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By Norman Hall

Can I Change My Vacuum Condensate Pump to a Simple Condensate Pump? (Part 2)

Last week we began a series about vacuum condensate units and introduced one of their uses: the reduction of time to bring a building up to temperature after a weekend setback. Today, the R. L. Deppmann Monday Morning Minute (MMM) looks at the second use of vacuum condensate pumps, temperature control.

The modern hydronic boiler systems incorporate temperature set back controls. We understand that fin tube or coils will give out less BTUH if supplied with 140°F water instead of 200°F water. Back in the days where steam systems were common, how did you employ temperature set back controls? A boiler operating at 1 PSIG steam pressure produced steam at 215°F. The only way to supply steam below 212°F was to operate under a vacuum.

If I could create a vacuum in the steam system, I could change the BTUH output of the radiator. In fact, if I change the pressure to 20" of vacuum, I can get water to boil at 161°F. Since the BTUH output of the radiator is directly proportional to temperature difference between the steam and the room air, one could vary the output of the radiator by varying the temperature at which the steam condensed.

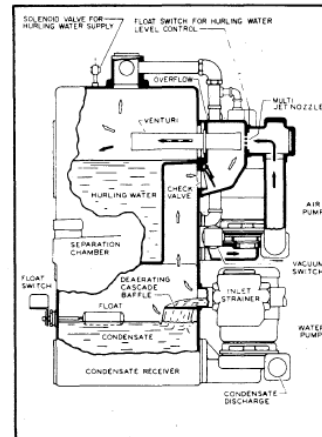
Properties of Saturated Steam

BELOW ATMOSPHERIC PRESSURE

Vacuum Inches of Mercury	Saturated Temp °F.	Specific Volume Cu. ft. per lb.	Heat Content Btu per lb.		Latent Heat of Vaporization Btu per lb.
			Saturated Liquid	Saturated Vapor	
29	79	657.0	47	1094	1047
27	115	231.9	83	1110	1027
25	134	143.0	102	1118	1017
20	161	74.8	129	1130	1001
15	179	51.2	147	1137	990
10	192	39.1	160	1142	982
5	203	31.8	171	1147	976
1	210	27.7	178	1150	971

ABOVE ATMOSPHERIC PRESSURE

Pressure PSI (Gauge)	Saturated Temp °F.	Specific Volume Cu. ft. per lb.	Heat Content Btu per lb.		Latent Heat of Vaporization Btu per lb.
			Saturated Liquid	Saturated Vapor	
0	212	26.8	180	1150	970
1	215	24.3	183	1151	967
2	218	23.0	186	1153	965
3	222	21.8	190	1154	963
4	224	20.7	193	1155	961
5	227	19.8	195	1156	959



Jet Type Vacuum Pump
Two Pump Type

Figure 33.

From Xylem HOFFMAN HS-203C MANUAL

Bell and Gossett VCD vacuum condensate unit operation from manual TES-375

Many very smart people devised systems to operate under vacuum. Often, the system was named after them. I've seen some of these systems still in operation today.

If your system was designed for variable vacuum temperature control and is still operating, don't assume you can replace the vacuum condensate system with a straight "condensate only" system. Ask your R. L. Deppmann sales engineer to stop by and discuss it with your installing contractor or engineer. If you are not lucky enough to be in the Deppmann territory, Call your Bell and Gossett/Domestic pump representative for their assistance.

Next week we look at a third reason you may have a vacuum condensate pumping system; condensate lift.

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