System 004 - Site 501534, Canby OR

Site 501534 is a grocery store located in Canby, OR. There are seven refrigeration circuits that have been monitored. Circuits 1 and 2 (medium temperature Rack 1) and Circuit 3 (low temperature Rack 2) were installed in the 1990s. Circuits 4 and 5 are new medium and low temperature racks, respectively, installed more recently. Circuits 6 and 7 are medium temperature circuits, each with one compressor. Circuits 1, 2 and 3 share a single Emerson E2 refrigeration system controller. Control system information was not available for Circuits 4 to 7.

Circuit 4, Medium Temperature

Circuit 4 is a medium temperature multiplex system with six compressors located in Canby, OR. The discharge line has a desuperheater that recovers heat from the hot discharge gas to heat hot water and decrease the gas temperature before entering the condenser, increasing refrigeration efficiency. Information on compressor capacity, case descriptions and design parameters, refrigerant used, and controls was not available.

Table 1. Measured data on Circuit 4

Measured Data	Variable Name(s)	Point Number
Outdoor Temperature	TT_OUTDOOR	--
Discharge Temperatures after Compressors 1 to 6	MISC1 to MISC6	2
Common Discharge Temperature	TT_RCOMP_OUT	2
Compressor Suction Temperatures	MISC7 to MISC10, AI_X13, AI_ X14	1
Compressor Power, Comp 1 to 6	EP_COMP	--
Low Pressure, Suction Manifold	PT_RLP	1
High Pressure, Discharge Manifold	PT_RHP	2
Condenser Entering Temperature	TT_RCOND_IN	--
Condenser Fan Power	EP_AUX_SECW	--
Liquid Line Temperature entering expansion device	TT_REXP_IN	7

Table 2. Calculated values on Circuit 4

Calculated/Derived Values	Variable Name	Measured Temperatures Used in Calculations	Point Number/ Process
Isentropic Compressor Efficiency	COMP_EFF_ISEN	Discharge and suction manifold temperatures	1 to 2
Condensing Temperature	RHP_TCOND_MID	Dew point and bubble point temperatures at PT_RHP	c
Evaporator Temperature	RLP_TEVAP_MID	Dew point and bubble point temperatures temperature at PT_RLP	e
Desuperheater Capacity	RCAP_DESUPERHEAT	TT_RCOMP_OUT, TT_RCOND_IN	--

Heating COP	RCOP_HEAT	TT_RCOND_IN, TT_REXP_IN, Discharge and suction manifold conditions	3 to 6
Condenser Capacity	RCAP_HEAT_COND	TT_RCOND_IN, TT_REXP_IN	
Heating Capacity	RCAP_HEAT	TT_RCOND_IN, TT_REXP_IN	
Cooling COP	RCOP_COOL	TT_REXP_IN, Discharge and suction conditions	8 to 1
Cooling Capacity	RCAP_COOL	TT_REXP_IN, Suction Temperatures	
Subcooling	RSUBCOOL	TT_REXP_IN, , Bubble point temperature at PT_RHP	5 to 7
Superheat	RSUPERHEAT	Suction temperatures, Dew point temperature at PT_RLP	9 to 1

Figure 1. Pressure-enthalpy diagram for basic refrigeration cycle, neglecting pressure losses.

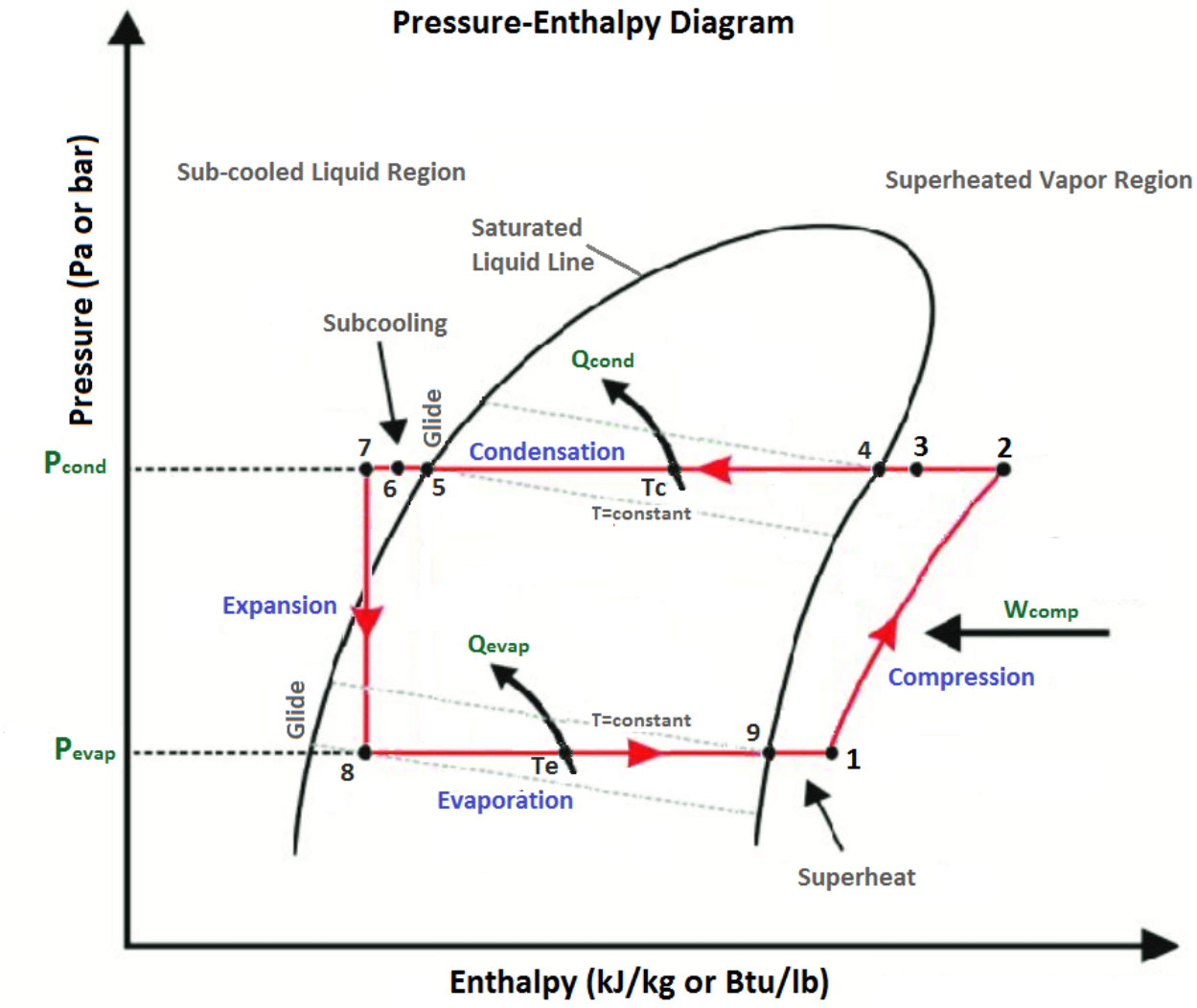

Figure 2. Circuit 4 ClimaCheck system diagram

CIRCUIT 4 (511534), MEDIUM TEMPERATURE