

R-422A (Freon™ MO79)

Zeotropic blend (85.1 % R-125 - 11.5 % R-134a - 3.4 % R-600a)

Molecular weight (g/mol)	113.60
Melting point (°C)	N/A
Boiling point (at 1.013 bar)	-46.50
Temperature glide at 1.013 bar (K)	2.46
Critical temperature (°C)	71.7
Critical pressure (bar absolute)	37.45
Specific heat (liquid) at + 25°C (kJ/kg.K)	1.446
Specific heat (vapour) at 1.013 bar and + 25°C (kJ/kg.K)	0.833
Thermal capacity ratio (Cp/Cv) at + 25°C and 1.013 bar	1.105
Viscosity (liquid) at + 25°C in Centipoise (10 ⁻³ Pa.s)	0.143
Surface tension at + 25°C in dyne per centimetre (10 ⁻³ N/m)	4.53
Classification NF-EN 378	A1
GWP (IPCC 4)	3143

🔍 Main applications

R-422A (Freon™ MO79) is a non azeotropic HFC blend intended as a "direct replacement" for R-502, R-408A and other similar R-22 based blends used in direct expansion commercial and industrial refrigeration applications.

🔍 Commercial specifications

Composition: (85.1 % R-125 - 11.5 % R-134a - 3.4 % R-600a) (±1 % / ±1 % / +0.1% -0.4%).

Purity: ≥ 99.5 % weight.

Water content: ≤ 10 ppm weight.

Chloride ion test: negative.

Acidity (HCl): ≤ 1 ppm weight.

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

High boiling residue: ≤ 0.01 % volume.

🔍 Oils

Use a mineral (MO), an alkyl benzene (AB) or 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-422A - Saturated state

Absolute pressure P (bar)	LIQUID					VAPOUR					Latent heat Lv (kJ/kg)
	Bubble point t' (°C)	Volume v' (dm ³ /kg)	Density ρ' (kg/dm ³)	Enthalpy h' (kJ/kg)	Entropy s' (kJ/kg.K)	Dew point t" (°C)	Volume v" (m ³ /kg)	Density ρ" (kg/m ³)	Enthalpy h" (kJ/kg)	Entropy s" (kJ/kg.K)	
0.029	-100	0.628	1.593	82.420	0.469	-96.11	4.432	0.226	288.550	1.651	206.130
0.045	-95	0.634	1.578	87.930	0.501	-91.29	2.930	0.341	291.385	1.635	203.454
0.068	-90	0.640	1.562	93.454	0.531	-86.45	1.991	0.502	294.252	1.621	200.797
0.100	-85	0.646	1.547	98.998	0.561	-81.61	1.386	0.722	297.147	1.608	198.149
0.144	-80	0.653	1.531	104.565	0.590	-76.75	0.987	1.013	300.065	1.597	195.500
0.203	-75	0.660	1.516	110.162	0.619	-71.89	0.717	1.394	303.001	1.587	192.839
0.279	-70	0.667	1.500	115.791	0.647	-67.02	0.531	1.883	305.951	1.578	190.159
0.378	-65	0.674	1.484	121.457	0.674	-62.14	0.400	2.501	308.908	1.570	187.451
0.503	-60	0.681	1.468	127.163	0.701	-57.25	0.306	3.271	311.868	1.564	184.705
0.660	-55	0.689	1.452	132.912	0.728	-52.36	0.237	4.217	314.826	1.558	181.913
0.853	-50	0.696	1.436	138.708	0.754	-47.47	0.186	5.367	317.775	1.553	179.068
1.013	-46.5	0.702	1.424	142.793	0.772	-44.04	0.158	6.309	319.832	1.550	177.039
1.088	-45	0.705	1.419	144.553	0.780	-42.57	0.148	6.751	320.712	1.549	176.159
1.372	-40	0.713	1.402	150.450	0.806	-37.66	0.119	8.401	323.630	1.545	173.179
1.710	-35	0.722	1.385	156.404	0.831	-32.75	0.097	10.352	326.523	1.542	170.119
2.109	-30	0.731	1.368	162.418	0.856	-27.84	0.079	12.642	329.387	1.540	166.969
2.577	-25	0.741	1.350	168.495	0.880	-22.92	0.065	15.314	332.215	1.538	163.720
3.120	-20	0.751	1.331	174.640	0.905	-18.0	0.054	18.414	335.001	1.536	160.361
3.746	-15	0.762	1.312	180.857	0.929	-13.08	0.045	21.993	337.737	1.535	156.880
4.464	-10	0.773	1.293	187.152	0.953	-8.16	0.038	26.111	340.417	1.533	153.264
5.281	-5	0.785	1.273	193.531	0.976	-3.23	0.032	30.834	343.028	1.532	149.497
6.205	0	0.798	1.253	200.000	1.000	1.69	0.028	36.238	345.559	1.531	145.559
7.246	5	0.812	1.231	206.567	1.024	6.62	0.024	42.415	347.995	1.531	141.428
8.412	10	0.827	1.209	213.243	1.047	11.55	0.020	49.472	350.320	1.530	137.077
9.712	15	0.843	1.186	220.037	1.070	16.48	0.017	57.536	352.513	1.529	132.476
11.157	20	0.861	1.161	226.963	1.094	21.41	0.015	66.767	354.551	1.528	127.589
12.757	25	0.881	1.136	234.037	1.117	26.33	0.013	77.359	356.411	1.527	122.373
14.521	30	0.902	1.108	241.282	1.141	31.26	0.011	89.565	358.058	1.525	116.776
16.461	35	0.927	1.079	248.724	1.165	36.18	0.010	103.717	359.453	1.523	110.728
18.589	40	0.955	1.047	256.402	1.189	41.1	0.008	120.272	360.539	1.521	104.137
20.918	45	0.987	1.013	264.369	1.213	46.01	0.007	139.891	361.236	1.517	96.867
23.462	50	1.027	0.974	272.708	1.238	50.92	0.006	163.597	361.418	1.513	88.710
26.237	55	1.076	0.929	281.559	1.265	55.82	0.005	193.134	360.869	1.506	79.310
29.263	60	1.142	0.876	291.193	1.293	60.7	0.004	231.953	359.166	1.497	67.972
32.566	65	1.245	0.804	302.312	1.325	65.54	0.003	289.029	355.222	1.481	52.910
36.168	70	1.526	0.655	319.596	1.374	70.23	0.002	421.741	342.453	1.441	22.857

Thermodynamic properties of R-422A - (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	0.020	6323.309	6507.654	6691.828	6875.861	7059.778	7243.597	7427.332	7610.996	7794.597	7978.145	8161.646	8345.106	8528.529	8711.919	8895.281	9078.617	9261.931	9445.223	9628.497	9811.754	9994.996
-95	0.032	4017.148	4131.428	4245.566	4359.587	4473.510	4587.348	4701.114	4814.818	4928.468	5042.071	5155.633	5269.157	5382.650	5496.114	5609.552	5722.967	5836.361	5949.736	6063.095	6176.438	6289.768
-90	0.051	2636.268	2709.595	2782.803	2855.911	2928.934	3001.885	3074.774	3147.608	3220.394	3293.139	3365.848	3438.524	3511.171	3583.792	3656.390	3728.967	3801.526	3874.068	3946.594	4019.107	4091.607
-85	0.077	1781.285	1829.831	1878.275	1926.633	1974.918	2023.140	2071.307	2119.427	2167.504	2215.545	2263.553	2311.532	2359.486	2407.416	2455.325	2503.215	2551.089	2598.947	2646.791	2694.622	2742.442
-80	0.113	1235.637	1268.708	1301.690	1334.599	1367.443	1400.232	1432.971	1465.672	1498.333	1530.962	1563.561	1596.134	1628.684	1661.213	1693.723	1726.217	1758.694	1791.158	1823.609	1856.049	1888.478
-75	0.163	877.684	900.808	923.857	946.840	969.767	992.644	1015.480	1038.277	1061.042	1083.776	1106.485	1129.170	1151.834	1174.479	1197.107	1219.720	1242.318	1264.904	1287.478	1310.041	1332.595
-70	0.230	636.932	653.495	669.991	686.430	702.818	719.163	735.470	751.743	767.986	784.203	800.396	816.567	832.720	848.855	864.975	881.081	897.173	913.254	929.325	945.385	961.437
-65	0.317	471.267	483.397	495.466	507.484	519.457	531.391	543.291	555.161	567.004	578.822	590.619	602.397	614.158	625.902	637.632	649.350	661.055	672.750	684.435	696.111	707.779
-60	0.429	354.872	363.937	372.949	381.915	390.841	399.731	408.590	417.422	426.230	435.015	443.781	452.529	461.261	469.979	478.684	487.377	496.059	504.731	513.394	522.049	530.696
-55	0.571	271.516	278.422	285.279	292.094	298.873	305.619	312.338	319.031	325.703	332.354	338.987	345.604	352.206	358.795	365.372	371.939	378.495	385.041	391.580	398.114	404.634
-50	0.748	210.767	216.121	221.430	226.701	231.939	237.148	242.331	247.491	252.631	257.752	262.857	267.946	273.023	278.087	283.139	288.182	293.215	298.240	303.257	308.267	313.270
-45	0.966	165.774	169.993	174.172	178.316	182.429	186.515	190.577	194.619	198.641	202.647	206.637	210.613	214.577	218.529	222.472	226.404	230.328	234.244	238.153	242.055	245.951
-44.04	1.013	158.499	162.536	166.534	170.497	174.429	178.336	182.219	186.081	189.924	193.751	197.562	201.360	205.146	208.921	212.685	216.440	220.186	223.925	227.656	231.381	235.100
-40	1.230	131.952	135.328	138.668	141.975	145.253	148.507	151.738	154.951	158.145	161.324	164.489	167.640	170.781	173.910	177.030	180.141	183.244	186.340	189.429	192.511	195.588
-35	1.548	106.176	108.918	111.624	114.301	116.951	119.578	122.185	124.773	127.345	129.902	132.446	134.979	137.500	140.011	142.513	145.007	147.494	149.973	152.447	154.914	157.376
-30	1.926	86.281	88.538	90.761	92.957	95.127	97.276	99.406	101.519	103.616	105.700	107.771	109.831	111.881	113.921	115.953	117.977	119.994	122.005	124.010	126.009	128.002
-25	2.370	70.744	72.625	74.475	76.298	78.098	79.878	81.639	83.385	85.116	86.834	88.540	90.236	91.922	93.599	95.268	96.930	98.586	100.235	101.878	103.516	105.149
-20	2.890	58.476	60.064	61.621	63.153	64.663	66.154	67.628	69.086	70.531	71.963	73.385	74.796	76.198	77.592	78.979	80.358	81.731	83.098	84.460	85.816	87.169
-15	3.492	48.690	50.045	51.372	52.674	53.955	55.218	56.464	57.696	58.915	60.122	61.318	62.505	63.683	64.853	66.016	67.173	68.323	69.468	70.608	71.742	72.873
-10	4.184	40.809	41.979	43.121	44.240	45.338	46.419	47.484	48.535	49.573	50.600	51.617	52.625	53.625	54.617	55.602	56.581	57.554	58.521	59.484	60.442	61.396
-5	4.976	34.404	35.425	36.419	37.390	38.342	39.276	40.195	41.100	41.993	42.876	43.748	44.612	45.468	46.316	47.158	47.994	48.824	49.649	50.470	51.286	52.098
0	5.875	29.155	30.056	30.930	31.782	32.614	33.429	34.230	35.017	35.792	36.557	37.312	38.058	38.797	39.529	40.255	40.975	41.689	42.398	43.103	43.804	44.501
5	6.890	24.818	25.622	26.399	27.153	27.888	28.606	29.309	29.999	30.678	31.346	32.005	32.656	33.299	33.936	34.566	35.191	35.810	36.425	37.035	37.642	38.245
10	8.031	21.208	21.933	22.630	23.305	23.960	24.598	25.221	25.831	26.430	27.019	27.598	28.170	28.734	29.292	29.843	30.389	30.931	31.467	32.000	32.528	33.053
15	9.308	18.180	18.842	19.475	20.084	20.673	21.244	21.801	22.345	22.877	23.400	23.913	24.419	24.917	25.409	25.896	26.376	26.853	27.324	27.792	28.256	28.716
20	10.730	15.624	16.235	16.815	17.370	17.904	18.420	18.922	19.410	19.887	20.354	20.812	21.262	21.706	22.143	22.574	23.001	23.423	23.839	24.253	24.662	25.069
25	12.308	13.450	14.022	14.559	15.070	15.558	16.028	16.483	16.924	17.354	17.775	18.186	18.590	18.987	19.378	19.763	20.143	20.519	20.890	21.258	21.622	21.982
30	14.054	11.590	12.132	12.635	13.109	13.559	13.990	14.405	14.808	15.198	15.579	15.951	16.315	16.673	17.024	17.370	17.711	18.048	18.380	18.709	19.034	19.356
35	15.979	9.988	10.508	10.984	11.428	11.846	12.245	12.627	12.995	13.352	13.699	14.037	14.368	14.692	15.010	15.322	15.630	15.933	16.232	16.528	16.820	17.109
40	18.097	8.596	9.104	9.560	9.980	10.372	10.742	11.096	11.436	11.764	12.082	12.391	12.693	12.988	13.277	13.561	13.839	14.114	14.385	14.651	14.915	15.176
45	20.420	7.377	7.884	8.325	8.725	9.096	9.443	9.773	10.088	10.391	10.684	10.968	11.245	11.515	11.779	12.038	12.292	12.542	12.787	13.030	13.269	13.505
50	22.967	6.299	6.814	7.249	7.634	7.986	8.314	8.623	8.917	9.199	9.470	9.733	9.987	10.236	10.478	10.715	10.947	11.176	11.400	11.621	11.838	12.053
55	25.756	5.328	5.871	6.304	6.679	7.017	7.328	7.619	7.895	8.158	8.410	8.654	8.890	9.119	9.342	9.560	9.774	9.983	10.188	10.390	10.589	10.785
60	28.814	4.432	5.032	5.471	5.840	6.165	6.463	6.738	6.998	7.245	7.480	7.707	7.926	8.138	8.345	8.546	8.742	8.935	9.124	9.309	9.491	9.671
65	32.182	3.557	4.277	4.730	5.095	5.412	5.697	5.959	6.204	6.436	6.657	6.869	7.073	7.270	7.461	7.647	7.829	8.007	8.180	8.351	8.519	8.683
70	35.971	2.462	3.574	4.052	4.417	4.726	5.000	5.250	5.483	5.701	5.909	6.107	6.297	6.481	6.658	6.831	6.999	7.163	7.323	7.480	7.634	7.786

Thermodynamic properties of R-422A - (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	0.020	286.289	289.273	292.306	295.386	298.515	301.693	304.918	308.191	311.512	314.880	318.295	321.757	325.265	328.819	332.419	336.065	339.757	343.493	347.275	351.101	354.972
-95	0.032	289.202	292.242	295.328	298.462	301.644	304.873	308.150	311.473	314.844	318.261	321.725	325.235	328.791	332.393	336.041	339.734	343.472	347.254	351.082	354.953	358.869
-90	0.051	292.147	295.242	298.384	301.572	304.807	308.088	311.416	314.791	318.212	321.679	325.192	328.751	332.355	336.005	339.700	343.439	347.224	351.053	354.926	358.843	362.804
-85	0.077	295.118	298.270	301.468	304.711	308.000	311.335	314.715	318.141	321.613	325.130	328.692	332.300	335.953	339.651	343.393	347.180	351.011	354.886	358.805	362.768	366.774
-80	0.113	298.111	301.322	304.577	307.876	311.220	314.608	318.041	321.519	325.042	328.610	332.223	335.880	339.582	343.328	347.118	350.952	354.831	358.752	362.718	366.726	370.777
-75	0.163	301.121	304.392	307.706	311.062	314.461	317.905	321.392	324.923	328.498	321.117	335.781	339.488	343.239	347.034	350.873	354.755	358.680	362.649	366.660	370.715	374.812
-70	0.230	304.143	307.476	310.850	314.265	317.722	321.221	324.763	328.348	331.976	335.648	339.362	343.120	346.921	350.766	354.653	358.584	362.557	366.573	370.631	374.732	378.874
-65	0.317	307.173	310.570	314.005	317.480	320.995	324.552	328.150	331.790	335.472	339.197	342.964	346.774	350.626	354.520	358.457	362.436	366.457	370.521	374.626	378.774	382.962
-60	0.429	310.204	313.667	317.166	320.703	324.278	327.894	331.549	335.246	338.983	342.762	346.582	350.444	354.348	358.293	362.280	366.309	370.379	374.491	378.644	382.838	387.073
-55	0.571	313.231	316.763	320.328	323.928	327.566	331.242	334.957	338.711	342.505	346.339	350.214	354.129	358.085	362.082	366.120	370.199	374.319	378.479	382.680	386.922	391.204
-50	0.748	316.250	319.852	323.486	327.153	330.855	334.593	338.368	342.181	346.033	349.924	353.854	357.824	361.834	365.883	369.973	374.103	378.273	382.483	386.733	391.023	395.352
-45	0.966	319.255	322.931	326.636	330.371	334.139	337.941	341.779	345.653	349.564	353.513	357.500	361.526	365.590	369.694	373.836	378.018	382.238	386.499	390.798	395.137	399.514
-44.04	1.013	319.832	323.523	327.241	330.990	334.771	338.586	342.436	346.322	350.245	354.205	358.200	362.240	366.315	370.429	374.581	378.773	383.004	387.274	391.583	395.931	400.318
-40	1.230	322.241	325.994	329.772	333.578	337.415	341.284	345.186	349.123	353.095	357.103	361.149	365.231	369.351	373.509	377.705	381.940	386.212	390.524	394.873	399.261	403.687
-35	1.548	325.201	329.035	332.890	336.770	340.678	344.615	348.584	352.585	356.620	360.690	364.795	368.936	373.113	377.327	381.578	385.866	390.192	394.555	398.955	403.393	407.869
-30	1.926	328.131	332.049	335.985	339.942	343.923	347.932	351.969	356.037	360.137	364.269	368.436	372.637	376.872	381.143	385.450	389.794	394.173	398.589	403.041	407.530	412.056
-25	2.370	331.025	335.032	339.052	343.089	347.147	351.229	355.338	359.474	363.641	367.838	372.068	376.330	380.626	384.955	389.320	393.719	398.153	402.623	407.128	411.669	416.245
-20	2.890	333.876	337.977	342.084	346.205	350.343	354.502	358.684	362.893	367.128	371.392	375.687	380.012	384.370	388.760	393.183	397.639	402.129	406.654	411.213	415.806	420.434
-15	3.492	336.678	340.877	345.077	349.286	353.507	357.746	362.005	366.287	370.595	374.928	379.290	383.681	388.101	392.553	397.036	401.551	406.098	410.679	415.292	419.939	424.620
-10	4.184	339.422	343.726	348.024	352.324	356.633	360.956	365.295	369.655	374.036	378.442	382.873	387.331	391.817	396.331	400.874	405.451	410.057	414.695	419.364	424.066	428.800
-5	4.976	342.100	346.515	350.916	355.314	359.716	364.126	368.550	372.990	377.449	381.929	386.432	390.959	395.512	400.092	404.700	409.337	414.003	418.699	423.426	428.183	432.972
0	5.875	344.699	349.233	353.745	358.248	362.748	367.252	371.764	376.289	380.829	385.386	389.964	394.563	399.185	403.832	408.505	413.205	417.933	422.689	427.474	432.288	437.133
5	6.890	347.206	351.870	356.502	361.117	365.723	370.326	374.933	379.546	384.171	388.809	393.464	398.137	402.832	407.548	412.288	417.053	421.844	426.661	431.506	436.379	441.280
10	8.031	349.603	354.411	359.177	363.915	368.634	373.344	378.050	382.758	387.471	392.194	396.929	401.680	406.448	411.236	416.045	420.877	425.733	430.613	435.519	440.452	445.411
15	9.308	351.870	356.844	361.759	366.632	371.475	376.299	381.111	385.917	390.724	395.535	400.356	405.186	410.031	414.893	419.774	424.674	429.597	434.542	439.511	444.504	449.523
20	10.730	353.987	359.153	364.236	369.258	374.236	379.183	384.108	389.020	393.925	398.829	403.736	408.651	413.577	418.515	423.470	428.442	433.433	438.445	443.478	448.534	453.614
25	12.308	355.927	361.319	366.594	371.784	376.910	381.990	387.036	392.060	397.069	402.070	407.070	412.072	417.081	422.100	427.131	432.176	437.239	442.319	447.419	452.539	457.681
30	14.054	357.659	363.322	368.820	374.197	379.487	384.711	389.888	395.031	400.150	405.254	410.351	415.445	420.540	425.642	430.753	435.875	441.010	446.161	451.329	456.516	461.722
35	15.979	359.144	365.138	370.895	376.485	381.955	387.337	392.655	397.925	403.162	408.376	413.574	418.764	423.951	429.139	434.332	439.533	444.745	449.969	455.208	460.462	465.735
40	18.097	360.327	366.735	372.798	378.631	384.303	389.859	395.329	400.737	406.099	411.429	416.735	422.026	427.308	432.587	437.866	443.149	448.439	453.739	459.051	464.375	469.715
45	20.420	361.130	368.072	374.504	380.617	386.516	392.264	397.901	403.457	408.954	414.407	419.827	425.225	430.607	435.980	441.349	446.718	452.090	457.468	462.855	468.252	473.662
50	22.967	361.431	368.994	375.979	382.421	388.578	394.538	400.359	406.077	411.718	417.302	422.844	428.355	433.843	439.315	444.778	450.236	455.693	461.152	466.617	472.089	477.571
55	25.756	361.026	369.725	377.182	384.014	390.467	396.667	402.689	408.583	414.381	420.107	425.778	431.408	437.000	442.584	448.145	453.697	459.242	464.786	470.331	475.881	481.437
60	28.814	359.507	369.853	378.575	385.360	392.155	398.626	404.874	410.961	416.928	422.807	428.616	434.374	440.091	445.778	451.443	457.091	462.730	468.361	473.991	479.621	485.254
65	32.182	355.851	369.309	378.518	386.400	393.599	400.379	406.879	413.179	419.333	425.377	431.336	437.230	443.073	448.877	454.651	460.403	466.139	471.863	477.581	483.295	489.009
70	35.971	344.086	367.671	378.326	386.954	394.646	401.795	408.588	415.134	421.499	427.728	433.854	439.899	445.880	451.812	457.706	463.569	469.410	475.233	481.045	486.849	492.649

Thermodynamic properties of R-422A - (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	0.020	1.666	1.683	1.699	1.716	1.733	1.749	1.765	1.781	1.797	1.812	1.828	1.843	1.858	1.873	1.888	1.903	1.918	1.932	1.947	1.961	1.976
-95	0.032	1.647	1.664	1.681	1.697	1.713	1.729	1.745	1.761	1.777	1.792	1.808	1.823	1.838	1.853	1.868	1.882	1.897	1.912	1.926	1.940	1.955
-90	0.051	1.631	1.648	1.664	1.680	1.696	1.712	1.728	1.744	1.759	1.775	1.790	1.805	1.820	1.835	1.850	1.864	1.879	1.893	1.908	1.922	1.936
-85	0.077	1.617	1.633	1.649	1.666	1.682	1.697	1.713	1.729	1.744	1.759	1.774	1.789	1.804	1.819	1.834	1.848	1.863	1.877	1.891	1.905	1.919
-80	0.113	1.604	1.620	1.637	1.653	1.668	1.684	1.700	1.715	1.730	1.746	1.761	1.775	1.790	1.805	1.819	1.834	1.848	1.862	1.877	1.891	1.905
-75	0.163	1.593	1.609	1.625	1.641	1.657	1.673	1.688	1.703	1.719	1.734	1.748	1.763	1.778	1.793	1.807	1.821	1.836	1.850	1.864	1.878	1.892
-70	0.230	1.583	1.599	1.615	1.631	1.647	1.662	1.678	1.693	1.708	1.723	1.738	1.753	1.767	1.782	1.796	1.810	1.824	1.838	1.852	1.866	1.880
-65	0.317	1.575	1.591	1.607	1.623	1.638	1.654	1.669	1.684	1.699	1.714	1.729	1.743	1.758	1.772	1.786	1.801	1.815	1.829	1.842	1.856	1.870
-60	0.429	1.567	1.584	1.599	1.615	1.631	1.646	1.661	1.676	1.691	1.706	1.721	1.735	1.749	1.764	1.778	1.792	1.806	1.820	1.834	1.848	1.861
-55	0.571	1.561	1.577	1.593	1.609	1.624	1.639	1.654	1.669	1.684	1.699	1.714	1.728	1.742	1.757	1.771	1.785	1.799	1.813	1.826	1.840	1.854
-50	0.748	1.556	1.572	1.587	1.603	1.618	1.634	1.649	1.664	1.678	1.693	1.708	1.722	1.736	1.750	1.764	1.778	1.792	1.806	1.820	1.833	1.847
-45	0.966	1.551	1.567	1.583	1.598	1.614	1.629	1.644	1.659	1.673	1.688	1.702	1.717	1.731	1.745	1.759	1.773	1.787	1.801	1.814	1.828	1.841
-44.04	1.013	1.550	1.566	1.582	1.597	1.613	1.628	1.643	1.658	1.672	1.687	1.702	1.716	1.730	1.744	1.758	1.772	1.786	1.800	1.813	1.827	1.840
-40	1.230	1.547	1.563	1.579	1.594	1.610	1.625	1.640	1.654	1.669	1.684	1.698	1.712	1.727	1.741	1.755	1.768	1.782	1.796	1.809	1.823	1.836
-35	1.548	1.544	1.560	1.575	1.591	1.606	1.621	1.636	1.651	1.666	1.680	1.694	1.709	1.723	1.737	1.751	1.765	1.778	1.792	1.805	1.819	1.832
-30	1.926	1.541	1.557	1.573	1.588	1.603	1.618	1.633	1.648	1.663	1.677	1.691	1.706	1.720	1.734	1.748	1.761	1.775	1.789	1.802	1.815	1.829
-25	2.370	1.539	1.555	1.570	1.586	1.601	1.616	1.631	1.646	1.660	1.675	1.689	1.703	1.717	1.731	1.745	1.759	1.772	1.786	1.799	1.813	1.826
-20	2.890	1.537	1.553	1.568	1.584	1.599	1.614	1.629	1.644	1.659	1.673	1.687	1.701	1.715	1.729	1.743	1.757	1.770	1.784	1.797	1.811	1.824
-15	3.492	1.535	1.551	1.567	1.583	1.598	1.613	1.628	1.643	1.657	1.672	1.686	1.700	1.714	1.728	1.742	1.755	1.769	1.782	1.796	1.809	1.822
-10	4.184	1.534	1.550	1.566	1.581	1.597	1.612	1.627	1.642	1.656	1.671	1.685	1.699	1.713	1.727	1.741	1.754	1.768	1.781	1.794	1.808	1.821
-5	4.976	1.533	1.549	1.565	1.581	1.596	1.611	1.626	1.641	1.656	1.670	1.684	1.698	1.712	1.726	1.740	1.754	1.767	1.780	1.794	1.807	1.820
0	5.875	1.532	1.548	1.564	1.580	1.596	1.611	1.626	1.641	1.655	1.670	1.684	1.698	1.712	1.726	1.740	1.753	1.767	1.780	1.793	1.806	1.820
5	6.890	1.531	1.548	1.564	1.580	1.595	1.611	1.626	1.640	1.655	1.670	1.684	1.698	1.712	1.726	1.740	1.753	1.767	1.780	1.793	1.806	1.819
10	8.031	1.530	1.547	1.563	1.579	1.595	1.611	1.626	1.640	1.655	1.670	1.684	1.698	1.712	1.726	1.740	1.753	1.767	1.780	1.793	1.806	1.820
15	9.308	1.529	1.546	1.563	1.579	1.595	1.611	1.626	1.641	1.656	1.670	1.685	1.699	1.713	1.727	1.740	1.754	1.767	1.781	1.794	1.807	1.821
20	10.730	1.528	1.546	1.563	1.579	1.595	1.611	1.626	1.641	1.656	1.671	1.685	1.699	1.713	1.727	1.741	1.755	1.768	1.781	1.795	1.808	1.820
25	12.308	1.527	1.545	1.562	1.579	1.595	1.611	1.627	1.642	1.657	1.671	1.686	1.700	1.714	1.728	1.742	1.756	1.769	1.782	1.796	1.809	1.822
30	14.054	1.526	1.544	1.562	1.579	1.595	1.612	1.627	1.643	1.658	1.672	1.687	1.701	1.715	1.729	1.743	1.757	1.770	1.784	1.797	1.810	1.823
35	15.979	1.524	1.543	1.561	1.579	1.596	1.612	1.628	1.643	1.658	1.673	1.688	1.702	1.716	1.730	1.744	1.758	1.771	1.785	1.798	1.811	1.824
40	18.097	1.521	1.542	1.561	1.578	1.596	1.612	1.628	1.644	1.659	1.674	1.689	1.703	1.718	1.732	1.745	1.759	1.773	1.786	1.799	1.813	1.826
45	20.420	1.518	1.540	1.559	1.578	1.595	1.612	1.629	1.644	1.660	1.675	1.690	1.704	1.719	1.733	1.747	1.761	1.774	1.788	1.801	1.814	1.827
50	22.967	1.514	1.537	1.558	1.577	1.595	1.612	1.629	1.645	1.661	1.676	1.691	1.706	1.720	1.734	1.748	1.762	1.776	1.789	1.802	1.816	1.829
55	25.756	1.507	1.534	1.556	1.576	1.595	1.612	1.629	1.646	1.661	1.677	1.692	1.707	1.721	1.736	1.750	1.763	1.777	1.791	1.804	1.817	1.830
60	28.814	1.498	1.529	1.553	1.574	1.594	1.612	1.629	1.646	1.662	1.678	1.693	1.708	1.722	1.737	1.751	1.765	1.779	1.792	1.806	1.819	1.832
65	32.182	1.483	1.523	1.550	1.572	1.592	1.611	1.629	1.646	1.662	1.678	1.694	1.709	1.723	1.738	1.752	1.766	1.780	1.794	1.807	1.820	1.833
70	35.971	1.445	1.514	1.544	1.569	1.590	1.609	1.628	1.645	1.662	1.678	1.694	1.709	1.724	1.739	1.753	1.767	1.781	1.795	1.808	1.821	1.835