

# FORANE® 407C - THERMODYNAMIC PROPERTIES

Calculated with NIST REFPROP database 23, version 8.0

Reference state : ASHRAE Enthalpy, entropy = 0 for the saturated liquid at -40°C

Saturation points - bubble and dew points at same composition

$T_{dew} = T_{bubble}$

T: dew temperature

P: pressure

$\rho$ : density

h: enthalpy

s: entropy



T (°C)	P <sub>liquid</sub> (bar)	P <sub>vapor</sub> (bar)	$\rho$ <sub>liquid</sub> (kg/m <sup>3</sup> )	$\rho$ <sub>vapor</sub> (kg/m <sup>3</sup> )	h <sub>liquid</sub> (kJ/kg)	h <sub>vapor</sub> (kJ/kg)	s <sub>liquid</sub> (kJ.kg <sup>-1</sup> .K <sup>-1</sup> )	s <sub>vapor</sub> (kJ.kg <sup>-1</sup> .K <sup>-1</sup> )	T (°C)	P <sub>vapor</sub> (kPa)	P <sub>liquid</sub> (kPa)	$\rho$ <sub>vapor</sub> (kg/m <sup>3</sup> )	$\rho$ <sub>liquid</sub> (kg/m <sup>3</sup> )	h <sub>vapor</sub> (kJ/kg)	h <sub>liquid</sub> (kJ/kg)	s <sub>liquid</sub> (kJ.kg <sup>-1</sup> .K <sup>-1</sup> )	s <sub>vapor</sub> (kJ.kg <sup>-1</sup> .K <sup>-1</sup> )
-50	0.74	0.50	1400.10	2.3941	132.3	381.85	0.728	1.865	0	5.68	4.61	1236.20	19.7	200.0	409.51	1.000	1.776
-48	0.82	0.56	1394.10	2.658	134.9	383.04	0.740	1.860	2	6.06	4.94	1228.90	21.1	202.8	410.47	1.010	1.774
-46	0.90	0.63	1388.00	2.9444	137.6	384.23	0.751	1.855	4	6.45	5.29	1221.50	22.5	205.7	411.41	1.021	1.772
-44	1.00	0.70	1381.90	3.2549	140.2	385.42	0.763	1.851	6	6.87	5.66	1214.00	24.1	208.6	412.34	1.031	1.769
-42	1.10	0.77	1375.70	3.5908	142.8	386.60	0.774	1.846	8	7.31	6.04	1206.40	25.7	211.5	413.25	1.041	1.767
-40	1.20	0.86	1369.50	3.9537	145.5	387.78	0.786	1.842	10	7.76	6.45	1198.70	27.4	214.4	414.14	1.051	1.765
-38	1.32	0.95	1363.30	4.3451	148.1	388.95	0.797	1.837	12	8.24	6.88	1191.00	29.3	217.3	415.01	1.061	1.762
-36	1.44	1.04	1357.00	4.7664	150.7	390.12	0.808	1.833	14	8.74	7.32	1183.10	31.2	220.2	415.86	1.071	1.760
-34	1.58	1.15	1350.80	5.2195	153.4	391.27	0.819	1.829	16	9.26	7.79	1175.10	33.2	223.2	416.69	1.081	1.758
-32	1.72	1.26	1344.40	5.706	156.1	392.42	0.830	1.825	18	9.81	8.29	1166.90	35.3	226.2	417.50	1.092	1.756
-30	1.87	1.39	1338.10	6.2275	158.7	393.57	0.841	1.821	20	10.38	8.80	1158.70	37.6	229.2	418.28	1.102	1.754
-28	2.03	1.52	1331.60	6.7861	161.4	394.70	0.852	1.818	22	10.97	9.34	1150.30	40.0	232.2	419.04	1.112	1.752
-26	2.21	1.66	1325.20	7.3835	164.1	395.83	0.863	1.814	24	11.59	9.91	1141.80	42.5	235.2	419.77	1.122	1.749
-24	2.39	1.81	1318.70	8.0217	166.8	396.94	0.874	1.811	26	12.23	10.50	1133.10	45.1	238.3	420.48	1.132	1.747
-22	2.59	1.97	1312.10	8.7027	169.5	398.05	0.885	1.807	28	12.90	11.12	1124.30	47.9	241.4	421.16	1.142	1.745
-20	2.80	2.15	1305.50	9.4287	172.2	399.15	0.895	1.804	30	13.59	11.76	1115.40	50.8	244.5	421.80	1.152	1.743
-18	3.02	2.33	1298.90	10.202	175.0	400.24	0.906	1.801	32	14.31	12.43	1106.20	53.9	247.6	422.4	1.162	1.741
-16	3.26	2.53	1292.20	11.024	177.7	401.32	0.917	1.798	34	15.06	13.13	1096.90	57.2	250.8	423.0	1.172	1.739
-14	3.51	2.74	1285.40	11.899	180.5	402.39	0.927	1.795	36	15.84	13.86	1087.40	60.6	253.9	423.5	1.182	1.736
-12	3.77	2.96	1278.60	12.827	183.2	403.44	0.938	1.792	38	16.65	14.62	1077.60	64.3	257.2	424.0	1.192	1.734
-10	4.05	3.20	1271.70	13.812	186.0	404.49	0.948	1.789	40	17.49	15.41	1067.70	68.1	260.4	424.5	1.203	1.732
-8	4.34	3.45	1264.70	14.857	188.8	405.52	0.959	1.787	42	18.36	16.24	1057.50	72.2	263.7	424.9	1.213	1.729
-6	4.65	3.71	1257.70	15.964	191.6	406.53	0.969	1.784	44	19.26	17.10	1047.00	76.6	267.0	425.3	1.223	1.727
-4	4.98	4.00	1250.60	17.136	194.4	407.54	0.979	1.781	46	20.19	17.99	1036.30	81.1	270.4	425.6	1.233	1.724
-2	5.32	4.29	1243.50	18.377	197.2	408.53	0.990	1.779	48	21.16	18.91	1025.30	86.0	273.8	425.9	1.244	1.722



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**Thermodynamic Properties of Forane<sup>®</sup> 407C - Saturation**

Saturation Temperature (°F)	Liquid Pressure (psia)	Vapor Pressure (psia)	Liquid Density (lb/ft <sup>3</sup> )	Vapor Density (lb/ft <sup>3</sup> )	Liquid Enthalpy (BTU/lb)	Vapor Enthalpy (BTU/lb)	Liquid Entropy (BTU/lb °R)	Vapor Entropy (BTU/lb °R)
-50	13.27	9.10	86.54	0.182	-2.9	103.1	-0.007	0.256
-45	15.14	10.54	86.03	0.209	-1.5	103.8	-0.003	0.254
-40	17.21	12.16	85.50	0.239	0.0	104.6	0.000	0.253
-35	19.50	13.98	84.98	0.272	1.5	105.4	0.003	0.252
-30	22.03	16.01	84.45	0.309	2.9	106.1	0.007	0.251
-25	24.80	18.26	83.91	0.349	4.4	106.9	0.010	0.249
-20	27.84	20.77	83.36	0.394	5.9	107.7	0.014	0.248
-15	31.16	23.53	82.81	0.443	7.4	108.4	0.017	0.247
-10	34.79	26.58	82.25	0.497	8.9	109.1	0.020	0.246
-5	38.74	29.93	81.69	0.556	10.5	109.9	0.024	0.245
0	43.03	33.60	81.12	0.620	12.0	110.6	0.027	0.244
5	47.69	37.60	80.54	0.691	13.6	111.3	0.031	0.243
10	52.73	41.97	79.95	0.767	15.2	112.1	0.034	0.242
15	58.17	46.71	79.36	0.849	16.8	112.8	0.037	0.242
20	64.04	51.85	78.76	0.938	18.4	113.5	0.041	0.241
25	70.37	57.40	78.14	1.035	20.0	114.1	0.044	0.240
30	77.17	63.40	77.52	1.139	21.7	114.8	0.047	0.239
35	84.47	69.85	76.89	1.251	23.4	115.5	0.051	0.239
40	92.29	76.79	76.25	1.372	25.1	116.1	0.054	0.238
45	100.66	84.23	75.60	1.502	26.8	116.8	0.057	0.237
50	109.60	92.20	74.93	1.642	28.5	117.4	0.061	0.237
55	119.15	100.73	74.26	1.792	30.3	118.0	0.064	0.236
60	129.32	109.83	73.57	1.953	32.0	118.6	0.068	0.236
65	140.14	119.53	72.87	2.126	33.9	119.2	0.071	0.235
70	151.64	129.86	72.15	2.312	35.7	119.7	0.074	0.234
75	163.84	140.85	71.42	2.511	37.6	120.3	0.078	0.234
80	176.77	152.54	70.67	2.725	39.5	120.8	0.081	0.233
85	190.46	164.94	69.90	2.955	41.4	121.3	0.085	0.233
90	204.92	178.10	69.11	3.202	43.3	121.7	0.088	0.232
95	220.19	192.05	68.31	3.469	45.3	122.2	0.092	0.232
100	236.29	206.83	67.47	3.755	47.4	122.6	0.095	0.231
105	253.24	222.48	66.62	4.065	49.5	122.9	0.099	0.230
110	271.06	239.06	65.73	4.399	51.6	123.2	0.103	0.229
115	289.77	256.60	64.82	4.762	53.7	123.5	0.106	0.229
120	309.39	275.16	63.87	5.156	56.0	123.8	0.110	0.228
125	329.95	294.80	62.88	5.585	58.3	123.9	0.114	0.227
130	351.44	315.59	61.85	6.056	60.6	124.0	0.118	0.226
135	373.89	337.58	60.77	6.573	63.0	124.1	0.122	0.225
140	397.32	360.86	59.63	7.145	65.5	124.0	0.126	0.224
145	421.71	385.50	58.43	7.782	68.1	123.9	0.130	0.223
150	447.10	411.59	57.14	8.498	70.8	123.6	0.134	0.221