TECHNICAL
DATA SHEET

R-134a

Features and uses of R-134a

The refrigerant gas R-134a is a HFC replacing R-12 in new installations. As all HFC refrigerants not damage the ozone layer. It has a great chemical and thermal stability, low toxicity and is non-flammable, besides having an excellent compatibility with most materials. Its classification is **A1 group L1.**

Immiscible with traditional oils of R-12 (mineral and alkyl benzene), whereas its miscibility with oils polyesters (POE) is complete, so it should always be used with these oils.

R-134a is an alternative refrigerant to R-12 for the facility retrofitting or for new installations. It is widely used in automobile air conditioners and household refrigerators. It is also widely used in the industrial and commercial chillers in addition to transport in positive temperatures.

Toxicity and storage

R-134a is a substance with very low toxicity. The index LCL0 inhalation in rats during 4 hours is less than 500,000 ppm and NOEL in relation to heart problems is about 75,000 ppm. In exposure for 104 weeks at a concentration of 10,000 ppm was observed no effect. R-134a containers should be stored in a cool and ventilated area away from heat sources. R-134a vapors are heavier than air and tend to accumulate near the ground.

Security

R-134a is not toxic, not flammable, high security.
It has been classified as **A1 / group L1.**

Components

Chemical Name	% By weight	CAS N °	EC N °
1,1,1,2- Tetrafluoroethane (R-134a)	100	811-97-2	212-377-0

Physical Properties

PHYSICAL PROPERTIES	UNITS	R-134a
Molecular weight	(G/mol)	102
Boiling point (at 1,013 bar)	(ºC)	-26.1
Freezing	(ºC)	-103
Critical temperature	(ºC)	101.1
Critical pressure	(Bar abs)	40.67
Critical density	(Kg/m³)	515.3
Liquid density (25ºC)	(Kg/m³)	1.206
Liquid density (0ºC)	(Kg/m³)	1.293
Saturated vapour density (a boiling point.)	(Kg/m3)	5.25
Vapour pressure (25ºC)	(Bar abs)	6.661
Vapour pressure (0ºC)	(Bar abs)	2.928
Heat of vaporization at boiling point	(KJ/Kg)	217.2
Specific heat of liquid at 25 ° C (1,013 bar)	(KJ/Kg.K)	1.44
Specific heat of vapour at 25ºC (1,013 bar)	(KJ/Kg.K)	0.85
Viscosity of liquid (25ºC)	(cP)	0.202
Surface pressure (25ºC)	(mN/m)	8.09
R134a Solubility in water (25ºC at 1,013 bar)	(wt%)	0.11
Volumetric cooling capacity. (–25ºC)	(Kg/m3)	1192.11
Flammability		No
ODP	-	0
GWP	-	1430*

(1) Bubble point

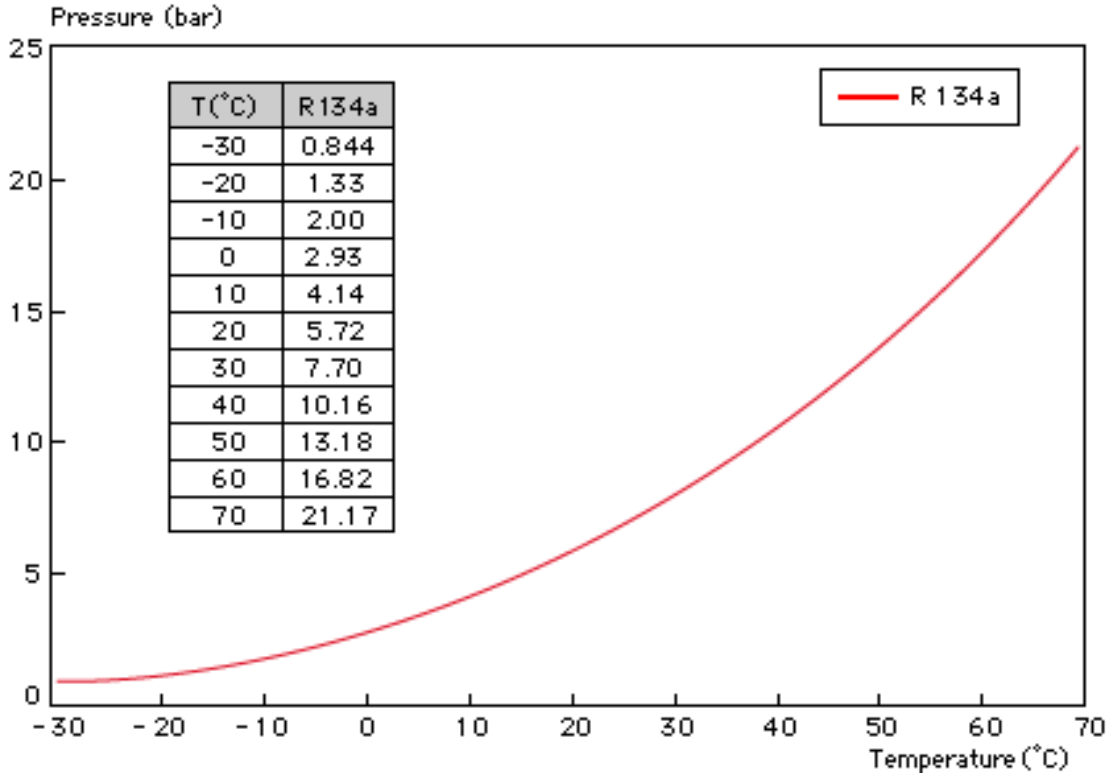
* According to IPPCC-AR4/CIE (Fourth Assessment Report of the Intergovernmental Panel on Climate Change) -2007.

Material compatibility

ELASTOMERS				PLASTOMERS			
	C	BC	NC		C	BC	NC
Butyl rubber	X			Propylene	X		
Neoprene	X			PVC	X		
Buna N	X			Polyethylene	X		
Buna S		X		Nylon	X		
Fluor rubber			X	Polystyrene		X	
Natural rubber	X			PTFE	X		
Silicone rubber		X		Polyacetylene	X		
EPDM rubber	X			Epoxy resin	X		
Polisulfurica	X			ABS		X	

C = Compatible bC = Bit Compatible NC = Not Compatible

Chart Pressure / Temperature



T(°C)	R134a
-30	0.844
-20	1.33
-10	2.00
0	2.93
10	4.14
20	5.72
30	7.70
40	10.16
50	13.18
60	16.82
70	21.17

Thermodynamic properties

TEMP. (°C)	ABSOLUTE PRESSURE (kPa)		DENSITY (kg/m³)		ENTHALPY (kJ/kg)		ENTROPY (kJ/kg.K)	
	BUBBLE	DEW	BUBBLE	DEW	BUBBLE	DEW	BUBBLE	BUBBLE
-40	51.14	51.14	1414.6	2.767	148.4	374.3	0.7967	1.7655
-35	66.07	66.07	1400.2	3.518	154.6	377.4	0.8231	1.7586
-30	84.29	84.29	1385.7	4.424	160.9	380.6	0.8492	1.7525
-25	106.32	106.32	1371.0	5.504	167.3	383.7	0.8750	1.747
-20	132.67	132.67	1356.0	6.784	173.7	386.8	0.9005	1.7422
-15	163.90	163.90	1340.8	8.288	180.2	389.8	0.9257	1.7379
-10	200.60	200.60	1325.3	10.044	186.7	392.9	0.9507	1.7341
-5	243.39	243.39	1309.4	12.082	193.3	395.9	0.9755	1.7308
0	292.93	292.93	1293.3	14.435	200.0	398.8	1.0000	1.7278
5	349.87	349.87	1276.7	17.140	206.8	401.7	1.0244	1.7252
10	414.92	414.92	1259.8	20.236	213.6	404.5	1.0485	1.7229
15	488.78	488.78	1242.3	23.770	220.5	407.3	1.0726	1.7208
20	572.25	572.25	1224.4	27.791	227.5	410.0	1.0964	1.7189
25	666.06	666.06	1205.9	32.359	234.6	412.6	1.1202	1.7171
30	771.02	771.02	1186.7	37.540	241.8	415.1	1.1439	1.7155
35	887.91	887.91	1166.8	43.413	249.2	417.5	1.1676	1.7138
40	1017.61	1017.61	1146.1	50.072	256.6	419.8	1.1912	1.7122
45	1161.01	1161.01	1124.5	57.630	264.2	421.9	1.2148	1.7105
50	1319.00	1319.00	1101.8	66.225	271.9	423.8	1.2384	1.7086

Mollier Diagram