

TORREJON, SP

Latitude = 40.50 N

Longitude = 3.45 W

Period of Record = 1988 To 2017

Station ID = ICAO_LETO

Elevation = 2026 Feet

Average Pressure = 27.95 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	102	67	50	8.5	VRB
0.4% Occurrence	99	67	56	7.6	VRB
1.0% Occurrence	95	66	56	7.6	VRB
2.0% Occurrence	93	65	53	7.6	VRB
Mean Daily Range	23	-	-	-	NNE
97.5% Occurrence	30	28	21	3.5	NNE
99.0% Occurrence	27	26	19	3.4	NNE
99.6% Occurrence	25	23	17	3.1	NNE
Median of Extreme Lows	21	20	14	3.5	NNE

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	70	91	81	6.1	SSW
0.4% Occurrence	71	93	84	6.3	SW
1.0% Occurrence	69	90	78	6.1	SSW
2.0% Occurrence	67	87	72	6.2	SSW

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	99	76	0.62	-	-
0.4% Occurrence	92	81	0.58	5.5	S
1.0% Occurrence	86	78	0.54	5.3	NE
2.0% Occurrence	80	76	0.5	5.7	S

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	193	953	39	206

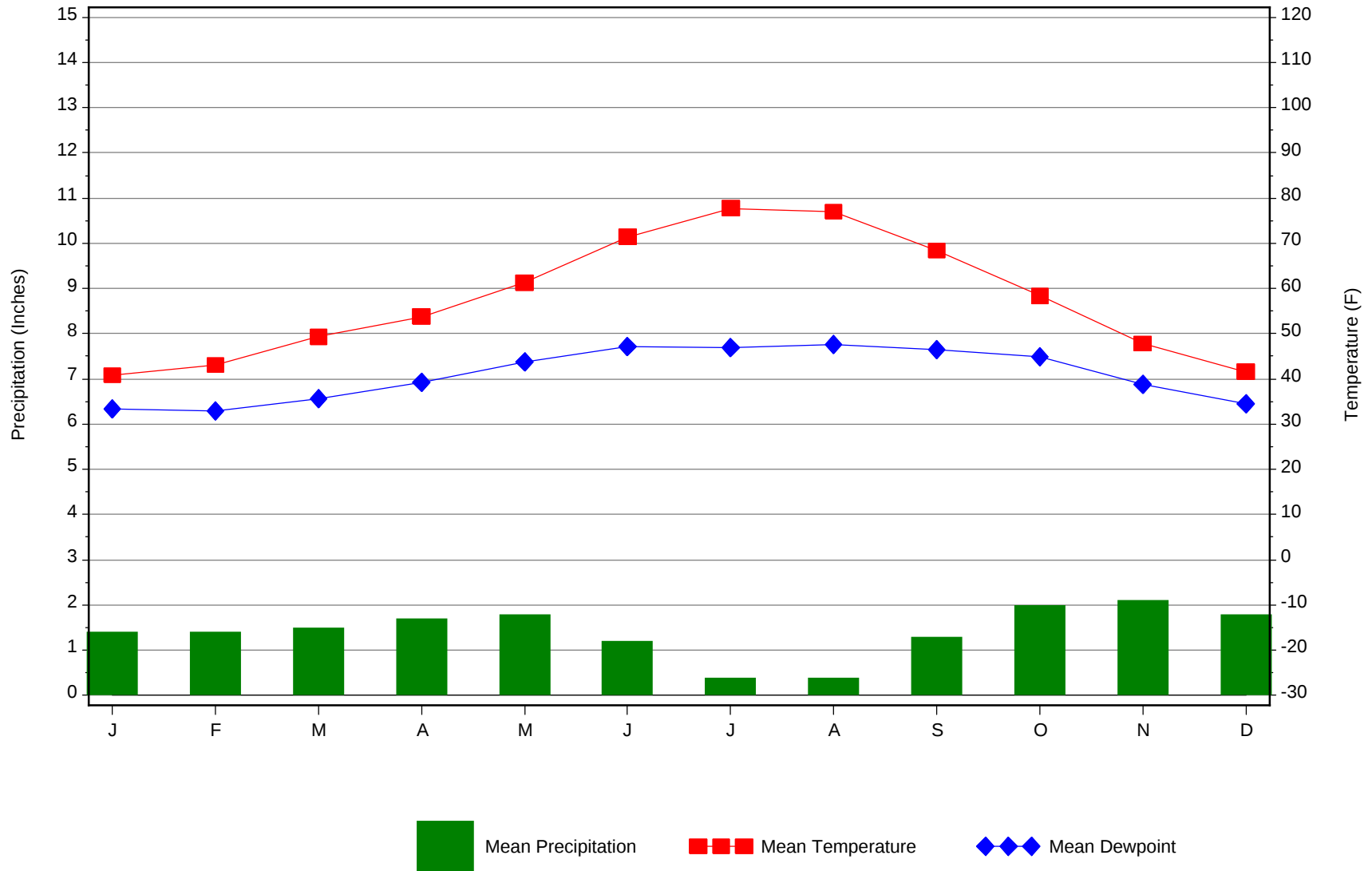
Other Site Data

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
8	N/A	N/A	0.0 + 1.2
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 (#)
60.1	N/A	N/A	39

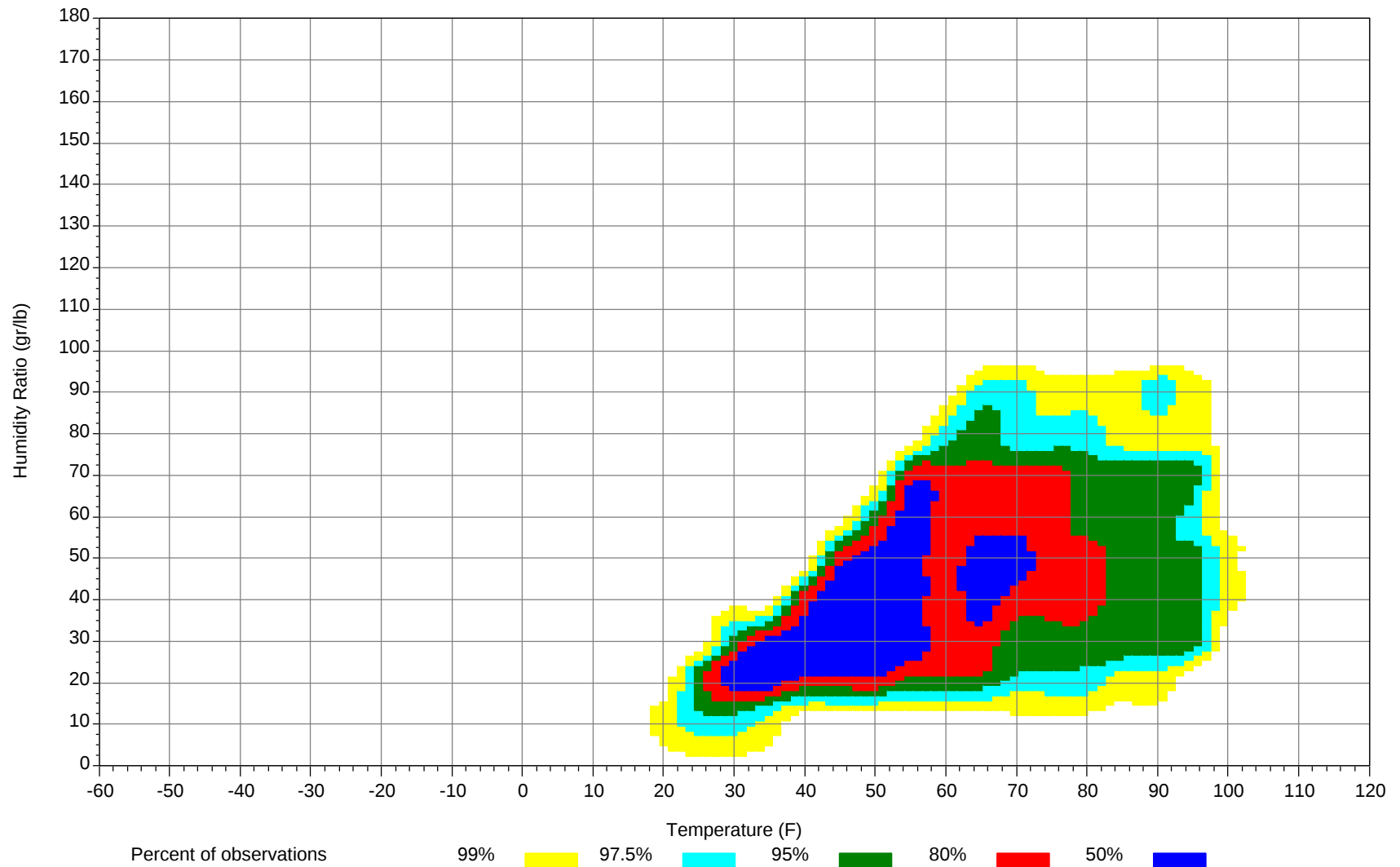
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



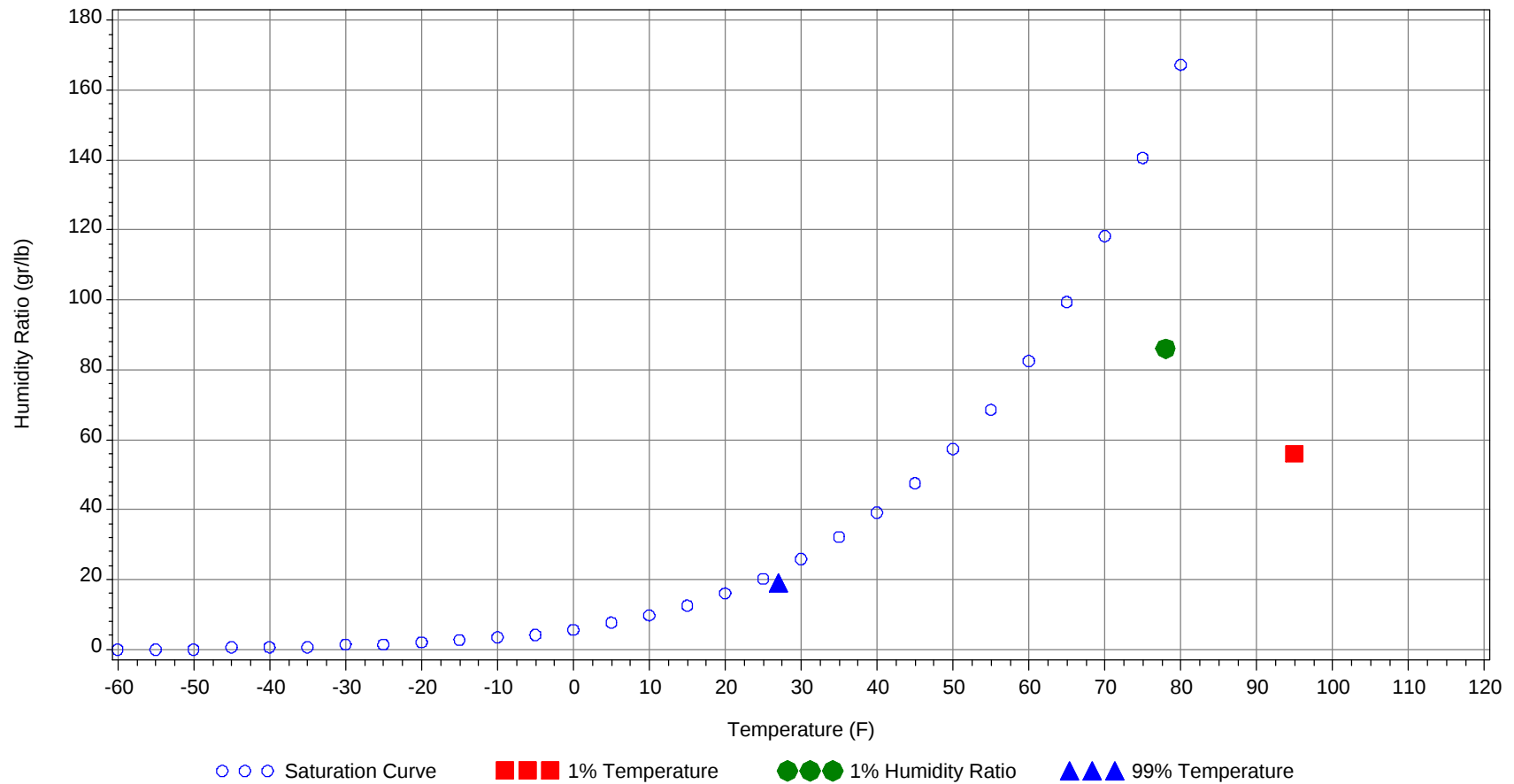
Average Annual Climate



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	95.0		66		56.0	31.5
99.0% Dry Bulb	27.0				19.0	9.3
1.0% Humidity Ratio	86.0	78.0	66.4	61.0		32.2

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	58
75/ 79												2	2	4	55.6
70/ 74		0		0	55		1	0	1	53.7		11	9	20	52.8
65/ 69		0	0	0	54.5		2	2	4	51		16	11	27	51.2
60/ 64		4	2	6	50.4		11	8	19	48.9	0	36	25	61	49.9
55/ 59	0	18	10	28	48.2	0	30	18	48	47.2	3	51	43	97	47.6
50/ 54	9	47	33	89	45.7	6	50	40	96	45	22	58	64	144	45.5
45/ 49	34	73	66	173	42.5	31	57	63	151	41.9	64	45	59	168	42.1
40/ 44	32	36	44	112	39	32	28	38	98	38.5	53	16	20	89	38.5
35/ 39	57	37	57	151	35.2	64	29	41	134	34.6	68	9	12	89	34.7
30/ 34	63	22	30	115	30.3	60	13	12	85	30.1	29	2	2	33	29.9
25/ 29	42	9	8	59	25.6	26	3	2	31	25.4	7	0	0	7	25.1
20/ 24	9	2	0	11	21.4	4	0	0	4	20.4	1	0	0	1	19.8
15/ 19	1	1	0	2	17.6	1	0		1	16.6	0			0	17.5
10/ 14	0	0		0	11.8	0			0	12.5					

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

	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												1	1	2	68.5
95/ 99							0	0	0	67.6		8	8	16	67.3
90/ 94		0		0	65		2	2	4	63.8		24	23	47	64.3
85/ 89		0	0	0	63.5		5	4	9	61.6	0	27	20	47	62.6
80/ 84		3	3	6	58.5		18	15	33	59.5	1	47	37	85	61.2
75/ 79		12	9	21	56.7		32	25	57	57.6	6	45	39	90	59.5
70/ 74		19	14	33	54.5	2	50	35	87	55.9	22	41	41	104	57.7
65/ 69	0	22	16	38	52.9	4	36	28	68	54.5	31	19	23	73	56.2
60/ 64	2	49	38	89	51.1	25	50	49	124	53.1	72	21	29	122	54.5
55/ 59	14	54	51	119	48.9	60	36	47	143	51	64	7	15	86	51.8
50/ 54	55	50	56	161	46.5	75	16	29	120	47.9	35	0	3	38	48.1
45/ 49	80	25	39	144	42.8	57	4	11	72	43.6	8		0	8	44.3
40/ 44	42	4	10	56	38.8	18	0	2	20	39.5	1		0	1	40
35/ 39	36	1	3	40	35.3	7		0	7	36.1	0			0	37.8
30/ 34	9		0	9	30.6	1		0	1	30.1					
25/ 29	1			1	27.3	0			0	26					
20/ 24															
15/ 19															
10/ 14															

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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	0	65			0	0	67					
100/104		3	4	7	66.3		3	3	6	69		1	1	2	64.5
95/ 99		25	28	53	66.1		20	19	39	66.7		2	1	3	64.2
90/ 94		50	44	94	64.3		47	42	89	64.6		8	7	15	64.1
85/ 89	0	38	31	69	62.7	0	37	30	67	63.1		18	14	32	63
80/ 84	3	55	45	103	61.4	3	57	48	108	62	0	46	33	79	61.4
75/ 79	23	44	44	111	59.7	18	45	46	109	60.2	2	49	40	91	59.6
70/ 74	59	23	32	114	58	55	27	37	119	58.1	11	48	48	107	57.8
65/ 69	56	7	11	74	56.3	59	8	13	80	56.1	23	28	33	84	56.3
60/ 64	69	3	8	80	53.8	77	4	8	89	53.6	73	28	42	143	54.4
55/ 59	31	0	1	32	50.1	29	0	1	30	49.9	75	10	17	102	50.8
50/ 54	7		0	7	47.1	6		0	6	47.2	40	2	5	47	46.6
45/ 49	1			1	44.3	1			1	41.1	14	0	1	15	42.7
40/ 44											2			2	38.4
35/ 39											1			1	37.4
30/ 34															
25/ 29															
20/ 24															
15/ 19															
10/ 14															

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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	0	65.3										
85/ 89		1	1	2	61.4										
80/ 84		8	4	12	59.9										
75/ 79		20	12	32	58.4		0		0	61					
70/ 74	0	38	23	61	57		3	1	4	57					
65/ 69	2	34	25	61	55.9		8	3	11	54.7			0	0	53.5
60/ 64	19	57	56	132	54.4	1	29	15	45	52.6	0	3	1	4	50.4
55/ 59	56	52	66	174	51.8	12	54	36	102	50.2	2	23	9	34	49
50/ 54	81	27	42	150	48	39	63	64	166	47.2	15	60	36	111	46.3
45/ 49	58	10	16	84	43.4	58	45	60	163	43	39	72	69	180	42.7
40/ 44	18	2	2	22	39.3	38	17	31	86	39.2	31	30	44	105	39.1
35/ 39	11	0	1	12	35.6	51	13	22	86	35.4	53	32	54	139	35.3
30/ 34	2	0		2	29.7	30	5	7	42	30.4	63	19	27	109	30.6
25/ 29	0			0	24	10	1	1	12	25.7	37	7	7	51	25.7
20/ 24						1	0		1	20.1	7	2	0	9	21.5
15/ 19						0			0	15.3	2	0	0	2	17.6
10/ 14											0	0		0	13.1

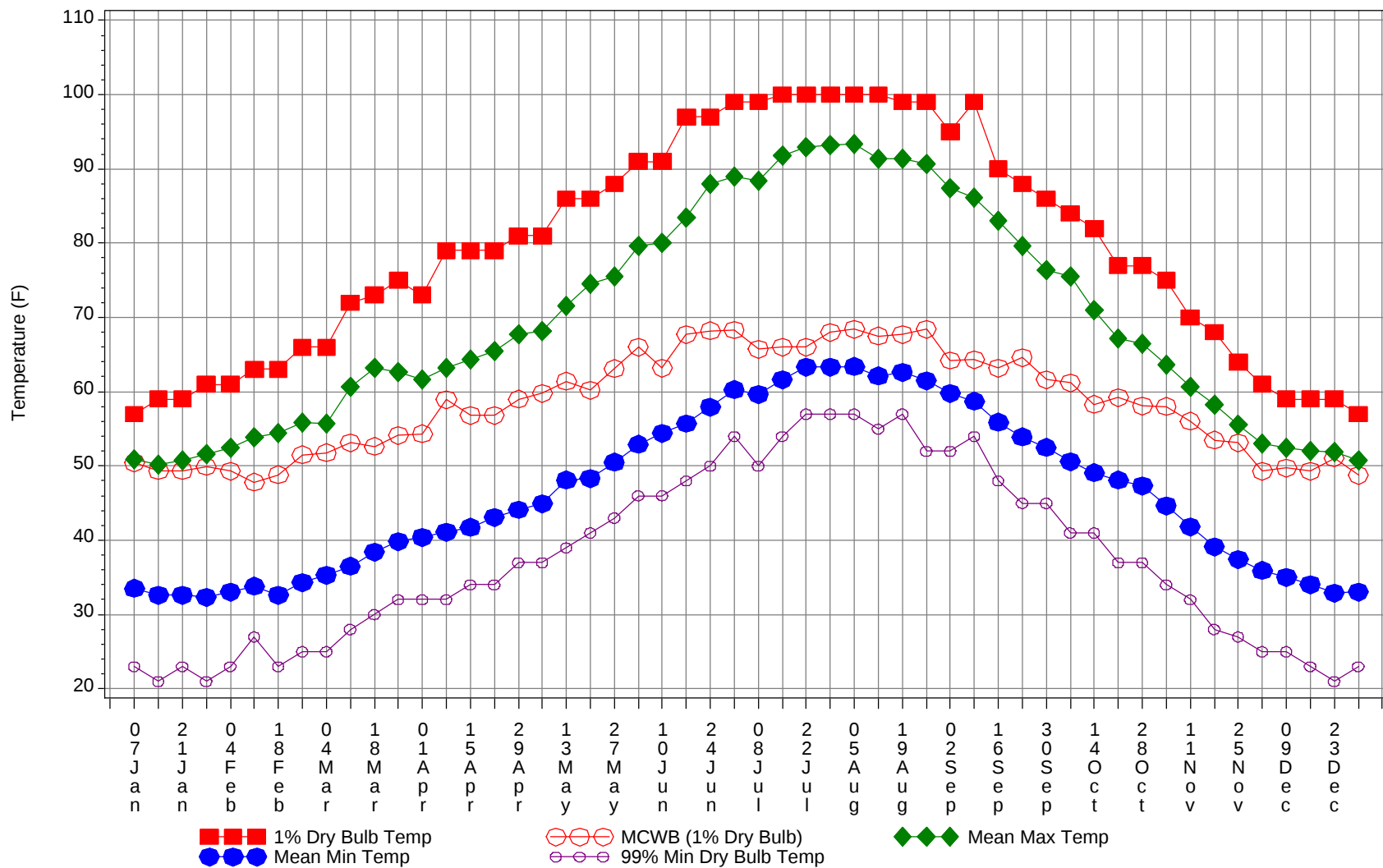
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Dry-Bulb Temperature Hours For An Average Year

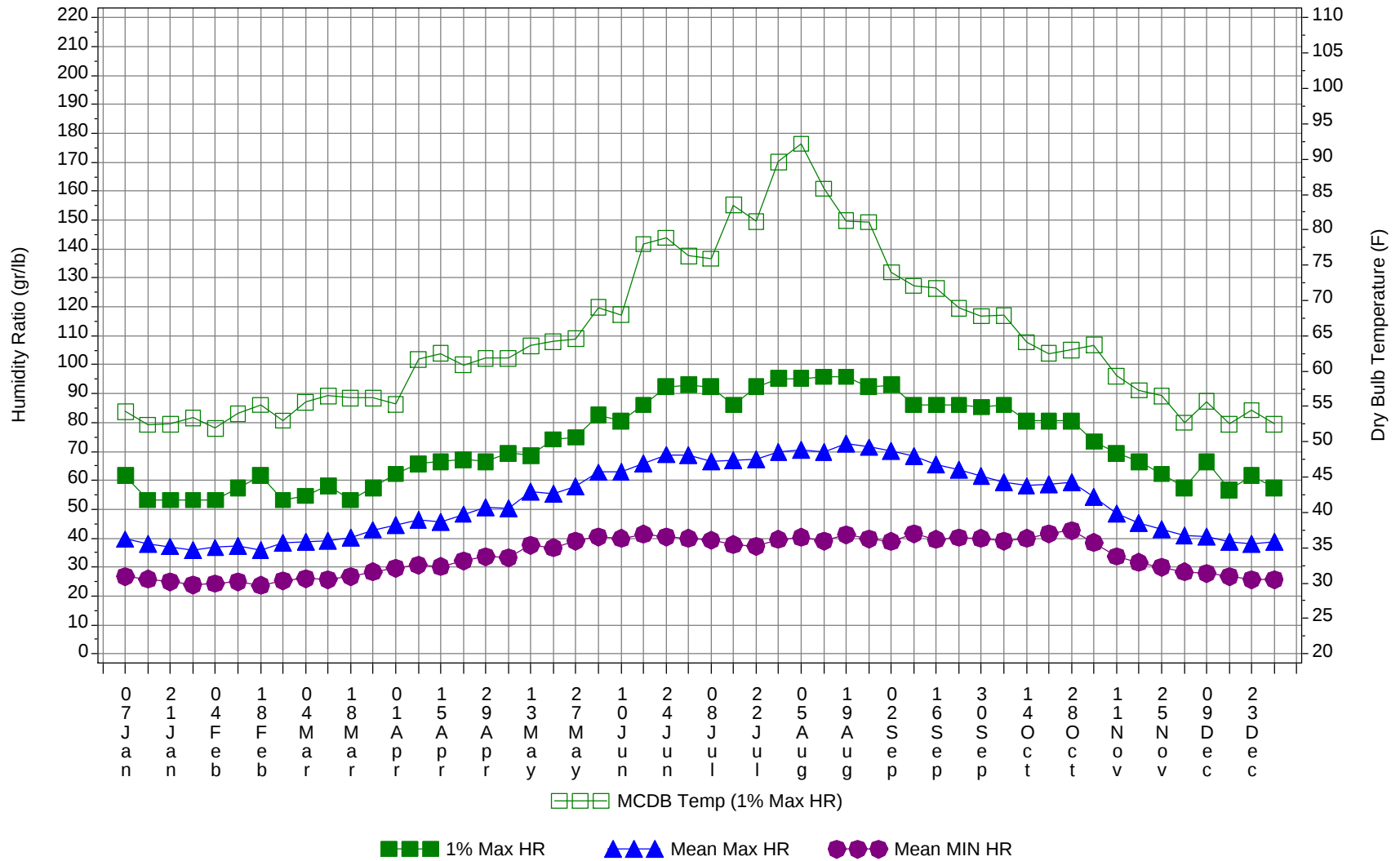
	Annual				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
105/109		0	0	0	65.4
100/104		8	9	17	67.4
95/ 99		55	56	111	66.4
90/ 94		130	118	248	64.4
85/ 89	0	127	100	227	62.8
80/ 84	7	232	185	424	61.3
75/ 79	48	250	216	514	59.3
70/ 74	148	262	241	651	57.2
65/ 69	175	180	167	522	55.4
60/ 64	336	296	280	912	53.2
55/ 59	348	338	315	1001	50.1
50/ 54	391	374	372	1137	46.7
45/ 49	447	329	384	1160	42.7
40/ 44	267	132	191	590	38.9
35/ 39	347	122	188	657	35.1
30/ 34	256	60	78	394	30.3
25/ 29	122	21	18	161	25.6
20/ 24	23	4	1	28	21.1
15/ 19	5	1	0	6	17.2
10/ 14	1	0		1	12.4

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Annual Summary of Temperatures



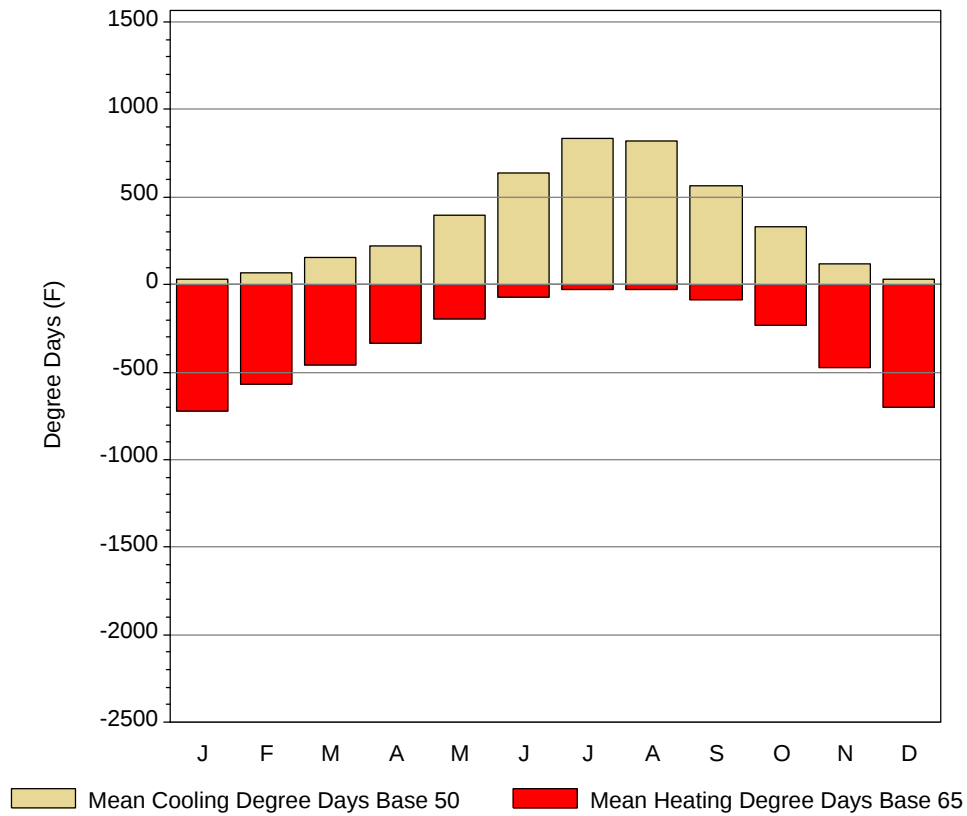
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

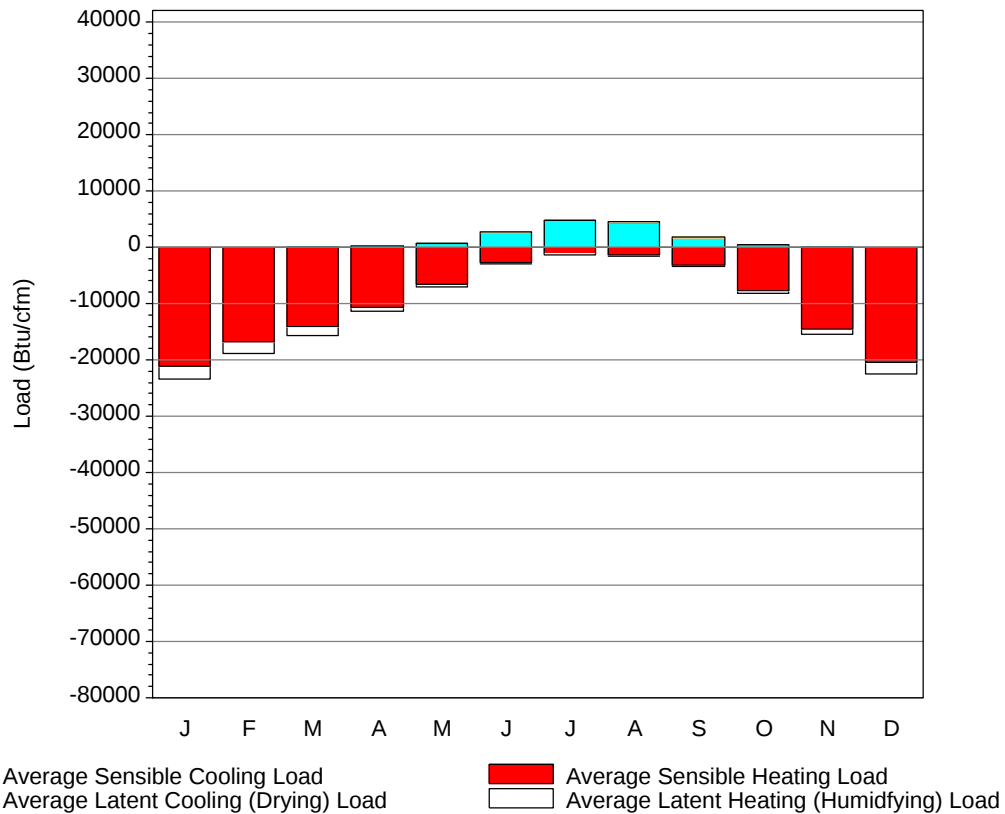
Week Ending	1.0% Temp (° F)	MCWB@ 1% Temp (° F)	Mean Max Temp (° F)	Mean Min Temp (° F)	99% Temp (° F)	1.0% HR (gr/lb)	MCDB@ 1% HR (° F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	57	50.4	50.9	33.5	23	61.6	54.3	39.7	26.8
14-Jan	59	49.4	50.2	32.6	21	53.2	52.4	38	25.8
21-Jan	59	49.4	50.7	32.6	23	53.2	52.5	37.1	25
28-Jan	61	49.9	51.6	32.3	21	53.2	53.4	35.8	23.8
4-Feb	61	49.3	52.4	33	23	53.2	51.9	36.8	24.3
11-Feb	63	47.8	53.8	33.8	27	57.4	54	37.4	25
18-Feb	63	48.8	54.4	32.6	23	61.6	55.2	36	23.7
25-Feb	66	51.5	55.8	34.3	25	53.2	53	38.4	25.3
4-Mar	66	51.8	55.7	35.3	25	54.6	55.6	38.7	26
11-Mar	72	53.1	60.7	36.5	28	58.1	56.5	39.1	25.7
18-Mar	73	52.6	63.2	38.4	30	53.2	56.2	40.3	26.8
25-Mar	75	54.1	62.6	39.8	32	57.4	56.2	42.9	28.3
1-Apr	73	54.3	61.6	40.4	32	62.3	55.3	44.6	29.6
8-Apr	79	58.9	63.2	41.1	32	65.8	61.7	46.3	30.7
15-Apr	79	56.8	64.3	41.7	34	66.5	62.5	45.5	30.2
22-Apr	79	56.8	65.5	43.1	34	67.2	60.9	48.3	32.2
29-Apr	81	59	67.8	44.1	37	66.5	61.8	50.6	33.6
6-May	81	59.8	68.1	44.9	37	69.3	61.8	50.3	33.3
13-May	86	61.4	71.6	48.1	39	68.6	63.6	56	37.6
20-May	86	60.2	74.5	48.3	41	74.2	64.2	55.5	36.7
27-May	88	63.1	75.5	50.5	43	74.9	64.6	58	39.1
4-Jun	91	66	79.6	52.9	46	82.6	69	62.8	40.5
10-Jun	91	63.2	80	54.4	46	80.5	68	62.9	39.9
17-Jun	97	67.7	83.5	55.7	48	86.1	78	65.8	41.4
24-Jun	97	68.2	88	57.9	50	92.4	78.9	68.9	40.5
1-Jul	99	68.3	89	60.3	54	93.1	76.3	68.8	40
8-Jul	99	65.7	88.4	59.6	50	92.4	75.9	66.6	39.3
15-Jul	100	66	91.8	61.6	54	86.1	83.5	67	37.8
22-Jul	100	66	92.9	63.3	57	92.4	81.2	67.2	37.3
29-Jul	100	68	93.2	63.3	57	95.2	89.6	69.9	39.6
5-Aug	100	68.4	93.3	63.4	57	95.2	92.2	70.7	40.3
12-Aug	100	67.5	91.4	62.1	55	95.9	85.8	69.8	39
19-Aug	99	67.7	91.4	62.6	57	95.9	81.3	72.7	41.2
26-Aug	99	68.4	90.7	61.5	52	92.4	81.1	71.5	39.7
2-Sep	95	64.2	87.4	59.8	52	93.1	74	70.1	38.9
9-Sep	99	64.3	86.1	58.7	54	86.1	72.1	68.4	41.5
16-Sep	90	63.2	83	55.9	48	86.1	71.7	65.5	39.6
23-Sep	88	64.6	79.6	53.9	45	86.1	68.9	63.8	40.2
30-Sep	86	61.6	76.3	52.5	45	85.4	67.8	61.5	39.9
7-Oct	84	61.2	75.5	50.6	41	86.1	67.9	59.3	39.1
14-Oct	82	58.3	71	49.1	41	80.5	64.1	58.1	40
21-Oct	77	59.2	67.2	48.1	37	80.5	62.5	58.6	41.6
28-Oct	77	58.1	66.5	47.3	37	80.5	63	59.5	42.6
4-Nov	75	58	63.6	44.6	34	73.5	63.7	54.2	38.5
11-Nov	70	56	60.6	41.8	32	69.3	59.3	48.6	33.7
18-Nov	68	53.5	58.3	39.1	28	66.5	57.3	45.3	31.6
25-Nov	64	53.1	55.5	37.4	27	62.3	56.5	43.2	30
2-Dec	61	49.3	53	35.9	25	57.4	52.7	41	28.4
9-Dec	59	49.7	52.4	35	25	66.5	55.7	40.7	27.9
16-Dec	59	49.3	52	34	23	56.7	52.5	38.8	26.7
23-Dec	59	51.1	51.9	32.9	21	61.6	54.5	38	25.7
31-Dec	57	48.7	50.7	33	23	57.4	52.5	38.8	25.7

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	31.4	2	723.1
FEB	70.1	9.9	565.7
MAR	152.3	23.3	455.8
APR	221	44.4	334.4
MAY	394.6	105.6	194.4
JUN	636.2	254.2	70.1
JUL	837.4	399	27.3
AUG	818.5	380.7	27.8
SEP	565.8	198.4	85.1
OCT	328.1	70.9	230.4
NOV	118.9	17.3	474.6
DEC	33.8	1.9	698.6
ANN	4208.1	1507.6	3887.3

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	0	-21098	0	-2308
FEB	0	-16734	0	-2028
MAR	44	-13975	0	-1609
APR	234	-10608	0	-834
MAY	668	-6615	1	-318
JUN	2625	-2725	54	-145
JUL	4798	-1210	97	-215
AUG	4434	-1246	166	-255
SEP	1719	-3262	28	-193
OCT	377	-7770	10	-375
NOV	9	-14452	0	-1081
DEC	0	-20465	0	-2016
ANN	14908	-120160	356	-11377

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													

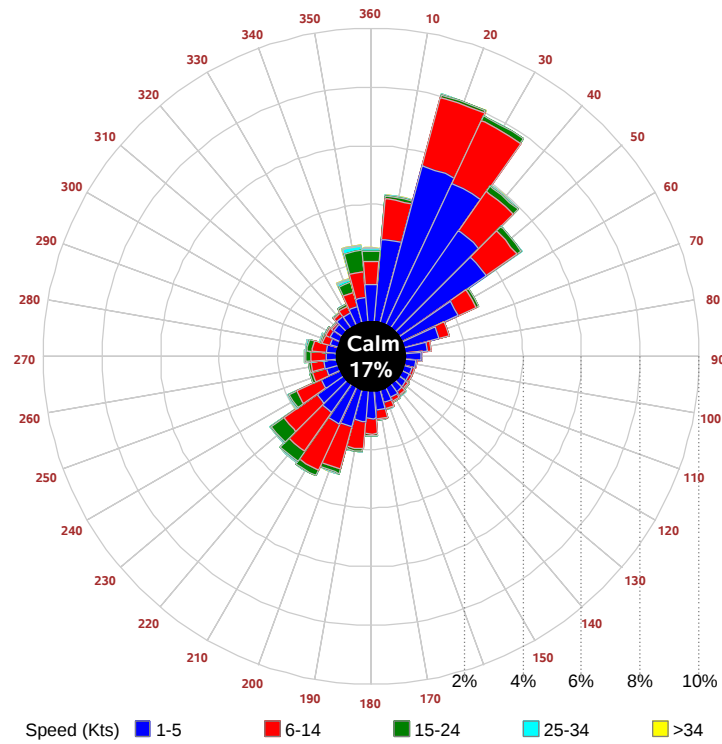
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

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													

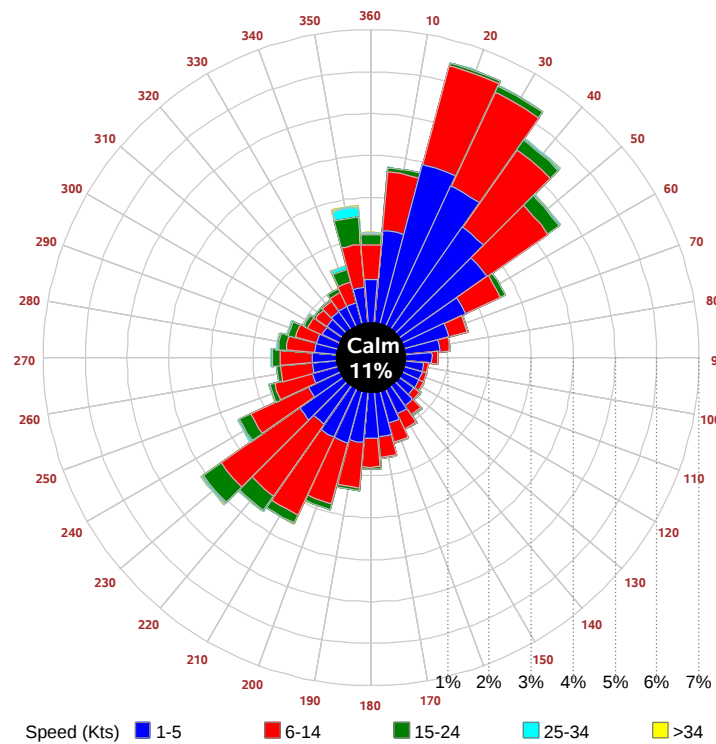
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9												
				March						June		
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear			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

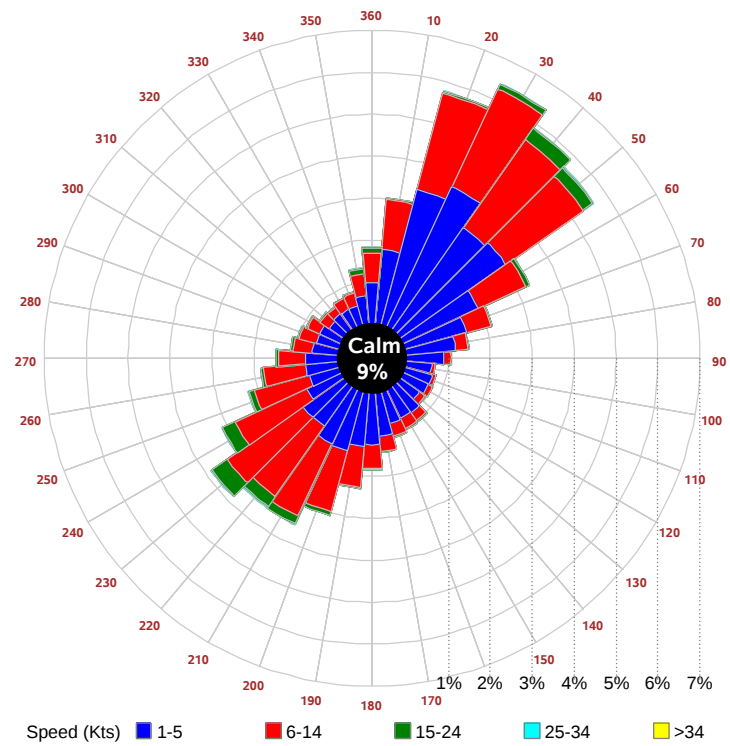
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

