

CHIANG MAI INTL, TH	
Latitude = 18.77 N	Station ID = ICAO_VTCC
Longitude = 98.96 E	Elevation = 1036 Feet
Period of Record = 1988 To 2017	Average Pressure = 28.75 inches Hg

Design Criteria Data

	Mean Coincident (Average) Values				
Dry Bulb Temperature (T)	Design Value (°F)	Wet Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	103	73	78	6.2	S
0.4% Occurrence	100	72	81	6.1	S
1.0% Occurrence	98	72	82	5.8	S
2.0% Occurrence	96	72	86	5.4	S
Mean Daily Range	19	-	-	-	W
97.5% Occurrence	60	57	68	0.7	W
99.0% Occurrence	57	55	63	0.6	WSW
99.6% Occurrence	55	53	59	0.6	W
Median of Extreme Lows	52	50	52	0.8	NNE

	Design Value (°F)	Dry Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Wet Bulb Temperature (T_{wb})					
Median of Extreme Highs	82	90	154	4.5	WSW
0.4% Occurrence	80	89	144	4.4	SW
1.0% Occurrence	79	87	139	4.1	SW
2.0% Occurrence	78	86	135	3.9	S

	Design Value (gr/lb)	Dry Bulb Temperature (°F)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Humidity Ratio (HR)					
Median of Extreme Highs	167	88	1.05	3.9	WNW
0.4% Occurrence	155	86	0.98	3.3	W
1.0% Occurrence	148	83	0.94	3.9	W
2.0% Occurrence	145	82	0.92	3.2	W

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	420	3852	4225	6311

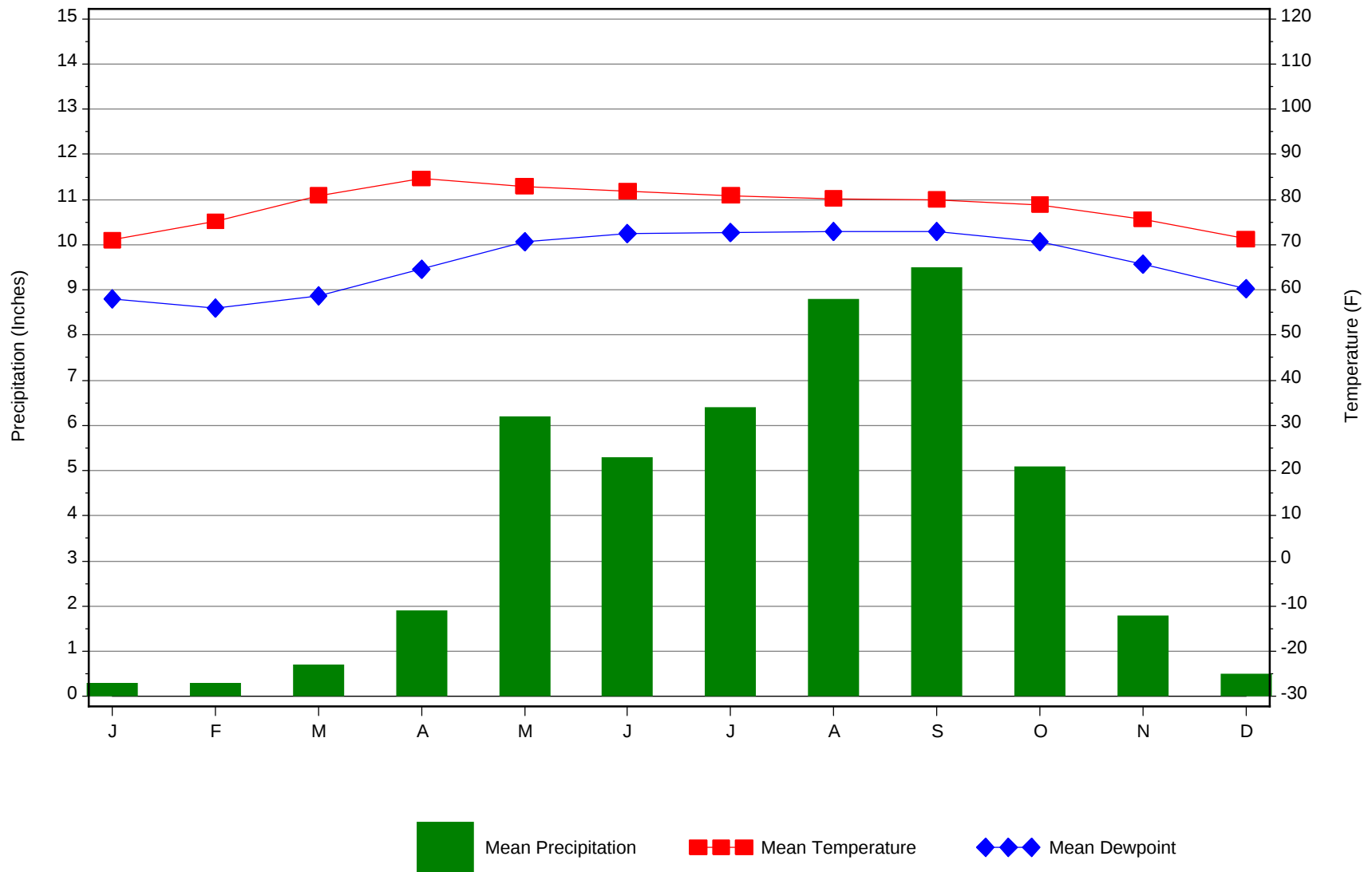
Other Site Data

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	N/A	95	12.8 + 4.3
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 (#)
81.1	0	0	0

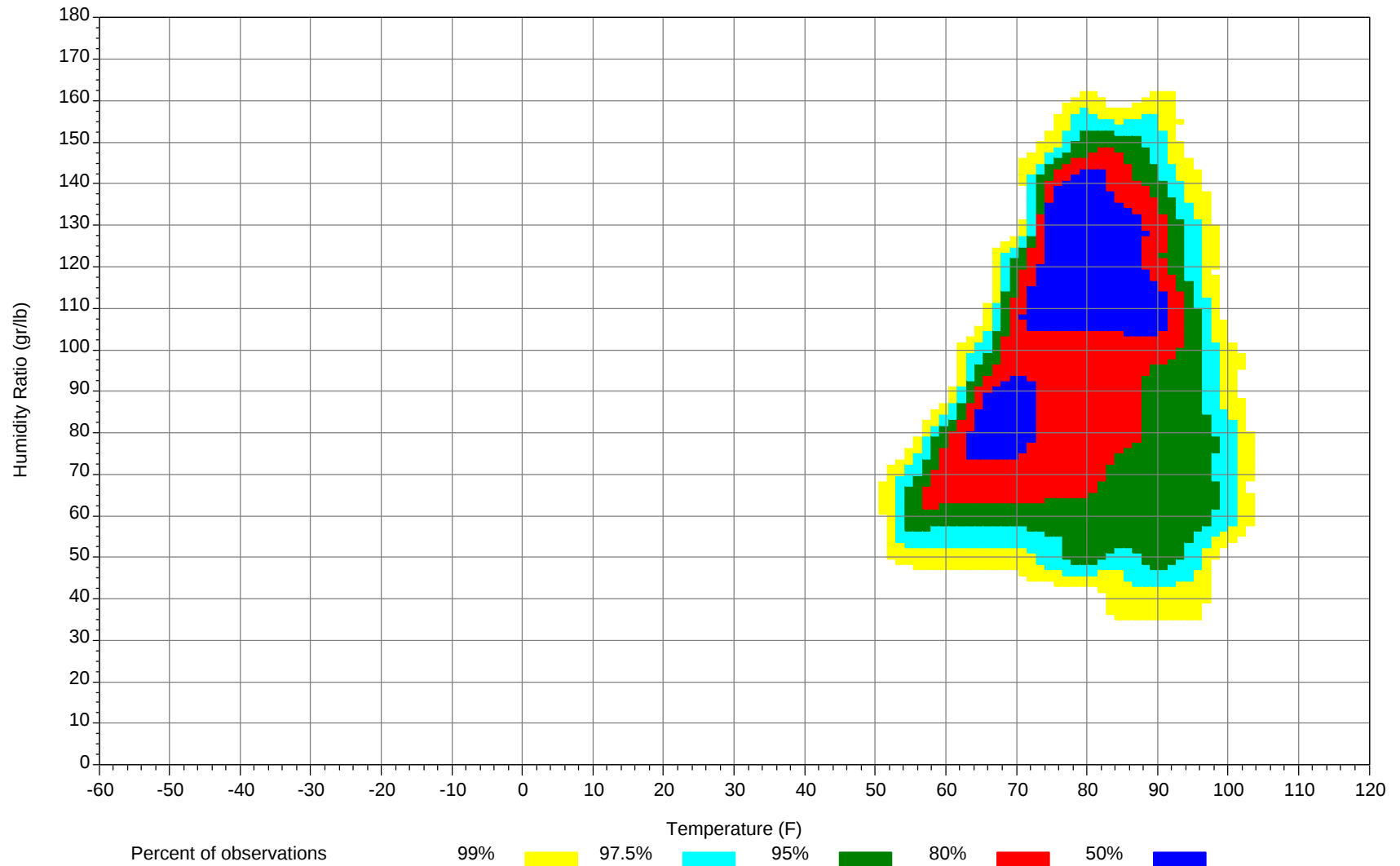
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



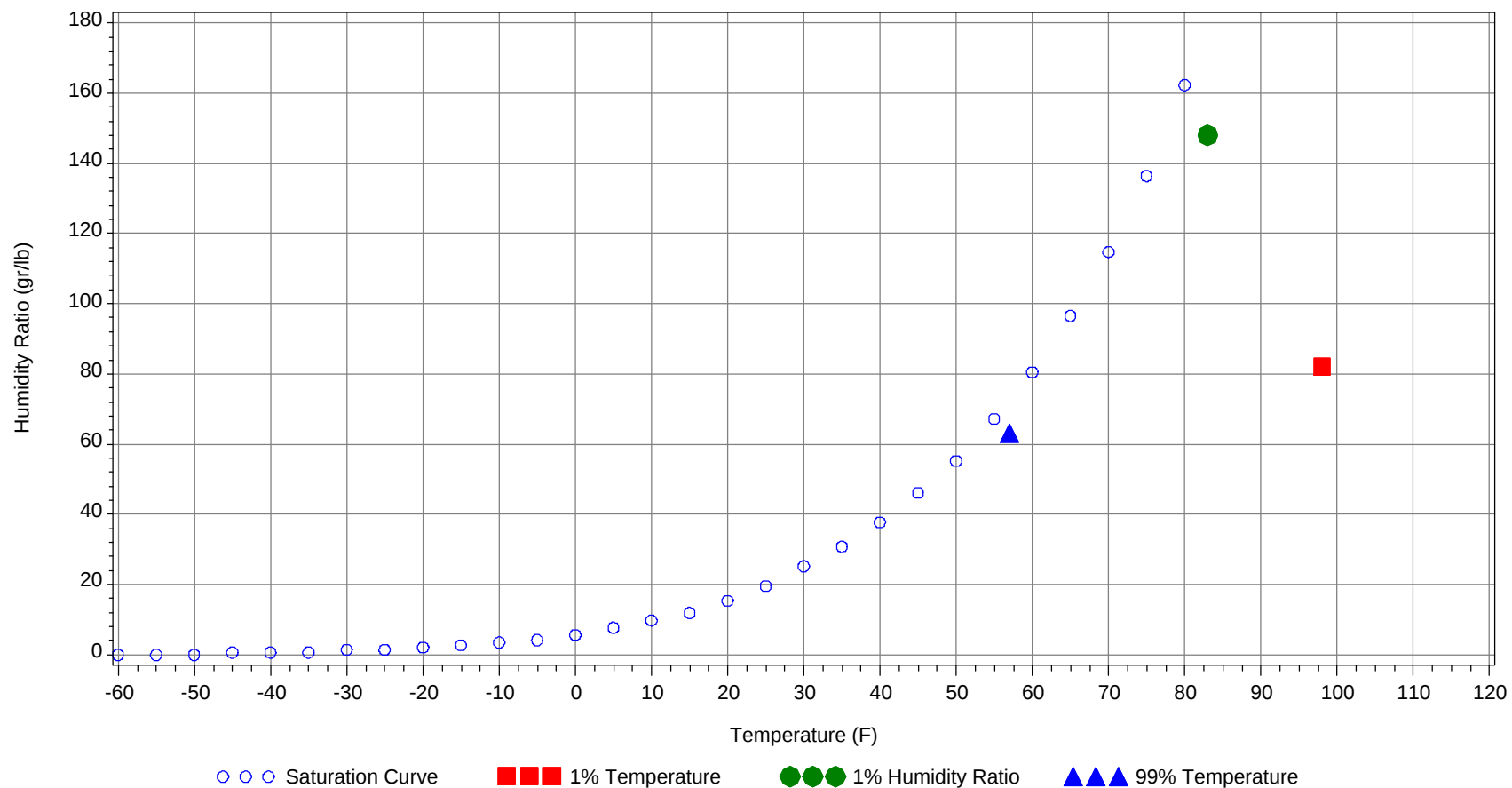
Average Annual Climate



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	98.0		72		82.0	36.6
99.0% Dry Bulb	57.0				63.0	23.3
1.0% Humidity Ratio	148.0	83.0	78.6	77.0		43.1

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							0		0	71.5		5	1	6	70.1
95/ 99		0		0	68		6	2	8	67.8		47	19	66	69
90/ 94		5	1	6	68.6		43	18	61	66.8		67	36	103	68.7
85/ 89		42	12	54	67.1	0	53	27	80	66.2	0	48	46	94	68.6
80/ 84	0	70	31	101	66.1	0	46	40	86	65.8	7	42	69	118	67.6
75/ 79	1	54	50	105	65.4	7	36	57	100	64.6	53	27	54	134	66.4
70/ 74	20	41	71	132	64.5	38	26	50	114	63.4	107	10	20	137	64.5
65/ 69	53	24	54	131	62.3	68	11	24	103	61	62	1	2	65	61.1
60/ 64	96	10	26	132	59.2	80	2	5	87	58	18	0	1	19	57.7
55/ 59	65	1	3	69	55.3	28	0	0	28	54.3	1		0	1	54.8
50/ 54	12	0	0	12	51	3			3	50					
45/ 49	0			0	47.5	0			0	47					
40/ 44															

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		1	0	1	73.9		0	0	0	72.7					
100/104	0	22	6	28	72.6		5	2	7	74.3		0	0	0	78.4
95/ 99	0	60	25	85	72.6		32	11	43	75.5		8	2	10	77.1
90/ 94	0	67	48	115	72.6	1	70	30	101	75.7		52	16	68	76.9
85/ 89	6	50	59	115	71.8	4	67	48	119	75.1	1	90	44	135	76
80/ 84	51	30	62	143	70.9	52	51	81	184	74.3	39	74	96	209	75.1
75/ 79	115	9	32	156	69.9	154	19	67	240	73.4	184	16	80	280	74.2
70/ 74	59	2	7	68	67.8	36	3	10	49	71.4	16	0	2	18	72.4
65/ 69	7	0	0	7	64.3	1	0	0	1	66.3					
60/ 64	0			0	58.2	0			0	63					
55/ 59															
50/ 54															
45/ 49															
40/ 44															

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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															
100/104		0	0	0	85										
95/ 99		2	1	3	77.9		1	0	1	77.5		1	0	1	80
90/ 94		34	11	45	76.8		28	6	34	77		30	6	36	77.1
85/ 89	0	87	37	124	76.1	0	83	28	111	76.5	0	85	25	110	76.4
80/ 84	22	93	96	211	75.3	11	97	90	198	75.5	8	87	83	178	75.7
75/ 79	202	30	101	333	74.2	203	38	116	357	74.3	178	36	118	332	74.3
70/ 74	24	1	4	29	72.6	34	2	7	43	72.5	54	1	9	64	72.3
65/ 69											0			0	65.4
60/ 64															
55/ 59															
50/ 54															
45/ 49															
40/ 44															

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

	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		0		0	79.2		0		0	75					
90/ 94		31	4	35	75.7	0	16	2	18	73.9		3	0	3	72.4
85/ 89	0	88	19	107	74.8	0	66	12	78	72.3		32	5	37	70.2
80/ 84	3	81	67	151	74.2	0	80	39	119	70.8	0	78	25	103	67.8
75/ 79	114	41	129	284	73.1	30	50	88	168	70.5	3	64	55	122	66.6
70/ 74	118	5	25	148	70.8	97	22	73	192	68.5	41	42	81	164	65.8
65/ 69	11	1	3	15	65.3	74	5	22	101	64.9	73	20	53	146	63.2
60/ 64	2		0	2	60.6	34	1	4	39	60.6	75	8	25	108	59.7
55/ 59	0			0	57.2	5	0	0	5	56	45	1	4	50	55.6
50/ 54						1			1	51.8	9	0	1	10	51
45/ 49											2		0	2	44.7
40/ 44											0			0	40.6

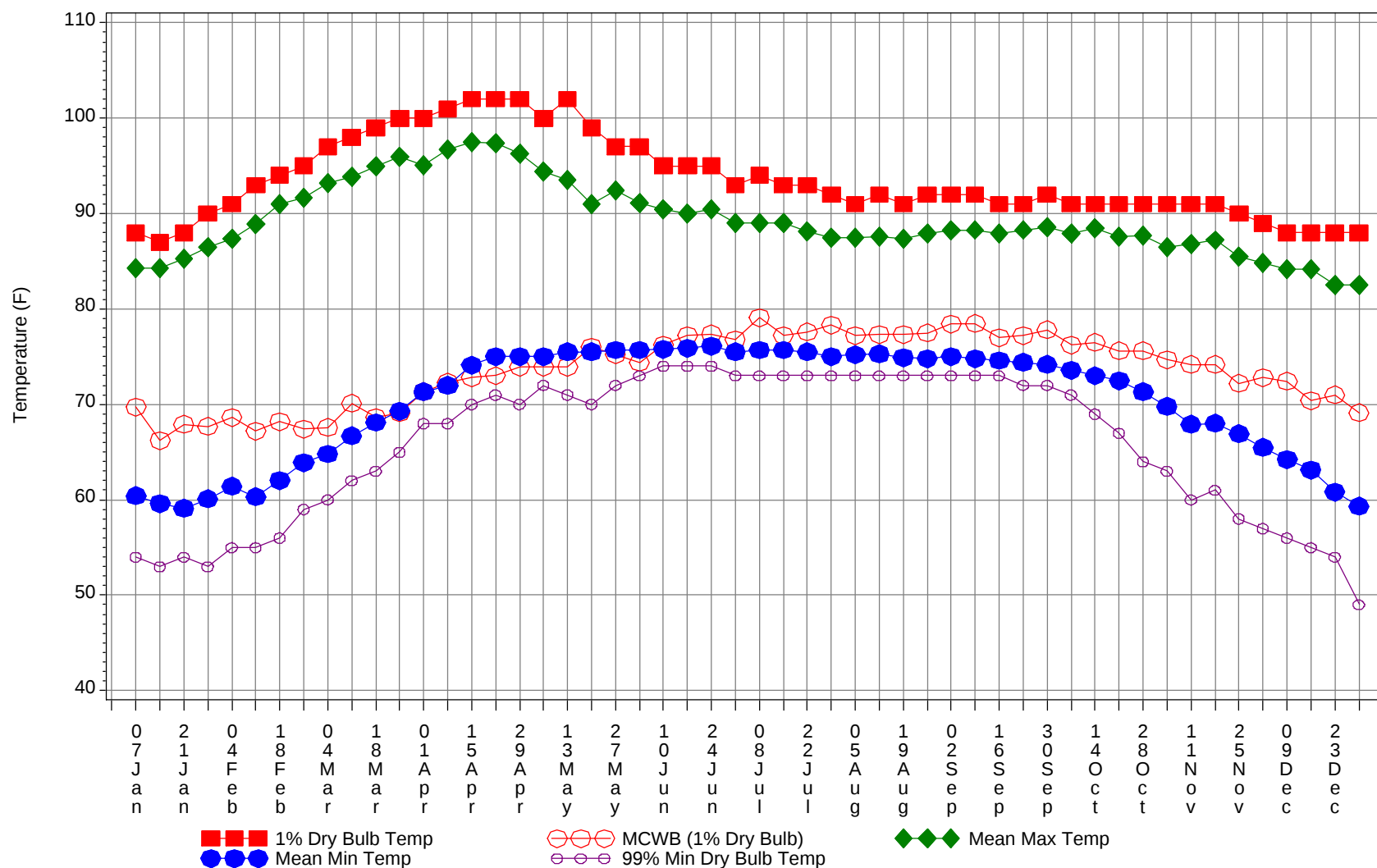
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

Dry-Bulb Temperature Hours For An Average Year

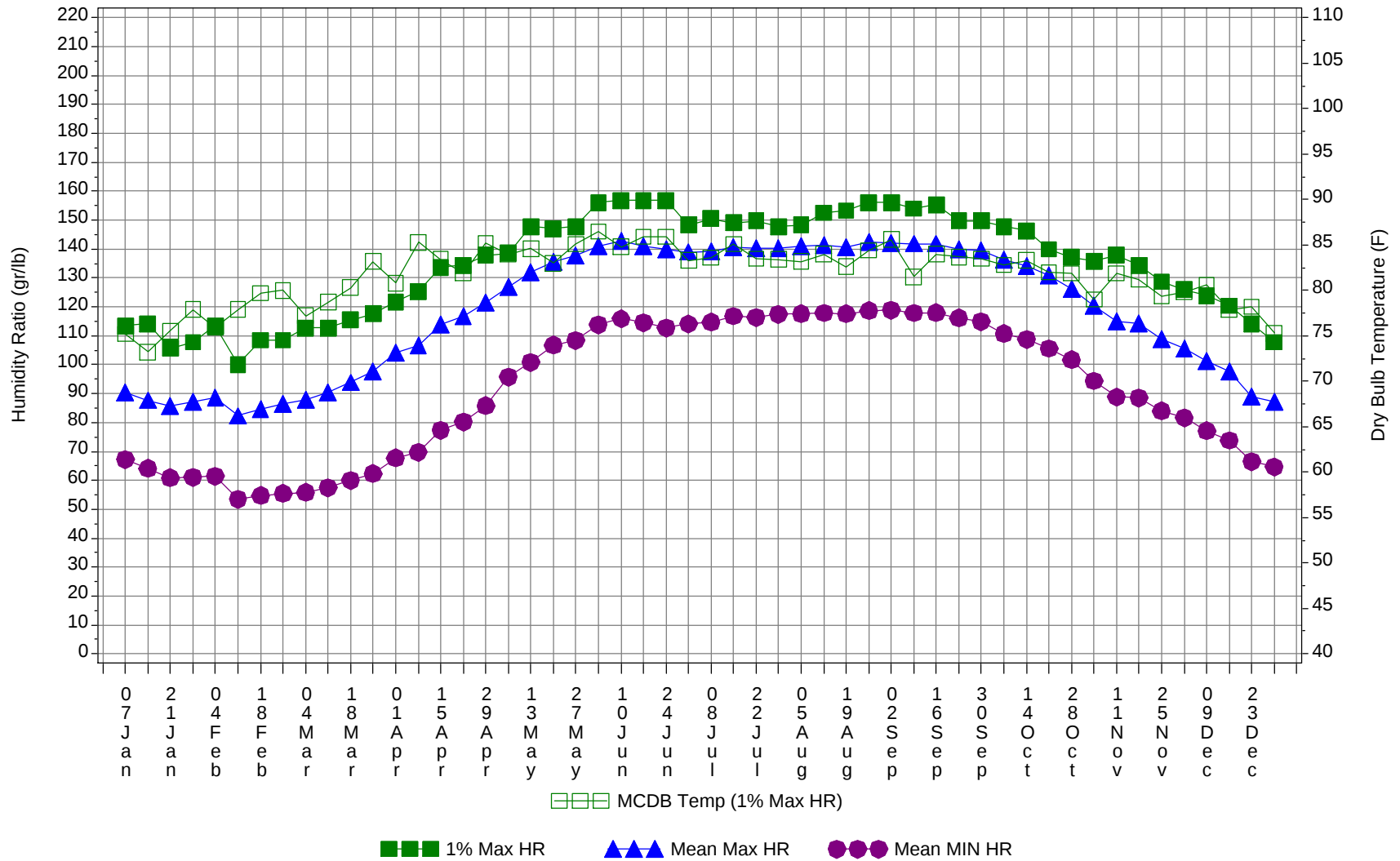
	Annual				
Temperature Range (° F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (° F)
105/109		1	0	1	73.4
100/104	0	33	9	42	72.6
95/ 99	0	156	60	216	72.2
90/ 94	1	446	177	624	73.3
85/ 89	13	791	362	1166	73.4
80/ 84	194	830	778	1802	72.6
75/ 79	1244	421	948	2613	72.1
70/ 74	643	155	358	1156	67.6
65/ 69	349	63	158	570	62.7
60/ 64	306	21	61	388	59.1
55/ 59	144	2	7	153	55.2
50/ 54	24	1	1	26	50.9
45/ 49	2		0	2	45.3
40/ 44	0			0	40.6

Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure 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



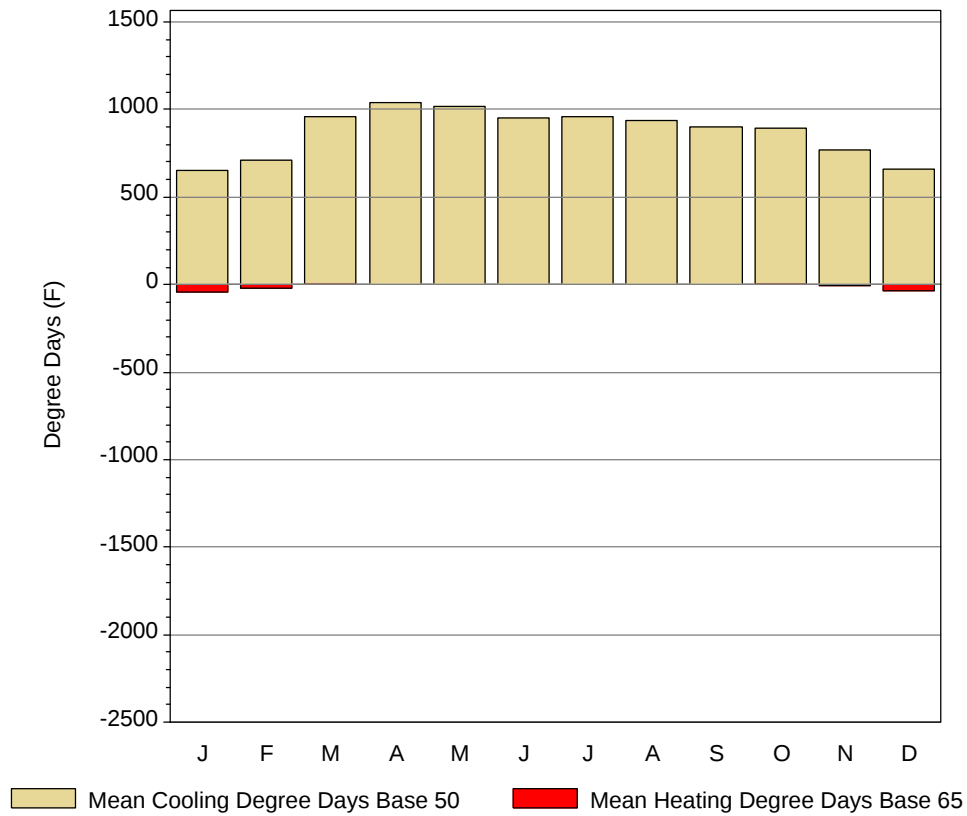
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

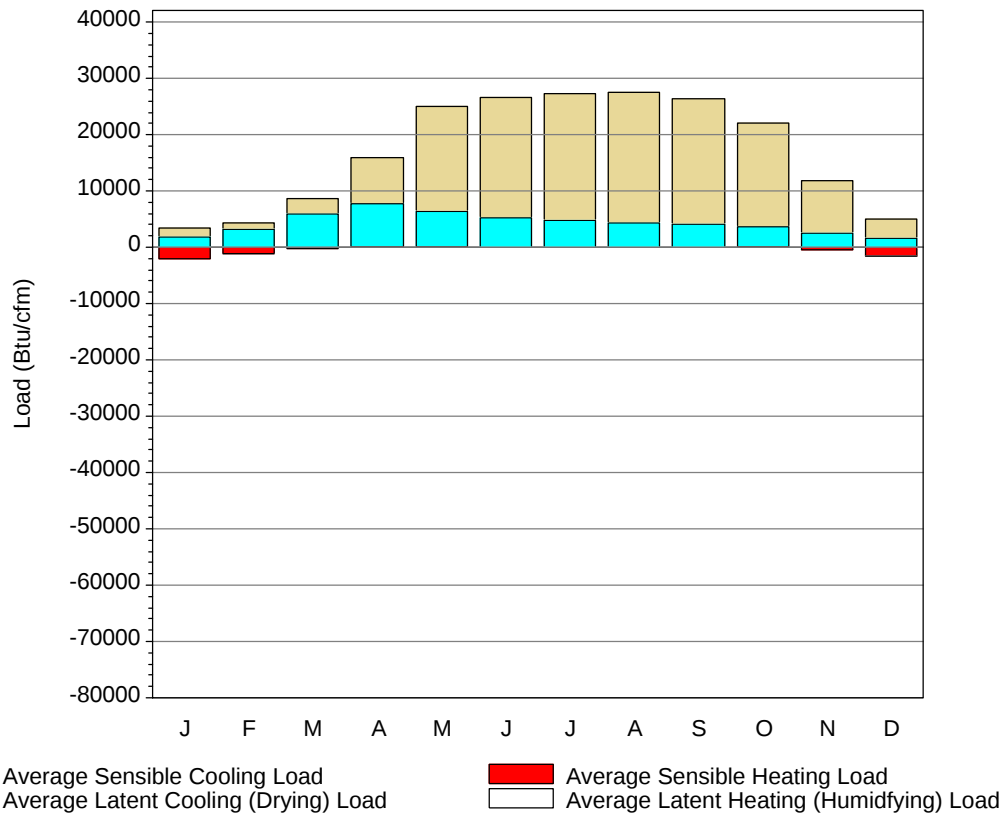
Week Ending	1.0% Temp (° F)	MCWB@ 1% Temp (° F)	Mean Max Temp (° F)	Mean Min Temp (° F)	99% Temp (° F)	1.0% HR (gr/lb)	MCDB@ 1% HR (° F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	88	69.7	84.3	60.4	54	113.4	75.2	90.4	67.2
14-Jan	87	66.2	84.3	59.6	53	114.1	73.2	87.7	64.2
21-Jan	88	67.9	85.3	59.1	54	105.7	75.5	85.7	60.9
28-Jan	90	67.7	86.5	60.1	53	107.8	77.9	87.3	61.1
4-Feb	91	68.6	87.4	61.4	55	113.4	75.9	88.6	61.5
11-Feb	93	67.2	88.9	60.3	55	100.1	77.9	82.3	53.5
18-Feb	94	68.2	91	62	56	108.5	79.7	84.6	54.7
25-Feb	95	67.4	91.7	63.9	59	108.5	80	86.6	55.5
4-Mar	97	67.6	93.2	64.8	60	112.7	77.2	88	55.8
11-Mar	98	70.1	93.9	66.7	62	112.7	78.7	90.4	57.4
18-Mar	99	68.6	95	68.1	63	115.5	80.3	93.9	60
25-Mar	100	69.1	95.9	69.3	65	117.6	83.2	97.6	62.3
1-Apr	100	71.3	95.1	71.3	68	121.8	80.8	104.2	67.8
8-Apr	101	72.3	96.7	72	68	125.3	85.3	106.6	69.7
15-Apr	102	72.8	97.5	74.1	70	133.7	83.4	113.9	77.3
22-Apr	102	73	97.4	75	71	134.4	81.9	116.7	80.3
29-Apr	102	73.9	96.3	75	70	137.9	85.2	121.4	85.8
6-May	100	73.9	94.4	75	72	138.6	84	126.9	95.7
13-May	102	73.9	93.5	75.5	71	147.7	84.6	131.9	100.8
20-May	99	76	91	75.5	70	147	83	135.6	106.8
27-May	97	75.2	92.4	75.7	72	147.7	85.1	137.8	108.4
4-Jun	97	74.4	91.1	75.7	73	156.1	86.5	141.1	113.8
10-Jun	95	76.2	90.4	75.8	74	156.8	84.8	142.7	115.9
17-Jun	95	77.2	90	75.9	74	156.8	85.9	141	114.5
24-Jun	95	77.4	90.4	76.1	74	156.8	85.9	139.9	112.7
1-Jul	93	76.8	89	75.5	73	148.4	83.3	139	114.1
8-Jul	94	79.1	89	75.7	73	150.5	83.6	139.2	114.7
15-Jul	93	77.2	89	75.7	73	149.1	85.1	140.7	116.8
22-Jul	93	77.6	88.1	75.5	73	149.8	83.5	140.3	116.4
29-Jul	92	78.3	87.5	75	73	147.7	83.4	140.3	117.5
5-Aug	91	77.2	87.5	75.2	73	148.4	83.2	141	117.7
12-Aug	92	77.3	87.6	75.3	73	152.6	84	141.4	117.9
19-Aug	91	77.3	87.4	74.9	73	153.3	82.6	140.6	117.6
26-Aug	92	77.5	87.9	74.8	73	156.1	84.4	142.4	118.7
2-Sep	92	78.4	88.2	75	73	156.1	85.6	142.1	118.9
9-Sep	92	78.5	88.3	74.8	73	154	81.5	141.9	117.9
16-Sep	91	77	87.9	74.6	73	155.4	84	141.9	118
23-Sep	91	77.2	88.3	74.4	72	149.8	83.7	140	116.2
30-Sep	92	77.8	88.6	74.2	72	149.8	83.5	139.6	114.9
7-Oct	91	76.2	87.9	73.6	71	147.7	82.8	136.2	110.8
14-Oct	91	76.5	88.5	73	69	146.3	83.3	134.1	108.8
21-Oct	91	75.6	87.6	72.5	67	140	82	131	105.6
28-Oct	91	75.6	87.7	71.3	64	137.2	81.9	126.3	101.7
4-Nov	91	74.7	86.5	69.8	63	135.8	79	120.3	94.4
11-Nov	91	74.2	86.8	67.9	60	137.9	81.9	115.1	88.8
18-Nov	91	74.2	87.2	68	61	134.4	81.2	114.4	88.5
25-Nov	90	72.2	85.5	66.9	58	128.8	79.4	109	84
2-Dec	89	72.8	84.8	65.5	57	126	79.8	105.5	81.6
9-Dec	88	72.4	84.2	64.2	56	123.9	80.6	101.2	77.1
16-Dec	88	70.4	84.2	63.1	55	120.4	77.9	97.6	73.8
23-Dec	88	71	82.5	60.8	54	114.1	78.2	89	66.5
31-Dec	88	69.1	82.5	59.3	49	107.8	75.3	87.3	64.6

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	649.8	228	43.1
FEB	710.6	306.2	19.5
MAR	956.8	493.7	1.9
APR	1041.4	591.4	0
MAY	1018.2	553.2	0
JUN	955.4	505.4	0
JUL	956.7	491.7	0
AUG	936.1	471.1	0
SEP	900.1	450.1	0
OCT	895.3	430.7	0.4
NOV	767.7	323.4	5.6
DEC	659.9	228.4	33.8
ANN	10448	5073.3	104.3

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	1776	-1968	1601	0
FEB	3190	-1017	1073	-3
MAR	5961	-170	2797	-2
APR	7796	-4	8242	0
MAY	6420	-1	18502	0
JUN	5353	0	21368	0
JUL	4755	0	22610	0
AUG	4248	0	23286	0
SEP	4006	0	22418	0
OCT	3647	-31	18352	0
NOV	2531	-385	9398	0
DEC	1537	-1591	3457	-9
ANN	51220	-5167	153104	-14

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													

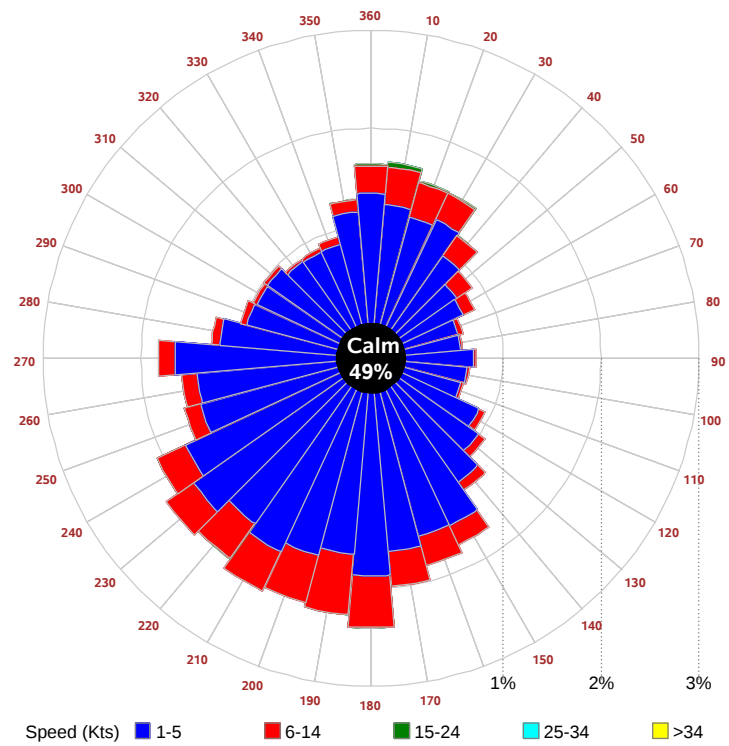
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

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													

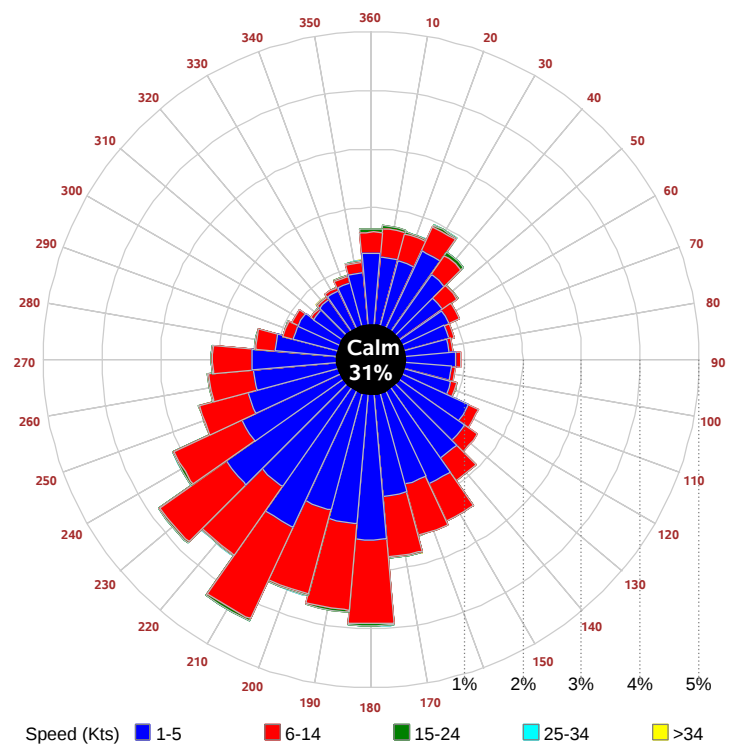
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9												
		March		June								
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear			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

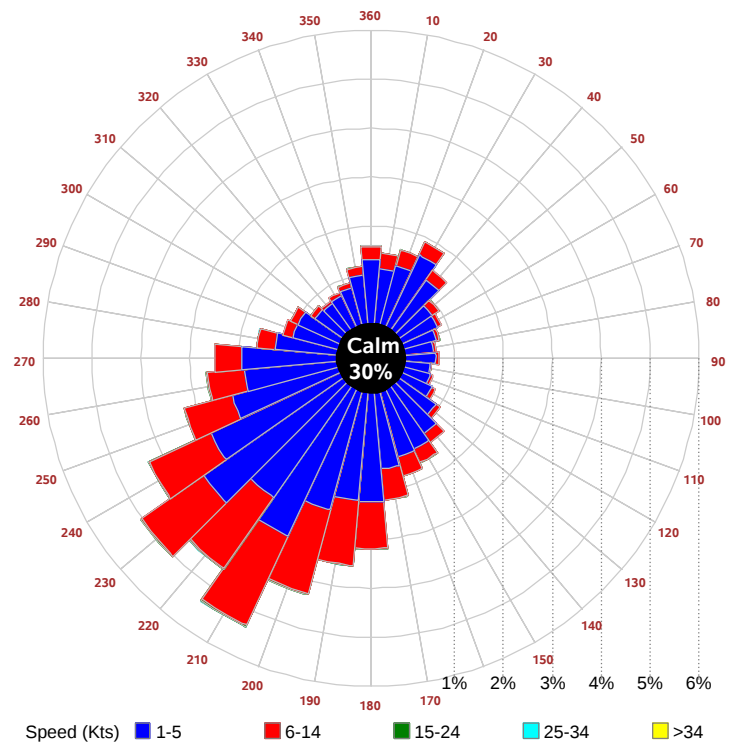
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

