GEM *Pump*

(**G**reen **E**ngineering and **M**anagement Co.,Ltd)

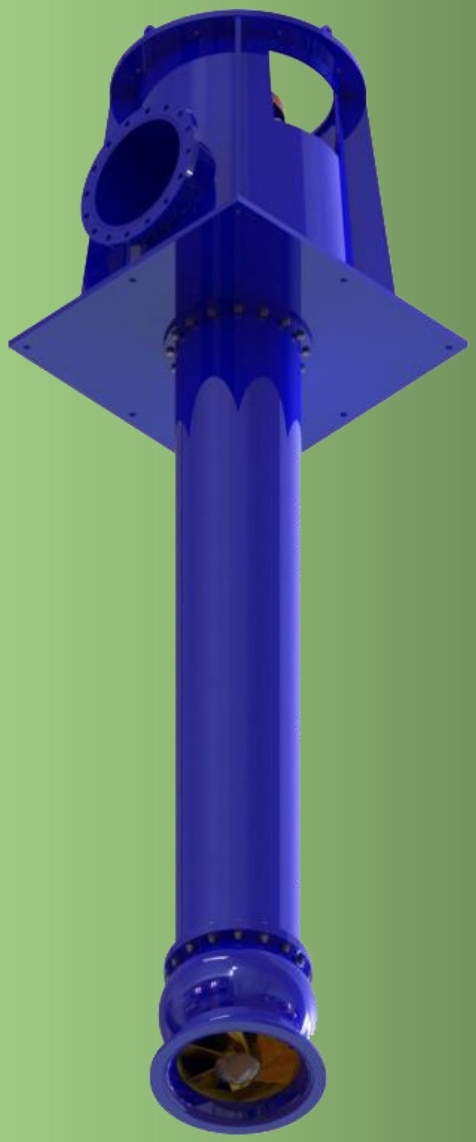
CATALOGUE

Vertical Turbine Pump

APPLICATION

For Handling Pure, Raw and Waste Water as well as Seawater in

- Water Works
- Irrigation and Drainage
- Pumping Stations
- Power Stations
- Industrial Water Supply
- Fire Fighting Systems





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Series description

Product series

The **GEM** Pump LP vertical turbine pump provides a wide range of hydraulic and mechanical coverage. **GEM** Pump offers many different material and design configurations; these numerous configuration options allow for custom-engineered construction tailored to suit your requirements. Maximum value, high efficiency and economical long-term pump performance are assured in each application.

Main applications

- Raw Water Intake
- Irrigation and Drainage
- Pumping Stations
- Power Stations
- Commercial/Industrial
- Municipal / Mining

Driver

Electric Motors

- Electric motors.are, usually, connected directly to the pump
- With hollow shaft motors the downward thrust of the pump's rotating assembly is carried by a thrust bearing, built into the motor.
- The line shaft extends up, through the motor shaft, and is properly secured at the top.
- With solid shaft motors, the line shaft is connected to a heavy ball bearing thrust assembly, located on the pump base plate.

Series Code

Example:

500LP-50*2

500 : pump outlet dia DN500

LP : vertical turbine pump

50 : Deliver head for single impeller

2 : 2 stage impeller

Lubrication

Oil Lubrication

All line shaft bearings are oil lubricated from oiler on the motor base. Oiler can be hand operated or solenoid for automatic lubrication. The bottom pump bearing is packed with water resistant grease, securing a long period of operation.

Grease Lubrication

Bronze line shaft bearings are lubricated by grease pump on the motor base.

Water Lubrication

The line shaft bearings are made of rubber and are water lubricated. The suction bowl bearing is grease lubricated. This type is recommended for clear water to avoid oil Contamination

The pump should not be run dry, as the rubber bearings will seize.

For turbid water we can also use enclosed line shaft and lubrication with clean water from an external source.

Series description

Impeller type

The impeller is of the mixed flow or Axail flow type, made of stainless steel, Bronze or Duplex Steel according to Standards ASTM, DIN, JISS and has a static and dynamic balance class G 6.3 according to ISO 1940/1 or JIS B 0905.

Coating and preservation Paint

- Surface treatment: SA 2.5 (ISO 8501-1)
- Primer: Solvent - free 2 Component epoxy
- Top coat: Solvent free 2 Component epoxy total dry film thickness 400 - 600 µm

Special coating

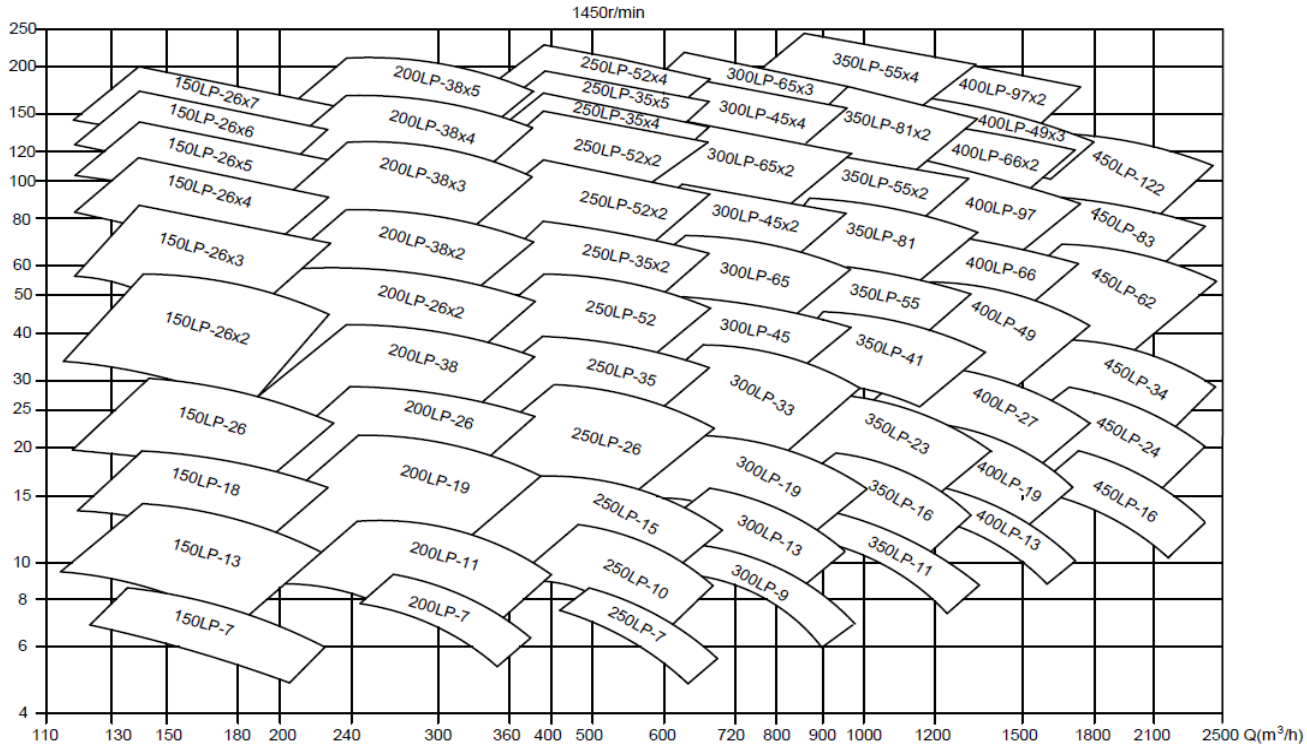
The special coating on request.

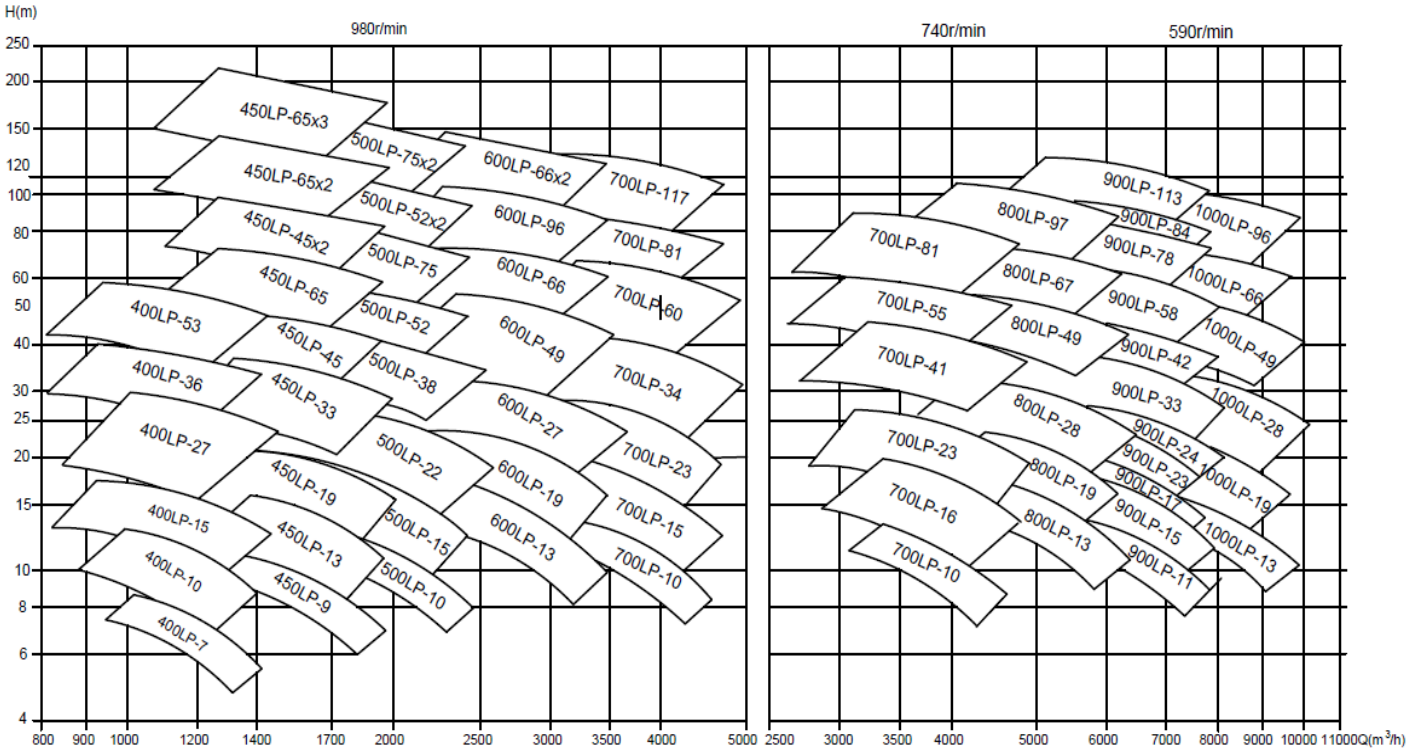
Order Data

- Designation of the pump
- Flow Q
- Head H_{total}
- Type and temperature of the fluid pumped
- Voltage, frequency, starting method
- Quantity and language of operating manuals

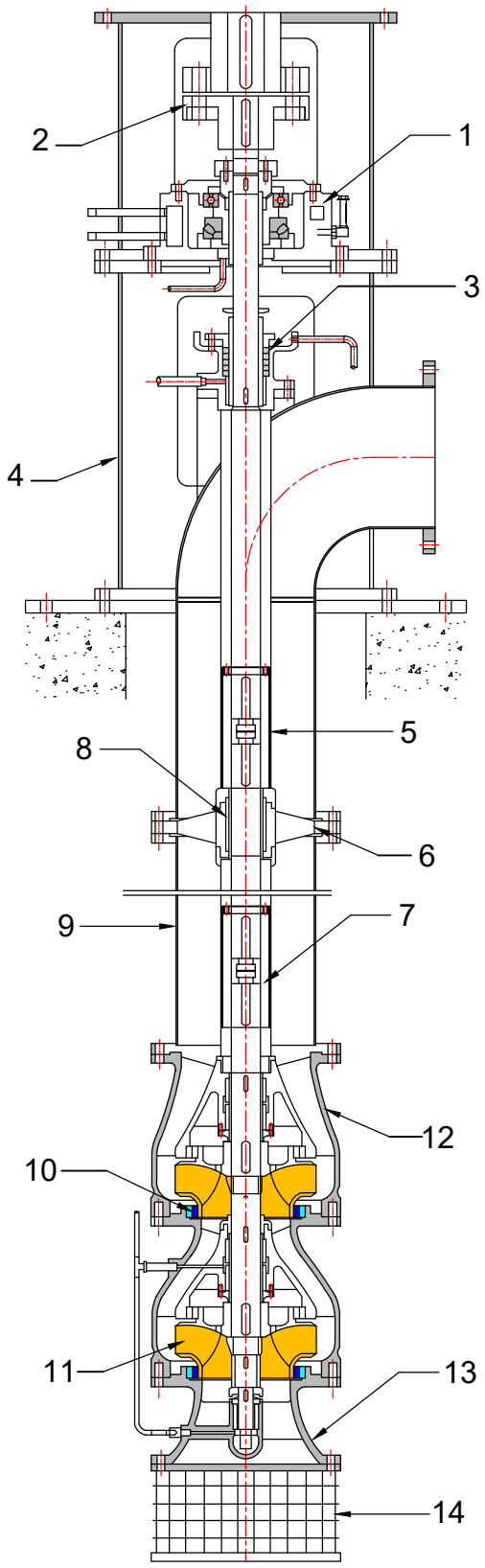
Operating properties		
Caracteristic value		
Flow	Q	Up to 10000 m3/h
Head	H	Up to 380 m
Mounting		Vertical
Fluid temperature	t	Up to +80°C
Column pipe	Dia.	Up to 150 mm
Direction of Rotation		Clockwise, Counter Clockwise
Bowl Assembly		Pull out or Non-pull out

Performance range



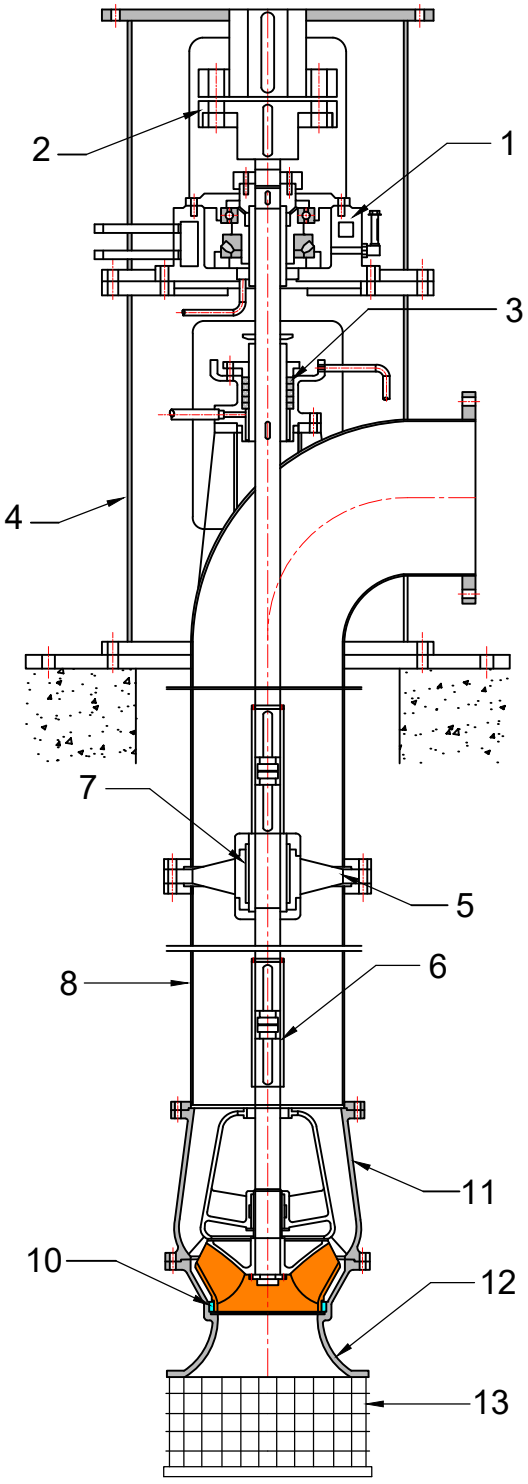


Structure Profile (Enclose Line Shaft)



Item	Description
1	**Thrust bearing parts and non-reverse ratchet**
	- Double bearing, less vibration and noise, Reserved hole for temperature and vibrication measuring, for remote control
2	**Coupling parts**
	- Designed high safety factor, Flexiable pin coupling, spacer coupling, rigid coupling are available.
3	**Shaft sealing**
	- Packing seal, leak tray leading leaks from packing seal
4	**Discharge head**
	- Welded construction - DN<600 is press forming - DN>600 is welded - Pressure measuring hole
5	**Enclosed tube**
	- Protecting shaft sleeve and bearing - With lifting hole outside
6	**Stabilizing "Spiders"**
	- Installed at intervals along the enclosing tube, serving to stabalize the tube within the column pipe
7	**Shaft Couplings**
	- Machined from heavy-duty alloys. "Weep" hole in the center of each coupling permits air and excess thread compound to escape, so the shaft sections butt together smoothly
8	**Line-shaft bering**
	- PTFE,Rubber,Thordon,Bronze are available - Sufficient lubricating water channel with good cooling and lubrication
9	**Column pipe**
	- Fabricated Steel - Support bracket for supporting and hoisting
10	**Wear ring**
	- Double sealing, impeller no touch with pump sealing ring, impeller has a long life - Spiral chute in impeller sealing ring, impurities can be moved out, which prolong impeller life
11	**Impeller**
	- Designed by three-dimensional flow, CFD simulation, high efficiency wide performance range - Balance hole can carry axail force metal mould, precision casting coating material can be used for increasing efficiency, corrosion-resist.
12	**Diffuser**
	- Designed by three-dimensional flow, CFD simulation, high efficiency - Wide performance range - With auto sealing device,prevent impurities in. when stop running - Coating material can be used for increasing efficiency, corrosion-resist
13	**Bell mouth**
	- bearing support can make more stable running
14	**Strainer**
	- special for sewage, no-clogging

Structure Profile (Open Line Shaft)



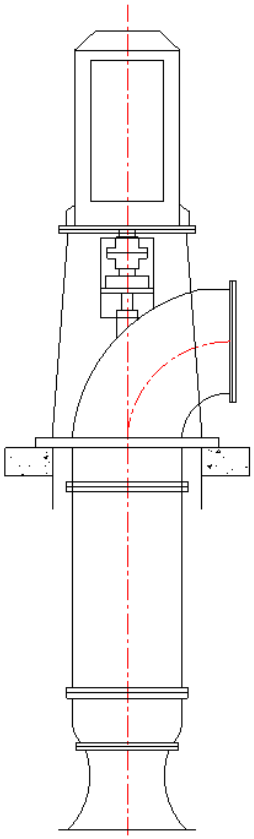
Item	Description
1	**Thrust bearing parts and non-reverse ratchet**
	- Double bearing, less vibration and noise, Reserved hole for temperature and vibrication measuring, for remote control
2	**Coupling parts**
	- Designed high safety factor, Flexiable pin coupling, spacer coupling, rigid coupling are available.
3	**Shaft sealing**
	- Packing seal, leak tray leading leaks from packing seal
4	**Discharge head**
	- Welded construction - DN<600 is press forming - DN>600 is welded - Pressure measuring hole
5	**Stabilizing "Spiders"**
	- Installed at intervals along the enclosing tube, serving to stabalize the tube within the column pipe
6	**Shaft Couplings**
	- Machined from heavy-duty alloys. "Weep" hole in the center of each coupling permits air and excess thread compound to escape, so the shaft sections butt together smoothly
7	**Line-shaft bering**
	- PTFE,Rubber,Thordon,Bronze are available - Sufficient lubricating water channel with good cooling and lubrication
8	**Column pipe**
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	- Double sealing, impeller no touch with pump sealing ring, impeller has a long life - Spiral chute in impeller sealing ring, impurities can be moved out, which prolong impeller life
10	**Impeller**
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12	**Bell mouth**
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13	**Strainer**
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Installation types

Overview of installation types

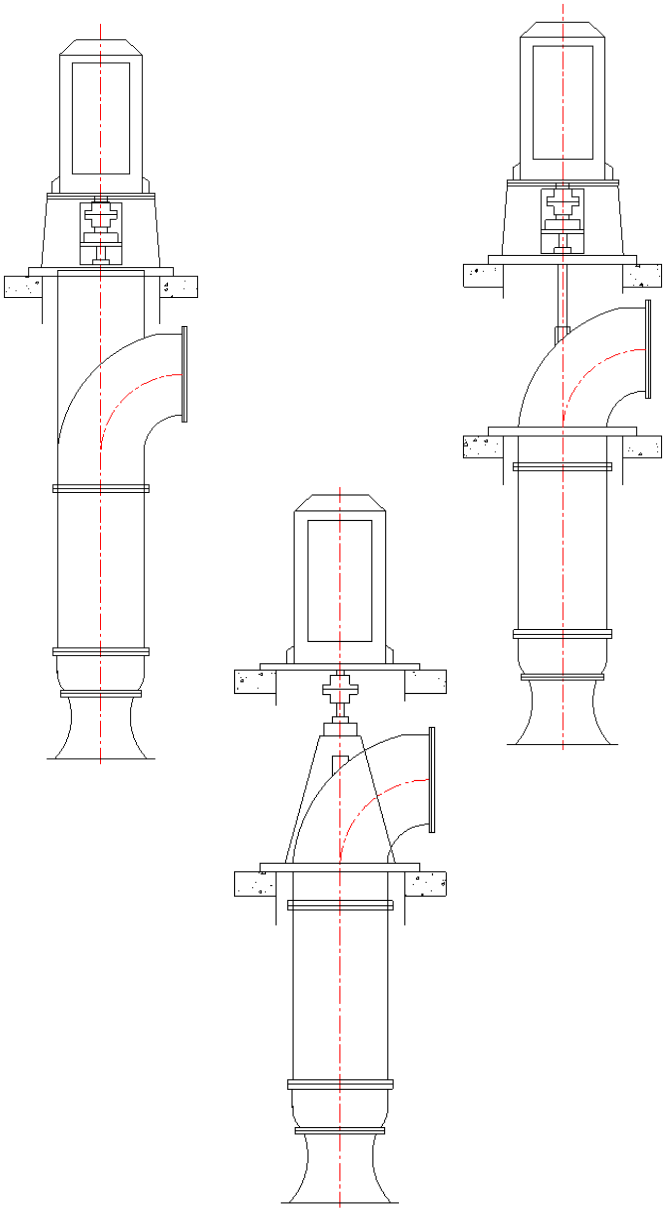
1. Above Floor Installation:

Discharge bend is above ground level



2. Below Floor Installation:

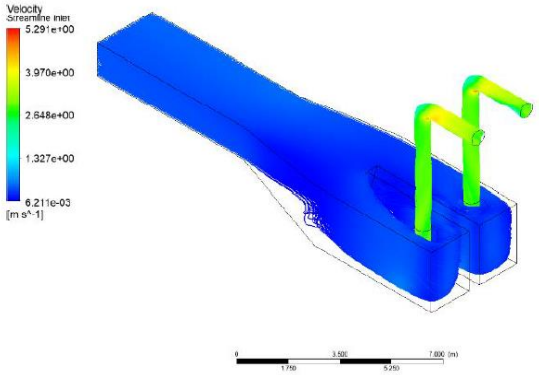
Discharge bend is below ground level, thrust block arrangement is provided at the back of the discharge bend to absorb the trust generated due to change in direction of flow in discharge bend

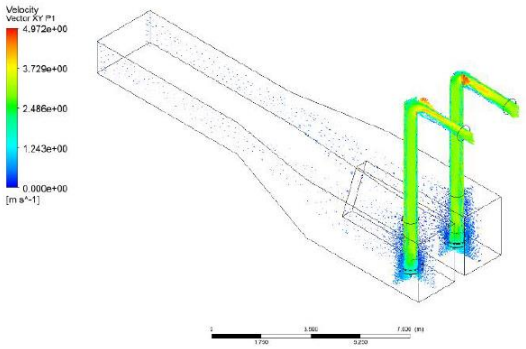


Computational Fluid Dynamics (CFD) Analysis

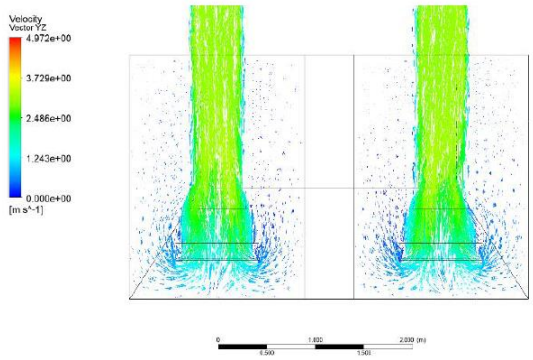
Our Design & Engineering Centre [IDEC] Facility in Thailand focus on continuouns research, development of products & Services with state of art technologies. Key activities carried out are as follows

- Geometric modelling
- In-house hydraulic design
- Computational fluid dynamics
- Finite Element Analysis [FEA]
- Sump model & Intake sump model analysis
- Stress, Torsional & Seismic Analysis





GEM analysis CFD to test the analysis of CFD complies with ANSI HI 9.8 – 2018. Which analyzes the flow pattern at the suction inlet of the pump without vortex or any other flow disturbance. These results can decide whether to modify the shape of the clarifier or install a flow modulator to achieve the desired flow pattern.



Materail Standards

Part	Material	Standards		
		ASTM	**DIN**	**JISS**
Pump bowl casing/Bell mouth	Gray iron casing	A-Gr 30	GG 20	FC 200
		A-Gr 35	GG 25	FC 250
		A-Gr 40,45	GG 30	FC 300
		A-Gr 50	GG 35	FC 350
		A-Gr 55,60	GG 40	
Impeller	Stainless steel	A-TYPE 329	1.4460	SUS 304
		A-TYPE 410	1.4006	SUS 316
		A-TYPE 420	1.4021	SUS 316Ti
		A-TYPE 431	1.4028	SUS 329
		A-TYPE CF8	1.4308	SUS 329J3L
		A-TYPE CF8M	1.4408	SUS 410
			1.4409	SUS 420
			1.4517	SUS 431
				SCS 13
	Bronze	B 61 Alloy 4A	2.1050.01/G CuSN10	H5111 Gr BC2
		B 62 Alloy 4A	2.1052.01/G CuSn12	H5120 CAC406
		B 584-90500	2.1086.01/G CuSn10Zn	
	Duplex Steel	ASTMA 890 Gr. CD4MCu	25Cr-5Ni-Mo-Cu	
		ASTMA 890 Gr. CE8MN	24Cr-10Ni-Mo-N	
		ASTMA 890 Gr. CD6MN	25Cr-5Ni-Mo-N	
Pump shaft/Line shaft & Shaft sleeve	Stainless steel	A-TYPE 316	1.4401	SUS 304
		A-TYPE 329	1.4460	SUS 316
		A-TYPE 403	1.4517	SUS 329
		A-TYPE 410	1.4006	SUS 410
		A-TYPE 416	1.4005	SUS 420
		A-TYPE 420	1.4021	SUS 431
		A-TYPE 431	1.4028	SCS 13
			1.4057	SCS 14
Casing wear ring/Liner	Stainless steel	A-TYPE 316	1.4401	SUS 304
		A-TYPE 316Ti	1.4460	SUS 316
		A-TYPE 329	1.4000	SUS 316Ti
		A-TYPE 403	1.4006	SUS 329
		A-TYPE 410	1.4005	SUS 410
		A-TYPE 416	1.4021	SUS 420
		A-TYPE 420	1.4028	SUS 431
		A-TYPE 431	1.4308	SCS 13
		A-TYPE CF8M	1.4408	SCS 14
Column pipe	Fabricated Steel	A-Gr 36	Rts 37-2	SS316
		A-Gr 53		SS400
Discharge Head	Gray iron casing	A-Gr 30	GG 20	FC 200
		A-Gr 35	GG 25	FC 250
	Fabricated Steel	A-Gr 36	Rts 37-2	SS316
		A-Gr 53		SS400
Motor Stool	Fabricated Steel	A-Gr 36	Rts 37-2	SS316
		A-Gr 53		SS400
Line shaft bearing		PTFE/Thordon/Ceramic/Silicon carbide		

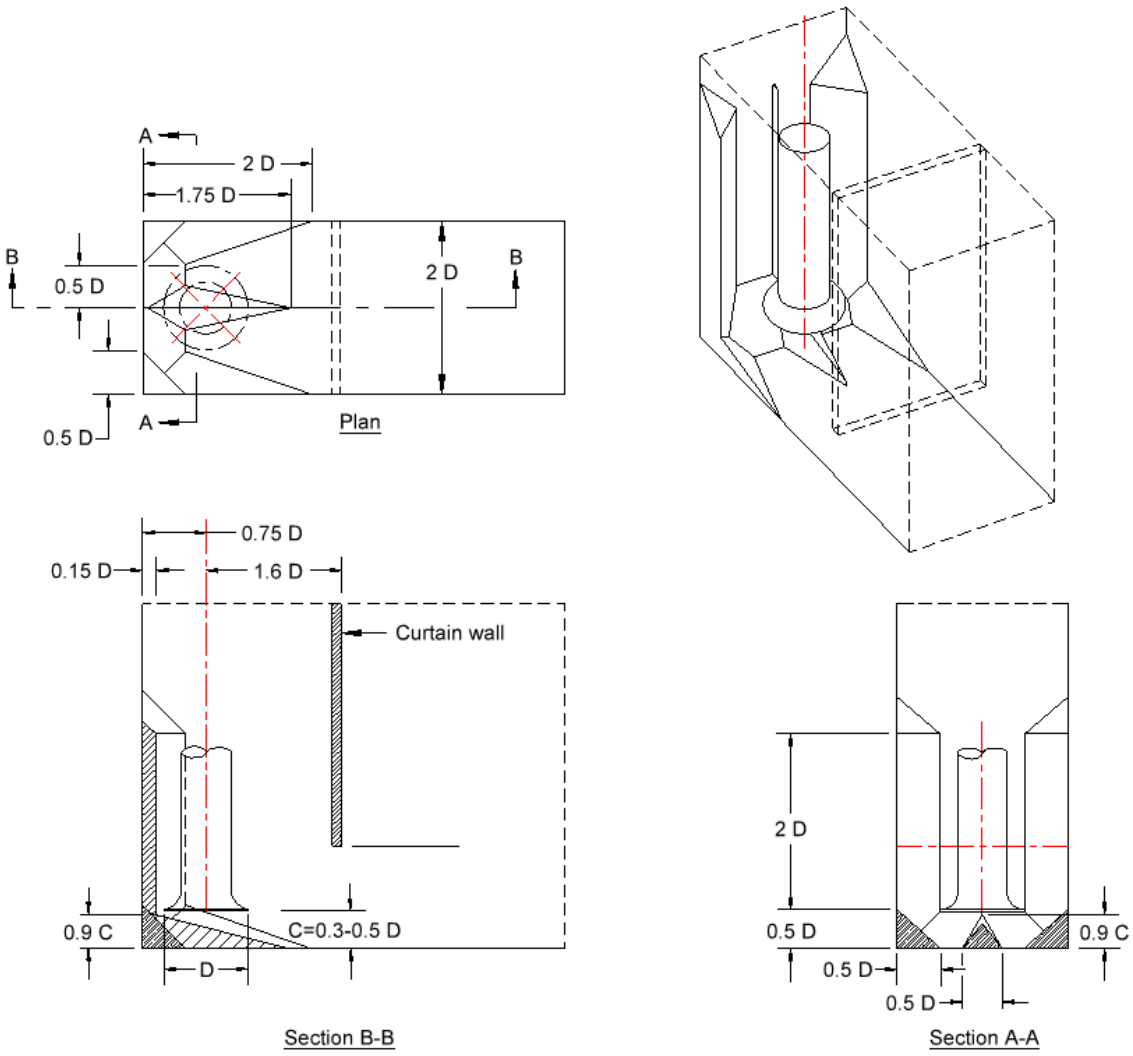
Remark: other materials can be by customer's request.

Accessories

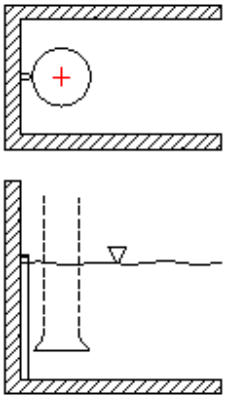
Accessories must be ordered separately. Contact GEM.

Anti-vortex device

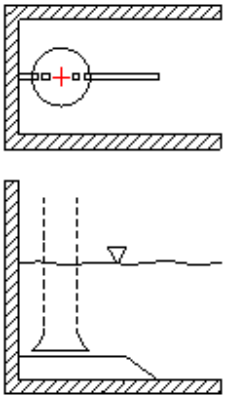
The anti-vortex device provides an optimal inlet flow to a vertically installed pump.The anti-vortex device prevents cavitation, pre-swirls, fluid separation and reduces vortices.



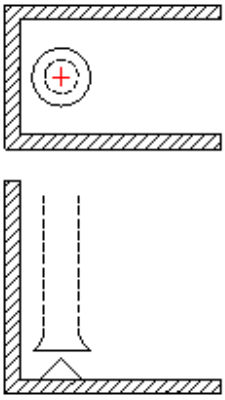
A1. Combination of correction curtain wall



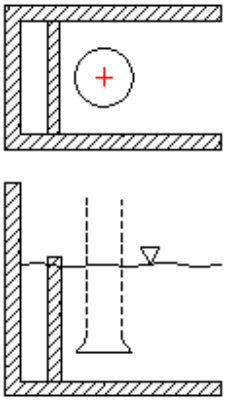
1. Wall splitter plate



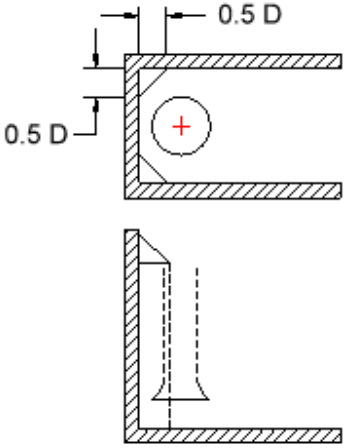
2. Floor splitter plate



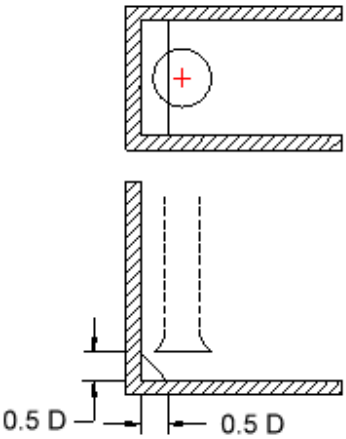
3. Floor cone



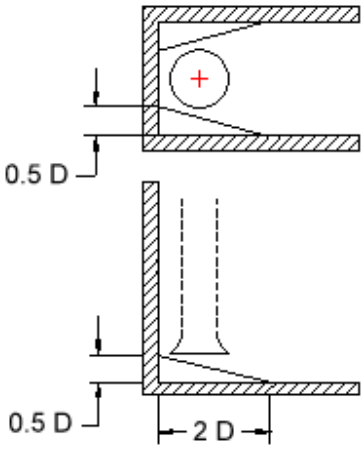
4. Backwall



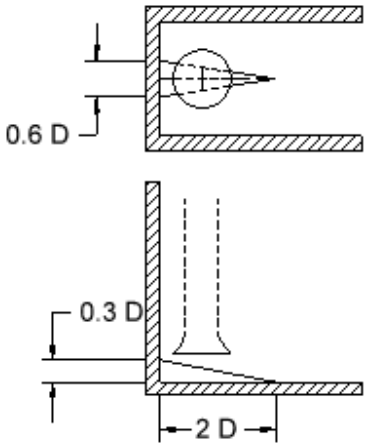
5. Corner fillets



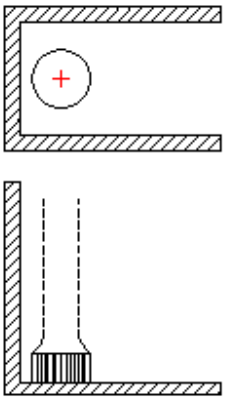
6. Backwall fillets



7. Sidewall fillets



8. Center splitter



9. Strainer with guid vanes

A2. Methods to reduce subsurface vortices (Examples 1-9)

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