

# Genetron® 422D Temperature-Pressure Chart

**Honeywell**

Temperature °F	Bubble Pressure psig	Dew Pressure psig
-40	2.4	2.3*
-35	4.6	0.8
-30	7.1	3.0
-25	9.9	5.4
-20	12.9	8.1
-15	16.2	11.0
-10	19.8	14.3
-5	23.7	17.8
0	27.9	21.7
5	32.5	25.8
10	37.5	30.4
15	42.8	35.3
20	48.5	40.7
25	54.7	46.4
30	61.3	52.6
35	68.4	59.3
40	75.9	66.4
45	84.0	74.0
50	92.6	82.2
55	101.7	90.9
60	111.4	100.2
65	121.7	110.1
70	132.6	120.7
75	144.1	131.8
80	156.3	143.7
85	169.2	156.2
90	182.7	169.5
95	197.1	183.5
100	212.1	198.4
105	228.0	214.0
110	244.7	230.5
115	262.2	247.9
120	280.6	266.2
125	300.0	285.5
130	320.2	305.8
135	341.4	327.2
140	363.7	349.6



**Genetron® 422D**  
a 22 retrofit refrigerant...

\* Inches of Mercury Vacuum  
1Values from NIST Refprop 7.0

# Genetron® 422D

Genetron® 422D is a non-ozone-depleting HFC-based refrigerant for replacement of HCFC-22 in low- and medium-temperature refrigeration systems. Genetron 422D is a blend refrigerant suitable for direct expansion evaporators. It should not be used in systems that employ flooded evaporators.

## Physical Properties

### Chemical Formula and Composition

Component	Formula	Weight %
HFC-134a	CF <sub>3</sub> CH <sub>2</sub> F	31.5
HFC-125	CF <sub>3</sub> CHF <sub>2</sub>	65.1
Isobutane	CH(CH <sub>3</sub> ) <sub>3</sub>	3.4

Average molecular weight*	109.9
Boiling point (bubble point) @ 1atm (°F)*	-45.76
Critical temperature (°F)*	175.2
Critical pressure (psia)*	566.22
Critical density (lb/ft <sup>3</sup> )*	33.008
Saturated liquid density @ 80°F (lb/ft <sup>3</sup> )*	70.87
Heat of vaporization @ boiling point (btu/lb)*	81.78
Specific heat of liquid @ 80°F (btu/lb·°F)	0.35
Specific heat of vapor @ constant pressure, Cp @ 1atm and 80°F (btu/lb·°F)*	0.20
Flammable range, % volume in air	none
ASHRAE/ANSI Standard 34	A1

\*Values from Refprop 7.0 (NIST)

## Applications

Examples of low- and medium-temperature commercial refrigeration applications include:

- Supermarket display cases
- Food preservation and food processing
- Ice machines

## Features

- Can replace HCFC-22 in many cases without having to change compressor lubricant.
- May be used with alkyl benzene (AB), mineral oil (MO), and polyolester (POE) lubricants. If inadequate oil return is observed for AB or MO, addition of POE may be needed.
- Genetron 422D can, in most cases, be used with existing HCFC-22 thermostatic expansion valves. Larger valves may be needed in cases where the R-22 valve is near its maximum capacity.
- Lower discharge temperature than HCFC-22 which may extend compressor longevity.
- Non-ozone-depleting HFC refrigerant.
- ASHRAE classification A1 (low toxicity, non-flammable per ASTM E-681 method).
- Allows for use of existing equipment.

## Retrofit Performance

Genetron® 422D has been evaluated in laboratory tests using typical commercial refrigeration systems. Based on these laboratory tests, subsequent field trials, and theoretical thermodynamic cycle calculations, the following observations were made:

Genetron 422D should be suitable for use with MO or AB in most commercial systems. If adequate oil return is not achieved, addition of POE should be considered.

Capacity and energy efficiency at low- and medium-temperature tends to be lower than HCFC-22. If the present R-22 system was at its maximum capacity during design conditions, additional capacity may be needed (such as upsizing compressor sizes).

Genetron 422D mass flow is higher compared to HCFC-22. Existing HCFC-22 TXVs may be acceptable in many cases. If the existing valve was near its maximum capacity for HCFC-22, a larger valve may be needed when retrofitting to Genetron 422D.

As with any retrofit, consideration should be given to the age of seals and gaskets. Over time, sealing devices may experience compression set, thermal set, and extraction. Aged sealing devices may not perform adequately after retrofitting service. Seal replacement may be required in some cases.