ANS series of Heavy duty Non Clog Sewage Submersible pumps

India's Largest manufacturer of Heavy Duty Non Clog Submersible Sewage pumps

ANS pumps are specifically designed *(as an upgrade over the 1st generation of submersible non clog pumps)* to withstand the harsh operating conditions *(encountered in sewage pumping)* in developing countries

..... *refer page 3*

Unique Advantages of Aqua's ANS

- Best long term maintenance free track record in India
- VFD compliant Inverter duty motors
- Tolerates wide Electrical supply fluctuations
- Zero Routine maintenance requirement
- Pumps factory tested on Full Scale TestBed equipped with VFD up to 1180kW
- Wide range of Hydraulic designs allow Clog-less handling of sewage at optimal efficiency
- High pump efficiency is sustainable over longer periods due to Smart Set hydraulics

India's Most Successful River Cleaning *(Sewage Interception)* project Sabarmati River - Ahmedabad; uses Aqua make Sub Sewage pumps *(totalling 42,000m3/hr & 5300hp)*

One of India's Largest Integrated modular Storm Water Drainage project *(SWD-Ahmedabad)* runs on Aqua Sub NC pumpsets *(totaling 1,32,000 m3/hr)*

India's Largest Sewage Treatment Plant *(of its time, based on Sub pumpsets for raw sewage intake)* runs on Aqua Sub Sewage pumps *(172mld - Hyderabad - Nagole STP)*

Design

Cable Gland
is specially designed to prevent moisture ingress *(into the motor windings via capillary action)* even in case of cable's protective outer sheath puncture

Long Bearing Life
Heavy duty ball bearings are designed for L_{10} life in excess of 1,00,000 hours. Factory filled with life long grease obviating the need of subsequent re-greasing. Dry Run fail resistant due to the use of high temperature characteristics of the grease used & increased internal clearance class. Bearing overheat detectors can be supplied on request

Motor Cooling
is effected by liquid submergence for submerged wet pit applications *(where minimum water level is above the motor level)*
However should the minimum water level desired to be kept low; Special Open Circuit Jacket Cooled motors are offered *(which utilize pumped media to cool the motor via the integral jacket)*

Inbuilt Electro Mechanical Reverse Rotation sensor detects accidental reverse rotation & gives alarm to cut off power

Minimum liquid level
Standard Motor

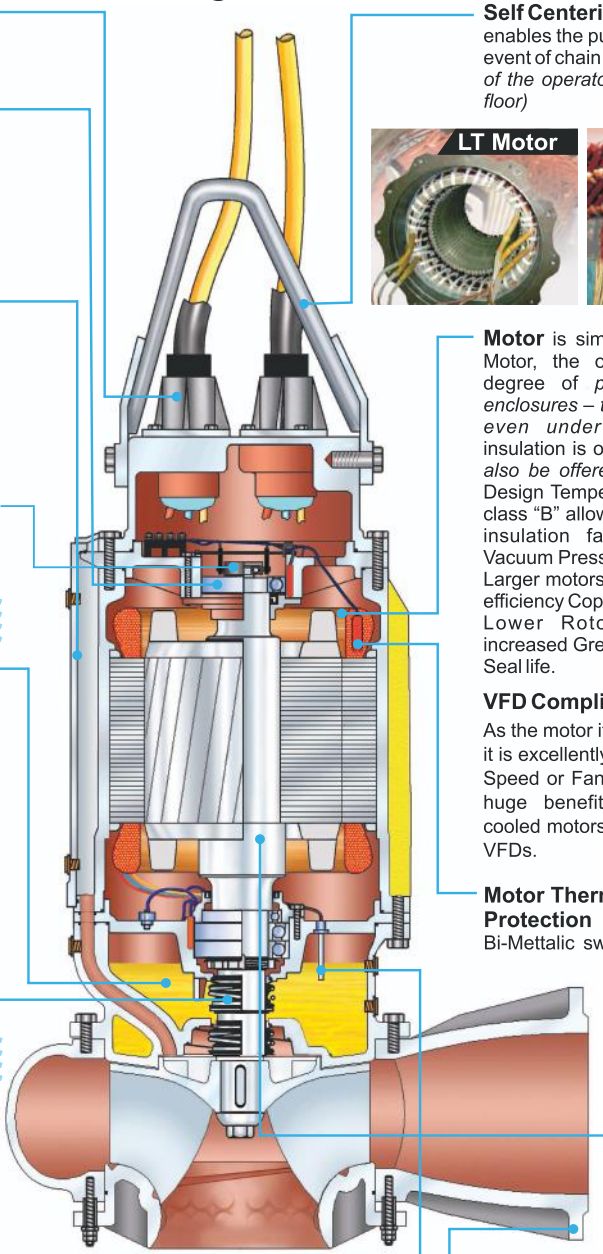
Oil Chamber
Large volume oil bath effectively lubricates & cools both the mechanical seals enabling longer safe dry running period

Reliable Shaft sealing
Two, Independent Mechanical Shaft Seals allow a longer useful life even in case of failure of one seal. Both the seals are bidirectional permitting safe Reverse rotation in case of accidental reverse rotation or intentional pipeline back-flow *(to flush out bottom sedimentation at suction side)*. The primary seal is of Silicon Carbide faces while all "O" rings are of *FKM* for enhanced dry run fail safe characteristics

Minimum liquid level
Jacket Cooled Motor

Semi Open Impeller
(Single Channel type with Macerating Inlet)

Vortex Impeller



Self Centering Lifting Hook
enables the pump to be *"fished out"* in the event of chain breakage *(without the need of the operator going down to the sump floor)*

Motor is similar to Dry Type Induction Motor, the only difference being the degree of *protection (it is of IP68 enclosures – to ensure Hermetic Sealing even under water immersion)*.The insulation is of Class "F" *(LT motors can also be offered with Class "H")* yet the Design Temperature Rise is restricted to class "B" allowing excellent resistance to insulation failures. All motors have Vacuum Pressure Impregnated windings. Larger motors can be offered with higher efficiency Copper Bar Rotors resulting in a Lower Rotor Temperature hence increased Grease, Bearing & Mechanical Seal life.

VFD Compliant heavy duty motors
As the motor itself is submerged in water, it is excellently Cooled irrespective of the Speed or Fan /Cowl condition - this is a huge benefit over TEFC/CACA Fan cooled motors especially when driven by VFDs.

Motor Thermal Overload Protection
Bi-Mettalic switches are embedded into each phase of winding to detect accidental overheating & thereby trip off the power. *Optionally Thermistors or PT 100 transducers can also be offered*

Shaft
Is always made from rust free stainless steel & designed without any sleeves for long maintenance free life

Pump Casing
CADesigned Casing withstands impacts *(during handling especially with portable emergency duties).*
Full In Volute profile *(as opposed to simple concentric design)* increases pump efficiency.
For sea water/Brackish application; Epoxy coated with or without Sacrificial Zinc Anode can be provided.

Seal Condition Monitoring
Standard fitted, in the event of primary seal leakage the same is detected by the inbuilt moisture sensor & displayed in the control panel. Optionally moisture detectors in motor chamber can also be provided

Impellers
Advanced CADesigned impellers are optimized for raw unscreened sewage – they can handle large solids as well as fibrous wastes *(which generally plait up & clog up conventional non clog impellers)*. To obviate the leakage losses *(due to erosion of wearing rings)*, Aqua pumps don't have any soft metal wearing rings / bushes. Restoration of the pump's efficiency is simple, easy & quick ensuring energy conversation

Selection :
Vortex impellers are preferred for small pumps operating in heavily solid laden unscreened sewage or gassy crude sludge
Semi Open, Single / Double Channel type impellers are preferred for medium sized pumps operating in unscreened sewage;
Fully Enclosed Double / Triple Channel impellers can be fitted on larger pumps for screened sewage, storm water, industrial waste water & effluents with lower fibrous waste content

Why 2nd generation of Submersible Sewage pumps?

A concept for 20th century Europe - a pump for 21st century World !

The 1st generation submersible non clog pumps used in India were either designed for European conditions or based on these European pumps *(either through inspirations or collaborations)*. However the Indian *(& most developing countries)* have operating conditions that are drastically different *(much harsher on pumps)*, like :

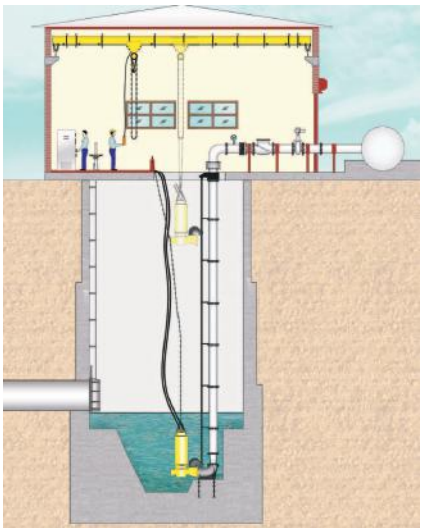
Condition	Effect on Pump	Result
Poor Electrical Supply	Motor Insulation Stressing	*Premature motor burnout*
Higher Ambient Temperature		
Poor liquid level sensing & operation by often unskilled staff leading to frequent Dry Running	Excessive heating leading to motor insulation burn out, bearings grease leakage & possibly seizure ; Mechanical seal overheating	*Immediate motor, bearing & mechanical seal failure*
Poor or defunct Solid Screening leading to high concentration of solids, especially fibrous ones	Dangerous cocktail of large solids & fibrous waste plait up & choke conventional non clog impellers leading to motor stall	*Immediate Motor Insulation burnout*
Higher content of sand, silt & ash in sewage	accelerated erosive wear of impeller Leakage Clearance	*Drop of pressure & efficiency*

hence their performance in India was below the mark. Aqua engineers were amongst the first to realize this mismatch between design & operating conditions. Here the concept of ANS was born - ANS is the First 2nd second generation of submersible sewage pump specifically redesigned / upgraded for operating conditions of developing countries; some of its salient features are :

The Buddh International Circuit in Noida, UP is India's answer to the world for Formula 1, Grand Prix. Spread over an area of 874 acres (354ha), it is 5.14 km long & cost about $ 215 million to build. Being spread out over such a vast area, it required around 16500lps of Storm Water pumping m/c to prevent the track from water logging. Aqua Submersible Drainage pumpsets cummulating 59400m3/hr drain this world class race track.

Installation

Permenant Wet Pit Installation



This represents the cheapest & most user friendly pumping station design. The pump is installed directly at the bottom of the wet pit using Aqua automatic coupling system. This system ensures that the pump is properly lowered *(& firmly connected to the discharge piping)* or Lifted out *(disengaged from line)* in a simple, precise & quick way. This system includes guide rails *(which guide the pump correctly downwards)* till its discharge flange matches that of the auto coupling pedestal. The contacting surfaces are well machined & designed such that the weight of the pump & wedge design of Autocoupling ensure a leak free joint. The pump is kept in place by its own weight - there is no need for any fasteners to clamp it to the delivery piping. Removing the pump for maintenance is equally simple – just pull it up; there are no bolts to be dismantled. The operator need not enter the septic sump once the automatic coupling system is fitted.

Being used to pump sewage from an open drain & incoming grit chamber.

DN 350mm discharge size ANS pump (weighing 2.5T) is being lowered for emergency dewatering of a flooded SPS. This pump was run for non stop 300hours in suspended mode without valves.

Minimum Liquid Level

If site conditions dictate minimal depth of excavation *(& hence a higher sump bottom level)*; Jacket cooled motors can be *(optionally)* offered allowing the pumping to almost the casing level of the pump. Aqua's wet pit jacket cooling system is field proven to be clog resistant in Real life Indian sewerage condition. It uses the pumped media to dissipate motor heat & hence does not require any additional coolant / impellers

..... *refer page 2*

Aqua offer an option of close circuited jacket cooling systems *(utilizing special coolant& internal circulation impeller)* for cases where the pumped liquid is very corrosive or very thick.

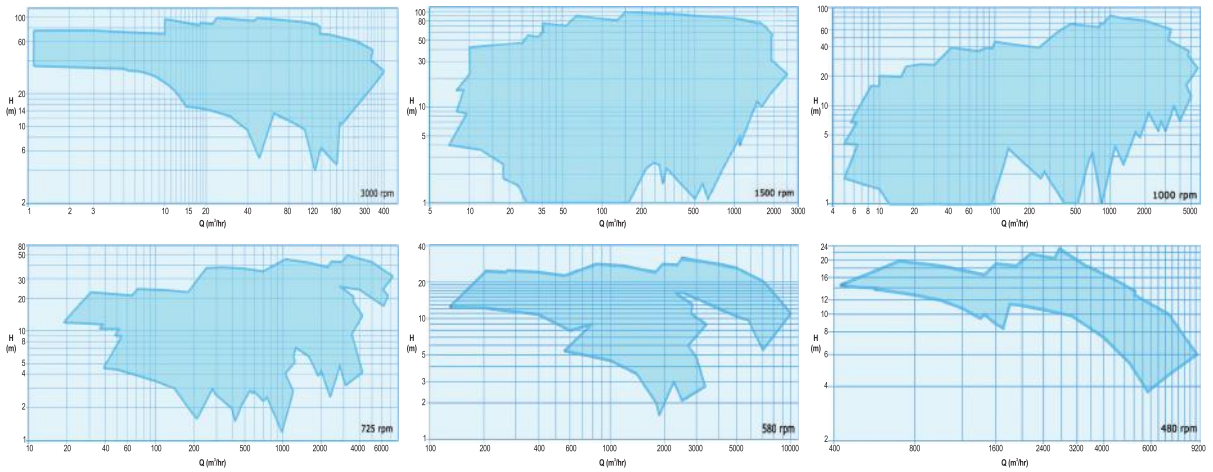
Flood Proof Insurance for your dry pit type drainage pumping stations-dry installed submersible pumps !

….. *refer page 6*

Submerged Portable Vertical installation

Certain applications like sewer pipe line construction / maintenance works, salvaging flooded dry pits in pumping stations, replacing aged dry installed pumps *(by mounting the ANS pump directly in the wet pit)*, drainage of open sewer drains; require submersible pumps to be installed on transportable portable stands. ANS pumps can be factory fitted with portable skirt base stands enabling quick & versatile installation – they can be fitted either Vertically or Horizontally

Typical Performance Range



Standard Technical Data		
Pump Discharge Sizes		DN 50 to 800 mm
Ambient Temperature		Standard : up to 50ºC *(options for 60ºC and 70ºC available)*
Motor	**Ratings**	2.2kW to 800 kW
	Speeds	3000, 1500, 1000, 750 ,600, 500, 375 rpm
	Duty & Enclosure	S1 & exceeds the standards laid down under IP68
	Supply Options	415V, 690V ,3300V, 6600V
Protection Systems	**Cable Connection Chamber Water Leakage Detector**	By built in moisture detection system (> 75 kW)
	Reverse Rotation Protection	By Built in rotation detection mechanism (> 25 kW)
	Upper Bearing Temperature Detector	By BiMettalic switches (> 30 kW) *(options of PTCT / PT 100 available)*
	Winding thermal overload Protection	By BiMettalic switches; *options of PTCT / PT 100 available*
	Stator Body Water Leakage Detector	By built in moisture detection system (> 25 kW)
	Lower Bearing Temperature Detector	By BiMettalic switches (> 30 kW) *(options of PTCT / PT 100 available)*
	Upper Seal Leakage Detector	By built in moisture detection system (> 250 kW)
	Lower Seal Leakage Detector	By built in moisture detection system

Standard Materials of Construction							
		Option 1	**Option 2**	**Option 3**	**Option 4**	**Option 5**	**Option 6**
Pump Casing		Ni Cast Iron	Spheroidal Cast Iron	Stainless Steel	Ni Resist	High Chrome Cast Iron	Al Bronze
Impeller & Suction Cover							
Shaft		Stainless Steel					
Motor Casing & other parts		Grey Cast Iron / Stainless Steel					
Motor Squirrel Cage Rotor		Aluminum / Copper					
Motor Jacket Casing		Galvanised Mild Steel / Stainless Steel					
Cables		PVC insulated double Sheathed / EPRS insulated double Sheathed					
Mechanical Shaft Seals	**Secondary (Upper)**	Carbon (B) v/s Cast Chrome Molybdenum Steel (S) with Viton (FKM) elastomers (upto 225 kW ; Carbon v/s SSiC (> 225 kW)					
	Primary (Lower)	Silicon Carbide (SSiC) v/s SSiC with Nitrile (NBR)					
Fasteners		MS Galvanised with Coating / Stainless Steel					
Oil		Eco Friendly paraffin white oil to ISO VG 15					

Options	
Jacket Cooled motors *(Option of Glycol Cooling is also available)*	Anti Erosion Coatings
Dual Cage Copper Bars Rotors & Class "H" insulation *for smaller motors as well*	