

# R-407C

Zeotropic blend (23 % R-32 - 25 % R-125 - 52 % R-134a)

Molecular weight (g/mol) .....	86.20
Melting point (°C) .....	N/A
Boiling point (at 1.013 bar) .....	-43.63
Temperature glide at 1.013 bar (K) .....	7.00
Critical temperature (°C) .....	86.0
Critical pressure (bar absolute) .....	46.29
Specific heat (liquid) at + 25°C (kJ/kg.K) .....	1.535
Specific heat (vapour) at 1.013 bar and + 25°C (kJ/kg.K) .....	0.837
Thermal capacity ratio (Cp/Cv) at + 25°C and 1.013 bar .....	1.144
Viscosity (liquid) at + 25°C in Centipoise (10 <sup>-3</sup> Pa.s) .....	0.154
Surface tension at + 25°C in dyne per centimetre (10 <sup>-3</sup> N/m) .....	6.94
Classification NF-EN 378 .....	A1
GWP (IPCC 4) .....	1774

## 🔍 Main applications

R-407C is a "non azeotropic" HFC blend. It is mainly used in air conditioning applications where R-22 would have previously been used.

## 🔍 Commercial specifications

Composition: (23 % R-32 - 25 % R-125 - 52 % R-134a) (±2 % / ±2 % / ± 2 %).

Purity: ≥ 99.5 % weight.

Water content: ≤ 10 ppm weight.

Chloride ion test: negative.

Non-condensables (gas phase): ≤ 1.5 % volume.

Acidity (HCl): ≤ 1 ppm weight.

High boiling residue: ≤ 0.01 % volume.

## 🔍 Oils

Use a polyol ester (POE) oil.

Check with **Climalife** regarding the viscosity of the oil selected for your application, and the miscibility with the fluid under consideration.

## 🔍 Regulation

The use of HFCs are restricted by the European Union Regulation n° 517/2014.

Recovery of halogenated refrigerants is compulsory as defined by the European regulation n° 517/2014.

(For their use, pay attention to the regulation of your country).

## Thermodynamic properties of R-407C - Saturated state

Absolute pressure P (bar)	LIQUID					VAPOUR					Latent heat Lv (kJ/kg)
	Bubble point t' (°C)	Volume v' (dm <sup>3</sup> /kg)	Density ρ' (kg/dm <sup>3</sup> )	Enthalpy h' (kJ/kg)	Entropy s' (kJ/kg.K)	Dew point t" (°C)	Volume v" (m <sup>3</sup> /kg)	Density ρ" (kg/m <sup>3</sup> )	Enthalpy h" (kJ/kg)	Entropy s" (kJ/kg.K)	
0.023	-100	0.647	1.546	67.910	0.402	-92.09	7.441	0.134	356.288	2.031	288.378
0.037	-95	0.653	1.532	74.365	0.438	-87.17	4.879	0.205	359.260	2.004	284.895
0.056	-90	0.659	1.517	80.794	0.474	-82.25	3.288	0.304	362.247	1.980	281.453
0.083	-85	0.665	1.503	87.209	0.509	-77.32	2.271	0.440	365.245	1.958	278.036
0.119	-80	0.672	1.488	93.618	0.542	-72.4	1.605	0.623	368.248	1.937	274.630
0.169	-75	0.678	1.474	100.030	0.575	-67.48	1.158	0.864	371.252	1.919	271.222
0.235	-70	0.685	1.459	106.450	0.607	-62.56	0.851	1.175	374.250	1.902	267.800
0.321	-65	0.692	1.445	112.885	0.638	-57.64	0.636	1.572	377.237	1.887	264.352
0.430	-60	0.699	1.430	119.340	0.669	-52.72	0.483	2.069	380.208	1.873	260.868
0.567	-55	0.707	1.415	125.819	0.699	-47.81	0.373	2.684	383.157	1.860	257.337
0.738	-50	0.714	1.400	132.328	0.728	-42.89	0.291	3.438	386.077	1.848	253.749
0.948	-45	0.722	1.385	138.870	0.757	-37.98	0.230	4.350	388.964	1.837	250.093
1.013	-43.63	0.724	1.381	140.667	0.765	-36.63	0.216	4.630	389.747	1.834	249.080
1.203	-40	0.730	1.370	145.450	0.786	-33.07	0.184	5.443	391.811	1.827	246.360
1.508	-35	0.739	1.354	152.073	0.814	-28.16	0.148	6.741	394.612	1.818	242.540
1.871	-30	0.747	1.338	158.741	0.841	-23.25	0.121	8.273	397.362	1.809	238.621
2.299	-25	0.756	1.322	165.460	0.868	-18.34	0.099	10.066	400.054	1.802	234.594
2.799	-20	0.766	1.306	172.235	0.895	-13.44	0.082	12.152	402.682	1.794	230.447
3.379	-15	0.776	1.289	179.071	0.922	-8.54	0.069	14.567	405.238	1.787	226.167
4.047	-10	0.786	1.272	185.973	0.948	-3.65	0.058	17.349	407.714	1.781	221.741
4.810	-5	0.797	1.254	192.947	0.974	1.24	0.049	20.540	410.103	1.775	217.156
5.679	0	0.809	1.236	200.000	1.000	6.12	0.041	24.188	412.394	1.769	212.394
6.660	5	0.821	1.218	207.139	1.026	11.0	0.035	28.347	414.577	1.764	207.438
7.764	10	0.834	1.199	214.372	1.051	15.87	0.030	33.078	416.639	1.758	202.267
9.000	15	0.848	1.179	221.709	1.076	20.74	0.026	38.454	418.565	1.753	196.855
10.376	20	0.863	1.159	229.161	1.102	25.59	0.022	44.557	420.338	1.748	191.177
11.903	25	0.879	1.137	236.740	1.127	30.44	0.019	51.486	421.938	1.742	185.198
13.591	30	0.897	1.115	244.460	1.152	35.27	0.017	59.361	423.341	1.737	178.880
15.450	35	0.916	1.092	252.340	1.177	40.09	0.015	68.329	424.518	1.731	172.178
17.490	40	0.937	1.068	260.402	1.203	44.9	0.013	78.573	425.435	1.726	165.034
19.723	45	0.960	1.042	268.671	1.228	49.68	0.011	90.330	426.046	1.719	157.375
22.160	50	0.986	1.014	277.185	1.254	54.45	0.010	103.915	426.292	1.712	149.107
24.812	55	1.016	0.984	285.992	1.280	59.19	0.008	119.760	426.092	1.704	140.100
27.692	60	1.051	0.951	295.163	1.307	63.9	0.007	138.494	425.330	1.695	130.167
30.814	65	1.094	0.914	304.809	1.335	68.58	0.006	161.086	423.829	1.685	119.020
34.189	70	1.147	0.872	315.121	1.364	73.19	0.005	189.172	421.292	1.672	106.171
37.830	75	1.218	0.821	326.477	1.395	77.72	0.004	225.942	417.151	1.655	90.674
41.738	80	1.331	0.752	339.836	1.432	82.1	0.004	279.480	409.993	1.630	70.157

## Thermodynamic properties of R-407C - (superheated vapour) - Volume (dm<sup>3</sup>/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	0.011	15622.632	16077.744	16532.296	16986.415	17440.192	17893.699	18346.986	18800.093	19253.052	19705.887	20158.618	20611.260	21063.827	21516.329	21968.775	22421.171	22873.525	23325.841	23778.124	24230.377	24682.604
-95	0.018	9680.709	9955.739	10230.328	10504.573	10778.543	11052.293	11325.863	11599.283	11872.580	12145.772	12418.876	12691.904	12964.867	13237.774	13510.631	13783.446	14056.223	14328.966	14601.680	14874.368	15147.033
-90	0.028	6198.055	6370.082	6541.754	6713.149	6884.320	7055.390	7226.148	7396.863	7567.473	7737.995	7908.440	8078.820	8249.144	8419.419	8589.650	8759.844	8930.004	9100.135	9270.240	9440.321	9610.381
-85	0.044	4087.673	4198.717	4309.473	4420.000	4530.342	4640.533	4750.598	4860.558	4970.428	5080.222	5189.951	5299.623	5409.246	5518.826	5628.368	5737.877	5847.356	5956.809	6066.238	6175.646	6285.035
-80	0.067	2769.412	2843.195	2916.739	2990.092	3063.291	3136.362	3209.327	3282.202	3355.000	3427.732	3500.407	3573.033	3645.615	3718.160	3790.671	3863.153	3935.608	4008.039	4080.450	4152.841	4225.216
-75	0.099	1922.783	1973.131	2023.277	2073.263	2123.118	2172.864	2222.519	2272.096	2321.607	2371.061	2420.465	2469.825	2519.148	2568.437	2617.696	2666.928	2716.137	2765.325	2814.493	2863.645	2912.781
-70	0.142	1365.060	1400.271	1435.310	1470.212	1505.001	1539.697	1574.314	1608.864	1643.356	1677.798	1712.196	1746.556	1780.882	1815.178	1849.447	1883.693	1917.917	1952.122	1986.310	2020.483	2054.641
-65	0.200	988.993	1014.185	1039.228	1064.152	1088.979	1113.724	1138.401	1163.019	1187.586	1212.109	1236.594	1261.044	1285.464	1309.857	1334.226	1358.574	1382.903	1407.214	1431.510	1455.792	1480.061
-60	0.277	729.929	748.336	766.613	784.786	802.875	820.892	838.849	856.754	874.614	892.435	910.221	927.977	945.705	963.410	981.093	998.757	1016.404	1034.035	1051.651	1069.255	1086.847
-55	0.376	547.913	561.629	575.230	588.740	602.174	615.546	628.865	642.137	655.366	668.567	681.733	694.872	707.987	721.080	734.154	747.210	760.250	773.276	786.289	799.290	812.281
-50	0.502	417.686	428.095	438.401	448.626	458.784	468.887	478.941	488.955	498.933	508.879	518.797	528.691	538.563	548.415	558.249	568.068	577.872	587.663	597.442	607.210	616.968
-45	0.661	322.939	330.973	338.915	346.784	354.594	362.354	370.071	377.750	385.398	393.017	400.611	408.183	415.735	423.268	430.786	438.289	445.779	453.256	460.723	468.180	475.628
-40	0.857	252.927	259.227	265.445	271.597	277.695	283.748	289.762	295.743	301.695	307.620	313.523	319.406	325.270	331.118	336.951	342.771	348.578	354.375	360.161	365.938	371.707
-36.63	1.013	216.004	221.398	226.716	231.971	237.176	242.339	247.466	252.561	257.629	262.673	267.695	272.698	277.684	282.654	287.610	292.553	297.485	302.407	307.319	312.222	317.117
-35	1.097	200.445	205.460	210.400	215.280	220.111	224.901	229.656	234.381	239.079	243.754	248.407	253.042	257.660	262.263	266.853	271.430	275.996	280.551	285.097	289.635	294.165
-30	1.387	160.577	164.625	168.604	172.528	176.408	180.251	184.061	187.844	191.602	195.338	199.056	202.756	206.440	210.111	213.769	217.416	221.052	224.679	228.297	231.907	235.510
-25	1.735	129.914	133.225	136.472	139.669	142.825	145.946	149.038	152.105	155.149	158.172	161.179	164.169	167.145	170.108	173.060	176.000	178.932	181.854	184.768	187.675	190.575
-20	2.147	106.059	108.800	111.482	114.118	116.716	119.282	121.821	124.337	126.831	129.307	131.766	134.211	136.642	139.062	141.470	143.869	146.258	148.640	151.014	153.380	155.741
-15	2.632	87.299	89.595	91.837	94.035	96.199	98.332	100.440	102.526	104.593	106.642	108.676	110.697	112.705	114.701	116.688	118.665	120.634	122.595	124.549	126.496	128.438
-10	3.198	72.399	74.344	76.237	78.091	79.911	81.704	83.473	85.221	86.951	88.665	90.365	92.051	93.726	95.391	97.046	98.692	100.331	101.962	103.586	105.204	106.817
-5	3.853	60.453	62.117	63.734	65.313	66.860	68.382	69.881	71.360	72.823	74.270	75.704	77.126	78.536	79.937	81.329	82.713	84.089	85.458	86.821	88.178	89.529
0	4.607	50.790	52.230	53.623	54.981	56.310	57.614	58.896	60.160	61.408	62.641	63.862	65.071	66.270	67.459	68.640	69.813	70.979	72.139	73.292	74.440	75.583
5	5.469	42.910	44.167	45.380	46.559	47.710	48.837	49.944	51.034	52.108	53.168	54.216	55.253	56.281	57.299	58.310	59.313	60.309	61.299	62.283	63.262	64.236
10	6.449	36.434	37.542	38.608	39.641	40.646	41.629	42.593	43.540	44.472	45.391	46.298	47.195	48.083	48.962	49.833	50.697	51.555	52.407	53.254	54.095	54.932
15	7.557	31.071	32.057	33.002	33.915	34.802	35.666	36.512	37.341	38.157	38.960	39.751	40.533	41.305	42.070	42.827	43.577	44.321	45.059	45.792	46.521	47.245
20	8.803	26.600	27.485	28.331	29.144	29.932	30.699	31.447	32.179	32.898	33.604	34.300	34.986	35.663	36.332	36.995	37.650	38.300	38.945	39.584	40.219	40.850
25	10.200	22.847	23.650	24.412	25.143	25.849	26.534	27.200	27.852	28.490	29.116	29.731	30.337	30.935	31.525	32.109	32.686	33.257	33.823	34.385	34.942	35.495
30	11.759	19.676	20.411	21.105	21.768	22.405	23.021	23.619	24.202	24.772	25.331	25.879	26.418	26.949	27.473	27.990	28.501	29.007	29.507	30.003	30.494	30.982
35	13.492	16.980	17.660	18.297	18.902	19.482	20.040	20.581	21.107	21.619	22.121	22.612	23.095	23.569	24.037	24.498	24.953	25.403	25.848	26.288	26.725	27.157
40	15.413	14.674	15.309	15.900	16.457	16.988	17.497	17.989	18.466	18.931	19.384	19.827	20.261	20.688	21.107	21.521	21.928	22.331	22.729	23.122	23.511	23.897
45	17.536	12.689	13.289	13.841	14.358	14.848	15.317	15.767	16.203	16.625	17.037	17.439	17.832	18.218	18.596	18.969	19.336	19.698	20.055	20.408	20.758	21.103
50	19.878	10.969	11.543	12.064	12.548	13.004	13.437	13.852	14.252	14.639	15.015	15.382	15.740	16.090	16.433	16.771	17.103	17.430	17.753	18.071	18.389	18.697
55	22.454	9.468	10.025	10.522	10.979	11.406	11.810	12.194	12.564	12.920	13.265	13.601	13.928	14.248	14.561	14.868	15.170	15.467	15.759	16.048	16.333	16.614
60	25.287	8.148	8.697	9.177	9.612	10.015	10.393	10.751	11.094	11.424	11.743	12.052	12.352	12.645	12.932	13.213	13.488	13.759	14.025	14.288	14.546	14.802
65	28.400	6.974	7.527	7.996	8.414	8.797	9.153	9.490	9.810	10.116	10.412	10.697	10.974	11.244	11.508	11.765	12.018	12.265	12.509	12.748	12.984	13.217
70	31.823	5.916	6.489	6.953	7.359	7.725	8.063	8.380	8.680	8.966	9.241	9.506	9.763	10.012	10.255	10.492	10.724	10.952	11.175	11.394	11.610	11.823
75	35.601	4.940	5.557	6.025	6.421	6.774	7.097	7.397	7.680	7.948	8.205	8.452	8.690	8.921	9.146	9.365	9.579	9.788	9.993	10.195	10.393	10.588
80	39.808	3.993	4.705	5.186	5.579	5.921	6.231	6.516	6.783	7.036	7.276	7.507	7.729	7.943	8.156	8.354	8.552	8.745	8.934	9.120	9.302	9.481

## Thermodynamic properties of R-407C - (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	0.011	351.561	354.633	357.744	360.896	364.089	367.325	370.602	373.923	377.285	380.690	384.138	387.628	391.161	394.736	398.353	402.013	405.715	409.459	413.246	417.074	420.945
-95	0.018	354.543	357.667	360.829	364.030	367.273	370.556	373.881	377.247	380.656	384.106	387.599	391.134	394.711	398.330	401.992	405.695	409.441	413.228	417.058	420.930	424.843
-90	0.028	357.549	360.726	363.941	367.193	370.485	373.817	377.190	380.603	384.059	387.555	391.093	394.674	398.296	401.959	405.665	409.413	413.202	417.033	420.906	424.821	428.778
-85	0.044	360.574	363.807	367.075	370.380	373.723	377.104	380.526	383.988	387.490	391.034	394.618	398.244	401.912	405.620	409.371	413.163	416.996	420.872	424.788	428.747	432.746
-80	0.067	363.613	366.905	370.228	373.587	376.982	380.415	383.886	387.397	390.948	394.539	398.171	401.843	405.557	409.311	413.107	416.944	420.822	424.741	428.702	432.704	436.748
-75	0.099	366.662	370.014	373.395	376.809	380.258	383.743	387.266	390.827	394.427	398.067	401.747	405.467	409.227	413.028	416.870	420.752	424.676	428.640	432.645	436.692	440.779
-70	0.142	369.715	373.129	376.570	380.042	383.546	387.086	390.661	394.274	397.925	401.615	405.344	409.112	412.920	416.768	420.657	424.586	428.555	432.565	436.615	440.706	444.838
-65	0.200	372.765	376.245	379.749	383.280	386.843	390.438	394.068	397.734	401.438	405.178	408.957	412.775	416.632	420.528	424.464	428.440	432.456	436.512	440.608	444.745	448.921
-60	0.277	375.807	379.357	382.926	386.520	390.142	393.795	397.482	401.203	404.960	408.753	412.584	416.452	420.359	424.305	428.289	432.313	436.376	440.479	444.622	448.804	453.027
-55	0.376	378.836	382.458	386.096	389.754	393.439	397.153	400.897	404.675	408.487	412.335	416.219	420.139	424.097	428.093	432.127	436.200	440.312	444.463	448.653	452.882	457.150
-50	0.502	381.845	385.544	389.253	392.979	396.729	400.505	404.310	408.147	412.016	415.920	419.858	423.832	427.843	431.890	435.975	440.098	444.259	448.459	452.697	456.974	461.289
-45	0.661	384.828	388.608	392.392	396.190	400.007	403.848	407.716	411.613	415.542	419.503	423.497	427.527	431.591	435.692	439.829	444.003	448.215	452.464	456.751	461.076	465.440
-40	0.857	387.780	391.645	395.508	399.379	403.267	407.176	411.109	415.070	419.059	423.080	427.133	431.219	435.339	439.494	443.685	447.911	452.173	456.475	460.812	465.187	469.599
-36.63	1.013	389.747	393.671	397.589	401.513	405.450	409.406	413.385	417.389	421.421	425.483	429.576	433.701	437.859	442.052	446.280	450.542	454.841	459.176	463.548	467.956	472.402
-35	1.097	390.695	394.648	398.594	402.544	406.505	410.484	414.486	418.512	422.565	426.647	430.759	434.904	439.081	443.293	447.538	451.819	456.135	460.487	464.876	469.301	473.763
-30	1.387	393.565	397.613	401.646	405.677	409.715	413.768	417.840	421.934	426.053	430.199	434.373	438.578	442.815	447.084	451.386	455.722	460.092	464.498	468.939	473.416	477.929
-25	1.735	396.387	400.534	404.657	408.774	412.893	417.022	421.168	425.332	429.519	433.731	437.970	442.238	446.535	450.863	455.223	459.616	464.043	468.505	472.998	477.527	482.092
-20	2.147	399.152	403.403	407.623	411.828	416.032	420.242	424.463	428.702	432.960	437.240	441.545	445.877	450.237	454.627	459.047	463.498	467.982	472.498	477.048	481.632	486.250
-15	2.632	401.854	406.215	410.536	414.836	419.128	423.421	427.723	432.037	436.369	440.721	445.095	449.493	453.918	458.371	462.853	467.364	471.907	476.481	481.087	485.726	490.398
-10	3.198	404.485	408.964	413.391	417.789	422.174	426.555	430.940	435.334	439.743	444.168	448.614	453.081	457.574	462.092	466.637	471.210	475.813	480.447	485.111	489.807	494.535
-5	3.853	407.039	411.641	416.181	420.683	425.165	429.638	434.110	438.588	443.076	447.578	452.098	456.637	461.199	465.784	470.395	475.033	479.698	484.392	489.116	493.870	498.655
0	4.607	409.506	414.239	418.898	423.511	428.095	432.664	437.228	441.793	446.364	450.946	455.543	460.157	464.790	469.445	474.124	478.827	483.557	488.314	493.099	497.913	502.756
5	5.469	411.876	416.750	421.535	426.264	430.957	435.628	440.288	444.944	449.602	454.268	458.944	463.633	468.343	473.071	477.819	482.591	487.386	492.208	497.056	501.931	506.835
10	6.449	414.138	419.163	424.085	428.937	433.744	438.523	443.283	448.035	452.784	457.537	462.297	467.069	471.854	476.656	481.477	486.319	491.183	496.071	500.984	505.922	510.888
15	7.557	416.279	421.467	426.534	431.519	436.449	441.341	446.208	451.061	455.906	460.750	465.597	470.452	475.318	480.198	485.094	490.008	494.943	499.899	504.878	509.883	514.912
20	8.803	418.282	423.649	428.874	434.002	439.063	444.076	449.057	454.016	458.961	463.900	468.839	473.781	478.731	483.691	488.665	493.655	498.662	503.690	508.739	513.809	518.904
25	10.200	420.130	425.695	431.093	436.376	441.577	446.720	451.821	456.892	461.944	466.984	472.017	477.051	482.088	487.132	492.187	497.254	502.338	507.439	512.558	517.696	522.860
30	11.759	421.801	427.587	433.177	438.629	443.983	449.264	454.493	459.684	464.848	469.993	475.127	480.256	485.384	490.516	495.654	500.803	505.965	511.141	516.334	521.546	526.777
35	13.492	423.268	429.307	435.110	440.748	446.267	451.699	457.066	462.384	467.666	472.923	478.162	483.391	488.615	493.838	499.064	504.297	509.540	514.794	520.064	525.349	530.652
40	15.413	424.498	430.829	436.873	442.718	448.419	454.014	459.528	464.982	470.391	475.766	481.117	486.451	491.774	497.093	502.410	507.731	513.058	518.394	523.744	529.100	534.480
45	17.536	425.452	432.126	438.446	444.523	450.424	456.196	461.871	467.471	473.015	478.515	483.984	489.428	494.857	500.275	505.688	511.101	516.516	521.936	527.366	532.806	538.259
50	19.878	426.074	433.163	439.802	446.141	452.266	458.233	464.082	469.840	475.528	481.162	486.755	492.317	497.856	503.380	508.893	514.400	519.907	525.416	530.930	536.452	541.985
55	22.454	426.293	433.893	440.910	447.549	453.925	460.108	466.147	472.075	477.919	483.696	489.422	495.100	500.765	506.398	512.016	517.624	523.226	528.827	534.429	540.036	545.651
60	25.287	426.005	434.251	441.729	448.717	455.377	461.801	468.049	474.164	480.176	486.107	491.975	497.793	503.573	509.323	515.052	520.765	526.467	532.163	537.858	543.553	549.253
65	28.400	425.054	434.316	442.208	449.607	456.593	463.287	469.768	476.088	482.282	488.379	494.400	500.359	506.270	512.144	517.989	523.812	529.620	535.416	541.207	546.994	552.783
70	31.823	423.179	433.571	442.275	450.169	457.533	464.535	471.276	477.821	484.216	490.493	496.678	502.788	508.840	514.846	520.814	526.754	532.672	538.574	544.465	550.349	556.231
75	35.601	419.890	432.146	441.825	450.327	458.138	465.495	472.530	479.327	485.943	492.418	498.781	505.055	511.258	517.404	523.504	529.568	535.603	541.617	547.614	553.600	559.579
80	39.808	414.014	429.701	440.675	449.947	458.300	466.074	473.448	480.532	487.396	494.091	500.651	507.105	513.473	519.772	526.014	532.212	538.373	544.506	550.616	556.710	562.792

## Thermodynamic properties of R-407C - (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	0.011	2.080	2.097	2.115	2.132	2.148	2.165	2.181	2.197	2.213	2.229	2.245	2.260	2.276	2.291	2.306	2.321	2.335	2.350	2.365	2.379	2.393
-95	0.018	2.048	2.066	2.083	2.099	2.116	2.132	2.148	2.164	2.180	2.196	2.211	2.227	2.242	2.257	2.272	2.287	2.301	2.316	2.330	2.344	2.359
-90	0.028	2.019	2.037	2.053	2.070	2.086	2.103	2.119	2.134	2.150	2.166	2.181	2.196	2.211	2.226	2.241	2.256	2.270	2.285	2.299	2.313	2.327
-85	0.044	1.993	2.010	2.027	2.043	2.060	2.076	2.092	2.107	2.123	2.138	2.153	2.168	2.183	2.198	2.213	2.227	2.242	2.256	2.270	2.284	2.298
-80	0.067	1.969	1.986	2.003	2.019	2.035	2.051	2.067	2.083	2.098	2.113	2.128	2.143	2.158	2.173	2.187	2.202	2.216	2.230	2.244	2.258	2.272
-75	0.099	1.948	1.965	1.981	1.997	2.013	2.029	2.045	2.060	2.075	2.090	2.105	2.120	2.135	2.150	2.164	2.178	2.192	2.207	2.221	2.235	2.249
-70	0.142	1.928	1.945	1.961	1.977	1.993	2.009	2.024	2.040	2.055	2.070	2.085	2.099	2.114	2.129	2.143	2.157	2.171	2.185	2.199	2.213	2.227
-65	0.200	1.910	1.927	1.943	1.959	1.975	1.990	2.006	2.021	2.036	2.051	2.066	2.081	2.095	2.109	2.124	2.138	2.152	2.166	2.180	2.194	2.207
-60	0.277	1.894	1.910	1.927	1.943	1.958	1.974	1.989	2.004	2.019	2.034	2.049	2.063	2.078	2.092	2.106	2.120	2.134	2.148	2.162	2.176	2.189
-55	0.376	1.879	1.895	1.912	1.927	1.943	1.959	1.974	1.989	2.004	2.019	2.033	2.048	2.062	2.076	2.090	2.104	2.118	2.132	2.146	2.159	2.173
-50	0.502	1.865	1.882	1.898	1.914	1.929	1.945	1.960	1.975	1.990	2.004	2.019	2.033	2.048	2.062	2.076	2.090	2.104	2.117	2.131	2.145	2.158
-45	0.661	1.853	1.869	1.885	1.901	1.917	1.932	1.947	1.962	1.977	1.992	2.006	2.020	2.035	2.049	2.063	2.077	2.090	2.104	2.118	2.131	2.145
-40	0.857	1.842	1.858	1.874	1.890	1.905	1.921	1.936	1.951	1.965	1.980	1.994	2.009	2.023	2.037	2.051	2.065	2.078	2.092	2.105	2.119	2.132
-36.63	1.013	1.834	1.851	1.867	1.883	1.898	1.913	1.928	1.943	1.958	1.973	1.987	2.001	2.015	2.029	2.043	2.057	2.071	2.084	2.098	2.111	2.125
-35	1.097	1.831	1.847	1.864	1.879	1.895	1.910	1.925	1.940	1.955	1.969	1.984	1.998	2.012	2.026	2.040	2.054	2.067	2.081	2.094	2.108	2.121
-30	1.387	1.821	1.838	1.854	1.870	1.885	1.900	1.915	1.930	1.945	1.960	1.974	1.988	2.002	2.016	2.030	2.044	2.057	2.071	2.084	2.098	2.111
-25	1.735	1.812	1.829	1.845	1.861	1.876	1.892	1.907	1.922	1.936	1.951	1.965	1.979	1.993	2.007	2.021	2.035	2.048	2.062	2.075	2.088	2.102
-20	2.147	1.804	1.821	1.837	1.853	1.868	1.884	1.899	1.914	1.928	1.943	1.957	1.971	1.985	1.999	2.013	2.027	2.040	2.054	2.067	2.080	2.093
-15	2.632	1.797	1.813	1.830	1.845	1.861	1.876	1.891	1.906	1.921	1.935	1.950	1.964	1.978	1.992	2.005	2.019	2.033	2.046	2.059	2.073	2.086
-10	3.198	1.789	1.806	1.823	1.839	1.854	1.870	1.885	1.899	1.914	1.929	1.943	1.957	1.971	1.985	1.999	2.012	2.026	2.039	2.053	2.066	2.079
-5	3.853	1.783	1.800	1.816	1.832	1.848	1.863	1.878	1.893	1.908	1.922	1.937	1.951	1.965	1.979	1.993	2.006	2.020	2.033	2.046	2.060	2.073
0	4.607	1.776	1.794	1.810	1.826	1.842	1.858	1.873	1.888	1.902	1.917	1.931	1.945	1.959	1.973	1.987	2.001	2.014	2.027	2.041	2.054	2.067
5	5.469	1.770	1.788	1.805	1.821	1.837	1.852	1.867	1.882	1.897	1.912	1.926	1.940	1.954	1.968	1.982	1.996	2.009	2.022	2.036	2.049	2.062
10	6.449	1.765	1.782	1.799	1.816	1.832	1.847	1.863	1.878	1.892	1.907	1.921	1.936	1.950	1.964	1.977	1.991	2.004	2.018	2.031	2.044	2.057
15	7.557	1.759	1.777	1.794	1.811	1.827	1.843	1.858	1.873	1.888	1.903	1.917	1.931	1.945	1.959	1.973	1.987	2.000	2.014	2.027	2.040	2.053
20	8.803	1.754	1.772	1.789	1.806	1.822	1.838	1.854	1.869	1.884	1.899	1.913	1.927	1.942	1.955	1.969	1.983	1.996	2.010	2.023	2.036	2.049
25	10.200	1.748	1.767	1.784	1.801	1.818	1.834	1.850	1.865	1.880	1.895	1.909	1.924	1.938	1.952	1.966	1.979	1.993	2.006	2.020	2.033	2.046
30	11.759	1.743	1.762	1.780	1.797	1.814	1.830	1.846	1.861	1.876	1.891	1.906	1.920	1.935	1.949	1.963	1.976	1.990	2.003	2.016	2.030	2.043
35	13.492	1.737	1.757	1.775	1.793	1.810	1.826	1.842	1.858	1.873	1.888	1.903	1.917	1.932	1.946	1.960	1.973	1.987	2.000	2.014	2.027	2.040
40	15.413	1.732	1.752	1.770	1.788	1.806	1.822	1.838	1.854	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
45	17.536	1.725	1.746	1.766	1.784	1.802	1.819	1.835	1.851	1.866	1.882	1.897	1.911	1.926	1.940	1.954	1.968	1.982	1.995	2.009	2.022	2.035
50	19.878	1.719	1.740	1.761	1.779	1.797	1.815	1.831	1.848	1.863	1.879	1.894	1.909	1.923	1.938	1.952	1.966	1.979	1.993	2.006	2.020	2.033
55	22.454	1.711	1.734	1.755	1.775	1.793	1.811	1.828	1.844	1.860	1.876	1.891	1.906	1.921	1.935	1.949	1.963	1.977	1.991	2.004	2.018	2.031
60	25.287	1.703	1.728	1.749	1.770	1.789	1.807	1.824	1.841	1.857	1.873	1.888	1.903	1.918	1.933	1.947	1.961	1.975	1.989	2.002	2.016	2.029
65	28.400	1.693	1.720	1.743	1.764	1.784	1.802	1.820	1.837	1.854	1.870	1.885	1.901	1.916	1.930	1.945	1.959	1.973	1.987	2.000	2.014	2.027
70	31.823	1.681	1.711	1.736	1.758	1.779	1.798	1.816	1.833	1.850	1.866	1.882	1.898	1.913	1.928	1.942	1.957	1.971	1.984	1.998	2.012	2.025
75	35.601	1.666	1.701	1.728	1.751	1.773	1.793	1.811	1.829	1.846	1.863	1.879	1.895	1.910	1.925	1.940	1.954	1.968	1.982	1.996	2.010	2.023
80	39.808	1.644	1.688	1.718	1.744	1.766	1.787	1.806	1.825	1.842	1.859	1.875	1.891	1.907	1.922	1.937	1.951	1.966	1.980	1.994	2.007	2.021