BUROHAPPOLD ENGINEERING

BH-ZSG-CAL-P-0002

WATER SUPPLY PUMP HEAD ESTIMATION

Revision	Description	Issued by	Date	Checked by
00	Tender	TA	Nov-15	TA
01	Tender	TA	Dec-15	TA

BUROHAPPOLD ENGINEERING

Project	Lodha Clarient		
		Revision	00
Area of Project	Plot-C Sales gallery	Prepared by	TA
		Date	01/12/2015
Element Description	Water supply pump head estimation	Checked by	TA
		Date	01/12/2015

INPUT	OUTPUT	CALCULATED

Pressure drop in straight pipe (Pa) = 6.819 x L x (V / C)$^{1.852}$ x (1 / D)$^{1.167}$ x (r g)

C= 120 Fluid density (water) @ 20° C -------> 998 Kg/m^3

	Pressure Drop Through Straight Piping						Pressure Drop Through Valve & Fitting					
Pipe Element Description	**Flow Rate**	**Nom Pipe Dia**	**Velocity**	**Pipe Length**	**P.D**	**Total P.D (A)**	**Valve/ Fitting Tag**	**Valve or Fitting Description**	**Number of Fittings**	**Equivalent Length of Pipe for Each Fitting**	**Valve & Fitting PD (B)**	**Remarks**
	US-GPM	**mm**	**fps**	**Meter**	**Feet/100'**	**Meter**			**Qty**	**Meter**	**Meter**	
Pump suction	51	65	3.4	10	2.59	0.259					0.000	
	51	65	3.4		2.59	0.000	1	Gate Valve	1	0.85	0.022	
	51	65	3.4		2.59	0.000	16	Strainer	1	47.00	1.219	
	51	65	3.4		2.59	0.000	7	Standard 90° Elbow	3	47.00	3.658	
Pump discharge	51	65	3.4	10	2.59	0.259			1		0.000	
	51	65	3.4		2.59	0.000	1	Gate Valve	1	0.85	0.022	
	51	65	3.4		2.59	0.000	14	Swing check valve	1	7.62	0.198	
	51	65	3.4		2.59	0.000	7	Standard 90° Elbow	3	1.83	0.142	
Straight Pipe	51	65	3.4	200	2.59	5.188			4		0.000	
	51	65	3.4		2.59	0.000	7	Standard 90° Elbow	10	1.83	0.474	
	51	65	3.4		2.59	0.000	9	Standard 45° Elbow	5	0.98	0.127	
	51	65	3.4		2.59	0.000	5	45°-Y Angle Valve	2	8.84	0.459	
	51	65	3.4		2.59	0.000	1	Gate Valve	1	0.85	0.022	
	Subtotal Frictional Head Losses					**5.7**					**6.3**	

A	Pressure drop of pipes and fittings		12.05	Meter	
B	Considering safety on Pipes, fittings & valve	20%	2.41	Meter	....A x 20%
C	Water softner pressure drop			Meter	
D	Pressur required at remote fixture (Residual pressure)		15.30	Meter	
E	Static head			Meter	
F	Add any additional component here -->			Meter	
G	Add any additional component here -->			Meter	
H	Total Frictional head loss		29.76	Meter	....A+B+C+D+E+F+G
I	**Therefore Total Pump Head**		**30.00**	**Meter**	

Table 22.4.4.7 Hazen–Williams *C* Values

Pipe or Tube	*C* Value*
Unlined cast or ductile iron	100
Black steel (dry systems including preaction)	100
Black steel (wet systems including deluge)	120
Galvanized (all)	120
Plastic (listed) all	150
Cement-lined cast or ductile iron	140
Copper tube or stainless steel	150
Asbestos cement	140
Concrete	140

*The authority having jurisdiction is permitted to consider other *C* values.

22.4.4.9* Pressures.

22.4.4.9.1 When calculating flow from an orifice, the total pressure (P_t) shall be used, unless the calculation method of 22.4.4.9.2 is utilized.

22.4.4.9.2 Use of the normal pressure (P_n) calculated by subtracting the velocity pressure from the total pressure shall be permitted. Where the normal pressure is used, it shall be used on all branch lines and cross mains where applicable.

22.4.4.9.3 Flow from a sprinkler shall be calculated using the nominal K-factor.

22.5.1.5 Slatted Floors, Large Floor Openings, Mezzanines, and Large Platforms. Buildings having slatted floors or large unprotected floor openings without approved stops shall be treated as one area with reference to pipe sizes, and the feed mains or risers shall be of the size required for the total number of sprinklers.

22.5.1.6 Stair Towers. Stair towers, or other construction with incomplete floors, if piped on independent risers, shall be treated as one area with reference to pipe sizes.

22.5.2 Schedule for Light Hazard Occupancies.

22.5.2.1 Branch Lines.

22.5.2.1.1 Unless permitted by 22.5.2.1.2 or 22.5.2.1.3, branch lines shall not exceed eight sprinklers on either side of a cross main.

22.5.2.1.2 Where more than eight sprinklers on a branch line are necessary, lines shall be permitted to be increased to nine sprinklers by making the two end lengths 1 in. (25.4 mm) and 1¼ in. (33 mm), respectively, and the sizes thereafter standard.

22.5.2.1.3 Ten sprinklers shall be permitted to be placed on a branch line, making the two end lengths 1 in. (25.4 mm) and 1¼ in. (33 mm), respectively, and feeding the tenth sprinkler by a 2½ in. (64 mm) pipe.

22.5.2.2 Pipe Sizes.

22.5.2.2.1 Pipe sizes shall be in accordance with Table 22.5.2.2.1.