

Harp[®] 134a

(1,1,1,2-tetrafluoroethane)

Harp[®] 134a is a zero ozone depletion (ODP) hydrofluorocarbon (HFC) refrigerant. It is used on its own as a pure refrigerant and as a component in a large number of refrigerant blends. It is widely used in new equipment that would have previously used CFC R12 and can with specific modifications be retrofitted into exiting R12 equipment.

APPLICATION

Harp[®] 134a applications include automotive air conditioning, chillers, medium temperature commercial refrigeration, domestic refrigeration appliances and transport refrigeration.

PROPERTIES AND PERFORMANCE

Harp[®] 134a is designed to meet the needs of many air conditioning and medium temperature refrigeration systems. Harp[®] 134a is a single component refrigerant, rated A1 by ASHRAE (lowest levels of toxicity and flammability), has zero ozone depletion potential and a Global Warming Potential of 1430.

LUBRICATION

Either Polyolester (POE) or Polyalkylene glycol (PAG) for auto Air conditioning lubricants must be used with HARP[®] 134a. It is not miscible with mineral oil or alkylbenzene lubricants found in many systems. When retrofitting, a lubricant flush procedure is necessary to reduce the original oil content below 5% of the total oil charge. New R134a equipment will be charged with the OEM recommended lubricant, ready to use with Harp[®] 134a.

CHARGING

Charging with Harp[®] 134a can be done either as a vapour or a liquid. End-users should check with the equipment manufacturers guidelines for specific charging instructions.

RETROFITTING

When retrofitting R12 systems to Harp[®] 134a, it is necessary to replace the existing lubricant with POE oil, except in some automotive retrofit applications, which require PAG oil. In most cases, the mineral oil or alkylbenzene oil levels must be reduced below 5% of the new POE charge. Check with OEMs for any specific recommendations regarding viscosity grades or procedures. Remove as much of the existing lubricant as possible, add POE, and run the system on R12 for some time. When the residual oil concentration is appropriate, remove R12, replace the filter-drier, and charge Harp[®] 134a.

MATERIAL COMPATIBILITY

Whenever retrofitting air conditioning or refrigeration systems, compatibility of system materials must always be taken into consideration. Items such as elastomers, hoses, and filter-driers respond differently to different refrigerants and oils. For these reasons, before performing any refrigerant retrofit, Harp International recommends contacting the OEM for specific recommendations.



Harp® 134a

Technical Data

Harp® 134a BASIC PROPERTIES

Chemical formula	CH ₂ FCF ₃
Molecular weight	102.0
Boiling point at 1 atmosphere	-26.08°C
Critical temperature	101°C
Critical pressure	40.7 bar absolute

Harp® 134a THERMODYNAMIC PROPERTIES

Temperature (°C)	Pressure (bar)	Liquid Density (kg/m ³)	Vapour Density (kg/m ³)	Liquid Enthalpy (kJ/kg)	Liquid Enthalpy (kJ/kg)	Vapour Entropy (kJ/kg.K)	Vapour Entropy (kJ/kg.K)
-40	0.51	1417.7	2.77	148.1	374.0	0.796	1.764
-35	0.66	1403.2	3.52	154.4	377.2	0.822	1.758
-30	0.84	1388.4	4.43	160.8	380.3	0.849	1.752
-26.08	1.013	1376.7	5.26	165.8	382.8	0.869	1.747
-25	1.06	1373.5	5.51	167.2	383.5	0.875	1.746
-20	1.33	1358.3	6.78	173.6	386.6	0.900	1.741
-15	1.64	1342.8	8.29	180.1	389.6	0.926	1.737
-10	2.01	1327.1	10.04	186.7	392.7	0.951	1.733
-5	2.43	1311.1	12.08	193.3	395.7	0.975	1.730
0	2.93	1294.8	14.43	200.0	398.6	1.000	1.727
5	3.50	1278.1	17.13	206.8	401.5	1.024	1.725
10	4.15	1261.0	20.23	213.6	404.3	1.049	1.722
15	4.88	1243.4	23.76	220.5	407.1	1.072	1.720
20	5.72	1225.3	27.78	227.5	409.8	1.096	1.718
25	6.65	1206.7	32.35	234.6	412.3	1.120	1.716
30	7.70	1187.5	37.54	241.7	414.8	1.144	1.715
35	8.87	1167.5	43.42	249.0	417.2	1.167	1.713
40	10.17	1146.7	50.09	256.4	419.4	1.191	1.711
45	11.60	1125.1	57.66	263.9	421.5	1.214	1.709
50	13.18	1102.3	66.27	271.6	423.4	1.238	1.707
55	14.92	1078.3	76.10	279.5	425.2	1.261	1.705
60	16.82	1052.9	87.38	287.5	426.6	1.285	1.702
65	18.90	1025.6	100.40	295.8	427.8	1.309	1.699
70	21.17	996.3	115.57	304.3	428.7	1.333	1.696
75	23.64	964.1	133.49	313.1	429.0	1.358	1.691
80	26.33	928.2	155.08	322.4	428.8	1.384	1.685
85	29.26	887.2	181.85	332.2	427.8	1.410	1.677