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مجمع الشارقة للبحوث والتكنولوجيا والابتكار
Sharjah Research Technology and Innovation Park

PUMP
FLOW CALCULATION
&
HEAD CALCUALTION
(SAMPLE)

FLOW AND HEAD CALCULATION FOR

1) SINGLE PUMP

2) TRANSFER PUMP SET

3) BOOSTER PUMP SET

4) CIRCULATION PUMP SET

5) SUMP PUMP SET / DRAINAGE / SEWAGE

6) CHILLED WATER PUMPS

7) PRESSURIZATION UNIT PUMP SET

8) IRRIGATION BOOSTER PUMP SET

9) SINGLE DUTY PUMP SET

10) FILTERATION TRANSFER PUMP SET

11) NPSH / MAXIMUM SUCTION LIFT CALCULATION

12) PRESSURE VESSEL CALCULATION

13) EXPANSION VESSEL CALCULATION FOR PU

14) TESTING & COMMISSIONING

15) METHOD OF STATEMENT

16) WARRANTY

17) MAINTENANCE

GOVINDASAMY RAMASAMY (PUMP PRODUCTS MANAGER) – EUROPEAN MAKE PUMPS
OUR ENGINEERING & TECHNOLOGY, YOUR SUCCESS! EMAIL: JJTRADING77@GMAIL.COM

1) SINGLE PUMP:

Flow (M^3/HR) – Flow is the volume of liquid that passes through a pump.

Head (M) – Pump's head is the maximum height that the pump can achieve pumping against gravity.

FLOW CONVERSION TABLE:

0.278	L/S	1 M^3/HR
16.7	L/M	
4.4	GPM	
3.67	IMP GPM	
1000	L/H	

HEAD CONVERSION TABLE:

9.81 kpa	1 m
0.0981 bar	
1.42 psi	
3.28 tt	

Head of pump (m) = Static discharge head (m) + friction losses (m)
Friction losses = Length and size of pipe work, bends, valves and velocity of flow.

WATER PUMP REPLACEMENT OF PROCESS:

The following Information required to replace water pump in project site.

- Existing pump name plate details
- Pump inlet and outlet
- Power (HP)
- Vertical or Horizontal pump

2) TRANSFER PUMP SET: (FLOW AND HEAD) SAMPLE

Building: 2B + G + 7 Floors (Typical) + Roof Floor

Height: 2 (5m) + 1 (5m) +7 (3.6m) + 1 (3m)

= (10 + 5 + 25.2 + 3) m

= 43.2 m

Flow (M^3/HR) = Tank Capacity/ Filling Hours

20.52 M^3/HR = 48 m^3/ 2.34 Hours

FLOW = 20.52 M^3/HR

HEAD OF THE PUMPS:

Head (m) = Static head + Friction losses in total pipe length and Fittings (ELBOW and TEE) + Safety margin (20%)

= 43.2 m + 0.7 m + 8.78 m

= 52.68 m ≅ 55 m

3) BOOSTER PUMP SET: (FLOW AND HEAD)

Building Type: 2B + G + 7F + RF

Calculate last 3 floors only. Since no high required pressure. Balance floors pressure by graving force.

APPLIANCES	LOADING UNITS	EACH	TOTAL	
Wash basin	2	16	32	
Water closet	2	16	32	
Shower	3	16	48	
Kitchen Sink	5	8	40	
Bath tub	10	8	80	
Washing Machine	0.2	8	1.6	
Tap	0.3	16	4.8	
	TOTAL		**238.4**	

X3 Floors

= 715.2

20% Margin

From loading unit char (for 858 loading units)

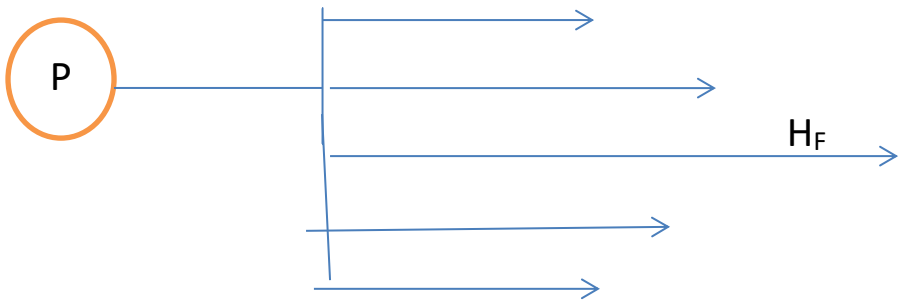
6 L/S

HEAD CALCULATION FOR BOOSTER PUMP

Head = Static height (m) + Friction losses in longest pipe line + End pressure (consider 2 bar)

$$\text{Head (m)} = 0 + H_F + 20 \text{ m}$$

Static head = Consider o (Roof floor to down) Friction losses in longest line water, shortest line easily reach.



End Pressure = Pressure required in shower, wash basin and etc..

H = 2.5 BAR

4) HOT WATER CIRCULATION PUMP SET:

Required flow by contractor

Head (m) = Consider static head = 0 for closed system + Friction losses in longest closed pipe lines & Fittings.

5) SUMP PUMP SET / DRAINAG / SEWAGE PUMP SET:

Sump pit = 1500 X 1500 X 2000 mm 4 L/S @ 2 BAR

Flow (L/S) = Sump pit capacity (L)/ Time to empty the tank

= 4500 L/ 4504 S = 1.25 Hours

6) CHILLED WATER PUMP SET:

18 L/S @ 3.5 BAR

Pump flow = by contractor

Head (m) = Consider static head = 0 for closed system + Friction losses in longest closed pipe lines & Fittings.

7) PRESSURIZATION UNIT PUMP SET:

1 L/S @ 2.5 BAR

What is use of pressurization unit in chilled water system?

Pressurization unit is an engineered package unit designed to replace water that has been lost through system leakage and to maintain the system design fill pressure in system.

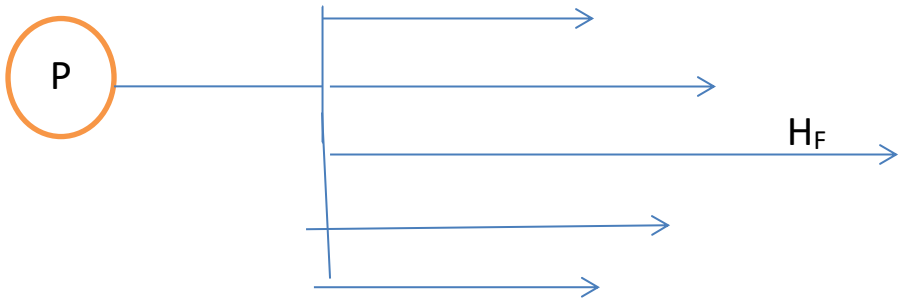
8) IRRIGATION BOOSTER PUMP SET:

HEAD CALCULATION FOR BOOSTER PUMP

Head = Static height (m) + Friction losses in longest pipe line + End pressure (consider 2 bar)

$$\text{Head (m)} = 0 + H_F + 20 \text{ m}$$

Static head = Consider o (Roof floor to down) Friction losses in longest line water, shortest line easily reach.



End Pressure = Pressure required in shower, wash basin and etc..

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9) SINGLE DUTY PUMP SET

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