



R-23

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Composition: 100% trifluoromethane (CHF₃)

Application:

Very low temperature refrigeration

Performance:

Operates in the low temperature stage of a cascade system because of its low boiling point

Lubricant:

- Polyolester
- Hydrocarbon additives are often added to a system to improve oil circulation at very low temperatures

Retrofitting:

- Consult the comments on Page 10
- See Ultra-Low Temperature Refrigeration Section — page 66-67

[PRESSURE-TEMP CHART]

TEMP. (°F)	R-23 psig
-125	7.8"
-120	4.0"
-115	0.3
-110	2.9
-105	5.8
-100	9.0
-95	12.7
-90	16.7
-85	21.3
-80	26.3
-75	31.8
-70	37.9
-65	44.6
-60	52.0
-55	60.0
-50	68.7
-45	78.1
-40	88.3
-35	99.4
-30	111
-25	124
-20	138
-15	152
-10	168
-5	185
0	203
5	222
10	242
15	264
20	287

[PHYSICAL PROPERTIES OF REFRIGERANTS]

Environmental Classification	HFC
Molecular Weight	70
Boiling Point (1atm, °F)	-115.6
Critical Pressure (psia)	701.4
Critical Temperature (°F)	78.7
Critical Density (lb./ft ³)	32.8
Liquid Density (20°F, lb./ft ³)	67.46
Vapor Density (bp.lb./ft ³)	0.29
Heat of Vaporization (bp, BTU/lb.)	102.7
Specific Heat Liquid (20°F, BTU/lb. °F)	0.4063
Specific Heat Vapor (1atm, 20°F, BTU/lb. °F)	0.1663
Ozone Depletion Potential (CFC 11 = 1.0)	0
Global Warming Potential (CO ₂ = 1.0)	14800
ASHRAE Standard 34 Safety Rating	A1

**National
R-23**

[AVAILABLE IN SIZES]

REFRIGERANT	Type	Size
	R-23	Cylinder
	9 lb.	
	20 lb.	
	70 lb.	



Thermodynamic Properties of R-23

TEMP. (°F)	Pressure Liquid (psia)	Density Liquid (lb/ft ³)	Density Vapor (lb/ft ³)	Enthalpy Liquid (Btu/lb)	Enthalpy Vapor (Btu/lb)	Entropy Liquid (Btu/R-lb)	Entropy Vapor (Btu/R-lb)
-140	6.3	92.72	0.1312	-30.60	77.43	-0.08247	0.2555
-135	7.6	92.20	0.1562	-29.15	77.98	-0.07799	0.2520
-130	9.1	91.66	0.1850	-27.70	78.52	-0.07356	0.2486
-125	10.8	91.12	0.2178	-26.25	79.05	-0.06919	0.2455
-120	12.8	90.57	0.2550	-24.78	79.58	-0.06486	0.2424
-115	15.1	90.00	0.2972	-23.31	80.09	-0.06058	0.2394
-110	17.6	89.43	0.3446	-21.84	80.59	-0.05634	0.2366
-105	20.6	88.84	0.3978	-20.35	81.09	-0.05214	0.2339
-100	23.8	88.24	0.4572	-18.86	81.56	-0.04798	0.2312
-95	27.5	87.63	0.5234	-17.35	82.03	-0.04385	0.2287
-90	31.6	87.00	0.5970	-15.84	82.48	-0.03975	0.2262
-85	36.1	86.36	0.6784	-14.32	82.92	-0.03568	0.2238
-80	41.2	85.70	0.7684	-12.78	83.34	-0.03163	0.2215
-75	46.7	85.03	0.8675	-11.23	83.75	-0.02762	0.2193
-70	52.9	84.35	0.9765	-9.671	84.14	-0.02362	0.2171
-65	59.6	83.64	1.096	-8.097	84.51	-0.01964	0.2150
-60	67.0	82.93	1.227	-6.509	84.86	-0.01569	0.2129
-55	75.0	82.19	1.370	-4.906	85.19	-0.01175	0.2109
-50	83.7	81.43	1.527	-3.288	85.50	-0.00782	0.2089
-45	93.2	80.66	1.698	-1.653	85.79	-0.00390	0.2070
-40	103.5	79.86	1.884	0.000	86.06	0.00000	0.2051
-35	114.6	79.04	2.087	1.671	86.30	0.00390	0.2032
-30	126.6	78.20	2.307	3.361	86.52	0.00779	0.2013
-25	139.5	77.34	2.547	5.072	86.70	0.01168	0.1995
-20	153.3	76.44	2.808	6.806	86.86	0.01556	0.1976
-15	168.1	75.52	3.092	8.563	86.98	0.01946	0.1958
-10	184.0	74.57	3.402	10.34	87.06	0.02335	0.1940
-5	201.0	73.58	3.739	12.15	87.11	0.02726	0.1921
0	219.1	72.55	4.106	13.99	87.11	0.03119	0.1903
5	238.4	71.49	4.508	15.87	87.07	0.03513	0.1884
10	258.9	70.38	4.948	17.77	86.97	0.03910	0.1864
15	280.8	69.22	5.431	19.72	86.81	0.04310	0.1844
20	303.9	68.00	5.963	21.71	86.59	0.04715	0.1824
25	328.5	66.72	6.551	23.76	86.28	0.05124	0.1802
30	354.6	65.36	7.206	25.86	85.89	0.05541	0.1780
35	382.1	63.92	7.940	28.03	85.39	0.05966	0.1756
40	411.3	62.36	8.769	30.28	84.75	0.06402	0.1730