Direct Steam Injection Heater Sizing

The following table can be used to estimate the size of a direct steam injection heater. The heater size is based on the water flow rate (gpm). The amount of steam required depends on the desired water temperature rise and the minimum steam pressure depends on the system pressure levels. The following parameters and equations can be used for these estimates:

V = Water flow rate, gallons per minute

ΔT = Water temperature rise, °F (final temperature should not exceed 220 F)

P_W = Water inlet pressure, psig

P_O = Water outlet pressure, psig

P_S = Required steam pressure, psig

$P_S = 2 \times (P_O - P_W) + 1.8 \times (P_W + 14.7) - 14.7$

S = Required steam flow rate, pounds per hour

$S = V \times \Delta T \times 0.43$

Size (inches)	Direct Steam Injection Heater Sizes			
	Water Flow Rates (gpm)			Connections
	Minimum	Recommended	Maximum	
½	6	11	17	NPT
¾	10	20	30	NPT
1	16	32	48	NPT
1¼	28	56	84	NPT
1½	38	76	114	NPT or Flanged
2	63	125	188	NPT or Flanged
2½	90	179	269	Flanged
3	138	276	415	Flanged
4	238	476	714	Flanged
5	374	748	1,122	Flanged
6	540	1,080	1,621	Flanged
8	935	1,871	2,806	Flanged
10	1,474	2,949	4,423	Flanged
12	2,115	4,230	6,344	Flanged
14	2,529	5,059	7,588	Flanged
16	3,304	6,609	9,913	Flanged
18	4,183	8,365	12,548	Flanged
20	5,197	10,394	15,592	Flanged
22	6,632	13,263	19,895	Flanged
24	7,517	15,034	22,551	Flanged

Note: Consult Kadant Johnson for optimum sizing and direct steam injection heater performance curves.

Dimensions are for reference only and subject to change.

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