

JACK MC NAMARA FLD, CA

Latitude = 41.78 N

Longitude = 124.24 W

Period of Record = 1988 To 2017

Station ID = ICAO_KCEC

Elevation = 57 Feet

Average Pressure = 29.99 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	78	59	42	6.8	S
0.4% Occurrence	68	59	60	8.8	S
1.0% Occurrence	66	59	62	9.5	S
2.0% Occurrence	64	58	61	10.1	NNW
Mean Daily Range	10	-	-	-	E
97.5% Occurrence	39	37	29	5	E
99.0% Occurrence	37	35	27	4.7	E
99.6% Occurrence	35	33	25	4.6	E
Median of Extreme Lows	30	27	15	7.1	E

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	64	68	78	8.2	S
0.4% Occurrence	61	65	71	8.3	S
1.0% Occurrence	60	64	69	8.5	S
2.0% Occurrence	59	62	67	8.6	S

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	80	64	0.54	7	S
0.4% Occurrence	74	63	0.5	7.7	S
1.0% Occurrence	71	61	0.48	7.9	S
2.0% Occurrence	69	61	0.47	7.8	S

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	0	2	0	2

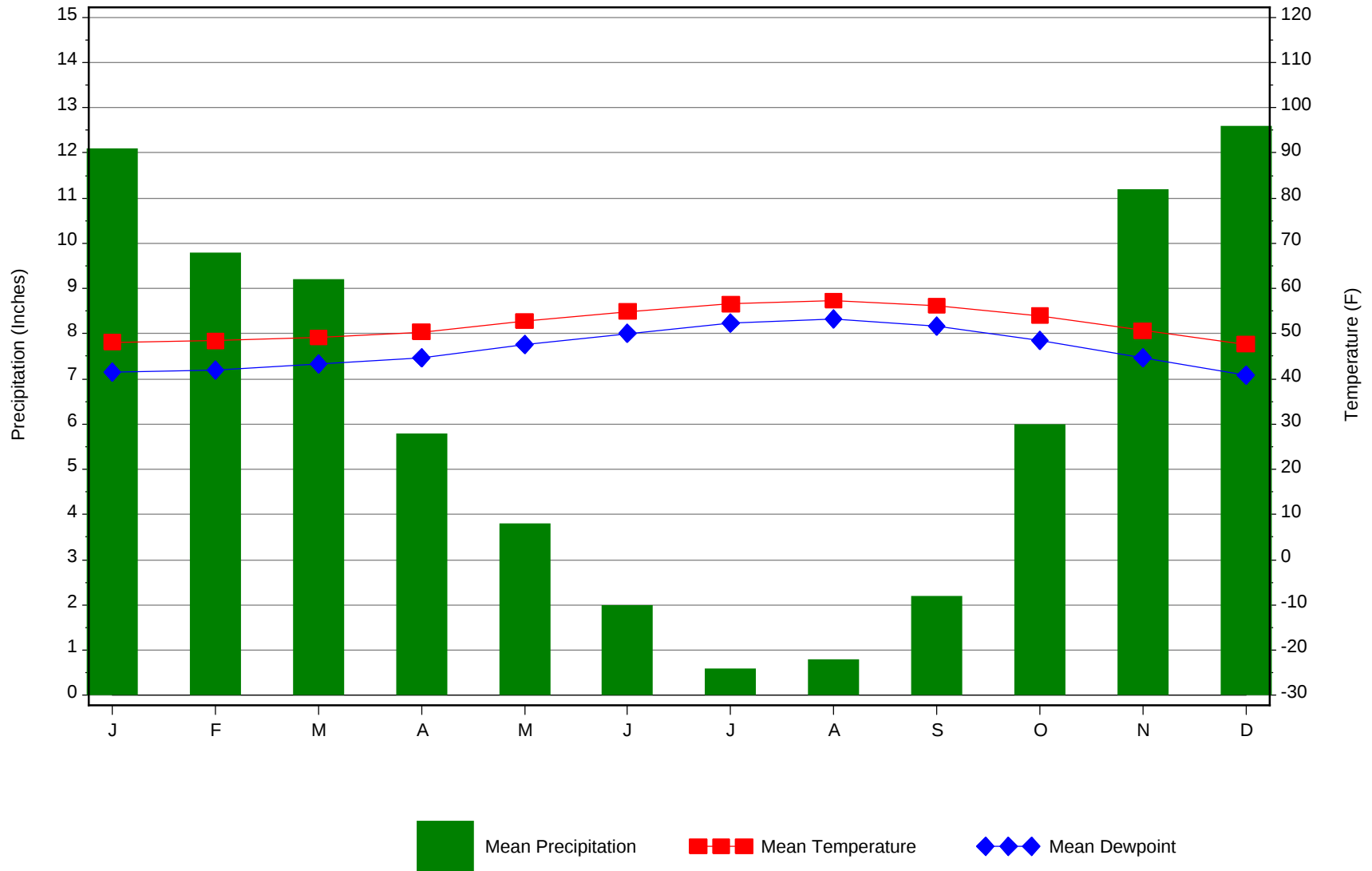
Other Site Data

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	1.5	85	0.0 + 0.0
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 (#)
54.7	N/A	N/A	1

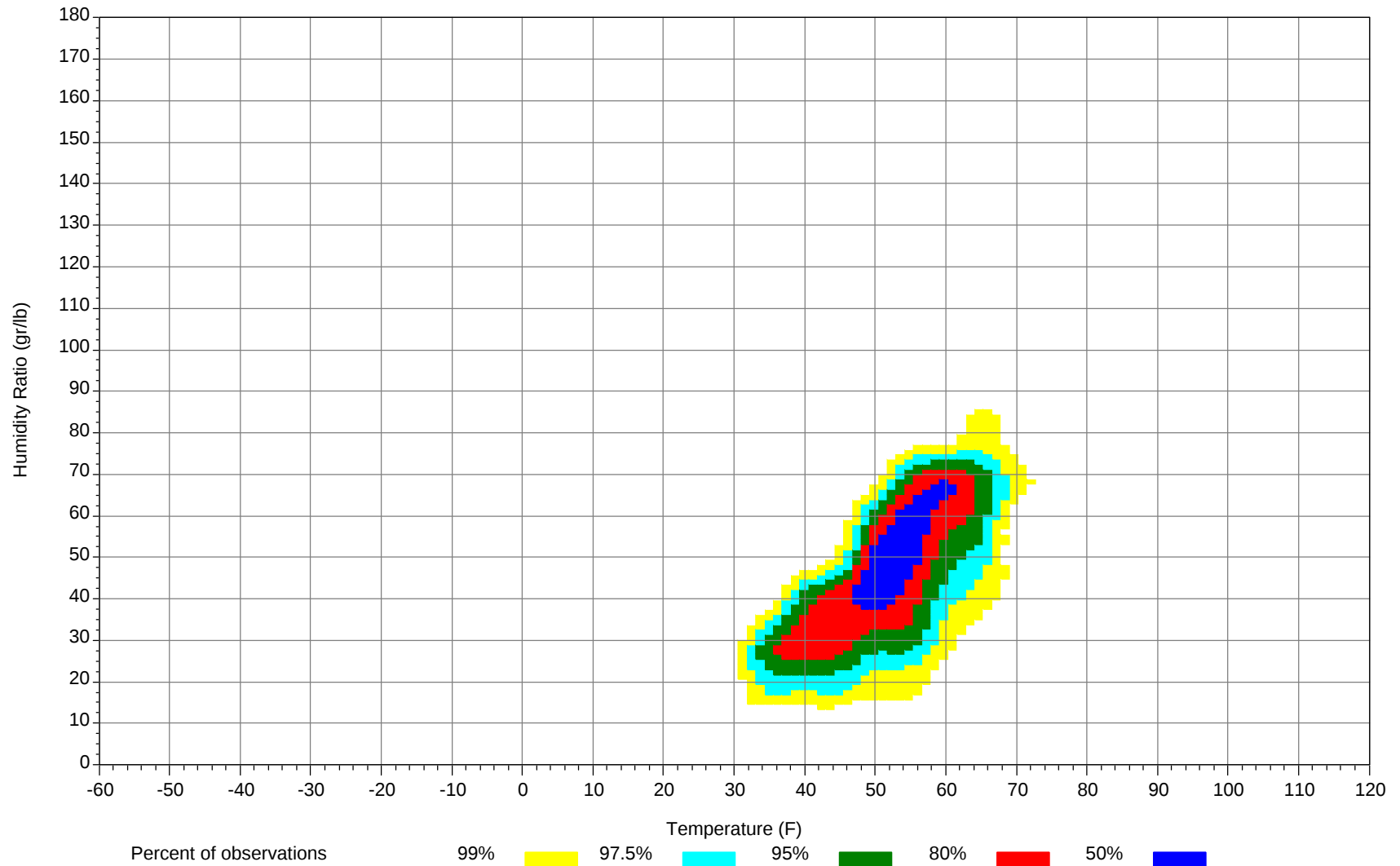
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



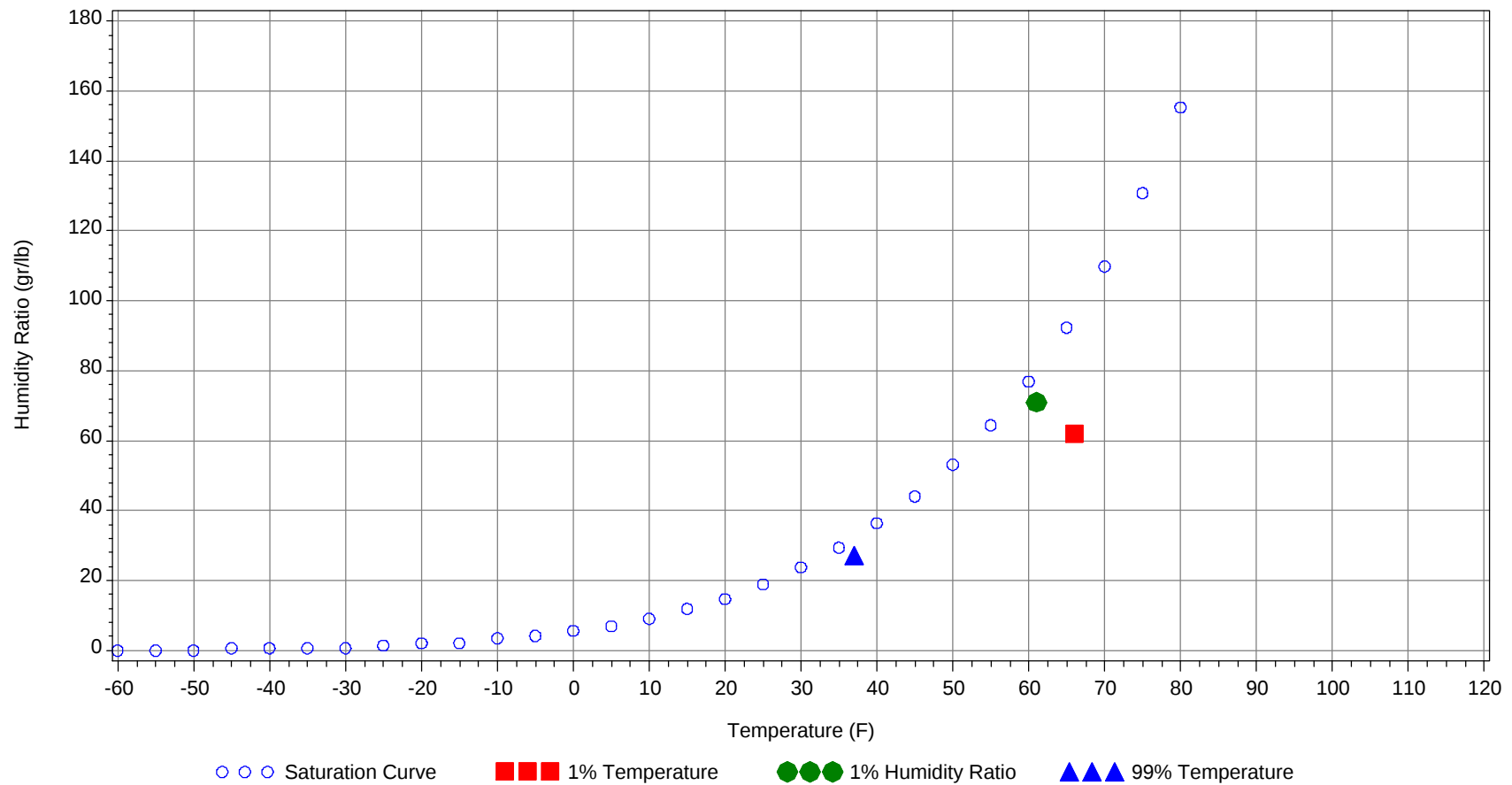
Average Annual Climate



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	66.0		59		62.0	25.5
99.0% Dry Bulb	37.0				27.0	13.1
1.0% Humidity Ratio	71.0	61.0	59.2	57.9		25.8

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)
85/ 89															
80/ 84															
75/ 79							0		0	58					
70/ 74		0	0	0	55.6	0	0	0	0	56.9					
65/ 69		1	0	1	51.8	0	1	0	1	53.8		0		0	54.6
60/ 64	1	7	1	9	50.9	1	9	1	11	52	0	7	1	8	52.5
55/ 59	12	40	15	67	51.2	9	40	12	61	51.3	6	53	13	72	51.6
50/ 54	54	108	74	236	48.7	49	104	76	229	48.6	61	129	102	292	48.9
45/ 49	83	71	99	253	44.2	85	56	94	235	44.4	107	53	106	266	44.7
40/ 44	52	15	41	108	39.9	40	11	27	78	39.9	44	5	20	69	40.3
35/ 39	40	5	17	62	36	34	3	12	49	35.9	27	1	6	34	36.6
30/ 34	6	0	1	7	31.8	5	1	1	7	30.8	3		0	3	32
25/ 29	0		0	0	26	0	0	0	0	24.6					
20/ 24			0	0	17										

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.

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)
85/ 89								0	0	57					
80/ 84		0		0	57		0	0	0	60.7	0			0	59
75/ 79		0	0	0	58.4	0	0	0	0	58.6	0			0	57
70/ 74	0	1	0	1	57.3	0	2	0	2	59.2	0	0	0	0	59.6
65/ 69	0	2	0	2	55.3	1	2	1	4	58.1	0	2	0	2	59.7
60/ 64	1	8	2	11	54.2	2	24	6	32	56.3	2	65	12	79	56.5
55/ 59	6	71	19	96	51.8	22	129	48	199	52.8	53	146	97	296	53.6
50/ 54	71	129	114	314	49	119	87	143	349	49.8	136	27	116	279	50.7
45/ 49	113	27	92	232	45.1	88	4	49	141	45.8	46	0	14	60	46.3
40/ 44	35	2	11	48	40.7	14	0	1	15	41.4	3		0	3	41.8
35/ 39	14	0	2	16	37	2		0	2	37.8	0			0	38.7
30/ 34	0			0	32	0		0	0	31.4					
25/ 29															
20/ 24															

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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)
85/ 89												0		0	60
80/ 84												0	0	0	62.7
75/ 79		0		0	62.7						0	1	0	1	58.5
70/ 74	0	1	0	1	62.2		2	0	2	61.7	0	4	0	4	60.1
65/ 69	0	10	2	12	60	1	23	3	27	60.4	1	20	2	23	59.6
60/ 64	7	107	34	148	57.3	13	113	44	170	57.7	12	100	30	142	57.1
55/ 59	90	110	131	331	54.5	110	97	141	348	54.8	68	86	105	259	54.3
50/ 54	136	19	79	234	51.9	113	13	60	186	52.2	118	29	92	239	51.2
45/ 49	14	0	2	16	47	11		0	11	46.8	38	1	9	48	46.9
40/ 44	1			1	42.3	0			0	41	2		0	2	42.3
35/ 39											0			0	39
30/ 34															
25/ 29															
20/ 24															

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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)
85/ 89		0		0	63										
80/ 84		0		0	60.7										
75/ 79	0	2	0	2	58.1										
70/ 74	1	4	1	6	56.5		1		1	54.3					
65/ 69	1	9	1	11	56.5	0	2	0	2	54.7		1		1	50.7
60/ 64	8	56	11	75	55.8	2	18	3	23	54.2	2	7	1	10	52.7
55/ 59	46	117	68	231	53.5	25	85	34	144	52.7	14	42	17	73	51.9
50/ 54	101	52	119	272	50.4	71	99	95	265	49.4	51	103	64	218	48.5
45/ 49	72	7	45	124	45.9	84	31	80	195	44.8	72	73	97	242	44
40/ 44	17	0	3	20	41.4	37	4	22	63	40.2	56	15	44	115	39.8
35/ 39	2		0	2	37.8	20	0	6	26	36.3	45	6	22	73	35.8
30/ 34						1		0	1	31.8	7	1	3	11	29.3
25/ 29											1	0	1	2	23.4
20/ 24											0	0	0	0	19.2

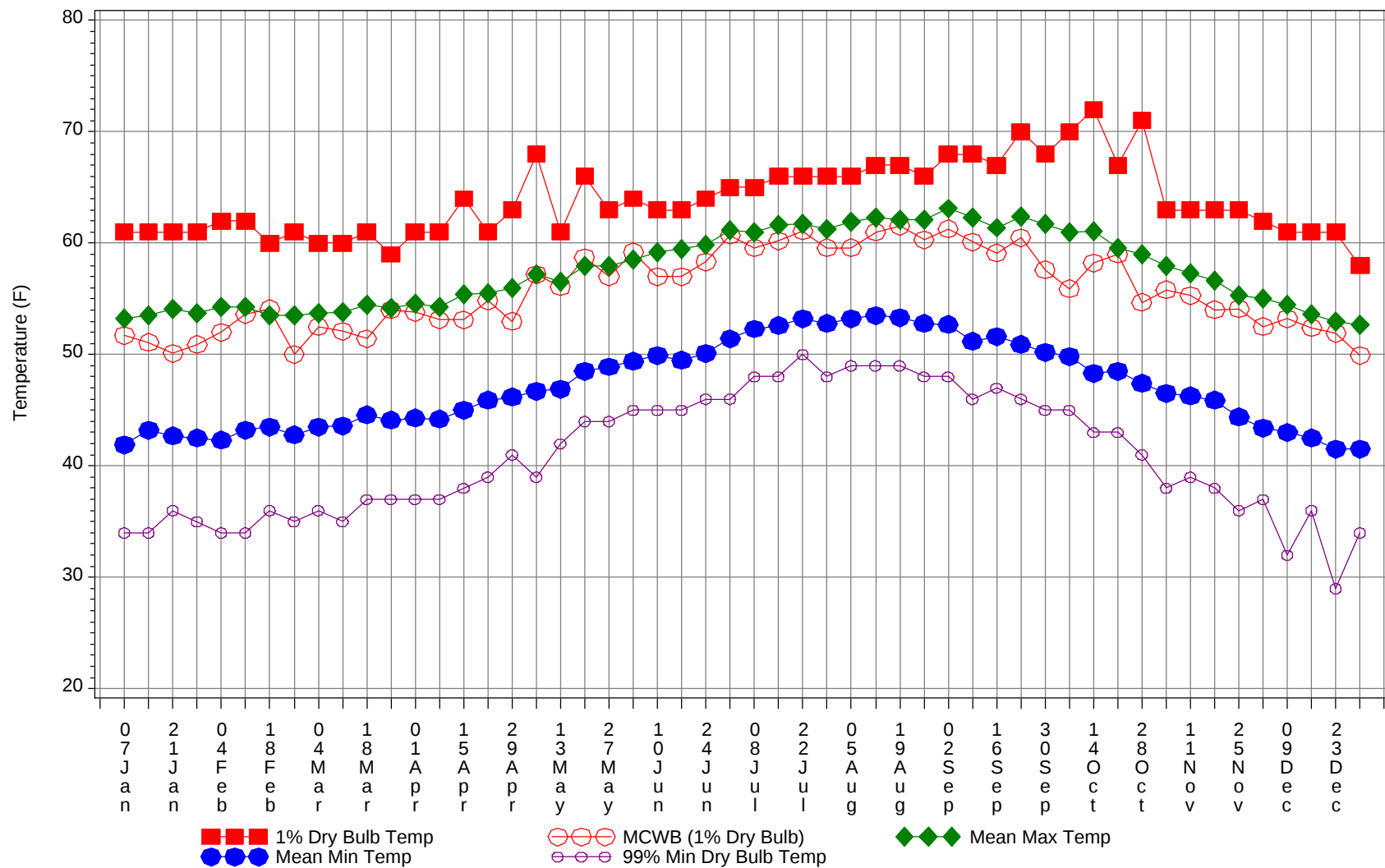
Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

Dry-Bulb Temperature Hours For An Average Year

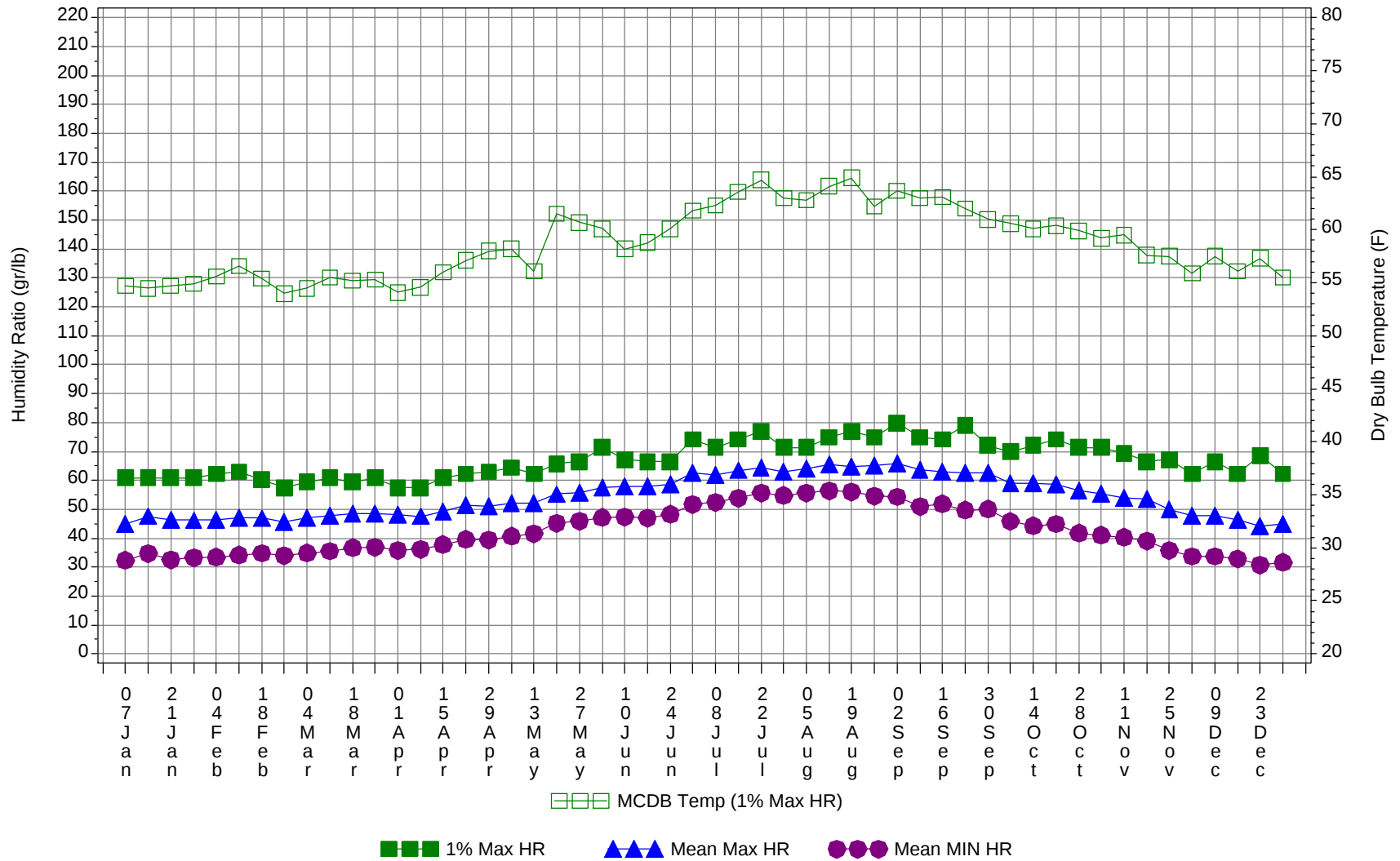
	Annual				
Temperature Range (° F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (° F)
85/ 89		0	0	0	60
80/ 84	0	0	0	0	61.1
75/ 79	0	3	0	3	58.4
70/ 74	2	15	2	19	58.6
65/ 69	4	74	11	89	58.9
60/ 64	51	520	145	716	56.6
55/ 59	455	1015	700	2170	53.5
50/ 54	1077	901	1133	3111	49.8
45/ 49	815	323	688	1826	44.8
40/ 44	303	52	169	524	40.1
35/ 39	187	15	64	266	36.1
30/ 34	23	2	6	31	30.7
25/ 29	1	0	1	2	23.8
20/ 24	0	0	0	0	19.1

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



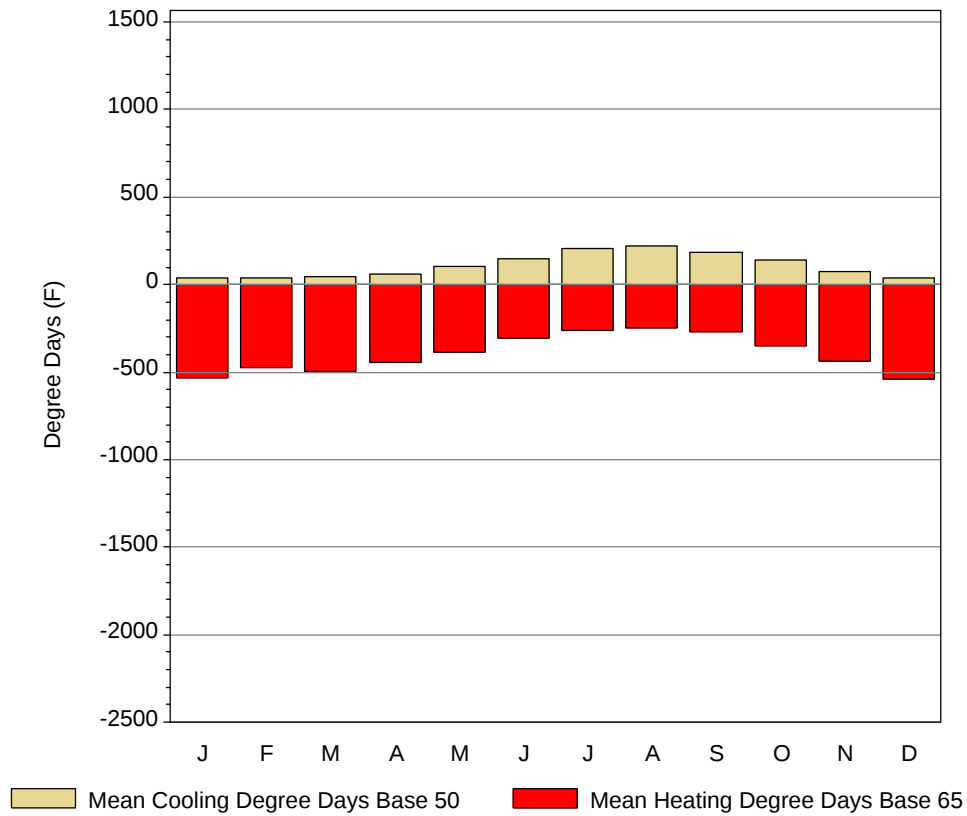
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

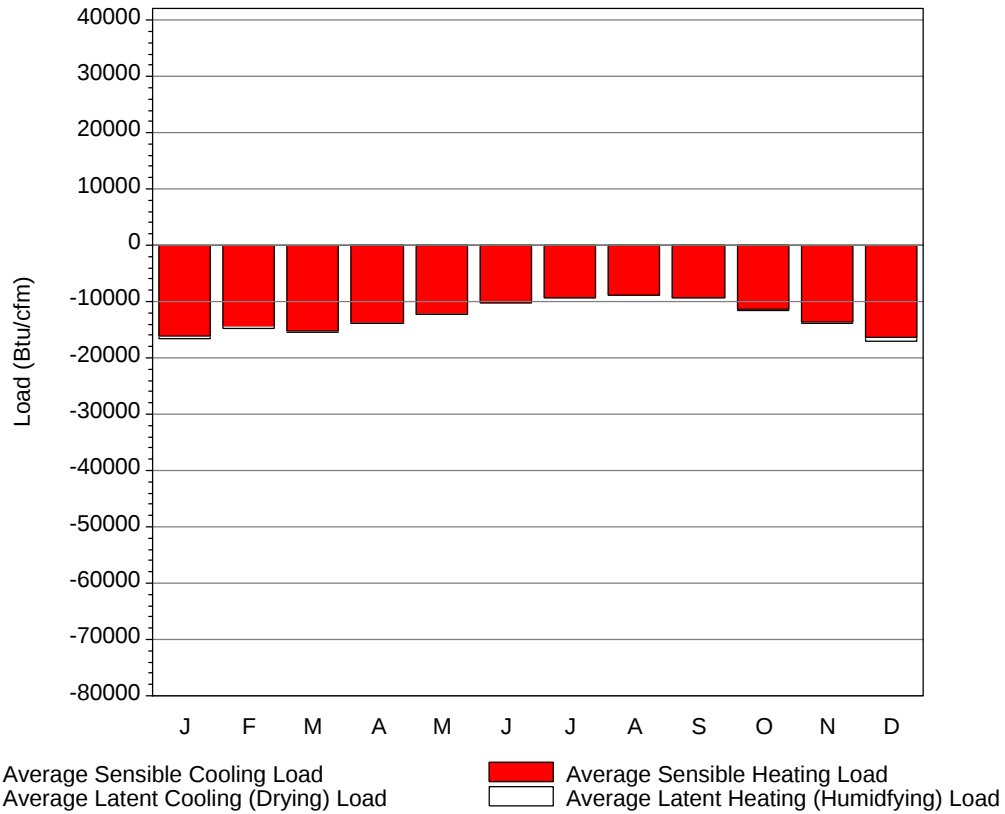
Week Ending	1.0% Temp (° F)	MCWB@ 1% Temp (° F)	Mean Max Temp (° F)	Mean Min Temp (° F)	99% Temp (° F)	1.0% HR (gr/lb)	MCDB@ 1% HR (° F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	61	51.7	53.2	41.9	34	60.9	54.7	45	32.4
14-Jan	61	51.1	53.5	43.2	34	60.9	54.5	47.6	34.7
21-Jan	61	50.1	54.1	42.7	36	60.9	54.7	46.3	32.6
28-Jan	61	50.9	53.7	42.5	35	60.9	54.9	46.2	33.2
4-Feb	62	52	54.3	42.3	34	62.3	55.6	46.3	33.4
11-Feb	62	53.6	54.3	43.2	34	63	56.6	47.1	34.1
18-Feb	60	54.1	53.5	43.5	36	60.2	55.4	46.9	34.8
25-Feb	61	50	53.5	42.8	35	57.4	54	45.7	33.9
4-Mar	60	52.5	53.7	43.5	36	59.5	54.5	47.1	34.9
11-Mar	60	52.1	53.8	43.6	35	60.9	55.5	47.7	35.5
18-Mar	61	51.4	54.5	44.6	37	59.5	55.2	48.6	36.7
25-Mar	59	54	54.2	44.1	37	60.9	55.3	48.5	36.8
1-Apr	61	53.8	54.6	44.3	37	57.4	54.1	48.1	35.7
8-Apr	61	53.1	54.3	44.2	37	57.4	54.6	47.6	36.2
15-Apr	64	53.1	55.4	45	38	60.9	56	49.2	37.7
22-Apr	61	54.8	55.5	45.9	39	62.3	57.1	51.3	39.6
29-Apr	63	53	56	46.2	41	63	58	51	39.4
6-May	68	57.2	57.2	46.7	39	64.4	58.2	52.2	40.7
13-May	61	56.1	56.5	46.9	42	62.3	56.1	52	41.5
20-May	66	58.7	58	48.5	44	65.8	61.5	55.2	45.1
27-May	63	57	58	48.9	44	66.5	60.7	55.8	45.9
4-Jun	64	59.2	58.5	49.4	45	71.4	60.1	57.6	47.2
10-Jun	63	57	59.2	49.9	45	67.2	58.2	57.9	47.3
17-Jun	63	57	59.5	49.5	45	66.5	58.8	57.8	46.9
24-Jun	64	58.3	59.8	50.1	46	66.5	60.1	58.6	48.3
1-Jul	65	60.7	61.2	51.4	46	74.2	61.8	62.7	51.7
8-Jul	65	59.6	61	52.3	48	71.4	62.3	62	52.4
15-Jul	66	60.2	61.6	52.6	48	74.2	63.6	63.5	53.8
22-Jul	66	61.1	61.7	53.2	50	77	64.7	64.5	55.6
29-Jul	66	59.6	61.3	52.8	48	71.4	63	63.1	54.8
5-Aug	66	59.6	61.9	53.2	49	71.4	62.8	64	55.7
12-Aug	67	61	62.3	53.5	49	74.9	64.1	65.6	56.3
19-Aug	67	61.5	62.1	53.3	49	77	64.9	64.9	56
26-Aug	66	60.3	62.1	52.8	48	74.9	62.2	65	54.5
2-Sep	68	61.3	63.1	52.7	48	79.8	63.7	65.9	54.3
9-Sep	68	60.1	62.3	51.2	46	74.9	63	63.7	51
16-Sep	67	59.1	61.4	51.6	47	74.2	63.1	62.9	51.8
23-Sep	70	60.5	62.4	50.9	46	79.1	62	62.6	49.7
30-Sep	68	57.6	61.7	50.2	45	72.1	61	62.5	50
7-Oct	70	55.9	61	49.8	45	70	60.6	59	45.8
14-Oct	72	58.2	61.1	48.3	43	72.1	60.1	58.9	44.2
21-Oct	67	59	59.6	48.5	43	74.2	60.4	58.6	44.9
28-Oct	71	54.7	59	47.4	41	71.4	59.9	56.4	41.7
4-Nov	63	55.8	58	46.5	38	71.4	59.2	55.3	41
11-Nov	63	55.3	57.3	46.3	39	69.3	59.5	54	40.3
18-Nov	63	54	56.6	45.9	38	66.5	57.6	53.5	39.1
25-Nov	63	54.1	55.3	44.4	36	67.2	57.5	50.1	35.8
2-Dec	62	52.5	55	43.4	37	62.3	55.9	47.9	33.7
9-Dec	61	53.2	54.5	43	32	66.5	57.5	47.8	33.7
16-Dec	61	52.4	53.6	42.5	36	62.3	56.1	46.4	32.8
23-Dec	61	51.9	53	41.5	29	68.6	57.3	44.2	30.7
31-Dec	58	49.9	52.7	41.5	34	62.3	55.5	45	31.6

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	40.8	0.2	531.9
FEB	39.2	0.2	472.9
MAR	45	0	493.5
APR	58.6	0.6	441.9
MAY	104	1	382.9
JUN	149.5	0.3	307.5
JUL	204	0.9	263.3
AUG	222.3	1.7	245.3
SEP	187.2	2.8	271.2
OCT	140.2	3.5	350.3
NOV	73.5	0.2	435.5
DEC	41	0	541.5
ANN	1305.3	11.4	4737.7

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	-16194	0	-448
FEB	0	-14451	0	-339
MAR	0	-15201	0	-143
APR	1	-13779	0	-44
MAY	1	-12321	0	-17
JUN	0	-10298	1	0
JUL	0	-9216	3	-1
AUG	0	-8730	7	0
SEP	3	-9316	8	-1
OCT	5	-11445	2	-45
NOV	0	-13615	0	-244
DEC	0	-16446	0	-630
ANN	10	-151012	21	-1912

Station Information		Shading Geometry in Dimensionless Units	
City, State, WBAN	ARCATA, CA 24283	Window:	1.000
Lat, Lon, Elev	40.98N 124.10W 226ft	Overhang:	0.562
Press, Stn_Type	14.6psia Secondary	Vert Gap:	0.325

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	570	790	1150	1570	1830	1910	1870	1600	1390	970	640	510	1230
	Std.Dev.	58	99	120	131	142	168	126	114	111	84	68	62	33
	Minimum	470	570	900	1300	1510	1590	1610	1410	1160	790	520	360	1150
	Maximum	680	1070	1410	1820	2090	2210	2170	1890	1680	1170	770	630	1290
	Diffuse	310	440	580	710	810	870	840	780	590	470	340	270	580
Clear Day	Global	860	1210	1710	2230	2570	2700	2620	2330	1870	1350	930	760	1760
NORTH	Global	190	260	350	440	550	620	580	480	380	290	210	170	370
	Diffuse	190	260	350	430	500	540	520	460	380	290	210	170	360
Clear Day	Global	170	230	310	420	590	700	650	470	340	250	180	150	370
EAST	Global	400	510	690	870	960	920	850	730	770	590	430	360	670
	Diffuse	230	310	420	520	590	610	590	530	450	350	250	200	420
Clear Day	Global	680	880	1140	1380	1500	1540	1510	1400	1210	950	730	620	1130
SOUTH	Global	910	960	1010	1000	870	790	820	890	1090	1060	930	880	940
	Diffuse	330	410	490	550	570	580	570	550	500	430	350	300	470
Clear Day	Global	1920	1970	1830	1460	1120	970	1020	1290	1670	1910	1920	1850	1570
WEST	Global	390	500	690	930	1060	1140	1150	1030	890	640	430	350	770
	Diffuse	230	310	420	540	600	640	620	560	470	350	250	200	430
Clear Day	Global	680	880	1140	1380	1500	1540	1510	1400	1210	950	730	620	1130

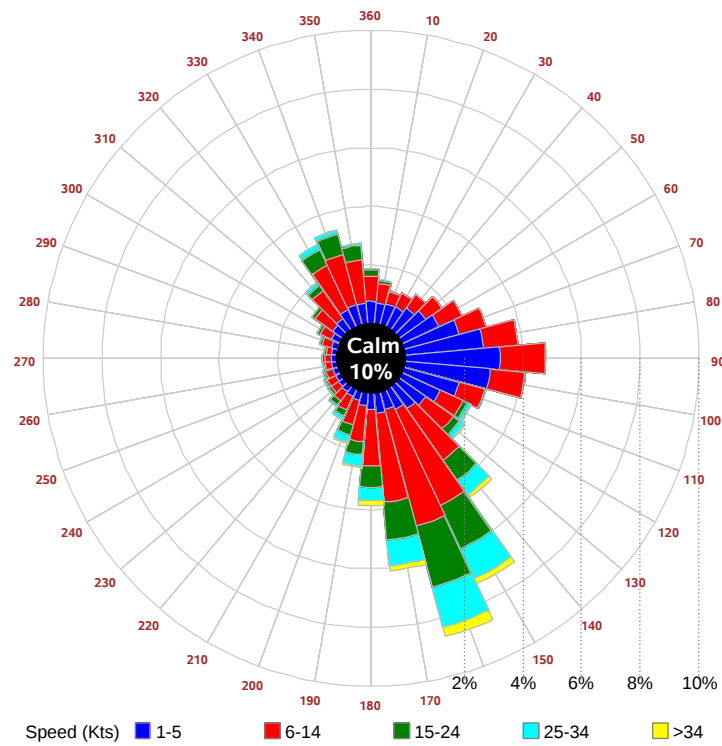
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

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	370	540	810	1130	1330	1390	1360	1150	990	670	420	320	870
NORTH	Unshaded	130	180	240	300	360	410	380	320	260	200	140	110	250
	Shaded	110	150	210	270	320	350	330	280	230	170	120	99	220
EAST	Unshaded	270	360	490	620	680	650	590	510	540	410	300	240	470
	Shaded	240	310	420	520	560	540	490	430	460	360	260	220	400
SOUTH	Unshaded	690	700	710	660	550	490	510	580	750	760	690	670	650
	Shaded	670	640	550	420	350	350	340	360	530	660	670	650	510
WEST	Unshaded	270	350	490	660	750	820	820	740	630	450	300	240	540
	Shaded	240	310	420	560	630	680	690	620	540	390	260	210	460

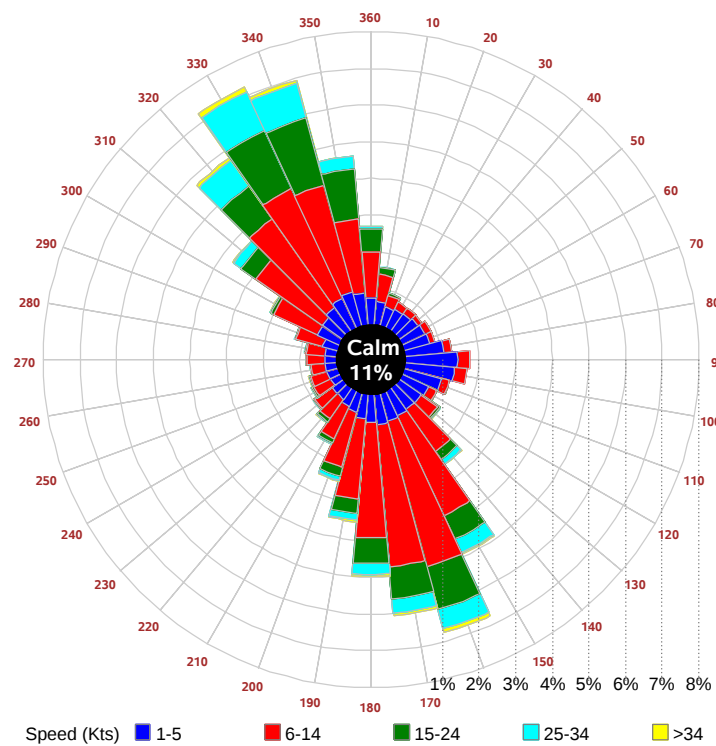
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS Percentage Uncertainty = 9												
		March					June					
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear	34	68	80	66	31	44	81	100	98	74	
	M.Cloudy	20	42	48	41	18	24	47	65	66	47	
NORTH	M.Clear	9	13	15	13	9	19	15	16	16	15	
	M.Cloudy	8	15	16	15	8	12	18	20	20	16	
EAST	M.Clear	72	60	15	13	9	78	75	36	16	15	
	M.Cloudy	24	31	16	15	8	24	34	29	20	16	
SOUTH	M.Clear	35	71	83	68	31	11	30	48	46	25	
	M.Cloudy	15	35	41	34	14	10	22	33	33	20	
WEST	M.Clear	9	13	17	63	69	11	15	16	47	80	
	M.Cloudy	8	15	17	32	23	10	18	20	34	41	
M.Clear	(% hrs)	23	24	26	24	23	19	25	33	38	45	

		Sept					Dec					
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear	24	63	83	80	53	10	36	45	29	3	
	M.Cloudy	13	34	51	50	31	6	21	25	18	3	
NORTH	M.Clear	7	13	15	15	12	4	9	10	8	2	
	M.Cloudy	6	14	18	17	12	3	9	10	8	1	
EAST	M.Clear	63	73	34	15	12	34	42	10	8	2	
	M.Cloudy	14	27	24	17	12	9	17	10	8	1	
SOUTH	M.Clear	18	56	76	73	45	29	78	90	67	10	
	M.Cloudy	8	23	39	39	22	8	26	29	22	3	
WEST	M.Clear	7	13	15	49	78	4	9	16	46	13	
	M.Cloudy	6	14	18	30	31	3	9	11	17	4	
M.Clear	(% hrs)	31	35	42	47	48	29	28	29	27	27	

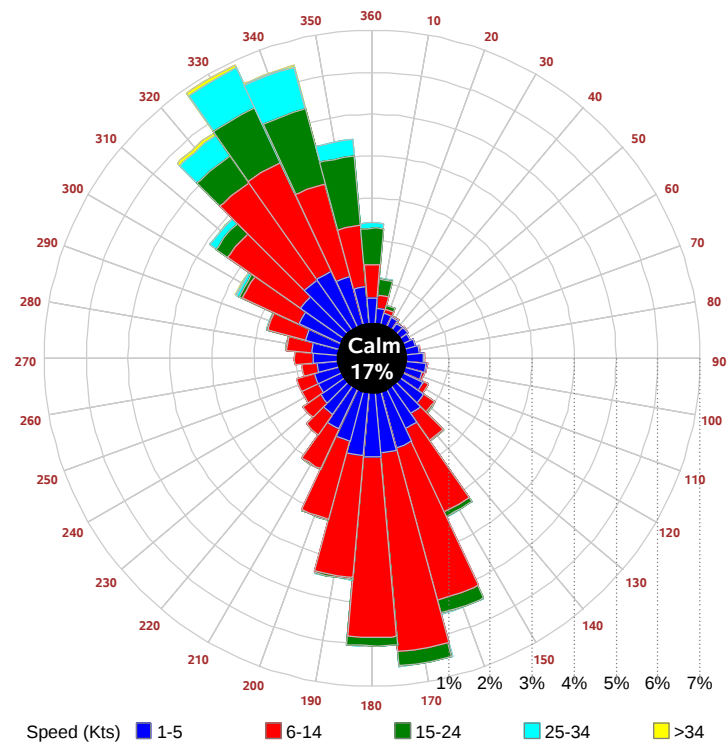
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

