

Partnership in the Oilfield

Individual Solutions for Pump Systems



Company

NETZSCH Group

Since 1873 NETZSCH has been developing and manufacturing instruments and machines for research and industry. Today the group consists of three global business units and employs more than 3.000 people.

- Business Unit Analyzing & Testing
- Business Unit Grinding & Dispersing
- Business Unit Pumps & Systems

NETZSCH Holding

The NETZSCH Holding builds the bridge between the owning family and the business units and is mainly involved in the group strategy and the financial management.



Business Unit Pumps & Systems

For more than six decades we've been supplying worldwide NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, screw pumps, macerators/grinders, dosing systems and equipment for custom built and challenging solutions for your applications. With a worldwide production of over 45.000 pumps per year we underline our technology and market leadership.

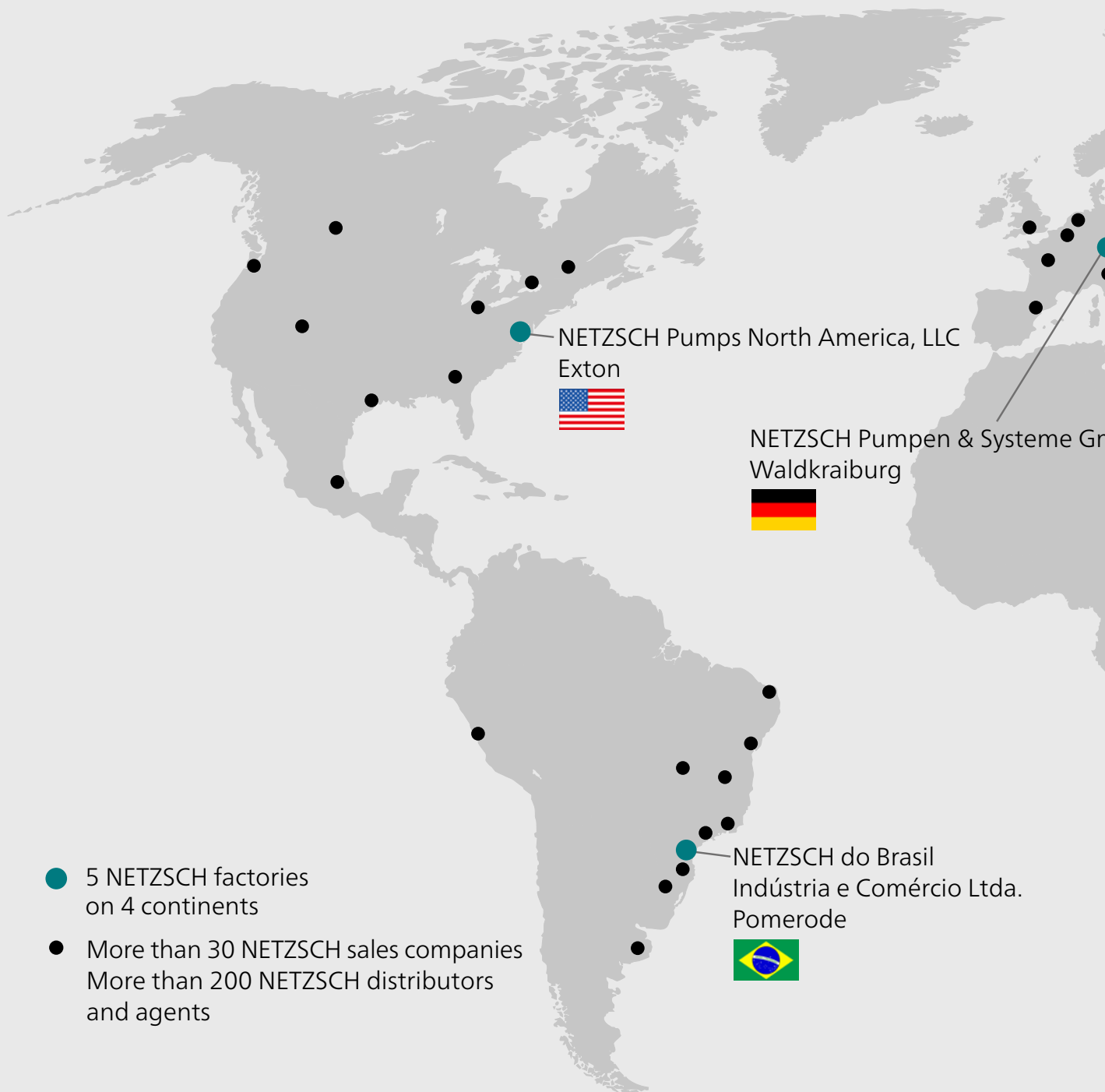
Business Field Oil & Gas

Within the Business Unit Pumps & Systems the Business Field Oil & Gas specializes in the delivery of systems with progressing cavity pumps for the production of crude oil and other highly viscous materials; the pumps above mentioned are used throughout the world. Whether it is a large oilfield operator or a small production company – the experts at NETZSCH give their attention to all projects.

At the same time we try to correspond to the increasing technological demands by highly efficient development work. Success in corporate research and development work with universities and operators of our pumps in the field confirms this fact.

From Canada to Russia, from Latin America to Indonesia Where there is heavy oil, there is a hot spot for NETZSCH pumps

NETZSCH progressing cavity pumps are first choice when API grades are below 25°.



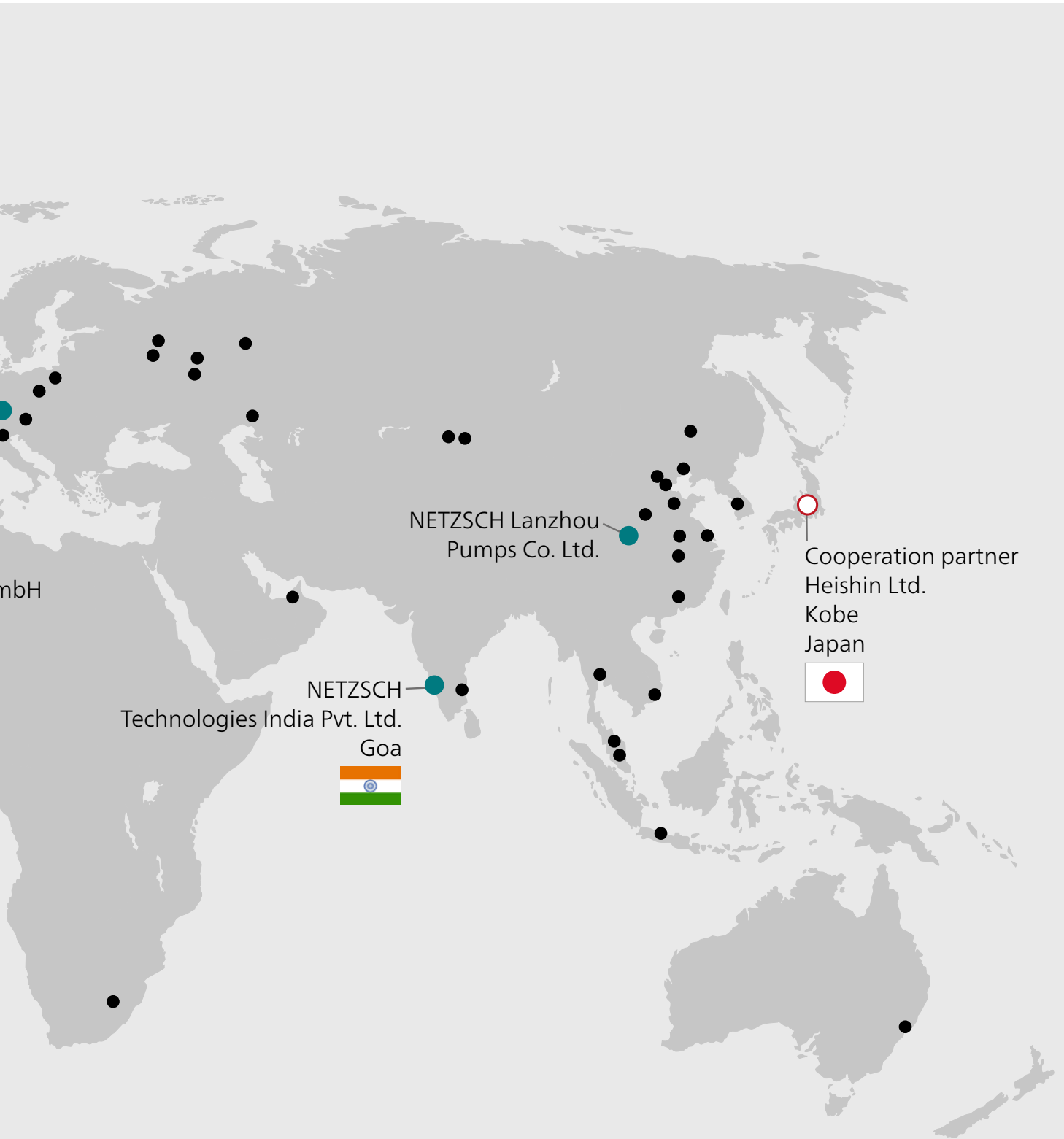
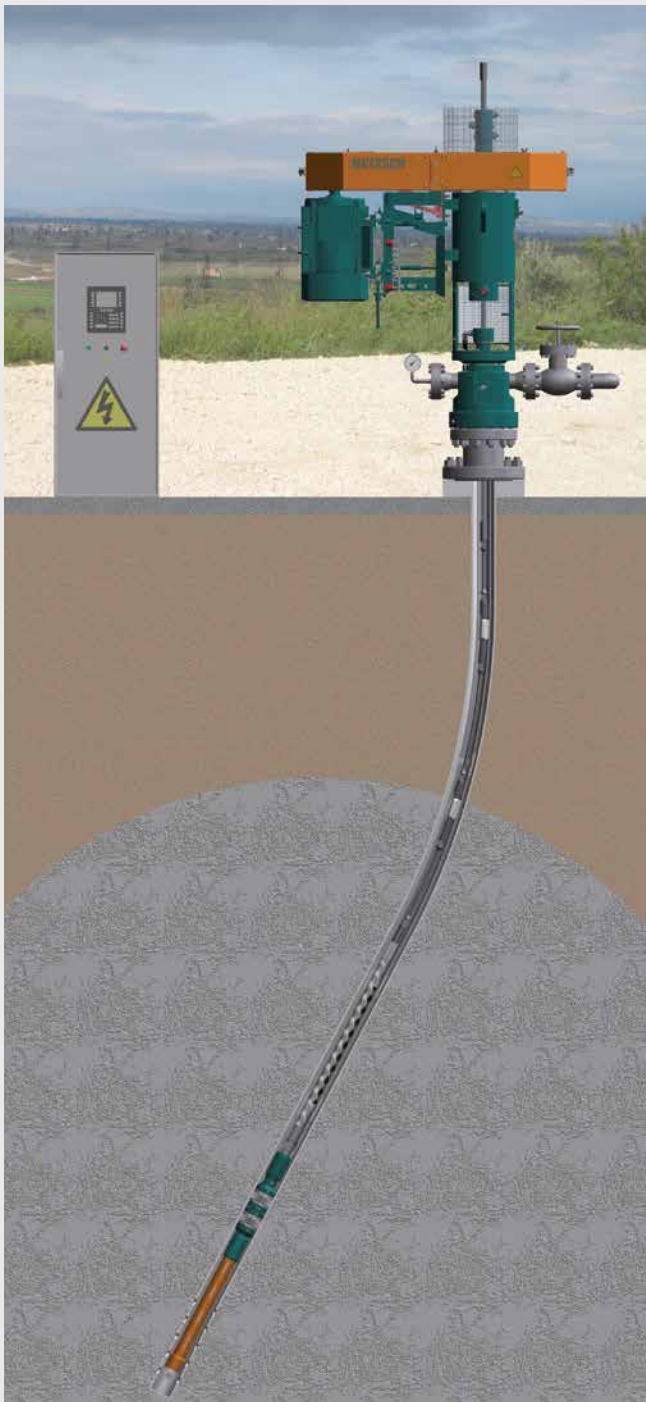


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Optimum UPSTREAM Solutions for Oil Water and Gas Production

The Progressing Cavity Pump System – the perfect solution when you face difficult media in the oilfield



Pump Equipment

- PC Pump
- Insertable Pump
- Torque Anchor
- Gas Separator
- Accessories

Drive Head Equipment

- Drive Head
- Three Phase Motor
- Control Panel
- Accessories

Rod String Equipment

- Sucker Rod
- Pony Rod and Polished Rod
- Non Rotating Centralizer
- Accessories

Well Head Equipment

- FBOP and SBOP
- Flow Tee
- Spool and Well Head Adapter

Further information

Product Catalogue
Brochure NOP · Product Catalogue

Application Range

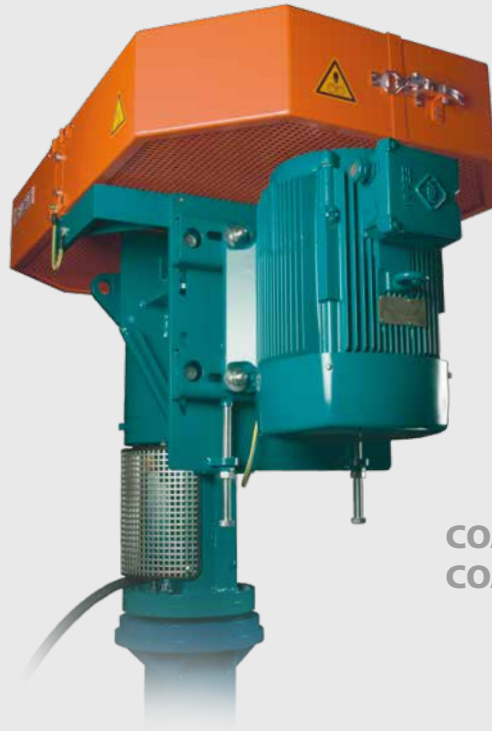
**CONVENTIONAL
OIL PRODUCTION**

**HEAVY OIL
PRODUCTION**

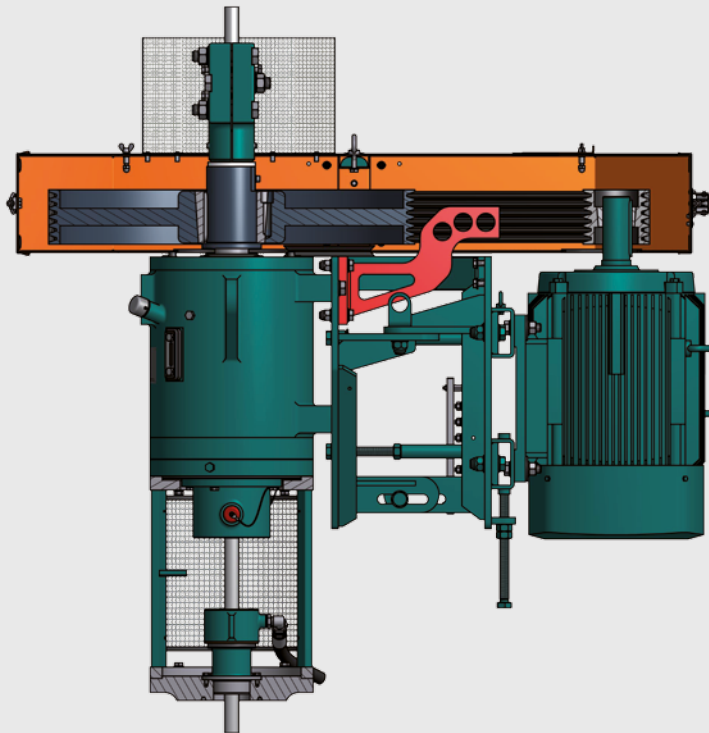
**DEWATERING OF
GAS WELLS**

**THERMAL WATER
PRODUCTION**

**COAL BED METHANE/
COAL SEAM GAS**



NETZSCH Drive Heads



NETZSCH Drive Heads – model ATEX – are approved in compliance with directive 94/9/EC for use in zone 1 (compared to name plate zone II 2G EEx c, k II T3 classification and the conformity declaration)

The drive head is designed for commercial plant and in conformity to the following regulations and norms:

- Conform to the Machinery Directive 2006/42/EC
- Conform to the pertinent provisions of ATEX Directive 94/9/EC
- Conform to the pertinent provisions of the following other directives
 - DIN EN 13463-1
 - DIN EN 13463-5
 - DIN EN 13463-8
- DIN EN ISO 12100
- DIN EN 1127-1
- ISO 15136-2

Drive Head Accessories

Very often small accessories can be decisive for the safety of the service people and for the lifetime of the equipment. Therefore NETZSCH Pumpen & Systeme GmbH offers several special tools based on the service experience for more than 20 years PCP downhole pump installations and start ups.

General features

- Different Polished Rod speed can be achieved by changing the pulleys or by using a Variable Speed Drive
- All Drive Head Types can be supplied for the Polished Rod Sizes 1 1/4 and 1 1/2
- Axial Load: 9 to 33 klb
- Sealing system: Stuffing Box, Mechanical Seal or Lip Seal System
- Flow Tee Connection: Flange API Spec. 6A Type 6B/Thread API 5B

Benefits and special features

- Use in explosives atmospheres (CE II 2G EEX c, k IIB T3)
- Integrated overload protection
- Integrated hydraulic brake
- Integrated safety clamp
- Exchangeable sealing box
- Exchangeable flange connections

Spare partsets

on special request

Vertical Drive Head GH

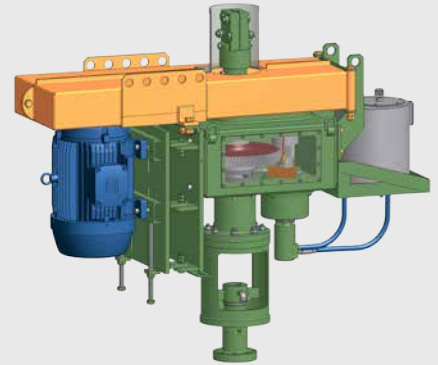
Integrated Gear Box GH – Hollow Shaft

Features

- Vertical Drive Head GH is used especially for high load (motor power)
- The integrated reduction allows a rotation reduction ratio of 1:4.

Specifications

- Power: 20 to 100 hp
- Speed Range: 60 to 400 rpm
- Maximum Torque: 3400 Nm
- Brake System: Hydraulic Motor
- Transmission: Gear Box and Pulleys and Belts



Right Angle Drive Head RH

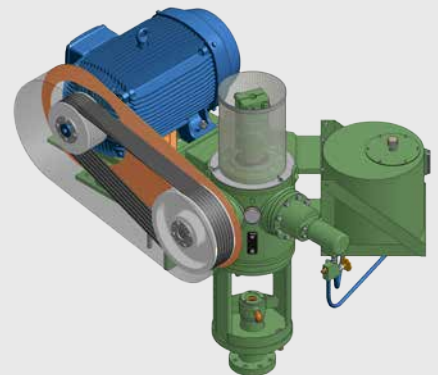
Angle Drive with Gearbox RH – Hollow Shaft

Features

- Angle Drive Head is used especially for very low polished rod speed
- The Drive Head has an integrated gear reduction.
- The geometry of the Angle Drive Head allows the alternative use of a combustion motor or hydraulic motor.

Specifications

- Power: 20 to 60 hp
- Speed Range: 60 to 400 rpm
- Maximum Torque: 2500 Nm
- Brake System: Hydraulic, Hydraulic Motor or Mechanical
- Transmission: Gear Box and Pulleys and Belts



Vertical Drive Head DH

Direct Drive DH – Hollow Shaft

Features

- Economical and reliable.
- Used for applications with higher rotations.

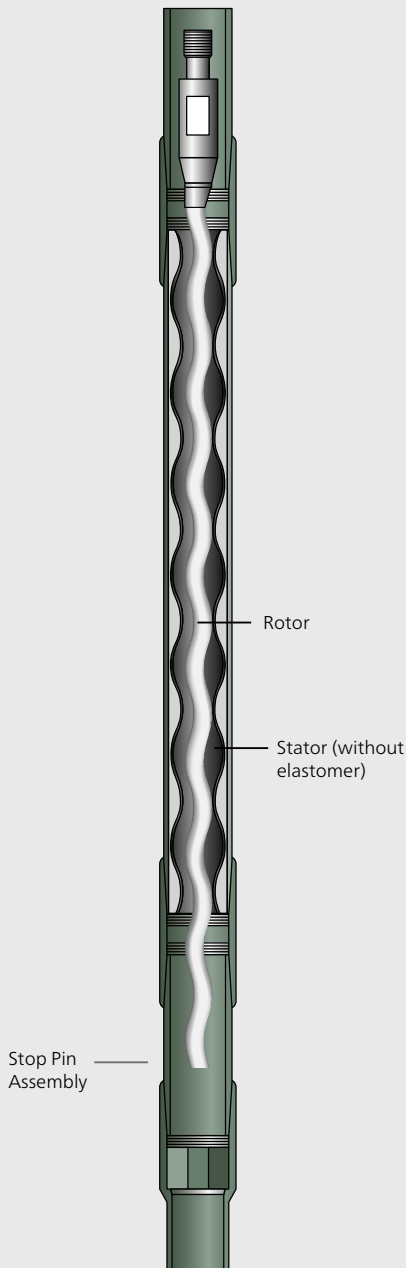
Specifications

- Power: 20 to 75 hp
- Speed range: 100 to 500 rpm
- Maximum Torque: 2000 Nm
- Brake System: Hydraulic or Hydraulic Motor
- Transmission: Pulleys and belts



PCP Pump Types – Make the right choice for the right application

NTZ Progressing Cavity Pumps



Efficient handling of fluid

- High viscosity oil – more than 50.000 cP at the well head
- High sand content – up to 40% at the suction side
- High gas content – app. 40% free gas at the suction side
- Water cut – up to 100%
- Density – up to 0.82 kg/dm³ (45° API)
- Temperature – up to max. 160°C
- Pressure – up to 300 bar
- Production – up to 300 m³/day (1900 bpd)

Key Advantages

- Lower life cycle cost
- Easy installation and transport
- Less number of wear parts

Various types

Pump Type	nominal production rate [m ³ /d]	nominal production rate [bpd]	max. differential pressure [bar]	minimum tubing size	minimum casing size
NTZ 166*	0,5 to 4,5	3 to 30	240	1,66"	3 1/2"
NTZ 238*	1,3 to 15	8 to 80	240	2 3/8"	3 1/2"
NTZ 278*	3 to 130	20 to 800	300	2 3/8"	4 1/2"
NTZ 350*	13 to 140	80 to 880	300	2 7/8"	5 1/2"
NTZ 400*	25 to 475	160 to 3000	240	2 7/8"	5 1/2"
NTZ 450*	60 to 390	375 to 2450	240	3 1/2"	6 5/8"
NTZ 500*	110 to 475	695 to 3000	200	4 1/2"	6 5/8"



NTZ-DT Geometry



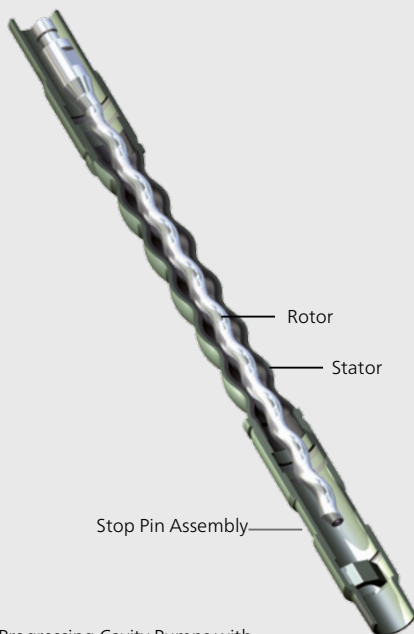
NTZ-ST Geometry

NTU Progressing Cavity Pumps

Produced with steel tube conform with the same internal geometry as the stator (helical). Thus the elastomer has a uniform wall and produces even distribution of the elastomer. The main NTU pump feature is its lower operation and starting torque due to its lower swelling when exposed to temperature variations and chemically aggressive fluids.

Advantages

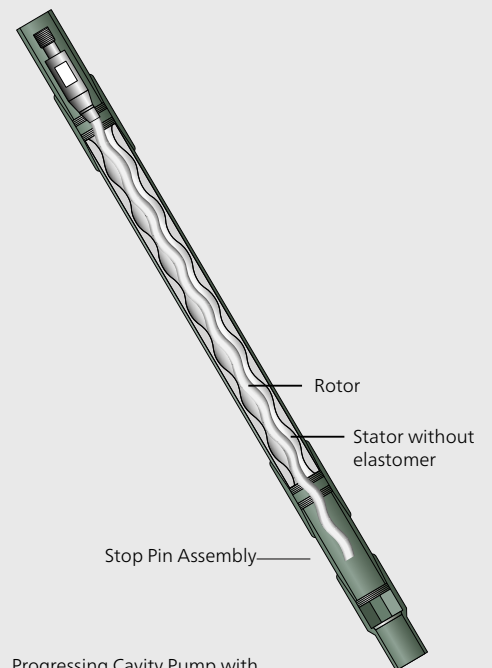
- Short pump length
- Lower starting and operational torque
- Longer run life under severe fluid conditions
- Less influence due to temperature and chemicals
- Easier to assemble in wells with deviations
- Lower hysteresis
- Better heat dissipation



Progressing Cavity Pumps with Uniform Elastomer Wall – NTU

NTM Progressing Cavity Pumps

- Maximum flexibility in the perspective of viscosity and temperature
- No chemical attack on the elastomer
- Perfectly suited in combination with thermal treatment of the wells



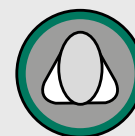
Progressing Cavity Pump with full metal stator – NTM



NTU-DT Geometry



NTU-ST Geometry



NTM-DT Geometry



NTM-ST Geometry

Special Pumps and Special Pump Systems

Insertable Progressing Cavity Pumps

The main feature of Progressing Cavity Pumps (rotor & stator) is their assembly inside the tubing. Thus, the pump is not connected to the production line but assembled inside it.

Applications

- Wells with low flow – the cost of the intervention makes the use of a normal pump economically not suitable
- Wells with a high frequency of interventions (independent of the flow)
- Flow range 1,3 to 491 bpd at 100 rpm
- Pressure range 100 to 240 bar
- Pump with downhole sensors

Advantages

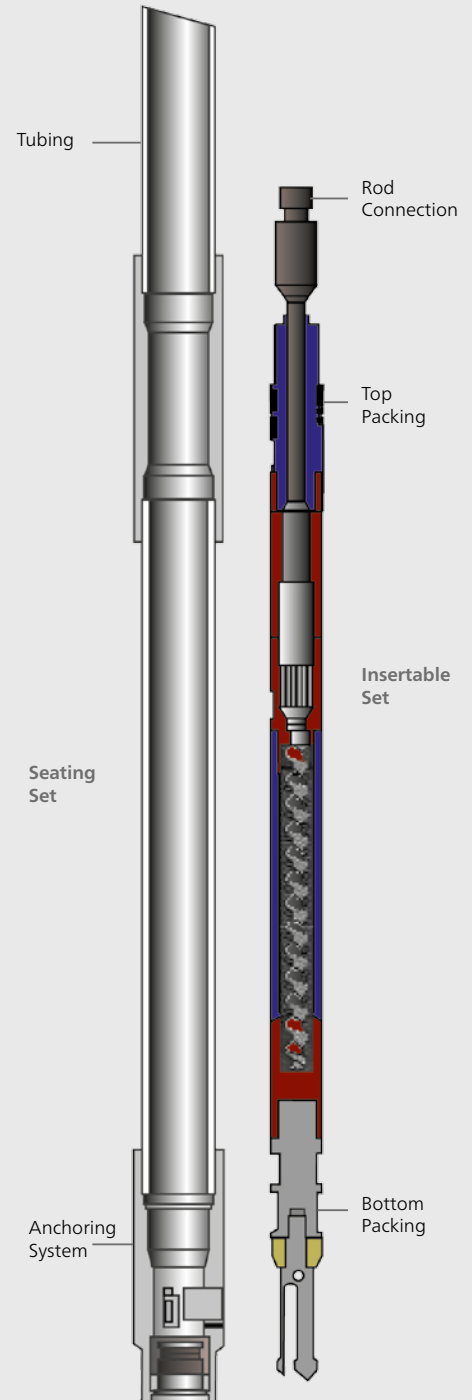
- Minimization of the time of intervention
- Minimization of costs of rig
- Minimize rig's costs in work-over services, this minimizes production losses
- Pump substitution without removing it from the tubing
- Pump substitution with flush-by equipment
- Up to 60 % savings in pump replacement
- Does not require removal of downhole sensors and cable

Anchoring Set



Not Anchored

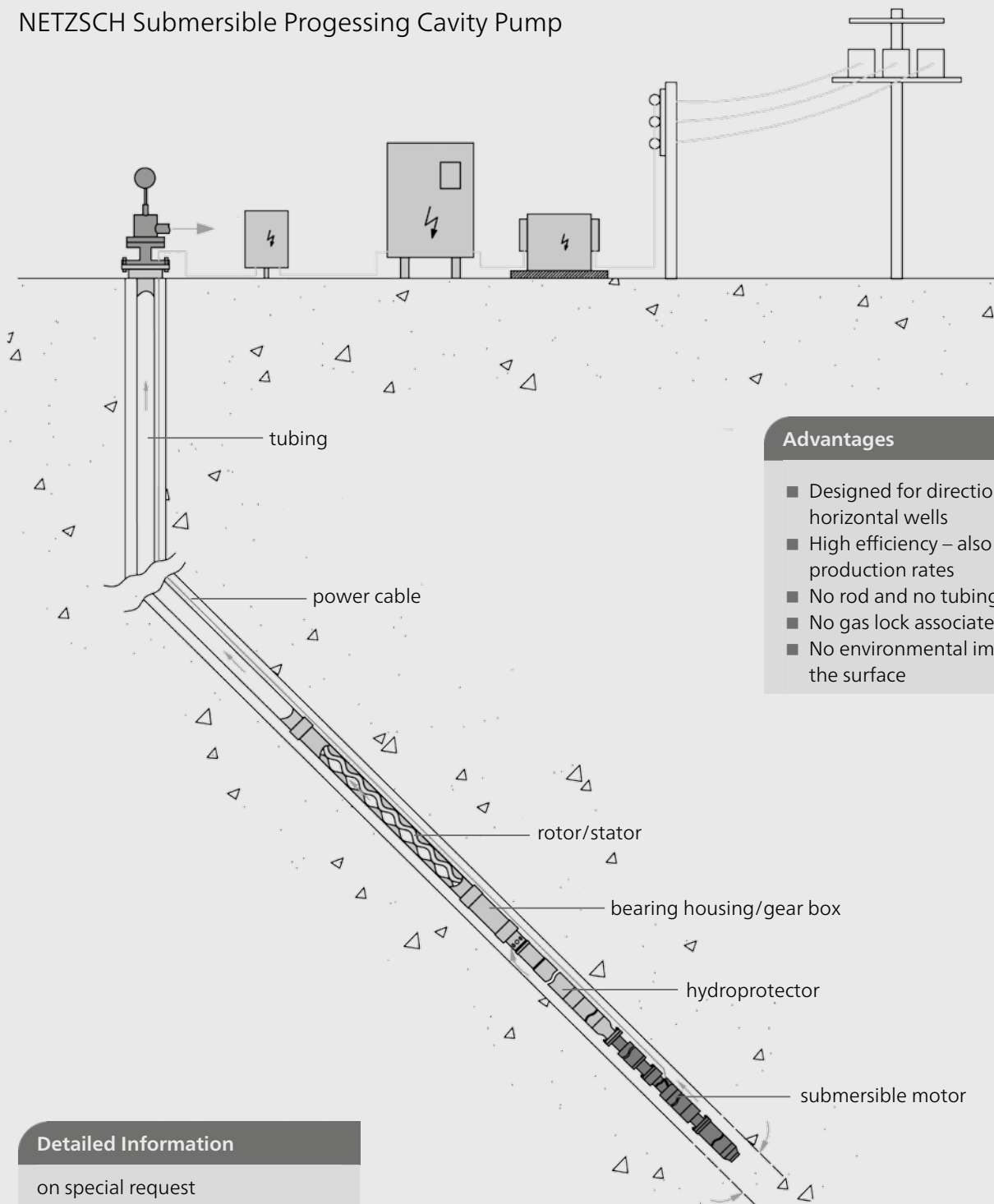
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Detailed Information

on special request

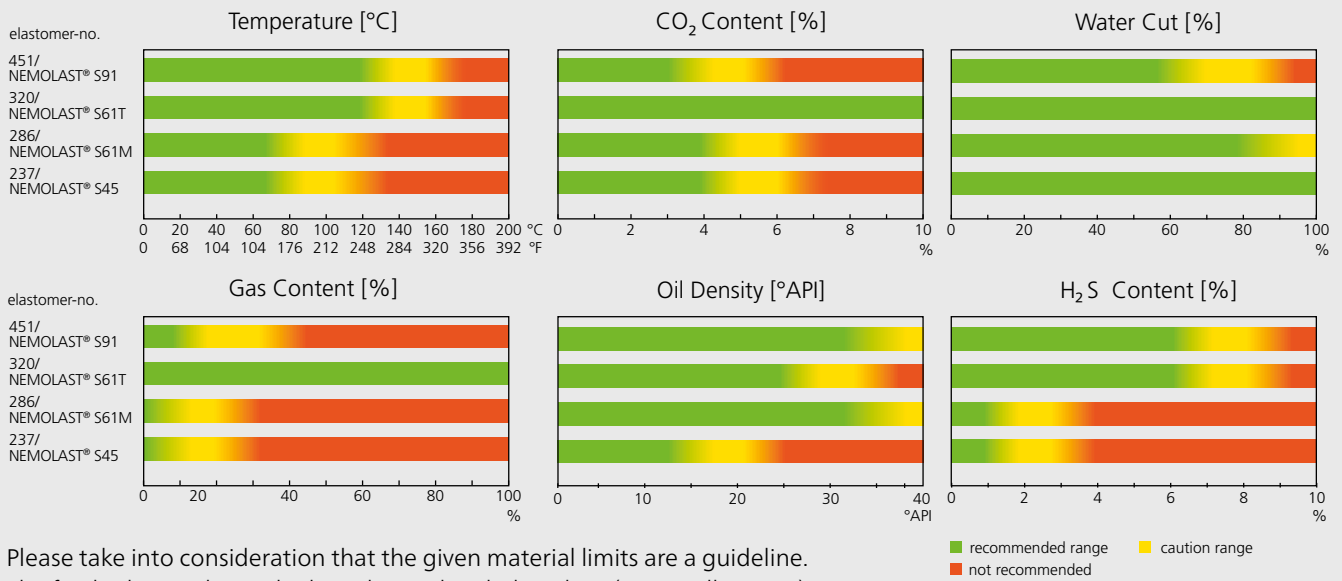
NSPCP® –
NETZSCH Submersible Progressing Cavity Pump



Technical Features

Material and Efficiency Information

Elastomer Overview

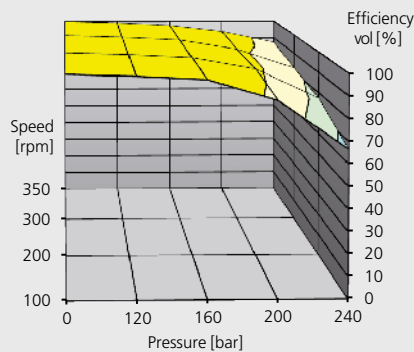


Please take into consideration that the given material limits are a guideline. The final selection has to be based on a detailed analysis (e.g. swelling test).

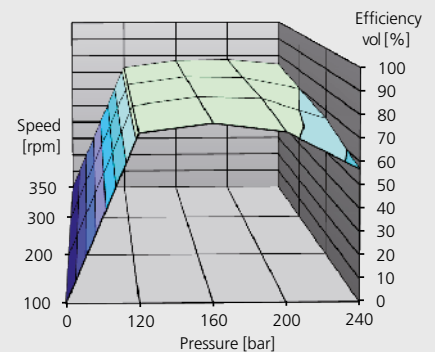
Efficiency

The general efficiency is normally between 40 % and 70 %, compared to a 30 % efficiency for plunger pumping units and 35 % for electrical submerged centrifugal pumps. The range of volumetric efficiency of NETZSCH downhole PC pump systems is 75 % – 95 %.

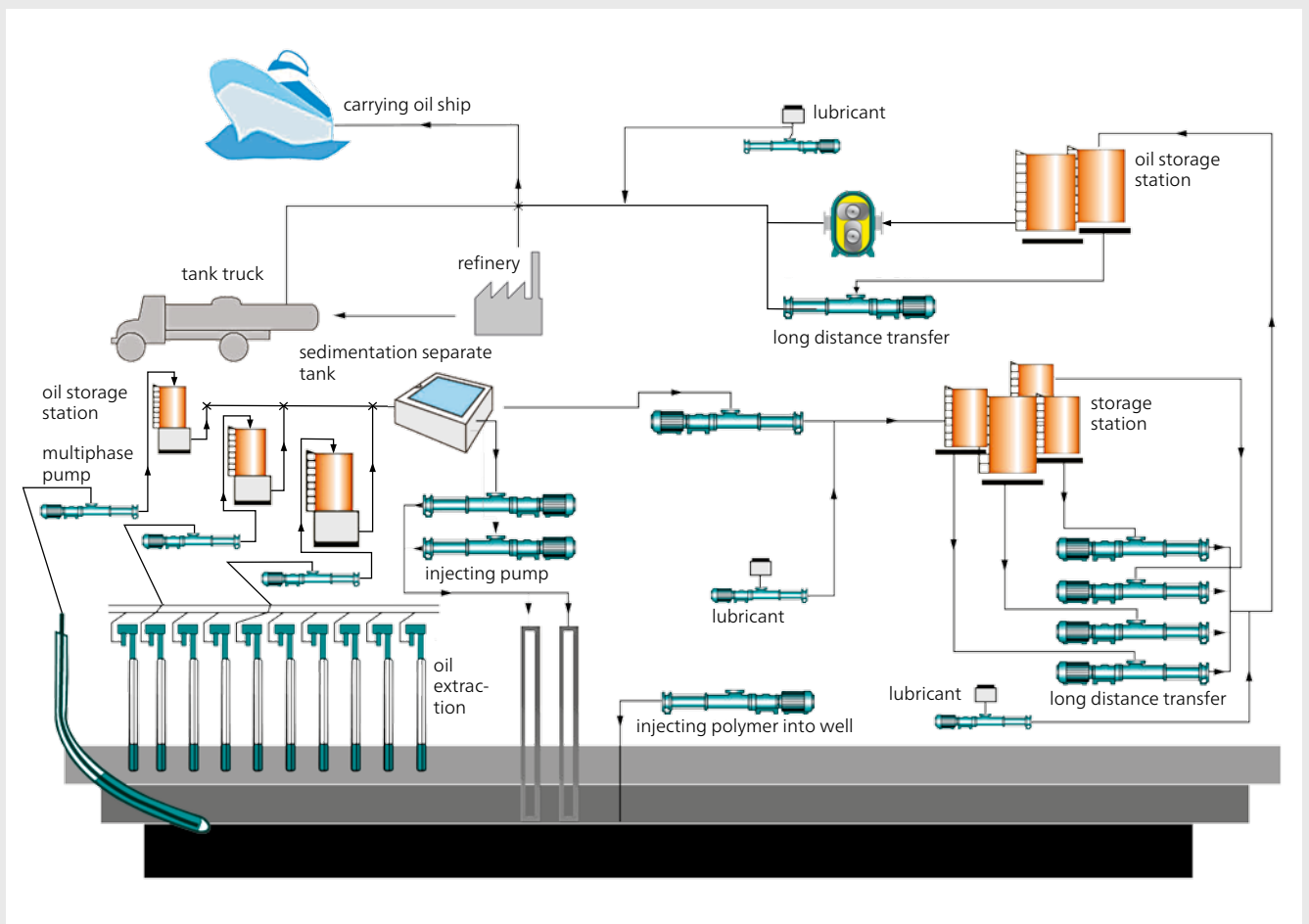
Volumetric efficiency




Overall efficiency




Application Process Flow Chart in Oil Field




 NEMO® Progressing Cavity Pumps

 NEMO® Progressing Cavity Pumps, lubricant

 TORNADO® Rotary Lobe Pumps

 Submersible Driven Downhole PC Pumps

 Top Driven Downhole PC Pumps

From Upstream through Midstream and Downstream Application, the wide product range of NETZSCH Pumps and Systems for the Oil & Gas Industry provide the optimum solution for you.

NETZSCH Products for the Midstream and Downstream Applications have proved their reliability over decades

Products and Components

NEMO® Progressing Cavity Pumps

- Standard pumps
- Hopper pumps
- Immersible pumps
- High pressure pumps (injection pumps)
- Custom built pumps

TORNADO® Rotary Lobe Pumps

- Standard pumps
- Custom built pumps

NETZSCH Engineering

- Testing and quality control
- Inspection and certification
- Special documentation

NETZSCH Accessories

- Protection devices
- Flushing/Sealing pressure devices
- Control systems
- Trolley assemblies
- Tools
- Skids
- Valves

The highest standards for equipment and safety are a basic requirement for oil field work to ensure that processes remain safe and reliable. NEMO® and TORNADO® pumps contribute to such safety and reliability. The complexity of pump media ranges from highly viscous to low-viscous, from shearing-sensitive to heavily laden with solid matter. The sophisticated and reliable design meets the particular pump job requirements and contributes to efficient process control. These pumps meet the requirements of API 676 3rd edition and also NACE MR-0-175.

Wide Range of Applications

NEMO® progressing cavity pumps are normally used for fluids having the following properties:

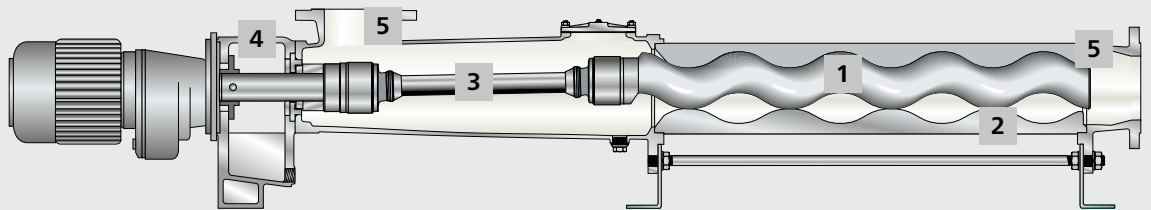
- Shear-sensitive
- Of low up to high viscosity
- With or without solids
- Dilatant or thixotropic
- Abrasive
- Adhesive

Quality and choice

We manufacture according to international standards and are certified according to DIN EN 9001: 2000. We weld in accordance with ASME IX and use materials such as Chromium-Nickel steels, Duplex and Super Duplex steels, Hastelloy, Titanium, as well as synthetic and ceramic materials. NBR, HNBR and Viton are employed as elastomers. Materials are coated with corresponding material products.

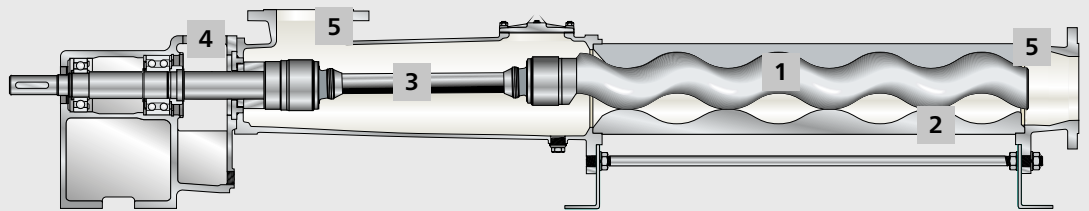
The shaft seals are available according to API 682 with installation space API 610. Stuffing-box packing, lip seals, single-acting mechanical seals with and without quenching, dual-acting mechanical seals (back-to-back or tandem) as well as shaft-seal-free designs with magnetic coupling. Thermosyphon systems according to API designs.

Design of NETZSCH Progressing Cavity Pump



NEMO® block construction pump

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



NEMO® bearing housing pump

Bare shaft pumps with double bearing for high torques in cast iron. Connection to the drive through flexible couplings, spacer couplings according to DIN or API.

1 Rotor

Wear and corrosion resistant design in all usual materials, as well as Duplex, Super Duplex, 254 SMO, Monel etc. (materials acc. to NACE possible). The hardened rotor is ease to transfer medium with sand.

2 Stator

Vulcanised into a tube, with integrated seals on both ends in a variety of elastomers, plastics or metals. Stators with equal wall thickness for high temperature variations. We also supply special materials HSB, HNBR for products including H₂S and high temperature.

3 Drive Train

Drive shaft and connecting shaft with coupling rod and two universal joints for power transmission from the drive to the rotor in all usual materials, as well as Duplex, Super Duplex, 254 SMO, Monel etc. (materials according to NACE possible). For high volume and high pressure application double seal pivot joint available. Its feature is high intensity, long-life and steady transmission.

4 Shaft Seal

Standard design with single acting, wear resistant mechanical seal independent of the direction of rotation; on request different types of single/double acting mechanical seals by various manufacturers, cartridge and special seals with circulation systems.

5 Suction and Pressure Housing

Flanges acc. to DIN, ANSI, JIS etc. or threads. Materials in Cast Iron, Cast Iron internal rubber-lined, Halar® coated, AISI 316 L or Ti, Duplex, Super Duplex, 254 SMO, Monel etc. (materials according to NACE possible).

NETZSCH Multiphase Pumps Substitute the expensive on-site Separation

NETZSCH Multiphase Pump

Applications

- Pumping of oil, gas or water mixtures with solids
- Pumping from the well to the manifolds or gathering stations

Large Range of Capacities and Pressures

- Flow rate from a few m³/h up to 600 m³/h (91,000 bpd)
- Pressure up to 60 bar



NM105SY
Capacity: 44-94 m³/h
Pressure: 18 bar
Medium: multiphase water, gas, crude oil, H₂S
Gas rate: 85%



NM090SY
Capacity: 11,5-50-55 m³/h
Pressure: 23-30-35 bar
Medium: oil, water, gas
Gas rate: 35%

Further information

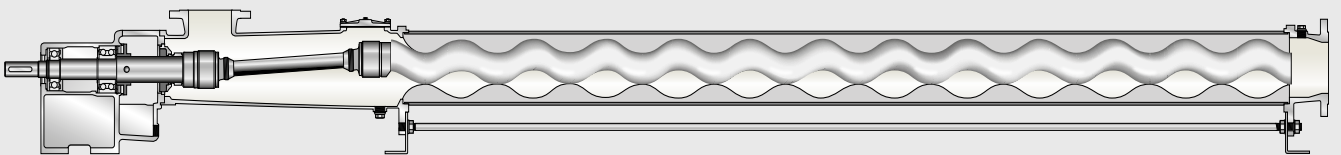
NETZSCH Multiphase Pumps
Brochure NPS · 409

Advantages

- High content of sand and/or gas
- Low operating and maintenance cost
- Very low emulsify effect to oil/water mixtures
- Efficient transport of oil/water mixtures with a very high content of sand and/or gas
- Efficient transport of highly viscous products
- Almost pulsation-free pumping
- Installation in any position
- Efficient transport of medium with high content of medium
- Near to no shear rate



NM0535Y
Capacity: 2-12 m³/h
Pressure: 28-40 bar
Medium: oil, water, gas 20-30%
Gas rate: 32%



NETZSCH Transfer- and Multiphase pump

NETZSCH Transfer Pump for low Pressure Applications



NETZSCH Transfer NEMO® Progressing Cavity Pumps

Large Range of Capacities and Pressures

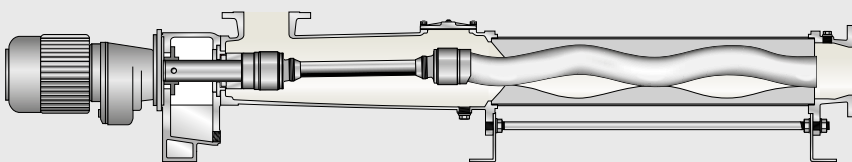
- Flow rate from a few m³/h up to 700 m³/h (91,000 bpd)
- Pressure up to 6 bar

Advantages

- Low operational cost
- Efficient handling of viscous mediums
- Transfer with high metering, repeated precision up to ±1 %
- Only low emulsion of oil/water mixtures

Applications

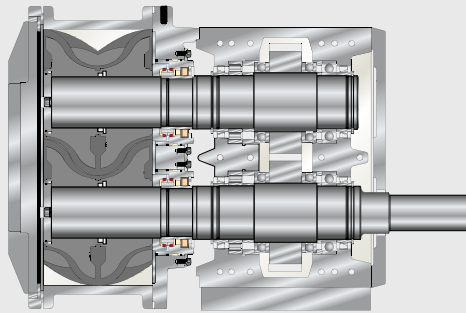
- Transfer viscous polymer from storage-tank to the polymer stations
- Transfer dilute polymer to well
- Transfer crude oil to unite station from well
- Pumping exhausted polymer
- Transfer sewage and mud
- Pumping of drilling sludge
- Pumping of slurries
- Pumping of cuttings
- Unloading of tank-truck (special version for low ambient temperatures)
- Tank cleaning



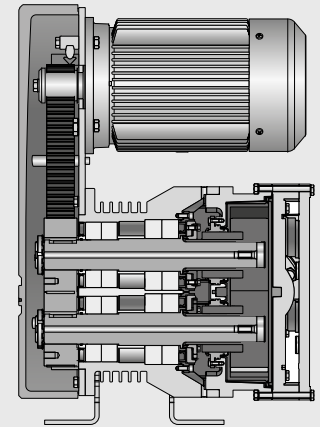
NEMO® High Flow Transfer Pump

NETZSCH Transfer 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 are ideally suited to transfer, process and dosing applications.



TORNADO® T1



TORNADO® T2

Large Range of Capacities and Pressures

- Flow rate from a few m³/h up to 1,000 m³/h (151,000 bpd)
- Pressure up to 6 bar

Advantages

- Variable, modular system
- Robust and space saving design
- Three lobe geometries
- Highly abrasion resistant protection plates or housing liners
- Adjustable housing for long service life
- Standard mechanical seal, will accept any DIN 24960 seal (optional)
- The patented timing gear on the T1, together with separate seals for pump and drive housings prevent ingress of any product leakage
- Bearing shafts on the rotary lobes with polygonal plug-in connection simplify maintenance of the T1



Further information

TORNADO® T.Proc®
Brochure NPS · 088

NETZSCH Injection Pumps, NETZSCH Sump and Caisson Pumps for High Pressure Applications and High Viscous Products



NETZSCH Injection Pump

Applications

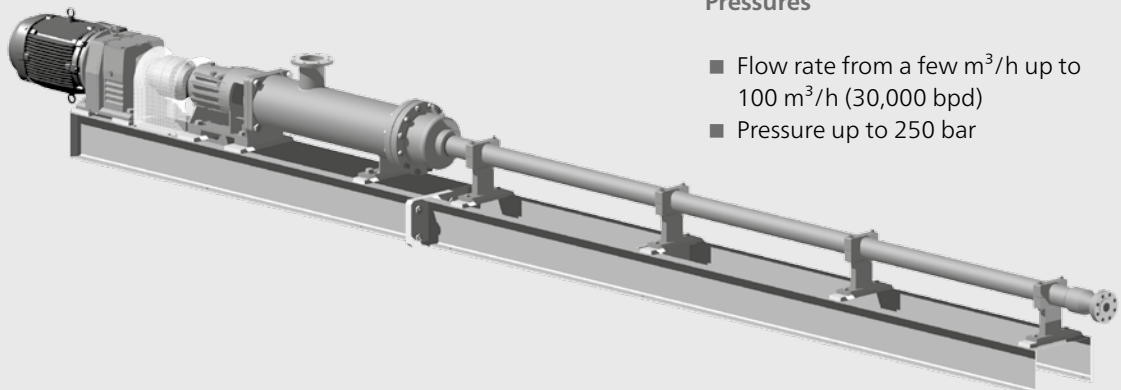
- Injecting water, produced water and slurry into oil well
- Injecting polymer into oil well
- Conveyance over long distances
- Conveyance at high systems pressure

Advantages

- Low operating and maintenance cost
- Low amount of wearing parts
- Efficient conveyance of highly viscous products
- Almost pulsation-free conveyance

Large Range of Capacities and Pressures

- Flow rate from a few m³/h up to 100 m³/h (30,000 bpd)
- Pressure up to 250 bar



NETZSCH Sump and Caisson Pump

Applications

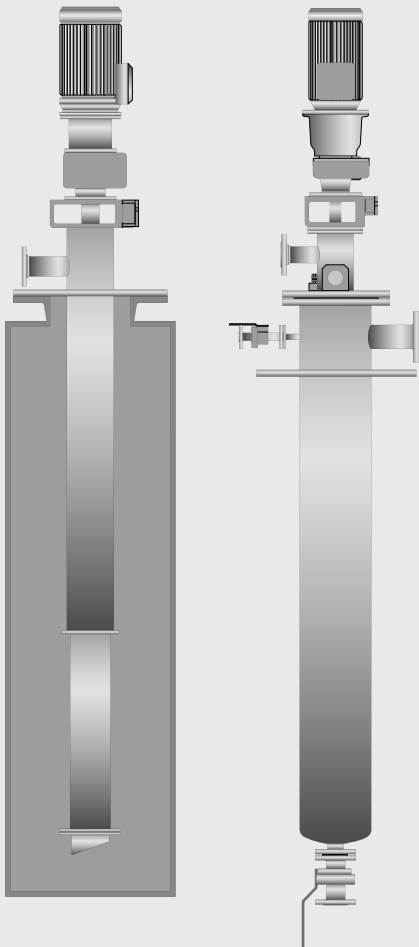
- Handling of reclaimed oil
- Oil-seawater
- Mud-seawater
- Emptying of crude oil wagon
- Emptying tanks
- Hydrocarbon condensate

Advantages

- Compact equipment
- High efficiency
- Transfer viscous medium with solid
- Avoiding dry-running because of medium directly into pump house
- Convenient installation
- Single or double acting seal according API 682 possible

Large Range of Capacities and Pressures

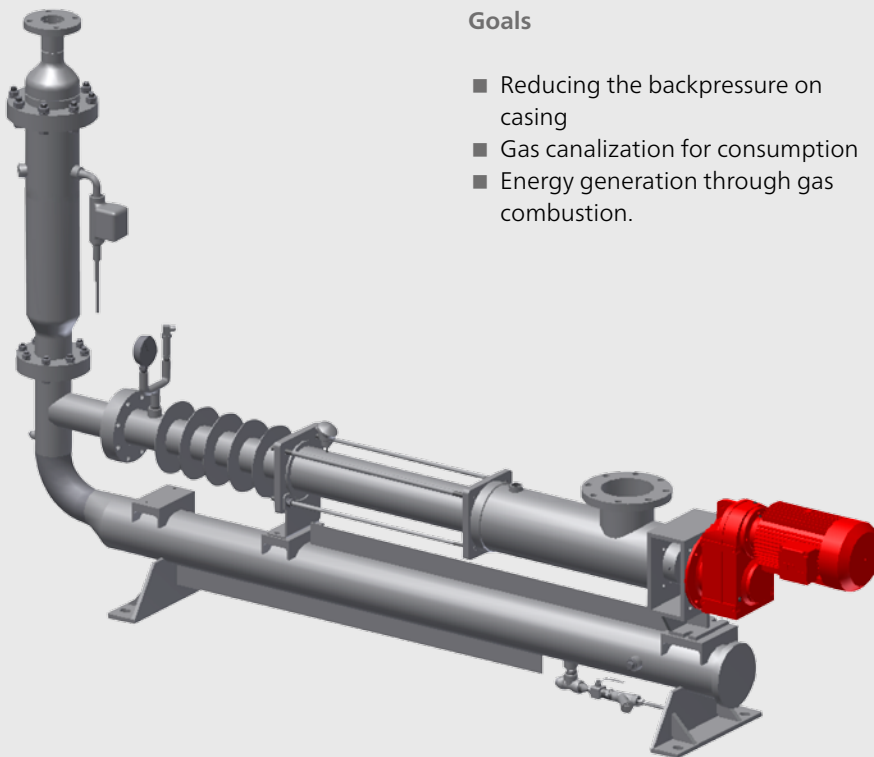
- Flow rate from a few m³/h up to 300 m³/h (45,000 bpd)
- Pressure up to 24 bar
- Immersible depth up to 12 m



NETZSCH Gas Compressor



PCP Gas Compressors Increase the Well's Productivity



Goals

- Reducing the backpressure on casing
- Gas canalization for consumption
- Energy generation through gas combustion.

Consequences

- Increases well's productivity
- Increases pump's efficiency, as less gas will pass through the pump;
- Create self sufficient field: using natural resources to create energy and avoid gas being released into atmosphere

Advantages

- Managing low and medium volume of gas
- Cheaper than standard compressors
- Managing wet gas and condensates (purge system for condensates)
- Differential pressure up to 7 bar

Accessories and Service for Upstream applications

Pump System Accessories

- Control line
- Production line

Pump Accessories

- Pump oint
- Couplings

Drive Head Accessories

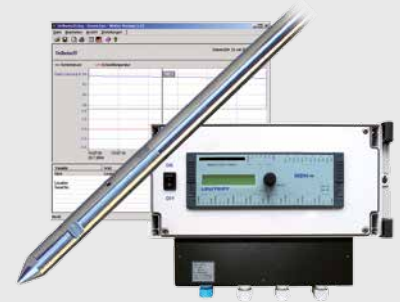
- Power belts / V-belts
- Packings
- Ring joints

Rod Accessories

- Polished Rod Couplings
- Couplings / Cross Couplings

Complete Well Production Simulation and Optimisation

Complete Monitoring System



Accessories and Service for Downstream applications

Safety Valves and Bypass System

- Safety valves and bypass system equipped between the inlet and outlet can protect the system.
- When pressure exceeds the rated pressure, safety valve is opening up and the mediums of outlet flow into pump house through bypass system.

Control Panel

- Frequency inverter
- Complete instrumentation
- Flowmeter

Diaphragm Pressure Gauge and Over Pressure Protection

- Gauge is 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
- Pressure range of 0 ~10 / 0 ~16 / 0 ~25 / 0 ~ 40 bar

After Sales

- Commissioning on request
- Start-up on request
- Maintenance at site
- Training at site and inhouse

Heating Jacket Pump House and Dry Running Protection

When the temperature of the medium in the pump exceeds the set value or no medium passes through, the NEMO® pumps equipped with STP-2A dry running protective system will stop operation automatically. For special applications, such as the pumps are installed in cold region, we provide the pumps with a heat preservation jacket. When the hot water introduced into the jacket, the whole pump will be heated, hence the original temperature, viscosity, and fluidness of the medium will be ensured.

Questionnaire for Oil & Gas Upstream



Contact

company		address	
name		phone	
telefax		e-mail	

Well Completion Data

well no.		field name	
vertical depth*	<input type="checkbox"/> [m] <input type="checkbox"/> [ft]	perforation depth	from <input type="checkbox"/> [m] <input type="checkbox"/> [ft] to <input type="checkbox"/> [m] <input type="checkbox"/> [ft]
well information	<input type="checkbox"/> vertical <input type="checkbox"/> deviated ¹ <input type="checkbox"/> horizontal ¹ <input type="checkbox"/> existing <input type="checkbox"/> newly drilled <input type="checkbox"/> planned		
well head information	<input type="checkbox"/> 3 1/8" x 2000 psi <input type="checkbox"/> 3 1/8" x 3000 psi <input type="checkbox"/> other ³		
electrical power	<input type="checkbox"/> [Volts]	<input type="checkbox"/> [Hz]	ambient temperature <input type="checkbox"/> [°C] <input type="checkbox"/> [°F]
casing²	tubing²	sucker rod	
size	<input type="checkbox"/> [inch] <input type="checkbox"/> [mm]	size	<input type="checkbox"/> [inch] <input type="checkbox"/> [mm]
inside dia	<input type="checkbox"/> [inch] <input type="checkbox"/> [mm]	inside dia	<input type="checkbox"/> [inch] <input type="checkbox"/> [mm]
weight	<input type="checkbox"/> [lbs]	weight	<input type="checkbox"/> [lbs]
		thread	<input type="checkbox"/> EU <input type="checkbox"/> NU
			<input type="checkbox"/> grade D <input type="checkbox"/> grade K <input type="checkbox"/> special

Production Data

current lift method			
production rate	current <input type="checkbox"/> [bpd] <input type="checkbox"/> [m ³ /d]	planned <input type="checkbox"/> [bpd] <input type="checkbox"/> [m ³ /d]	water cut <input type="checkbox"/> [%]
pump setting depth*	current <input type="checkbox"/> [m] <input type="checkbox"/> [ft]	planned <input type="checkbox"/> [m] <input type="checkbox"/> [ft]	sand cut <input type="checkbox"/> [%]
dynamic fluid level*	current <input type="checkbox"/> [m] <input type="checkbox"/> [ft]	planned <input type="checkbox"/> [m] <input type="checkbox"/> [ft]	static fluid level* <input type="checkbox"/> [m] <input type="checkbox"/> [ft]
static BHP (at perf.)	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]	productivity index	<input type="checkbox"/> [b/d/psi] <input type="checkbox"/> [m ³ /d/psi]
dynamic BHP (at perf.)	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]	casing pressure	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]
GOR	<input type="checkbox"/> [m ³ /m ³] <input type="checkbox"/> [cuft/bbl]	flow line pressure	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]

Fluid Data

chemical treatment	<input type="checkbox"/> yes <input type="checkbox"/> no	bubble point pressure	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]
paraffin production	<input type="checkbox"/> yes <input type="checkbox"/> no	CO₂ content	<input type="checkbox"/> [%] <input type="checkbox"/> [ppm]
oil viscosity at surface	<input type="checkbox"/> [cP]	H₂S content	<input type="checkbox"/> [%] <input type="checkbox"/> [ppm]
oil viscosity at pump	<input type="checkbox"/> [cP]	aromatics⁴	<input type="checkbox"/> [%]
chloride content	<input type="checkbox"/> [%]	specific oil density⁴	<input type="checkbox"/> [°API] <input type="checkbox"/> [kg/dm ³]
temperature at surface	<input type="checkbox"/> [°C] <input type="checkbox"/> [°F]	temperature at pump	<input type="checkbox"/> [°C] <input type="checkbox"/> [°F]

Attachments and Comments

¹ well bore geometry ² completion details ³ wellhead drawing ⁴ fluid analysis other *from surface



Questionnaire for Oil & Gas Downstream



Contact

company		country	
department		phone	
name of the oilfield		fax	
name		e-mail	
address		project name	
		project number	

Please send a quotation for units

Fluid Data

medium		water cut	<input type="text"/> [%]
fluid temperature	<input type="checkbox"/> [°C] <input type="checkbox"/> [°F]	solid content	<input type="text"/> [%]
oil gravity	<input type="checkbox"/> [°API] <input type="checkbox"/> [g/cm³] <input type="checkbox"/> [kg/m³]	H₂S content	<input type="checkbox"/> [%] <input type="checkbox"/> [ppm]
viscosity	<input type="checkbox"/> [cP] <input type="checkbox"/> [CST] <input type="checkbox"/> [mPas]	chloride content	<input type="checkbox"/> [%] <input type="checkbox"/> [ppm]
GOR	<input type="checkbox"/> [m³/m³] <input type="checkbox"/> [m³/t] <input type="checkbox"/> [scft/b]	CO₂ content	<input type="checkbox"/> [%] <input type="checkbox"/> [ppm]
bubble point pressure	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]	particle size	<input type="checkbox"/> [mm] <input type="checkbox"/> [inch]

System Data

production rate	<input type="checkbox"/> [m³/d] <input type="checkbox"/> [m³/h] <input type="checkbox"/> [bpd]	discharge pressure	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]
suction pressure	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]	ambient temperature	<input type="checkbox"/> [°C] <input type="checkbox"/> [°F]

Electric Data or

operating voltage	V	air or gas pressure	<input type="checkbox"/> [bar] <input type="checkbox"/> [psi]	oil pressure	<input type="text"/>
cycles	Hz	air or gas consumption	<input type="checkbox"/> [m³/min]	oil consumption	<input type="text"/>
protection		gas structure	<input type="text"/>		

Pneumativ or Gas Data or

Hydraulic Data

Options

<input type="checkbox"/> pump bare shaft	<input type="checkbox"/> base plate or moving device	<input type="checkbox"/> coupling	<input type="checkbox"/> shut off valves	<input type="checkbox"/> relief valves
<input type="checkbox"/> control panel	Protection	Requirements		
<input type="checkbox"/> VSD	<input type="checkbox"/> mechanical <input type="checkbox"/> electrical <input type="checkbox"/> frequency			

Shipping Data

<input type="checkbox"/> EXW	ex works (defined location)	<input type="checkbox"/> FOB	free on board (defined port or shipment)	<input type="checkbox"/> CIF	cost insurance freight (defined port or destination)
<input type="checkbox"/> FCA	free carrier (defined location)	<input type="checkbox"/> CFR	cost and freight (defined port or destination)	<input type="checkbox"/> CIP	cost insurance paid (defined port or destination)

Signature and date

Comments

<input type="text"/>	<input type="text"/>
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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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