

NETZSCH

Proven Excellence.



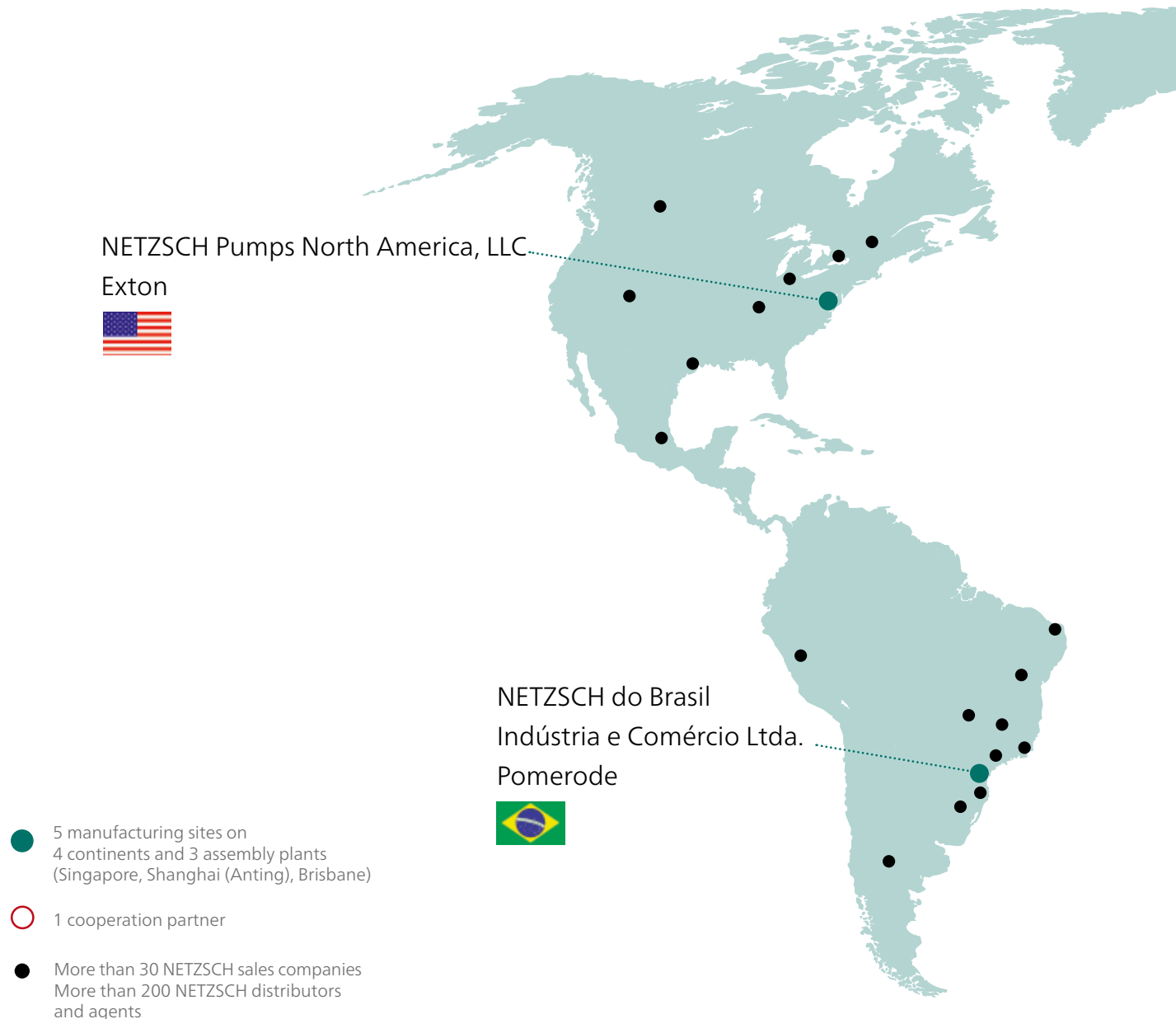
NETZSCH Pumps in the Mining Industry

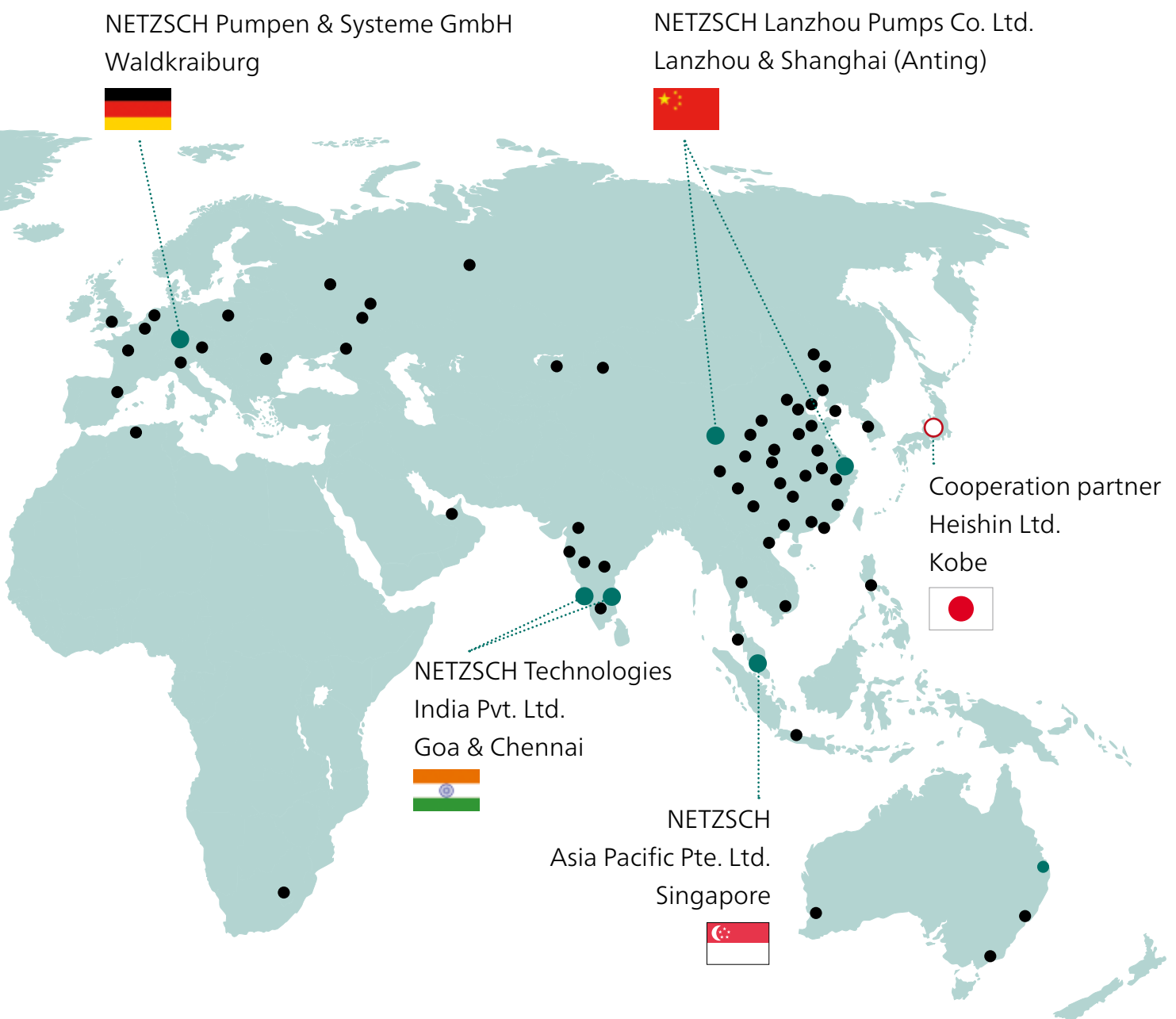
Pumps & Systems

We are there, where you need us

The global network at your side

The extraction and processing of minerals takes place every day on every continent. Every day mining companies need reliable pumps for a wide range of diverse and challenging applications including slurry transport, dewatering, chemical dosing, and neutralization. NETZSCH Pumps and Systems is everywhere you need us. Our companies in Europe, Africa, Asia, Latin America and North America will reach every customer that needs us.





NETZSCH brings you solutions

Unrivalled Expertise in Positive Displacement Pumps

NETZSCH Pumps and Systems has been serving its customers for over 60 years all around the world. We have satisfied customers from even the most demanding and difficult industries. What they are looking for, first of all, is a reliable solution, which will secure and maintain production with long-term cost efficiency.

Our roots in mining and mineral processing go back even further. From 1896 when NETZSCH Grinding and Dispersing was established, the NETZSCH company has delivered products and solutions to this demanding industry.



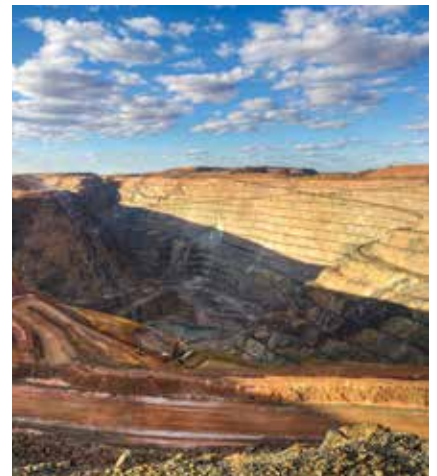
Expertise in Mining

Advantages

With NETZSCH Pumps you can

- reduce the cost of wear
- pump slurries with very high solids content
- transport very abrasive, dense and viscous media
- convey aggressive media
- save time and money on maintenance

We welcome even the most difficult tasks!



Four different technologies for one aim

NETZSCH Pumps and Systems offers different pump technologies for the mining industry: NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, NOTOS® multi screw pumps and NETZSCH down-hole pumps. All types of pumps can be successfully applied in difficult mining conditions. However, we also believe that each of our positive displacement pumps have their unique features that are not always replaceable.

Which technology we recommend to you depends on the unique features of your application and the particular working conditions. Nevertheless, what you can be absolutely sure of is that we will always offer you the better solution!

Applications in Mining & Explosives

- Slurry transfer
- Thickener underflow
- Dewatering
- Back-filling
- Gland seal water
- Face slurry pumping
- Reagent dosing and transfer
- Neutralization
- Ammonium Nitrate
- Explosive emulsions
- Coal bed methane recovery
- Coal seam dewatering



Ease of maintenance and long service life are the strengths of the TORNADO® rotary lobe pumps



Excellent solids handling and pressure capabilities enable the handling of demanding slurries with NEMO® progressing cavity pumps.

NETZSCH Pumps and Systems for the Mining Industry

NETZSCH positive displacement pumps are a long-term, cost-effective solution. In the mining industry high solids content and large particles can dramatically increase wear costs and have a negative impact on the pump's operation. NETZSCH pumps are robustly built to increase reliability enabling them to operate longer without interruptions, significantly reducing maintenance costs.

NETZSCH pumps are not limited in their ability to transport very dense slurries and paste-type materials unlike some other pump technologies and therefore dense slurries are easily transported with low wear rates.

NETZSCH pumps are the perfect solution when you are looking for a long lasting investment!

Our pumps

- convey media with very high solid contents or large particles
- can transport low and highly viscous media and are suited for higher density and higher yield stress applications
- operate over a wide range of pressures
- handle shear sensitive materials
- are a perfect solution for long distance transfer applications
- are energy efficient



NOTOS® multi screw pump, NEMO® progressing cavity pump and TORNADO® T2 rotary lobe pump



NEMO® Progressing Cavity Pump

When slurries are too thick and pump speeds get too high for other technologies NETZSCH steps in. NEMO® progressing cavity pumps can transfer even very thick slurries at low operational speeds, thus significantly reducing wear. NEMO® pumps can also easily handle big solids and withstand high pressures.

Main advantages

- Transport of liquids with or without high solid content (maximum particle 6"/150 mm)
- Wear and corrosion resistant materials for handling demanding products
- Low operating and maintenance costs
- Very low emulsification effect
- Efficient transport of slurries
- Efficient transport of highly viscous products
- Almost pulsation-free pumping
- Installation in any position
- Almost no shear



NEMO® High Pressure Slurry Transfer Pump

NOTOS®

Multi screw pump

Since 1979 NETZSCH has been manufacturing multi screw pumps to serve a wide range of industries and applications. The most advanced technology is employed to produce these pumps. Reliability, durability and experience are some reasons why you should choose NETZSCH.

NOTOS® Multi screw pumps for lubrication of ball mills and sag mills

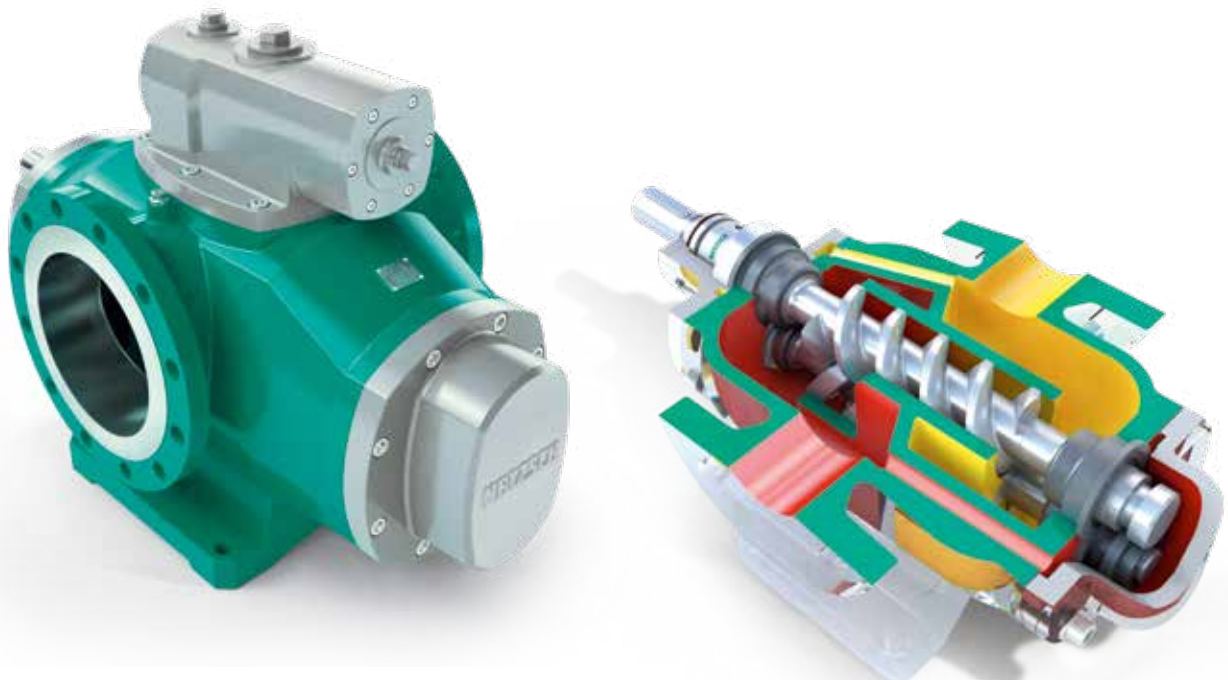
In mining you need sturdy equipment for working with different types of rock and that work steadfastly. To ensure the required reliability of ball mills and sag mills working in this harsh conditions consistent lubrication is essential. NOTOS® multi screw pumps provide the continuous supply of lubricant and fulfil two essential tasks: supply to the injection unit and the actual lubrication oil circulation.

Performance 2NS

- Flow up to 2,860 gpm / 650 m³/h
- Pressure up to 230 psi / 16 bar
- Temperature up to 570 °F / 300 °C
- Viscosity up to 100,000 cSt

Advantages 2NS

- High efficiency
- Hydraulically balanced
- Quiet operation
- Long service life
- Low pulsation
- Excellent suction capability

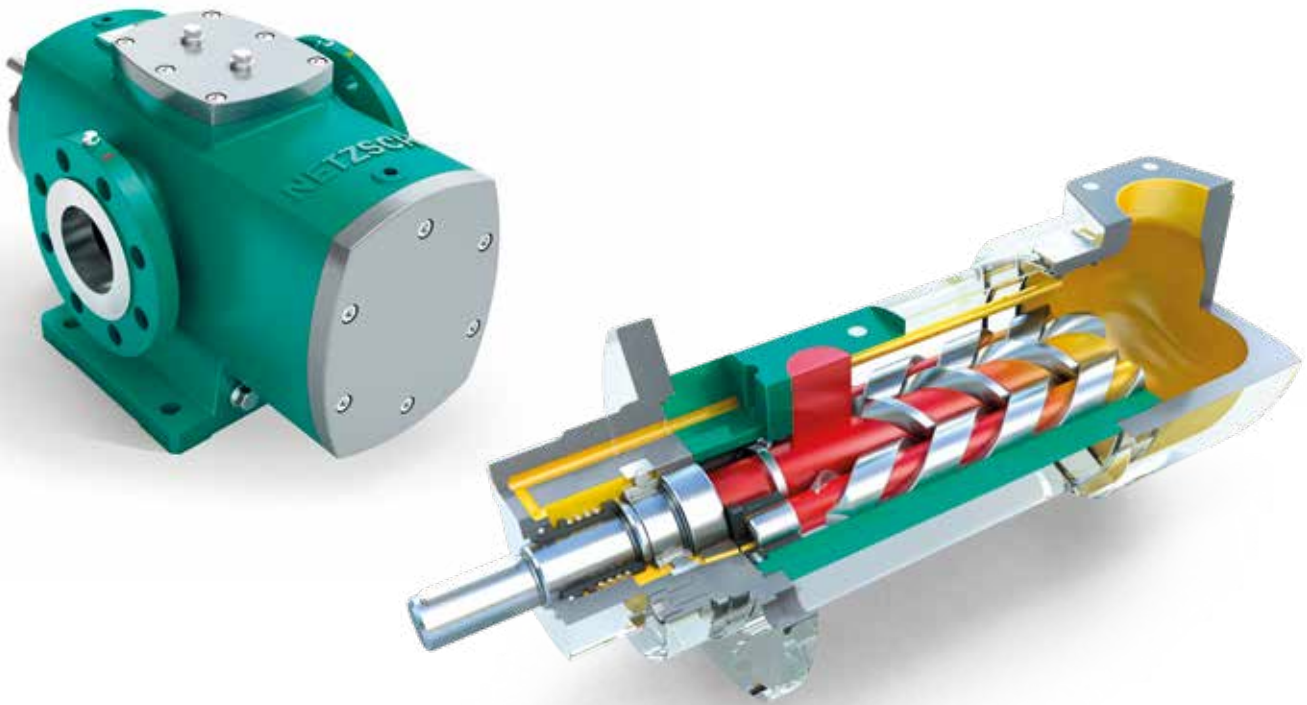


Performance 3NS

- Flow up to 1,760 gpm / 400 m³/h
- Pressure up to 1,450 psi / 100 bar
- Temperature up to 570 °F / 300 °C
- Viscosity up to 15,000 cSt

Advantages 3NS

- High efficiency
- Easy maintenance
- Lightweight and small footprint
- Low pulsation



To start and stop a Journal Bearing (Ball Mill, gear reducer and centrifuge) it is necessary to inject oil in the center of the bearings to "lift" the shaft from the bushing.

- Model: 3NS189/25C8E
- Fluid: Oil ISO VG 220
- Viscosity: from 76 to 220 cSt
- Flow: 132 gpm / 500 l/min
@ 1750 rpm
- Pressure: 362psi / 25 bar





TORNADO® Rotary Lobe Pump

So effective and reliable to run

The TORNADO® rotary lobe pump is the best solution if you are looking for a maintenance friendly pump and have limited space requirements. TORNADO® pumps can run slowly even for abrasive applications, which significantly reduces the wear compared to other pumping technologies such as centrifugal pumps. What's more, NETZSCH TORNADO® pumps can successfully handle viscous slurries and liquids with high solids content.



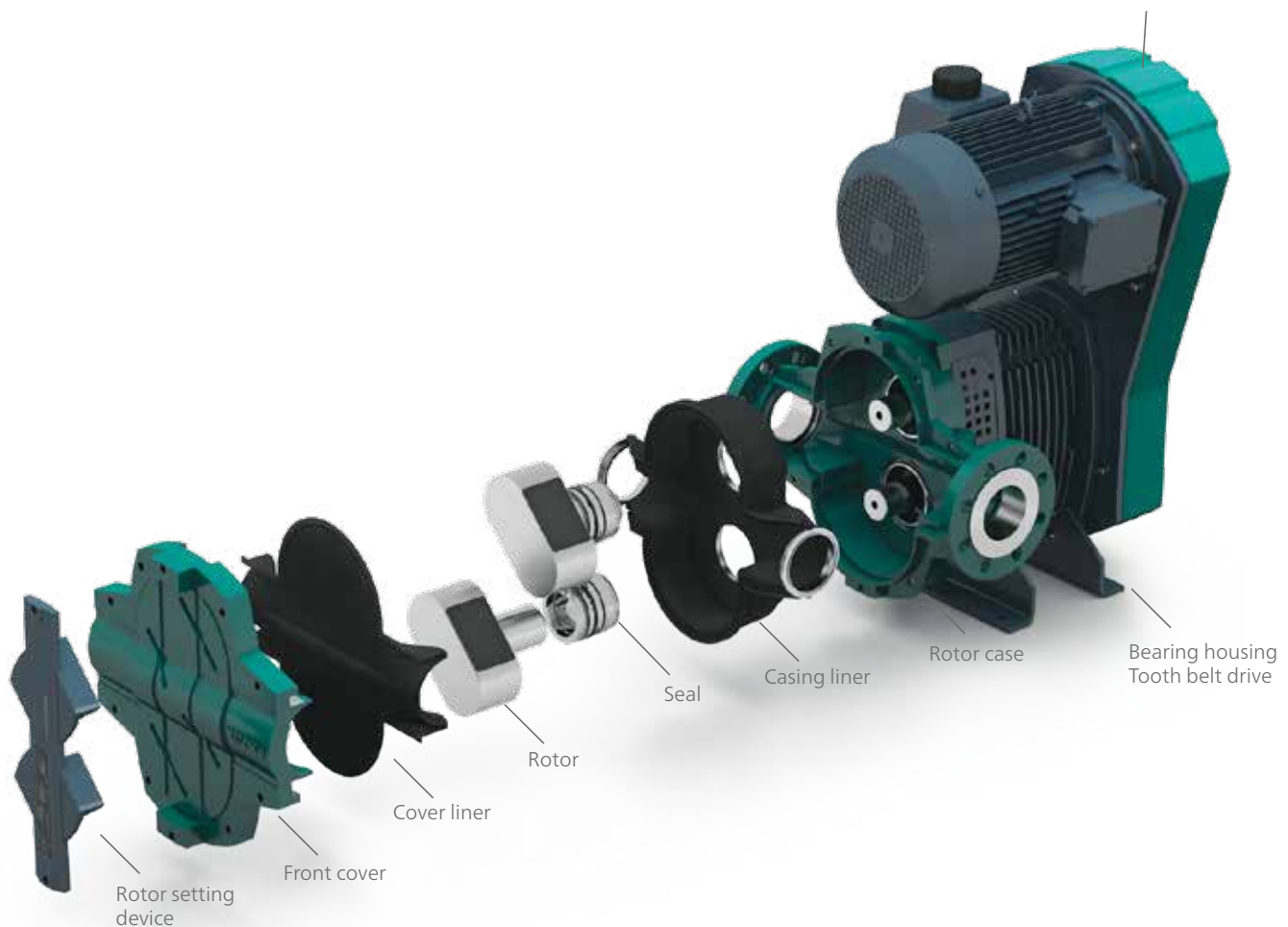
TORNADO® T2 Rubber-Metal Pump
seen from behind: employs a robust and
maintenance friendly tooth belt drive

So quick and simple to maintain

TORNADO® pumps have been designed with ease of maintenance in mind. All of the product's wetted components, including the mechanical seals are accessible from the front with built-in jacking points, allowing the replacement of the components in minutes saving you hours.

Main advantages

- Small installation space requirements
- High performance and maximum operational reliability
- Physical separation between the pump head and bearing housing
- Service and maintenance friendly
- All parts in contact with the media are directly accessible without dismantling the pipework or disconnecting the drive



Examples out of Mining

NEMO® SY pump for
high pressure tailings disposal



NEMO® BY for transfer of coal slurry



Tornado® pump on a copper
thickener underflow application





Mine dewatering skid with
NEMO® SY pump



Reagent transfer using multiple
NEMO® BY pumps



Tailings recovery with
TORNADO® T2

Mine Dewatering Pump Skid

Safe, Reliable, Cost Efficient

NETZSCH offers dewatering systems or skids to help mines that require a small and compact movable unit to address their dewatering challenges.

The Base Unit

The base unit includes a tank, progressing cavity pump with right angle gearmotor, inspection ladder, valves and piping all mounted on a common galvanized steel skid. NETZSCH can optionally provide a unit with a control panel (with or without VFD on a removable stand) and instrumentation such as high/low level switches for the tank or dry run protection for the pump.



NETZSCH Mine Dewatering Unit for a gold mine in Montana, USA



NETZSCH Mine Dewatering Unit for a gold mine in Australia

Features and Benefits

- The tank includes baffle/divider screens to filter out any solids too big to fit through the pump.
- The pump, located to the side of the tank, allows for easier access and maintenance.
- A right angle gearmotor is used to save space and eliminate the need for a belt drive, but belt and pulley designs are also available.
- A removable inspection ladder with hand rails and a removable safety screen for the tank are provided for operator safety.
- Wide range of flow and pressure capability.
- The pump and tank are available in various materials to best suit each application, including low pH applications: Elastomers like BUNA, EPDM and FKM, metals like carbon, stainless and galvanized steel and Halar or rubber lined steel.
- Standard or customized controls are optional for all units.
- All items can be custom designed to best address specific needs.
- Complies with all relevant safety standards (OSHA, MSHA, etc.).
- Anti-reversing devices are available to prevent the pump from running in reverse.

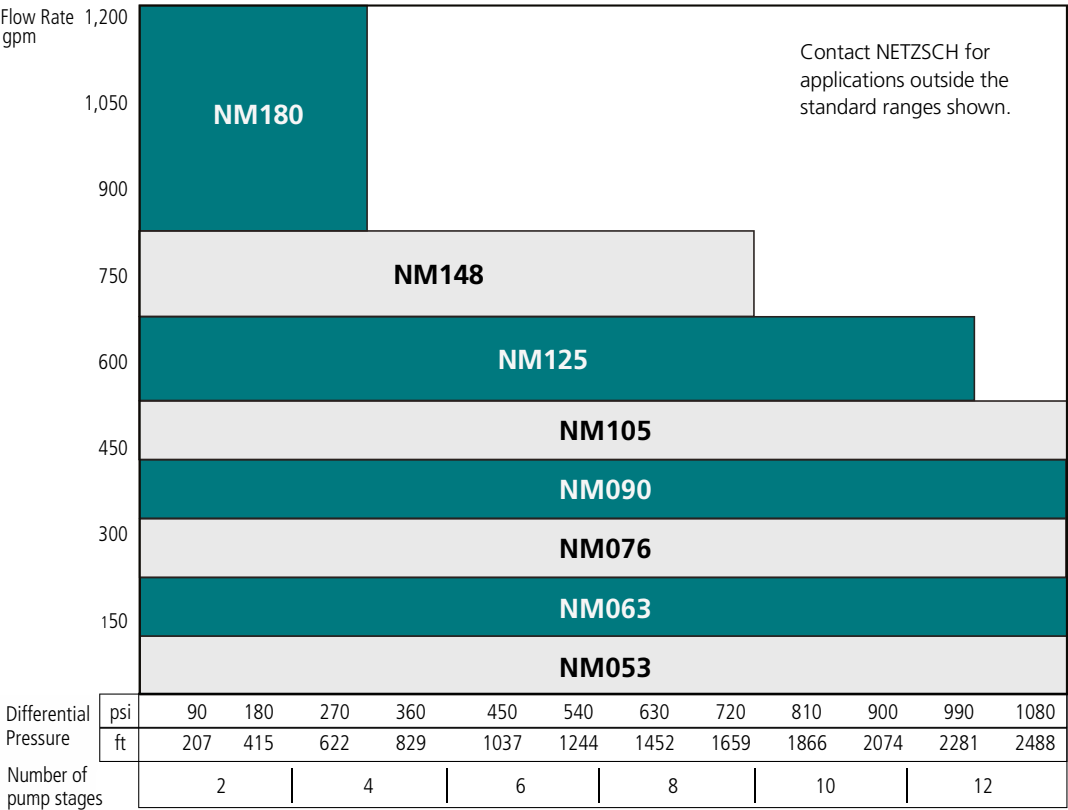
Performance

We select the pump most appropriate for your mine water management application – whether stock or specialized. Our wide flow and pressure

capabilities ranges allow you to require fewer pumps in your pump station. Our engineers can recommend solutions to meet your challenges.

With standard designs we can meet:

- Max flow rate up to 4,400 gpm / 1,000 m³/h
- Max pressure from 90 psi to 1,044 psi / 6 bar to 72 bar.



PCP Systems

in the coal mining industry

Gas production rates from Coal Bed Methane applications are suppressed by water increasing well pressure, thus hindering gas release. In order to reduce the pressure, water has to be removed using a pumping system. An extremely effective and common method to remove the water is a PCP downhole system. This system, often referred to as an artificial lift system, can be used in Coal Bed Methane (CBM) and Coal Seam Gas (CSG) applications. There are challenges to be overcome with CBM and CSG applications. The NETZSCH PCP system is capable of handling abrasive coal fines, capable of handling large volumes of gas without locking and is able to operate over a wide range of flowrates to accommodate changing well conditions.

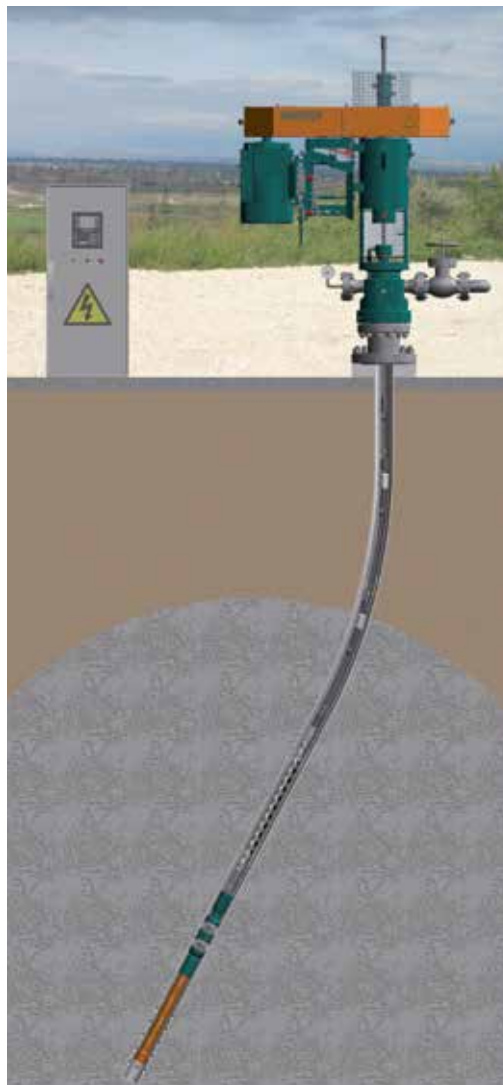
Coal bed methane (CBM) and coal seam dewatering with PCP System

Progressing Cavity Pump (PCP System)

- High Solid Content – up to 40% by volume
- Pumped Gas Content – maximum 40%
- Maximum differential pressure – up to 4,500 psi / 300 bar
- Pump rate up to – 1,890 BPD / 300 m³/d with minimum 5-1/2" casing
- Pump rate up to – 3,460 BPD / 550 m³/day with minimum 7" casing

PCP Applications in the coal mining industry

- Coal Bed Methane: Water present in a coal bed well generates pressure that lowers the gas productivity of the well. In this case, a pumping system is required to dewater the well and release the trapped gas.
- Coal Seam Dewatering: Water is removed from the coal seam to reduce levels of gas to increase the safety of mine working.





Pump in a methane application with optional remote well monitoring and control

Strengths of the PCP System

- Lowest power consumption
- Excellent solids handling capability (coal fines)
- No risk of gas locks when handling free gas
- Maximum flexibility – very large production rate range
- Proven safety record with more than 3,000 pumps in gas dewatering



NETZSCH PCP System dewatering of a gas well in Austria



For a long-lasting Partnership

Quality comes first

Our high-quality products are manufactured according to the highest international standards in our own production plants in Germany, Brazil, China and India.

Partnership

With our customers from all over the world we incorporate the latest market trends and requirements into the development and improvement of our products.

Our Contribution to Partnership

- Special internal and external training for customers
- Flexibility
- Customized solutions

Competence and reliable service

- We guarantee you optimal service, fast response and delivery times.
- With more than 3,800 NETZSCH employees and over 2,000 in the Business Unit Pumps and Systems alone at five development and production sites as well as 30 sales offices and 200 NETZSCH Pumps & Systems representatives worldwide we are close to you wherever you are.

What we can also offer

Safety Valves and Bypass System

- Safety valves and bypass system equipped between the inlet and outlet can protect the system.
- When pressure exceeds the maximum allowable limit, relief valves protect pump and pipe systems from damage.

Diaphragm Pressure Gauge and Over Pressure Protection

- Gauge internals are isolated from the media by a generously dimensioned diaphragm
- Stainless steel diaphragm
- Display of operation pressure
- For highly clogging fluids
- Shutdown at the adjusted pump's maximum discharge pressure

Heating Jacketed Pump Housing and Dry Running Protection

When the temperature of the medium in the pump exceeds the set value or no medium passes through, NEMO® pumps equipped with an STP dry running protective system will stop operation automatically. For special applications, such as when the pumps are installed in a cold region, we provide those pumps with heating jackets. When the hot water is introduced in the jacket, the whole pump will be heated, ensuring that the pumped media is kept in a flowable condition.


Control Panel

- Frequency inverter
- Complete instrumentation
- PLC controlled

After Sales

- Commissioning
- Start-up assistance
- Maintenance on site
- Training on site and in-house





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

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

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

Proven Excellence. ■

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