

CARLSBAD/CAVERN CITY NM

Latitude = 32.33 N

WMO No. 722687

Longitude = 104.20 W

Elevation = 3294 feet

Period of Record = 1973 to 1996

Average Pressure = 26.60 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	106	67	51	10.4	SSE
0.4% Occurrence	102	67	53	11.5	SE
1.0% Occurrence	99	67	58	11.2	SE
2.0% Occurrence	97	66	60	10.9	SE
Mean Daily Range	27	-	-	-	-
97.5% Occurrence	27	25	18	6.7	N
99.0% Occurrence	23	21	14	6.3	N
99.6% Occurrence	18	16	11	6.8	N
Median of Extreme Lows	10	9	8	7.1	E
	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	75	90	119	9.0	SE
0.4% Occurrence	73	88	110	8.8	SE
1.0% Occurrence	72	87	105	8.8	SE
2.0% Occurrence	71	86	101	8.9	SE
	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	130	77	0.77	7.2	SE
0.4% Occurrence	121	76	0.72	7.7	SSE
1.0% Occurrence	116	76	0.69	7.5	SSE
2.0% Occurrence	111	74	0.67	7.1	S
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		410	1743	43	1101

Other Site Data

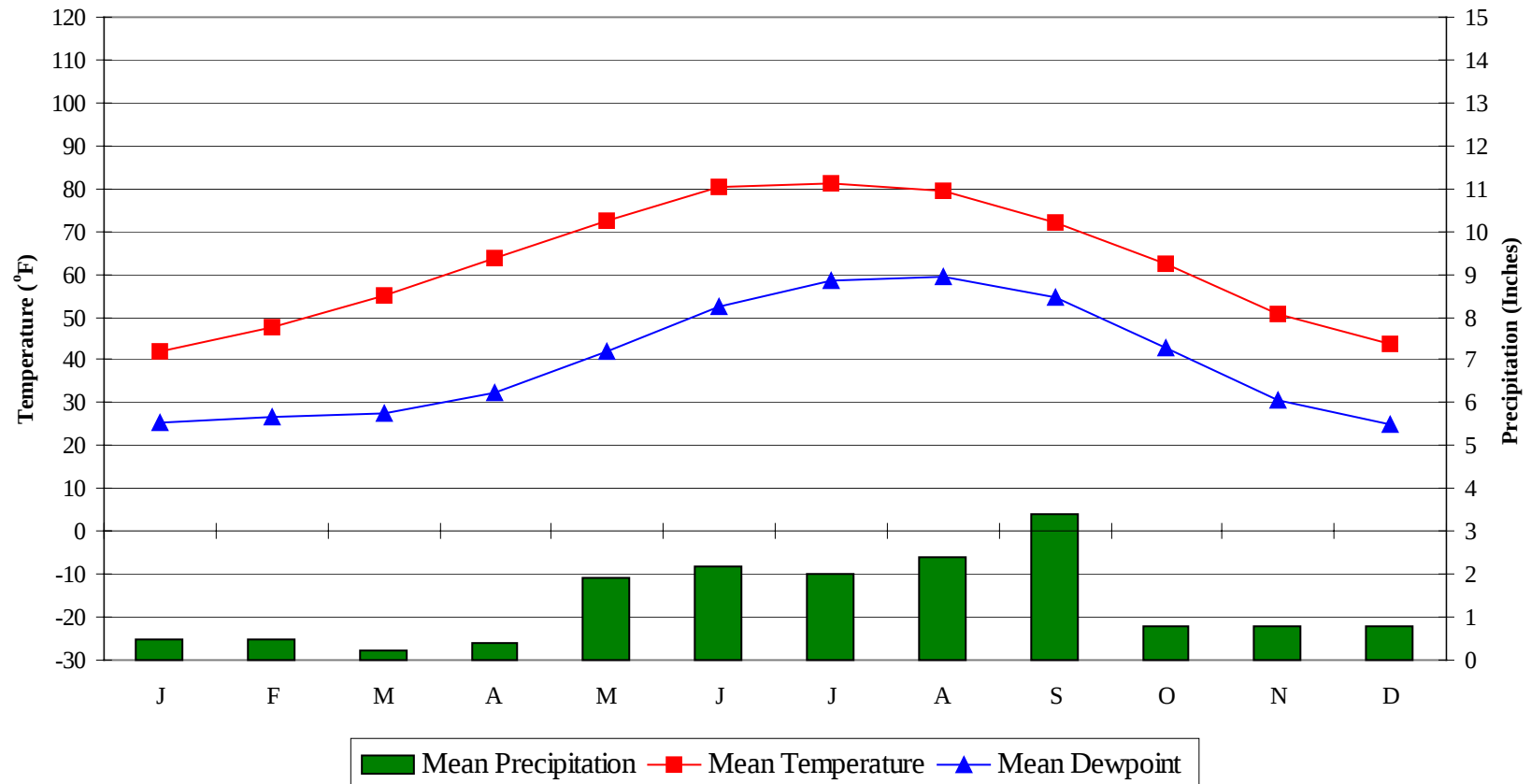
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
11	2.5	90	0.7 + 2.1
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
65.2	N/A	N/A	56

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

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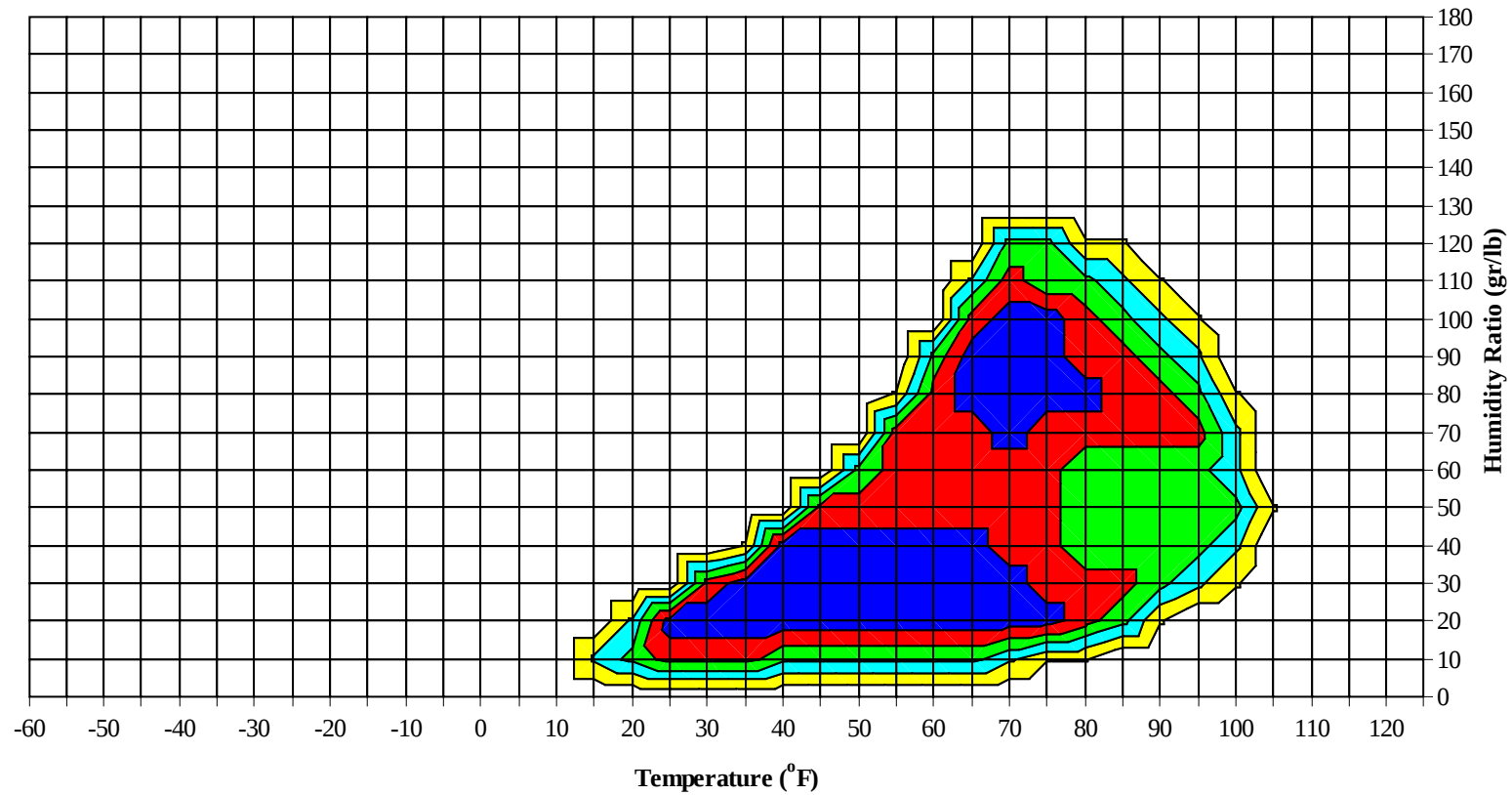
Average Annual Climate



CARLSBAD/CAVERN CITY NM

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Long Term Psychrometric Summary

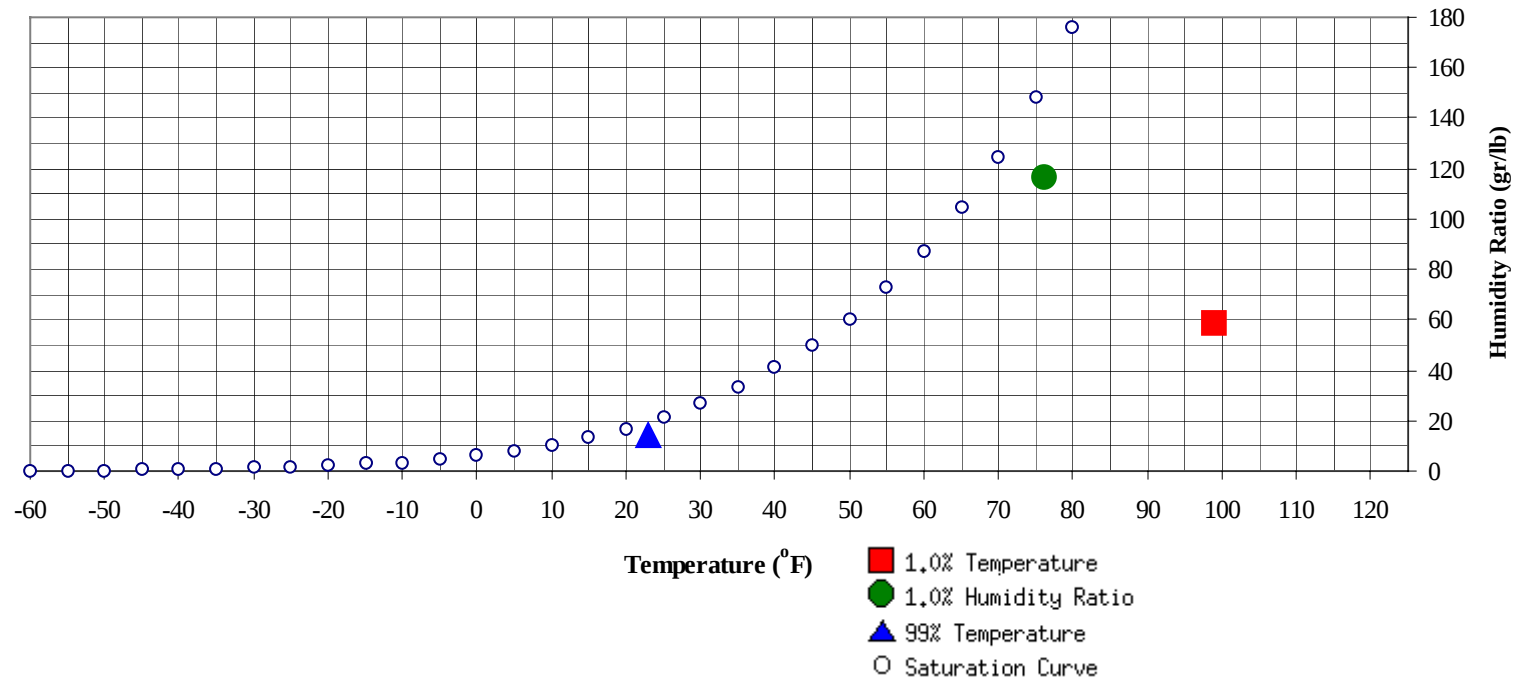


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

CARLSBAD/CAVERN CITY NM

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Psychrometric Summary of Peak Design Values



99% Dry Bulb	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)	1.0% Humidity Ratio	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
	23	14.4	7.7		116.2	76.1	70.4	68	36.4

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	99	58.6	66.7	33.0

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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		
110 / 114															
105 / 109															
100 / 104															
95 / 99															
90 / 94												1	0	1	57.9
85 / 89							1	0	1	54.8		5	1	6	55.5
80 / 84		1		1	53.6		4	0	4	53.7		16	5	21	53.6
75 / 79		2	0	2	51.4		10	2	12	51.7		29	11	40	52.0
70 / 74	0	8	1	9	49.5	0	18	6	24	49.8	2	35	19	57	49.9
65 / 69	1	18	4	23	47.5	2	29	15	46	48.1	6	38	27	71	48.1
60 / 64	2	26	13	41	45.6	4	29	23	56	46.1	10	38	35	83	46.2
55 / 59	5	31	21	58	43.4	9	31	29	70	44.0	21	29	38	88	44.0
50 / 54	10	33	31	74	41.2	17	29	34	79	41.9	36	24	42	102	42.0
45 / 49	14	31	36	82	38.8	25	22	34	81	39.3	47	16	36	99	39.4
40 / 44	32	30	42	104	36.3	39	20	34	92	36.3	52	9	17	78	36.2
35 / 39	42	27	41	110	32.8	44	14	22	80	33.2	38	5	10	53	32.7
30 / 34	59	22	36	117	29.4	43	9	15	67	29.3	22	3	4	29	28.8
25 / 29	47	11	17	74	25.2	27	6	7	40	25.1	9	1	2	12	24.8
20 / 24	25	5	5	35	20.8	10	2	2	14	20.9	3	0	0	3	19.8
15 / 19	7	2	1	10	16.2	3	1	1	5	15.6	1			1	15.9
10 / 14	2	1	0	3	12.0	1	0	0	1	10.8	0			0	12.0
5 / 9	0	0	0	0	6.1	0	0		0	7.6					
0 / 4	1		0	1	2.3	0			0	2.0					
-5 / -1	0			0	-1.5										

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.

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		
110 / 114												1	0	1	66.2
105 / 109							0		0	69.3		6	1	7	67.0
100 / 104		0		0	67.0		4	1	5	63.9		22	8	30	65.7
95 / 99		2	0	2	61.8		15	6	22	62.2		37	19	56	65.5
90 / 94		7	2	9	58.3	0	32	13	45	60.4	0	50	29	80	65.2
85 / 89	0	28	9	38	56.5	1	47	22	71	59.3	2	46	36	83	64.9
80 / 84	0	41	18	59	55.3	5	48	31	84	58.5	13	39	43	95	64.2
75 / 79	2	39	24	65	53.8	13	38	38	89	57.7	36	23	43	102	63.1
70 / 74	9	37	35	81	52.2	30	30	46	106	56.2	73	11	35	119	61.7
65 / 69	19	30	40	89	50.4	48	17	40	106	55.5	71	4	19	94	60.2
60 / 64	33	23	37	93	48.7	66	9	31	106	53.6	35	1	6	43	57.4
55 / 59	43	15	31	89	46.4	49	4	14	67	50.4	8	0	1	9	53.1
50 / 54	52	9	23	84	43.4	24	2	5	31	45.7	1			1	49.3
45 / 49	39	5	12	56	40.3	9	1	1	11	42.7					
40 / 44	27	2	5	34	36.7	2		0	2	38.7					
35 / 39	11	1	3	15	33.0	0			0	35.0					
30 / 34	4	1	1	6	29.9										
25 / 29	1	0	0	1	25.7										
20 / 24	0	0		0	21.0										
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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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		
110 / 114		0		0	69.5										
105 / 109		3	1	4	68.2		0		0	67.6		0		0	89.0
100 / 104		14	5	19	67.8		7	1	8	69.0		1	0	1	67.0
95 / 99		46	19	65	67.8		35	12	47	68.1		9	2	12	66.1
90 / 94	0	62	30	92	67.9	0	62	25	87	68.1		28	7	36	66.0
85 / 89	2	51	39	92	67.5	1	55	34	90	68.0	0	45	15	60	65.6
80 / 84	18	43	58	119	66.7	9	47	53	108	67.0	1	50	25	76	64.8
75 / 79	57	19	51	128	65.6	40	24	60	124	66.0	6	39	39	84	63.8
70 / 74	96	9	36	140	65.1	94	12	45	152	64.9	34	31	56	122	62.9
65 / 69	68	2	8	78	63.6	82	5	16	103	63.3	79	17	51	146	61.4
60 / 64	7	0	0	7	59.9	20	1	3	24	59.8	59	9	25	94	57.6
55 / 59	0			0	59.0	2		0	2	56.4	34	5	13	52	53.0
50 / 54											18	4	5	27	48.9
45 / 49											7	1	1	9	44.4
40 / 44											1	0	0	1	41.7
35 / 39															
30 / 34															
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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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		
110 / 114															
105 / 109															
100 / 104															
95 / 99		2		2	61.6										
90 / 94		8	1	9	59.9		0		0	58.0					
85 / 89		20	3	23	59.6		2		2	55.9					
80 / 84		33	7	40	59.2		7	0	7	54.7		1		1	52.5
75 / 79	0	43	16	59	58.2		20	2	22	53.6		6		6	51.6
70 / 74	4	41	28	73	56.6	1	26	8	36	52.1	0	17	1	18	49.7
65 / 69	11	37	44	92	55.0	3	32	17	52	50.2	1	21	7	30	47.8
60 / 64	36	31	58	124	53.4	8	35	26	69	48.3	5	28	15	47	46.0
55 / 59	59	18	46	123	50.5	15	35	35	86	46.0	6	29	23	59	43.5
50 / 54	65	8	25	99	46.7	27	32	38	96	43.7	11	36	32	79	41.1
45 / 49	41	4	12	56	42.6	40	22	41	102	40.3	19	34	41	94	38.8
40 / 44	20	2	4	26	38.5	47	15	34	96	36.9	31	27	38	96	35.9
35 / 39	6	2	3	11	34.7	42	8	21	71	32.8	43	22	39	104	32.5
30 / 34	4	0	1	5	30.5	31	4	11	46	28.5	56	15	30	100	28.9
25 / 29	1	0	0	1	25.8	16	2	5	23	24.9	44	7	14	66	24.8
20 / 24	0			0	22.7	7	1	1	9	20.1	19	4	4	26	20.0
15 / 19						2	0	0	2	16.2	7	2	2	11	15.4
10 / 14						1	0	0	1	11.9	3	1	1	5	10.9
5 / 9						0		0	0	6.2	1	0	1	2	6.9
0 / 4						0		0	0	2.0	1		0	1	2.5
-5 / -1											0			0	-2.0

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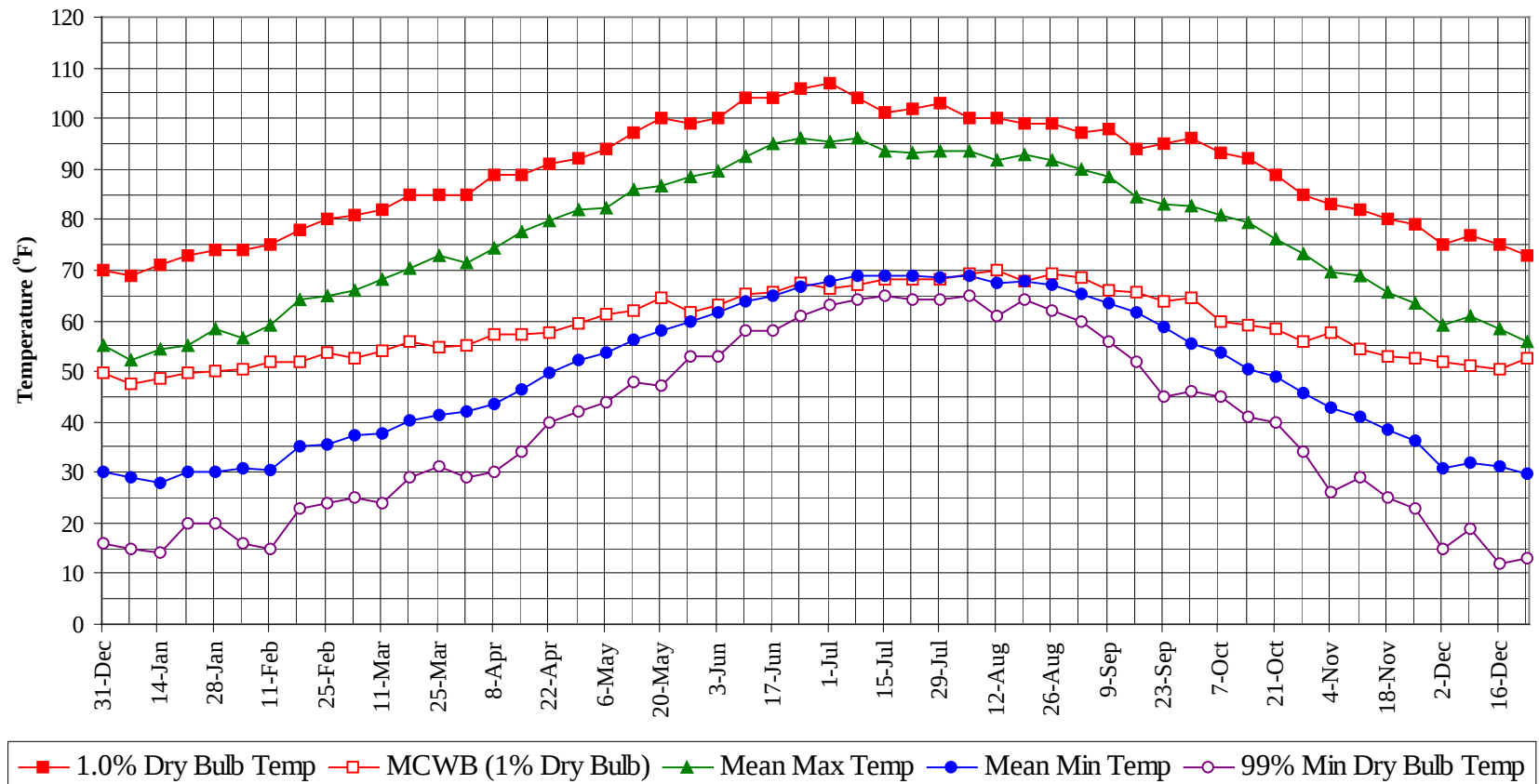
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

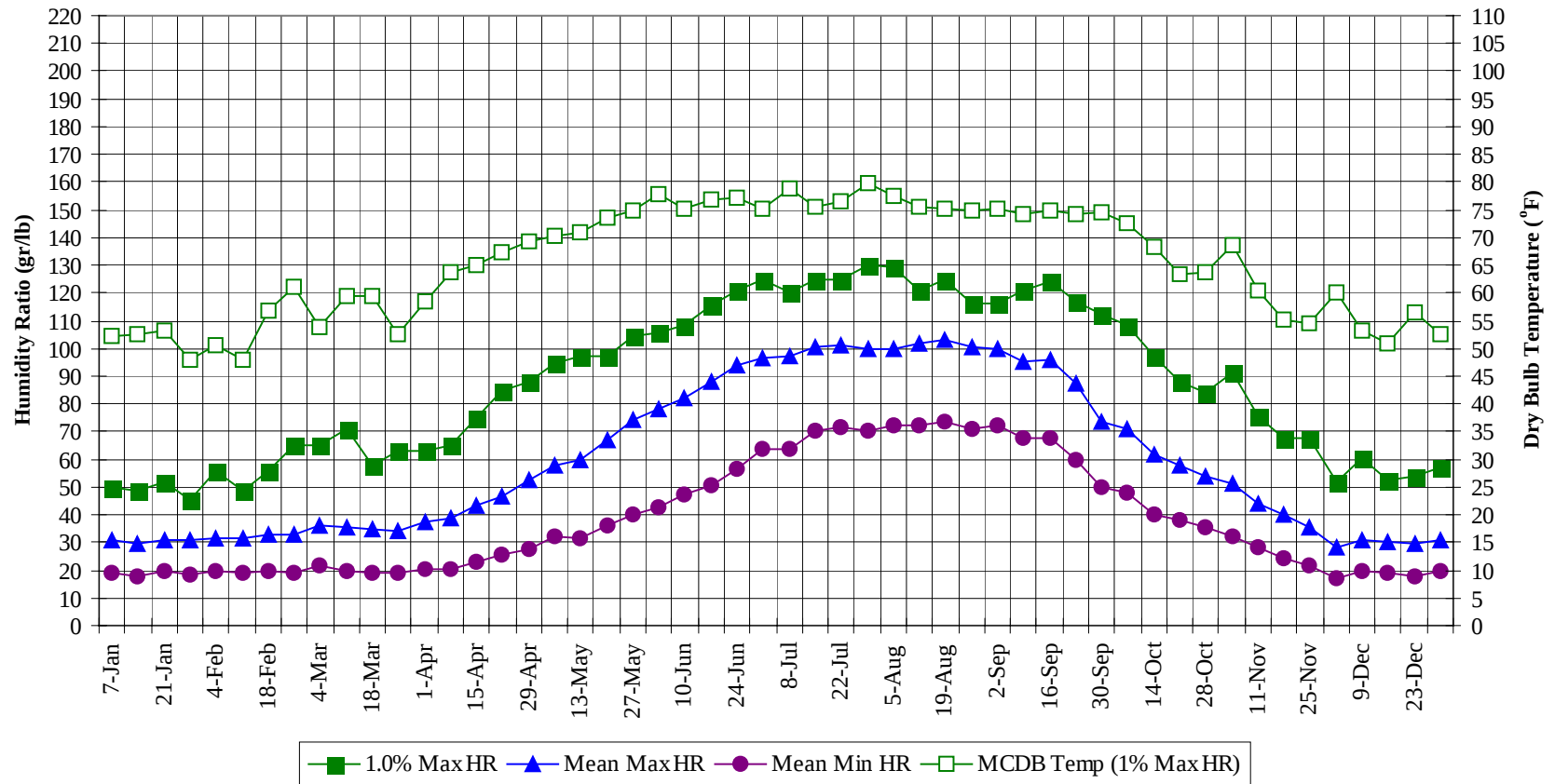
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
110 / 114		1	0	1	66.9
105 / 109		8	2	11	67.5
100 / 104		48	16	64	66.6
95 / 99		146	57	204	66.5
90 / 94	1	247	109	357	65.7
85 / 89	7	298	159	464	64.1
80 / 84	46	329	239	613	62.6
75 / 79	157	291	287	735	60.9
70 / 74	348	276	317	941	59.2
65 / 69	395	251	288	934	56.2
60 / 64	289	230	274	793	51.2
55 / 59	253	198	252	703	47.0
50 / 54	259	179	234	673	43.4
45 / 49	240	137	212	589	39.9
40 / 44	250	104	173	527	36.5
35 / 39	225	78	137	440	32.8
30 / 34	215	53	96	364	29.1
25 / 29	141	27	45	214	25.0
20 / 24	63	10	15	88	20.5
15 / 19	20	5	5	30	15.8
10 / 14	7	2	2	11	11.3
5 / 9	2	0	1	3	6.8
0 / 4	2		0	2	2.3
-5 / -1	0			0	-1.8

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

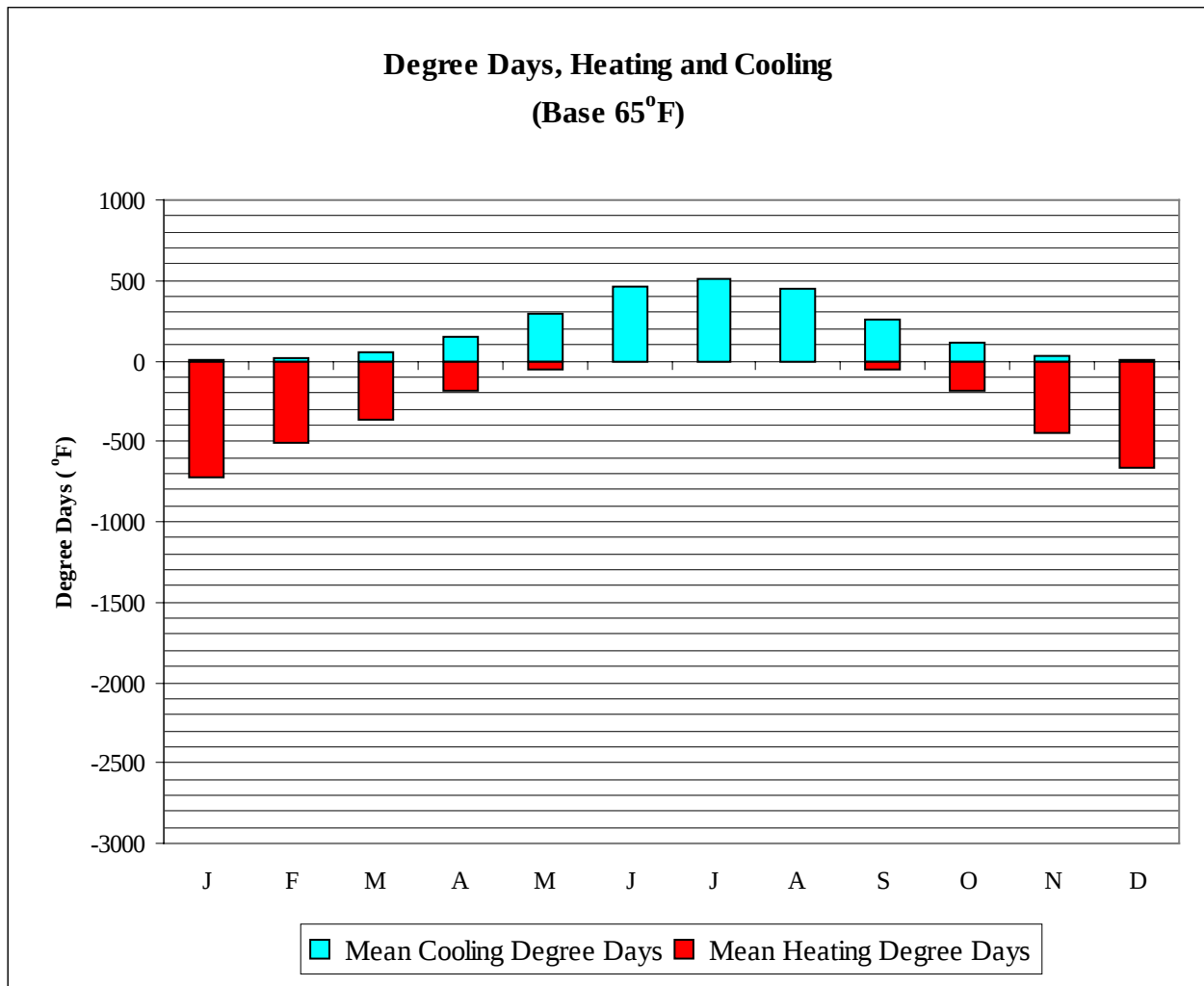


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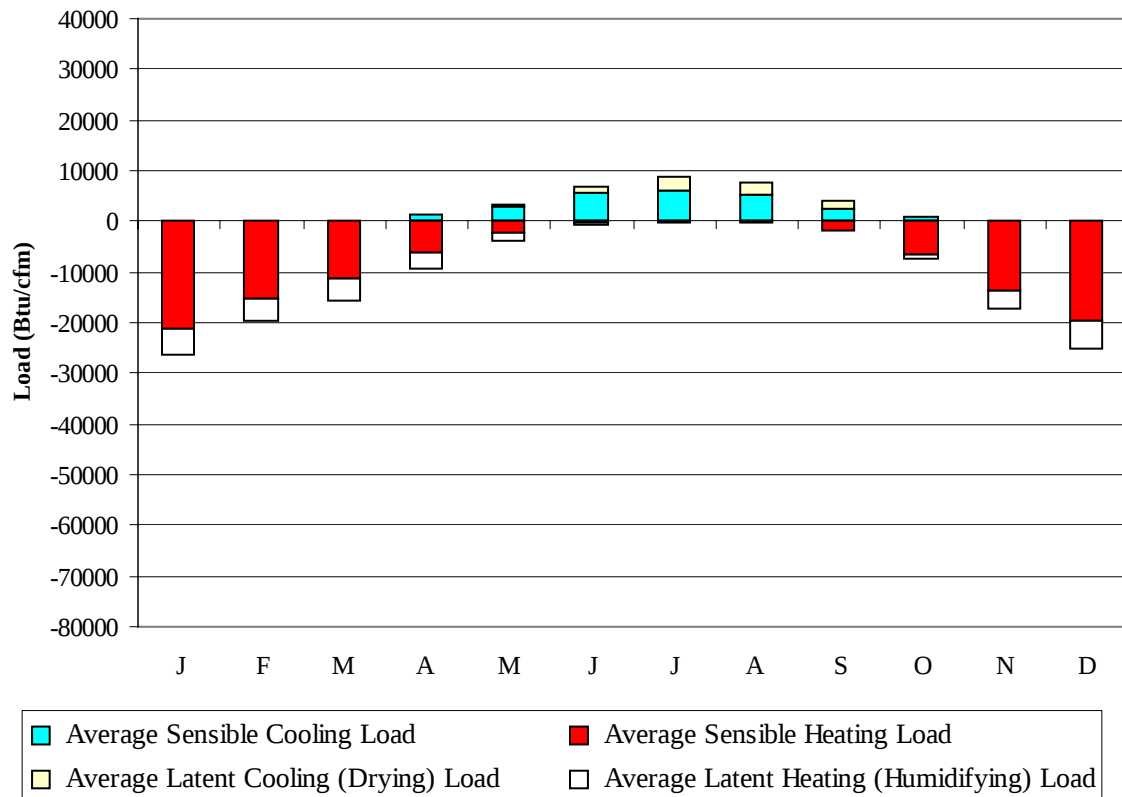
Long Term Dry Bulb Temperature and Humidity Summary

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	69.0	47.5	52.3	29.2	15.0	49.7	52.2	30.6	18.8
14-Jan	71.0	48.6	54.3	27.7	14.0	48.3	52.5	29.7	17.6
21-Jan	73.0	49.7	55.1	29.9	20.0	51.8	53.3	31.2	19.4
28-Jan	74.0	50.2	58.2	30.1	20.0	45.5	47.9	30.8	18.3
4-Feb	74.0	50.5	56.6	30.7	16.0	56.0	50.5	31.5	19.6
11-Feb	75.0	51.8	59.0	30.3	15.0	48.3	47.9	31.3	18.8
18-Feb	78.0	51.8	64.0	35.1	23.0	56.0	56.7	33.1	19.8
25-Feb	80.0	53.7	65.1	35.6	24.0	65.1	61.2	33.0	19.1
4-Mar	81.0	52.7	65.9	37.4	25.0	65.1	53.9	36.0	21.4
11-Mar	82.0	54.1	68.0	37.8	24.0	70.7	59.6	35.3	19.8
18-Mar	85.0	55.7	70.2	40.2	29.0	58.1	59.6	35.1	19.3
25-Mar	85.0	54.7	72.8	41.3	31.0	63.0	52.7	34.3	18.8
1-Apr	85.0	55.0	71.4	41.9	29.0	63.0	58.5	37.5	20.6
8-Apr	89.0	57.4	74.3	43.6	30.0	65.1	63.7	38.6	20.1
15-Apr	89.0	57.4	77.8	46.5	34.0	74.9	65.0	43.5	22.9
22-Apr	91.0	57.7	79.8	49.6	40.0	84.7	67.4	47.0	25.4
29-Apr	92.0	59.5	81.8	52.3	42.0	88.2	69.2	52.3	27.8
6-May	94.0	61.3	82.2	53.8	44.0	94.5	70.2	57.9	32.4
13-May	97.0	62.0	85.9	56.3	48.0	97.3	70.8	59.8	31.3
20-May	100.0	64.4	86.7	58.0	47.0	97.3	73.5	66.8	36.3
27-May	99.0	61.8	88.5	59.9	53.0	104.3	74.8	74.5	39.9
3-Jun	100.0	62.9	89.5	61.8	53.0	105.7	77.9	77.8	42.4
10-Jun	104.0	65.3	92.6	64.0	58.0	108.5	75.2	81.9	47.3
17-Jun	104.0	65.6	95.0	64.9	58.0	115.5	77.0	88.1	50.4
24-Jun	106.0	67.3	96.0	66.8	61.0	121.1	77.3	94.0	56.2
1-Jul	107.0	66.4	95.4	67.8	63.0	124.6	75.4	96.2	63.9
8-Jul	104.0	67.2	96.0	68.9	64.0	120.4	79.0	97.3	63.8
15-Jul	101.0	68.3	93.4	68.8	65.0	124.6	75.6	100.2	70.3
22-Jul	102.0	68.3	93.3	69.0	64.0	124.6	76.4	101.1	71.8
29-Jul	103.0	68.3	93.7	68.7	64.0	130.2	79.9	99.7	70.2
5-Aug	100.0	69.1	93.6	69.0	65.0	129.5	77.4	100.1	72.0
12-Aug	100.0	69.8	91.8	67.3	61.0	121.1	75.4	101.9	72.2
19-Aug	99.0	67.9	92.8	67.7	64.0	124.6	75.1	103.4	73.3
26-Aug	99.0	69.3	91.9	67.1	62.0	116.2	75.0	100.2	70.6
2-Sep	97.0	68.4	89.8	65.1	60.0	116.2	75.1	99.7	72.5
9-Sep	98.0	65.9	88.4	63.4	56.0	121.1	74.3	95.5	67.8
16-Sep	94.0	65.8	84.5	61.5	52.0	123.9	74.8	95.6	68.0
23-Sep	95.0	63.9	82.9	58.7	45.0	116.9	74.3	87.0	59.8
30-Sep	96.0	64.6	82.7	55.3	46.0	112.0	74.5	73.3	49.8
7-Oct	93.0	59.9	81.0	53.6	45.0	108.5	72.4	71.3	47.9
14-Oct	92.0	59.3	79.4	50.3	41.0	97.3	68.5	61.5	39.8
21-Oct	89.0	58.2	76.2	48.8	40.0	88.2	63.3	58.1	37.9
28-Oct	85.0	55.7	73.1	45.8	34.0	84.0	63.5	53.8	35.5
4-Nov	83.0	57.6	69.5	42.7	26.0	91.0	68.8	51.1	32.4
11-Nov	82.0	54.4	68.9	40.8	29.0	75.6	60.6	43.7	28.3
18-Nov	80.0	53.0	65.8	38.3	25.0	67.9	55.1	39.8	24.4
25-Nov	79.0	52.5	63.4	36.4	23.0	67.9	54.6	35.4	21.8
2-Dec	75.0	51.7	59.0	31.0	15.0	51.8	60.0	28.1	17.3
9-Dec	77.0	51.1	60.9	32.0	19.0	60.2	53.3	31.1	19.4
16-Dec	75.0	50.5	58.3	31.0	12.0	52.5	51.0	30.4	18.7
23-Dec	73.0	52.5	55.8	29.6	13.0	53.9	56.6	29.3	17.6
31-Dec	70.0	49.6	55.0	30.0	16.0	57.4	52.6	30.9	19.6



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	6	721
FEB	19	510
MAR	59	361
APR	146	180
MAY	290	57
JUN	463	7
JUL	511	1
AUG	452	3
SEP	262	48
OCT	115	190
NOV	30	448
DEC	10	669
ANN	2363	3195

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	8	-21096	0	-5124
FEB	55	-15265	0	-4290
MAR	289	-11274	0	-4542
APR	1173	-6069	10	-3261
MAY	2992	-2296	138	-1467
JUN	5798	-448	1198	-241
JUL	6196	-92	2601	-17
AUG	5102	-231	2532	-3
SEP	2433	-1967	1531	-66
OCT	828	-6541	128	-893
NOV	104	-13717	6	-3530
DEC	12	-19713	0	-5314
ANN	24990	-98709	8144	-28748

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

No Solar Radiation
Data Available

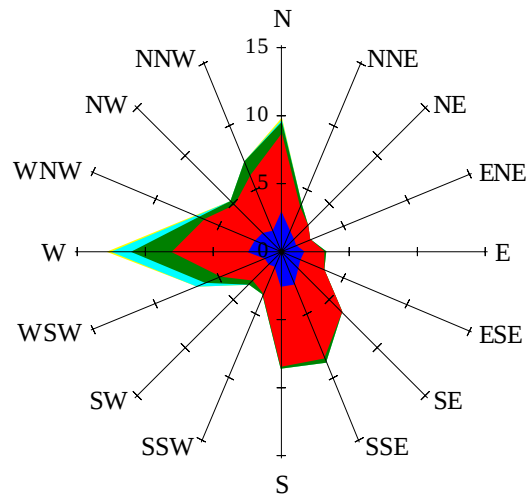


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

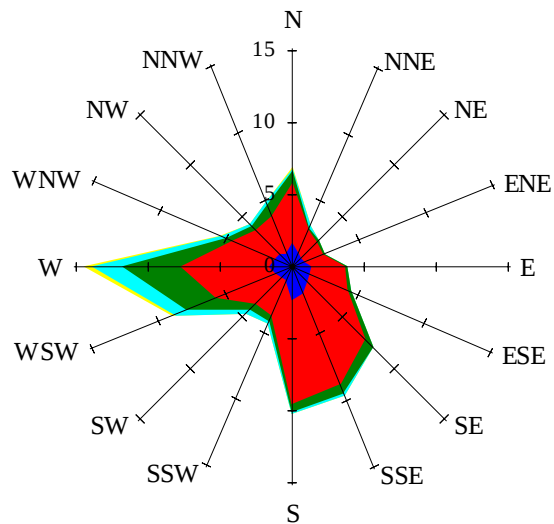
Labels of Percent Frequency on North Axis



Percent Calm = 7.14

Wind Summary - March, April, and May

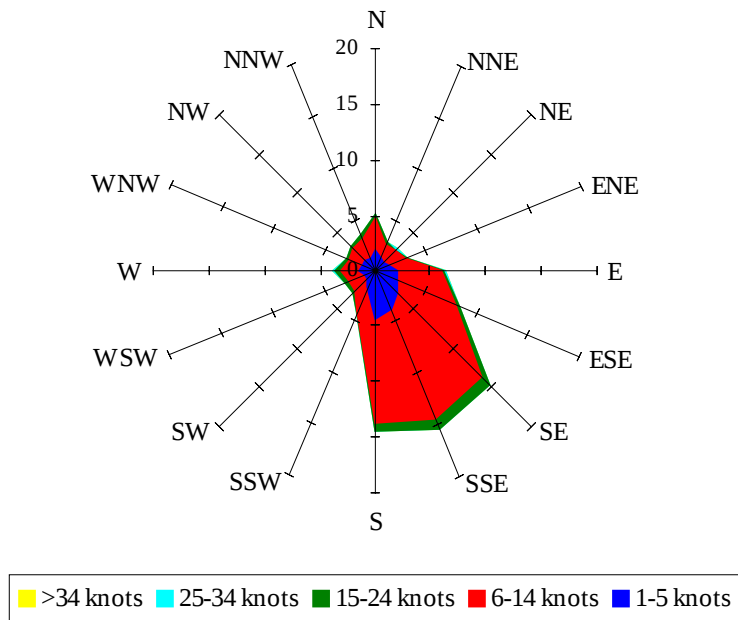
Labels of Percent Frequency on North Axis



Percent Calm = 4.49

Wind Summary - June, July, and August

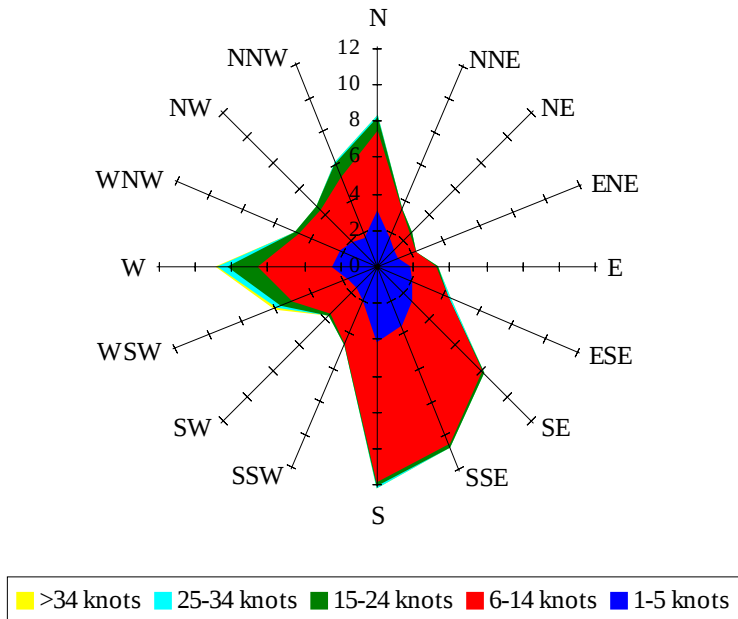
Labels of Percent Frequency on North Axis



Percent Calm = 4.52

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 6.53