WEMCO®-HIDROSTAL®

Screw Centrifugal Pumps

High Efficiency, Clog- Free Pumping

Horizontal, Vertical, & Immersible Pumps

Excellent
Power & Industrial
Solutions

WEIR POWER & INDUSTRIAL

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WEMCO®-Hidrostal® Pump Available in Horizontal, Vertical or Immersible configurations. Choose the one that is right for your application!

Only the Wemco-Hidrostal Pump offers the screw centrifugal* design which combines the clog-free features of a vortex pump with the gentle action of a screw pump and the high efficiency of a centrifugal pump.

Performance & economic advantages:

- The screw centrifugal impeller* with open channel design reduces power costs. Connected horse power can now cost more than $1,000 per horse power per year.
- Clog-free pumping with unique screw-centrifugal impeller easily pumps solids and stringy, fibrous materials without plugging.
- Gentle action prevents damage to delicate solids or biological flocs.
- Steep head/capacity curve minimizes interruptions in capacity, prevents motor overloads, and provides additional pressure to blow out plugs.
- Low NPSH requirements help to keep thick sludges and large solids moving as available suction head decreases. It also reduces installation costs.
- Positive suction flow enables the pump to easily handle thick sludges.
- Externally adjustable liners adjust the clearance between the suction liner and the impeller.
- Non-overloading motors in most selections of Immersible pumps.
- Two-speed Immersible motors available
- Exclusive top and bottom sealing system for Immersible pump applications.
- Immersible pump motors will run continuously either in or out of the water.
- Explosion-proof motors with all the features (moisture probes, etc.) normally found only in non-explosion-proof design.

*Hidrostal screw-type centrifugal impeller as referenced in original U.S. Patent #3156190 issued to Martin Staehle.

WEMCO®-Hidrostal® Pump
Unique screw/centrifugal impeller permits clog-free pump with 80%+ efficiencies.

The WEMCO-Hidrostal Immersible Pump offers excellent service in a variety of configurations:

- *Immersible wet pit*
- *Immersible dry pit*
- *Portable pump applications*
- *In our automatic flow matching WEMCO-Hidrostal Prero system*

You Get Two Pumps In One

The screw centrifugal impeller with open channel design combines the clog-free features of a vortex pump, the gentle action of a screw pump and the high efficiency of a centrifugal pump.

The **Screw section** of the Wemco-Hidrostal pump performs like an Archimedes spiral. In thick sludges, slurries, and suspended solids, it burrows like a corkscrew to start the material pumping and keep it pumping.

The **Centrifugal section** produces steep head-capacity curve for non-overloading performance. Combined, the screw/centrifugal action provides high, hydraulic efficiencies and clog-free pumping. The pump is able to handle large, soft solids with efficiencies of more than 80%.

Clog-Free Pumping

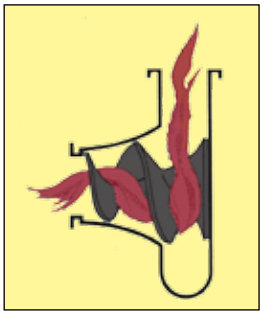
The large, open channel, from suction to discharge, produces a highly clog-free operation. The screw tip has a shoulder shield to prevent blade edges from hooking into solids such as long, fibrous materials.

So-called non-clog pumps, such as standard one port or two port pumps, are not really clog-free because fibrous materials and solids can hang up on the impeller vane edge as they enter the suction.

Gentle Action Pumping

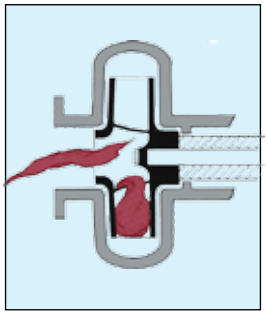
Material enters the pump at a low entrance angle where it flows through a smooth, open channel to the discharge... without any abrupt changes of direction. This gentle action enables fragile material to move through the pump without damage. Vane pumps cannot provide this gentle handling because of the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

Clog-Free WEMCO-Hidrostal Pump



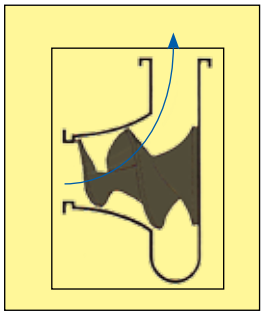
Rags and fibrous materials can't hang up in the open channel WEMCO-Hidrostal

Conventional Non-Clog Pump



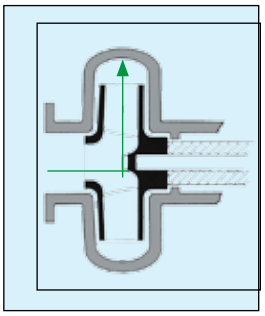
Rags and fibrous materials hang up on the leading edge of the impeller vane.

Gentle Action WEMCO-Hidrostal Pump



Gentle change in flow direction of the WEMCO-Hidrostal Pump

Conventional Pump

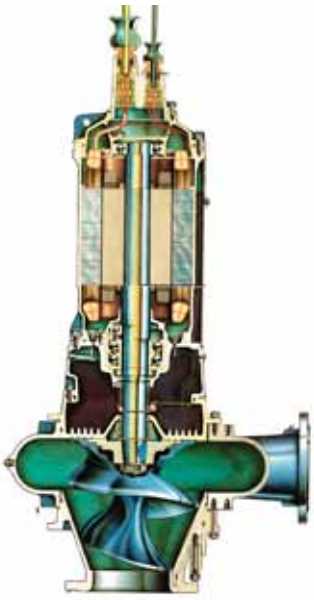


Abrupt 90° change in flow direction of the conventional pump.

Clog-Free Pumping Applications:

- *Raw Sewages & Sludges*
- *Food Processing & Handling*
- *Paper Stock & Wood Chips*
- *Sump Cleanup*
- *Crystalline compounds*
- *Bacterial floc*
- *Easily damaged fruits & vegetables*
- *Live fish*

Advantages of Wemco-Hidrostal Pumps



Low NPSH Applications:

- *Hot liquids*
- *Low vacuum suction sources*
- *Liquids near vapor pressure*
- *Heavy sludges or paper stock*
- *Stripper bottoms*

Positive Suction Flow for Sludge Handling Applications:

- *Paper mill wastes*
- *Municipal & Industrial Sludges*
- *Viscous materials*

Adjustable Liner and/ or Abrasion-Resistance Applications:

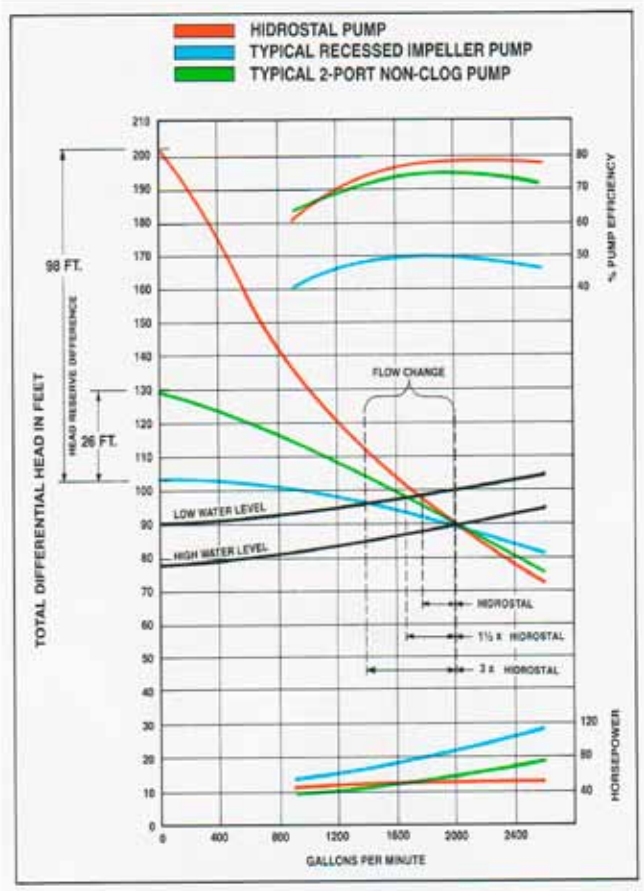
- *Most gravity thickened sewage sludges (Except secondary)*
- *Sewage and stormwater*
- *Lift stations handling high infiltration loads*
- *Lagoon sludges*
- *Most vertical applications*
- *Most horizontal applications with 6" or larger pump sizes*
- *Wood room, bark, or chip operations*

Steep head curve compensates for system head changes

The head produced by the Wemco 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.

The head requirement of every pump depends on the piping, static lift, flow requirements, and resistance to flow of the material being pumped. These factors define the application's system-head requirement, which then "tell" centrifugal type pumps where they should operate on their own characteristic pump curve.

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. However, most non-clog pumps (vortex or vane) have very flat head-capacity curves, so a small change in system head can substantially reduce capacity. To maintain the flow rate near the original design, these pumps often require expensive variable speed drives.

Supplies ample head reserve

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 WEMCO-Hidrostal pump, with its steep head capacity curve, offers a large head reserve which is often enough to blow out the blockage with out having to rod or pig lines.

Produces *non-overloading* curve

The horsepower curve of the WEMCO-Hidrostal 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. 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 operating costs of these pumps can be significantly more than the Hidrostal screw centrifugal pump.

Savings & Lower Long-Term Costs

Low NPSH requirements

NSPSHR (net positive suction head required) is the minimum absolute pressure required to keep a pump performing effectively.

The WEMCO-Hidrostal 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.

Adjustable liner

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. Wemco'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.

Positive suction for sludge handling

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.

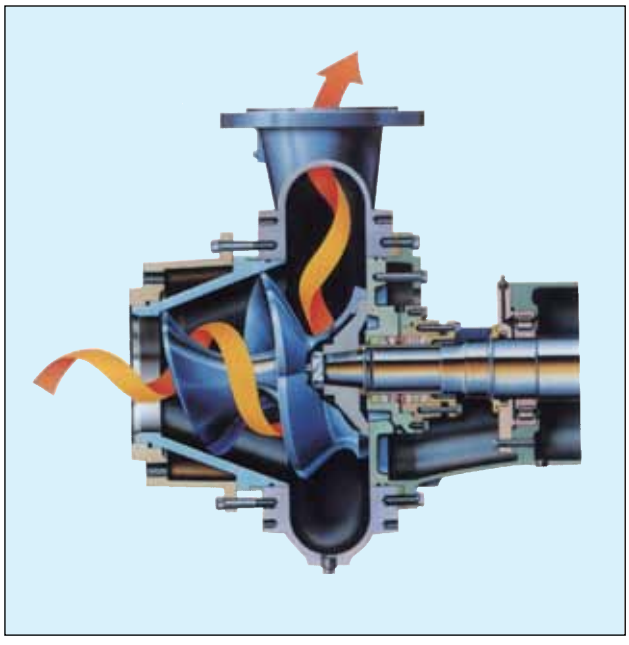
Positive displacement pumps may be ideal for handling thick sludges, but they are expensive and have problems with solids - usually requiring grinders in front of the pump. They are impractical for high-volume pumping and require extensive maintenance. While vane pumps can handle some sludges, their 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.

Optional abrasion-resistant impeller & liner

For abrasive applications, the impeller and adjustable suction liner are available in 450 Brinell hardened Hi-Chrome iron (ASTM A532-III-A).

Wemco-Hidrostal pumps are heavy-duty pumps which have been designed for the toughest applications. They will give many years of reliable service and only routine maintenance is needed.



Advantages of the Wemco-Hidrostal Immersible Pump

High wire-to-water

The cost of running any pump is measured by the amount of power it consumes, which is a function of the combined (wire-to-water) efficiencies of the pump and the motor. The unique combination of the Wemco®-Hidrostal® screw-centrifugal impeller and immersible motor routinely produce wire-to-water efficiencies that are among the highest, and in many instances, the highest in the industry.

Since connected horsepower may now cost as much as $1,000 year/HP, the cost savings from this pump are substantial when evaluated over the normal 10-20 year design-life of a station.

Non-Overloading

For many models, power requirements do not rise as capacity increases. Thus, motors sized for the design conditions also provide complete overload protection for run-out conditions.

Two-speed motors

- Can be used in parallel operation at high/low speed operation, without the problem of the high speed pump forcing the low speed pump to shut off.
- Two-speed operation allows pump to closely match station inflow rate, thus reducing wet-well size, buffer volume, and station construction costs.
- Allow automatic matching of inflow rates to the station when used with the Prerostal® Pumping System (see back page)
- Offer automatic soft-starting which reduces energy consumption.

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Only WEMCO®-Hidrostal® Immersible Pumps Offer All These Features:

1- Clog-free pumping

2- High wire-to-water efficiencies

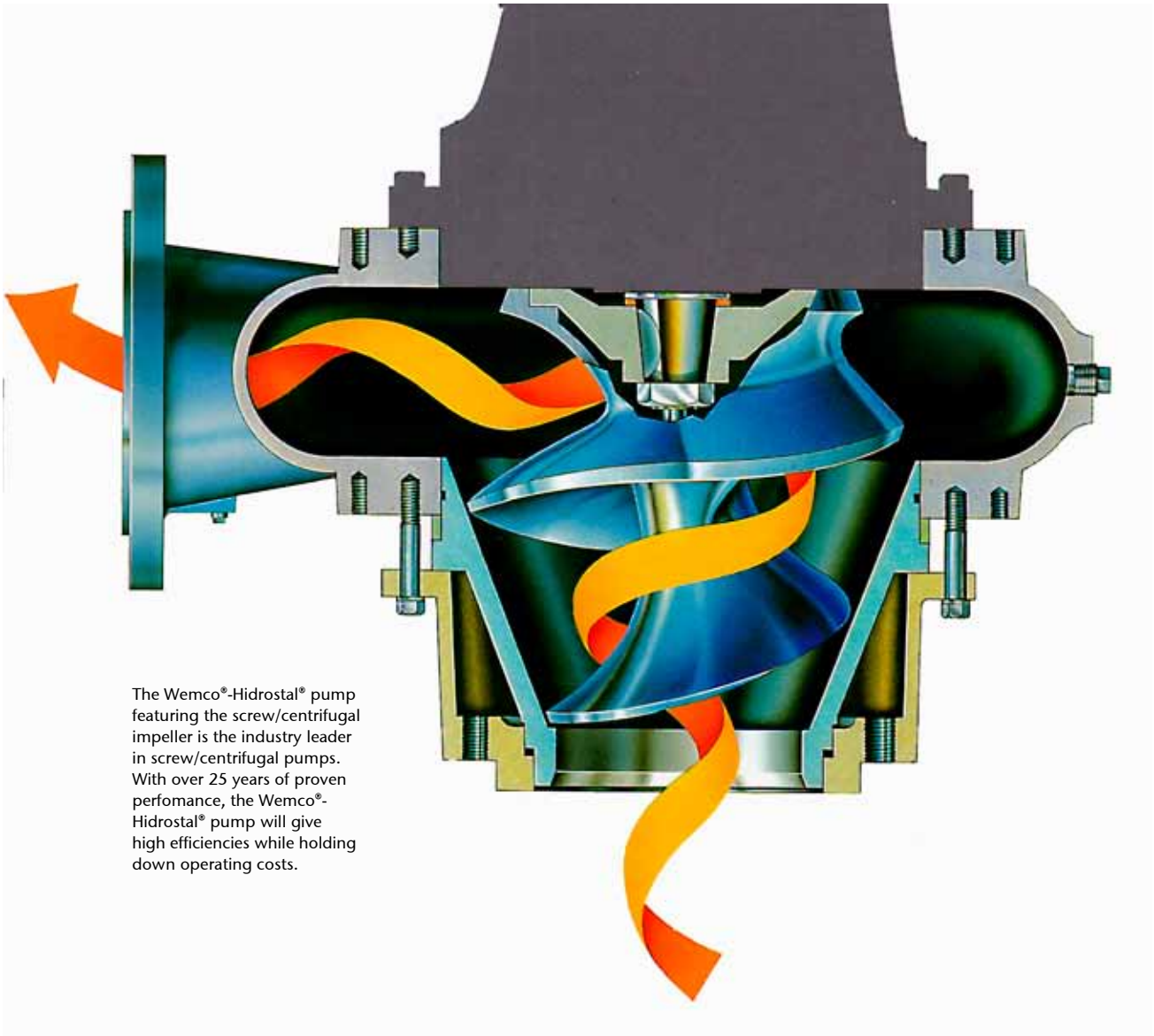
3- Steep head/capacity curve

4- Non-overloading motors

5- Two-speed motors available

6- Exclusive top & bottom sealing system

7- Immersible pump motors will run continuously in or out of the water

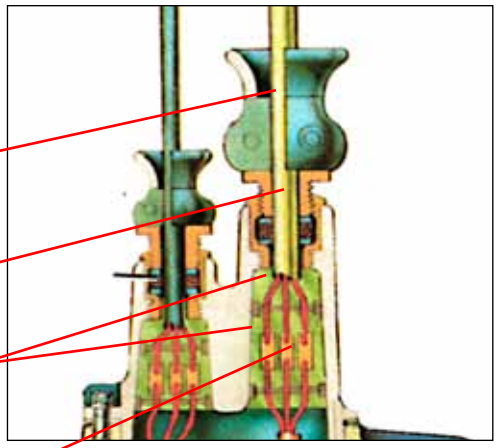


The Wemco®-Hidrostal® pump featuring the screw/centrifugal impeller is the industry leader in screw/centrifugal pumps. With over 25 years of proven perfomance, the Wemco®-Hidrostal® pump will give high efficiencies while holding down operating costs.

Exceptional Sealing & Reliability Systems

The Wemco®-Hidrostal® pump featuring the screw/centrifugal impeller is the industry leader in screw/centrifugal pumps. With over 25 years of proven performance, the Wemco®-Hidrostal® pump will give high efficiencies while holding down operating costs.

Submerged motors are most vulnerable in the two areas where liquid is sealed from the motor: the cable entry on top of the motor, and the shaft sealing at the bottom of the motor. The Wemco-Hidrostal motor is the most reliable design to insure no leakage at these points and incorporates these features:



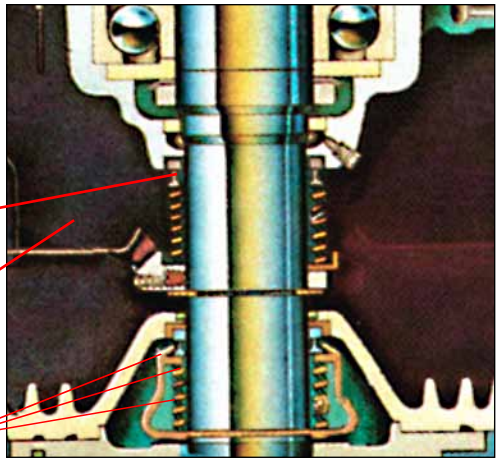
1-Strain-relief clam grips cable above sealing components to isolate the electrical components from any mechanical strain.

2-Cable sheath is sealed by an elastomer grommet compressed by a threaded follower gland.

3- Poured epoxy totally encapsulates cable-end insulation and copper dams, and offers redundant sealing for both the cable outside diameter and any internal leakage.

4-Each individual cable wire is isolated from the motor cable by a solid copper isolation dam which prevents the wicking of moisture through cable strands in event of cable damage.

5- Motors are shipped with waterproof cap over the panel end of the cable to keep the cable dry during storage, shipping and installation (not shown).



Mechanical Seals

1-The upper seal is a standard domestic John Crane® type 21 carbon-ceramic face seal.

2-Both seals run in a clean oil bath, lubricating springs and seal faces, which permits the pump to run dry without seal damage.

3-The lower seal has a solid tungsten-carbide face rotating against a solid silicon-carbide stationary seat. Both seal faces are harder than any grit particles encountered, and the combination of two different faces insures that no molecular welding can occur as can happen when two identical seal faces are used. Springs are completely encased in a rubber boot or in a stainless steel bellows to avoid fouling by stringy materials. This seal is dimensionally interchangeable with stand John Crane® type 21 seals.

Moisture Probes

One probe constantly monitors conductivity of the cooling oil. If significant water leaks past the lower seal, an alarm circuit in the panel advises the operator of the failure so the seal can be replaced. However, the pump can continue to run for some time, as the motor is still protected by the upper seal. This feature is also available in explosion-proof motors.

Temperature Sensor

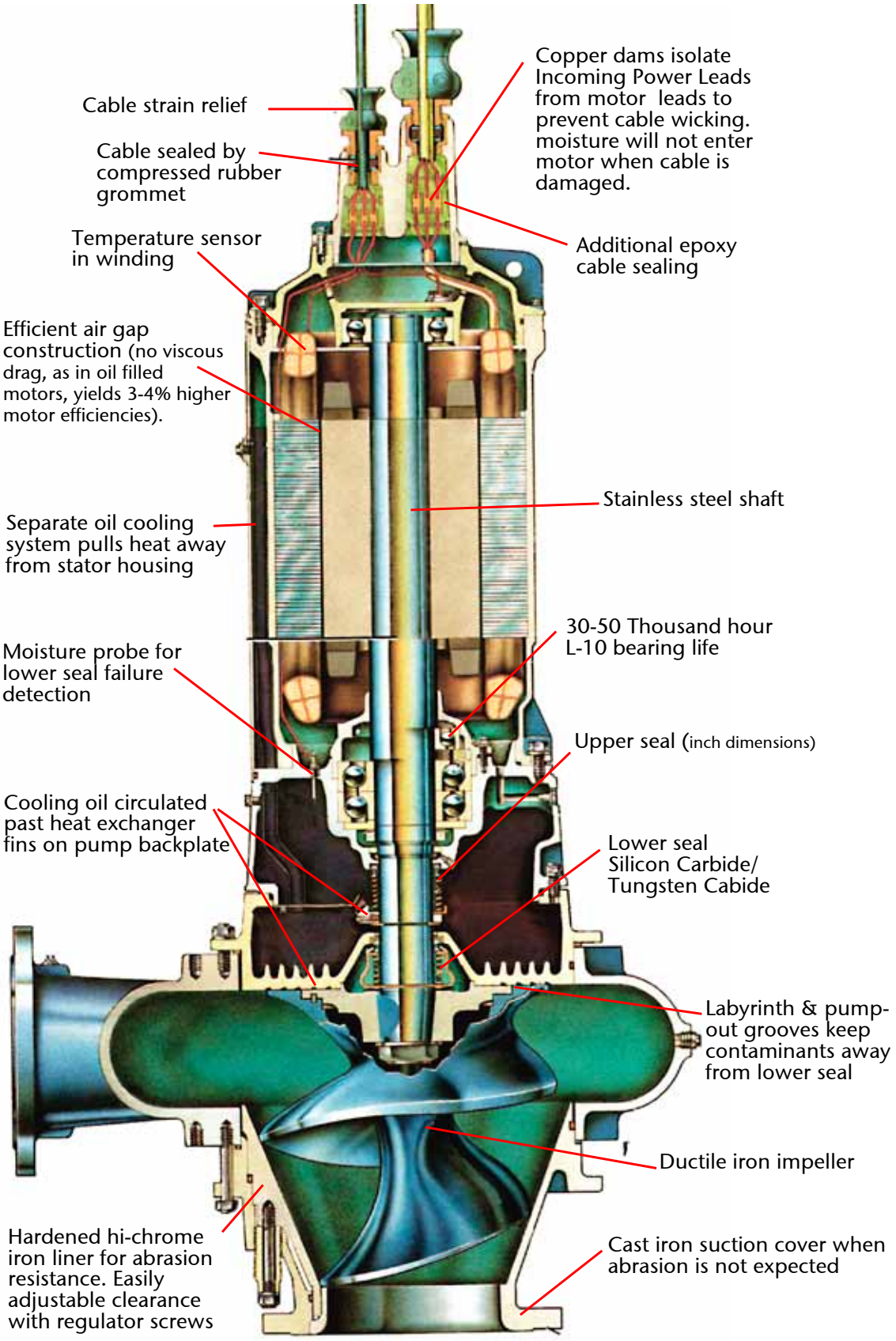
Backup bi-metallic or thermistor-type thermal sensors embedded in the stator windings protect the motor from overheating due to any reason.

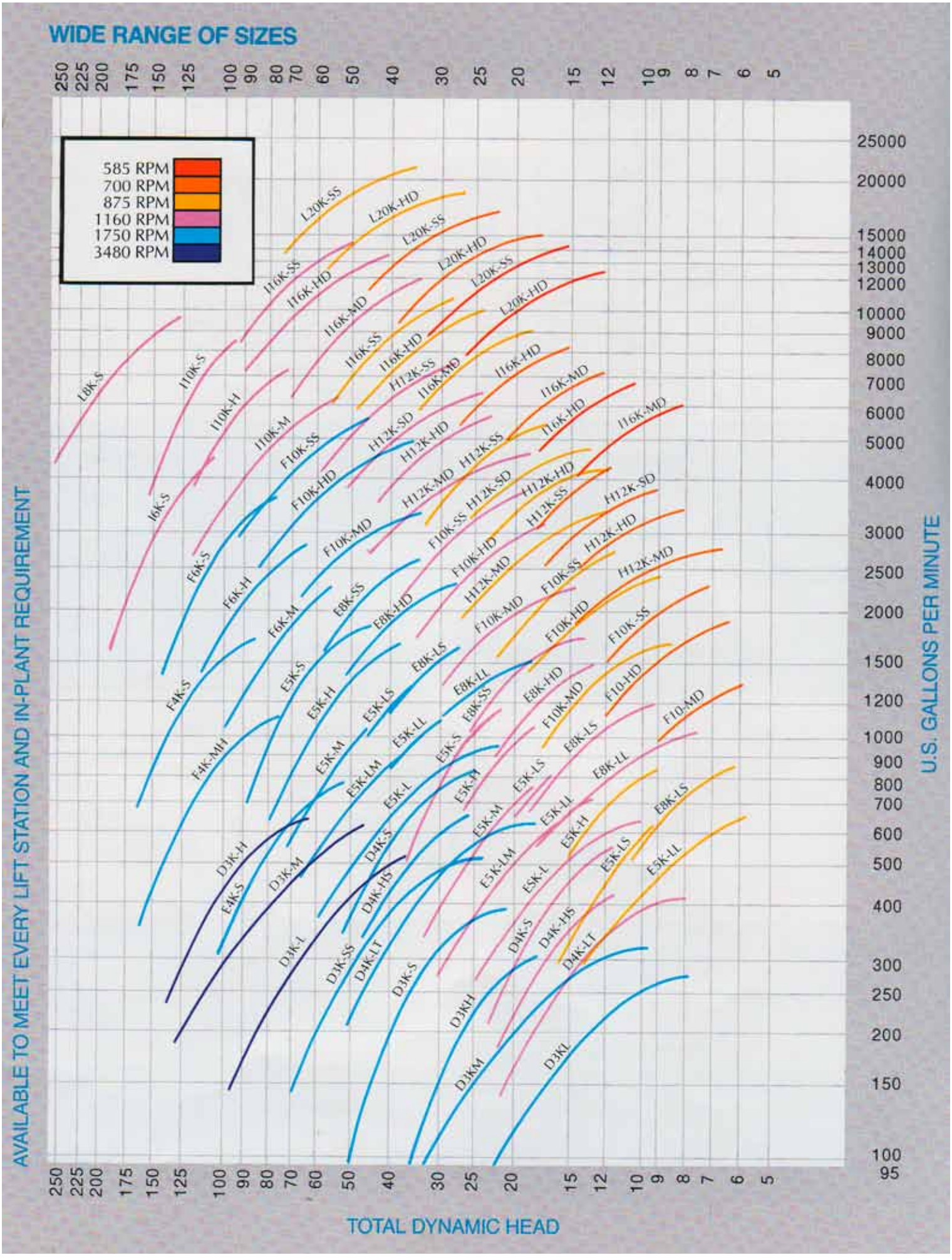
Explosion-Proof Motors

Motors are explosion-proof design, approved by Factory Mutual for uses in Class 1 groups C & D "hazardous locations."

Although other motors incorporate one or two of these features, the Wemco® Hidrostal® motor is the only one that incorporates all of these redundant features. The result is the most positive and reliable design for excluding liquid.

Immersible Motor Design

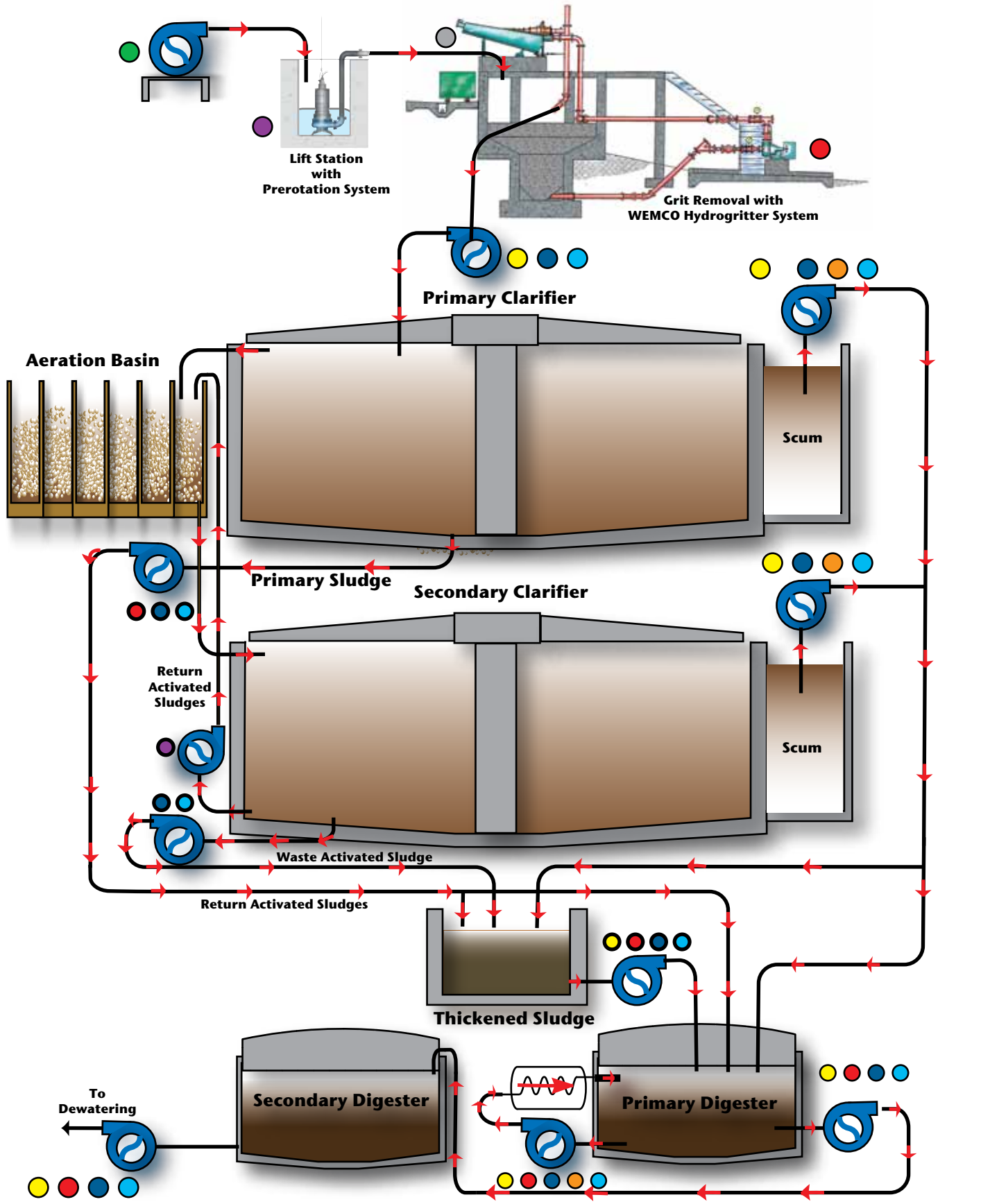



WIDE RANGE OF SIZES
585 RPM
700 RPM
875 RPM
1160 RPM
1750 RPM
3480 RPM
L20K-SS
L20K-HD
H16K-SS
H16K-HD
H16K-MD
H12K-SS
H12K-SD
H12K-HD
H12K-MD
L8K-S
H10K-S
H10K-H
H10K-M
F10K-SS
F10K-HD
F10K-MD
I6K-S
F6K-S
F6K-H
F6K-M
E8K-SS
E8K-HD
E8K-LS
E8K-LL
F4K-S
F4K-MH
E5K-S
E5K-H
E5K-M
E5K-LS
E5K-LL
E5K-LM
E5K-L
D3K-H
D3K-M
D4K-S
D4K-HS
D4K-LT
D3K-L
D3K-SS
D3K-S
D3KH
D3KM
D3KL
AVAILABLE TO MEET EVERY LIFT STATION AND IN-PLANT REQUIREMENT
TOTAL DYNAMIC HEAD
U.S. GALLONS PER MINUTE
250 225 200 175 150 125 100 90 80 70 60 50 40 30 25 20 15 12 10 9 8 7 6 5
25000 20000 15000 14000 13000 12000 10000 9000 8000 7000 6000 5000 4000 3000 2500 2000 1500 1200 1000 900 800 700 600 500 400 300 250 200 150 100 95

WEMCO® Pumps & Equipment In The Municipal Flow Diagram

=Model CF™ Chop-Flow™ =Model C™ Torque-Flow® =Model CE™ Torque-Flow® =Model E™ Torque-Flow®

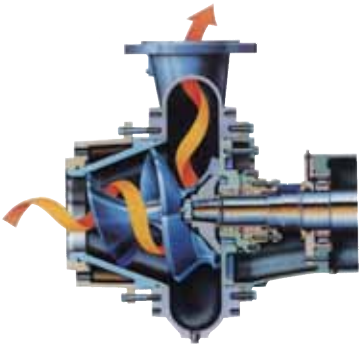
=WEMCO® Self Primer =WEMCO®-Hidrostal® Screw Centrifugal =WEMCO®-Hidrostal® Prerotation =WEMCO Hydrogritter®



Weir Specialty Pumps has the right pump for the job with its WEMCO® Brand Pumps & Equipment

Large Solids, Abrasive Solids, High Efficiency, Self-Priming or Chopping

WEMCO® Self-Primer Pumps



WEMCO® Hidrostal®
Screw Centrifugal Pumps

WEMCO® Chop-Flow Pumps

WEMCO® Hidrostal® Prerostal
Prerotation System

WEMCO® Hydrogritter™
Grit Removal System