

# NETZSCH

Proven Excellence.



## Biogas with NETZSCH

Fit for the future with technology from the professionals

Pumps & Systems

# OPTIMISATION OF BIOGAS PRODUCTION WITH special NETZSCH products

## INCREASING THE GAS YIELD NEMO® B.MAX®

### COMPACT, USER-FRIENDLY TORNADO® ROTARY LOBE PUMP

### HIGH LEVEL OF AVAILABILITY NEMO® PROGRESSING CAVITY PUMP



### LOW ENERGY REQUIREMENT NETZSCH GRINDING SYSTEMS

### SERVICE AND SPARE PARTS, NETZSCH ACCESSORIES

#### A multitude of substrates

Many operators are looking for reasonably priced, ecological alternatives to maize. Grass silage and sugar beet have already been though practical testing in this area, but the range of liquid substrates is also constantly being extended. The reuse of food waste is experiencing progress as the second method of biogas production (cofermentation). This extension of input materials means feeding technology needs to be adjusted. With the NEMO® B.Max® mixing pump, the M-Ovas® cutting plate macerator or a twin shaft macerator, NETZSCH offers appropriate products enabling the use of existing plants for new substrates here.

#### Feeding technology

Substrate feeding often caused problems as far as dry feeding was concerned and is time-consuming for the operator, as well as having a high maintenance requirement. Switching to fluid feeding using the NEMO® B.Max® mixing pump can contribute to a significant improvement in the operator's quality of life here. Firstly, it combines the feeding and mixing of the substrates. Secondly, feeding and stirring in the plant is separated timewise and this therefore means greater flexibility in terms of time and the avoidance of power spikes. The additional stone-separation function of the M-Ovas® macerator increases the reliability of the plant and reduces the likelihood of maintenance being needed.

#### Plant layout and biogas process

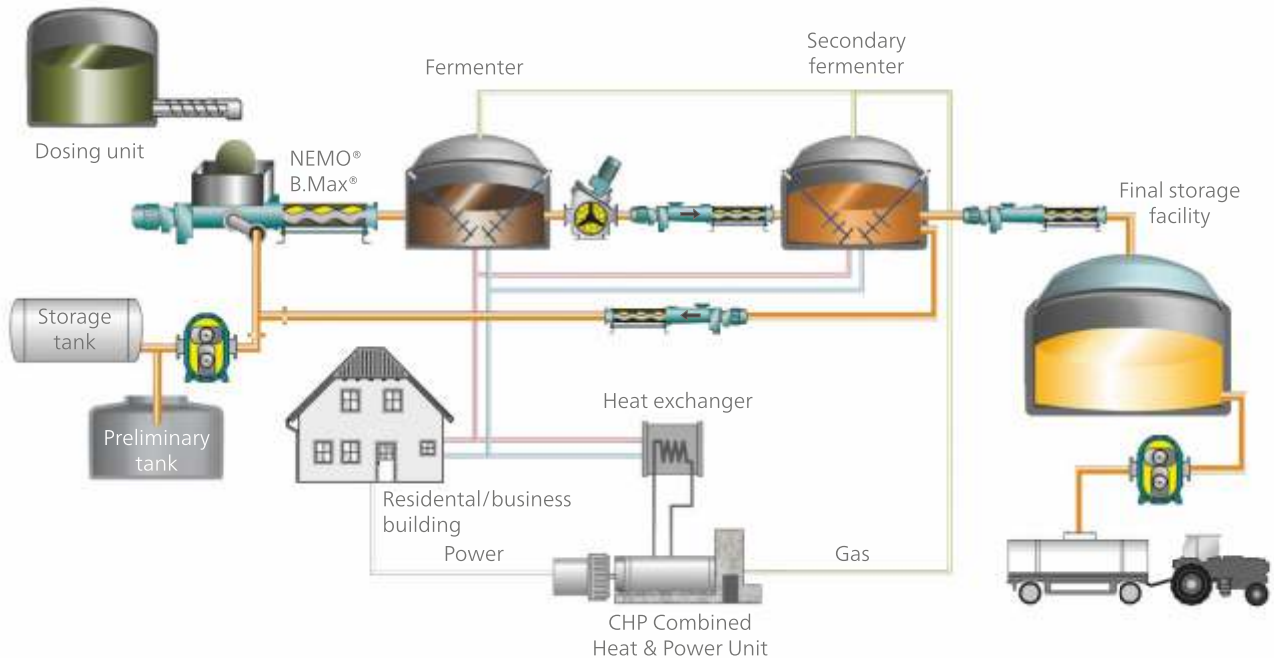
Low methane yields from old plants mean they become uneconomic. Yields have to be increased by enlarging the plant, more concentrated substrates or several stages of fermentation. This can be achieved by higher feed quantities, additional dwell steps or an extension of the dwell time for the substrate in the plant. Flexible adjustment of NETZSCH pumps is possible to achieve this and they can contribute to the reliability of the process.

The NEMO® B.Max® mixing pump prepares the substrate that are fed in to create a homogeneous mass, which produces a higher level of gas yield in fermentation. Use of the M-Ovas® macerator in the process further increases the homogenisation of the mass and so the gas yield. The NEMO® progressing cavity pump and the TORNADO® rotary lobe pump convey recirculated substances for further fermentation in a way that ensures process reliability and they can even do this over greater distances or different levels.

# NETZSCH PRODUCTS SUPPORT BIOGAS PROCESSES

## Mixing-Conveying-Grinding

Operation using agricultural substrates (renewable raw materials)

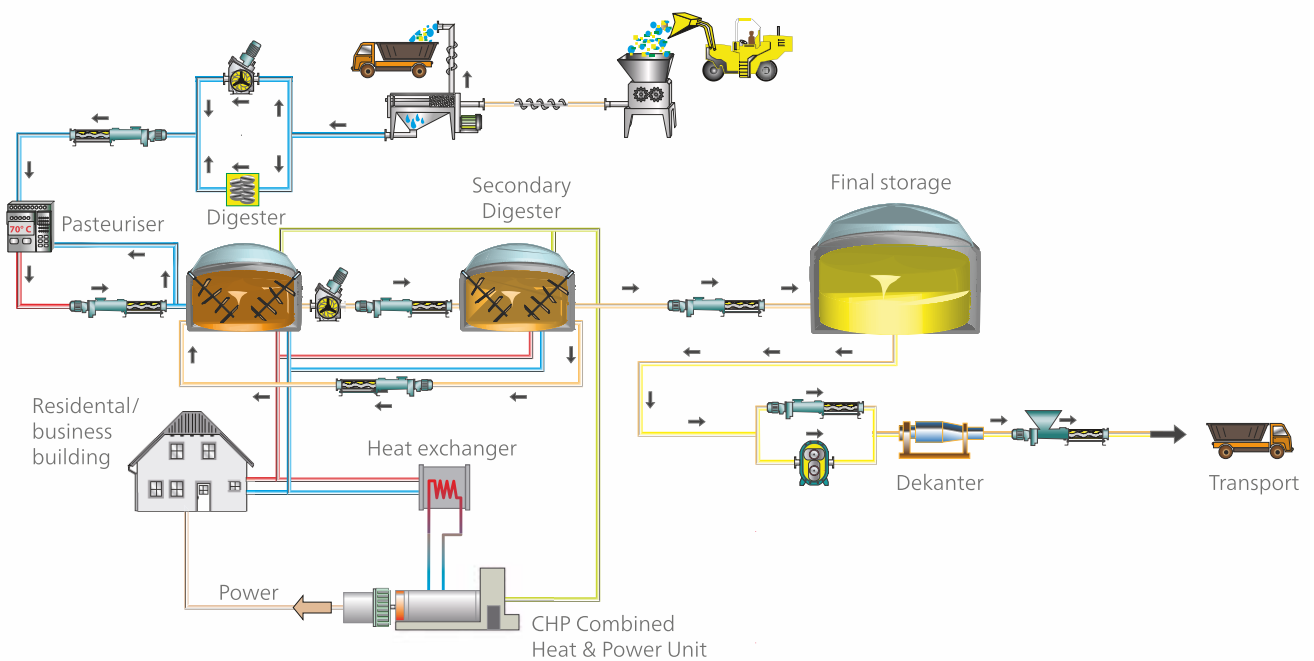


The diagram shows a multi-stage biogas plant. This can be newly designed by the plant manufacturer or be converted to wet fermentation by appropriate retrofitting and upgrading and extended by including secondary fermentation. The possibilities for using NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps and grinding systems range from mixing and conveying to grinding.

At the start of the process, the B.Max® mixing pump feeds the fermenter with a mix of dry and liquid substrates. Fermentation takes place with a dry matter content of approx. 5 - 15%. The pre-fermented substrate is then conveyed to the secondary fermenter which allows the output of additional biogas in the process thanks to the longer dwell time. The NEMO® progressing cavity pump can contribute to the flexibility of the plant here by reversing the direction of conveyance.

It conveys substrates and recirculated substances reliably between the various containers, even with higher solid contents. An upstream grinding system enables an even higher gas yield to be achieved. The methane gas obtained is, for example, fed into a cogeneration plant to generate power or thermal energy. The remaining biomass, which still has a residue of organic contents, is dewatered. The substrates obtained find further reuse in agriculture.

## Operation with organic waste



 NEMO® progressing cavity pump

 TORNADO® rotary lobe pump

 NETZSCH M-Ovas® cutting plate macerator

 N.Mac® twin shaft macerators

The diagram shows a biogas plant where the range of processable raw materials has been extended to include waste from the food industry, from meat processing and also from supermarkets, hotels, etc.

Operators of these kinds of plants are more energy generators than farmers, but upgrading their plants for cost reasons or to increase capacity utilisation is possible by extending the feed systems using NETZSCH pumps and macerators. Grinding systems make a significant contribution here to process reliability and to the protection of both pumps and plants.

The M-Ovas® itself serves both as a cutting tool and a stone separator and makes a positive contribution to the plant's operating performance through better homogenisation of the medium. The biogas production process then runs as previously described. It is only at the end of the process that dewatering of the residues is necessary as an additional step before disposal. NETZSCH pumps and macerators can again make worthwhile contributions here too.

# NEMO® B.MAX®

## A BENCHMARK IN MIXING TECHNOLOGY

### Features and design

The NEMO® B.Max® mixing pump sets new standards through optimum mixing and conveyance of your bio-substrates. It is a perfectly tailored feeding technology for your biogas application.

### Broad range of applications

The NEMO® B.Max® is particularly well suited to the following media:

- Fermented, renewable raw materials
- Liquid manure
- Process water
- Macerated bio waste and leftover food
- Pre-processed slaughter waste
- Co-substrates
- Concentrated substrate
- Silage

### Large capacity and pressure range

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

### Additional features

- Optimum feeding and mixing of substrates into the biomass through optimally positioned feed tubes on the hopper housing
- Pump housing with large, rectangular feed hopper with inspection opening
- Coupling rod with patented, horizontally positioned conveying screw for optimum product feed into the conveying elements and for mixing
- Removable, conically shaped compression chamber with inspection openings

### Advantages

- Maximum homogenisation of the substrates
- Increased gas production
- Continuous, low-pulsation conveyance irrespective of pressure and viscosity
- High pressure capacity
- Robust shaft sealing
- Low investment and operating costs
- High operational reliability



The length of the hopper depends on the installation situation.

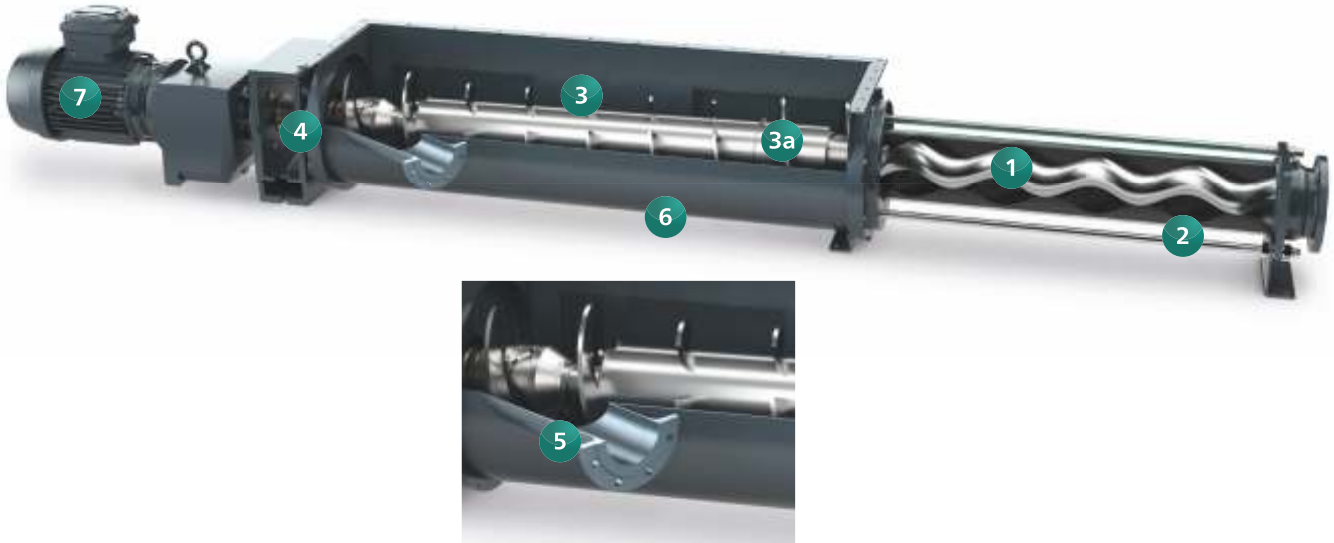


For improved substrate mixing the supply of the liquid is opposite to the direction of pumping.



Easy maintenance through large inspection cover.

in block design with directly flanged drive or with bearing housing and free shaft end



**1 Rotor**

In wear and corrosion-resistant models.

**2 Stator**

Vulcanised into the tubes with seals on both sides in a wide variety of elastomers. Stator inlet with funnel-shaped opening to improve product infeed into the conveying chamber.

**3 Mixing and screw conveyor**

The reinforced and offset spiral lobes of the mixing and screw conveyor ensure maximum mixing and homogenisation of the media. The patented, horizontally

positioned feeding screw guarantees an optimum fill level for the conveying chamber. As an option, metal protection sleeves and joints provide further safeguards.

**3a Two-part screw conveyor**

The feeding screw is in two parts to be able to replace the part on the pressure side, which is exposed to the most stress, separately. This saves costs and facilitates the service work.

**4 Shaft seal**

Use of a single-acting, robust mechanical face seal for the highest operational reliability requirements.

**5 Feed tube**

Optimum positioning of the feed tube contra to the direction of conveyance means maximum mixing of the substrates.

**6 Inspection openings**

Large, easily accessible inspection openings for easy cleaning and maintenance.

**7 Drive**

The compact block design with directly flanged drive make it stand out due to low investment, operating and maintenance costs.

# NEMO® progressing cavity pumps

FOR TRANSFERRING BETWEEN ALL TYPES OF CONTAINER

Reliable technology – Flexible direction of rotation – Robust design

## NEMO® BY progressing cavity pump

in block design, and with joint protection sleeves as an option, or NEMO® SY with bearing housing and free shaft end

Compact design with directly flanged drive. Its low investment, operating and maintenance costs really make it stand out. Four rotor/stator geometries for optimum performance with every kind of application.



FSIP® design

## The FSIP® design

The FSIP® design enables a particularly service-friendly maintenance without dis-assembling of the pump from the pipeline. By easier access to all rotating parts through cartridge joint and mechanical seals the maintenance is reduced.

## Broad range of applications

The pumps should preferably be used for conveying:

- Fermented, renewable raw materials
- Liquid manure
- Process water
- Macerated and fermented bio waste, leftover food and slaughter waste
- Co-substrates
- Condensed substrate
- Stillage

## Media characteristics

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

## Large capacity and pressure range

- Capacities up to 400 m<sup>3</sup>/h
- Pressures up to 24 bar

## Options

- With protective sleeve
- With inspection opening

## Additional features

- Great suction capacity – up to 9 meter water column
- Direction of rotation and therefore of conveyance reversible
- Can be installed anywhere
- Quiet, low-noise running
- Temperatures from - 20 °C to + 200 °C

## Advantages

- Continuous, low-pulsation conveyance irrespective of pressure and viscosity
- High suction and pressure capacity
- Low investment and operating costs
- High operational reliability
- Various installation options



The NEMO® progressing cavity pump: an energy-efficient solution for high pressure ranges too



B.Max® progressing cavity pump liquid feeding for reliable and flexible substrate supply



M-Ovas® and NEMO® macerator progressing cavity pump in series offers process reliability and efficiency.

# TORNADO® rotary lobe pumps

FOR ALL LIQUID SUBSTRATES

High-performance technology – Compact design



TORNADO® T2



TORNADO® T1

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

## Broad range of applications

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

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

## Large capacity and pressure range

- Capacities up to 1,000 m<sup>3</sup>/h
- Pressures up to 10 bar



## Guaranteed customer benefit thanks to state-of-the-art technology

Their major advantages are limited space requirements due to their compact design, high power and maximum operational reliability. Thanks to the unique physical separation between pump and gear chambers. TORNADO® rotary lobe pumps are particularly service and maintenance friendly; all wetted parts are immediately accessible without dismantling any pipework or the drive.

### TORNADO® T2 rotary lobe pump: "Full Service in Place" (FSIP) instead of "Maintenance in Place"

Servicing is easy, because no special tools are required. You have quick and easy access to the pump chamber right up to the flange mounting, because you can open the whole front on the TORNADO® T2. The rotary lobes can be replaced in no time at all

because the lobes are fixed with easily accessible taper lock ringsets. The simple geometry of the rotary lobes means that all the lobes can be fitted and removed independently of one another. It is child's play to do this with our setting and installation gauge for positioning the rotary lobes, which is integrated into the front cover. The preset mechanical seals (cartridge design) are fitted onto the shaft, along with the rotary lobes. For the first time, different seal designs can be fitted without changing the mechanical seal housing: "Plug and Play"

The service-friendly design of the belt drive means the belt is easy to replace in no time at all. Premium-quality features of both the belt and pulleys ensure the best accuracy of fit and synchronisation of the belt drive, along with exceptionally smooth running.

### Advantages

- Great suction capacity – up to 8 mWC
- Highly resistant to dry running
- Direction of rotation and of conveyance reversible
- Can be installed in any position
- Quiet, low-noise running
- Low life cycle costs
- Service without pump removal
- Particular features of the TORNADO® T2 rotary lobe pump:
  - Full Service in Place,
  - Oil-free gear box,
  - Drive synchronisation via the belt drive



Substrate conveyance to the final storage facility



Emptying a final storage facility at a capacity of 20m<sup>3</sup>/h



Pumping liquid manure in a biogas plant

# NETZSCH Grinding Systems

## M-Ovas® Cutting Plate Macerator

The M-Ovas® cutting plate macerator for coarse materials is ideally suited for use in biogas plants where impurities in the medium reduce process reliability. The solids in the medium are reliably macerated or separated from the medium (e.g. stones), to prevent pipes getting blocked or damage to downstream equipment.

### Broad range of applications

The NETZSCH M-Ovas® should preferably be used to macerate the following media:

- Fermented, renewable raw materials
- Slurry
- Bio waste
- Slaughter waste
- Manure

### High flow rates

- Throughput rates of up to 300 m<sup>3</sup>/h with water & 70 m<sup>3</sup>/h for substrates of up to 12 % dry solid content

### Advantages

- Compact design with high throughput rate
- Simple, easy disassembly of the cutting plate
- Low energy requirement with high throughput rate
- Integrated separator vessel with separate cleaning and drainage aperture
- Effortless disposal of the sedimented materials through easy access
- Shaft sealing using mechanical seal with lubrication
- Easy maintenance in place
- Cutting plate usable on both sides
- Different perforated plates depending on the application



## FSIP® – Full Service in Place holds also true for our grinders

### N.Mac® Double Shaft Macerator

Capable of fragmenting large and solid particles, the N-Mac® Double shaft grinder is the ideal equipment to suit different applications such as wastewater treatment, biomass substrate handling, food and fruit scraps. Its various housing designs in channel and inline version allow installation into effluent channels or flange assembly to prevent pipe clogging and protect downstream equipment, such as pumps.

### Broad range of applications

The double shaft macerators should preferably be used with media in the following industries:

- Biogas plants
- Agriculture
- Slaughterhouses and recycling plants
- Canning factories
- Industrial kitchens
- Sugar factories

### High flow rates

Flow rates up to 400 m<sup>3</sup>/h with a solid content of up to 10 %.

### Design Details

- Housing for inline or channel installations
- Double shaft technology for reduction of solid particles
- Low power installation at 2,2 kW (and 3 kW)
- Low rotation of the cutters at high torque (1:29 reduction)
- Hexagonal shaft in hardened steel
- Standard cutter arrangement 7/7 teeth
- Optional control unit to reverse direction of rotation in case of blockage
- Optional extended shaft for channel version



N.Mac® in Inline- and Channelversion

### Advantages

- Shock absorption system
- Mechanical seals with quench
- Modular design of cutting units
- Easy maintenance in place
- Optional clearing comb for fibrous materials
- Efficiency increasing side rails (flow and cutting)

# Service on-site, training and short delivery times for spares

## **NETZSCH – the right partner for biogas**

With state of art of manufacturing facility and branches in India, we are the ideal partner for biogas plant operators. We ensure spare parts availability.

Our specialists are happy to provide consultation and support with troubleshooting and part identification for all our pump and grinder models. It is in our interest to service or repair your pump as quickly as possible.

### **Fast delivery of spare parts:**

It is in our interests to service or repair your pump as quickly as possible. We have the standard parts in stock at our factory in Goa.

### **Spare parts service:**

For NETZSCH Original spare parts & technical service. Scan the QR code



Mail us at [info.nti@netzsch.com](mailto:info.nti@netzsch.com)  
or Call us at +91 44 4296 5100

## **The benefit for you**

- High stock availability
- Specific appointments for repairs and maintenance work
- Shorter time for repairs and maintenance
- Original spare parts with NETZSCH manufacturing quality
- Ensuring warranty claims
- Procuring spare parts for old pump

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.

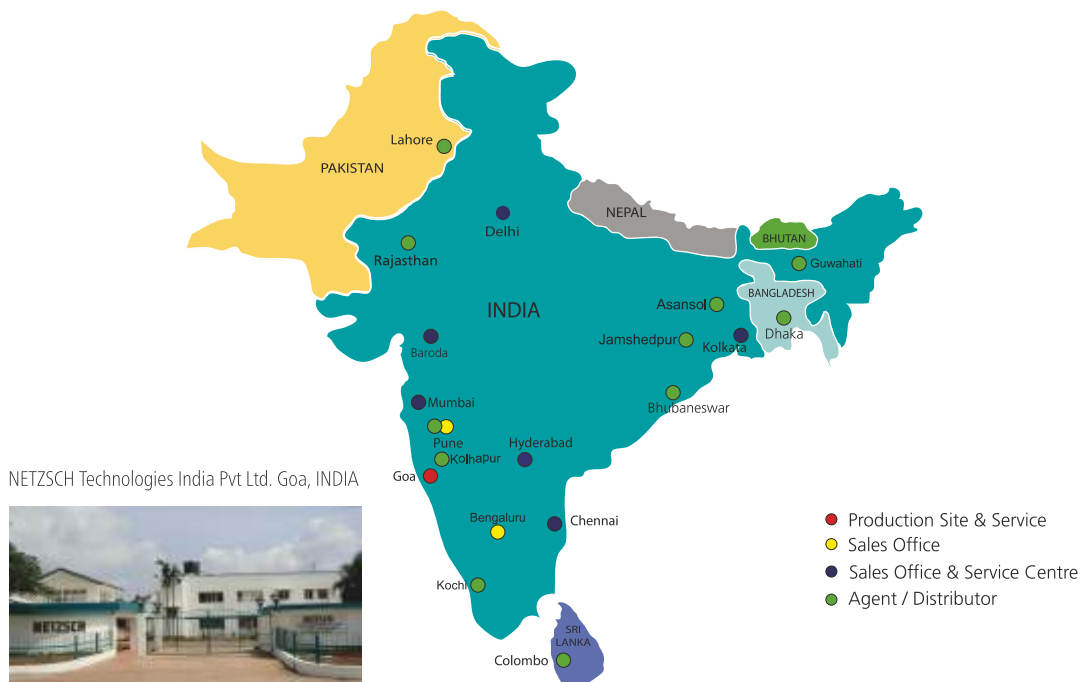
The three Business Units – Pumps & Systems, Grinding & Dispersing and Analysing & Testing – provide tailored solutions for highest-level needs. Over 4,000 employees at 210 sales and production centres in 36 countries across the globe guarantee that expert service is never far from our customers.

NETZSCH Pumps & Systems has its manufacturing unit since 2005, the state of art of manufacturing plant in Goa. Services customers in India, Srilanka, Bangladesh, Pakistan and Nepal through Regional Offices and Distribution Network.

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

Business Unit Pumps & Systems  
NETZSCH South Asia

**NETZSCH**  
Proven Excellence.



Proven Excellence.■

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