

# PT Charts For Refrigeration

Solstice® N40 (R-448A) and Solstice N13 (R-450A) are Honeywell's newest blends for commercial refrigeration.

R-448A & R-407F are great retrofit options for R-22, R-404A, R-507, R-402A, & R-408A

## REFRIGERATION SECTION 1

### PRESSURE BASED PT CHARTS

Pressure (psig)	Solstice® N40 (R-448A)			Genetron Performax® (R-407F)			Genetron® 22 (R-22)	Genetron® 404A (R-404A)			Genetron® AZ-50 (R-507A)	Genetron® 408A (R-408A)			Genetron® HP80 (R-402A)		
	Temperature			Temperature			Temperature	Temperature			Temperature	Temperature			Temperature		
	°F			°F			°F	°F			°F	°F			°F		
	Avg	Bubble	Dew	Avg	Bubble	Dew		Avg	Bubble	Dew		Avg	Bubble	Dew	Avg	Bubble	Dew
0.0	-45.5	-51.0	-39.9	-45.2	-50.9	-39.4	-41.5	-50.5	-51.2	-49.9	-52.1	-47.8	-48.2	-47.4	-54.3	-56.1	-52.6
1.0	-43.0	-48.6	-37.5	-42.7	-48.5	-37.0	-38.9	-48.0	-48.7	-47.4	-49.7	-45.3	-45.7	-44.9	-51.9	-53.6	-50.2
2.0	-40.7	-46.2	-35.2	-40.4	-46.1	-34.7	-36.5	-45.7	-46.3	-45.0	-47.3	-42.9	-43.3	-42.5	-49.5	-51.2	-47.8
3.0	-38.5	-44.0	-32.9	-38.2	-43.9	-32.5	-34.2	-43.4	-44.1	-42.8	-45.1	-40.6	-41.0	-40.2	-47.3	-49.0	-45.6
4.0	-36.3	-41.9	-30.8	-36.1	-41.8	-30.5	-32.0	-41.3	-41.9	-40.6	-42.9	-38.4	-38.8	-38.0	-45.1	-46.8	-43.5
5.0	-34.3	-39.8	-28.8	-34.1	-39.8	-28.5	-29.9	-39.2	-39.9	-38.6	-40.8	-36.3	-36.7	-35.9	-43.1	-44.7	-41.4
6.0	-32.3	-37.8	-26.9	-32.2	-37.8	-26.5	-27.8	-37.2	-37.9	-36.6	-38.9	-34.3	-34.7	-33.9	-41.1	-42.7	-39.4
7.0	-30.5	-35.9	-25.0	-30.3	-36.0	-24.7	-25.9	-35.3	-35.9	-34.7	-36.9	-32.4	-32.7	-32.0	-39.2	-40.8	-37.6
8.0	-28.6	-34.1	-23.2	-28.5	-34.1	-22.9	-24.0	-33.5	-34.1	-32.8	-35.1	-30.5	-30.9	-30.1	-37.3	-39.0	-35.7
9.0	-26.9	-32.4	-21.4	-26.8	-32.4	-21.2	-22.1	-31.7	-32.3	-31.1	-33.3	-28.7	-29.0	-28.3	-35.6	-37.2	-34.0
10.0	-25.2	-30.6	-19.7	-25.1	-30.7	-19.5	-20.4	-30.0	-30.6	-29.3	-31.6	-26.9	-27.3	-26.5	-33.8	-35.4	-32.3
11.0	-23.5	-29.0	-18.1	-23.5	-29.1	-17.9	-18.7	-28.3	-28.9	-27.7	-29.9	-25.2	-25.6	-24.8	-32.2	-33.8	-30.6
12.0	-21.9	-27.4	-16.5	-21.9	-27.5	-16.4	-17.0	-26.7	-27.3	-26.1	-28.3	-23.6	-23.9	-23.2	-30.6	-32.1	-29.0
13.0	-20.4	-25.8	-15.0	-20.4	-25.9	-14.8	-15.4	-25.1	-25.7	-24.5	-26.7	-21.9	-22.3	-21.6	-29.0	-30.6	-27.4
14.0	-18.9	-24.3	-13.5	-18.9	-24.4	-13.4	-13.8	-23.5	-24.1	-23.0	-25.2	-20.4	-20.8	-20.0	-27.5	-29.0	-25.9
16.0	-16.0	-21.4	-10.6	-16.0	-21.5	-10.5	-10.8	-20.6	-21.2	-20.0	-22.3	-17.4	-17.8	-17.0	-24.5	-26.1	-23.0
18.0	-13.2	-18.6	-7.8	-13.3	-18.8	-7.8	-7.9	-17.8	-18.4	-17.2	-19.5	-14.5	-14.9	-14.2	-21.7	-23.3	-20.2
20.0	-10.6	-16.0	-5.2	-10.7	-16.2	-5.3	-5.2	-15.1	-15.7	-14.6	-16.8	-11.8	-12.2	-11.5	-19.1	-20.6	-17.6
22.0	-8.1	-13.5	-2.7	-8.2	-13.7	-2.8	-2.6	-12.6	-13.1	-12.0	-14.2	-9.2	-9.6	-8.9	-16.5	-18.0	-15.1
24.0	-5.7	-11.0	-0.3	-5.8	-11.3	-0.4	0.0	-10.1	-10.7	-9.6	-11.8	-6.7	-7.1	-6.4	-14.1	-15.6	-12.6
26.0	-3.4	-8.7	2.0	-3.6	-8.9	1.8	2.4	-7.8	-8.3	-7.2	-9.4	-4.3	-4.7	-4.0	-11.8	-13.2	-10.3
28.0	-1.1	-6.5	4.2	-1.4	-6.7	4.0	4.7	-5.5	-6.0	-4.9	-7.2	-2.0	-2.4	-1.7	-9.5	-10.9	-8.1
29.0	-0.1	-5.4	5.3	-0.3	-5.6	5.1	5.8	-4.4	-4.9	-3.8	-6.1	-0.9	-1.2	-0.5	-8.4	-9.8	-7.0
31.0	2.1	-3.3	7.4	1.8	-3.5	7.1	8.0	-2.2	-2.8	-1.7	-3.9	1.3	1.0	1.7	-6.3	-7.7	-4.8
34.0	5.1	-0.2	10.4	4.8	-0.5	10.1	11.2	0.9	0.4	1.4	-0.8	4.5	4.1	4.8	-3.2	-4.6	-1.8
37.0	8.0	2.7	13.3	7.7	2.4	12.9	14.2	3.8	3.3	4.4	2.1	7.5	7.1	7.8	-0.2	-1.6	1.2
40.0	10.8	5.5	16.0	10.4	5.2	15.7	17.1	6.7	6.2	7.2	5.0	10.3	10.0	10.7	2.6	1.2	4.0
43.0	13.4	8.2	18.7	13.0	7.8	18.2	19.9	9.4	8.9	9.9	7.7	13.1	12.8	13.4	5.3	3.9	6.6
46.0	16.0	10.8	21.2	15.5	10.4	20.7	22.6	12.0	11.5	12.5	10.3	15.7	15.4	16.1	7.9	6.5	9.2
49.0	18.4	13.2	23.7	18.0	12.8	23.1	25.2	14.5	14.0	15.0	12.8	18.3	18.0	18.6	10.4	9.1	11.7
52.0	20.8	15.6	26.0	20.3	15.2	25.5	27.6	16.9	16.4	17.4	15.2	20.8	20.4	21.1	12.8	11.5	14.1
55.0	23.1	17.9	28.3	22.6	17.5	27.7	30.0	19.3	18.8	19.8	17.6	23.2	22.8	23.5	15.1	13.8	16.4
59.0	26.1	20.9	31.2	25.5	20.4	30.6	33.1	22.3	21.8	22.8	20.6	26.2	25.9	26.5	18.1	16.8	19.4
63.0	28.9	23.8	34.0	28.3	23.2	33.3	36.1	25.2	24.7	25.7	23.4	29.2	28.8	29.5	21.0	19.7	22.3
67.0	31.6	26.5	36.7	31.0	25.9	36.0	38.9	28.0	27.5	28.4	26.2	32.0	31.7	32.3	23.8	22.5	25.0
83.0	41.6	36.5	46.6	40.8	35.9	45.7	49.4	38.2	37.7	38.6	36.4	42.3	42.0	42.6	33.9	32.7	35.1
101.0	51.4	46.5	56.3	50.5	45.7	55.3	59.7	48.2	47.8	48.6	46.4	52.6	52.3	52.9	43.9	42.8	45.0
121.0	61.1	56.2	65.9	60.0	55.3	64.7	69.8	58.1	57.7	58.5	56.3	62.6	62.4	62.9	53.7	52.7	54.8
142.0	70.1	65.4	74.9	68.9	64.3	73.4	79.3	67.4	67.0	67.8	65.6	72.1	71.8	72.3	63.0	61.9	64.0
154.0	74.9	70.2	79.6	73.6	69.1	78.1	84.3	72.3	71.9	72.6	70.4	77.0	76.8	77.3	67.8	66.8	68.8
167.0	79.8	75.1	84.4	78.4	74.0	82.8	89.5	77.3	76.9	77.6	75.4	82.2	81.9	82.4	72.8	71.9	73.8
181.0	84.8	80.2	89.3	83.3	78.9	87.6	94.7	82.4	82.0	82.7	80.5	87.4	87.1	87.6	77.9	77.0	78.9
196.0	89.8	85.3	94.3	88.3	84.0	92.5	100.0	87.5	87.2	87.9	85.7	92.6	92.4	92.9	83.1	82.2	84.0
212.0	94.9	90.5	99.3	93.3	89.1	97.5	105.4	92.8	92.4	93.1	90.9	97.9	97.7	98.2	88.3	87.4	89.2
229.0	100.0	95.7	104.3	98.3	94.2	102.4	110.8	98.0	97.7	98.3	96.1	103.3	103.1	103.6	93.5	92.7	94.4
246.0	104.9	100.7	109.1	103.1	99.1	107.1	116.0	103.0	102.7	103.3	101.1	108.4	108.2	108.6	98.5	97.7	99.3
264.0	109.8	105.6	113.9	107.9	104.0	111.8	121.1	108.0	107.7	108.3	106.1	113.5	113.3	113.8	103.5	102.7	104.3
284.0	115.0	110.9	119.0	113.0	109.2	116.8	126.6	113.3	113.0	113.6	111.4	118.9	118.7	119.2	108.8	108.0	109.6
304.0	119.9	115.9	123.8	117.8	114.1	121.5	131.8	118.3	118.0	118.6	116.4	124.1	123.9	124.3	113.8	113.1	114.6
325.0	124.8	121.0	128.6	122.7	119.1	126.3	137.0	123.3	123.1	123.6	121.4	129.2	129.0	129.4	118.9	118.2	119.6
348.0	129.9	126.2	133.6	127.7	124.2	131.2	142.5	128.6	128.3	128.8	126.6	134.6	134.4	134.8	124.1	123.5	124.8
349.0	130.1	126.4	133.8	127.9	124.5	131.4	142.7	128.8	128.5	129.0	126.8	134.8	134.6	135.0	124.4	123.7	125.0
372.0	135.0	131.4	138.5	132.7	129.4	136.0	147.9	133.7	133.5	134.0	131.8	139.9	139.7	140.1	129.3	128.7	130.0
397.0	140.0	136.6	143.4	137.7	134.5	140.9	153.3	138.9	138.7	139.1	136.9	145.2	145.0	145.4	134.5	133.9	135.1
423.0	145.0	141.8	148.3	142.6	139.5	145.6	158.6	143.9	143.8	144.1	142.0	150.4	150.3	150.6	139.6	139.1	140.2
450.0	150.0	146.9	153.0	147.5	144.6	150.3	163.9	148.9	148.8	149.1	146.9	155.6	155.5	155.8	144.7	144.2	145.2



Scan to learn more about our new PT Chart.



Scan to learn more about calculating Glide.

## REFRIGERATION SECTION 2

### PRESSURE BASED PT CHARTS

Pressure (psig)	Solstice® N13 (R-450A)			Genetron® 134a (R-134a)	Genetron® MP39 (R-401A)			Genetron® 409A (R-409A)		
	Temperature			Temperature	Temperature			Temperature		
	°F			°F	°F			°F		
	Avg	Bubble	Dew		Avg	Bubble	Dew	Avg	Bubble	Dew
0.0	-9.5	-10.1	-9.0	-14.9	-22.1	-27.3	-16.9	-22.4	-30.0	-14.7
5.0	2.7	2.1	3.3	-3.1	-10.0	-15.1	-5.0	-10.3	-17.8	-2.7
10.0	12.7	12.1	13.2	6.7	-0.2	-5.2	4.8	-0.4	-7.9	7.1
15.0	21.1	20.6	21.7	14.9	8.2	3.3	13.2	8.1	0.7	15.5
20.0	28.6	28.0	29.2	22.2	15.6	10.7	20.5	15.5	8.1	22.9
22.0	31.3	30.8	31.9	24.9	18.3	13.5	23.2	18.2	10.9	25.6
24.0	34.0	33.4	34.6	27.4	21.0	16.1	25.8	20.9	13.5	28.2
26.0	36.5	35.9	37.1	29.9	23.5	18.6	28.3	23.4	16.1	30.7
28.0	38.9	38.4	39.5	32.3	25.9	21.1	30.7	25.8	18.5	33.1
30.0	41.3	40.7	41.9	34.6	28.2	23.4	33.0	28.1	20.9	35.4
32.0	43.6	43.0	44.2	36.8	30.5	25.7	35.2	30.4	23.2	37.6
34.0	45.8	45.2	46.4	38.9	32.7	27.9	37.4	32.6	25.4	39.8
36.0	47.9	47.3	48.5	41.0	34.8	30.0	39.5	34.7	27.6	41.9
38.0	50.0	49.4	50.6	43.0	36.8	32.1	41.5	36.8	29.6	44.0
40.0	52.0	51.4	52.6	45.0	38.8	34.1	43.5	38.8	31.7	45.9
42.0	53.9	5								

# PT CHARTS FOR A/C AND REFRIGERATION

New Pressure-based Charts Make Calculating Glide Easy

## SUPERHEAT

### Procedure:

- Use gauges to determine the pressure at the evaporator coil outlet, and a thermometer to get the actual temperature at the same point.
- Get the Dew temperature from the "Dew" column
- Superheat = Actual Temperature - Dew Temperature

**Example:** Find the superheat on a system which uses Solstice® N40 (R-448A) when the pressure at the evaporator outlet reads 40 psig and your surface thermometer reads 26°F

- ✓ 40 psig yields ~ 16°F (using dew point)
- ✓ Degree of Superheat = 26°F - 16°F = 10°F



## Charge Calculation

Product	ASHRAE Number	Refrigerant Type	Refrigerant Class	Lubricant Used*	Liquid Density (lbs/ft <sup>3</sup> ) <sup>†</sup> at 80°F
Solstice® N40	R-448A	Blend	HFO/HFC	POE	68
Genetron Performax® LT	R-407F	Blend HFC	HFC	POE	69.3
Genetron® 22	R-22	Single Component	HCFC	MO	73.9
Genetron 404A	R-404A	Blend HFC	HFC	POE	64.7
Genetron AZ-50®	R-507	Azeotrope HFC	HFC	POE	64.9
Genetron 408A	R-408A	Blend HCFC	HCFC	AB	65.7
Genetron 502 <sup>†</sup>	R-502	Azeotrope CFC	CFC	MO	75.4
Solstice N13	R-450A	Blend	HFO/HFC	POE	73.1
Genetron 134a	R-134a	Single Component	HFC	POE	74.9
Genetron MP39	R-401A	Blend HCFC	HCFC	AB	73.9
Genetron HP80	R-402A	Blend HCFC	HCFC	AB	71
Genetron 409A	R-409A	Blend HCFC	HCFC	AB	75.4
Genetron 12 <sup>†</sup>	12	Single Component	CFC	MO	81.5
Genetron 407C	407C	Blend	HFC	POE	70.6
Genetron 422D	422D	Blend	HFC/HC	POE/MO	70.9

\* POE = polyol ester, MO = mineral oil, AB = Alkylbenzene \*\* Divide by 7.48 to convert to lbs/gal.  
<sup>†</sup> U.S. production stopped Dec. 31, 1995.

When retrofitting a system with a new refrigerant, use this formula to determine amount needed:  
 Pounds of new refrigerant =  $\frac{\text{Pounds of original refrigerant} \times \text{density of new refrigerant (at 80°F)}}{\text{density of original refrigerant (at 80°F)}}$

### EXAMPLE

If you were using 1,000 pounds of R-22, you'll need about 920 pounds of R-448A, as follows:

$$\text{Pounds of R-448A} = \frac{1,000 \times 68.0}{73.9} = \frac{68,000}{73.9} = 920$$

## PT Charts for Air Conditioning

Genetron® 407C and 422D are excellent alternatives to R-22

Pressure (psig)	Genetron® 407C (R-407C)			Genetron® 422D (R-422D)			Genetron® R-22
	Temperature			Temperature			Temperature
	Avg	Bubble	Dew	Avg	Bubble	Dew	°F
0.0	-40.2	-46.5	-33.9	-41.4	-45.8	-37.0	-41.5
10.0	-19.9	-26.0	-13.8	-20.8	-24.8	-16.7	-20.4
20.0	-5.2	-11.2	0.7	-5.9	-9.7	-2.1	-5.2
30.0	6.4	0.6	12.3	5.9	2.3	9.6	6.9
40.0	16.2	10.4	21.9	15.9	12.4	19.4	17.1
45.0	20.6	14.9	26.3	20.4	17.0	23.8	21.7
50.0	24.7	19.0	30.3	24.6	21.2	27.9	26.0
55.0	28.6	22.9	34.2	28.5	25.2	31.8	30.0
60.0	32.2	26.7	37.8	32.3	29.0	35.5	33.9
65.0	35.7	30.2	41.3	35.9	32.7	39.1	37.5
70.0	39.0	33.6	44.5	39.3	36.1	42.4	41.0
75.0	42.2	36.8	47.7	42.5	39.4	45.6	44.3
80.0	45.3	39.9	50.7	45.6	42.6	48.7	47.5
85.0	48.2	42.8	53.6	48.6	45.6	51.6	50.6
90.0	51.0	45.7	56.4	51.5	48.5	54.5	53.5
95.0	53.7	48.4	59.1	54.3	51.4	57.2	56.4
100.0	56.4	51.1	61.6	57.0	54.1	59.9	59.1
105.0	58.9	53.7	64.2	59.6	56.7	62.4	61.8
110.0	61.4	56.2	66.6	62.1	59.3	64.9	64.4
120.0	66.1	61.0	71.2	67.0	64.2	69.7	69.3
130.0	70.6	65.5	75.6	71.5	68.9	74.2	74.0
140.0	74.8	69.8	79.8	75.9	73.3	78.5	78.4
150.0	78.8	73.9	83.8	80.0	77.5	82.6	82.7
160.0	82.7	77.8	87.6	84.0	81.5	86.5	86.7
170.0	86.4	81.5	91.2	87.7	85.3	90.2	90.6
180.0	89.9	85.2	94.7	91.4	89.0	93.8	94.3
185.0	91.6	86.9	96.4	93.2	90.8	95.5	96.2
190.0	93.3	88.6	98.0	94.9	92.6	97.2	97.9
195.0	95.0	90.3	99.6	96.6	94.3	98.9	99.7
200.0	96.6	92.0	101.2	98.3	96.0	100.5	101.4
205.0	98.2	93.6	102.8	99.9	97.7	102.1	103.1
210.0	99.8	95.2	104.4	101.5	99.3	103.7	104.8
215.0	101.3	96.8	105.9	103.1	100.9	105.3	106.4
220.0	102.8	98.3	107.4	104.7	102.5	106.8	108.0
225.0	104.3	99.9	108.8	106.2	104.1	108.4	109.6
230.0	105.8	101.4	110.3	107.7	105.6	109.8	111.1
235.0	107.3	102.8	111.7	109.2	107.1	111.3	112.7
240.0	108.7	104.3	113.1	110.7	108.6	112.8	114.2
245.0	110.1	105.7	114.5	112.1	110.1	114.2	115.7
250.0	111.5	107.2	115.8	113.6	111.5	115.6	117.1
255.0	112.9	108.6	117.2	115.0	113.0	117.0	118.6
260.0	114.2	109.9	118.5	116.3	114.4	118.3	120.0
265.0	115.5	111.3	119.8	117.7	115.8	119.7	121.4
270.0	116.9	112.6	121.1	119.1	117.1	121.0	122.8
275.0	118.2	114.0	122.4	120.4	118.5	122.3	124.2
280.0	119.4	115.3	123.6	121.7	119.8	123.6	125.5
285.0	120.7	116.6	124.8	123.0	121.2	124.9	126.9
290.0	121.9	117.8	126.1	124.3	122.5	126.1	128.2
295.0	123.2	119.1	127.3	125.6	123.7	127.4	129.5
300.0	124.4	120.4	128.4	126.8	125.0	128.6	130.8
305.0	125.6	121.6	129.6	128.0	126.3	129.8	132.1
310.0	126.8	122.8	130.8	129.3	127.5	131.0	133.3
315.0	128.0	124.0	131.9	130.5	128.7	132.2	134.6
320.0	129.1	125.2	133.1	131.7	130.0	133.4	135.8
325.0	130.3	126.4	134.2	132.8	131.1	134.5	137.0
330.0	131.4	127.5	135.3	134.0	132.3	135.6	138.2
335.0	132.5	128.7	136.4	135.1	133.5	136.8	139.4
345.0	134.7	131.0	138.5	137.4	135.8	139.0	141.8
355.0	136.9	133.2	140.6	139.6	138.1	141.2	144.1
365.0	139.0	135.4	142.7	141.8	140.3	143.3	146.3
375.0	141.1	137.5	144.7	143.9	142.5	145.4	148.6
385.0	143.1	139.6	146.7	146.0	144.6	147.4	150.7
395.0	145.1	141.7	148.6	148.0	146.7	149.4	
405.0	147.1	143.7	150.5	150.0	148.7	151.3	
415.0	149.0	145.7	152.3	152.0	150.7	153.2	
425.0	150.9	147.6	154.1	153.9	152.7	155.1	



### Contact Honeywell

To learn more about the benefits of Honeywell refrigerants for your next project, call 1-800-631-8138 or visit [www.honeywell-refrigerants.com](http://www.honeywell-refrigerants.com).

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## SUBCOOLING



### Procedure:

- Use gauges to determine the pressure at the condenser coil outlet, and a thermometer to get the actual temperature at the same point.
- Use the Bubble column to get the bubble temperature
- Subcooling = Bubble Temperature - Actual Temperature

**Example:** Find the amount of subcooling on a system using Solstice N40 (R-448A) when the liquid line temperature reads 75°F and the liquid line pressure is 196 psig.

- ✓ 40 psig yields ~ 16°F (using Bubble temp)
- ✓ Degree of Subcooling = 85°F - 75°F = 10°F