

The required NPSH of a water pump at rated capacity is 17 ft. Water Temperature 85°F Elevation 1000 ft. above sea level. Entrance and friction losses in suction piping calculated = 2 ft.

What will be the maximum suction lift permissible?

To better visualize the problem the solution is presented graphically on the right. The two horizontal lines are spaced apart a distance equal to the barometric pressure in feet.

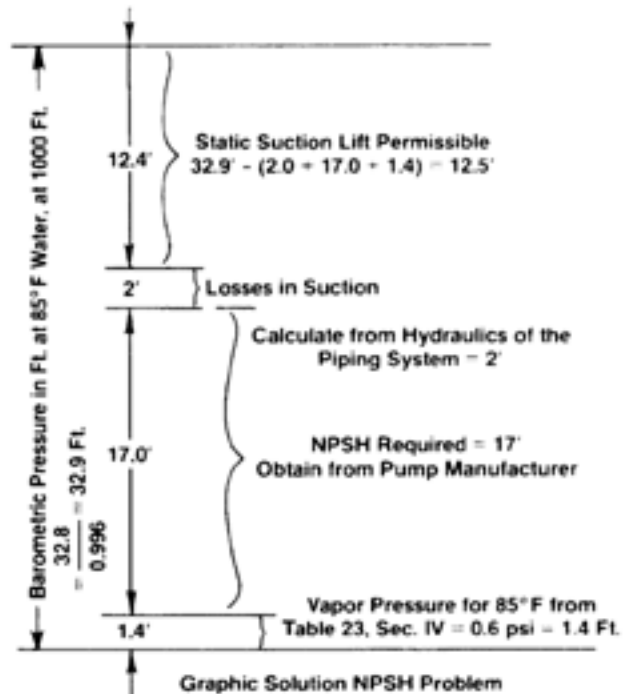
AVAILABLE NPSH is a function of the system in which the pump operates. It can be calculated for any installation. Any pump installation, to operate successfully, must have an available NPSH equal to or greater than the required NPSH of the pump at the desired pump conditions.

When the source of liquid is above the pump:

$$\text{NPSH} = \text{Barometric Pressure, Ft.} + \text{Static Head on suction, ft.} - \text{friction losses in suction piping, ft.} - \text{Vapor Pressure of liquid, ft.}$$

When the source of liquid is below the pump:

$$\text{NPSH} = \text{Barometric Pressure, ft.} - \text{Static Suction lift, ft.} - \text{friction losses in suction piping, ft.} - \text{Vapor Pressure of liquid, ft.}$$



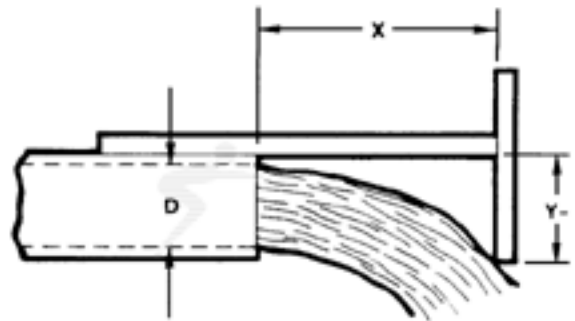
Approximating Water Flow

It is possible to approximate water flow from horizontal or vertical pipes when it is not practical to use flow meters or other measuring devices. This can be done by measuring to the top of the flowing stream, always

measuring the horizontal distance "X" in inches as illustrated, and determining the flow from the chart shown below.

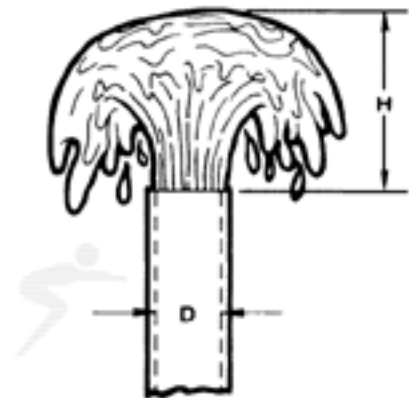
Approximate Capacity, GPM for Full Flowing Horizontal Pipes

Std. Wt. Steel Pipe, Inside Dia., In.	Distance X, In., When Y = 12"												
	Nominal	Actual	12	14	16	18	20	22	24	25	28	30	32
2	2.067	42	49	56	63	70	77	84	91	98	105	112	
2 1/2	2.469	60	70	80	90	100	110	120	130	140	150	160	
3	3.068	93	108	123	139	154	169	185	200	216	231	246	
4	4.025	159	186	212	239	266	292	318	345	372	398	425	
5	5.047	250	292	334	376	417	459	501	543	585	627	668	
6	6.065	362	422	482	542	602	662	722	782	842	902	962	
8	7.981	627	732	837	942	1047	1150	1255	1360	1465	1570	1675	
10	10.020	980	1145	1310	1475	1635	1800	1965	2130	2290	2455	2620	
12	12.000	1415	1660	1890	2125	2360	2595	2830	3065	3300	3540	3775	



Approximate Capacity, GPM, for Full Flowing Vertical Pipes

Nominal I.D. Pipe, In.	Vertical Height, H, of Water Jet, In.										
	3	3.5	4	4.5	5	5.5	6	7	8	10	12
2	38	41	44	47	50	53	56	61	65	74	82
3	81	89	96	103	109	114	120	132	141	160	177
4	137	151	163	174	185	195	205	222	240	269	299
6	318	349	378	405	430	455	480	520	560	635	700
8	567	623	684	730	776	821	868	945	1020	1150	1270
10	950	1055	1115	1200	1280	1350	1415	1530	1640	1840	2010



The accuracy of these methods will vary up to 1-%. The pipe must be flowing full.

HYDRAULIC CHARTS & TABLES

ENGINEERING DATA



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