

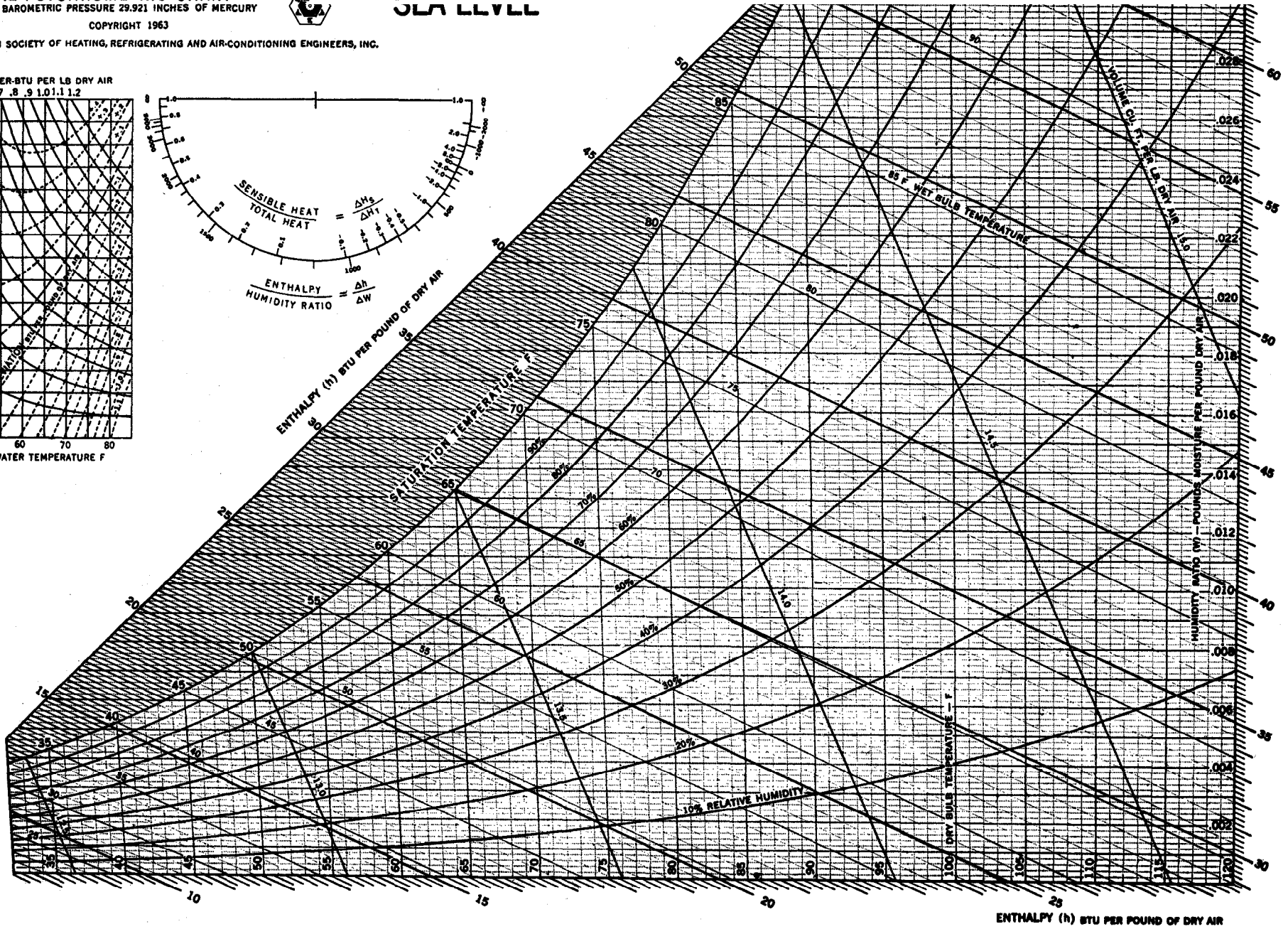
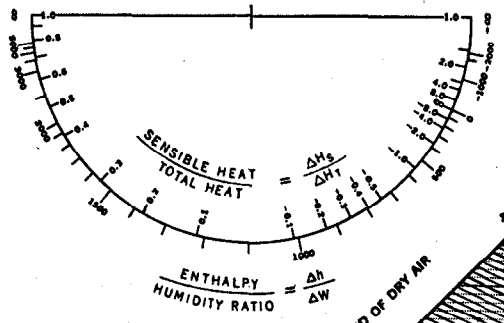
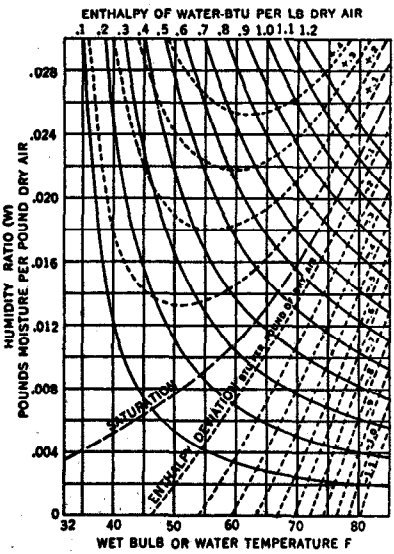
ASHRAE PSYCHROMETRIC CHART NO. 1
 BAROMETRIC PRESSURE 29.921 INCHES OF MERCURY



SEA LEVEL

COPYRIGHT 1963

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.





DETERMINING HUMIDIFICATION LOADS FOR AIR HANDLING SYSTEMS

Table A – 70°F. Primary Humidification. Pounds of vapor required per hour per 100 CFM to secure desired relative humidity at 70°F. (outside air 75% saturated).

Outdoor Temp.	RELATIVE HUMIDITY DESIRED							
	35%	40%	45%	50%	55%	60%	70%	
30	1.165	1.510	1.855	2.200	2.545	2.891	3.236	3.581
20	1.618	1.963	2.308	2.653	2.998	3.344	3.689	4.034
10	1.918	2.263	2.608	2.953	3.298	3.644	3.989	4.334
0	2.111	2.456	2.801	3.146	3.591	3.937	4.182	4.527
-10	2.233	2.578	2.923	3.268	3.613	3.959	4.304	4.649
-20	2.309	2.654	2.999	3.344	3.689	4.035	4.380	4.725

Table B – 75°F. Primary Humidification. Pounds of vapor required per hour per 100 CFM to secure desired relative humidity at 75°F. (outside air 75% saturated).

Outdoor Temp.	RELATIVE HUMIDITY DESIRED							
	35%	40%	45%	50%	55%	60%	70%	
30	1.584	1.989	2.394	2.799	3.204	3.609	4.014	4.419
20	2.034	2.439	2.844	3.249	3.654	4.059	4.464	4.869
10	2.334	2.739	3.144	3.549	3.954	4.359	4.764	5.169
0	2.529	2.934	3.339	3.744	4.149	4.554	4.959	5.364
-10	2.652	3.057	3.462	3.867	4.272	4.677	5.082	5.487
-20	2.727	3.132	3.537	3.942	4.347	4.752	5.157	5.562

Table C – 80°F. Primary Humidification. Pounds of vapor required per hour per 100 CFM to secure desired relative humidity at 80°F. (outside air 75% saturated).

Outdoor Temp.	RELATIVE HUMIDITY DESIRED							
	35%	40%	45%	50%	55%	60%	70%	
30	2.059	2.532	3.005	3.478	3.951	4.424	4.897	5.370
20	2.811	3.284	3.757	4.230	4.703	5.176	5.649	6.122
0	3.005	3.478	3.951	4.424	4.897	5.370	5.843	6.316
-10	3.126	3.599	4.073	4.545	5.018	5.491	5.964	6.437
-20	3.203	3.676	4.149	4.622	5.095	5.568	6.041	6.514

Table D – Booster Humidification. Pounds of vapor per hour per 100 CFM to secure desired relative humidity with no change in air temperature.

Initial Condition Temp.	R.H.	RELATIVE HUMIDITY DESIRED						
		40%	45%	50%	55%	60%	65%	70%
70	35%	.345	.690	1.03	1.38	1.72	2.07	2.42
70	40%	—	.345	.69	1.03	1.38	1.72	2.07
72	35%	.368	.728	1.10	1.46	1.83	2.20	2.57
72	40%	—	.368	.73	1.10	1.46	1.83	2.20
75	35%	.405	.810	1.22	1.62	2.03	2.43	2.84
75	40%	—	.405	.81	1.22	1.62	2.03	2.43

Table E – Grains of Water Vapor per cu. ft. of air at various temperatures and relative humidities.

Air Temp.	Grains Cu. Ft. Saturated	Grains Per Cu. Ft. at Relative Humidity Specifies							
		d							
		35%	40%	45%	50%	55%	60%	65%	75%
80	111.04	3.86	4.42	4.97	5.52	6.07	6.62	7.18	8.28
79	107.71	3.75	4.28	4.82	5.36	5.89	6.43	6.96	8.03
78	103.38	3.63	4.15	4.67	5.19	5.71	6.23	6.75	7.79
77	100.06	3.52	4.03	4.53	5.03	5.54	6.04	6.55	7.55
76	97.749	3.41	3.90	4.39	4.87	5.36	5.85	6.34	7.31
75	95.448	3.31	3.78	4.25	4.72	5.20	5.67	6.14	7.09
74	93.153	3.20	3.66	4.12	4.58	5.03	5.49	5.95	6.86
73	90.867	3.10	3.55	3.99	4.43	4.88	5.32	5.76	6.65
72	88.568	3.01	3.44	3.86	4.29	4.72	5.15	5.58	6.44
71	86.319	2.91	3.33	3.74	4.16	4.58	4.99	5.41	6.24
70	84.055	2.82	3.22	3.62	4.03	4.43	4.83	5.24	6.04
65	6.845	2.40	2.74	3.08	3.42	3.76	4.11	4.45	5.13
60	5.795	2.03	2.32	2.61	2.90	3.19	3.48	3.77	4.35
55	4.889	1.71	1.96	2.20	2.44	2.69	2.93	3.18	3.67
50	4.106	1.44	1.64	1.85	2.05	2.26	2.46	2.67	3.08
40	2.863	1.00	1.15	1.29	1.43	1.57	1.72	1.86	2.15
30	1.946	.58	.68	.78	.97	1.07	1.17	1.26	1.46
20	1.242	.43	.50	.56	.62	.68	.758	.81	.98
10	.776	.27	.31	.35	.39	.43	.47	.50	.58
0	.475	.17	.19	.21	.24	.26	.29	.31	.36
-10	.285	.10	.11	.13	.14	.16	.17	.19	.21
-20	.166	.06	.07	.07	.08	.09	.10	.11	.12

Steam required to add 1 gr. per cu. ft. to 100 CFM: 100 X 60 = 6000 cu.ft. per hour of 6000 grains per hour $\frac{6000}{7000} = .857 \text{ lb./hr.}$

ECONOMIZER CYCLES

Table 1 With 70°F Return Air

Max. humidification load (given in lbs. of vapor/hr/1000 CFM of total air) occurs at outside air temp. shown for given inside RH												
Inside R.H.	30%		35%		40%		45%		50%		55%	
Mixed Air Temp. °F	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load
50"	30"	6.7	39"	8.6	46"	11.2	50"	14.5	50"	18.0	50"	21.5
55"	30"	5.0	39"	6.5	46"	8.4	54°	11.1	55"	14.6	55"	18.1
60"	30"	3.3	39"	4.3	46"	5.6	54°	7.4	60"	10.5	60"	14.0
65"	30"	1.7	39"	2.2	46"	2.8	54"	3.7	65"	5.7	65°	9.2

Table 2 With 75°F Return Air

Max. humidification load (given in lbs. of vapor/hr/1000 CFM of total air) occurs at outside air temp. shown for given inside RH												
Inside R.H.	30%		35%		40%		45%		50%		55%	
Mixed Air Temp. °F	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load	Outside Air °F	Max. Load
50°	35"	9.7	43"	12.6	50°	16.4	50"	20.5	50°	24.7	50°	28.8
55"	35°	7.8	43°	10.1	50"	13.1	55"	17.0	55°	21.2	55"	25.4
60"	35"	5.8	43"	7.6	50°	9.8	59"	13.0	60"	17.1	60"	21.3
65°	35"	3.9	43°	5.1	50°	6.5	59"	8.6	65"	12.3	65"	16.5