AQUA®©

WORKMANSHIP 30 MONTHS WARRANTY

MAKE IN INDIA

Ultra Compact, Pit Installed;
Vertical Flood Proof (Fully Immersible)
InLine/ Online Booster Pumpsets...

ARFP / AILFP

AILFP

Pump House *is not mandatory*

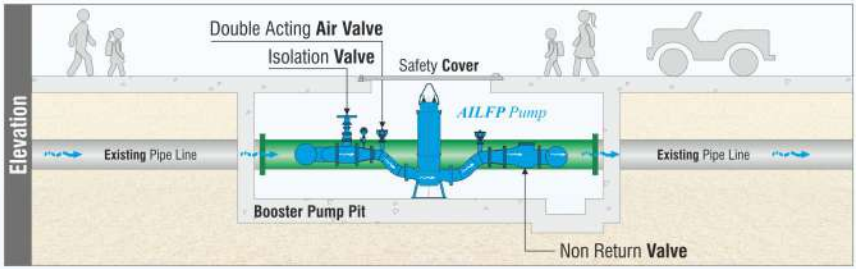
Flood Proof

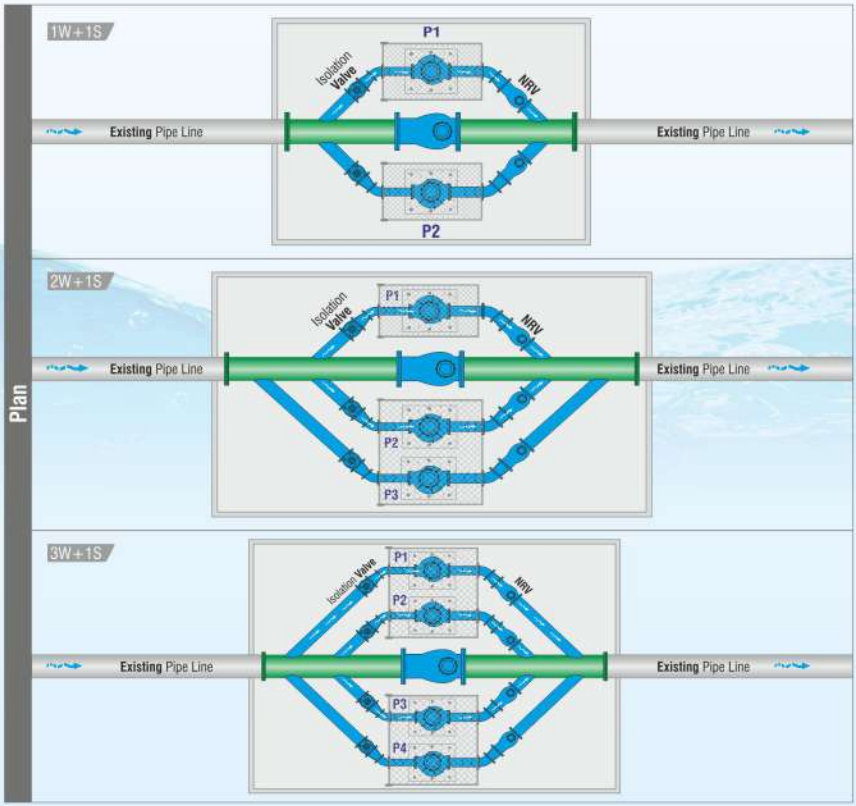
VFD Compatible *for Variable Pumping*

Suitable for 24x7

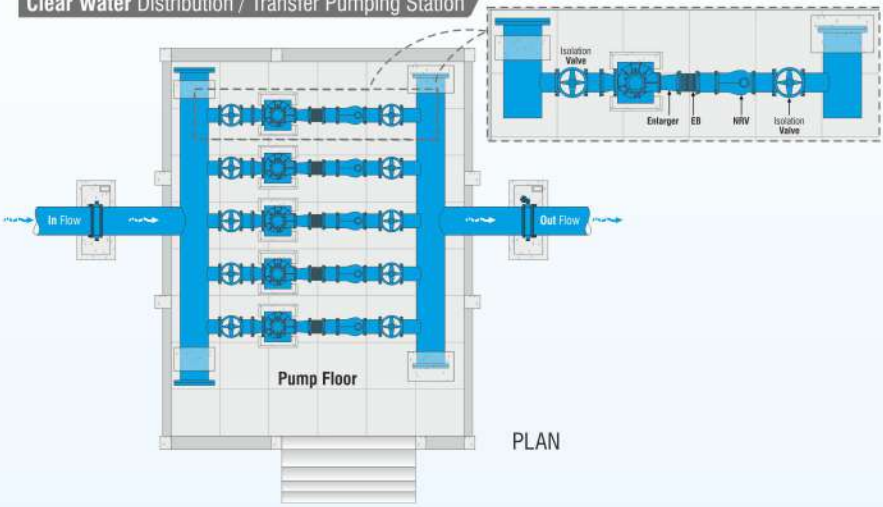
www.aquapumps.com

Typical Installation: **InLine Pressure Boosting** with **AILFP** pumpset



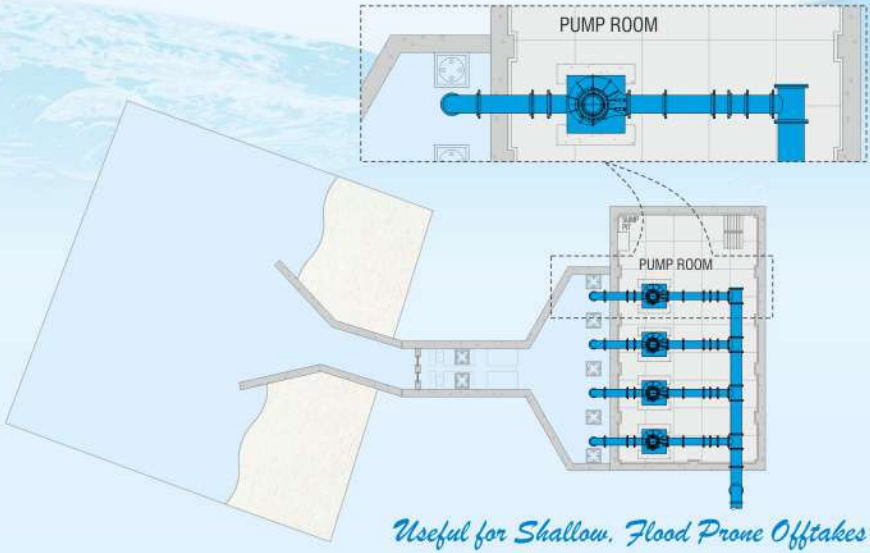


Clear Water Distribution / Transfer Pumping Station



PLAN

Flood Proof Raw Water Offtake Pumping Station



Useful for Shallow, Flood Prone Offtakes

Design: **Pumpset**

Flood Proof Motor Pumpsets are the latest technological development - their Pump-end is similar to **Conventional** *(End Suction)* **Volute pumps** while their Motor-end is much more superior then Conventional Air / Water Cooled Bare Shaft Induction motors - these motors *(already popular in Submersible pumpsets)* are **Fully Immersible** thanks to their **IP68** enclosure.

The motor is **Amphibious** & hence can safely operate either in totally Dry or Submerged *(Flooded)* conditions.

A built in Jacket Cooling system ensures that the motor is efficiently cooled irrespective of whether or not it is submerged; while the **IP68 Enclosure** ensures that even if the surroundings are flooded, the motor is safe to run.

Design : **Motor Cooling**

Glycol Cooled Motor *(ARFP)*

Aqua's **Closed Loop Glycol** system uses a mixture of **Potable Water** & any commercially available Polypropylene Glycol formulations.

It has excellent heat transfer, corrosion resistance properties & is suitable for temperatures between -45°C to **+55°C**.

The coolant is circulated by an Inbuilt circulating Impeller through the space between the Motor Casing, Jacket Shell thereby extracting motor heat & dissipating it to pumped liquid *(via an inbuilt Heat Exchanger)* away from the Dry Well.

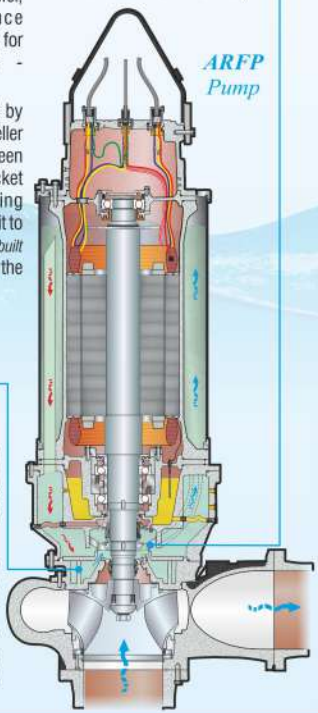
Heat Exchanger

The maintenance free, Inbuilt **Water to Water** *(Waste Water)* Heat Exchanger is built of sturdy **Cast Iron**.

The Heat Exchanger & Coolant Pump effectively transfer motor's heat to pumped liquid enabling **S1** operation even with the motor in Air.

Coolant Pump

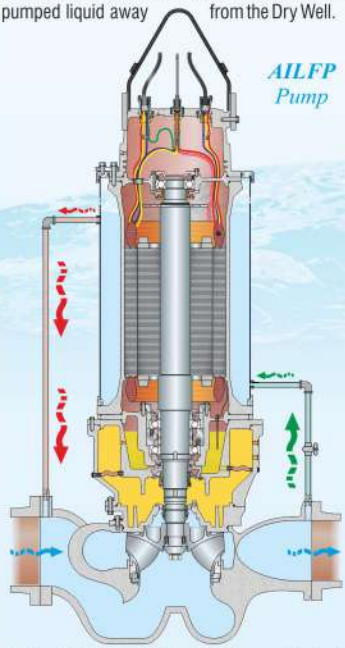
The **Inbuilt** Water + Glycol Circulating Impeller is key driven by the pumpset's shaft itself *(& hence it doesn't require any additional motor or maintenance)*



Pumped Water Cooled Motor *(AILFP)*

Aqua's **Closed Loop** system uses a Pumped Water for Motor Thermal Cooling.

The Pumped in used as coolant is circulated in the space between the Motor Casing, Jacket Shell thereby extracting motor heat & dissipating it to pumped liquid away from the Dry Well.



The Heat Exchanger & Coolant Pump effectively transfer motor's heat to pumped liquid enabling **S1** operation even with the motor in Air.

Design: **Motor**

The motor is **Amphibious** & hence can safely operate either in totally Dry or Submerged Flooded conditions.

LT Motor

The Totally Enclosed, Self Circulation 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 if an accidental water flooding the dry-well)*.

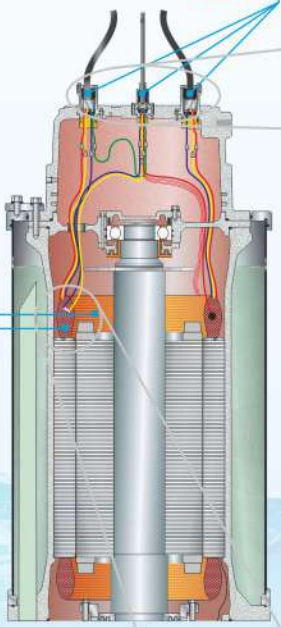
It is cooled by an inbuilt cooling mechanism which uses either Pumped Water or Potable Water + Commercially available Glycol Mixture as a Coolant.

IE2 **High** Efficiency

Options of IE2 & IE3 Equivalent Motor Efficiencies available.

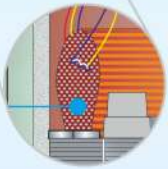
IE3 **Premium** Efficiency

Water Proof Cable Glands
are specially designed as per **IP68** to prevent water ingress *(into the motor windings)* even in case of water flooding the dry well



VFD Compatible

Thanks to the very high Thermal Conductivity of Water + Glycol/ Pumped Water *(as compared to Air)*, Aqua's Flood Proof pumpsets can be safely run staying cool even at reduced frequency despite harmonics from VFD

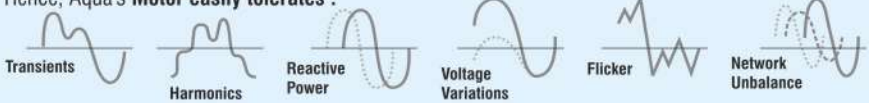


World's Best, Premium **Motor Insulation**

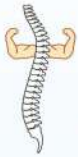
Insulation is based on **"Power House"** type treatment ***(Dual Vaccum Pressure Resin Impregnation (VPI))*** technology for Superb **Di-Electric Strength** due to use of costlier **Resin** *(v/s cheaper **Varnish** used by most Competitors)*.

Thanks to **generous Reserve Margins** & Optimized Design; Aqua's Motors keep coolly working even upto **+55 °C.**

Hence, Aqua's **Motor easily tolerates :**



Design: **Shaft**



Premium Materials

A **Robust, Single Shaft** for Fail Safe Operation

Design: **Bearing**

All **Thrusts** are absorbed by **Grease Lubricated Anti Friction Bearings** located deep inside the motor.

Superb Bearing Life

A Typical Bearing of L_{10H} life of 1,00,000 hours &/or 10 years.

Premium, **Ultra Long Life; Synthetic Grease**

Ensures a Typical Re-Greasing Interval of 50,000 hours &/or 5 year for ARFP 1,09000hr &/or 10 year for AILFP

Made from **Rust Free Stainless Steel** & designed **without** Couplings thereby **Reducing Maintenance, Eliminating** the need of **Spare Parts** as well as the **Risk of Misalignment.**

Design: **Mechanical Shaft Seals**

Shaft Sealing is by means of **Two**, Independent, high quality Bi-Directional; **Mechanical Seals** *(& the Primary seal is always of **Silicon Carbide** faces to withstand Erosion incase of increased silt & grit content in sewage/ water)* hence there is Zero Leakage of water/ septic sewage into the Dry Well from the Shaft Gland.

Seals have L_{10H} life in excess of **50,000** hours &/or **5** years.

Design: **Pump End**

Impeller

CADesigned, CFD optimized; **Multi bladed Water Impellers** ensure **Superb Efficiency.**

Pump Casing is of End Suction **Volute** type & Impeller is mounted **directly** on to the Extended Shaft of the motor hence **eliminating alignment** & **vibration problems.**

Design: **Intelligent InBuilt Monitoring Systems**

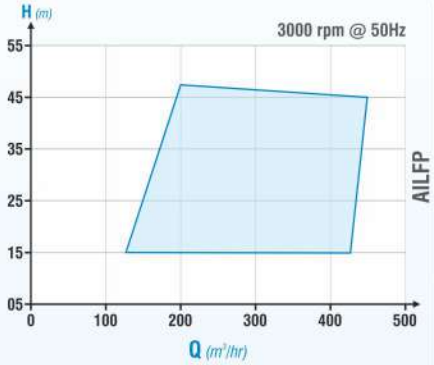
Easy Monitoring *(& Remote Control*)* of your Pumpset's Health.*

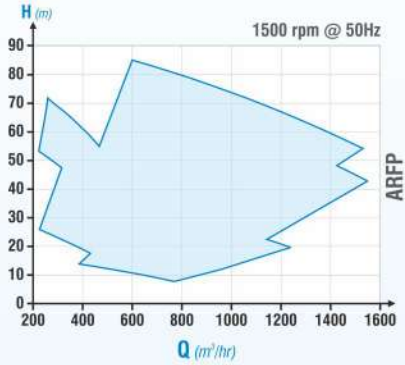
- **PSLD** detects Pressurized Water Leakage from Mechanical Seals.
- **CCWLD** detects Accidental Water Leakage from Cable Sheath's Cuts &/or Nicks into the Motor.
- **SBWLD** detect Accidental Water Leakage in to Motor's Stator Chamber.

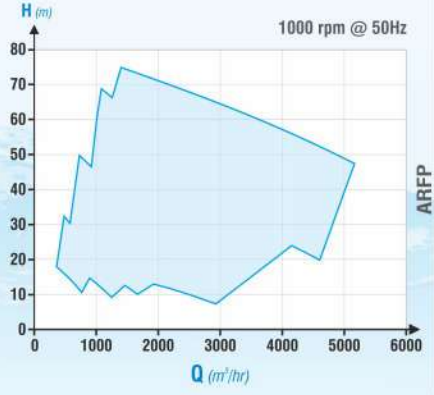
- **BTDs** in the form of Bi-metallic Switches *(for All Pumpsets)* & RTD's *(PT100 - 3 Wire Simplex type - from Size > 150kW)* to Monitor Bearing Temperature *(without any Additional Cost)#*.
- **WTDs** in the form of Bi-metallic Switches *(for All Pumpsets)* & RTD's *(PT100 - 3 Wire Simplex type - 1 per each Phase - from Size > 150kW)* to Monitor Winding Temperature *(without any Additional Cost)#*.

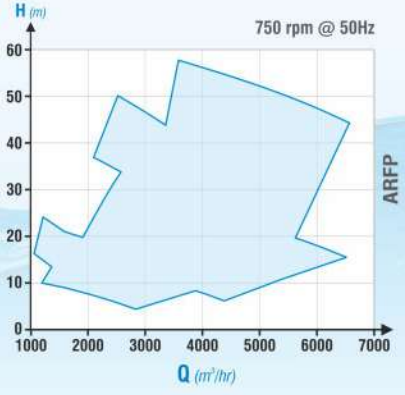
**depends upon model & kW ratings* **requires additional communication hardware*

Typical **Performance Range**









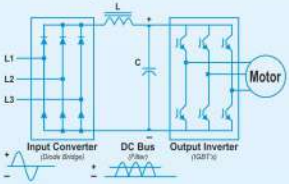
Standard **Technical Specifications**			
	Pumpset Type	**AILFP**	**ARFP**
Pump	**Discharge Sizes**	DN 75 to 200mm	DN 250 to 800mm
	Flow Rate	Upto 462 m^3/hr	Upto 9500 m^3/hr
	Head	Upto 45m	Upto 85m
Motor	**Ratings**	12kW to 75kW	22.5kW to 1000kW
	Speeds	3000, 1500 rpm *(synchronous)*	1500, 1000, 750 rpm *(synchronous)*
	Duty & Enclosure	S1 & Exceeding IP 68	S1 & Exceeding IP 68
	Supply Options	3Ø; 415V	3Ø; 415V, 3300V, 6600V

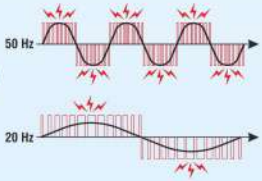
Typical **Material** of **Construction** *(MoC)*			
		Option 1	**Option 2**
Pump Volute Casing		Cast Iron	Ductile CI
Impeller		CF8	CF8M
Motor Casing, Cable, Terminal Chamber		Grey Cast Iron	
Oil Chamber		Grey Cast Iron	
Shaft		Stainless Steel *(SS410 / SS431)*	
Fasteners		Stainless Steel *(A2 - SS304)*	
Motor Cooling Jacket Shell		Stainless Steel *(SS304)*	
Elastomers		Nitrile	Viton
Mechanical Shaft Seals	**Primary** *(Pump side)*	Silicon Carbide v/s Silicon Carbide	
	Secondary *(Motor side)*	Cast Chrome Moly Steel v/s Resin Impregnated Carbon	
Wearing Ring / Plate *(Casing)*		Stainless Steel	
Motor Squirrel Cage Rotor Bars		Aluminum bar	Copper bar
Cables		PVC insulated, Copper Cored	ERPS insulated, Copper Cored
Buffer Oil		Skin-Friendly, Liquid Paraffin White Oil *(GRAS (Generally Recognized As Safe)).*	
Sole Plate		MS Fabricated	

Concept Benefits

Side Effects of VFD's:

⚠ VFDs generate PWM Output with **High Harmonic Distortion** which causes **severe Di-Electric Stresses** which may reduce the life of Motor's Stator's Winding Insulation.





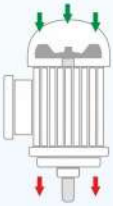
To counter this, Aqua's Motors have Additional Mica / Multiple Glass Fibre Aramid Insulation + **Dual Vacum Pressure Resin Poor Impregnation** *(VPI)*; resulting in **Insulation** having **Extremely High** Winding Di-Electric **Strength** enabling it to work satisfactorily even when fed by **VFD.**

Premium Materials

VFD Compatible

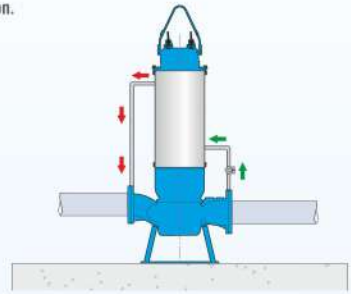
Side Effects of VFD's: **Motor Cooling**

Satisfactory operation of any Motor depends upon its *(Stator Insulation)* **Temperature which in turn relies upon the rate of Heat Dissipation always being more then that of Heat Generation.**



In case of typical Air Cooled *(TEFC)* motors, Heat Dissipation *(Cooling)* is by mode of **Forced Air** blown by a *(Centrifugal axial)* **Fan** mounted on the motor shaft itself. As per the basic law of centrifugal machines, the **Fan's Output** *(heat dissipation)* is proportional to the **Cube** of it's Speed.

Totally Enclosed **Air Fan** Cooled ***(TEFC / CACA)***
(Squirrel Cage Induction) **Motor** of **Conventional** Pump
(Shaft Mounted Fan - IC4A1A1)

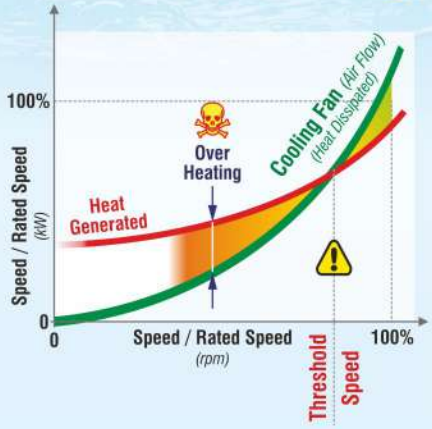


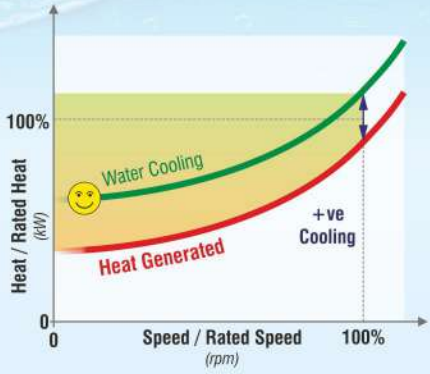
Totally Enclosed *(IP68)* **Flood Proof Pumpset** with **Motor Cooled** either **Glycol + WATER** Cooled or **Pumped Water**

Hence when such motor's speed is slowed down by VFDs, the Cooling **Fan** *(being mounted on the motor's shaft)* **also Slows down** & subsequently the motor's **Cooling Air Flow** *(heat dissipation)* **Reduces Drastically** - so much so that below a threshold speed; the motor can **Overheat to unacceptable levels.**

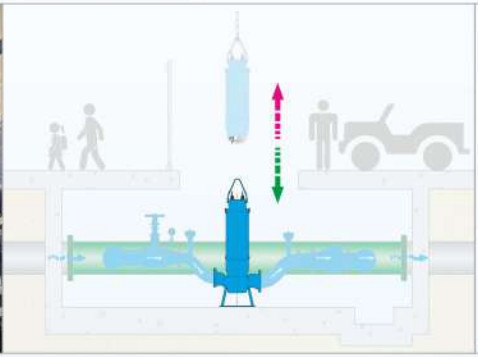
Flood Proof motors are **always effectively** cooled by **Water** *(whose Cooling **Effectiveness is not so sensitive to the Speed.**)*

VFD Compatible



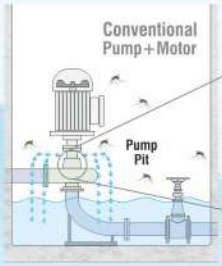


Concept Benefits: **Simplified Maintenance**



Thanks to the **Back Pull Out design**; the Entire Motor+Shaft+Impeller can be pulled out as a **Single unit** *(without disturbing the pipeline)*; Maintained Ground Level & Refitted within minutes *(without the risk of misalignment)*.

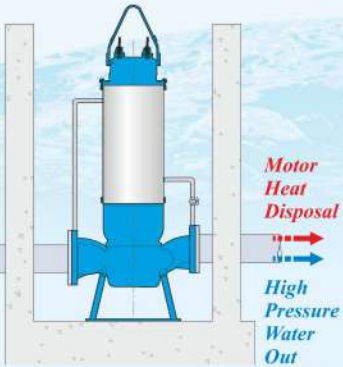
Concept Benefits: **Cool, Dry & Noise Free Ambience**



Conventional Pumps use **Air** Cooled *(TEFC / CACA)* **motor** which **dissipate** their **Heat** & **Noise** into the Pit.

No need of Costly, Maintenance Prone & Energy Consuming **Air Handling Units** *(AHU)*

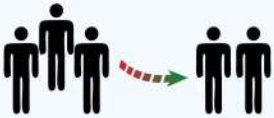
Aqua's Flood Proof Pumpsets are Totally Enclosed *(IP68)* using either **Glycol** or **Pumped Water** as Coolant *to* ***dissipate*** *their Heat safely into* ***Pumped Liquid...***



Thanks to the use of Two Ultra High Quality **Mechanical Shaft Seals**, there is **no Nuisance Leakage** *(from Pump Gland Rope)* into the Pump Pit.

...**No Breeding** ground for **Mosquitoes**

Weather Proof
...works even if the entire Pump Pit is **Flooded**

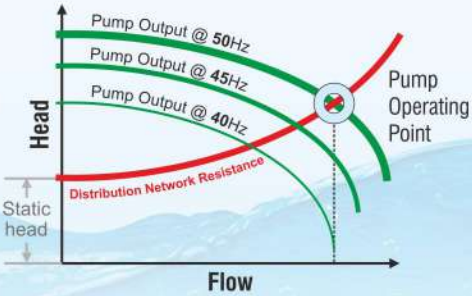


Saves *(upto 33%)* **O&M Staff***

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

In **24 x 7** systems; water is supplied Round the Clock which requires a vast Variation in the Head as well as the Flow out output of the pumpset. Often this is achieved using VFD to drive the pumpsets.

Fully VFD Compatible



No Periodic Maintenance & **Minimal Operational ManPower so that you can...**

NO need for Frequent Periodic...

Shafts / Sleeves &/or **Coupling**

Gland Packing

Oil &/or **Grease**

NO need of Operations; like :

Valve Opening-Closing during pump Starting-Stopping

Operating the Dewatering Pump to water leakage from Seepage / Gland Piping Leakage, etc.

Awards & Accreditations

Certificate of Compliance

CE

We hereby declare that the technical file of product complied with the requirement of directives 2014/35/EU Low Voltage Directive, 2014/30/EU Electromagnetic Compatibility Directive & 2006/42/EC Machinery Directive.

Certificate No.: CE-3096

Manufacturer
Name : AQUA MACHINERIES PRIVATE LIMITED
Address : S. NO.504/1 & 2,442/2, NR HARIDARSHAN ESTATE, NR EXPRESSWAY HIGHWAY, RAMOL, AHMEDABAD-382445, GUJARAT, INDIA

Products :
- Submerged Centrifugal, Turbine, Single, Multistage/ Single, Double Suction, Monoblock Pump set for Water & Waste Water
- Submersible Bore well Motor and Pump Set
- Fodder Type Pump Set
- Submersible Mono Type Pump Set
- Pump Set With Gland Cooled Motor

This certificate is issued under the following conditions:

Validity of this certificate can be verified at www.ukcertifications.org.uk/verify

Date of this Certificate	16th August 2023
1st Surveillance Audit Due	15th August 2024
2nd Surveillance Audit Due	15th August 2025
Certificate Expiry	15th August 2026

Authorised Signatory

International Organization for Standardization

ISO 45001:2018

(OHSAS - Occupational Health & Safety Management System)

International Organization for Standardization

ISO 9001:2015

International Organization for Standardization

ISO 14001:2015

(Environment Management System)

Conformité Européenne (CE)

Aqua has been awarded the Prestigious

Best Quality Pump Vendor

by

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Spacious & State of the Art Plant...

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