

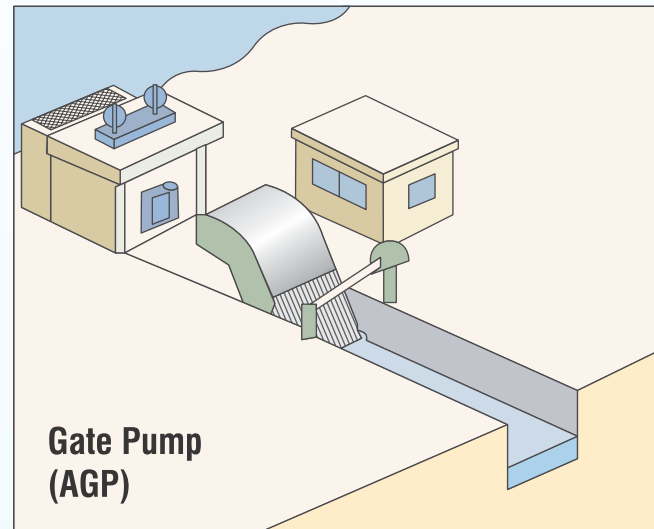
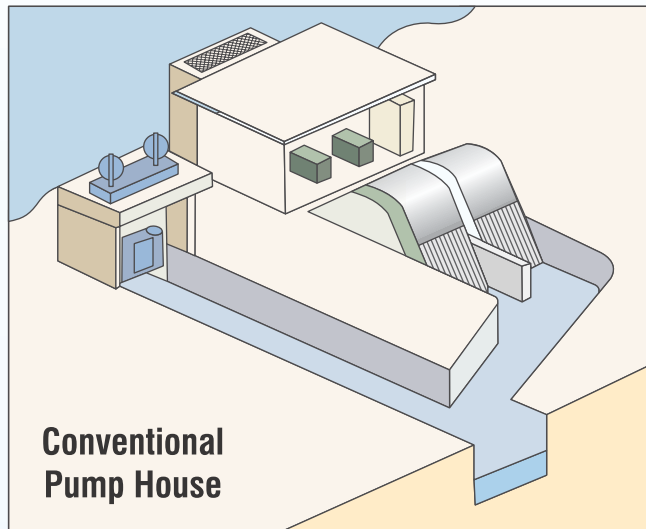


Gate Pumps... AGP

Evolutionary Integration of Submerged Pump into a Gate enables Ultra Compact & Energy Efficient Drainage Pumping Stations



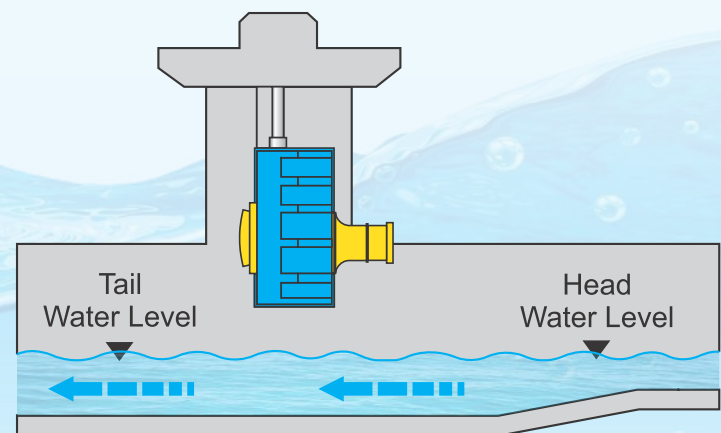
Concept



- Multi Functional - works both as a Gravity Flood Gate as well as Pumped Gate
- Ultra Low Land Space required for Pumping Station - in many cases, Pumping Station will not be required at all.
- Low Construction Gestation Time, Hassles & Cost
- Ultra Low Maintenance Cost Construction Period
- Existing Flood Gates can be Utilized (with modification)
- Low Energy Consumption & Connected Load Requirement
- Inherently compatible for Automation

Operation

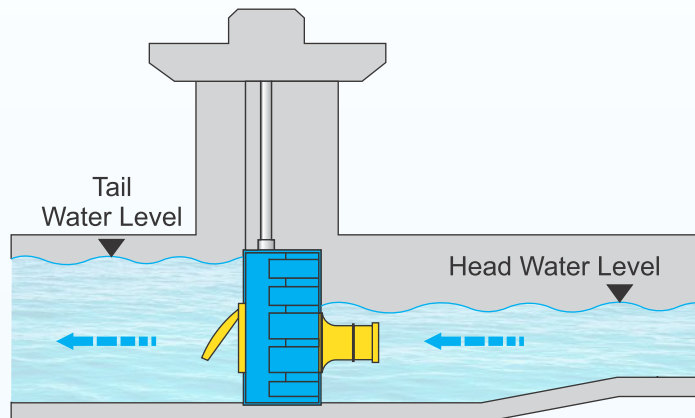
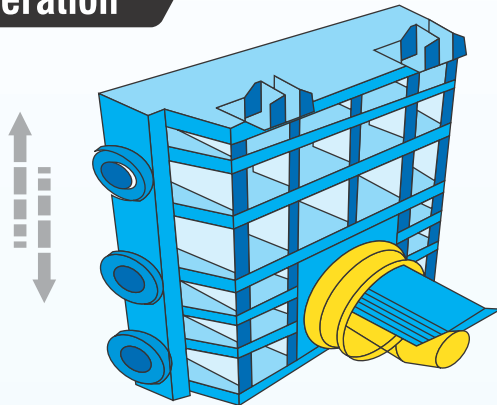
Horizontal Pump-Vertical Sluice Gate



- When the Tail water level is lower (than Head WL); the Gate Pump (& the Screen (if)) will be pulled up (lifted above) so that Gravity flow will drain the waste water without Energy consumption (without pumping).
- However, when the Tail WL rises above the Head WL; the Gate Pump (& Screen (IF)) will be Lowered (Swinged downwards) to seal the Reverse entry of water into the Nallah.
- If the Nallah WL rises to a pre-determined level; the Gate Pump (& Screen (IF)) will be automatically operated in order to pressurize force the nallah head water to the other side of the Gate- i.e. the Tail end.
- When exterior water level is lower than that of interior water, Gate Pump (& Screen (IF)) will again be opened so that gravity flow will discharge Head water toward Tail Water.

Horizontal Pump-Vertical Sluice Gate

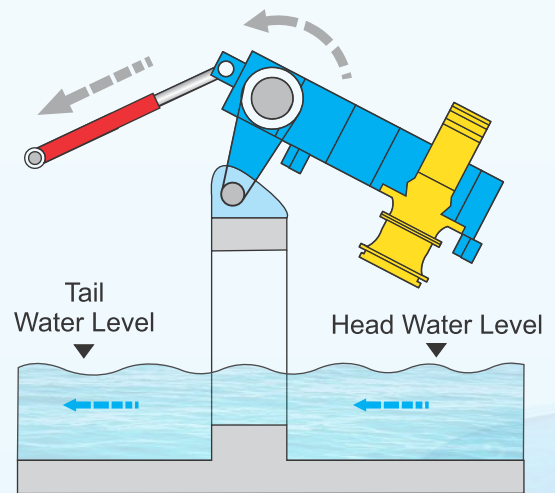
Operation



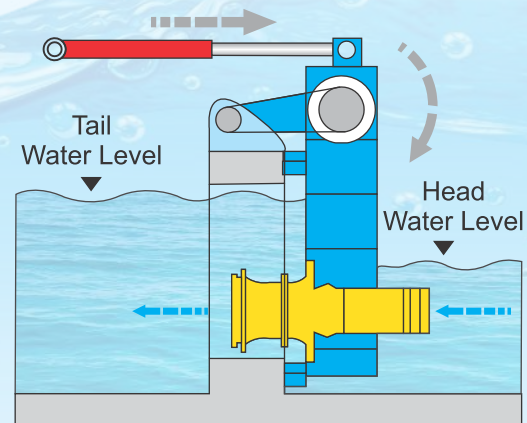
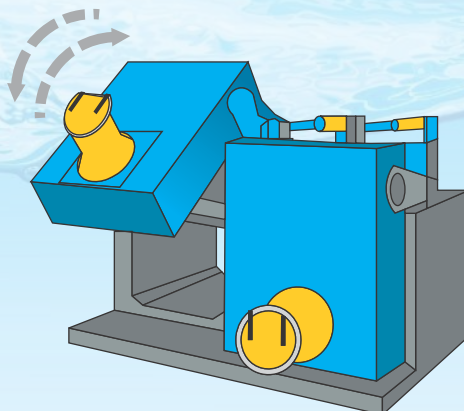
- When exterior water level is lower than that of interior water, Gate Pump (& Screen (IF)) will again be opened so that gravity flow will discharge Head water toward Tail Water.

Operation

Horizontal Pump-Hinged Gate



- When the Tail water level is lower (than Head WL); the Gate Pump (& the Screen (if)) will be pulled up (lifted above) so that Gravity flow will drain the waste water without Energy consumption (without pumping).



- However, when the Tail WL rises above the Head WL; the Gate Pump (& Screen (IF)) will be Lowered to seal the Reverse entry of water into the Nallah.
- If the Nallah WL rises to a pre-determined level; the Gate Pump (& Screen (IF)) will be automatically operated in order to pressurize force the nallah water to the other side of the Gate- i.e. the Tail end.
- When Tail water level is lower than that of head water, Gate Pump (& Screen (IF)) will again be opened so that gravity flow will discharge head water.

Benefits of Gate Pump

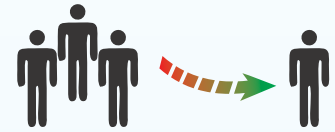
Gate Pump - to substitute pump station



Saves (upto 55%) Land Requirement*



Saves (upto 45%) Capital Cost of Entire Pumping Station*

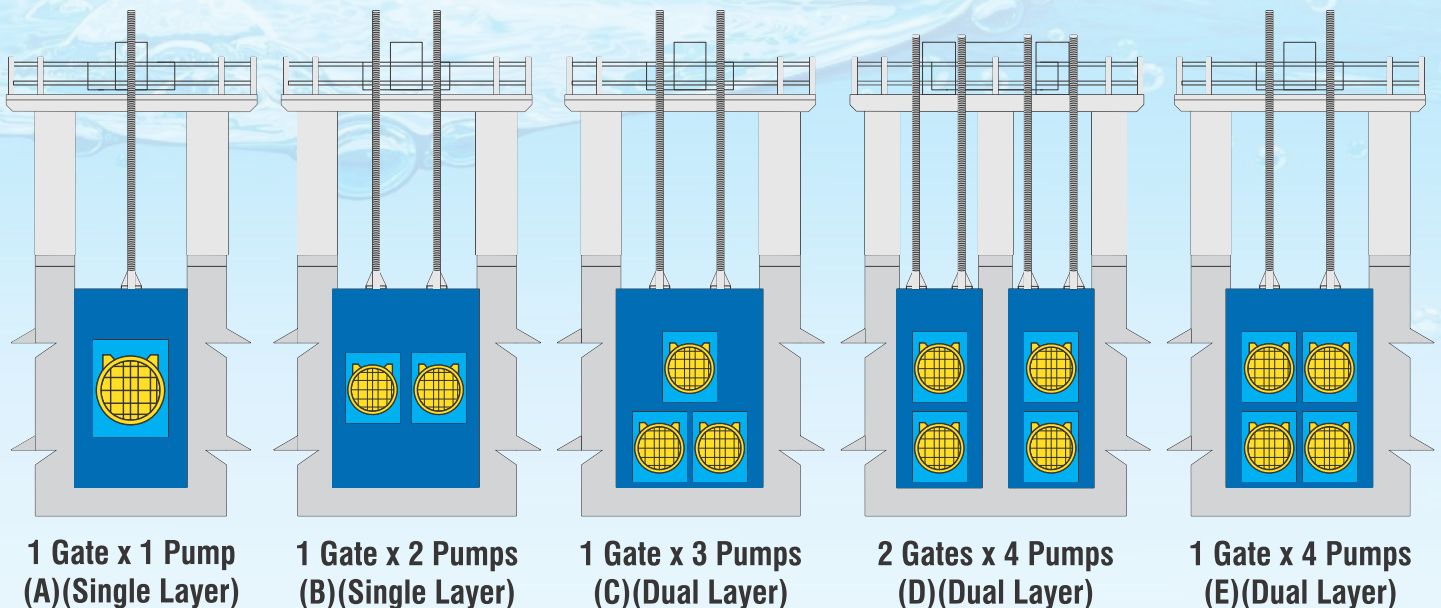










































Saves (upto 66%) O&M Staff*

Description	Conventional Pump Station	Gate Pump
Pump type	Vertical	Horizontal
Area Required	100	55-65
Mech Electrical Cost	100	45-55
Civil Cost	100	45-55
O & M Cost	100	75
Pump Room	Required	Not Required
Reservoir	Required	Channel itself is used as a reservoir
Flood Gate	Required	Gate pump used for flood gate

Aqua **Gate Pump (AGP)** series has been developed as an evolutionary system which integrates our robust Submerged Axial Flow pump & Gate into a single system. These can be installed in existing water channels hence large spacious sumps & pumping stations are not necessary.

Typical Configuration Options

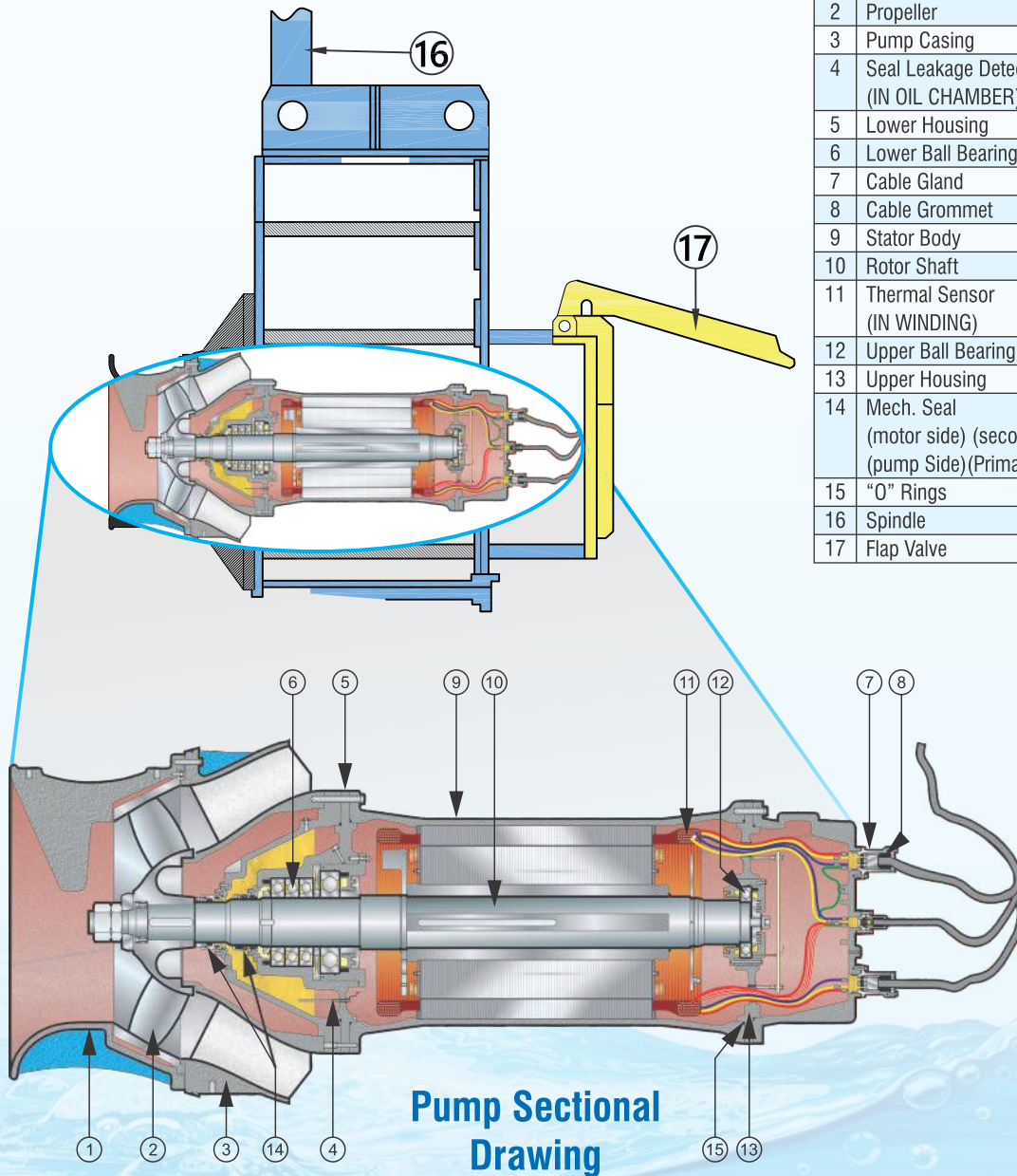


Model (AGP)	Number of Pumps	Schematic Layout	Minimum Channel Breadth x Height (m)	Flow Rate* (m ³ /hr)	Pumpset Rating (kW)
700A	1		1.65 x 1.50	3810	45 ~ 110
700B	2		2.80 x 1.50	7620	(45~110)*2 = 90~220
700C	3		2.80 x 2.50	11430	(45~110)*3 = 135~330
700D	4		3.00 x 2.50	15240	(45~110)*4 = 180~440
700E	4		2.80 x 2.50	15240	(45~110)*4 = 180~440
800A	1		1.95 x 1.75	5100	55 ~ 130
800B	2		3.20 x 1.75	10200	(55~130)*2 = 110~260
800C	3		3.20 x 2.90	15300	(55~130)*3 = 165~390
800D	4		3.40 x 2.90	20400	(55~130)*4 = 220~520
800E	4		3.20 x 2.90	20400	(55~130)*4 = 220~520
900A	1		2.15 x 2.00	6600	75 ~ 170
900B	2		3.60 x 2.00	13200	(75~170)*2 = 150~340
900C	3		3.60 x 3.40	19800	(75~170)*3 = 225~510
900D	4		3.80 x 3.40	26400	(75~170)*4 = 300~680
900E	4		3.60 x 3.40	26400	(75~170)*4 = 300~680
1000A	1		2.40 x 2.00	8250	90 ~ 200
1000B	2		4.00 x 2.00	16500	(90~200)*2 = 180~400
1000C	3		4.00 x 3.35	24750	(90~200)*3 = 270~600
1000D	4		4.20 x 3.35	33000	(90~200)*4 = 360~800
1000E	4		4.00 x 3.35	33000	(90~200)*4 = 360~800
1100A	1		2.65 x 2.25	9600	115 ~ 230
1100B	2		4.40 x 2.25	19200	(115~230)*2 = 230~460
1100C	3		4.40 x 3.40	28800	(115~230)*3 = 345~690
1100D	4		4.60 x 3.40	38400	(115~230)*4 = 460~920
1100E	4		4.40 x 3.40	38400	(115~230)*4 = 460~920
1200A	1		2.90 x 2.25	11400	120 ~ 280
1200B	2		4.70 x 2.25	22800	(120~280)*2 = 240~560
1200C	3		4.70 x 3.65	34200	(120~280)*3 = 360~840
1200D	4		4.90 x 3.65	45600	(120~280)*4 = 480~1120
1200E	4		4.70 x 3.65	45600	(120~280)*4 = 480~1120
1350A	1		3.30 x 2.50	14700	190 ~ 350
1350B	2		5.20 x 2.50	29400	(190~350)*2 = 380~700
1350C	3		5.20 x 4.00	44100	(190~350)*3 = 570~1050
1350D	4		5.50 x 4.00	58800	(190~350)*4 = 760~1400
1350E	4		5.20 x 4.00	58800	(190~350)*4 = 760~1400
1500A	1		3.65 x 2.75	18300	190 ~ 440
1500B	2		6.00 x 2.75	36600	(190~440)*2 = 380~880
1500C	3		6.00 x 4.50	54900	(190~440)*3 = 570~1320
1500D	4		6.30 x 4.50	73200	(190~440)*4 = 760~1760
1500E	4		6.00 x 4.50	73200	(190~440)*4 = 760~1760

* Based on assumed 3m Total Head. Detailed Calculations will be provided based on the actual data.

Design : Submersible Axial Pumpset

NO	DESCRIPTION	MATERIALS
1	Suction Bell mouth	CI FO 260; IS 210
2	Propeller	CF8M
3	Pump Casing	CI FC 260; IS 190
4	Seal Leakage Detector (IN OIL CHAMBER)	By Element
5	Lower Housing	CI FO 260; IS 210
6	Lower Ball Bearing	Grease Lubricated
7	Cable Gland	SS
8	Cable Grommet	Viton Rubber
9	Stator Body	CI FG 260; IS 210
10	Rotor Shaft	CI FG 260; IS 210
11	Thermal Sensor (IN WINDING)	By Thermal Overload Protector
12	Upper Ball Bearing	Grease Lubricated
13	Upper Housing	CI FO 260; IS 210
14	Mech. Seal (motor side) (secondary seal) (pump Side)(Primary seal)	Carbon v/s SiC SiC v/s SiC
15	"O" Rings	Nitrile Rubber
16	Spindle	STS 304
17	Flap Valve	SS 400

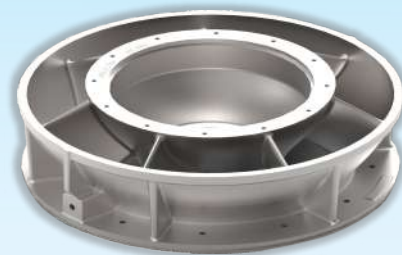


Axial Flow; Propeller type Hydraulics... (for High Efficiency, Low Head pumping of Raw or Sea Water &/or Solid laden liquids)



Unique "Back Swept" Propeller is surprisingly **Clog Free** even in **unscreened** sewage & yet requires Low **NPSHr**

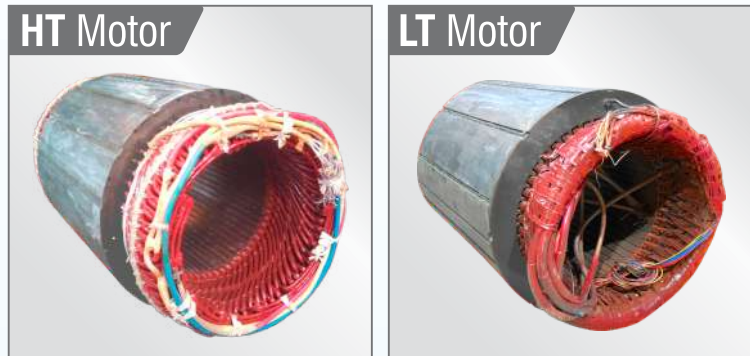
CADesigned, CFD optimized;
Bowl Hydraulics ensure Superb Efficiency



the **Non Clog Propeller Non-Clog** is mounted **directly** on to the **Common Shaft** (of the motor) hence **eliminating alignment & vibration** problems.

Design : Submersible Axial Pumpset

The Totally Enclosed, Self Water Cooled [TESWC IC-4A1W1 to IEC/IS-60034_6] motor is similar to Dry Type Induction Motor, the major difference being the Degree of Protection - it is of IP-68 Enclosure – to ensure **Hermetic Sealing** (even under water immersion).



Oversized Shaft
for Fail Safe Operation

Pump Clogging though un-desirable, is often unavoidable causing severe Stress on Shaft. To tackle this problem, Aqua's Pumpsets are built with an **Oversized** Stainless Steel **Shaft** & designed **without** Any **Sleeves** (below the Mechanical Seals) thereby **Eliminating** shaft failures, **Reducing Maintenance** & the need of **Spare Parts** for **15years**.



Thanks to the use of **Ultra Modern Design Mechanical Shaft Seals** (instead of Simple Low Profile Mechanical Shaft Seals used in Sewage Submersible pumps); Aqua's pumpsets run without the need of any mechanical seal replacement for approx **7.5years**



Superb Bearing Life
Anti Drip, Premium Synthetic Grease ensures a minimum Regreasing Interval F_{10H} of **7.5years**

Intelligent InBuilt Monitoring

Easy Monitoring (& Remote Control[#]) of your Pumpset's Health.



- **PSLD** detects Pressurized Water Leakage from Mechanical Seals.
- **CCWLD** detects Accidental Water Leakage from Cable Sheath's Cuts &/or Nicks into the Motor.
- **SBWLD** detect Accidental Water Leakage in to Motor's Stator Chamber.
- **BTDs** in the form of Bi-metallic Switches (for All Pumpsets) & **RTD's** (PT100 - 3 Wire Simplex type - from Size > 150kW) to Monitor Bearing Temperature (without any Additional Cost)[#].
- **WTDs** in the form of Bi-metallic Switches (for All Pumpsets) & **RTD's** (PT100 - 3 Wire Simplex type - 1 per each Phase - from Size > 150kW) to Monitor Winding Temperature (without any Additional Cost)[#].

[#]requires additional communication hardware

Why 2nd Generation of Submersible Axial Pumps...?

The 1st Generation Submersible Axial 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 st Gen. Sub. pumpset	Upgradation in Aqua's 2 nd Gen. Sub. pumpset	Benefits
Poor or defunct Solids Screening leading to high concentration of solids	Poor or defunct Solids Screening lead to high concentration of solids which Choke / Clog the Propeller leading to severe failure	Conventional Propeller	Back Swept Propeller & Low Overlapping Bowl Vanes	Hugely Reduced Risk of Drastic Failures
Poor Electricity Supply	Motor Insulation Stressing	Premature motor burnout	Additional Mica (over & above Glass Fiber Aramid) + Dual Vacuum Pressure Resin Impregnation (VPI); Aqua's Motor's Insulation has Extremely High stator Winding Di-Electric Strength.	Tolerates wide Voltage variation and Power Spikes & Surges. Reduce Motor Failure & hence Minimum Breakdown Aqua's motors keep coolly working even in scorching Indian summers
Higher Ambient Temperature		Generous Reserve Margins & optimized design;	Generous Reserve Margins & optimized design;	
Drive End Bearing/s	Mean Time between Maintenance & Cost	Single Bearing - Frequent Failure	Heavy Duty, Dual Bearings	Reduced Cost & Increased Life
Spare Parts	Cost Effectiveness & Ease of Local Availability are Essential for Least Life Cycle Cost & Minimum Downtime	Expensive & Imported	Due to Various Up-gradation & Local Production; Spares Requirement is Much Lower & Easily Available at Economic Rates	Easily Availability & Very Short time
Inbuilt Motor Protections	—	None	Provided with Intelligent Inbuilt Monitoring : (1) Bi-metallic thermal overload switches for Winding (BMS) & (2) Primary Mechanical Seal Condition Monitoring in Oil Chamber	Easy Monitoring of Pumpset's Health & Reduced Risk of Failure despite Operator's negligence
Motor Chamber Fill	Oil filled Motors require Frequent Checking / Changing	Oil filled Motor	Air filled motor	No Periodic Maintenance/ Zero(Oil) Replacement Cost

Hence, the performance of 1st generation of Submersible Axial Pumps in India was below the mark. Aqua engineers realized this mismatch & hence the concept of ATBP was born - they are specifically redesigned/upgraded for rough operating conditions of developing INDIA.

Benefits of Aqua's Submersible Axial pumps

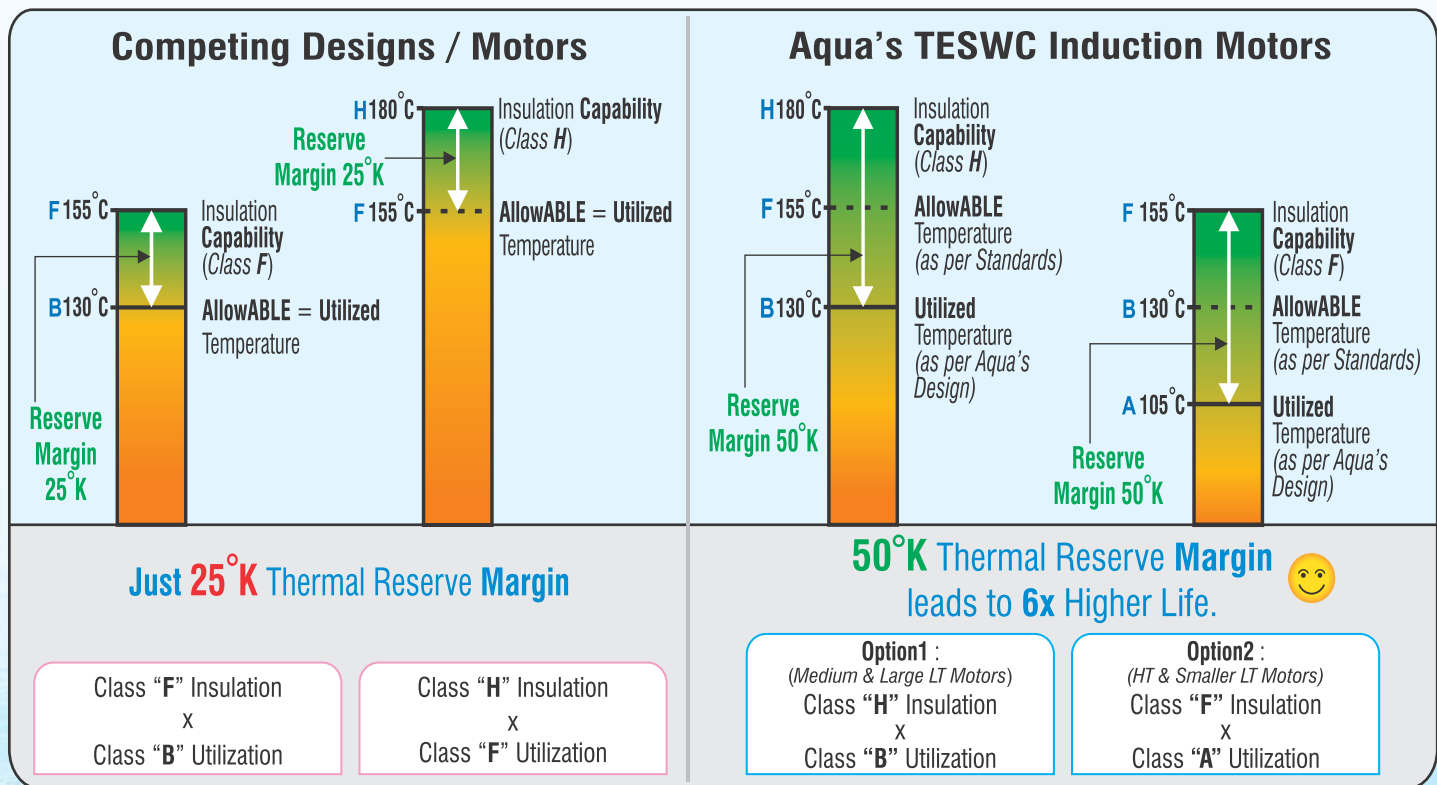
India's 1st ; 2nd Generation of Submersible Non Clog pumpset



Huge Motor Reserve Margin: based on Arrhenius equation; for every 10°C Drop in Temperature, the useful Life of Insulation is Doubled.

Hence with a **50°K** Reserve Margin (v/s just 25°K of Competitors); Aqua's (Motor {Stator Insulation}) will have a **6 times Higher Life** (than competitors)...!

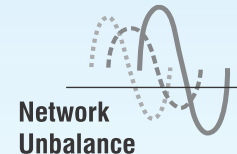
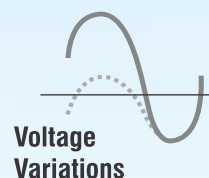
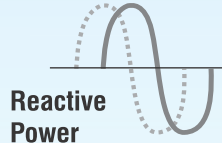
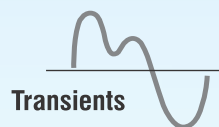
Designed for upto **55°C Ambient temperature**



World's Best, Premium Motor Insulation



Insulation is based on "Power House" type treatment (Mica based; Dual Vacuum Pressure Resin Impregnation (VPI) technology for Superb Di-Electric Strength due to use of costlier Resin (v/s cheaper Varnish used by most Competitors). Hence, Aqua's Motor easily tolerates :



Benefits of Aqua's Submersible Axial pumps



Robust & Reliable



No need for Frequent Periodic....

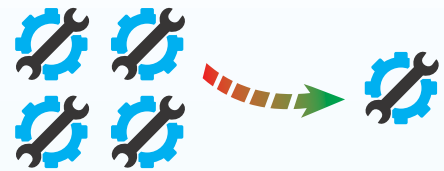


...Refilling

Oil &/or Grease



Specially Designed for Ease of Local Repairs

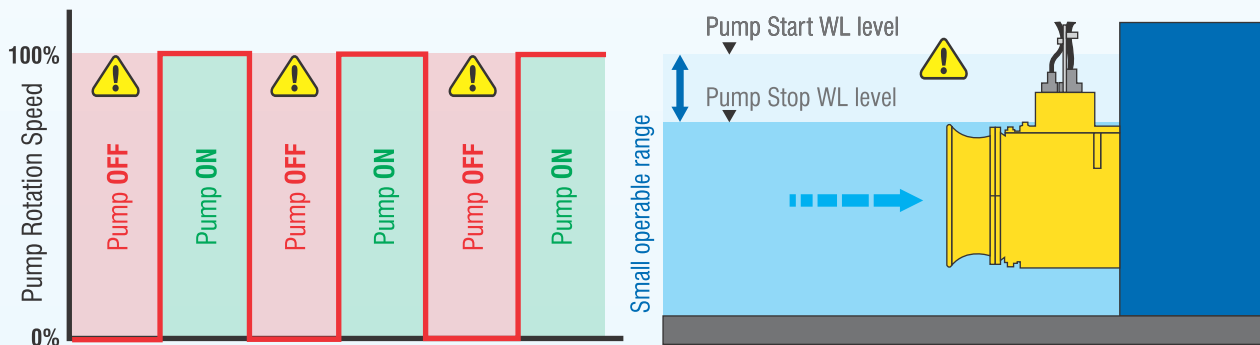


Saves (upto 90%) Spare Parts & Consumables*

Innovative Solution (FSH)

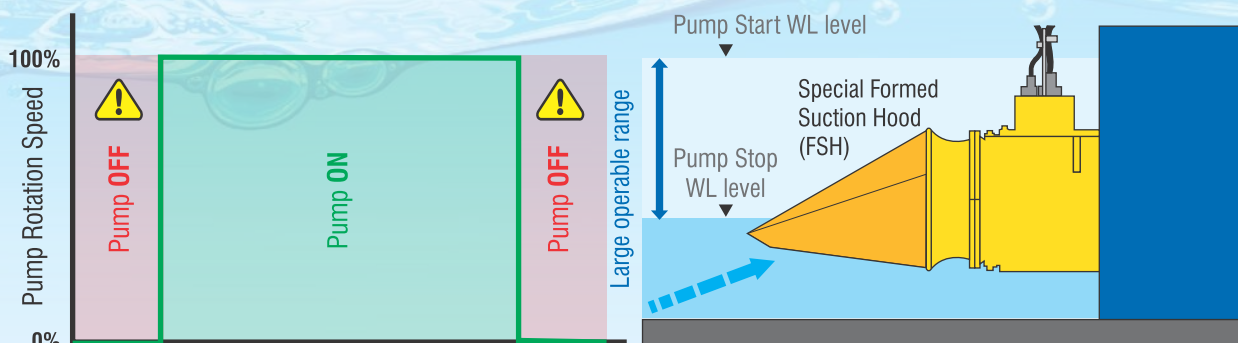
Aqua's Formed Suction Hood (FSH) allows pump operation without frequent Start-Stops despite varying Inflows

Problems with 1st Gen Sub Axial pumps



Due to Small Operating Range, pump is subjected to repeated Start - Stop which induces Electrical Stresses on Motor Starters.

Solution with 2nd Generation Aqua Sub Axial pumps



Thanks to Aqua's Formed Suction Hood (FSH); pump Operating Range is widened & hence pump can run for much longer durations thereby reducing Electrical Stresses on Motor Starters & leads to better water level control.



Typical Pump Specifications



- Pole : 6 to 24
- Insulation : Class F / Class H
- Phase/Voltage : 3Ø / 390 to 6600V
- Motor Power : 45kW to 450kW

Standard Technical Specifications

Pump	Discharge Sizes	DN 700 to 1,500mm
	Flow Rate	Upto 20,000 m ³ /hr
	Head	Up to 5.5m
Motor	Ratings	45kW to 450kW
	Speeds	1000, 750, 600, 500 & 375 rpm (<i>synchronous</i>)
	Duty & Enclosure	S1 & Exceeding IP 68
	Supply Options	3Ø; 415V, 3300V, 6600V
InBuilt Monitoring	Primary Seal Leakage Monitoring (<i>PSLD</i>)	By built in Detection System
	Cable Connection Chamber Water Leakage Detector (<i>CCWLD</i>)	Available from size 200kW & above
	Winding Temp Detector (<i>WTD</i>)	Available by default by Bimetallic Switches in each phase (<i>PT100</i> optionally available for sizes 150kW & above)
	Drive End Bearing Temperature Detector (<i>BTD</i>) (<i>DE</i>)	Available by default by Bimetallic Switches from size 22 kW & above (<i>PT100</i> optionally available for sizes 150kW & above)
	Non Drive End Bearing Temperature Detector (<i>BTD</i>) (<i>NDE</i>)	Available by default by Bimetallic Switches from size 22 kW & above (<i>PT100</i> optionally available for sizes 150kW & above)
	Stator Chamber Water Leakage Detector (<i>SBWLD</i>)	Available from size 45 kW & above

Material of Construction (*MoC*)

		Option 1	Option 2
Pump Casing (<i>Bowl</i>) & Suction Bell Mouth		Grey Cast Iron, Ductile CI, NiResist, NiAL Bronze (<i>NAB</i>)	CF8, CF8M, CD4MCu
Impeller / Propeller		NiResist, NiAL Bronze (<i>NAB</i>)	CF8, CF8M, CD4MCu
Motor Casing, Cable, Terminal Chamber		Grey Cast Iron	NiAL Bronze (<i>NAB</i>)
Oil Chamber		Grey Cast Iron, Ductile CI, NiResist, NiAL Bronze (<i>NAB</i>)	CF8, CF8M, CD4MCu
Shaft		Stainless Steel	
Fasteners (<i>Exposed to Liquid</i>)		Stainless Steel (<i>A2 - SS304</i>)	Stainless Steel (<i>A4 - SS316</i>)
Elastomers		Nitrile	Viton
Mechanical Shaft Seals	Primary (<i>Pump Side</i>)	Silicon Carbide v/s Silicon Carbide	Tungsten Carbide v/s Tungsten Carbide
	Secondary (<i>Motor Side</i>)	Cast Chrome Moly Steel v/s Resin Impregnated Carbon	Silicon Carbide v/s Silicon Carbide
Wearing Ring / Plate (<i>Casing</i>)		Stainless Steel	
Motor Squirrel Cage Rotor Bars		Aluminum bar	Copper bar
Cables		PVC insulated, Copper Cored	ERPS insulated, Copper Cored
Oil		Eco friendly Paraffin White Oil ISO VG 20 or 40	



Aqua has been awarded the Prestigious
Best Quality Pump Vendor

by



A Pan India Support set up



World's 2nd Largest Plant (dedicated to Sub pumps)
in terms of Area & Capacity

Globally Un-Matched Range (of Sub pumps)
upto 25,000m³/hr, 450m, 3,350hp, 11KV & DN 2100mm

The Largest & Fastest Growing (of Sub pumps)
Manufacturer of India...

We have successfully executed a **1468mld**
Green Field Raw Water Pumping Station
(Civil + E&M) in just **65days**

We have successfully designed, built & supplied a
294mld Submersible pump in just **30days**

Global Technologies...
...Locally Sustainable Pumps

World's 2nd Largest Plant (for submersibles)

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

After Sales & Services :
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(+91-90167 53328)
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