



2<sup>nd</sup> Generation

# Submersible **Dredging / Slurry Pumpset** (PDSJ)

*Ultra Heavy Duty; Abrasion Resistant*



2<sup>nd</sup> Generation

# Submersible **Dewatering Pumpset** (PSSJ)

*Heavy Duty Submersible Pumpset*





## Why Submersible Pumps...?



- **Low Construction Cost** : Require no support structure as they operate directly in the slurry, drastically reducing space requirement.
- **Low Maintenance** : Mono Solid Rigid Shaft, Heavy Duty Double Mechanical Seals Design, Adequate Motor reserve Margin.
- **Plug & Play** : No Priming, No Greasing, No Gland Tightening and No Alignment required.
- **Noise levels** : Extremely low noise levels as operation is underwater.
- **Less Wear & Tear** : Bearings are isolated from Pumped liquid quality.
- **Flood Proof** : Submersible pump by definition is completely flood proof. In majority of plants there is always a risk of flooding which may endanger pump operation itself as well as prove to be a safety hazard.
- **Ease & Flexible Installation** : Submersible pumps are compact and robust & versatile design makes the pumps easy to handle in every situation. There are no alignment issues also with this design.
- **Cleaner Sumps** : In conventional horizontal design, there is limited access to traversing in the sump. Which lead to problems of sediment build-up especially when deeper sumps, more than 2m are involved.

## Why 2<sup>nd</sup> Generation of Submersible Pumps...?

The 1<sup>st</sup> Generation Submersible Pumps were designed for European conditions - however the operating conditions in India (& most Developing Countries) are drastically different (*much harsher on pumps*), like :

Aspect	Effect	1 <sup>st</sup> Gen. Sub. pumpset	Up gradation in Pullen's 2 <sup>nd</sup> Gen. Sub. pumpset	Benefits
<b>Spare Parts</b>	Cost Effectiveness & Ease of Local Availability are Essential for Least Life Cycle Cost & Minimum Downtime	<i>Expensive &amp; Imported</i>	<i>Due to Various Up-gradation &amp; Local Production; Spares Requirement is Much Lower &amp; Easily Available at Economic Rates</i>	<b>Easily Availability &amp; Very Short time</b>
<b>Drive End Bearing/s</b>	Mean Time between Maintenance & Cost	<i>Single Bearing - Frequent Failure</i>	<i>Heavy Duty, Dual Bearings</i>	<b>Reduced Cost &amp; Increased Life</b>
<b>Mechanical Shaft Seal/s</b>	Mean Time between Maintenance	<i>Single Mechanical Seal (without Backup/Secondary) - leads to Frequent Ingress of Water in Motor</i>	<i>Two Mechanical Seals for Dual Safety against Water Ingress into Motor</i>	<b>Reduced Motor Failure &amp; Prolonged Maintenance Period</b>
<b>Motor Chamber Fill</b>	Oil filled Motors require Frequent Checking / Changing	<i>Oil filled Motor</i>	<i>Air filled motor</i>	<b>No Periodic Maintenance/ Zero (Oil) Replacement Cost</b>
<b>Motor Cooling Jacket</b>	Solids Laden Liquid have a tendency to <b>settle down</b> within the Jacket leading to subsequent overheating of Motor (& finally failure)	<i>360° Jacket Annulus with multiple Dead Water x Low Velocity flows lead to higher risk of sedimentation within the Jacket</i>	<i>Side type design, Jacket with Pipe type Annulus with Zero Dead Water x High Self Flushing Velocity flows lead to Zero risk of sedimentation within the Jacket</i>	<b>No Risk of Motor Burnout even when Pumping Sedimentation Prone Slurries</b>
<b>Inbuilt Motor Protections</b>	-	<i>None</i>	<i>Provided with Intelligent Inbuilt Monitoring : 1) Bi-metallic thermal overload switches for Winding (BMS) &amp; 2) Primary Mechanical Seal Condition Monitoring in Oil Chamber</i>	<b>Easy Monitoring of Pumpset's Health &amp; Reduced Risk of Failure despite Operator's negligence</b>



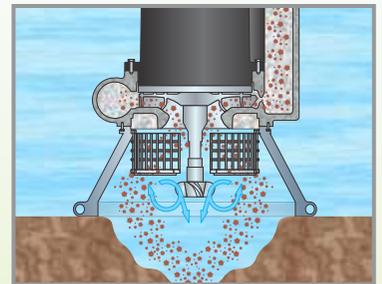
<b>Poor Electricity Supply</b>	Motor Insulation Stressing	<i>Premature motor burnout</i>	<i>Additional Mica (over &amp; above Glass Fiber Aramid) + Dual Vacuum Pressure Resin Impregnation (VPI); Pullen's Motor's Insulation has Extremely High stator Winding Di-Electric Strength.</i>	<b>Tolerates wide Voltage variation and Power Spikes &amp; Surges. Reduce Motor Failure &amp; hence Minimum Breakdown</b> Pullen's motors keep coolly working even in scorching Indian summers
<b>Higher Ambient Temperature</b>		<i>Generous Reserve Margins &amp; optimized design;</i>	<i>Generous Reserve Margins &amp; optimized design;</i>	
<b>Poor or defunct Solids Screening leading to high concentration of solids</b>	Poor or defunct Solids Screening lead to high concentration of solids which Choke / Clog the Impeller / Jacket leading to severe failure	<i>No Strainer / Screening provided - leads to drastic failure</i>	<i>Heavy Duty Suction Strainer is always provided to screen the entry of objectionable solids into the pumpset</i>	<b>Hugely Reduced Risk of Drastic Failures</b>
<b>Pump Output v/s Erosion</b>	Erosive Wear of Impeller-Wear Plates lead to drop of pump's output	<i>No adjustment mechanism - to restore pump's output; client needs to buy Expensive (&amp; often non easily available) Spare Replacements</i>	<i>Innovative Adjustable Design of Impeller - Back Wear Plate gaps</i>	<b>Sustainable Pump's Output at Zero Cost &amp; within minutes without dependency on pump manufacturer</b>

Hence, the performance of 1<sup>st</sup> generation of Submersible Pumps in India was below the mark. Pullen engineers realized this mismatch & hence the concept of PDSJ & PSSJ was born - they are the first 2<sup>nd</sup> generation of Submersible Pumps specifically redesigned/upgraded for rough operating conditions of developing countries.

### PDSJ ( Pullen Dredging / Slurry Submersible Pumpset )

Built in agitator forces high-energy streams onto the bottom, stirring & churning up sedimented material below the pump's suction. This effect in tandem with the resultant pressure differential between pump suction versus down pressure of agitator, thoroughly mixes & homogenizes the stirred up material, which is then sucked by the pump & discharged away.

Especially useful for bulk pumpage of slurries with large quantities of fast settling fine to solids (*Dredging, etc*).



**PDSJ\_10\_33\_4P\_A\_17kW\_W\_415**

Product Code:

Submersible Dredging/Slurry pumpset

DN (equ. Vol. size) : 10

Imp dia OR Column Size : 33

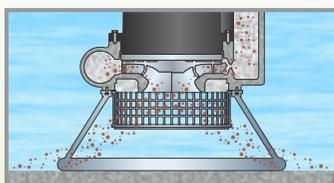
Pole : 4P

Rotor : A

Voltage : 415

Warm water : W

KW : \_\_17 / 18.5 / 22.5 / \_\_25 / \_\_30



### PSSJ ( Pullen Submersible Dewatering Pumpset )

The wide passage & liberal clearance hydraulics ensure non clog & wear resistant pumpage of slurries with fine grain solids.

**PSSJ\_10\_33\_4P\_A\_17kW\_W\_415**

Product Code:

Submersible Dewatering/Slurry pumpset

DN (equ. Vol. size) : 10

Imp dia OR Column Size : 33

Pole : 4P

Rotor : A

Voltage : 415

Warm water W

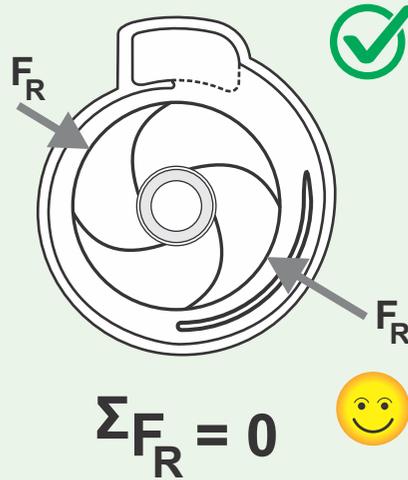
KW : \_\_17 / 18.5 / 22.5 / \_\_25 / \_\_30

## Benefits of "Pullen" 2<sup>nd</sup> Gen. Sub. Pumps

### Single Volute



### Double Volute

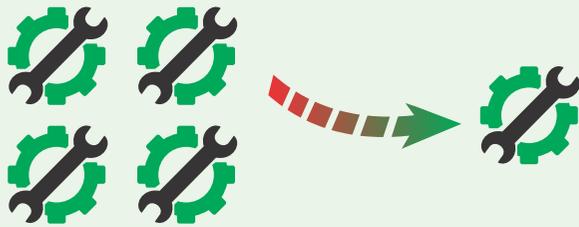


### Double Volute Design

#### ADVANTAGE OF DOUBLE VOLUTE CASING

An impeller, revolving in a single volute-shaped casing, is subject to an Unbalanced Side Thrust ( $F_R$ ) which causes vibration, deflection & rapid wear of the Bearings & Mechanical Seals.

We have provided a "Splitter Double Volute" design which Nullifies the two Opposing Side Thrusts at 180° resulting in net Zero  $F_R$  there by **prolonging seal & bearing life.**



**Saves (upto 75%) Spare Parts & Consumables**



**No need for Frequent Periodic....**



**Oil &/or Grease**



#### User Friendly

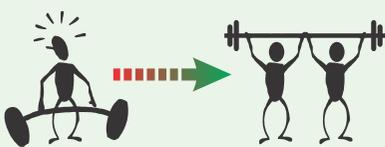
Easy low requirement & Easy & Cost Effective availability of indigenous Spare parts.



**Requires No Special Pre – Post / Ancillary-Auxillary Operations; like :**

**Operating & Maintaining the Forced Water Lubrication systems operation.**

#### Mechanical Seal & Bearing



**Single Capacity**

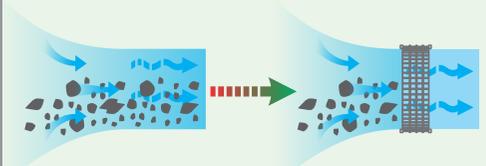
**Double Capacity**

#### Clog free Jacketing



The Unique Innovative design optimizes Jacket Geometry which forces out Solids & prevents their Settling within the jacket (& subsequent overheating).

#### Heavy Duty Suction Strainer



**Larger solids are screened out by the strainer screen**



#### Intelligent InBuilt Monitoring

Easy Monitoring (& Remote Control<sup>#</sup>) of your Pumpset's Health.

- **WTDs** in the form of Bi-metallic Switches (for All Pumpsets) & to Monitor Winding Temperature (without any Additional Cost)<sup>#</sup>.
- **PSLD** detects Pressurized Water Leakage from Mechanical Seals.
- **BTDs** in the form of Bi-metallic Switches to Monitor Bearing Temperature (without any Additional Cost)<sup>#</sup>. (Motor Rating  $\geq 30kW$ )

<sup>#</sup>requires additional communication hardware



## Design

# Rugged Design to the Core !

*(PSSJ Pumps are vastly similar to PDSJ, a major exception being that of Agitator)*

**Super Heavy Duty Motor :** Heavy Class "F" Insulated (*withing up to 155°C max Winding Temperature*). High Starting Torque & Generous Service Factor allows stall free starting even if the pump is fully buried under sedimented solids.

**Shaft :** Oversized, Rigid & Robust takes Shock Loads (*from impacting pebbles, mineral lumps, gravel, etc*) without damage.

**Four stage Cable Gland :** Ensures pressure resistant, cut resistant; Moisture Proof sealing (*even in case of protective inner sheath puncture*).

**Mechanical Seal Condition Monitoring :** Water leaking into the Oil Chamber (*from leakage of the Primary Mechanical Seal*) is Sensed (& displayed in the control panel for timely Tripage). Back up Mechanical Seal ensures that the pump can still be run for some time (*before the primary seal is serviced*).

**Oil Chamber :** Lubricates & cools both the Mechanical Seals ensuring that they can **endure dry running**.

**Hybrid Stuffing Box :** The Synergistic effect of Multiple Mechanisms (*of the stuffing box*) maintains Low Pressure & Very Low Solid Content (*near the Mechanical Seal*) thereby maximizing It's life multifold.

**Fasteners :** Corrosion resistant materials for long service life.

**Stand :** Heavy Duty, Wide Based, Robust Portable Stand for Topple Resistant resting (*even on unlevelled fluid beds*).

**Suction Strainer :** Larger solids which could foul the impeller-pump-pipe system are screened away by the strainer screen.

**Inbuilt Motor Protection :** Thermal overload protection protects the windings against burn out by cutting of the supply in case of overheating.

**Top Discharge :** Assures allows reduced Overall Dimensions of the pump enabling installation in confined spaces.

**Ultra Long Bearing Life :** Greased for Life, ultra heavy duty Anti Friction Bearings with L10h Life exceeding 1,00,000 hours.

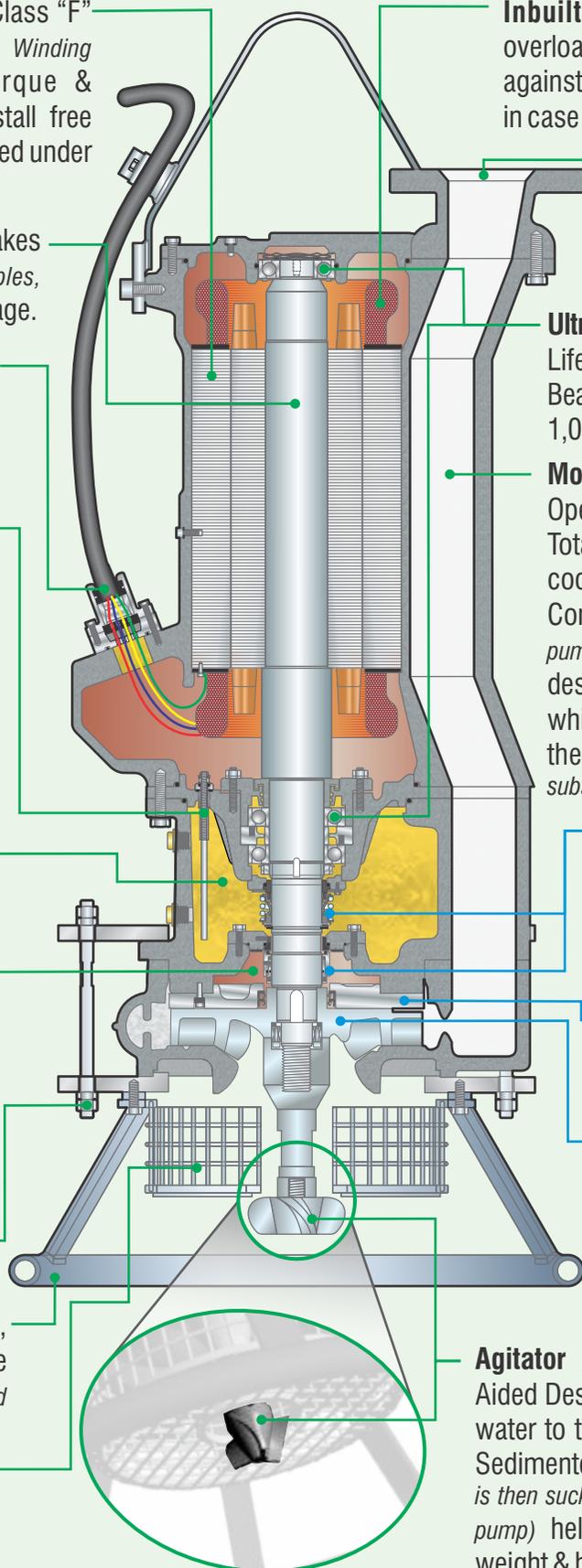
**Motor Cooling design :** ensures Safe Operation in both Fully Submerged or Totally Open (*motor end*) due to motor cooling vide the Inbuilt Self Sufficient; Convection Cooling system (*utilizing pumped Liquid*). The Unique Innovative design optimizes Jacket Geometry which forces out Solids & prevents their Settling within the jacket (& subsequent overheating).

**Mechanical Seals :** Two, Independent; Bi-Directional rotational Mechanical Seals (*with the primary seal of Silicon Carbide faces for superb erosion resistance*).

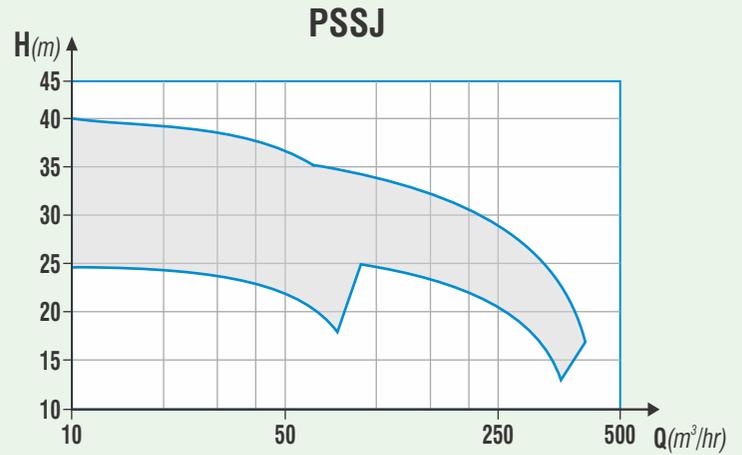
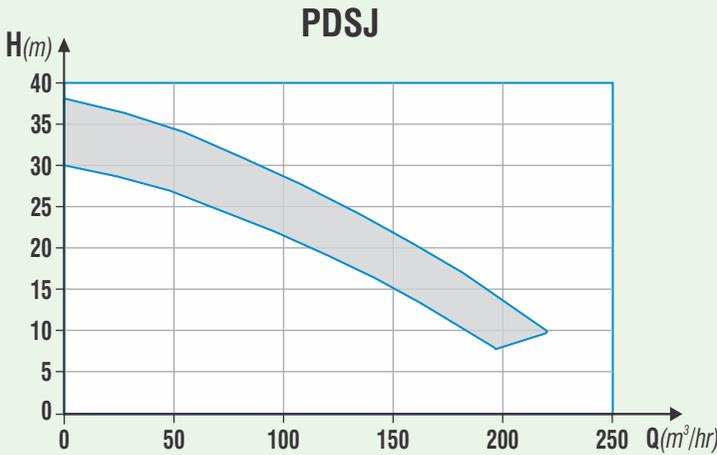
**Wear Plates :** Abrasion Resistant, Generous Thickness for Extra Life.

**Impeller :** Computer Aided Design, Semi Open Non Clogging Impeller with Wide Passages for Homogenous Flow & Low Wear Rates for extended service life.

**Agitator (for PDSJ Pump only) :** Computer Aided Designed, Agitator forces streams of water to the bottom thereby stirring up the Sedimented Solids into Suspension, (*which is then sucked up by the impeller & discharged by pump*) helps pump up to 80% solids by weight & has a Fool Proof securing design.



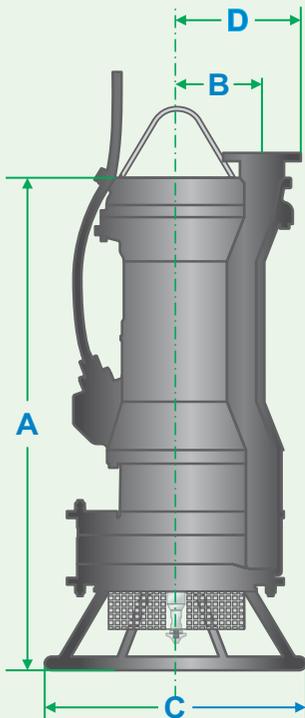
## Typical Performance Range



## Standard Technical Specifications

Description		PDSJ	PSSJ
<b>Pump Size</b>	<b>DN</b>	100 mm	50 & 125 mm
<b>Capacity</b>	<b>Q</b>	upto 220 m <sup>3</sup> /hr	upto 400 m <sup>3</sup> /hr
<b>Head</b>	<b>H</b>	upto 38 m	upto 37 m
<b>Motor Rating</b>	<b>P</b>	18.5 & 30 kW	7.5, 15, 22.5, 30, 37, 45 kW
<b>Liquid Ambient Temperature</b>	<b>T</b>	upto 90° C	upto 55° C
<b>Speed (synchronous)</b>	<b>n</b>	1500 rpm	3000 & 1500 rpm
<b>Duty</b>		S1 & IP68	S1 & IP68
<b>Power Supply</b>		3 Phase, 415V (or 550V)	3 Phase, 415V (or 550V)
<b>Concentration of Solids</b>		upto 65% by weight	-
<b>Slurry Specific Gravity</b>		upto 2.8	-

## Dimensions & Weight



Description	Unit	PDSJ	PSSJ	
<b>Pump DN Size</b>	mm	100	50	125
<b>Motor Speed (syn)</b>	rpm	1500	3000	1500
<b>Maximum Particle Size</b>	mm	40	10	40
<b>Pumpset Weight</b>	kg.	~700	~250	~650
<b>Dimensions in mm</b>	A	1485	810	1450
	B	245	150	245
	C	740	285	740
	D	355	190	370
<b>Minimum Liquid Submergence</b>	mm	450	250	450
<b>Minimum Sump Size based on pump dimensions</b>	mm (LxWxD)	1650 x 740 x 1650	920 x 400 x 920	1650 x 740 x 1650
<b>Maximum Liquid Submergence Depth</b>	m	40	40	40
<b>Top Discharge Delivery Flange Drilling</b>	Standard as per	IS 1538	EN-1092/2, PN 10	IS 1538
	mm	PCD : 180	PCD : 125	PCD : 210
	mm	Dia : 19	Dia : 19	Dia : 19
	Nos.	Nos : 8	Nos : 4	Nos : 8
<b>Special</b>	Various range / design combination customized built shall also provided.			

## Material of Construction (MoC)

### PDSJ

Description	Standard Construction				Options
	Commercial Name	DIN Standard	ASTM/AISI Standard	JIS Standard	
<b>Pump Casing</b>	High Chrome Iron (HiCr 27 / 400)	1695-GX 300 Cr. Ni. Si- 9 5 2	High Chrome Cast Iron ASTM 532 Alloy III A	—	CA 15
<b>Impeller</b>	High Chrome Iron (HiCr 27 / 400)	1695-GX 300 Cr. Ni. Si- 9 5 2	High Chrome Cast Iron ASTM 532 Alloy III A	—	CA 15
<b>Agitator</b>	CA 15	J91150	ASTM A217	—	High Chrome Iron (HiCr 27 / 400) CF3M, CD4MCu
<b>Motor Casing, Cable &amp; Oil Chamber</b>	Grey Cast Iron, IS 210, Grade FG 260	GG25-JL 1040	A48-76, 30	FC200	ASTM A743, SS 136 / CF8M
<b>Shaft</b>	AISI 410	W.-nr 1.4400	410	STS429 J2	AISI 431
<b>Fasteners</b>	SS 304 (A4)	W.-nr 1.4400	304	SUS304	SS 316 (A4)
<b>Mechanical Seal (Primary)</b>	SiC vs SiC (Enclosed spring)	SiC vs SiC	SiC vs SiC	SiC vs SiC	—
<b>Suction Strainer</b>	SS 304	W.-nr 1.4400	304	SUS304	SS 316 (A4)

Other Materials to suit exacting requirement are also available on request. Material pairing depends upon liquids & duty.

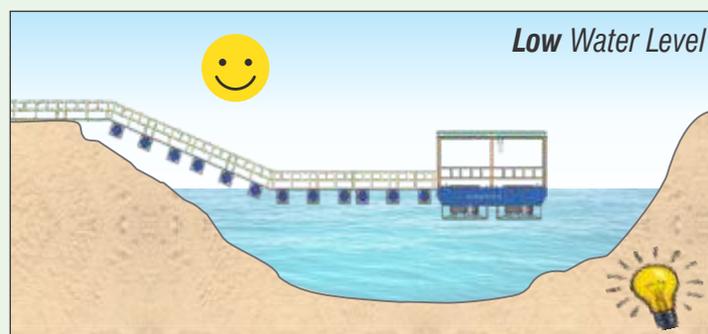
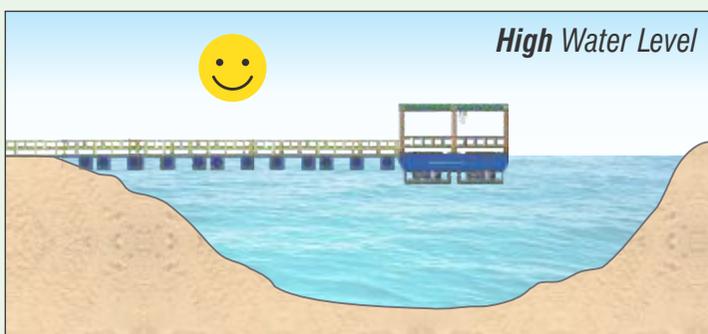
### PSSJ

Description	Standard Construction				Options
	Commercial Name	DIN Standard	ASTM/AISI Standard	JIS Standard	
<b>Pump Casing</b>	Grey Cast Iron, IS 210, Grade FG 260	GG25-JL 1040	A48-76, 30	FC200	Ductile Cast Iron, Stainless Steel
<b>Impeller</b>	CF8	W.-nr 1.4400	304	SUS304	C8M, CF3M, CD4MCu, ASTM A744, CA 15
<b>Motor Casing, Cable &amp; Oil Chamber</b>	Grey Cast Iron, IS 210, Grade FG 260	GG25-JL 1040	A48-76, 30	FC200	Ductile Cast Iron, Stainless Steel
<b>Shaft</b>	AISI 410	W.-nr 1.4400	410	STS429 J2	AISI 431
<b>Fasteners</b>	SS 304 (A2)	W.-nr 1.4400	304	SUS304	SS 316 (A4)
<b>Mechanical Seal (Primary)</b>	SiC vs SiC	SiC vs SiC	SiC vs SiC	SiC vs SiC	—
<b>Suction Strainer</b>	SS 304	W.-nr 1.4400	304	SUS304	SS 316

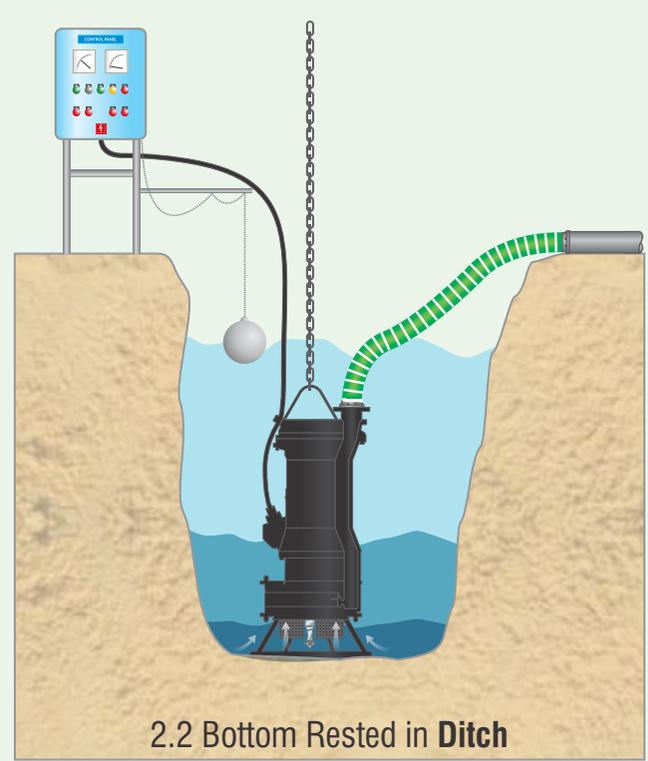
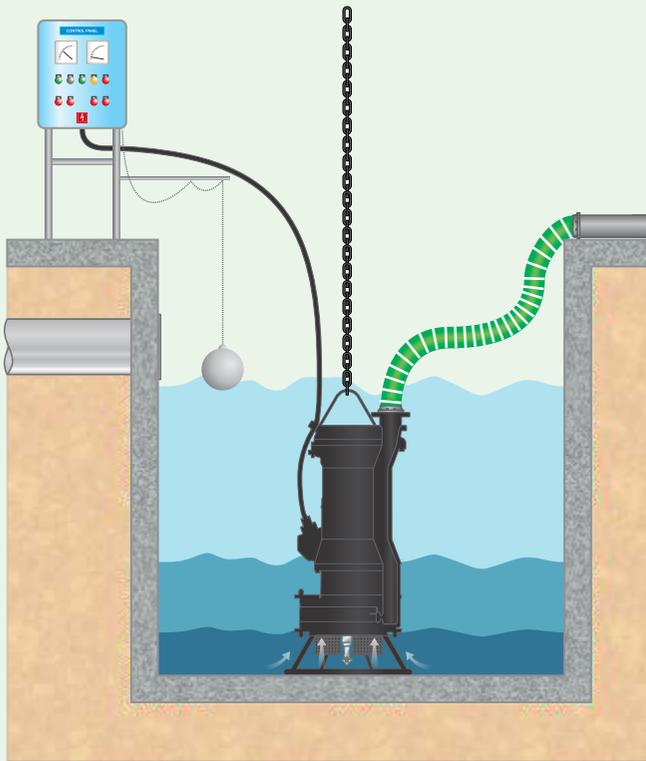
Other Materials to suit exacting requirement are also available on request. Material pairing depends upon liquids & duty.

## Installations

### 1. Floating Pontoon Pumping Station



## 2. Vertical Portable Bottom Rested



2.2 Bottom Rested in **Ditch**

## Typical Pumping Applications

### 1. Dewatering & Desilting of Dry Docks



Dry docks need to be dewatered before maintenance/repairs on vessels can be started. The vessel floats in brackish water having a very high content of silt, sand, shells & weeds. Metallic swarf from welding, gas cutting, etc processes is also added to this water.

The ability of PDSJ/PSSJ pumps to startup with severe sedimentations of abrasive silt, sand & swarf; makes them ideally suited to these conditions. They dewater as well as desilt thereby obviating the need for secondary desilting.

The PDSJ pumps can start up even under severe sedimentation!

Typically placed in the collection pit they are also run at frequent intervals to handle leakage from the gates.

## 2. Metal Industry

Pullen slurry pump installation in the steel plants for mill scale (*High chrome cast iron recommended for excellent abrasion resistance*) transportation is considered one of the toughest applications for slurry pumps. Water from the cooling process is collected in sumps. This water has a high content of mill scale, which is normally very abrasive.

These particles are often separated & water is re-used in the cooling process.



- Mill Scale Removal.
- Slag Transportation.
- Wet Scrubber Effluents.
- Iron Powder.
- Transportation.
- Machine Tool Cutting.
- Grinding Circuits
- Floor Sumps
- Tailing
- Hydro-Cyclone Feed
- General Purpose (*mineral*)
- Slurry

## 3. Thermal Power & FGD



Pullen slurry pump installation in the thermal power plants for ash handling application (*High chromium steel used for excellent abrasion resistance*).

- Bottom Ash Pumping
- Fly Ash Pumping
- Ash Handling Plants
- FGD Feactor Feed (*lime*)
- FGD Feactor Discharge (*gypsum*)

## 4. Mining (*Ore Slurry / Coal Slurry*)



Pullen slurry pump installation in the coal mines for coal slurry application. Coal washing requires the service of rugged pumps able to withstand liquids containing coal particles & grit.

- Hydraulic Back Filling.
- Mine Water (*with solids*).

## 5. Pulp & Paper



- Lime & Caustic Mud.
- Reject Pulp (*Containing Sand*).
- Solids from Debarking.
- Hydraulic Transportation of Wood Chips.
- Floor Spillage Pumps.
- Paper Filler and Coating Slurries.

## 6. Coal Handling Plant (*CHP*)



- Coal Storage Slurry Pumping.
- Coal / Water Mixtures.
- General Purpose.
- Coal Sluicing.
- Froth (*Coal*).

## 7. Construction



### Dewatering & Dredging of Cofferdams / Caissons Ballast

Construction in the Vicinity of Water Bodies invariably leads to Water, Silt & Gravel Seepage. Caissons / Cofferdams have to be Dewatered & Dredged before Concreting. Our Pumps are Fully Portable, can be Quickly Commissioned & Dredge out the Ballast without much Fuss.

- Wash Water (*sand and gravel*).
- Sand Transportation.
- Underground Tunnel Dewatering.
- Drainage Pump.
- Building Construction Dewatering.
- Pipe Line Laying Dewatering.
- Excavation in Tunnels, Underpass Railway, Metro Stations.

## 8. Quarry / Hydro Power Stations



Pullen Slurry Pump installations in the Stone / Marble Granite Quarry & Hydro Power Stations. Suitable for Raft Installation or Permanent Installation for Pumping Solids containing Groundwater or Flood Drainage or for Transfer of Slurries Comprising Sand & Gravel Products.

## 9. Waste & Recycling



- pH Neutral Effluent Handling.
- Hydraulic Transportation of Light Waste.
- Soil Treatment.

## 10. Others

- Cement Plants.
- Intake Well / Sump Cleaning.

## Pump Control Panel & Monitoring Unit

### Features of Fully Auto “Pullen” Control Panel



- Auto-Manual Mode Select using Auto-Manual Selector Switch.

#### A. AUTO MODE :

Control Panel Works in Auto Mode using Float Switch or Sensors. When the level reaches a high Pump start and when the level reaches a low Pump will stop automatically. Automatic features are also available with a time switch. So, the pump starts at a pre-determined time with a reference Float switch or sensors.

#### B. MANUAL MODE :

Control Panel Works in Manual Mode using Start / Stop Push-Buttons Provided on Panel Door.

- Control Panel up to 5.5 kW with DOL Starting, 7.5 to 45 kW with Star-Delta Starting (*ATS Starting or Micro-Processor Soft Start also Available*).

### Protection of Fully Auto Control Panel

Short Circuit & Over Current Protection (*MCB/MCCB*).

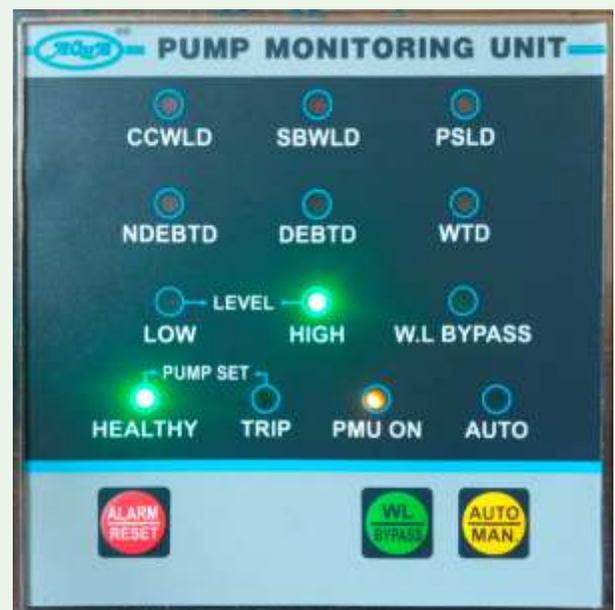
- Overload Protection.
- Phase Failure Protection.
- Phase Loss Protection.
- Under Voltage / Over Voltage Protection.
- Control Panel enclosure Protection up to IP54.

### Optional Features of Fully Auto Control Panel

- Control Panel enclosure Protection up to IP65 with Canopy.
- Control Panel with Electronic Motor Protection.
- Control Panel with Earth Fault Protection.
- Control Panel with PLC Compatible.
- Control Panel with Type “2” Co-ordination.
- Additional Features as per Customer Requirements.

### Pump Monitoring Unit (PMU)

- Intelligent InBuilt Monitoring for Easy Monitoring of Pumpset's Health.





*Aqua has been awarded the Prestigious  
Best Quality Pump Vendor*

by



**A Pan India Support set up**



**Some of Our Other Products**



**Submerged Turbine Pumpsets (AVT)**



**Submerged Centrifugal Pumpsets (SCF)**



**Dry Pit Installed Submerged Centrifugal Flood Proof Pumpsets (ARFP)**



**Non Clog Submersible Sewage Pumpsets (ANS)**



**Pontoons & Walkways**



**Submerged Elbow Pumpsets (AES)**



**Submerged Mine Dewatering Pumpsets (AMS)**



**Submersible Slurry Hydro Electric Pumpsets (ASSHE)**



**Submersible Slurry Pumpsets (ASS)**



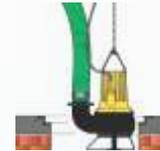
**Submerged Tubular Column Pumpsets (ATB)**



**Dry Pit Installed Non Clog Flood Proof Submersible Pumpsets (ANFP)**



**Ultra Compact Submersible Sewage Pumpsets (Scavenger)**



**Submersible Sewer Manhole Pumpsets (AM)**

**Spacious & State of the Art Plant...**

**Centralized Quotation Cell :**  
marketing@aquapumps.com  
(+91-80001 53324)

**After Sales & Services :**  
service@aquapumps.com  
(+91-90167 53328)  
(+91-98259 51116)

**Feedback :**  
ajp@aquapumps.com



**Aqua Machineries Private Limited**

[www.aquapumps.com](http://www.aquapumps.com)

**Registered Office & Manufacturing Plant**

Survey No. 504/1-2, 442/2, Near Haridarshan Estate, Near Express Highway, Ramol, Ahmedabad-382 445. Gujarat, India.