NETZSCH

Pumps & Systems

Environmental & Energy

Processes, Markets and Applications

NETZSCH Pumps & Systems – Solutions you can trust

Expertise creates trust

Intelligent solutions for a clean environment

Within the Business Unit Pumps & Systems, the business field Environmental & Energy has positioned itself as global specialists in the treatment of waste water and biogas technology. We provide special conveying systems and grinders– and, thus, the optimum solution for all stages of the process for many challenges.

Business Field Environmental & Energy

- Cleaning waste water
- Agriculture
- Construction industry
- Renewable energies
- Electroplating
- Marine equipment
- Purification of water and drinking water
- and much more

It is good to have a choice

For more than six decades, we provide positive displacement pumps as conveying systems for all media in environmental technology. Due to their regulating characteristics, these pumps ensure a safe, reliable and efficient process. Here we differentiate between the NEMO® progressing cavity pumps and TORNADO® rotary lobe pumps.

Always the correct product

The technically best pump is selected for the respective application. You benefit from reliable pumps and systems optimally tuned to your application and matched to the market. The NEMO® and TORNADO® pumps are supplemented by the NETZSCH grinding systems.

We are there where you are

More than 1900 employees at five development and production sites, as well as 30 distribution companies, one cooperation partner and more than 200 agencies, mean that NETZSCH can be there for its customers wherever required.

NETZSCH

Product range

NEMO® Progressing Cavity Pumps

- Flange pumps
- Mixing pumps
- Hopper pumps
- Immersion pumps
- Pumps for special applications

NETZSCH Grinder

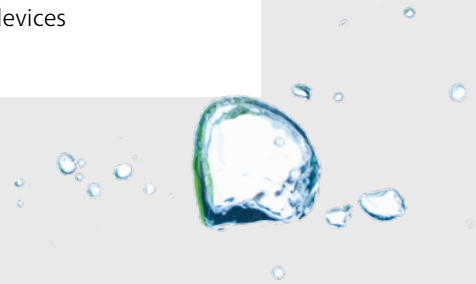
- Shear plate grinder M-Ovas®
- Twin shaft grinder

TORNADO® rotary lobe pumps

- Standard pumps
- Mobile pumps
- Pumps for special applications

NETZSCH accessory

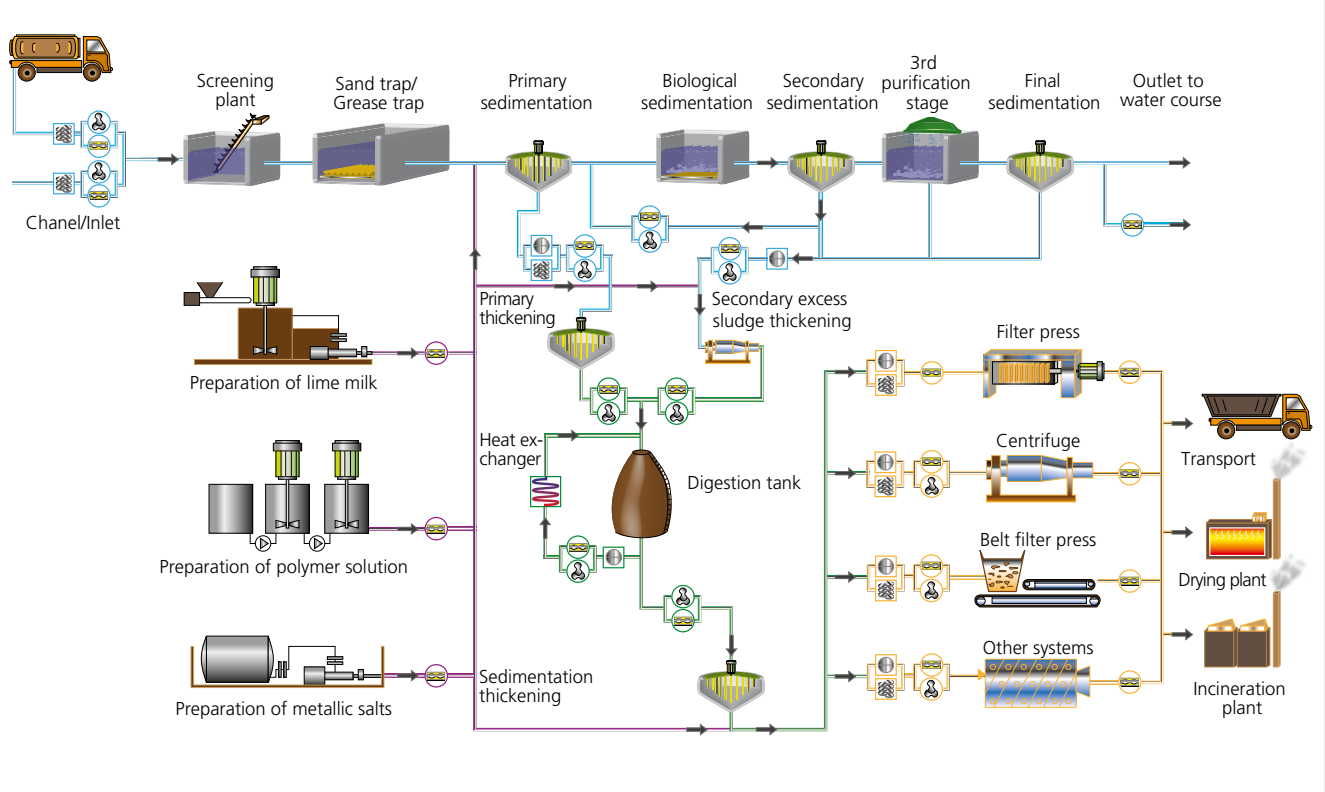
- Protection devices
- Flushing/pressurised flushing devices
- Control units
- Transport devices
- Tools



Your medium – We are prepared for everything

- Activated sludge
- Biomass
- Bio waste, packed and unpacked
- Centrate
- Compacted sludge
- Concentrated sludge
- Conditioned sludge
- De-watered sludge
- Digested sludge
- Draff
- Faecal sludge
- Flocculating agent
- Flotate sludge
- Flotation sludge
- Fresh sludge
- Grease and oil emulsion
- Gypsum suspension
- Gypsum slurry
- Haylage
- Hygienised sludge
- Industrial water
- Iron III chloride
- Kaolin sludge
- Landfill leachate
- Lime milk
- Liquid manure
- Liquid sludge
- Lubricant
- Metal-hydroxide sludge
- Mine water
- Mixed water
- Moor mud
- Polymer concentrate
- Polymer solution
- Pomace
- Primary sludge
- Pulps
- Purified sludge
- Raw sludge
- Raw waste water
- Refinery sludge
- Return sludge
- River mud
- Secondary sludge
- Sewage
- Slaughter waste
- Slop
- Stabilized sludge
- Surplus sludge
- Thick sludge
- Waste water

Process sequence of a waste water cleaning plant



Points of use for

NEMO® progressing cavity pump

TORNADO® rotary lobe pumps

NETZSCH Cutting Plate Macerator M-Ovas®

NETZSCH Twin Shaft Macerators

External view: NEMO® progressing cavity pump in a sewage plant with hopper and aBP-Module®

Internal view of the progressing cavity pump: Attachment with aBP-Module® to prevent bridging

TORNADO® rotary lobe pump conveys digested sludge in the sewage plant

The process

We provide you NEMO® progressing cavity pumps and TORNADO® rotary lobe pumps in diverse designs and materials, designed according to the location of use in the waste water plant. Low viscosity and also abrasive sludge is reliably conveyed using our pumps with flanged connections. For media with a high dry material content, such as de-watered sludge, are suitable for different designs of the NEMO® hopper pumps with screw conveyors or also with our aBPModule ® to prevent bridging.

The robust NEMO® progressing cavity pump:

NEMO® progressing cavity pumps are used in all sectors of the environment to convey almost all types of media continuously, smoothly, with low pulsation and dosing in proportion to speed.

Further features:

- High suction capacity - up to 9 mWS
- Direction of rotation and flow can be reversed
- Can be installed anywhere
- Quiet, low-noise running
- Temperatures from - 20°C to + 200 °C

The compact TORNADO® rotary lobe pump

Due to their compact construction, TORNADO® rotary lobe pumps are predestined for cramped installation situations. In robustness, they are no inferior to the progressing cavity pumps and are also very suitable for media with larger solid substances. As TORNADO® Mobile or on a hand trolley, they are used locally flexible and also have proven their reliability in the event of a catastrophe. (refer to P. 14/15)

Grinder for process reliability

The cutting plate grinder M-Ovas® and NETZSCH twin shaft grinder protect lines and pumps and, alongside the wide range of accessories, also contribute to the process reliability of the overall plant. (refer to P. 16/17)

Further information

NEMO® progressing cavity pump
Brochure NPS · 305

TORNADO® rotary lobe pump
Brochure NPS · 081

Grinder
Brochure NPS · 040

Typical application in the waste water sector

Flotation sludge

Flotation sludge and sludge foam represent floatation fractions of sludge that collect on the surface in the secondary settlement tanks.
This effect is not desired and results in the floatation sludge, appearing as an air-medium mixture, needing to be pumped away. Ideal for this is the NEMO® progressing cavity pump, which reliably and continuously conveys, even with a high ratio of gas in the medium. For restricted spaces, the TORNADO® rotary lobe pump can also be used here.

Concentrated sludge

In an initial step, the water ratio and, thus, the overall volume of the sludge is reduced by means of gravity or mechanical thickening. Thereby, the objective is to attain a dry matter content of 4% to 11% in the medium. Thickened sludge is a flowable to viscous media that can also be pumped over long distances. High counter-pressures are overcome by using multiple stage NEMO® progressing cavity pumps. The space-saving TORNADO® roatary lobe pump is also frequently used on this sludge.

Flocculating agent

Flocculating agent is fed to the sludge before draining. It promotes formation of larger solid flakes in the sludge and, in this manner, contributes to improved de-watering. Normally, flocculating agent is dosed as a polymer solution or dispersion. Its viscosity and the requirement to be able to accurately dose the quantity, place requirements on pumps that the NEMO® progressing cavity pump can conform to.

De-watered sludge

During de-watering of the sludge, by adding flocculating agents in centrifuges, decanters, belt or chamber filter presses, an additional reduction in the volume of between 65% and 80% can be attained. A crumbly, compacted product ensues that cannot flow. Due to the characteristics of the medium, forced feeding into the pump is required. Furthermore, bridging in the inlet area of the pump must be prevented. Fundamentally, NEMO® progressing cavity pumps with rectangular inlet hopper and feed and conveying screw are used for these applications. A feature of this pump is the horizontally positioned, patented conveying screw that ensures an optimum degree of filling of the delivery chamber. For sludge that tends towards bridging, the feed hopper of the NEMO® progressing cavity pump has an additional aBP-Module® (up to size NM090) and integrated bridge breaker (from size NM090).

NEMO® progressing cavity pumps convey digested sludge

TORNADO® rotary lobe pumps in digested sludge recirculation

Liquid sludge

During the initial steps of cleaning waste water, liquid sludge occurs in large quantities as "waste". This is sludge with a dry matter content of approx. 1% to 4%. Depending on the origin, the ratio of the content of organic and inorganic substances can differ greatly. Pumps that can convey large quantities at low pressures, as well as feature a long service life, are normally required to convey low viscosity sludge. Both the NEMO® progressing cavity pumps as well as the TORNADO® rotary lobe pumps are used here. Particularly when using the L and P-geometry, NEMO® progressing cavity pumps feature a high power density. Another advantage is presented by long service live, to the long seal line and reduced sliding velocity of the rotor.

Lime milk

Lime milk is an inorganic suspension of lime hydrate and water. Alternatively, lime milk can also be directly produced by quenching caustic lime with a surplus of water. Lime milk is used as an aid to filtration during the de-watering of sludge using filter presses. The structure and constitution of the calcium carbonate is dependent on the origin of the production process. It is a very abrasive medium. In order to attain high service life, NEMO® progressing cavity pumps are used equipped with rotors and stators a high-quality material. Here, the non-wear NEMO CERATEC® ceramic rotor, in combination with an extremely abrasion-resistant elastomer stator is ideal.

Marine waste water

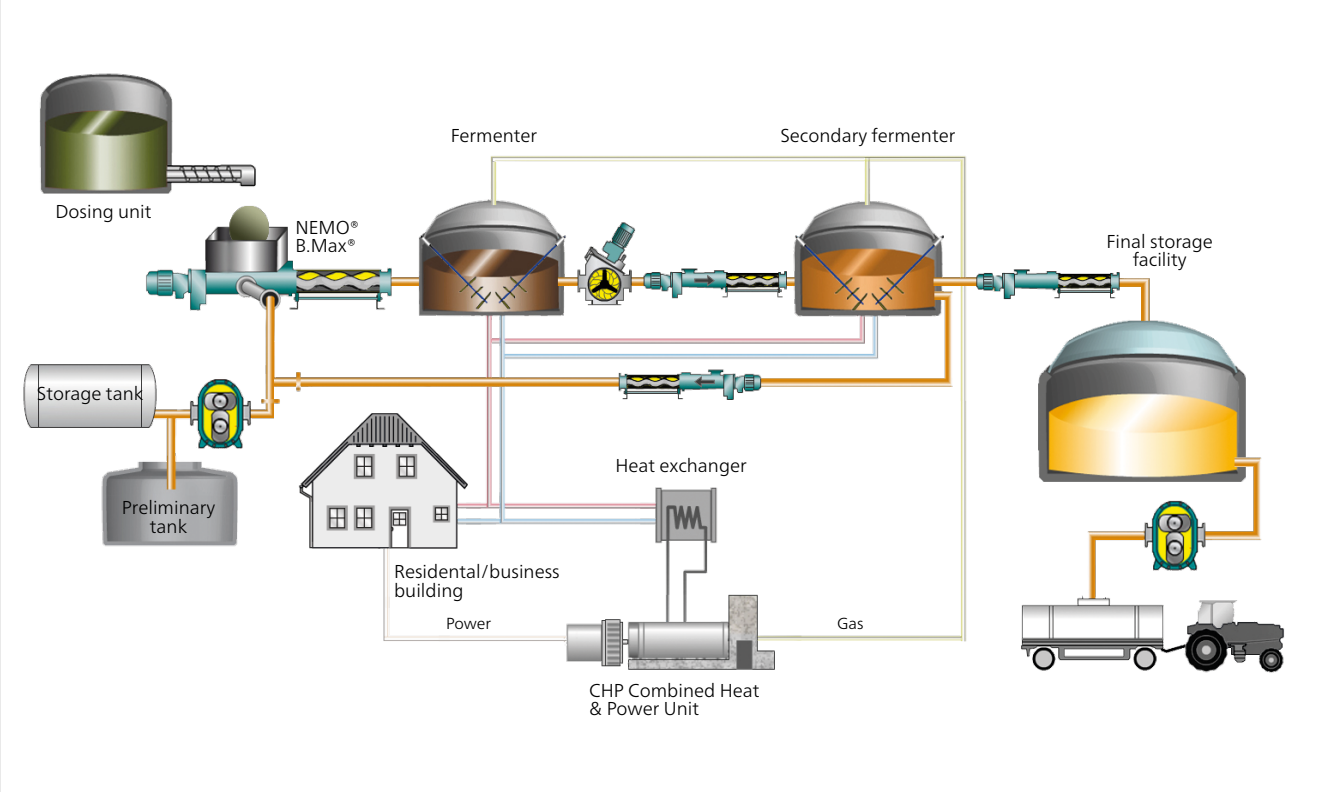
Compact, light, robust and simple to use – these requirements are particularly applicable for pumps in ships. The pumps must also be versatile for universal use to keep down the cost of servicing and spare parts. The TORNADO® rotary lobe pump takes into account all of these demands. Therefore, it is used as a bilge pump as well as a waste water pump: The core is the oil-free synchronised gear with belt drive. It reduces the weight of the pump by a minimum of 30 percent compared to a normal gear pump and the robust sub-assembly uses significantly less individual parts. The overall mechanism is extremely reliable, the number of spare parts is conceivably low. Because the system is not lubricated, extravagant lubricant changes are not necessary and leakage detrimental to the environment is excluded. After removing the drive cover, the entire synchronised gear including the belt can be accessed. Workload is kept to a minimum and downtimes are shorter. If maintenance or repair tasks are required in the pump room, these can be carried out quickly and easily by direct access from flange to flange.

Also the NEMO® progressive cavity pump works reliably below deck: as a bilge pump it is used successfully.

Further information

NEMO CERATEC®
Brochure NPS · 347

Process sequence of a biogas plant with renewable raw materials



Points of use for

NEMO® progressing cavity pump

TORNADO® rotary lobe pumps

NETZSCH Cutting Plate Macerator M-Ovas®

B. Max® mixing pump

TORNADO® rotary lobe pump in the biogas plant, pumping liquid manure

A strong team: NEMO® progressing cavity pump with grinder M-Ovas®

The process

Renewable raw materials are a source of raw material for the future. These inhomogeneous, liquid or solid, organic substances are decomposed through the use of microorganisms and, thereby, used to generate energy. Depending on the process sequence, it is necessary that the biomass is continuously fed to the fermenters and circulated in the reactor. Here, pump systems are required to convey the large quantity and sizes of grain in the solids flux without problems. NEMO® progressing cavity pumps as well as TORNADO® rotary lobe pumps are used for this application, also sometimes combined with NETZSCH grinders.

Large capacity and pressure range

- Capacities up to 500 m^3/h
- Pressures up to 48 bar

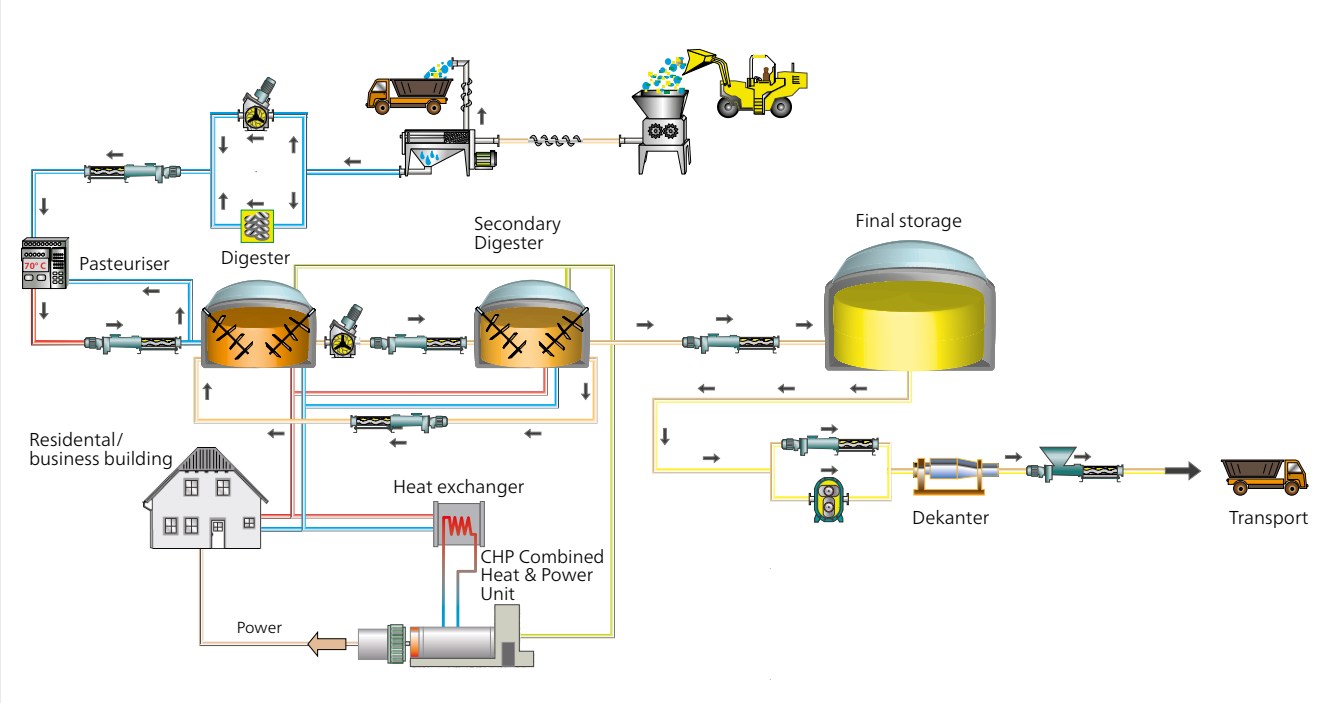
Special characteristics

- Continuous, low-pulsation conveyance irrespective of pressure and viscosity
- High accuracy of dispensing, even at low speeds
- High suction and pressure capacity (-0.9 bar to +48 bar) without valves direction offlow reversible
- Stator with bevelled inlet for optimum filling of the delivery chamber
- Patented, horizontally positioned feeding screw for thick matter pumps for media with high dry solid content
- For compacted sludge that tend towards bridging, the feed hopper of the NEMO® pump has an additional aBP-Module® (up to size NM090) and integrated bridge breaker (from size NM090)
- Low lifecycle costs due to high operating reliability and easy maintenance
- Maximum mixing and movement of the bio-substrate is achieved by the specially designed NEMO® B.Max®

Advantages

- Variable, modular system
- Robust and compact block design, as well as designs with bearing housing
- Four rotor/stator geometries and a large range of materials
- The correct joint for every application
- Mechanical seal as standard, further seals as an option. (Page 15)

Process sequence of a biogas plant with bio waste



Einsatzpunkte von

- NEMO® progressing cavity pump
- TORNADO® rotary lobe pumps
- NETZSCH Cutting Plate Macerator M-Ovas®
- NETZSCH Twin Shaft Macerators

Bio waste

NEMO® progressing cavity pumps convey the substrate to the fermenters

NEMO® und TORNADO® pumps side by side in a biogas plant

The process

In addition to sustainable raw materials, bio waste from different sources is used increasingly in the generation of biogas. The waste is sometimes supplied to the biogas plant in its packaging and must be separated and reduced there. Here, the cutting plate grinder M.Ovas® is simultaneously used as a cutting tool and a solid separator and makes a positive contribution to the operating performance of the plant through better homogenisation of the substances introduced. During the complete process of recovering biogas, NETZSCH pumps deliver the biomass forwards and backwards and between the fermenters and other units. Changing the direction of flow can be a useful tool in cleaning blockages. Also at the end of the process for the additional step of draining the residue, NETZSCH pumps again provide valuable service.

NETZSCH units

NEMO® progressing cavity pumps and TORNADO® rotary lobe pumps are used as preference in biogas plants for media with the following characteristics:

- High dry matter content
- Abrasive
- Low to high viscosity
- Lubricating and non-lubricating
- Corrosive (pH 0 -14)
- Heated and unheated
- Dilatant, thixotropic or shear thinning

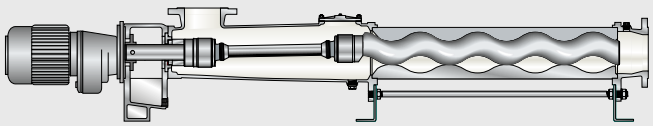
Powerful grinding systems are used to protect your plants and pump units contained therein.

NEMO® progressing cavity pumps for the treatment of waste water and biogas technology

NEMO® BY

in block design

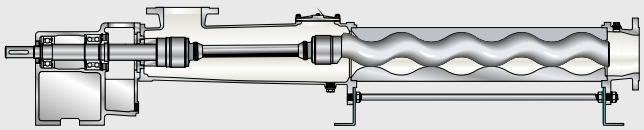
Compact design with directly flanged drive. It is distinguished by its low investment, operating and maintenance costs. Four rotor / stator geometries for optimum performance with every kind of application.



NEMO® SY

with bearing housing and drive shaft

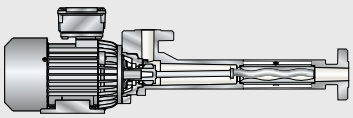
The design with bearing housing and drive shaft means it can be used with all types of drive. Four rotor / stator geometries for optimum performance for the respective application.



NEMO® C.Pro®

Mini dosing pump in plastic design

High dosing accuracy (deviation of < 1%).
Compact design with directly flanged drive.



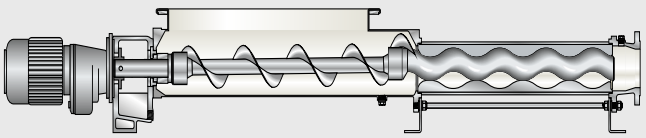
Further information

C.Pro®
Brochure NPS · 313

NEMO® BO/BS

in block design with directly flanged drive or NEMO® SO/SS with bearing housing and drive shaft (top fig.)

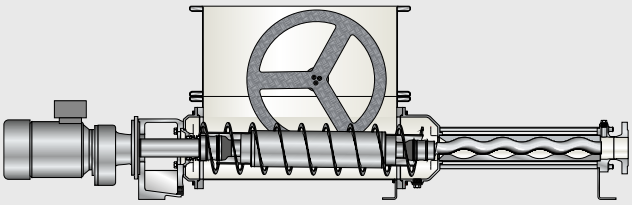
Housing with rectangular/square feed hopper and coupling rod with conveying screw with compression chamber for improved product feeding into the conveying elements.



NEMO® BF option with aBP-Module®

in block design with directly flanged drive or with bearing housing and free shaft end (top fig.)

Housing with enlarged, rectangular feed hopper and with removable, cone-shaped compression chamber, coupling rod with patented, horizontally positioned conveying screw for optimum product feeding into the conveying elements.



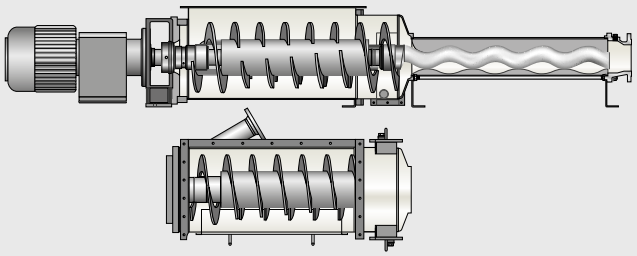
Further information

aBP-Module®
Brochure NPS · 070

NEMO® B.Max®

in block design with directly flanged drive or with bearing housing and drive shaft end (top fig.)

Housing with large, rectangular feed hopper coupling rod with patented, horizontally positioned conveying screw for optimum product feeding into the conveying elements.. The additional, hydrodynamically designed flushing stud installed on the hopper housing ensures the substrates are fed and mixed optimally for the biomass.



Further information

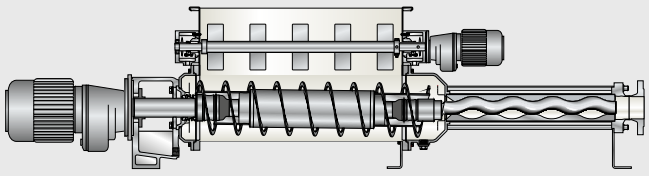
NEMO® B.Max®
Brochure NPS · 060

Repowering
Brochure NPS · 063

NEMO® BP

in block design with directly flanged drive or NEMO® SP with bearing housing and drive shaft (top fig.)

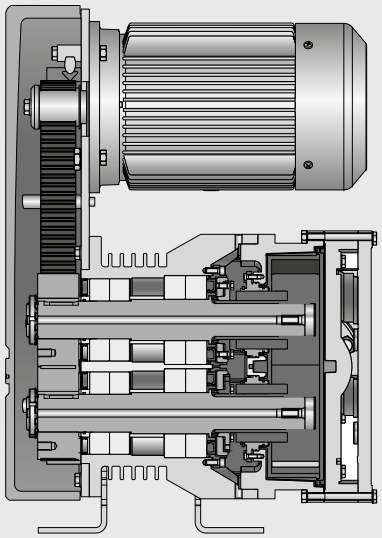
Housing with integrated bridge breaker to prevent bridging and to mix in additives, enlarged rectangular feed hopper and removable, cone-shaped compression chamber, coupling rod with patented, horizontally positioned conveying screw for optimum product feeding into the conveying elements.



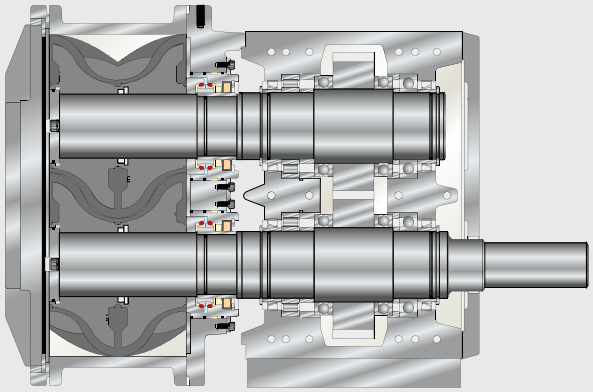
Technical notes: the hopper dimensions can be adjusted to suit the specific application.

The correct product for every application

TORNADO® rotary lobe pumps – powerful, robust, compact



TORNADO® T2



TORNADO® T1

TORNADO® self-priming, valveless positive displacement pumps are high-performance and optimally tailored to individual requirements. They are used for continuous and smooth conveyance of almost all media, as well as for dosing in proportion to speed.

Large capacity and pressure range

- Capacities up to 1,000 m^3/h
- Pressures up to 8 bar

Broad range of applications

The pumps are primarily used with media that have the following features:

- With and without solids
- Low to high viscosity
- Thixotropic and dilatant
- Shear sensitive
- Abrasive
- Non-lubricating and lubricating

TORNADO® Mobile

The NETZSCH TORNADO® Mobil is ideal for applications where pumps have to be used quickly and flexibly outside buildings and plants or away from any infrastructure. This unit comprises a mobile TORNADO® rotary lobe pump with diesel drive. This complete unit conveys large quantities of sewage and sludge, independent of the local circumstances.

Further information

TORNADO®
Brochure NPS · 081

Grinding systems

Powerful NETZSCH grinder systems are used to protect your plant and pump units contained therein. These ensure that impurities are separated or ground suitable for pumping. Thus, the risk of blocking and/or clogging in the pump systems are/is reliably prevented.

The NETZSCH M-Ovas® cutting plate grinder

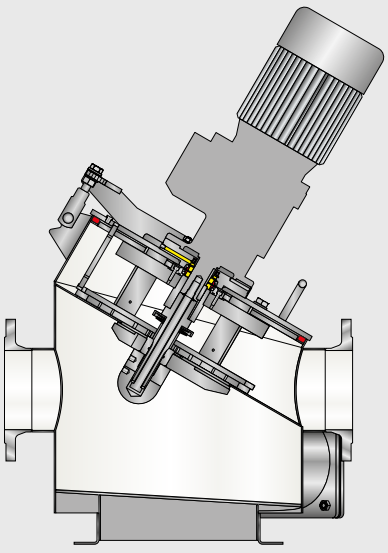
During the treatment of waste water, the impurities in the medium are directed through the specially shaped housing and gathered and cut by the rotating blades. This unit can be used for sludge with a throughput rate of up to max. 300 m^3/h and a dry matter content of up to 7% and is characterised by its ease of maintenance.
In biogas plants, the M-Ovas® is used in addition as a solid separator for foreign matter of bio waste. The throughput rate for substrates is up to 80m^3/h at a dry matter content of up to 12%. Two sizes can be selected depending on the throughput quantity.

NETZSCH twin shaft macerator

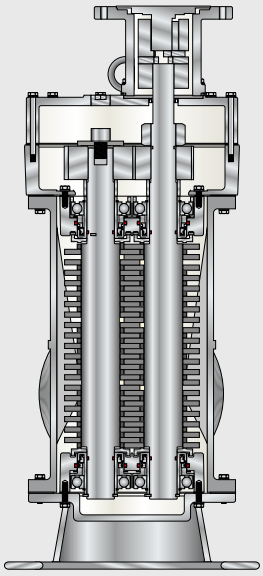
The NETZSCH twin shaft grinder is used for applications with particularly coarse and solid substrates. The twin shaft macerators impress with their robust design, simple operation and high performance. They offer the optimum solution, even in the most extreme conditions.
Depending on the application, five different NETZSCH twin shaft macerators can be used in various designs. The various, very slow speeds of the shafts provide the option of self cleaning. The low drive power with particularly high flow rate enables cost-effective use.

Further information

Grinder
Brochure NPS · 040



NETZSCH M-Ovas® cutting plate grinder



NETZSCH twin shaft macerator

NETZSCH

The NETZSCH Group is a mid-sized, family-owned German company engaging in the manufacture of machinery and instrumentation with worldwide production, sales, and service branches.

The three Business Units – Analyzing & Testing, Grinding & Dispersing and Pumps & Systems – provide tailored solutions for highest-level needs. Over 3,000 employees at 163 sales and production centers in 28 countries across the globe guarantee that expert service is never far from our customers.

The NETZSCH Business Unit Pumps & Systems offers with NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, screw pumps, macerators/grinders, dosing systems and equipment custom built and challenging solutions for different applications on a global basis.

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