R-245fa

1,1,1,3,3 - PENTAFLUOROPROPANE CF_3-CH_2-CHF_2

Molecular weight (g/mol)	134.05
Melting point (°C)	-102.1
Boiling point (at 1.013 bar)	15.13
Temperature glide at 1.013 bar (K)	0
Critical temperature (°C)	154.0
Critical pressure (bar absolute)	36.51
Specific heat (liquid) at + 25°C (kJ/kg.K)	1.322
Specific heat (vapour) at 1.013 bar and + 25°C (kJ/kg.K)	0.920
Thermal capacity ratio (Cp/Cv) at + 25°C and 1.013 bar	1.101
Viscosity (liquid) at + 25°C in Centipoise (10^{-3} Pa.s)	0.401
Surface tension at + 25°C in dyne per centimetre (10^{-3} N/m)	13.63
Classification NF-EN 378	B1
GWP (IPCC 4)	1030

Main applications

R-245fa is a hydrofluorocarbon (HFC). It is used for new installations as a specialist refrigerant in industrial air conditioning, air conditioning in buildings, Organic Rankine Cycle (ORC) heat recovery systems and for energy recovery systems at high ambients. It can also be used in high power installations equipped with centrifugal compressors (one or more stages) and can replace HCFC R-123. R-1233zd is an alternative to R-245fa and R-123 in a new installation only.

Commercial specifications

Purity: ≥ 99.5 % weight.
Water content: ≤ 20 ppm weight.
Non-condensable content (gas phase): ≤ 1.5 % volume.
Chlorine ion test (silver nitrate test): negative.
High boiling residues: ≤ 0.01 % volume.
Total Acidity (HCL): ≤ 1 ppm weight.

Oils

Use a polyol ester (POE) oil.
Consult **Climalife** regarding the viscosity of the oil selected for your application and the miscibility with the fluid under consideration.

Regulation

The use and implementation of R-245fa are governed by the European Regulation No 517/2014.
The recovery of R-245fa is mandatory under the European Regulation No 517/2014.

(Refer to regulations enforced in each country).

Thermodynamic properties of R-245fa - Saturated state

Absolute pressure	LIQUID					VAPOUR					Latent heat
	Bubble point	Volume	Density	Enthalpy	Entropy	Dew point	Volume	Density	Enthalpy	Entropy	
P	t'	v'	p'	h'	s'	t''	v''	p''	h''	s''	Lv
(bar)	(°C)	(dm³/kg)	(kg/dm³)	(kJ/kg)	(kJ/kg.K)	(°C)	(m³/kg)	(kg/m³)	(kJ/kg)	(kJ/kg.K)	(kJ/kg)
0.000	-100	0.609	1.643	78.244	0.446	-100.0	638.636	0.002	335.895	1.934	257.651
0.000	-95	0.613	1.631	84.238	0.481	-95.0	336.318	0.003	338.985	1.910	254.747
0.001	-90	0.618	1.619	90.218	0.514	-90.0	184.844	0.005	342.121	1.889	251.903
0.001	-85	0.622	1.607	96.189	0.546	-85.0	105.629	0.009	345.300	1.870	249.111
0.002	-80	0.627	1.596	102.156	0.577	-80.0	62.549	0.016	348.523	1.853	246.367
0.003	-75	0.631	1.584	108.125	0.608	-75.0	38.265	0.026	351.788	1.837	243.663
0.005	-70	0.636	1.572	114.099	0.637	-70.0	24.118	0.041	355.094	1.824	240.995
0.008	-65	0.641	1.560	120.081	0.666	-65.0	15.624	0.064	358.438	1.812	238.357
0.013	-60	0.646	1.549	126.076	0.695	-60.0	10.380	0.096	361.819	1.801	235.743
0.019	-55	0.651	1.537	132.087	0.723	-55.0	7.059	0.142	365.235	1.792	233.148
0.028	-50	0.656	1.525	138.117	0.750	-50.0	4.904	0.204	368.684	1.783	230.567
0.040	-45	0.661	1.513	144.169	0.777	-45.0	3.475	0.288	372.163	1.776	227.995
0.057	-40	0.666	1.502	150.244	0.803	-40.0	2.508	0.399	375.671	1.770	225.427
0.079	-35	0.671	1.490	156.347	0.829	-35.0	1.841	0.543	379.204	1.765	222.858
0.109	-30	0.677	1.478	162.478	0.855	-30.0	1.373	0.729	382.761	1.761	220.283
0.146	-25	0.682	1.466	168.641	0.880	-25.0	1.038	0.963	386.339	1.757	217.698
0.194	-20	0.688	1.454	174.837	0.904	-20.0	0.796	1.256	389.936	1.754	215.098
0.254	-15	0.694	1.441	181.069	0.929	-15.0	0.618	1.617	393.549	1.752	212.480
0.328	-10	0.700	1.429	187.339	0.953	-10.0	0.486	2.058	397.177	1.750	209.838
0.419	-5	0.706	1.417	193.649	0.977	-5.0	0.386	2.592	400.817	1.749	207.168
0.529	0	0.712	1.404	200.000	1.000	0.0	0.310	3.230	404.467	1.749	204.467
0.662	5	0.719	1.391	206.395	1.023	5.0	0.251	3.989	408.124	1.748	201.729
0.820	10	0.726	1.378	212.836	1.046	10.0	0.205	4.884	411.786	1.749	198.950
1.008	15	0.732	1.365	219.325	1.069	15.0	0.169	5.930	415.451	1.749	196.125
1.013	15.13	0.733	1.365	219.499	1.069	15.13	0.168	5.960	415.548	1.749	196.050
1.227	20	0.740	1.352	225.865	1.091	20.0	0.140	7.147	419.115	1.750	193.251
1.482	25	0.747	1.339	232.456	1.113	25.0	0.117	8.553	422.777	1.752	190.320
1.778	30	0.755	1.325	239.103	1.135	30.0	0.098	10.169	426.432	1.753	187.329
2.117	35	0.763	1.311	245.807	1.157	35.0	0.083	12.018	430.079	1.755	184.272
2.505	40	0.771	1.297	252.571	1.179	40.0	0.071	14.124	433.713	1.757	181.142
2.945	45	0.780	1.282	259.397	1.201	45.0	0.061	16.513	437.330	1.760	177.932
3.442	50	0.789	1.267	266.290	1.222	50.0	0.052	19.213	440.926	1.762	174.636
4.001	55	0.799	1.252	273.251	1.243	55.0	0.045	22.257	444.496	1.765	171.245
4.626	60	0.809	1.237	280.286	1.264	60.0	0.039	25.679	448.036	1.768	167.750
5.323	65	0.819	1.221	287.397	1.285	65.0	0.034	29.519	451.538	1.771	164.141
6.096	70	0.830	1.204	294.589	1.306	70.0	0.030	33.820	454.996	1.774	160.407
6.951	75	0.842	1.188	301.867	1.327	75.0	0.026	38.632	458.401	1.777	156.534
7.893	80	0.855	1.170	309.237	1.348	80.0	0.023	44.013	461.745	1.780	152.508
8.928	85	0.868	1.152	316.706	1.369	85.0	0.020	50.030	465.017	1.783	148.312
10.061	90	0.882	1.133	324.280	1.389	90.0	0.018	56.763	468.204	1.786	143.924
11.298	95	0.898	1.114	331.969	1.410	95.0	0.016	64.306	471.291	1.788	139.322
12.646	100	0.915	1.093	339.784	1.431	100.0	0.014	72.777	474.259	1.791	134.475
14.110	105	0.933	1.072	347.737	1.452	105.0	0.012	82.319	477.086	1.794	129.349
15.698	110	0.953	1.049	355.846	1.473	110.0	0.011	93.117	479.743	1.796	123.897
17.417	115	0.976	1.025	364.131	1.494	115.0	0.009	105.411	482.192	1.798	118.061
19.275	120	1.001	0.999	372.620	1.515	120.0	0.008	119.528	484.386	1.799	111.765
21.280	125	1.030	0.971	381.353	1.536	125.0	0.007	135.925	486.254	1.800	104.901
23.442	130	1.063	0.940	390.387	1.558	130.0	0.006	155.281	487.699	1.800	97.312
25.773	135	1.104	0.906	399.814	1.581	135.0	0.006	178.676	488.566	1.798	88.752

Thermodynamic properties of R-245fa - (superheated vapour) - Volume (dm³/kg)

Sat. Temp. °C	Sat. Pressure bar	Superheat (°C)																					
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
-100	0.000	638654.394	657114.546	675571.950	694027.172	712480.649	730932.723	749383.661	767833.674	786282.930	804731.563	823179.682	841627.372	860074.705	878521.738	896968.518	915415.086	933861.472	952307.703	970753.802	989199.788	1007645.676
-95	0.000	336317.983	345771.843	355223.518	364673.447	374121.972	383569.360	393015.822	402461.528	411906.610	421351.178	430795.317	440239.098	449682.580	459125.809	468568.825	478011.660	487454.340	496896.888	506339.322	515781.658	525223.910
-90	0.001	184843.992	189902.342	194958.943	200014.138	205068.195	210121.326	215173.699	220225.449	225276.683	230327.489	235377.937	240428.085	245477.981	250527.663	255577.164	260626.510	265675.724	270724.825	275773.827	280822.745	285871.590
-85	0.001	105629.275	108446.370	111262.055	114076.600	116890.218	119703.076	122515.311	125327.029	128138.319	130949.250	133759.882	136570.261	139380.426	142190.410	145000.240	147809.937	150619.520	153429.005	156238.406	159047.734	161856.997
-80	0.002	62548.870	64176.437	65802.861	67428.354	69053.087	70677.195	72300.785	73923.947	75546.750	77169.253	78791.502	80413.538	82035.393	83657.093	85278.660	86900.114	88521.470	90142.741	91763.938	93385.072	95006.150
-75	0.003	38264.764	39237.362	40209.027	41179.928	42150.202	43119.958	44089.283	45058.250	46026.915	46995.328	47963.526	48931.542	49899.404	50867.133	51834.749	52802.266	53769.699	54737.058	55704.353	56671.593	57638.783
-70	0.005	24118.294	24717.859	25316.657	25914.824	26512.471	27109.686	27706.541	28303.095	28899.394	29495.479	30091.382	30687.130	31282.746	31878.247	32473.650	33068.969	33664.214	34259.395	34854.520	35449.596	36044.630
-65	0.008	15624.421	16004.801	16384.547	16763.769	17142.557	17520.984	17899.107	18276.976	18654.630	19032.102	19409.417	19786.600	20163.669	20540.640	20917.526	21294.338	21671.086	22047.778	22424.421	22801.022	23177.584
-60	0.013	10380.456	10628.287	10875.589	11122.454	11368.955	11615.152	11861.092	12106.817	12352.358	12597.743	12842.995	13088.133	13333.172	13578.126	13823.007	14067.823	14312.583	14557.294	14801.962	15046.592	15291.189
-55	0.019	7058.635	7224.141	7389.204	7553.901	7718.290	7882.421	8046.335	8210.065	8373.638	8537.077	8700.402	8863.627	9026.768	9189.834	9352.836	9515.782	9678.679	9841.532	10004.348	10167.130	10329.883
-50	0.028	4903.812	5016.906	5129.628	5242.039	5354.190	5466.121	5577.867	5689.455	5800.908	5912.246	6023.485	6134.638	6245.717	6356.732	6467.690	6578.599	6689.464	6800.292	6911.086	7021.850	7132.588
-45	0.040	3474.915	3553.864	3632.498	3710.869	3789.017	3866.978	3944.779	4022.445	4099.994	4177.444	4254.808	4332.096	4409.321	4486.488	4563.606	4640.681	4717.718	4794.721	4871.694	4948.640	5025.563
-40	0.057	2507.861	2564.085	2620.040	2675.770	2731.309	2786.687	2841.928	2897.052	2952.075	3007.011	3061.871	3116.667	3171.406	3226.095	3280.741	3335.348	3389.921	3444.465	3498.982	3553.475	3607.947
-35	0.079	1840.857	1881.650	1922.213	1962.582	2002.786	2042.852	2082.799	2122.643	2162.400	2202.082	2241.697	2281.256	2320.764	2360.228	2399.654	2439.046	2478.408	2517.743	2557.055	2596.345	2635.616
-30	0.109	1372.628	1402.746	1432.665	1462.416	1492.026	1521.514	1550.900	1580.196	1609.416	1638.569	1667.664	1696.709	1725.710	1754.672	1783.599	1812.497	1841.368	1870.214	1899.040	1927.847	1956.636
-25	0.146	1038.498	1061.100	1083.530	1105.815	1127.976	1150.031	1171.996	1193.883	1215.703	1237.464	1259.174	1280.839	1302.466	1324.058	1345.619	1367.154	1388.664	1410.153	1431.623	1453.076	1474.513
-20	0.194	796.385	813.609	830.683	847.630	864.469	881.215	897.882	914.480	931.018	947.505	963.947	980.349	996.716	1013.053	1029.362	1045.647	1061.911	1078.155	1094.382	1110.594	1126.791
-15	0.254	618.424	631.740	644.924	657.997	670.975	683.871	696.697	709.462	722.174	734.841	747.467	760.059	772.619	785.151	797.659	810.145	822.612	835.061	847.495	859.915	872.323
-10	0.328	485.858	496.293	506.612	516.832	526.968	537.032	547.034	556.982	566.883	576.743	586.567	596.360	606.124	615.864	625.582	635.280	644.961	654.626	664.277	673.915	683.541
-5	0.419	385.865	394.147	402.327	410.418	418.435	426.388	434.286	442.135	449.942	457.713	465.451	473.161	480.846	488.509	496.152	503.777	511.386	518.980	526.562	534.132	541.692
0	0.529	309.554	316.207	322.768	329.251	335.667	342.026	348.336	354.602	360.831	367.027	373.193	379.334	385.453	391.551	397.631	403.695	409.744	415.781	421.805	427.819	433.824
5	0.662	250.671	256.077	261.400	266.653	271.846	276.987	282.084	287.142	292.167	297.161	302.129	307.074	311.999	316.904	321.794	326.669	331.531	336.380	341.219	346.048	350.869
10	0.820	204.766	209.205	213.570	217.872	222.119	226.321	230.482	234.607	238.702	242.770	246.814	250.838	254.842	258.829	262.802	266.761	270.708	274.644	278.570	282.487	286.396
15	1.008	168.629	172.312	175.927	179.486	182.995	186.462	189.893	193.292	196.662	200.008	203.333	206.638	209.926	213.198	216.457	219.703	222.939	226.164	229.380	232.588	235.788
15.13	1.013	167.778	171.443	175.040	178.581	182.073	185.523	188.937	192.318	195.672	199.001	202.309	205.597	208.868	212.124	215.366	218.596	221.814	225.023	228.222	231.413	234.597
20	1.227	139.921	143.006	146.030	149.001	151.928	154.817	157.672	160.498	163.298	166.076	168.834	171.575	174.299	177.010	179.708	182.394	185.070	187.737	190.396	193.047	195.690
25	1.482	116.917	119.525	122.077	124.581	127.045	129.473	131.870	134.241	136.588	138.915	141.224	143.516	145.793	148.058	150.311	152.553	154.786	157.010	159.227	161.436	163.639
30	1.778	98.334	100.558	102.730	104.859	106.950	109.009	111.039	113.045	115.029	116.994	118.943	120.876	122.796	124.703	126.600	128.487	130.366	132.236	134.099	135.955	137.805
35	2.117	83.206	85.119	86.984	88.808	90.598	92.357	94.091	95.802	97.492	99.165	100.823	102.466	104.097	105.717	107.326	108.927	110.519	112.104	113.682	115.254	116.820
40	2.505	70.801	72.459	74.073	75.649	77.193	78.709	80.200	81.671	83.122	84.557	85.978	87.386	88.782	90.167	91.543	92.911	94.270	95.623	96.970	98.310	99.645
45	2.945	60.559	62.008	63.415	64.787	66.129	67.444	68.737	70.010	71.266	72.506	73.732	74.946	76.150	77.343	78.528	79.705	80.874	82.037	83.194	84.345	85.492
50	3.442	52.047	53.323	54.559	55.762	56.937	58.086	59.215	60.325	61.418	62.497	63.563	64.618	65.663	66.698	67.725	68.744	69.757	70.763	71.764	72.759	73.750
55	4.001	44.929	46.061	47.155	48.217	49.252	50.264	51.256	52.230	53.189	54.134	55.067	55.989	56.902	57.805	58.701	59.590	60.472	61.349	62.220	63.086	63.947
60	4.626	38.942	39.953	40.928	41.872	42.791	43.687	44.565	45.425	46.271	47.104	47.926	48.737	49.539	50.333	51.120	51.899	52.673	53.441	54.203	54.962	55.715
65	5.323	33.877	34.786	35.661	36.506	37.327	38.126	38.908	39.673	40.424	41.163	41.891	42.609	43.318	44.019	44.714	45.402	46.084	46.760	47.432	48.100	48.763
70	6.096	29.569	30.393	31.183	31.945	32.682	33.400	34.099	34.784	35.455	36.114	36.762	37.402	38.032	38.656	39.272	39.883	40.488	41.087	41.682	42.273	42.860
75	6.951	25.885	26.638	27.356	28.047	28.714	29.362	29.992	30.608	31.211	31.802	32.383	32.955	33.520	34.076	34.627	35.171	35.711	36.245	36.775	37.300	37.822
80	7.893	22.721	23.412	24.070	24.700	25.307	25.895	26.467	27.024	27.568	28.102	28.625	29.140	29.648	30.148	30.642	31.130	31.613	32.092	32.566	33.036	33.502
85	8.928	19.988	20.628	21.234	21.813	22.369	22.906	23.427	23.934	24.428	24.912	25.386	25.852	26.311	26.762	27.208	27.648	28.083	28.513	28.939	29.362	29.781
90	10.061	17.617	18.214	18.777	19.312	19.824	20.318	20.795	21.258	21.710	22.151	22.582	23.006	23.422	23.832	24.235	24.634	25.027	25.416	25.801	26.183	26.561
95	11.298	15.551	16.112	16.637	17.135	17.610	18.066	18.506	18.932	19.346	19.750	20.145	20.532	20.911	21.285	21.652	22.015	22.372	22.725	23.075	23.420	23.763
100	12.646	13.741	14.273	14.768	15.233	15.676	16.100	16.507	16.901	17.283	17.655	18.018	18.373	18.720	19.062	19.398	19.729	20.056	20.378	20.696	21.011	21.322
105	14.110	12.148	12.657	13.126	13.565	13.980	14.376	14.755	15.121	15.475	15.819	16.154	16.481	16.801	17.116	17.424	17.728	18.027	18.322	18.613	18.900	19.185
110	15.698	10.739	11.231	11.680	12.096	12.488	12.860	13.215	13.556	13.886	14.205	14.516	14.818	15.114	15.404	15.689	15.968	16.243	16.514	16.782	17.046	17.307
115	17.417	9.487	9.967	10.400	10.798	11.170	11.521	11.855	12.175	12.483	12.781	13.070	13.352	13.626	13.895	14.158	14.416	14.670	14.920	15.167	15.410	15.650
120	19.275	8.366	8.842	9.263	9.646	10.001	10.335	10.651	10.952	11.241	11.520	11.791	12.053	12.309	12.559	12.803	13.043	13.278	13.510	13.737	13.962	14.183
125	21.280	7.357	7.835	8.249	8.621	8.962	9.280	9.580	9.866	10.138	10.401	10.654	10.900	11.139	11.372	11.600	11.823	12.042	12.257	12.468	12.676	12.881
130	23.442	6.440	6.930	7.342	7.705	8.035	8.340	8.627	8.898	9.156	9.403	9.642	9.873	10.097	10.315	10.528	10.736	10.940	11.140	11.337	11.530	11.721
135	25.773	5.597	6.112	6.526	6.884	7.205	7.500	7.774	8.032	8.277	8.512	8.737	8.955	9.166	9.370	9.570	9.765	9.955	10.142	10.326	10.506	10.683

Thermodynamic properties of R-245fa - (superheated vapour) - Enthalpy (kJ/kg)

Sat. Temp. °C	Sat. Pressure bar	Superheat (°C)																					
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
-100	0.000	335.895	338.994	342.142	345.339	348.584	351.879	355.224	358.619	362.065	365.561	369.107	372.703	376.349	380.046	383.792	387.588	391.433	395.328	399.271	403.263	407.303
-95	0.000	338.985	342.134	345.332	348.579	351.875	355.220	358.616	362.062	365.558	369.104	372.701	376.347	380.044	383.791	387.587	391.432	395.327	399.270	403.262	407.302	411.391
-90	0.001	342.121	345.320	348.569	351.866	355.213	358.610	362.056	365.553	369.100	372.697	376.344	380.041	383.788	387.584	391.430	395.325	399.269	403.261	407.301	411.389	415.525
-85	0.001	345.300	348.552	351.851	355.200	358.599	362.047	365.545	369.093	372.690	376.338	380.036	383.783	387.580	391.426	395.322	399.265	403.258	407.298	411.387	415.523	419.706
-80	0.002	348.523	351.827	355.179	358.580	362.031	365.531	369.080	372.680	376.329	380.028	383.776	387.574	391.420	395.316	399.261	403.253	407.294	411.383	415.520	419.703	423.934
-75	0.003	351.788	355.146	358.551	362.006	365.509	369.061	372.663	376.314	380.014	383.764	387.563	391.411	395.307	399.253	403.246	407.288	411.377	415.514	419.698	423.929	428.207
-70	0.005	355.094	358.506	361.966	365.474	369.031	372.636	376.290	379.993	383.745	387.546	391.396	395.294	399.240	403.235	407.278	411.368	415.506	419.690	423.922	428.200	432.524
-65	0.008	358.438	361.907	365.422	368.985	372.596	376.255	379.962	383.717	387.521	391.373	395.273	399.222	403.218	407.262	411.354	415.493	419.678	423.911	428.190	432.515	436.886
-60	0.013	361.819	365.346	368.918	372.537	376.202	379.915	383.675	387.483	391.339	395.243	399.194	403.193	407.240	411.333	415.474	419.661	423.895	428.175	432.501	436.873	441.290
-55	0.019	365.235	368.821	372.451	376.127	379.848	383.616	387.430	391.291	395.200	399.155	403.158	407.207	411.303	415.446	419.636	423.872	428.153	432.481	436.854	441.273	445.737
-50	0.028	368.684	372.331	376.020	379.753	383.531	387.354	391.223	395.138	399.100	403.107	407.161	411.261	415.408	419.600	423.839	428.123	432.453	436.828	441.249	445.714	450.224
-45	0.040	372.163	375.872	379.622	383.414	387.250	391.130	395.054	399.023	403.038	407.098	411.204	415.355	419.552	423.794	428.082	432.415	436.793	441.215	445.683	450.195	454.751
-40	0.057	375.671	379.444	383.256	387.108	391.002	394.939	398.919	402.944	407.012	411.125	415.283	419.486	423.733	428.025	432.362	436.744	441.170	445.641	450.155	454.714	459.317
-35	0.079	379.204	383.043	386.918	390.832	394.786	398.781	402.818	406.898	411.021	415.187	419.398	423.652	427.950	432.293	436.679	441.110	445.585	450.103	454.665	459.270	463.920
-30	0.109	382.761	386.667	390.607	394.583	398.598	402.652	406.747	410.883	415.062	419.282	423.546	427.852	432.202	436.595	441.031	445.511	450.034	454.600	459.210	463.862	468.558
-25	0.146	386.339	390.314	394.320	398.361	402.438	406.552	410.705	414.899	419.133	423.408	427.725	432.084	436.485	440.929	445.416	449.945	454.516	459.131	463.788	468.488	473.230
-20	0.194	389.936	393.982	398.056	402.162	406.302	410.477	414.690	418.941	423.232	427.562	431.933	436.345	440.799	445.294	449.831	454.410	459.031	463.694	468.398	473.145	477.934
-15	0.254	393.549	397.668	401.811	405.984	410.188	414.426	418.699	423.009	427.357	431.743	436.169	440.635	445.141	449.688	454.276	458.904	463.575	468.286	473.039	477.834	482.669
-10	0.328	397.177	401.370	405.585	409.825	414.095	418.396	422.731	427.100	431.506	435.949	440.430	444.950	449.509	454.108	458.747	463.427	468.147	472.907	477.708	482.551	487.434
-5	0.419	400.817	405.086	409.373	413.683	418.020	422.385	426.782	431.212	435.677	440.177	444.714	449.289	453.902	458.553	463.244	467.974	472.744	477.554	482.404	487.295	492.225
0	0.529	404.467	408.813	413.175	417.556	421.960	426.391	430.852	435.343	439.867	444.425	449.019	453.649	458.316	463.021	467.764	472.546	477.366	482.226	487.125	492.064	497.042
5	0.662	408.124	412.550	416.987	421.440	425.914	430.412	434.937	439.490	444.075	448.692	453.343	458.029	462.751	467.510	472.306	477.139	482.011	486.920	491.869	496.856	501.883
10	0.820	411.786	416.294	420.808	425.335	429.879	434.445	439.035	443.652	448.298	452.975	457.684	462.427	467.204	472.017	476.866	481.752	486.675	491.635	496.634	501.670	506.745
15	1.008	415.451	420.042	424.635	429.237	433.853	438.488	443.144	447.826	452.534	457.271	462.040	466.840	471.674	476.541	481.444	486.383	491.358	496.369	501.418	506.504	511.627
15.13	1.013	415.548	420.142	424.737	429.341	433.959	438.596	443.254	447.937	452.647	457.386	462.156	466.958	471.793	476.662	481.566	486.506	491.483	496.495	501.545	506.633	511.757
20	1.227	419.115	423.792	428.466	433.144	437.834	442.539	447.263	452.009	456.781	461.580	466.408	471.266	476.157	481.080	486.037	491.029	496.057	501.120	506.219	511.355	516.528
25	1.482	422.777	427.541	432.297	437.054	441.819	446.595	451.388	456.201	461.037	465.898	470.786	475.704	480.652	485.631	490.644	495.690	500.770	505.885	511.036	516.222	521.444
30	1.778	426.432	431.286	436.127	440.964	445.805	450.654	455.517	460.397	465.298	470.223	475.173	480.150	485.156	490.193	495.261	500.362	505.496	510.663	515.865	521.103	526.375
35	2.117	430.079	435.025	439.952	444.871	449.790	454.714	459.648	464.597	469.564	474.553	479.565	484.603	489.669	494.763	499.888	505.044	510.232	515.452	520.707	525.995	531.318
40	2.505	433.713	438.753	443.770	448.773	453.771	458.771	463.778	468.797	473.832	478.886	483.961	489.061	494.186	499.339	504.521	509.733	514.976	520.251	525.558	530.898	536.272
45	2.945	437.330	442.468	447.576	452.666	457.745	462.823	467.904	472.995	478.098	483.219	488.359	493.521	498.707	503.920	509.160	514.428	519.727	525.056	530.416	535.809	541.235
50	3.442	440.926	446.166	451.368	456.546	461.709	466.867	472.024	477.187	482.361	487.550	492.755	497.981	503.229	508.502	513.801	519.127	524.482	529.866	535.281	540.727	546.205
55	4.001	444.496	449.842	455.142	460.411	465.661	470.899	476.135	481.373	486.618	491.876	497.148	502.439	507.750	513.084	518.442	523.827	529.239	534.679	540.149	545.648	551.179
60	4.626	448.036	453.491	458.893	464.256	469.595	474.917	480.233	485.547	490.866	496.194	501.535	506.892	512.267	517.663	523.083	528.526	533.996	539.493	545.018	550.572	556.157
65	5.323	451.538	457.108	462.616	468.078	473.508	478.918	484.315	489.708	495.102	500.502	505.913	511.337	516.778	522.238	527.719	533.223	538.751	544.306	549.887	555.497	561.135
70	6.096	454.996	460.688	466.306	471.871	477.396	482.896	488.378	493.852	499.323	504.798	510.280	515.773	521.280	526.805	532.349	537.914	543.503	549.116	554.755	560.420	566.113
75	6.951	458.401	464.223	469.958	475.630	481.255	486.848	492.418	497.976	503.526	509.077	514.632	520.196	525.771	531.362	536.971	542.599	548.248	553.920	559.617	565.340	571.089
80	7.893	461.745	467.706	473.565	479.350	485.080	490.770	496.431	502.075	507.708	513.337	518.967	524.603	530.249	535.907	541.581	547.273	552.985	558.718	564.474	570.254	576.060
85	8.928	465.017	471.127	477.120	483.025	488.864	494.656	500.413	506.146	511.864	517.574	523.282	528.993	534.710	540.438	546.179	551.936	557.711	563.506	569.322	575.161	581.024
90	10.061	468.204	474.478	480.614	486.647	492.603	498.502	504.359	510.185	515.992	521.785	527.573	533.361	539.152	544.951	550.761	556.584	562.424	568.282	574.160	580.059	585.981
95	11.298	471.291	477.747	484.039	490.209	496.290	502.302	508.263	514.188	520.086	525.967	531.838	537.704	543.571	549.444	555.324	561.216	567.122	573.045	578.985	584.946	590.927
100	12.646	474.259	480.918	487.382	493.703	499.916	506.049	512.121	518.148	524.143	530.115	536.071	542.020	547.966	553.913	559.866	565.829	571.803	577.791	583.796	589.819	595.861
105	14.110	477.086	483.978	490.633	497.118	503.475	509.737	515.927	522.062	528.158	534.224	540.271	546.304	552.331	558.357	564.385	570.420	576.463	582.519	588.590	594.676	600.781
110	15.698	479.743	486.905	493.777	500.442	506.957	513.358	519.673	525.924	532.126	538.292	544.432	550.554	556.665	562.771	568.877	574.986	581.101	587.227	593.364	599.516	605.684
115	17.417	482.192	489.676	496.796	503.665	510.352	516.904	523.354	529.728	536.042	542.313	548.551	554.765	560.964	567.154	573.339	579.525	585.714	591.911	598.118	604.336	610.570
120	19.275	484.386	492.262	499.671	506.770	513.649	520.366	526.962	533.466	539.900	546.281	552.622	558.933	565.224	571.500	577.768	584.033	590.299	596.569	602.847	609.134	615.434
125	21.280	486.254	494.626	502.379	509.742	516.834	523.733	530.487	537.133	543.694	550.192	556.642	563.054	569.440	575.807	582.161	588.508	594.852	601.198	607.549	613.907	620.275
130	23.442	487.699	496.720	504.892	512.560	519.895	526.995	533.922	540.719	547.418	554.040	560.604	567.123	573.608	580.069	586.513	592.945	599.371	605.795	612.221	618.652	625.090
135	25.773	488.566	498.485	507.176	515.205	522.815	530.139	537.255	544.217	551.062	557.817	564.502	571.133	577.724	584.283	590.820	597.340	603.851	610.356	616.859	623.365	629.876

Thermodynamic properties of R-245fa - (superheated vapour) - Entropy (kJ/kg.K)

Sat. Temp. °C	Sat. Pressure bar	Superheat (°C)																				
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
-100	0.000	1.934	1.952	1.970	1.987	2.004	2.021	2.037	2.054	2.070	2.086	2.102	2.118	2.134	2.150	2.165	2.181	2.196	2.211	2.227	2.242	2.257
-95	0.000	1.910	1.928	1.945	1.962	1.979	1.996	2.012	2.029	2.045	2.061	2.077	2.093	2.108	2.124	2.139	2.155	2.170	2.185	2.200	2.215	2.230
-90	0.001	1.889	1.906	1.923	1.940	1.957	1.973	1.990	2.006	2.022	2.038	2.054	2.069	2.085	2.100	2.116	2.131	2.146	2.161	2.176	2.191	2.206
-85	0.001	1.870	1.887	1.904	1.920	1.937	1.953	1.970	1.986	2.002	2.017	2.033	2.049	2.064	2.079	2.095	2.110	2.125	2.140	2.155	2.169	2.184
-80	0.002	1.853	1.870	1.886	1.903	1.919	1.935	1.951	1.967	1.983	1.999	2.015	2.030	2.045	2.061	2.076	2.091	2.106	2.120	2.135	2.150	2.164
-75	0.003	1.837	1.854	1.871	1.887	1.903	1.919	1.935	1.951	1.967	1.982	1.998	2.013	2.028	2.044	2.059	2.074	2.088	2.103	2.118	2.132	2.147
-70	0.005	1.824	1.840	1.857	1.873	1.889	1.905	1.921	1.937	1.952	1.968	1.983	1.998	2.013	2.028	2.043	2.058	2.073	2.088	2.102	2.117	2.131
-65	0.008	1.812	1.828	1.844	1.861	1.877	1.892	1.908	1.924	1.939	1.955	1.970	1.985	2.000	2.015	2.030	2.045	2.059	2.074	2.088	2.103	2.117
-60	0.013	1.801	1.817	1.833	1.850	1.865	1.881	1.897	1.912	1.928	1.943	1.958	1.973	1.988	2.003	2.018	2.032	2.047	2.061	2.076	2.090	2.104
-55	0.019	1.792	1.808	1.824	1.840	1.856	1.871	1.887	1.902	1.918	1.933	1.948	1.963	1.978	1.992	2.007	2.022	2.036	2.050	2.065	2.079	2.093
-50	0.028	1.783	1.800	1.816	1.831	1.847	1.863	1.878	1.893	1.909	1.924	1.939	1.954	1.968	1.983	1.998	2.012	2.026	2.041	2.055	2.069	2.083
-45	0.040	1.776	1.792	1.808	1.824	1.840	1.855	1.870	1.886	1.901	1.916	1.931	1.945	1.960	1.975	1.989	2.004	2.018	2.032	2.046	2.060	2.074
-40	0.057	1.770	1.786	1.802	1.818	1.833	1.849	1.864	1.879	1.894	1.909	1.924	1.939	1.953	1.968	1.982	1.996	2.011	2.025	2.039	2.053	2.067
-35	0.079	1.765	1.781	1.797	1.812	1.828	1.843	1.858	1.873	1.888	1.903	1.918	1.933	1.947	1.962	1.976	1.990	2.004	2.018	2.032	2.046	2.060
-30	0.109	1.761	1.777	1.792	1.808	1.823	1.838	1.854	1.869	1.883	1.898	1.913	1.927	1.942	1.956	1.971	1.985	1.999	2.013	2.027	2.041	2.055
-25	0.146	1.757	1.773	1.789	1.804	1.819	1.835	1.850	1.865	1.879	1.894	1.909	1.923	1.938	1.952	1.966	1.980	1.994	2.008	2.022	2.036	2.050
-20	0.194	1.754	1.770	1.786	1.801	1.816	1.831	1.846	1.861	1.876	1.891	1.905	1.920	1.934	1.948	1.962	1.977	1.991	2.004	2.018	2.032	2.046
-15	0.254	1.752	1.768	1.783	1.799	1.814	1.829	1.844	1.859	1.874	1.888	1.903	1.917	1.931	1.945	1.960	1.974	1.987	2.001	2.015	2.029	2.042
-10	0.328	1.750	1.766	1.782	1.797	1.812	1.827	1.842	1.857	1.872	1.886	1.901	1.915	1.929	1.943	1.957	1.971	1.985	1.999	2.013	2.026	2.040
-5	0.419	1.749	1.765	1.780	1.796	1.811	1.826	1.841	1.856	1.870	1.885	1.899	1.913	1.928	1.942	1.956	1.969	1.983	1.997	2.011	2.024	2.038
0	0.529	1.749	1.764	1.780	1.795	1.810	1.825	1.840	1.855	1.869	1.884	1.898	1.912	1.927	1.941	1.954	1.968	1.982	1.996	2.009	2.023	2.036
5	0.662	1.748	1.764	1.780	1.795	1.810	1.825	1.840	1.855	1.869	1.884	1.898	1.912	1.926	1.940	1.954	1.968	1.981	1.995	2.009	2.022	2.035
10	0.820	1.749	1.764	1.780	1.795	1.810	1.825	1.840	1.855	1.869	1.884	1.898	1.912	1.926	1.940	1.954	1.968	1.981	1.995	2.008	2.022	2.035
15	1.008	1.749	1.765	1.781	1.796	1.811	1.826	1.841	1.855	1.870	1.884	1.898	1.912	1.926	1.940	1.954	1.968	1.981	1.995	2.008	2.022	2.035
15.13	1.013	1.749	1.765	1.781	1.796	1.811	1.826	1.841	1.855	1.870	1.884	1.898	1.912	1.926	1.940	1.954	1.968	1.981	1.995	2.008	2.022	2.035
20	1.227	1.750	1.766	1.782	1.797	1.812	1.827	1.842	1.856	1.871	1.885	1.899	1.913	1.927	1.941	1.955	1.969	1.982	1.996	2.009	2.022	2.036
25	1.482	1.752	1.768	1.783	1.798	1.814	1.828	1.843	1.858	1.872	1.886	1.901	1.915	1.929	1.942	1.956	1.970	1.983	1.997	2.010	2.023	2.036
30	1.778	1.753	1.769	1.785	1.800	1.815	1.830	1.845	1.859	1.874	1.888	1.902	1.916	1.930	1.944	1.957	1.971	1.985	1.998	2.011	2.025	2.038
35	2.117	1.755	1.771	1.787	1.802	1.817	1.832	1.847	1.861	1.876	1.890	1.904	1.918	1.932	1.946	1.959	1.973	1.986	2.000	2.013	2.026	2.039
40	2.505	1.757	1.773	1.789	1.804	1.820	1.834	1.849	1.864	1.878	1.892	1.906	1.920	1.934	1.948	1.961	1.975	1.988	2.002	2.015	2.028	2.041
45	2.945	1.760	1.776	1.791	1.807	1.822	1.837	1.852	1.866	1.880	1.895	1.909	1.923	1.936	1.950	1.964	1.977	1.991	2.004	2.017	2.030	2.043
50	3.442	1.762	1.778	1.794	1.810	1.825	1.840	1.854	1.869	1.883	1.897	1.911	1.925	1.939	1.953	1.966	1.980	1.993	2.006	2.020	2.033	2.046
55	4.001	1.765	1.781	1.797	1.812	1.828	1.843	1.857	1.872	1.886	1.900	1.914	1.928	1.942	1.956	1.969	1.983	1.996	2.009	2.022	2.035	2.048
60	4.626	1.768	1.784	1.800	1.815	1.831	1.846	1.860	1.875	1.889	1.903	1.917	1.931	1.945	1.959	1.972	1.986	1.999	2.012	2.025	2.038	2.051
65	5.323	1.771	1.787	1.803	1.819	1.834	1.849	1.864	1.878	1.892	1.907	1.921	1.935	1.948	1.962	1.975	1.989	2.002	2.015	2.028	2.042	2.054
70	6.096	1.774	1.790	1.806	1.822	1.837	1.852	1.867	1.881	1.896	1.910	1.924	1.938	1.952	1.965	1.979	1.992	2.006	2.019	2.032	2.045	2.058
75	6.951	1.777	1.793	1.809	1.825	1.840	1.856	1.870	1.885	1.899	1.914	1.928	1.942	1.955	1.969	1.982	1.996	2.009	2.022	2.035	2.048	2.061
80	7.893	1.780	1.796	1.813	1.829	1.844	1.859	1.874	1.889	1.903	1.917	1.931	1.945	1.959	1.973	1.986	1.999	2.013	2.026	2.039	2.052	2.065
85	8.928	1.783	1.800	1.816	1.832	1.847	1.863	1.878	1.892	1.907	1.921	1.935	1.949	1.963	1.976	1.990	2.003	2.016	2.030	2.043	2.056	2.068
90	10.061	1.786	1.803	1.819	1.835	1.851	1.866	1.881	1.896	1.911	1.925	1.939	1.953	1.967	1.980	1.994	2.007	2.020	2.033	2.047	2.059	2.072
95	11.298	1.788	1.806	1.823	1.839	1.855	1.870	1.885	1.900	1.914	1.929	1.943	1.957	1.971	1.984	1.998	2.011	2.024	2.037	2.051	2.063	2.076
100	12.646	1.791	1.809	1.826	1.842	1.858	1.874	1.889	1.904	1.918	1.933	1.947	1.961	1.975	1.988	2.002	2.015	2.028	2.042	2.055	2.067	2.080
105	14.110	1.794	1.812	1.829	1.846	1.862	1.877	1.893	1.908	1.922	1.937	1.951	1.965	1.979	1.992	2.006	2.019	2.033	2.046	2.059	2.072	2.084
110	15.698	1.796	1.814	1.832	1.849	1.865	1.881	1.896	1.911	1.926	1.941	1.955	1.969	1.983	1.996	2.010	2.023	2.037	2.050	2.063	2.076	2.089
115	17.417	1.798	1.817	1.835	1.852	1.869	1.884	1.900	1.915	1.930	1.945	1.959	1.973	1.987	2.001	2.014	2.028	2.041	2.054	2.067	2.080	2.093
120	19.275	1.799	1.819	1.838	1.855	1.872	1.888	1.904	1.919	1.934	1.948	1.963	1.977	1.991	2.005	2.018	2.032	2.045	2.058	2.071	2.084	2.097
125	21.280	1.800	1.821	1.840	1.858	1.875	1.891	1.907	1.923	1.938	1.952	1.967	1.981	1.995	2.009	2.023	2.036	2.049	2.063	2.076	2.089	2.101
130	23.442	1.800	1.822	1.842	1.860	1.878	1.894	1.911	1.926	1.941	1.956	1.971	1.985	1.999	2.013	2.027	2.040	2.054	2.067	2.080	2.093	2.106
135	25.773	1.798	1.823	1.843	1.863	1.880	1.897	1.914	1.930	1.945	1.960	1.975	1.989	2.003	2.017	2.031	2.044	2.058	2.071	2.084	2.097	2.110