

Evaporator Temperature and Glide

Technical Bulletin

Product: Refrigerant blends with glide (R-400 series)

Bulletin#: 07 rev 1.0

Application: Refrigeration and HVAC



Background

Zeotropic refrigerant blends exhibit a temperature glide (glide) during phase change in the condenser and evaporator. The glide leads to changing temperatures across the heat exchanger. The changing temperature affects the air flowing through the coil. The effect of the changing temperature has typically been calculated by taking the average of the bubble and dew point temperatures.

The use of the average temperature is suitable for the vast majority of applications.

Problem

The precise evaporator temperature will be slightly affected by the temperature of the refrigerant entering the expansion device. This is due to the quality of the refrigerant entering the evaporator. There may be specialty applications where a very precise value for the evaporator temperature is needed.

Resolution

Use Honeywell's Genetron® Properties software to determine the precise evaporator temperature.

Download the software from www.honeywell-refrigerants.com/americas/genetron-refrigerants-modeling-software-download.

Step 1:
Open the program and Select "CYCLES".



Step 2:
Select the second icon "BASIC CYCLE".



Step 3:
Select your refrigerant.



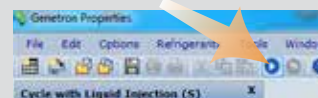
Step 4:
Change liquid line selection to "Expansion Valve Device Inlet".
Enter your liquid temperature.



Step 5:
Change evaporator parameter to "Evaporator Pressure". Enter evaporator pressure.



Step 6:
Click the "Run" icon.



Step 7:
Read the evaporator temperature.

Performance Parameters					
Refrigerant	R448A		EER	Btu/W.h	5.447
GWP	1273		Heating COP	-	2.127
Mass Flow	lb/s	0.04873	Subcooling Exp. Dev. In	°F	60.76
Cooling Capacity	Btu/h	11904.6	Superheat Evap. Out	°F	9
Heating Capacity	Btu/h	15968.3	Condensation Temp.	°F	134.33
Power	kW	2.199	Evaporation Temp.	°F	-23.77
Cooling COP	-	1.597			

Tables for R-448A and R-407F evaporator temperatures are given below for convenience.

LIQUID TEMPERATURE ENTERING TXV °F	EVAPORATOR PRESSURE psig							
	5	10	20	30	40	50	60	70
	COIL TEMPERATURE °F - R-448A							
40	-33.3	-24.3	-9.9	1.6	11.3	19.6	27.1	35.8
50	-33.1	-24.1	-9.7	1.8	11.4	19.8	27.2	33.9
60	-35.0	-23.9	-9.5	1.9	11.6	19.9	27.4	34.1
70	-32.8	-23.8	-9.4	2.1	11.7	20.1	27.5	34.2
80	-32.6	-23.6	-9.2	2.3	11.9	20.3	27.7	34.4
90	-32.4	-23.4	-9.0	2.5	12.1	20.5	27.9	34.6
100	-32.2	-23.2	-8.8	2.7	12.3	20.7	28.1	34.8
110	-32.0	-23.0	-8.6	2.9	12.5	20.9	28.3	35.0
120	-31.7	-22.7	-8.3	3.1	12.7	21.1	28.5	35.2
AVERAGE COIL TEMPERATURE °F	-34.3	-25.2	-10.6	1.0	10.8	19.2	26.8	33.6

Table 1: R-448A Evaporator Coil Temperature

LIQUID TEMPERATURE ENTERING TXV °F	EVAPORATOR PRESSURE psig							
	5	10	20	30	40	50	60	70
	COIL TEMPERATURE °F - R-448A							
40	-33.1	-24.2	-10.0	1.4	10.9	19.1	26.5	33.1
50	-32.9	-24.0	-9.8	1.5	11.0	19.3	26.6	33.2
60	-32.8	-23.9	-9.7	1.7	11.2	19.4	26.7	33.4
70	-32.6	-23.7	-9.5	1.8	11.3	19.6	26.9	33.5
80	-32.4	-23.5	-9.3	2.0	11.5	19.7	27.1	33.7
90	-32.2	-23.4	-9.1	2.2	11.7	19.9	27.2	33.9
100	-32.0	-23.2	-9.0	2.4	11.9	20.1	27.4	34.0
110	-31.8	-23.0	-8.7	2.6	12.1	20.3	27.6	34.2
120	-31.6	-22.7	-8.5	2.8	12.3	20.5	27.8	34.4
AVERAGE COIL TEMPERATURE °F	-34.1	-25.1	-10.7	0.8	10.4	18.8	26.2	32.9

Table 2: R-407F Evaporator Coil Temperature

For more information:

Technical Support Team

800-631-8138

www.honeywell-refrigerants.com

Honeywell Refrigerants

115 Tabor Road

Morris Plains, NJ 07950

Although Honeywell International Inc. believes that the information contained herein is accurate and reliable, it is presented without guarantee or responsibility of any kind and does not constitute any representation or warranty of Honeywell International Inc., either expressed or implied. A number of factors may affect the performance of any products used in conjunction with user's materials, such as other raw materials, application, formulation, environmental factors and manufacturing conditions among others, all of which must be taken into account by the user in producing or using the products. The user should not assume that all necessary data for the proper evaluation of these products are contained herein. Information provided herein does not relieve the user from the responsibility of carrying out its own tests and experiments, and the user assumes all risks and liabilities (including, but not limited to, risks relating to results, patent infringement, regulatory compliance and health, safety and environment) related to the use of the products and/or information contained herein.



Genetron is a registered trademark of Honeywell International Inc.

FP REF 1832 | March 2019 | v5

© 2019 Honeywell International Inc. All rights reserved.

Honeywell