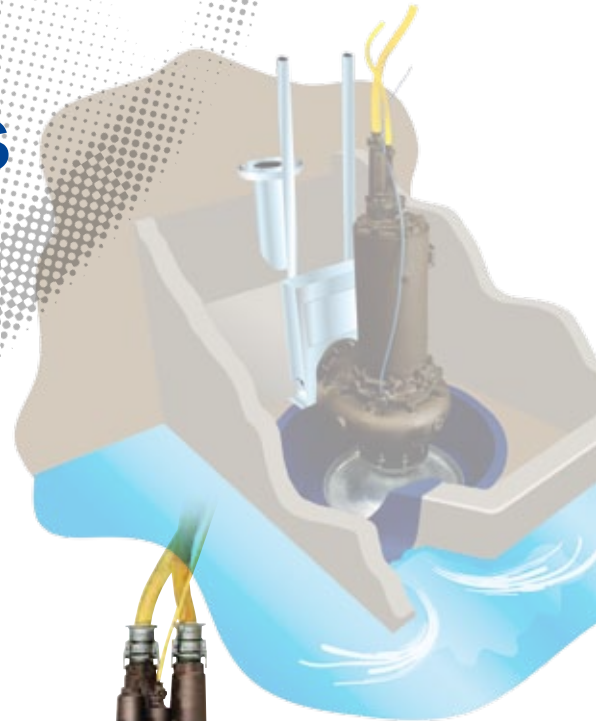


Submersible and Immersible Pumps for sewage & sludges



A range of quality pumps featuring the unique Hidrostal Screw Centrifugal Impeller. Models are available for fully, partially submerged or dry installation and designed for:

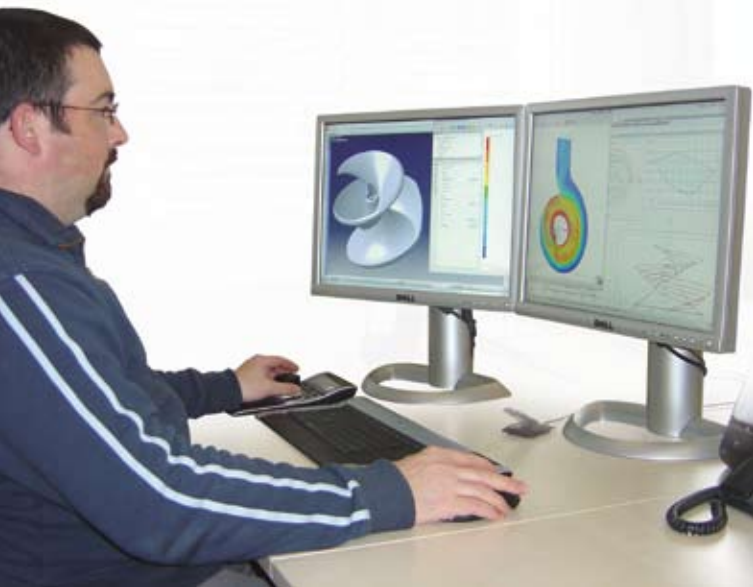
- **SOLIDS HANDLING**
- **VISCOUS PUMPING**
- **DELICATE HANDLING**

HIDROSTAL PUMPS...



This brochure provides an overview of Hidrostal's range of submersible and immersible pumps. The pumps are deployed in many industries worldwide in an extensive range of applications. Based on Hidrostal's unique screw centrifugal impeller technology the pumps also incorporate many other features exclusive to Hidrostal products.

Detailed product selection and installation advice can be obtained from Hidrostal's Engineers, or approved agents and distributors.



DESIGN PHILOSOPHY

Hidrostal's principles are to combine innovation with proven pump design, produce value for money products and to minimise life cycle costs (LCC).

Key design objectives are:

- Provide a range of solutions for many diverse applications
- Provide full flexibility by cross-generation compatibility. Sub-assemblies such as hydraulic ends, bearing frames and motors can be replaced by units of later technology.
- Flexibility to upgrade pump specifications to meet changing requirements.

LIFE CYCLE COSTING (LCC)

The Water & Waste Industry acknowledges that initial purchase price of a typical pump system represents only some 5% of a total 15-year LCC, which includes operation and maintenance costs.

Hidrostal asserts that unseen significant costs can potentially be incurred due to lost efficiency, unscheduled maintenance caused by full or partial blocking and not being 'fit for purpose'.

All Hidrostal pumps have exceptional solids handling capability and operating efficiency provided by the unique screw centrifugal impeller. The capability to handle sewage sludges up to 8% DSC and unscreened sewage without blockages makes Hidrostal pumps truly 'fit for purpose'.

Hidrostal equipment is easy to maintain. No special tools are required for dismantling, repair and re-assembly. Routine adjustments such as running clearances are simple.

INNOVATION

From the time Hidrostal designed the screw centrifugal impeller, innovation has been a key company culture.

Hidrostal submersible/immersible pumps include:

- Screw centrifugal impeller in all pumps
- Immersible motor with dry running or submerged capability. Oil cooling precludes issues with using pumped liquid as coolant.
- Cable entry assemblies seal motor avoiding leakage from inside or outside the cable.
- Variable pump output using fixed speed motor by prerotating liquids pre-pumping (see the Prerostal section on back page of brochure).
- Two speed submersible/immersible motors
- Externally adjustable high chrome liners resist wear and maintain optimum pump efficiency.
- Optional flywheel in motor enclosure reduces effects of pipeline surges which can lead to pipeline damage.



A typical flywheel installation, pumping raw sewage. 4 x Immersible pumps with 175KW motors and a duty of 300l/s at 35m head per pump.

The correct selection of pump for the design of the pump station is critical to Life Cycle Costing [LCC]. Hidrostal's Engineers, and their approved agents and distributors, can provide detailed information on selection and installation.

UNIQUE & DEPENDABLE

THE SCREW CENTRIFUGAL IMPELLER

The heart of all Hidrostal pumps. Extremely versatile in its applications, the impeller provides efficient handling of a range of liquids, often highly abrasive or corrosive in nature. It is ideal for:

- Solids Handling
- Pumping Viscous Sludges
- Handling Delicate or Low Shear Products

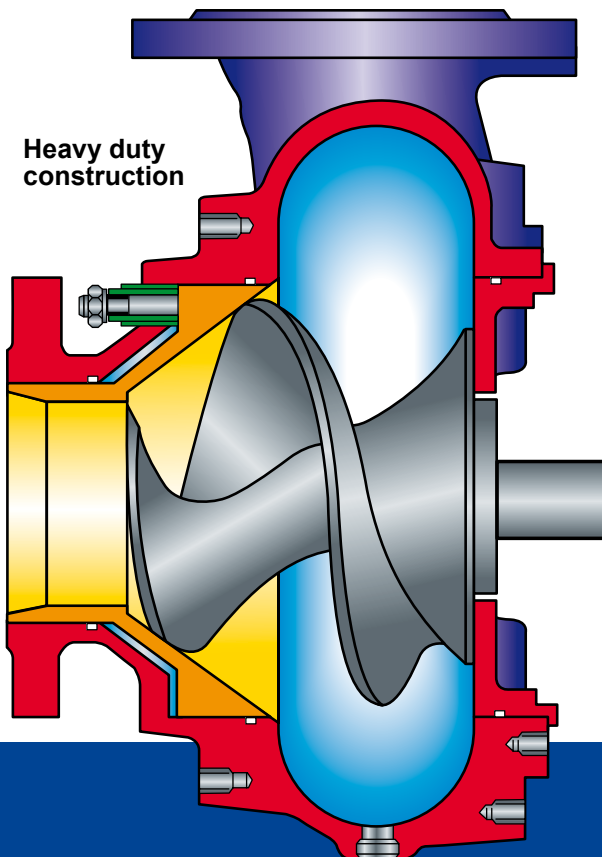
Unique to all Hidrostal pumps is the ability to handle the above in combination.

Many applications too arduous for other types of centrifugal pumps can usually be handled by the Hidrostal screw centrifugal impeller. The impeller comprises a single spiral vane, with large open passages, which makes a long slow turn from the axial inlet to the radial outlet. The design provides optimum hydraulic performance giving:

- High efficiencies
- Steep and stable hydraulic curve
- Non-overloading power curve
- Low NPSH
- Non-clog pumping

Typical applications:

- Industrial effluents
- Raw unscreened sewage
- Viscous sludges
- Return activated sludges
- Drainage/Stormwater
- Process Waste



PUMP CONSTRUCTION

The standard materials of construction are grey cast iron with a nodular iron impeller. The pump shaft is stainless steel. Alternative materials are available for increased wear and corrosion resistance.

MATERIALS

| Code | Pump casing | Impeller | Liner/suction cover | Motor casing cover |
|------|-------------|----------|---------------------|--------------------|
| 1 | CI | NI | CI | CI |
| 2 | CI | NI | HH | CI |
| 3 | CI | CM | HH | CI |
| 4 | CI | HH | HH | CI |
| 5 | SS | SS | SS | SS or CI |
| 6 | DS | DS | DS | DS or CI |

CI = Cast Iron

HH = Hidro Hard

SS = 316 St. Steel

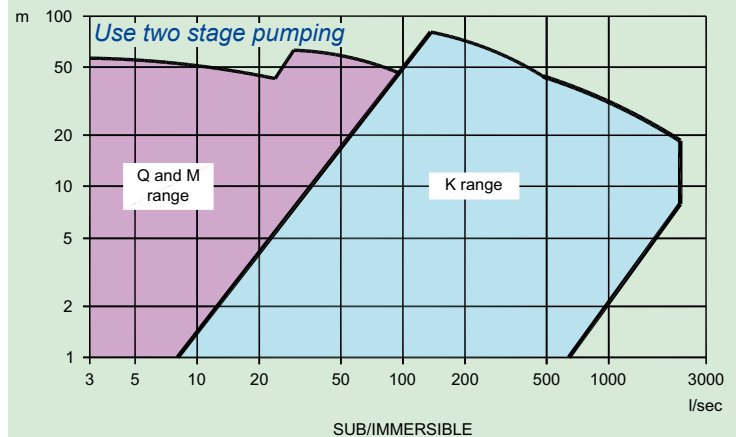
NI = Nodular Iron

CM = Cr. Mo Steel

DS = Duplex St. Steel

The above combinations are standard build, but components can be interchanged and other materials are available to suit specific applications.

PERFORMANCE



TWO STAGE PUMPING

First stage:

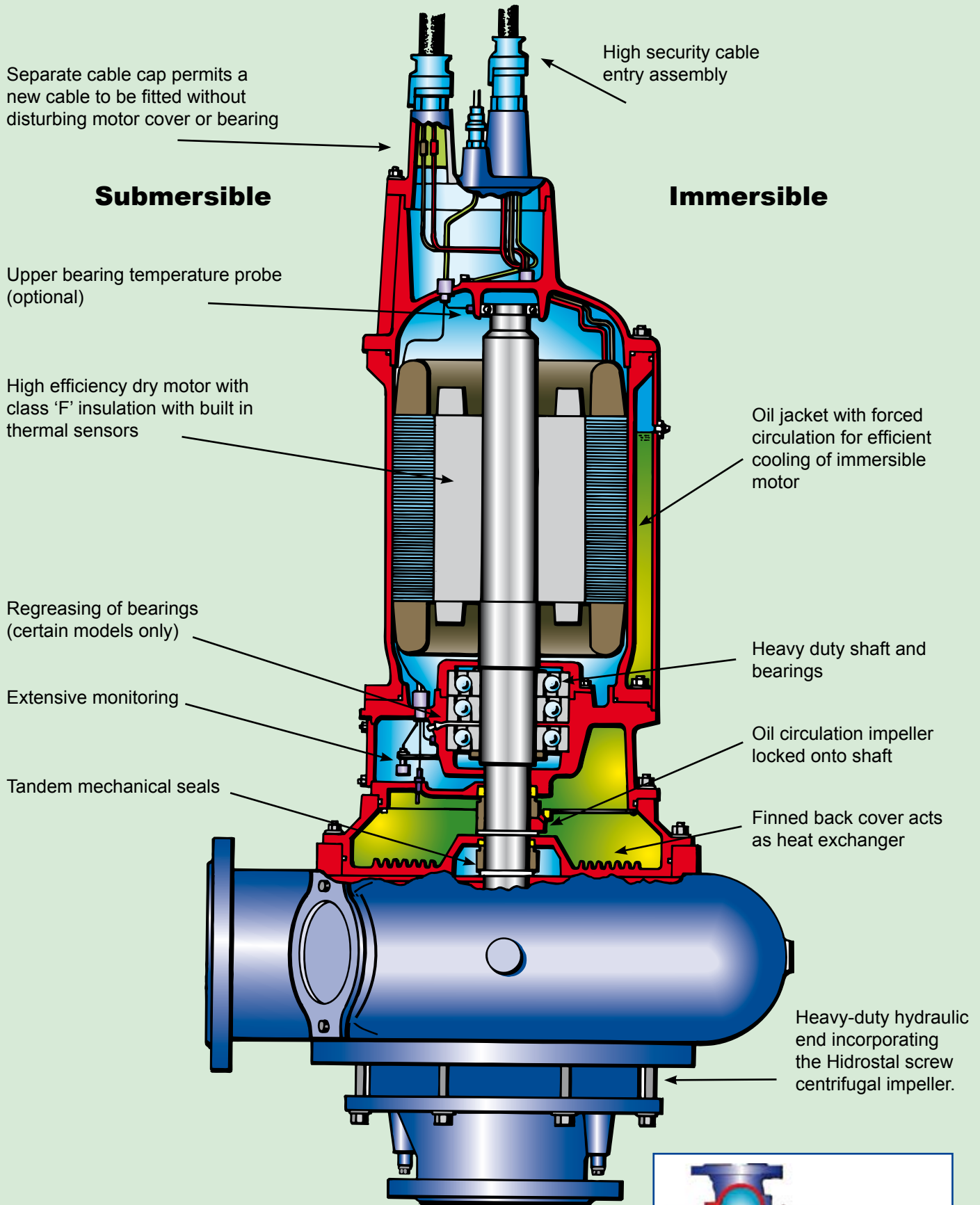
Submersible/immersion/end suction

Second stage:

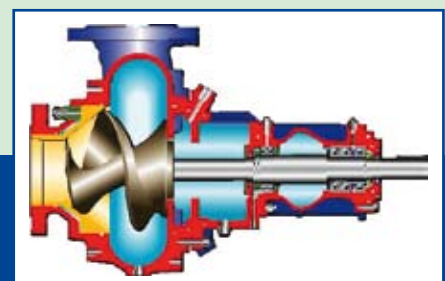
Immersion/end suction, horizontally or vertically mounted.

[Consult Hidrostal for specific proposals]

SUBMERSIBLE / IMMERSIBLE



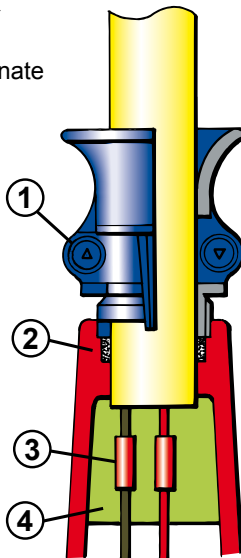
Also available with end-suction pumps for above ground pumping
[see separate brochure]



DESIGN FEATURES

MOTOR CABLE ENTRY

- ① Cable mechanically clamped to eliminate strain on sealing elements.
- ② Outside of cable is sealed by a compressed grommet.
- ③ Each cable conductor is isolated from the motor by copper dams which prevent moisture leaking through the interior of the cable in the event of cable damage.
- ④ Poured epoxy totally encapsulates each individual conductor and copper dam preventing moisture from entering the motor via the outside or inside of the cable.



Motors are shipped with free end of cable fitted with a waterproof sleeve.

COOLING

All immersible motors are efficiently cooled by oil, contained within a jacket, circulated around the motor, by an impeller locked to the motor shaft.

The oil transfers the heat to the pumped liquid, through a finned back cover between the pump and the motor.

The Hidrostral cooling method has advantages over other systems which circulate the pumped liquid through internal cooling channels which often become coated with sludge and slime, reducing the heat transfer and effectively derating the motor.

TANDEM MECHANICAL SEALS

Both seals run in an oil bath which lubricates the pump side seal faces in the event of dry running. The pump side seal has faces of tungsten carbide running against silicon carbide, effective for abrasive applications. For heavy-duty applications the pumpside seal springs are totally enclosed in a rubber boot or metal body depending on application. Motor side seals are of the open spring type with carbon/ceramic faces.

REGREASING OF BEARINGS

The lower bearing carries the axial thrust, the weight of the rotating unit and substantial radial loads. To fulfil its L10 design life, periodic regreasing is necessary on certain models. This is easily done by removing a watertight cover which exposes a greasing nipple.

The upper bearing carries a lighter load and does not require regreasing between major overhauls.

INVERTERS & SOFT STARTS

All Hidrostral motors can operate with inverters and soft starts, provided quality electrical elements of approved specification are used.

EXPLOSION PROOF MOTORS

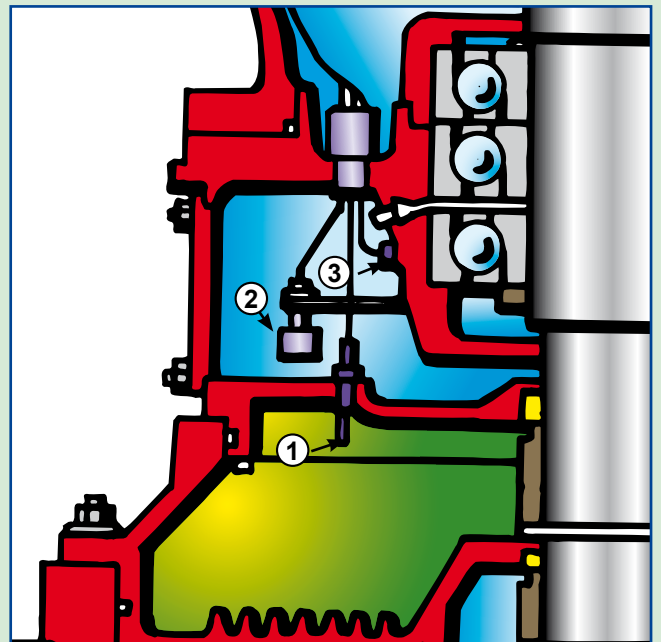
All 50hz motors are approved by ATEX for explosion proof application to 112G EExd11BT4 bzw and 112GEZxd[ib]11BT4.

TWO SPEED MOTORS

Dual wound, two speed, submersible and immersible motors are available to suit individual applications.

MONITORING MOTOR TEMPERATURE

Klixon type temperature sensors are built into the motor winding. Thermistors are available as an option.



① MOISTURE PROBE

Monitors the condition of the pump side seal by detecting water ingress in the cooling/seal chamber oil. An alarm is triggered when a significant amount of water has entered, indicating that the pump side seal should be replaced.

② FLOAT SWITCH

Detects any water or oil passing through the motor side seal which could cause failure of the lower bearing. This feature is standard on larger motors and an option on smaller versions.

③ BEARING TEMPERATURES

Most Hidrostral motors have an option of monitoring bearing temperature and on large motors thrust bearing temperature sensors are provided as standard.

SUBMERSIBLES

Pumps are heavy-duty construction designed to operate at depths of 30 metres, greater depths are possible with special designs.



GUIDE RAIL MOUNTED

For permanent installation and ease of maintenance, a guide rail mounting arrangement is available. Twin guide rails ensure the pump is guided to the discharge elbow and correctly locates in position to give a leak free connection.



FREE-STANDING OR PORTABLE UNITS

For applications where a permanent guide rail system is inappropriate, or a temporary arrangement is required, all Hidrostral submersible (and immersible) pumps can be used as free-standing or portable units.



AIR OR HYDRAULICALLY DRIVEN OPTIONS

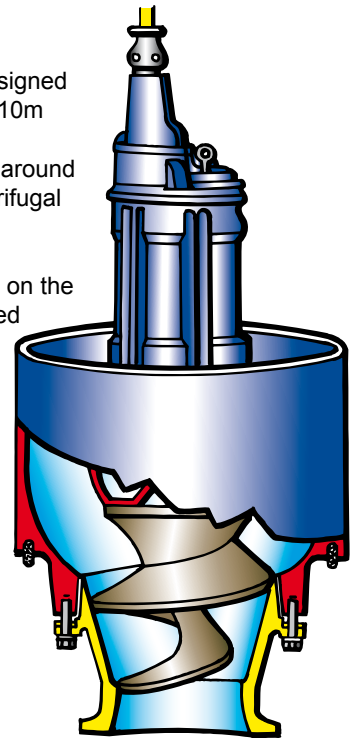
For applications where the use of electric submersible pumps is restricted by a lack of an electrical supply or a Zone '0' environment. Hidrostral can provide air or hydraulically driven portable or permanently installed units.

AXIAL FLOW TUBE MOUNTED

Hidrostral 'A' type pumps are designed for low head applications up to 10m and flows from 30 to 1,100l/s.

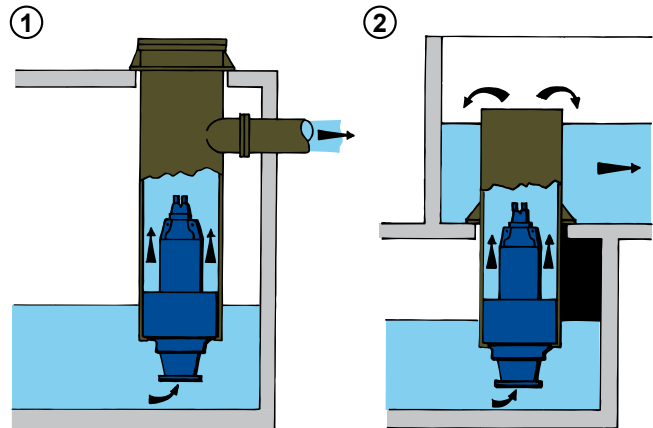
The axial pump range is based around Hidrostral's classical screw centrifugal impeller and standard range of submersible motors.

The difference is that the volute on the low pressure versions is replaced with a casing having an axial discharge enabling the pumps to be installed in a tube or concrete chamber.



TYPICAL APPLICATIONS

- Screened Sewage
- Stormwater
- Returned activated sludge
- Effluents
- Drainage water
- Oily water



- ① Pump mounted in steel tube with pipeline discharge.
- ② Pump mounted in steel tube. Top of tube acts as weir.
- ③ Pump mounted in concrete chamber with weir discharge.

The above mountings are the most common but many other arrangements are possible.



Non-clog performance - rags & solids handling, viscous pumping, gentle handling, low shear.

IMMERSIBLES

Hidrostal immersible pumps are a versatile, innovative development of the established submersible range. Capable of continuous operation in a dry installation, the immersibles may be operated, with equal efficiency, when fully or partially submerged.



The pumps are particularly suited for dry pit applications where the combination of the Screw Centrifugal Impeller and immersible motor can be considered the state-of-the-art technology. Leakage of the pumped product is eliminated by tandem seals running in an oil bath, avoiding a situation commonly experienced with soft-packed glands.

Hidrostal immersible waste water / sewage pump stations have frequently been mistaken for clean water stations, due to the lack of odour and the cleanliness of the buildings.

Immersible pumps are particularly suitable for installation where quiet running, clean surroundings, reliable and long trouble-free operation is required.



The pumps may be installed vertically or horizontally.

ADVANTAGES OF DRY PIT INSTALLATION

- Quiet running
- Cool exterior
- No leakage of product
- Compact, simple installation
- No exposed rotating shafts or couplings
- Pump easily opened for inspection
- Vertical or horizontal installation
- Clean odour-free waste water pump stations



ADVANTAGES OF WET PIT INSTALLATION

- Immersible pumps can be installed in the same manner as submersible pumps
- Liquid level can be drawn down to pump casing without risk of overheating the motor.
- Shallower sumps compared with conventional submersible pump installations.
- Full motor rating maintained when pumping sludge



OTHER APPLICATIONS

PREROSTAL™ AUTOMATIC FLOW MATCHING SYSTEM

A unique system, incorporating a Hidrostal immersible pump, which automatically adjusts its output to match varying inflows, using a fixed speed motor. The system also has the capability of automatically skimming and pumping floating materials, oil and greases, eliminating maintenance and reducing odour.

Standard, guide rail-mounted immersible pumps are positioned in such a way that they draw liquid from a specially designed basin having a tangential inlet. The geometry of the basin causes the liquid to rotate at the pump inlet at a rate determined by the sump level. Since output relates to the speed of the liquid rotation the pump automatically varies its delivery.



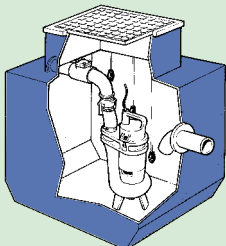
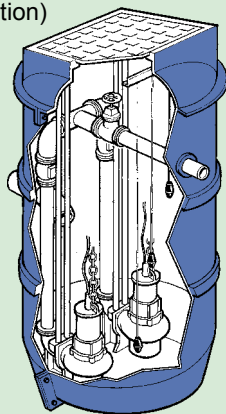
The Prerostal™ system is ideal for:

- Unscreened sewage (inlet pump station)
- Activated sludge return
- Industrial effluents
- Skimming of floating material

PACKAGED PUMP STATIONS

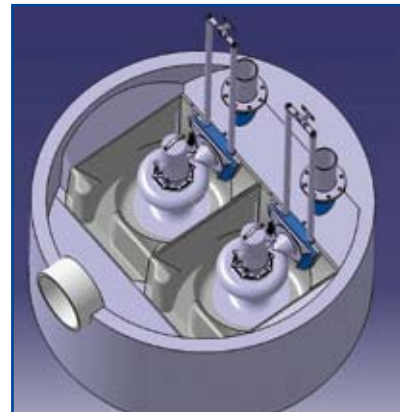
A range of fully self-contained pump stations available with single or twin Hidrostal submersible pumps, complete with pipework, valves and level controls. External valve chambers can be supplied as an option.

The pumps are installed in strong corrosion resistant chambers, suitable for burial underground and fitted with access covers. Special versions are available for mounting in dry areas such as cellars or basements.



PREROCLEAN SELF CLEANING SUMP

The Preroclean is a simplified version of the Prerostal, designed to eliminate sump maintenance and reduce odour. It combines the Hidrostal screw centrifugal impeller pump with a special basin arrangement to make the sump self cleaning. With the special sump geometry installed, the pump behaves exactly like a normal submersible pump until the sump level approaches stop level. At this point the sump geometry induces a strong rotating flow which entrains all floating materials including oils and greases and pumps them into the discharge system. The result is that on every pump cycle all the solids and floating material [fat, oil, etc.] is pumped out of the sump to the screen and because there is no build up of solids or fats in the sump, the pump does not block and is kept clean. The Preroclean is ideal for duties within effluent and industrial treatment processes.



VO₂ VENTURI AERATORS

VO₂ Venturi Aerators are driven by Hidrostal submersible pumps, and are available as freestanding, guide rail-mounted, or floating units, (can also be supplied externally mounted if required) providing an efficient and economic solution for the:

- Provision of oxygen for the biological treatment of polluted effluents
- Rejuvenation of oxygen depleted water
- Enhancement of chemical reactions
- Powerful mixing of tank or lagoon contents



Guide rail-mounted



Floating