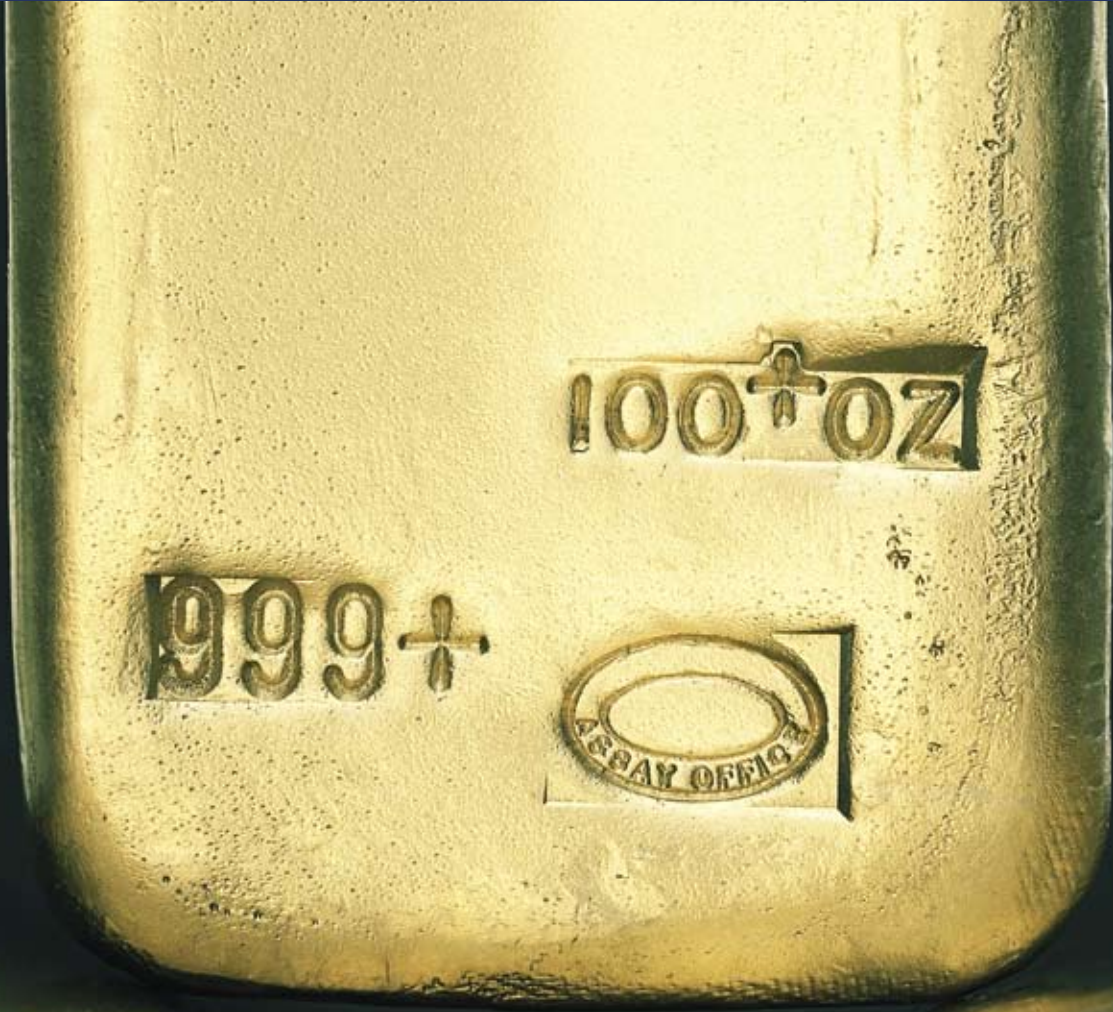


GRUNDFOS PUMPS FOR MINING



[WE KNOW YOUR TREASURES ...
NOW IT'S TIME YOU SEE OURS]

DEWATERING WATER SUPPLY WASTEWATER PROCESSING DUST SUPPRESSION

BE > THINK > INNOVATE >

GRUNDFOS 

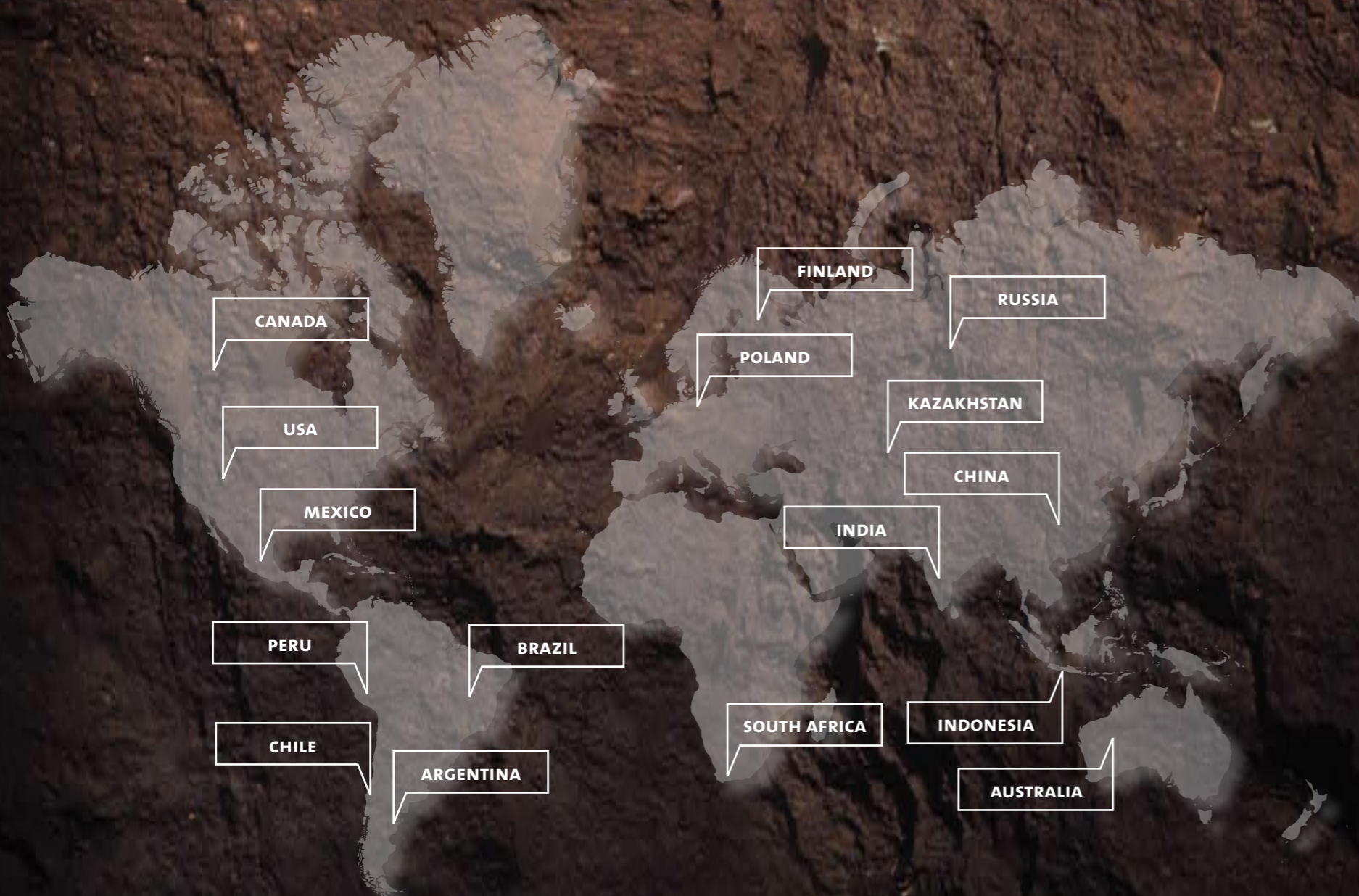


Since 1945, Grundfos has built its international reputation on attention to innovative solutions and quality in every detail.

[PRIDE IN GOOD CRAFTSMANSHIP]

Introduction to Grundfos	04
Application overview	06
Applications and solutions	08
Reference story	14
Service and Web tools	16
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[WE ARE ALSO... WHEREVER YOU ARE]



FROM LOCAL TO GLOBAL

Grundfos is the story of the visionary Danish pioneer, Poul Due Jensen, who started out helping local farmers to meet their water supply needs, and ended with a company of more than 17,000 employees, providing the world with some of the most advanced pump solutions.

Driven by innovation and a determined tradition of putting ideas into action that stems from our founder, we are today solution-providers in heating, dosing, wastewater, water supply, and industrial applications that bring about the development and production of more than 16 million pump-units annually.

GLOBAL PRESENCE

Grundfos is established in more than 50 countries worldwide, representing one of the most expansive networks in the industry. With an international network of more than 450 certified Grundfos partners; service, support, and spare parts are never far away.

In addition to our global network, Grundfos markets products through effective distribution centres and international express transport companies. As a result, our customers are guaranteed that pumps and spare parts are always on stock and available within the shortest possible time.

APPLICATION PUMP

PERIPHERAL DEWATERING 1

Frequency drive	CUE
Controls for dewatering	MC
Submersible pump	SP/SQ

OPEN PIT DRAINAGE 2

Dewatering pump	DW
Vertical turbine	VETP*
Sump pump	SE/SEV

UNDERGROUND DEWATERING / DRAINAGE 3

Drainage pump	AP
Vertical turbine	VETP*
Sump pump	SE/SEV/SEN

RAW WATER INTAKE 4

Horizontal split case pump	HS
End-suction pump	NB/NK
Submersible pump	SP

WASTEWATER HANDLING 5

Mixers and flowmakers	AMD/AMG
Dosing pump	DMX/DMH
Wastewater pump	SE1/SEV

WATER TREATMENT 6

Centrifugal pump	CR
Dosing pump	DMX/DMH
End-suction pump	NB/NK
Wastewater pump	SE1/SEV

PROCESSING / HEAP LEACHING 7

Transfer pump	CR/CRN
Transfer pump for low PH value liquids	CRT
Dosing pump	DMX/DMH
Chemical dosing pump	MTR
End-suction pump	NB/NK
Heap leaching pump	SEV
Submersible pump	SP

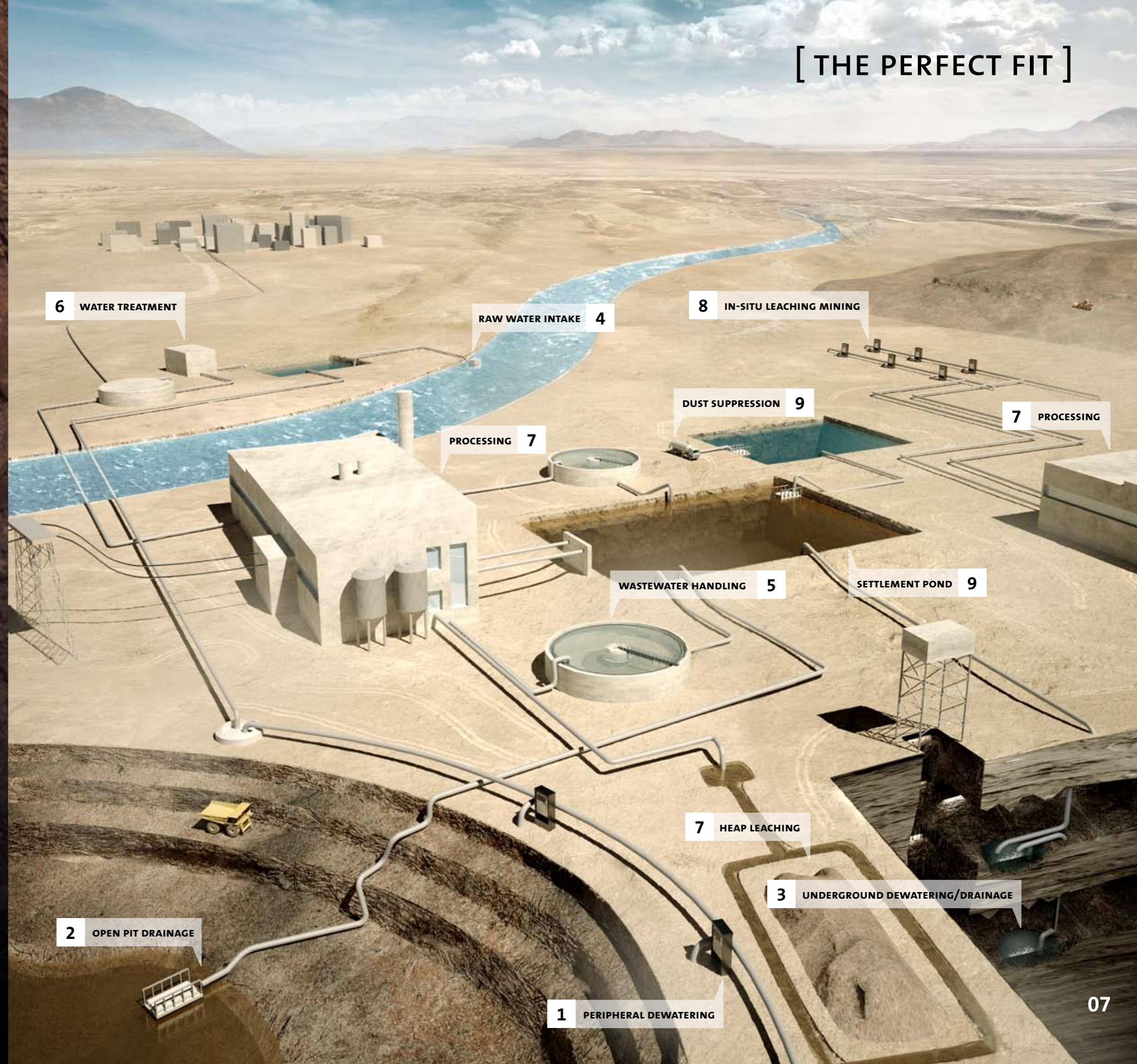
IN-SITU LEACHING MINING 8

Frequency drive	CUE
ISL controls	MC
Submersible pump	SP

DUST SUPPRESSION / SETTLEMENT POND 9

Drainage pump	AP
Dewatering pump	DW
Submersible pump	SP/SQ
Vertical turbine	VETP*
Booster	Hydro MPC

* Brand by Peerless



[APPLICATIONS AND SOLUTIONS]

BUILT TO LAST

Grundfos' leadership within the pump business provides us with the organisational setup and expertise to meet your every requirement for a reliable pump solution for surface, open pit and underground mining.

Grundfos pumps are built to last... even under the toughest working conditions.

On the following pages, we provide an insight into selected mining applications and what Grundfos has to offer.

DEWATERING

Peripheral dewatering

A series of peripheral deep wells are typically installed around open pit mines to reduce the risk of flooding, which makes them unsafe. Although complete removal of water due to nature is nearly impossible, Grundfos SP and SQ pumps can reduce the water entering mines significantly.

The SP pump resists sand and other abrasive materials and the extra high-grade stainless steel version is suitable for very severe conditions. Fitted with a frequency converter, Grundfos pumps will automatically adjust their speed to the demand.



Underground dewatering

The Grundfos dewatering range is built to last longer than conventional dewatering pumps. This is achieved through extensive use of high-grade materials such as chromium steel, silicon carbide (SiC/SiC), etc.

The Grundfos dewatering range is capable of pumping water containing abrasive materials such as sand, clay particles, drill cuttings, and other potentially damaging objects that could be found on rock faces in mine shafts, quarries, or gravel pits.

Open pit dewatering

The grey water in open pit mines typically contains abrasives such as stones, clay, sulphur, and the PH value is usually very low. This grey water requires a special pump and the Grundfos DW wastewater pumps is your guarantee for reliable grey water handling. And that's why, you find Grundfos wastewater solutions in the toughest environments – e.g. mines and offshore industries worldwide.



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WATER SUPPLY

Water treatment

Grundfos has years of experience with water supply and water treatment. The Grundfos pump range fits perfectly with small or medium sized waterworks sites. Our pumps are used worldwide for raw water supply and pressure boosting.

A Grundfos water treatment solution can also include dosing pumps that supply precise amounts of additives to secure the exact water quality required.

Raw water intake

In water supply applications for mining operations and mineral processing, Grundfos submersible pumps guarantee a reliable supply of raw water from lakes or rivers.



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WASTEWATER HANDLING

The Grundfos range of powerful wastewater pumps are designed for handling drainage, effluent, and sewage from processing, as well as mine camps, these pumps represent the essence of the know-how that Grundfos has built up through more than 25 years in the wastewater business.

The efficient single-channel or SuperVortex impellers provide free passage of large solids. This greatly reduces the risk of clogging and ensures maximum up-time and reduced operating costs. So, once installed these robust pumps will provide years of trouble-free operation at maximum efficiency.

In addition, Grundfos wastewater pumps are easy to install and easy to dismantle for service or inspection. The pumps can be installed submerged on auto-coupling system, as free-standing on ringstand for portable use, or in dry applications.



PROCESSING

One of the most important goals of today's modern mining industry is to minimise the impact of operation on the local environment. To achieve this, mines aim to maximise the use of recycled process water and reduce fresh-water consumption and treated water releases.

Process water

Grundfos offers robust pump solutions, which efficiently recirculate large amounts of water from the processing plant.

The Grundfos process water pumps are designed to handle aggressive water containing chemicals and water with a low PH value.

In-situ process

The in-situ process involves the installation of a series of wells through which a chemical solution is injected into the water, passed through the formation, and pumped back to the surface.

At mineral processing plants, small and medium-sized submersible pumps are used to pump barren or pregnant solutions.



DUST SUPPRESSION

In the mining industry, the creation of dust is an unavoidable result of operations. However, dust gets into everything, clogging up pipes and mechanical part, creating additional maintenance and repair.

Water spray systems remain the most efficient and cost effective means of dust control for both process and fugitive dust emissions. A Grundfos pump solution can move a large amount of water in a short time, making it possible to use a large nozzle configuration and minimise the need for filtration.

Dust control is an important investment in order to meet strict regulatory demands as well as ensuring safe operations, therefore reliable pump solutions are essential.

[MINARA RESOURCES CHOOSES GRUNDFOS... AGAIN]

In connection with an expansion of one of the world's biggest nickel mines Minara Resources knew exactly which submersible pump solution they wanted.

One of the world's most significant nickel deposits, at Murrin Murrin in Western Australia, is operated by Minara Resources Pty Ltd. It is the world's only single site fully integrated nickel laterite producer and is situated between Leonora and Laverton in the State's north eastern gold-fields.

Minara Resources uses open cut methods to mine nickel and cobalt and puts the ore through a leaching process which uses significant amounts of water – and Grundfos plays an integral part in this operation.

The water comes from an extensive company-owned borefield about 140 km away, and is extracted using Grundfos submersible pumps carrying water to tanks at transfer stations, from where it is ultimately pumped to the mining site.



THE SITUATION

In 2007, Minara Resources expanded its borefields to include a new area known as Grey Mare, with this expansion adding 20 new bores. It was important that reliable and robust submersible borehole pumps were used, and which were capable of pumping up to 600 kl/day per borehole/pump combination.

THE GRUNDFOS SOLUTION

Grundfos SPR (high grade steel) submersible pumps were already installed at all the existing bores and have been operating reliably for years. When the time came to expand the borefield, Grundfos pumps were specified based on their past record and to maintain uniformity in maintenance operations.

The borefield already employed Grundfos SPR-30 pumps in a proven installation setup. Based on the unproblematic and generally maintenance free operation of the SPR-30 pumps, identical pump solutions were specified again for the Grey Mare expansion project.

THE OUTCOME

Since their installation in 2007, the Grundfos pumps installed as part of the Grey Mare expansion project have operated reliably and contributed some 300-600 kl/day per bore/pump to the mining operation's water supply.

According to Project Manager of Minara Resources, Fernando Gutierrez, his company is very pleased with the result.



"Minara Resource's Murrin Murrin site is a world standard mining operation," says Mr. Gutierrez. "Our success largely depends on a reliable source and supply of water. Thanks to the Grundfos submersible pumps, we are able to operate effectively and mine nickel and cobalt in one of the world's harshest and driest environments."

[FROM LOCAL

...TO GLOBAL]

SERVICE BACKUP

We want our service to match our product quality. To do this, we have established a highly efficient worldwide service set-up. You can always get in touch with us for technical advice during planning and building. Spare parts are readily available once your system is up and running.

Wherever you are, your service requirements will be met with rapid, efficient response from highly skilled service technicians.

ONLINE PRODUCT SELECTION TOOL

Save yourself some time! Grundfos offers the market's most comprehensive, 24-hour, on-line access to everything you need to maintain or service your system: from CAD drawings to installation videos and operating instructions.

Go to www.grundfos.com, choose the WebCAPS symbol, and you're there: detailed technical information, drawings, wiring diagrams, dimensioning – everything!



Click **Catalogue** and go directly to the product you need.



Click **Replacement** to find the pump that exactly fits your installation.



Click **Sizing** to find the most suitable pump for any application.



Click **Service** to find all the information needed on service kits and spare parts.



Click **Literature** to find and download all the documentation you need – data booklets, installation and operating instructions, service, etc.



Click **CAD drawings** to find and download all relevant CAD drawings in .stp, .dxf and .dwg formats.

CONTACT

Contact us for a serious look at your opportunities. A brochure can only briefly outline the wide range of options available to you. To explore all the ways Grundfos can help you with your pumping system requirements, please contact your local Grundfos sales company.

Find your local Grundfos company in the list below or visit: www.grundfos.com

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GRUNDFOS OOO

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SOUTH AFRICA / AFRICA

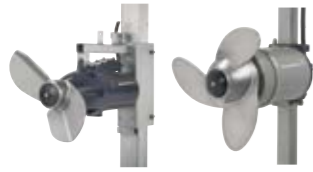
GRUNDFOS (PTY) LTD

TEL: +27 11 579 4800

USA

GRUNDFOS Pumps Corporation

TEL: +1 913 227 3400



AMD

- Fast-Speed mixers with direct drive

Flow, Q: max. 1435 m³/h
Propeller Speed (rpm): 675-710 rpm
Liquid temp.: 5 °C to +40 °C

AMG

- Intermediate-Speed mixers with planetary gear c

Flow, Q: max. 6985 m³/h
Propeller Speed (rpm): 325-354 rpm
Liquid temp.: 5 °C to +40 °C

- For Municipal sewage, stormwater, sludge treatment systems, and different industrial applications, we have quality solutions to offer.
- Modular motors and planetary gear systems makes the mixers and flowmakers highly dependable and very efficient with low operating costs.
- Atex-approved variants available.
- Our own special concept in accessories makes the installation, operation, and service of mixers, time and cost efficient.



Monitoring and Controls (MC)

- CUE, Modular Controls, MPC, MP204

Grundfos offers a complete range of pumps controls, frequency converters, motor protection units, sensors, and monitoring solutions.

In combination with Grundfos pumps, the Grundfos monitoring and control products offer substantial savings in installation, maintenance, service cost, energy consumption, as well as in the day-to-day operation.

- Dewatering (MC)
- In-situ leach mining (MC)
- Pressure boosting (MPC)
- Wastewater applications (LC, DC, MC)
- CUE frequency converters
- MP204 Motor Protection Unit
- IO112 sensor modules
- GRM remote monitoring

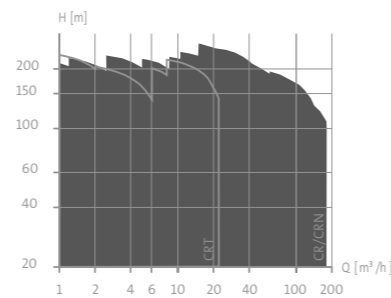


CR / CRN / CRT

- Multistage centrifugal pumps

Flow, Q: max. 180 m³/h
Head, H: max. 330 m
Liquid temp.: -40 °C to +180 °C
Operat. pres.: max. 50 bar

- Reliability
- High efficiency
- Service-friendly
- Space-saving
- Suitable for aggressive liquids
- Various types of shaft seal depending on liquid and temperature
- Available with magnetic coupling, MAGdrive
- Motor with integrated frequency converter

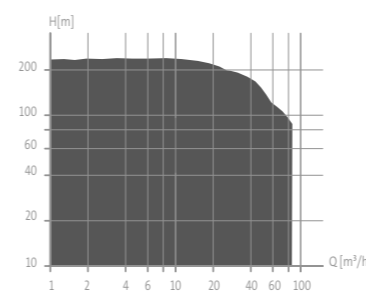


MTR

- Multistage centrifugal immersible pumps

Flow, Q: max. 85 m³/h
Head, H: max. 238 m
Liquid temp.: -20 °C to +90 °C
Operat. pres.: max. 25 bar

- Flexible installation length
- Wide range
- Reliability
- Service-friendly
- Simple installation

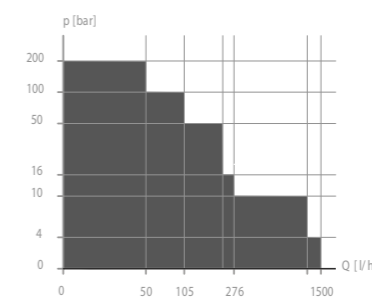


DMX / DMH

- Motor-driven diaphragm dosing pumps

Capacity, Q: max. 1150 l/h
Pressure, p: max. 10 bar
Liquid temp.: max. +50 °C

- Stroke length capacity control
- Leakage-free
- Motor control option with display and one-touch buttons
- Analog 0/4-20 mA control

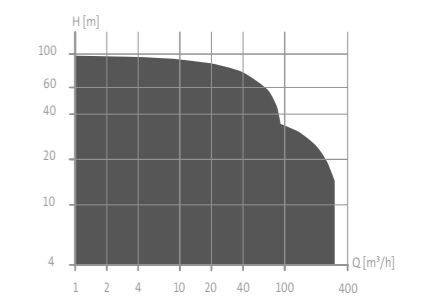


DW

- Contractor pumps

Flow, Q: max. 300 m³/h
Head, H: max. 100 m
Liquid temp.: 0 °C to +40 °C

- Extremely hard-wearing due to specially selected materials
- Simple installation
- Service-friendly

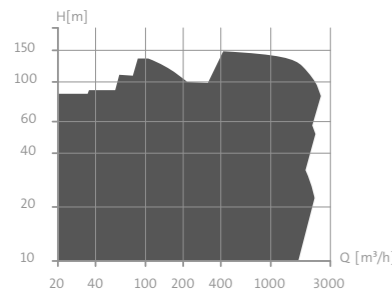


HS

- Horizontal split case pumps

Flow, Q: max. 2500 m³/h
Head, H: max. 148 m
Liquid temp.: 0 °C to +90 °C
Operat. pressure: max. 16 bar

- Flange dimensions according to EN 1092-2 (DIN 2501) standard
- Robust design
- Wide range
- Standard motor
- Adaptable to any application and performance
- Shaft seal according to EN 12756
- Ductile iron and cast iron pump casing
- Stuffing box
- Bronze, aluminium bronze and stainless steel impeller

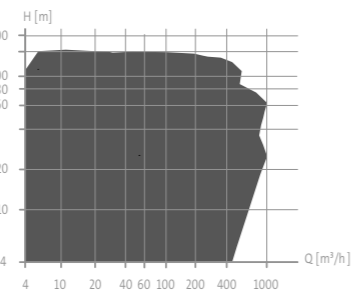


NB / NK MAXA / MAXANA

- Single-stage standard pumps

Flow, Q: max. 1000 m³/h
Head, H: max. 160 m
Liquid temp.: -25 °C to +140 °C
Operat. pressure: max. 16 bar (NB/NK)
 max. 10 bar (Maxa/Maxana)

- Standard dimensions according to EN and ISO standards
- Robust design
- Wide range
- Heavy-duty
- Flexible motor range
- Various types of shaft seal depending on liquid, temperature, and pressure
- Cast iron or bronze impeller (NB/NK)
- Stainless steel impeller (Maxa/Maxana)

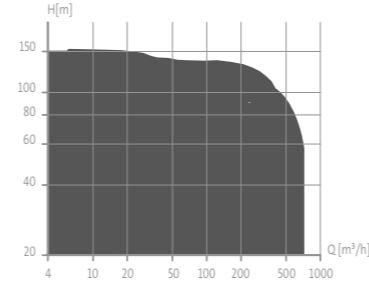


HYDRO MPC

- Hydro booster sets

Flow, Q: max. 725 m³/h
Head, H: max. 150 m
Liquid temp.: 0 °C to +70 °C
Operat. pressure: max. 16 bar

- Constant pressure control
- Extremely reliable
- User-friendly
- Energy saving
- Modular design
- Small footprint
- Many communication possibilities

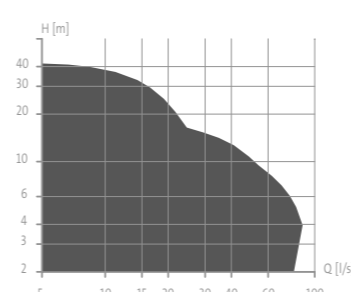


SE1 / SEV / SEN

- Drainage, effluent, and sewage pumps

Flow, Q: max. 70 m³/h
Head, H: max. 25 m
Liquid temp.: 0 °C to +40 °C
Discharge diameter: Rp 2 to DN 65

- Cable plug connection
- Unique clamp connection
- Single-channel and vortex impellers
- Solids passage up to 65 mm
- Unique cartridge shaft seal
- Modular design
- Minimum downtime

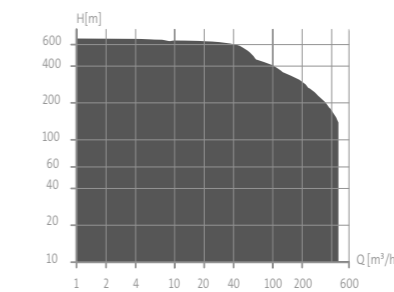


SP

- SUBMERSIBLE PUMPS

Flow, Q: max. 470 m³/h
Head, H: max. 810 m
Liquid temp.: 0 °C to +60 °C
Submersible depth: max. 600 m

- High efficiency
- Long service life as all components are stainless steel
- Motor protection via MP204

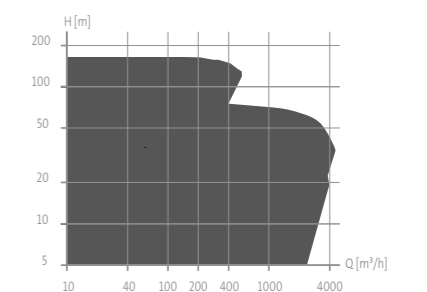


Vertical turbine

- Circulator pumps, close-coupled type

Flow, Q: max. 4600 m³/h
Head, H: max. 170 m
Liquid temp.: -25 °C to +150 °C
Operat. pressure: max. 25 bar

- Compact design
- Wide range
- Standard motor
- Service-friendly
- Various types of shaft seals depending on liquid, temperature, and pressure



BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

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