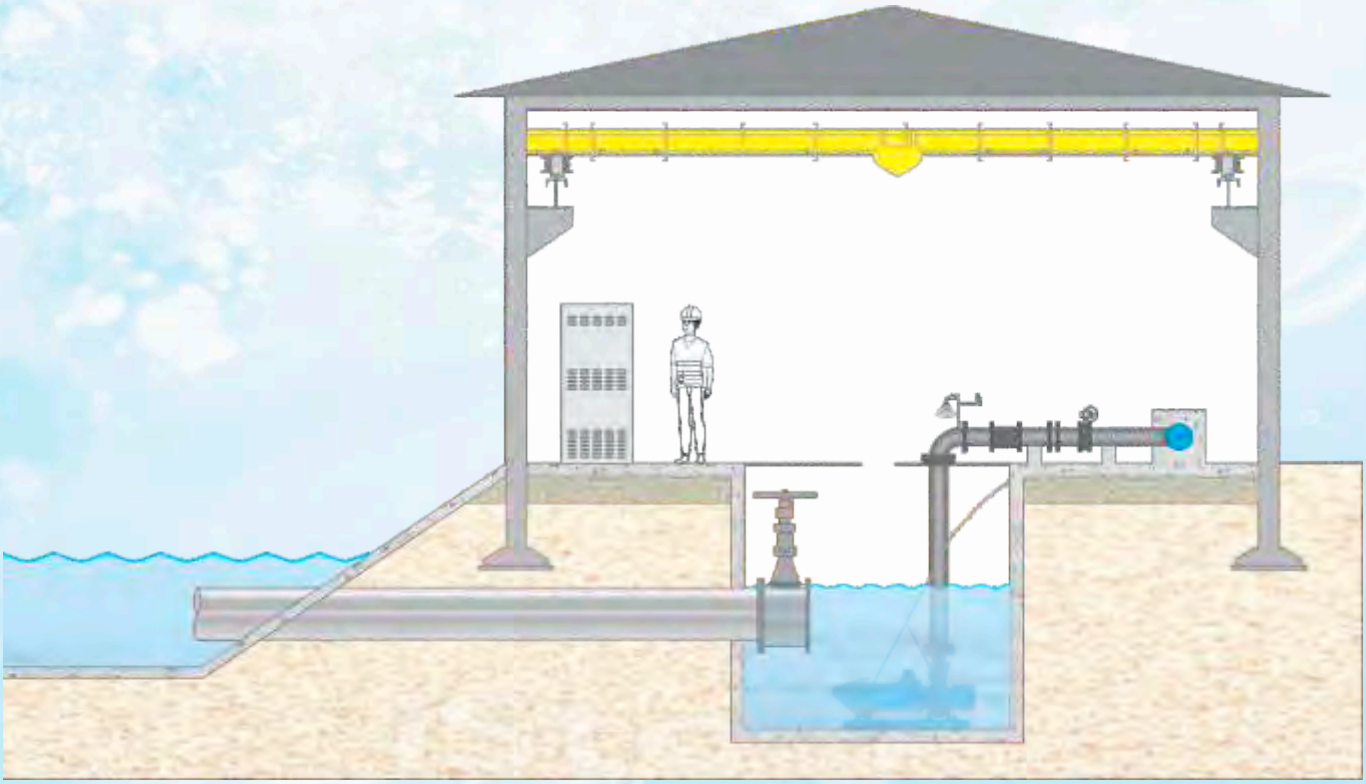
AQuA®©

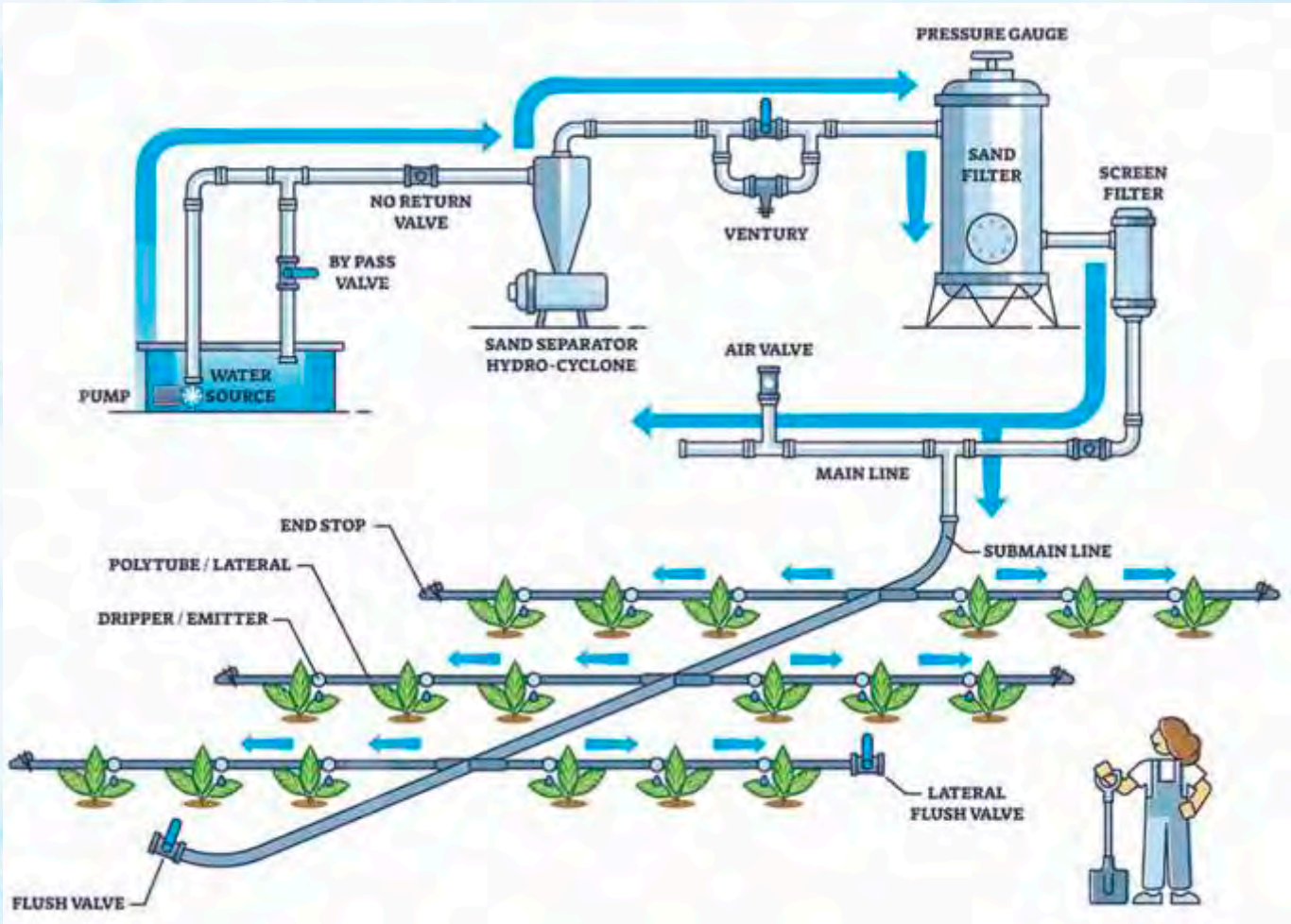
Lift Irrigation

Submerged CF Pumps for Low Energy Consumption, Ultra Low Maintenance & Compact PDN Pumping Stations



Why Pressurized Distribution Network (PDN) ....?

- Enhanced Yield
- Conserves Water *(up to 50%)*
- Conserves Energy used in pumping
- Low Incidence of Diseases & Pests
- Improves Fertilizer usage Efficiency.
- Uniform Grain size
- No need for Land Contour Leveling *(a prerequisite for gravity flow irrigation).*
- More Crop per Drop - Multiple Crops per Annum with same water availability

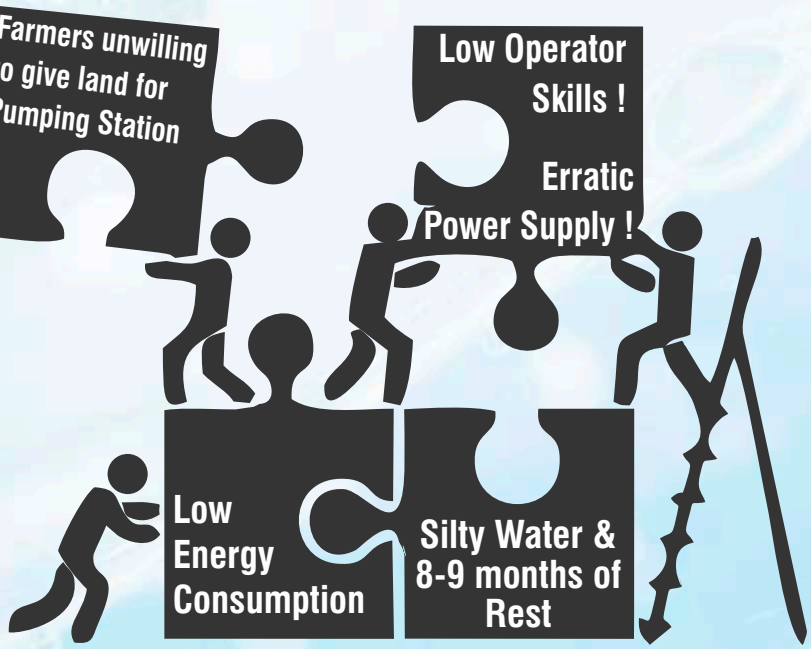


Criteria for Selection of Pumps....

"Pumps play a key role in PDNs.

They have to be optimized between many constraints"

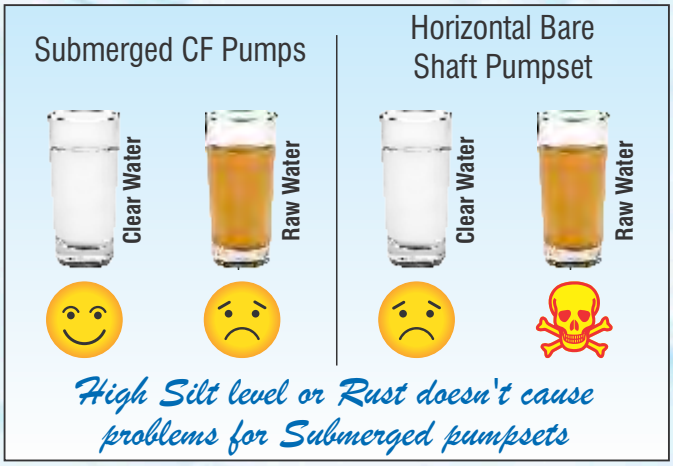
M.N. Gowaikar
Consulting Engineer



AQuA®©

Constraints

Silty Water & 8-9 months of Rest



According to Indian Standards ***(IS)***; water used in PDNs is NOT Clear water *(which means water having maximum Silt Turbidity of upto 50ppm (50mg/l) Silica scale)*

Horizontal Bare Shaft pumps ***(IS 6595)*** are primarily built for Clear water - they can be modified for Raw water *(with varying degrees of success - but these modifications will add to their Operational Complexity & Increased Spare Parts Consumption).*

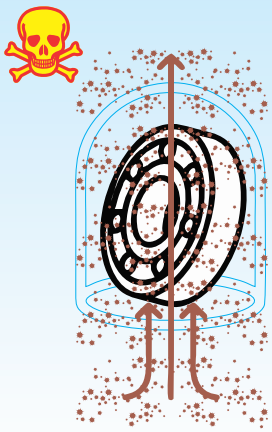
Due to **months of rest**; fine silt, rust, etc. deposits in the close clearance of the Horizontal Bare Shaft pump's internals causing elevated rusting/galling which can **jam** the **close- clearance parts** *(like water-lubricated Gland-Sleeves, etc)* creating **Lock Rotor** conditions **causing damage**.

However, Submerged Centrifugal pumps ***(ANSI HI 11.6)*** are Inherently Resistant to Silty Raw Water - due to the use of an Oil-Lubricated, Rust-Proof; Sleeve Less Shaft & Mechanical Seals, and the use of Sealed Grease Lubricated Ball Bearing; Submerged CF pumps can **safely** be **left unused** for **years** together.

Submerged CF Pumpset

Pumps **Bearings** are Located Deep inside the motor & are Totally **Sealed** by **Two Mechanical Seals** thereby **Isolated** from Water & **Silt** for 100% **Bullet Proof performance**

Horizontal Bare Shaft Pumpset



Bearings & **Gland Sleeves** in Horizontal pumps are frequently **exposed** to **Silt** & **Rust** laden **water** leading to Frequent Failures

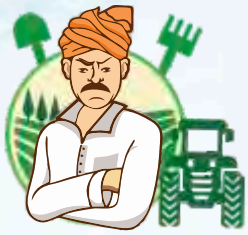
Aspect	Horizontal Bare Shaft Pumpset	Sub Centrifugal
Tolerance of basic pump design to Raw silty water	Poor	Medium
Under Ground Pump Motor Room required?	Yes Requires Higher Land Area & is prone to Flooding. Needs continuous dewatering of Seepage & Leakage of water	No
Total Pumping Station Power Consumption	Slightly High	Competitive
Ease of Operation	Complex	Easy
Operator's Skill level required	Highly skilled	Medium
Recommended Mean Time Between Maintenance *(MTBM)*	4 to 8 months or 1000hours	50 to 90 months or 45000hours

Why Submerged Centrifugal Pumpset (SubCF) ....?

Pump Room Layout:

To avoid Priming problems during each start-up; Horizontal Bare Shaft pumps need to be provided with Positive Suction –i.e. **Under Ground Motor Room needs to be created** which :

- is prone to Seepage & Leakage which needs daily Dewatering increasing O&M hassles & costs
- is prone to occasional Flooding &
- consumes more Land



Reduces issues of **Land Acquisition**
(for Pumping Station)

Submerged CF pumpsets are immersed directly in to Wet Pit hence **Eliminating** the need of Dry Pit resulting in **Huge Land Saving.**

Horizontal Bare Shaft Pumpsets require Costly & Spacious Pump Rooms

Criteria for Selection of Pumps....

Overall Pumping Station *(Wire to Water)* Power Consumption

Energy plays a vital role in these projects; a **deep thought to ALL Losses within the Pumping Stations** is necessary.

The Bowl Efficiency of Horizontal Bare Shaft pumps &/or Submerged CF pumps is nearly the same, but **Horizontal** Bare Shaft pumps **require :**

- **Suction Manifold Auxiliaries** *(like Bend, Elbow, Puddle Pipe, Isolation Valve, Expansion Bellow & Reducer etc.)* all of which will **have** their **Inherent Associated Unavoidable Friction Head** (m) **Losses** *(& hence will subsequently **waste Energy** too).*
- **Under Ground** Motor Pump Room thereby **wasting Energy** in its **Ventilation, Lighting** & **Dewatering.**
- **Couplings** between Motor & Pump which will incur Un-Avoidable Mechanical Power (kW) Losses

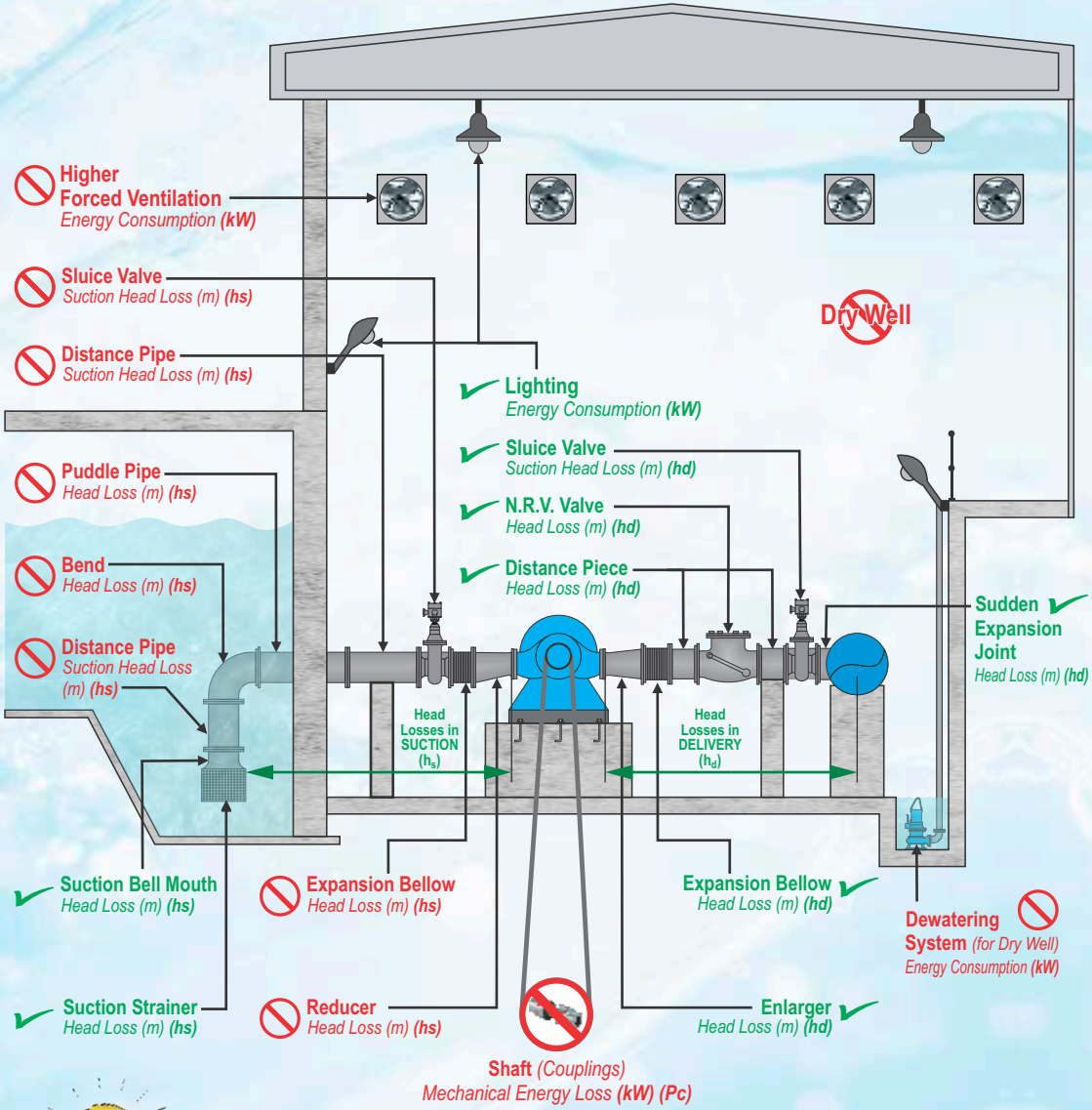
However, these are **not required/ applicable** in Submerged CF pumps & hence they will have slightly Lower Pumping Station Power Consumption *(even with the same pump efficiency).*

Pumping Station's Wire to Water Specific Power *(kW/ML)* Consumption

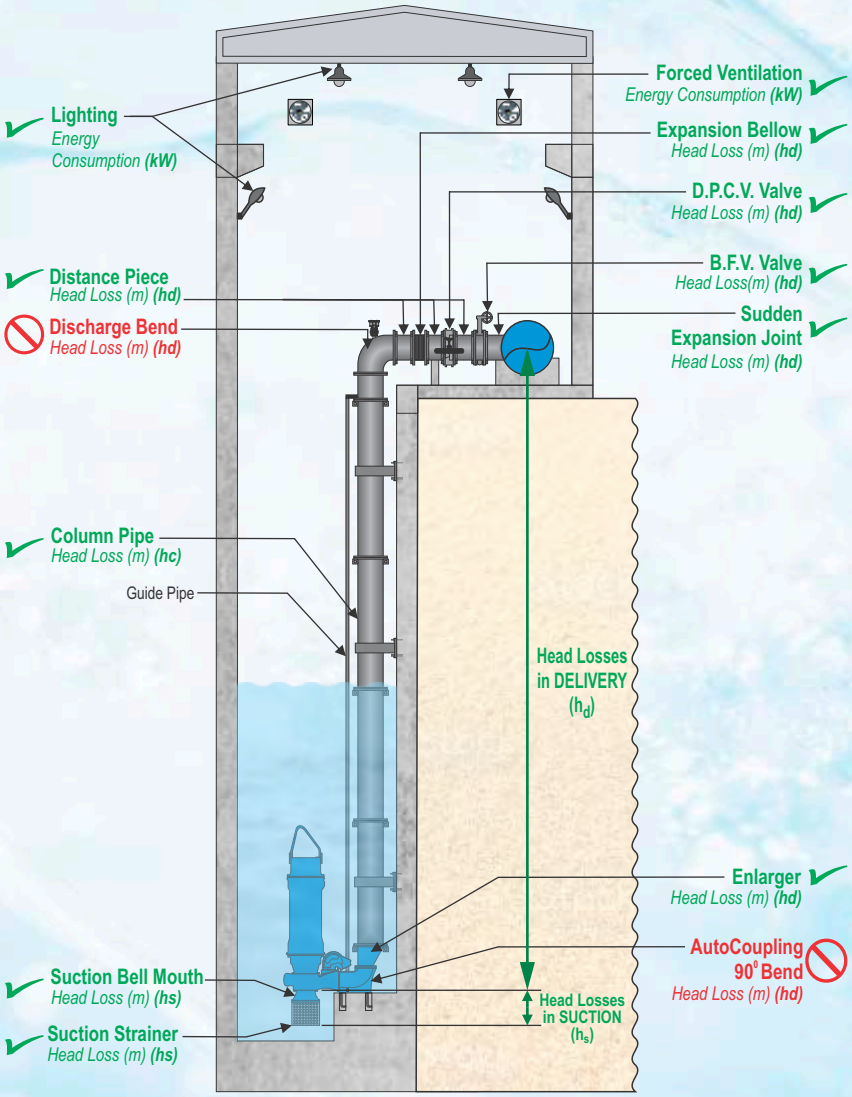
Legend :
Ancillaries / Auxiliaries / Components marked **RED** (⃠) indicate that they are **Not required / required** in **Lesser Quantity** in SubCF pumps *(& hence their **Losses / Parasitic Energy Wastage** is also automatically **Eliminated**)*.

Legend :
Ancillaries / Auxiliaries / Components marked **GREEN** (✔) indicate that they are **common** in all Pump / Pumping Stations types *(& hence their **Losses / Parasitic Energy Wastage** is also **unavoidable**)*.

HSCF based Pumping Station



SubCF based Pumping Station



Submerged pump based PUMPING STATIONS consumes less Total Energy

(as compared to HSCF Pump based Pumping Stations)...!

Energy & Efficiency Comparison

HSCF v/s **SubCF** *(Detailed Calculation)*

S.No.	Description		Unit	Type of Pumpsets HSCF	Type of Pumpsets SubCF	Remarks
1	***Total Capacity***		*MLD*	***150***		–
2	***Working Hours Per Day***		*hr*	*22*		–
3	***Pumpsets Quantity***	*Working*	*Nos*	***4***		–
4		*Stand-by*	*Nos*	*1*		–
5	***Pumpset's Rated*** *(Duty Point)* ***@ Discharge Bend***	*(Effective) Head (h)*	*m*	***27***		–
6		*(Effective) Discharge (Q)*	*l/s*	473.5		–
7			***m^3/hr***	**1704.5**		–
8	***Pump's Water Power*** *(p)*		*kW*	*125.3*		–
9	***Pump Delivery***	*Nozzle Size*	*mm*	300		–
10	***Delivery Pipe***	*Size*	*mm*	400		–
11		*Hazen Williams Constant*	*C*	*140*		C value from CPHEEO Water Manual Table : 6.1 (Page No : 108)
12	***Suction*** *(Head)* ***Losses*** (h_S)	12.1 **Suction Strainer**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.5	0.5	Strainer Losses = $KxV^2/2g$
			Loss	*m*	0.025	0.025	K Value Assumed = 0.5
		12.2 **Suction Bell Mouth**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.5	0.5	Bell Mouth Losses = $KxV^2/2g$
			Loss	*m*	0.362	0.362	K value from CPHEEO Water Manual Table : 6.5
		12.3 **Distance Piece**	Length	*m*	0.5	–	Distance Piece Losses = $3.35 \times 10^6 Q (l/s) / d^{2.63} C$
			Loss	*m*	0.012	–	C value from CPHEEO Water Manual Table : 6.1 (Page No : 108)
		12.4 **90° Bend**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.75	–	Bend Losses = $KxV^2/2g$
			Loss	*m*	0.543	–	K value from CPHEEO Water Manual Table : 6.5
		12.5 **Puddle Pipe**	Length	*m*	2.0	–	Distance Piece Losses = $3.35 \times 10^6 Q (l/s) / d^{2.63} C$
			Loss	*m*	0.049	–	C value from CPHEEO Water Manual Table : 6.1 (Page No : 108)
		12.6 **Distance Piece**	Length	*m*	0.5	–	Distance Piece Losses = $3.35 \times 10^6 Q (l/s) / d^{2.63} C$
			Loss	*m*	0.012	–	C value from CPHEEO Water Manual Table : 6.1 (Page No : 108)
		12.7 **Sluice Valve**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.3	–	Valve Losses = $KxV^2/2g$
			Loss	*m*	0.217	–	K value from CPHEEO Water Manual Table : 6.5
		12.8 **Expansion Bellow**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.5	–	Bellow Losses = $KxV^2/2g$
			Loss	*m*	0.362	–	K value from CPHEEO Water Manual Table : 6.5
		12.9 **Reducer**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.5	–	Reducer Losses = $KxV^2/2g$
			Loss	*m*	0.362	–	K value from CPHEEO Water Manual Table : 6.5
		Sub TOTAL		*m*	**1.95**	**0.39**	–
13	***Delivery*** *(Head)* ***Losses*** (h_d)	13.1 **Auto Coupling 90° Bend**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	–	0.5	Bend Losses = $KxV^2/2g$
			Loss	*m*	0.000	1.145	K value from CPHEEO Water Manual Table : 6.5
		13.2 **Enlarger**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.5	0.5	Enlarger Losses = $KxV^2/2g$
			Loss	*m*	1.145	1.145	K Value Assumed = 0.5
		13.3 **Discharge Bend**	Loss	*m*	0.00	0.36	For Sub. Pump = $KxV^2/2g$
							K Value Assumed = 0.5
		13.4 **Expansion Bellow**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.5	0.5	Bellow Losses = $KxV^2/2g$
			Loss	*m*	0.362	0.362	K value from CPHEEO Water Manual Table : 6.5
		12.3 **Distance Piece**	Length	*m*	0.5	0.5	Distance Piece Losses = $3.35 \times 10^6 Q (l/s) / d^{2.63} C$
			Loss	*m*	0.012	0.012	C value from CPHEEO Water Manual Table : 6.1 (Page No : 108)
		13.6 **NRV Valve**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.3	0.3	Valve Losses = $KxV^2/2g$
			Loss	*m*	0.217	0.217	K value from CPHEEO Water Manual Table : 6.5
		13.7 **Distance Piece**	Length	*m*	0.5	0.5	Distance Piece Losses = $3.35 \times 10^6 Q (l/s) / d^{2.63} C$
			Loss	*m*	0.012	0.012	C value from CPHEEO Water Manual Table : 6.1 (Page No : 108)
		13.8 **Sluice Valve**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.3	0.3	Valve Losses = $KxV^2/2g$
			Loss	*m*	0.217	0.217	K value from CPHEEO Water Manual Table : 6.5
		13.9 **Sudden Expansion Joint**	Loss Factor "K"	K Value *(Resistance Co-Efficient)*	0.3	0.3	Sudden Expansion Joint Losses = $KxV^2/2g$
			Loss	*m*	0.217	0.217	K value from CPHEEO Water Manual Table : 6.5
		Sub TOTAL		*m*	**2.18**	**3.69**	–
14	***Bowl Assembly Head (H)*** = 5+12+13 *to be developed by bowl to overcome ALL Head Losses upto Discharge Nozzle*			*m*	**31.13**	**31.08**	–

S.No.	Description		Unit	Type of Pumpsets HSCF	Type of Pumpsets SubCF	Remarks
15	***Pump*** *(Bowl)* ***Efficiency*** (η_p)		%	***85.00***	***84.50***	From HIS 2010
16	***Pump*** *(Bowl)* ***Assembly Input Power*** (P_b)		*kW*	170.00	170.73	–
17	***Coupling*** *Efficiency (IF provided)* (η_c)		%	**99.00**	–	From HIS & Euro Pumps Standard
18	***Coupling*** *(Mechanical)* ***Losses*** *(IF Provided)* (P_c)		*kW*	**1.70**	**0.0**	–
19	*(Mechanical)* ***Power drawn from*** *(Driver)* ***Motor*** = 16+18		*kW*	**171.7**	**170.7**	–
20	***Motor Rating Offered***		*kW*	**200**	**200**	–
21	***Resultant Motor Margin*** *@ Duty Point*		%	17.6	17.1	–
22	***Motor Efficiency*** (η_m)		%	***95.1***	***95.4***	–
23	***Motor Terminal Input*** *(Electrical)* ***Power Consumed*** *(PumpSET)* (P_{mi}) = 19/22		*kW*	180.6	179.0	–
24	***Overall*** *(PumpSET)* ***Efficiency*** (η_O) = 8/23		%	**69.42**	**70.04**	–
25	***TOTAL Electrical Power Consumed by PumpSET***		*kW/hr*	**180.6**	**179.0**	–
			kW-hr / Day	15,888	15,748	–
26	***Energy Consumption*** *in* ***Lighting*** *of* ***Electrical Room***	*Unit Rating*	*kW*	0.10	0.10	–
		Quantity/W+S	*nos*	6	6	–
		Working hr/day	*hr*	12	12	–
		Total Power	*kW/Day*	**36.0**	**36.0**	–
27	***Energy Consumption*** *in* ***Lighting*** *of* ***UnderGround Pump Room (Dry Well)***	*Unit Rating*	*kW*	0.10	0.00	–
		Quantity/W+S	*nos*	8	0	–
		Working hr/day	*hr*	12	0	–
		Total Power	*kW/Day*	**48.0**	**0.0**	–
28	***Energy Consumption*** *in Auxillary Power Consumption of* ***DeWatering System*** *(used for DeWatering seepage, gland & gasket leakage dewatering of Dry well under ground pump room)*	*Unit Rating*	*kW*	2.2	0.00	–
		Quantity/W+S	*nos*	1	0	–
		Working hr/day	*hr*	5	0	–
		Total Power	*kW/Day*	**44.8**	**0.0**	–
29	***Energy Consumption*** *in* ***Forced Ventilation*** *of* ***UnderGround Pump Room (Dry Well)***	*Current*	*A*	3.8	3.8	–
		Volt	*V*	240	240	–
		Power Factor	*Cos Ø*	1	1	–
		Power	*kW*	0.9	0.9	–
		Quantity of Fans	*nos*	4	2	–
		Total Power	*kW/Day*	**80.3**	**40.1**	–
30	***Total Auxiliary & Ancillary Power Consumption*** =26+27+28+29	*Unit Rating*	*kW/Day*	209.1	76.1	–
31	***Transformer, Electrical Substation & Miscellaneous Losses***		*kW/Day*	**402.4**	**395.6**	–
32	***Pumping Station*** *(P.S.)*	*P.S.Total Power Consumed*	*kW/Day (25+30+31)*	**16,500**	**16,220**	–
			Ratio	**1.02**	**1.00**	–
		P.S. Efficiency (Wire to Water)	%	66.8	68.0	–
		Specific Power Consumption	*kW/ML*	**110.0**	**108.1**	–

Despite having *(nearly)* ***Similar PUMP Efficiency; Submerged pump based PUMPING STATION consumes*** *(slightly)* ***Lower Energy...!***

Zero Ancillary &/or Auxiliary Systems & Fewer Parts

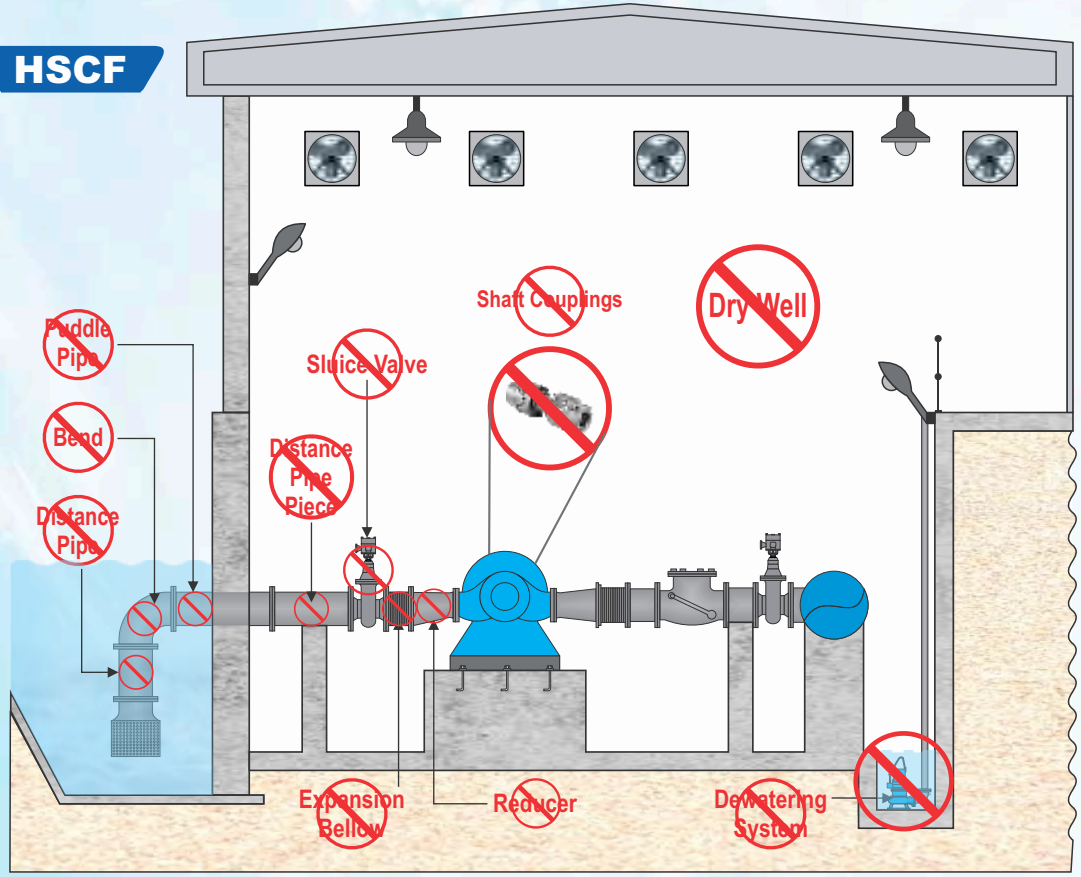
Lead to a Huge Reduction of Operation & Maintenance, Man-Power & Spare Parts

Saves *(upto **66**%)*
O&M Staff*

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

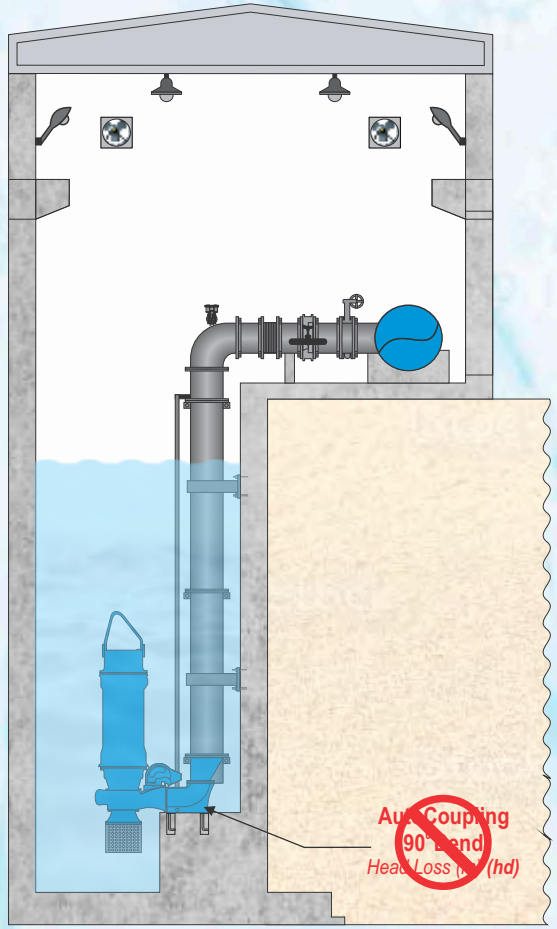
Legend : Ancillaries/ Auxiliaries / Parts marked ⃠ indicate that they are not required in All types of Pumping Stations *(& hence their associated Operation Hassles, Maintenance Problems & Spare Parts Consumption are also automatically eliminated).*

HSCF



Recommended Types of Spare Parts *to be kept in PumpHouse for 2year operation (as per **DIN 24296**)*					
1	Impeller	10	Impeller wear ring	19	Grooved pin
2	Rolling Element / Angular contact ball bearing	11	Shaft protecting sleeve	20	Fastening elements for the shaft
3	Rolling Element / Deep Groove ball bearing	12	Bearing sleeve	21	Stuffing Box insert
4	Gasket	13	Bush (thrust and radial bearing)	22	Gland follower
5	Joint ring	14	Locking sleeve, complete	23	Neck ring
6	O-ring	15	Threaded bush	24	Lantern ring
7	Mechanical seal (set)	16	Bearing bush	25	Spacer sleeve
8	Gland packing (set)	17	Torque transmitting coupling elements	26	Seal cover
9	Casing wear ring	18	Lock washer	**27**	Motor (Entire Unit)

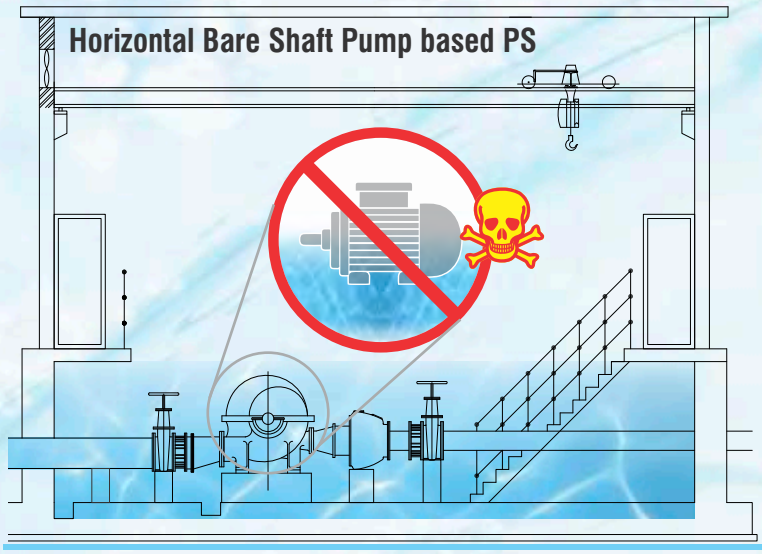
SubCF



Recommended Types of Spare Parts *to be kept in PumpHouse for 2year operation (as per **DIN 24296**)*			
1	Impeller	6	Casing wear ring
2	Rolling Element / Angular contact ball bearing	7	Impeller wear ring
3	Rolling Element / Deep Groove ball bearing	8	Cable Gland
4	O-ring	**9**	Motor (Rotor, Stator)
5	Mechanical seal (set)		

***SubCF pumpsets require just 9 types of Spare Parts** (as compared to **27** for **HSCF** respectively) .....!*

Lower Maintenance & Reduced O&M Costs



No Risk of Motor Burnout due to under Water Accumulated from Leakage of Piping &/or pump's Gland &/or pump's Gasket &/or Seepage from Wall *(even after Lack of Frequent DeWatering)* due to **Operator's Absenteeism** &/or Failure of DeWatering System.

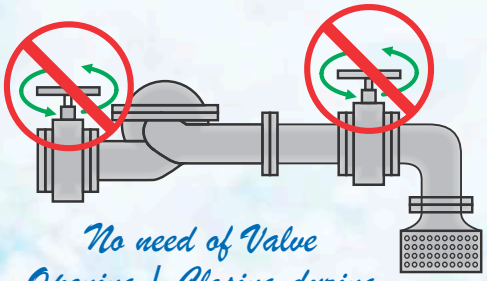
No need to Periodically...

...Check / Align Shaft Coupling

...Check / Change Gland Packing

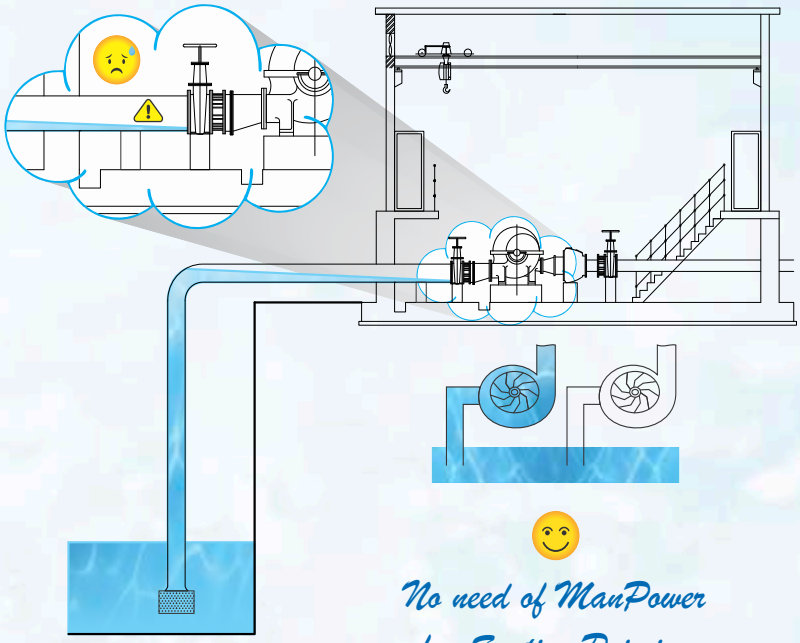
...ReGrease / Refill Oil

Horizontal Bare Shaft Pump based PS



No need of Valve Opening / Closing during pump Start/Stop

Horizontal Bare Shaft Pump based PS

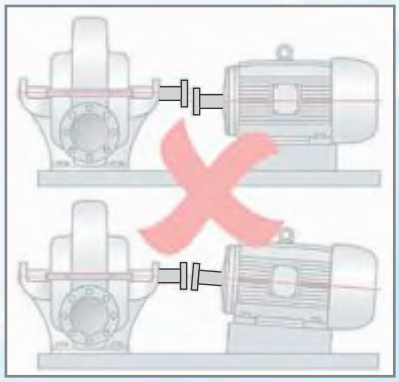


No need of ManPower for Suction Priming

Ultra Low ManPower Requirement

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

- Suction Priming during Pump StartUp,
- Valve Opening- Closing during pump Starting-Stopping
- Operating & Maintaining the Forced Water Lubrication systems operation,
- Operating the Dewatering Pump to water leakage from Seepage / Gland Piping Leakage, etc.



- **No** Shaft Alignment
- **No** Coupling or Base Plate **Maintenance**

Comparision : **Space & Cost :** Pumping Stations

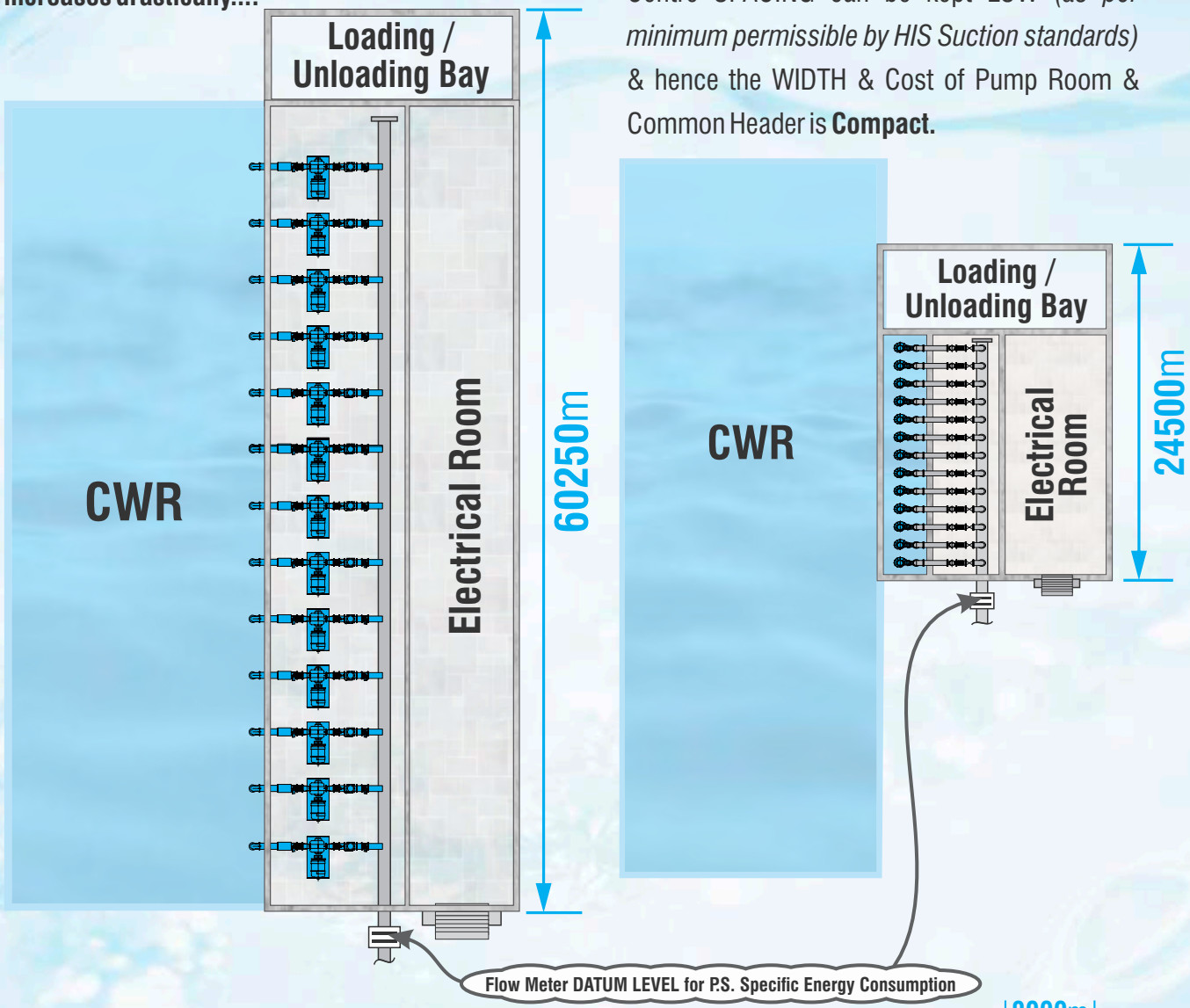
All PS with 10W + 3S x 1364m³/hr pumps each

HSCF based
Positive Suction Pump Room

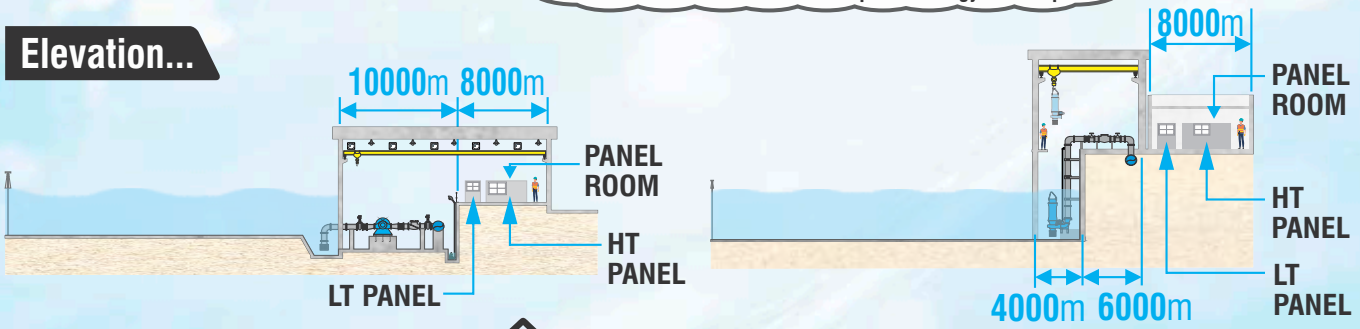
⚠⚠ Due to **Perpendicular Orientation** *(of Motor with respect to Piping)*; in HSCF pumpsets the pump Center to Centre SPACING & hence the WIDTH *(& Cost)* of Pump Room & Common Header **increases drastically...!**

SubCF based
Flooded Suction Pump Room

Due to Self **Water Cooled** Motors & ability to quickly pull up any single pump within minutes *(for maintenance at Loading/Unloading Bay)*, in SubCF pumpsets; the Pumpset Center to Centre SPACING can be kept LOW *(as per minimum permissible by HIS Suction standards)* & hence the WIDTH & Cost of Pump Room & Common Header is **Compact.**



Elevation...



Saves *(upto 55%)* **Land** Requirement*

Comparision : **Capital Cost** of Pumping Stations

All PS with 10W + 3S x 1364m³/hr pumps each (cost basis March 2019)

Component / Type of Installation			Unit	SubCF Pumping Station	HSCF Pumping Station
Time Frame of Project Completion			month	6	18
Capital Cost : Civil Structure **(Pump Room)**	**Pumpset Portion**	Carpet Area : Under Ground Portion	m²	82.0	562.5
		Rate / m²	₹/m²	17,000	22,000
		Cost of Under Ground Portion	₹	**13,94,000**	**1,23,75,000**
		Carpet Area: Above Ground Portion	m²	163.0	40.0
		Rate / m²	₹/m²	14,000	14,000
		Cost of Above Ground Portion	₹	**22,82,000**	**5,60,000**
	Electrical *(Switch Gear)* **Room**	Carpet Area	m²	196	480
		Rate / m²	₹/m²	12,500	12,500
		Cost of Electrical Portion of Pump Room	₹	**24,50,000**	**60,00,000**
	Pump Room	**Total Component Capital Cost**	₹	**61,26,000**	**1,89,35,000**
	Land Coast of Pump Room	Area	m²	759	1,546
		Rate / m²	₹/m²	**20,000**	**20,000**
		Total Component Capital Cost (IV - not time interest adjusted)	₹	1,51,80,000	3,09,10,000
CAPEX - Capital Cost : Pumping Station *(Civil)*			₹	**2,13,06,000**	**4,98,45,000**
			comparitive %	**100%**	**234%**
Capital Cost	**Pumping Machinery**	Pump Set Qty. (W)	nos.	**10**	**10**
		Pump Set Qty. (S)	nos.	**3**	**3**
		Nearest Standard Motor Rating	kW	**82**	**82**
		Approx. Total Rating of Installed Pumping m/c	kW	1066	1066
		Rate of Pumpset (Pump+Motor+Suction & Delivery manifolds)	₹/kW	**18,000**	**22,000**
		Rate of Common Header	₹/kW	1,725	2,760
				Due to Perpendicular Orientation of Motor with respect to Piping; in HSCF pumpsets the pump Center to Centre SPACING & hence the WIDTH *(& Cost)* of Pump Room & Common Header increases drastically	
		Lump Sum Capital Cost P/M	₹	**2,10,26,850**	**2,63,94,160**
CAPEX - Capital Cost : Pumping Station *(Civil) + Pumping M/c*			₹	**4,23,32,850**	**7,62,39,160**
			comparitive %	**100%**	**175%**

Study Conclusion: SubCF based Pumping Station is More Economical, Saves Substantial Land & Time to construct....

Why Aqua's SubCF Pumps....?

Long Life, Maintenance Free

Mechanical Seals

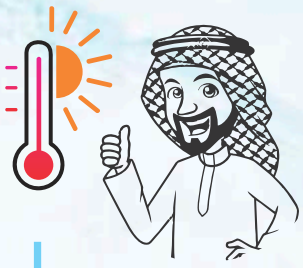
Two, Independent; Seals rated for atleast **16 / 25 bar** pressure capability for L_{10H} life in excess of **50,000** hours &/or **5** years.

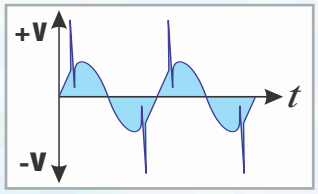
Bearings

Heavy duty, Anti Friction, bearings are designed for L_{10H} life in excess of **1,00,000** hours &/or **10** years.

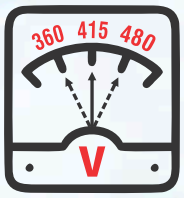
The pumps used in PDNs are to run **24hr/day** - hence they have to operate at S1 Duty despite often Poor Electrical Supply

Thanks to generous **Reserve Margins** *(50°C as against minimum 25°C required by IS)* & Superb Di-Electric Strength; Aqua's Motors keep coolly working even in 55°C scorching summers & Erratic Rural Power Supply.

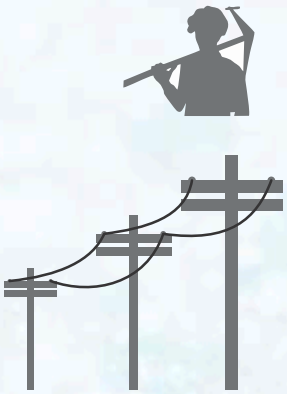




Tolerates **Power Spikes & Surges**



Tolerates Wide **Voltage Variation**



Minimal Noise, Vibration & Heat Emission

....suitable for Rural Power Supply....

Intelligent InBuilt Monitoring

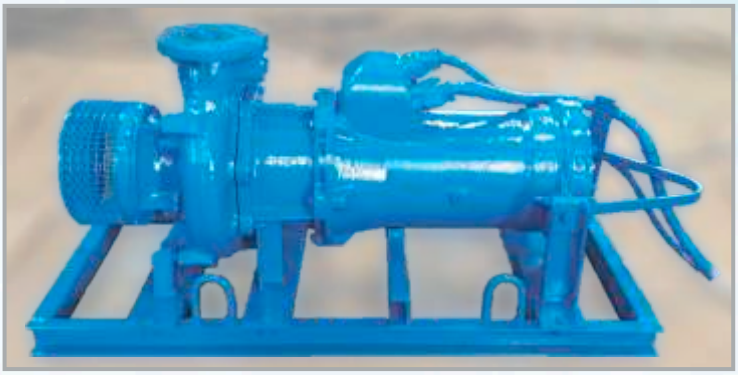
Easy Monitoring (& Remote Control[#]) of your Pumpset's Health.

- **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

Some PDNs with Aqua's SubCF Pumpsets.... *(as of June 2022)*				
Project	**End User**	**Aqua's Client**	**Total kW**	**QTY**
Waghur, Bhadli PDN	**Tapi Irrigation Development Corporation Jalgaon (TIDC)**	m/s Jain Irrigation	4219	**90**
Asoda PDN			2148	**44**
Tarikere Drip Irrigation	**Visvesvaraya Jala Nigam Ltd (VJNL)**	m/s MEIL	4535	**92**
Singataluru LIS P1	**Karnataka Neeravari Nigam LTD (KNNL)**		4300	**52**
Singataluru LIS P3			4237	**68**
Singataluru LIS P4			6989	**96**
Dholpur LIS	**WRD, Rajasthan**	m/s GVPR Engineers Ltd.	8874	**216**



Aqua has been awarded the Prestigious

Best Quality Pump Vendor

by

BHEL

Aqua Machineries Private Limited

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.

marketing@aquapumps.com