HARP INTERNATIONAL

Opteon™ yf / Solstice™ yf (R1234yf)

(2,3,3,3-tetrafluoroprop-1-ene)

Opteon™ yf / Solstice™ yf (R1234yf) is a zero ozone depletion (ODP) and extremely low global warming potential (GWP) hydrofluoro olefin (HFO) refrigerant which is used on its own as a pure single component refrigerant. It is widely used in new automotive air conditioning systems that would have previously used HFC R134a.

APPLICATION
R1234yf applications are automotive air conditioning.

PROPERTIES AND PERFORMANCE
R1234yf is designed to meet the needs of automotive air conditioning. R1234yf is a single component refrigerant, rated A2L by ASHRAE (mildly flammable and non-toxic). This means it may necessitate additional safety requirements during handling and use. R1234yf has zero ozone depletion potential and a Global Warming Potential of 4.

LUBRICATION
It is miscible with Polyolester (POE) lubricants and certain Polyalkylene glycol (PAG) lubricants that have been formulated for use with R1234yf. It is not miscible with mineral oil or alkylbenzene lubricants.

CHARGING
Charging with R1234yf can be done either as a vapour or a liquid. End-users should check with the equipment manufacturers guidelines for specific charging instructions.

RETROFITTING
R1234yf cannot be used for retrofitting R134a systems.

MATERIAL COMPATIBILITY
Items such as elastomers, hoses, and filter-driers respond differently to different refrigerants and oils and any used with R1234yf should be fully compatible and qualified for use. Harp International recommends contacting the OEM for specific recommendations.

ANCILLIARY EQUIPMENT
R1234yf will require the use of recovery, charging and leak detection equipment specifically designed and qualified for use with R1234yf.

Harp International The Complete Worldwide Refrigerant Service
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Technical Data

Opteon™ yf / Solstice™ yf (R1234yf) BASIC PROPERTIES

Chemical formula	$C_3H_2F_4$
Molecular weight	114.0
Boiling point at 1 atmosphere	-29.45°C
Critical temperature	94.7°C
Critical pressure	33.8 bar absolute

Opteon™ yf / Solstice™ yf (R1234yf) 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	0.62	1291.9	3.79	-12.4	173.2	-0.052	0.744
-35.0	0.79	1278.3	4.74	-6.5	176.5	-0.027	0.742
-30.0	0.99	1264.5	5.86	-0.6	179.9	-0.003	0.740
-25.0	1.23	1250.5	7.17	5.4	183.3	0.022	0.739
-20.0	1.51	1236.3	8.71	11.5	186.6	0.046	0.738
-15.0	1.84	1221.8	10.50	17.6	190.0	0.070	0.738
-10.0	2.22	1207.0	12.56	23.8	193.3	0.094	0.738
-5.0	2.66	1191.8	14.93	30.2	196.6	0.117	0.738
0.0	3.16	1176.3	17.65	36.6	199.9	0.141	0.739
5.0	3.73	1160.4	20.74	43.1	203.1	0.164	0.740
10.0	4.38	1144.0	24.27	49.7	206.3	0.188	0.741
15.0	5.10	1127.2	28.27	56.4	209.4	0.211	0.742
20.0	5.92	1109.9	32.80	63.2	212.5	0.234	0.743
25.0	6.83	1091.9	37.92	70.1	215.4	0.257	0.745
30.0	7.84	1073.3	43.73	77.1	218.3	0.280	0.746
35.0	8.95	1054.0	50.30	84.2	221.1	0.303	0.747
40.0	10.18	1033.8	57.75	91.5	223.8	0.326	0.748
45.0	11.54	1012.7	66.22	98.9	226.2	0.349	0.749
50.0	13.02	990.4	75.88	106.4	228.6	0.372	0.750
55.0	14.65	966.7	86.96	114.2	230.7	0.395	0.750
60.0	16.42	941.3	99.75	122.1	232.5	0.419	0.750
65.0	18.35	913.7	114.68	130.3	234.0	0.443	0.749
70.0	20.45	883.2	132.33	138.8	235.2	0.467	0.748
75.0	22.72	848.9	153.67	147.7	235.7	0.492	0.745
80.0	25.19	809.0	180.33	157.1	235.5	0.518	0.740

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