

## Applications for Biogas Production

Mixing, Conveying, Grinding



# NETZSCH in the Biogas Technology



## Your Partner for the Energy of the Future

Today's trend is the increasing use of the fermentation of organic matter for the economical production of energy. As your expert in biogas technology we provide specific mixing and conveyance systems for all process steps.

### Biogas Technology

For the production of biogas, different electricity, heat, fuel and mains gas processes are possible. Biogas belong, together with solarplants and waterpower plants, to the regenerative electricity producers (= CO-neutral). Among these, biogas is one of the most multi-functional

energy sources. Electricity, heat, fuel and mains gas can be produced from biogas. The "energy" for the biogas comes from renewable energies or organic waste which, with the help of bacteria, is transformed under the exclusion of air in large part into methane.

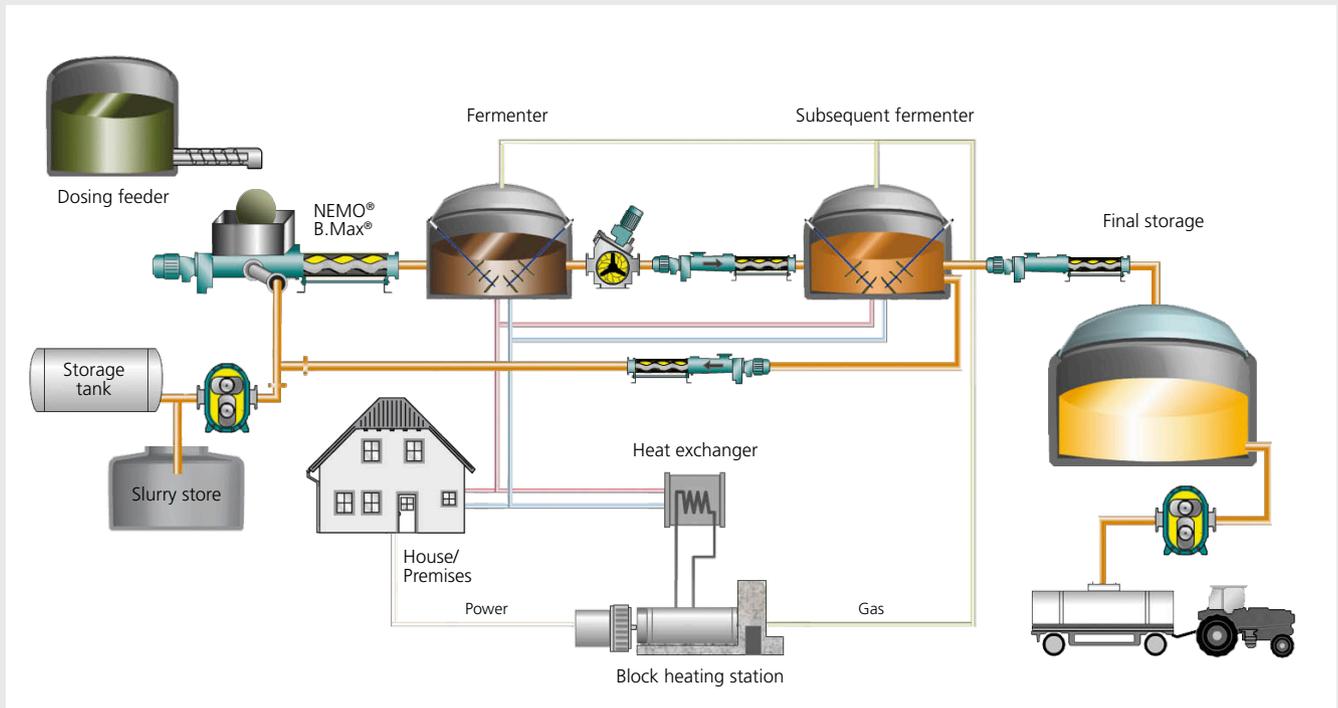
### Always the right product

For each individual application case, the technically most suitable pump is chosen. Your advantages are pump types and series, which are optimally matched to your specific application, reliable and market driven. The NEMO® and TORNADO® pumps are complemented by the NETZSCH grinding systems.

### We are ready for anything

- Fermented renewable energies
- Process water
- Ground biowaste and leftovers
- Pretreated slaughter waste
- Co-substrate
- Thickened substrate
- Pretreated slaughter waste
- Distillers grains with solubles
- Liquid manure
- Bio waste
- Slaughter waste

## Flow Chart of a Biogas Plant



### Application Points of



NEMO® Progressing Cavity Pumps



TORNADO® Rotary Lobe Pumps



NETZSCH Cutting Plate Macerator M-Ovas®

The flow chart represents a simplified, multi-level biogas plant for the production of methane.

The fields of use of your NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps as well as NETZSCH grinding systems comprise mixing, conveying and also grinding.

At the beginning of the process the fermenters are loaded with the substrate. The substrate is homogenized with

the process water in the B.Max®.

The fermentation proceeds, at a concentration of anhydrous mass of approx. 5 - 15 %, in four biological phases. These are the hydrolysis phase, acidification phase, acetic acid phase and the methane creation phase. Through use of an upstream grinder, a higher yield of gas can be achieved. Afterwards the pre-fermented substrate is delivered into the subsequent fermenter.

### Production of Electricity

The now generated methane will be supplied to a block heating station for the production of electricity or heat. The remaining biomass, still containing a residue of organic material, will be further dewatered, the extracted substrates are used agriculturally or will be finally composted.

# NEMO® B.Max® – Benchmark in Mixing Technology

## Features and Construction

The NEMO® B.Max® sets new standards with maximum bio-strate mixing and feeding. It is a perfectly co-ordinated piece of feed technology for your biogas application.

### Wide Range of Application

The NEMO® B.Max® is particularly suitable for the following media:

- Fermented renewable energies
- Liquid manure
- Process water
- Ground biowaste and leftovers
- Pretreated slaughter waste
- Co-substrate
- Thickened substrate
- Distillers grains with solubles

### Large Range of Capacities and Pressures

- Capacities up to 70 m<sup>3</sup>/h
- Pressures up to 48 bar

### Control

We offer for each application a customized control system. The systems range from simple hand operated units up to BUS connected fully automated mixing systems with data recording.

### Advantages

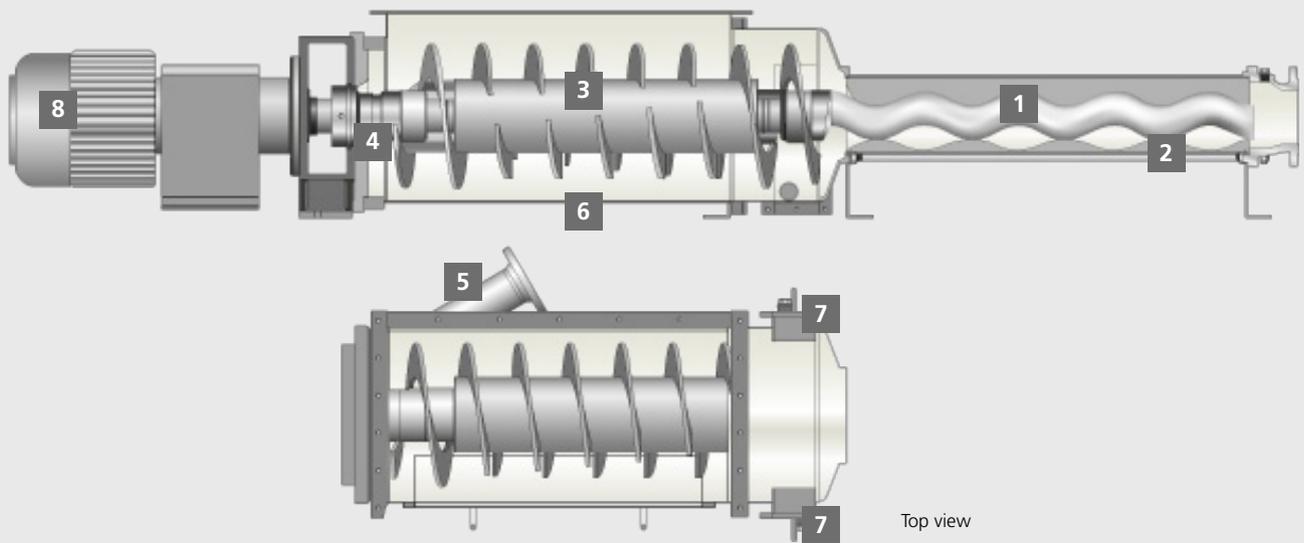
- Maximum homogenization of substrates
- Increased gas production
- Continuous and low pulsation conveyance independent of pressure and viscosity
- High pressure capability
- Sturdy drive sealing
- Low investment and operating costs
- High operational safety

### Additional Features

- Optimum feeding and mixing of the substrate into the biomass through supply connections situated conveniently on the hopper housing
- Housing with large, rectangular/ square hopper
- Tapered force feed chamber with inspection chamber
- Coupling rod with patented, positioned feeding screw for optimal transfer of the medium to the rotor and stator.

## NEMO® B.Max®

in block construction design with directly flanged drive or as NEMO® B.Max with bearing housing and drive shaft (no fig.)



Top view

### 1 Rotor

Wear and corrosion resistant design.

### 2 Stator

Vulcanised into a tube, with integrated seals on both ends, in a variety of elastomers. Stator inlet with hopper-shaped port to facilitate the entry of the fluid into the conveying chamber.

### 3 Mixing and conveying screw

The reinforced and offset screw blades of the mixing and conveying screw guarantee a maximum of mixing and homogenization of the media. The patented, conveniently located filling

screw guarantees optimum filling of the feed chamber.

There is also the option of having metallic protective sleeves to safeguard the joints.

### 4 Shaft seal

Use of a standard design, robust drive sealing for highest demands on operational safety.

### 5 Feed Connection

The ideally located feed connection, which is positioned against feed direction, leads to maximum substrate mixing.

### 6 Hopper Housing

With a conical, removable force-feed chamber. An infeed hopper, optionally coated and reinforced for protection against abrasion and corrosion. Available in different lengths.

### 7 Inspection Openings

Large and easily accessible inspection openings for easy cleaning and servicing.

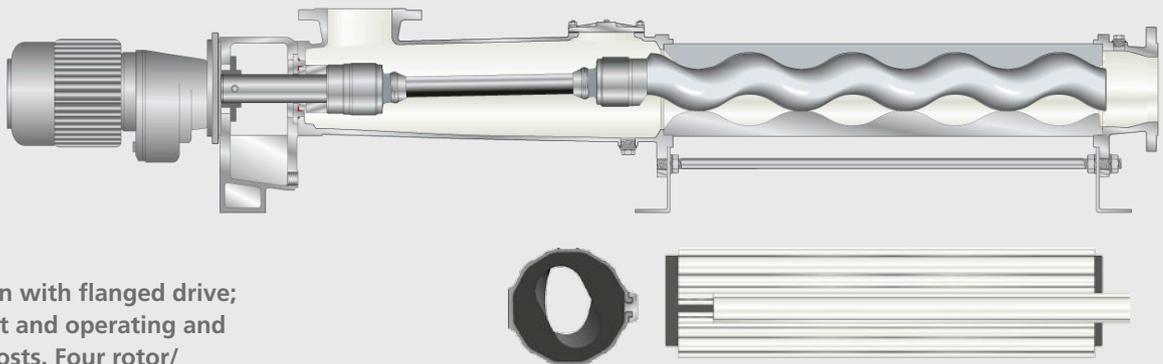
### 8 Drive

The compact block construction design with directly flanged drive is characterized by low investment, operating and maintenance costs.

# NEMO® Progressing Cavity Pumps – TORNADO® Rotary Lobe Pumps

## NEMO® BY Progressing Cavity Pump

in a block design and optionally with protective joint sleeves or NEMO® SY with bearing pedestal and free shaft end (no fig.)



**Compact design with flanged drive; low investment and operating and maintenance costs. Four rotor/stator geometries for optimised performance.**

NETZSCH iFD-Stator®

### Wide Range of Application

The pumps are mainly used for conveying:

- Fermented renewable energies
- Liquid manure
- Process water
- Ground biowaste and leftovers
- Pretreated slaughter waste
- Co-substrate
- Thickened substrate
- Distillers grains with solubles

### Optional

- With protective sleeve
- With inspection opening

### Large Range of Capacities and Pressures

- Capacities from a few millilitres up to 400 m<sup>3</sup>/h
- Pressures up to 48 bar

### Fluid Properties

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

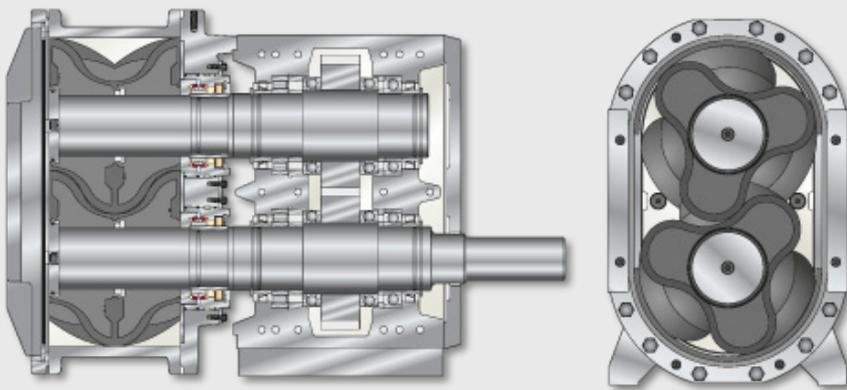
### Advantages

- Continuous and low pulsation conveyance independent of pressure and viscosity
- High suction and pressure capability
- Low investment and operating costs
- High operational safety
- Various installation options

### Further Features

- High suction capability up to 9 mwc (30 ftwc)
- Reversible direction of rotation and thus flow
- Installation in any position
- Smooth and quiet operation
- Temperatures of -20 up to + 200 °C (-5 up to +570 °F)

## TORNADO® Rotary Lobe Pumps



The NETZSCH TORNADO® positive displacement, self priming, valveless pumps offer high performance and are selected and configured for the individual requirements of each application. They are designed for intermittent or continuous operation and provide gentle pumping of the pumped media and ideally suited to transfer, process and dosing applications.

### Advantages

- Maximum operational reliability: the NETZSCH GSS-Technology (Gearbox Security System)
- User maintenance in place
- Small installation and maintenance envelope; compact construction
- Installation flexibility
- High suction lift capability – up to 8 mwc
- Dry running capability
- Reversible flow
- Low lifecycle costs

### A Broad Application Spectrum

NETZSCH TORNADO® pumps are suitable for a wide range of applications but are particularly good for liquids which:

- Contain large solids, solids up to 70 mm in diameter can be pumped
- Have a wide range of viscosities, from 1 mPas up to 1 million mPas
- Are shear sensitive, i.e. thixotropic, dilatent, pseudoplastic, etc
- Are fibrous and/or abrasive
- Are lubricative or non lubricative

### Large Range of Capacities and Pressures

- Capacities up to 1,000 m<sup>3</sup>/h
- Pressures up to 6 bar

### Further information

TORNADO®  
Brochure NMP · 080 · 02

# Macerators

## NETZSCH M-Ovas® Cutting Plate Macerator

The NETZSCH M-Ovas® is particularly useful in all industries, where particles in the medium endanger process reliability. All solids in the medium are reliably macerated to prevent pipework and downstream equipment from blocking.

### High Delivery Capacities

- Flow capacities up to 300 m<sup>3</sup>/h of waste water and sludge with up to 7 % dry solids content
- Two sizes of model available depending on the flow rate

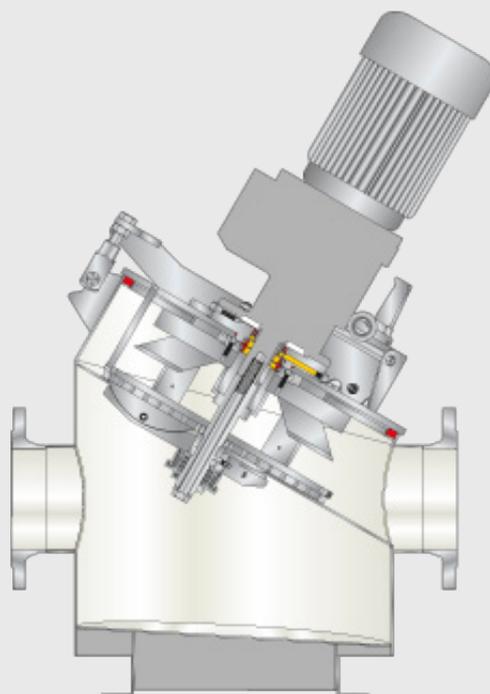
### Wide Range of Applications

The NETZSCH M-Ovas® is particularly suitable for the use in the following industries:

- Sewage and waste water treatment
- Biogas plants
- Abattoirs
- Organic biological waste recycling plants
- Rendering plants
- Paper and pulp production
- Agriculture
- Sugar factories
- Leather production
- Spas and health resorts

### Advantages

- Compact design for high flow rates
- Easy and fast disassembly of cutting plate and blade units
- Low energy demand at high flow rates
- Integrated stone trap with separate clean-out and drain ports
- Easy access allows simple disposal of the sediment
- Self-adjusting blades reduce maintenance and ensure optimal cutting performance
- Sealing by means of a mechanical seal with oil quench
- Easy to maintain



## NETZSCH Twin Shaft Macerator Taskmaster®

For applications with particularly chunky and sturdy solids in the waste water flow the NETZSCH Taskmaster® is needed.

The robust design of the NETZSCH Taskmaster® ensures a high performance coupled with trouble free operation. It offers the best performance even under the most arduous of operating conditions. The twin shaft macerator

provides a free flow through, protecting the pumps and other plant equipment. Depending on the application one of five different models and sizes can be installed. Through the different, very low number of revolutions of the shafts the NETZSCH twin shaft macerator offers the option of self cleaning. Low power drives can be used even on high throughput applications.

### Wide Range of Applications

The NETZSCH Taskmaster® is particularly suitable for the use in the following industries:

- Waste water treatment
- Agriculture
- Slaughterhouses and recycling plants
- Canning/tinning factories
- Industrial kitchens
- Sugar factories



### Advantages

- Optimized cost performance ratio
- Low running costs through highest efficiency
- Cartridge design cutter assemblies allow simple and quick maintenance providing high operational safety.
- Through the different, very low number of revolutions of the shafts the NETZSCH twin shaft macerator offers the option of self cleaning.
- Robust design, trouble free operation, high performance

### High Delivery Capacities

Capacities up to 300 m<sup>3</sup>/h with a solids content rate of up to 10 %

### Further information

Grinding Systems  
Brochure NMP · 040 · 02

# NETZSCH Accessories from A - Z – NETZSCH Service

## NETZSCH Accessories from A - Z

### Process monitoring

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 minimising downtime.

- Diaphragm pressure gauge G3/4 Inch connection
- Diaphragm pressure gauge with DN50/PN40 flanged connection
- Dry running protection for NEMOLAST® stators
- Flow sensing unit for solid stators
- Multi function pressure instrument
- Pressure control device DTSL 3
- Speed monitoring device

### NETZSCH Controls

- Dosing systems
- Filter press feed systems
- Frequency inverters
- Motor protection devices
- Pressure transducers

### Further information

NETZSCH Original-Accessories  
Brochure NMP · 343 · 02

### Protection Units and Trolley Assemblies

- Covers for drive motors
- Fixed wheels
- Machine feet elastic, star
- Pulling handle in stainless steel
- Steerable wheels
- Trolley assemblies
- Wheel mounting plates

### NETZSCH Optional Equipment, Fittings/Hoses and Tools

- Adjustable feet and foundation bolts
- Adjustable stator with adjusting device
- Automatic shut-off devices, valves, non return valves
- Bypass tubing with control switch or pressure relieve valve
- Chain wrench
- Chemical anchors
- Connecting, T and welding neck flanges
- Custom-engineered hoppers
- Coupling rod with mixing/agitator
- Gear joint filling unit
- Heating jacket
- Hoses and hose connections
- Mobile and trailer mounted units
- Pressure relieve valve
- Ring dosing nozzle
- Special tools
- Stator removal tool
- Stone trap for heavy solids
- Vibration dampener

## NETZSCH Services

**A high level of operational safety and effectiveness are of major importance for the biogas technology. NETZSCH is your competent and reliable partner in this interaction.**

### **Genuine Parts – You May Count on Those!**

In order to maintain the levels of performance and quality of your pump, we recommend the use of NETZSCH genuine parts. With our global realisation of uniform standards according to DIN EN ISO 9001 relating to development and production we assure the highest levels of quality irrespective of the production location.



### **24 h Spare Parts Emergency Service – Always There For you!**

If your pump is not performing to full capacity, whether during the day or night, we are there for you. You can reach our spare parts emergency service around the clock, any day of the year. This means you can order\* and immediately have spare parts shipped in an emergency, even outside business hours. On request, we can also send you your spare part by courier.

\* Subject to availability

The NETZSCH Group is an owner-managed, internationally operating technology company headquartered in Germany.

The three Business Units – Analyzing & Testing, Grinding & Dispersing and Pumps & Systems – provide tailored solutions for highest-level needs. Over 2,200 employees at 125 sales and production centers in 23 countries across the globe guarantee that expert service is never far from our customers.

The NETZSCH Business Unit Pumps & Systems offers 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 base.

NETZSCH Mohnopumpen GmbH  
Business Field Environmental & Energy  
Geretsrieder Str. 1  
84478 Waldkraiburg  
Germany  
Tel.: +49 8638 63-1010  
Fax: +49 8638 63-2333  
info.nmp@netzsch.com

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the German Biogas  
Association



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