



Temp. (°F)	Pressure (psia)	Volume (ft ³ /lbm)		Density (lbm/ft ³)		Enthalpy (Btu/lbm)			Entropy (Btu/lbm-°R)		Int. Energy (Btu/lbm)		Cp/Cv		Sound Speed (ft/s)	
		Liquid	Vapor	Liquid	Vapor	Liquid	Latent	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
-69	76.60	0.01361	1.1427	73.47	0.8751	-13.76	150.43	136.67	-0.0335	0.3515	-13.96	120.46	2.0064	1.4457	3191.0	731.1
-68	78.45	0.01363	1.1168	73.34	0.8954	-13.29	150.05	136.76	-0.0324	0.3508	-13.49	120.53	2.0094	1.4476	3177.8	731.3
-67	80.35	0.01366	1.0917	73.22	0.9160	-12.83	149.67	136.84	-0.0312	0.3500	-13.03	120.60	2.0124	1.4494	3164.6	731.5
-66	82.27	0.01368	1.0672	73.09	0.9370	-12.36	149.29	136.93	-0.0300	0.3492	-12.56	120.67	2.0155	1.4514	3151.4	731.7
-65	84.23	0.01371	1.0434	72.97	0.9584	-11.89	148.90	137.01	-0.0288	0.3485	-12.10	120.74	2.0186	1.4534	3138.3	731.9
-64	86.23	0.01373	1.0202	72.84	0.9802	-11.42	148.52	137.10	-0.0276	0.3477	-11.64	120.81	2.0218	1.4554	3125.1	732.1
-63	88.26	0.01375	0.9977	72.72	1.0023	-10.95	148.13	137.18	-0.0265	0.3470	-11.17	120.87	2.0250	1.4574	3112.0	732.2
-62	90.33	0.01378	0.9757	72.59	1.0249	-10.47	147.73	137.26	-0.0253	0.3462	-10.71	120.94	2.0282	1.4595	3098.8	732.4
-61	92.43	0.01380	0.9544	72.46	1.0478	-10.00	147.34	137.34	-0.0241	0.3455	-10.24	121.00	2.0315	1.4617	3085.7	732.5
-60	94.57	0.01383	0.9336	72.33	1.0711	-9.53	146.95	137.42	-0.0229	0.3447	-9.77	121.07	2.0348	1.4638	3072.5	732.7
-59	96.75	0.01385	0.9134	72.21	1.0949	-9.06	146.55	137.49	-0.0218	0.3440	-9.31	121.13	2.0382	1.4661	3059.4	732.8
-58	98.97	0.01387	0.8937	72.08	1.1190	-8.59	146.16	137.57	-0.0206	0.3433	-8.84	121.19	2.0416	1.4683	3046.2	732.9
-57	101.22	0.01390	0.8745	71.95	1.1436	-8.11	145.75	137.64	-0.0195	0.3425	-8.37	121.25	2.0450	1.4707	3033.1	733.0
-56	103.51	0.01392	0.8558	71.82	1.1686	-7.64	145.36	137.72	-0.0183	0.3418	-7.91	121.32	2.0485	1.4730	3020.0	733.1
-55	105.84	0.01395	0.8375	71.69	1.1940	-7.17	144.96	137.79	-0.0171	0.3411	-7.44	121.38	2.0521	1.4754	3006.8	733.2
-54	108.21	0.01397	0.8198	71.56	1.2198	-6.69	144.55	137.86	-0.0160	0.3404	-6.97	121.43	2.0557	1.4779	2993.7	733.3
-53	110.61	0.01400	0.8025	71.43	1.2461	-6.22	144.15	137.93	-0.0148	0.3396	-6.50	121.49	2.0593	1.4804	2980.6	733.3
-52	113.06	0.01403	0.7857	71.30	1.2728	-5.74	143.74	138.00	-0.0137	0.3389	-6.04	121.55	2.0630	1.4830	2967.4	733.4
-51	115.55	0.01405	0.7692	71.17	1.3000	-5.27	143.33	138.06	-0.0125	0.3382	-5.57	121.61	2.0667	1.4856	2954.3	733.4
-50	118.08	0.01408	0.7532	71.04	1.3277	-4.79	142.92	138.13	-0.0114	0.3375	-5.10	121.66	2.0705	1.4882	2941.1	733.5
-49	120.65	0.01410	0.7376	70.90	1.3558	-4.31	142.50	138.19	-0.0102	0.3368	-4.63	121.72	2.0743	1.4910	2928.0	733.5
-48	123.26	0.01413	0.7224	70.77	1.3843	-3.84	142.10	138.26	-0.0091	0.3361	-4.16	121.77	2.0782	1.4937	2914.8	733.5
-47	125.91	0.01416	0.7075	70.64	1.4134	-3.36	141.68	138.32	-0.0079	0.3354	-3.69	121.82	2.0821	1.4966	2901.7	733.5
-46	128.61	0.01418	0.6930	70.51	1.4429	-2.88	141.26	138.38	-0.0068	0.3347	-3.22	121.87	2.0861	1.4994	2888.5	733.5
-45	131.34	0.01421	0.6789	70.37	1.4730	-2.40	140.84	138.44	-0.0057	0.3340	-2.75	121.93	2.0901	1.5024	2875.3	733.5
-44	134.13	0.01424	0.6651	70.24	1.5035	-1.92	140.41	138.49	-0.0045	0.3333	-2.28	121.97	2.0942	1.5054	2862.2	733.5
-43	136.95	0.01427	0.6517	70.10	1.5345	-1.44	139.99	138.55	-0.0034	0.3326	-1.81	122.02	2.0984	1.5084	2849.0	733.4
-42	139.82	0.01429	0.6386	69.97	1.5660	-0.96	139.56	138.60	-0.0023	0.3319	-1.33	122.07	2.1025	1.5116	2835.8	733.4
-41	142.73	0.01432	0.6258	69.83	1.5981	-0.48	139.14	138.66	-0.0011	0.3312	-0.86	122.12	2.1068	1.5148	2822.6	733.3
-40	145.69	0.01435	0.6133	69.70	1.6307	0.00	138.71	138.71	0.0000	0.3305	-0.39	122.16	2.1111	1.5180	2809.4	733.3
-39	148.69	0.01438	0.6010	69.56	1.6638	0.48	138.28	138.76	0.0011	0.3298	0.09	122.21	2.1155	1.5213	2796.2	733.2
-38	151.74	0.01441	0.5891	69.42	1.6974	0.97	137.84	138.81	0.0023	0.3292	0.56	122.25	2.1199	1.5247	2783.0	733.1
-37	154.84	0.01443	0.5775	69.29	1.7316	1.45	137.40	138.85	0.0034	0.3285	1.04	122.29	2.1244	1.5282	2769.7	733.0
-36	157.98	0.01446	0.5661	69.15	1.7664	1.93	136.97	138.90	0.0045	0.3278	1.51	122.34	2.1290	1.5317	2756.5	732.9
-35	161.17	0.01449	0.5550	69.01	1.8017	2.42	136.52	138.94	0.0056	0.3271	1.99	122.38	2.1336	1.5353	2743.2	732.7
-34	164.40	0.01452	0.5442	68.87	1.8376	2.90	136.08	138.98	0.0068	0.3264	2.46	122.42	2.1383	1.5390	2729.9	732.6
-33	167.68	0.01455	0.5336	68.73	1.8740	3.39	135.63	139.02	0.0079	0.3258	2.94	122.45	2.1430	1.5428	2716.7	732.5
-32	171.02	0.01458	0.5233	68.59	1.9111	3.88	135.18	139.06	0.0090	0.3251	3.42	122.49	2.1478	1.5466	2703.4	732.3
-31	174.40	0.01461	0.5132	68.45	1.9488	4.37	134.73	139.10	0.0101	0.3244	3.89	122.53	2.1527	1.5505	2690.1	732.1
-30	177.83	0.01464	0.5033	68.31	1.9870	4.85	134.28	139.13	0.0112	0.3238	4.37	122.56	2.1577	1.5545	2676.7	732.0

R-744

Carbon Dioxide

CO2



Temp. (°F)	Pressure (psia)	Volume (ft ³ /lbm)		Density (lbm/ft ³)		Enthalpy (Btu/lbm)			Entropy (Btu/lbm-°R)		Int. Energy (Btu/lbm)		Cp/Cv		Sound Speed (ft/s)	
		Liquid	Vapor	Liquid	Vapor	Liquid	Latent	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
-29	181.30	0.01467	0.4936	68.17	2.0259	5.34	133.83	139.17	0.0123	0.3231	4.85	122.60	2.1627	1.5586	2663.4	731.8
-28	184.83	0.01470	0.4842	68.02	2.0654	5.83	133.37	139.20	0.0135	0.3224	5.33	122.63	2.1678	1.5628	2650.0	731.6
-27	188.41	0.01473	0.4750	67.88	2.1055	6.32	132.91	139.23	0.0146	0.3217	5.81	122.66	2.1730	1.5670	2636.6	731.3
-26	192.04	0.01476	0.4659	67.74	2.1463	6.82	132.44	139.26	0.0157	0.3211	6.29	122.69	2.1783	1.5714	2623.2	731.1
-25	195.72	0.01480	0.4571	67.59	2.1877	7.31	131.97	139.28	0.0168	0.3204	6.77	122.72	2.1836	1.5759	2609.8	730.9
-24	199.46	0.01483	0.4485	67.45	2.2298	7.80	131.51	139.31	0.0179	0.3198	7.25	122.74	2.1890	1.5804	2596.4	730.6
-23	203.24	0.01486	0.4400	67.30	2.2725	8.30	131.03	139.33	0.0190	0.3191	7.74	122.77	2.1945	1.5851	2582.9	730.4
-22	207.08	0.01489	0.4318	67.16	2.3160	8.79	130.56	139.35	0.0201	0.3184	8.22	122.80	2.2001	1.5898	2569.5	730.1
-21	210.97	0.01492	0.4237	67.01	2.3601	9.29	130.08	139.37	0.0212	0.3178	8.70	122.82	2.2058	1.5947	2556.0	729.8
-20	214.91	0.01496	0.4158	66.86	2.4049	9.78	129.61	139.39	0.0223	0.3171	9.19	122.84	2.2116	1.5996	2542.4	729.5
-19	218.91	0.01499	0.4081	66.71	2.4505	10.28	129.12	139.40	0.0234	0.3165	9.67	122.86	2.2174	1.6047	2528.9	729.2
-18	222.97	0.01502	0.4005	66.57	2.4967	10.78	128.64	139.42	0.0245	0.3158	10.16	122.88	2.2234	1.6099	2515.3	728.9
-17	227.07	0.01506	0.3931	66.42	2.5437	11.28	128.15	139.43	0.0257	0.3151	10.65	122.90	2.2294	1.6152	2501.7	728.6
-16	231.24	0.01509	0.3859	66.27	2.5915	11.78	127.66	139.44	0.0268	0.3145	11.14	122.92	2.2356	1.6206	2488.0	728.2
-15	235.45	0.01513	0.3788	66.11	2.6400	12.28	127.17	139.45	0.0279	0.3138	11.62	122.93	2.2418	1.6261	2474.4	727.9
-14	239.73	0.01516	0.3719	65.96	2.6893	12.79	126.66	139.45	0.0290	0.3132	12.11	122.94	2.2481	1.6318	2460.7	727.5
-13	244.06	0.01520	0.3651	65.81	2.7393	13.29	126.16	139.45	0.0301	0.3125	12.60	122.96	2.2546	1.6376	2446.9	727.1
-12	248.45	0.01523	0.3584	65.66	2.7902	13.79	125.66	139.45	0.0312	0.3119	13.09	122.97	2.2611	1.6435	2433.1	726.7
-11	252.90	0.01527	0.3519	65.50	2.8419	14.30	125.15	139.45	0.0323	0.3112	13.59	122.98	2.2678	1.6495	2419.3	726.3
-10	257.40	0.01530	0.3455	65.35	2.8944	14.81	124.64	139.45	0.0334	0.3106	14.08	122.98	2.2745	1.6557	2405.5	725.9
-9	261.96	0.01534	0.3393	65.19	2.9477	15.32	124.13	139.44	0.0345	0.3099	14.57	122.99	2.2814	1.6621	2391.5	725.5
-8	266.58	0.01538	0.3331	65.04	3.0019	15.82	123.62	139.44	0.0356	0.3092	15.07	122.99	2.2884	1.6685	2377.6	725.0
-7	271.27	0.01541	0.3271	64.88	3.0570	16.34	123.10	139.43	0.0367	0.3086	15.56	123.00	2.2955	1.6752	2363.6	724.6
-6	276.01	0.01545	0.3212	64.72	3.1129	16.85	122.56	139.41	0.0378	0.3079	16.06	123.00	2.3027	1.6820	2349.5	724.1
-5	280.81	0.01549	0.3155	64.56	3.1697	17.36	122.04	139.40	0.0389	0.3073	16.55	123.00	2.3100	1.6889	2335.4	723.6
-4	285.67	0.01553	0.3098	64.40	3.2275	17.87	121.51	139.38	0.0400	0.3066	17.05	122.99	2.3174	1.6960	2321.3	723.1
-3	290.59	0.01557	0.3043	64.24	3.2862	18.39	120.97	139.36	0.0411	0.3060	17.55	122.99	2.3250	1.7033	2307.0	722.6
-2	295.58	0.01561	0.2989	64.08	3.3458	18.91	120.44	139.34	0.0422	0.3053	18.05	122.98	2.3326	1.7108	2292.8	722.1
-1	300.63	0.01564	0.2936	63.92	3.4064	19.42	119.90	139.32	0.0433	0.3047	18.55	122.98	2.3404	1.7184	2278.4	721.5
0	305.74	0.01569	0.2884	63.76	3.4680	19.94	119.35	139.29	0.0444	0.3040	19.06	122.97	2.3484	1.7262	2264.0	721.0
1	310.91	0.01573	0.2832	63.59	3.5305	20.46	118.80	139.26	0.0455	0.3033	19.56	122.95	2.3564	1.7343	2249.5	720.4
2	316.15	0.01577	0.2782	63.43	3.5941	20.99	118.25	139.23	0.0466	0.3027	20.06	122.94	2.3646	1.7425	2235.0	719.8
3	321.45	0.01581	0.2733	63.26	3.6587	21.51	117.69	139.20	0.0477	0.3020	20.57	122.93	2.3728	1.7509	2220.3	719.2
4	326.82	0.01585	0.2685	63.09	3.7244	22.03	117.13	139.16	0.0488	0.3014	21.07	122.91	2.3813	1.7596	2205.6	718.6
5	332.25	0.01589	0.2638	62.93	3.7911	22.56	116.56	139.12	0.0498	0.3007	21.58	122.89	2.3898	1.7685	2190.8	718.0
6	337.75	0.01593	0.2591	62.76	3.8590	23.09	115.99	139.08	0.0509	0.3000	22.09	122.87	2.3985	1.7776	2176.0	717.4
7	343.31	0.01598	0.2546	62.59	3.9279	23.62	115.41	139.03	0.0521	0.2994	22.60	122.84	2.4073	1.7869	2161.0	716.7
8	348.94	0.01602	0.2501	62.42	3.9980	24.15	114.83	138.98	0.0532	0.2987	23.11	122.82	2.4162	1.7965	2146.0	716.1
9	354.64	0.01607	0.2457	62.24	4.0693	24.68	114.25	138.93	0.0543	0.2980	23.63	122.79	2.4253	1.8064	2130.9	715.4
10	360.41	0.01611	0.2414	62.07	4.1418	25.22	113.67	138.88	0.0554	0.2974	24.14	122.76	2.4345	1.8166	2115.7	714.7



Temp. (°F)	Pressure (psia)	Volume (ft ³ /lbm)		Density (lbm/ft ³)		Enthalpy (Btu/lbm)			Entropy (Btu/lbm-°R)		Int. Energy (Btu/lbm)		Cp/Cv		Sound Speed (ft/s)	
		Liquid	Vapor	Liquid	Vapor	Liquid	Latent	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
11	366.24	0.01616	0.2372	61.89	4.2154	25.75	113.07	138.82	0.0565	0.2967	24.66	122.73	2.4439	1.8270	2100.4	714.0
12	372.14	0.01620	0.2331	61.72	4.2903	26.29	112.47	138.76	0.0576	0.2960	25.17	122.70	2.4534	1.8377	2085.0	713.3
13	378.12	0.01625	0.2290	61.54	4.3665	26.83	111.86	138.69	0.0587	0.2953	25.69	122.66	2.4631	1.8487	2069.5	712.5
14	384.16	0.01630	0.2250	61.36	4.4439	27.37	111.26	138.63	0.0598	0.2947	26.21	122.62	2.4729	1.8601	2054.0	711.8
15	390.27	0.01635	0.2211	61.18	4.5227	27.91	110.65	138.56	0.0609	0.2940	26.73	122.58	2.4829	1.8717	2038.3	711.0
16	396.45	0.01639	0.2173	61.00	4.6028	28.46	110.02	138.48	0.0620	0.2933	27.25	122.54	2.4931	1.8837	2022.6	710.2
17	402.71	0.01644	0.2135	60.82	4.6843	29.00	109.41	138.41	0.0631	0.2926	27.78	122.49	2.5034	1.8961	2006.8	709.4
18	409.03	0.01649	0.2098	60.64	4.7672	29.55	108.78	138.33	0.0642	0.2919	28.30	122.44	2.5140	1.9089	1990.9	708.6
19	415.43	0.01654	0.2061	60.45	4.8515	30.10	108.14	138.24	0.0653	0.2912	28.83	122.39	2.5248	1.9220	1974.9	707.8
20	421.91	0.01659	0.2025	60.26	4.9373	30.66	107.50	138.16	0.0664	0.2905	29.36	122.33	2.5357	1.9356	1958.8	707.0
21	428.45	0.01665	0.1990	60.08	5.0246	31.21	106.86	138.07	0.0675	0.2898	29.89	122.28	2.5469	1.9495	1942.6	706.1
22	435.07	0.01670	0.1956	59.89	5.1135	31.77	106.20	137.97	0.0687	0.2892	30.42	122.22	2.5584	1.9640	1926.4	705.2
23	441.77	0.01675	0.1922	59.69	5.2039	32.33	105.54	137.87	0.0698	0.2884	30.96	122.15	2.5701	1.9789	1910.1	704.3
24	448.54	0.01681	0.1888	59.50	5.2960	32.89	104.88	137.77	0.0709	0.2877	31.49	122.09	2.5821	1.9942	1893.7	703.4
25	455.38	0.01686	0.1855	59.31	5.3897	33.45	104.22	137.67	0.0720	0.2870	32.03	122.02	2.5944	2.0101	1877.2	702.5
26	462.31	0.01692	0.1823	59.11	5.4851	34.02	103.54	137.56	0.0731	0.2863	32.57	121.95	2.6070	2.0266	1860.7	701.6
27	469.30	0.01697	0.1791	58.91	5.5823	34.59	102.85	137.44	0.0743	0.2856	33.11	121.87	2.6199	2.0435	1844.0	700.7
28	476.38	0.01703	0.1760	58.71	5.6812	35.16	102.16	137.32	0.0754	0.2849	33.66	121.80	2.6332	2.0611	1827.4	699.7
29	483.54	0.01709	0.1730	58.51	5.7820	35.73	101.47	137.20	0.0765	0.2842	34.20	121.71	2.6469	2.0793	1810.6	698.7
30	490.77	0.01715	0.1699	58.31	5.8847	36.31	100.76	137.07	0.0776	0.2834	34.75	121.63	2.6609	2.0982	1793.8	697.7
31	498.08	0.01721	0.1670	58.11	5.9893	36.89	100.05	136.94	0.0788	0.2827	35.30	121.54	2.6755	2.1177	1776.9	696.7
32	505.48	0.01727	0.1640	57.90	6.0959	37.47	99.33	136.80	0.0799	0.2820	35.85	121.45	2.6905	2.1380	1760.0	695.7
33	512.95	0.01733	0.1612	57.69	6.2046	38.06	98.61	136.66	0.0811	0.2812	36.41	121.35	2.7060	2.1590	1743.0	694.6
34	520.51	0.01740	0.1583	57.48	6.3154	38.64	97.87	136.51	0.0822	0.2805	36.97	121.25	2.7220	2.1808	1726.0	693.6
35	528.14	0.01746	0.1556	57.27	6.4283	39.23	97.13	136.36	0.0833	0.2797	37.53	121.15	2.7386	2.2035	1708.9	692.5
36	535.86	0.01753	0.1528	57.05	6.5435	39.83	96.38	136.21	0.0845	0.2789	38.09	121.04	2.7559	2.2271	1691.7	691.4
37	543.67	0.01760	0.1501	56.83	6.6610	40.43	95.62	136.04	0.0856	0.2782	38.65	120.93	2.7738	2.2516	1674.5	690.3
38	551.55	0.01766	0.1475	56.61	6.7809	41.03	94.86	135.88	0.0868	0.2774	39.22	120.81	2.7924	2.2771	1657.3	689.1
39	559.52	0.01773	0.1449	56.39	6.9032	41.63	94.07	135.70	0.0880	0.2766	39.79	120.69	2.8117	2.3037	1640.0	688.0
40	567.58	0.01781	0.1423	56.17	7.0281	42.24	93.28	135.52	0.0891	0.2758	40.37	120.57	2.8319	2.3314	1622.6	686.8
41	575.72	0.01788	0.1398	55.94	7.1556	42.85	92.49	135.34	0.0903	0.2750	40.94	120.44	2.8529	2.3603	1605.3	685.6
42	583.95	0.01795	0.1373	55.71	7.2858	43.46	91.68	135.14	0.0915	0.2742	41.52	120.30	2.8749	2.3905	1587.8	684.4
43	592.27	0.01803	0.1348	55.47	7.4188	44.08	90.87	134.95	0.0926	0.2734	42.11	120.16	2.8978	2.4221	1570.4	683.2
44	600.67	0.01810	0.1324	55.24	7.5547	44.71	90.03	134.74	0.0938	0.2726	42.69	120.02	2.9218	2.4551	1552.8	681.9
45	609.16	0.01818	0.1300	55.00	7.6936	45.33	89.20	134.53	0.0950	0.2718	43.28	119.87	2.9470	2.4897	1535.3	680.6
46	617.75	0.01826	0.1276	54.76	7.8356	45.97	88.35	134.31	0.0962	0.2709	43.88	119.71	2.9733	2.5260	1517.7	679.3
47	626.42	0.01834	0.1253	54.51	7.9809	46.60	87.48	134.08	0.0974	0.2701	44.47	119.55	3.0010	2.5640	1500.0	678.0
48	635.18	0.01843	0.1230	54.27	8.1296	47.24	86.61	133.85	0.0986	0.2692	45.08	119.38	3.0301	2.6040	1482.3	676.7
49	644.04	0.01851	0.1208	54.01	8.2817	47.89	85.72	133.61	0.0998	0.2683	45.68	119.21	3.0608	2.6460	1464.6	675.3
50	652.99	0.01860	0.1185	53.76	8.4375	48.54	84.82	133.36	0.1010	0.2675	46.29	119.03	3.0931	2.6903	1446.7	673.9

R-744

Carbon Dioxide

CO2



Temp. (°F)	Pressure (psia)	Volume (ft ³ /lbm)		Density (lbm/ft ³)		Enthalpy (Btu/lbm)			Entropy (Btu/lbm-°R)		Int. Energy (Btu/lbm)		Cp/Cv		Sound Speed (ft/s)	
		Liquid	Vapor	Liquid	Vapor	Liquid	Latent	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
51	662.03	0.01869	0.1163	53.50	8.5972	49.20	83.90	133.10	0.1023	0.2666	46.90	118.84	3.1272	2.7370	1428.9	672.5
52	671.16	0.01878	0.1142	53.24	8.7608	49.86	82.97	132.83	0.1035	0.2657	47.52	118.64	3.1632	2.7863	1410.9	671.1
53	680.39	0.01888	0.1120	52.97	8.9285	50.53	82.02	132.55	0.1047	0.2647	48.15	118.44	3.2013	2.8385	1392.9	669.6
54	689.72	0.01898	0.1099	52.70	9.1006	51.20	81.07	132.27	0.1060	0.2638	48.78	118.23	3.2417	2.8938	1374.9	668.1
55	699.15	0.01908	0.1078	52.42	9.2772	51.88	80.09	131.97	0.1073	0.2629	49.41	118.01	3.2845	2.9524	1356.7	666.6
56	708.67	0.01918	0.1057	52.14	9.4586	52.57	79.09	131.66	0.1085	0.2619	50.05	117.79	3.3300	3.0147	1338.5	665.0
57	718.29	0.01929	0.1037	51.85	9.6450	53.26	78.08	131.34	0.1098	0.2609	50.70	117.55	3.3785	3.0811	1320.1	663.4
58	728.01	0.01939	0.1017	51.56	9.8368	53.96	77.05	131.01	0.1111	0.2599	51.35	117.31	3.4301	3.1519	1301.7	661.8
59	737.83	0.01951	0.0997	51.27	10.0340	54.67	76.00	130.67	0.1124	0.2589	52.01	117.05	3.4852	3.2276	1283.1	660.1
60	747.75	0.01962	0.0977	50.96	10.2370	55.39	74.92	130.31	0.1137	0.2579	52.68	116.79	3.5442	3.3088	1264.5	658.4
61	757.78	0.01974	0.0957	50.66	10.4470	56.12	73.82	129.94	0.1150	0.2568	53.35	116.51	3.6074	3.3960	1245.6	656.7
62	767.91	0.01987	0.0938	50.34	10.6620	56.86	72.71	129.56	0.1164	0.2557	54.03	116.22	3.6753	3.4899	1226.6	654.9
63	778.14	0.01999	0.0919	50.02	10.8850	57.60	71.56	129.16	0.1177	0.2546	54.72	115.92	3.7483	3.5914	1207.4	653.1
64	788.48	0.02013	0.0900	49.69	11.1160	58.36	70.38	128.74	0.1191	0.2535	55.42	115.61	3.8271	3.7014	1188.0	651.3
65	798.93	0.02026	0.0881	49.35	11.3540	59.13	69.18	128.31	0.1205	0.2524	56.13	115.28	3.9123	3.8209	1168.4	649.4
66	809.48	0.02041	0.0862	49.00	11.6010	59.91	67.95	127.86	0.1219	0.2512	56.85	114.94	4.0048	3.9514	1148.5	647.4
67	820.15	0.02056	0.0843	48.65	11.8580	60.70	66.69	127.39	0.1233	0.2500	57.58	114.58	4.1055	4.0943	1128.3	645.4
68	830.93	0.02071	0.0825	48.28	12.1240	61.51	65.40	126.90	0.1248	0.2487	58.32	114.20	4.2156	4.2515	1107.8	643.4
69	841.82	0.02088	0.0806	47.91	12.4000	62.33	64.05	126.38	0.1263	0.2474	59.07	113.81	4.3364	4.4253	1086.9	641.2
70	852.82	0.02105	0.0788	47.52	12.6890	63.17	62.68	125.84	0.1278	0.2461	59.84	113.39	4.4697	4.6183	1065.5	639.0
71	863.95	0.02122	0.0770	47.12	12.9900	64.02	61.25	125.27	0.1293	0.2447	60.62	112.96	4.6178	4.8340	1043.8	636.7
72	875.18	0.02141	0.0752	46.70	13.3050	64.90	59.78	124.67	0.1309	0.2433	61.42	112.49	4.7833	5.0766	1021.4	634.3
73	886.54	0.02161	0.0733	46.27	13.6360	65.79	58.25	124.04	0.1325	0.2418	62.24	112.00	4.9698	5.3514	998.5	631.9
74	898.02	0.02182	0.0715	45.82	13.9840	66.71	56.67	123.38	0.1341	0.2403	63.08	111.49	5.1818	5.6654	975.0	629.2
75	909.62	0.02205	0.0697	45.36	14.3510	67.66	55.01	122.67	0.1358	0.2387	63.94	110.93	5.4254	6.0274	950.8	626.5
76	921.35	0.02229	0.0678	44.87	14.7400	68.63	53.29	121.92	0.1375	0.2370	64.83	110.34	5.7085	6.4497	925.7	623.6
77	933.21	0.02255	0.0660	44.36	15.1530	69.64	51.48	121.12	0.1393	0.2352	65.75	109.71	6.0420	6.9487	899.8	620.5
78	945.20	0.02283	0.0641	43.81	15.5950	70.69	49.56	120.25	0.1412	0.2333	66.70	109.03	6.4409	7.5476	873.0	617.1
79	957.32	0.02313	0.0622	43.24	16.0710	71.79	47.53	119.32	0.1431	0.2314	67.69	108.29	6.9269	8.2804	845.0	613.5
80	969.57	0.02346	0.0603	42.62	16.5870	72.95	45.37	118.31	0.1452	0.2292	68.73	107.48	7.5324	9.1985	815.9	609.5
81	981.97	0.02384	0.0583	41.95	17.1510	74.17	43.03	117.20	0.1473	0.2269	69.83	106.60	8.3087	10.3840	785.4	605.0
82	994.51	0.02426	0.0563	41.22	17.7770	75.48	40.49	115.96	0.1496	0.2244	71.01	105.60	9.3427	11.9770	753.0	599.8
83	1007.20	0.02475	0.0541	40.41	18.4830	76.89	37.68	114.57	0.1521	0.2216	72.28	104.47	10.7970	14.2380	718.2	593.8
84	1020.10	0.02532	0.0518	39.49	19.2990	78.46	34.49	112.95	0.1549	0.2184	73.68	103.16	13.0110	17.7050	679.9	586.4
85	1033.10	0.02604	0.0493	38.41	20.2800	80.26	30.75	111.01	0.1581	0.2146	75.28	101.57	16.8370	23.7120	635.8	576.6
86	1046.30	0.02700	0.0464	37.04	21.5440	82.45	26.06	108.51	0.1620	0.2098	77.22	99.52	25.1290	36.6570	581.5	561.9
87	1059.60	0.02854	0.0426	35.03	23.4540	85.53	19.25	104.78	0.1675	0.2027	79.93	96.41	56.3830	83.9760	505.4	531.9