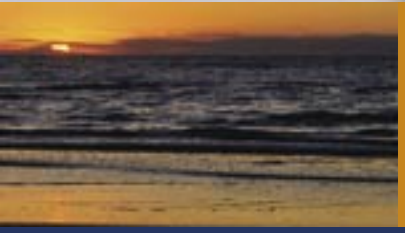
At Grundfos research and development at the highest level is an ongoing commitment that accounts for investment of more than USD 55 million a year. Grundfos was the first pump manufacturer in the world to be certified according to the ISO 9001 Quality Standard.

Today, all Grundfos production companies have been certified according to the 9000 Production Quality Assurance Standard. The current field failure rate for Grundfos SP pumps, motors and controls is less than 1%.

GRUNDFOS **SP**



Grundfos submersibles – the optimum solution

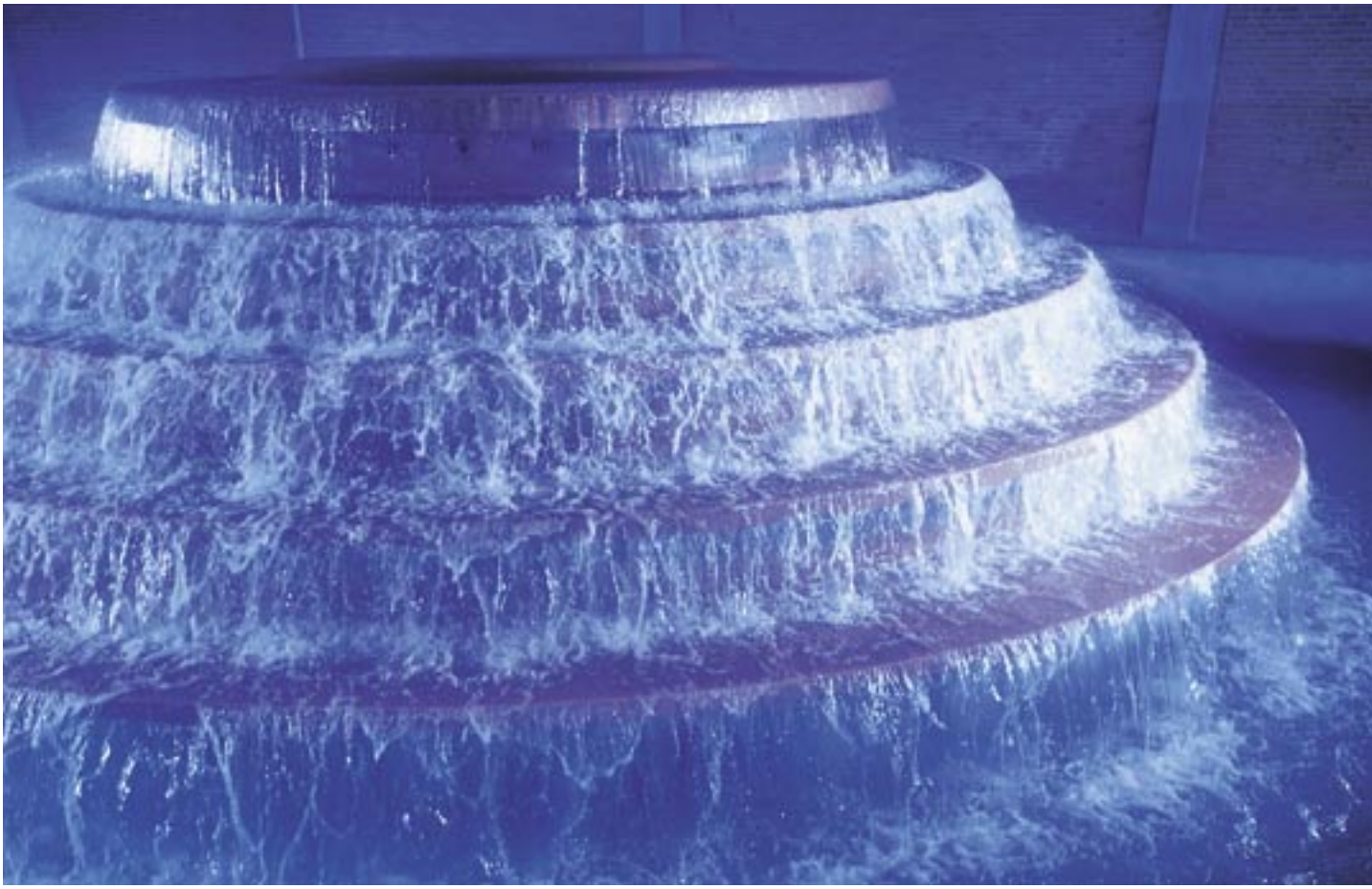
BE > THINK > INNOVATE >

GRUNDFOS

Grundfos SP – designed for a long working life underground

- Complete range of pumps and motors with flow rates of 0-475 m^3/h
- State-of-the-art hydraulics provide increased pump efficiency and reduced energy costs
- 100% high-grade stainless steel inside and outside provides maximum reliability
- Resistance to wear caused by sand and other abrasives
- Resistance to aggressive water
- Motor burnout protection
- Dry-running protection
- Monitoring and communication via CU 3 control unit for pumping system optimisation

Whatever your needs, the Grundfos SP range provides a highly efficient pumping solution



The Grundfos SP range of submersible pumps is well-known for high efficiency and reliability. Made entirely of corrosion-resistant stainless steel, the SP pumps are ideal for a wide variety of applications, such as raw water supply, pressure boosting, irrigation, and dewatering – in addition to a variety of industrial applications.

State-of-the-art technology

The Grundfos SP pumps are made of the very best materials and offer state-of-the-art hydraulic design. Built to deliver optimum efficiency during periods of high demand, the SP pumps provide low long-term operating costs and high operating reliability regardless of the application.

The Grundfos SP range offers unique user benefits such as high efficiency, high resistance to sand and other abrasives, motor burnout protection, and easy maintenance. In addition, a complete monitoring and control system is available for constant optimisation of the pumping system. In fact, no other submersible pump offers you as many advantages as you will get with an SP pump from Grundfos.

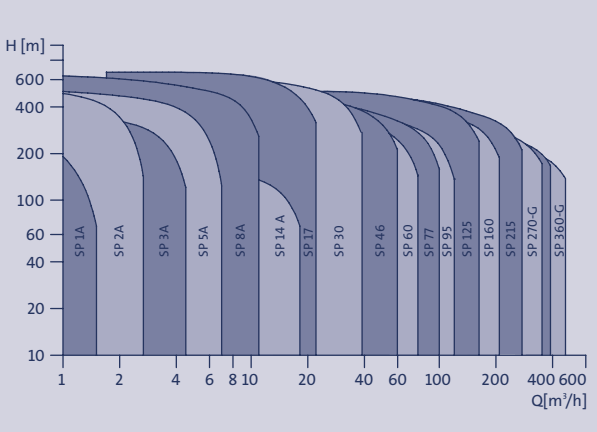
Meeting all your needs

The Grundfos SP range of submersible pumps comprises a large variety of models of 4, 6, 8, 10 and 12" diameter. With flow-rates up to 475 m^3/h and heads up to 670 m there is a Grundfos SP pump available for every specified duty point within this range.

Sand resistant materials and design
Most submersible pumps can run forever in clean cold water. In real life, however, groundwater often contains abrasives, such as sand, that – sooner or later – will wear out both pump and motor. In order to minimise wear and to provide maximum lifetime and optimum performance, the SP range is designed to let the suspended particles be flushed out of the pump with the pumped liquid. Both the chambers and the impellers of the SP range are made of high-grade stainless steel.

As standard, all Grundfos SP models are made entirely of stainless steel DIN W.-Nr. 1.4301 (AISI 304). Where particularly aggressive liquids are encountered, the SP pumps are available in extra high grade stainless steel DIN W.-Nr. 1.4401 (AISI 316), or, for severe conditions, DIN W.-Nr. 1.4539 (AISI 904 L).

Optionally, the pumps are available with all rubber parts made of Viton® for handling slightly contaminated water, such as, oil-containing water.



Grundfos SP performance range

Customised solutions

No standard range of pumps has a model for every conceivable application, but at Grund-fos we have made it our policy never to say no to a customer.

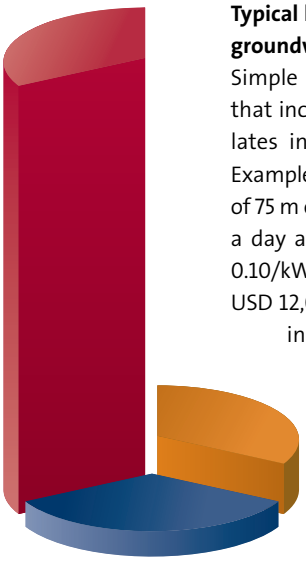
Consequently, in addition to the standard range of SP pumps we offer a number of customised solutions designed for special circumstances or unique operating conditions.

In close co-operation with you, our customer, we will analyse the actual problem without compromising our own high standards of reliability, performance, and serviceability. Most often the SP standard range will do the job, otherwise we will put our customisation "task-force" to work to develop a solution that meets your specific requirements.

Reduce your operating costs

The total cost of owning and operating a pump over its entire lifespan covers much more than just the initial cost – it covers the total sum of the Life Cycle Costs of the pump itself and the benefits of having a business relationship with Grundfos.

An important element of Cost of Ownership, as Grundfos defines it, is how we can help you drive down your operating costs by providing expert technical advice, thorough training, and reliable logistics. High pumping efficiency, reliable pump operation, and quick response to your service calls are other important aspects of – what all adds up to – your total Cost of Ownership.

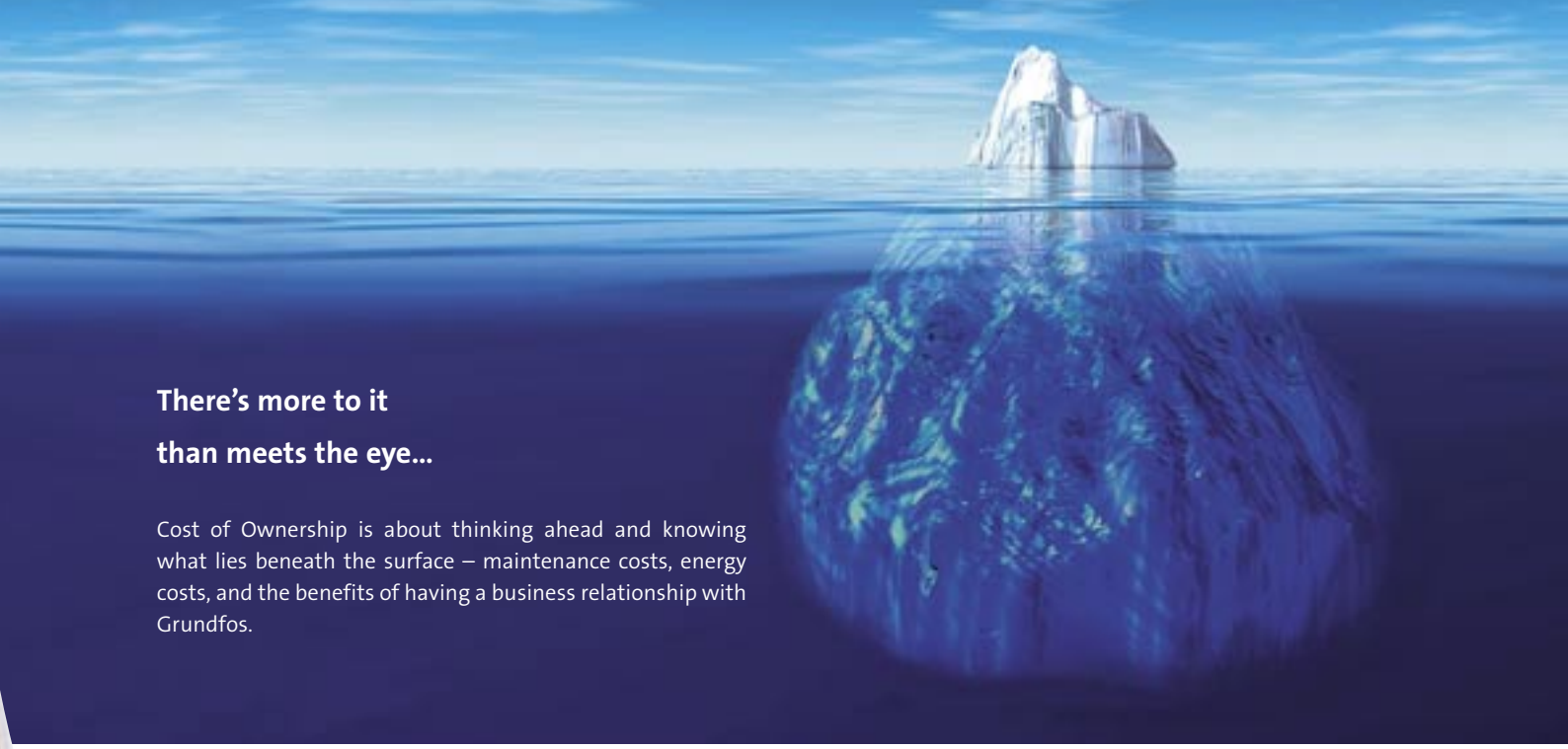


Initial cost 5 %
Maintenance cost 10 %
Energy cost 85 %

Typical lifetime cost-split for a groundwater installation
Simple calculations will demonstrate that increased pump efficiency translates into major, long-term savings. Example: Pumping 100 m^3/h at a head of 75 m over 10 years, operating 8 hours a day at an energy cost of, say, USD 0.10/kWh – a savings of approximately USD 12,000 can be achieved by choosing a pump with a 10% higher efficiency rate.

Grundfos WinCAPS for an optimised system selection
It all starts with the selection of the pumping system. In order to get the full benefit of the more than USD 55 million that Grundfos spends on research and development every year, the actual installation conditions must be fully analysed and a correct pumping system selection must be made to match those requirements.

The Grundfos WinCAPS is a highly advanced software tool designed to help our customers assess the wire-to-water efficiency and to compare the Life Cycle Costs between alternative pumping solutions.



There's more to it than meets the eye...

Cost of Ownership is about thinking ahead and knowing what lies beneath the surface – maintenance costs, energy costs, and the benefits of having a business relationship with Grundfos.

Operation analysis

Our specially trained staff can make a difference by supporting you to conduct a detailed examination of your pumping needs. The result will be a detailed operation analysis defining the precise specifications for your entire pumping system, based on your specific resources and requirements.

Maximum reliability

Reliability is an important overall parameter in system operations – and thus in Cost of Ownership assessment. The Grundfos SP pumps, motors and control systems are designed to provide maximum reliability under all operating conditions. This eliminates costly unscheduled shutdowns and ensures trouble-free operation at all times.

Keeping up performance

Made exclusively of stainless steel components, the Grundfos SP range offers high resistance to abrasives and corrosive agents in the pumped water. Contributing to this are features such as octagonal bearings and built-in sand shields, which ensure that particles are removed from the pump and motor by the water itself.

Erosion and corrosion of a pump mean loss of material and, consequently, a drop in performance and efficiency of the pump. In terms of Cost of Ownership, high efficiency of a brand new pump is useless if the efficiency starts to drop the moment the pump is brought into operation. Therefore, the Grundfos SP pumps are made entirely of high-grade stainless steel. This material ensures high efficiency and low energy costs during the entire lifetime of a pump.

In this context, it is important to remember that your Grundfos SP pump deserves a pipes system with very little resistance in order to benefit fully from the high efficiency of pump and motor developed by Grundfos.

The Grundfos WinCAPS contains complete information about all Grundfos pumps, including performance curves, drawings and installation and service information. An optimisation feature in WinCAPS enables you to fine-tune each important part in your pumping system and to find the most effective way of operation. Using the dimensioning features of the program, we help you to illustrate the consequences of changing parameters in the system or in the mode of operation.

Motors that make a difference

The highly efficient Grundfos MS and MMS motors, used for the Grundfos SP pumps, are rated among the very best in the market. These all stainless steel, water filled motors are available in two basic versions in a variety of sizes from 4" to 12".

Canned submersible motors are available in sizes up to 30 kW (40 hp), while the rewindable motors are available in sizes up to 250 kW (340 hp). In addition, a range of specially designed industrial versions that boost the efficiency a further 2-5% is also available. These models will have a noticeably longer operation life time.

High motor efficiency
When focusing on efficiency, remember that the motor is just as important as the pump. Hydraulic efficiency will not do it alone. This is why Grundfos has developed a complete range of highly efficient submersible motors that match the advanced hydraulics of the SP range.

Attention should also be attached to the submersible drop cable. Too small a cable reduces motor efficiency and may cause overheating of the motor. Grundfos, therefore, recommends max. 1% cable loss.

Motor burnout protection
Almost all motor failures that occur in submersible pumps are caused by too high motor temperature. The Grundfos SP range offers a failure rate of close to zero!

Reduced cable loss generates substantial savings
Experience shows that with a 75 kW submersible pump and a 75 m submersible drop cable, the savings generated by a 1% voltage drop (2 sizes bigger cable) compared to 3% drop will amount to no less than 112,800 kWh after 10 years of operation. This corresponds to USD 11,280 and a payback time of less than a year!

Monitoring

Motor protection and energy optimisation possible with remote monitoring facilities CU 3, SM 100, R100, and G100

Sensor

Temperature protection by means of Pt 100 sensor

Windings

Rewindable motor construction allows for low-cost motor repair that can be made locally

Efficiency

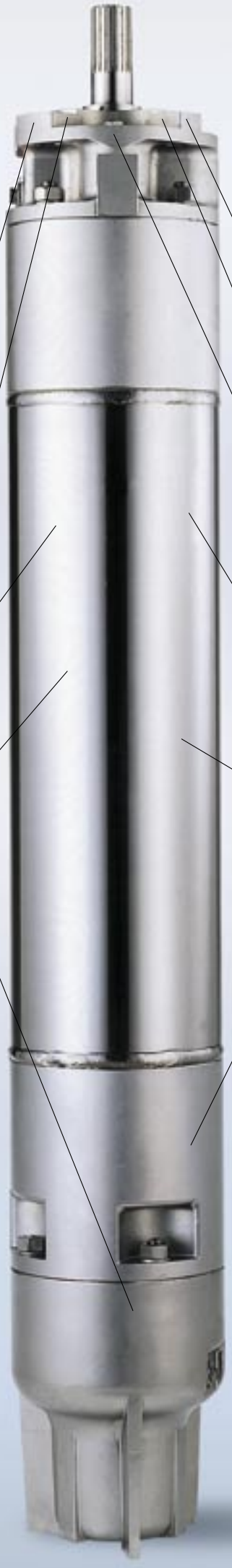
High efficiency provides energy savings

Thrust

High thrust capacity

Grundfos MS range

All-stainless steel, from 0.37 kW (0.5 hp) to 30 kW (40 hp)



Cable

Cable approved for drinking water

Earth cable

Inside or outside earth cable available

Shaft seal

High sand resistance with mechanical shaft seal in SiC/SiC. Also available in other materials and with lip seal

Warm water

Warm water version available with PE2 + PA wire

Contamination

Water filled motor design prevents water contamination

Corrosion

High-grade materials provide high corrosion resistance. Available in all stainless steel
DIN W.-Nr. 1.4301 (AISI 316),
DIN W.-Nr. 1.4539 (AISI 304 L) or
cast iron

Grundfos MMS range

3.7 kW (5 hp) - 250 kW (340 hp) for 50 Hz, and 3.7 kW (5 hp) - 190 kW (260 hp) for 60 Hz

Our goal is to put you in complete control

In order to get the full benefit of your high-efficiency Grundfos SP pump, operation must ideally take place at the top of the efficiency curve at all times. The time when a pump was installed and subsequently left to pump until it ceased to do so is over. A pump owner needs access to reliable pumping data in order to optimise pumping efficiency and energy consumption. Without data you are out of control.

By measuring cost per pumped volume of water (kWh/m^3) it becomes possible to operate at the best wire-to-water efficiency point and to give priority to those pumps that supply water at the lowest cost. Your analysis may also tell you that it is time to pull up the old worn out pump – or the wrongly selected pump – and replace it with a new high-efficiency pump, dimensioned specifically for the actual operating conditions.

With sensors installed in the borehole, the water table and cost per pumped volume of water can be measured.

As an example of why pumping data is important, operating with a drawdown in excess of 10 m may cause energy costs to rise by 25% or more. Without access to accurate and up-to-date data this situation may easily occur.

Online monitoring and control
The Grundfos CU 3 control unit, is an electronic motor protection device capable of monitoring the pump, motor and borehole performance via the handheld R100, remote control.

Optimum time for service or maintenance
Service and maintenance of a pumping system often take place at fixed intervals or, worse, only when the system no longer yields sufficient water. This is clearly not an optimum solution as the pumping operation may result in unnecessarily high production costs (kWh/m^3) for extended periods of time.

Only by continuous monitoring, ideally online, will it be possible to choose the optimum time for maintenance or service of the pump. This is normally the point in time when the savings resulting from the increased system efficiency, exceed the costs of the service.

In complete control
With sensors installed, the water table and cost per pumped volume of water can be measured. The CU 3 can also provide online communication, for example, of vital pump and motor data to a PC tool or to a monitoring system (SCADA), either directly or via the Grundfos G100 gateway and data logger.

The CU 3 control unit protects against:

- Dry-running and overload
- Operation against a closed valve or discharge pipe
- Insufficient flow of liquid past the motor
- Too high temperature of the pumped liquid
- Deposits on the motor
- Overvoltage or undervoltage
- Phase asymmetry
- The onset of motor failure
- Motor overheating or burnout