

BARAJAS, SP	Station ID = ICAO_LEMD
Latitude = 40.49 N	Elevation = 2000 Feet
Longitude = 3.57 W	Average Pressure = 28.06 inches Hg
Period of Record = 1988 To 2017	

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	102	67	48	10.3	SW
0.4% Occurrence	98	66	50	8.5	SW
1.0% Occurrence	96	65	50	8.5	SW
2.0% Occurrence	93	64	50	8.2	SW
Mean Daily Range	22	-	-	-	N
97.5% Occurrence	31	29	22	3	N
99.0% Occurrence	28	26	19	2.7	N
99.6% Occurrence	25	24	17	2.6	N
Median of Extreme Lows	21	20	14	2.4	N

	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	71	93	84	6.6	WSW
0.4% Occurrence	70	91	80	6.6	WSW
1.0% Occurrence	68	89	74	6.4	S
2.0% Occurrence	66	87	67	6.7	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	102	83	0.64	5.9	SSE
0.4% Occurrence	90	75	0.56	6.1	N
1.0% Occurrence	83	74	0.52	6	N
2.0% Occurrence	79	75	0.5	5.3	N

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	208	1100	19	171

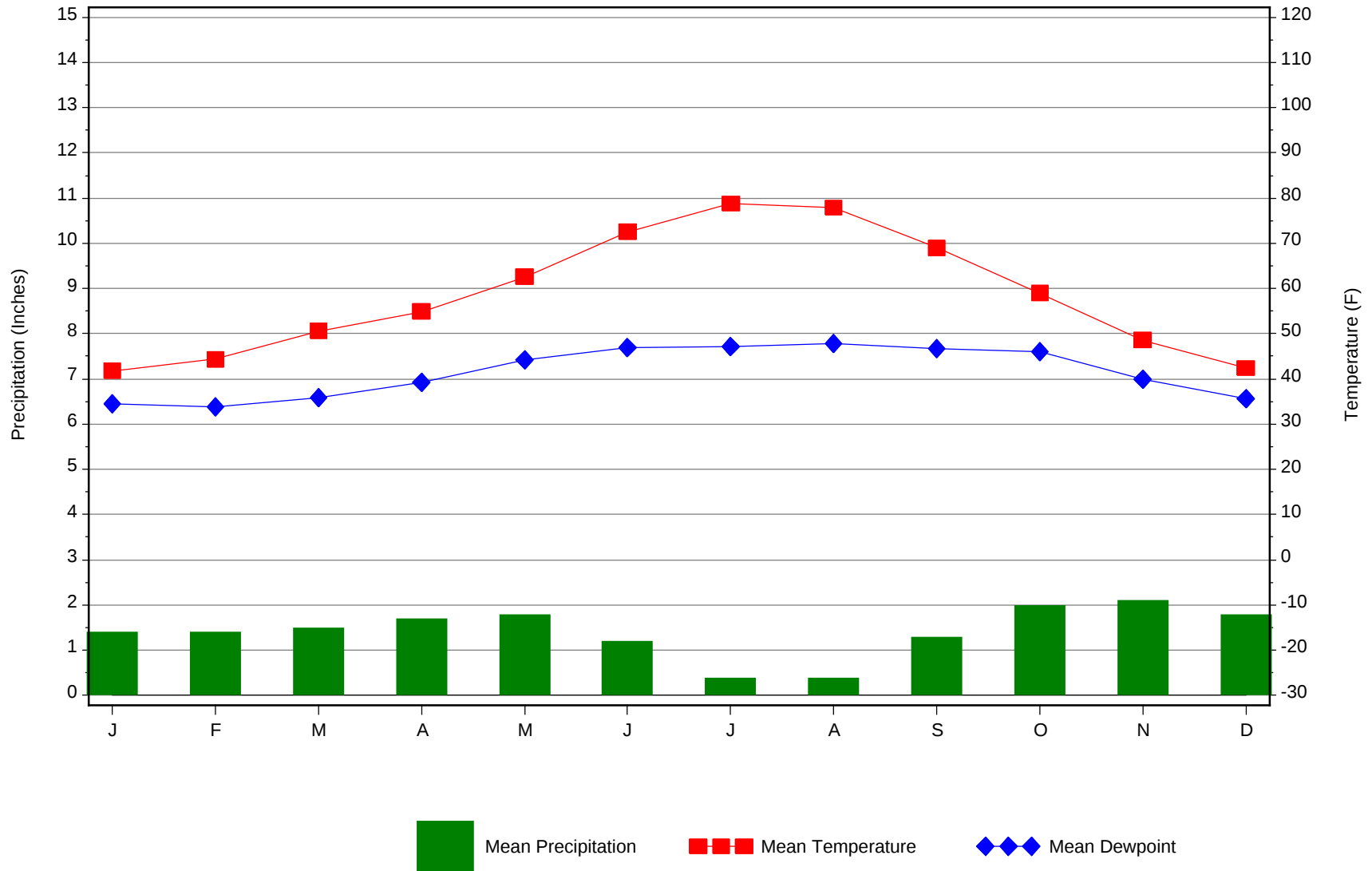
Other Site Data

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 + 1.3
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 (#)
61.1	N/A	N/A	38

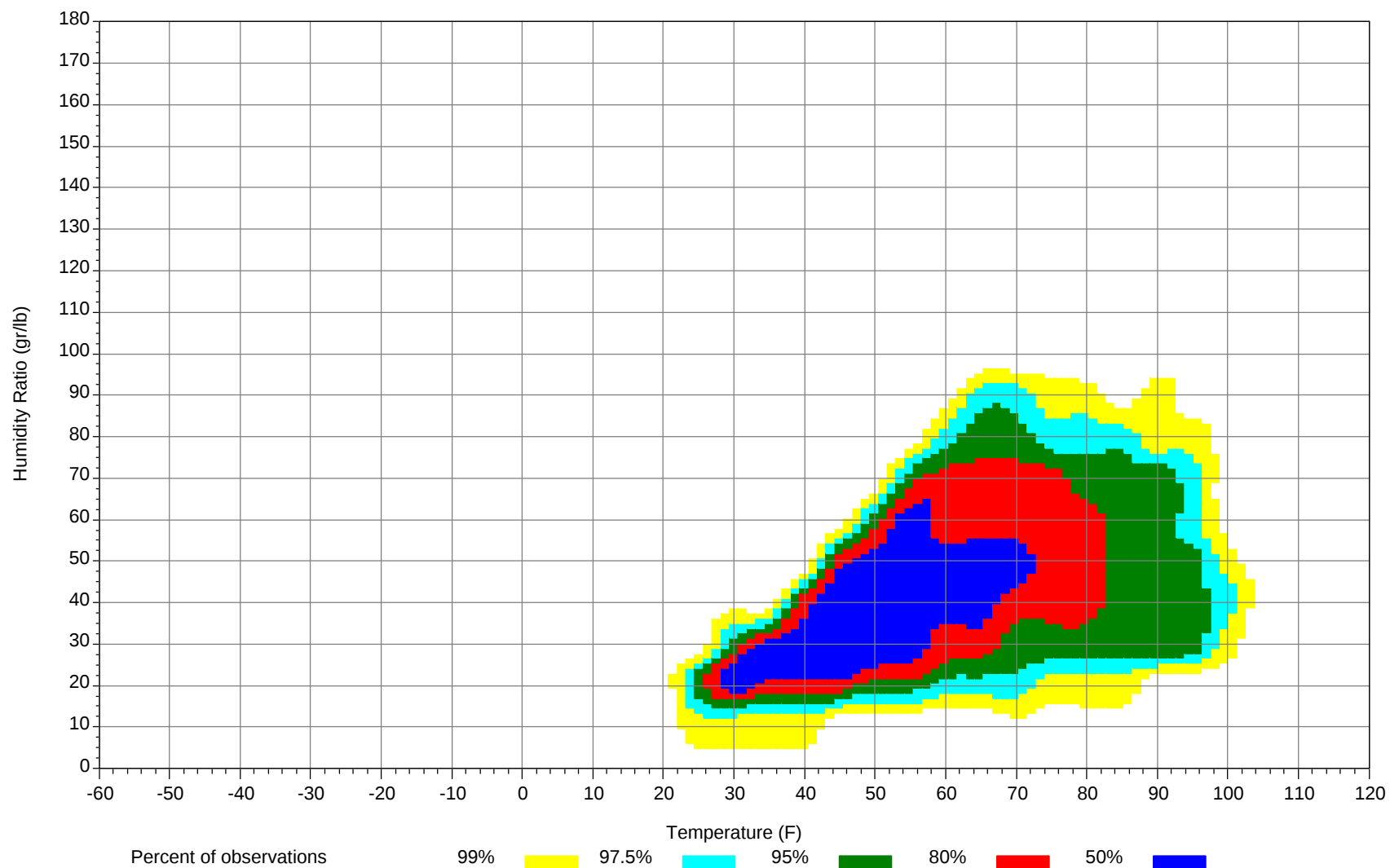
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



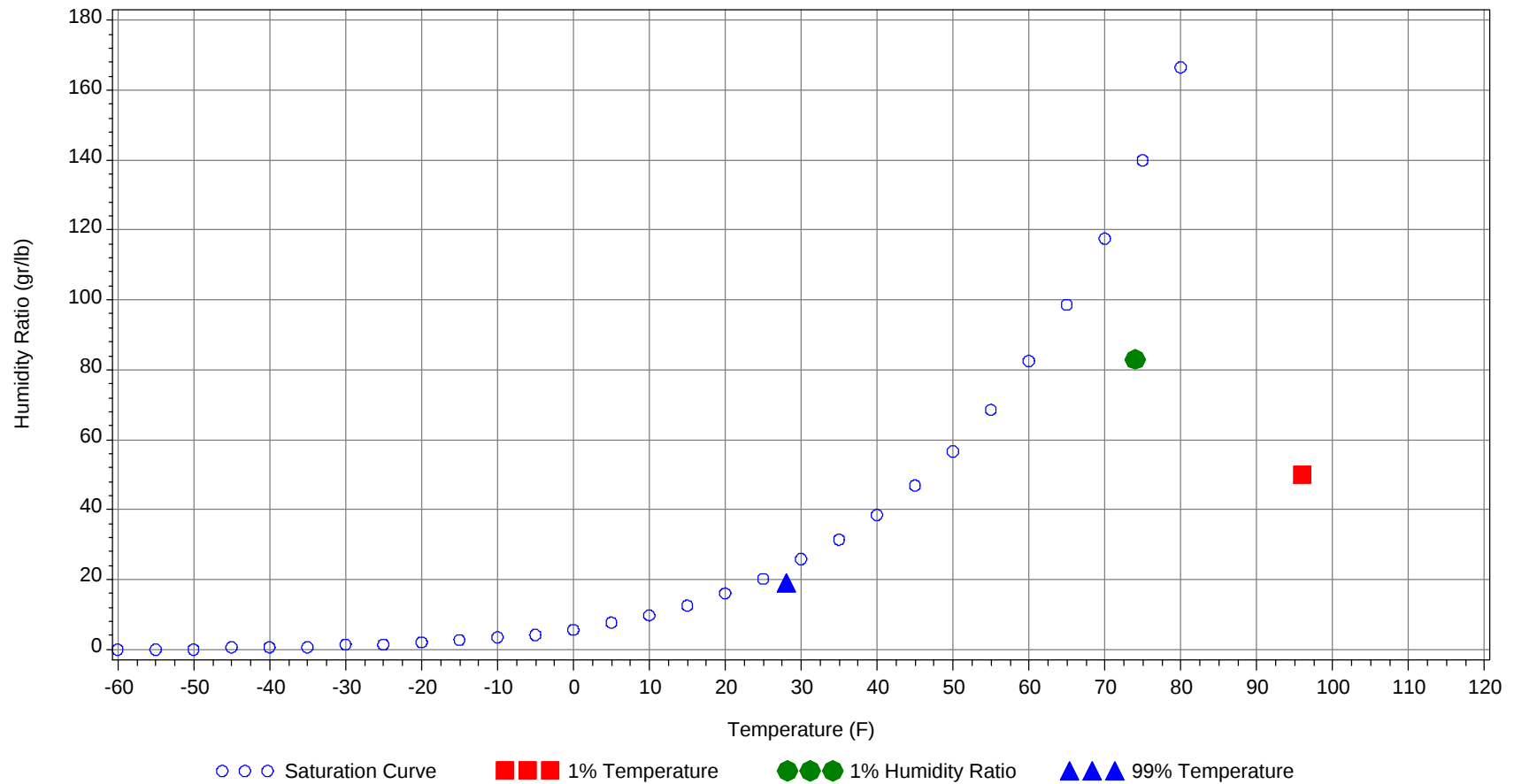
Average Annual Climate



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	96.0		65		50.0	30.7
99.0% Dry Bulb	28.0				19.0	9.7
1.0% Humidity Ratio	83.0	74.0	64.6	60.0		30.7

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	55.3
70/ 74		0		0	55.5		0	0	0	53	0	11	11	22	53.2
65/ 69		0	0	0	53.1		3	3	6	51.2	0	22	19	41	51.6
60/ 64		3	1	4	50.3		12	10	22	49.6	0	36	32	68	49.9
55/ 59	1	17	11	29	48.7	1	30	26	57	47.6	5	51	51	107	47.7
50/ 54	10	49	42	101	46	7	50	50	107	45.1	28	55	64	147	45.3
45/ 49	34	65	73	172	42.8	35	52	62	149	42.2	68	41	45	154	42.2
40/ 44	47	47	57	151	39.2	47	36	42	125	38.5	70	19	18	107	38.3
35/ 39	52	33	42	127	34.9	62	25	23	110	34.4	54	8	6	68	34.3
30/ 34	61	22	19	102	30.5	51	13	6	70	30.1	19	2	1	22	29.8
25/ 29	36	9	3	48	26	18	3	1	22	25.4	4	0	0	4	25.2
20/ 24	6	2	0	8	21.8	2	0		2	20.8	0		0	0	19.1
15/ 19	1	0		1	17.5	0	0		0	17.8					
10/ 14	0			0	12										

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	65.6
95/ 99							0	0	0	63.5		7	8	15	64.7
90/ 94							2	2	4	61.9		22	22	44	63.3
85/ 89		0	0	0	56		7	7	14	60.9	0	34	31	65	62.3
80/ 84		3	3	6	58.3		18	17	35	59.3	1	44	40	85	61
75/ 79		11	10	21	56.7	0	32	28	60	57.8	8	47	43	98	59.5
70/ 74		19	18	37	54.6	2	45	38	85	56.2	27	39	38	104	57.9
65/ 69	0	30	25	55	52.7	9	45	40	94	54.7	52	24	26	102	56.4
60/ 64	3	47	42	92	50.8	32	45	45	122	53.2	71	17	21	109	54.6
55/ 59	20	53	53	126	48.6	71	35	42	148	51.1	53	6	9	68	51.8
50/ 54	60	48	51	159	46.4	74	14	20	108	47.9	26	0	2	28	48
45/ 49	79	22	30	131	42.8	44	4	7	55	43.8	4		0	4	43.7
40/ 44	50	6	7	63	39	12	0	1	13	39.3	0			0	41.5
35/ 39	24	0	1	25	34.9	4	0	0	4	35.8					
30/ 34	4	0		4	30.7	0	0		0	30					
25/ 29	0			0	27.8										
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	69.8		0		0	67.3					
100/104		4	4	8	66.9		2	3	5	66.9		1	1	2	66.3
95/ 99		27	30	57	65.5		19	20	39	65.6		1	1	2	65.5
90/ 94		44	46	90	64.2		42	43	85	64.4		7	7	14	63.9
85/ 89	0	48	46	94	62.6	0	49	45	94	63		22	19	41	62.2
80/ 84	5	51	48	104	61.4	3	53	53	109	61.8	0	39	35	74	60.8
75/ 79	28	41	39	108	59.9	23	43	45	111	60.3	2	46	44	92	59.4
70/ 74	68	23	21	112	58.3	64	27	25	116	58.6	12	45	47	104	57.9
65/ 69	75	8	9	92	56.5	79	10	11	100	56.7	34	38	43	115	56.3
60/ 64	52	3	4	59	54	59	3	3	65	54	77	27	31	135	54.3
55/ 59	17	0	0	17	50.8	16	0	0	16	50.6	69	12	11	92	51.1
50/ 54	3	0	0	3	47.9	3			3	47.6	35	2	3	40	47.1
45/ 49	0			0	45.5	0			0	44.3	9	0	0	9	43.4
40/ 44											1			1	39.1
35/ 39											0			0	37
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															
85/ 89		2	1	3	59.5										
80/ 84		7	5	12	59.9										
75/ 79	0	19	13	32	58.7		0	0	0	57.7					
70/ 74	0	34	26	60	57.3		3	1	4	56.2					
65/ 69	3	41	37	81	56.1	0	12	5	17	54.8		0	0	0	54
60/ 64	21	57	60	138	54.5	1	28	18	47	52.9		4	1	5	51.2
55/ 59	67	50	62	179	52.2	12	51	44	107	50.5	2	23	12	37	49.9
50/ 54	78	26	34	138	48.4	40	62	68	170	47.4	17	58	43	118	46.8
45/ 49	53	10	9	72	44.1	58	45	58	161	43.5	39	65	73	177	43.2
40/ 44	20	2	1	23	39.6	52	21	31	104	39.5	44	40	58	142	39.2
35/ 39	5	0	0	5	35.1	45	11	12	68	35.3	53	30	41	124	35.1
30/ 34	1			1	31	25	5	2	32	30.7	50	18	17	85	30.5
25/ 29						6	1	0	7	25.8	34	8	3	45	26.1
20/ 24						1	0		1	20.4	7	2	0	9	21.7
15/ 19											1	0		1	16.9
10/ 14											0	0		0	13

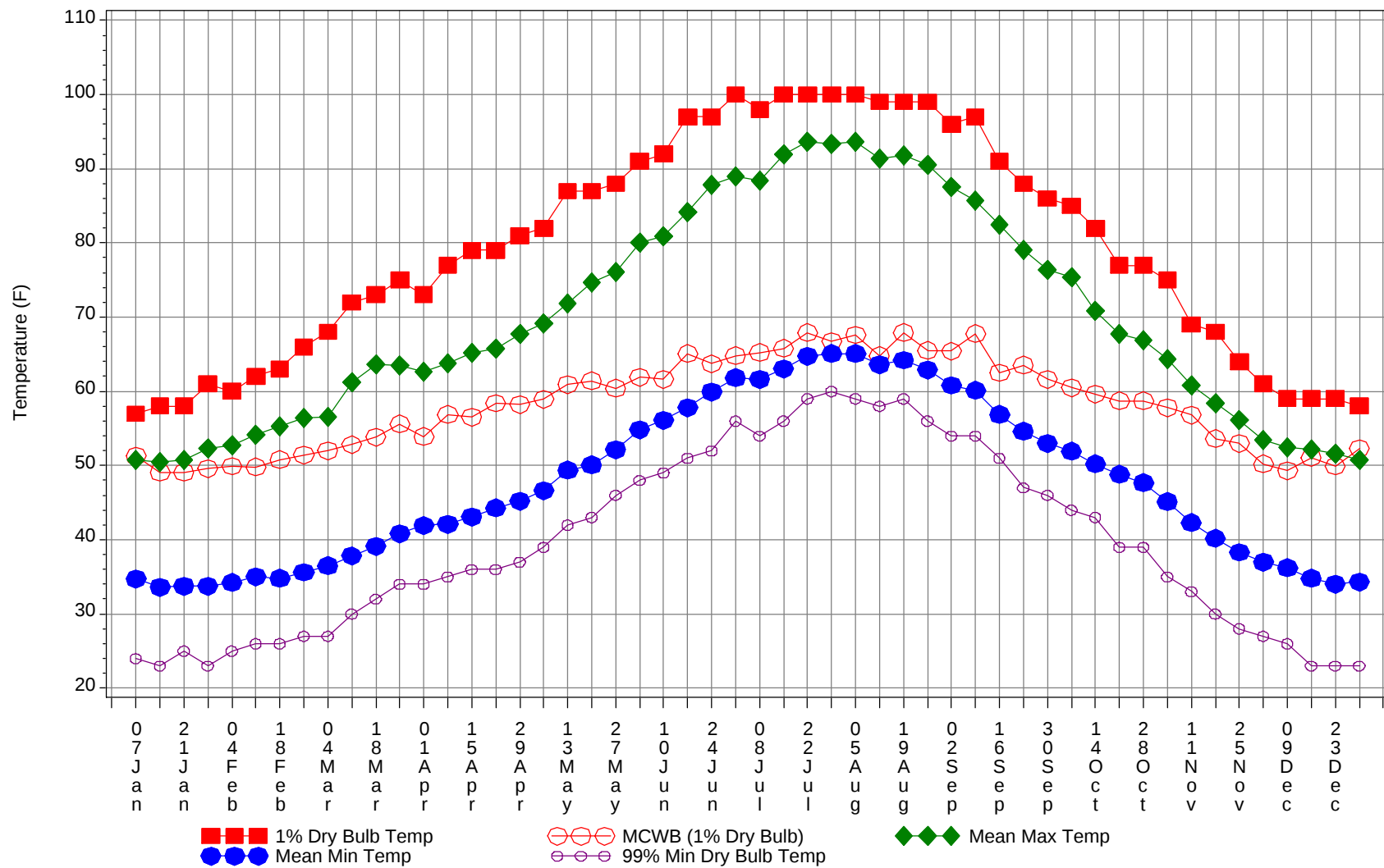
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

Dry-Bulb Temperature Hours For An Average Year

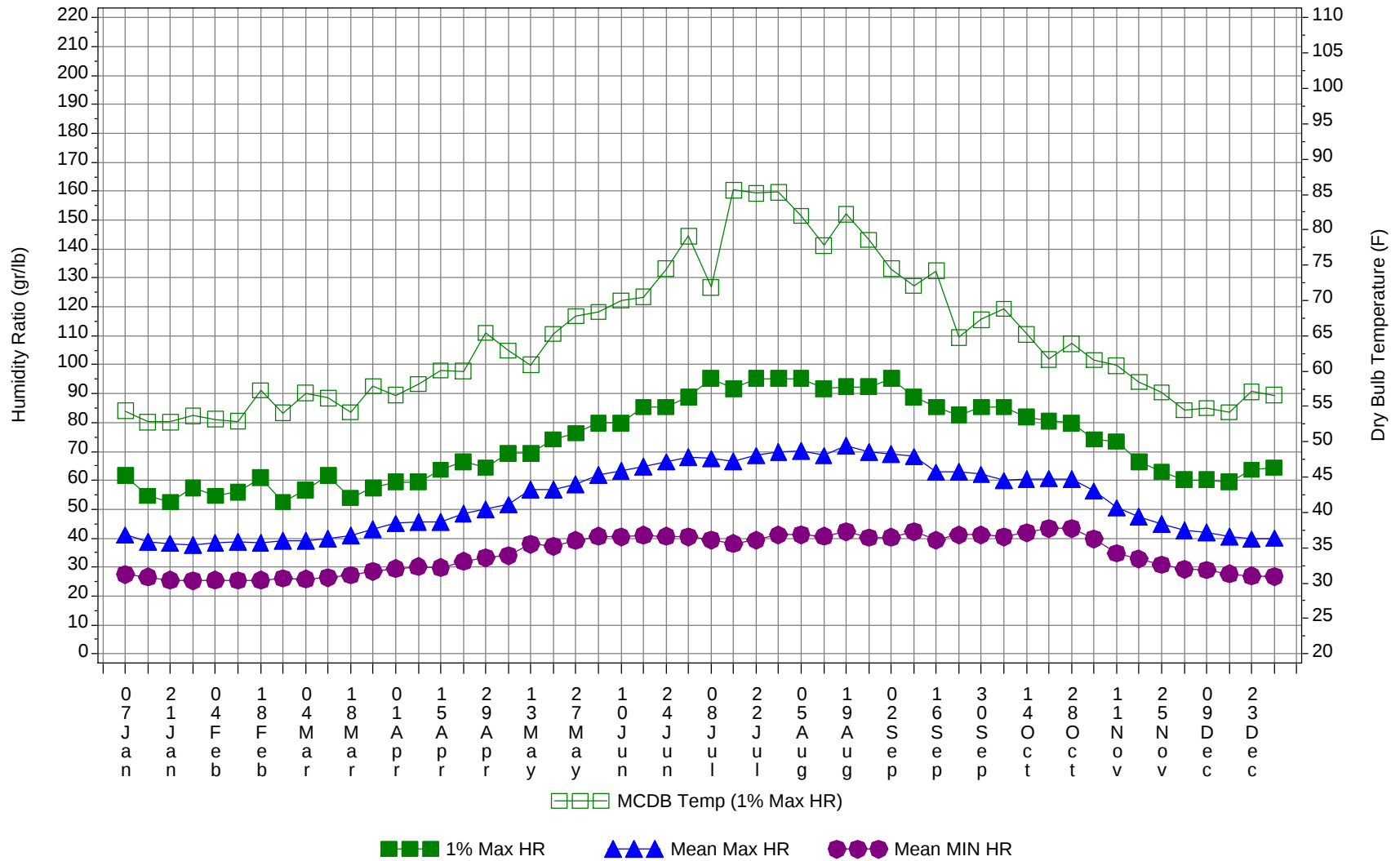
	Annual				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
105/109		0	0	0	69
100/104		8	9	17	66.7
95/ 99		54	59	113	65.4
90/ 94		116	121	237	64
85/ 89	1	162	148	311	62.5
80/ 84	9	215	199	423	61.1
75/ 79	61	241	225	527	59.3
70/ 74	172	246	226	644	57.4
65/ 69	252	233	217	702	55.5
60/ 64	315	282	269	866	53.2
55/ 59	334	328	322	984	50.3
50/ 54	382	365	376	1123	46.8
45/ 49	422	305	357	1084	42.9
40/ 44	343	172	215	730	39
35/ 39	300	108	125	533	34.8
30/ 34	213	59	46	318	30.4
25/ 29	98	21	7	126	25.9
20/ 24	18	4	0	22	21.5
15/ 19	2	0		2	17.3
10/ 14	0	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.

Annual Summary of Temperatures



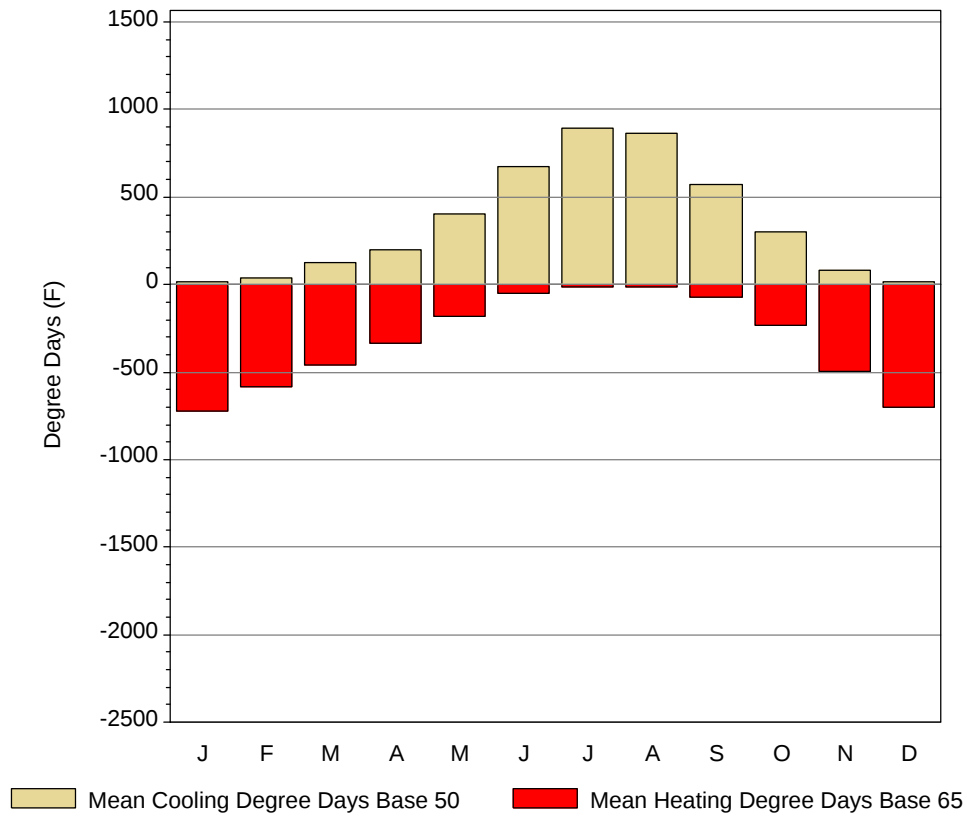
Long Term Humidity and Dry Bulb Temperature Summary



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	51.3	50.7	34.7	24	61.6	54.4	41.1	27.5
14-Jan	58	49.1	50.5	33.6	23	54.6	52.8	38.9	26.6
21-Jan	58	49.1	50.7	33.7	25	52.5	52.8	38.2	25.5
28-Jan	61	49.6	52.3	33.7	23	57.4	53.7	37.7	25.3
4-Feb	60	49.9	52.7	34.2	25	54.6	53.2	38.4	25.5
11-Feb	62	49.8	54.2	35	26	56	52.9	38.9	25.4
18-Feb	63	50.8	55.3	34.8	26	60.9	57.3	38.3	25.5
25-Feb	66	51.4	56.4	35.6	27	52.5	54.1	39.1	26.1
4-Mar	68	52	56.5	36.5	27	56.7	56.9	39.2	25.9
11-Mar	72	52.8	61.2	37.8	30	61.6	56.2	39.8	26.4
18-Mar	73	53.8	63.6	39.1	32	53.9	54.2	40.8	27.2
25-Mar	75	55.6	63.5	40.8	34	57.4	57.9	43.2	28.6
1-Apr	73	53.9	62.7	41.9	34	59.5	56.6	45.1	29.4
8-Apr	77	56.9	63.8	42.1	35	59.5	58.2	45.6	30.2
15-Apr	79	56.5	65.2	43.1	36	63.7	60.1	45.5	29.8
22-Apr	79	58.4	65.7	44.3	36	66.5	60	48.4	32
29-Apr	81	58.2	67.8	45.2	37	64.4	65.4	50	33.2
6-May	82	58.9	69.2	46.6	39	69.3	62.9	51.6	34
13-May	87	60.9	71.8	49.4	42	69.3	60.9	56.9	38
20-May	87	61.4	74.6	50.1	43	74.2	65.3	56.8	37.2
27-May	88	60.4	76.1	52.1	46	76.3	67.8	58.6	39.2
4-Jun	91	61.9	80	54.8	48	79.8	68.4	61.9	40.7
10-Jun	92	61.6	80.9	56.1	49	79.8	70	63.4	40.5
17-Jun	97	65.1	84.1	57.8	51	85.4	70.5	64.7	41
24-Jun	97	63.7	87.8	59.9	52	85.4	74.5	66.4	40.6
1-Jul	100	64.8	88.9	61.8	56	88.9	79.1	68.1	40.5
8-Jul	98	65.2	88.4	61.6	54	95.2	71.9	67.5	39.4
15-Jul	100	65.8	91.9	63	56	91.7	85.6	66.5	38.1
22-Jul	100	67.9	93.7	64.7	59	95.2	85.2	68.6	39.3
29-Jul	100	66.7	93.4	65.1	60	95.2	85.3	69.8	41.1
5-Aug	100	67.6	93.6	65.1	59	95.2	82	70.1	41.2
12-Aug	99	64.8	91.4	63.6	58	91.7	77.8	68.6	40.7
19-Aug	99	67.9	91.8	64.2	59	92.4	82.2	72	42.2
26-Aug	99	65.5	90.5	62.9	56	92.4	78.6	69.8	40.2
2-Sep	96	65.4	87.5	60.8	54	95.2	74.5	69	40.3
9-Sep	97	67.8	85.7	60.1	54	88.9	72.1	68.2	42.2
16-Sep	91	62.5	82.5	56.9	51	85.4	74.2	62.8	39.3
23-Sep	88	63.5	79	54.6	47	82.6	64.8	63	41.1
30-Sep	86	61.6	76.4	53	46	85.4	67.3	62.1	41.1
7-Oct	85	60.5	75.4	51.9	44	85.4	68.8	59.9	40.5
14-Oct	82	59.6	70.9	50.2	43	81.9	65.2	60.4	41.9
21-Oct	77	58.7	67.7	48.8	39	80.5	61.7	60.6	43.3
28-Oct	77	58.7	66.9	47.7	39	79.8	63.9	60.5	43.4
4-Nov	75	57.8	64.3	45.1	35	74.2	61.6	56.3	39.8
11-Nov	69	56.8	60.8	42.3	33	73.5	60.8	50.5	34.8
18-Nov	68	53.6	58.4	40.2	30	66.5	58.5	47.5	32.8
25-Nov	64	53	56.1	38.3	28	63	57	44.9	30.8
2-Dec	61	50.2	53.4	37	27	60.2	54.5	42.7	29.3
9-Dec	59	49.3	52.4	36.2	26	60.2	54.8	42.1	29
16-Dec	59	51.1	52.1	34.8	23	59.5	54.2	40.7	27.7
23-Dec	59	49.9	51.6	34	23	63.7	57.1	39.7	27
31-Dec	58	52.3	50.8	34.3	23	64.4	56.6	40	26.8

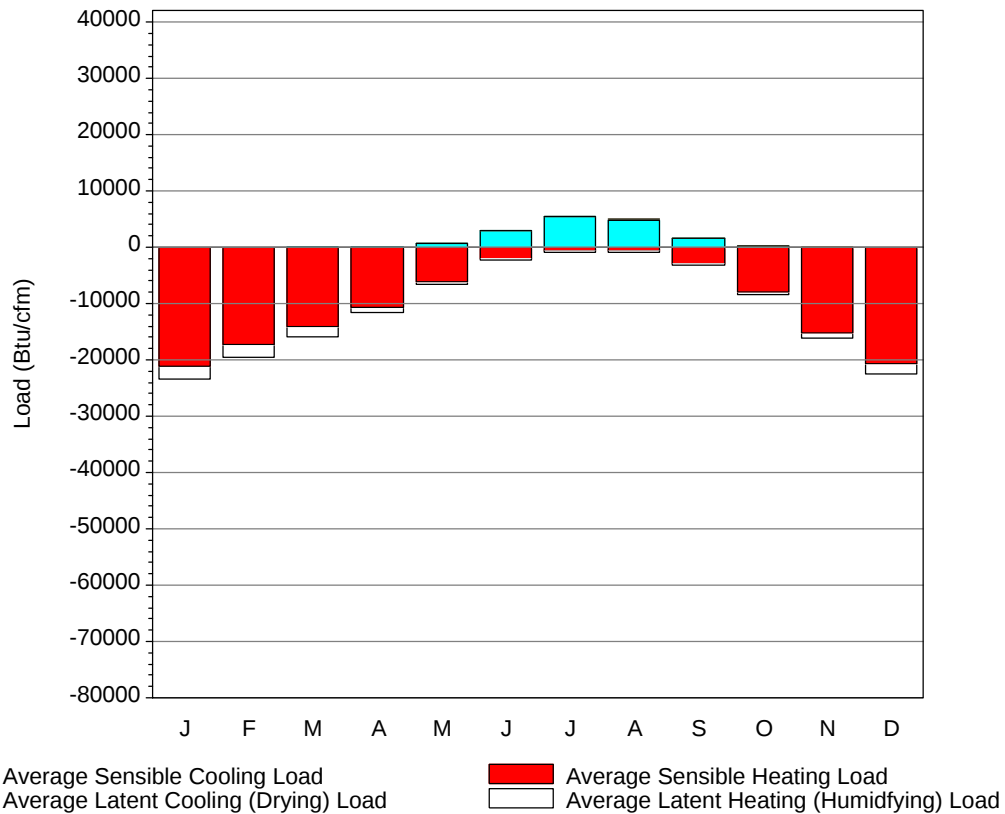
Degree Days, Heating and Cooling (Base 65 F) & Cooling (Base 50F)



Month	Mean Cooling Degree Days (°F) Base 50	Mean Cooling Degree Days (°F) Base 65	Mean Heating Degree Days (°F) Base 65
JAN	16.6	0	721.6
FEB	39.4	0.4	583.6
MAR	128.7	10.6	458.6
APR	198.3	28.8	333.7
MAY	402.3	104	179.5
JUN	675.9	276.6	51.2
JUL	892.9	441.1	13.2
AUG	865.1	413.5	13.4
SEP	570.7	193.5	74.3
OCT	298.8	48.7	234.7
NOV	81.9	2.4	494.2
DEC	19.8	0	700.2
ANN	4190.4	1519.6	3858.2

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	-21113	0	-2216
FEB	0	-17315	0	-2138
MAR	4	-14140	0	-1692
APR	79	-10674	0	-889
MAY	631	-6225	1	-327
JUN	2868	-2124	26	-155
JUL	5410	-701	156	-195
AUG	4850	-737	135	-174
SEP	1588	-2967	36	-181
OCT	167	-7995	10	-298
NOV	0	-15099	1	-977
DEC	0	-20561	0	-1947
ANN	15597	-119651	365	-11189

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													

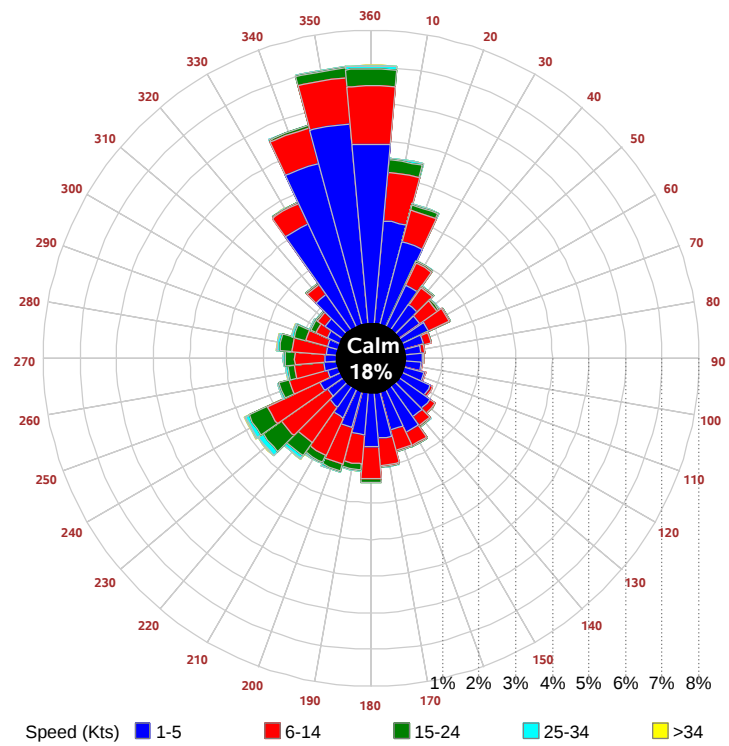
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

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													

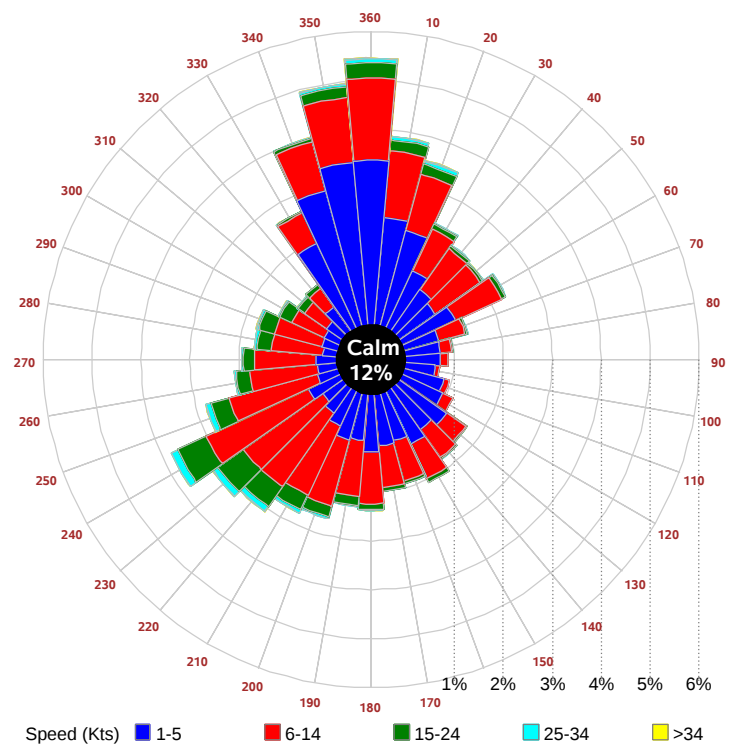
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9												
				March						June		
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear			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

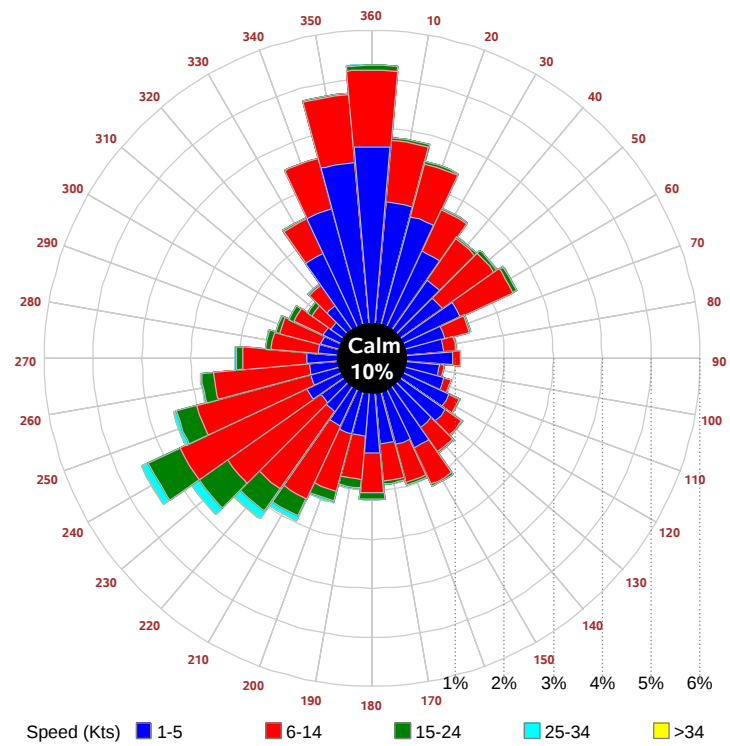
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

