R-1233zd (Solstice® zd)

Trans-1-chloro-3,3,3-trifluoroprop-1-ene

Molecular weight (g/mol)	130.50
Melting point (°C)	-78
Boiling point (at 1.013 bar)	18.31
Temperature glide at 1.013 bar (K)	0
Critical temperature (°C)	165.6
Critical pressure (bar absolute)	35.73
Specific heat (liquid) at + 25°C (kJ/kg.K)	1.243
Specific heat (vapour) at 1.013 bar and + 25°C (kJ/kg.K)	0.825
Thermal capacity ratio (Cp/Cv) at + 25°C and 1.013 bar	1.104
Viscosity (liquid) at + 25°C in Centipoise (10^{-3} Pa.s)	0.469
Surface tension at + 25°C in dyne per centimetre (10^{-3} N/m)	12.57
Classification NF-EN 378	A1
GWP (IPCC 4)	5

Main applications

R-1233zd is a fluorinated gas from the HFO family. This product has a very low GWP and low pressure. It is suitable for new industrial air conditioning applications and the cooling of buildings where cooling water or intermediate fluids are used in large systems with centrifugal compressors (one or more stages) where R-123 may have been used in the past.

Commercial specifications

Purity: ≥ 99.5 % weight.
Water content: ≤ 20 ppm weight.
Chlorine ion test (silver nitrate test): negative.
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 most suitable for your application.

Regulation

The use and implementation of R-1233zd are governed by the European Regulation N° 517/2014.
The recovery of R-1233zd is mandatory under the European Regulation N° 517/2014.

(Refer to regulations enforced in each country).

Thermodynamic properties of R-1233zd - Saturated state

Absolute pressure	LIQUID					VAPOUR					Latent heat
	Bubble point	Volume	Density	Enthalpy	Entropy	Dew point	Volume	Density	Enthalpy	Entropy	
P	t'	v'	ρ'	h'	s'	t"	v"	ρ"	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)
0.003	-75	0.675	1.482	108.096	0.607	-75.0	37.407	0.027	352.276	1.839	244.181
0.005	-70	0.679	1.472	114.290	0.638	-70.0	23.877	0.042	355.636	1.826	241.346
0.008	-65	0.684	1.462	120.464	0.668	-65.0	15.660	0.064	359.028	1.814	238.564
0.013	-60	0.689	1.451	126.621	0.697	-60.0	10.531	0.095	362.449	1.803	235.828
0.019	-55	0.694	1.441	132.763	0.725	-55.0	7.245	0.138	365.897	1.794	233.134
0.028	-50	0.699	1.430	138.893	0.753	-50.0	5.092	0.196	369.370	1.786	230.476
0.040	-45	0.705	1.419	145.013	0.780	-45.0	3.649	0.274	372.864	1.779	227.851
0.056	-40	0.710	1.409	151.125	0.807	-40.0	2.662	0.376	376.378	1.773	225.253
0.076	-35	0.715	1.398	157.231	0.833	-35.0	1.975	0.506	379.908	1.768	222.677
0.103	-30	0.721	1.387	163.334	0.858	-30.0	1.488	0.672	383.452	1.763	220.119
0.138	-25	0.726	1.377	169.435	0.883	-25.0	1.137	0.880	387.008	1.760	217.573
0.181	-20	0.732	1.366	175.537	0.907	-20.0	0.880	1.136	390.573	1.757	215.036
0.235	-15	0.738	1.355	181.643	0.931	-15.0	0.690	1.449	394.144	1.754	212.502
0.301	-10	0.744	1.344	187.754	0.954	-10.0	0.547	1.828	397.719	1.752	209.966
0.382	-5	0.750	1.333	193.872	0.977	-5.0	0.438	2.282	401.295	1.751	207.424
0.479	0	0.757	1.321	200.000	1.000	0.0	0.355	2.820	404.870	1.750	204.870
0.594	5	0.763	1.310	206.140	1.022	5.0	0.289	3.455	408.441	1.750	202.301
0.731	10	0.770	1.298	212.295	1.044	10.0	0.238	4.196	412.005	1.749	199.710
0.892	15	0.777	1.287	218.467	1.066	15.0	0.198	5.058	415.560	1.750	197.094
1.013	18.31	0.782	1.279	222.559	1.080	18.31	0.175	5.699	417.905	1.750	195.346
1.080	20	0.784	1.275	224.657	1.087	20.0	0.165	6.052	419.104	1.750	194.446
1.296	25	0.792	1.263	230.870	1.108	25.0	0.139	7.192	422.632	1.751	191.762
1.546	30	0.800	1.251	237.107	1.129	30.0	0.118	8.495	426.144	1.752	189.037
1.831	35	0.808	1.238	243.370	1.149	35.0	0.100	9.975	429.635	1.753	186.264
2.155	40	0.816	1.226	249.664	1.169	40.0	0.086	11.650	433.102	1.755	183.438
2.521	45	0.825	1.213	255.990	1.189	45.0	0.074	13.540	436.542	1.757	180.552
2.933	50	0.834	1.200	262.351	1.209	50.0	0.064	15.664	439.952	1.758	177.601
3.395	55	0.843	1.186	268.751	1.228	55.0	0.055	18.044	443.326	1.760	174.576
3.909	60	0.853	1.173	275.193	1.248	60.0	0.048	20.706	446.662	1.762	171.469
4.481	65	0.863	1.159	281.680	1.267	65.0	0.042	23.676	449.953	1.765	168.274
5.113	70	0.874	1.145	288.217	1.286	70.0	0.037	26.983	453.196	1.767	164.979
5.811	75	0.885	1.130	294.807	1.305	75.0	0.033	30.663	456.383	1.769	161.575
6.577	80	0.897	1.115	301.456	1.324	80.0	0.029	34.752	459.507	1.771	158.051
7.418	85	0.910	1.099	308.169	1.342	85.0	0.025	39.294	462.562	1.773	154.393
8.336	90	0.923	1.083	314.951	1.361	90.0	0.023	44.340	465.539	1.776	150.588
9.336	95	0.937	1.067	321.810	1.379	95.0	0.020	49.947	468.427	1.778	146.617
10.424	100	0.953	1.050	328.753	1.398	100.0	0.018	56.184	471.214	1.780	142.461
11.604	105	0.969	1.032	335.790	1.416	105.0	0.016	63.135	473.887	1.781	138.097
12.882	110	0.987	1.013	342.932	1.435	110.0	0.014	70.898	476.428	1.783	133.497
14.262	115	1.007	0.993	350.192	1.453	115.0	0.013	79.599	478.817	1.785	128.625
15.751	120	1.028	0.972	357.587	1.472	120.0	0.011	89.393	481.027	1.786	123.439
17.355	125	1.052	0.950	365.140	1.490	125.0	0.010	100.485	483.024	1.786	117.884
19.081	130	1.079	0.927	372.878	1.509	130.0	0.009	113.145	484.764	1.787	111.886
20.935	135	1.110	0.901	380.841	1.528	135.0	0.008	127.751	486.186	1.786	105.346
22.926	140	1.146	0.873	389.085	1.548	140.0	0.007	144.852	487.204	1.785	98.120
25.063	145	1.189	0.841	397.695	1.568	145.0	0.006	165.299	487.685	1.783	89.989
27.357	150	1.243	0.805	406.818	1.589	150.0	0.005	190.539	487.406	1.779	80.589
29.822	155	1.315	0.761	416.735	1.612	155.0	0.004	223.414	485.944	1.773	69.209
32.478	160	1.426	0.701	428.182	1.637	160.0	0.004	271.280	482.225	1.762	54.042

Thermodynamic properties of R-1233zd - (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
-75	0.003	37406.989	38352.542	39298.013	40243.409	41188.735	42133.996	43079.197	44024.342	44969.435	45914.480	46859.482	47804.442	48749.365	49694.253	50639.109	51583.936	52528.735	53473.509	54418.259	55362.989	56307.698
-70	0.005	23877.336	24466.539	25055.667	25644.725	26233.717	26822.650	27411.526	28000.351	28589.128	29177.861	29766.553	30355.207	30943.827	31532.414	32120.972	32709.502	33298.007	33886.489	34474.950	35063.391	35651.814
-65	0.008	15660.437	16038.034	16415.560	16793.020	17170.421	17547.766	17925.059	18302.304	18679.504	19056.664	19433.786	19810.874	20187.929	20564.954	20941.952	21318.925	21695.875	22072.803	22449.712	22826.602	23203.476
-60	0.013	10530.573	10778.908	11027.178	11275.388	11523.541	11771.643	12019.697	12267.706	12515.674	12763.605	13011.500	13259.364	13507.198	13755.004	14002.785	14250.543	14498.280	14745.997	14993.695	15241.377	15489.043
-55	0.019	7245.467	7412.753	7579.977	7747.146	7914.262	8081.330	8248.354	8415.337	8582.281	8749.191	8916.069	9082.917	9249.737	9416.533	9583.305	9750.055	9916.786	10083.498	10250.194	10416.874	10583.540
-50	0.028	5091.708	5206.928	5322.092	5437.204	5552.267	5667.286	5782.263	5897.203	6012.107	6126.979	6241.821	6356.636	6471.426	6586.192	6700.937	6815.662	6930.368	7045.058	7159.732	7274.392	7389.038
-45	0.040	3648.637	3729.652	3810.615	3891.530	3972.400	4053.228	4134.018	4214.773	4295.496	4376.189	4456.854	4537.494	4618.110	4698.705	4779.280	4859.837	4940.377	5020.901	5101.411	5181.907	5262.391
-40	0.056	2662.063	2720.134	2778.156	2836.133	2894.068	2951.965	3009.827	3067.656	3125.455	3183.227	3240.973	3298.695	3356.396	3414.077	3471.740	3529.386	3587.016	3644.631	3702.233	3759.823	3817.401
-35	0.076	1974.846	2017.224	2059.556	2101.847	2144.099	2186.315	2228.498	2270.652	2312.777	2354.877	2396.954	2439.008	2481.043	2523.059	2565.058	2607.042	2649.010	2690.966	2732.909	2774.841	2816.762
-30	0.103	1487.759	1519.207	1550.614	1581.981	1613.312	1644.610	1675.878	1707.118	1738.332	1769.522	1800.690	1831.839	1862.969	1894.081	1925.178	1956.260	1987.329	2018.386	2049.430	2080.464	2111.489
-25	0.138	1136.891	1160.598	1184.266	1207.897	1231.494	1255.061	1278.600	1302.113	1325.602	1349.068	1372.515	1395.943	1419.354	1442.748	1466.129	1489.495	1512.849	1536.192	1559.524	1582.846	1606.158
-20	0.181	880.310	898.445	916.545	934.610	952.644	970.649	988.629	1006.584	1024.517	1042.429	1060.323	1078.199	1096.060	1113.905	1131.737	1149.556	1167.364	1185.161	1202.948	1220.726	1238.495
-15	0.235	690.021	704.088	718.121	732.122	746.094	760.039	773.960	787.859	801.737	815.596	829.437	843.262	857.073	870.869	884.653	898.426	912.187	925.938	939.680	953.413	967.139
-10	0.301	547.032	558.086	569.108	580.100	591.065	602.005	612.923	623.819	634.697	645.556	656.399	667.227	678.042	688.843	699.633	710.412	721.180	731.939	742.690	753.432	764.167
-5	0.382	438.259	447.052	455.815	464.550	473.260	481.947	490.613	499.259	507.886	516.498	525.094	533.676	542.245	550.802	559.349	567.884	576.411	584.928	593.438	601.939	610.434
0	0.479	354.557	361.634	368.681	375.703	382.701	389.678	396.634	403.572	410.493	417.399	424.291	431.169	438.035	444.890	451.735	458.570	465.396	472.214	479.024	485.827	492.623
5	0.594	289.452	295.209	300.939	306.645	312.329	317.992	323.636	329.263	334.875	340.472	346.055	351.626	357.186	362.735	368.275	373.805	379.327	384.842	390.349	395.849	401.343
10	0.731	238.298	243.030	247.737	252.421	257.084	261.728	266.354	270.965	275.560	280.141	284.711	289.268	293.815	298.351	302.879	307.398	311.909	316.413	320.910	325.401	329.886
15	0.892	197.721	201.650	205.554	209.437	213.300	217.145	220.973	224.786	228.585	232.372	236.146	239.909	243.662	247.406	251.141	254.869	258.588	262.301	266.008	269.708	273.402
18.31	1.013	175.461	178.952	182.421	185.868	189.296	192.707	196.101	199.481	202.847	206.201	209.544	212.876	216.198	219.512	222.817	226.114	229.404	232.687	235.964	239.235	242.501
20	1.080	165.248	168.540	171.809	175.057	178.287	181.499	184.696	187.878	191.047	194.204	197.350	200.485	203.611	206.728	209.837	212.938	216.032	219.119	222.201	225.276	228.347
25	1.296	139.041	141.824	144.585	147.326	150.050	152.757	155.450	158.129	160.795	163.449	166.093	168.728	171.353	173.969	176.578	179.180	181.775	184.364	186.947	189.524	192.097
30	1.546	117.723	120.095	122.447	124.781	127.097	129.397	131.684	133.957	136.218	138.468	140.709	142.940	145.162	147.376	149.583	151.783	153.977	156.165	158.347	160.524	162.696
35	1.831	100.252	102.292	104.311	106.313	108.298	110.268	112.225	114.169	116.102	118.024	119.937	121.841	123.736	125.624	127.505	129.379	131.248	133.110	134.967	136.820	138.667
40	2.155	85.834	87.601	89.348	91.079	92.793	94.493	96.180	97.855	99.519	101.173	102.818	104.455	106.083	107.704	109.319	110.927	112.530	114.126	115.718	117.305	118.888
45	2.521	73.856	75.398	76.921	78.428	79.919	81.396	82.861	84.315	85.758	87.191	88.616	90.032	91.441	92.842	94.238	95.627	97.010	98.389	99.762	101.131	102.496
50	2.933	63.841	65.197	66.534	67.855	69.162	70.455	71.736	73.006	74.265	75.515	76.757	77.991	79.217	80.437	81.651	82.859	84.061	85.259	86.451	87.640	88.824
55	3.395	55.419	56.619	57.801	58.968	60.120	61.259	62.386	63.503	64.609	65.707	66.796	67.878	68.953	70.021	71.083	72.139	73.191	74.237	75.279	76.317	77.351
60	3.909	48.295	49.365	50.418	51.454	52.477	53.487	54.485	55.473	56.451	57.421	58.382	59.336	60.283	61.224	62.159	63.089	64.013	64.933	65.849	66.760	67.668
65	4.481	42.237	43.198	44.141	45.068	45.982	46.883	47.772	48.651	49.521	50.382	51.236	52.082	52.922	53.755	54.583	55.406	56.223	57.036	57.845	58.650	59.452
70	5.113	37.060	37.928	38.778	39.613	40.434	41.242	42.039	42.826	43.604	44.374	45.136	45.890	46.639	47.381	48.118	48.850	49.577	50.299	51.018	51.732	52.444
75	5.811	32.613	33.402	34.174	34.930	35.672	36.402	37.120	37.829	38.528	39.220	39.903	40.580	41.251	41.915	42.575	43.229	43.878	44.524	45.165	45.803	46.437
80	6.577	28.775	29.498	30.203	30.891	31.566	32.229	32.880	33.521	34.154	34.778	35.395	36.005	36.608	37.207	37.799	38.387	38.971	39.550	40.125	40.697	41.265
85	7.418	25.449	26.115	26.762	27.394	28.011	28.616	29.209	29.793	30.367	30.934	31.493	32.045	32.592	33.132	33.668	34.199	34.725	35.247	35.765	36.280	36.791
90	8.336	22.553	23.171	23.770	24.352	24.919	25.474	26.018	26.551	27.076	27.593	28.102	28.605	29.102	29.593	30.079	30.560	31.037	31.510	31.979	32.444	32.906
95	9.336	20.021	20.598	21.155	21.695	22.220	22.732	23.233	23.723	24.205	24.678	25.144	25.604	26.057	26.505	26.948	27.386	27.820	28.250	28.677	29.099	29.519
100	10.424	17.799	18.342	18.863	19.367	19.855	20.330	20.793	21.246	21.690	22.125	22.554	22.976	23.392	23.802	24.207	24.608	25.005	25.397	25.786	26.172	26.554
105	11.604	15.839	16.354	16.846	17.318	17.775	18.217	18.648	19.068	19.479	19.882	20.278	20.667	21.050	21.427	21.799	22.167	22.531	22.891	23.247	23.600	23.950
110	12.882	14.105	14.597	15.063	15.509	15.939	16.353	16.756	17.148	17.530	17.904	18.271	18.631	18.985	19.333	19.677	20.016	20.351	20.681	21.009	21.333	21.654
115	14.262	12.563	13.037	13.483	13.907	14.313	14.703	15.081	15.448	15.805	16.154	16.495	16.830	17.158	17.481	17.799	18.113	18.422	18.727	19.029	19.328	19.624
120	15.751	11.187	11.648	12.077	12.483	12.868	13.238	13.595	13.939	14.275	14.601	14.920	15.232	15.537	15.838	16.133	16.424	16.711	16.994	17.273	17.550	17.823
125	17.355	9.952	10.405	10.823	11.213	11.582	11.933	12.271	12.597	12.912	13.219	13.517	13.809	14.095	14.376	14.651	14.922	15.188	15.451	15.711	15.967	16.220
130	19.081	8.838	9.290	9.699	10.077	10.431	10.768	11.089	11.398	11.696	11.985	12.266	12.540	12.808	13.070	13.328	13.581	13.829	14.074	14.316	14.554	14.789
135	20.935	7.828	8.284	8.689	9.058	9.401	9.724	10.031	10.324	10.607	10.881	11.146	11.404	11.656	11.902	12.144	12.380	12.613	12.842	13.067	13.289	13.509
140	22.926	6.904	7.374	7.778	8.141	8.474	8.786	9.080	9.361	9.630	9.890	10.141	10.385	10.622	10.854	11.081	11.303	11.521	11.735	11.946	12.154	12.359
145	25.063	6.050	6.545	6.954	7.313	7.639	7.941	8.225	8.494	8.751	8.998	9.236	9.467	9.691	9.910	10.124	10.333	10.538	10.739	10.937	11.131	11.323
150	27.357	5.248	5.788	6.207	6.565	6.885	7.179	7.453	7.711	7.957	8.193	8.419	8.638	8.851	9.058	9.259	9.457	9.650	9.839	10.025	10.208	10.388
155	29.822	4.476	5.092	5.526	5.886	6.202	6.488	6.754	7.003	7.238	7.463	7.680	7.888	8.090	8.286	8.476	8.663	8.845	9.023	9.198	9.370	9.539
160	32.478	3.686	4.449	4.905	5.268	5.580	5.861	6.118	6.358	6.585	6.800	7.006	7.205	7.397	7.582	7.763	7.939	8.111	8.280	8.445	8.607	8.766

Thermodynamic properties of R-1233zd - (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
-75	0.003	352.276	355.649	359.059	362.504	365.983	369.496	373.043	376.621	380.232	383.875	387.550	391.255	394.992	398.760	402.560	406.390	410.251	414.143	418.067	422.022	426.008
-70	0.005	355.636	359.046	362.492	365.972	369.486	373.033	376.612	380.223	383.867	387.542	391.248	394.985	398.753	402.553	406.383	410.245	414.138	418.062	422.017	426.003	430.021
-65	0.008	359.028	362.474	365.955	369.470	373.018	376.598	380.210	383.854	387.529	391.236	394.974	398.743	402.543	406.374	410.236	414.129	418.053	422.009	425.996	430.014	434.064
-60	0.013	362.449	365.931	369.447	372.996	376.577	380.190	383.835	387.512	391.219	394.958	398.728	402.528	406.360	410.223	414.116	418.041	421.997	425.985	430.004	434.054	438.136
-55	0.019	365.897	369.415	372.965	376.548	380.163	383.809	387.487	391.196	394.935	398.706	402.508	406.341	410.204	414.099	418.024	421.981	425.969	429.989	434.040	438.123	442.237
-50	0.028	369.370	372.922	376.507	380.124	383.772	387.452	391.162	394.904	398.676	402.479	406.313	410.178	414.074	418.001	421.959	425.948	429.968	434.020	438.104	442.219	446.366
-45	0.040	372.864	376.452	380.071	383.722	387.404	391.117	394.861	398.635	402.441	406.276	410.143	414.040	417.969	421.928	425.918	429.940	433.993	438.078	442.194	446.342	450.522
-40	0.056	376.378	380.001	383.655	387.341	391.057	394.804	398.581	402.388	406.227	410.096	413.995	417.925	421.887	425.879	429.902	433.957	438.043	442.161	446.310	450.491	454.704
-35	0.076	379.908	383.567	387.257	390.977	394.728	398.509	402.320	406.161	410.033	413.936	417.869	421.832	425.827	429.853	433.909	437.997	442.117	446.268	450.451	454.665	458.912
-30	0.103	383.452	387.148	390.874	394.630	398.415	402.231	406.077	409.953	413.859	417.795	421.762	425.760	429.788	433.848	437.938	442.060	446.213	450.398	454.615	458.863	463.144
-25	0.138	387.008	390.741	394.504	398.295	402.117	405.968	409.849	413.760	417.701	421.672	425.674	429.706	433.769	437.863	441.988	446.144	450.331	454.550	458.801	463.084	467.398
-20	0.181	390.573	394.344	398.144	401.973	405.831	409.718	413.635	417.582	421.559	425.565	429.602	433.669	437.767	441.896	446.056	450.247	454.469	458.723	463.008	467.325	471.674
-15	0.235	394.144	397.954	401.793	405.659	409.555	413.480	417.434	421.417	425.430	429.472	433.545	437.648	441.782	445.946	450.142	454.368	458.625	462.914	467.235	471.587	475.971
-10	0.301	397.719	401.569	405.447	409.353	413.287	417.250	421.242	425.262	429.312	433.392	437.502	441.641	445.811	450.012	454.243	458.505	462.798	467.123	471.479	475.866	480.285
-5	0.382	401.295	405.187	409.105	413.051	417.025	421.027	425.058	429.117	433.205	437.322	441.469	445.646	449.853	454.090	458.358	462.657	466.987	471.347	475.739	480.162	484.617
0	0.479	404.870	408.804	412.765	416.752	420.767	424.809	428.879	432.978	437.105	441.261	445.446	449.661	453.906	458.181	462.486	466.822	471.188	475.586	480.014	484.474	488.964
5	0.594	408.441	412.419	416.423	420.453	424.510	428.594	432.705	436.843	441.010	445.206	449.430	453.684	457.968	462.281	466.624	470.997	475.402	479.836	484.302	488.798	493.325
10	0.731	412.005	416.029	420.078	424.152	428.252	432.378	436.531	440.712	444.920	449.156	453.420	457.714	462.037	466.389	470.771	475.183	479.625	484.097	488.600	493.134	497.698
15	0.892	415.560	419.632	423.727	427.847	431.992	436.162	440.358	444.581	448.831	453.108	457.414	461.748	466.111	470.503	474.924	479.375	483.856	488.367	492.908	497.480	502.082
18.31	1.013	417.905	422.009	426.136	430.287	434.462	438.662	442.887	447.139	451.417	455.723	460.056	464.418	468.808	473.226	477.674	482.151	486.658	491.195	495.762	500.359	504.985
20	1.080	419.104	423.225	427.368	431.535	435.725	439.941	444.181	448.448	452.741	457.061	461.409	465.784	470.188	474.621	479.083	483.573	488.094	492.644	497.224	501.833	506.473
25	1.296	422.632	426.805	430.998	435.213	439.451	443.713	448.000	452.311	456.649	461.013	465.403	469.822	474.267	478.741	483.244	487.775	492.336	496.926	501.545	506.193	510.872
30	1.546	426.144	430.369	434.614	438.880	443.167	447.477	451.811	456.169	460.552	464.961	469.395	473.857	478.346	482.862	487.407	491.979	496.580	501.210	505.870	510.558	515.275
35	1.831	429.635	433.915	438.214	442.532	446.871	451.230	455.613	460.018	464.448	468.903	473.383	477.889	482.421	486.981	491.568	496.183	500.826	505.497	510.196	514.925	519.682
40	2.155	433.102	437.440	441.795	446.167	450.558	454.970	459.402	463.857	468.335	472.837	477.363	481.915	486.492	491.096	495.727	500.384	505.070	509.782	514.523	519.292	524.090
45	2.521	436.542	440.941	445.354	449.783	454.228	458.693	463.177	467.683	472.210	476.761	481.335	485.933	490.556	495.205	499.880	504.582	509.310	514.066	518.848	523.659	528.497
50	2.933	439.952	444.414	448.887	453.375	457.877	462.397	466.935	471.493	476.071	480.672	485.295	489.941	494.612	499.307	504.027	508.773	513.546	518.344	523.170	528.023	532.902
55	3.395	443.326	447.855	452.392	456.941	461.503	466.080	470.673	475.285	479.916	484.568	489.241	493.937	498.656	503.398	508.165	512.957	517.774	522.617	527.486	532.381	537.303
60	3.909	446.662	451.260	455.865	460.477	465.101	469.737	474.389	479.057	483.742	488.447	493.172	497.918	502.686	507.477	512.292	517.130	521.993	526.881	531.795	536.734	541.698
65	4.481	449.953	454.626	459.300	463.980	468.669	473.367	478.079	482.804	487.546	492.306	497.084	501.883	506.702	511.542	516.406	521.292	526.202	531.136	536.094	541.077	546.086
70	5.113	453.196	457.947	462.696	467.447	472.202	476.966	481.740	486.526	491.326	496.143	500.976	505.828	510.699	515.591	520.504	525.439	530.397	535.378	540.382	545.411	550.464
75	5.811	456.383	461.218	466.046	470.871	475.698	480.530	485.369	490.218	495.079	499.954	504.844	509.751	514.676	519.621	524.585	529.570	534.577	539.606	544.658	549.732	554.831
80	6.577	459.507	464.433	469.346	474.251	479.153	484.056	488.963	493.878	498.802	503.737	508.686	513.651	518.631	523.630	528.647	533.683	538.740	543.818	548.918	554.040	559.184
85	7.418	462.562	467.586	472.589	477.579	482.561	487.539	492.518	497.501	502.491	507.490	512.500	517.523	522.561	527.615	532.687	537.776	542.885	548.013	553.162	558.332	563.523
90	8.336	465.539	470.669	475.770	480.851	485.917	490.976	496.030	501.085	506.144	511.208	516.282	521.367	526.464	531.575	536.702	541.846	547.008	552.188	557.387	562.606	567.846
95	9.336	468.427	473.675	478.882	484.061	489.218	494.361	499.495	504.626	509.756	514.890	520.030	525.178	530.337	535.508	540.692	545.892	551.108	556.341	561.591	566.861	572.150
100	10.424	471.214	476.593	481.917	487.202	492.456	497.690	502.909	508.119	513.326	518.531	523.740	528.954	534.177	539.409	544.653	549.911	555.182	560.470	565.774	571.095	576.434
105	11.604	473.887	479.413	484.866	490.267	495.627	500.957	506.267	511.562	516.848	522.129	527.410	532.693	537.982	543.278	548.584	553.900	559.230	564.573	569.931	575.305	580.696
110	12.882	476.428	482.121	487.719	493.247	498.722	504.157	509.563	514.948	520.318	525.680	531.036	536.391	541.749	547.111	552.481	557.859	563.248	568.649	574.063	579.491	584.935
115	14.262	478.817	484.703	490.465	496.134	501.735	507.284	512.793	518.274	523.734	529.179	534.615	540.046	545.475	550.906	556.342	561.784	567.234	572.694	578.166	583.650	589.148
120	15.751	481.027	487.141	493.089	498.918	504.657	510.330	515.951	521.535	527.090	532.624	538.144	543.653	549.158	554.661	560.165	565.673	571.186	576.708	582.239	587.781	593.334
125	17.355	483.024	489.412	495.577	501.586	507.479	513.288	519.031	524.725	530.382	536.010	541.618	547.211	552.794	558.372	563.947	569.523	575.103	580.688	586.279	591.880	597.491
130	19.081	484.764	491.490	497.911	504.125	510.192	516.150	522.025	527.839	533.604	539.333	545.034	550.715	556.380	562.036	567.686	573.333	578.980	584.630	590.285	595.947	601.616
135	20.935	486.186	493.342	500.069	506.522	512.784	518.907	524.928	530.870	536.753	542.588	548.388	554.161	559.913	565.650	571.378	577.099	582.817	588.534	594.254	599.978	605.708
140	22.926	487.204	494.926	502.028	508.759	515.243	521.551	527.731	533.814	539.821	545.771	551.676	557.546	563.389	569.212	575.020	580.817	586.608	592.396	598.183	603.971	609.763
145	25.063	487.685	496.188	503.758	510.819	517.556	524.072	530.426	536.661	542.804	548.876	554.892	560.864	566.803	572.715	578.607	584.485	590.352	596.212	602.068	607.923	613.779
150	27.357	487.406	497.062	505.227	512.680	519.709	526.457	533.004	539.405	545.693	551.895	558.030	564.111	570.150	576.156	582.136	588.097	594.042	599.977	605.905	611.829	617.751
155	29.822	485.944	497.462	506.397	514.321	521.686	528.693	535.454	542.034	548.480	554.821	561.082	567.277	573.422	579.527	585.599	591.646	597.674	603.687	609.689	615.684	621.674
160	32.478	482.225	497.280	507.226	515.714	523.464	530.763	537.758	544.535	551.150	557.640	564.034	570.352	576.608	582.816	588.985	595.122	601.235	607.329	613.408	619.477	625.538

Thermodynamic properties of R-1233zd - (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
-75	0.003	1.839	1.856	1.872	1.889	1.905	1.921	1.936	1.952	1.967	1.982	1.997	2.012	2.027	2.041	2.056	2.070	2.084	2.098	2.111	2.125	2.138
-70	0.005	1.826	1.842	1.858	1.875	1.891	1.906	1.922	1.937	1.952	1.967	1.982	1.997	2.011	2.025	2.040	2.054	2.067	2.081	2.095	2.108	2.122
-65	0.008	1.814	1.830	1.846	1.862	1.878	1.893	1.909	1.924	1.939	1.954	1.968	1.983	1.997	2.011	2.025	2.039	2.053	2.066	2.080	2.093	2.106
-60	0.013	1.803	1.819	1.835	1.851	1.867	1.882	1.897	1.912	1.927	1.941	1.956	1.970	1.984	1.998	2.012	2.026	2.040	2.053	2.066	2.080	2.093
-55	0.019	1.794	1.810	1.826	1.841	1.857	1.872	1.887	1.901	1.916	1.931	1.945	1.959	1.973	1.987	2.001	2.014	2.028	2.041	2.054	2.067	2.081
-50	0.028	1.786	1.802	1.817	1.833	1.848	1.863	1.877	1.892	1.907	1.921	1.935	1.949	1.963	1.977	1.990	2.004	2.017	2.030	2.044	2.057	2.070
-45	0.040	1.779	1.794	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	2.021	2.034	2.047	2.060
-40	0.056	1.773	1.788	1.803	1.818	1.833	1.848	1.862	1.877	1.891	1.905	1.919	1.933	1.946	1.960	1.973	1.986	1.999	2.013	2.025	2.038	2.051
-35	0.076	1.768	1.783	1.798	1.813	1.827	1.842	1.856	1.870	1.884	1.898	1.912	1.926	1.939	1.953	1.966	1.979	1.992	2.005	2.018	2.031	2.043
-30	0.103	1.763	1.778	1.793	1.808	1.822	1.837	1.851	1.865	1.879	1.893	1.906	1.920	1.933	1.947	1.960	1.973	1.986	1.999	2.011	2.024	2.037
-25	0.138	1.760	1.774	1.789	1.804	1.818	1.832	1.846	1.860	1.874	1.888	1.901	1.915	1.928	1.941	1.954	1.967	1.980	1.993	2.006	2.018	2.031
-20	0.181	1.757	1.771	1.786	1.800	1.815	1.829	1.843	1.856	1.870	1.884	1.897	1.910	1.924	1.937	1.950	1.962	1.975	1.988	2.001	2.013	2.025
-15	0.235	1.754	1.769	1.783	1.797	1.812	1.826	1.839	1.853	1.867	1.880	1.893	1.907	1.920	1.933	1.946	1.958	1.971	1.984	1.996	2.009	2.021
-10	0.301	1.752	1.767	1.781	1.795	1.809	1.823	1.837	1.850	1.864	1.877	1.891	1.904	1.917	1.930	1.942	1.955	1.968	1.980	1.993	2.005	2.017
-5	0.382	1.751	1.765	1.780	1.794	1.807	1.821	1.835	1.848	1.862	1.875	1.888	1.901	1.914	1.927	1.940	1.952	1.965	1.977	1.990	2.002	2.014
0	0.479	1.750	1.764	1.778	1.792	1.806	1.820	1.833	1.847	1.860	1.873	1.886	1.899	1.912	1.925	1.937	1.950	1.962	1.975	1.987	1.999	2.011
5	0.594	1.750	1.764	1.778	1.792	1.805	1.819	1.832	1.846	1.859	1.872	1.885	1.898	1.911	1.923	1.936	1.948	1.961	1.973	1.985	1.997	2.009
10	0.731	1.749	1.764	1.777	1.791	1.805	1.818	1.832	1.845	1.858	1.871	1.884	1.897	1.910	1.922	1.935	1.947	1.959	1.972	1.984	1.996	2.008
15	0.892	1.750	1.764	1.778	1.791	1.805	1.818	1.832	1.845	1.858	1.871	1.884	1.896	1.909	1.921	1.934	1.946	1.958	1.971	1.983	1.995	2.007
18.31	1.013	1.750	1.764	1.778	1.791	1.805	1.818	1.832	1.845	1.858	1.871	1.883	1.896	1.909	1.921	1.934	1.946	1.958	1.970	1.982	1.994	2.006
20	1.080	1.750	1.764	1.778	1.792	1.805	1.818	1.832	1.845	1.858	1.871	1.883	1.896	1.909	1.921	1.933	1.946	1.958	1.970	1.982	1.994	2.006
25	1.296	1.751	1.765	1.779	1.792	1.806	1.819	1.832	1.845	1.858	1.871	1.884	1.896	1.909	1.921	1.933	1.946	1.958	1.970	1.982	1.994	2.006
30	1.546	1.752	1.766	1.780	1.793	1.807	1.820	1.833	1.846	1.859	1.871	1.884	1.897	1.909	1.921	1.934	1.946	1.958	1.970	1.982	1.994	2.006
35	1.831	1.753	1.767	1.781	1.794	1.808	1.821	1.834	1.847	1.860	1.872	1.885	1.897	1.910	1.922	1.934	1.946	1.959	1.970	1.982	1.994	2.006
40	2.155	1.755	1.769	1.782	1.796	1.809	1.822	1.835	1.848	1.861	1.873	1.886	1.898	1.911	1.923	1.935	1.947	1.959	1.971	1.983	1.995	2.006
45	2.521	1.757	1.770	1.784	1.797	1.811	1.824	1.837	1.849	1.862	1.875	1.887	1.900	1.912	1.924	1.936	1.948	1.960	1.972	1.984	1.996	2.007
50	2.933	1.758	1.772	1.786	1.799	1.812	1.825	1.838	1.851	1.864	1.876	1.889	1.901	1.913	1.926	1.938	1.950	1.962	1.973	1.985	1.997	2.009
55	3.395	1.760	1.774	1.788	1.801	1.814	1.827	1.840	1.853	1.866	1.878	1.891	1.903	1.915	1.927	1.939	1.951	1.963	1.975	1.987	1.998	2.010
60	3.909	1.762	1.776	1.790	1.803	1.816	1.829	1.842	1.855	1.868	1.880	1.892	1.905	1.917	1.929	1.941	1.953	1.965	1.977	1.988	2.000	2.011
65	4.481	1.765	1.778	1.792	1.805	1.818	1.831	1.844	1.857	1.870	1.882	1.895	1.907	1.919	1.931	1.943	1.955	1.967	1.978	1.990	2.002	2.013
70	5.113	1.767	1.780	1.794	1.807	1.821	1.834	1.846	1.859	1.872	1.884	1.897	1.909	1.921	1.933	1.945	1.957	1.969	1.980	1.992	2.004	2.015
75	5.811	1.769	1.783	1.796	1.810	1.823	1.836	1.849	1.862	1.874	1.887	1.899	1.911	1.923	1.935	1.947	1.959	1.971	1.983	1.994	2.006	2.017
80	6.577	1.771	1.785	1.799	1.812	1.825	1.838	1.851	1.864	1.877	1.889	1.901	1.914	1.926	1.938	1.950	1.962	1.973	1.985	1.997	2.008	2.019
85	7.418	1.773	1.787	1.801	1.814	1.828	1.841	1.854	1.866	1.879	1.892	1.904	1.916	1.928	1.940	1.952	1.964	1.976	1.987	1.999	2.010	2.022
90	8.336	1.776	1.790	1.803	1.817	1.830	1.843	1.856	1.869	1.882	1.894	1.906	1.919	1.931	1.943	1.955	1.967	1.978	1.990	2.001	2.013	2.024
95	9.336	1.778	1.792	1.806	1.819	1.833	1.846	1.859	1.872	1.884	1.897	1.909	1.921	1.933	1.945	1.957	1.969	1.981	1.992	2.004	2.015	2.027
100	10.424	1.780	1.794	1.808	1.822	1.835	1.848	1.861	1.874	1.887	1.899	1.912	1.924	1.936	1.948	1.960	1.972	1.984	1.995	2.007	2.018	2.029
105	11.604	1.781	1.796	1.810	1.824	1.837	1.851	1.864	1.877	1.889	1.902	1.914	1.927	1.939	1.951	1.963	1.975	1.986	1.998	2.009	2.021	2.032
110	12.882	1.783	1.798	1.812	1.826	1.840	1.853	1.866	1.879	1.892	1.905	1.917	1.929	1.942	1.954	1.966	1.977	1.989	2.001	2.012	2.024	2.035
115	14.262	1.785	1.800	1.814	1.828	1.842	1.856	1.869	1.882	1.895	1.907	1.920	1.932	1.944	1.956	1.968	1.980	1.992	2.003	2.015	2.026	2.038
120	15.751	1.786	1.801	1.816	1.830	1.844	1.858	1.871	1.884	1.897	1.910	1.923	1.935	1.947	1.959	1.971	1.983	1.995	2.006	2.018	2.029	2.041
125	17.355	1.786	1.802	1.818	1.832	1.846	1.860	1.874	1.887	1.900	1.913	1.925	1.938	1.950	1.962	1.974	1.986	1.998	2.009	2.021	2.032	2.043
130	19.081	1.787	1.803	1.819	1.834	1.848	1.862	1.876	1.889	1.902	1.915	1.928	1.940	1.953	1.965	1.977	1.989	2.000	2.012	2.024	2.035	2.046
135	20.935	1.786	1.804	1.820	1.835	1.850	1.864	1.878	1.892	1.905	1.918	1.930	1.943	1.955	1.968	1.980	1.992	2.003	2.015	2.026	2.038	2.049
140	22.926	1.785	1.804	1.821	1.837	1.852	1.866	1.880	1.894	1.907	1.920	1.933	1.946	1.958	1.970	1.982	1.994	2.006	2.018	2.029	2.041	2.052
145	25.063	1.783	1.803	1.821	1.838	1.853	1.868	1.882	1.896	1.909	1.923	1.936	1.948	1.961	1.973	1.985	1.997	2.009	2.021	2.032	2.044	2.055
150	27.357	1.779	1.802	1.821	1.838	1.854	1.869	1.884	1.898	1.912	1.925	1.938	1.951	1.963	1.976	1.988	2.000	2.012	2.023	2.035	2.047	2.058
155	29.822	1.773	1.800	1.820	1.838	1.855	1.871	1.885	1.900	1.913	1.927	1.940	1.953	1.966	1.978	1.990	2.002	2.014	2.026	2.038	2.049	2.061
160	32.478	1.762	1.797	1.819	1.838	1.855	1.871	1.887	1.901	1.915	1.929	1.942	1.955	1.968	1.981	1.993	2.005	2.017	2.029	2.040	2.052	2.063