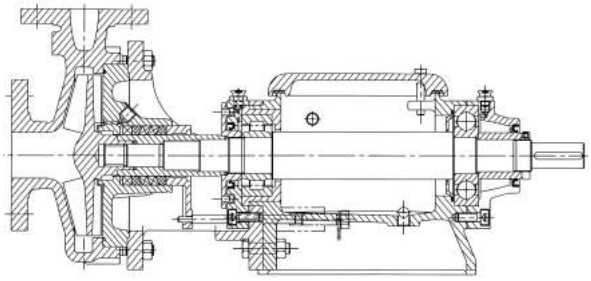
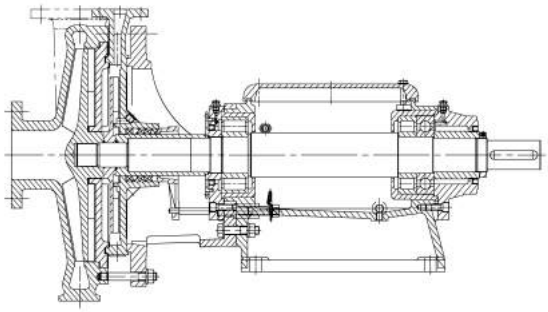




BUNGARTZ

CENTRIFUGAL PUMPS

MOS/UMOS
MOR/UMOR
MOG/UMOG

TOUGH.

THE HORIZONTAL CENTRIFUGAL PUMPS MOS AND UMOS.

Nearly all sectors of the chemical and petrochemical industry as well as power plant engineering have something in common: Difficult and highly complex conveying tasks are increasingly involved here. They can be mastered only with innovative, tailored and robust solutions. Our special centrifugal pumps MOS and UMOS, developed for extreme applications, perform the task where others fail. They function well where standard pumps are unable to cope.

MOS and UMOS operate dependably and economically. Without any protest they feed corrosive, abrasive, sticky, gas containing, crystallising and gelling liquids. Liquids with poor lubricating properties are accepted too.

There are good reasons why MOS and UMOS accept every challenge and solve every problem. Firstly, they are constructed specifically for the particular task. Secondly, they have an innovative shaft seal. And thirdly they are specially made for the task they are required to carry out.

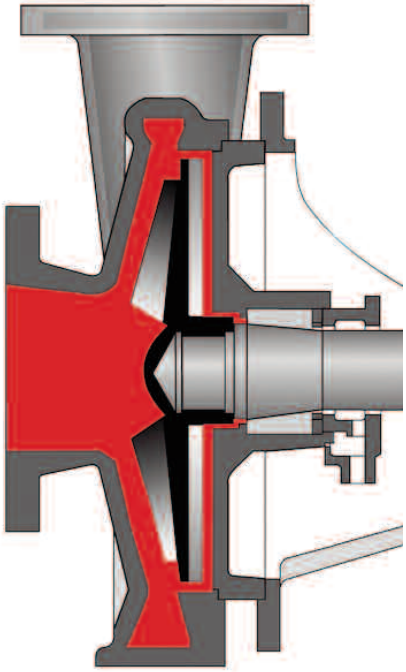
ALWAYS ON THE MOVE.

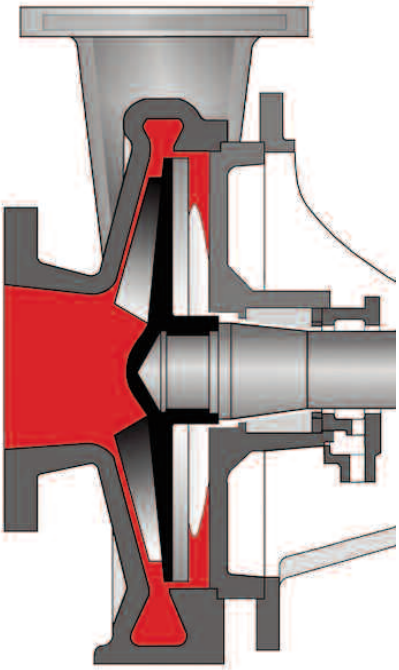
THE HYDRODYNAMIC SHAFT SEAL.

The hydrodynamic shaft seal is an almost forgotten but very effective principle. It is eminently suitable for operation with liquids loaded with solid material.

The hydrodynamically sealed pump has an impeller with back vanes and additionally, depending on the suction head, a high performance seal expeller/impeller. This exerts an equal pressure opposing the residual or pumping pressure.

The hydrodynamic shaft seal has the advantage of operating absolutely without any leakage. This advantage is retained even under severe operating conditions, for example when the pumping conditions are subject to extreme fluctuations.





PUMP IN IDLE STATE.

- Liquid in contact with the shaft seal (secondary sealing)
- selected secondary sealing (gland packing, mechanical seal) provides idle state sealing function

PUMP ROTATING.

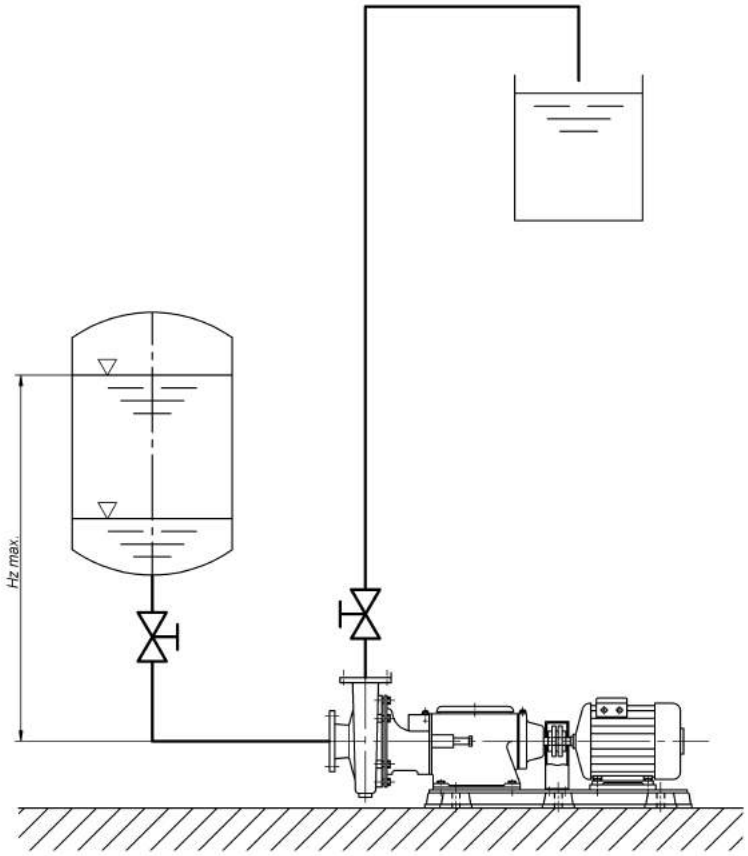
- No liquid is in contact with the secondary sealing
- the primary sealing operates hydrodynamically
- the back vanes relieve completely with respect to the pumping and conveying pressure
- the secondary sealing can be selected depending on the particular application
- the secondary sealing has optimum protection

FIT FOR PRACTICE.

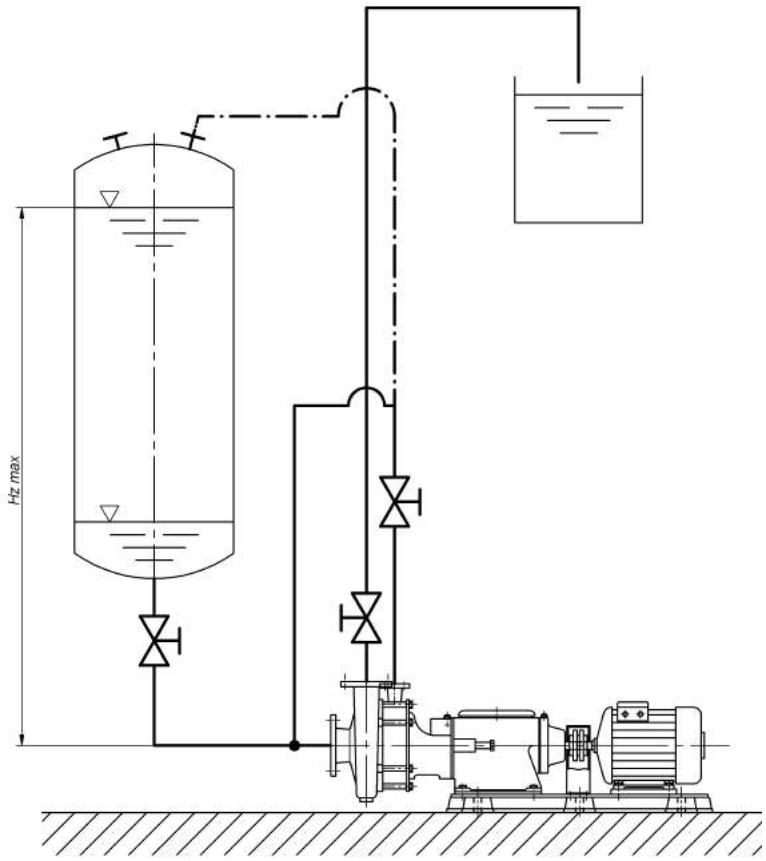
THE TYPICAL APPLICATIONS.

Pumps with hydrodynamic shaft sealing are the optimum solution for arduous genuine real practice. They are utilised wherever centrifugal pumps with conventional gland packing or mechanical shaft seals do not operate reliably or have only a short service life.

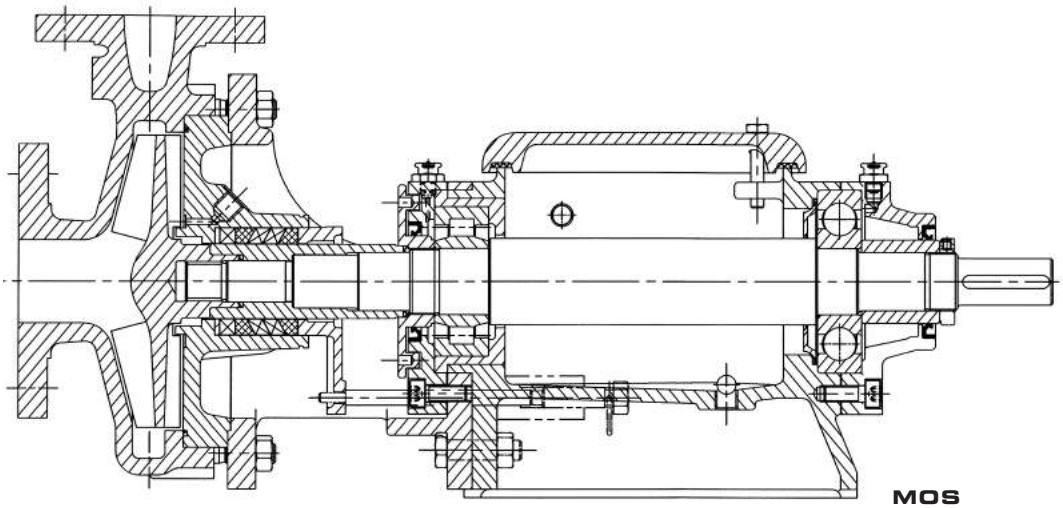
What are the liquids for which our high performance pumps are eminently suitable? For example ammonium nitrate, fertiliser suspension, iron oxide, ore slurry, gas scrubber liquids, gypsum suspension, molten urea, milk of lime, pulps, sodium hydroxide solution, phosphoric acid, sulphuric acid, starch milk, TSP slurry, titanium tetrachloride, titanium dioxide and zinc sulphate.



MOS
for small suction heads



UMOS
for large suction heads



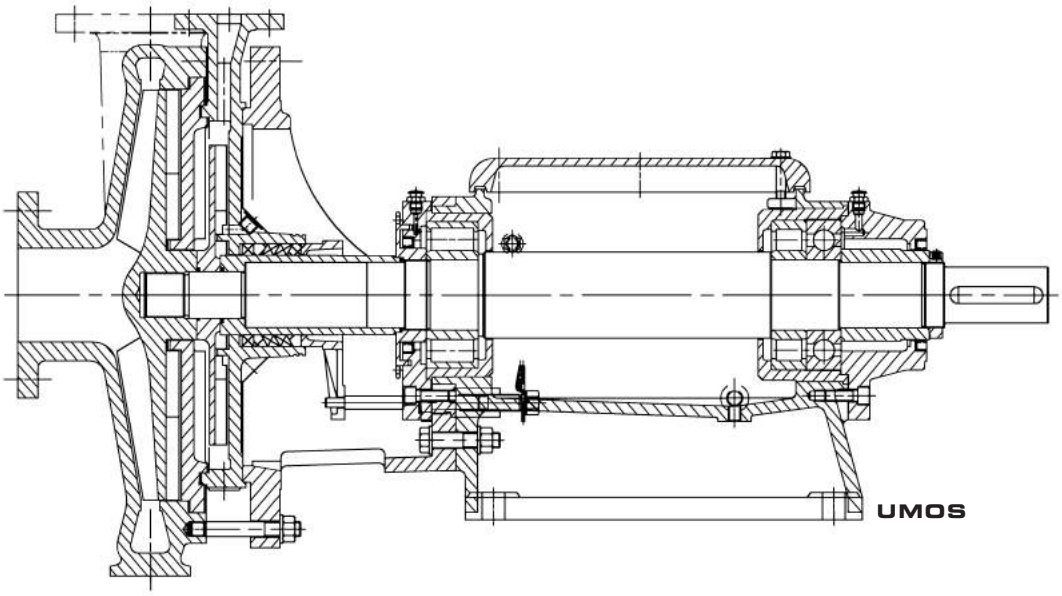
MOS

THEY MASTER ALL TASKS.

THE HORIZONTAL CENTRIFUGAL PUMPS MOS AND UMOS.

The centrifugal pump MOS is a versatile talented device. It is utilised in all industrial fields. It is sealed with the frictionless hydrodynamic shaft sealing system. A gland packing is located downstream.

MOS is the specialist for small suction heads. The back vanes of the impeller here constitute the seal expeller/impeller. The diameter of the back vanes is greater than that of the semi-open impeller to enable the former to take up the pumping and conveying pressure.



The centrifugal pump UMOS, like its companion model MOS, is an impressive multi-talented device. It, too, has demonstrated its capabilities in all industrial fields. UMOS is the right choice when greater suction heads and complicated pumping conditions are involved. For this pump, an additional seal expeller/impeller separate from the impeller was accommodated in a seal expeller casing with circulation nozzle. This circulation nozzlecan be connected to the suction line. This increases the dynamic sealing capability. Furthermore, the circulation prevents accumulation of solids and heating of the pumping liquid in the seal expeller casing.

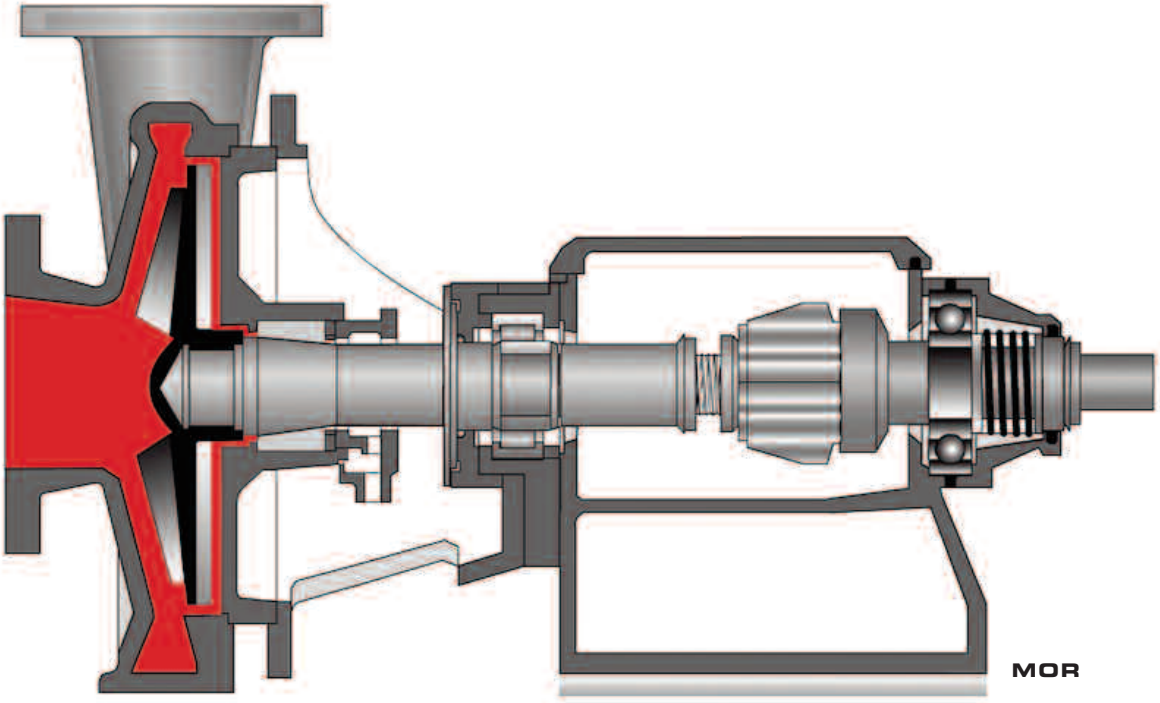
The UMOS gives excellent performance with severely contaminated media.

APPLICATION AREAS.

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

ADVANTAGES.

- no sealing liquids are required
- no leakages in operation
- capable of dry running
- suitable for solids
- robust and low wear and tear
- reliable and low maintenance requirements
- durable



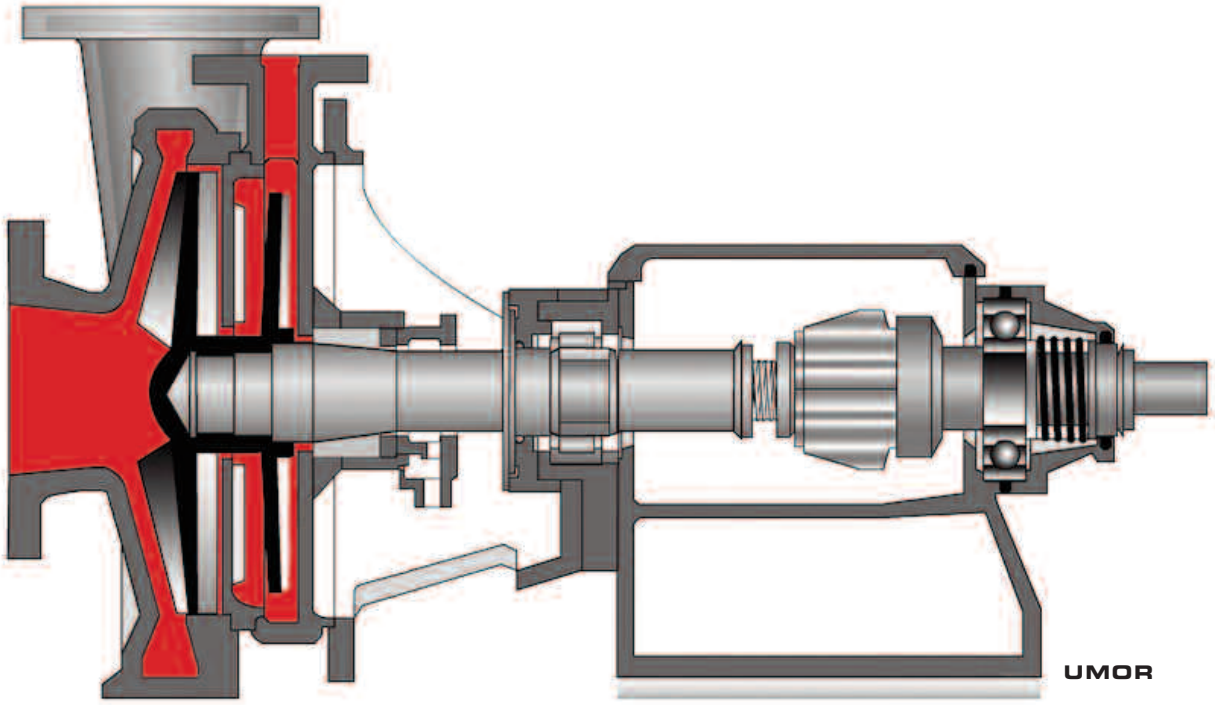
MOR

MORE THAN JUST FLEXIBLE.

MOR, UMOR AND THE CONICAL GLAND PACKING.

The centrifugal pumps MOR and UMOR are high performance devices: As variants of the models MOS and UMOS they are additionally equipped with a centrifugal governor. They are particularly suitable for media which require frictionless sealing.

The gland packing and the seal cone constitute the stand-still seal. When the pump runs up to operating speed, the centrifugal governor shifts the shaft to the pump side against the spring force. The seal cone thereby lifts off the packing. The shaft then rotates without friction on the packing. When the rotation speed decreases to stand-still, the spring pulls the shaft back to the motor side. The seal cone is then seated pressed into the packing. This is perfect flexibility.



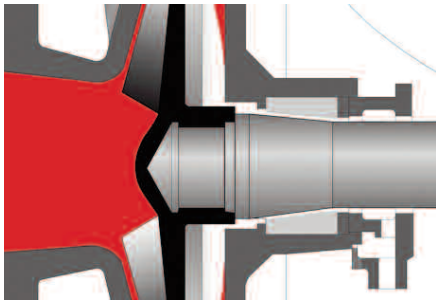
UMOR

ADVANTAGES.

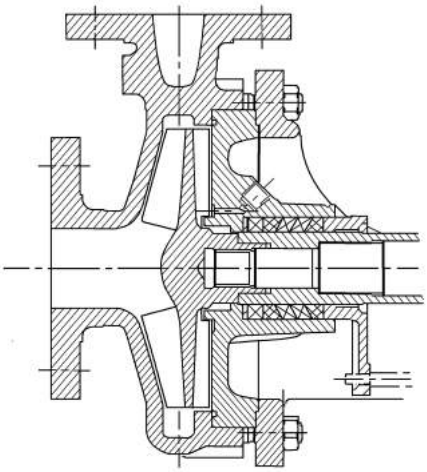
- continuous operation without any leakage
- no rubbing seal faces
- no sealing liquids are required
- capable of dry running
- robust stand-still seal
- seal governor well protected
- low maintenance requirements and cost saving
- especially suitable for ammonium nitrate and for liquids containing solids

DETAIL
CONICAL GLAND PACKING.

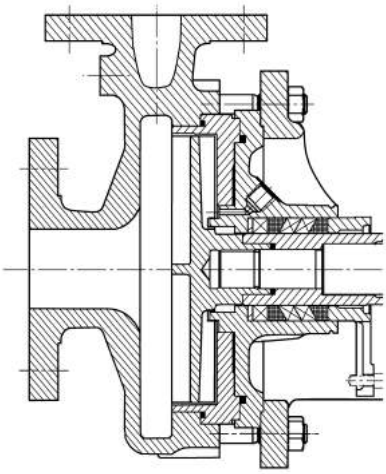
- in operation, there is a gap between the packing and the shaft sleeve
- frictionless
- no leakages in operation



CONICAL
GLAND PACKING



MOS/UMOS



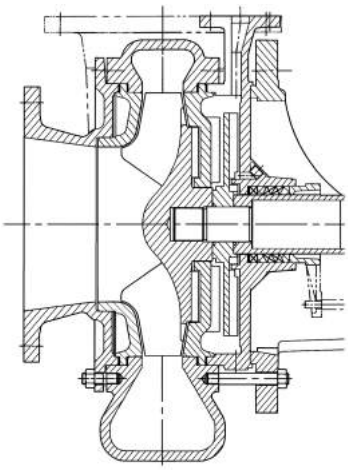
F-MOS/F-UMOS

MANY THINGS ARE POSSIBLE.

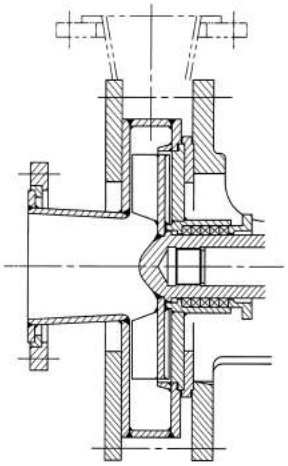
THE CONSTRUCTIONAL VARIANTS.

The hydrodynamic shaft seal gives high performance and provides impressive versatility. Its basic principle is compatible with all impeller geometries and material designs.

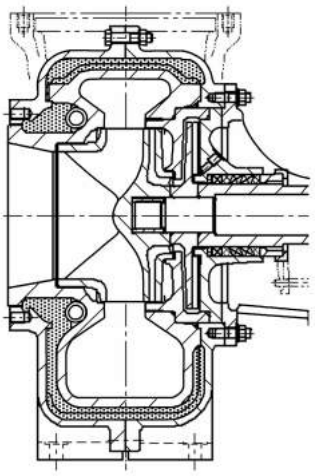
The sealing can be combined with various impeller types: open, semi-open as well as closed. That is not yet all. It works without problems with a wide diversity of sealing variants and numerous materials.



M-MOS/M-UMOS



SK-MOS/SK-UMOS



P-SI-MOS/P-SI-UMOS

MOS/UMOS.

- basic variant with cylindrical gland packing
- implementable in all stainless steel casting grades
- for low (MOS) and high (UMOS) suction heads

F-MOS/F-UMOS.

- with torque flow impeller
- utilisable with larger solid grain sizes

M-MOS/M-UMOS.

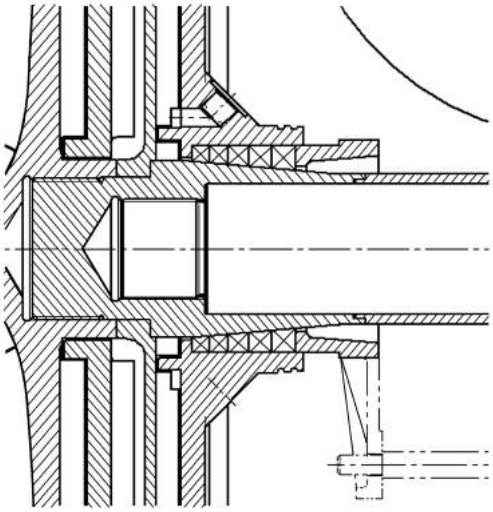
- with additional wear protection
- for high solid concentration

SK-MOS/SK-UMOS.

- welded construction made of special materials such as titanium and zirconium

P-SI-MOS/P-SI-UMOS.

- special construction with additional cast iron armour when using silicon iron castings



1

DEPENDING ON THE APPLICATION.

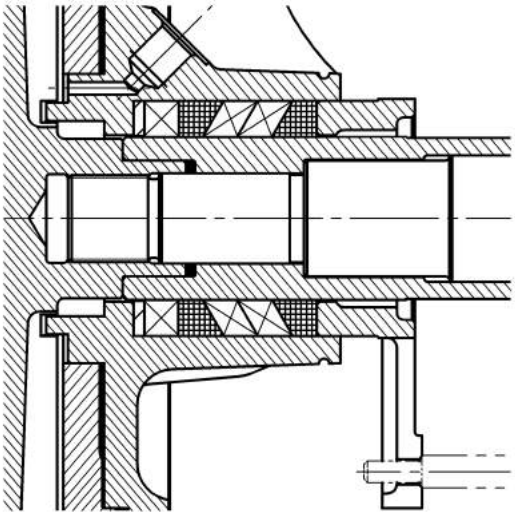
THE SEALING POSSIBILITIES.

The horizontal centrifugal pumps with hydrodynamic shaft seal are extremely flexible. They have shaft seals (secondary seals) which are fully matched for the particular application. This means: A specific kind of seal is recommended for each particular kind of application.

1 THE CONICAL GLAND PACKING WITH CENTRIFUGAL GOVERNOR.

The stand-still seal consists of the gland packing and the seal cone. When the pump is operating, the centrifugal governor shifts the shaft to the pump side against the spring force. The seal cone thereby lifts off the packing. The shaft then rotates without friction against the packing. When the rotation speed decreases to stand-still, the spring pulls the shaft back to the motor side. The seal cone is thereby pressed into the packing.

Advantages: The stand-still seal is extremely robust. There are no friction seal faces or sealing liquids. The centrifugal governor is protected. Further positive aspects: can run dry, keeps off solid particles, maintenance-free, cost saving and eminently suitable for ammonium nitrate.



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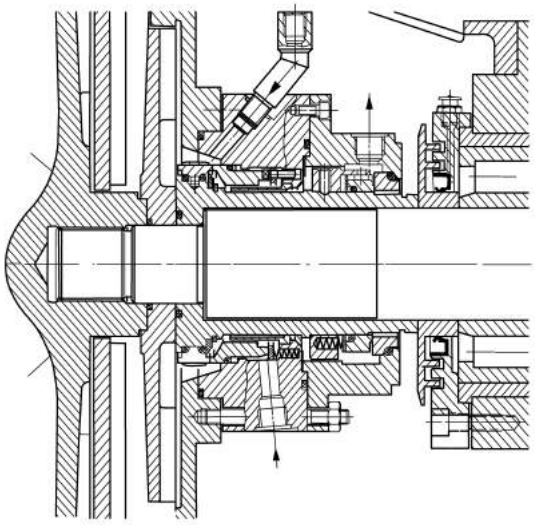


3

2 THE CYLINDRICAL GLAND PACKING WITH GRAPHITE INSERT.

This fulfils the secondary sealing function for centrifugal pumps in horizontal orientation. The primary sealing function is implemented hydrodynamically. In contrast to the blocked gland packing, the sealing function is here fulfilled with nearly no leakage, even in the idle state.

Advantages: The gland packing is self-lubricating with the graphite insert. The conversion is possible without dismantling the pump. And the flushing fluid? Not required.

3 THE DOUBLE MECHANICAL SEAL FOR LIQUIDS CONTAINING SOLIDS.

Serves as secondary sealing for horizontal pumps. Utilised for toxic media with high solid material content or for media which tend to crystallise or behave as adhesive. A hydrodynamic shaft seal is interposed upstream. This removes the pump feeding pressure from the sealing.

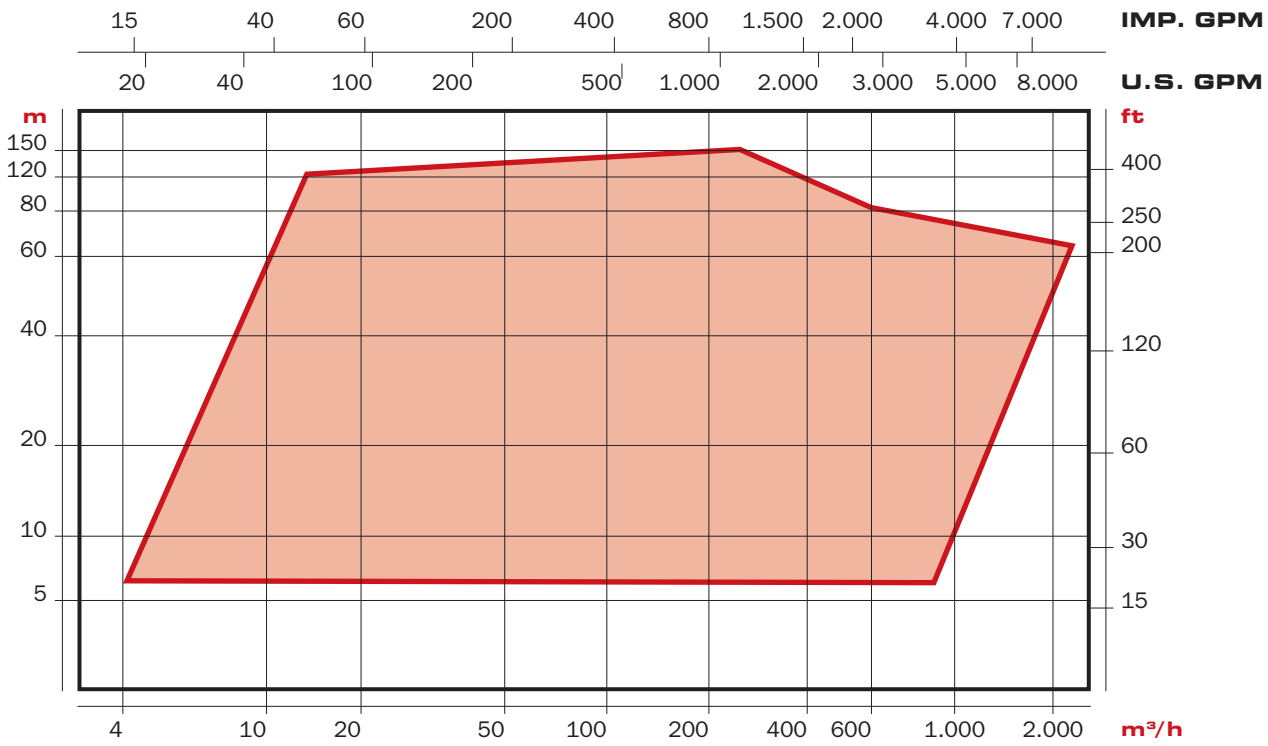
Advantages: The sealing pressure is low. And: The centrifugal effect of the back vanes rejects solids. It prefers to keep them away from the mechanical seal.

For extreme applications requiring particularly effective sealing we refer to our pump types MPCV **and** MPCH**DryRun with dry running magnetic drives.**

READY FOR EVERYTHING.

MATERIALS AND IDENTIFICATION FIELD.

To ensure that our centrifugal pumps perform their arduous and exacting tasks without any problems, it is also necessary to ensure that the materials of which they are made are of highest quality. Numerous high quality metallic materials are available for delivery. Special materials are also available on special request.



MATERIALS.

- Nearly all high alloyed stainless steels
- Proven special alloy steel grades from our own development
- Nickel based alloys
- Grey cast iron, gummed
- Stainless steel, titanium, zirconium, tantalum, nickel-based alloys

IDENTIFICATION FIELD.

Connecting dimensions	DN	32	—	400	mm
Capacities	Q	4	—	2.300	m³/h
Delivery Heads	H	7	—	130	m
Speed	n	750	—	3.600	rpm
Temperature	t	-20	—	280	°C
Performance	P	1	—	350	kW

SPECIALISTS AMONG THEMSELVES.

AN OVERVIEW OF THE CENTRIFUGAL PUMPS.

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

Downstream seals
for pumps with hydrodynamic relief of the shaft
- gland packing
- 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, gummed
- special materials such as titanium, zirconium, etc.

RANGE OF PERFORMANCE.

– Nozzle	DN	32 to 400 mm
– Capacities	Q	0 to 1.500 m^3/h
– Delivery Head	H	5 to 140 m
– Speed	n	750 to 3.600 1/rpm
– Pressure	p	-1 to 40 bar
– Temperature	t	-20 to 300 °C

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MOS_UMOS/08_e