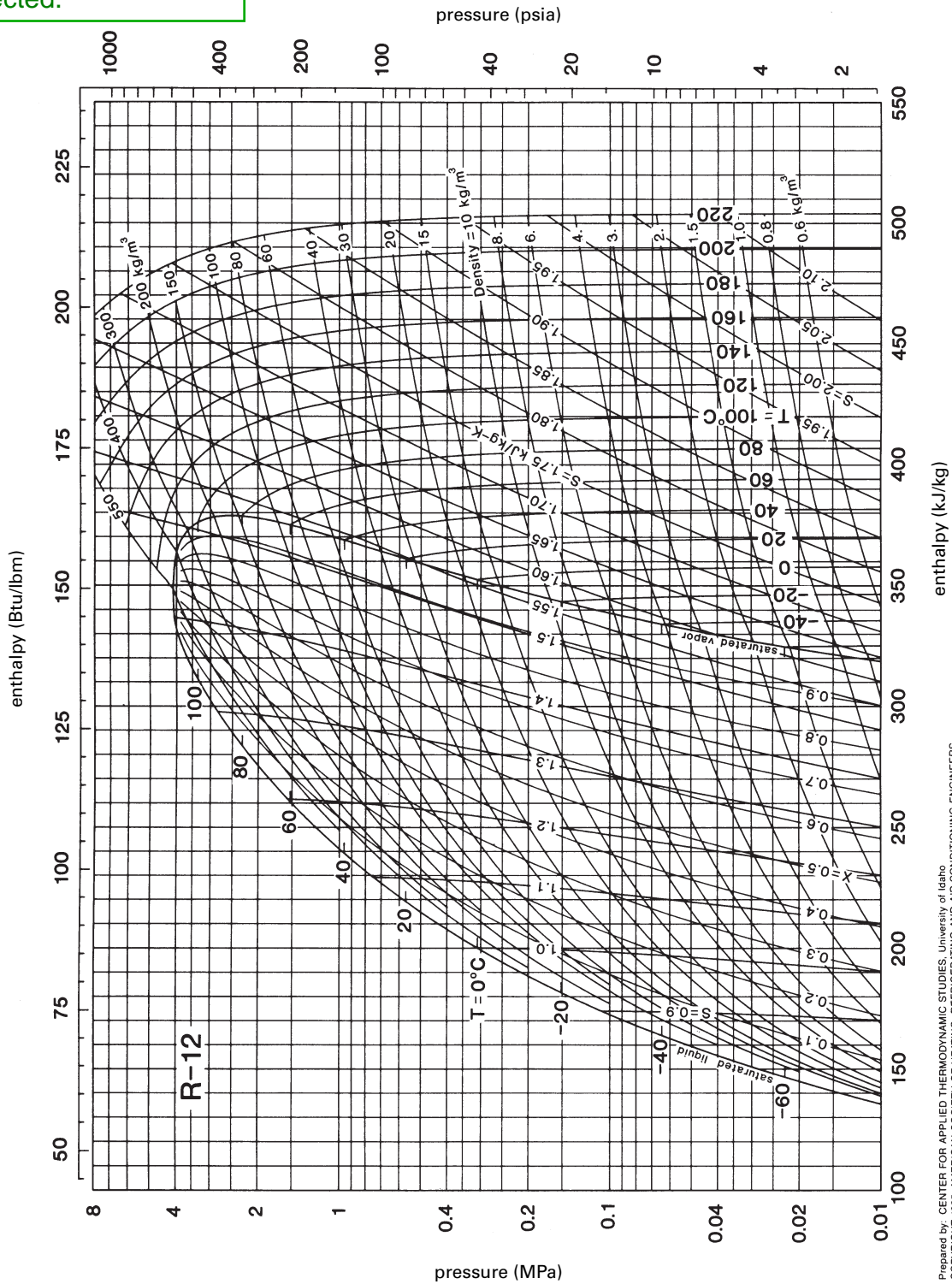


These pages replace those for App. 23.U though 23.X

The correct chart now shows under App. 23.U, and the duplicated one under App. 23.X has been corrected.

APPENDIX 23.U  
Pressure-Enthalpy Diagram for Refrigerant-12 (R-12)  
(SI units)



Prepared by: CENTER FOR APPLIED THERMODYNAMIC STUDIES, University of Idaho  
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Support Material

## APPENDIX 23.V

Properties of Saturated Refrigerant-22 (R-22) by Temperature  
(SI units)

temp. (°C)	absolute	volume	density	enthalpy		entropy	
	pressure (MPa)	vapor (m <sup>3</sup> /kg)	liquid (kg/m <sup>3</sup> )	liquid (kJ/kg)	vapor (kJ/kg)	liquid (kJ/kg·K)	vapor (kJ/kg·K)
-90	0.004748	3.6939	1542.8	98.575	364.20	0.55032	2.006
-85	0.007084	2.5394	1529.9	104.54	366.63	0.58246	1.9754
-80	0.010308	1.7883	1516.8	110.42	369.06	0.61326	1.9524
-75	0.014662	1.2870	1503.6	116.21	371.49	0.64284	1.9312
-70	0.020424	0.94477	1490.3	121.92	373.91	0.67132	1.9117
-65	0.027914	0.70609	1476.7	127.58	376.32	0.69879	1.8938
-60	0.037491	0.53641	1463.1	133.18	378.72	0.72535	1.8773
-55	0.049556	0.41362	1449.2	138.74	381.10	0.75109	1.8621
-50	0.064549	0.32330	1435.2	144.27	383.45	0.77610	1.8479
-45	0.082947	0.25586	1421.0	149.77	385.77	0.80044	1.8348
-40.82	0.101325	0.21223	1408.9	154.37	387.69	0.82034	1.8246
-40	0.10527	0.20480	1406.5	155.26	388.06	0.82419	1.8227
-38	0.11542	0.18790	1400.7	157.46	388.96	0.83354	1.8180
-36	0.12632	0.17268	1394.8	159.66	389.86	0.84281	1.8135
-34	0.13801	0.15894	1388.9	161.86	390.75	0.85200	1.8091
-32	0.15053	0.14651	1382.9	164.06	391.64	0.86113	1.8049
-30	0.16391	0.13524	1376.9	166.26	392.52	0.87018	1.8007
-28	0.17821	0.12502	1370.9	168.46	393.39	0.87917	1.7967
-26	0.19346	0.11573	1364.8	170.67	394.25	0.88810	1.7927
-24	0.20969	0.10726	1358.7	172.89	395.10	0.89697	1.7889
-22	0.22696	0.09954	1352.6	175.10	395.95	0.90579	1.7851
-20	0.24531	0.09249	1346.4	177.33	396.79	0.91455	1.7815
-18	0.26477	0.08603	1340.1	179.56	397.62	0.92327	1.7779
-16	0.28540	0.08012	1333.8	181.79	398.43	0.93194	1.7744
-14	0.30724	0.07470	1327.5	184.04	399.24	0.94057	1.7710
-12	0.33034	0.06971	1321.1	186.29	400.04	0.94916	1.7677
-10	0.35474	0.06513	1314.6	188.55	400.83	0.95771	1.7644
-8	0.38049	0.06090	1308.1	190.82	401.61	0.96623	1.7612
-6	0.40763	0.05701	1301.5	193.10	402.37	0.97471	1.7581
-4	0.43622	0.05341	1294.9	195.39	403.12	0.98317	1.7550
-2	0.46630	0.05008	1288.2	197.69	403.87	0.99160	1.7520
0	0.49792	0.04700	1281.5	200.00	404.59	1.0000	1.7490
2	0.53113	0.04415	1274.7	202.32	405.31	1.0084	1.7461
4	0.56599	0.04150	1267.8	204.66	406.01	1.0167	1.7432
6	0.60254	0.03904	1260.8	207.01	406.70	1.0251	1.7404
8	0.64083	0.03675	1253.8	209.37	407.37	1.0334	1.7376
10	0.68091	0.03462	1246.7	211.74	408.03	1.0417	1.7349
12	0.72285	0.03263	1239.5	214.13	408.67	1.0500	1.7322
14	0.76668	0.03078	1232.3	216.54	409.29	1.0583	1.7295
16	0.81246	0.02905	1224.9	218.96	409.90	1.0665	1.7269
18	0.86025	0.02743	1217.5	221.40	410.49	1.0748	1.7243
20	0.91009	0.02592	1210.0	223.85	411.06	1.0831	1.7217
22	0.96205	0.02451	1202.4	226.32	411.61	1.0913	1.7191

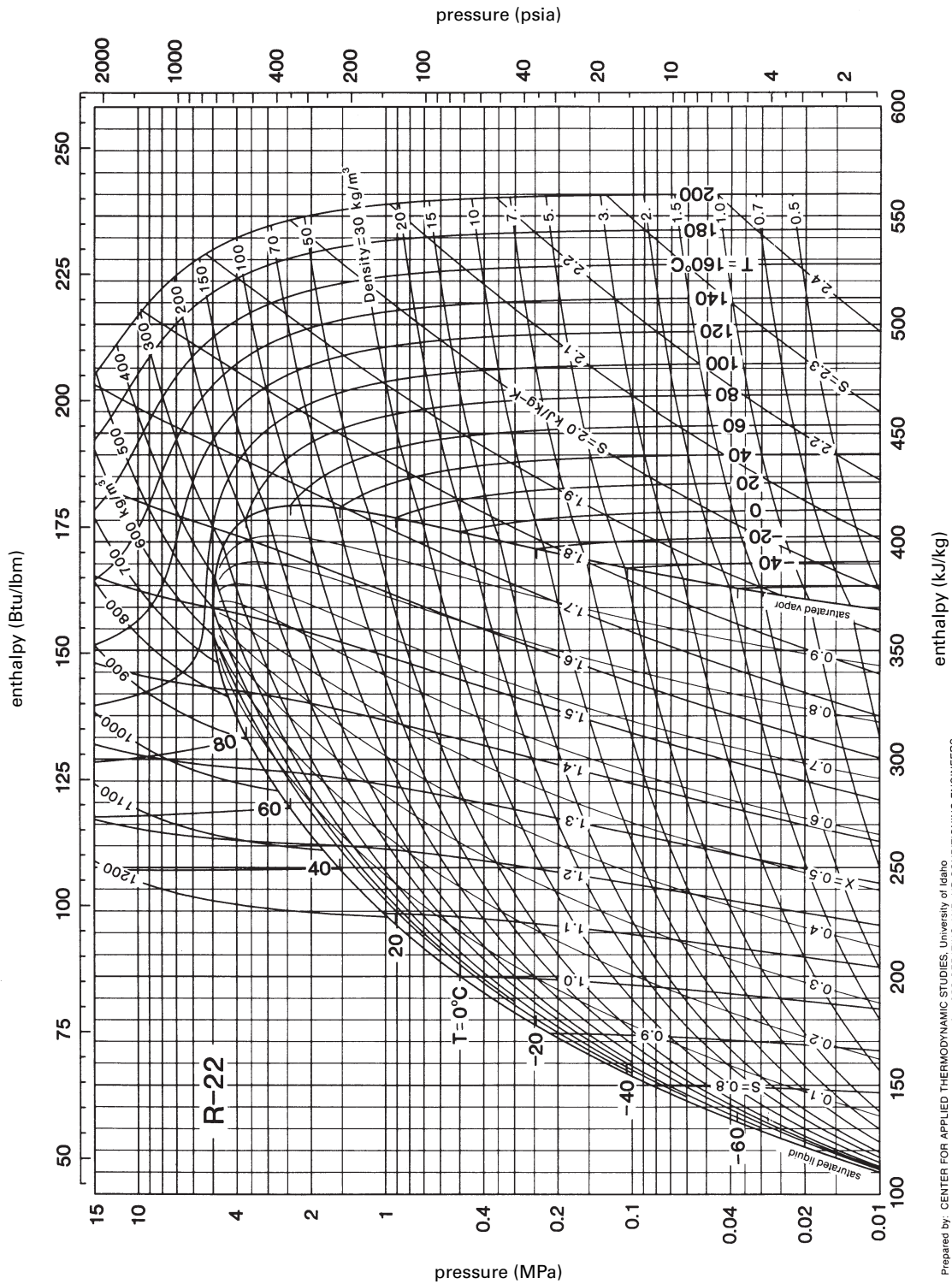
**APPENDIX 23.V** (continued)  
 Properties of Saturated Refrigerant-22 (R-22) by Temperature  
 (SI units)

temp. (°C)	absolute pressure (MPa)	volume vapor (m <sup>3</sup> /kg)	density liquid (kg/m <sup>3</sup> )	enthalpy		entropy	
				liquid (kJ/kg)	vapor (kJ/kg)	liquid (kJ/kg·K)	vapor (kJ/kg·K)
24	1.0162	0.02318	1194.6	228.80	412.14	1.0996	1.7165
26	1.0725	0.02193	1186.8	231.31	412.65	1.1078	1.7140
28	1.1312	0.02076	1178.9	233.83	413.13	1.1160	1.7114
30	1.1921	0.01967	1170.8	236.38	413.60	1.1243	1.7089
32	1.2555	0.01863	1162.6	238.94	414.03	1.1325	1.7063
34	1.3213	0.01766	1154.3	241.52	414.45	1.1408	1.7038
36	1.3896	0.01674	1145.9	244.13	414.83	1.1490	1.7012
38	1.4605	0.01588	1137.3	246.75	415.19	1.1573	1.6987
40	1.5340	0.01506	1128.6	249.40	415.52	1.1656	1.6961
42	1.6102	0.01429	1119.7	252.07	415.82	1.1739	1.6934
44	1.6892	0.01356	1110.6	254.77	416.08	1.1822	1.6908
46	1.7710	0.01287	1101.4	257.49	416.31	1.1905	1.6881
48	1.8556	0.01221	1091.9	260.24	416.50	1.1989	1.6854
50	1.9432	0.01159	1082.3	263.02	416.65	1.2072	1.6826
52	2.0339	0.01101	1072.4	265.83	416.75	1.2156	1.6798
54	2.1276	0.01045	1062.3	268.67	416.81	1.2241	1.6769
56	2.2244	0.009915	1051.9	271.55	416.83	1.2326	1.6739
58	2.3245	0.009409	1041.3	274.46	416.79	1.2411	1.6709
60	2.4279	0.008927	1030.3	277.41	416.69	1.2497	1.6677
65	2.7015	0.007816	1001.3	284.98	416.16	1.2714	1.6594
70	2.9975	0.006819	969.68	292.88	416.14	1.2937	1.6500
75	3.3175	0.005917	934.38	301.22	413.46	1.3169	1.6393
80	3.6633	0.005086	893.89	310.18	410.88	1.3414	1.6265
85	4.0370	0.004301	845.17	320.13	406.90	1.3681	1.6104
90	4.4413	0.003517	780.60	331.96	400.28	1.3996	1.5877
95	4.8808	0.002547	660.94	350.67	384.95	1.4490	1.5421
*96.15	4.988	0.00195	513	368.1	368.1	1.496	1.496

\*critical point

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**APPENDIX 23.W**  
 Pressure-Enthalpy Diagram for Refrigerant-22 (R-22)  
 (SI units)

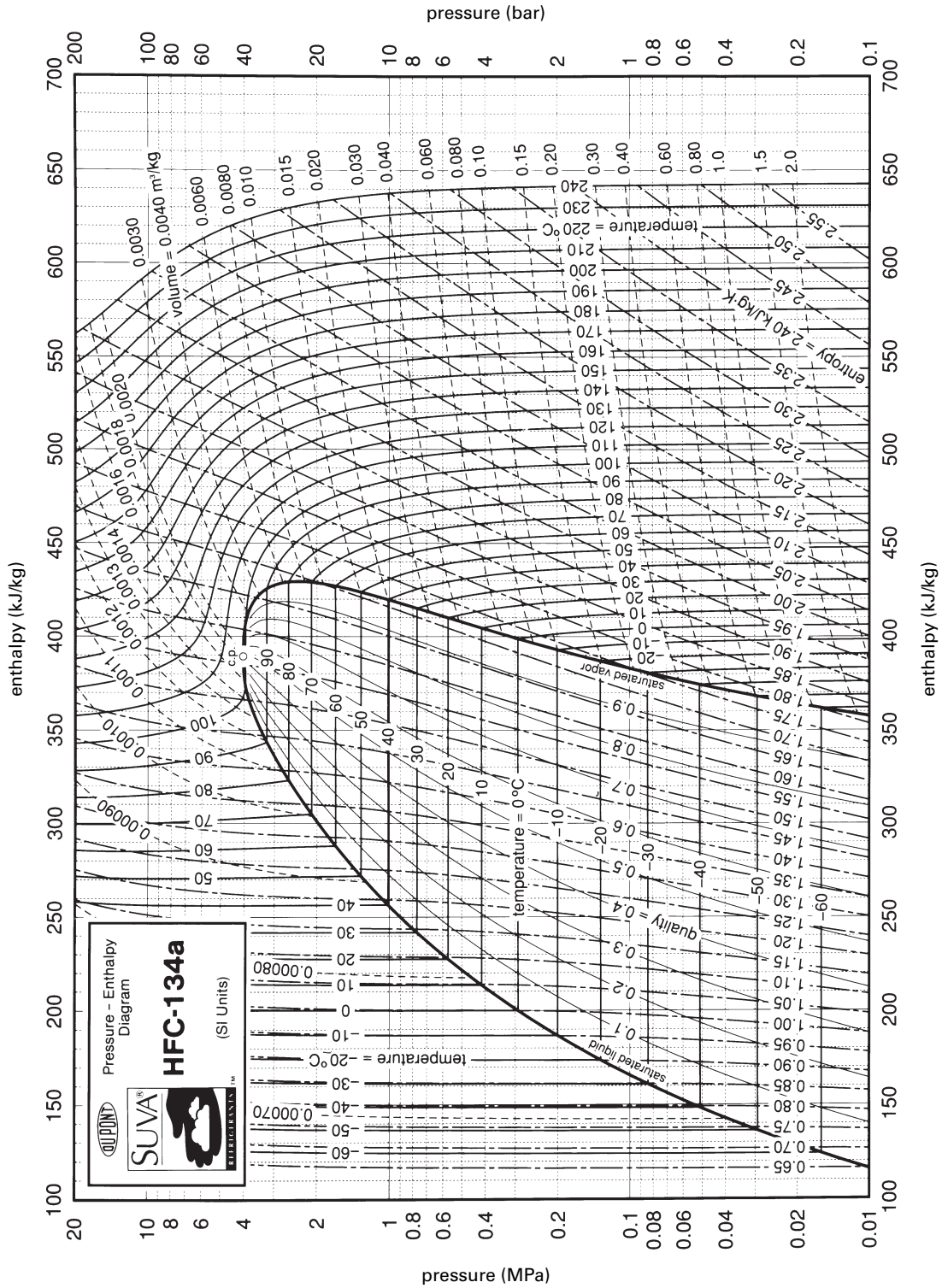


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Support Material

APPENDIX 23.X  
 Pressure-Enthalpy Diagram for Refrigerant HFC-134a  
 (SI units)



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