



Suction Pressure

Optimizing Suction Pressure for Your Facility

September 2018




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Suction Pressure

Advantages of highest possible Suction Pressure

- 1- Product
- 2- Defrost
- 3- Energy



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Suction Pressure

Product

Advantages

- Low Temperature Differential.
- Higher Humidity.
- Consistent Temperature across the room.

Disadvantages

- Requires more coil surface area.
- Precise zone pressure control required.
- High Humidity,
 - Packaging may become soggy.
 - Some commodities require Low Humidity.



Suction Pressure

Defrost

Advantages

- Less moisture removed from air, less Ice.
- Fewer Defrost Cycles needed.

Common Mistakes During Defrost

- Lowering Zone Pressure too quickly, when coming out of Defrost.
 - Creates large temperature differential, Dries out air, put ice back on coil.
 - Creates large short term load at the compressor room.



Suction Pressure

Defrost

Mistakes During Defrost

- Too long of duration.
 - Hot Gas Defrost should not take more than 8 – 10 minutes.
 - Water Defrost should not take more than 15 minutes.

Disadvantages

- None



Suction Pressure

Energy Savings

Advantages

- Higher House Suction Pressure.
- Less Horse Power Required.
- Lower Superheat.
- Stable House Suction Pressure

Disadvantages

- None



Suction Pressure

Disadvantages Of Low Suction Pressure

Liquid Recirculation

- “Brining” Cold liquid has to warm up before it can boil. (if colder than Zone Pressure)
- Zones cycling on and off, temperature fluctuation, unstable House Suction Pressure.
- Wasted energy, keeping the liquid colder than it needs to be.



Suction Pressure

Disadvantages Of Low Suction Pressure

Flooded (with Fixed or no Back Pressure Regulators)

- Set for worst case.
- Dries out the air.
- Zones cycling on and off, temperature fluctuation, unstable House Suction Pressure.



Suction Pressure

Determining Optimal House Suction Pressure Flooded and Liquid Recirc.

$$(LZP) - (PDV) - (PDP) = (HSP)$$

LZP = Lowest Zone Pressure

PDV = Pressure Drop across Control Valves

PDP = Pressure Drop in Suction Piping

HSP = House Suction Pressure



Suction Pressure

Determining Optimal House Suction Pressure Flooded and Liquid Recirc.

$$42.5\text{psig} - 2\text{psi} - 5\text{psi} = 35.5\text{psig}$$

LZP = 42.5 psig Lowest Zone Pressure, 28°F Ammonia

PDV = 2 psi Pressure Drop across Control Valves

PDP = 5 psi Pressure Drop in Suction Piping

HSP = 35.5 psig House Suction Pressure



Suction Pressure

Determining Optimal House Suction Pressure TX / DX

$$(RAT) - (SHT) = (ET) \quad (EP) - (PDV) - (PDP) = (HSP)$$

RAT = Coldest Return Air Temperature

SHT = Superheat Required

ET = Evaporator Temperature

EP = Evaporator Pressure, Converted from Evaporator Temperature

PDV = Pressure Drop across Control Valves

PDP = Pressure Drop in Suction Piping

HSP = House Suction Pressure



Suction Pressure

Determining Optimal House Suction Pressure TX / DX

$$33^{\circ}\text{F} - 10^{\circ}\text{F} = 23^{\circ}\text{F} \quad 36.8\text{psig} - 2\text{psi} - 5\text{psi} = 29.8\text{psig}$$

RAT = 33°F Coldest Return Air Temperature

SHT = 10°F Superheat Required

ET = 23°F Evaporator Temperature

EP = 36.8 psig Evaporator Pressure, Converted from Evaporator Temperature

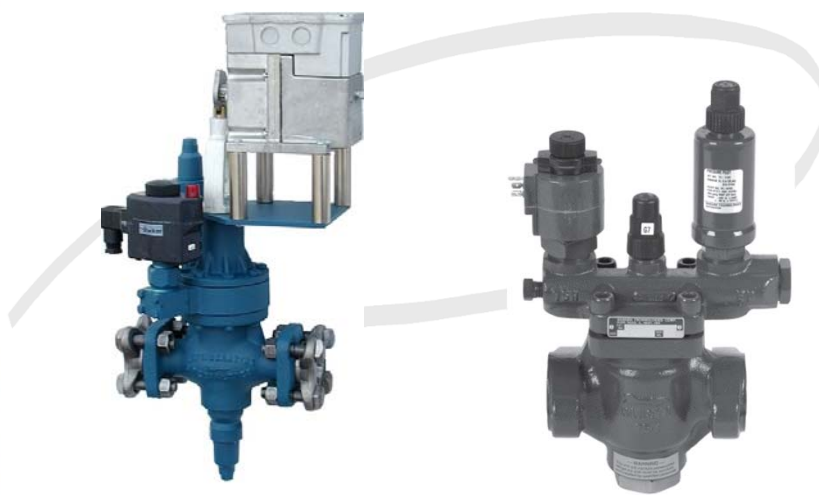
PDV = 2 psi Pressure Drop across Control Valves

PDP = 5 psi Pressure Drop in Suction Piping

HSP = 29.8psig House Suction Pressure



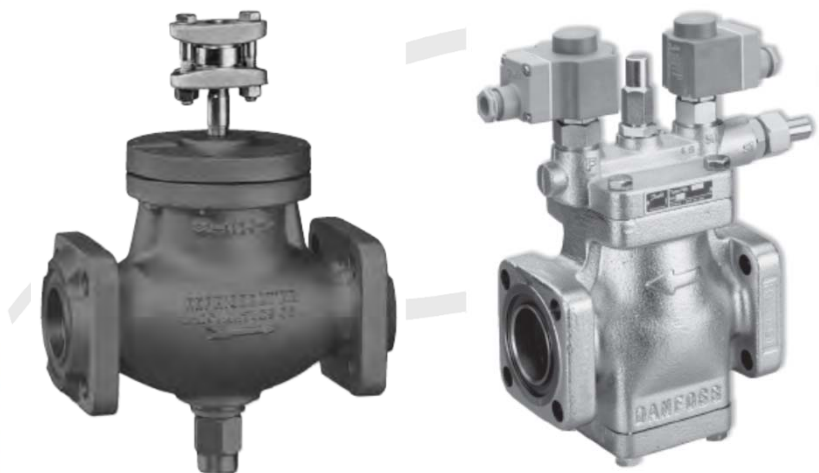
Control Valves



Back Pressure Regulators




Control Valves



Suction Stop Valves





Suction Pressure

Questions

