

R-422D (Freon™ MO29)

Zeotropic blend (65.1 % R-125 - 31.5 % R-134a - 3.4 % R-600a)

Molecular weight (g/mol)	109.94
Melting point (°C)	N/A
Boiling point (at 1.013 bar)	-43.21
Temperature glide at 1.013 bar (K)	4.86
Critical temperature (°C)	79.6
Critical pressure (bar absolute)	39.05
Specific heat (liquid) at + 25°C (kJ/kg.K)	1.443
Specific heat (vapour) at 1.013 bar and + 25°C (kJ/kg.K)	0.844
Thermal capacity ratio (Cp/Cv) at + 25°C and 1.013 bar	1.108
Viscosity (liquid) at + 25°C in Centipoise (10 ⁻³ Pa.s)	0.155
Surface tension at + 25°C in dyne per centimetre (10 ⁻³ N/m)	5.51
Classification NF-EN 378	A1
GWP (IPCC 4)	2729

🔍 Main applications

R-422D (Freon™ MO29) is a "non azeotropic" HFC blend intended as a "direct replacement" for R-22 in refrigeration, air-conditioning, and chiller applications.

🔍 Commercial specifications

Composition: (65.1 % R-125 – 31.5 % R-134a – 3.4 % R-600a)

(+0.9 %-1.1 % / +2%-0%/+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-422D - 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)	
0.024	-100	0.634	1.576	78.935	0.452	-93.19	5.617	0.178	301.992	1.719	223.057
0.038	-95	0.641	1.561	84.752	0.486	-88.38	3.707	0.270	304.873	1.701	220.121
0.057	-90	0.647	1.546	90.554	0.518	-83.57	2.512	0.398	307.784	1.686	217.229
0.084	-85	0.653	1.531	96.354	0.549	-78.75	1.744	0.573	310.721	1.672	214.368
0.121	-80	0.660	1.516	102.159	0.579	-73.92	1.238	0.808	313.680	1.660	211.522
0.170	-75	0.666	1.500	107.976	0.609	-69.1	0.897	1.115	316.657	1.649	208.681
0.235	-70	0.673	1.485	113.813	0.638	-64.27	0.662	1.510	319.645	1.639	205.833
0.319	-65	0.680	1.470	119.673	0.667	-59.43	0.497	2.012	322.641	1.630	202.968
0.426	-60	0.687	1.455	125.563	0.695	-54.6	0.379	2.639	325.639	1.623	200.076
0.561	-55	0.695	1.439	131.487	0.722	-49.76	0.293	3.412	328.635	1.616	197.148
0.727	-50	0.703	1.423	137.448	0.749	-44.92	0.230	4.355	331.623	1.610	194.175
0.930	-45	0.710	1.408	143.450	0.775	-40.08	0.182	5.493	334.598	1.605	191.148
1.013	-43.21	0.713	1.402	145.614	0.785	-38.35	0.168	5.954	335.661	1.604	190.047
1.176	-40	0.719	1.391	149.498	0.802	-35.24	0.146	6.854	337.555	1.601	188.057
1.470	-35	0.727	1.375	155.595	0.827	-30.4	0.118	8.466	340.489	1.597	184.894
1.818	-30	0.736	1.358	161.745	0.853	-25.55	0.097	10.363	343.394	1.594	181.649
2.227	-25	0.745	1.341	167.952	0.878	-20.7	0.080	12.579	346.265	1.591	178.313
2.704	-20	0.755	1.324	174.220	0.903	-15.85	0.066	15.153	349.096	1.589	174.876
3.256	-15	0.765	1.306	180.553	0.927	-11.0	0.055	18.128	351.880	1.586	171.327
3.889	-10	0.776	1.288	186.958	0.952	-6.15	0.046	21.551	354.611	1.585	167.654
4.612	-5	0.788	1.270	193.438	0.976	-1.29	0.039	25.477	357.281	1.583	163.843
5.431	0	0.800	1.250	200.000	1.000	3.56	0.033	29.965	359.879	1.582	159.879
6.357	5	0.813	1.231	206.651	1.024	8.42	0.029	35.085	362.395	1.581	155.744
7.395	10	0.826	1.210	213.399	1.048	13.27	0.024	40.920	364.814	1.579	151.415
8.556	15	0.841	1.189	220.254	1.071	18.13	0.021	47.565	367.122	1.578	146.868
9.847	20	0.857	1.167	227.225	1.095	22.99	0.018	55.136	369.299	1.577	142.074
11.279	25	0.875	1.143	234.327	1.118	27.84	0.016	63.771	371.324	1.576	136.998
12.860	30	0.894	1.119	241.574	1.142	32.69	0.014	73.645	373.174	1.574	131.600
14.601	35	0.915	1.093	248.988	1.166	37.54	0.012	84.976	374.816	1.573	125.828
16.512	40	0.939	1.065	256.594	1.190	42.38	0.010	98.053	376.213	1.570	119.618
18.604	45	0.966	1.036	264.427	1.214	47.22	0.009	113.263	377.310	1.568	112.883
20.889	50	0.997	1.003	272.536	1.239	52.05	0.008	131.154	378.036	1.564	105.500
23.379	55	1.034	0.967	280.991	1.264	56.87	0.007	152.548	378.278	1.559	97.287
26.090	60	1.080	0.926	289.909	1.290	61.67	0.006	178.774	377.859	1.553	87.950
29.037	65	1.139	0.878	299.495	1.317	66.45	0.005	212.255	376.456	1.545	76.961
32.238	70	1.224	0.817	310.204	1.348	71.18	0.004	258.355	373.365	1.531	63.161
35.710	75	1.378	0.725	323.601	1.385	75.79	0.003	335.324	366.263	1.508	42.661

Thermodynamic properties of R-422D - (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	0.012	10645.396	10955.128	11264.577	11573.804	11882.855	12191.762	12500.551	12809.242	13117.851	13426.389	13734.868	14043.294	14351.675	14660.017	14968.324	15276.600	15584.849	15893.073	16201.275	16509.458	16817.623
-95	0.020	6614.611	6802.244	6989.654	7176.886	7363.973	7550.942	7737.813	7924.601	8111.319	8297.977	8484.582	8671.143	8857.663	9044.149	9230.604	9417.031	9603.434	9789.815	9976.177	10162.520	10348.848
-90	0.032	4249.327	4367.050	4484.592	4601.988	4719.266	4836.444	4953.540	5070.564	5187.529	5304.441	5421.308	5538.135	5654.927	5771.689	5888.422	6005.132	6121.819	6238.486	6355.136	6471.770	6588.389
-85	0.050	2813.055	2889.309	2965.415	3041.400	3117.286	3193.087	3268.818	3344.488	3420.105	3495.677	3571.209	3646.706	3722.172	3797.610	3873.024	3948.415	4023.787	4099.141	4174.479	4249.802	4325.112
-80	0.076	1913.645	1964.504	2015.239	2065.873	2116.422	2166.899	2217.315	2267.678	2317.996	2368.273	2418.515	2468.726	2518.909	2569.068	2619.204	2669.321	2719.419	2769.502	2819.570	2869.624	2919.666
-75	0.111	1334.378	1369.224	1403.965	1438.620	1473.202	1507.721	1542.188	1576.603	1610.987	1645.331	1679.644	1713.929	1748.189	1782.427	1816.645	1850.845	1885.028	1919.197	1953.353	1987.496	2021.629
-70	0.160	951.594	976.068	1000.452	1024.761	1049.007	1073.199	1097.344	1121.448	1145.516	1169.552	1193.560	1217.544	1241.505	1265.446	1289.369	1313.275	1337.167	1361.045	1384.911	1408.766	1432.611
-65	0.224	692.623	710.211	727.721	745.166	762.555	779.896	797.195	814.458	831.689	848.891	866.068	883.223	900.358	917.474	934.574	951.659	968.730	985.789	1002.837	1019.875	1036.903
-60	0.308	513.593	526.505	539.347	552.131	564.866	577.559	590.214	602.836	615.430	627.999	640.544	653.069	665.575	678.065	690.540	703.002	715.451	727.888	740.316	752.733	765.143
-55	0.416	387.346	397.013	406.619	416.172	425.682	435.153	444.591	454.000	463.382	472.742	482.080	491.400	500.703	509.991	519.266	528.527	537.778	547.017	556.248	565.469	574.683
-50	0.553	296.677	304.049	311.366	318.637	325.867	333.063	340.229	347.368	354.483	361.577	368.652	375.711	382.753	389.782	396.798	403.803	410.797	417.781	424.757	431.724	438.684
-45	0.724	230.453	236.173	241.842	247.469	253.060	258.620	264.151	269.659	275.144	280.611	286.060	291.493	296.912	302.318	307.712	313.096	318.470	323.835	329.192	334.542	339.884
-40	0.934	181.325	185.834	190.297	194.722	199.113	203.476	207.813	212.128	216.423	220.699	224.960	229.207	233.440	237.661	241.872	246.072	250.264	254.447	258.623	262.791	266.953
-38.35	1.013	167.944	172.126	176.264	180.363	184.431	188.471	192.485	196.478	200.452	204.408	208.349	212.275	216.189	220.091	223.982	227.864	231.737	235.601	239.459	243.309	247.153
-35	1.189	144.350	147.959	151.525	155.056	158.557	162.030	165.480	168.910	172.321	175.715	179.095	182.461	185.815	189.158	192.491	195.814	199.129	202.436	205.737	209.030	212.318
-30	1.496	116.148	119.078	121.968	124.825	127.654	130.457	133.240	136.002	138.748	141.478	144.195	146.899	149.591	152.273	154.946	157.610	160.266	162.915	165.557	168.193	170.823
-25	1.861	94.370	96.780	99.153	101.495	103.811	106.103	108.375	110.629	112.868	115.091	117.302	119.501	121.689	123.868	126.037	128.199	130.353	132.500	134.641	136.777	138.906
-20	2.292	77.357	79.365	81.338	83.282	85.201	87.098	88.976	90.837	92.683	94.515	96.335	98.145	99.944	101.734	103.515	105.289	107.056	108.817	110.571	112.320	114.064
-15	2.795	63.923	65.616	67.276	68.908	70.517	72.105	73.675	75.229	76.768	78.295	79.810	81.315	82.810	84.297	85.776	87.247	88.712	90.170	91.624	93.071	94.514
-10	3.379	53.209	54.653	56.065	57.451	58.814	60.158	61.484	62.795	64.093	65.378	66.653	67.917	69.173	70.420	71.660	72.892	74.119	75.340	76.555	77.765	78.971
-5	4.051	44.583	45.828	47.042	48.231	49.399	50.547	51.680	52.797	53.902	54.995	56.077	57.150	58.214	59.270	60.320	61.362	62.399	63.430	64.456	65.477	66.494
0	4.820	37.576	38.661	39.716	40.747	41.757	42.749	43.724	44.686	45.635	46.573	47.501	48.419	49.330	50.232	51.128	52.018	52.902	53.780	54.654	55.523	56.388
5	5.694	31.837	32.792	33.719	34.622	35.503	36.368	37.216	38.051	38.874	39.686	40.488	41.281	42.067	42.845	43.616	44.382	45.142	45.896	46.647	47.392	48.134
10	6.682	27.098	27.949	28.771	29.569	30.346	31.106	31.851	32.582	33.301	34.010	34.709	35.400	36.083	36.759	37.428	38.092	38.751	39.404	40.053	40.698	41.339
15	7.793	23.157	23.923	24.659	25.371	26.062	26.736	27.395	28.041	28.675	29.298	29.912	30.518	31.117	31.708	32.294	32.874	33.449	34.019	34.584	35.146	35.704
20	9.037	19.855	20.551	21.217	21.858	22.479	23.082	23.669	24.244	24.807	25.360	25.903	26.439	26.967	27.489	28.004	28.514	29.020	29.520	30.016	30.509	30.998
25	10.424	17.070	17.710	18.319	18.901	19.463	20.006	20.534	21.050	21.553	22.047	22.531	23.008	23.477	23.940	24.397	24.849	25.296	25.738	26.177	26.611	27.042
30	11.964	14.705	15.301	15.862	16.396	16.908	17.402	17.881	18.346	18.799	19.243	19.678	20.104	20.524	20.938	21.345	21.748	22.146	22.539	22.929	23.315	23.697
35	13.669	12.683	13.244	13.767	14.262	14.733	15.185	15.621	16.044	16.455	16.857	17.249	17.634	18.012	18.383	18.749	19.110	19.466	19.818	20.166	20.510	20.851
40	15.550	10.943	11.479	11.972	12.433	12.870	13.287	13.687	14.074	14.450	14.815	15.171	15.520	15.862	16.198	16.528	16.853	17.174	17.490	17.803	18.112	18.418
45	17.621	9.435	9.954	10.423	10.858	11.266	11.653	12.024	12.380	12.724	13.059	13.385	13.702	14.013	14.318	14.618	14.912	15.202	15.488	15.771	16.049	16.325
50	19.894	8.118	8.629	9.081	9.494	9.879	10.241	10.585	10.916	11.234	11.541	11.840	12.132	12.416	12.694	12.967	13.235	13.499	13.759	14.015	14.267	14.517
55	22.387	6.956	7.470	7.912	8.308	8.673	9.014	9.336	9.644	9.939	10.224	10.500	10.768	11.029	11.284	11.534	11.779	12.020	12.257	12.490	12.720	12.946
60	25.119	5.918	6.449	6.887	7.271	7.619	7.942	8.246	8.534	8.809	9.074	9.330	9.577	9.818	10.053	10.283	10.508	10.729	10.945	11.159	11.368	11.575
65	28.115	4.973	5.543	5.983	6.358	6.694	7.002	7.289	7.560	7.818	8.065	8.303	8.533	8.756	8.973	9.185	9.392	9.595	9.794	9.990	10.182	10.372
70	31.411	4.080	4.729	5.179	5.550	5.876	6.171	6.444	6.700	6.942	7.174	7.396	7.610	7.817	8.018	8.214	8.405	8.593	8.776	8.956	9.132	9.306
75	35.081	3.152	3.983	4.454	4.824	5.141	5.425	5.685	5.928	6.156	6.373	6.581	6.781	6.973	7.160	7.342	7.519	7.692	7.861	8.027	8.189	8.349

Thermodynamic properties of R-422D - (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	0.012	297.974	300.980	304.035	307.139	310.293	313.496	316.748	320.048	323.398	326.795	330.241	333.735	337.276	340.864	344.500	348.182	351.910	355.685	359.506	363.372	367.284
-95	0.020	300.919	303.982	307.092	310.250	313.457	316.713	320.016	323.368	326.768	330.216	333.711	337.254	340.844	344.480	348.164	351.893	355.669	359.490	363.358	367.270	371.228
-90	0.032	303.901	307.020	310.186	313.399	316.660	319.968	323.324	326.727	330.178	333.676	337.221	340.813	344.451	348.136	351.867	355.645	359.467	363.336	367.249	371.208	375.211
-85	0.050	306.914	310.091	313.313	316.582	319.897	323.258	326.667	330.122	333.624	337.172	340.767	344.409	348.096	351.830	355.609	359.434	363.304	367.219	371.179	375.184	379.233
-80	0.076	309.955	313.190	316.470	319.795	323.164	326.580	330.042	333.549	337.103	340.702	344.344	348.030	351.776	355.558	359.385	363.258	367.176	371.138	375.145	379.196	383.291
-75	0.111	313.018	316.313	319.652	323.033	326.459	329.929	333.445	337.005	340.611	344.262	347.959	351.700	355.487	359.318	363.194	367.115	371.081	375.090	379.144	383.241	387.383
-70	0.160	316.098	319.455	322.853	326.293	329.776	333.302	336.873	340.487	344.146	347.849	351.597	355.390	359.226	363.108	367.033	371.002	375.016	379.073	383.174	387.318	391.505
-65	0.224	319.191	322.611	326.071	329.571	333.112	336.695	340.321	343.991	347.703	351.460	355.260	359.104	362.991	366.923	370.898	374.916	378.978	383.083	387.232	391.423	395.657
-60	0.308	322.290	325.776	329.299	332.860	336.461	340.103	343.786	347.511	351.279	355.090	358.943	362.839	366.778	370.761	374.786	378.854	382.965	387.118	391.315	395.553	399.834
-55	0.416	325.392	328.945	332.533	336.157	339.819	343.521	347.263	351.045	354.869	358.735	362.642	366.592	370.584	374.618	378.694	382.812	386.973	391.175	395.420	399.706	404.034
-50	0.553	328.489	332.112	335.768	339.457	343.182	346.946	350.747	354.589	358.470	362.392	366.355	370.359	374.404	378.490	382.618	386.788	390.998	395.251	399.544	403.879	408.255
-45	0.724	331.577	335.273	338.998	342.755	346.546	350.372	354.236	358.137	362.077	366.057	370.076	374.135	378.235	382.375	386.556	390.777	395.039	399.341	403.684	408.068	412.492
-40	0.934	334.649	338.422	342.219	346.046	349.904	353.796	357.723	361.687	365.687	369.726	373.803	377.919	382.074	386.268	390.503	394.777	399.090	403.444	407.837	412.271	416.744
-38.35	1.013	335.661	339.459	343.282	347.132	351.013	354.927	358.876	362.860	366.881	370.939	375.036	379.171	383.344	387.557	391.809	396.101	400.432	404.803	409.213	413.663	418.152
-35	1.189	337.701	341.553	345.426	349.325	353.253	357.213	361.206	365.233	369.295	373.395	377.531	381.703	385.917	390.167	394.456	398.783	403.150	407.555	412.000	416.484	421.006
-30	1.496	340.727	344.662	348.614	352.588	356.589	360.618	364.678	368.771	372.898	377.059	381.256	385.490	389.760	394.067	398.411	402.794	407.214	411.673	416.169	420.704	425.277
-25	1.861	343.721	347.742	351.777	355.830	359.905	364.007	368.138	372.298	376.491	380.716	384.976	389.270	393.599	397.965	402.367	406.805	411.280	415.792	420.342	424.928	429.552
-20	2.292	346.676	350.789	354.910	359.045	363.199	367.376	371.579	375.809	380.070	384.361	388.685	393.042	397.432	401.858	406.318	410.813	415.344	419.911	424.514	429.154	433.830
-15	2.795	349.587	353.797	358.008	362.228	366.464	370.719	374.997	379.300	383.631	387.991	392.381	396.802	401.255	405.741	410.261	414.815	419.403	424.026	428.684	433.378	438.106
-10	3.379	352.447	356.758	361.064	365.374	369.695	374.032	378.388	382.767	387.170	391.600	396.059	400.546	405.064	409.613	414.194	418.808	423.454	428.135	432.849	437.597	442.379
-5	4.051	355.247	359.666	364.072	368.477	372.887	377.309	381.747	386.204	390.683	395.186	399.715	404.271	408.855	413.469	418.113	422.788	427.495	432.233	437.004	441.808	446.646
0	4.820	357.980	362.513	367.025	371.529	376.034	380.545	385.069	389.608	394.166	398.745	403.347	407.973	412.626	417.306	422.015	426.753	431.520	436.319	441.148	446.010	450.903
5	5.694	360.633	365.289	369.915	374.525	379.129	383.735	388.349	392.974	397.614	402.271	406.949	411.649	416.372	421.121	425.896	430.698	435.529	440.389	445.278	450.198	455.148
10	6.682	363.194	367.983	372.732	377.456	382.167	386.873	391.582	396.297	401.022	405.762	410.518	415.294	420.090	424.910	429.753	434.622	439.517	444.440	449.391	454.370	459.378
15	7.793	365.648	370.584	375.467	380.313	385.139	389.953	394.761	399.571	404.387	409.212	414.051	418.905	423.777	428.669	433.583	438.521	443.482	448.470	453.483	458.524	463.592
20	9.037	367.977	373.078	378.108	383.090	388.039	392.967	397.882	402.792	407.702	412.617	417.541	422.477	427.428	432.396	437.383	442.391	447.421	452.475	457.552	462.656	467.785
25	10.424	370.159	375.449	380.645	385.758	390.858	395.909	400.938	405.954	410.964	415.973	420.986	426.007	431.040	436.086	441.149	446.230	451.330	456.452	461.596	466.764	471.956
30	11.964	372.172	377.680	383.063	388.358	393.588	398.771	403.922	409.051	414.166	419.274	424.381	429.491	434.608	439.736	444.877	450.033	455.207	460.399	465.611	470.845	476.101
35	13.669	373.984	379.751	385.348	390.826	396.217	401.545	406.826	412.075	417.302	422.514	427.720	432.923	438.129	443.342	448.564	453.799	459.047	464.312	469.595	474.896	480.219
40	15.550	375.559	381.636	387.482	393.167	398.736	404.221	409.624	415.021	420.366	425.689	430.998	436.300	441.599	446.900	452.207	457.522	462.848	468.188	473.543	478.915	484.306
45	17.621	376.884	383.306	389.443	395.363	401.131	406.788	412.363	417.879	423.351	428.792	434.211	439.615	445.012	450.405	455.800	461.199	466.607	472.024	477.454	482.899	488.359
50	19.894	377.779	384.721	391.204	397.396	403.386	409.234	414.977	420.642	426.250	431.816	437.351	442.864	448.363	453.853	459.340	464.827	470.318	475.817	481.324	486.843	492.375
55	22.387	378.251	385.827	392.734	399.241	405.485	411.544	417.417	423.199	428.954	434.715	440.411	446.040	451.646	457.238	462.821	468.400	473.979	479.561	485.148	490.745	496.352
60	25.119	378.096	386.555	393.990	400.872	407.405	413.702	419.832	425.837	431.750	437.593	443.384	449.134	454.854	460.553	466.237	471.912	477.582	483.251	488.922	494.596	500.282
65	28.115	377.016	386.800	394.916	402.249	409.119	415.685	422.040	428.240	434.325	440.324	446.255	452.135	457.977	463.789	469.579	475.354	481.119	486.879	492.637	498.397	504.161
70	31.411	374.368	386.406	395.432	403.317	410.582	417.457	424.064	430.480	436.754	442.921	449.005	455.025	460.995	466.927	472.830	478.711	484.576	490.431	496.280	502.127	507.974
75	35.081	368.086	385.076	395.374	403.959	411.700	418.934	425.832	432.492	438.976	445.329	451.580	457.752	463.862	469.924	475.948	481.942	487.915	493.871	499.817	505.755	511.690

Thermodynamic properties of R-422D - (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	0.012	1.747	1.764	1.781	1.798	1.814	1.831	1.847	1.863	1.879	1.895	1.910	1.926	1.941	1.956	1.972	1.986	2.001	2.016	2.031	2.045	2.060
-95	0.020	1.726	1.743	1.760	1.776	1.793	1.809	1.825	1.841	1.857	1.872	1.888	1.903	1.918	1.933	1.948	1.963	1.978	1.993	2.007	2.022	2.036
-90	0.032	1.707	1.724	1.740	1.757	1.773	1.789	1.805	1.821	1.837	1.852	1.867	1.883	1.898	1.913	1.928	1.942	1.957	1.972	1.986	2.001	2.015
-85	0.050	1.690	1.707	1.723	1.740	1.756	1.772	1.788	1.803	1.819	1.834	1.849	1.865	1.880	1.894	1.909	1.924	1.938	1.953	1.967	1.982	1.996
-80	0.076	1.675	1.692	1.708	1.724	1.740	1.756	1.772	1.788	1.803	1.818	1.833	1.848	1.863	1.878	1.893	1.907	1.922	1.936	1.950	1.965	1.979
-75	0.111	1.662	1.679	1.695	1.711	1.727	1.743	1.758	1.774	1.789	1.804	1.819	1.834	1.849	1.864	1.878	1.893	1.907	1.921	1.935	1.950	1.964
-70	0.160	1.651	1.667	1.683	1.699	1.715	1.730	1.746	1.761	1.776	1.792	1.806	1.821	1.836	1.851	1.865	1.880	1.894	1.908	1.922	1.936	1.950
-65	0.224	1.640	1.657	1.673	1.688	1.704	1.720	1.735	1.750	1.765	1.780	1.795	1.810	1.825	1.839	1.854	1.868	1.882	1.896	1.910	1.924	1.938
-60	0.308	1.631	1.647	1.663	1.679	1.695	1.710	1.726	1.741	1.756	1.771	1.786	1.800	1.815	1.829	1.844	1.858	1.872	1.886	1.900	1.914	1.928
-55	0.416	1.623	1.640	1.655	1.671	1.687	1.702	1.717	1.732	1.747	1.762	1.777	1.791	1.806	1.820	1.835	1.849	1.863	1.877	1.891	1.905	1.918
-50	0.553	1.616	1.633	1.648	1.664	1.680	1.695	1.710	1.725	1.740	1.755	1.769	1.784	1.798	1.813	1.827	1.841	1.855	1.869	1.883	1.896	1.910
-45	0.724	1.610	1.626	1.642	1.658	1.673	1.689	1.704	1.719	1.734	1.748	1.763	1.777	1.792	1.806	1.820	1.834	1.848	1.862	1.876	1.889	1.903
-40	0.934	1.605	1.621	1.637	1.653	1.668	1.683	1.698	1.713	1.728	1.743	1.757	1.772	1.786	1.800	1.814	1.828	1.842	1.856	1.869	1.883	1.897
-38.35	1.013	1.604	1.620	1.635	1.651	1.666	1.682	1.697	1.712	1.726	1.741	1.755	1.770	1.784	1.798	1.812	1.826	1.840	1.854	1.868	1.881	1.895
-35	1.189	1.601	1.617	1.632	1.648	1.663	1.679	1.694	1.708	1.723	1.738	1.752	1.767	1.781	1.795	1.809	1.823	1.837	1.851	1.864	1.878	1.891
-30	1.496	1.597	1.613	1.629	1.644	1.659	1.675	1.690	1.704	1.719	1.734	1.748	1.763	1.777	1.791	1.805	1.819	1.832	1.846	1.860	1.873	1.887
-25	1.861	1.593	1.609	1.625	1.641	1.656	1.671	1.686	1.701	1.716	1.730	1.745	1.759	1.773	1.787	1.801	1.815	1.829	1.842	1.856	1.869	1.883
-20	2.292	1.591	1.607	1.622	1.638	1.653	1.669	1.684	1.698	1.713	1.727	1.742	1.756	1.770	1.784	1.798	1.812	1.826	1.839	1.853	1.866	1.880
-15	2.795	1.588	1.604	1.620	1.636	1.651	1.666	1.681	1.696	1.711	1.725	1.740	1.754	1.768	1.782	1.796	1.810	1.823	1.837	1.850	1.864	1.877
-10	3.379	1.586	1.602	1.618	1.634	1.649	1.664	1.679	1.694	1.709	1.723	1.738	1.752	1.766	1.780	1.794	1.808	1.821	1.835	1.848	1.862	1.875
-5	4.051	1.584	1.601	1.617	1.632	1.648	1.663	1.678	1.693	1.707	1.722	1.736	1.750	1.765	1.779	1.792	1.806	1.820	1.833	1.847	1.860	1.873
0	4.820	1.583	1.599	1.615	1.631	1.647	1.662	1.677	1.692	1.706	1.721	1.735	1.749	1.764	1.777	1.791	1.805	1.819	1.832	1.845	1.859	1.872
5	5.694	1.581	1.598	1.614	1.630	1.646	1.661	1.676	1.691	1.706	1.720	1.735	1.749	1.763	1.777	1.791	1.804	1.818	1.831	1.845	1.858	1.871
10	6.682	1.580	1.597	1.613	1.629	1.645	1.660	1.676	1.690	1.705	1.720	1.734	1.748	1.762	1.776	1.790	1.804	1.817	1.831	1.844	1.858	1.871
15	7.793	1.579	1.596	1.613	1.629	1.644	1.660	1.675	1.690	1.705	1.720	1.734	1.748	1.762	1.776	1.790	1.804	1.817	1.831	1.844	1.857	1.871
20	9.037	1.578	1.595	1.612	1.628	1.644	1.660	1.675	1.690	1.705	1.720	1.734	1.748	1.763	1.776	1.790	1.804	1.818	1.831	1.844	1.858	1.871
25	10.424	1.577	1.594	1.611	1.628	1.644	1.660	1.675	1.690	1.705	1.720	1.734	1.749	1.763	1.777	1.791	1.804	1.818	1.831	1.845	1.858	1.871
30	11.964	1.575	1.593	1.611	1.627	1.644	1.660	1.675	1.690	1.705	1.720	1.735	1.749	1.763	1.777	1.791	1.805	1.819	1.832	1.845	1.859	1.872
35	13.669	1.574	1.592	1.610	1.627	1.644	1.660	1.675	1.691	1.706	1.721	1.735	1.750	1.764	1.778	1.792	1.806	1.819	1.833	1.846	1.859	1.873
40	15.550	1.572	1.591	1.609	1.626	1.643	1.660	1.676	1.691	1.706	1.721	1.736	1.751	1.765	1.779	1.793	1.807	1.820	1.834	1.847	1.860	1.874
45	17.621	1.569	1.589	1.608	1.626	1.643	1.660	1.676	1.691	1.707	1.722	1.737	1.751	1.766	1.780	1.794	1.808	1.821	1.835	1.848	1.862	1.875
50	19.894	1.566	1.587	1.607	1.625	1.643	1.660	1.676	1.692	1.707	1.723	1.738	1.752	1.767	1.781	1.795	1.809	1.823	1.836	1.849	1.863	1.876
55	22.387	1.561	1.584	1.605	1.624	1.642	1.659	1.676	1.692	1.708	1.723	1.738	1.753	1.768	1.782	1.796	1.810	1.824	1.837	1.851	1.864	1.877
60	25.119	1.556	1.581	1.603	1.623	1.641	1.659	1.676	1.692	1.708	1.724	1.739	1.754	1.769	1.783	1.797	1.811	1.825	1.839	1.852	1.865	1.879
65	28.115	1.547	1.576	1.600	1.621	1.640	1.658	1.676	1.692	1.708	1.724	1.740	1.755	1.769	1.784	1.798	1.812	1.826	1.840	1.853	1.867	1.880
70	31.411	1.535	1.570	1.596	1.618	1.638	1.657	1.675	1.692	1.708	1.724	1.740	1.755	1.770	1.785	1.799	1.813	1.827	1.841	1.855	1.868	1.881
75	35.081	1.513	1.562	1.591	1.615	1.636	1.655	1.674	1.691	1.708	1.724	1.740	1.755	1.771	1.785	1.800	1.814	1.828	1.842	1.856	1.869	1.882