

SCREW CENTRIFUGAL PUMPS



TYPICAL APPLICATIONS

- Industrial effluents
- Raw unscreened sewage
- Viscous sludges
- Return activated sludges
- Drainage/Storm-water
- Process waste
- Sump cleanup
- Bacterial Floc



KEY BENEFITS & FEATURES OF SCREW CENTRIFUGAL PUMP

High Efficiency - reduces power costs.

Clog-free Operations – true non-clogging operation not just marketing hype.

Gentle Action – prevents damage to delicate solids.

Steep Head-Capacity Curve – compensates for dynamic head changes without disruption of flow and prevents motor overloads.

Allows for low NPSH requirements – help to keep thick sludges and large solids moving as available suction head decreases thus lowering the cost of construction.

Positive suction flow – enables the pump to easily handle thicker sludges.

Externally adjustable suction liners – allow improved efficiency and reduced life cycle costs.

Abrasion resistant and corrosion resistant construction available – Hi-Chrome impeller and externally adjustable suction liner available.

Non-overloading power curve – flat horsepower curve throughout the normal operating range.

Reduced life cycle costs – reduce unscheduled maintenance costs.

Reliability – proven worldwide installations for over 50 years.



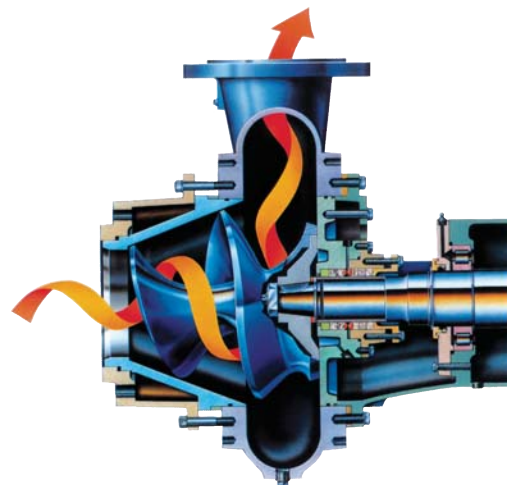
SPECIFICATIONS

- **Models:** 56
- **Discharge Sizes:** 2" to 28"
- **Suction Sizes:** 2" to 28"
- **Head:** 7 ft. to 240 ft.
- **Flow:** 30 gpm to 40,000 gpm
- **Horsepower:** 3 HP to 900 HP
- **Speeds:** 3600, 1800, 1200, 900, 720, 600 RPM
- **Materials:** Cast Iron, Ductile Iron, Hi-Chrome, Stainless Steel, Duplex

HIDROSTAL® PUMPS SCREW CENTRIFUGAL PUMP

HIGH EFFICIENCY

The centrifugal screw impeller with open channel design combines the clog-free features of a vortex pump and the high efficiency of a centrifugal pump. Smooth flow and low turbulence produced by the centrifugal screw impeller keep hydraulic losses to a minimum. The pump is able to handle large soft solids with efficiencies of more than 80%, whereas standard solid handling pumps normally run around 35%-50% efficiency.

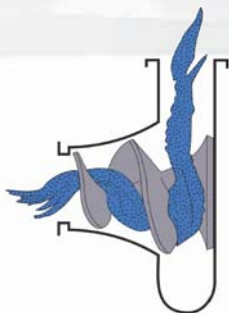


CLOG-FREE OPERATIONS

The large, open channel, from suction to discharge, produces highly efficient clog-free operation. The screw tip has a shoulder shield to prevent blade edges from hooking into solids such as long, fibrous materials (Fig.1).

So-called non-clog pumps, such as standard one-port or two-port, are not really clog-free because fibrous materials and solids can hang up on the impeller vane edge as they enter the suction (Fig.2). What's more, material must make an abrupt 90° turn between the inlet and discharge. Large, irregular objects can lodge here and cause clogging and possible mechanical damage if not quickly freed.

FIGURE 1



Rags and fibrous materials can't hang up

FIGURE 2

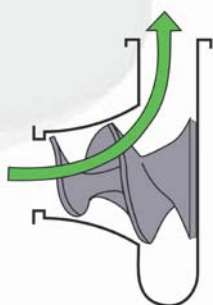


Rags and fibrous hang up on leading edge

GENTLE ACTION

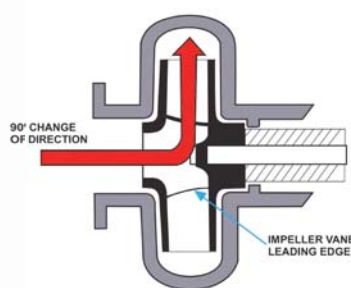
Material enters the pump at a low entrance angle where it flows through a smooth, open channel to the discharge without any abrupt changes of direction (Fig. 3). This gentle action enables fragile material to move through the pump without damage. Vane pumps cannot provide this gentle handling because of the abrupt 90° turn and high turbulence that the material encounters (Fig. 4).

FIGURE 3



Gentle change in flow direction

FIGURE 4



Abrupt 90° change in flow direction

The head produced by the Hidrostal Pump drops or climbs very quickly as flow rates change, thus resulting in a steep slope. This type of performance is ideal for most applications.

As liquid levels vary or sludge consistency changes, the system head curve changes and the pump has to operate on a different portion of its head capacity curve.

When the Hidrostal screw centrifugal pump encounters system head changes, capacity changes are small, as shown on the curve.

If a blockage occurs in the pumping system's discharge piping, the normal system head curve steepens due to the large pressure resistance. With normal non-clog (vortex or vane) pumps, there is a very small head reserve between the normal flow rate and pump shut-off with which to dislodge these blockages.

However, the Hidrostral pump, with its steep head-capacity curve, offers a large head reserve which is often enough to blow out the blockage without having to rod or pig lines.



The horsepower curve of the Hidrostaal pump is relatively flat throughout the normal operating range and in many cases actually begins to drop as capacity increases. This is because the head drops more quickly than the flow increases. Less work is therefore being done by the pump, so the HP requirement is reduced and thus the associated costs. It is impossible to overload the motor when the capacity increases due to a drop in head, so interruptions in pumping due to motor overload are prevented.

Most vane and vortex pumps have constantly rising HP curves. Motors selected for specific operating points can become overloaded with a drop in head, and the only protection is to buy an oversized motor. Combined with the larger electrical starting equipment and service necessary to run this large motor, the capital and total lifetime of these pumps can be significantly more than the Hidrostal screw centrifugal pump.

ALLOWS FOR LOW NPSH REQUIREMENTS

NPSHR (net positive suction head required) is the minimum absolute pressure required to keep a pump performing effectively. The Hidrostaal pump has one of the lowest NPSH requirements of any centrifugal pump. The reason is its screw/centrifugal impeller produces a smooth, low-turbulence flow which gradually builds pressure without sustaining the high entrance losses usually associated with normal high-turbulence pumping.

The screw portion of the impeller actually acts as a suction inducer, but unlike ordinary pumps, it can handle large solids.

Low NPSH requirement helps to keep sludge moving as available head decreases. This is a substantial economic benefit because it doesn't require additional construction or special installation to elevate the liquid source to meet a pump's minimum NPSH requirements.

Applications: Hot Liquids, Low vacuum suction sources, Liquids near vapor pressure, Heavy sludges or paper stock, and Stripper bottoms.

POSITIVE SUCTION FLOW

The corkscrew action of the screw impeller plus its low NPSH requirements provide the suction flow necessary to start sludge pumping and keep it pumping. In addition, the steep head-capacity curve makes it possible to pump sludges of widely varying consistencies without changing speed. It also provides reserve head for dislodging temporary line blockages. Positive displacement pumps may be ideal for handling thick sludges, but they are expensive and have problems with solids - usually requiring grinders in front of the pump. They are impractical for high-volume pumping and require extensive maintenance. While vane pumps can handle some sludges, their capabilities are limited by the following factors:

- Relatively high NPSH requirements make it difficult to start sludge moving and keep it moving.
- Relatively flat head-capacity curves can't provide the reserve head necessary to compensate for changes in sludge consistency.

Applications: Paper mill wastes, Municipal & Industrial sludges, Viscous materials and medium density pulp stock.



EXTERNALLY ADJUSTABLE LINERS

The clearance between the impeller and suction liner is a factor in any pump's performance and must be adjusted at intervals to compensate for wear. Hidrostal's optional adjustable liner easily does this by means of three external regulator screws. Other pumps lacking this feature must rely on shims between the case and suction piece. Those who have to maintain large pumps or pumps in abrasive service will especially welcome this feature.

ABRASION RESISTANT CONSTRUCTION AVAILABLE

Standard construction consists of cast iron pump casing, liner/suction cover and motor casing cover and ductile iron impeller. For abrasive applications, the impeller and adjustable suction liner are available in Hi-Chrome iron. Also stainless steel construction along with other special materials available upon request.

Applications: *Most gravity-thickened sewage sludges (except secondary), Sewage and stormwater, Lift stations handling high infiltration load, Lagoon sludges, Most vertical applications, Most horizontal applications with 6" or larger pumps sizes and Wood room, bark or chip operations.*

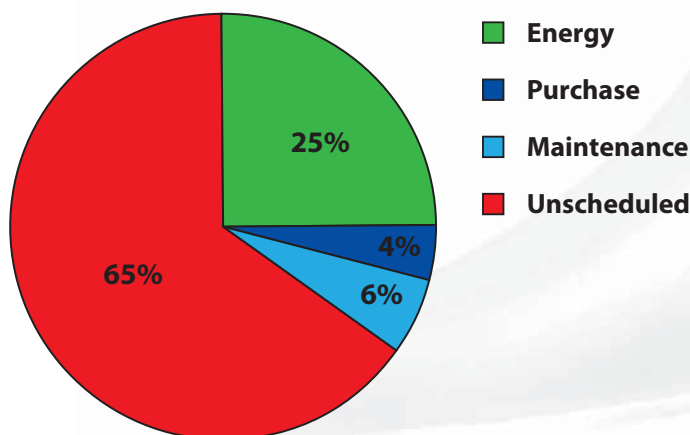
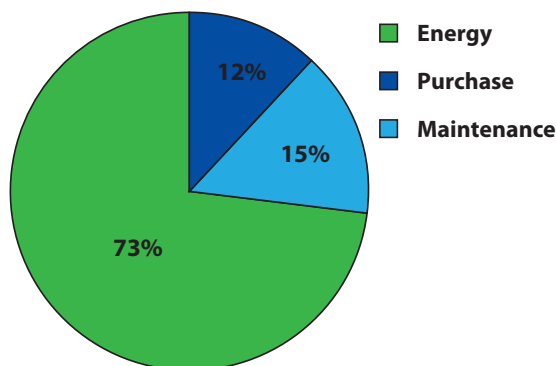


REDUCED LIFE CYCLE COSTS

A common mistake is to assume that maintenance costs apply purely to routine maintenance and spare parts. The reality is that unscheduled maintenance, caused by blocked or partially blocked pumps and premature failure or leaks at mechanical seals, can incur the greater costs. The impact of flooding, environmental issues, loss of output and consequential damages can have a detrimental effect on the company's brand as well as expenditure!

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.



The Bearing Frame Pumps offer robust construction and long reliable service for both vertical and horizontal mounting. The standard construction has grease lubricated bearings, oil lubrication can be provided on horizontal units to meet the requirements of the process industries.

The bearing housing is of modular construction, permitting various arrangements mechanical seal or soft packing to be used. The shaft end bearings have been selected to be used with belt drives and yet maintain long bearing lives.

Advantages:

- Direct access to the pump and to the monitoring devices.
- Maintenance in a clean environment.
- Commercially-available drive elements can be used.
- Robust construction for smooth operation.
- Back pull-out design means the complete rotating unit can be simply withdrawn for inspection and maintenance of the hydraulic end.
- Heavy duty bearings for superior L10 bearing life.

HORIZONTAL PUMP MOUNTING OPTIONS



DIRECT CONNECT

- Fabricated steel base, couplings, fabricated steel guard.



BELT DRIVE SIDE BY SIDE

- Fabricated steel base, v-belts, fabricated steel guard.



BELT DRIVE OVERHEAD

- Fabricated steel base, v-belts, fabricated steel guard.

BELT DRIVE PIGGYBACK OPPOSED

- Also available but not shown.

VERTICAL PUMP MOUNTING OPTIONS

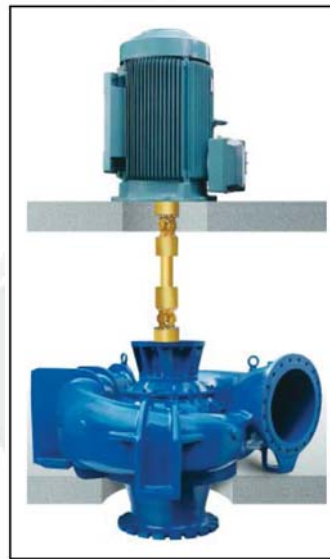


VERTICAL PUMP SUPPORT

- Fabricated steel support with a cast iron long radius suction elbow.

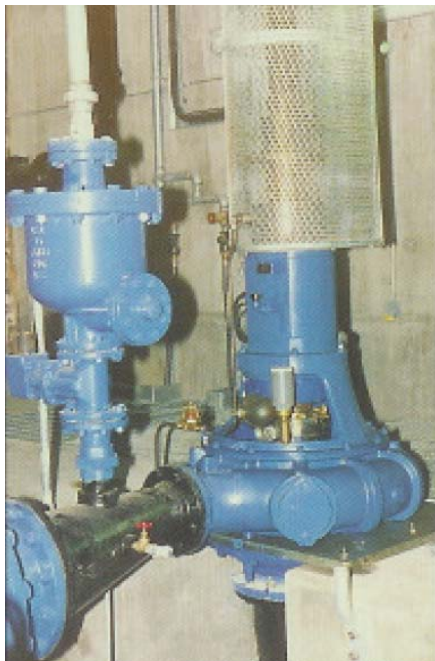
VERTICAL SUPPORT ELBOW

- Also available but not shown.



VERTICAL EXTENDED SHAFTING

- When motor location requires remote mounting at higher elevation due to space requirements.



VERTICAL PIER MOUNT

- Fabricated steel baseplate on concrete piers.



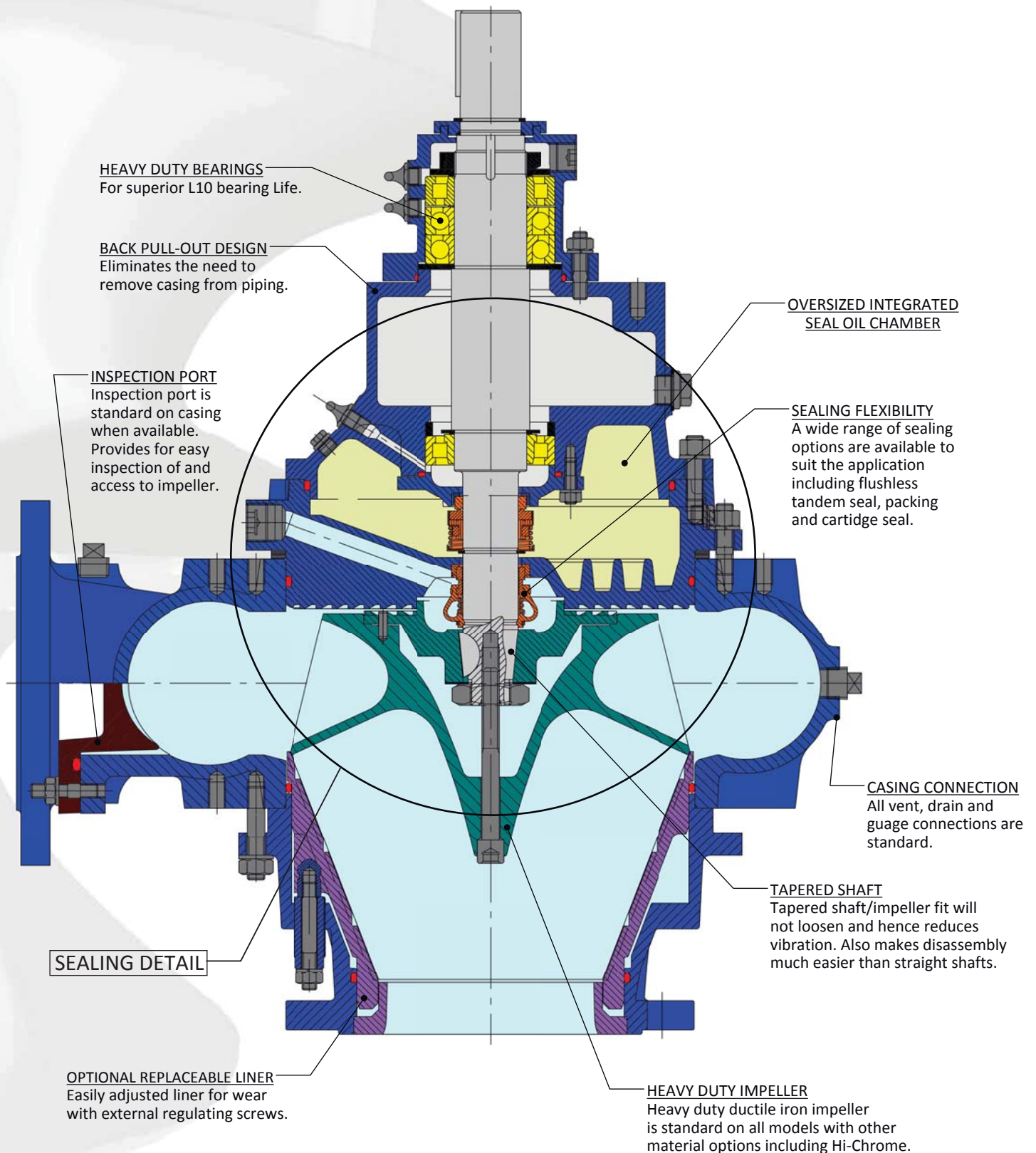
VERTICAL SUCTION STAND

- Rectangular box with special geometry and center mounted inverted cone to smooth inlet flow and reduce turbulence.

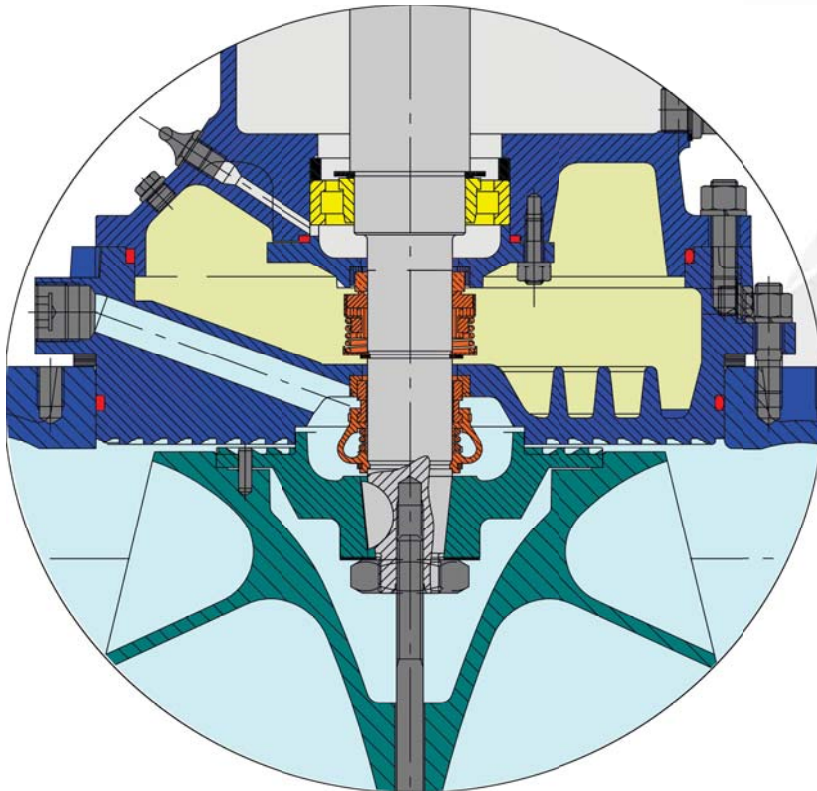
VERTICAL PIER MOUNT & SUCTION STAND

- Also available but not shown.

DESIGN FEATURES



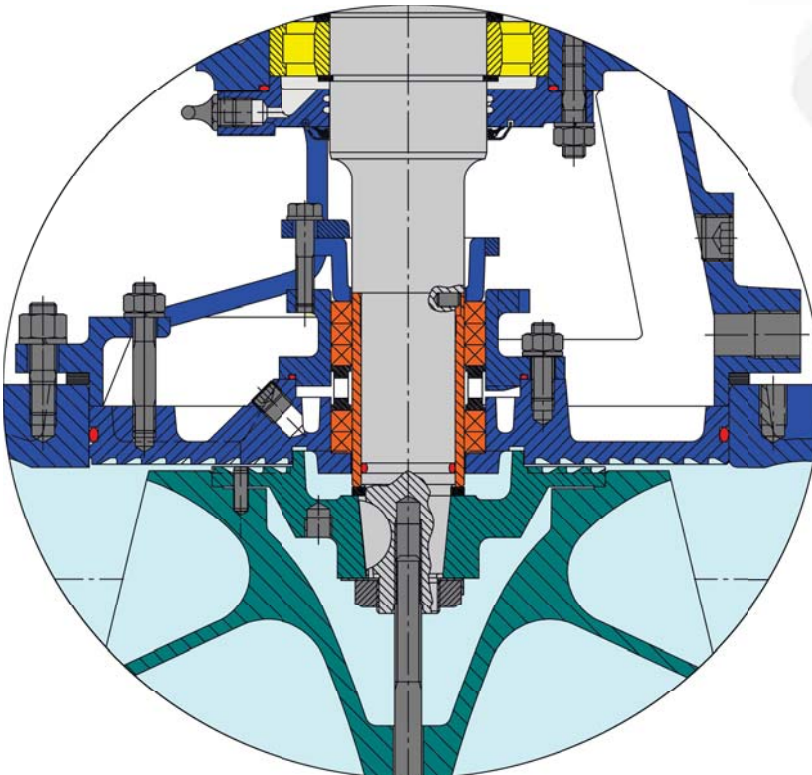
FLUSHLESS TANDEM SEAL DETAIL



HIDROSTAL FLUSHLESS TANDEM SEAL

Flushless tandem mechanical seal with a sealed oil chamber maintains optimum mechanical seal environment.

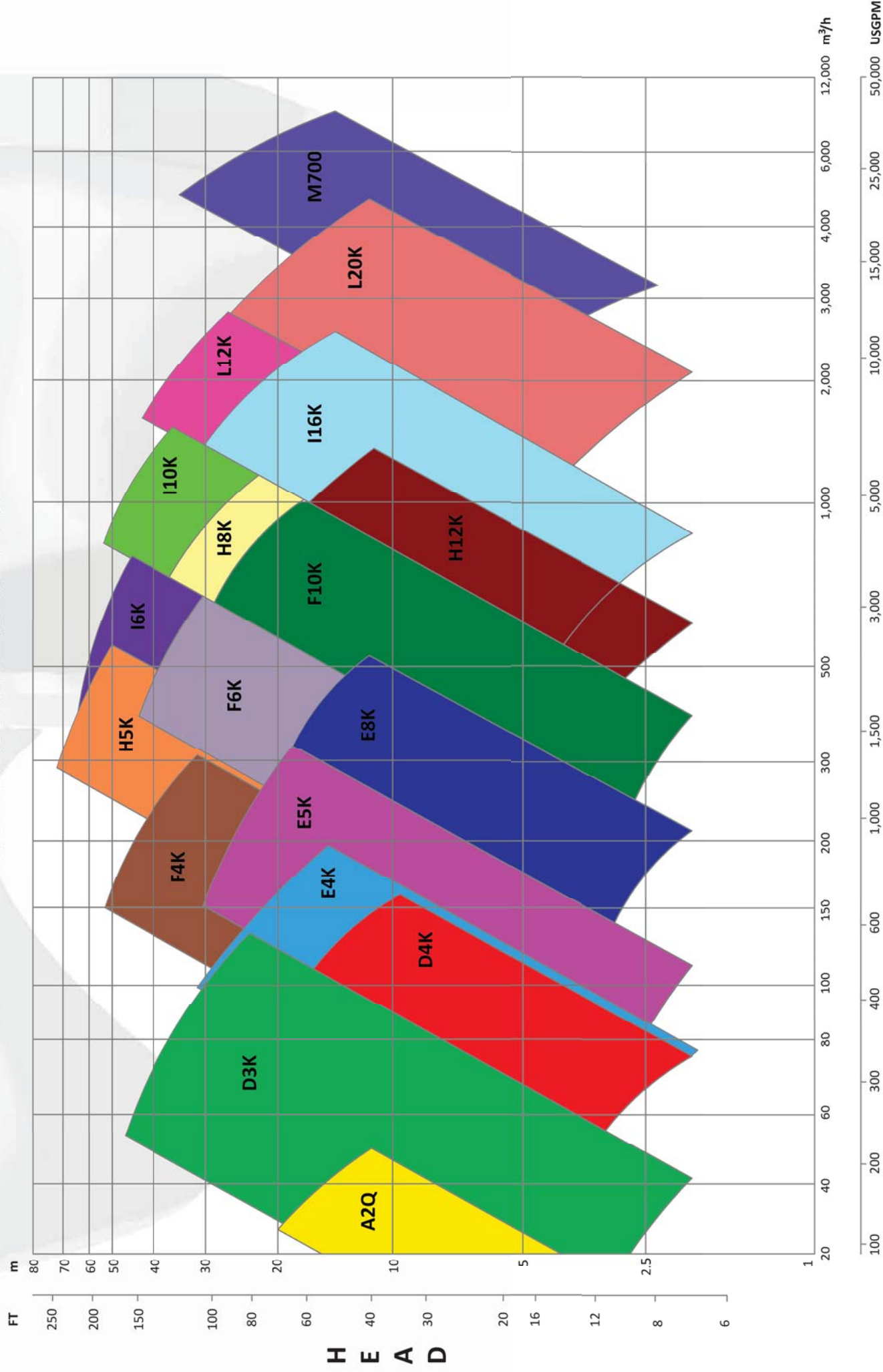
PACKING DETAIL



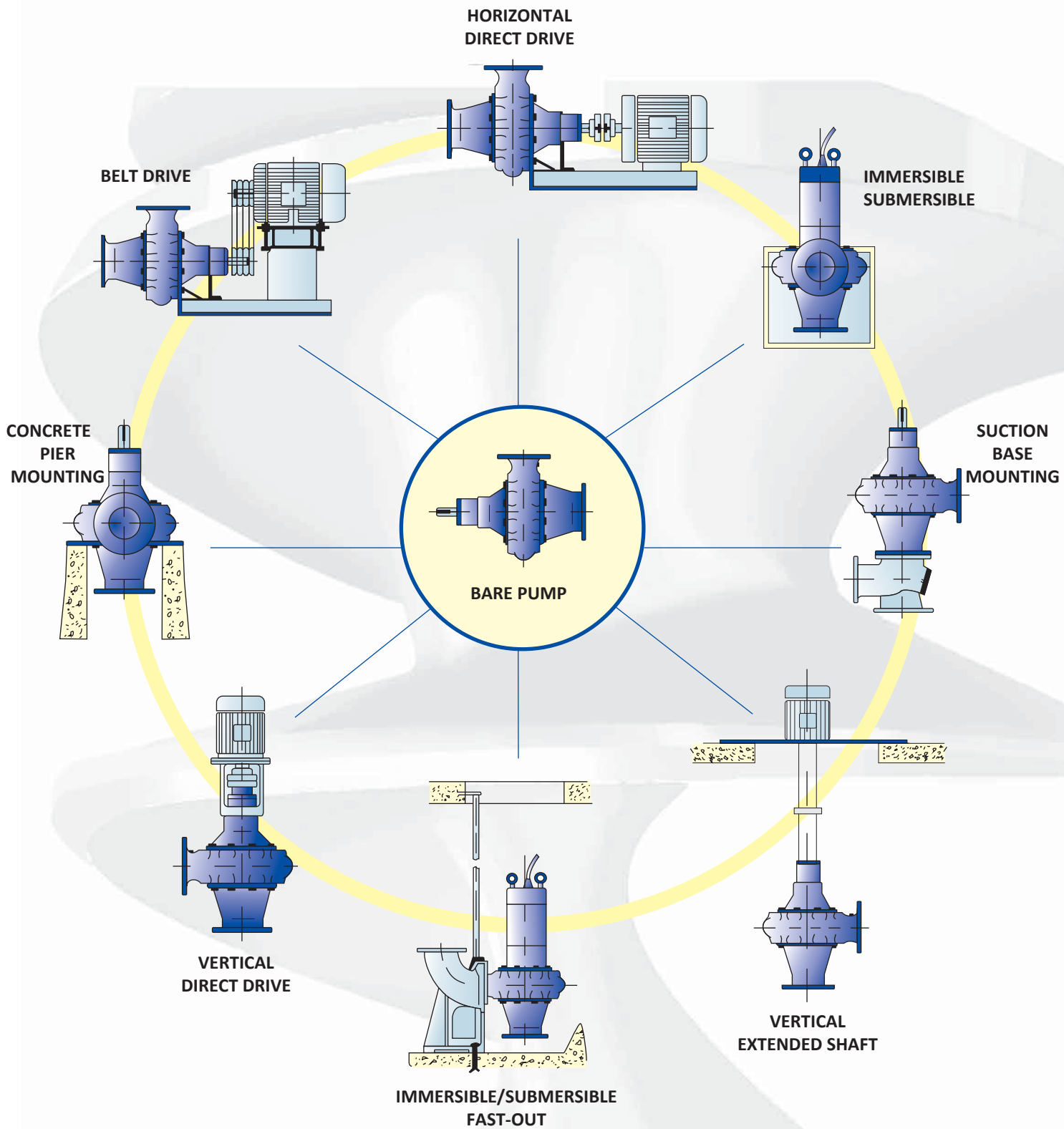
PACKING BOX

Specially-designed, radially-split packing box for easy replacement of deepest packing rings.

HIDROSTAL PUMPS RANGE CHART



CAPACITY



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Horizontal/Vertical End Suction Pumps BRO-HVES

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