



Characteristics and applications

The R-513A refrigerant gas is an azeotropic HFC+HFO blend and a direct drop-in replacement for R-134a in existing systems. As with all HFC+HFO refrigerants, it causes no damage to the ozone layer. Its safety classification is **A1** group **L1**, meaning that it has a low toxicity and is non-flammable.

Some of its main properties are:

- It is a good alternative to R-410a for new medium and high temperature systems.
- It is a **direct drop-in** replacement for R-134a in existing commercial and industrial medium and high temperature refrigeration equipment that uses positive displacement compressors and direct expansion systems. It is also suitable for centrifugal water chillers and for replacing R-134a in medium-temperature circuits of two-stage hybrid cascade systems with CO₂.
- It is compatible with the equipment, components, lubricant and joints of an existing R-134a system.
- It has a low global warming potential (GWP). A reduction of 55.87% in comparison to R-134a.
- It is compatible with POE synthetic oils.

Toxicity and storage

R-513A is a substance with a very low toxicity. R-513A vapours are heavier than the air, so tend to accumulate near the floor. High atmospheric concentrations could cause anaesthetic effects and asphyxiation. Prolonged exposure may lead to heart arrhythmia and could cause sudden death.

R-513A cylinders should be stored in a cool and well-ventilated place, away from heat sources.

Components

Chemical Name	% By weight	CAS No.	EC No.
2,3,3,3-Tetrafluoropropene (R-1234yf)	56	754-12-1	468-710-7
1,1,1,2- Tetrafluoroethane (R-134a)	44	811-97-2	212-377-0



Physical properties

PHYSICAL PROPERTIES	UNITS	R-513A
Molecular weight	(g/mol)	108,4
Boiling point (at 1,013 bar)	(°C)	-29,2
Critical temperature	(°C)	96,5
Critical pressure	(bar)	37,67
Critical density	(Kg/m ³)	516,75
Vapour pressure (25°C)	(bar)	7,06
Sliding temperature or glide	(K)	0
Flammability		No
ODP	-	0
GWP	-	631 *

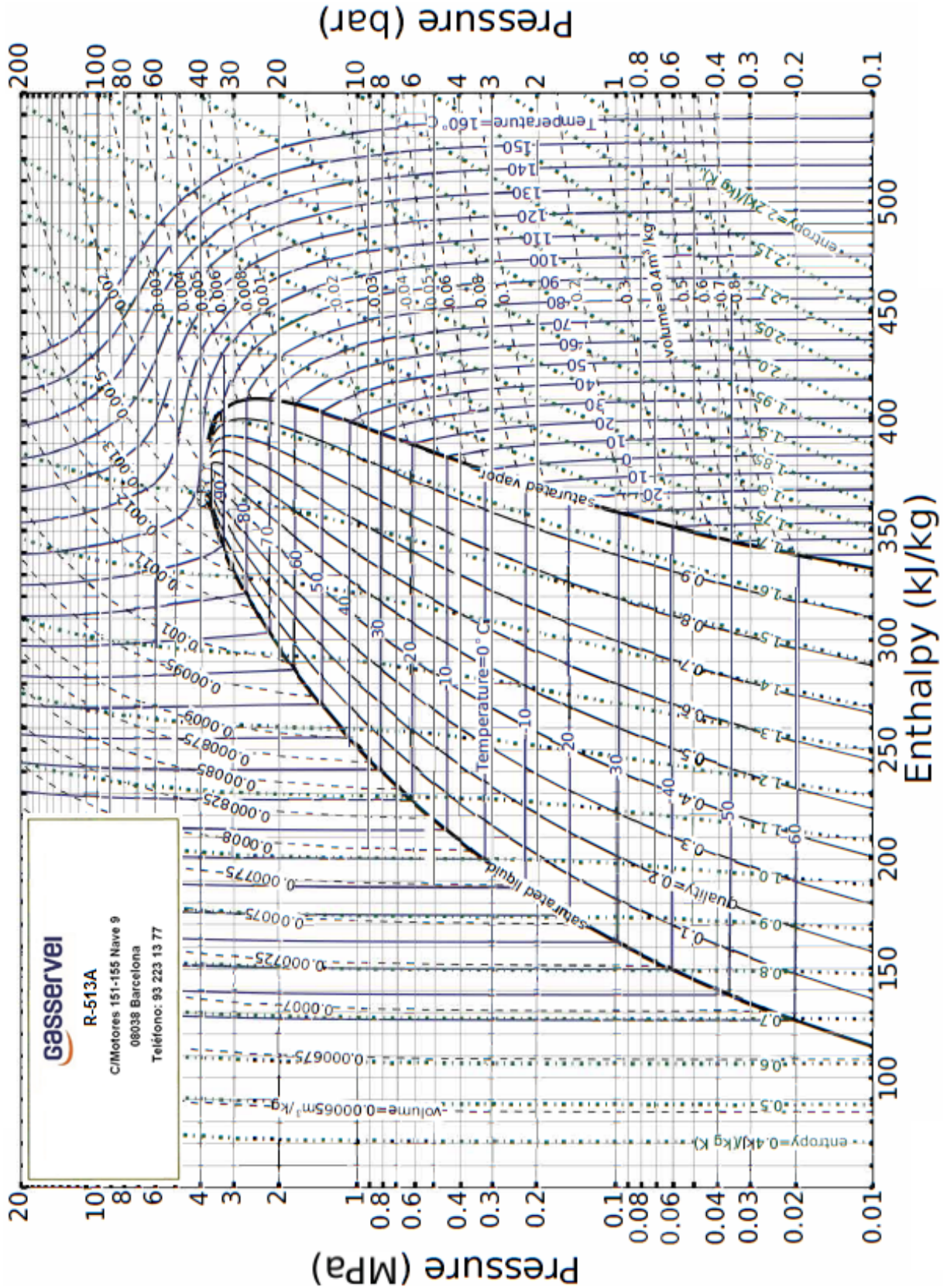
* According to IPPCC-AR4/CIE (Fourth Assessment Report of the Intergovernmental Panel of Experts on Climate Change)-2007.

Pressure / temperature table

TEMP. (° C)	ABSOLUTE PRESSURE (bar)		DENSITY (Kg/m ³)		ENTHALPY (kJ/Kg)		ENTROPY (kJ/Kg.K)	
	BUBBLE	DEW	BUBBLE	DEW	BUBBLE	DEW	BUBBLE	DEW
-50	0,359	0,355	1411,1	2,117	137,9	345,3	0,750	1,680
-45	0,471	0,465	1397,0	2,730	143,9	348,6	0,777	1,674
-40	0,608	0,603	1382,8	3,477	149,8	351,8	0,802	1,669
-35	0,776	0,770	1368,3	4,378	155,9	355,1	0,828	1,665
-30	0,978	0,973	1353,7	5,453	161,9	358,4	0,853	1,661
-25	1,221	1,216	1338,8	6,725	168,1	361,6	0,878	1,658
-20	1,508	1,503	1323,6	8,220	174,3	364,9	0,903	1,656
-15	1,846	1,842	1308,2	9,965	180,6	368,1	0,928	1,654
-10	2,239	2,236	1292,5	11,990	187,0	371,2	0,952	1,652
-5	2,695	2,692	1276,4	14,326	193,5	374,4	0,976	1,651
0	3,219	3,217	1260,0	17,011	200,0	377,5	1,000	1,650
5	3,818	3,816	1243,2	20,082	206,6	380,6	1,024	1,649
10	4,498	4,497	1225,9	23,586	213,3	383,6	1,047	1,649
15	5,266	5,265	1208,2	27,571	220,1	386,5	1,071	1,649
20	6,129	6,129	1189,9	32,095	227,0	389,4	1,094	1,648
25	7,095	7,095	1170,9	37,225	234,0	392,1	1,118	1,648
30	8,171	8,171	1151,3	43,038	241,1	394,8	1,141	1,648
35	9,366	9,365	1131,0	49,624	248,3	397,4	1,164	1,648
40	10,686	10,685	1109,7	57,095	255,6	399,8	1,188	1,648
45	12,142	12,139	1087,5	65,586	263,1	402,1	1,211	1,648
50	13,741	13,738	1064,1	75,266	270,7	404,2	1,234	1,647



Mollier Diagram



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