

PHOENIX/SKY HARBOR AZ

Latitude = 33.43 N

WMO No. 722780

Longitude = 112.00 W

Elevation = 1106 feet

Period of Record = 1973 to 1996

Average Pressure = 28.72 inches Hg

Design Criteria Data

	Design Value	Mean Coincident (Average) Values			
		Wet Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Dry Bulb Temperature (T)	(°F)				
Median of Extreme Highs	115	70	43	10.8	W
0.4% Occurrence	110	70	52	9.1	W
1.0% Occurrence	108	70	55	8.7	W
2.0% Occurrence	106	70	57	8.4	W
Mean Daily Range	23	-	-	-	-
97.5% Occurrence	44	39	28	5.3	E
99.0% Occurrence	40	35	24	5.0	E
99.6% Occurrence	37	33	22	4.9	E
Median of Extreme Lows	33	29	18	4.7	ESE
	Design Value	Mean Coincident (Average) Values			
		Dry Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Wet Bulb Temperature (T_{wb})	(°F)				
Median of Extreme Highs	78	99	111	8.3	W
0.4% Occurrence	76	97	102	7.7	W
1.0% Occurrence	75	97	98	7.5	W
2.0% Occurrence	74	96	94	7.4	W
	Design Value	Mean Coincident (Average) Values			
		Dry Bulb Temperature (°F)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Humidity Ratio (HR)	(gr/lb)				
Median of Extreme Highs	132	82	0.85	7.0	E
0.4% Occurrence	120	82	0.77	6.5	E
1.0% Occurrence	112	85	0.72	7.2	E
2.0% Occurrence	104	87	0.67	7.0	E
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		1578	3605	511	1704

Other Site Data

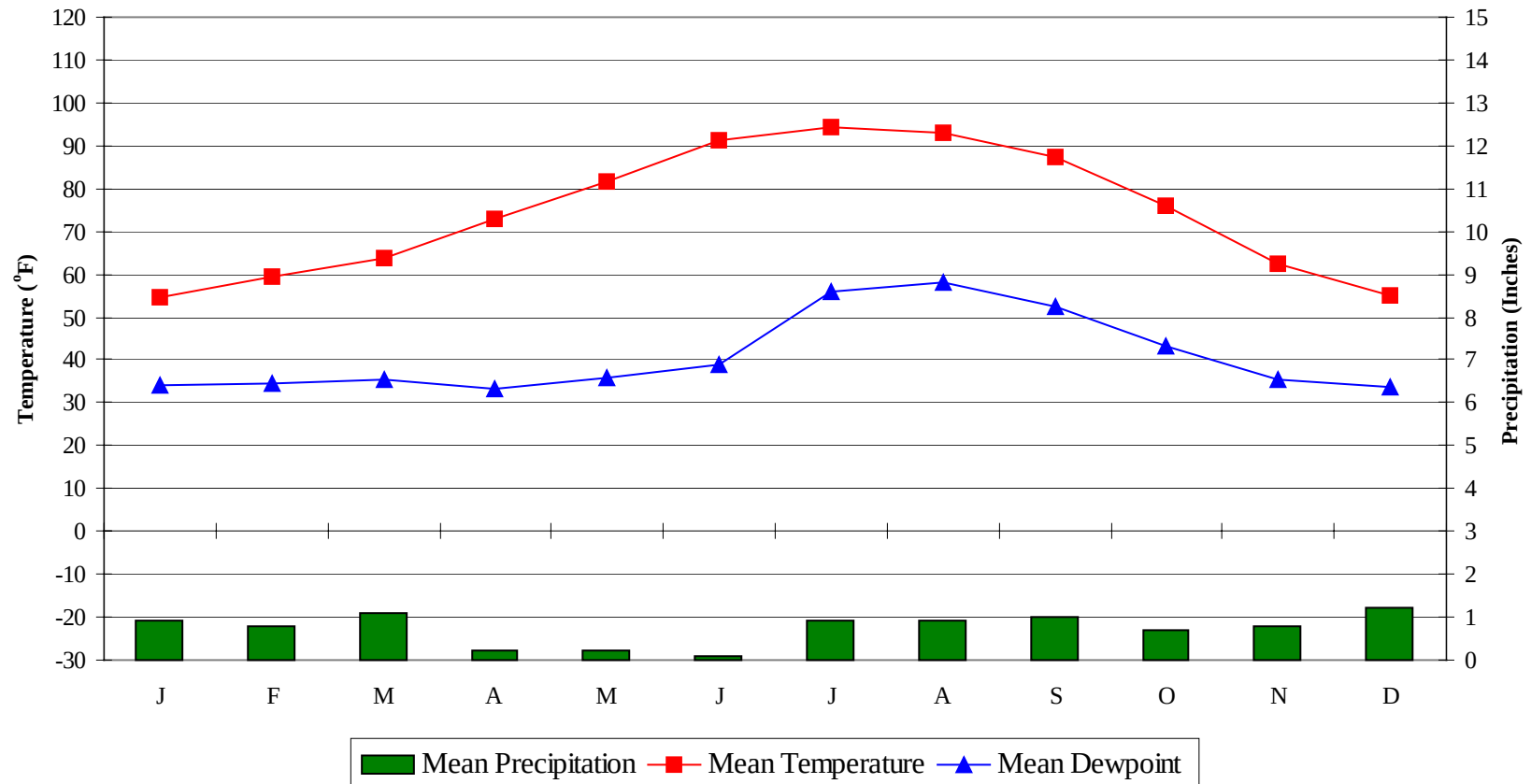
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
10	2.5	90	0.7 + 5.6
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
76.8	5	0	1

*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

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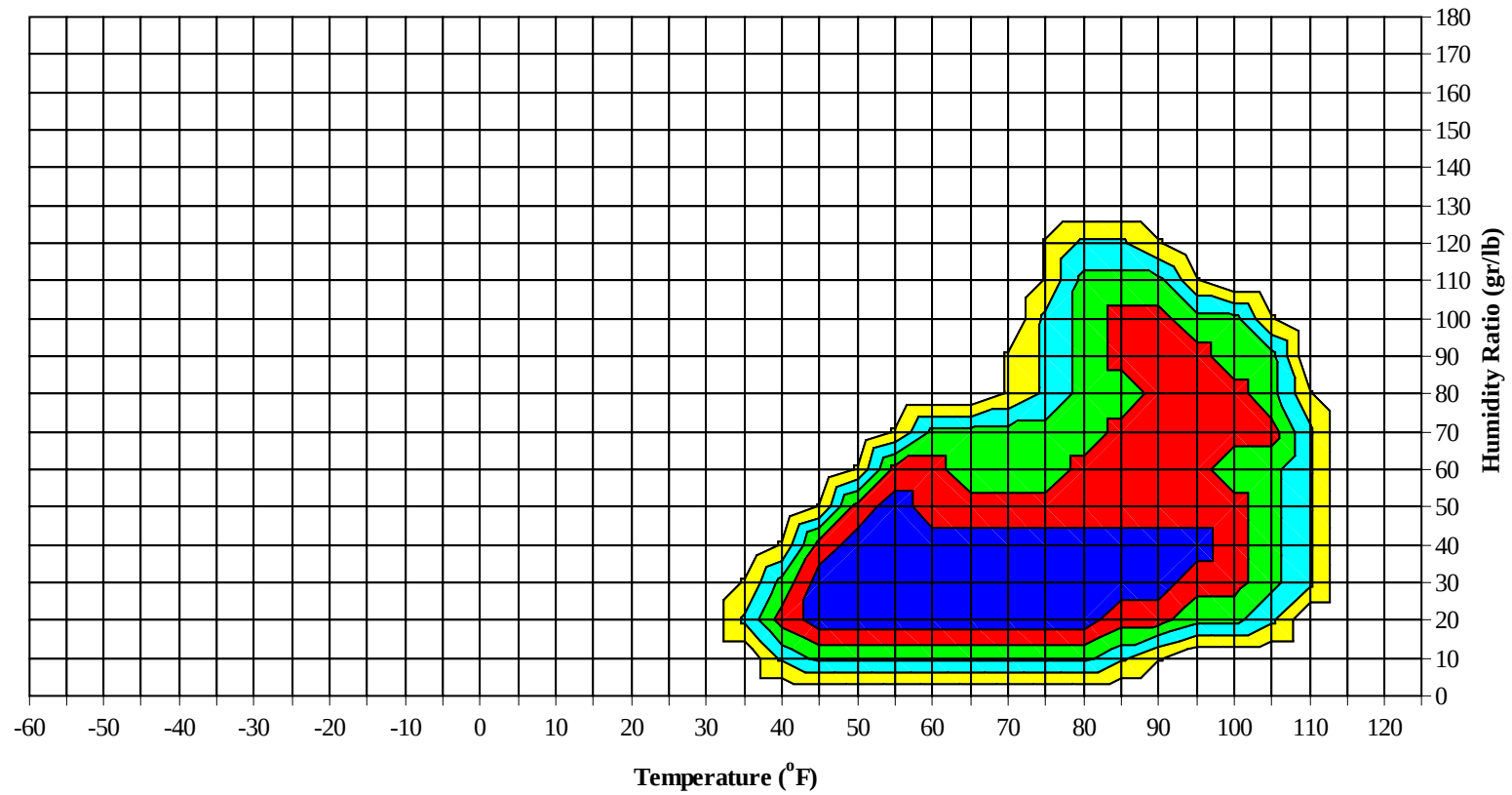
Average Annual Climate



PHOENIX/SKY HARBOR AZ

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Long Term Psychrometric Summary

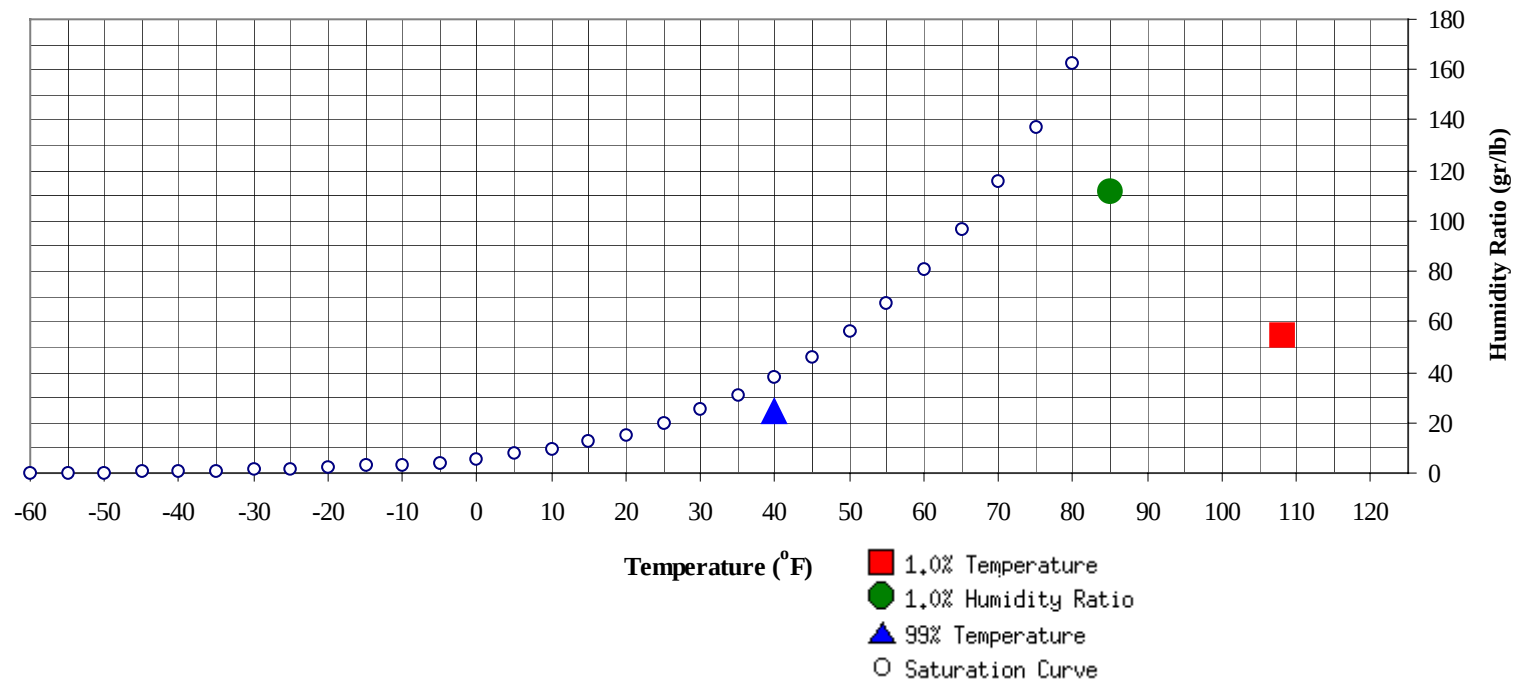


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

PHOENIX/SKY HARBOR AZ

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Psychrometric Summary of Peak Design Values



	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)	1.0% Humidity Ratio	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
99% Dry Bulb	40	24.2	13.3		112	85	73.7	69.1	38.0

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	108	54.9	70.2	34.6

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Dry-Bulb Temperature Hours For An Average Year (Sheet 1 of 5)

Period of Record = 1973 to 1996

Temperature Range (°F)	January					February					March				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00		
120 / 124															
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99												0	0	0	60.8
90 / 94							0	0	0	61.0		2	1	3	59.7
85 / 89							2	1	3	57.1		10	6	16	57.8
80 / 84		1	0	1	54.4		8	5	13	55.3	0	23	15	38	56.2
75 / 79		9	3	12	53.0		23	14	37	53.9	1	34	29	64	54.4
70 / 74		20	11	31	51.7	0	36	28	64	52.3	3	46	46	95	52.6
65 / 69	1	40	25	66	50.3	3	42	39	84	50.9	17	49	51	117	51.2
60 / 64	6	54	48	109	48.9	18	45	55	118	49.6	45	42	47	134	49.7
55 / 59	25	53	70	149	47.5	50	34	46	130	47.9	69	28	33	130	47.9
50 / 54	62	40	56	159	44.7	70	22	24	116	45.0	69	11	17	97	45.5
45 / 49	73	20	24	117	41.3	49	9	9	67	41.1	35	2	3	40	42.0
40 / 44	54	7	8	69	37.4	25	2	3	30	37.1	8	0	1	9	38.0
35 / 39	21	2	2	25	33.4	7	1	0	8	32.8	1		0	1	35.9
30 / 34	5	0	0	5	29.6	2	0	0	2	27.6					
25 / 29	1			1	25.6										

Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary and the ventilation and infiltration load pages in this manual.

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Dry-Bulb Temperature Hours For An Average Year (Sheet 2 of 5)

Period of Record = 1973 to 1996

Temperature Range (°F)	April					May					June				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00		
120 / 124												0	0	0	75.0
115 / 119												1	1	2	71.1
110 / 114							0	0	0	67.3		11	8	19	68.1
105 / 109							4	2	6	65.3		37	28	65	66.8
100 / 104		2	1	3	63.2		15	10	25	63.7	0	54	43	97	64.8
95 / 99		10	6	16	61.6	0	36	26	62	62.3	3	56	51	110	63.4
90 / 94		24	16	40	59.7	1	52	41	95	60.6	18	42	51	111	62.3
85 / 89		38	30	68	57.7	4	52	54	111	59.1	52	26	36	114	61.0
80 / 84	2	45	41	88	56.1	26	41	51	119	57.6	69	9	16	94	58.6
75 / 79	13	42	48	103	54.4	59	25	32	117	56.0	58	3	5	66	56.2
70 / 74	34	34	42	110	52.6	68	14	18	100	54.0	29	0	2	31	53.7
65 / 69	52	24	27	103	50.7	51	6	10	67	51.8	9	0	0	9	52.1
60 / 64	62	13	17	92	48.6	27	1	3	31	49.8	1			1	48.6
55 / 59	45	6	8	59	46.8	10	0	0	10	47.1					
50 / 54	22	2	4	28	44.6	1		0	1	43.7					
45 / 49	8	0	1	9	42.6	0			0	38.1					
40 / 44	2		0	2	39.9										
35 / 39	0			0	34.0										
30 / 34															
25 / 29															

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Dry-Bulb Temperature Hours For An Average Year (Sheet 3 of 5)

Period of Record = 1973 to 1996

Temperature Range (°F)	July					August					September				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00		
120 / 124															
115 / 119		0	1	1	70.9		0		0	71.0					
110 / 114		10	8	18	70.9		5	3	8	72.3		1	0	1	72.7
105 / 109		47	39	86	71.1		35	27	62	72.2		11	6	17	70.5
100 / 104	0	69	58	127	70.6	0	70	56	126	71.3		37	22	59	69.7
95 / 99	7	63	63	133	70.2	4	63	65	132	70.9	0	60	44	104	68.1
90 / 94	57	39	46	142	69.4	43	47	53	143	70.2	9	54	54	118	67.4
85 / 89	97	14	23	134	68.5	92	19	28	139	69.5	37	40	53	131	66.4
80 / 84	65	4	8	77	67.7	72	6	11	89	68.6	67	23	36	126	64.6
75 / 79	18	1	2	21	65.2	30	2	5	37	66.2	72	9	17	98	62.7
70 / 74	4	0	0	4	64.5	6	1	1	8	64.9	41	3	6	50	60.2
65 / 69						0			0	55.0	12	1	1	14	56.8
60 / 64											2	0	0	2	53.5
55 / 59											0			0	47.8
50 / 54															
45 / 49															
40 / 44															
35 / 39															
30 / 34															
25 / 29															

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Dry-Bulb Temperature Hours For An Average Year (Sheet 4 of 5)

Period of Record = 1973 to 1996

Temperature Range (°F)	October					November					December				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00		
120 / 124															
115 / 119															
110 / 114															
105 / 109		0	0	0	65.5										
100 / 104		6	2	8	65.4										
95 / 99		20	8	28	64.3										
90 / 94		35	20	55	62.7		1	0	1	59.7					
85 / 89	1	47	34	82	61.8		9	3	12	58.4		0		0	56.3
80 / 84	8	47	49	104	60.5		24	8	32	56.9		1	0	1	56.1
75 / 79	30	39	53	122	58.9	0	37	20	57	55.4		9	3	12	53.1
70 / 74	65	28	42	135	57.3	2	44	37	83	53.6		28	10	38	51.6
65 / 69	66	15	24	105	54.8	13	43	50	106	52.1	0	41	24	65	50.2
60 / 64	42	7	12	61	51.3	38	38	52	128	49.9	4	55	48	107	48.8
55 / 59	24	2	4	30	47.1	69	24	39	132	47.3	27	49	72	148	47.6
50 / 54	10	1	1	12	43.6	60	14	22	96	44.0	63	35	56	154	44.5
45 / 49	3		0	3	41.1	37	5	8	50	40.7	79	20	24	123	40.9
40 / 44	0			0	36.0	17	1	2	20	36.5	49	8	8	65	37.2
35 / 39						5			5	33.1	21	1	2	24	33.1
30 / 34						0			0	28.3	4	0	0	4	28.4
25 / 29											1			1	24.4

Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary and the ventilation and infiltration load pages in this manual.

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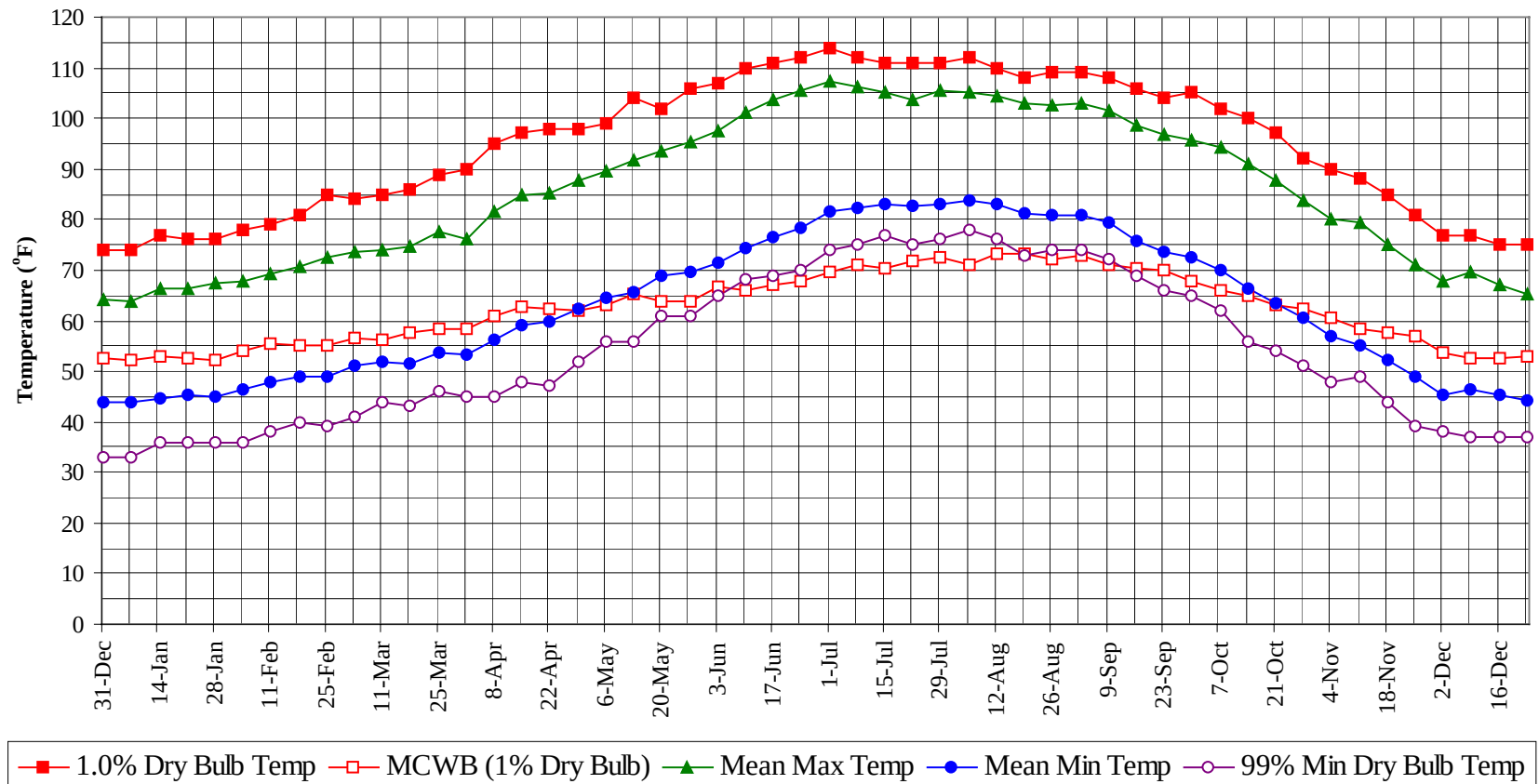
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

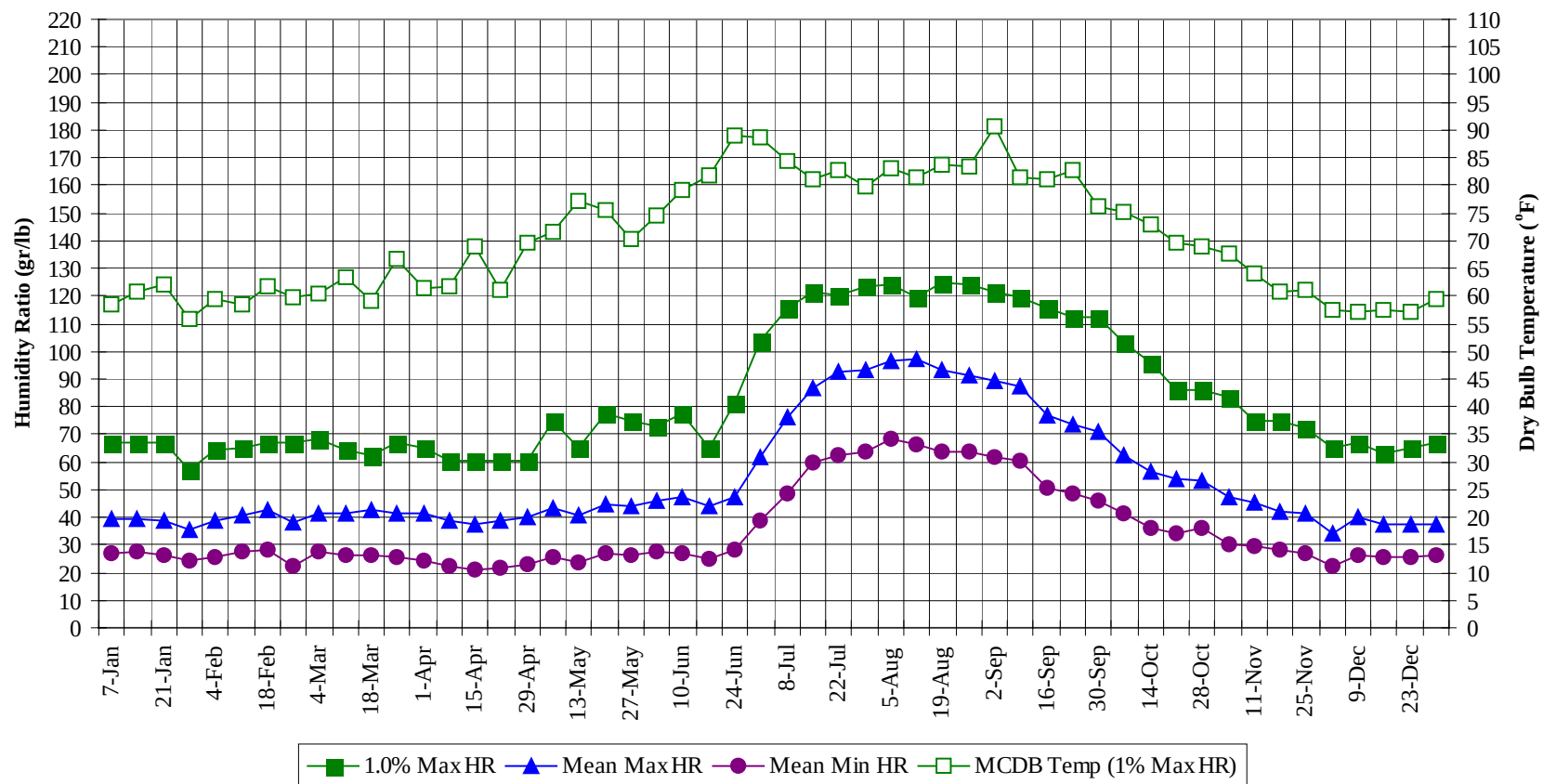
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
120 / 124		0	0	0	75.0
115 / 119		2	1	3	71.1
110 / 114		28	20	48	70.1
105 / 109		133	101	234	70.0
100 / 104	0	253	190	444	68.9
95 / 99	15	308	264	587	67.4
90 / 94	127	297	281	705	65.8
85 / 89	283	258	267	809	64.0
80 / 84	307	231	240	779	61.2
75 / 79	280	235	229	745	57.5
70 / 74	252	255	242	750	54.4
65 / 69	225	261	252	739	51.7
60 / 64	244	256	283	784	49.5
55 / 59	320	196	274	791	47.5
50 / 54	358	124	179	662	44.7
45 / 49	285	56	69	410	41.2
40 / 44	156	19	22	197	37.3
35 / 39	54	4	5	63	33.2
30 / 34	10	1	0	11	28.8
25 / 29	1			1	24.9

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

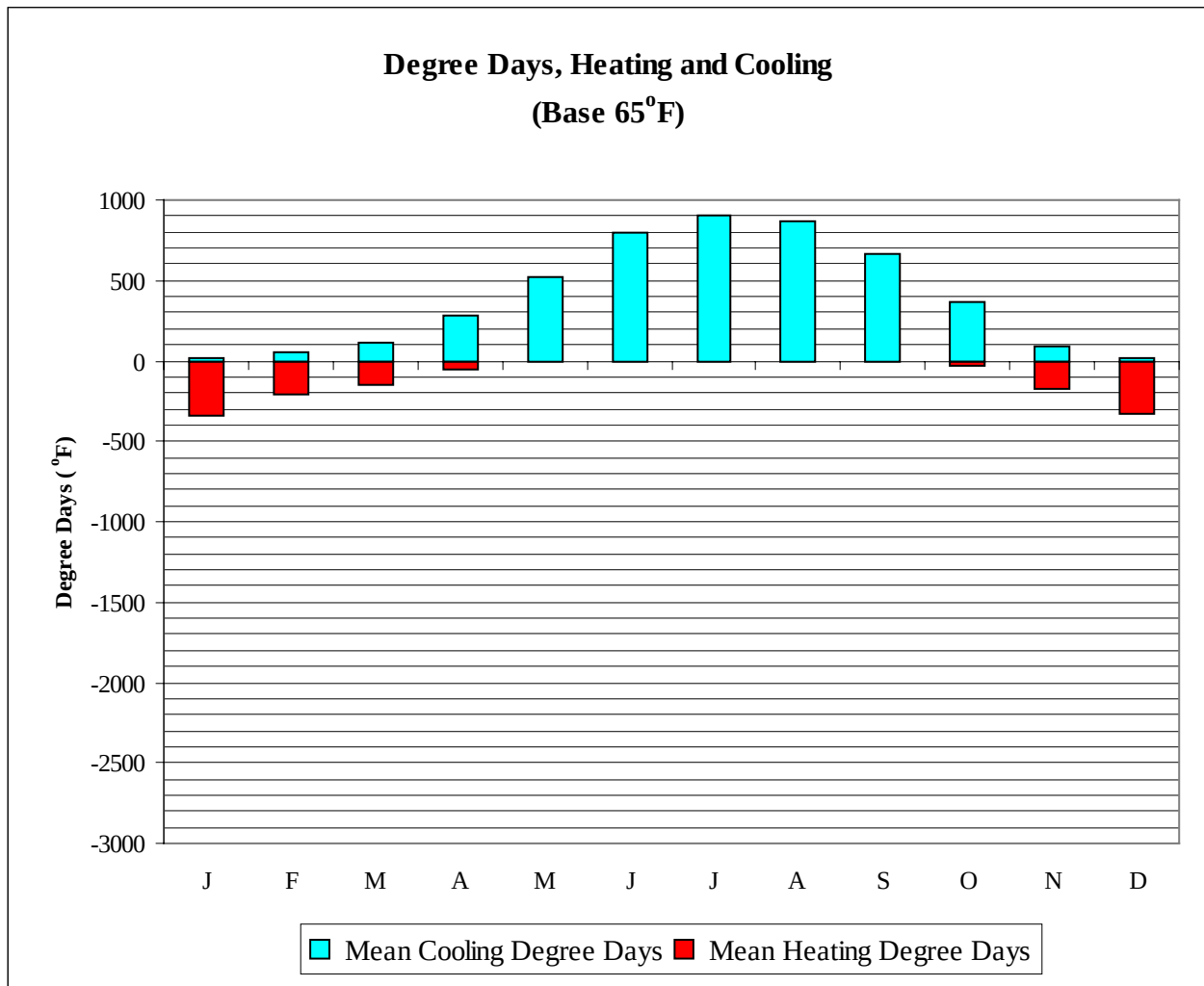


PHOENIX/SKY HARBOR AZ

WMO No. 722780

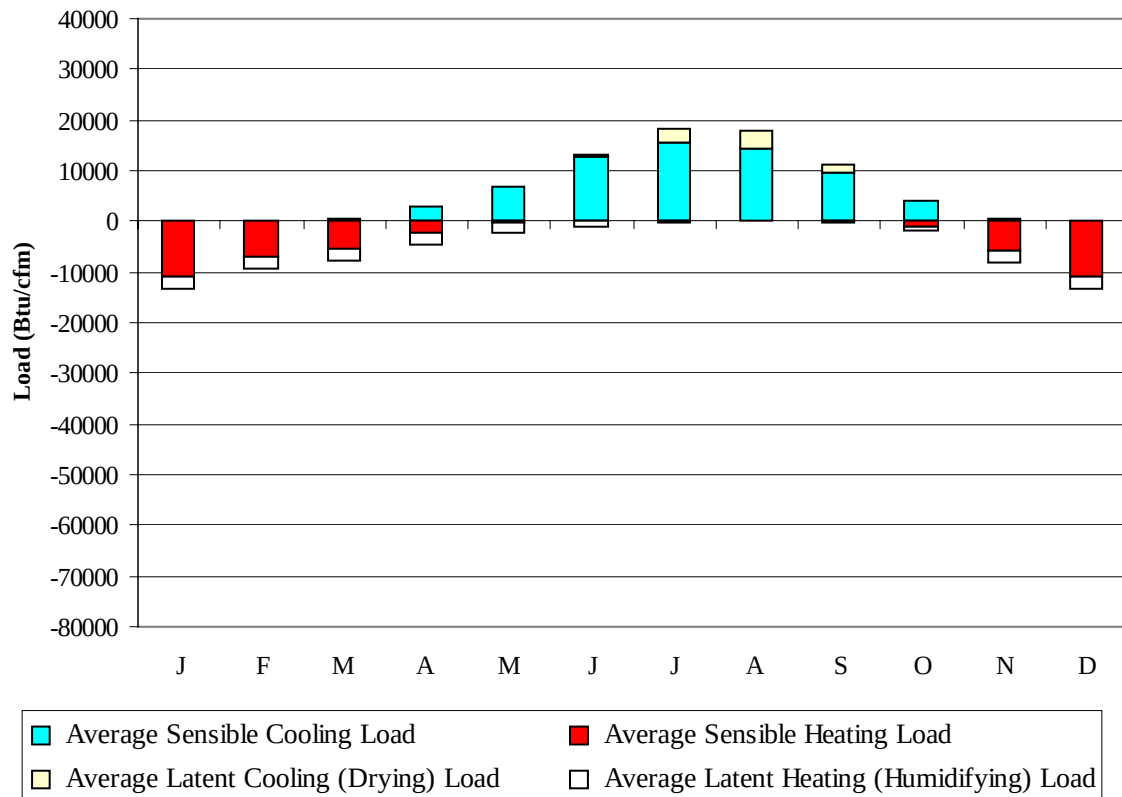
Long Term Dry Bulb Temperature and Humidity Summary

Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	74.0	52.3	63.9	43.7	33.0	67.2	58.5	39.6	26.7
14-Jan	77.0	53.0	66.5	44.7	36.0	67.2	60.7	39.6	27.7
21-Jan	76.0	52.6	66.2	45.3	36.0	67.2	62.0	38.7	26.6
28-Jan	76.0	52.4	67.3	44.8	36.0	57.4	55.7	35.6	24.1
4-Feb	78.0	54.0	67.8	46.4	36.0	64.4	59.3	38.8	25.6
11-Feb	79.0	55.6	69.1	47.9	38.0	65.1	58.4	41.0	27.5
18-Feb	81.0	55.2	70.6	49.0	40.0	67.2	61.8	42.4	27.9
25-Feb	85.0	55.0	72.5	49.1	39.0	67.2	59.7	38.0	22.6
4-Mar	84.0	56.6	73.7	51.2	41.0	68.6	60.5	41.4	27.5
11-Mar	85.0	56.3	74.0	51.7	44.0	64.4	63.5	41.5	26.4
18-Mar	86.0	57.6	74.6	51.3	43.0	62.3	59.0	42.5	26.1
25-Mar	89.0	58.2	77.5	53.7	46.0	67.2	66.8	41.1	25.3
1-Apr	90.0	58.5	76.2	53.2	45.0	65.1	61.5	41.3	24.1
8-Apr	95.0	60.8	81.7	56.1	45.0	60.2	61.8	38.7	22.1
15-Apr	97.0	62.7	85.0	59.1	48.0	60.2	68.9	37.2	21.3
22-Apr	98.0	62.5	85.3	59.9	47.0	60.2	61.2	38.7	21.9
29-Apr	98.0	62.2	87.8	62.3	52.0	60.2	69.5	40.1	23.0
6-May	99.0	63.0	89.5	64.5	56.0	74.9	71.5	43.1	25.5
13-May	104.0	65.4	91.8	65.7	56.0	65.1	77.1	40.9	23.9
20-May	102.0	64.0	93.7	68.8	61.0	77.7	75.5	44.7	26.9
27-May	106.0	63.9	95.3	69.5	61.0	74.9	70.2	43.8	26.1
3-Jun	107.0	66.6	97.6	71.5	65.0	72.8	74.6	46.2	27.5
10-Jun	110.0	66.1	101.1	74.4	68.0	77.7	79.2	47.0	27.0
17-Jun	111.0	66.9	103.8	76.4	69.0	65.1	81.8	44.1	25.0
24-Jun	112.0	67.8	105.5	78.3	70.0	81.2	89.1	47.6	28.0
1-Jul	114.0	69.7	107.2	81.6	74.0	103.6	88.8	61.9	38.6
8-Jul	112.0	70.9	106.2	82.5	75.0	115.5	84.3	75.9	48.7
15-Jul	111.0	70.5	105.2	83.0	77.0	121.8	81.2	87.0	59.8
22-Jul	111.0	71.7	103.8	82.6	75.0	120.4	82.6	92.6	62.6
29-Jul	111.0	72.4	105.4	82.9	76.0	123.2	79.7	93.0	63.7
5-Aug	112.0	71.1	105.1	83.8	78.0	123.9	83.2	96.9	68.0
12-Aug	110.0	73.1	104.6	83.1	76.0	119.7	81.3	97.4	66.3
19-Aug	108.0	73.3	102.9	81.3	73.0	124.6	83.6	93.1	63.8
26-Aug	109.0	72.2	102.7	80.8	74.0	123.9	83.4	91.2	63.7
2-Sep	109.0	72.8	103.1	80.9	74.0	121.8	90.8	89.0	61.9
9-Sep	108.0	71.1	101.6	79.6	72.0	119.7	81.4	87.6	60.4
16-Sep	106.0	70.4	98.5	75.8	69.0	115.5	81.0	76.6	50.3
23-Sep	104.0	70.1	96.8	73.8	66.0	112.0	82.8	73.8	48.8
30-Sep	105.0	67.7	95.9	72.6	65.0	112.0	76.2	70.9	45.7
7-Oct	102.0	65.8	94.1	70.1	62.0	102.9	75.2	62.6	41.1
14-Oct	100.0	64.8	91.0	66.4	56.0	95.9	72.8	56.6	36.1
21-Oct	97.0	63.2	87.7	63.4	54.0	86.1	69.6	54.1	34.5
28-Oct	92.0	62.4	83.8	60.5	51.0	86.1	68.9	53.3	35.8
4-Nov	90.0	60.7	80.2	56.8	48.0	83.3	67.7	47.1	30.4
11-Nov	88.0	58.3	79.6	55.0	49.0	74.9	64.2	45.1	29.6
18-Nov	85.0	57.8	75.1	52.2	44.0	74.9	60.7	42.4	28.1
25-Nov	81.0	56.8	71.1	49.0	39.0	72.1	61.0	41.2	27.0
2-Dec	77.0	53.6	68.0	45.3	38.0	65.1	57.3	34.3	22.1
9-Dec	77.0	52.6	69.6	46.3	37.0	67.2	57.1	39.7	26.6
16-Dec	75.0	52.7	67.0	45.2	37.0	63.0	57.4	37.4	25.3
23-Dec	75.0	52.9	65.2	44.4	37.0	65.1	57.2	37.7	25.9
31-Dec	74.0	52.6	64.0	43.9	33.0	67.2	59.5	37.6	26.1



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	20	338
FEB	54	211
MAR	112	150
APR	284	53
MAY	516	8
JUN	791	0
JUL	910	0
AUG	868	0
SEP	667	0
OCT	368	24
NOV	93	170
DEC	22	335
ANN	4704	1289

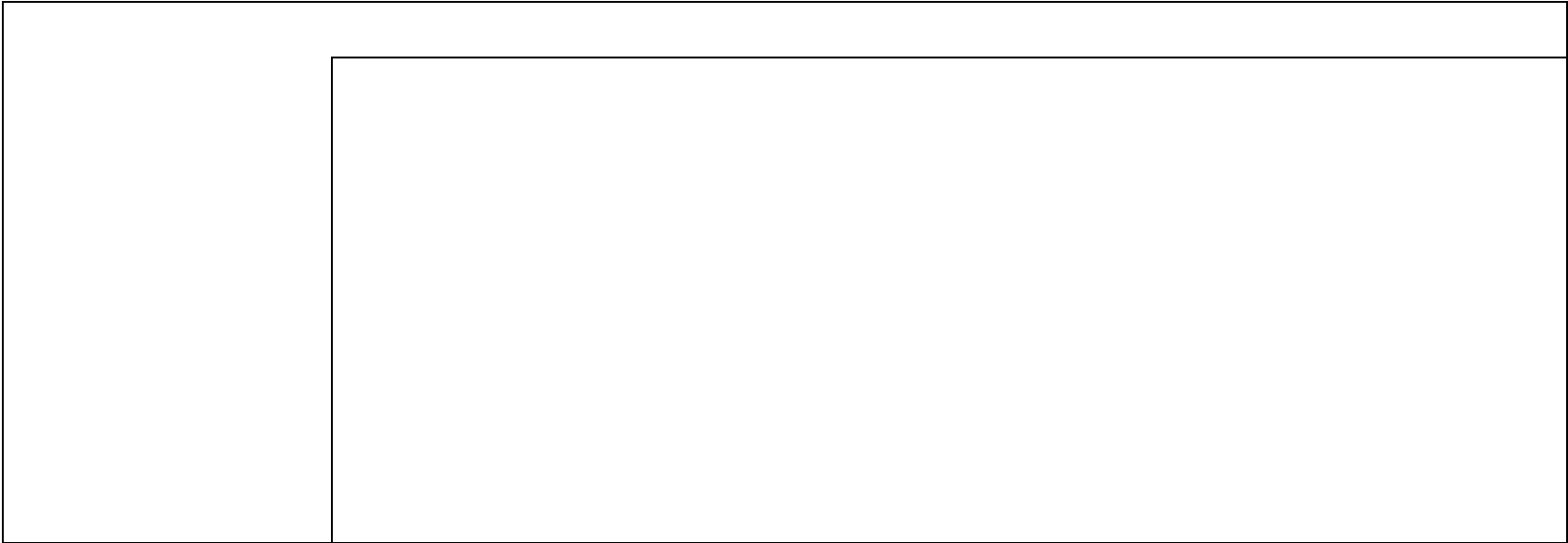
Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	Average Sensible Cooling Load	Average Sensible Heating Load	Average Latent Cooling Load	Average Latent Heating Load
	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)
JAN	29	-10916	0	-2487
FEB	188	-7135	0	-2183
MAR	663	-5398	0	-2178
APR	2881	-2107	0	-2514
MAY	6662	-408	6	-1862
JUN	12880	-11	94	-1208
JUL	15570	0	2687	-99
AUG	14471	0	3569	-34
SEP	9785	-27	1488	-131
OCT	3946	-1083	185	-823
NOV	489	-5935	1	-2164
DEC	26	-10816	0	-2646
ANN	67590	-43836	8030	-18329

Average Annual Solar Radiation – Nearest Available Site
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

No Solar Radiation
Data Available

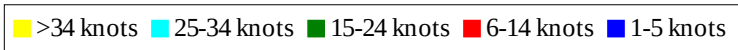
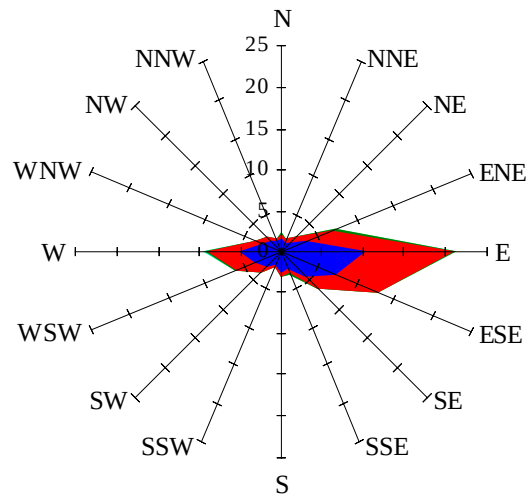


Average Annual Solar Heat and Illumination – Nearest Available Site

(Source: National Renewable Energy Laboratory, Golden CO, 1995)

Wind Summary - December, January, and February

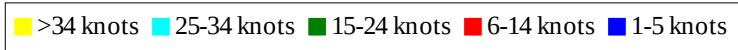
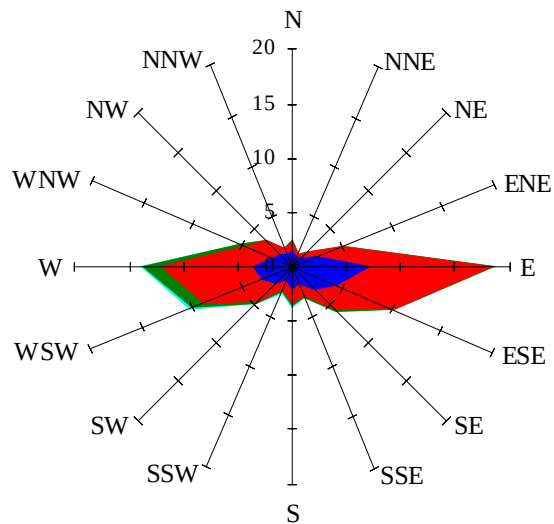
Labels of Percent Frequency on North Axis



Percent Calm = 13.20

Wind Summary - March, April, and May

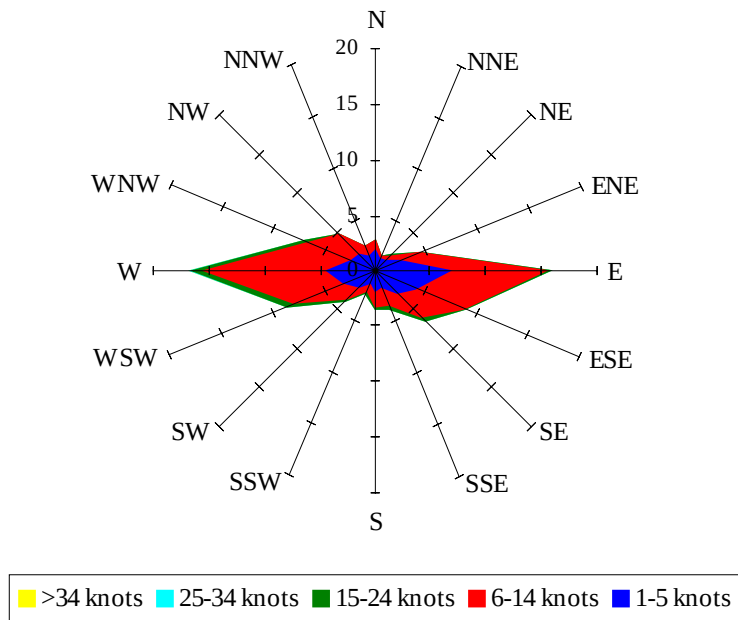
Labels of Percent Frequency on North Axis



Percent Calm = 6.65

Wind Summary - June, July, and August

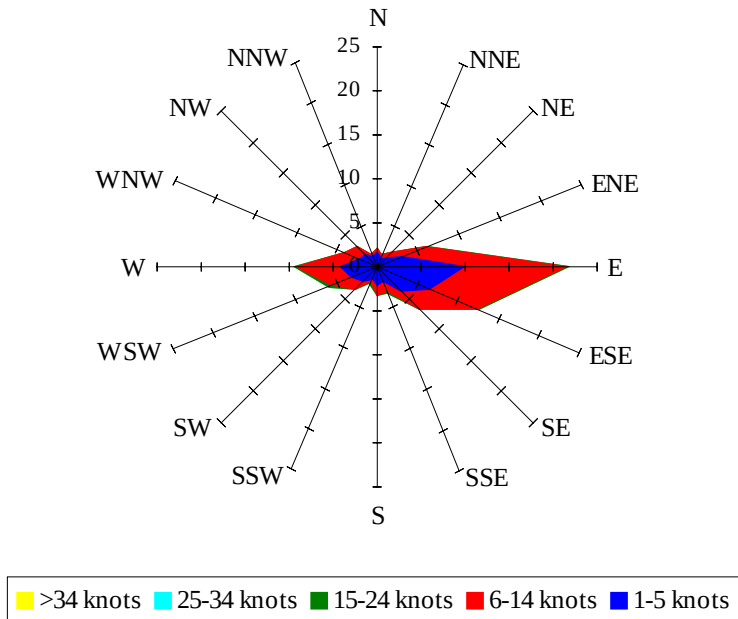
Labels of Percent Frequency on North Axis



Percent Calm = 6.45

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 11.55