

VARNA, BU

Latitude = 43.23 N

Longitude = 27.83 E

Period of Record = 1988 To 2017

Station ID = ICAO_LBWN

Elevation = 230 Feet

Average Pressure = 29.83 inches Hg

Design Criteria Data

Dry Bulb Temperature (T)	Mean Coincident (Average) Values				
	Design Value (°F)	Wet Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	94	72	85	11.1	SE
0.4% Occurrence	90	72	91	10.3	SE
1.0% Occurrence	86	72	98	9.2	SE
2.0% Occurrence	84	71	96	8.8	SE
Mean Daily Range	17	-	-	-	N
97.5% Occurrence	25	23	15	9.8	N
99.0% Occurrence	19	17	11	11.7	N
99.6% Occurrence	16	15	10	14.2	N
Median of Extreme Lows	10	9	7	10.2	NW

Wet Bulb Temperature (T _{wb})	Design Value (°F)	Dry Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	79	86	136	7.8	SE
0.4% Occurrence	76	84	120	7.7	SE
1.0% Occurrence	74	82	112	7.7	SE
2.0% Occurrence	73	81	108	7.6	SE

Humidity Ratio (HR)	Design Value (gr/lb)	Dry Bulb Temperature (°F)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	142	84	0.94	8.8	ESE
0.4% Occurrence	125	81	0.83	8.7	ESE
1.0% Occurrence	118	79	0.78	7.6	ESE
2.0% Occurrence	111	78	0.73	7.6	ESE

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	14	496	212	1087

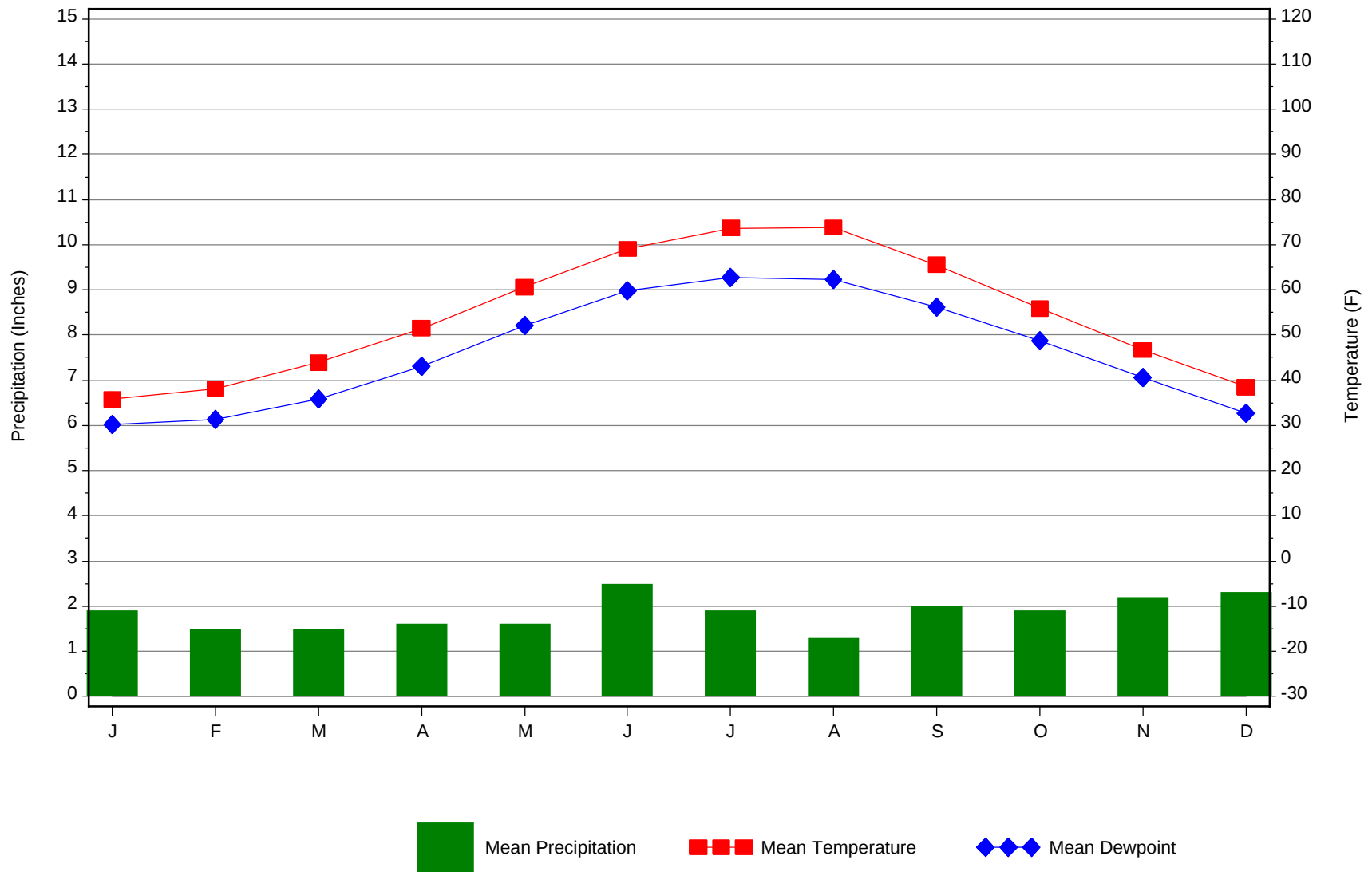
Other Site Data

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
7	N/A	N/A	1.4 + 0.5
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 (#)
57	N/A	N/A	57

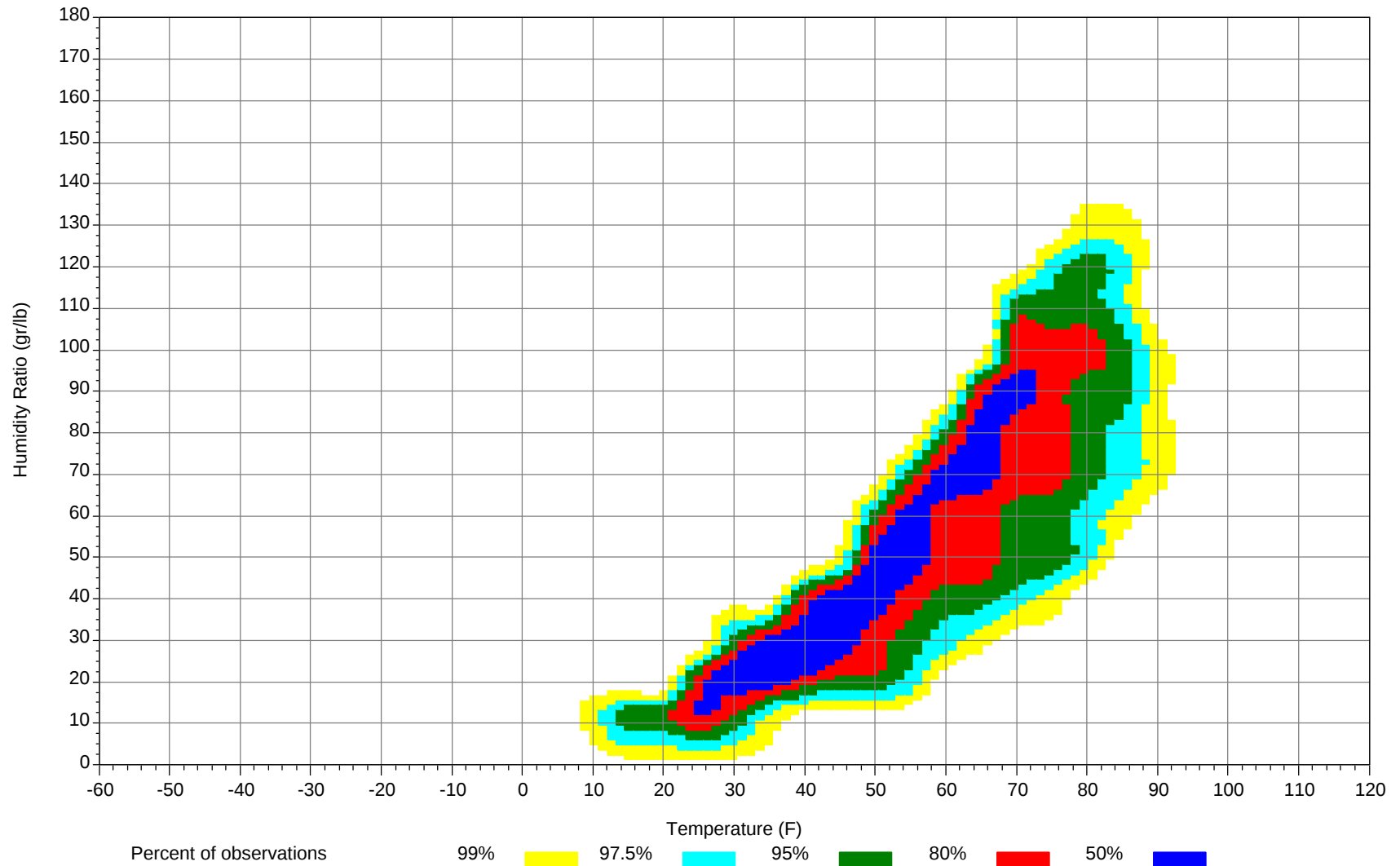
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



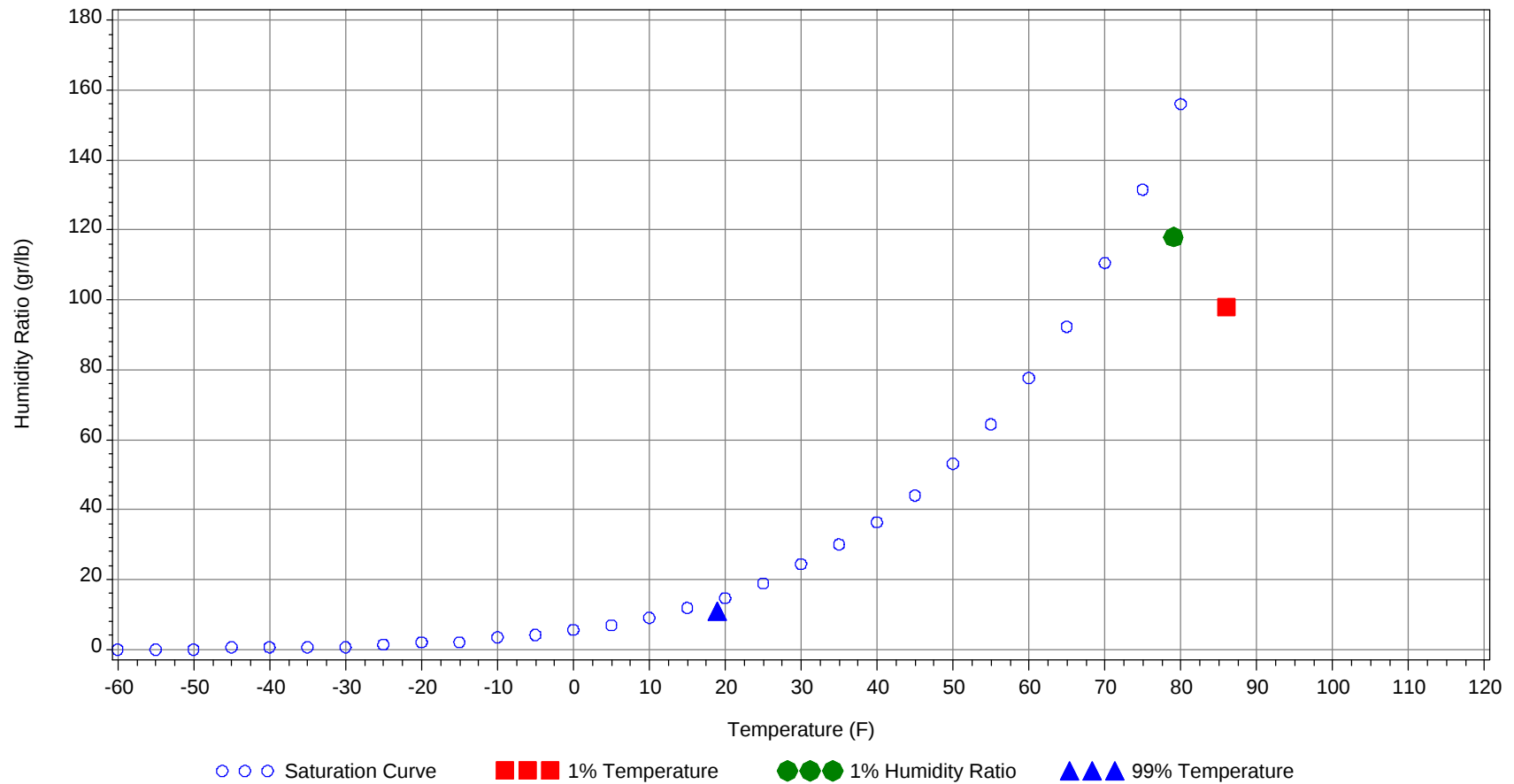
Average Annual Climate



Long Term Psychrometric Summary



Psychrometric Summary of Peak Design Values



	(° F) / (gr/lb)	MCDB (° F)	MCWB (° F)	MCDP (° F)	MCHR (gr/lb)	Enthalpy (btu/lb)
1.0% Dry Bulb	86.0		72		98.0	35.4
99.0% Dry Bulb	19.0				11.0	6.3
1.0% Humidity Ratio	118.0	79.0	73.9	71.6		37.5

Dry-Bulb Temperature Hours For An Average Year

	January					February					March				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
105/109															
100/104															
95/ 99															
90/ 94															
85/ 89															
80/ 84												0	0	0	60
75/ 79							0		0	57		1	0	1	56.5
70/ 74							1	0	1	56.8	0	3	1	4	55.3
65/ 69		0	0	0	51.4		2	0	2	54.4	0	7	2	9	53.6
60/ 64		3	0	3	52.1	0	7	1	8	51.5	1	16	5	22	51.5
55/ 59	1	10	3	14	49.6	2	13	4	19	49.5	4	28	12	44	48.8
50/ 54	4	20	8	32	46.4	5	24	12	41	46.2	16	48	28	92	46.4
45/ 49	18	36	28	82	43.6	23	44	31	98	43	43	66	60	169	43.2
40/ 44	34	42	45	121	39.6	32	43	46	121	39.4	61	38	62	161	39.4
35/ 39	56	53	60	169	35.2	59	43	57	159	35	64	26	50	140	35.1
30/ 34	57	40	49	146	30.4	46	25	36	107	30.3	39	10	22	71	30.7
25/ 29	41	24	29	94	25.6	31	14	21	66	25.4	17	2	5	24	26
20/ 24	16	9	14	39	20.9	14	5	8	27	20.9	3	1	1	5	21.6
15/ 19	13	7	8	28	16.5	8	3	5	16	16.2	0	0		0	17.5
10/ 14	6	2	3	11	11.5	4	1	1	6	11.4					
5/ 9	1	0	1	2	6.4	1	0	0	1	7.1					
0/ 4	1	0	0	1	1.6	0			0	2.7					
-5/ -1	0			0	-3										

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

	April					May					June				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
105/109															
100/104												0		0	75
95/ 99												0	0	0	73
90/ 94							0	0	0	70.4		3	0	3	72.4
85/ 89		0		0	62	0	1	0	1	68.2	0	9	2	11	71.3
80/ 84		1	0	1	62	0	6	0	6	67.4	1	47	9	57	69.8
75/ 79		3	0	3	59.9	0	27	3	30	64.6	7	80	32	119	67.2
70/ 74	0	11	2	13	57.9	3	55	15	73	62.4	27	60	60	147	65
65/ 69	1	18	4	23	56.2	13	57	34	104	60.1	60	27	63	150	62.8
60/ 64	4	48	15	67	53.8	43	61	66	170	57.5	83	11	55	149	59.7
55/ 59	19	67	41	127	51.2	80	33	73	186	54	48	2	17	67	55.6
50/ 54	60	56	76	192	48.3	72	7	43	122	50	12		2	14	51.1
45/ 49	78	25	66	169	44.5	29	1	11	41	45.3	1		0	1	46.5
40/ 44	43	8	23	74	40.3	6	0	2	8	40.8					
35/ 39	26	2	11	39	36	2		0	2	37.4					
30/ 34	7	0	2	9	31.5	0			0	34					
25/ 29	1		0	1	27.3										
20/ 24															
15/ 19															
10/ 14															
5/ 9															
0/ 4															
-5/ -1															

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Dry-Bulb Temperature Hours For An Average Year

	July					August					September				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
105/109		0		0	72										
100/104		0	0	0	72.5		0	0	0	74.1					
95/ 99		1	0	1	71.8		2	0	2	71.8					
90/ 94		10	1	11	72.1		15	1	16	72.1		1		1	68.6
85/ 89	0	37	5	42	72.3	0	44	6	50	72.4		3	0	3	68.8
80/ 84	3	100	29	132	70.4	3	94	30	127	70.6		26	2	28	69
75/ 79	22	67	66	155	68.4	21	63	67	151	68.3	1	63	13	77	66.5
70/ 74	63	24	78	165	66.4	67	21	73	161	66.1	13	70	46	129	64.2
65/ 69	85	6	47	138	63.5	78	8	46	132	63.3	38	37	61	136	61.8
60/ 64	60	2	19	81	60.4	59	3	22	84	59.9	72	25	63	160	58.5
55/ 59	13	0	3	16	56.1	18	0	2	20	55.5	70	13	40	123	54.4
50/ 54	1		0	1	51.6	1			1	51.4	36	2	12	50	50.1
45/ 49	0			0	48						9	0	2	11	45.4
40/ 44											1		0	1	42.1
35/ 39											0			0	37.7
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

	October					November					December				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
105/109															
100/104															
95/ 99															
90/ 94		0		0	69										
85/ 89		0		0	69.8										
80/ 84		3	0	3	66.1		0		0	61					
75/ 79	0	11	1	12	64.9		1		1	60.8					
70/ 74	1	29	5	35	63.1		5	0	5	60.6		0	0	0	58
65/ 69	6	42	16	64	60.7	1	9	2	12	58.5		1	0	1	56.9
60/ 64	27	58	50	135	57.9	5	25	9	39	56.8	1	6	1	8	54.3
55/ 59	55	46	66	167	53.8	20	46	29	95	53.2	4	16	7	27	51.4
50/ 54	67	33	57	157	49.4	42	49	53	144	49.2	14	31	21	66	48.3
45/ 49	52	17	34	103	44.6	50	40	52	142	44.5	29	43	37	109	43.9
40/ 44	22	6	11	39	39.7	40	27	34	101	39.6	35	42	41	118	39.4
35/ 39	13	3	7	23	35.5	43	24	32	99	35.3	54	49	57	160	35.1
30/ 34	4	0	1	5	31	27	10	19	56	30.6	52	35	44	131	30.3
25/ 29	0		0	0	26.5	10	3	7	20	25.9	35	17	26	78	25.6
20/ 24						3	0	1	4	20.5	13	5	9	27	20.8
15/ 19						1	0	0	1	16.8	8	3	4	15	16.9
10/ 14								0	0	13	3	0	1	4	11.9
5/ 9											0		0	0	6.6
0/ 4															
-5/ -1															

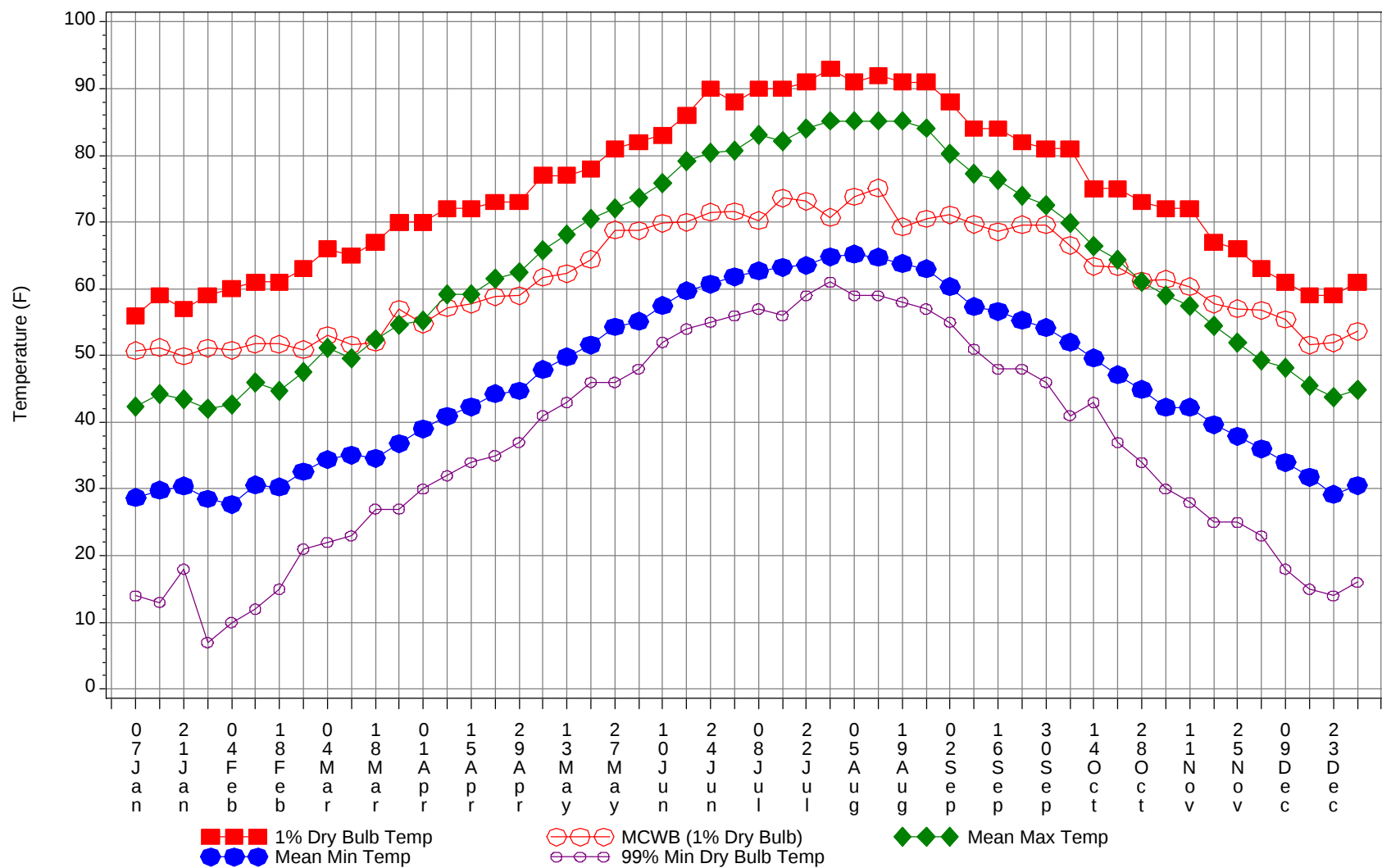
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Dry-Bulb Temperature Hours For An Average Year

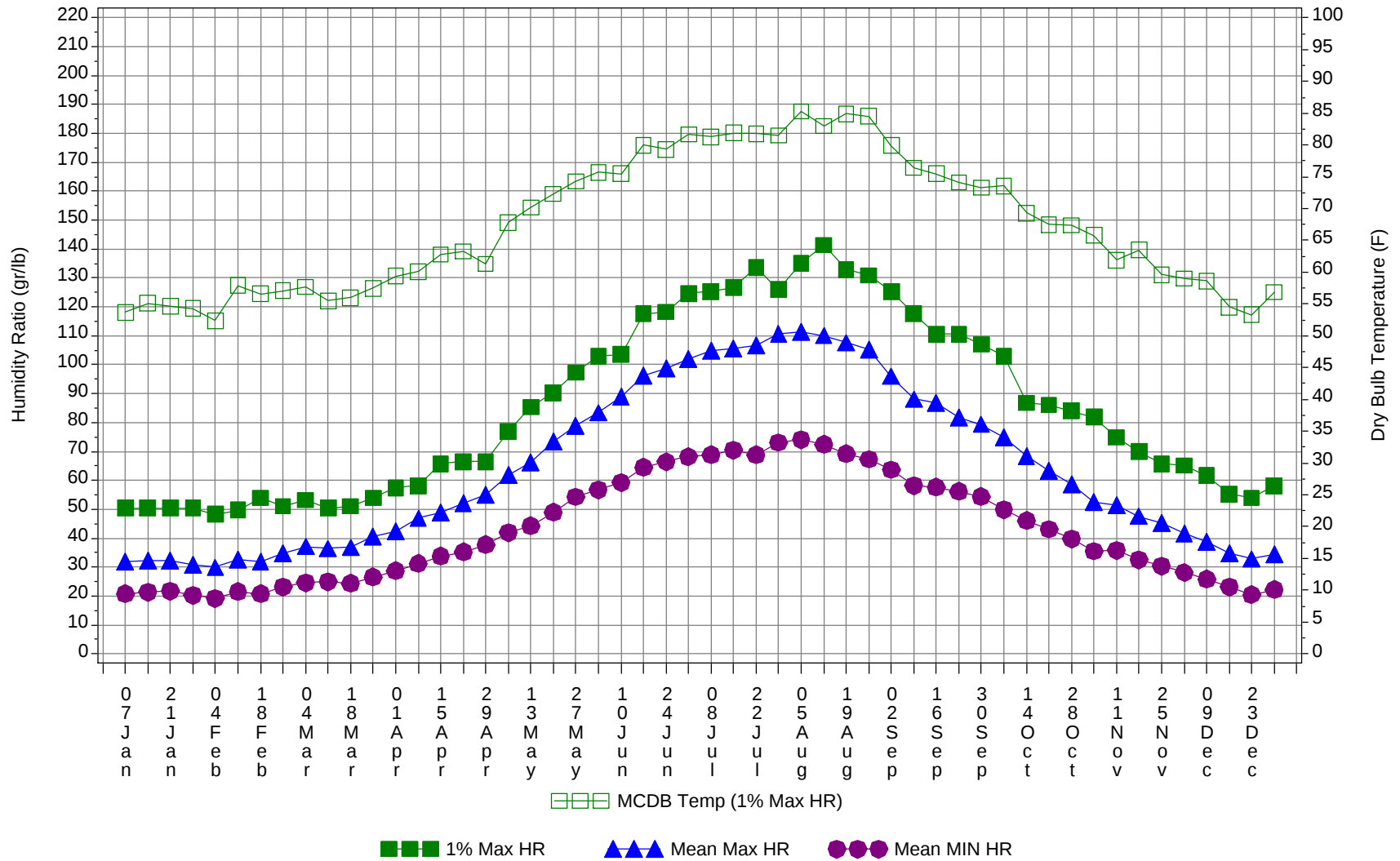
	Annual				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
105/109		0		0	72
100/104		1	0	1	73.2
95/ 99		4	0	4	71.9
90/ 94		29	2	31	72
85/ 89	0	93	13	106	72.1
80/ 84	7	276	71	354	70.1
75/ 79	51	316	182	549	67.5
70/ 74	173	278	281	732	64.8
65/ 69	284	215	274	773	61.9
60/ 64	355	266	307	928	58
55/ 59	333	275	298	906	53.2
50/ 54	331	270	312	913	48.6
45/ 49	332	274	322	928	44
40/ 44	274	206	265	745	39.6
35/ 39	315	200	273	788	35.2
30/ 34	231	121	174	526	30.4
25/ 29	135	60	88	283	25.6
20/ 24	50	20	33	103	20.9
15/ 19	31	13	18	62	16.5
10/ 14	12	4	6	22	11.5
5/ 9	2	1	1	4	6.7
0/ 4	1	0	0	1	1.6
-5/ -1	0			0	-3

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.

Annual Summary of Temperatures



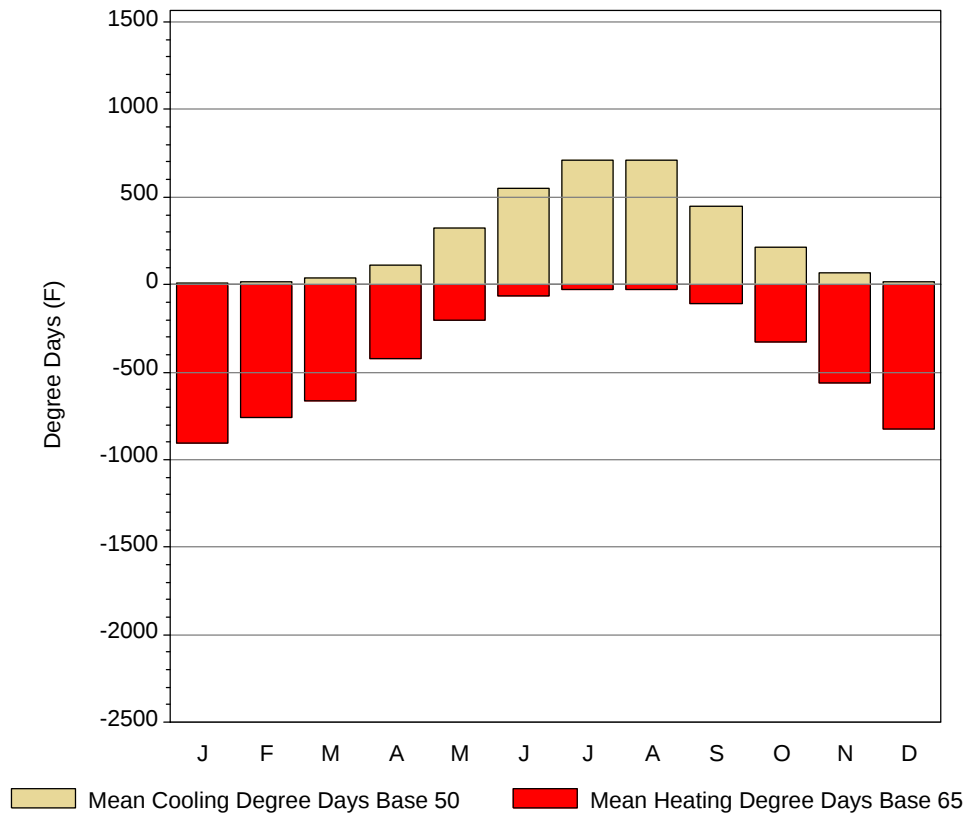
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

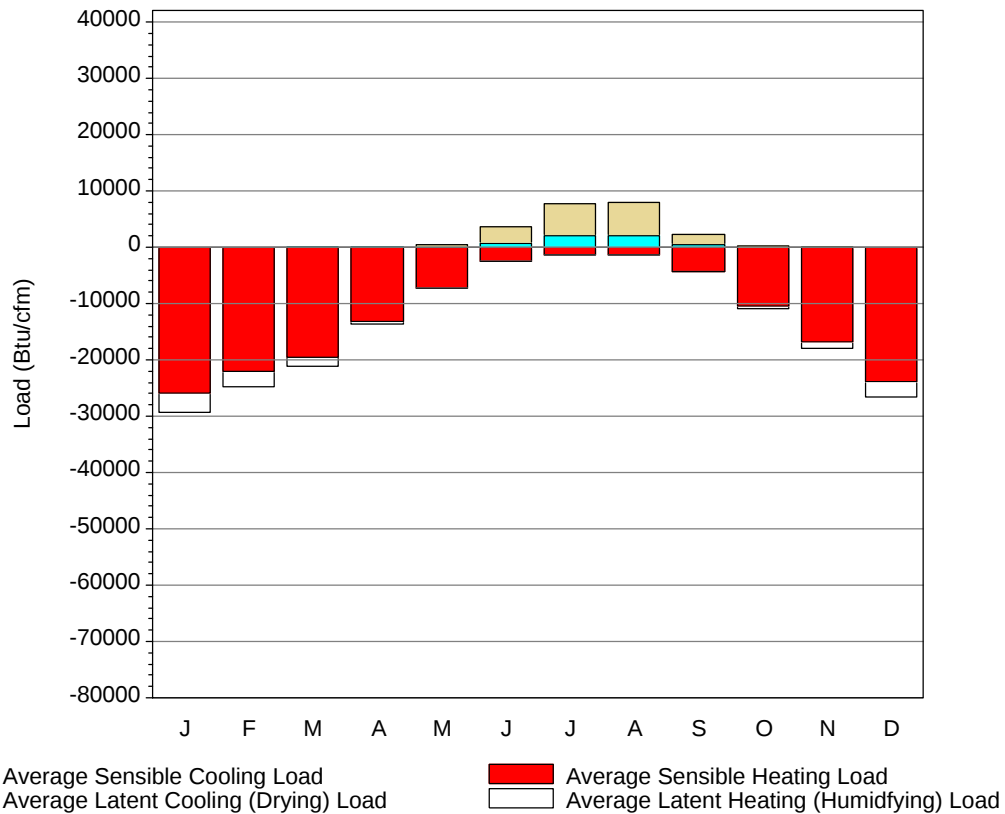
Week Ending	1.0% Temp (° F)	MCWB@ 1% Temp (° F)	Mean Max Temp (° F)	Mean Min Temp (° F)	99% Temp (° F)	1.0% HR (gr/lb)	MCDB@ 1% HR (° F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	56	50.7	42.4	28.7	14	50.4	53.7	32	20.8
14-Jan	59	51.2	44.2	29.8	13	50.4	55.1	32.3	21.3
21-Jan	57	49.9	43.4	30.4	18	50.4	54.7	32.2	21.7
28-Jan	59	51.1	42	28.5	7	50.4	54.3	30.9	20.2
4-Feb	60	50.8	42.6	27.7	10	48.3	52.4	29.9	19.2
11-Feb	61	51.7	46	30.6	12	49.7	57.9	32.7	21.5
18-Feb	61	51.7	44.7	30.3	15	53.9	56.6	31.8	20.8
25-Feb	63	50.9	47.6	32.6	21	51.1	57.1	34.7	23.2
4-Mar	66	53	51.2	34.4	22	53.2	57.7	37.1	24.6
11-Mar	65	51.6	49.5	35.1	23	50.4	55.5	36.4	24.9
18-Mar	67	52	52.4	34.6	27	51.1	56	36.8	24.4
25-Mar	70	56.9	54.6	36.8	27	53.9	57.5	40.5	26.5
1-Apr	70	54.7	55.2	39	30	57.4	59.4	42.3	28.7
8-Apr	72	57.2	59.1	40.9	32	58.1	60.1	46.9	31.3
15-Apr	72	57.7	59.1	42.3	34	65.8	62.8	48.8	33.8
22-Apr	73	58.8	61.6	44.3	35	66.5	63.3	52.1	35.2
29-Apr	73	59	62.5	44.7	37	66.5	61.3	54.9	37.7
6-May	77	61.7	65.8	47.9	41	77	67.8	62	41.9
13-May	77	62.3	68.2	49.8	43	85.4	70.2	66.2	44.3
20-May	78	64.4	70.5	51.6	46	90.3	72.3	73.4	48.9
27-May	81	68.8	72	54.3	46	97.3	74.3	78.9	54.3
4-Jun	82	68.7	73.6	55.1	48	102.9	75.7	83.4	56.7
10-Jun	83	69.8	75.9	57.5	52	103.6	75.5	89.1	59.3
17-Jun	86	70	79.2	59.7	54	117.6	80	96.2	64.5
24-Jun	90	71.5	80.4	60.7	55	118.3	79.3	98.8	66.4
1-Jul	88	71.6	80.7	61.8	56	124.6	81.7	102	68.2
8-Jul	90	70.2	83.1	62.7	57	125.3	81.3	104.9	68.8
15-Jul	90	73.6	82.2	63.2	56	126.7	81.9	105.6	70.5
22-Jul	91	73.1	84	63.5	59	133.7	81.8	106.8	68.9
29-Jul	93	70.7	85.2	64.8	61	126	81.5	110.8	73.1
5-Aug	91	73.8	85.2	65.2	59	135.1	85.3	111.3	74
12-Aug	92	75.1	85.2	64.7	59	141.4	83	110.1	72.4
19-Aug	91	69.3	85.2	63.8	58	133	84.9	107.6	69.2
26-Aug	91	70.5	84.1	63	57	130.9	84.5	105.2	67.3
2-Sep	88	71.1	80.2	60.3	55	125.3	79.9	96	63.7
9-Sep	84	69.7	77.2	57.3	51	117.6	76.4	88.1	58.2
16-Sep	84	68.6	76.3	56.6	48	110.6	75.5	86.8	57.7
23-Sep	82	69.6	74	55.3	48	110.6	74.1	81.8	56.2
30-Sep	81	69.6	72.5	54.2	46	107.1	73.3	79.4	54.4
7-Oct	81	66.5	69.9	52	41	102.9	73.6	74.9	49.9
14-Oct	75	63.4	66.4	49.6	43	86.8	69.3	68.4	46.1
21-Oct	75	63.3	64.3	47.1	37	86.1	67.5	63.4	43.1
28-Oct	73	61.2	61	44.9	34	84	67.4	58.7	39.8
4-Nov	72	61.4	59	42.2	30	81.9	65.8	52.5	35.5
11-Nov	72	60.3	57.4	42.2	28	74.9	61.9	51.4	35.7
18-Nov	67	57.7	54.5	39.6	25	70	63.5	47.6	32.5
25-Nov	66	57	52	37.9	25	65.8	59.6	45.3	30.3
2-Dec	63	56.8	49.2	36	23	65.1	59	41.6	28.1
9-Dec	61	55.4	48.2	34	18	61.6	58.6	38.8	25.8
16-Dec	59	51.6	45.5	31.8	15	55.3	54.5	34.7	23.1
23-Dec	59	51.9	43.7	29.2	14	53.9	53.3	32.8	20.5
31-Dec	61	53.6	44.9	30.5	16	58.1	56.9	34.3	22.2

Degree Days, Heating and Cooling (Base 65 F) & Cooling (Base 50F)



Month	Mean Cooling Degree Days (°F) Base 50	Mean Cooling Degree Days (°F) Base 65	Mean Heating Degree Days (°F) Base 65
JAN	7.8	0	904.2
FEB	14.1	0.3	761.5
MAR	40.2	2.4	662.7
APR	113.8	7.5	424.3
MAY	324.4	46.5	203.7
JUN	552.4	160.5	60.8
JUL	709.4	272	28.5
AUG	712.2	276.9	30.1
SEP	450.5	103.7	110.9
OCT	216	21.1	324
NOV	69.4	2.8	563.2
DEC	16.1	0.1	824.9
ANN	3226.3	893.8	4898.8

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



Month	Average Sensible Cooling Load (Btu/cfm)	Average Sensible Heating Load (Btu/cfm)	Average Latent Cooling Load (Btu/cfm)	Average Latent Heating Load (Btu/cfm)
JAN	0	-25848	0	-3381
FEB	0	-21929	0	-2729
MAR	3	-19555	0	-1550
APR	14	-13234	0	-321
MAY	102	-7143	354	-37
JUN	813	-2556	2855	-31
JUL	2011	-1269	5652	-38
AUG	2145	-1323	5753	-43
SEP	367	-4190	1867	-52
OCT	39	-10540	269	-237
NOV	1	-16888	5	-1079
DEC	0	-23789	0	-2770
ANN	5495	-148264	16755	-12268

Station Information		Shading Geometry in Dimensionless Units	
City, State, WBAN	N/A	N/A	N/A
Lat, Lon, Elev	N/A	N/A	N/A
Press Stn Type	N/A	N/A	N/A

AVERAGE INCIDENT SOLAR RADIATION (Btu/sq.ft./day), Percentage Uncertainty = 9														
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
HORIZ.	Global													
	Std.Dev.													
	Minimum													
	Maximum													
	Diffuse													
Clear Day	Global													
NORTH	Global													
	Diffuse													
Clear Day	Global													
EAST	Global													
	Diffuse													
Clear Day	Global													
SOUTH	Global													
	Diffuse													
Clear Day	Global													
WEST	Global													
	Diffuse													
Clear Day	Global													

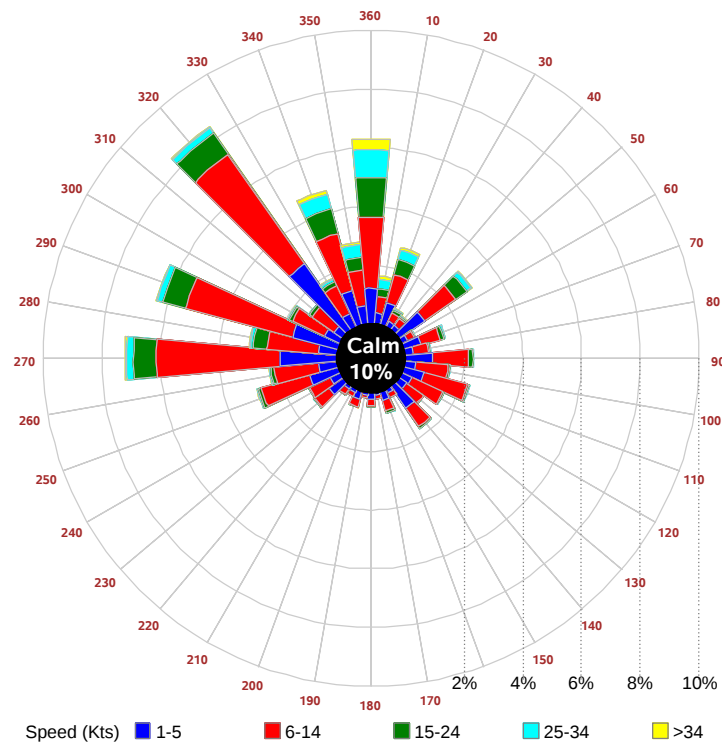
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

AVERAGE TRANSMITTED SOLAR RADIATION (Btu/sq.ft./day) FOR DOUBLE GLAZING, Percentage Uncertainty = 9														
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
HORIZ.	Unshaded													
NORTH	Unshaded													
	Shaded													
EAST	Unshaded													
	Shaded													
SOUTH	Unshaded													
	Shaded													
WEST	Unshaded													
	Shaded													

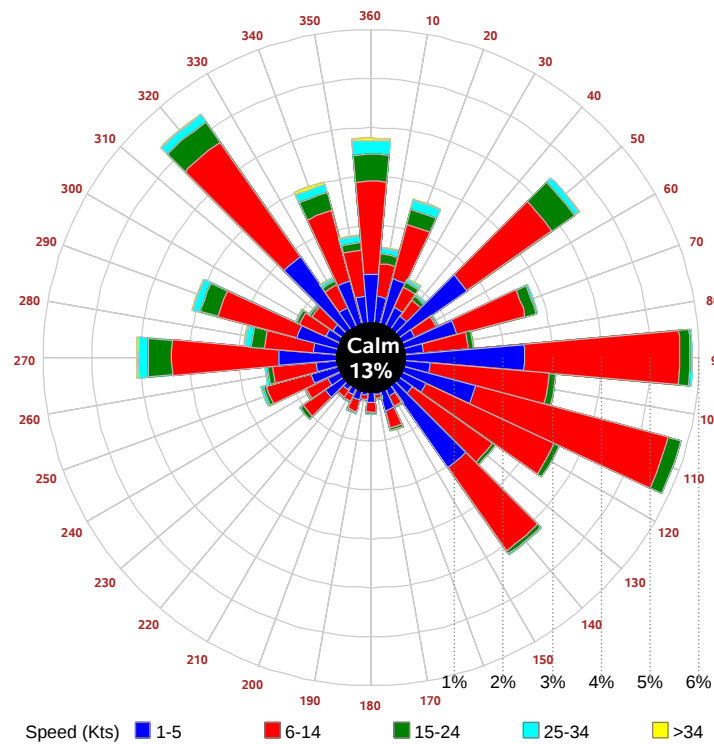
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9												
				March						June		
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear											
	M.Cloudy											
SOUTH	M.Clear											
	M.Cloudy											
WEST	M.Clear											
	M.Cloudy											
M.Clear	(% hrs)											

				Sept						Dec		
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear											
	M.Cloudy											
SOUTH	M.Clear											
	M.Cloudy											
WEST	M.Clear											
	M.Cloudy											
M.Clear	(% hrs)											

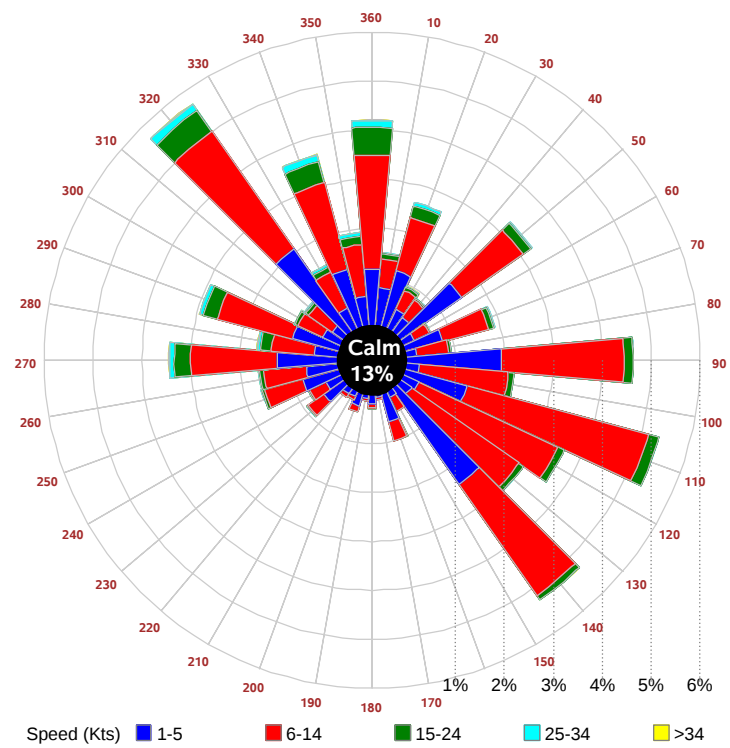
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

