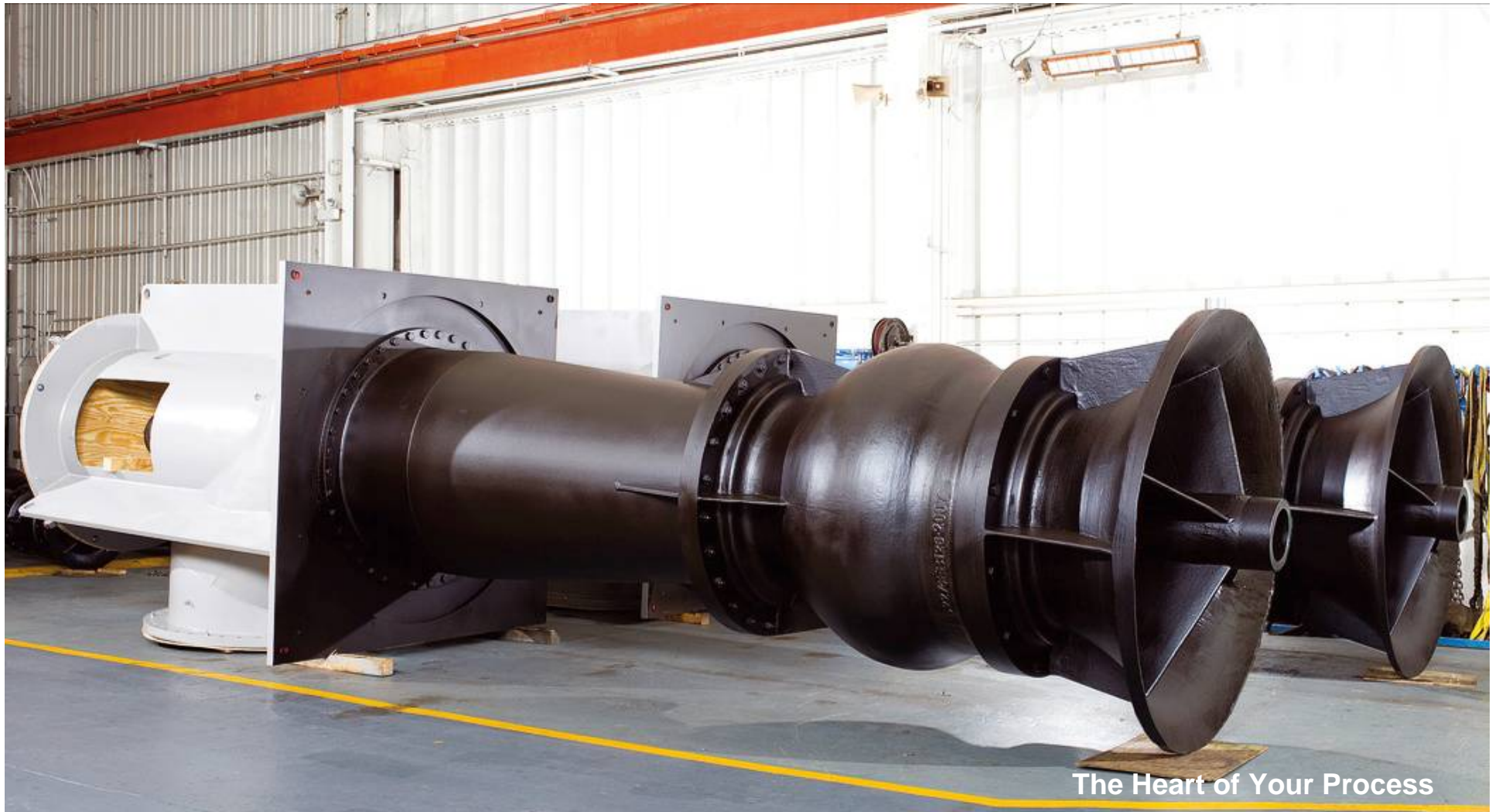


**SULZER**

Sulzer Pumps

# SJT / SJM / SJP Large Vertical Pumps



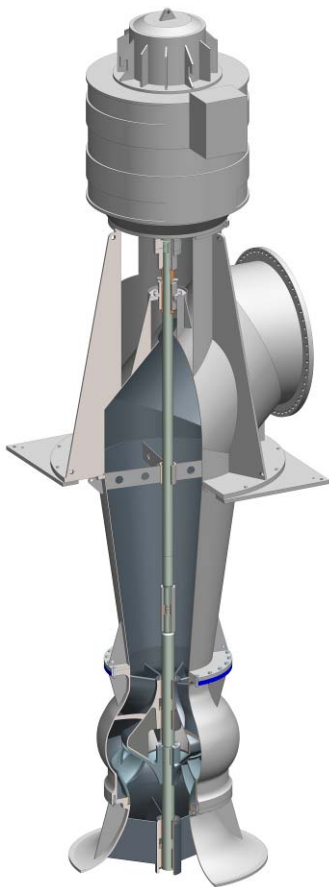
The Heart of Your Process

# SJT, SJM, SJP Large Vertical Pumps

**SULZER**

Sulzer Pumps

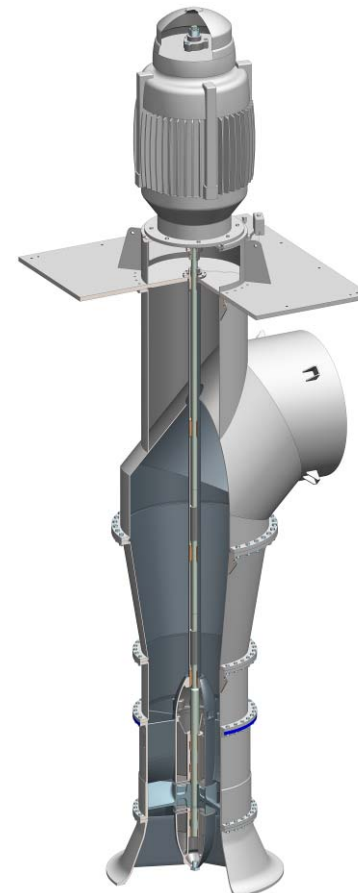
## Product Overview



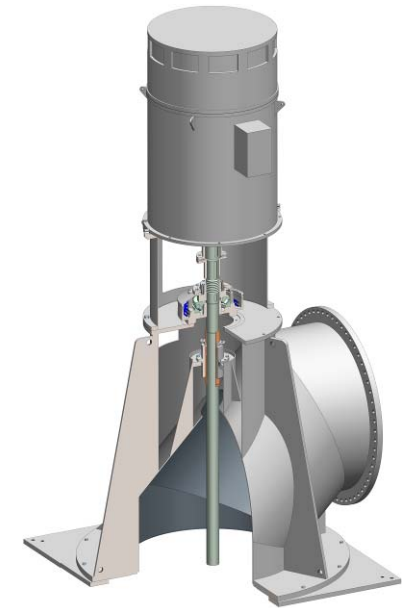
**SJT Turbine**  
Ns 1800 < 5000  
nq 35 < 110



**SJM Mixed Flow**  
Ns 5800 < 8300  
nq 113 < 161



**SJP Axial Flow**  
Ns ~ 14,500  
nq ~ 280



Discharge head  
with thrust  
bearing assy.

# SJT, SJM, SJP

## Large Vertical Pumps

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### Applications

Large vertical pumps are "engineered-to-order" pumps for power and water applications including, but not limited to the following:

- cooling tower and cooling water circulation
- waste or storm water sump drainage
- water supply installations
- booster service from open or closed systems
- secondary recovery supply and injection systems
- irrigation supply and land drainage
- offshore fire and service water
- flood control

# SJT, SJM, SJP

## Large Vertical Pumps

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### Example pump designations

#### SJT 30KNC-3s (from SPHO hydraulic)

<b>SJT</b>	→ Vertical Turbine Pump
<b>30KNC</b>	→ Nominal diameter of bowl [in], Hydraulic
<b>3s</b>	→ Number of stages (3)

---

#### SJM BSm 950/001-1s (from B-range hydraulic)

<b>SJM</b>	→ Vertical Mixed Flow Pump
<b>BSm</b>	→ Pump type: B-Range, semi-open impeller
<b>950</b>	→ Nominal diameter of impeller [mm]
<b>001</b>	→ Hydraulic Code
<b>1s</b>	→ Number of stages (1)

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#### SJP 48PO-1s (from SPHO hydraulic)

<b>SJP</b>	→ Vertical Propeller Pump
<b>48PO</b>	→ Nominal diameter of bowl [in], Hydraulic
<b>1s</b>	→ Number of stages (1)

# SJT, SJM, SJP

## Large Vertical Pumps



Sulzer Pumps

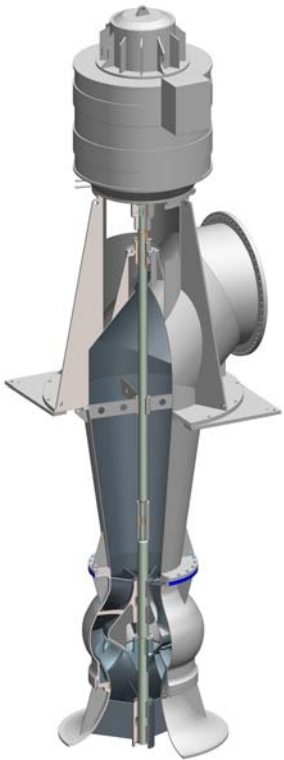
### Materials of Construction

Component	I-1	S-1	S-3	D-1
<b>Bowls / Bell</b>	Cast Iron	Carbon Steel	Ni. Resist	Duplex
<b>Impellers</b>	Alum. Bronze, 12% Chrome -or- 316 Aus (or EN equiv.)	Alum. Bronze, 12% Chrome -or- 316 Aus (or EN equiv)	316 Aus (or EN equiv.)	Duplex
<b>Impeller Rings</b> (when applicable)	12% Chrome	12% Chrome	316 Aus (or EN equiv.)	Duplex
<b>Shafts</b>	12% Chrome	12% Chrome	12% Chrome	Nitronic 50 (or EN equiv.)
<b>Bearing Bushings</b>	Cutless Rubber (Bronze Backed)	Cutless Rubber (Bronze Backed)	Cutless Rubber (Stainless Backed)	Cutless Rubber (Phenolic Backed)
<b>Bolting</b>	Carbon Steel	Carbon Steel	Carbon Steel	Duplex

# SJT Large Vertical Pump

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## Operating Limits: SJT



### 46 Sizes

**(69 Hydraulic Combinations)**..... $\geq 20''$  (508 mm)

**Capacity** ..... $Q = 1,600$  to  $180,000$  US GPM ( $360$  to  $41,000$  M<sup>3</sup>/Hr)

**Head** ..... up to  $H = 360$  ft (110 M)

**Max. Operating Pressures** .....  $125$  up to  $925$  PSig ( $8.6$  to  $63.8$  Bar)

model specific, see ePM

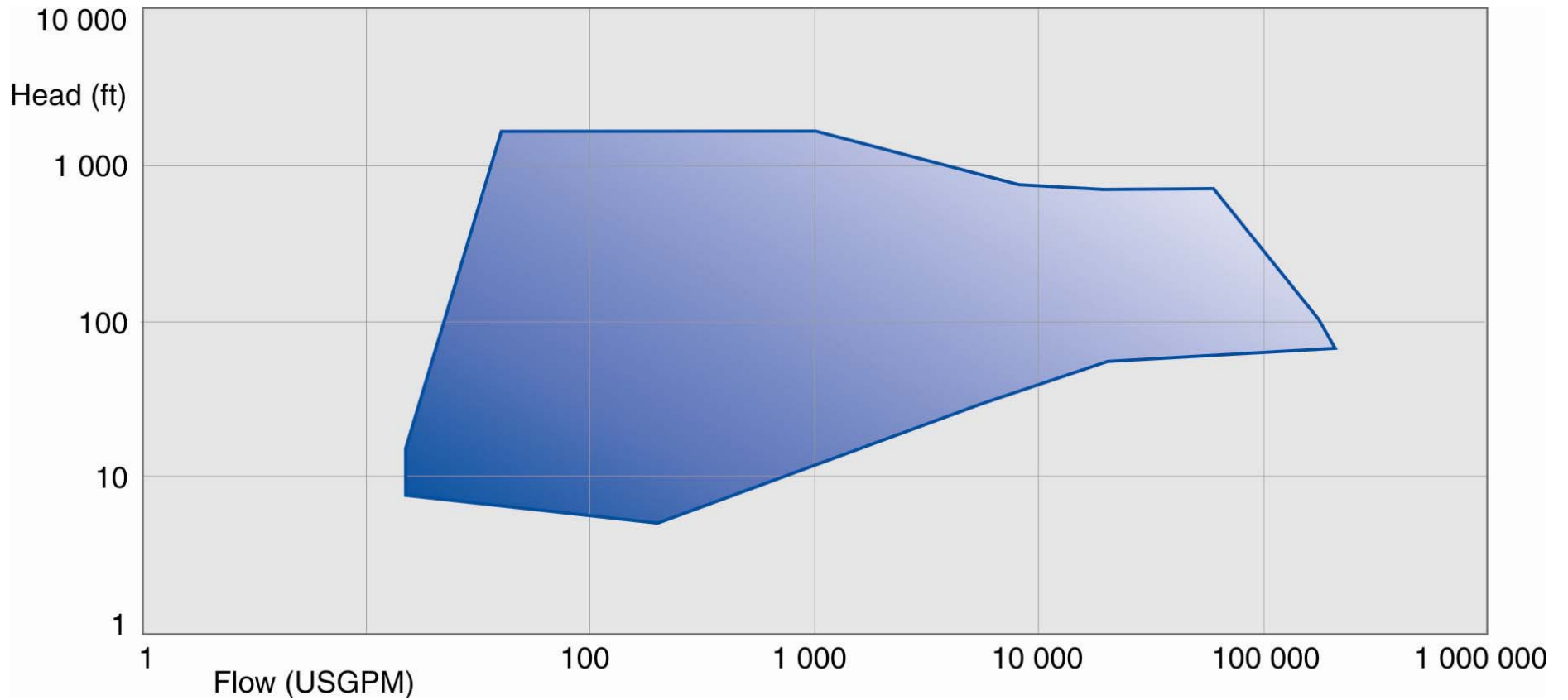
**Temperature**..... $\leq 122^\circ\text{F}$  ( $50^\circ\text{C}$ )

**Nominal Speeds** .....  $320$  RPM to  $1800$  RPM

**Direction of Rotation** ..... Counterclockwise –or– (Clockwise, "B"-range and SJT 40CLC) as seen from drive end.

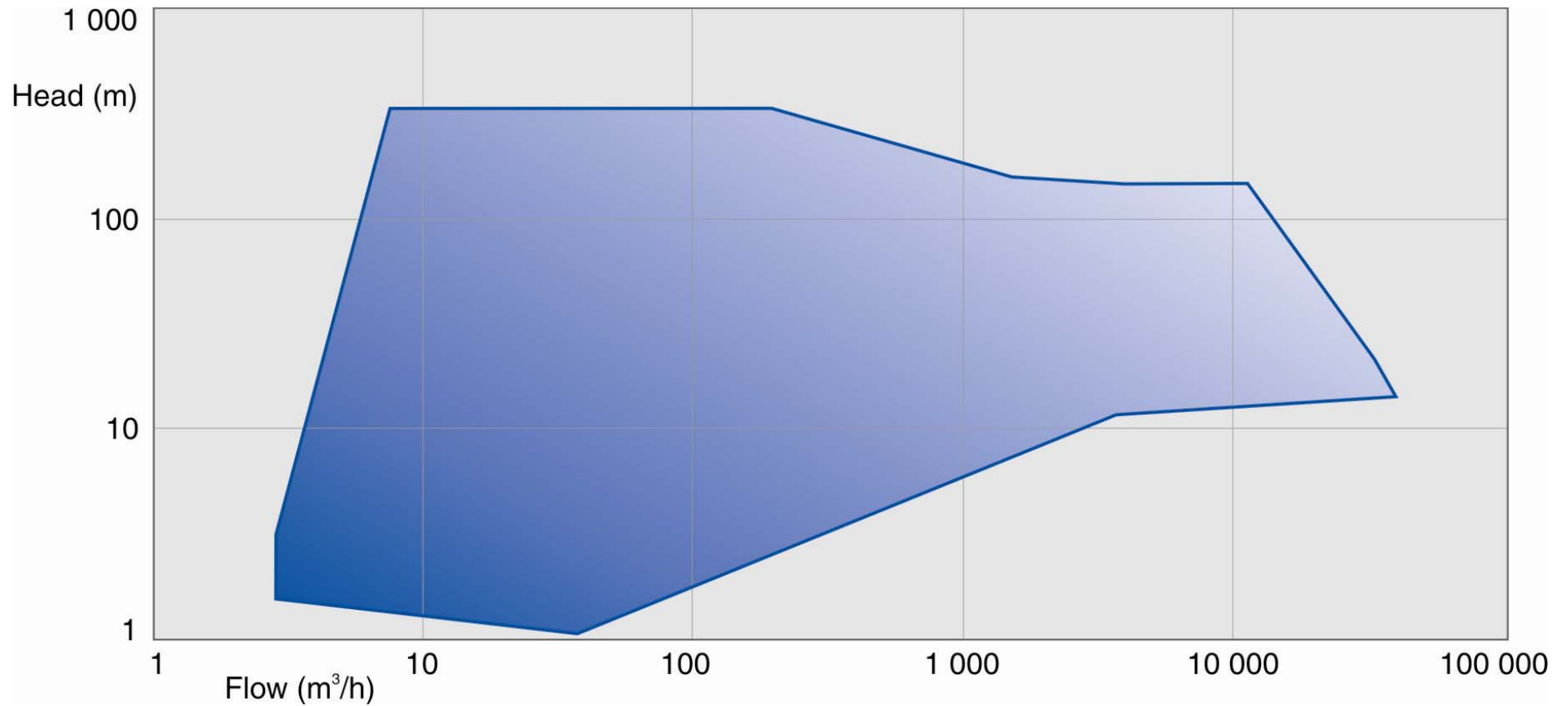
# SJT Large Vertical Pump

## SJT Performance Range: 60 Hz



# SJT Large Vertical Pump

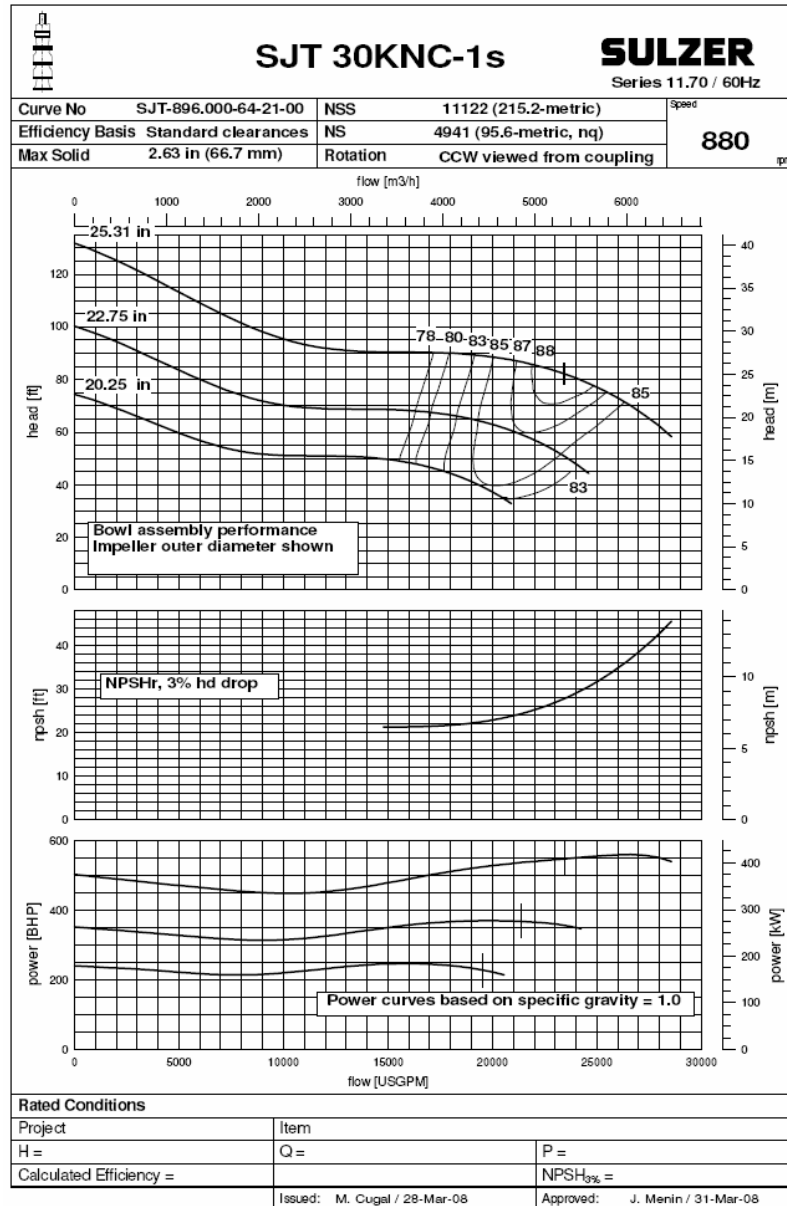
## SJT Performance Range: 50 Hz





# SJT Large Vertical Pump

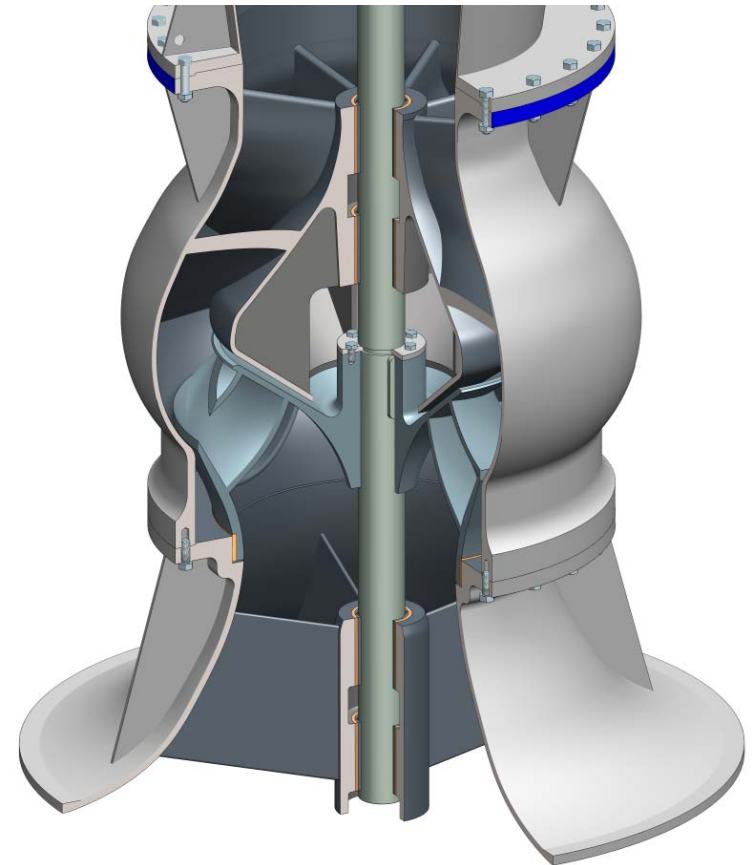
## SJT sample Performance Curve



# SJT Large Vertical Pump

## SJT Design Features & Benefits: Bowl Assembly

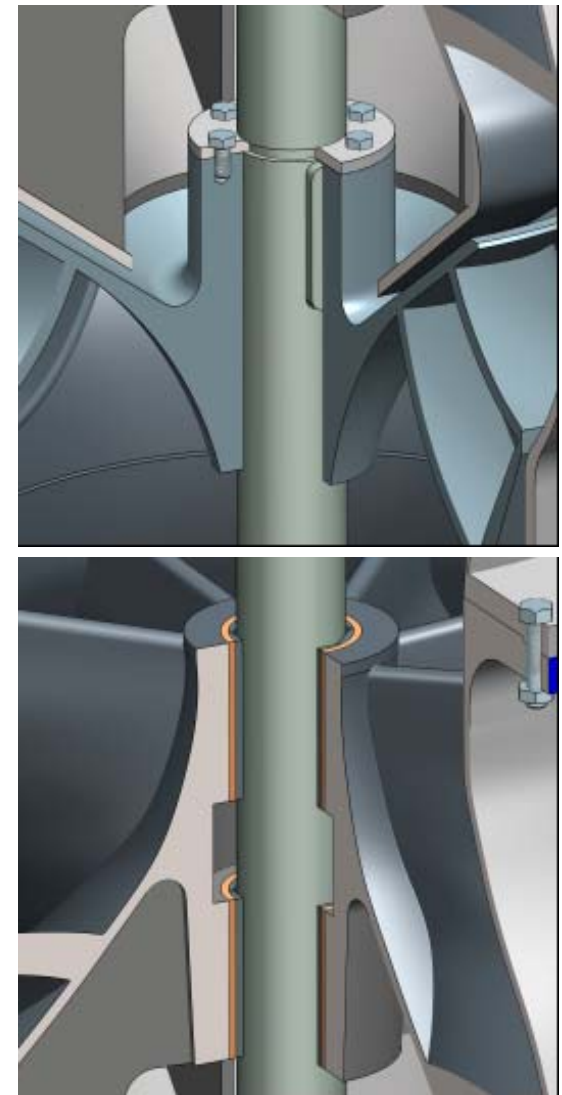
- Suction bells are cast construction with a tail bearing (to minimize shaft deflection at lowest impeller) and anti-vortex ribs on all sizes.
- Bowls are cast construction which are flanged and bolted together.
- An integral wear surface is standard on bell and bowls. Replaceable wear ring is offered as an option.
- An optional strainer restricts entry of foreign objects into the bowl assembly.
- Bearing bushings are located in the bowl assembly to provide rotor support.
- Bearing bushings lubricated by the pumped liquid as standard. Oil or clean water flush is also available.



# SJT Large Vertical Pump

## SJT Design Features & Benefits: Bowl Assembly (cont.)

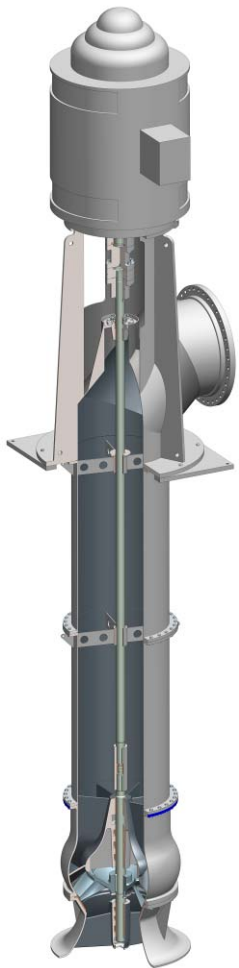
- Most impellers are enclosed design and are cast construction. Some SJT impellers are semi-open.
- The impeller is mounted on the pump shaft with a split axial retaining ring and key to allow easy disassembly.
- The impellers are dynamically balanced to reduce vibration.
- The SJT can be a multistage pump to the limits defined in the documentation.
- The pump shaft is tailor-made to the service needs and sized individually for each installation; sized for max. torque.



# SJM Large Vertical Pump

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## Operating Limits: SJM



### 17 Sizes

**(31 Hydraulic Combinations)**..... $\geq 24"$  (610 mm)

**Capacity** .....Q = 11,000 to 220,000 US GPM (up to 47,700 M<sup>3</sup>/Hr)

**Head** ..... up to H = 160 ft (48.8 M)

**Max. Operating Pressures** .....up to 260 PSIG (up to 17.9 Bar)

model specific, see ePM

**Temperature**..... $\leq 122^{\circ}\text{F}$  (50°C)

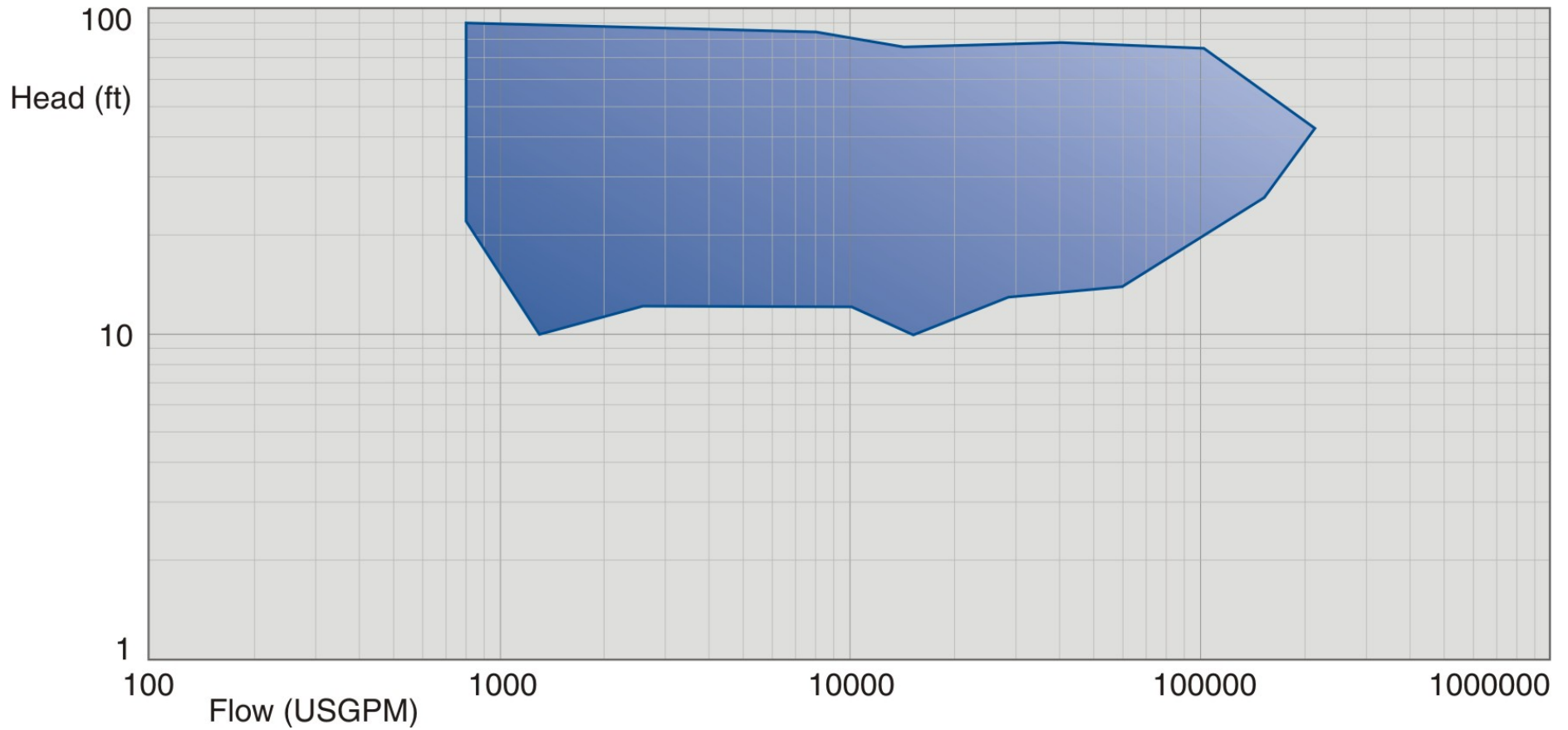
**Nominal Speeds** .....273 RPM to 900 RPM

**Direction of Rotation** .....Counterclockwise –or- Clockwise (B-Range)

as seen from drive end.

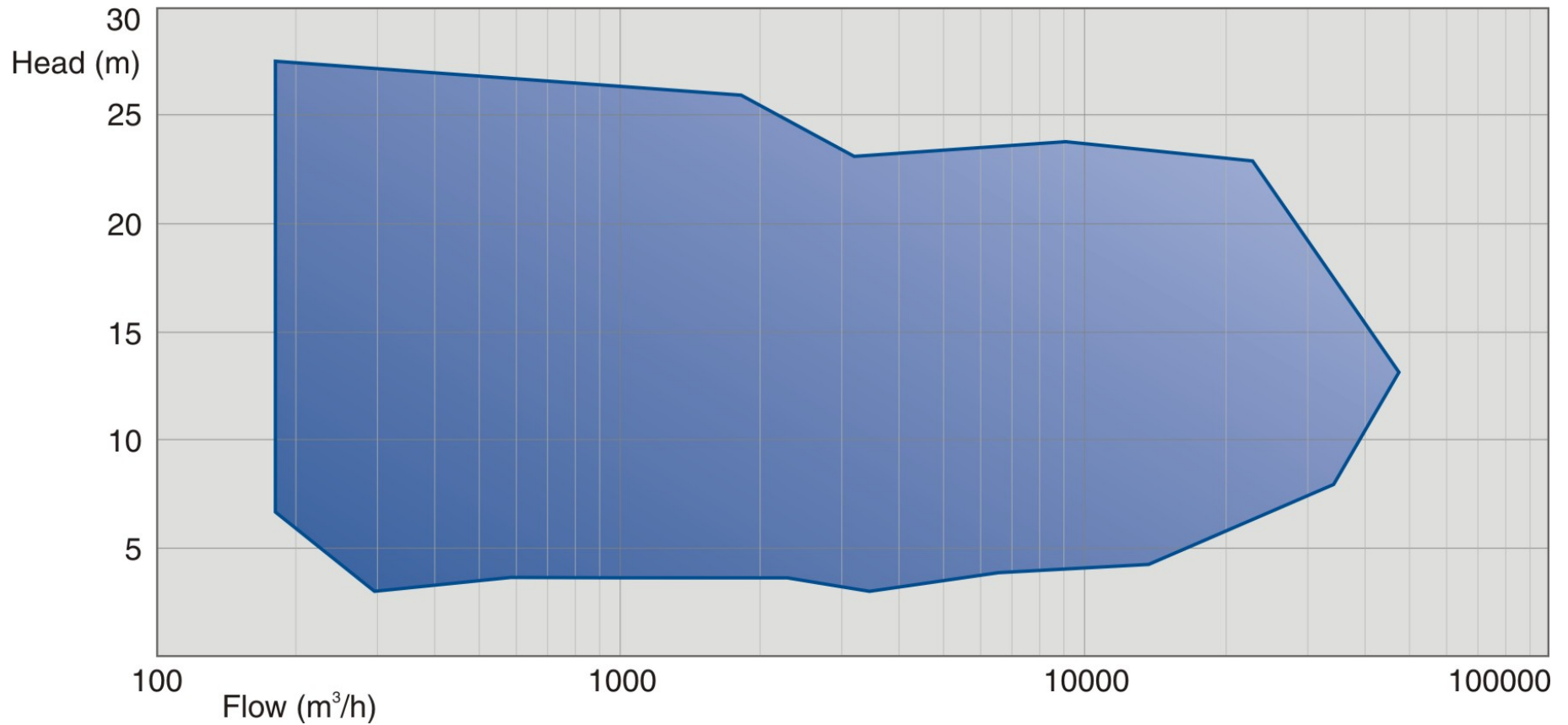
# SJM Large Vertical Pump

## SJM Performance Range: 60 Hz



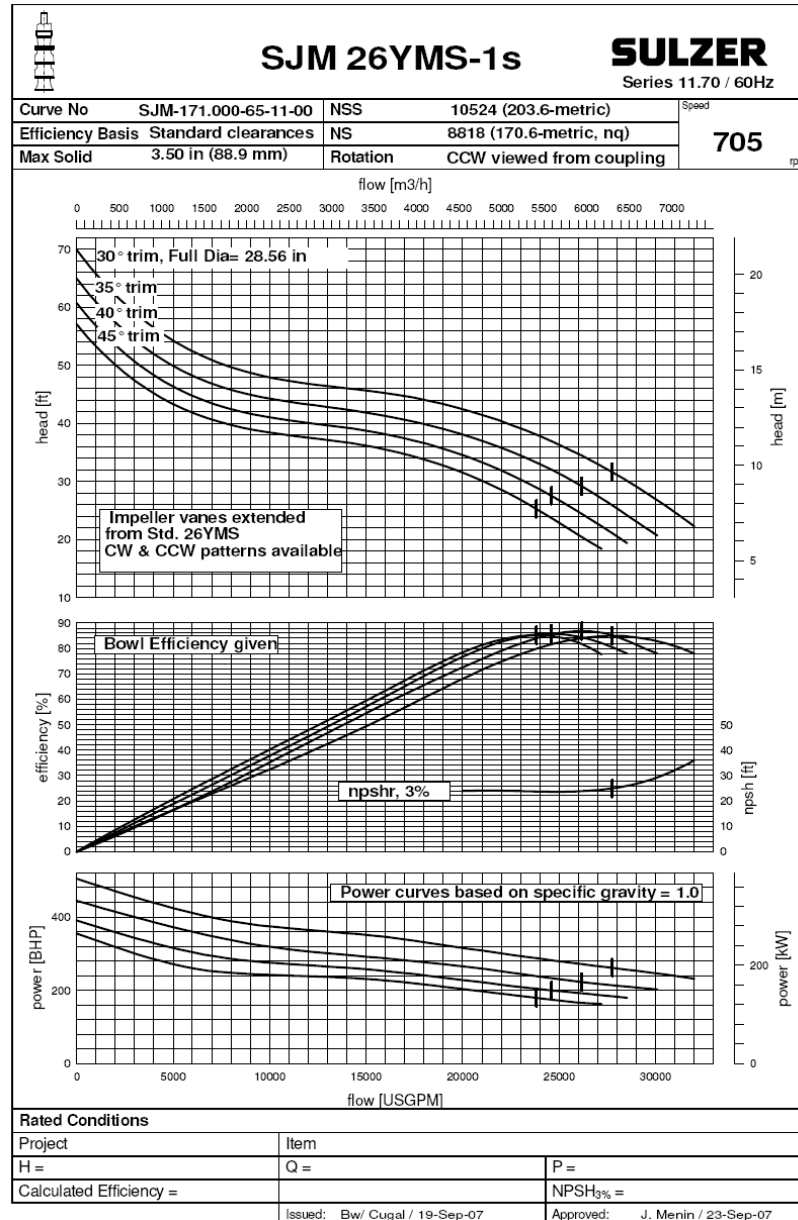
# SJM Large Vertical Pump

## SJM Performance Range: 50 Hz



# SJM Large Vertical Pump

## SJM sample Performance Curve

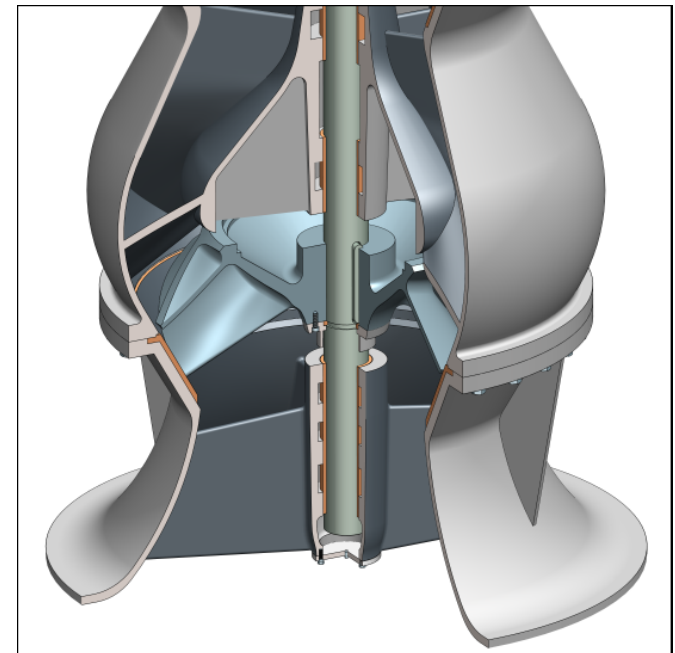


# SJM Large Vertical Pump

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## SJM Design Features & Benefits: Bowl Assembly

- Suction bells are cast construction, offered with a tail bearing (to minimize shaft deflection at lowest impeller) and anti-vortex ribs on all sizes.
- Bowls are cast construction which are flanged and bolted together.
- A replaceable case liner is offered as an option.
- An optional strainer restricts entry of foreign objects into the bowl assembly.
- Bearing bushings are located in the bowl assembly to provide rotor support.
- Bearing bushings lubricated by the pumped liquid as standard. Oil or clean water flush is also available.

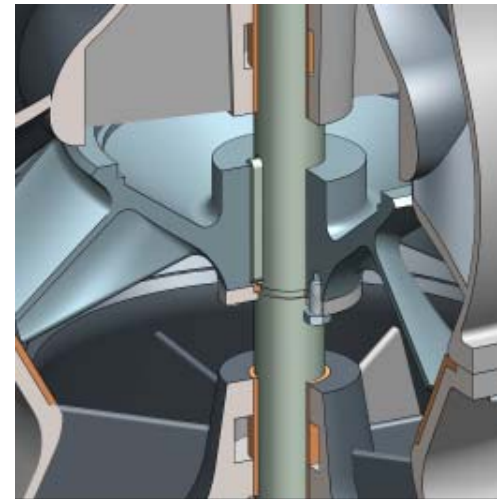




# SJM Large Vertical Pump

## SJM Design Features & Benefits: Bowl Assembly (cont.)

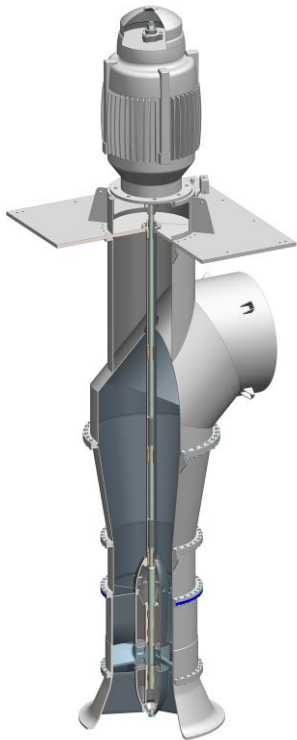
- Impellers are semi-open design and are cast construction.
- The impeller is mounted on the pump shaft with a split axial retaining ring and key to allow easy disassembly.
- The impeller is dynamically balanced to reduce vibration.
- The SJM is typically offered as a single stage unit.
- A two stage pump SJM is available for increased head requirements (LS, MS & PS models only).
- The pump shaft is tailor-made to the service needs and sized individually for each installation; sized for max. torque.



# SJP Large Vertical Pump

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## Operating Limits: SJP



### 8 Sizes

**(8 Hydraulic Combinations)**..... $\geq 24$ " (610 mm)

**Capacity** .....Q = 11,000 to 220,000 US GPM (up to 47,700 M<sup>3</sup>/Hr)

**Head** .....up to H = 26 ft (8 M)

**Max. Operating Pressures** .....up to 270 PSIG (up to 18.8 Bar)

model specific, see ePM

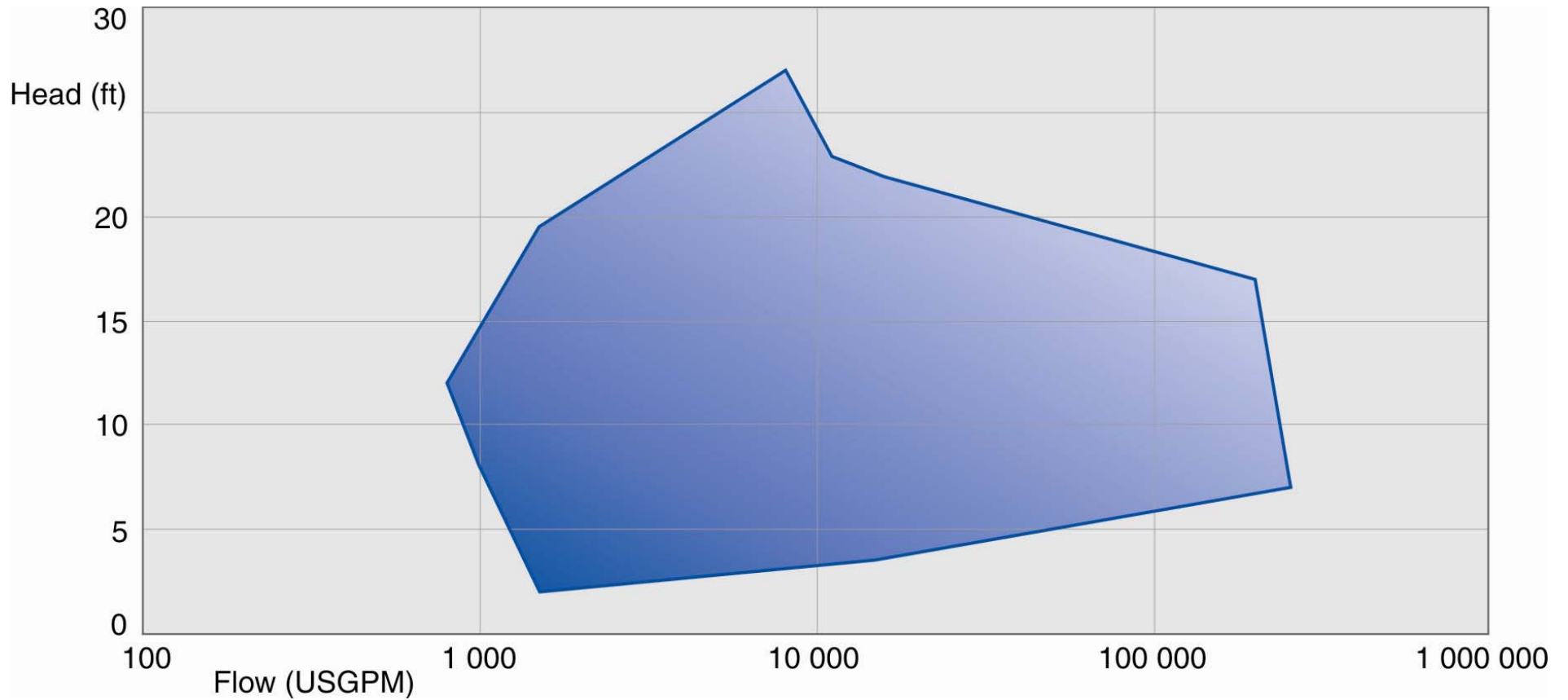
**Temperature**..... $\leq 122^{\circ}\text{F}$  ( $50^{\circ}\text{C}$ )

**Nominal Speeds** .....300 RPM to 750 RPM

**Direction of Rotation** .....Counterclockwise as seen from drive end.

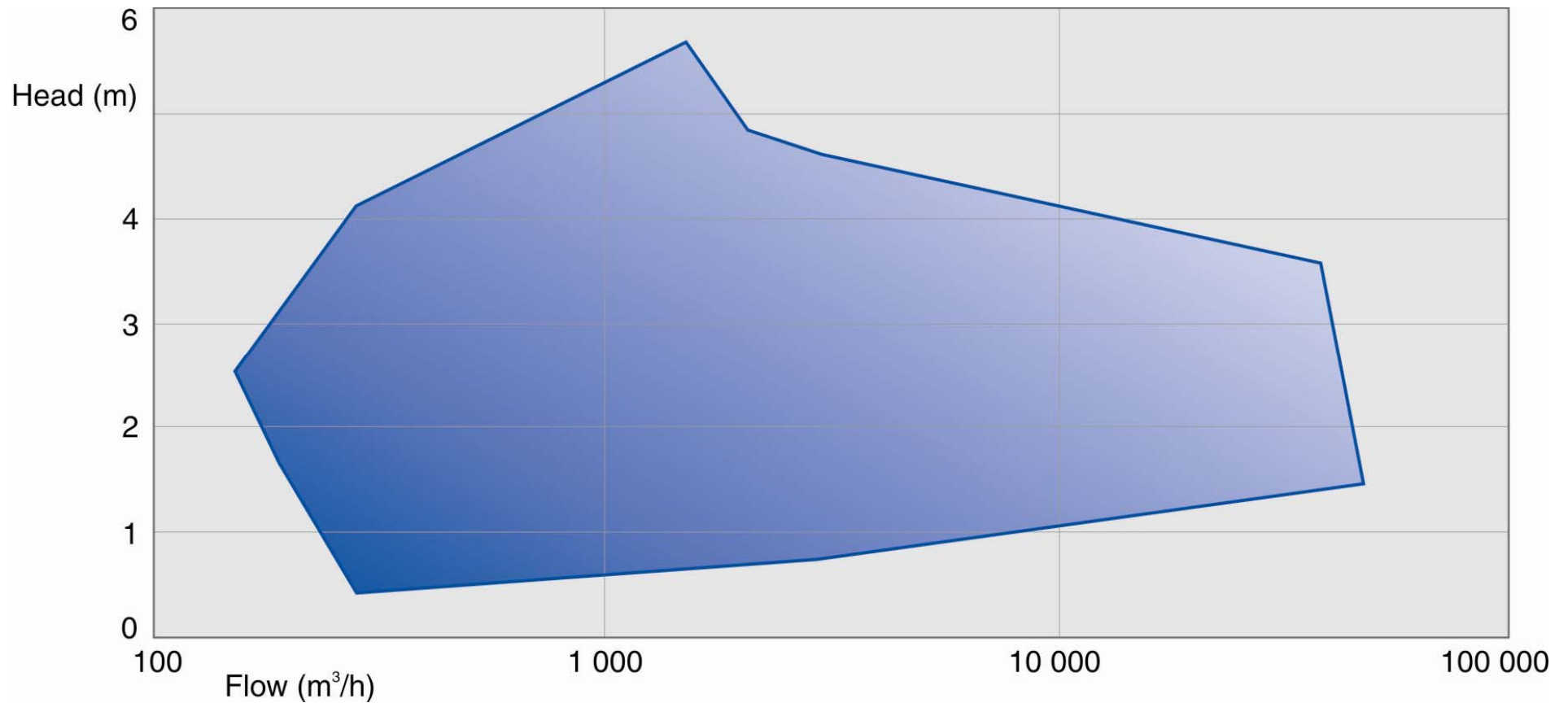
# SJP Large Vertical Pump

## SJP Performance Range: 60 Hz



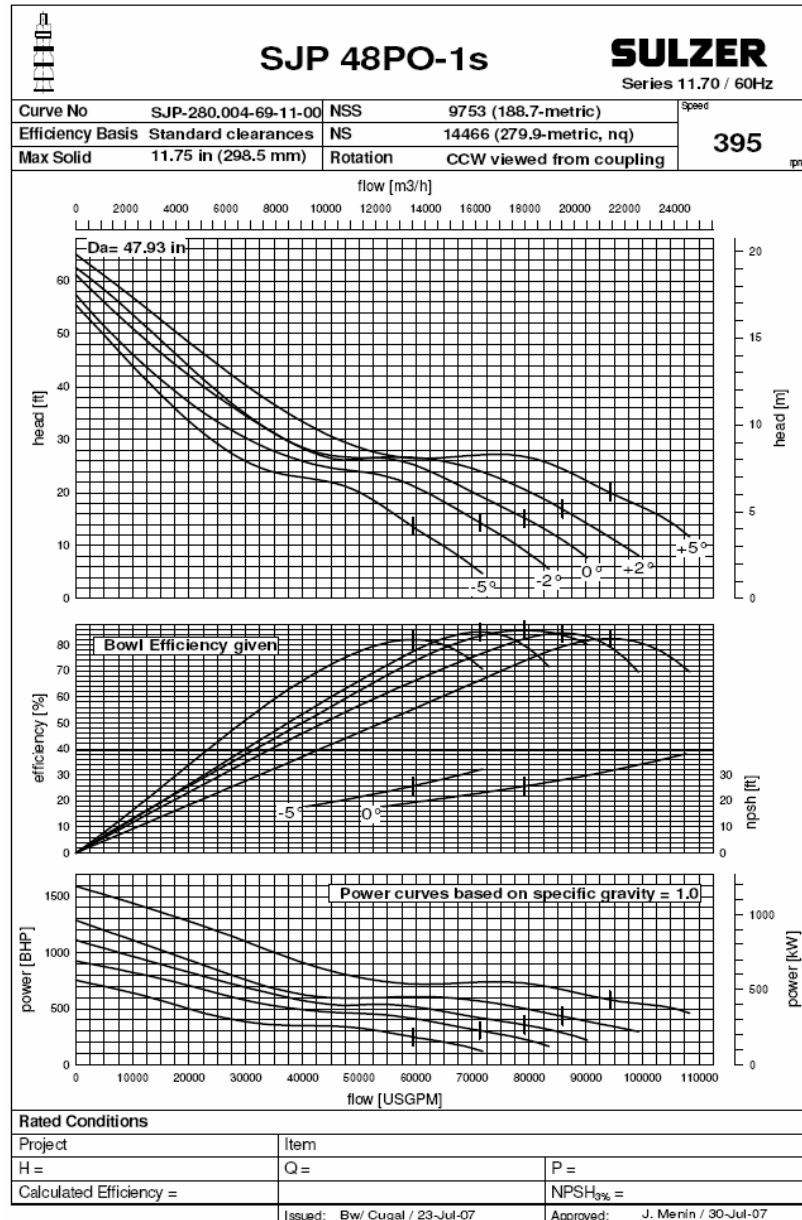
# SJP Large Vertical Pump

## SJP Performance Range: 50 Hz



# SJP Large Vertical Pump

## SJP sample Performance Curve

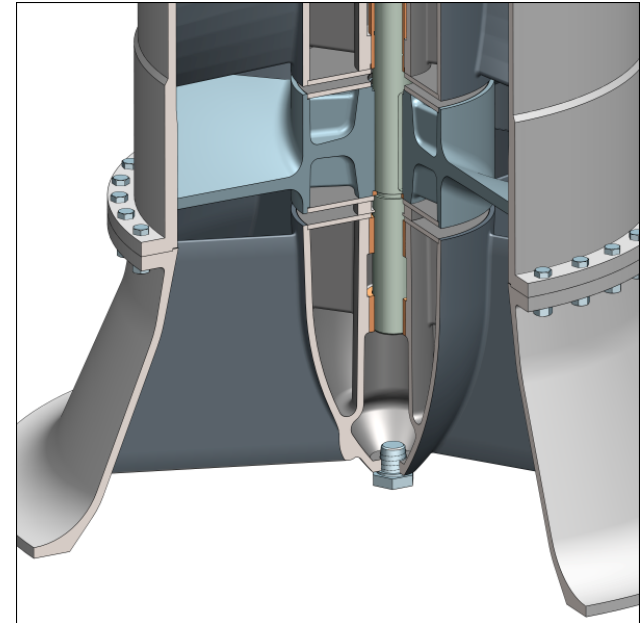


# SJP Large Vertical Pumps

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## SJP Design Features & Benefits: Bowl Assembly

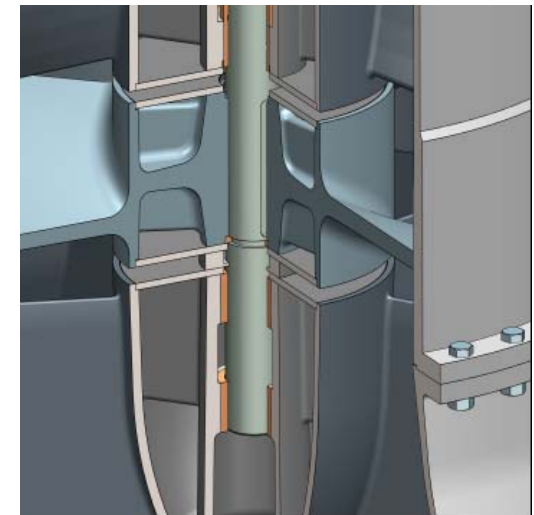
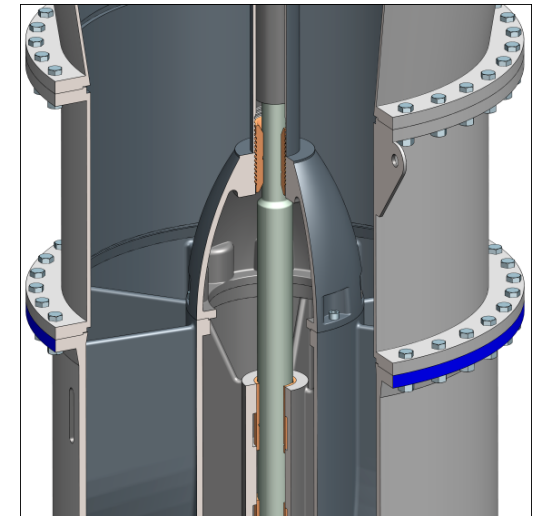
- The SJP is offered as a single stage unit only.
- Suction bells are cast construction, offered with a tail bearing (to minimize shaft deflection at impeller) and anti-vortex ribs on all sizes.
- Bowls are cast construction which are flanged and bolted together
- Fabricated bowl and suction bell construction available.
- A replaceable case liner is offered as an option in the bowl to increase bowl life when abrasive fluids are pumped. It also reduces maintenance cost.
- An optional strainer restricts entry of foreign objects into the bowl assembly.



# SJP Large Vertical Pump

## SJP Design Features & Benefits: Bowl Assembly (cont.)

- Bearing bushings are located in the bowl assembly to provide rotor support.
- Bearing bushings lubricated by the pumped liquid as standard. Oil or clean water flush is also available.
- Impellers are open design (propeller type) and are cast construction.
- The propeller is mounted on the pump shaft with a split axial retaining ring and key to allow easy disassembly.
- The propeller is dynamically balanced to reduce vibration.
- The pump shaft is tailor-made to the service needs and sized individually for each installation; sized for max. torque.



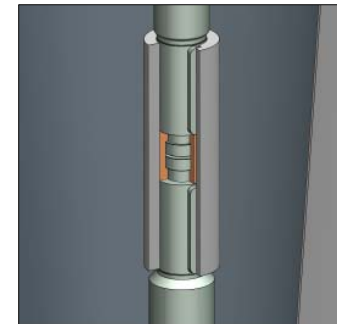
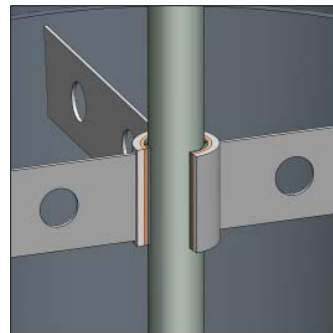
# SJT, SJM, SJP

## Large Vertical Pumps

### Design Features & Benefits: Column Assembly



- Column pipes are fabricated, flanged and bolted construction.
- Column pipes are to be sized for a fluid velocity of 12.5 ft/sec (3.8 m/sec) at BEP flow rate. Higher velocities are also possible upon request.
- Each column joint has a bearing spider which houses the replaceable bearing bushing:
  - drop-in bearing spider –  $\leq 14"$  (DN 350)
  - integral spider -  $16"+$  (DN 400+)
- Line shafts are connected by a threaded coupling for shaft diameters  $\leq 2.69"$  (68 mm). For larger shaft sizes the coupling will be a sleeve, split ring and key type.



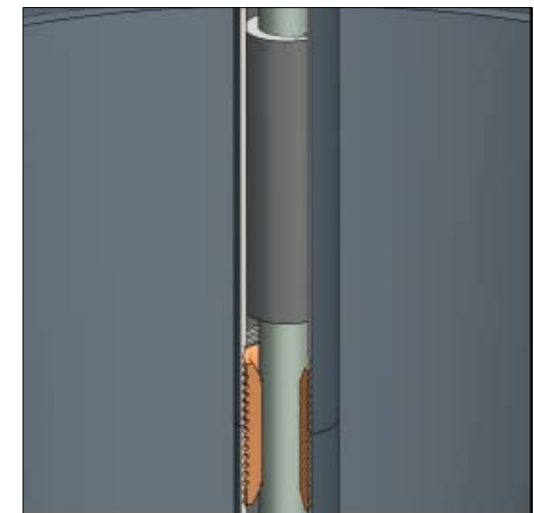
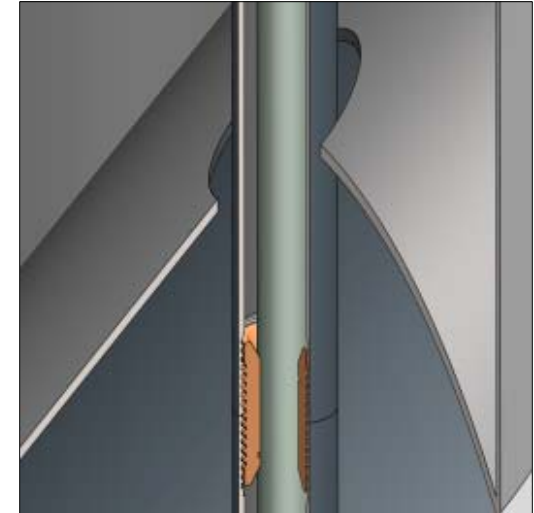


# SJT, SJM, SJP

## Large Vertical Pumps

### Design Features & Benefits: Column Assembly (cont.)

- Product lubricated column assemblies are offered as standard.
- Enclosed lineshaft is offered as an option. Oil lubrication, grease packed or clean water flush are all offered.
- The enclosing tube will be threaded together or flanged and held in tension by the tube tension nut.
- The tube is put into tension by a tube nut located in the stuffing box area of the discharge head. Proper bearing spans are maintained.
- A tube stabilizer will be supplied for every 30 ft (9 meters) of column assembly.
- The lineshaft will be sized to transmit the torque over the entire range of operation.



# SJT, SJM, SJP

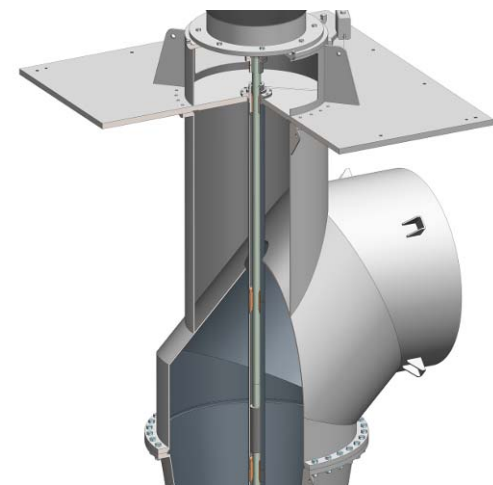
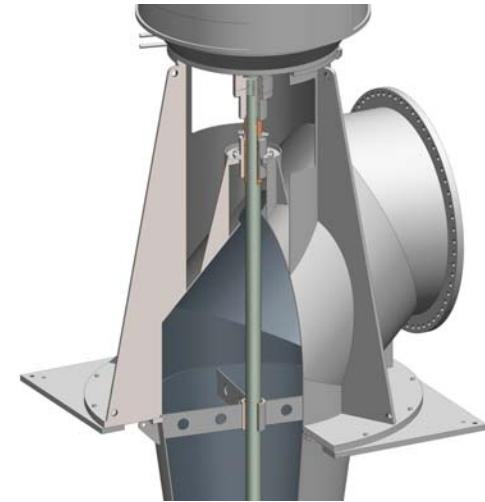
## Large Vertical Pumps

**SULZER**

Sulzer Pumps

### Design Features & Benefits: Discharge Head

- A fabricated discharge head is offered as standard.
- These heads are offered with f or plain end connection. flanges will be ANSI (AWWA C207 Class D).
- Each discharge head comes with segmented bend delivery nozzle and integral driver stand to support the driver.
- Window size will be large enough to allow easy.
- Access to removable packing/seal box and drive coupling.
- The discharge nozzle can be positioned either above or below ground.



# SJT, SJM & SJP Large Vertical Pumps

**SULZER**

Sulzer Pumps

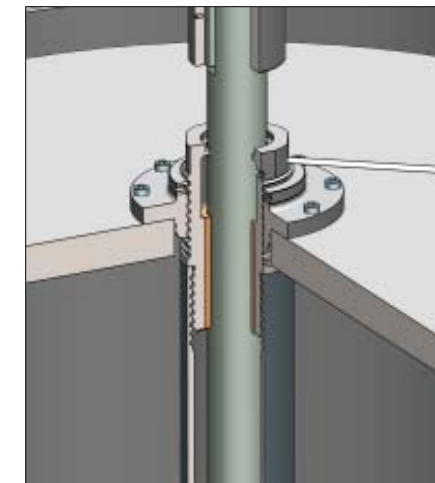
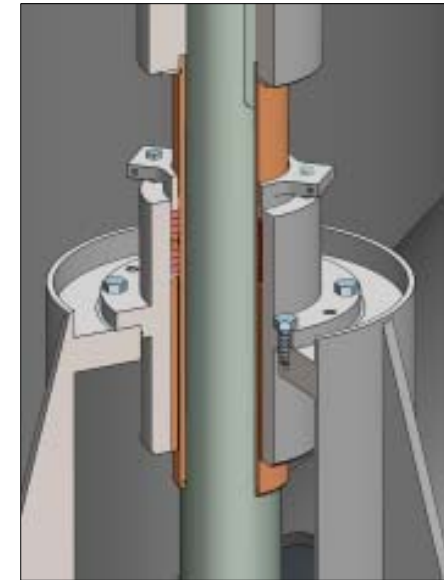
## Shaft Sealing Methods

### Product Lubrication

- Packed stuffing box is provided for reliable sealing and simple maintenance.
- By-pass packing box is used for higher pressure applications where some of the pressure in the stuffing box is by-passed back into the sump.
- Optional cartridge type mechanical seals are available.
- Headshaft sleeve offered as standard with product lubricated stuffing boxes.

### Enclosed Lineshaft for oil lubrication or clean water flush

- Shaft sealing is accomplished by packing below the tube tension nut.



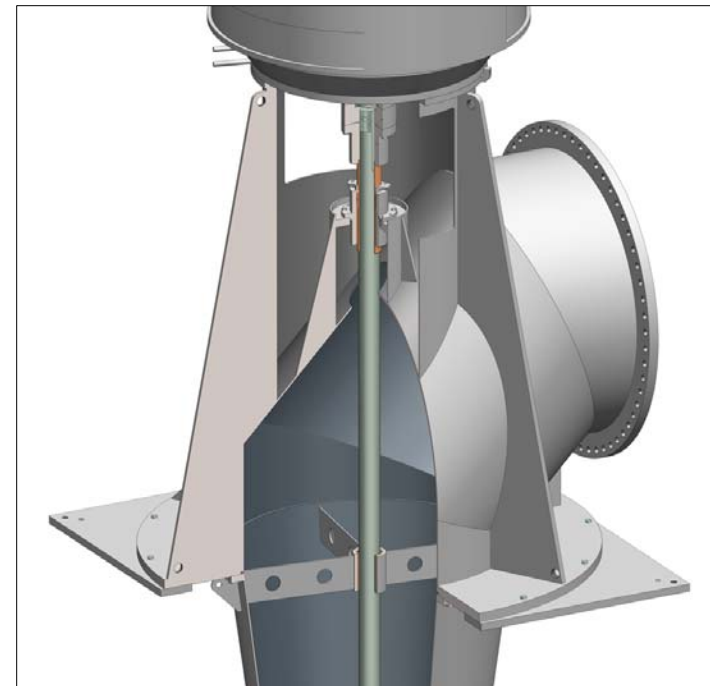
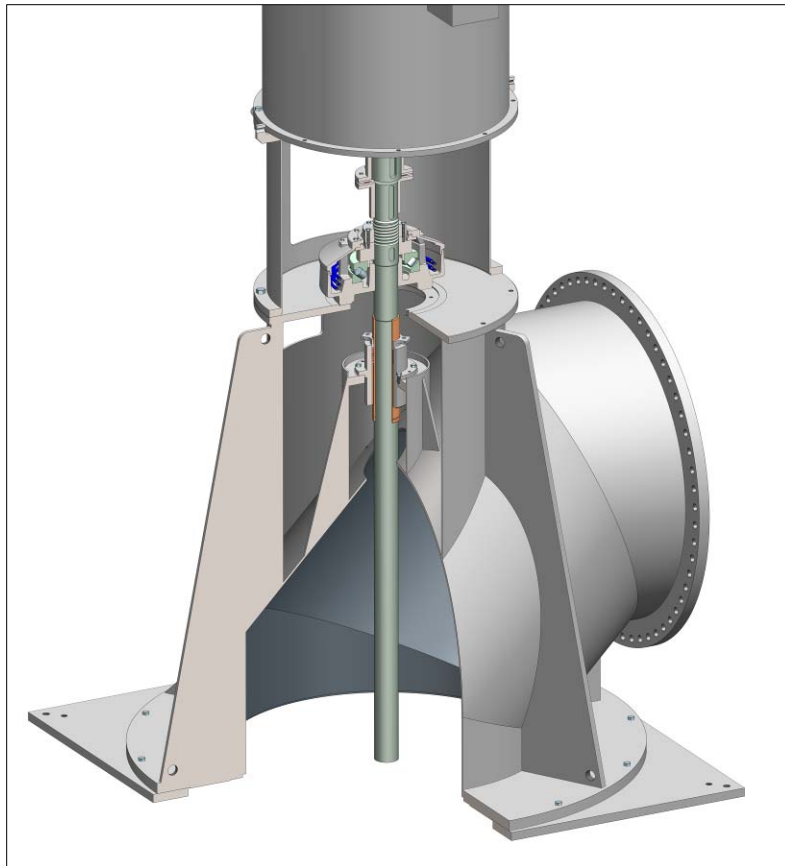
# SJT, SJM & SJP Large Vertical Pumps

## Thrust Bearing Location

**ISO Pump Design:** thrust bearing in pump

**US Pump Design:** thrust bearing in motor  
(offered in pump as an option)

← A separate fabricated **driver stand** is supplied to accommodate the thrust bearing when it is fitted in the pump.



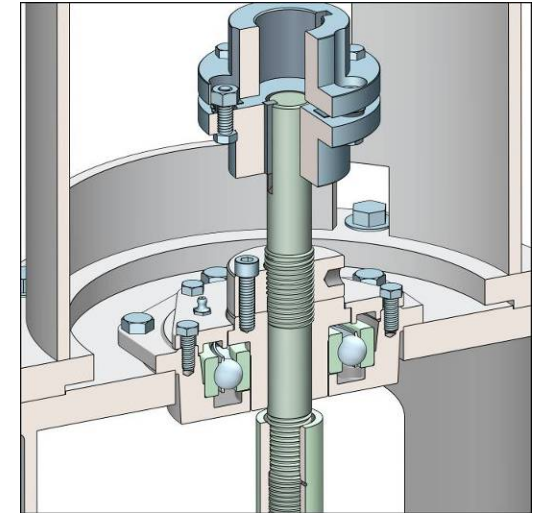
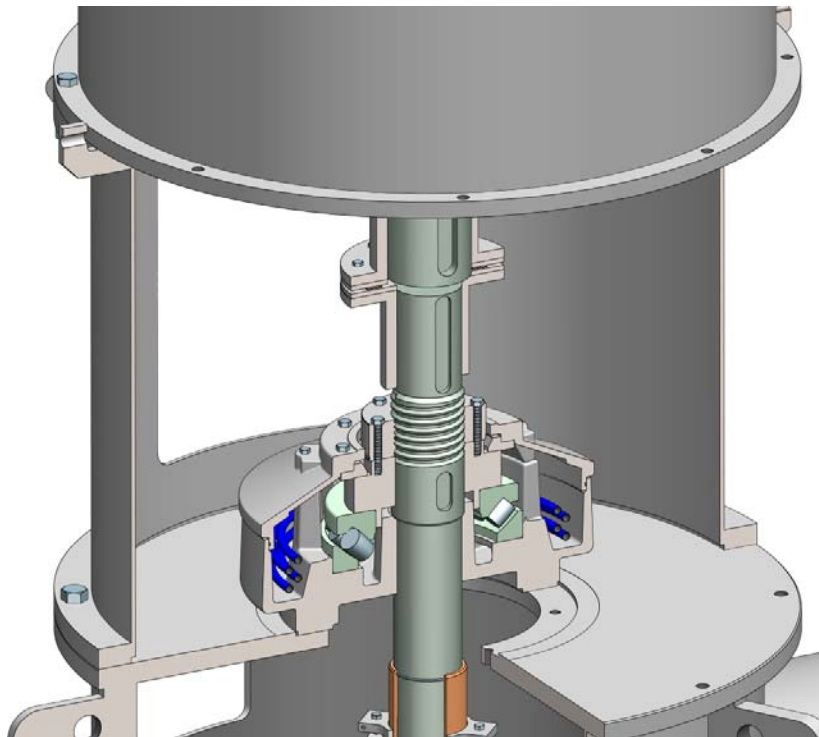
# SJT, SJM & SJP Large Vertical Pumps

**SULZER**

Sulzer Pumps

## Thrust Bearing Details (if supplied in pump)

- **VAL** – grease lubricated, angular contact bearing
- **VALS/VALR** – oil lubricated, spherical roller bearing  
VALS for open sump application  
VALR for suction barrel application



- To be selected for L10 bearing life of:
  - 25,000 hrs at BEP and
  - 16,000 hrs at Min Flow
- VALS/VALR are supplied with a cooling coil. (fan cooled design available upon request)

# SJT, SJM & SJP Large Vertical Pumps

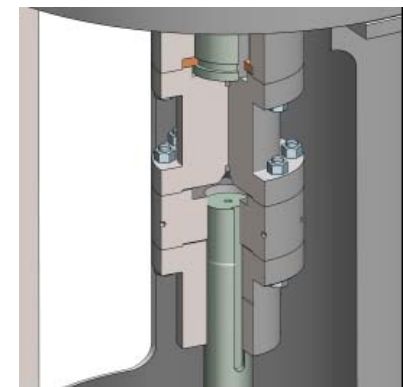
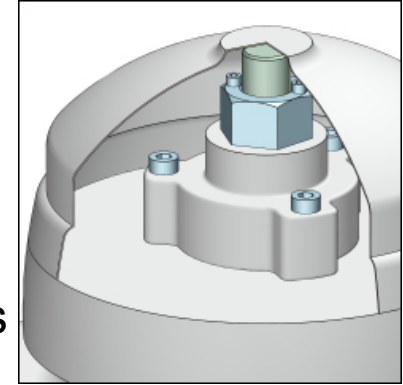
**SULZER**

Sulzer Pumps

## Driving Assembly

The driver and drive coupling for the large vertical pumps is one of the following:

- 1) vertical hollow shaft motor with a threaded drive coupling; axial thrust is carried in this motor.
  - Sulzer Pumps supplies the drive shaft and requires a steady bushing. The lift setting is made via an adjusting nut at the top of the motor.
  
- 2) vertical solid shaft motor with a flanged adjustable coupling (rigid coupling) with or without a spacer; axial thrust is carried in this motor.
  - The lift setting is made via an adjusting nut which is part of the rigid coupling assembly.



# SJT, SJM & SJP Large Vertical Pumps

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**SULZER**

Sulzer Pumps

## Driving Assembly (cont.)

3) vertical solid shaft motor with a flexible (disk type) coupling with or without a spacer;

axial thrust is NOT carried in this motor.

Thrust bearing required in the pump.  
The lift setting is made via an adjusting nut which is part of the thrust bearing assembly.

