



Opteon™ XL41

Refrigerant

Thermodynamic Properties of Opteon™ XL41 (R-454B) Engineering (I/P) Units

Physical Properties

Molecular Weight	62.6 lb/lb-mole
Boiling Point at One Atmosphere	-58.9 °F
Critical Temperature	172.6 °F
Critical Pressure	763.9 psia
Critical Density	27.66 lb/ft ³
Critical Volume	0.0362 ft ³ /lb
Ozone Depletion Potential	0
Global Warming Potential (AR4)	466
ASHRAE Standard 34 Safety Rating	A2L

Units and Factors

t	= temperature in °F
P	= pressure in lb/in ² absolute (psia)
v_f	= volume of saturated liquid in ft ³ /lb
v_g	= volume of saturated vapor in ft ³ /lb
V	= volume of superheated vapor in ft ³ /lb
$d_f = 1/v_f$	= density of saturated liquid in lb/ft ³
$d_g = 1/v_g$	= density of saturated vapor in lb/ft ³
h_f	= enthalpy of saturated liquid in Btu/lb
h_{fg}	= enthalpy of vaporization in Btu/lb
h_g	= enthalpy of saturated vapor in Btu/lb
H	= enthalpy of superheated vapor in Btu/lb
s_f	= entropy of saturated liquid in Btu/(lb) (°R)
s_g	= entropy of saturated vapor in Btu/(lb) (°R)
S	= entropy of superheated vapor in Btu/(lb) (°R)

One atmosphere = 14.696 psia

Reference point for enthalpy and entropy:

$h_f = 0.0$ Btu/lb at -40°F

$s_f = 0.0$ Btu/lb·°R at -40°F

This information is based on NIST Standard Database 23, Version 10 (Lemmon, E.W.; Huber, M.L.; McLinden, M.O.; REFPROP Reference Fluid Thermodynamic and Transport Properties - National Institute of Standards and Technology, 2013).

Opteon™ XL41 (R-454B)
Saturation Properties - Temperature Table

Temp °F	Pressure [psia]		Volume [ft ³ /lb]		Density [lb/ft ³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp °F
	Liquid P _l	Vapor P _g	Liquid v _f	Vapor v _g	Liquid d _l	Vapor d _g	Liquid h _f	Latent h _{fg}	Vapor h _g	Liquid s _f	Vapor s _g	
-40	24.23	23.09	0.0133	2.9353	75.459	0.3407	0.00	131.54	131.54	0.00000	0.31433	-40
-39	24.84	23.68	0.0133	2.8664	75.358	0.3489	0.36	131.31	131.66	0.00085	0.31387	-39
-38	25.47	24.27	0.0133	2.7994	75.257	0.3572	0.71	131.07	131.79	0.00169	0.31341	-38
-37	26.10	24.89	0.0133	2.7343	75.156	0.3657	1.07	130.84	131.91	0.00253	0.31296	-37
-36	26.76	25.51	0.0133	2.6711	75.054	0.3744	1.43	130.60	132.03	0.00337	0.31251	-36
-35	27.42	26.14	0.0133	2.6096	74.952	0.3832	1.79	130.36	132.15	0.00421	0.31206	-35
-34	28.10	26.79	0.0134	2.5498	74.850	0.3922	2.14	130.13	132.27	0.00505	0.31162	-34
-33	28.79	27.45	0.0134	2.4917	74.748	0.4013	2.50	129.89	132.39	0.00589	0.31118	-33
-32	29.49	28.13	0.0134	2.4351	74.646	0.4107	2.86	129.65	132.51	0.00672	0.31074	-32
-31	30.20	28.81	0.0134	2.3801	74.543	0.4201	3.22	129.41	132.63	0.00756	0.31030	-31
-30	30.93	29.51	0.0134	2.3266	74.440	0.4298	3.58	129.17	132.75	0.00839	0.30987	-30
-29	31.68	30.22	0.0135	2.2746	74.337	0.4396	3.94	128.93	132.87	0.00922	0.30944	-29
-28	32.43	30.95	0.0135	2.2239	74.234	0.4497	4.30	128.68	132.98	0.01005	0.30901	-28
-27	33.20	31.69	0.0135	2.1746	74.130	0.4599	4.66	128.44	133.10	0.01088	0.30858	-27
-26	33.99	32.44	0.0135	2.1266	74.026	0.4702	5.02	128.20	133.22	0.01171	0.30816	-26
-25	34.79	33.21	0.0135	2.0799	73.922	0.4808	5.38	127.95	133.33	0.01254	0.30774	-25
-24	35.60	33.99	0.0135	2.0345	73.818	0.4915	5.74	127.71	133.45	0.01336	0.30732	-24
-23	36.43	34.78	0.0136	1.9902	73.714	0.5025	6.10	127.46	133.56	0.01419	0.30691	-23
-22	37.27	35.59	0.0136	1.9471	73.609	0.5136	6.47	127.21	133.68	0.01501	0.30649	-22
-21	38.13	36.41	0.0136	1.9051	73.504	0.5249	6.83	126.96	133.79	0.01583	0.30608	-21
-20	39.01	37.25	0.0136	1.8642	73.398	0.5364	7.19	126.71	133.90	0.01665	0.30568	-20
-19	39.90	38.10	0.0136	1.8244	73.293	0.5481	7.55	126.46	134.02	0.01747	0.30527	-19
-18	40.80	38.97	0.0137	1.7855	73.187	0.5601	7.92	126.21	134.13	0.01829	0.30487	-18
-17	41.72	39.85	0.0137	1.7477	73.081	0.5722	8.28	125.96	134.24	0.01911	0.30447	-17
-16	42.66	40.75	0.0137	1.7109	72.975	0.5845	8.65	125.71	134.35	0.01992	0.30407	-16
-15	43.61	41.67	0.0137	1.6749	72.868	0.5970	9.01	125.45	134.46	0.02074	0.30367	-15
-14	44.58	42.60	0.0137	1.6399	72.762	0.6098	9.38	125.20	134.57	0.02155	0.30328	-14
-13	45.57	43.54	0.0138	1.6058	72.654	0.6228	9.74	124.94	134.68	0.02237	0.30289	-13
-12	46.57	44.50	0.0138	1.5725	72.547	0.6359	10.11	124.69	134.79	0.02318	0.30250	-12
-11	47.59	45.48	0.0138	1.5400	72.440	0.6493	10.47	124.43	134.90	0.02399	0.30211	-11
-10	48.62	46.48	0.0138	1.5083	72.332	0.6630	10.84	124.17	135.01	0.02480	0.30172	-10
-9	49.68	47.49	0.0138	1.4775	72.223	0.6768	11.21	123.91	135.11	0.02561	0.30134	-9
-8	50.75	48.52	0.0139	1.4473	72.115	0.6909	11.57	123.65	135.22	0.02642	0.30096	-8
-7	51.84	49.56	0.0139	1.4180	72.006	0.7052	11.94	123.39	135.33	0.02723	0.30058	-7
-6	52.94	50.63	0.0139	1.3893	71.897	0.7198	12.31	123.12	135.43	0.02803	0.30020	-6
-5	54.07	51.71	0.0139	1.3613	71.788	0.7346	12.68	122.86	135.54	0.02884	0.29983	-5
-4	55.21	52.81	0.0140	1.3340	71.678	0.7496	13.05	122.59	135.64	0.02964	0.29946	-4
-3	56.37	53.92	0.0140	1.3074	71.569	0.7649	13.42	122.33	135.74	0.03045	0.29908	-3
-2	57.55	55.06	0.0140	1.2814	71.458	0.7804	13.79	122.06	135.85	0.03125	0.29871	-2
-1	58.75	56.21	0.0140	1.2560	71.348	0.7962	14.16	121.79	135.95	0.03205	0.29835	-1
0	59.97	57.38	0.0140	1.2312	71.237	0.8122	14.53	121.52	136.05	0.03285	0.29798	0
1	61.21	58.57	0.0141	1.2070	71.126	0.8285	14.90	121.25	136.15	0.03365	0.29762	1
2	62.46	59.78	0.0141	1.1833	71.015	0.8451	15.27	120.98	136.25	0.03445	0.29725	2
3	63.74	61.00	0.0141	1.1602	70.903	0.8619	15.64	120.71	136.35	0.03525	0.29689	3
4	65.04	62.25	0.0141	1.1377	70.791	0.8790	16.02	120.43	136.45	0.03605	0.29653	4
5	66.35	63.52	0.0141	1.1157	70.679	0.8963	16.39	120.16	136.55	0.03684	0.29618	5
6	67.69	64.80	0.0142	1.0941	70.566	0.9140	16.76	119.88	136.65	0.03764	0.29582	6
7	69.04	66.11	0.0142	1.0731	70.453	0.9319	17.14	119.61	136.74	0.03843	0.29547	7
8	70.42	67.43	0.0142	1.0526	70.340	0.9501	17.51	119.33	136.84	0.03923	0.29511	8
9	71.82	68.78	0.0142	1.0325	70.226	0.9685	17.89	119.05	136.93	0.04002	0.29476	9
10	73.24	70.14	0.0143	1.0129	70.112	0.9873	18.26	118.77	137.03	0.04081	0.29441	10
11	74.68	71.53	0.0143	0.9937	69.998	1.0064	18.64	118.48	137.12	0.04160	0.29406	11
12	76.14	72.94	0.0143	0.9749	69.883	1.0257	19.02	118.20	137.22	0.04240	0.29372	12
13	77.63	74.37	0.0143	0.9566	69.768	1.0454	19.39	117.92	137.31	0.04319	0.29337	13
14	79.13	75.82	0.0144	0.9387	69.653	1.0653	19.77	117.63	137.40	0.04398	0.29303	14
15	80.66	77.29	0.0144	0.9212	69.537	1.0856	20.15	117.34	137.49	0.04476	0.29269	15
16	82.21	78.78	0.0144	0.9040	69.421	1.1062	20.53	117.05	137.58	0.04555	0.29235	16
17	83.78	80.29	0.0144	0.8873	69.305	1.1271	20.91	116.76	137.67	0.04634	0.29201	17
18	85.38	81.83	0.0145	0.8709	69.188	1.1483	21.29	116.47	137.76	0.04713	0.29167	18

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Saturation Properties - Temperature Table

Temp °F	Pressure [psia]		Volume [ft ³ /lb]		Density [lb/ft ³]		Enthalpy [Btu/lb]			Entropy [Btu/lb-°R]		Temp °F
	Liquid P _l	Vapor P _g	Liquid v _f	Vapor v _g	Liquid d _l	Vapor d _g	Liquid h _f	Latent h _{fg}	Vapor h _g	Liquid s _f	Vapor s _g	
19	87.00	83.39	0.0145	0.8548	69.071	1.1698	21.67	116.18	137.85	0.04791	0.29133	19
20	88.64	84.97	0.0145	0.8391	68.954	1.1917	22.05	115.89	137.93	0.04870	0.29099	20
21	90.30	86.58	0.0145	0.8238	68.836	1.2139	22.43	115.59	138.02	0.04949	0.29066	21
22	91.99	88.21	0.0146	0.8088	68.718	1.2365	22.81	115.29	138.11	0.05027	0.29032	22
23	93.70	89.86	0.0146	0.7941	68.599	1.2593	23.19	115.00	138.19	0.05105	0.28999	23
24	95.44	91.53	0.0146	0.7797	68.480	1.2826	23.58	114.70	138.27	0.05184	0.28966	24
25	97.20	93.23	0.0146	0.7656	68.361	1.3062	23.96	114.40	138.36	0.05262	0.28933	25
26	98.98	94.95	0.0147	0.7518	68.241	1.3301	24.34	114.09	138.44	0.05340	0.28900	26
27	100.79	96.70	0.0147	0.7383	68.121	1.3544	24.73	113.79	138.52	0.05418	0.28867	27
28	102.63	98.47	0.0147	0.7251	68.000	1.3791	25.11	113.49	138.60	0.05496	0.28834	28
29	104.49	100.26	0.0147	0.7122	67.879	1.4041	25.50	113.18	138.68	0.05575	0.28802	29
30	106.37	102.08	0.0148	0.6995	67.758	1.4295	25.89	112.87	138.76	0.05653	0.28769	30
31	108.28	103.92	0.0148	0.6871	67.636	1.4553	26.28	112.56	138.84	0.05730	0.28737	31
32	110.22	105.79	0.0148	0.6750	67.514	1.4815	26.66	112.25	138.91	0.05808	0.28704	32
33	112.18	107.69	0.0148	0.6631	67.391	1.5081	27.05	111.94	138.99	0.05886	0.28672	33
34	114.17	109.61	0.0149	0.6514	67.268	1.5351	27.44	111.62	139.06	0.05964	0.28640	34
35	116.18	111.55	0.0149	0.6400	67.144	1.5624	27.83	111.31	139.14	0.06042	0.28608	35
36	118.23	113.53	0.0149	0.6288	67.020	1.5902	28.22	110.99	139.21	0.06120	0.28575	36
37	120.30	115.53	0.0149	0.6179	66.896	1.6184	28.61	110.67	139.28	0.06197	0.28543	37
38	122.39	117.55	0.0150	0.6071	66.771	1.6470	29.00	110.35	139.35	0.06275	0.28512	38
39	124.51	119.60	0.0150	0.5966	66.646	1.6761	29.40	110.02	139.42	0.06353	0.28480	39
40	126.66	121.68	0.0150	0.5863	66.520	1.7056	29.79	109.70	139.49	0.06430	0.28448	40
41	128.84	123.79	0.0151	0.5762	66.393	1.7355	30.18	109.37	139.56	0.06508	0.28416	41
42	131.05	125.92	0.0151	0.5663	66.267	1.7658	30.58	109.05	139.63	0.06585	0.28384	42
43	133.28	128.08	0.0151	0.5566	66.139	1.7966	30.97	108.72	139.69	0.06663	0.28353	43
44	135.55	130.27	0.0151	0.5471	66.012	1.8279	31.37	108.39	139.76	0.06740	0.28321	44
45	137.84	132.49	0.0152	0.5377	65.883	1.8596	31.77	108.05	139.82	0.06818	0.28289	45
46	140.16	134.74	0.0152	0.5286	65.755	1.8918	32.16	107.72	139.88	0.06895	0.28258	46
47	142.51	137.01	0.0152	0.5196	65.625	1.9245	32.56	107.38	139.94	0.06972	0.28226	47
48	144.89	139.32	0.0153	0.5108	65.495	1.9576	32.96	107.04	140.00	0.07050	0.28195	48
49	147.30	141.65	0.0153	0.5022	65.365	1.9913	33.36	106.70	140.06	0.07127	0.28164	49
50	149.74	144.01	0.0153	0.4937	65.234	2.0254	33.76	106.36	140.12	0.07204	0.28132	50
51	152.21	146.40	0.0154	0.4854	65.103	2.0601	34.16	106.01	140.18	0.07282	0.28101	51
52	154.71	148.83	0.0154	0.4773	64.971	2.0952	34.57	105.67	140.23	0.07359	0.28070	52
53	157.24	151.28	0.0154	0.4693	64.838	2.1309	34.97	105.32	140.29	0.07436	0.28038	53
54	159.80	153.76	0.0155	0.4614	64.705	2.1671	35.37	104.97	140.34	0.07513	0.28007	54
55	162.40	156.28	0.0155	0.4537	64.572	2.2039	35.78	104.62	140.39	0.07591	0.27976	55
56	165.02	158.82	0.0155	0.4462	64.437	2.2412	36.18	104.26	140.44	0.07668	0.27944	56
57	167.68	161.40	0.0156	0.4388	64.303	2.2790	36.59	103.90	140.49	0.07745	0.27913	57
58	170.36	164.00	0.0156	0.4315	64.167	2.3174	37.00	103.55	140.54	0.07822	0.27882	58
59	173.08	166.64	0.0156	0.4244	64.031	2.3564	37.40	103.19	140.59	0.07899	0.27850	59
60	175.84	169.31	0.0157	0.4174	63.895	2.3959	37.81	102.82	140.63	0.07977	0.27819	60
61	178.62	172.02	0.0157	0.4105	63.757	2.4361	38.22	102.46	140.68	0.08054	0.27788	61
62	181.44	174.75	0.0157	0.4037	63.619	2.4768	38.63	102.09	140.72	0.08131	0.27757	62
63	184.29	177.52	0.0158	0.3971	63.481	2.5181	39.04	101.72	140.76	0.08208	0.27725	63
64	187.17	180.32	0.0158	0.3906	63.342	2.5601	39.46	101.35	140.80	0.08285	0.27694	64
65	190.09	183.16	0.0158	0.3842	63.202	2.6027	39.87	100.97	140.84	0.08363	0.27662	65
66	193.04	186.02	0.0159	0.3779	63.061	2.6459	40.28	100.60	140.88	0.08440	0.27631	66
67	196.03	188.93	0.0159	0.3718	62.920	2.6898	40.70	100.22	140.92	0.08517	0.27600	67
68	199.05	191.86	0.0159	0.3657	62.778	2.7343	41.11	99.84	140.95	0.08594	0.27568	68
69	202.11	194.83	0.0160	0.3598	62.636	2.7795	41.53	99.45	140.98	0.08672	0.27537	69
70	205.20	197.84	0.0160	0.3539	62.492	2.8254	41.95	99.07	141.02	0.08749	0.27505	70
71	208.32	200.88	0.0160	0.3482	62.348	2.8720	42.37	98.68	141.05	0.08826	0.27474	71
72	211.48	203.95	0.0161	0.3426	62.204	2.9192	42.79	98.29	141.07	0.08903	0.27442	72
73	214.68	207.06	0.0161	0.3370	62.058	2.9672	43.21	97.89	141.10	0.08981	0.27410	73
74	217.91	210.21	0.0162	0.3316	61.912	3.0160	43.63	97.49	141.13	0.09058	0.27378	74
75	221.18	213.39	0.0162	0.3262	61.765	3.0654	44.06	97.09	141.15	0.09136	0.27347	75
76	224.48	216.61	0.0162	0.3210	61.617	3.1156	44.48	96.69	141.17	0.09213	0.27315	76
77	227.83	219.87	0.0163	0.3158	61.468	3.1666	44.90	96.29	141.19	0.09290	0.27283	77

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	Liquid P _l	Vapor P _g	Liquid v _f	Vapor v _g	Liquid d _l	Vapor d _g	Liquid h _f	Latent h _{fg}	Vapor h _g	Liquid s _f	Vapor s _g	
78	231.21	223.16	0.0163	0.3107	61.319	3.2184	45.33	95.88	141.21	0.09368	0.27251	78
79	234.62	226.49	0.0163	0.3057	61.168	3.2709	45.76	95.47	141.23	0.09446	0.27218	79
80	238.08	229.86	0.0164	0.3008	61.017	3.3243	46.19	95.06	141.24	0.09523	0.27186	80
81	241.57	233.26	0.0164	0.2960	60.865	3.3785	46.62	94.64	141.26	0.09601	0.27154	81
82	245.10	236.71	0.0165	0.2912	60.712	3.4335	47.05	94.22	141.27	0.09678	0.27121	82
83	248.67	240.19	0.0165	0.2866	60.559	3.4894	47.48	93.80	141.28	0.09756	0.27089	83
84	252.27	243.71	0.0166	0.2820	60.404	3.5462	47.91	93.37	141.29	0.09834	0.27056	84
85	255.92	247.27	0.0166	0.2775	60.248	3.6038	48.35	92.94	141.29	0.09912	0.27023	85
86	259.60	250.87	0.0166	0.2730	60.092	3.6624	48.79	92.51	141.30	0.09990	0.26991	86
87	263.33	254.51	0.0167	0.2687	59.934	3.7218	49.22	92.08	141.30	0.10068	0.26958	87
88	267.09	258.18	0.0167	0.2644	59.776	3.7823	49.66	91.64	141.30	0.10146	0.26924	88
89	270.90	261.90	0.0168	0.2602	59.616	3.8436	50.10	91.20	141.30	0.10224	0.26891	89
90	274.74	265.66	0.0168	0.2560	59.456	3.9060	50.54	90.75	141.29	0.10302	0.26858	90
91	278.63	269.46	0.0169	0.2519	59.294	3.9694	50.99	90.30	141.29	0.10380	0.26824	91
92	282.55	273.30	0.0169	0.2479	59.131	4.0338	51.43	89.85	141.28	0.10459	0.26790	92
93	286.52	277.19	0.0170	0.2440	58.968	4.0992	51.88	89.39	141.27	0.10537	0.26757	93
94	290.53	281.11	0.0170	0.2401	58.803	4.1657	52.32	88.93	141.26	0.10616	0.26723	94
95	294.58	285.08	0.0171	0.2362	58.637	4.2333	52.77	88.47	141.24	0.10694	0.26688	95
96	298.67	289.09	0.0171	0.2325	58.470	4.3019	53.22	88.00	141.22	0.10773	0.26654	96
97	302.81	293.14	0.0172	0.2287	58.301	4.3718	53.67	87.53	141.21	0.10852	0.26619	97
98	306.99	297.24	0.0172	0.2251	58.132	4.4427	54.13	87.06	141.18	0.10931	0.26584	98
99	311.21	301.38	0.0173	0.2215	57.961	4.5149	54.58	86.58	141.16	0.11010	0.26549	99
100	315.47	305.56	0.0173	0.2179	57.789	4.5883	55.04	86.10	141.13	0.11089	0.26514	100
101	319.78	309.79	0.0174	0.2145	57.616	4.6629	55.49	85.61	141.10	0.11168	0.26479	101
102	324.13	314.06	0.0174	0.2110	57.441	4.7388	55.95	85.12	141.07	0.11248	0.26443	102
103	328.53	318.38	0.0175	0.2076	57.265	4.8160	56.42	84.62	141.04	0.11327	0.26407	103
104	332.97	322.74	0.0175	0.2043	57.087	4.8946	56.88	84.12	141.00	0.11407	0.26371	104
105	337.46	327.15	0.0176	0.2010	56.908	4.9744	57.34	83.61	140.96	0.11487	0.26335	105
106	341.99	331.60	0.0176	0.1978	56.728	5.0557	57.81	83.10	140.92	0.11567	0.26298	106
107	346.56	336.10	0.0177	0.1946	56.546	5.1385	58.28	82.59	140.87	0.11647	0.26261	107
108	351.19	340.65	0.0177	0.1915	56.363	5.2226	58.75	82.07	140.82	0.11727	0.26224	108
109	355.86	345.25	0.0178	0.1884	56.178	5.3083	59.22	81.55	140.77	0.11808	0.26186	109
110	360.57	349.89	0.0179	0.1853	55.991	5.3956	59.70	81.02	140.72	0.11889	0.26148	110
111	365.33	354.58	0.0179	0.1823	55.803	5.4844	60.18	80.48	140.66	0.11969	0.26110	111
112	370.14	359.32	0.0180	0.1794	55.613	5.5749	60.66	79.94	140.60	0.12051	0.26071	112
113	375.00	364.11	0.0180	0.1765	55.421	5.6670	61.14	79.39	140.53	0.12132	0.26033	113
114	379.90	368.95	0.0181	0.1736	55.227	5.7608	61.62	78.84	140.46	0.12213	0.25993	114
115	384.86	373.83	0.0182	0.1708	55.032	5.8564	62.11	78.29	140.39	0.12295	0.25954	115
116	389.86	378.77	0.0182	0.1680	54.835	5.9539	62.59	77.72	140.32	0.12377	0.25914	116
117	394.91	383.76	0.0183	0.1652	54.635	6.0532	63.09	77.15	140.24	0.12459	0.25873	117
118	400.01	388.80	0.0184	0.1625	54.434	6.1544	63.58	76.58	140.15	0.12542	0.25833	118
119	405.16	393.89	0.0184	0.1598	54.230	6.2576	64.07	75.99	140.07	0.12625	0.25791	119
120	410.36	399.03	0.0185	0.1572	54.024	6.3629	64.57	75.40	139.98	0.12708	0.25750	120
121	415.60	404.22	0.0186	0.1546	53.816	6.4703	65.07	74.81	139.88	0.12791	0.25708	121
122	420.90	409.47	0.0187	0.1520	53.606	6.5798	65.58	74.21	139.78	0.12874	0.25665	122
123	426.26	414.77	0.0187	0.1494	53.393	6.6917	66.09	73.60	139.68	0.12958	0.25622	123
124	431.66	420.13	0.0188	0.1469	53.178	6.8058	66.60	72.98	139.57	0.13043	0.25578	124
125	437.11	425.53	0.0189	0.1445	52.961	6.9223	67.11	72.35	139.46	0.13127	0.25534	125
126	442.62	431.00	0.0190	0.1420	52.740	7.0413	67.62	71.72	139.34	0.13212	0.25489	126
127	448.18	436.52	0.0190	0.1396	52.517	7.1629	68.14	71.08	139.22	0.13297	0.25444	127
128	453.79	442.09	0.0191	0.1372	52.291	7.2872	68.67	70.43	139.10	0.13383	0.25398	128
129	459.45	447.72	0.0192	0.1349	52.062	7.4142	69.19	69.77	138.96	0.13469	0.25351	129
130	465.17	453.41	0.0193	0.1326	51.830	7.5441	69.72	69.10	138.83	0.13556	0.25304	130
131	470.95	459.15	0.0194	0.1303	51.595	7.6769	70.26	68.42	138.68	0.13643	0.25256	131
132	476.77	464.96	0.0195	0.1280	51.356	7.8129	70.80	67.74	138.53	0.13730	0.25207	132
133	482.66	470.82	0.0196	0.1258	51.114	7.9522	71.34	67.04	138.38	0.13818	0.25158	133
134	488.60	476.74	0.0197	0.1235	50.869	8.0947	71.88	66.33	138.22	0.13906	0.25108	134
135	494.59	482.72	0.0198	0.1213	50.620	8.2408	72.43	65.61	138.05	0.13995	0.25057	135
136	500.64	488.76	0.0199	0.1192	50.367	8.3905	72.99	64.89	137.87	0.14085	0.25005	136

Opteon™ XL41 (R-454B)
Saturation Properties - Temperature Table

Temp °F	Pressure [psia]		Volume [ft ³ /lb]		Density [lb/ft ³]		Enthalpy [Btu/lb]			Entropy [Btu/lb·°R]		Temp °F
	Liquid P _l	Vapor P _g	Liquid v _f	Vapor v _g	Liquid d _l	Vapor d _g	Liquid h _f	Latent h _{fg}	Vapor h _g	Liquid s _f	Vapor s _g	
137	506.75	494.86	0.0200	0.1170	50.109	8.5440	73.55	64.14	137.69	0.14175	0.24952	137
138	512.91	501.02	0.0201	0.1149	49.848	8.7015	74.11	63.39	137.50	0.14266	0.24898	138
139	519.13	507.25	0.0202	0.1128	49.582	8.8632	74.68	62.62	137.31	0.14357	0.24843	139
140	525.41	513.54	0.0203	0.1108	49.312	9.0293	75.26	61.84	137.10	0.14449	0.24787	140
141	531.75	519.89	0.0204	0.1087	49.036	9.2000	75.84	61.05	136.89	0.14542	0.24730	141
142	538.15	526.31	0.0205	0.1067	48.756	9.3755	76.43	60.24	136.67	0.14636	0.24672	142
143	544.61	532.79	0.0206	0.1046	48.470	9.5562	77.02	59.41	136.43	0.14730	0.24612	143
144	551.13	539.34	0.0208	0.1026	48.178	9.7422	77.62	58.57	136.19	0.14825	0.24552	144
145	557.70	545.96	0.0209	0.1007	47.880	9.9340	78.23	57.72	135.94	0.14922	0.24489	145
146	564.34	552.65	0.0210	0.0987	47.576	10.1317	78.84	56.84	135.68	0.15019	0.24426	146
147	571.04	559.40	0.0212	0.0967	47.266	10.3359	79.46	55.94	135.41	0.15117	0.24360	147
148	577.81	566.22	0.0213	0.0948	46.948	10.5470	80.09	55.03	135.12	0.15217	0.24293	148
149	584.63	573.12	0.0214	0.0929	46.623	10.7653	80.73	54.09	134.82	0.15317	0.24225	149
150	591.52	580.09	0.0216	0.0910	46.289	10.9914	81.38	53.13	134.51	0.15419	0.24154	150
151	598.48	587.13	0.0218	0.0891	45.947	11.2259	82.04	52.14	134.18	0.15522	0.24081	151
152	605.49	594.24	0.0219	0.0872	45.596	11.4695	82.71	51.13	133.84	0.15627	0.24006	152
153	612.58	601.43	0.0221	0.0853	45.234	11.7227	83.39	50.09	133.48	0.15734	0.23928	153
154	619.73	608.70	0.0223	0.0834	44.862	11.9865	84.08	49.02	133.10	0.15842	0.23848	154
155	626.94	616.05	0.0225	0.0816	44.478	12.2619	84.79	47.92	132.70	0.15952	0.23765	155
156	634.22	623.48	0.0227	0.0797	44.081	12.5498	85.51	46.77	132.28	0.16064	0.23678	156
157	641.57	630.99	0.0229	0.0778	43.670	12.8516	86.24	45.59	131.84	0.16179	0.23589	157
158	648.99	638.58	0.0231	0.0759	43.244	13.1688	87.00	44.37	131.37	0.16296	0.23495	158
159	656.48	646.27	0.0234	0.0741	42.801	13.5031	87.77	43.10	130.87	0.16416	0.23397	159
160	664.04	654.04	0.0236	0.0722	42.338	13.8566	88.57	41.77	130.34	0.16539	0.23294	160
161	671.67	661.90	0.0239	0.0703	41.854	14.2320	89.39	40.38	129.77	0.16666	0.23186	161
162	679.37	669.86	0.0242	0.0683	41.345	14.6325	90.24	38.92	129.16	0.16798	0.23071	162
163	687.14	677.92	0.0245	0.0664	40.808	15.0621	91.12	37.38	128.50	0.16934	0.22949	163
164	694.98	686.08	0.0249	0.0644	40.237	15.5260	92.05	35.74	127.78	0.17076	0.22818	164
165	702.90	694.36	0.0252	0.0624	39.626	16.0311	93.01	33.99	127.00	0.17225	0.22677	165
166	710.89	702.75	0.0257	0.0603	38.966	16.5871	94.04	32.10	126.14	0.17383	0.22524	166
167	718.95	711.27	0.0261	0.0581	38.244	17.2078	95.14	30.03	125.16	0.17552	0.22354	167
168	727.09	719.94	0.0267	0.0558	37.440	17.9136	96.33	27.73	124.06	0.17736	0.22163	168
169	735.29	728.77	0.0274	0.0534	36.521	18.7391	97.66	25.10	122.76	0.17941	0.21942	169
170	743.55	737.79	0.0282	0.0506	35.426	19.7481	99.19	21.98	121.18	0.18178	0.21676	170
171	751.83	747.10	0.0294	0.0474	34.017	21.0844	101.11	17.98	119.09	0.18475	0.21332	171
172	760.00	756.89	0.0314	0.0430	31.813	23.2510	104.00	11.77	115.78	0.18927	0.20794	172
173	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	109.62	0.00	109.62	0.19807	0.19807	173
174	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	109.99	0.00	109.99	0.19857	0.19857	174
175	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	110.36	0.00	110.36	0.19906	0.19906	175
176	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	110.73	0.00	110.73	0.19955	0.19955	176
177	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	111.10	0.00	111.10	0.20003	0.20003	177
178	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	111.47	0.00	111.47	0.20051	0.20051	178
179	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	111.83	0.00	111.83	0.20099	0.20099	179
180	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	112.19	0.00	112.19	0.20146	0.20146	180
181	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	112.55	0.00	112.55	0.20193	0.20193	181
182	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	112.91	0.00	112.91	0.20239	0.20239	182
183	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	113.26	0.00	113.26	0.20285	0.20285	183
184	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	113.62	0.00	113.62	0.20331	0.20331	184
185	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	113.97	0.00	113.97	0.20376	0.20376	185
186	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	114.32	0.00	114.32	0.20422	0.20422	186
187	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	114.67	0.00	114.67	0.20466	0.20466	187
188	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	115.02	0.00	115.02	0.20511	0.20511	188
189	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	115.37	0.00	115.37	0.20555	0.20555	189
190	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	115.71	0.00	115.71	0.20599	0.20599	190
191	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	116.06	0.00	116.06	0.20643	0.20643	191
192	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	116.40	0.00	116.40	0.20687	0.20687	192
193	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	116.74	0.00	116.74	0.20730	0.20730	193
194	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	117.09	0.00	117.09	0.20773	0.20773	194
195	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	117.43	0.00	117.43	0.20816	0.20816	195

Opteon™ XL41 (R-454B)

Saturation Properties - Temperature Table

Temp °F	Pressure [psia]		Volume [ft ³ /lb]		Density [lb/ft ³]		Enthalpy [Btu/lb]			Entropy [Btu/lb-°R]		Temp °F
	Liquid P _f	Vapor P _g	Liquid v _f	Vapor v _g	Liquid d _f	Vapor d _g	Liquid h _f	Latent h _{fg}	Vapor h _g	Liquid s _f	Vapor s _g	
196	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	117.77	0.00	117.77	0.20858	0.20858	196
197	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	118.11	0.00	118.11	0.20901	0.20901	197
198	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	118.44	0.00	118.44	0.20943	0.20943	198
199	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	118.78	0.00	118.78	0.20985	0.20985	199
200	1145.86	1145.86	0.0362	0.0362	27.658	27.6576	119.12	0.00	119.12	0.21027	0.21027	200

Opteon™ XL41 (R-454B)
Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	9			10			11			12			Temp °F
	-73.92			-70.44			-67.23			-64.24			
	V	H	S	V	H	S	V	H	S	V	H	S	
	7.1148	127.1	0.3320	6.4462	127.6	0.3300	5.8953	128.0	0.3282	5.4334	128.4	0.3265	
-70	7.1979	127.9	0.3339	6.4547	127.7	0.3302							-70
-65	7.3031	128.8	0.3364	6.5506	128.7	0.3327	5.9346	128.5	0.3293				-65
-60	7.4075	129.8	0.3387	6.6456	129.6	0.3351	6.0221	129.5	0.3317	5.5023	129.3	0.3286	-60
-55	7.5113	130.7	0.3411	6.7400	130.6	0.3374	6.1087	130.4	0.3341	5.5826	130.3	0.3310	-55
-50	7.6144	131.7	0.3434	6.8336	131.5	0.3398	6.1947	131.4	0.3365	5.6622	131.2	0.3334	-50
-45	7.7169	132.6	0.3457	6.9268	132.5	0.3421	6.2802	132.3	0.3388	5.7412	132.2	0.3358	-45
-40	7.8190	133.6	0.3480	7.0194	133.4	0.3444	6.3651	133.3	0.3411	5.8197	133.2	0.3381	-40
-35	7.9207	134.5	0.3502	7.1116	134.4	0.3466	6.4495	134.3	0.3434	5.8977	134.1	0.3404	-35
-30	8.0219	135.5	0.3524	7.2034	135.3	0.3488	6.5335	135.2	0.3456	5.9753	135.1	0.3426	-30
-25	8.1228	136.4	0.3546	7.2948	136.3	0.3511	6.6172	136.2	0.3478	6.0525	136.1	0.3449	-25
-20	8.2234	137.4	0.3568	7.3859	137.2	0.3532	6.7005	137.1	0.3500	6.1294	137.0	0.3471	-20
-15	8.3237	138.3	0.3589	7.4767	138.2	0.3554	6.7836	138.1	0.3522	6.2060	138.0	0.3492	-15
-10	8.4237	139.3	0.3611	7.5672	139.2	0.3575	6.8663	139.1	0.3543	6.2822	138.9	0.3514	-10
-5	8.5235	140.2	0.3632	7.6574	140.1	0.3597	6.9488	140.0	0.3565	6.3582	139.9	0.3536	-5
0	8.6230	141.2	0.3653	7.7474	141.1	0.3618	7.0310	141.0	0.3586	6.4340	140.9	0.3557	0
5	8.7223	142.1	0.3674	7.8372	142.0	0.3639	7.1130	142.0	0.3607	6.5095	141.9	0.3578	5
10	8.8214	143.1	0.3694	7.9268	143.0	0.3659	7.1949	142.9	0.3628	6.5849	142.8	0.3599	10
15	8.9203	144.1	0.3715	8.0162	144.0	0.3680	7.2765	143.9	0.3648	6.6600	143.8	0.3619	15
20	9.0190	145.0	0.3735	8.1054	145.0	0.3700	7.3579	144.9	0.3669	6.7350	144.8	0.3640	20
25	9.1176	146.0	0.3755	8.1945	145.9	0.3721	7.4392	145.9	0.3689	6.8098	145.8	0.3661	25
30	9.2160	147.0	0.3776	8.2834	146.9	0.3741	7.5203	146.9	0.3710	6.8844	146.8	0.3681	30
35	9.3143	148.0	0.3796	8.3721	147.9	0.3761	7.6013	147.8	0.3730	6.9589	147.8	0.3701	35
40	9.4124	149.0	0.3816	8.4608	148.9	0.3781	7.6821	148.8	0.3750	7.0332	148.8	0.3721	40
45	9.5104	150.0	0.3835	8.5493	149.9	0.3801	7.7628	149.8	0.3770	7.1075	149.8	0.3741	45
50	9.6083	151.0	0.3855	8.6376	150.9	0.3821	7.8434	150.8	0.3789	7.1816	150.8	0.3761	50
55	9.7061	152.0	0.3875	8.7259	151.9	0.3840	7.9239	151.8	0.3809	7.2556	151.8	0.3780	55
60	9.8038	153.0	0.3894	8.8141	152.9	0.3860	8.0043	152.9	0.3829	7.3295	152.8	0.3800	60
65	9.9014	154.0	0.3913	8.9021	153.9	0.3879	8.0846	153.9	0.3848	7.4033	153.8	0.3819	65
70	9.9988	155.0	0.3933	8.9901	154.9	0.3898	8.1647	154.9	0.3867	7.4769	154.8	0.3839	70
75	10.0962	156.0	0.3952	9.0780	156.0	0.3918	8.2448	155.9	0.3887	7.5506	155.9	0.3858	75
ABSOLUTE PRESSURE, psia													
Temp °F	13			14			14.696			15			Temp °F
	-61.45			-58.83			-57.09			-56.35			
	V	H	S	V	H	S	V	H	S	V	H	S	
	5.0403	128.8	0.3250	4.7015	129.2	0.3236	4.4920	129.4	0.3227	4.4065	129.5	0.3223	
-60	5.0622	129.1	0.3257										-60
-55	5.1372	130.1	0.3282	4.7554	129.9	0.3255	4.5202	129.8	0.3237	4.4243	129.7	0.3230	-55
-50	5.2115	131.1	0.3306	4.8250	130.9	0.3279	4.5870	130.8	0.3262	4.4900	130.8	0.3254	-50
-45	5.2851	132.0	0.3330	4.8940	131.9	0.3303	4.6532	131.8	0.3286	4.5550	131.7	0.3279	-45
-40	5.3582	133.0	0.3353	4.9625	132.9	0.3327	4.7188	132.8	0.3310	4.6195	132.7	0.3302	-40
-35	5.4307	134.0	0.3376	5.0304	133.9	0.3350	4.7839	133.8	0.3333	4.6834	133.7	0.3326	-35
-30	5.5029	135.0	0.3399	5.0979	134.8	0.3373	4.8485	134.7	0.3356	4.7469	134.7	0.3349	-30
-25	5.5747	135.9	0.3421	5.1650	135.8	0.3395	4.9128	135.7	0.3379	4.8099	135.7	0.3371	-25
-20	5.6461	136.9	0.3443	5.2317	136.8	0.3418	4.9766	136.7	0.3401	4.8726	136.7	0.3394	-20
-15	5.7172	137.9	0.3465	5.2982	137.8	0.3440	5.0402	137.7	0.3423	4.9350	137.7	0.3416	-15
-10	5.7880	138.8	0.3487	5.3643	138.7	0.3462	5.1034	138.7	0.3445	4.9970	138.6	0.3438	-10
-5	5.8585	139.8	0.3508	5.4301	139.7	0.3483	5.1664	139.6	0.3467	5.0588	139.6	0.3460	-5
0	5.9288	140.8	0.3530	5.4957	140.7	0.3505	5.2291	140.6	0.3488	5.1204	140.6	0.3481	0
5	5.9989	141.8	0.3551	5.5611	141.7	0.3526	5.2916	141.6	0.3509	5.1817	141.6	0.3503	5
10	6.0687	142.7	0.3572	5.6263	142.7	0.3547	5.3538	142.6	0.3531	5.2428	142.6	0.3524	10
15	6.1384	143.7	0.3593	5.6912	143.6	0.3568	5.4159	143.6	0.3552	5.3037	143.6	0.3545	15
20	6.2078	144.7	0.3613	5.7560	144.6	0.3589	5.4778	144.6	0.3572	5.3644	144.6	0.3565	20
25	6.2772	145.7	0.3634	5.8206	145.6	0.3609	5.5395	145.6	0.3593	5.4249	145.5	0.3586	25
30	6.3463	146.7	0.3654	5.8851	146.6	0.3630	5.6011	146.6	0.3613	5.4853	146.5	0.3606	30
35	6.4153	147.7	0.3674	5.9494	147.6	0.3650	5.6625	147.6	0.3634	5.5455	147.5	0.3627	35
40	6.4842	148.7	0.3695	6.0135	148.6	0.3670	5.7238	148.6	0.3654	5.6056	148.5	0.3647	40
45	6.5529	149.7	0.3715	6.0776	149.6	0.3690	5.7849	149.6	0.3674	5.6656	149.6	0.3667	45
50	6.6215	150.7	0.3734	6.1415	150.6	0.3710	5.8459	150.6	0.3694	5.7254	150.6	0.3687	50
55	6.6900	151.7	0.3754	6.2053	151.6	0.3730	5.9068	151.6	0.3714	5.7852	151.6	0.3707	55
60	6.7584	152.7	0.3774	6.2690	152.7	0.3749	5.9676	152.6	0.3733	5.8448	152.6	0.3726	60
65	6.8267	153.7	0.3793	6.3326	153.7	0.3769	6.0283	153.6	0.3753	5.9043	153.6	0.3746	65
70	6.8950	154.8	0.3813	6.3961	154.7	0.3788	6.0890	154.7	0.3772	5.9637	154.6	0.3766	70
75	6.9631	155.8	0.3832	6.4595	155.7	0.3808	6.1495	155.7	0.3792	6.0231	155.7	0.3785	75
80	7.0311	156.8	0.3851	6.5228	156.8	0.3827	6.2099	156.7	0.3811	6.0823	156.7	0.3804	80
85	7.0991	157.9	0.3870	6.5861	157.8	0.3846	6.2703	157.8	0.3830	6.1415	157.7	0.3823	85

Opteon™ XL41 (R-454B) Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	16			17			18			19			Temp °F
	-53.99			-51.75			-49.62			-47.57			
	V	H	S	V	H	S	V	H	S	V	H	S	
	4.1471	129.8	0.3211	3.9172	130.1	0.3200	3.7120	130.3	0.3189	3.5277	130.6	0.3179	
-50	4.1968	130.6	0.3231	3.9379	130.4	0.3208							-50
-45	4.2583	131.6	0.3255	3.9964	131.4	0.3233	3.7636	131.3	0.3212	3.5551	131.1	0.3192	-45
-40	4.3193	132.6	0.3279	4.0543	132.5	0.3257	3.8188	132.3	0.3236	3.6079	132.2	0.3217	-40
-35	4.3797	133.6	0.3303	4.1117	133.5	0.3281	3.8734	133.3	0.3260	3.6601	133.2	0.3241	-35
-30	4.4397	134.6	0.3326	4.1685	134.5	0.3304	3.9275	134.3	0.3284	3.7118	134.2	0.3264	-30
-25	4.4992	135.6	0.3349	4.2250	135.4	0.3327	3.9812	135.3	0.3307	3.7630	135.2	0.3288	-25
-20	4.5583	136.6	0.3371	4.2810	136.4	0.3350	4.0345	136.3	0.3330	3.8138	136.2	0.3311	-20
-15	4.6172	137.5	0.3394	4.3367	137.4	0.3373	4.0874	137.3	0.3352	3.8643	137.2	0.3333	-15
-10	4.6757	138.5	0.3416	4.3921	138.4	0.3395	4.1400	138.3	0.3375	3.9144	138.2	0.3356	-10
-5	4.7339	139.5	0.3438	4.4472	139.4	0.3417	4.1924	139.3	0.3397	3.9643	139.2	0.3378	-5
0	4.7919	140.5	0.3459	4.5021	140.4	0.3438	4.2444	140.3	0.3419	4.0139	140.2	0.3400	0
5	4.8497	141.5	0.3481	4.5567	141.4	0.3460	4.2963	141.3	0.3440	4.0632	141.2	0.3421	5
10	4.9072	142.5	0.3502	4.6111	142.4	0.3481	4.3479	142.3	0.3461	4.1124	142.2	0.3443	10
15	4.9646	143.5	0.3523	4.6653	143.4	0.3502	4.3993	143.3	0.3483	4.1613	143.2	0.3464	15
20	5.0217	144.5	0.3544	4.7193	144.4	0.3523	4.4505	144.3	0.3504	4.2100	144.2	0.3485	20
25	5.0787	145.5	0.3564	4.7732	145.4	0.3544	4.5016	145.3	0.3524	4.2586	145.2	0.3506	25
30	5.1355	146.5	0.3585	4.8268	146.4	0.3564	4.5525	146.3	0.3545	4.3070	146.2	0.3527	30
35	5.1922	147.5	0.3605	4.8804	147.4	0.3585	4.6032	147.3	0.3566	4.3552	147.2	0.3547	35
40	5.2487	148.5	0.3625	4.9338	148.4	0.3605	4.6538	148.3	0.3586	4.4033	148.3	0.3568	40
45	5.3051	149.5	0.3646	4.9870	149.4	0.3625	4.7043	149.3	0.3606	4.4513	149.3	0.3588	45
50	5.3614	150.5	0.3666	5.0402	150.4	0.3645	4.7546	150.4	0.3626	4.4991	150.3	0.3608	50
55	5.4176	151.5	0.3685	5.0932	151.4	0.3665	4.8048	151.4	0.3646	4.5468	151.3	0.3628	55
60	5.4736	152.5	0.3705	5.1461	152.5	0.3685	4.8549	152.4	0.3666	4.5944	152.3	0.3648	60
65	5.5296	153.6	0.3725	5.1989	153.5	0.3705	4.9050	153.4	0.3686	4.6420	153.4	0.3668	65
70	5.5854	154.6	0.3744	5.2516	154.5	0.3724	4.9549	154.5	0.3705	4.6894	154.4	0.3687	70
75	5.6412	155.6	0.3764	5.3042	155.6	0.3744	5.0047	155.5	0.3725	4.7367	155.4	0.3707	75
80	5.6969	156.7	0.3783	5.3568	156.6	0.3763	5.0544	156.5	0.3744	4.7839	156.5	0.3726	80
85	5.7525	157.7	0.3802	5.4092	157.6	0.3782	5.1041	157.6	0.3763	4.8311	157.5	0.3745	85
90	5.8080	158.7	0.3821	5.4616	158.7	0.3801	5.1537	158.6	0.3782	4.8782	158.6	0.3764	90
95	5.8635	159.8	0.3840	5.5139	159.7	0.3820	5.2032	159.7	0.3801	4.9252	159.6	0.3784	95
ABSOLUTE PRESSURE, psia													
Temp °F	20			21			22			23			Temp °F
	-45.61			-43.72			-41.90			-40.15			
	V	H	S	V	H	S	V	H	S	V	H	S	
	3.3612	130.8	0.3170	3.2100	131.1	0.3161	3.0722	131.3	0.3152	2.9459	131.5	0.3144	
-45	3.3674	131.0	0.3173										-45
-40	3.4181	132.0	0.3198	3.2462	131.9	0.3179	3.0900	131.7	0.3162	2.9472	131.6	0.3145	-40
-35	3.4681	133.0	0.3222	3.2943	132.9	0.3204	3.1363	132.8	0.3187	2.9919	132.6	0.3170	-35
-30	3.5176	134.1	0.3246	3.3418	133.9	0.3228	3.1820	133.8	0.3211	3.0360	133.7	0.3194	-30
-25	3.5666	135.1	0.3269	3.3889	134.9	0.3252	3.2272	134.8	0.3235	3.0796	134.7	0.3218	-25
-20	3.6152	136.1	0.3292	3.4355	136.0	0.3275	3.2720	135.8	0.3258	3.1228	135.7	0.3242	-20
-15	3.6634	137.1	0.3315	3.4817	137.0	0.3298	3.3165	136.9	0.3281	3.1656	136.7	0.3265	-15
-10	3.7114	138.1	0.3338	3.5276	138.0	0.3320	3.3606	137.9	0.3304	3.2080	137.8	0.3288	-10
-5	3.7590	139.1	0.3360	3.5732	139.0	0.3343	3.4043	138.9	0.3326	3.2501	138.8	0.3310	-5
0	3.8064	140.1	0.3382	3.6186	140.0	0.3365	3.4478	139.9	0.3348	3.2919	139.8	0.3333	0
5	3.8535	141.1	0.3404	3.6637	141.0	0.3387	3.4911	140.9	0.3370	3.3335	140.8	0.3355	5
10	3.9004	142.1	0.3425	3.7085	142.0	0.3408	3.5341	141.9	0.3392	3.3749	141.8	0.3376	10
15	3.9470	143.1	0.3446	3.7532	143.0	0.3430	3.5769	142.9	0.3413	3.4160	142.9	0.3398	15
20	3.9935	144.1	0.3468	3.7977	144.0	0.3451	3.6196	144.0	0.3435	3.4570	143.9	0.3419	20
25	4.0398	145.1	0.3488	3.8419	145.1	0.3472	3.6620	145.0	0.3456	3.4977	144.9	0.3440	25
30	4.0860	146.2	0.3509	3.8861	146.1	0.3493	3.7043	146.0	0.3477	3.5383	145.9	0.3461	30
35	4.1320	147.2	0.3530	3.9300	147.1	0.3513	3.7464	147.0	0.3497	3.5787	146.9	0.3482	35
40	4.1778	148.2	0.3550	3.9738	148.1	0.3534	3.7884	148.0	0.3518	3.6190	148.0	0.3503	40
45	4.2236	149.2	0.3571	4.0175	149.1	0.3554	3.8302	149.1	0.3538	3.6592	149.0	0.3523	45
50	4.2691	150.2	0.3591	4.0611	150.2	0.3574	3.8719	150.1	0.3558	3.6992	150.0	0.3543	50
55	4.3146	151.2	0.3611	4.1045	151.2	0.3594	3.9135	151.1	0.3579	3.7391	151.0	0.3564	55
60	4.3600	152.3	0.3631	4.1478	152.2	0.3614	3.9550	152.1	0.3599	3.7789	152.1	0.3584	60
65	4.4052	153.3	0.3650	4.1911	153.2	0.3634	3.9964	153.2	0.3618	3.8186	153.1	0.3603	65
70	4.4504	154.3	0.3670	4.2342	154.3	0.3654	4.0376	154.2	0.3638	3.8582	154.2	0.3623	70
75	4.4955	155.4	0.3690	4.2772	155.3	0.3673	4.0788	155.3	0.3658	3.8977	155.2	0.3643	75
80	4.5405	156.4	0.3709	4.3202	156.4	0.3693	4.1199	156.3	0.3677	3.9371	156.3	0.3662	80
85	4.5854	157.5	0.3728	4.3631	157.4	0.3712	4.1610	157.4	0.3697	3.9764	157.3	0.3682	85
90	4.6302	158.5	0.3747	4.4059	158.5	0.3731	4.2019	158.4	0.3716	4.0157	158.4	0.3701	90
95	4.6750	159.6	0.3767	4.4486	159.5	0.3750	4.2428	159.5	0.3735	4.0548	159.4	0.3720	95
100	4.7197	160.6	0.3786	4.4912	160.6	0.3769	4.2836	160.5	0.3754	4.0940	160.5	0.3739	100

Opteon™ XL41 (R-454B) Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	24			25			26			27			Temp °F
	-38.46			-36.82			-35.23			-33.68			
	V	H	S	V	H	S	V	H	S	V	H	S	
	2.8297	131.7	0.3136	2.7226	131.9	0.3129	2.6234	132.1	0.3122	2.5313	132.3	0.3115	
-35	2.8595	132.5	0.3154	2.7377	132.3	0.3138	2.6252	132.2	0.3123				-35
-30	2.9022	133.5	0.3178	2.7790	133.4	0.3163	2.6652	133.2	0.3148	2.5599	133.1	0.3133	-30
-25	2.9443	134.6	0.3202	2.8197	134.4	0.3187	2.7047	134.3	0.3172	2.5982	134.2	0.3158	-25
-20	2.9860	135.6	0.3226	2.8600	135.5	0.3211	2.7438	135.4	0.3196	2.6361	135.2	0.3182	-20
-15	3.0272	136.6	0.3249	2.8999	136.5	0.3235	2.7824	136.4	0.3220	2.6735	136.3	0.3206	-15
-10	3.0681	137.7	0.3272	2.9394	137.5	0.3258	2.8206	137.4	0.3243	2.7105	137.3	0.3229	-10
-5	3.1087	138.7	0.3295	2.9786	138.6	0.3280	2.8585	138.5	0.3266	2.7472	138.4	0.3252	-5
0	3.1490	139.7	0.3317	3.0175	139.6	0.3303	2.8961	139.5	0.3289	2.7837	139.4	0.3275	0
5	3.1891	140.7	0.3340	3.0562	140.6	0.3325	2.9334	140.5	0.3311	2.8198	140.4	0.3297	5
10	3.2289	141.7	0.3361	3.0946	141.7	0.3347	2.9705	141.6	0.3333	2.8557	141.5	0.3320	10
15	3.2685	142.8	0.3383	3.1327	142.7	0.3369	3.0074	142.6	0.3355	2.8914	142.5	0.3341	15
20	3.3079	143.8	0.3404	3.1707	143.7	0.3390	3.0441	143.6	0.3376	2.9269	143.5	0.3363	20
25	3.3471	144.8	0.3426	3.2085	144.7	0.3411	3.0806	144.6	0.3398	2.9621	144.6	0.3384	25
30	3.3862	145.8	0.3447	3.2462	145.8	0.3432	3.1169	145.7	0.3419	2.9973	145.6	0.3406	30
35	3.4250	146.9	0.3467	3.2836	146.8	0.3453	3.1531	146.7	0.3440	3.0322	146.6	0.3427	35
40	3.4638	147.9	0.3488	3.3210	147.8	0.3474	3.1891	147.7	0.3460	3.0670	147.7	0.3447	40
45	3.5024	148.9	0.3509	3.3581	148.8	0.3495	3.2250	148.8	0.3481	3.1017	148.7	0.3468	45
50	3.5409	149.9	0.3529	3.3952	149.9	0.3515	3.2607	149.8	0.3501	3.1362	149.7	0.3488	50
55	3.5792	151.0	0.3549	3.4321	150.9	0.3535	3.2963	150.8	0.3522	3.1706	150.8	0.3509	55
60	3.6175	152.0	0.3569	3.4690	152.0	0.3555	3.3319	151.9	0.3542	3.2049	151.8	0.3529	60
65	3.6556	153.1	0.3589	3.5057	153.0	0.3575	3.3673	152.9	0.3562	3.2391	152.9	0.3549	65
70	3.6937	154.1	0.3609	3.5423	154.0	0.3595	3.4026	154.0	0.3582	3.2732	153.9	0.3569	70
75	3.7316	155.1	0.3628	3.5788	155.1	0.3615	3.4378	155.0	0.3601	3.3072	155.0	0.3589	75
80	3.7695	156.2	0.3648	3.6153	156.1	0.3634	3.4729	156.1	0.3621	3.3411	156.0	0.3608	80
85	3.8073	157.2	0.3667	3.6516	157.2	0.3654	3.5079	157.1	0.3641	3.3749	157.1	0.3628	85
90	3.8450	158.3	0.3687	3.6879	158.2	0.3673	3.5429	158.2	0.3660	3.4087	158.1	0.3647	90
95	3.8826	159.4	0.3706	3.7241	159.3	0.3692	3.5778	159.3	0.3679	3.4423	159.2	0.3666	95
100	3.9201	160.4	0.3725	3.7602	160.4	0.3711	3.6126	160.3	0.3698	3.4759	160.3	0.3686	100
105	3.9576	161.5	0.3744	3.7963	161.4	0.3730	3.6474	161.4	0.3717	3.5095	161.3	0.3705	105
110	3.9951	162.6	0.3763	3.8323	162.5	0.3749	3.6821	162.5	0.3736	3.5429	162.4	0.3724	110
ABSOLUTE PRESSURE, psia													
Temp °F	28			29			30			31			Temp °F
	-32.19			-30.73			-29.31			-27.93			
	V	H	S	V	H	S	V	H	S	V	H	S	
	2.4455	132.5	0.3108	2.3655	132.7	0.3102	2.2906	132.8	0.3096	2.2204	133.0	0.3090	
-30	2.4620	133.0	0.3119	2.3708	132.8	0.3106							-30
-25	2.4993	134.0	0.3144	2.4071	133.9	0.3131	2.3211	133.8	0.3118	2.2405	133.6	0.3105	-25
-20	2.5360	135.1	0.3169	2.4429	135.0	0.3155	2.3559	134.9	0.3142	2.2745	134.7	0.3130	-20
-15	2.5724	136.2	0.3192	2.4782	136.0	0.3179	2.3903	135.9	0.3166	2.3080	135.8	0.3154	-15
-10	2.6083	137.2	0.3216	2.5131	137.1	0.3203	2.4243	137.0	0.3190	2.3411	136.9	0.3178	-10
-5	2.6439	138.3	0.3239	2.5477	138.2	0.3226	2.4579	138.0	0.3214	2.3739	137.9	0.3201	-5
0	2.6792	139.3	0.3262	2.5820	139.2	0.3249	2.4912	139.1	0.3237	2.4063	139.0	0.3224	0
5	2.7143	140.3	0.3284	2.6160	140.2	0.3272	2.5243	140.1	0.3259	2.4384	140.0	0.3247	5
10	2.7491	141.4	0.3307	2.6497	141.3	0.3294	2.5570	141.2	0.3282	2.4703	141.1	0.3270	10
15	2.7836	142.4	0.3328	2.6833	142.3	0.3316	2.5896	142.2	0.3304	2.5020	142.1	0.3292	15
20	2.8180	143.4	0.3350	2.7166	143.4	0.3338	2.6219	143.3	0.3325	2.5334	143.2	0.3314	20
25	2.8521	144.5	0.3372	2.7497	144.4	0.3359	2.6541	144.3	0.3347	2.5646	144.2	0.3335	25
30	2.8861	145.5	0.3393	2.7827	145.4	0.3380	2.6861	145.4	0.3368	2.5957	145.3	0.3357	30
35	2.9200	146.5	0.3414	2.8154	146.5	0.3402	2.7179	146.4	0.3390	2.6266	146.3	0.3378	35
40	2.9536	147.6	0.3435	2.8481	147.5	0.3422	2.7495	147.4	0.3411	2.6573	147.4	0.3399	40
45	2.9872	148.6	0.3455	2.8806	148.6	0.3443	2.7810	148.5	0.3431	2.6879	148.4	0.3420	45
50	3.0206	149.7	0.3476	2.9129	149.6	0.3464	2.8124	149.5	0.3452	2.7184	149.5	0.3441	50
55	3.0539	150.7	0.3496	2.9451	150.6	0.3484	2.8437	150.6	0.3472	2.7487	150.5	0.3461	55
60	3.0870	151.8	0.3516	2.9773	151.7	0.3504	2.8748	151.6	0.3493	2.7790	151.6	0.3481	60
65	3.1201	152.8	0.3537	3.0093	152.7	0.3525	2.9058	152.7	0.3513	2.8091	152.6	0.3502	65
70	3.1530	153.9	0.3556	3.0412	153.8	0.3544	2.9368	153.7	0.3533	2.8391	153.7	0.3522	70
75	3.1859	154.9	0.3576	3.0730	154.8	0.3564	2.9676	154.8	0.3553	2.8690	154.7	0.3541	75
80	3.2187	156.0	0.3596	3.1047	155.9	0.3584	2.9984	155.8	0.3572	2.8988	155.8	0.3561	80
85	3.2514	157.0	0.3615	3.1364	157.0	0.3604	3.0290	156.9	0.3592	2.9286	156.9	0.3581	85
90	3.2840	158.1	0.3635	3.1679	158.0	0.3623	3.0596	158.0	0.3612	2.9583	157.9	0.3600	90
95	3.3165	159.2	0.3654	3.1994	159.1	0.3642	3.0901	159.0	0.3631	2.9878	159.0	0.3620	95
100	3.3490	160.2	0.3673	3.2308	160.2	0.3662	3.1205	160.1	0.3650	3.0174	160.1	0.3639	100
105	3.3814	161.3	0.3693	3.2622	161.2	0.3681	3.1509	161.2	0.3669	3.0468	161.1	0.3658	105
110	3.4138	162.4	0.3712	3.2935	162.3	0.3700	3.1812	162.3	0.3688	3.0762	162.2	0.3677	110
115	3.4460	163.5	0.3730	3.3247	163.4	0.3719	3.2115	163.4	0.3707	3.1055	163.3	0.3696	115

Opteon™ XL41 (R-454B)
Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	32			33			34			35			Temp °F
	-26.52			-25.27			-23.98			-22.73			
	V	H	S	V	H	S	V	H	S	V	H	S	
	2.1544	133.1	0.3084	2.0922	133.3	0.3079	2.0336	133.5	0.3073	1.9783	133.6	0.3068	
-25	2.1650	133.5	0.3092	2.0940	133.4	0.3080							-25
-20	2.1982	134.6	0.3117	2.1264	134.5	0.3105	2.0589	134.3	0.3093	1.9952	134.2	0.3082	-20
-15	2.2309	135.7	0.3142	2.1584	135.6	0.3130	2.0901	135.4	0.3118	2.0257	135.3	0.3107	-15
-10	2.2632	136.8	0.3166	2.1899	136.6	0.3154	2.1209	136.5	0.3143	2.0558	136.4	0.3131	-10
-5	2.2951	137.8	0.3189	2.2210	137.7	0.3178	2.1513	137.6	0.3166	2.0856	137.5	0.3155	-5
0	2.3267	138.9	0.3213	2.2518	138.8	0.3201	2.1814	138.7	0.3190	2.1150	138.6	0.3179	0
5	2.3580	139.9	0.3236	2.2823	139.8	0.3224	2.2112	139.7	0.3213	2.1440	139.6	0.3202	5
10	2.3890	141.0	0.3258	2.3126	140.9	0.3247	2.2407	140.8	0.3236	2.1728	140.7	0.3225	10
15	2.4198	142.0	0.3280	2.3426	142.0	0.3269	2.2699	141.9	0.3258	2.2014	141.8	0.3247	15
20	2.4504	143.1	0.3302	2.3724	143.0	0.3291	2.2990	142.9	0.3280	2.2297	142.8	0.3270	20
25	2.4808	144.1	0.3324	2.4020	144.1	0.3313	2.3278	144.0	0.3302	2.2579	143.9	0.3292	25
30	2.5110	145.2	0.3346	2.4314	145.1	0.3335	2.3565	145.0	0.3324	2.2858	144.9	0.3313	30
35	2.5410	146.2	0.3367	2.4606	146.2	0.3356	2.3850	146.1	0.3345	2.3136	146.0	0.3335	35
40	2.5709	147.3	0.3388	2.4897	147.2	0.3377	2.4133	147.1	0.3366	2.3412	147.1	0.3356	40
45	2.6007	148.3	0.3409	2.5187	148.3	0.3398	2.4415	148.2	0.3387	2.3687	148.1	0.3377	45
50	2.6303	149.4	0.3429	2.5475	149.3	0.3419	2.4695	149.2	0.3408	2.3960	149.2	0.3398	50
55	2.6597	150.4	0.3450	2.5761	150.4	0.3439	2.4974	150.3	0.3429	2.4232	150.2	0.3419	55
60	2.6891	151.5	0.3470	2.6047	151.4	0.3460	2.5252	151.4	0.3449	2.4503	151.3	0.3439	60
65	2.7184	152.5	0.3491	2.6331	152.5	0.3480	2.5529	152.4	0.3470	2.4773	152.4	0.3459	65
70	2.7475	153.6	0.3511	2.6615	153.5	0.3500	2.5805	153.5	0.3490	2.5042	153.4	0.3480	70
75	2.7766	154.7	0.3531	2.6897	154.6	0.3520	2.6080	154.5	0.3510	2.5310	154.5	0.3500	75
80	2.8056	155.7	0.3550	2.7179	155.7	0.3540	2.6354	155.6	0.3530	2.5576	155.6	0.3520	80
85	2.8344	156.8	0.3570	2.7460	156.7	0.3560	2.6627	156.7	0.3549	2.5842	156.6	0.3539	85
90	2.8632	157.9	0.3590	2.7740	157.8	0.3579	2.6900	157.8	0.3569	2.6108	157.7	0.3559	90
95	2.8920	158.9	0.3609	2.8019	158.9	0.3599	2.7171	158.8	0.3588	2.6372	158.8	0.3578	95
100	2.9206	160.0	0.3628	2.8297	160.0	0.3618	2.7442	159.9	0.3608	2.6636	159.9	0.3598	100
105	2.9492	161.1	0.3648	2.8575	161.0	0.3637	2.7712	161.0	0.3627	2.6899	160.9	0.3617	105
110	2.9777	162.2	0.3667	2.8852	162.1	0.3656	2.7982	162.1	0.3646	2.7161	162.0	0.3636	110
115	3.0062	163.3	0.3686	2.9129	163.2	0.3675	2.8251	163.2	0.3665	2.7423	163.1	0.3655	115
120	3.0346	164.4	0.3705	2.9405	164.3	0.3694	2.8519	164.3	0.3684	2.7684	164.2	0.3674	120
ABSOLUTE PRESSURE, psia													
Temp °F	36			37			38			39			Temp °F
	-21.50			-20.30			-19.12			-17.97			
	V	H	S	V	H	S	V	H	S	V	H	S	
	1.9259	133.7	0.3063	1.8762	133.9	0.3058	1.8291	134.0	0.3053	1.7843	134.1	0.3049	
-20	1.9350	134.1	0.3071	1.8780	133.9	0.3060							-20
-15	1.9649	135.2	0.3096	1.9073	135.1	0.3085	1.8528	134.9	0.3074	1.8010	134.8	0.3064	-15
-10	1.9944	136.3	0.3120	1.9362	136.2	0.3110	1.8811	136.1	0.3099	1.8288	135.9	0.3089	-10
-5	2.0235	137.4	0.3145	1.9647	137.3	0.3134	1.9090	137.2	0.3124	1.8561	137.0	0.3113	-5
0	2.0522	138.5	0.3168	1.9928	138.4	0.3158	1.9365	138.3	0.3148	1.8831	138.1	0.3138	0
5	2.0806	139.5	0.3192	2.0206	139.4	0.3181	1.9638	139.3	0.3171	1.9098	139.2	0.3161	5
10	2.1088	140.6	0.3214	2.0481	140.5	0.3204	1.9907	140.4	0.3194	1.9362	140.3	0.3184	10
15	2.1367	141.7	0.3237	2.0754	141.6	0.3227	2.0174	141.5	0.3217	1.9623	141.4	0.3207	15
20	2.1643	142.7	0.3259	2.1025	142.7	0.3249	2.0438	142.6	0.3239	1.9882	142.5	0.3230	20
25	2.1918	143.8	0.3281	2.1293	143.7	0.3271	2.0701	143.6	0.3262	2.0139	143.5	0.3252	25
30	2.2191	144.9	0.3303	2.1560	144.8	0.3293	2.0961	144.7	0.3283	2.0394	144.6	0.3274	30
35	2.2462	145.9	0.3325	2.1824	145.8	0.3315	2.1220	145.8	0.3305	2.0647	145.7	0.3296	35
40	2.2731	147.0	0.3346	2.2087	146.9	0.3336	2.1477	146.8	0.3327	2.0898	146.8	0.3317	40
45	2.2999	148.0	0.3367	2.2349	148.0	0.3357	2.1733	147.9	0.3348	2.1148	147.8	0.3338	45
50	2.3266	149.1	0.3388	2.2609	149.0	0.3378	2.1987	149.0	0.3369	2.1397	148.9	0.3359	50
55	2.3531	150.2	0.3409	2.2868	150.1	0.3399	2.2240	150.0	0.3390	2.1644	150.0	0.3380	55
60	2.3796	151.2	0.3429	2.3126	151.2	0.3420	2.2492	151.1	0.3410	2.1890	151.0	0.3401	60
65	2.4059	152.3	0.3450	2.3383	152.2	0.3440	2.2743	152.2	0.3431	2.2135	152.1	0.3421	65
70	2.4321	153.4	0.3470	2.3638	153.3	0.3460	2.2992	153.2	0.3451	2.2379	153.2	0.3442	70
75	2.4582	154.4	0.3490	2.3893	154.4	0.3480	2.3241	154.3	0.3471	2.2622	154.2	0.3462	75
80	2.4842	155.5	0.3510	2.4147	155.4	0.3500	2.3488	155.4	0.3491	2.2864	155.3	0.3482	80
85	2.5101	156.6	0.3530	2.4400	156.5	0.3520	2.3735	156.5	0.3511	2.3105	156.4	0.3502	85
90	2.5359	157.6	0.3549	2.4652	157.6	0.3540	2.3981	157.5	0.3531	2.3345	157.5	0.3522	90
95	2.5617	158.7	0.3569	2.4903	158.7	0.3559	2.4226	158.6	0.3550	2.3584	158.6	0.3541	95
100	2.5874	159.8	0.3588	2.5153	159.7	0.3579	2.4471	159.7	0.3570	2.3823	159.6	0.3561	100
105	2.6130	160.9	0.3608	2.5403	160.8	0.3598	2.4715	160.8	0.3589	2.4061	160.7	0.3580	105
110	2.6386	162.0	0.3627	2.5652	161.9	0.3617	2.4958	161.9	0.3608	2.4298	161.8	0.3599	110
115	2.6641	163.1	0.3646	2.5901	163.0	0.3636	2.5200	163.0	0.3627	2.4535	162.9	0.3619	115
120	2.6895	164.2	0.3665	2.6149	164.1	0.3655	2.5442	164.1	0.3646	2.4771	164.0	0.3638	120
125	2.7149	165.3	0.3684	2.6396	165.2	0.3674	2.5683	165.2	0.3665	2.5007	165.1	0.3657	125

Opteon™ XL41 (R-454B)
Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	40			41			42			43			Temp °F
	-16.84			-15.73			-14.64			-13.57			
	V	H	S	V	H	S	V	H	S	V	H	S	
	1.7416	134.3	0.3044	1.7010	134.4	0.3040	1.6622	134.5	0.3035	1.6252	134.6	0.3031	
-15	1.7518	134.7	0.3053	1.7049	134.6	0.3043							-15
-10	1.7791	135.8	0.3079	1.7317	135.7	0.3069	1.6867	135.6	0.3059	1.6437	135.4	0.3050	-10
-5	1.8059	136.9	0.3104	1.7581	136.8	0.3094	1.7126	136.7	0.3084	1.6692	136.6	0.3075	-5
0	1.8324	138.0	0.3128	1.7841	137.9	0.3118	1.7381	137.8	0.3109	1.6942	137.7	0.3099	0
5	1.8586	139.1	0.3151	1.8098	139.0	0.3142	1.7633	138.9	0.3133	1.7190	138.8	0.3123	5
10	1.8844	140.2	0.3175	1.8351	140.1	0.3165	1.7882	140.0	0.3156	1.7434	139.9	0.3147	10
15	1.9100	141.3	0.3198	1.8602	141.2	0.3188	1.8128	141.1	0.3179	1.7676	141.0	0.3170	15
20	1.9354	142.4	0.3220	1.8851	142.3	0.3211	1.8372	142.2	0.3202	1.7915	142.1	0.3193	20
25	1.9605	143.5	0.3243	1.9097	143.4	0.3233	1.8613	143.3	0.3224	1.8152	143.2	0.3216	25
30	1.9855	144.5	0.3265	1.9342	144.4	0.3256	1.8853	144.4	0.3247	1.8387	144.3	0.3238	30
35	2.0102	145.6	0.3286	1.9584	145.5	0.3277	1.9091	145.4	0.3269	1.8620	145.4	0.3260	35
40	2.0348	146.7	0.3308	1.9825	146.6	0.3299	1.9327	146.5	0.3290	1.8851	146.4	0.3282	40
45	2.0593	147.7	0.3329	2.0065	147.7	0.3320	1.9561	147.6	0.3312	1.9081	147.5	0.3303	45
50	2.0836	148.8	0.3350	2.0303	148.7	0.3341	1.9794	148.7	0.3333	1.9310	148.6	0.3324	50
55	2.1078	149.9	0.3371	2.0539	149.8	0.3362	2.0026	149.7	0.3354	1.9537	149.7	0.3345	55
60	2.1319	151.0	0.3392	2.0775	150.9	0.3383	2.0257	150.8	0.3375	1.9763	150.8	0.3366	60
65	2.1558	152.0	0.3413	2.1009	152.0	0.3404	2.0486	151.9	0.3395	1.9987	151.8	0.3387	65
70	2.1796	153.1	0.3433	2.1242	153.0	0.3424	2.0714	153.0	0.3416	2.0211	152.9	0.3407	70
75	2.2034	154.2	0.3453	2.1474	154.1	0.3444	2.0942	154.1	0.3436	2.0434	154.0	0.3428	75
80	2.2270	155.3	0.3473	2.1706	155.2	0.3465	2.1168	155.1	0.3456	2.0655	155.1	0.3448	80
85	2.2506	156.3	0.3493	2.1936	156.3	0.3484	2.1393	156.2	0.3476	2.0876	156.2	0.3468	85
90	2.2741	157.4	0.3513	2.2166	157.4	0.3504	2.1618	157.3	0.3496	2.1096	157.2	0.3488	90
95	2.2975	158.5	0.3533	2.2394	158.4	0.3524	2.1842	158.4	0.3516	2.1315	158.3	0.3507	95
100	2.3208	159.6	0.3552	2.2623	159.5	0.3543	2.2065	159.5	0.3535	2.1534	159.4	0.3527	100
105	2.3440	160.7	0.3571	2.2850	160.6	0.3563	2.2287	160.6	0.3555	2.1751	160.5	0.3546	105
110	2.3672	161.8	0.3591	2.3077	161.7	0.3582	2.2509	161.7	0.3574	2.1968	161.6	0.3566	110
115	2.3904	162.9	0.3610	2.3303	162.8	0.3601	2.2730	162.8	0.3593	2.2185	162.7	0.3585	115
120	2.4134	164.0	0.3629	2.3528	163.9	0.3621	2.2951	163.9	0.3612	2.2400	163.8	0.3604	120
125	2.4364	165.1	0.3648	2.3753	165.0	0.3640	2.3171	165.0	0.3631	2.2616	164.9	0.3623	125
130	2.4594	166.2	0.3667	2.3977	166.1	0.3658	2.3390	166.1	0.3650	2.2830	166.0	0.3642	130
ABSOLUTE PRESSURE, psia													
Temp °F	44			45			46			47			Temp °F
	-12.52			-11.49			-10.48			-9.48			
	V	H	S	V	H	S	V	H	S	V	H	S	
	1.5898	134.7	0.3027	1.5559	134.8	0.3023	1.5234	135.0	0.3019	1.4923	135.1	0.3015	
-10	1.6026	135.3	0.3040	1.5633	135.2	0.3031	1.5258	135.1	0.3022				-10
-5	1.6277	136.5	0.3065	1.5880	136.3	0.3056	1.5501	136.2	0.3047	1.5137	136.1	0.3038	-5
0	1.6524	137.6	0.3090	1.6123	137.5	0.3081	1.5740	137.4	0.3072	1.5373	137.3	0.3064	0
5	1.6767	138.7	0.3114	1.6362	138.6	0.3105	1.5975	138.5	0.3097	1.5605	138.4	0.3088	5
10	1.7007	139.8	0.3138	1.6598	139.7	0.3129	1.6207	139.6	0.3121	1.5833	139.5	0.3112	10
15	1.7244	140.9	0.3161	1.6831	140.8	0.3153	1.6437	140.7	0.3144	1.6059	140.6	0.3136	15
20	1.7479	142.0	0.3184	1.7062	141.9	0.3176	1.6663	141.8	0.3167	1.6281	141.7	0.3159	20
25	1.7711	143.1	0.3207	1.7291	143.0	0.3198	1.6888	142.9	0.3190	1.6502	142.8	0.3182	25
30	1.7942	144.2	0.3229	1.7517	144.1	0.3221	1.7110	144.0	0.3213	1.6721	143.9	0.3204	30
35	1.8171	145.3	0.3251	1.7741	145.2	0.3243	1.7331	145.1	0.3235	1.6937	145.0	0.3227	35
40	1.8398	146.4	0.3273	1.7964	146.3	0.3265	1.7549	146.2	0.3257	1.7152	146.1	0.3249	40
45	1.8623	147.4	0.3295	1.8185	147.4	0.3286	1.7767	147.3	0.3278	1.7365	147.2	0.3270	45
50	1.8847	148.5	0.3316	1.8405	148.5	0.3308	1.7982	148.4	0.3300	1.7577	148.3	0.3292	50
55	1.9070	149.6	0.3337	1.8623	149.5	0.3329	1.8197	149.5	0.3321	1.7788	149.4	0.3313	55
60	1.9291	150.7	0.3358	1.8841	150.6	0.3350	1.8410	150.6	0.3342	1.7997	150.5	0.3334	60
65	1.9511	151.8	0.3379	1.9057	151.7	0.3371	1.8621	151.6	0.3363	1.8205	151.6	0.3355	65
70	1.9731	152.8	0.3399	1.9271	152.8	0.3391	1.8832	152.7	0.3383	1.8412	152.7	0.3376	70
75	1.9949	153.9	0.3419	1.9485	153.9	0.3411	1.9042	153.8	0.3404	1.8618	153.7	0.3396	75
80	2.0166	155.0	0.3440	1.9698	155.0	0.3432	1.9251	154.9	0.3424	1.8822	154.8	0.3416	80
85	2.0382	156.1	0.3460	1.9910	156.0	0.3452	1.9459	156.0	0.3444	1.9026	155.9	0.3436	85
90	2.0598	157.2	0.3480	2.0121	157.1	0.3472	1.9666	157.1	0.3464	1.9229	157.0	0.3456	90
95	2.0812	158.3	0.3499	2.0332	158.2	0.3492	1.9872	158.2	0.3484	1.9432	158.1	0.3476	95
100	2.1026	159.4	0.3519	2.0541	159.3	0.3511	2.0077	159.3	0.3504	1.9633	159.2	0.3496	100
105	2.1239	160.5	0.3539	2.0750	160.4	0.3531	2.0282	160.4	0.3523	1.9834	160.3	0.3516	105
110	2.1452	161.6	0.3558	2.0958	161.5	0.3550	2.0486	161.5	0.3542	2.0034	161.4	0.3535	110
115	2.1664	162.7	0.3577	2.1166	162.6	0.3569	2.0690	162.6	0.3562	2.0234	162.5	0.3554	115
120	2.1875	163.8	0.3596	2.1373	163.7	0.3589	2.0893	163.7	0.3581	2.0433	163.6	0.3574	120
125	2.2086	164.9	0.3615	2.1579	164.8	0.3608	2.1095	164.8	0.3600	2.0631	164.7	0.3593	125
130	2.2296	166.0	0.3634	2.1785	166.0	0.3627	2.1297	165.9	0.3619	2.0829	165.9	0.3612	130
135	2.2506	167.1	0.3653	2.1991	167.1	0.3645	2.1498	167.0	0.3638	2.1026	167.0	0.3631	135

Opteon™ XL41 (R-454B)
Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	48			49			50			51			Temp °F
	-8.50			-7.54			-6.59			-5.65			
	V	H	S	V	H	S	V	H	S	V	H	S	
	1.4624	135.2	0.3012	1.4337	135.3	0.3008	1.4061	135.4	0.3004	1.3795	135.5	0.3001	
-5	1.4789	136.0	0.3030	1.4455	135.9	0.3021	1.4133	135.7	0.3013	1.3825	135.6	0.3004	-5
0	1.5021	137.1	0.3055	1.4683	137.0	0.3047	1.4359	136.9	0.3038	1.4047	136.8	0.3030	0
5	1.5249	138.3	0.3080	1.4908	138.2	0.3071	1.4581	138.1	0.3063	1.4266	138.0	0.3055	5
10	1.5474	139.4	0.3104	1.5130	139.3	0.3096	1.4799	139.2	0.3088	1.4481	139.1	0.3080	10
15	1.5696	140.5	0.3128	1.5348	140.4	0.3119	1.5014	140.3	0.3112	1.4694	140.2	0.3104	15
20	1.5915	141.7	0.3151	1.5564	141.6	0.3143	1.5227	141.5	0.3135	1.4903	141.4	0.3127	20
25	1.6132	142.8	0.3174	1.5778	142.7	0.3166	1.5437	142.6	0.3158	1.5110	142.5	0.3150	25
30	1.6347	143.9	0.3196	1.5989	143.8	0.3189	1.5645	143.7	0.3181	1.5315	143.6	0.3173	30
35	1.6560	145.0	0.3219	1.6199	144.9	0.3211	1.5851	144.8	0.3203	1.5518	144.7	0.3196	35
40	1.6771	146.1	0.3241	1.6406	146.0	0.3233	1.6056	145.9	0.3225	1.5719	145.8	0.3218	40
45	1.6981	147.1	0.3263	1.6612	147.1	0.3255	1.6258	147.0	0.3247	1.5918	146.9	0.3240	45
50	1.7189	148.2	0.3284	1.6817	148.2	0.3276	1.6459	148.1	0.3269	1.6116	148.0	0.3262	50
55	1.7396	149.3	0.3305	1.7020	149.3	0.3298	1.6659	149.2	0.3290	1.6312	149.1	0.3283	55
60	1.7601	150.4	0.3326	1.7222	150.3	0.3319	1.6857	150.3	0.3311	1.6507	150.2	0.3304	60
65	1.7805	151.5	0.3347	1.7422	151.4	0.3340	1.7055	151.4	0.3332	1.6701	151.3	0.3325	65
70	1.8009	152.6	0.3368	1.7622	152.5	0.3361	1.7251	152.5	0.3353	1.6894	152.4	0.3346	70
75	1.8211	153.7	0.3388	1.7820	153.6	0.3381	1.7446	153.6	0.3374	1.7086	153.5	0.3367	75
80	1.8412	154.8	0.3409	1.8018	154.7	0.3401	1.7640	154.7	0.3394	1.7277	154.6	0.3387	80
85	1.8612	155.9	0.3429	1.8215	155.8	0.3422	1.7833	155.8	0.3414	1.7466	155.7	0.3407	85
90	1.8811	157.0	0.3449	1.8410	156.9	0.3442	1.8025	156.9	0.3435	1.7655	156.8	0.3427	90
95	1.9010	158.1	0.3469	1.8605	158.0	0.3462	1.8217	158.0	0.3454	1.7844	157.9	0.3447	95
100	1.9208	159.2	0.3489	1.8799	159.1	0.3481	1.8408	159.1	0.3474	1.8031	159.0	0.3467	100
105	1.9405	160.3	0.3508	1.8993	160.2	0.3501	1.8598	160.2	0.3494	1.8218	160.1	0.3487	105
110	1.9601	161.4	0.3528	1.9186	161.3	0.3520	1.8787	161.3	0.3513	1.8404	161.2	0.3506	110
115	1.9797	162.5	0.3547	1.9378	162.4	0.3540	1.8976	162.4	0.3533	1.8589	162.3	0.3526	115
120	1.9992	163.6	0.3566	1.9569	163.5	0.3559	1.9164	163.5	0.3552	1.8774	163.4	0.3545	120
125	2.0187	164.7	0.3585	1.9760	164.7	0.3578	1.9351	164.6	0.3571	1.8958	164.6	0.3564	125
130	2.0381	165.8	0.3604	1.9951	165.8	0.3597	1.9538	165.7	0.3590	1.9141	165.7	0.3583	130
135	2.0574	166.9	0.3623	2.0141	166.9	0.3616	1.9724	166.9	0.3609	1.9324	166.8	0.3602	135
140	2.0767	168.1	0.3642	2.0330	168.0	0.3635	1.9910	168.0	0.3628	1.9507	167.9	0.3621	140
ABSOLUTE PRESSURE, psia													
Temp °F	52			53			54			55			Temp °F
	-4.73			-3.82			-2.93			-2.05			
	V	H	S	V	H	S	V	H	S	V	H	S	
	1.3539	135.6	0.2997	1.3293	135.7	0.2994	1.3055	135.8	0.2991	1.2826	135.8	0.2987	
0	1.3748	136.7	0.3022	1.3459	136.6	0.3014	1.3181	136.5	0.3006	1.2913	136.3	0.2998	0
5	1.3963	137.9	0.3047	1.3672	137.7	0.3039	1.3391	137.6	0.3031	1.3121	137.5	0.3024	5
10	1.4176	139.0	0.3072	1.3881	138.9	0.3064	1.3598	138.8	0.3056	1.3325	138.7	0.3049	10
15	1.4385	140.1	0.3096	1.4088	140.0	0.3088	1.3802	139.9	0.3081	1.3526	139.8	0.3073	15
20	1.4591	141.3	0.3120	1.4291	141.2	0.3112	1.4002	141.1	0.3105	1.3724	141.0	0.3097	20
25	1.4795	142.4	0.3143	1.4492	142.3	0.3135	1.4200	142.2	0.3128	1.3919	142.1	0.3121	25
30	1.4997	143.5	0.3166	1.4691	143.4	0.3158	1.4396	143.3	0.3151	1.4112	143.3	0.3144	30
35	1.5197	144.6	0.3188	1.4888	144.5	0.3181	1.4590	144.5	0.3174	1.4304	144.4	0.3167	35
40	1.5395	145.7	0.3211	1.5083	145.7	0.3203	1.4782	145.6	0.3196	1.4493	145.5	0.3189	40
45	1.5591	146.8	0.3233	1.5276	146.8	0.3225	1.4973	146.7	0.3218	1.4680	146.6	0.3211	45
50	1.5785	147.9	0.3254	1.5468	147.9	0.3247	1.5161	147.8	0.3240	1.4866	147.7	0.3233	50
55	1.5979	149.0	0.3276	1.5658	149.0	0.3269	1.5349	148.9	0.3262	1.5051	148.8	0.3255	55
60	1.6171	150.1	0.3297	1.5847	150.1	0.3290	1.5535	150.0	0.3283	1.5234	149.9	0.3276	60
65	1.6362	151.2	0.3318	1.6035	151.2	0.3311	1.5720	151.1	0.3304	1.5416	151.0	0.3298	65
70	1.6551	152.3	0.3339	1.6221	152.3	0.3332	1.5903	152.2	0.3325	1.5597	152.1	0.3318	70
75	1.6740	153.4	0.3360	1.6407	153.4	0.3353	1.6086	153.3	0.3346	1.5777	153.2	0.3339	75
80	1.6927	154.5	0.3380	1.6591	154.5	0.3373	1.6267	154.4	0.3366	1.5955	154.4	0.3360	80
85	1.7114	155.6	0.3400	1.6775	155.6	0.3394	1.6448	155.5	0.3387	1.6133	155.5	0.3380	85
90	1.7300	156.7	0.3421	1.6957	156.7	0.3414	1.6628	156.6	0.3407	1.6310	156.6	0.3400	90
95	1.7485	157.8	0.3441	1.7139	157.8	0.3434	1.6807	157.7	0.3427	1.6486	157.7	0.3421	95
100	1.7669	158.9	0.3460	1.7320	158.9	0.3454	1.6985	158.8	0.3447	1.6661	158.8	0.3440	100
105	1.7852	160.1	0.3480	1.7501	160.0	0.3473	1.7162	160.0	0.3467	1.6836	159.9	0.3460	105
110	1.8035	161.2	0.3500	1.7680	161.1	0.3493	1.7339	161.1	0.3486	1.7010	161.0	0.3480	110
115	1.8217	162.3	0.3519	1.7859	162.2	0.3512	1.7515	162.2	0.3506	1.7183	162.1	0.3499	115
120	1.8399	163.4	0.3538	1.8038	163.3	0.3532	1.7690	163.3	0.3525	1.7356	163.3	0.3519	120
125	1.8580	164.5	0.3558	1.8216	164.5	0.3551	1.7865	164.4	0.3545	1.7528	164.4	0.3538	125
130	1.8760	165.6	0.3577	1.8393	165.6	0.3570	1.8040	165.5	0.3564	1.7699	165.5	0.3557	130
135	1.8940	166.8	0.3596	1.8570	166.7	0.3589	1.8213	166.7	0.3583	1.7870	166.6	0.3576	135
140	1.9119	167.9	0.3615	1.8746	167.8	0.3608	1.8387	167.8	0.3602	1.8040	167.8	0.3595	140
145	1.9298	169.0	0.3633	1.8922	169.0	0.3627	1.8560	168.9	0.3620	1.8210	168.9	0.3614	145

Opteon™ XL41 (R-454B)

Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	60			65			70			75			Temp °F
	2.18			6.15			9.90			13.44			
	V	H	S	V	H	S	V	H	S	V	H	S	
	1.1790	136.3	0.2972	1.0909	136.7	0.2958	1.0149	137.0	0.2944	0.9487	137.3	0.2932	
5	1.1901	137.0	0.2987										5
10	1.2094	138.2	0.3012	1.1050	137.6	0.2978	1.0153	137.0	0.2945				10
15	1.2283	139.3	0.3037	1.1230	138.8	0.3004	1.0325	138.3	0.2971	0.9538	137.7	0.2941	15
20	1.2469	140.5	0.3062	1.1406	140.0	0.3029	1.0493	139.5	0.2997	0.9700	139.0	0.2967	20
25	1.2653	141.7	0.3086	1.1579	141.2	0.3053	1.0658	140.7	0.3022	0.9858	140.2	0.2993	25
30	1.2834	142.8	0.3110	1.1750	142.4	0.3077	1.0820	141.9	0.3047	1.0013	141.5	0.3017	30
35	1.3013	144.0	0.3133	1.1919	143.5	0.3101	1.0980	143.1	0.3071	1.0166	142.7	0.3042	35
40	1.3189	145.1	0.3156	1.2085	144.7	0.3124	1.1138	144.3	0.3094	1.0316	143.8	0.3066	40
45	1.3365	146.2	0.3178	1.2250	145.8	0.3147	1.1294	145.4	0.3117	1.0464	145.0	0.3089	45
50	1.3538	147.3	0.3200	1.2413	147.0	0.3169	1.1448	146.6	0.3140	1.0611	146.2	0.3112	50
55	1.3710	148.5	0.3222	1.2575	148.1	0.3191	1.1601	147.7	0.3162	1.0756	147.4	0.3135	55
60	1.3881	149.6	0.3244	1.2735	149.2	0.3213	1.1752	148.9	0.3185	1.0899	148.5	0.3158	60
65	1.4050	150.7	0.3265	1.2893	150.4	0.3235	1.1901	150.0	0.3206	1.1041	149.7	0.3180	65
70	1.4218	151.8	0.3286	1.3051	151.5	0.3256	1.2049	151.2	0.3228	1.1181	150.8	0.3201	70
75	1.4385	152.9	0.3307	1.3207	152.6	0.3277	1.2197	152.3	0.3249	1.1321	152.0	0.3223	75
80	1.4551	154.0	0.3328	1.3362	153.7	0.3298	1.2343	153.4	0.3271	1.1459	153.1	0.3244	80
85	1.4716	155.2	0.3349	1.3516	154.9	0.3319	1.2488	154.6	0.3292	1.1596	154.3	0.3266	85
90	1.4880	156.3	0.3369	1.3670	156.0	0.3340	1.2632	155.7	0.3312	1.1732	155.4	0.3286	90
95	1.5043	157.4	0.3389	1.3822	157.1	0.3360	1.2775	156.8	0.3333	1.1867	156.5	0.3307	95
100	1.5206	158.5	0.3409	1.3974	158.2	0.3380	1.2918	158.0	0.3353	1.2002	157.7	0.3328	100
105	1.5368	159.6	0.3429	1.4125	159.4	0.3400	1.3059	159.1	0.3373	1.2136	158.8	0.3348	105
110	1.5529	160.8	0.3449	1.4275	160.5	0.3420	1.3200	160.2	0.3393	1.2268	160.0	0.3368	110
115	1.5689	161.9	0.3469	1.4425	161.6	0.3440	1.3340	161.4	0.3413	1.2401	161.1	0.3388	115
120	1.5849	163.0	0.3488	1.4573	162.8	0.3460	1.3480	162.5	0.3433	1.2532	162.3	0.3408	120
125	1.6008	164.1	0.3508	1.4722	163.9	0.3479	1.3619	163.7	0.3453	1.2663	163.4	0.3428	125
130	1.6166	165.3	0.3527	1.4869	165.0	0.3498	1.3757	164.8	0.3472	1.2793	164.6	0.3447	130
135	1.6325	166.4	0.3546	1.5017	166.2	0.3518	1.3895	165.9	0.3491	1.2923	165.7	0.3467	135
140	1.6482	167.5	0.3565	1.5163	167.3	0.3537	1.4033	167.1	0.3511	1.3052	166.9	0.3486	140
145	1.6639	168.7	0.3584	1.5309	168.5	0.3556	1.4169	168.2	0.3530	1.3181	168.0	0.3505	145
150	1.6796	169.8	0.3603	1.5455	169.6	0.3575	1.4306	169.4	0.3549	1.3310	169.2	0.3524	150
ABSOLUTE PRESSURE, psia													
Temp °F	80			85			90			95			Temp °F
	16.81			20.02			23.09			26.03			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.8905	137.7	0.2921	0.8389	137.9	0.2910	0.7928	138.2	0.2900	0.7514	138.4	0.2890	
20	0.9004	138.5	0.2938										20
25	0.9156	139.7	0.2964	0.8536	139.2	0.2937	0.7983	138.7	0.2910				25
30	0.9306	141.0	0.2990	0.8680	140.5	0.2963	0.8122	140.0	0.2937	0.7622	139.5	0.2912	30
35	0.9452	142.2	0.3014	0.8821	141.7	0.2988	0.8259	141.3	0.2963	0.7755	140.8	0.2938	35
40	0.9596	143.4	0.3039	0.8959	143.0	0.3013	0.8393	142.5	0.2988	0.7884	142.1	0.2964	40
45	0.9738	144.6	0.3063	0.9096	144.2	0.3037	0.8524	143.8	0.3013	0.8012	143.3	0.2989	45
50	0.9878	145.8	0.3086	0.9230	145.4	0.3061	0.8653	145.0	0.3037	0.8136	144.6	0.3013	50
55	1.0016	147.0	0.3109	0.9362	146.6	0.3084	0.8780	146.2	0.3060	0.8259	145.8	0.3037	55
60	1.0152	148.2	0.3132	0.9493	147.8	0.3107	0.8906	147.4	0.3084	0.8380	147.0	0.3061	60
65	1.0287	149.3	0.3154	0.9622	149.0	0.3130	0.9030	148.6	0.3107	0.8500	148.2	0.3084	65
70	1.0421	150.5	0.3176	0.9750	150.1	0.3152	0.9153	149.8	0.3129	0.8618	149.4	0.3107	70
75	1.0554	151.6	0.3198	0.9876	151.3	0.3174	0.9274	151.0	0.3151	0.8734	150.6	0.3129	75
80	1.0685	152.8	0.3220	1.0002	152.5	0.3196	0.9394	152.2	0.3173	0.8850	151.8	0.3152	80
85	1.0815	154.0	0.3241	1.0126	153.6	0.3217	0.9513	153.3	0.3195	0.8964	153.0	0.3174	85
90	1.0944	155.1	0.3262	1.0249	154.8	0.3239	0.9631	154.5	0.3216	0.9077	154.2	0.3195	90
95	1.1073	156.3	0.3283	1.0371	156.0	0.3260	0.9747	155.7	0.3238	0.9189	155.4	0.3217	95
100	1.1200	157.4	0.3303	1.0493	157.1	0.3281	0.9863	156.8	0.3259	0.9300	156.6	0.3238	100
105	1.1327	158.6	0.3324	1.0613	158.3	0.3301	0.9979	158.0	0.3279	0.9410	157.7	0.3259	105
110	1.1453	159.7	0.3344	1.0733	159.5	0.3322	1.0093	159.2	0.3300	0.9520	158.9	0.3279	110
115	1.1578	160.9	0.3364	1.0852	160.6	0.3342	1.0206	160.4	0.3320	0.9629	160.1	0.3300	115
120	1.1703	162.0	0.3384	1.0970	161.8	0.3362	1.0319	161.5	0.3341	0.9737	161.3	0.3320	120
125	1.1827	163.2	0.3404	1.1088	162.9	0.3382	1.0432	162.7	0.3361	0.9844	162.4	0.3340	125
130	1.1950	164.3	0.3424	1.1205	164.1	0.3402	1.0543	163.9	0.3381	0.9951	163.6	0.3360	130
135	1.2073	165.5	0.3443	1.1322	165.3	0.3421	1.0654	165.0	0.3400	1.0057	164.8	0.3380	135
140	1.2195	166.6	0.3463	1.1438	166.4	0.3441	1.0765	166.2	0.3420	1.0162	166.0	0.3400	140
145	1.2316	167.8	0.3482	1.1553	167.6	0.3460	1.0875	167.4	0.3439	1.0268	167.1	0.3420	145
150	1.2438	169.0	0.3501	1.1668	168.8	0.3479	1.0984	168.5	0.3459	1.0372	168.3	0.3439	150
155	1.2558	170.1	0.3520	1.1783	169.9	0.3499	1.1093	169.7	0.3478	1.0476	169.5	0.3458	155
160	1.2679	171.3	0.3539	1.1897	171.1	0.3518	1.1202	170.9	0.3497	1.0580	170.7	0.3477	160
165	1.2799	172.5	0.3558	1.2011	172.3	0.3536	1.1310	172.1	0.3516	1.0683	171.9	0.3496	165

Opteon™ XL41 (R-454B)
Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	100			110			120			130			Temp °F
	28.86			34.20			39.19			43.88			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.7140	138.7	0.2881	0.6491	139.1	0.2863	0.5946	139.4	0.2847	0.5482	139.7	0.2832	
30	0.7170	139.0	0.2887										30
35	0.7300	140.3	0.2914	0.6511	139.3	0.2868							35
40	0.7426	141.6	0.2940	0.6631	140.7	0.2895	0.5965	139.7	0.2852				40
45	0.7549	142.9	0.2966	0.6749	142.0	0.2922	0.6078	141.1	0.2880	0.5507	140.1	0.2839	45
50	0.7671	144.2	0.2991	0.6864	143.3	0.2948	0.6188	142.4	0.2906	0.5614	141.5	0.2867	50
55	0.7790	145.4	0.3015	0.6976	144.6	0.2973	0.6296	143.7	0.2932	0.5717	142.9	0.2894	55
60	0.7907	146.6	0.3039	0.7087	145.9	0.2997	0.6401	145.1	0.2958	0.5819	144.2	0.2920	60
65	0.8022	147.9	0.3063	0.7195	147.1	0.3021	0.6504	146.4	0.2983	0.5917	145.6	0.2946	65
70	0.8136	149.1	0.3086	0.7302	148.4	0.3045	0.6606	147.6	0.3007	0.6014	146.9	0.2971	70
75	0.8248	150.3	0.3108	0.7408	149.6	0.3068	0.6705	148.9	0.3031	0.6109	148.2	0.2995	75
80	0.8359	151.5	0.3131	0.7512	150.8	0.3091	0.6804	150.2	0.3054	0.6203	149.5	0.3019	80
85	0.8469	152.7	0.3153	0.7614	152.1	0.3114	0.6900	151.4	0.3077	0.6295	150.7	0.3042	85
90	0.8578	153.9	0.3175	0.7716	153.3	0.3136	0.6996	152.6	0.3100	0.6386	152.0	0.3065	90
95	0.8686	155.1	0.3196	0.7816	154.5	0.3158	0.7091	153.9	0.3122	0.6476	153.3	0.3088	95
100	0.8793	156.3	0.3218	0.7916	155.7	0.3180	0.7184	155.1	0.3144	0.6564	154.5	0.3111	100
105	0.8899	157.5	0.3239	0.8014	156.9	0.3201	0.7277	156.3	0.3166	0.6651	155.7	0.3133	105
110	0.9004	158.6	0.3260	0.8112	158.1	0.3222	0.7368	157.5	0.3187	0.6738	157.0	0.3155	110
115	0.9108	159.8	0.3280	0.8209	159.3	0.3243	0.7459	158.8	0.3209	0.6824	158.2	0.3176	115
120	0.9212	161.0	0.3301	0.8305	160.5	0.3264	0.7549	160.0	0.3230	0.6908	159.4	0.3197	120
125	0.9315	162.2	0.3321	0.8401	161.7	0.3284	0.7638	161.2	0.3250	0.6992	160.7	0.3218	125
130	0.9417	163.4	0.3341	0.8496	162.9	0.3305	0.7727	162.4	0.3271	0.7076	161.9	0.3239	130
135	0.9519	164.6	0.3361	0.8590	164.1	0.3325	0.7815	163.6	0.3291	0.7158	163.1	0.3260	135
140	0.9620	165.7	0.3381	0.8683	165.3	0.3345	0.7902	164.8	0.3312	0.7240	164.3	0.3280	140
145	0.9721	166.9	0.3401	0.8776	166.5	0.3365	0.7989	166.0	0.3332	0.7322	165.6	0.3301	145
150	0.9821	168.1	0.3420	0.8869	167.7	0.3385	0.8075	167.2	0.3352	0.7403	166.8	0.3321	150
155	0.9921	169.3	0.3439	0.8961	168.9	0.3404	0.8161	168.4	0.3371	0.7483	168.0	0.3341	155
160	1.0020	170.5	0.3459	0.9052	170.1	0.3423	0.8246	169.6	0.3391	0.7563	169.2	0.3360	160
165	1.0119	171.7	0.3478	0.9144	171.3	0.3443	0.8331	170.9	0.3410	0.7642	170.4	0.3380	165
170	1.0217	172.9	0.3497	0.9234	172.5	0.3462	0.8415	172.1	0.3430	0.7721	171.7	0.3400	170
175	1.0315	174.1	0.3516	0.9324	173.7	0.3481	0.8499	173.3	0.3449	0.7800	172.9	0.3419	175
ABSOLUTE PRESSURE, psia													
Temp °F	140			150			160			170			Temp °F
	48.29			52.48			56.46			60.26			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.5083	140.0	0.2819	0.4734	140.3	0.2805	0.4428	140.5	0.2793	0.4156	140.6	0.2781	
50	0.5118	140.5	0.2828										50
55	0.5219	142.0	0.2856	0.4784	141.0	0.2820							55
60	0.5317	143.4	0.2884	0.4880	142.5	0.2848	0.4494	141.5	0.2814				60
65	0.5412	144.7	0.2910	0.4972	143.9	0.2876	0.4585	143.0	0.2842	0.4241	142.1	0.2809	65
70	0.5506	146.1	0.2936	0.5063	145.3	0.2902	0.4674	144.5	0.2869	0.4328	143.6	0.2837	70
75	0.5597	147.4	0.2961	0.5151	146.7	0.2928	0.4760	145.9	0.2896	0.4413	145.1	0.2865	75
80	0.5687	148.7	0.2985	0.5238	148.0	0.2953	0.4844	147.3	0.2922	0.4495	146.5	0.2891	80
85	0.5775	150.0	0.3009	0.5323	149.3	0.2978	0.4926	148.6	0.2947	0.4575	147.9	0.2917	85
90	0.5862	151.3	0.3033	0.5406	150.7	0.3002	0.5007	150.0	0.2972	0.4653	149.3	0.2942	90
95	0.5947	152.6	0.3056	0.5488	152.0	0.3025	0.5086	151.3	0.2996	0.4729	150.6	0.2967	95
100	0.6031	153.9	0.3079	0.5569	153.3	0.3048	0.5164	152.6	0.3019	0.4805	152.0	0.2991	100
105	0.6115	155.1	0.3101	0.5649	154.5	0.3071	0.5240	153.9	0.3043	0.4879	153.3	0.3015	105
110	0.6197	156.4	0.3123	0.5727	155.8	0.3094	0.5316	155.2	0.3066	0.4952	154.6	0.3038	110
115	0.6278	157.7	0.3145	0.5805	157.1	0.3116	0.5390	156.5	0.3088	0.5023	155.9	0.3061	115
120	0.6359	158.9	0.3167	0.5882	158.4	0.3138	0.5464	157.8	0.3110	0.5094	157.2	0.3084	120
125	0.6438	160.1	0.3188	0.5957	159.6	0.3160	0.5536	159.1	0.3132	0.5164	158.5	0.3106	125
130	0.6517	161.4	0.3209	0.6033	160.9	0.3181	0.5608	160.4	0.3154	0.5233	159.8	0.3128	130
135	0.6595	162.6	0.3230	0.6107	162.1	0.3202	0.5679	161.6	0.3175	0.5301	161.1	0.3150	135
140	0.6673	163.9	0.3251	0.6181	163.4	0.3223	0.5750	162.9	0.3197	0.5369	162.4	0.3171	140
145	0.6750	165.1	0.3271	0.6254	164.6	0.3244	0.5819	164.1	0.3217	0.5436	163.7	0.3192	145
150	0.6826	166.3	0.3292	0.6326	165.9	0.3264	0.5888	165.4	0.3238	0.5502	164.9	0.3213	150
155	0.6902	167.6	0.3312	0.6398	167.1	0.3285	0.5957	166.7	0.3259	0.5567	166.2	0.3234	155
160	0.6977	168.8	0.3332	0.6470	168.4	0.3305	0.6025	167.9	0.3279	0.5632	167.5	0.3254	160
165	0.7052	170.0	0.3352	0.6541	169.6	0.3325	0.6093	169.2	0.3299	0.5697	168.7	0.3275	165
170	0.7127	171.2	0.3371	0.6611	170.8	0.3345	0.6160	170.4	0.3319	0.5761	170.0	0.3295	170
175	0.7201	172.5	0.3391	0.6681	172.1	0.3364	0.6226	171.7	0.3339	0.5825	171.3	0.3315	175
180	0.7274	173.7	0.3410	0.6751	173.3	0.3384	0.6292	172.9	0.3359	0.5888	172.5	0.3335	180
185	0.7347	175.0	0.3429	0.6820	174.6	0.3403	0.6358	174.2	0.3378	0.5950	173.8	0.3354	185
190	0.7420	176.2	0.3448	0.6889	175.8	0.3422	0.6423	175.4	0.3398	0.6013	175.1	0.3374	190
195	0.7493	177.4	0.3467	0.6957	177.1	0.3441	0.6488	176.7	0.3417	0.6075	176.3	0.3393	195

Opteon™ XL41 (R-454B) Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	180			190			200			210			Temp °F
	63.89			67.37			70.71			73.93			
	V	H	S	V	H	S	V	H	S	V	H	S	
65	0.3933	141.2	0.2776	0.3695	140.9	0.2759	0.3498	141.0	0.2748	0.3319	141.1	0.2738	65
70	0.4019	142.7	0.2806	0.3740	141.8	0.2775							70
75	0.4102	144.2	0.2834	0.3822	143.3	0.2804	0.3568	142.4	0.2774	0.3336	141.5	0.2745	75
80	0.4182	145.7	0.2862	0.3902	144.9	0.2833	0.3647	144.0	0.2804	0.3415	143.1	0.2775	80
85	0.4261	147.1	0.2888	0.3979	146.3	0.2860	0.3723	145.5	0.2832	0.3490	144.7	0.2804	85
90	0.4337	148.5	0.2914	0.4053	147.8	0.2886	0.3797	147.0	0.2859	0.3563	146.2	0.2833	90
95	0.4412	149.9	0.2939	0.4126	149.2	0.2912	0.3869	148.5	0.2886	0.3634	147.7	0.2860	95
100	0.4485	151.3	0.2964	0.4198	150.6	0.2938	0.3938	149.9	0.2912	0.3703	149.2	0.2886	100
105	0.4557	152.7	0.2988	0.4268	152.0	0.2962	0.4007	151.4	0.2937	0.3770	150.7	0.2912	105
110	0.4627	154.0	0.3012	0.4336	153.4	0.2986	0.4074	152.8	0.2962	0.3835	152.1	0.2937	110
115	0.4697	155.4	0.3035	0.4404	154.7	0.3010	0.4139	154.1	0.2986	0.3900	153.5	0.2962	115
120	0.4765	156.7	0.3058	0.4470	156.1	0.3033	0.4204	155.5	0.3009	0.3963	154.9	0.2986	120
125	0.4833	158.0	0.3081	0.4535	157.4	0.3056	0.4267	156.9	0.3033	0.4025	156.3	0.3010	125
130	0.4899	159.3	0.3103	0.4600	158.8	0.3079	0.4330	158.2	0.3056	0.4085	157.6	0.3033	130
135	0.4965	160.6	0.3125	0.4663	160.1	0.3101	0.4392	159.5	0.3078	0.4145	159.0	0.3056	135
140	0.5030	161.9	0.3147	0.4726	161.4	0.3123	0.4452	160.9	0.3100	0.4204	160.3	0.3078	140
145	0.5094	163.2	0.3168	0.4788	162.7	0.3145	0.4513	162.2	0.3122	0.4263	161.7	0.3101	145
150	0.5158	164.5	0.3189	0.4850	164.0	0.3166	0.4572	163.5	0.3144	0.4320	163.0	0.3123	150
155	0.5221	165.7	0.3210	0.4910	165.3	0.3187	0.4631	164.8	0.3165	0.4377	164.3	0.3144	155
160	0.5283	167.0	0.3231	0.4970	166.6	0.3208	0.4689	166.1	0.3187	0.4433	165.7	0.3166	160
165	0.5345	168.3	0.3252	0.5030	167.9	0.3229	0.4746	167.4	0.3208	0.4489	167.0	0.3187	165
170	0.5406	169.6	0.3272	0.5089	169.2	0.3250	0.4803	168.7	0.3228	0.4544	168.3	0.3208	170
175	0.5467	170.9	0.3292	0.5148	170.4	0.3270	0.4859	170.0	0.3249	0.4599	169.6	0.3228	175
180	0.5528	172.1	0.3312	0.5206	171.7	0.3290	0.4915	171.3	0.3269	0.4653	170.9	0.3249	180
185	0.5588	173.4	0.3332	0.5263	173.0	0.3310	0.4971	172.6	0.3289	0.4706	172.2	0.3269	185
190	0.5647	174.7	0.3351	0.5320	174.3	0.3330	0.5026	173.9	0.3309	0.4760	173.5	0.3289	190
195	0.5707	175.9	0.3371	0.5377	175.6	0.3350	0.5081	175.2	0.3329	0.4812	174.8	0.3309	195
200	0.5766	177.2	0.3390	0.5434	176.8	0.3369	0.5135	176.5	0.3349	0.4865	176.1	0.3329	200
205	0.5824	178.5	0.3410	0.5490	178.1	0.3388	0.5189	177.8	0.3368	0.4917	177.4	0.3349	205
210	0.5882	179.8	0.3429	0.5546	179.4	0.3408	0.5243	179.1	0.3387	0.4968	178.7	0.3368	210
ABSOLUTE PRESSURE, psia													
Temp °F	220			230			240			250			Temp °F
	77.04			80.04			82.95			85.76			
	V	H	S	V	H	S	V	H	S	V	H	S	
80	0.3156	141.2	0.2728	0.3006	141.2	0.2718	0.2868	141.3	0.2709	0.2741	141.3	0.2700	80
85	0.3202	142.2	0.2747										85
90	0.3277	143.8	0.2777	0.3081	142.9	0.2750	0.2899	142.0	0.2722				90
95	0.3350	145.4	0.2806	0.3153	144.6	0.2780	0.2972	143.7	0.2754	0.2803	142.8	0.2727	95
100	0.3420	147.0	0.2834	0.3223	146.2	0.2809	0.3041	145.4	0.2784	0.2872	144.5	0.2758	100
105	0.3488	148.5	0.2861	0.3290	147.7	0.2837	0.3108	147.0	0.2812	0.2939	146.2	0.2788	105
110	0.3554	150.0	0.2888	0.3355	149.3	0.2864	0.3172	148.5	0.2840	0.3003	147.8	0.2817	110
115	0.3618	151.4	0.2914	0.3419	150.8	0.2890	0.3235	150.1	0.2867	0.3065	149.3	0.2844	115
120	0.3681	152.9	0.2939	0.3481	152.2	0.2916	0.3296	151.6	0.2893	0.3126	150.9	0.2871	120
125	0.3743	154.3	0.2963	0.3541	153.7	0.2941	0.3356	153.0	0.2919	0.3185	152.4	0.2897	125
130	0.3803	155.7	0.2987	0.3600	155.1	0.2965	0.3414	154.5	0.2944	0.3242	153.9	0.2923	130
135	0.3863	157.1	0.3011	0.3659	156.5	0.2989	0.3471	155.9	0.2968	0.3298	155.3	0.2947	135
140	0.3921	158.5	0.3034	0.3716	157.9	0.3013	0.3527	157.3	0.2992	0.3353	156.8	0.2972	140
145	0.3979	159.8	0.3057	0.3772	159.3	0.3036	0.3582	158.7	0.3016	0.3407	158.2	0.2996	145
150	0.4035	161.2	0.3080	0.3827	160.7	0.3059	0.3636	160.1	0.3039	0.3460	159.6	0.3019	150
155	0.4091	162.5	0.3102	0.3882	162.0	0.3081	0.3690	161.5	0.3062	0.3512	161.0	0.3042	155
160	0.4147	163.9	0.3124	0.3936	163.4	0.3104	0.3742	162.9	0.3084	0.3564	162.4	0.3065	160
165	0.4201	165.2	0.3145	0.3989	164.7	0.3125	0.3794	164.3	0.3106	0.3614	163.8	0.3087	165
170	0.4255	166.5	0.3167	0.4041	166.1	0.3147	0.3845	165.6	0.3128	0.3664	165.1	0.3109	170
175	0.4309	167.9	0.3188	0.4093	167.4	0.3168	0.3896	167.0	0.3149	0.3714	166.5	0.3131	175
180	0.4361	169.2	0.3209	0.4145	168.7	0.3189	0.3946	168.3	0.3171	0.3762	167.9	0.3153	180
185	0.4414	170.5	0.3229	0.4195	170.1	0.3210	0.3995	169.6	0.3192	0.3810	169.2	0.3174	185
190	0.4466	171.8	0.3250	0.4246	171.4	0.3231	0.4044	171.0	0.3213	0.3858	170.6	0.3195	190
195	0.4517	173.1	0.3270	0.4296	172.7	0.3251	0.4092	172.3	0.3233	0.3905	171.9	0.3216	195
200	0.4568	174.4	0.3290	0.4345	174.0	0.3272	0.4140	173.6	0.3254	0.3952	173.3	0.3236	200
205	0.4619	175.7	0.3310	0.4394	175.4	0.3292	0.4188	175.0	0.3274	0.3998	174.6	0.3256	205
210	0.4669	177.0	0.3330	0.4443	176.7	0.3311	0.4235	176.3	0.3294	0.4044	175.9	0.3277	210
215	0.4719	178.3	0.3349	0.4491	178.0	0.3331	0.4282	177.6	0.3314	0.4090	177.3	0.3297	215
220	0.4768	179.7	0.3369	0.4539	179.3	0.3351	0.4328	178.9	0.3333	0.4135	178.6	0.3316	220
225	0.4818	181.0	0.3388	0.4586	180.6	0.3370	0.4375	180.3	0.3353	0.4179	179.9	0.3336	225
230	0.4866	182.3	0.3407	0.4634	181.9	0.3389	0.4420	181.6	0.3372	0.4224	181.3	0.3356	230

Opteon™ XL41 (R-454B)
Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	260			270			280			290			Temp °F
	88.49			91.14			93.72			96.23			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.2623	141.3	0.2691	0.2514	141.3	0.2682	0.2411	141.3	0.2673	0.2316	141.2	0.2665	
90	0.2645	141.9	0.2701										90
95	0.2715	143.6	0.2733	0.2568	142.7	0.2708	0.2430	141.7	0.2682				95
100	0.2782	145.3	0.2764	0.2635	144.5	0.2740	0.2498	143.6	0.2715	0.2368	142.7	0.2691	100
105	0.2846	147.0	0.2793	0.2699	146.2	0.2770	0.2562	145.4	0.2747	0.2433	144.5	0.2723	105
110	0.2908	148.6	0.2822	0.2761	147.9	0.2799	0.2624	147.1	0.2777	0.2495	146.3	0.2754	110
115	0.2968	150.2	0.2849	0.2821	149.5	0.2827	0.2683	148.7	0.2806	0.2555	148.0	0.2784	115
120	0.3026	151.7	0.2876	0.2878	151.0	0.2855	0.2741	150.3	0.2834	0.2612	149.6	0.2813	120
125	0.3083	153.2	0.2902	0.2935	152.6	0.2881	0.2796	151.9	0.2861	0.2667	151.2	0.2840	125
130	0.3138	154.7	0.2927	0.2989	154.1	0.2907	0.2851	153.5	0.2887	0.2721	152.8	0.2867	130
135	0.3192	156.2	0.2952	0.3043	155.6	0.2932	0.2903	155.0	0.2913	0.2773	154.4	0.2893	135
140	0.3245	157.6	0.2976	0.3095	157.1	0.2957	0.2955	156.5	0.2938	0.2824	155.9	0.2919	140
145	0.3297	159.1	0.3000	0.3146	158.5	0.2981	0.3005	158.0	0.2962	0.2874	157.4	0.2944	145
150	0.3348	160.5	0.3023	0.3196	160.0	0.3005	0.3055	159.4	0.2986	0.2923	158.9	0.2968	150
155	0.3399	161.9	0.3046	0.3246	161.4	0.3028	0.3103	160.9	0.3010	0.2971	160.3	0.2992	155
160	0.3448	163.3	0.3069	0.3294	162.8	0.3051	0.3151	162.3	0.3033	0.3018	161.8	0.3016	160
165	0.3497	164.7	0.3091	0.3342	164.2	0.3073	0.3198	163.7	0.3056	0.3064	163.2	0.3039	165
170	0.3545	166.0	0.3113	0.3389	165.6	0.3096	0.3244	165.1	0.3078	0.3109	164.6	0.3062	170
175	0.3593	167.4	0.3135	0.3436	167.0	0.3117	0.3290	166.5	0.3101	0.3154	166.1	0.3084	175
180	0.3640	168.8	0.3156	0.3482	168.4	0.3139	0.3335	167.9	0.3122	0.3198	167.5	0.3106	180
185	0.3686	170.1	0.3177	0.3527	169.7	0.3161	0.3379	169.3	0.3144	0.3242	168.9	0.3128	185
190	0.3732	171.5	0.3198	0.3572	171.1	0.3182	0.3423	170.7	0.3165	0.3285	170.3	0.3149	190
195	0.3778	172.9	0.3219	0.3617	172.5	0.3203	0.3467	172.1	0.3186	0.3327	171.6	0.3171	195
200	0.3823	174.2	0.3240	0.3661	173.8	0.3223	0.3510	173.4	0.3207	0.3369	173.0	0.3192	200
205	0.3868	175.5	0.3260	0.3704	175.2	0.3244	0.3552	174.8	0.3228	0.3411	174.4	0.3212	205
210	0.3912	176.9	0.3280	0.3747	176.5	0.3264	0.3594	176.1	0.3248	0.3452	175.8	0.3233	210
215	0.3956	178.2	0.3300	0.3790	177.9	0.3284	0.3636	177.5	0.3268	0.3493	177.1	0.3253	215
220	0.3999	179.6	0.3320	0.3832	179.2	0.3304	0.3677	178.9	0.3289	0.3533	178.5	0.3273	220
225	0.4043	180.9	0.3339	0.3874	180.6	0.3324	0.3718	180.2	0.3308	0.3573	179.9	0.3293	225
230	0.4085	182.2	0.3359	0.3916	181.9	0.3343	0.3759	181.6	0.3328	0.3613	181.2	0.3313	230
235	0.4128	183.6	0.3378	0.3958	183.3	0.3363	0.3799	182.9	0.3348	0.3652	182.6	0.3333	235
ABSOLUTE PRESSURE, psia													
Temp °F	300			320			340			360			Temp °F
	98.67			103.37			107.86			112.14			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.2227	141.2	0.2656	0.2064	141.0	0.2639	0.1919	140.8	0.2623	0.1790	140.6	0.2607	
100	0.2245	141.7	0.2666										100
105	0.2311	143.6	0.2700	0.2086	141.7	0.2651							105
110	0.2374	145.4	0.2732	0.2150	143.7	0.2686	0.1948	141.7	0.2639				110
115	0.2433	147.2	0.2762	0.2211	145.6	0.2719	0.2010	143.8	0.2675	0.1827	141.9	0.2629	115
120	0.2491	148.9	0.2792	0.2269	147.4	0.2750	0.2069	145.7	0.2708	0.1888	143.9	0.2665	120
125	0.2546	150.5	0.2820	0.2324	149.1	0.2780	0.2125	147.6	0.2740	0.1945	145.9	0.2699	125
130	0.2599	152.2	0.2848	0.2377	150.8	0.2809	0.2179	149.3	0.2770	0.2000	147.8	0.2731	130
135	0.2651	153.7	0.2874	0.2429	152.4	0.2837	0.2230	151.1	0.2799	0.2051	149.6	0.2762	135
140	0.2702	155.3	0.2900	0.2478	154.0	0.2864	0.2280	152.8	0.2828	0.2101	151.4	0.2792	140
145	0.2751	156.8	0.2926	0.2527	155.6	0.2890	0.2328	154.4	0.2855	0.2149	153.1	0.2820	145
150	0.2799	158.3	0.2951	0.2574	157.2	0.2916	0.2374	156.0	0.2881	0.2195	154.8	0.2847	150
155	0.2846	159.8	0.2975	0.2620	158.7	0.2941	0.2420	157.6	0.2907	0.2240	156.4	0.2874	155
160	0.2893	161.3	0.2999	0.2665	160.2	0.2965	0.2464	159.1	0.2932	0.2284	158.0	0.2900	160
165	0.2938	162.7	0.3022	0.2710	161.7	0.2989	0.2507	160.7	0.2957	0.2326	159.6	0.2926	165
170	0.2983	164.2	0.3045	0.2753	163.2	0.3013	0.2549	162.2	0.2981	0.2368	161.2	0.2950	170
175	0.3027	165.6	0.3068	0.2796	164.7	0.3036	0.2591	163.7	0.3005	0.2408	162.7	0.2975	175
180	0.3070	167.0	0.3090	0.2838	166.1	0.3059	0.2632	165.2	0.3028	0.2448	164.2	0.2999	180
185	0.3113	168.4	0.3112	0.2879	167.5	0.3081	0.2672	166.6	0.3051	0.2487	165.7	0.3022	185
190	0.3155	169.8	0.3134	0.2920	169.0	0.3103	0.2711	168.1	0.3074	0.2526	167.2	0.3045	190
195	0.3197	171.2	0.3155	0.2960	170.4	0.3125	0.2750	169.6	0.3096	0.2564	168.7	0.3068	195
200	0.3238	172.6	0.3176	0.2999	171.8	0.3147	0.2789	171.0	0.3118	0.2601	170.2	0.3090	200
205	0.3278	174.0	0.3197	0.3039	173.2	0.3168	0.2827	172.4	0.3139	0.2638	171.6	0.3112	205
210	0.3319	175.4	0.3218	0.3077	174.6	0.3189	0.2864	173.9	0.3161	0.2674	173.1	0.3134	210
215	0.3359	176.8	0.3238	0.3116	176.0	0.3210	0.2901	175.3	0.3182	0.2710	174.5	0.3155	215
220	0.3398	178.2	0.3259	0.3153	177.4	0.3230	0.2937	176.7	0.3203	0.2745	175.9	0.3176	220
225	0.3437	179.5	0.3279	0.3191	178.8	0.3251	0.2973	178.1	0.3223	0.2780	177.4	0.3197	225
230	0.3476	180.9	0.3299	0.3228	180.2	0.3271	0.3009	179.5	0.3244	0.2814	178.8	0.3218	230
235	0.3514	182.3	0.3319	0.3265	181.6	0.3291	0.3045	180.9	0.3264	0.2848	180.2	0.3239	235
240	0.3553	183.6	0.3338	0.3301	183.0	0.3311	0.3080	182.3	0.3284	0.2882	181.6	0.3259	240
245	0.3591	185.0	0.3358	0.3338	184.4	0.3330	0.3114	183.7	0.3304	0.2916	183.0	0.3279	245

Opteon™ XL41 (R-454B)
Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	380			400			420			440			Temp °F
	116.25			120.19			123.98			127.63			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.1673	140.3	0.2590	0.1567	140.0	0.2574	0.1470	139.6	0.2558	0.1381	139.1	0.2542	
120	0.1721	142.0	0.2620										120
125	0.1781	144.2	0.2657	0.1628	142.2	0.2613	0.1483	140.1	0.2567				125
130	0.1836	146.2	0.2692	0.1686	144.4	0.2651	0.1545	142.5	0.2608	0.1412	140.4	0.2563	130
135	0.1889	148.1	0.2724	0.1740	146.5	0.2686	0.1602	144.8	0.2646	0.1473	142.9	0.2605	135
140	0.1939	150.0	0.2755	0.1791	148.5	0.2719	0.1655	146.9	0.2682	0.1528	145.2	0.2643	140
145	0.1987	151.8	0.2785	0.1840	150.4	0.2750	0.1704	148.9	0.2715	0.1579	147.3	0.2679	145
150	0.2033	153.5	0.2814	0.1886	152.2	0.2780	0.1751	150.8	0.2746	0.1627	149.3	0.2712	150
155	0.2078	155.2	0.2842	0.1931	154.0	0.2809	0.1796	152.7	0.2777	0.1672	151.3	0.2744	155
160	0.2121	156.9	0.2869	0.1974	155.7	0.2837	0.1840	154.4	0.2806	0.1716	153.2	0.2774	160
165	0.2163	158.5	0.2895	0.2016	157.4	0.2864	0.1881	156.2	0.2834	0.1758	155.0	0.2803	165
170	0.2204	160.1	0.2920	0.2056	159.0	0.2890	0.1922	157.9	0.2861	0.1798	156.7	0.2832	170
175	0.2244	161.7	0.2945	0.2096	160.6	0.2916	0.1961	159.6	0.2887	0.1837	158.5	0.2859	175
180	0.2283	163.2	0.2970	0.2134	162.2	0.2941	0.1999	161.2	0.2913	0.1875	160.2	0.2885	180
185	0.2322	164.8	0.2994	0.2172	163.8	0.2966	0.2036	162.8	0.2938	0.1912	161.8	0.2911	185
190	0.2359	166.3	0.3017	0.2209	165.4	0.2990	0.2072	164.4	0.2963	0.1948	163.5	0.2937	190
195	0.2396	167.8	0.3040	0.2245	166.9	0.3013	0.2108	166.0	0.2987	0.1983	165.1	0.2961	195
200	0.2433	169.3	0.3063	0.2281	168.4	0.3037	0.2143	167.6	0.3011	0.2017	166.7	0.2986	200
205	0.2468	170.8	0.3085	0.2315	170.0	0.3059	0.2177	169.1	0.3034	0.2050	168.2	0.3009	205
210	0.2503	172.3	0.3108	0.2350	171.5	0.3082	0.2210	170.6	0.3057	0.2083	169.8	0.3033	210
215	0.2538	173.7	0.3129	0.2384	172.9	0.3104	0.2244	172.1	0.3080	0.2116	171.3	0.3055	215
220	0.2572	175.2	0.3151	0.2417	174.4	0.3126	0.2276	173.6	0.3102	0.2148	172.9	0.3078	220
225	0.2606	176.6	0.3172	0.2450	175.9	0.3148	0.2308	175.1	0.3124	0.2179	174.4	0.3100	225
230	0.2640	178.1	0.3193	0.2482	177.4	0.3169	0.2340	176.6	0.3145	0.2210	175.9	0.3122	230
235	0.2673	179.5	0.3214	0.2514	178.8	0.3190	0.2371	178.1	0.3167	0.2240	177.4	0.3144	235
240	0.2705	181.0	0.3234	0.2546	180.3	0.3211	0.2402	179.6	0.3188	0.2271	178.9	0.3165	240
245	0.2738	182.4	0.3255	0.2578	181.7	0.3231	0.2432	181.0	0.3209	0.2300	180.4	0.3186	245
250	0.2770	183.8	0.3275	0.2609	183.2	0.3252	0.2463	182.5	0.3229	0.2330	181.8	0.3207	250
255	0.2802	185.2	0.3295	0.2639	184.6	0.3272	0.2492	183.9	0.3250	0.2359	183.3	0.3228	255
260	0.2833	186.7	0.3315	0.2670	186.0	0.3292	0.2522	185.4	0.3270	0.2387	184.8	0.3248	260
265	0.2864	188.1	0.3334	0.2700	187.5	0.3312	0.2551	186.8	0.3290	0.2416	186.2	0.3269	265
ABSOLUTE PRESSURE, psia													
Temp °F	460			480			500			520			Temp °F
	131.15			134.55			137.83			141.02			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.1299	138.7	0.2525	0.1223	138.1	0.2508	0.1153	137.5	0.2491	0.1087	136.9	0.2473	
135	0.1349	140.8	0.2561	0.1230	138.4	0.2513							135
140	0.1408	143.3	0.2603	0.1294	141.2	0.2560	0.1183	138.9	0.2514				140
145	0.1461	145.6	0.2641	0.1350	143.8	0.2602	0.1244	141.8	0.2561	0.1141	139.5	0.2516	145
150	0.1511	147.8	0.2677	0.1402	146.1	0.2641	0.1299	144.3	0.2603	0.1201	142.3	0.2563	150
155	0.1558	149.8	0.2711	0.1450	148.3	0.2677	0.1349	146.7	0.2642	0.1254	144.9	0.2605	155
160	0.1602	151.8	0.2742	0.1495	150.4	0.2710	0.1396	148.9	0.2677	0.1302	147.3	0.2644	160
165	0.1644	153.7	0.2773	0.1538	152.4	0.2742	0.1439	151.0	0.2711	0.1347	149.5	0.2679	165
170	0.1684	155.5	0.2802	0.1579	154.3	0.2773	0.1481	153.0	0.2743	0.1389	151.6	0.2713	170
175	0.1723	157.3	0.2831	0.1618	156.1	0.2802	0.1520	154.9	0.2774	0.1429	153.6	0.2745	175
180	0.1761	159.1	0.2858	0.1656	157.9	0.2830	0.1558	156.8	0.2803	0.1467	155.6	0.2775	180
185	0.1797	160.8	0.2885	0.1692	159.7	0.2858	0.1595	158.6	0.2831	0.1504	157.5	0.2805	185
190	0.1833	162.5	0.2910	0.1728	161.4	0.2885	0.1630	160.4	0.2859	0.1539	159.3	0.2833	190
195	0.1868	164.1	0.2936	0.1762	163.1	0.2911	0.1664	162.1	0.2885	0.1573	161.1	0.2861	195
200	0.1902	165.7	0.2961	0.1795	164.8	0.2936	0.1697	163.8	0.2911	0.1606	162.8	0.2887	200
205	0.1935	167.3	0.2985	0.1828	166.4	0.2961	0.1730	165.5	0.2937	0.1639	164.6	0.2913	205
210	0.1967	168.9	0.3009	0.1860	168.1	0.2985	0.1761	167.2	0.2962	0.1670	166.3	0.2939	210
215	0.1999	170.5	0.3032	0.1892	169.7	0.3009	0.1792	168.8	0.2986	0.1701	167.9	0.2963	215
220	0.2030	172.1	0.3055	0.1922	171.2	0.3032	0.1823	170.4	0.3010	0.1731	169.6	0.2988	220
225	0.2061	173.6	0.3077	0.1953	172.8	0.3055	0.1853	172.0	0.3033	0.1760	171.2	0.3011	225
230	0.2091	175.1	0.3100	0.1982	174.4	0.3078	0.1882	173.6	0.3056	0.1789	172.8	0.3035	230
235	0.2121	176.6	0.3122	0.2011	175.9	0.3100	0.1910	175.2	0.3079	0.1817	174.4	0.3058	235
240	0.2150	178.2	0.3143	0.2040	177.4	0.3122	0.1939	176.7	0.3101	0.1845	176.0	0.3080	240
245	0.2179	179.7	0.3165	0.2069	179.0	0.3144	0.1967	178.2	0.3123	0.1872	177.5	0.3103	245
250	0.2208	181.2	0.3186	0.2097	180.5	0.3165	0.1994	179.8	0.3145	0.1899	179.1	0.3125	250
255	0.2236	182.6	0.3207	0.2124	182.0	0.3186	0.2021	181.3	0.3166	0.1926	180.6	0.3146	255
260	0.2264	184.1	0.3227	0.2152	183.5	0.3207	0.2048	182.8	0.3187	0.1952	182.2	0.3168	260
265	0.2292	185.6	0.3248	0.2179	185.0	0.3228	0.2074	184.3	0.3208	0.1978	183.7	0.3189	265
270	0.2319	187.1	0.3268	0.2205	186.5	0.3248	0.2100	185.8	0.3229	0.2003	185.2	0.3210	270
275	0.2347	188.5	0.3288	0.2232	187.9	0.3268	0.2126	187.3	0.3249	0.2028	186.7	0.3230	275
280	0.2373	190.0	0.3308	0.2258	189.4	0.3289	0.2152	188.8	0.3270	0.2053	188.2	0.3251	280

Opteon™ XL41 (R-454B) Superheated Vapor - Constant Pressure Tables

V = Volume in ft³/lb

H = Enthalpy in Btu/lb

S = Entropy in Btu/lb-°R

Saturation Properties in Light Blue

ABSOLUTE PRESSURE, psia													
Temp °F	540			550			560			570			Temp °F
	144.10			147.09			149.99			152.80			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.1024	136.2	0.2455	0.0966	135.4	0.2435	0.0910	134.5	0.2415	0.0857	133.6	0.2394	
145	0.1038	136.8	0.2466										145
150	0.1105	140.1	0.2520	0.1009	137.6	0.2472	0.0910	134.5	0.2416				150
155	0.1162	143.0	0.2567	0.1072	140.9	0.2525	0.0984	138.5	0.2480	0.0893	135.6	0.2427	155
160	0.1213	145.6	0.2608	0.1127	143.7	0.2571	0.1044	141.7	0.2532	0.0962	139.4	0.2489	160
165	0.1259	147.9	0.2647	0.1176	146.3	0.2613	0.1096	144.5	0.2577	0.1019	142.5	0.2540	165
170	0.1303	150.2	0.2682	0.1221	148.7	0.2651	0.1143	147.0	0.2618	0.1068	145.3	0.2584	170
175	0.1343	152.3	0.2716	0.1263	150.9	0.2686	0.1186	149.4	0.2656	0.1113	147.9	0.2624	175
180	0.1382	154.3	0.2748	0.1302	153.0	0.2719	0.1227	151.7	0.2691	0.1155	150.2	0.2661	180
185	0.1419	156.3	0.2778	0.1340	155.1	0.2751	0.1265	153.8	0.2724	0.1194	152.5	0.2696	185
190	0.1455	158.2	0.2807	0.1375	157.0	0.2782	0.1301	155.8	0.2756	0.1230	154.6	0.2729	190
195	0.1489	160.0	0.2836	0.1410	158.9	0.2811	0.1335	157.8	0.2786	0.1265	156.6	0.2761	195
200	0.1522	161.8	0.2863	0.1443	160.8	0.2839	0.1368	159.7	0.2815	0.1299	158.6	0.2791	200
205	0.1554	163.6	0.2890	0.1475	162.6	0.2866	0.1401	161.6	0.2843	0.1331	160.5	0.2820	205
210	0.1585	165.3	0.2916	0.1506	164.4	0.2893	0.1431	163.4	0.2870	0.1362	162.4	0.2848	210
215	0.1615	167.0	0.2941	0.1536	166.1	0.2919	0.1462	165.2	0.2897	0.1392	164.2	0.2875	215
220	0.1645	168.7	0.2966	0.1565	167.8	0.2944	0.1491	166.9	0.2923	0.1421	166.0	0.2901	220
225	0.1674	170.4	0.2990	0.1594	169.5	0.2969	0.1519	168.7	0.2948	0.1449	167.8	0.2927	225
230	0.1702	172.0	0.3014	0.1622	171.2	0.2993	0.1547	170.4	0.2973	0.1477	169.5	0.2952	230
235	0.1730	173.6	0.3037	0.1650	172.8	0.3017	0.1574	172.0	0.2997	0.1504	171.2	0.2977	235
240	0.1758	175.2	0.3060	0.1677	174.5	0.3040	0.1601	173.7	0.3021	0.1530	172.9	0.3001	240
245	0.1785	176.8	0.3083	0.1703	176.1	0.3063	0.1627	175.3	0.3044	0.1556	174.6	0.3025	245
250	0.1811	178.4	0.3105	0.1729	177.7	0.3086	0.1653	176.9	0.3067	0.1582	176.2	0.3048	250
255	0.1837	179.9	0.3127	0.1755	179.2	0.3108	0.1678	178.5	0.3089	0.1607	177.8	0.3071	255
260	0.1863	181.5	0.3149	0.1780	180.8	0.3130	0.1703	180.1	0.3112	0.1631	179.5	0.3093	260
265	0.1888	183.0	0.3170	0.1805	182.4	0.3152	0.1728	181.7	0.3133	0.1655	181.1	0.3116	265
270	0.1913	184.6	0.3191	0.1830	183.9	0.3173	0.1752	183.3	0.3155	0.1679	182.6	0.3137	270
275	0.1938	186.1	0.3212	0.1854	185.5	0.3194	0.1776	184.9	0.3176	0.1702	184.2	0.3159	275
280	0.1962	187.6	0.3233	0.1878	187.0	0.3215	0.1799	186.4	0.3197	0.1725	185.8	0.3180	280
285	0.1986	189.1	0.3253	0.1901	188.6	0.3236	0.1822	188.0	0.3218	0.1748	187.4	0.3201	285
290	0.2010	190.7	0.3273	0.1925	190.1	0.3256	0.1845	189.5	0.3239	0.1771	188.9	0.3222	290
ABSOLUTE PRESSURE, psia													
Temp °F	580			600			620			640			Temp °F
	155.53			158.19			160.76			163.26			
	V	H	S	V	H	S	V	H	S	V	H	S	
	0.0806	132.5	0.2372	0.0756	131.3	0.2348	0.0707	129.9	0.2321	0.0659	128.3	0.2292	
160	0.0879	136.7	0.2440	0.0791	133.4	0.2382							160
165	0.0943	140.3	0.2499	0.0866	137.9	0.2454	0.0788	134.9	0.2401	0.0701	131.0	0.2335	165
170	0.0996	143.4	0.2548	0.0925	141.4	0.2510	0.0855	139.0	0.2467	0.0784	136.4	0.2420	170
175	0.1043	146.2	0.2592	0.0976	144.4	0.2557	0.0910	142.4	0.2521	0.0845	140.3	0.2482	175
180	0.1087	148.7	0.2631	0.1021	147.1	0.2600	0.0958	145.4	0.2567	0.0896	143.5	0.2533	180
185	0.1127	151.1	0.2668	0.1062	149.6	0.2639	0.1001	148.1	0.2609	0.0942	146.4	0.2578	185
190	0.1164	153.3	0.2703	0.1101	152.0	0.2675	0.1040	150.5	0.2648	0.0983	149.1	0.2619	190
195	0.1199	155.4	0.2735	0.1137	154.2	0.2709	0.1077	152.9	0.2683	0.1020	151.5	0.2657	195
200	0.1233	157.5	0.2766	0.1171	156.3	0.2742	0.1112	155.1	0.2717	0.1056	153.8	0.2692	200
205	0.1265	159.5	0.2796	0.1203	158.4	0.2773	0.1145	157.2	0.2749	0.1089	156.0	0.2725	205
210	0.1296	161.4	0.2825	0.1235	160.3	0.2803	0.1176	159.3	0.2780	0.1121	158.2	0.2757	210
215	0.1326	163.3	0.2853	0.1265	162.3	0.2831	0.1206	161.3	0.2809	0.1151	160.2	0.2787	215
220	0.1355	165.1	0.2880	0.1294	164.1	0.2859	0.1235	163.2	0.2838	0.1180	162.2	0.2817	220
225	0.1384	166.9	0.2906	0.1322	166.0	0.2886	0.1264	165.1	0.2865	0.1208	164.1	0.2845	225
230	0.1411	168.7	0.2932	0.1349	167.8	0.2912	0.1291	166.9	0.2892	0.1236	166.0	0.2872	230
235	0.1438	170.4	0.2957	0.1376	169.6	0.2938	0.1317	168.7	0.2918	0.1262	167.8	0.2899	235
240	0.1464	172.1	0.2982	0.1402	171.3	0.2963	0.1343	170.5	0.2944	0.1288	169.7	0.2925	240
245	0.1490	173.8	0.3006	0.1427	173.0	0.2987	0.1368	172.2	0.2969	0.1313	171.4	0.2950	245
250	0.1515	175.5	0.3029	0.1452	174.7	0.3011	0.1393	174.0	0.2993	0.1337	173.2	0.2975	250
255	0.1539	177.1	0.3053	0.1476	176.4	0.3035	0.1417	175.7	0.3017	0.1361	174.9	0.2999	255
260	0.1564	178.8	0.3076	0.1500	178.1	0.3058	0.1441	177.3	0.3040	0.1385	176.6	0.3023	260
265	0.1587	180.4	0.3098	0.1524	179.7	0.3081	0.1464	179.0	0.3063	0.1408	178.3	0.3047	265
270	0.1611	182.0	0.3120	0.1547	181.3	0.3103	0.1487	180.7	0.3086	0.1430	180.0	0.3070	270
275	0.1634	183.6	0.3142	0.1570	182.9	0.3125	0.1509	182.3	0.3109	0.1452	181.6	0.3092	275
280	0.1657	185.2	0.3163	0.1592	184.6	0.3147	0.1531	183.9	0.3131	0.1474	183.3	0.3114	280
285	0.1679	186.8	0.3185	0.1614	186.1	0.3168	0.1553	185.5	0.3152	0.1496	184.9	0.3136	285
290	0.1701	188.3	0.3206	0.1636	187.7	0.3190	0.1575	187.1	0.3174	0.1517	186.5	0.3158	290
295	0.1723	189.9	0.3227	0.1657	189.3	0.3211	0.1596	188.7	0.3195	0.1538	188.1	0.3179	295
300	0.1745	191.4	0.3247	0.1679	190.9	0.3231	0.1617	190.3	0.3216	0.1558	189.7	0.3201	300
305	0.1766	193.0	0.3268	0.1700	192.4	0.3252	0.1637	191.9	0.3237	0.1578	191.3	0.3221	305

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C-XL41THP-ENG (8/23)