

**Tetrafluoroethane – CH<sub>2</sub>F–CF<sub>3</sub> (Refrigerant 134a)**

Saturation Values							Superheat ( $T - T_s$ )			
$T$ [°C]	$p_s$ [bar]	$v_g$ [m <sup>3</sup> /kg]	$h_f$ $h_g$		$s_f$ $s_g$		10 K		20 K	
			[kJ/kg]		[kJ/kg K]		$h$	$s$	$h$	$s$
							[kJ/kg]	[kJ/kg K]	[kJ/kg]	[kJ/kg K]
-103.30	0.0041	34.032	77.69	335.24	0.4453	1.9616	341.16	1.9955	347.29	2.0287
-100	0.0058	24.341	80.89	337.15	0.4640	1.9439	343.14	1.9776	349.35	2.0106
-90	0.0155	9.5984	90.97	343.05	0.5205	1.8969	349.27	1.9300	355.70	1.9624
-80	0.0370	4.2333	101.60	349.09	0.5770	1.8584	355.55	1.8910	362.20	1.9229
-70	0.0800	2.0522	112.70	355.25	0.6330	1.8270	361.95	1.8592	368.84	1.8907
-60	0.1591	1.07785	124.23	361.48	0.6884	1.8015	368.44	1.8334	375.57	1.8646
-50	0.2944	0.60592	136.14	367.76	0.7430	1.7809	374.99	1.8126	382.38	1.8436
-40	0.5188	0.36089	148.37	374.03	0.7965	1.7644	381.56	1.7960	389.22	1.8269
-30	0.8435	0.22577	160.89	380.27	0.8490	1.7512	388.12	1.7828	396.07	1.8137
-25	1.0637	0.18146	167.25	383.37	0.8748	1.7457	391.38	1.7774	399.49	1.8082
-20	1.3272	0.14725	173.67	386.44	0.9003	1.7408	394.63	1.7726	402.90	1.8034
-15	1.6393	0.12055	180.16	389.49	0.9256	1.7365	397.86	1.7683	406.29	1.7992
-10	2.0060	0.09949	186.71	392.51	0.9506	1.7327	401.07	1.7647	409.67	1.7956
-5	2.4335	0.08273	193.32	395.49	0.9754	1.7294	404.25	1.7614	413.02	1.7924
0†	2.9281	0.06925	200.00†	398.43	1.0000†	1.7264	407.40	1.7587	416.35	1.7897
5	3.4966	0.05834	206.75	401.33	1.0243	1.7238	410.50	1.7562	419.65	1.7874
10	4.1459	0.04942	213.57	404.16	1.0484	1.7215	413.56	1.7542	422.90	1.7855
15	4.8833	0.04208	220.46	406.93	1.0723	1.7194	416.57	1.7524	426.12	1.7838
20	5.7162	0.03599	227.45	409.62	1.0961	1.7176	419.52	1.7508	429.29	1.7825
25	6.6525	0.03092	234.52	412.23	1.1198	1.7158	422.41	1.7494	432.40	1.7813
30	7.7000	0.02665	241.69	414.74	1.1434	1.7142	425.21	1.7482	435.44	1.7803
35	8.8672	0.02304	248.98	417.14	1.1669	1.7126	427.93	1.7470	438.42	1.7795
40	10.163	0.01998	256.38	419.41	1.1903	1.7109	430.55	1.7460	441.32	1.7788
45	11.595	0.01735	263.92	421.53	1.2138	1.7092	433.06	1.7449	444.13	1.7781
50	13.174	0.01510	271.61	423.47	1.2374	1.7073	435.44	1.7438	446.84	1.7775
55	14.910	0.01315	279.46	425.20	1.2610	1.7051	437.69	1.7426	449.45	1.7769
60	16.812	0.01145	287.51	426.69	1.2848	1.7026	439.77	1.7412	451.93	1.7762
65	18.892	0.00997	295.77	427.89	1.3088	1.6995	441.67	1.7397	454.29	1.7754
70	21.161	0.00866	304.29	428.72	1.3332	1.6958	443.36	1.7378	456.50	1.7745
75	23.633	0.00750	313.13	429.09	1.3580	1.6911	444.82	1.7356	458.54	1.7734
80	26.323	0.00645	322.36	428.85	1.3835	1.6851	446.01	1.7330	460.42	1.7721
85	29.249	0.00550	332.16	427.77	1.4101	1.6771	446.88	1.7298	462.09	1.7706
90	32.433	0.00462	342.79	425.40	1.4386	1.6661	447.40	1.7259	463.55	1.7687
95	35.906	0.00375	355.05	420.64	1.4709	1.6491	447.49	1.7212	464.76	1.7663
100	39.728	0.00266	373.53	406.93	1.5193	1.6088	447.04	1.7153	465.65	1.7633
101.00	40.550	0.00196	389.67	389.67	1.5621	1.5621	446.84	1.7139	465.77	1.7626

Molar mass  $\bar{m} = 102.03$  kg/kmol; further properties of the liquid are given on p. 23.

†The datum state for refrigerant properties used to be  $-40^\circ\text{C}$  ( $h_f = 0$ ,  $s_f = 0$ ), a temperature at which  $-40^\circ\text{C} = -40^\circ\text{F}$ . This datum state is used here for the R717 and R12 tables. Nowadays the datum state chosen is  $0^\circ\text{C}$  ( $h_f = 200$  kJ/kg,  $s_f = 1.000$  kJ/kg K), a choice which ensures that no negative values of  $h_f$  and  $s_f$  appear in common refrigerant tables. This datum state is chosen for the R134a table.

It must be remembered that datum states are quite arbitrary and do not affect calculations which involve changes of properties, such as  $\Delta h$ .