, offset print colors and similar.



Pulp industry

Paper and pulp, coating pastes, paints, adhesives, lime water, wastewater, starch and similar.



Shipbuilding industry

Bilgewater, feces, fresh water, oil sludge and similar.



Starch industry

Potato pulps, starch pastes, mash, glucose and similar.



Sugar industry

Molasses, different types of run-off, calcium carbonate sludge, pulp press water, beet washing sludge, beet tails with leaves and similar.



Wastewater

Crude wastewater, raw sludge, digested sludge, activated sludge, concentrated sludge with 40% DS content, flocculation agent, filter press feed sludge, filter cake and similar.

Characteristics of NEMO® Progressing Cavity Pumps

Universal installation

NEMO® Progressing Cavity Pumps are utilized in various industries to convey many types of fluids in a continuous, low pulsating manner, while maintaining an accurate flow.

Wide Range of Applications

The pumps are specifically designed for products with the following characteristics:

- high solids content (maximum particle size up to 6" / 150mm) and free of solids
- low to high viscosity (1 mPas - 3million Cps.)
- thixotropic and dilatant
- shear-sensitive
- abrasive
- lubricating and non-lubricating
- aggressive (pH 0-14)
- adhesive
- toxic

Large Range of Capacities and Pressures

- capacities from a few fluid ounces up to 500m³/h (2200gpm)
- number of stages ranging from 1 up to 8 for pressures up to 48bar (680psi)

Various Conveying Elements

Four different rotor/stator geometries are available allowing optimization of the pump characteristics for specific applications.

Extensive Range of Materials of Construction

Wetted parts are available in numerous materials. Standard housings are made of cast iron and stainless steel. Parts are available in mild steel, stainless steel and tool steel. Other materials are available upon request. Elastomers like highly abrasion resistant natural rubber, oil-, acid- and alkali-proof elastomers, Aflas and Viton are available. When elastomers cannot be used due to high temperatures or compatibility reasons, NETZSCH offers a variety of solid materials.

A Wide Variety of Shaft Sealing Options

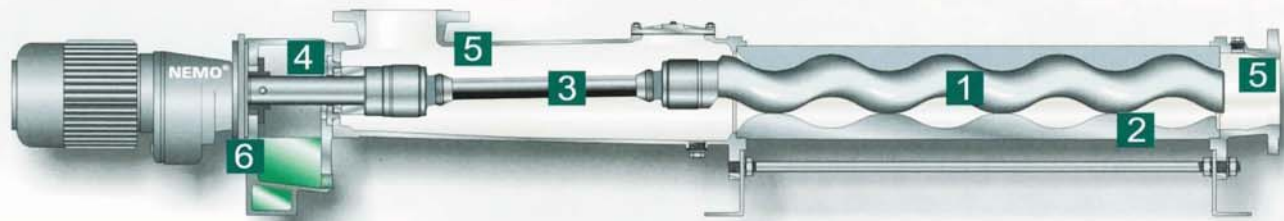
Shaft seals range from single-acting mechanical seals, with and without quench, to double-acting mechanical seals in back-to-back or tandem arrangement as well as cartridge seals as per customer specification. For certain applications there are gland packings, lip seals and specially designed seals.

In the case of toxic fluids we offer a pump with a magnetic coupling which is 100 % leakproof.

Additional Features

- high suction capability up to 9mwc (30ftwc)
- reversible direction of rotation and thus flow
- installation in any position
- smooth and quiet operation
- temperatures of -20 up to +300°C
(-5 up to +570°F)

Typical Components of the NEMO® Progressing Cavity Pump e.g. the NEMO® Block Construction Pump in industrial design



1 Rotor
Wear- and corrosion-resistant design.

2 Stator
Vulcanised into a tube, with integrated seals on both ends in a variety of elastomers, plastics or metals. Stator inlet with chamber to facilitate the entry of the fluid into the conveying chamber.

3 Drive Chain
Plug in shaft with coupling rod and two universal joints for power transmission from the drive to the rotor.
For further details please see pages 20 and 21.

4 Shaft Seal
Standard design with single-acting, wear-resistant, bidirectional mechanical seal; on request different types of single-/double-acting mechanical seals by various manufacturers, cartridge and other special seals as well as gland packing. For toxic fluids, magnetic, leakage-free couplings are available.

5 Suction and Pressure Housing
Designed to optimize through flow with flanges or threads according to ANSI and other international standards. Materials in cast iron, nickel chromium steel, rubber-coated cast iron as well as special materials according to specifications.

6 Block Construction Design
A drive flanged directly to the housing reduces length, weight and gives a constant shaft height, independent of construction and size of the drive. It is both maintenance- and service-friendly as well as economical.

Accessory Programme

A wide variety of protection and monitoring accessories are available for these pumps (see pages 32 and 33).

Conveying Elements

Four different rotor/stator geometries are available for optimised performance. For further details see pages 18 and 19.

Range of Applications and Performance Data

Performance	Description	Range of Applications
Capacities up to 400 m ³ /h (1,800 gpm) Pressures up to 24 bar (340psi)	Compact design with flanged drive; low investment and operating and maintenance costs. Four rotor/stator geometries for optimized performance.	Industrial applications in environmental, food and chemical industries for low and highly viscous fluids with or without solids.
Capacities up to 500 m ³ /h (2,200 gpm) Pressures up to 48 bar (680psi)	Design with bearing housing and drive shaft allows for universal use of all types of drives. Four rotor/stator geometries for optimized performance.	Industrial applications in environmental, food and chemical industries for low and highly viscous fluids with or without solids.
Capacities from .1 up to 500l/h (.025 up to 130gph) Pressures up to 36 bar (510psi)	High Metering accuracy (deviation < 1 %). Compact design with directly flanged drive.	Industrial applications in environmental and chemical industries for conveying and dosing of fluids of low or medium viscosity with or without solids.
Capacities up to 85m ³ /h (360gpm) Pressures up to 6bar (85psi)	Compact design with flanged robust bevel gear drive. The patented and integrated NEMOLAST® reversible stator and the simple design guarantees a long service life and low life cycle cost.	Industrial applications in environmental industries for low to highly viscous fluids with or without solids.



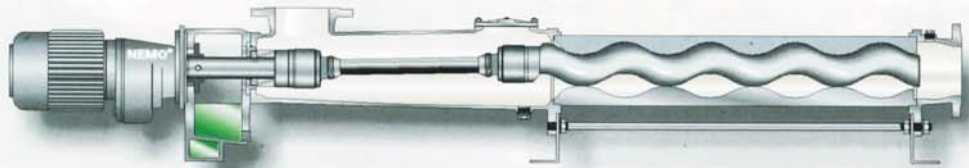
NEMO® Progressing Cavity Pumps

Product Program Overview

Pump Type

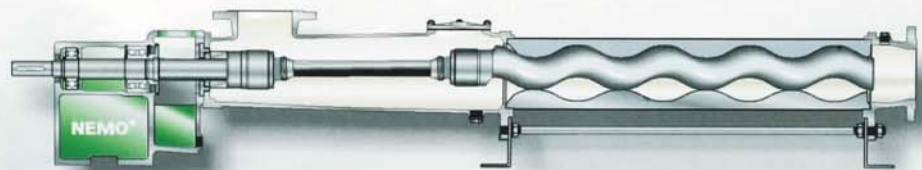
NEMO® BY

in block construction design



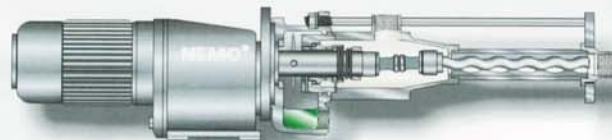
NEMO® SY

with bearing housing
and drive shaft



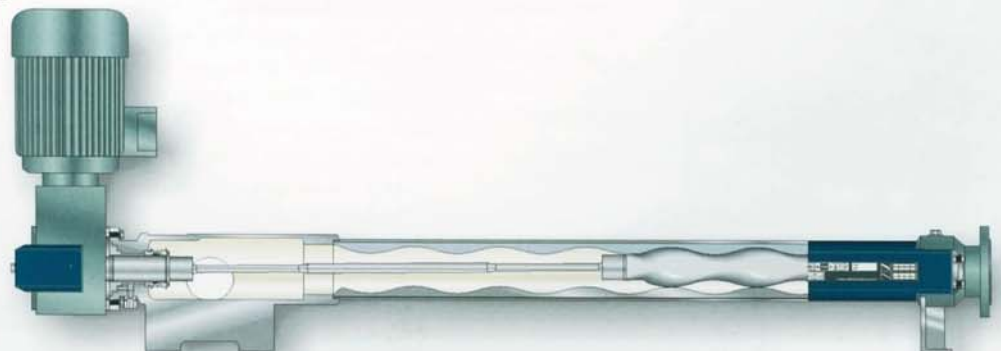
NEMO® MINI BY

in block construction design



NEMO® M.Champ®

in block construction design
with maintenance-free
flexible rod and
integrated
reserve stator



Range of Applications and Performance Data

Performance	Description	Range of Applications
Capacities up to 200m ³ /h (880gpm) Pressures up to 12bar (170psi)	Pump housing with rectangular/square hopper and coupling rod with feeding auger with or without force feed chamber for easier entry of the fluid into the rotor and stator. Adjustment of hopper dimensions to specific applications is possible. Compact design with directly flanged drive resulting in low initial investment, and economical operation and maintenance. Design with bearing housing and drive shaft allows for the use of all types of drive.	Industrial applications in environmental, food and chemical industries for highly viscous and non-free flowing fluids with or without solids.
Capacities up to 200m ³ /h (880gpm) Pressures up to 48bar (680psi)	Pump housing with enlarged rectangular hopper and tapered force feed chamber as well as coupling rod with patented, positioned feeding auger for optimal transfer of the product to the rotor and stator. Adjustment of hopper dimensions to specific applications is possible. Compact design with directly flanged drive resulting in low initial investment, and economical operation and maintenance. Design with bearing housing and drive shaft allows for the use of all types of drive.	Industrial applications in environmental and chemical industries for highly viscous, compact and crumbly media that does not have a tendency to bridge.
Capacities up to 200m ³ /h (880gpm) Pressures up to 48bar (680psi)	Pump housing with integrated bridge breaker, mixing additions (e.g. for conditioning of dewatered sludges) enlarged rectangular hopper and tapered force feed chamber as well as coupling rod with patented, positioned feeding auger for optimal transfer of the product to the rotor and stator. Adjustment of hopper dimensions to specific applications is possible. Compact design with directly flanged drive resulting in low initial investment, and economical operation and maintenance. Design with bearing housing and drive shaft allows for the use of all types of drive.	Industrial applications in environmental and chemical industries for compact and crumbly media that may have a tendency to bridge.



NEMO® Progressing Cavity Pumps

Product Program Overview

Pump Type

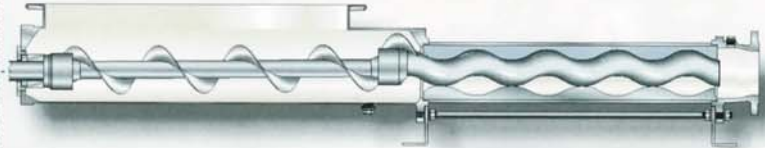
NEMO® BO

in block construction design with directly flanged drive



NEMO® SO

with bearing housing and drive shaft



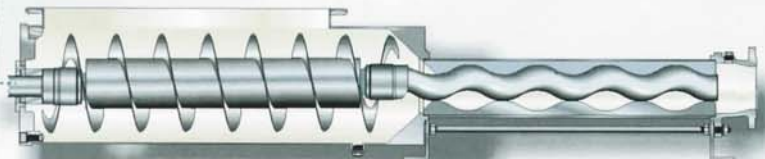
NEMO® BF

in block construction design with directly flanged drive



NEMO® SF

with bearing housing and drive shaft



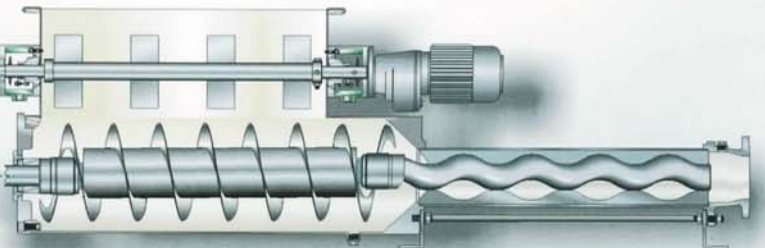
NEMO® BP

in block construction design with directly flanged drive



NEMO® SP

with bearing housing and drive shaft



Range of Applications and Performance Data

The pumps are designed and manufactured according to EHEDG and QHD-standards; they are suitable for CIP and SIP and are constructed in accordance with the US 3-A Sanitary Standards. Three rotor/stator geometries for optimal performance (except for NEMO® Hygienic Mini Plus).

Range of Applications

For sanitary applications and optimal cleaning in food, pharmaceutical, cosmetics and chemical/biochemical industries for non-viscous up to highly viscous fluids with or without solids.

Performance

Description

Capacities up to
140 m³/h (620 gpm)
Pressures up to
24 bar (340 psi)

Compact design with directly flanged drive resulting in low initial investment, and economical operation and maintenance

Capacities up to
140 m³/h (620 gpm)
Pressures up to
24 bar (340 psi)

The crevice-, wear- and maintenance-free flexible rod allows the conveyance of highly sensitive and abrasive products. Design with bearing housing and drive shaft allows for the use of all types of drives.

Capacities of .1 up
to 500 l/h
(.025 up to 130 gph)
Pressures up to
36 bar (510 psi)

The smooth crevice-free flexible rod requires no maintenance and is not subject to wear, thus enabling the conveyance of highly sensitive and abrasive products. Compact design with directly flanged drive resulting in low initial investment, and economical operation and maintenance. High dosing accuracy (deviation < 1 %).

Capacities up to
140 m³/h (620 gpm)
Pressures up to
24 bar (340 psi)

The smooth crevice-free flexible rod requires no maintenance and is not subject to wear, thus enabling the handling of highly sensitive and abrasive products.

The pump housing has a reduced diameter as well as a product entry moved towards the shaft seal (discharge in vertical position). This creates an absolutely crevice-free pump body generating an optimised flow of the product through the pump. For complete self-emptying, flushing ports are arranged tangentially and pressure ports are arranged eccentrically. To avoid contamination from the atmosphere, all seals are equipped with connections for flushing with sterile fluids, vapour or condensate and fitted with optional tubing. For changing product temperatures a standard stator with reduced wall thickness and a stator protector for dry running and overheating protection is available.

Design with bearing housing and drive shaft allows for the use of all types of drives.

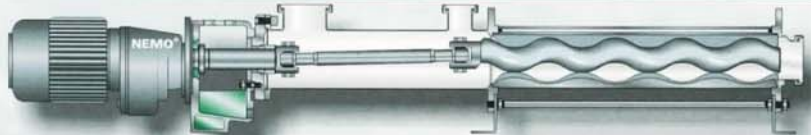
NEMO® Progressing Cavity Pumps

Product Program Overview

Pump Type

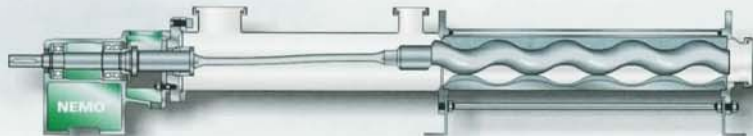
NEMO® BH

Hygienic Pump
in block construction design,
pump with bearing housing and
drive shaft also available



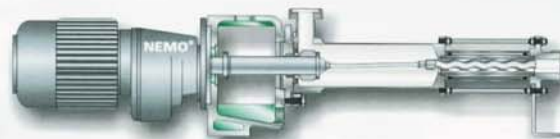
NEMO® SH

Hygienic Plus Pump
with bearing housing and drive shaft



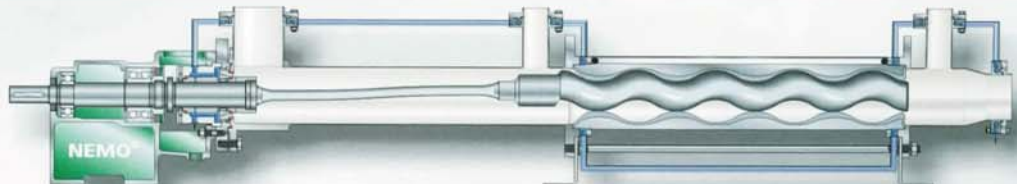
NEMO® MINI BH

Mini Hygienic Plus Pump
in block construction design



NEMO® SA

Aseptic Pump
with bearing housing
and drive shaft



*You gain a lead:
Process reliability even under the most demanding conditions*

Applications and Performance Data

NEMO® semi-submersible pumps are used for emptying barrels, containers, tanks, clarifiers, pits, etc. They are also used where space is limited and when cavitation may be a danger or where low NPSH is available. Furthermore the pumps are suitable for emptying barrels containing materials harmful to water and the environment where emptying through a connection at the bottom of the barrel is not permitted.

Description

Compact design with directly flanged drive. Four rotor/stator geometries for optimal performance. Immersion depth up to 49 feet. The length of the immersed tube can be modified by using an extended pump housing or an additional suction pipe or a combination of both.

Performance

Capacities up to 140 m³/h (620 gpm)
Pressures up to 24 bar (340 psi).

Depending on the application a number of designs / immersion variations are available. The immersion depth is adjusted as required by the application.

NEMO® Immersible Pump BT with Suspension Bracket

This pump is used for emptying open barrels and containers. It is equipped with a suspension bow for crane suspension.

NEMO® Barrel Pump NLPBT

The portable or suspended barrel pump is also suitable for emptying barrels with two inch bungholes. A large range of drives and accessories like hoses, hose connections, barrel adapters, built-in flanges, foot filters, etc. are available.

NEMO® Immersible Pump BT for Wall Mounting

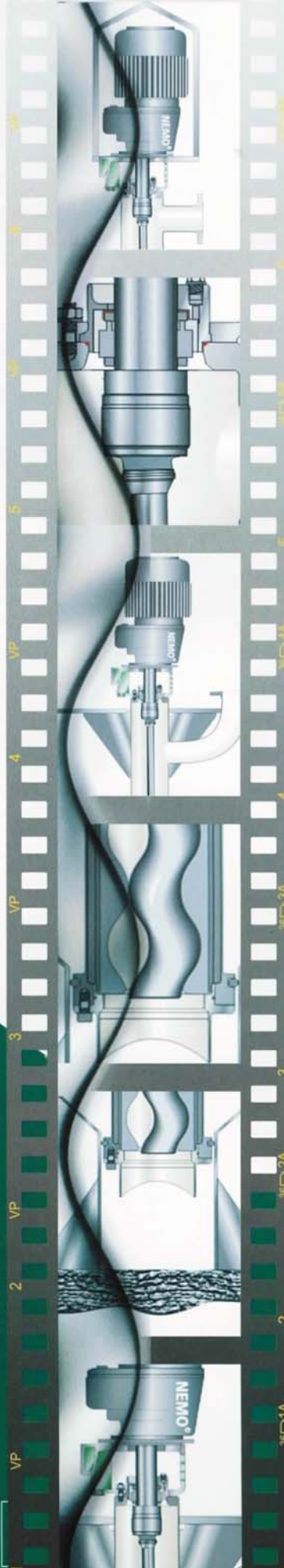
This pump is normally used in open collecting pits and mounted directly to the wall.

NEMO® Immersible Pump BT with Integral Mounting Plate and Discharge Connection above the Mounting Position

This pump is used in closed pits, tanks and containers where there is the possibility to vertically flange mount the pump to the tank lid. Depending on pump size, speed and immersion depth, an additional support guide is available to secure the pump to the bottom or to the wall near the bottom. Removal of the pump from a full tank is possible because the guide units are self-centering and secure the pump suction without hardware.

NEMO® Immersible Pump BT with Integral Mounting Plate and Discharge Connection below the Mounting Position

This pump is used in closed pits, tanks and containers where there is the possibility to vertically flange mount the pump to the tank lid. With this type, the discharge connection of the pump is below the tank lid. The product is either piped to the outside vertically through the lid via a 90° elbow or horizontally through the tank wall. This minimizes the dead space in the pump housing thus reducing the overall height of the pump above the tank lid. This version is normally used where there is only limited space available. Depending on pump size, speed and immersion depth, an additional support guide is available to secure the pump to the bottom or to the wall near the bottom. Removal of the pump from a full tank is possible because the guide units are self-centering and secure the pump suction without hardware.



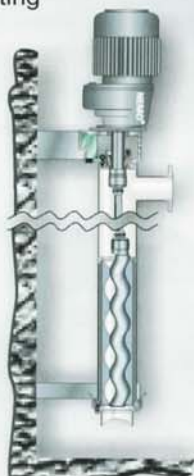
NEMO® Immersible Pumps Product Program Overview

**NEMO® Immersible
Pump BT**
with suspension bracket

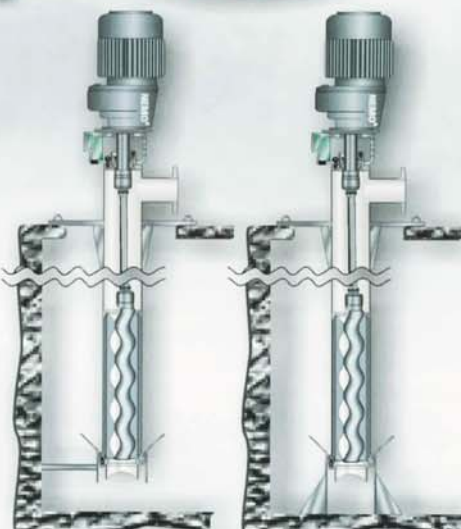


NEMO® Barrel Pump NLPBT
with suspension bracket

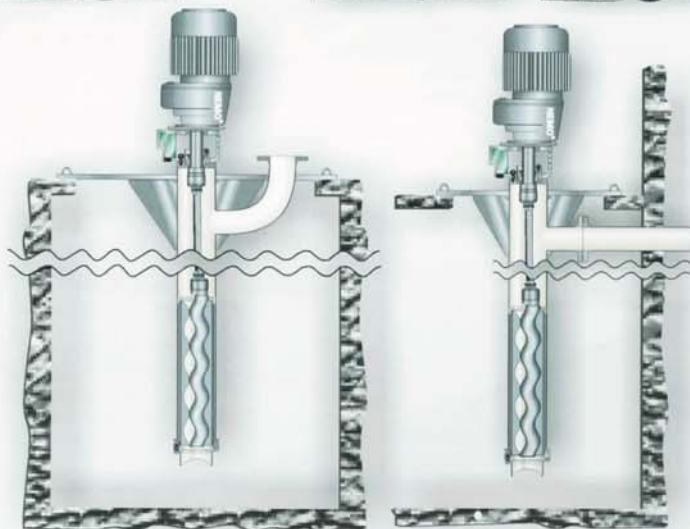
**NEMO® Immersible
Pump BT**
for wall mounting



**NEMO® Immersible
Pump BT**
with integral mounting plate and
discharge connection above the
mounting plate



**NEMO® Immersible
Pump BT**
with integral mounting plate and
discharge connection below the
mounting plate



*Versatile and adaptable:
Tell us your conveying task – we will supply the right pump*

Operational Characteristics and Conveying Principle of NEMO® Pumps in Different Geometries

Modular Design

NEMO® Pumps belong to the group of rotary positive displacement pumps. The conveying elements consist of the rotor which rotates within the fixed stator.

S/L-Geometry

The single helical screw/rotor has a circular cross section, an extremely long pitch and large thread depth which oscillates when the rotor is turned within the fixed stator. The cross section of the stator is the same profile as that of the rotor, however, the stator is a 180° internal twin start thread. As a result of the 1/2 ratio lobe geometry cavities are formed between the rotor and stator when the two are put together. By the turning movement of the rotor the progressing cavities between rotor and stator transport the fluid in a smooth and continuous manner from the suction to the discharge side of the stator. The flow rate is determined by the pitch of the rotor/stator, diameter and eccentricity as well as the speed of the pump.

The pressure capability depends on the number of stages and the differential pressure per stage up to 6 bar (85 psi).

The 2-stage NEMO® Pump in S-geometry can reach a differential pressure up to 12 bar (170 psi) with a flow rate of 100%.

A single-stage NEMO® Pump in L-geometry, has the same outer dimensions as the 2-stage pump in S-geometry, the same diameter and eccentricity but a pitch double that of the S-geometry rotor/stator. Therefore, the pump produces a flow rate of 200% when compared to the S-geometry at a differential pressure of up to 6 bar (85 psi).

D/P-Geometry

The twin start helical rotor has an elliptical cross section, a long pitch and large thread depth. It rotates within a circular eccentric motion within the fixed stator, the form of which is the same geometry as the rotor, however, the stator is a triple start internal thread with 120° interval starts. As a result of the 2/3 ratio lobe geometry cavities are formed between the rotor and stator when the two are put together.

By the turning movement of the rotor, the progressing cavities between rotor and stator transport the fluid in a smooth and continuous manner from the suction to the discharge side of the stator. The flow rate is determined by the pitch of rotor/stator, elliptic diameter and eccentricity as well as the speed of the pump. The pressure capability depends on the number of stages with the differential pressure being up to 6 bar (85 psi) per stage.

In D/P-geometry the cavities are approximately 75% of the size of the S/L geometry however they open twice per revolution compared to once per revolution in 1/2 stage geometries. Therefore D/P-geometry rotors/stators have a 50% increase in the flow per revolution compared to S/L geometry.

The 2-stage NEMO® Pump in D-geometry can reach differential pressures of up to 12 bar (170 psi) at a flow rate of 150% over that of the S-geometry.

A single-stage NEMO® Pump in P-geometry, has the same outer dimensions as the 2-stage pump in D-geometry, the same ellipse and eccentricity but a pitch double that of the D-geometry rotor/stator. Therefore the pump produces a flow rate of 300 % over that of the S-geometry at a differential pressure of up to 6 bar (85 psi).



NEMO® Rotor/Stator Geometries

Comparison

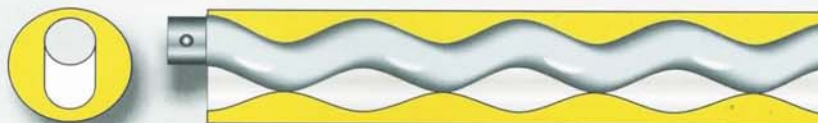
As all four pump geometries have the same outer dimensions, we have a modular design where - apart from rotor and stator - all other components are identical.

When a change in flow rate or pressure is required, installed NEMO® Pumps can be adapted to the new operating conditions by simply changing rotor and stator.

Geometries

S-Geometry

- very smooth conveyance
- compact dimensions despite high number of stages
- large cross sections of rotor inlet
- low flow velocity/NPSH
- conveyance of compacted products possible
- conveyance of large solid particles



- 1/2 lobe
- Double stage
- Flow rate: 100%
- Differential pressure: 12 bar (170 psi)

L-Geometry

- greater volumetric efficiency/long service life due to long seal lines between rotor and stator
- compact dimensions together with high flow rates



- 1/2 lobe
- Single stage
- Flow rate: 200%
- Differential pressure: 6 bar (85 psi)

D-Geometry

- extremely compact dimensions despite high pressures and flow rates capabilities
- almost pulsation free conveyance
- high dosing accuracy



- 2/3 lobe
- Double stage
- Flow rate: 150%
- Differential pressure: 12 bar (170 psi)

P-Geometry

- compact dimensions in conjunction with very high flow rates
- almost pulsation free conveyance
- high dosing accuracy
- good volumetric efficiency/long service life due to long seal line between rotor and stator



- 2/3 lobe
- Single stage
- Flow rate: 300%
- Differential pressure: 6 bar (85 psi)

Type of Joints – The Proper Joint for every Application

The correct joint design in a NEMO® Pump has a decisive influence on the operational reliability and life cycle cost. The optimal joint for the respective pump series is selected depending upon application, operational conditions as well as the flow rates.

The NEMO® Universal Pin Joint is the standard joint for NEMO® industrial pumps because of its simple design and outstanding reliability.

To achieve a long service life, the joint is oil filled and sealed by the NEMO® SM® seal. The joint can also be used without seal in case of extremely high temperatures and products where elastomers are not suitable.

The joint consists of a minimum number of parts that enables simple disassembly for maintenance.

The operational characteristics of the NEMO® V pin joint are similar to those of the B pin joint. For longer service life in difficult applications they are strengthened by hardened bushings fitted into boreholes in the coupling rod and the rotor/drive shaft head. The V pin joints with hardened bushings are easy to remove for maintenance purposes.

The open, patented pin joint was designed specifically for use in hygienic pumps. It is crevice and dead space free, polished and, therefore, easy to clean. The joint is made in accordance with US 3-A Sanitary Standards.

The patented flexible rod made from titanium is highly corrosion-proof, wear- and maintenance-free because there are no components moving against each other as in other joint types. Neither lubrication nor seals are required. Therefore, the flexible rod is suitable for high pressures and temperatures.

The flexible rod is also free from crevices and dead spaces which allows it to be used for pumping highly sensitive products in aseptic conditions. It is designed in accordance with the US 3-A Sanitary Standards.

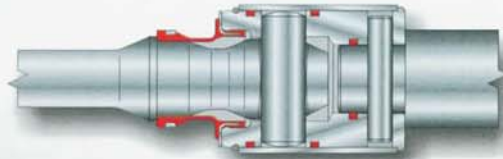
The patented K joint was designed for extremely difficult industrial applications involving constant pump running, frequent stop/starts or shock loads. It is kinematically designed so that the torque and axial loads are borne by separate elements within the joint. The joint is oil filled and hermetically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

For the largest flows and pressures possible with NEMO® pumps where the torques and axial loads are at their highest (in bearing housing size NM 125SY and above) the pumps are fitted as standard with a cartridge type precision pivot joint. The joint is oil filled, hermetically sealed by two seals which are compatible with the lubricant and the pumped product. It is suitable for continuous operation.

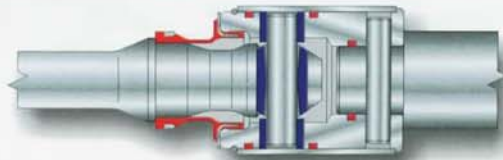
NEMO® Joints

Type of Joint

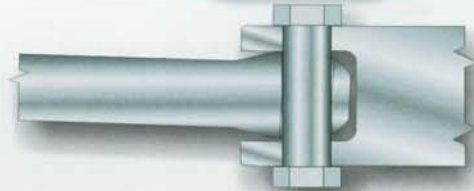
B Universal Pin Joint
with SM® seal



V Pin Joint
with hardened bushings
and with SM® seal



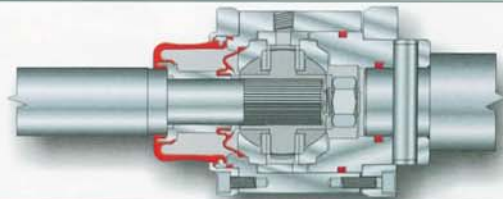
H Hygienic Pin Joint
patented



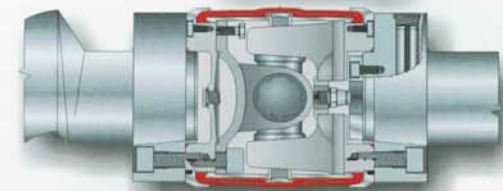
F NEMO® Flextec Flexible Rod
patented



K Joint
patented



Z Double Seal Pivot Joint



General Features of NETZSCH Oilfield Pumps and Systems

NETZSCH offers a complete downhole pump system comprising pump, drive head with motor, control cabinet, rods and other accessories.

The range of pumps includes downhole pumps, submersible downhole pumps, transfer pumps, multi-phase pumps and injection pumps. These pump systems are used for a continuous, pressure stable, non-emulsifying, almost pulsation-free handling of waste water and crude oil.

Wide Scope of Applications

The pumps are mainly used for fluids with the following properties:

- high solid content (up to 30% sand) and also free of solids
- low to high viscosities
- abrasive
- high content of gas
- high content of water
- high fluid and environmental temperature

Large Range of Capacities and Pressures

- capacities from 6 bpd up to 2,200 bpd
- pressures up to 240 bar (3,400 psi)
- installation depth up to 2,200 m (7,700 ft)

Submersible Downhole Pumps

Above all, this system is suitable for deep installation including doglegged and horizontal bore holes. A remarkable feature of this system is that no rods are required and, thus, wear on the tubing is dramatically reduced.

Transfer and Multi-Phase Pumps

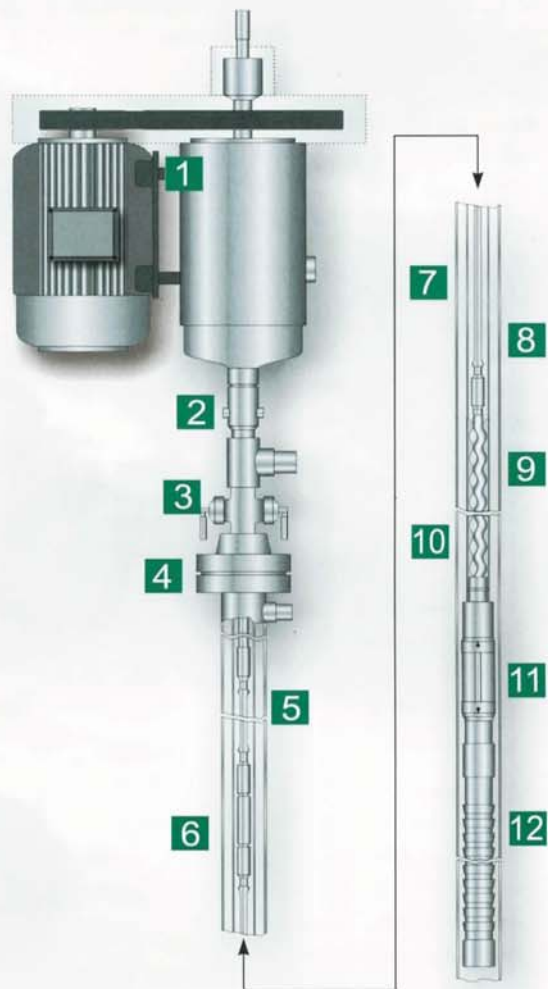
NETZSCH Transfer and Multi-Phase Pumps have proved to have a long service life even in the case of fluids with high solids and gas contents. Consequently, operational and maintenance costs are low as well as is the initial investment cost.

Injection Pumps

NETZSCH high-pressure pumps are rated for pressures up to 240 bar (3,400 psi) for universal applications. They are also suitable for water re-injection. The system is insensitive to high solid content in the fluid and has a low energy consumption due to its high efficiency.



NETZSCH in the Oilfield Downhole Pumps



- | | |
|-----------------------------------|-------------------------|
| 1 Drive Head | 7 Tubing |
| 2 Second Stuffing Box | 8 Sucker Rod |
| 3 Blow Out Preventor | 9 Rotor |
| 4 Drive Head Adapter | 10 Stator |
| 5 Pony Rod | 11 Torque Anchor |
| 6 Non Rotating Centralizer | 12 Gas Separator |

(further information: simply order brochure NLP. 402E)

Characteristics of NEMO® Barrel Emptying Pumps

NEMO® barrel emptying units are used to completely empty barrels in chemical, pharmaceutical, and food industries. The heart of the NEMO® systems is a NEMO® progressing cavity pump.

When the NEMO® pump is started a vacuum is created below the follower plate. The follower plate exerts a light pressure on the fluid to allow the pump to properly self-prime and gently pump the product. The flow rate can be adjusted by controlling the pump speed with the NEMO® VC-Dos.

Wide Range of Applications

The system is normally used for fluids having the following properties:

- low to high viscosity (up to 10 million Cps.)
- thixotropic, dilatant, viscous structure
- with or without solids
- shear-sensitive
- abrasive
- adhesive
- gel-like

Large Range of Capacities and Pressures

- capacities from 1 l/h up to 25,000 l/h (.25 gph up to 6.600 gph)
- pressures up to 24 bar (340 psi)

Advantages

- continuous and intermittent discharging
- no loss of pressure
- smooth delivery with low pulsation
- wear resistant
- clean emptying
- residues in the barrel without liner < 1%
- residues in the barrel with liner < 2 %
- low disposal cost
- little pressure on the follower plate in the barrel
- simple design
- dented barrels are no problem
- tapered barrels are emptied completely



NEMO® Barrel Emptying Pumps



1 Three pneumatic cylinders

2 Upper stator clamp plate

3 Follower plate

4 Frame

5 NEMO® Pump

6 Rotor/Stator

7 Pneumatic control panel

8 Space for barrel

The NEMO® barrel emptying unit, type BE(T)200, is suitable for emptying 200l (55 g) standard barrels. However, the simple design allows for an easy modification to bigger barrels or containers.

*Complete discharge:
The NEMO® Pump is drawn towards the bottom of the barrel*

Characteristics of TORNADO® Industrial Rotary Lobe Pumps

Universal Use

TORNADO® industrial rotary lobe pumps are used in the environmental and chemical industries for the continuous, smooth and almost pulsation-free conveyance of almost all fluids, as well as dosing them in proportion to speed. They are highly efficient and only require limited installation space.

Wide Spectrum of Applications

This pump is normally used for products having the following properties:

- with or without solids (max. size of solids up to 70 mm / 3")
- low to high viscosity (1 Cp. - 1 million Cps.)
- thixotropic and dilatant
- shear-sensitive
- abrasive
- non-smearing and smearing

Large Range of Capacities and Pressures

- capacities from 2 up to 700 m³/h (8.8 up to 3,100 gpm)
- pressures up to 12 bar (170 psi)

Alternative Rotating Elements

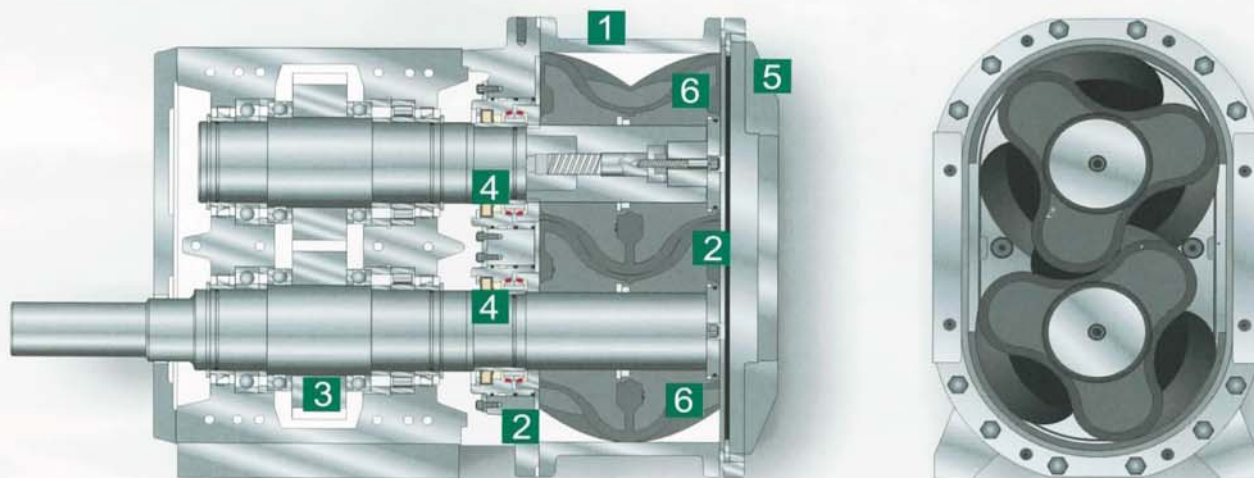
For specific applications four different types of rotary lobes are available.

Additional Features

- high suction capability of up to 8 mwc (26 ftwc)
- intermittent dry run capabilities
- reversible direction of rotation and flow
- vertical or horizontal installation
- vibration free and quiet running
- low life cycle cost and service friendliness



Construction of the TORNADO® Industrial Rotary Lobe Pump



1 Housing
Modular design with an adjustable housing for long service life.

2 Protection Wear Plates
Highly abrasive resistant and replaceable protection plates located on both sides of the lobes.

3 Timing Gear
Patented timing gear design with open space between pump seals and gear housing prevents cross contamination of gear case and bearings.

4 Shaft Seal
Easy to service shaft seals with single acting and wear resistant mechanical seals independent of the direction of rotation. Installation of any DIN/ISO Standard mechanical seal is possible.

5 Housing Cover Plate
Rotary lobe, pump and gear seals can easily be serviced or exchanged after removal of the cover plate without having to remove pump housing or gears.

6 Rotary Lobe
For different applications two to four bladed, straight or bevelled, rotary lobes in various elastomer qualities are available.

*Installation in limited space:
because of its compact, space-saving design*

Characteristics of the mobile emergency pump station TORNADO® Mobile

Universal Use

TORNADO® Industrial Rotary Lobe Pump mounted on mobile two-wheel trailer, allows pumping large quantities of wastewater and sludge at different places. Depending on the application, various sizes of the TORNADO® Rotary Lobe Pumps can be trailer mounted.

They are highly efficient and only require limited installation space which makes them especially suitable for emergency cases.

Wide Range of Applications

The TORNADO® Mobile Rotary Lobe Pumps are specifically designed for products with the following characteristics:

- capable of handling low to highly viscous and also abrasive fluids (1 Cp. to 1 million Cps.) without problems
- insensitive to solids contained in wastewater (completely free passage up to 60 mm) and dry running
- self-priming up to a maximum of 26 Feet for water and sludge
- other pump sizes with different flow rates and pressures are available

Large Range of Capacities and Pressures

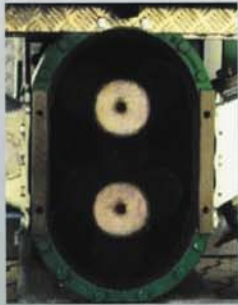
- capacities up to 2650 Gpm
- pressures up to 75 Psi, optional 150 Psi

Alternative Rotating Elements

For specific applications two different types of rotary lobes are available.

Additional Features

- bi-directional
- easy operation by integrated electronic motor control
- integrated tool box
- 2 x 3 m suction hose in ANSI 6" or 2 x 3 m suction pipe extension



Construction of the mobile emergency pump station TORNADO® Mobile e.g. the Rotary Lobe Pump XLB4-JD-60kW



1 Pump Typ XLB4-JD-60kW

bi-directional, self priming rotary lobe pump, pulsation free helical lobes made from GG25 cast iron with NBR rubber coating. Bearings only on drive side to allow quick lobe replacement, adjustable housings, replaceable wear plates.

2 Diesel Drive

powerful John-Deere 60 kW / 80 PS 4-cylinder diesel drive, 4-stroke direct injection engine, water cooler, fuel filter, air filter, injection pump, lubricating oil filter, oil pan, oil level dipstick, thermostat, cooling fan, 12 V starter, 65 A Bosch dynamo, suction filter, exhaust assembly with silencer.

3 Connections

suction: 2 x DN 150 Perrot M T ype. Discharge: DN 150 V Type (Storz A or other types of connections also possible), discharge ports either on side of unit or at the rear, each fitted with a blind cover, all pipes and flanges galvanised.

4 Trailer

completely hot dip galvanised, made from stable, torsionally rigid, structural steel, drive console with vibration dampener. Stable, hinged front support wheel, rear support with hand crank. Braked trailer with tow bar suitable for car. Total weight 2000 kg.

5 Drive Accessories

optimised starting, adjustable speed control, ignition starter switch, error memory. Preset shut off time, resettable hours run meter, total hours run meter.

6 Gear and Coupling

directly flanged gear reducer, 1:3 ratio reduction, with hand operated clutch.

For a detailed report please refer to our internet website under www.netzsch-pumps.com

General Properties of the M-Ovas[®]

Universal Use

The M-Ovas[®] solids grinding machine is used in all fields of industry where trash in the product interferes with process safety. The solids in the product are reliably ground in order to prevent clogging of pipelines and of subsequent aggregates.

Wide Range of Application

The M-Ovas[®] is preferably used for products of the following branches of industry:

- sewage and wastewater plants
- biogas plants
- animal waste processing plants
- organic biological waste plants
- slaughterhouses
- paper and pulp production industry
- agriculture
- sugar plants
- leather production
- health resorts

Large Range of Capacities

- flow rates of up to 1300 Gpm in wastewater and sludge with up to 7 % TR-content

Advantages:

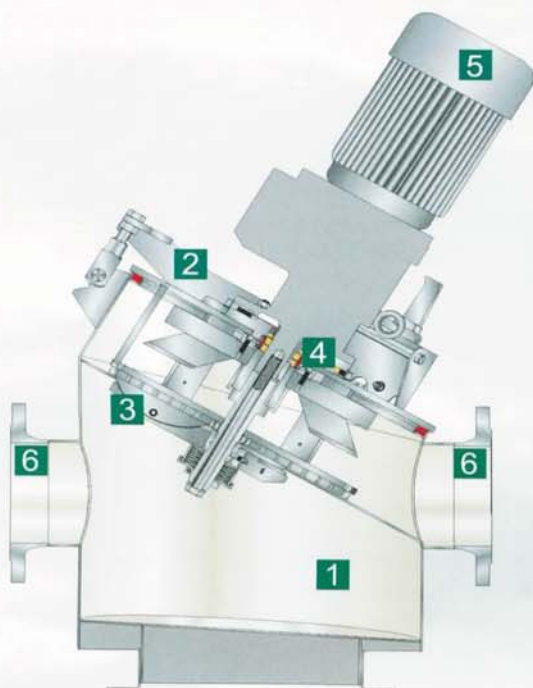
- compact design at high flow rates
- easy and fast disassembly of cutting tip and cutting unit
- low demand of energy at high flow rates
- integrated separating chamber with separate cleaning and outlet ports
- easy disposal of settled material due to easy access
- self-adjusting knives allow for optimum grinding
- shaft sealing by means of mechanical seals with grease lubrication



NETZSCH Grinding Systems

Construction of the NETZSCH Grinding System

e.g. the M-Ovas®



1 Housing

A flow convenient design with integrated collecting separator for solids and cleaning port. The settled solids can be easily removed by opening the cover plate. Galvanized in ST, the housing is corrosion-resistant.

2 Housing cover

Cutting unit integrated into the housing cover. The housing cover can be easily opened due to gas pressure reducing devices. This port allows for easy cleaning of the collecting separator for solids.

3 Cutting unit

Cutting tip of wear-resistant, hardened steel. Optimum cutting performance by a cutting unit with self-adjusting cutting mechanism. Cutter head tipped with cutting knives made of hardened steel. A flywheel supports the cutting process and reduces the driving power. Easy replacement of cutting tip and cutting knife without the necessity of disassembling the pipeline.

4 Shaft Seal

Effective mechanical seal made of hardened steel with greasing for preventing product leakage into the bearing.

5 Drive

As standard, a gear motor with heavy duty bearing.

6 Inline Version

Product inlet and outlet are on the same level. The M-Ovas® can be directly connected to a horizontal pipeline or to a pump inlet of a NEMO® Pump that is rotated by 90°.

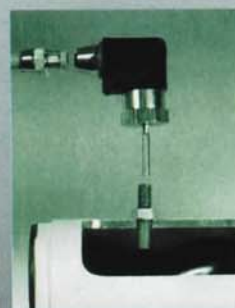
NETZSCH Accessories and Optional Equipment

NETZSCH Controls

- dosing systems
- filter press feed systems
- frequency inverters
- motor protection devices
- pressure transducers

NETZSCH Optional Equipment, Fittings/Hoses and Tools

- adjustable stator with adjusting device (NEMO® pump)
- coupling rod with mixing/agitator blade (NEMO® pump)
- bypass tubing with control switch or pressure relieve valve
- pressure relieve valve
- heating jacket
- stone trap for heavy solids
- custom-engineered hoppers
- ring dosing nozzle
- seal support systems and buffer fluid systems for mechanical seals
- adjustable feet and foundation bolts
- vibration dampener
- covers for drives
- mobile and trailer mounted units
- automatic shut-off devices, valves, non return valves
- connecting-, T- and welding neck flanges
- hoses and hose connections
- special tools



NETZSCH Accessories and Optional Equipment

NETZSCH Dry Running and Over-/Underpressure Protection devices avoid thermal destruction of stators and protect the pump and accessory equipment from unsuitable pressures. These devices continuously measure the stator temperature, as well as suction/discharge pressures, therefore increasing the operating reliability of the pump and minimizing downtime.

System STP-2

Dry running protection for constant product temperatures. In the event of an increase in the stator temperature the pump will instantly be shut down.

System STP-D

Dry running protection for constant and changing fluid temperatures. In the event of an increase in the differential temperature between product and the stator the pump will instantly be shut down.

System TTP

Dry running protection for constant or changing fluid temperatures. Protection against over temperature and pressure by early warning and shut down of the pump. Warning in the case of wear on the rotor and stator. Integrated running hours indicator.

System TTC

Dry running protection at constant or changing fluid temperatures. Protection against over temperature and cavitation when the suction pressure is too low by early warning and shut down of the pump. Warning in the case of wear on the rotor and stator. Integrated running hours indicator.

Conductivity Probe FTW 360

Dry running protection for electroconductive fluids and pastes which do not insulate the inner walls of the tube. When there is not sufficient flow the pump shuts off automatically.

Tuning Fork Probe FTL 260

Dry running protection for fluids with a tendency to leave deposits but without fibrous matter. When there is not sufficient flow the pump shuts off automatically.

Pressure Control Device DTSL 3

Display of operating pressure by a Bourdon gauge. Gauge is isolated from the process fluid by an elastomer diaphragm. Shut down of the pump when the maximum allowable pressure is exceeded with adjustable pressure setting. Also available with a differential pressure on/off switch.

Diaphragm Pressure Gauge G3/4 Inch connection

The pressure gauge displays the operating pressure. Gauge is isolated from the process fluid by a stainless steel diaphragm. Shut down of the pump when the maximum allowable pressure is exceeded with adjustable pressure setting. Suitable for low up to medium viscosities.

Diaphragm Pressure Gauge with DN50/PN40 or 2" ANSI B16,5 300 lbs flanged connection

Operation similar to the G3/4 inch unit. Includes larger flanged connection suitable for highly viscous and clogging fluids.

Diaphragm Pressure Gauge with connections for Food and Pharmaceutical Industries

The pressure gauge displays the operating pressure. Gauge is isolated from the process fluid by a stainless steel diaphragm. Shut down of the pump when the maximum allowable pressure is exceeded with adjustable pressure setting. Suitable for low up to medium viscosities. Also available with sanitary connection DN25/DIN 11887.

Monitor and Control

NETZSCH Service

To us, NETZSCH service is of equal importance as the quality of our pumps.

Our service teams are ready to help with mounting, installation, after-sales service, problem solving and maintenance through our Distribution Network.

In your area well-trained service partners are available for quick and economic service of the pumps at your premises. You will find your personal service partner in our homepage www.netzschusa.com

NETZSCH Seminars for Users

Know how and competence for your staff.

There are 1-days seminars where your staff members get introduced to installing, handling, maintaining and repairing NETZSCH pumps.

Training Subjects

The participants get acquainted with the functioning and proper handling of NETZSCH pumps, their mounting, initial operation and repair. A group analysis of damage is the basis for the participants to realize the root causes of a damage and to find measures to minimize down times and cost.

Furthermore, your staff members get to know the wide range of accessories and their application. They receive information on what is new in the NETZSCH pump range.

Your benefit

- trained personnel for handling NETZSCH pumps
- avoid mistakes with installation and commissioning
- save costs by preventive maintenance and professional repairs
- save time when analyzing damage and restarting pumps
- optimise your stock of NETZSCH Genuine Spare Parts

For more information, visit www.netzschusa.com or contact your Distributor .



NETZSCH Genuine Spare Parts

With the purchase of a NETZSCH pump you decided for good reason on NETZSCH quality!

Using NETZSCH Genuine Spare Parts guarantees both the performance of your NEMO® Pump and the continuity of your processes.

Why?

Only NETZSCH Genuine Spare Parts guarantee:

- constant quality of materials
- correct fit of all parts
- low starting and operating torque
- consistently high efficiency
- stability of flow rates and pressures
- low pulsation
- long service life
- low life cycle cost
- low down time
- high profitability
- security of supply

For the production of stators the coordination of manufacturing processes, elastomer compounds and moulds are the key to reliability, efficiency and the service life of the rotating elements.

Only NETZSCH original stators guarantee constant dimensional tolerance over the entire length of the stator independent of the elastomer type because for every elastomer compound a separate core is made.

For sanitary and aseptic applications in food, pharmaceutical and biochemical industries, our stators are certified and accepted in accordance with international standards. The composition and origin of each elastomer compound is traceable.

For the production of rotors where materials and coatings/hardenings for chemical and abrasion resistance are specifically adapted to individual applications, a precise fit and the surface finish quality of the rotating elements are of vital importance.

In order to minimize the weight of the rotor entailing a reduction in centrifugal force caused by the eccentricity of the rotor, we use hollow rotors depending on the application and the size of the pump. The smooth running of pumps originally fitted with these rotors is only maintained if NETZSCH original hollow rotors are used.

Our manufacturing knowledge for pumps and spare parts acquired over decades of research is made available to you.

Strict quality standards, tests and the certification according to DIN EN ISO 9001 guarantee all parts are of a consistent quality to the highest degree.

Global Presence

Addresses of all representatives and distributors in 60 countries worldwide are available upon request or by visiting:

www.netzschusa.com



NETZSCH

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M-Ovas®, M. Champ®, iFD-stator®, pMT-Pilot®, C. Pro®, NEMOLAST®
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