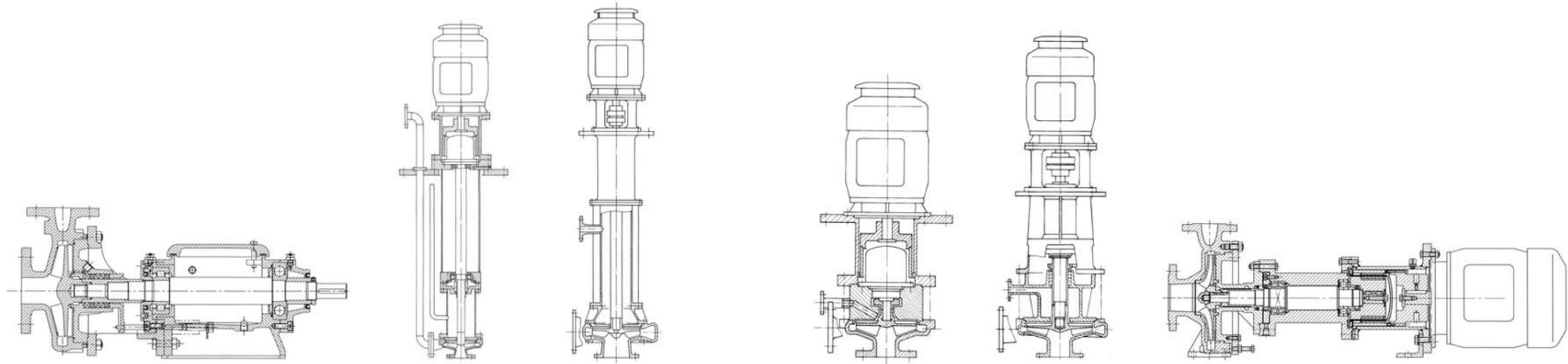


North America Fertilizer Application



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CONTENTS

2	Company profile
4	Horizontal centrifugal pumps MOS and UMOS
6	Self-regulating centrifugal pump V-AN
8	Centrifugal pump with magnetic coupling MPCH DryRun
10	Vertical submerged pump MPAT and vertical centrifugal pump MPCV
12	Vertical submerged pump T
14	Vertical tank pump VB and vertical submerged pump VKT
16	Overview

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GROW WITH THE TASKS.

HISTORY. In the 1930's a man called Paul Bungartz considered the problem of frictionless centrifugal shaft sealing. He patented his groundbreaking ideas, so that any future feed problems could be solved. The first special pumps were then produced in Magdeburg: the "Mackensen Special Centrifugal Pumps according to the patents of Paul Bungartz". From the outset these were applied to tasks, for which traditional pumps failed.

In 1947 Paul Bungartz founded the presently-named Paul Bungartz GmbH & Co. KG. Since then much has changed, apart from one aspect: we still like to keep things in the family. In 1987 Jürgen Bungartz, son of the company founder, took over leadership; and since January 2006 his son Frank Bungartz has been in control of the business, hence we're already in the third generation. Naturally his father, with his knowledge and long-term experience, is still available for the company.

LOCATION. The development, construction, marketing and administration are attended in Düsseldorf, our headquarter. Production, assembly and testing is undertaken in Euskirchen. Both here and there, our 50-odd staff have one thing in mind above all: to satisfy our customers.

Incidentally, we cooperate with freelance engineering consultants and marketing partners not only in this country but worldwide.

CHALLENGE. We regard ourselves as suppliers of solutions. Nowadays, difficult and complex feed tasks appear in nearly all branches of the chemical and petrochemical industry, in power plant technology and in environmental protection. Here innovative, tailor-made and robust answers are in demand. Our special centrifugal pumps for extreme assignments are executing those jobs, which are too demanding for others. They are applied to problems, which defeat standard pumps.

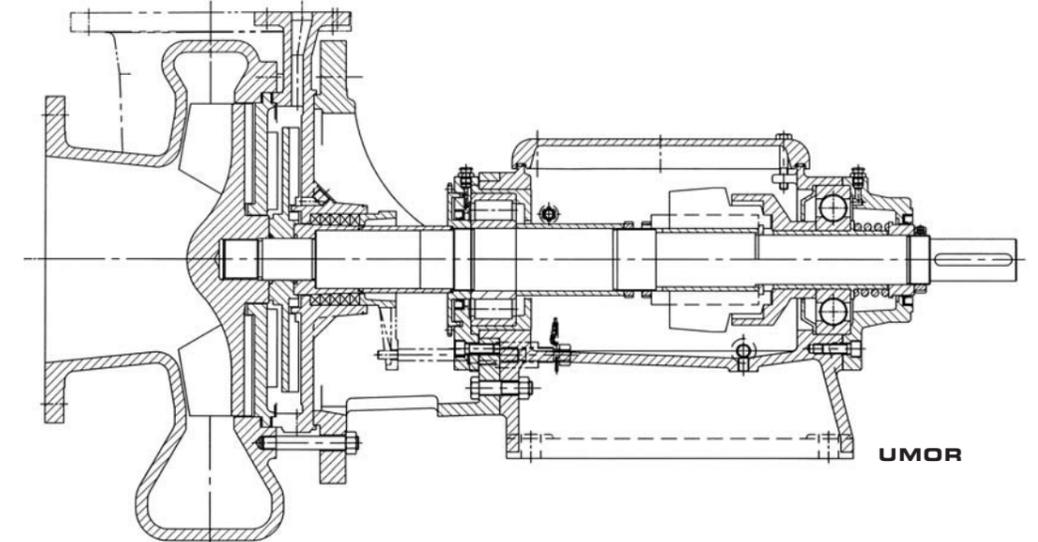
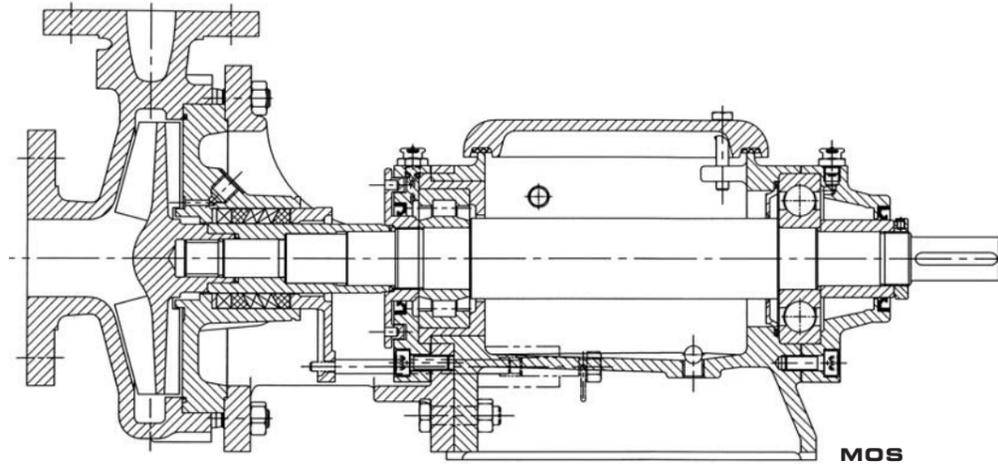
QUALITY. In order that our technically excellent products maintain their high quality, we leave nothing to chance. We prefer to revert the experience gained over decades, deep know-how, constant further development and distinctive pioneering spirit. Naturally we also regularly go through a complex inspection by means of a quality management system. The result: the certification ISO 9001.

Now it is time to get acquainted with our special centrifugal pumps in detail. In the following, we introduce you

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TOUGH.
THE HORIZONTAL CENTRIFUGAL PUMPS MOS AND UMOS.

The centrifugal pumps MOS and UMOS are used in numerous branches of industry concerned with non-toxic media. They are self-sealing with a non-contacting hydrodynamic shaft seal. A packed gland is integrated as seal when pump is not running.

MOS is specially designed for low suction heads. The shaft seal is achieved here by hydrodynamic means via an impeller with back vanes. For greater suction heads UMOS comes into operation. This has an additional seal expeller which bears the inlet pressure only.

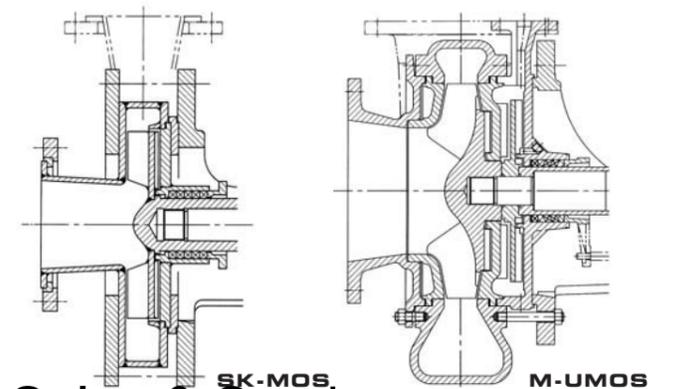
Whereas MOS and UMOS have no problem working without a centrifugal governor in normally polluted liquids, M-MOS and M-UMOS proceed with renewable wearing plates. MOR and UMOR are characterised by a centrifugal governor, which "switches of" the packed gland during operation. SK-MOS and SK-UMOS are welded constructions and are implemented as substitutes when low-castable substances are applied.

APPLICATION AREAS.

- non-toxic, corrosive, abrasive, adhesive, gas-containing, crystallising and gelling liquids
- non-toxic media with solid parts such as phosphoric acid, ammonium nitrate, iron oxide and saline solutions

ADVANTAGES.

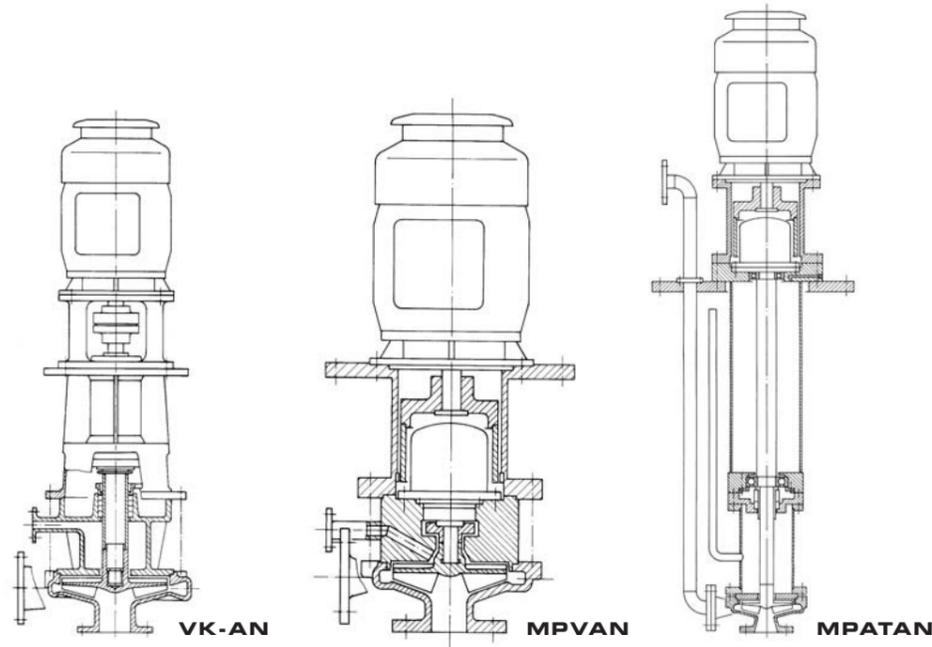
- no sealing liquids are required
- no leakages during long-term use
- capable of dry running
- suitable for solids
- robust with low wear and tear
- reliable and maintenance-free
- durable
- no rubbing seal faces with the governor version



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DIFFERENT FROM OTHERS.

THE SELF-REGULATING CENTRIFUGAL PUMP V-AN.

Centrifugal pumps of the type V-AN are designed to cope with all possible cases. Without difficulty they can adjust to fit variable inlet flow rates and moreover in a self-regulating manner. Hence they are ready for each task. Their NPSH value is almost zero. By this property they operate free of cavitation, even if the vapour pressure in the suction container is attained.

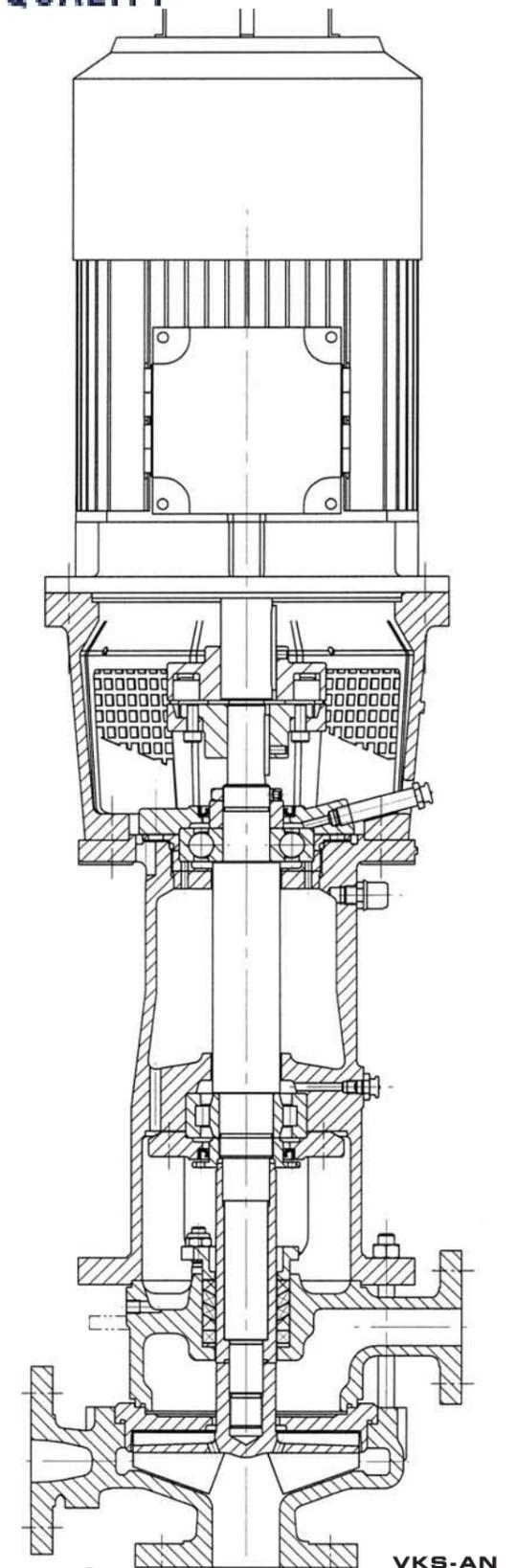
As far as the shaft seal is concerned, the V-AN excels by using a hydrodynamic seal as the primary seal. With the secondary seal the pumps demonstrate their flexibility. Here a packed gland, double mechanical seal, double seal expeller or magnetic drive can be used depending on the pumping medium.

APPLICATION AREAS.

- media at boiling point
- fluctuating inlet flow rates
- gas-containing liquids
- drainage of residue in containers, e.g. tankers
- delivery and collection of condensates
- vacuum filters
- centrifuges
- distillation columns
- evaporation plants
- waste containers

ADVANTAGES.

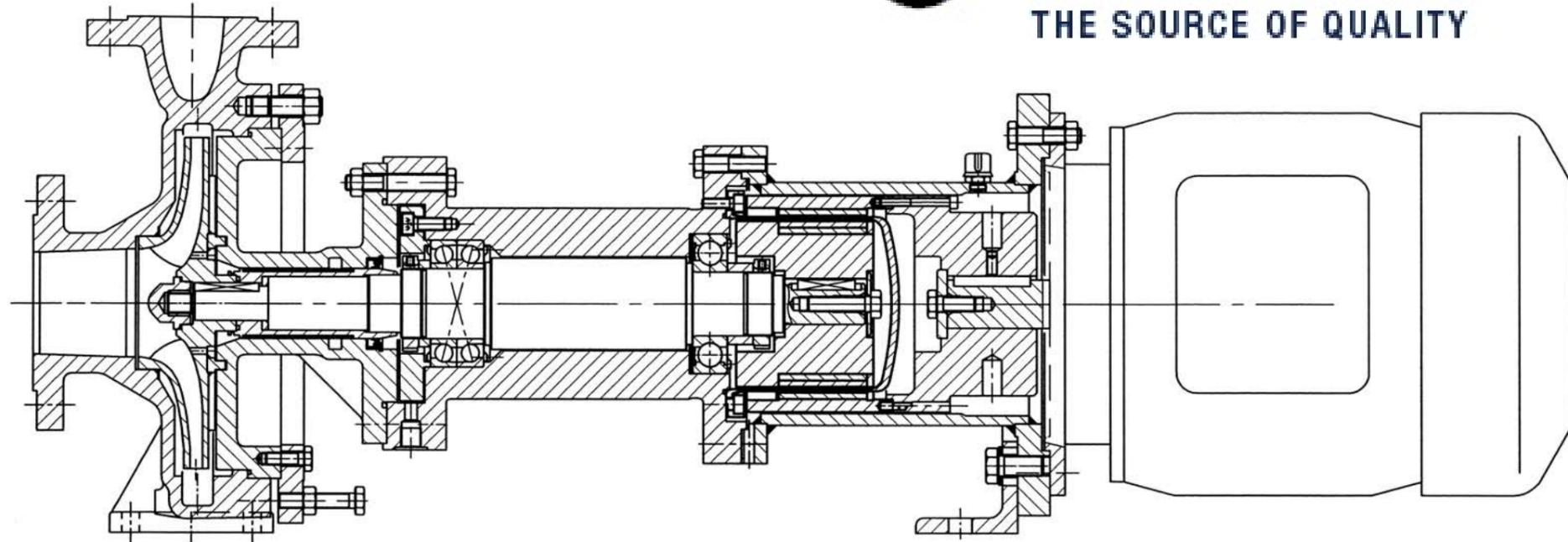
- no regulation is required
- height reduction
- no suction vessels are required
- self-regulating
- self-ventilating
- safe to run dry
- reliable
- reduction of plant costs



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MPCHDryRun

SAFE IS SAFE.

THE CENTRIFUGAL PUMP WITH MAGNETIC DRIVE MPCHDryRun.

The chemical pump MPCHDryRun with standard connecting sizes is best suited for the most extreme challenges. This is not only due to the magnetic drive, which is running dry and de-pressurised; but moreover because the highly-accurate, grease-lubricated rolling bearings provide maximal load capacity. By the way, the bearings lifetime is more than 32,000 hours.

The shaft seal guarantees the highest level of safety. Due to the back vanes on the impeller and the balance holes, the shaft clearance pressure sinks to the pumping pressure. A labyrinth between the impeller and the shaft bearing separates solid parts. In this way they cannot enter the area around the bearing. The special lip seal in front of the bearing comes into play in case the nitrogen supply fails. The can, the actual sealing element of the magnetic coupling, is thereby barely affected.

The horizontal pump MPCHDryRun is suitable for all liquids. This even includes hot products such as melts due to the heat barrier between the product- and the bearing-chamber, which minimises the heat transfer to the bearing support.

APPLICATION AREAS.

- toxic media with particular demands on the shaft seal
- pumping liquids containing solid parts
- gas-containing pumping liquids

ADVANTAGES.

- continuously dry running
- robust and low wear and tear
- low vibrations
- maintenance-free
- reliable
- durable
- all sizes available in normal measurements

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PLAYING IT SAFE.

THE VERTICAL SUB-MERGED PUMP MPAT AND THE VERTICAL CENTRIFUGAL PUMP MPCV.

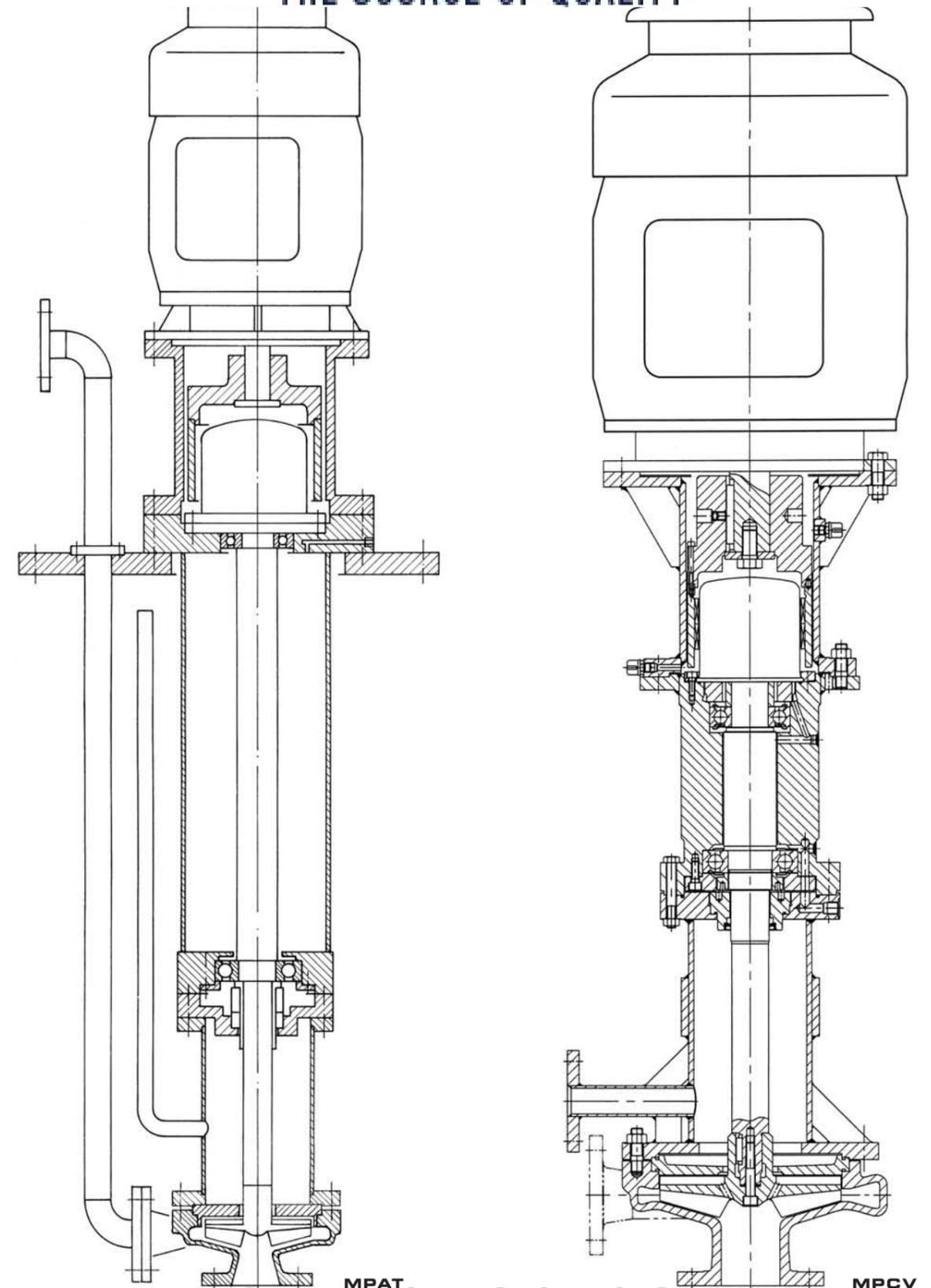
Due to the magnetic drive, MPAT and MPCV can go the whole hog without having a bearing in the liquid. This type of shaft seal opens up a broad field of activity for the special pumps. MPAT is constructed for great submersion depths. MPCV is used as a dry installation in extreme conditions. Both share the concept of efficient shaft sealing; here the dry-running magnetic drive free from eddy currents hermetically seals the pump. Self-regulating versions are also possible: these are called MPATAN and MPCVAN.

APPLICATION AREAS.

- toxic media containing solid parts
- gas-containing liquids
- high temperatures and/or high pressure

ADVANTAGES.

- no slide bearing in the pumping liquid
- suitable for fluctuating inlet flow rates
- suitable for solid parts
- suitable for great submersion depths
- safe to run dry
- robust



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**THE STRONG ONE.
THE VERTICAL
SUBMERGED PUMP T.**

The special centrifugal pump T handles extreme working conditions. It proves its strength particularly with aggressive and abrasive liquids. Problems with seals and bearings are absent because none of these elements are located in the pumping liquid.

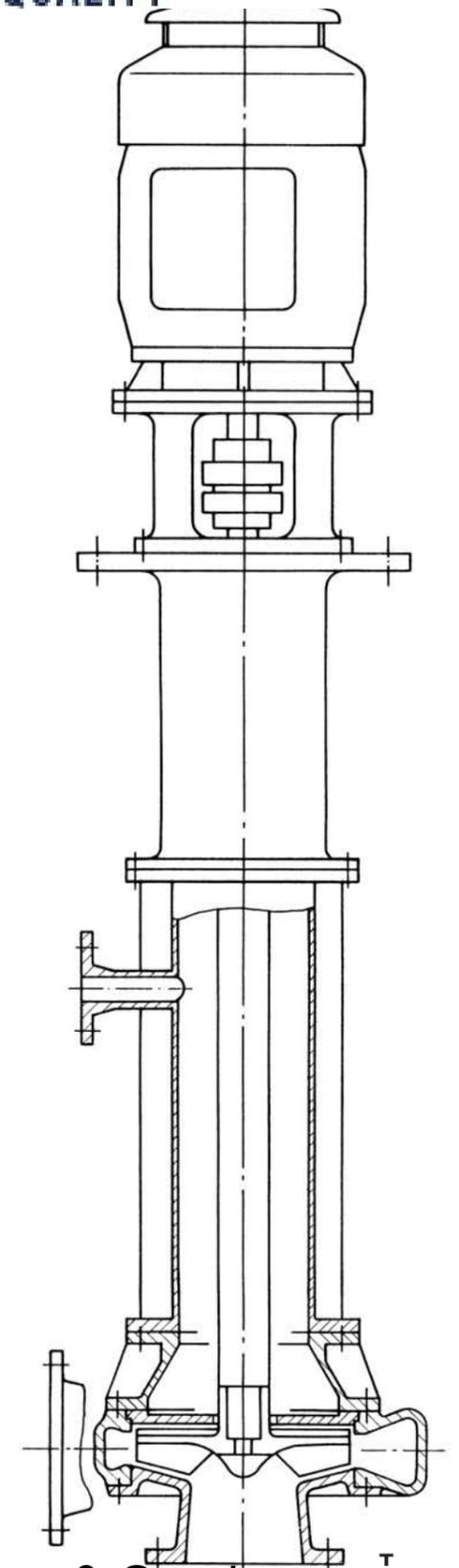
As a primary seal, T comes up with a hydrodynamic shaft seal. Here the impeller seals up through hydrodynamic effects caused by the back vanes against the feed pressure. A packed gland is integrated as secondary seal. Incidentally, there are also self-regulating versions of the T pump.

APPLICATION AREAS.

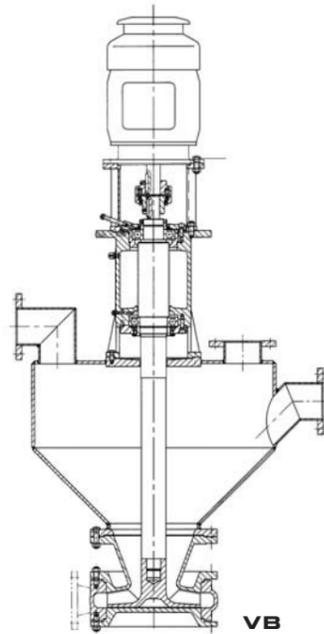
- non-toxic media with solid parts such as phosphoric acid, ammonium nitrate, iron oxide, saline solutions and waste water
- drainage of pits without the danger of running dry for submersion depths of up to 1.4 m

ADVANTAGES.

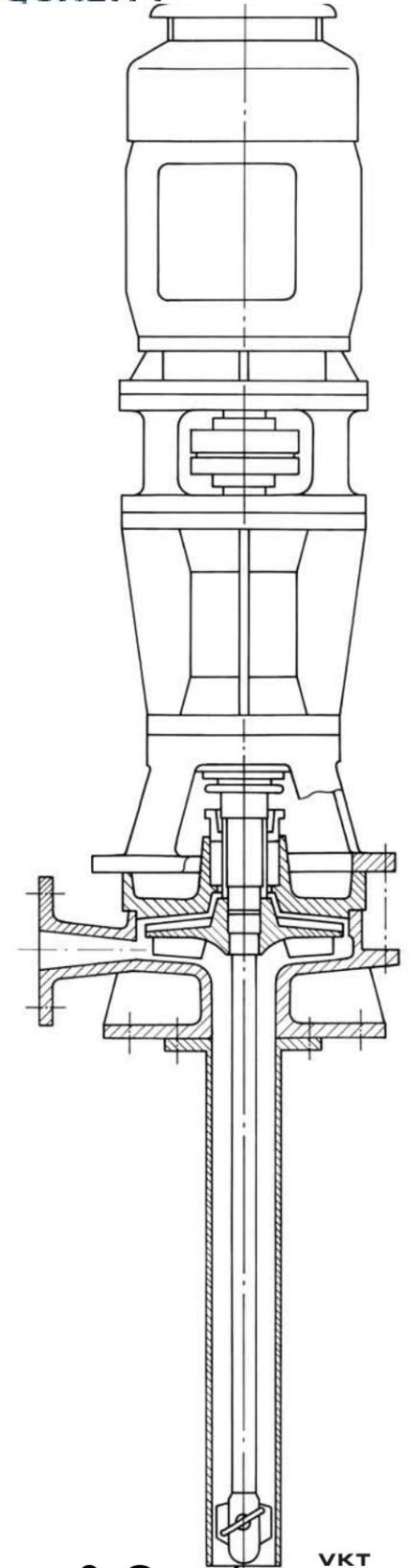
- robust construction
- no shaft leakage
- no bearing problems
- safe to run dry
- low maintenance requirements



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VB



VKT

FIT FOR SPECIAL APPLICATIONS.

THE VERTICAL TANK PUMP VB AND THE VERTICAL SUBMERGED PUMP VKT.

When it comes to solid-containing, muddy, foamy or gas-containing liquids, the centrifugal pump VB is completely in its element. This is because the impeller is fed from above. For the tank pump, the packed gland or seal expeller serves as the shaft seal.

APPLICATION AREAS.

- solids containing liquids, which tend to sediment
- foamy and gas-containing liquids
- mixing and simultaneous delivery of powdery and fluid components

ADVANTAGES.

- safe, even with inflow shortage
- ideal for residue drainage
- no dead spaces
- safe to run dry
- self-ventilating

When it comes to a narrow mounting port, the centrifugal pump VKT is called for. The hydrodynamic shaft seal gives its best here as primary seal. The secondary seal is either a packed gland or a double mechanical seal, both being fully unaffected by the pump's pressure.

APPLICATION AREAS.

- media with solid parts such as phosphoric acid, ammonium nitrate, iron oxide and saline solutions
- narrow mounting ports

ADVANTAGES.

- submersion depths of up to 1 m
- starts with any liquid level
- no bearing in the liquid
- safe to run dry

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DELIVERY PROGRAMME.

Horizontal pumps

with hydrodynamical shaft seal

Vertical pumps

- for dry installations, short design
- for wet installations, without bearing in the liquid
- for wet installations, with slide bearings
- with feeder propeller, space-saving installation

Tank pumps

with in-feed from above

Horizontal and vertical pumps

- with semi-open impellers
- with closed impellers
- with torque flow impellers

Secondary seals

for pumps with hydrodynamic seals

- packed gland
- mechanical seal
- magnetic drive
- particular solution for problem cases

Comprehensive information about each type of pump is featured in individual product brochures.

MATERIALS.

- all castable and weldable stainless steel qualities
- castable and weldable special alloys
- grey cast iron, rubber lined
- special materials such as titanium, zirconium, etc.

RANGE OF PERFORMANCE.

- nozzle DN 32 to 400 mm
- capacity Q 0 to 1.500 m³/h
- pump delivery height H 5 to 140 m
- speed of rotation n 750 to 3.600 1/rpm
- pressure p -1 to 40 bar
- temperature t -20 to 300°C

SPECIALISTS AMONG THEMSELVES.

AN OVERVIEW OF THE CENTRIFUGAL PUMPS.



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