

BROMMA, SW	
Latitude = 59.35 N	Station ID = ICAO_ESSB
Longitude = 17.94 E	Elevation = 47 Feet
Period of Record = 1988 To 2017	Average Pressure = 29.83 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	84	65	61	8.8	W
0.4% Occurrence	81	65	64	8.4	SSW
1.0% Occurrence	77	63	62	8.8	W
2.0% Occurrence	74	61	61	8.6	W
Mean Daily Range	13	-	-	-	W
97.5% Occurrence	18	17	12	5.5	W
99.0% Occurrence	10	9	8	4.2	WNW
99.6% Occurrence	5	4	6	3	W
Median of Extreme Lows	0	0	5	2.7	W

	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	69	78	89	7.8	VRB
0.4% Occurrence	67	75	85	7.6	ESE
1.0% Occurrence	65	73	79	7.5	SE
2.0% Occurrence	64	71	76	7.4	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	97	72	0.64	6.3	VRB
0.4% Occurrence	90	70	0.6	6.1	SE
1.0% Occurrence	86	69	0.58	6.7	SE
2.0% Occurrence	80	68	0.54	6.5	VRB

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	0	49	2	56

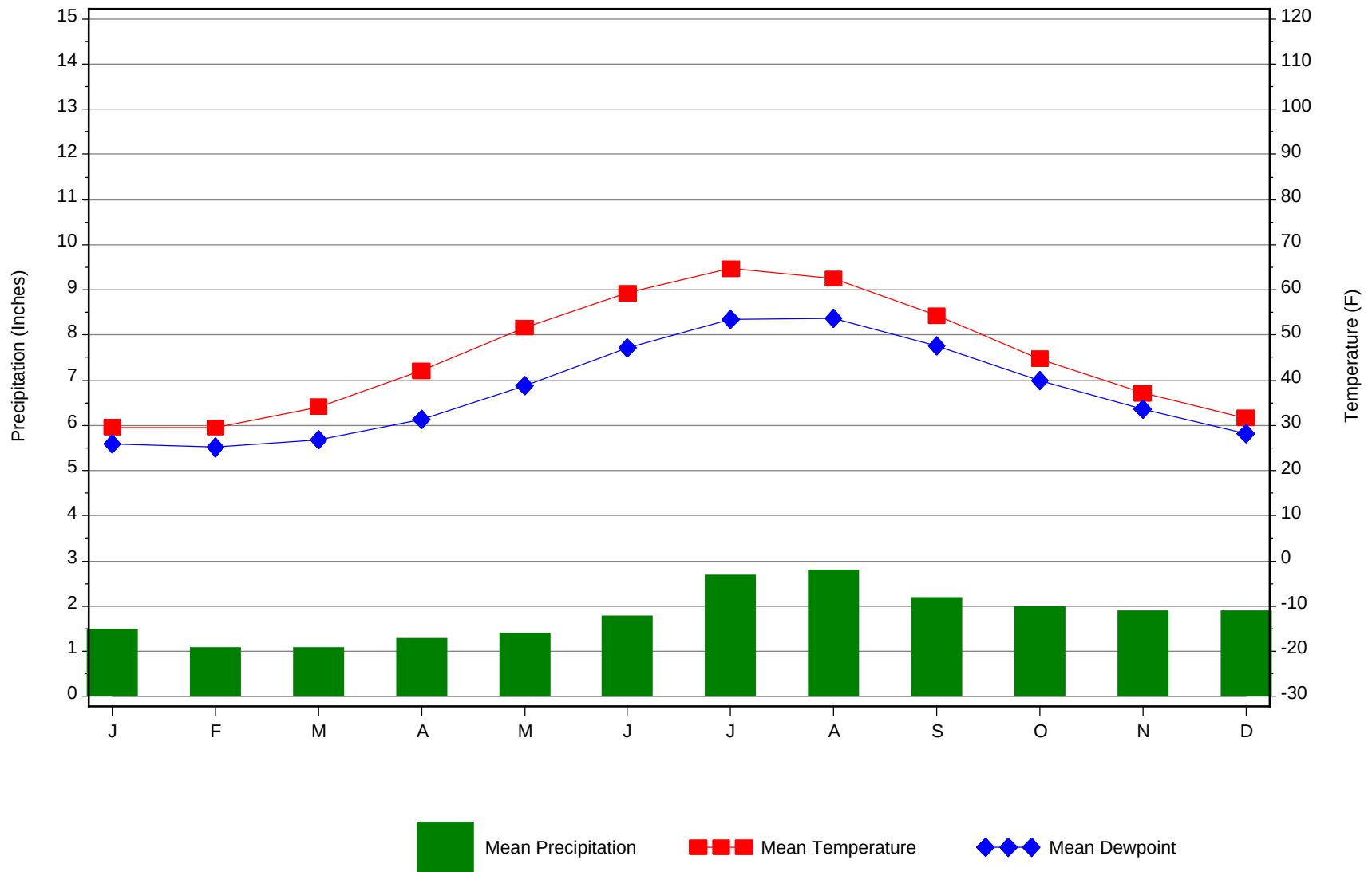
Other Site Data

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
5	N/A	N/A	0.1 + 0.0
Ground Water Temperature (°F) 50 Foot Depth*	Frost Depth 50 Year Recurrence (in)	Ground Snow Load 50 Year Recurrence (lb/ft²)	Average Annual Freeze-Thaw Cycles (#)
47.7	N/A	N/A	54

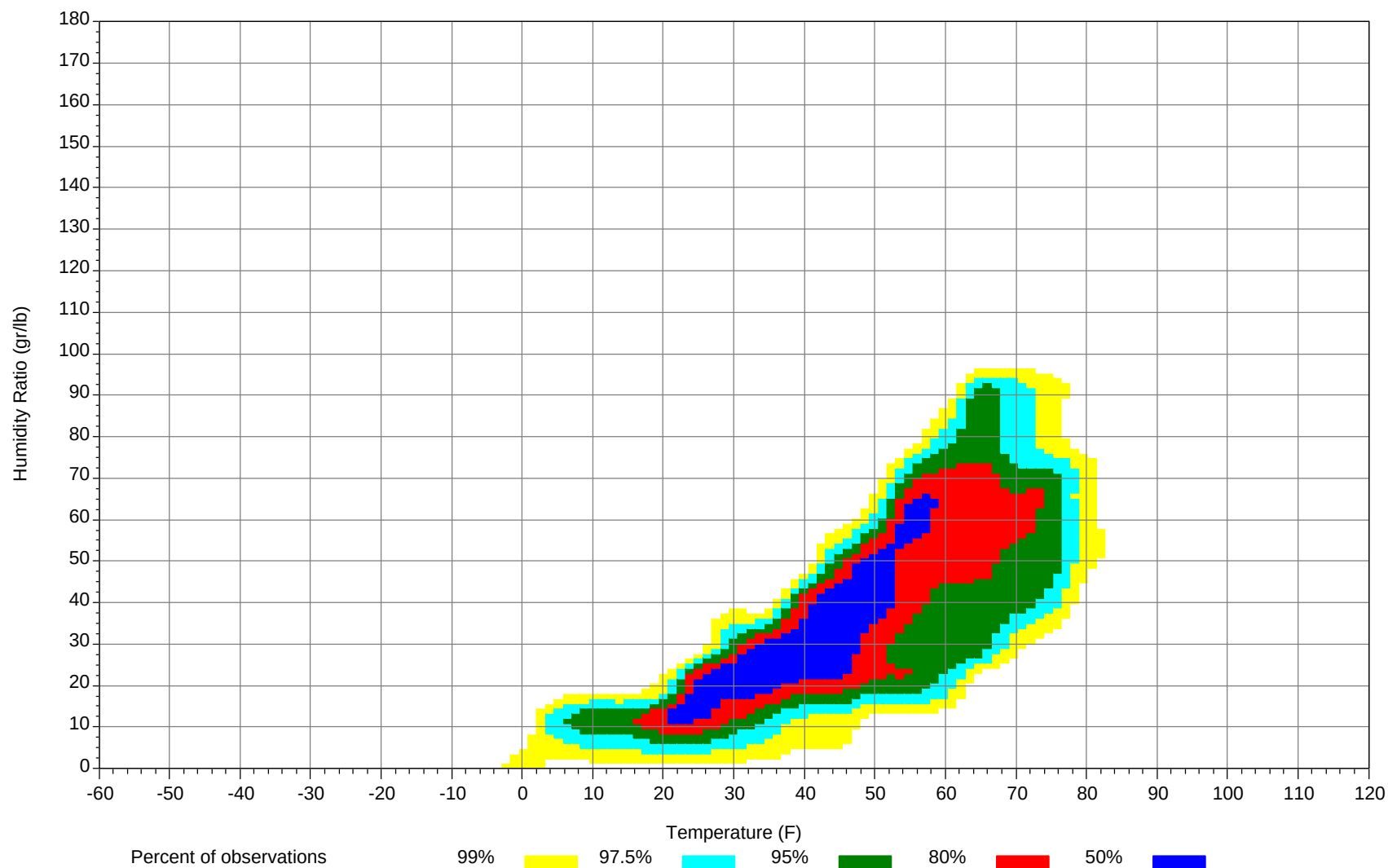
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



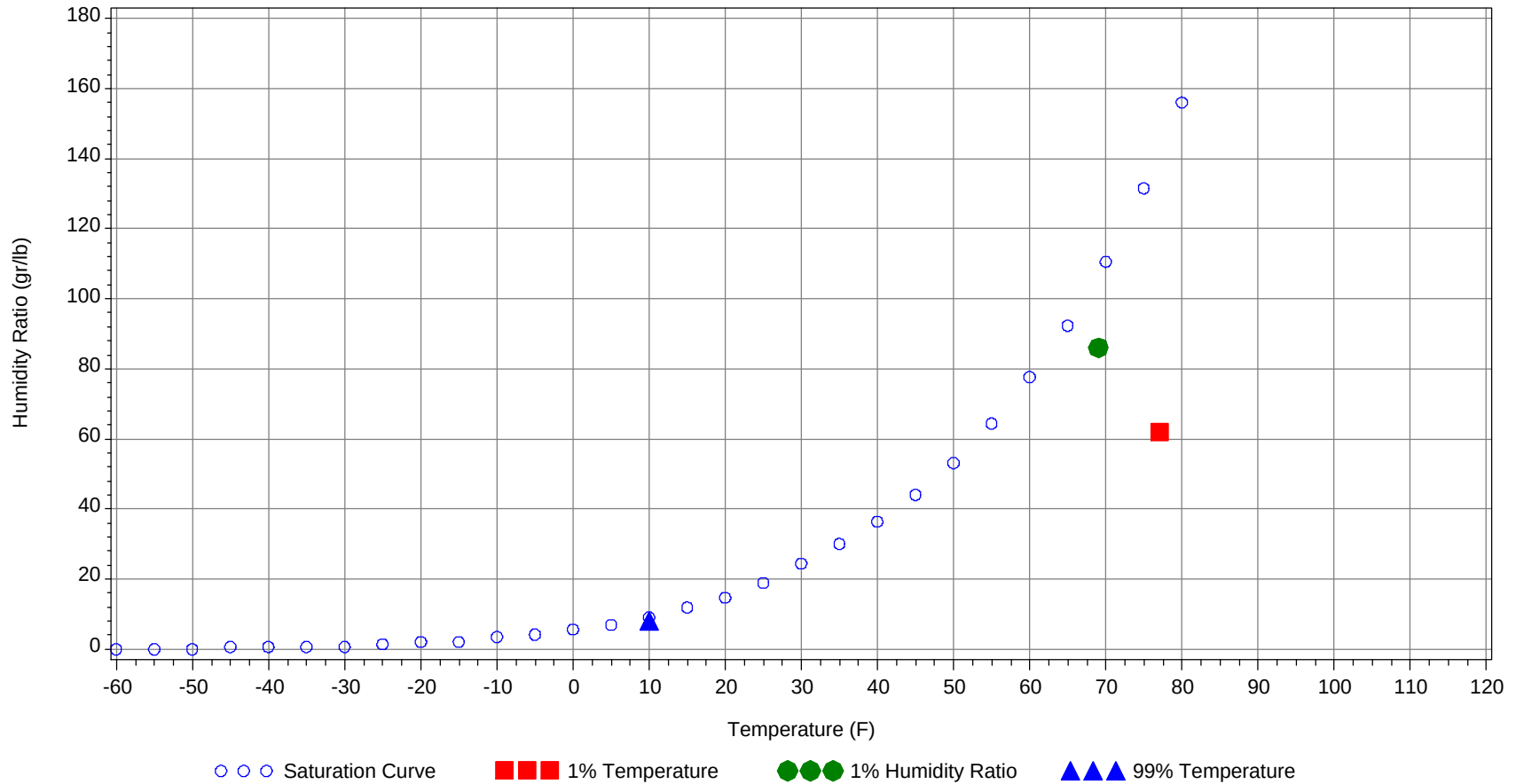
Average Annual Climate



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	77.0		63		62.0	28.1
99.0% Dry Bulb	10.0				8.0	3.6
1.0% Humidity Ratio	86.0	69.0	64.8	63.0		29.9

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)
90/ 94															
85/ 89															
80/ 84															
75/ 79															
70/ 74															
65/ 69															
60/ 64												1	0	1	49.7
55/ 59												3	1	4	46.8
50/ 54	0	0	0	0	45.6		1	1	2	47	0	14	5	19	43.3
45/ 49	2	5	3	10	42.8	3	9	4	16	42.7	4	28	15	47	40.4
40/ 44	15	18	15	48	39.4	10	18	13	41	38.9	17	40	29	86	38
35/ 39	55	61	60	176	35.5	41	55	50	146	35.3	56	76	69	201	34.5
30/ 34	67	65	65	197	30.8	59	61	61	181	30.5	81	56	74	211	30.3
25/ 29	44	49	47	140	25.6	43	39	45	127	25.4	43	22	33	98	25
20/ 24	24	20	23	67	21.1	25	19	18	62	20.9	21	6	11	38	20.7
15/ 19	20	16	18	54	16.7	19	14	17	50	16.5	15	2	6	23	16.6
10/ 14	12	8	8	28	11.7	12	4	9	25	11.5	5	0	3	8	11.7
5/ 9	5	2	6	13	6.4	7	2	4	13	6.3	4	0	1	5	6.6
0/ 4	3	2	2	7	1.1	3	1	2	6	1.5	1		0	1	1.6
-5/ -1	2	0	0	2	-3	2	0	0	2	-3.5	0		0	0	-4.5
-10/ -6	0	0	0	0	-7.7	0			0	-6.5	0			0	-7.7
-15/-11	0		0	0	-11.6										

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

	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)
90/ 94															
85/ 89												0	0	0	62.4
80/ 84		0		0	59		0	0	0	61.2		3	1	4	62.2
75/ 79		0	0	0	57.6		6	1	7	59.2	0	19	5	24	60.5
70/ 74		1	0	1	55.4	0	18	5	23	56.6	3	38	19	60	58.3
65/ 69		3	1	4	52.8	1	20	8	29	54.4	7	41	25	73	56.6
60/ 64	0	13	3	16	50	6	47	23	76	51.5	34	68	57	159	54.6
55/ 59	1	28	11	40	47	22	62	46	130	48.9	74	49	70	193	52.2
50/ 54	7	48	26	81	43.7	52	53	62	167	46	76	18	46	140	49.1
45/ 49	29	59	49	137	41	76	30	59	165	42.8	37	3	15	55	45
40/ 44	46	39	50	135	38.1	46	8	27	81	39.3	9	1	2	12	41.1
35/ 39	71	36	57	164	34.6	32	3	14	49	35.5	1		0	1	37
30/ 34	56	12	32	100	30.1	11	0	2	13	31.5					
25/ 29	25	0	9	34	25.5	1		0	1	26.3					
20/ 24	5		0	5	21.4	0			0	24					
15/ 19	1			1	17.4										
10/ 14															
5/ 9															
0/ 4															
-5/ -1															
-10/ -6															
-15/-11															

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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)
90/ 94		0		0	68.7										
85/ 89		3	1	4	66.3		1		1	66.2					
80/ 84	0	18	5	23	64.8		10	2	12	65.3					
75/ 79	2	38	17	57	62.8	1	25	8	34	64		2	0	2	62.5
70/ 74	12	63	37	112	60.9	6	57	26	89	61.5	0	12	2	14	60.5
65/ 69	26	55	49	130	59.6	18	61	43	122	60.1	1	21	6	28	58.5
60/ 64	76	55	79	210	57.8	67	68	80	215	58	11	64	30	105	56.2
55/ 59	94	15	51	160	54.8	91	23	64	178	54.7	58	83	74	215	53.2
50/ 54	32	1	9	42	50.7	47	3	21	71	50.6	75	45	71	191	49.4
45/ 49	5		1	6	46.4	14	0	4	18	46.1	56	12	37	105	45.1
40/ 44	0			0	43	3		1	4	41.8	22	1	13	36	40.8
35/ 39						1		0	1	38	14		5	19	36.8
30/ 34											3		1	4	32.2
25/ 29											0			0	28.2
20/ 24															
15/ 19															
10/ 14															
5/ 9															
0/ 4															
-5/ -1															
-10/ -6															
-15/-11															

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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)
90/ 94															
85/ 89															
80/ 84															
75/ 79															
70/ 74															
65/ 69		0	0	0	59.8										
60/ 64	0	5	1	6	55.8										
55/ 59	8	33	13	54	52.9	0	1	0	1	51		0		0	51
50/ 54	39	70	51	160	48.9	6	11	6	23	48.4	2	1	2	5	47.4
45/ 49	69	75	73	217	44.3	36	48	39	123	44.3	10	13	11	34	43.3
40/ 44	48	36	44	128	39.9	38	43	44	125	40.3	26	28	25	79	39.8
35/ 39	41	22	41	104	35.6	63	64	62	189	35.7	56	64	64	184	35.8
30/ 34	28	6	17	51	30.8	58	51	54	163	30.9	65	67	58	190	30.9
25/ 29	13	1	7	21	26.1	23	15	22	60	26	44	39	45	128	25.9
20/ 24	2	0	1	3	21.7	9	4	7	20	21.4	18	13	18	49	21.2
15/ 19	1		0	1	17.1	4	3	4	11	17	14	13	12	39	17
10/ 14	0		0	0	13.3	2	0	1	3	12.1	7	6	7	20	11.8
5/ 9						1	0	0	1	7	4	3	4	11	6.5
0/ 4						0			0	3	2	1	1	4	1.5
-5/ -1											1	0	1	2	-3.1
-10/ -6											0	0	1	1	-7.9
-15/-11											0	0		0	-11.1

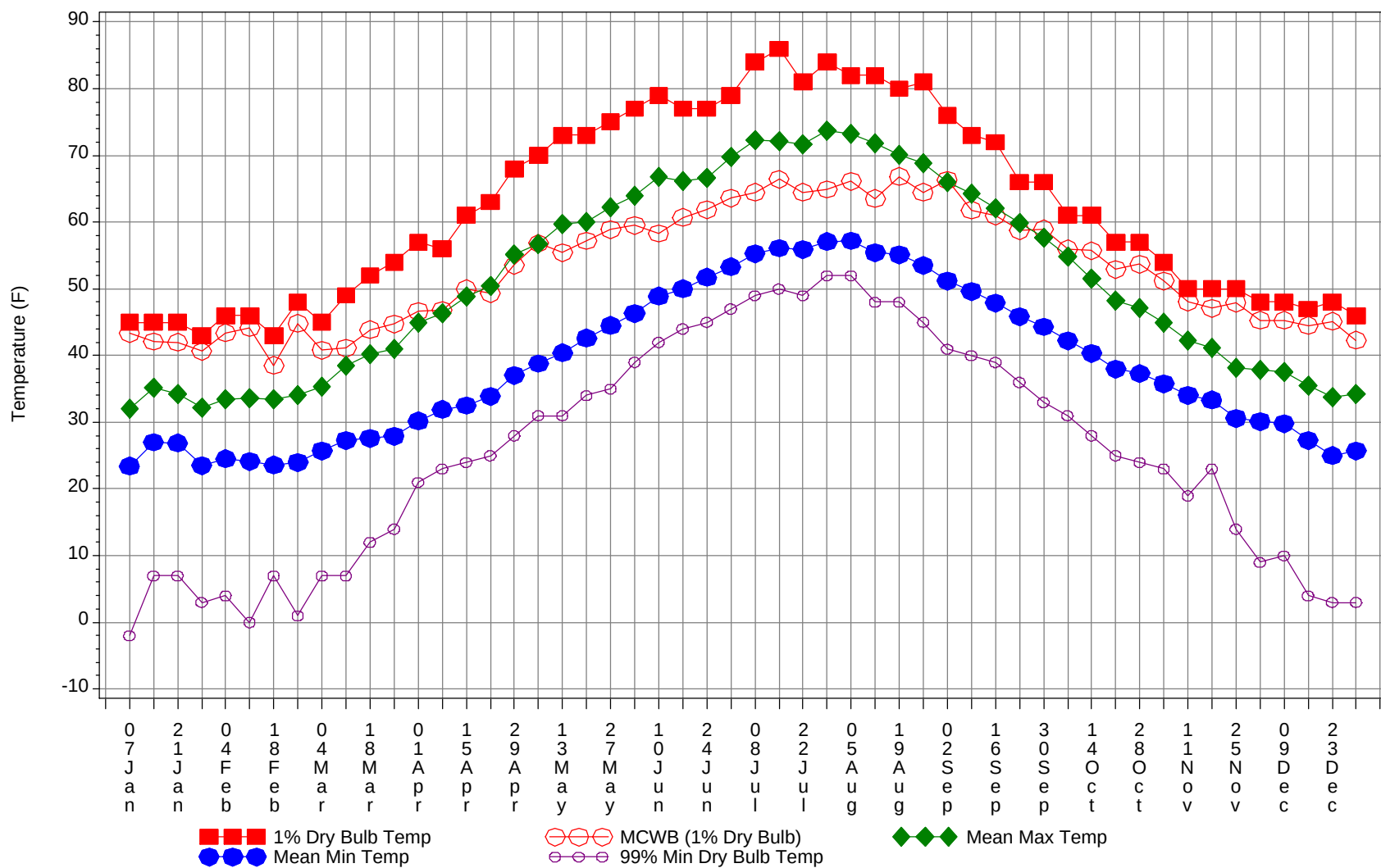
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

Dry-Bulb Temperature Hours For An Average Year

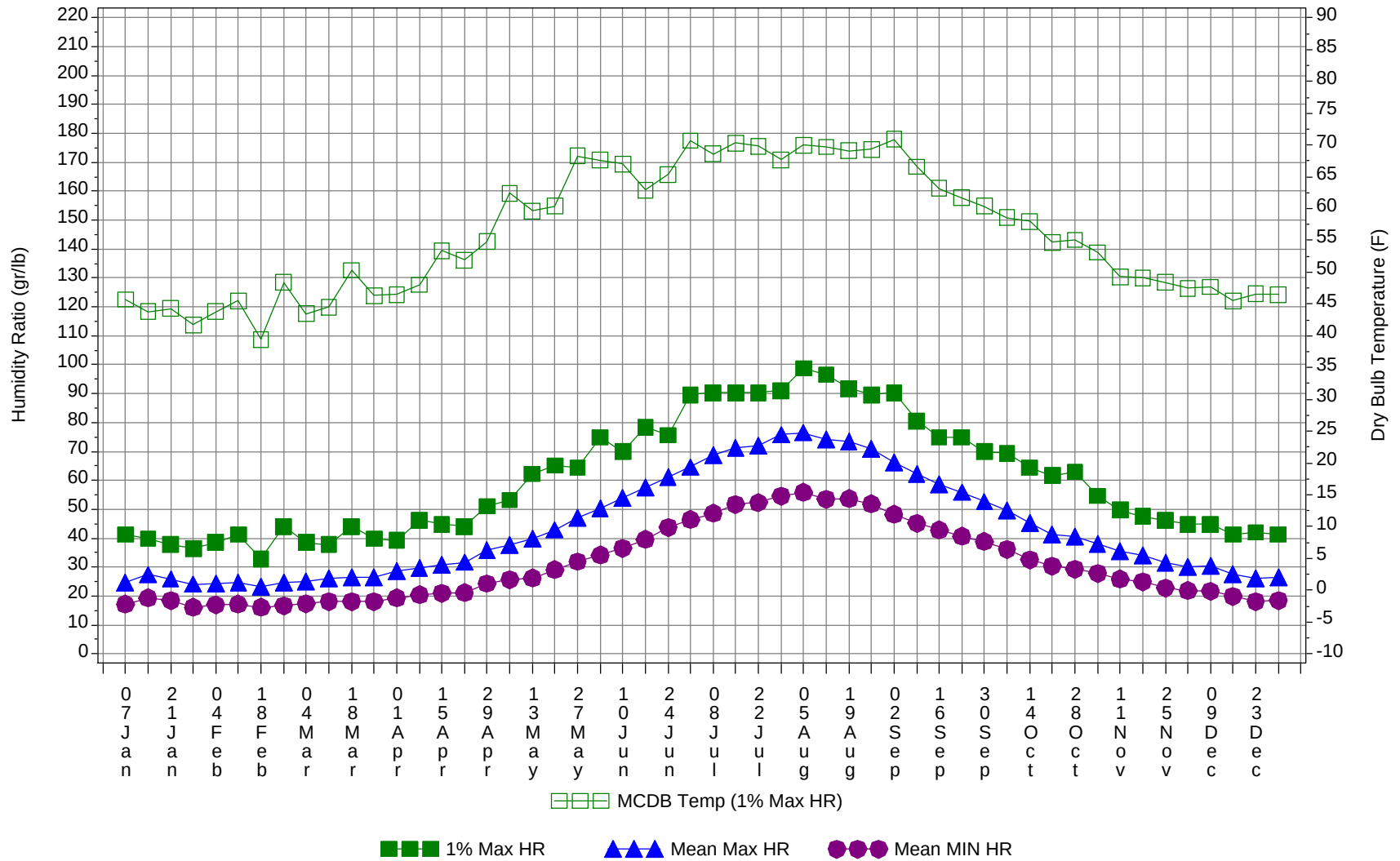
	Annual				
Temperature Range (° F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (° F)
90/ 94		0		0	68.7
85/ 89		4	1	5	66.1
80/ 84	0	31	8	39	64.7
75/ 79	3	91	31	125	62.5
70/ 74	21	190	89	300	60.2
65/ 69	54	201	132	387	58.6
60/ 64	194	320	274	788	56.2
55/ 59	349	299	330	978	52.7
50/ 54	334	264	300	898	48.1
45/ 49	339	280	310	929	43.5
40/ 44	279	231	264	774	39.3
35/ 39	429	382	423	1234	35.3
30/ 34	429	319	364	1112	30.6
25/ 29	237	166	209	612	25.6
20/ 24	105	63	78	246	21.1
15/ 19	74	48	58	180	16.7
10/ 14	38	20	28	86	11.7
5/ 9	19	7	14	40	6.4
0/ 4	10	3	6	19	1.4
-5/ -1	4	1	1	6	-3.2
-10/ -6	1	0	1	2	-7.5
-15/-11	0	0	0	0	-11.4

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



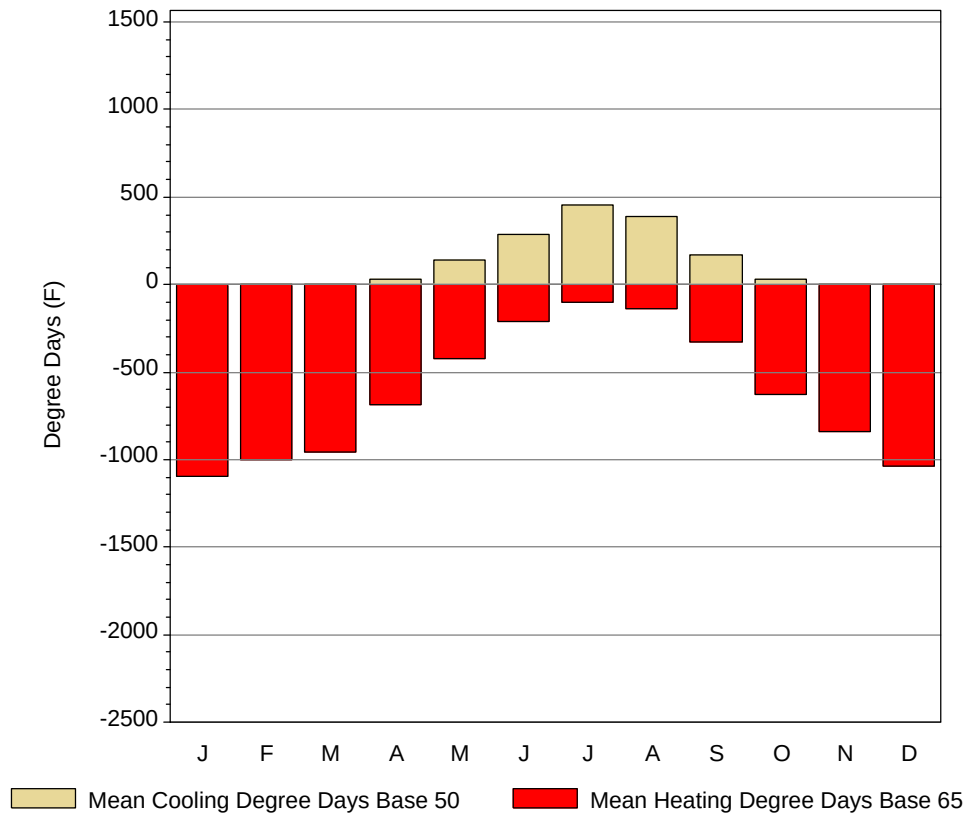
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

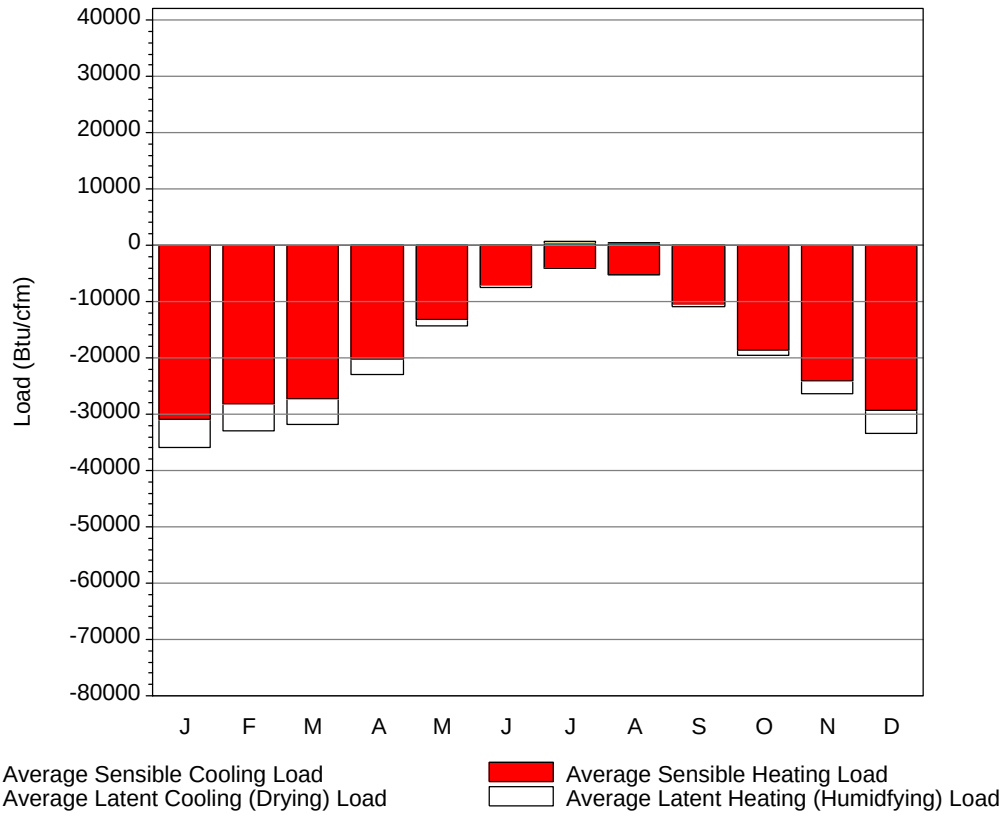
Week Ending	1.0% Temp (° F)	MCWB@ 1% Temp (° F)	Mean Max Temp (° F)	Mean Min Temp (° F)	99% Temp (° F)	1.0% HR (gr/lb)	MCDB@ 1% HR (° F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	45	43.3	32.1	23.4	-2	41.3	45.7	24.8	17.1
14-Jan	45	42.1	35.1	27	7	39.9	43.8	27.4	19.4
21-Jan	45	42	34.3	26.9	7	37.8	44.3	25.9	18.4
28-Jan	43	40.6	32.2	23.5	3	36.4	41.7	24.1	16.1
4-Feb	46	43.4	33.4	24.5	4	38.5	43.8	24.3	16.9
11-Feb	46	44.2	33.6	24.1	0	41.3	45.5	24.7	17.2
18-Feb	43	38.5	33.4	23.6	7	32.9	39.4	23.3	16.1
25-Feb	48	44.8	34.1	24	1	44.1	48.4	24.6	16.6
4-Mar	45	40.8	35.4	25.7	7	38.5	43.5	24.9	17.4
11-Mar	49	41.1	38.5	27.3	7	37.8	44.5	26.1	18.1
18-Mar	52	43.9	40.2	27.6	12	44.1	50.3	26.6	18
25-Mar	54	44.7	41	27.9	14	39.9	46.3	26.5	18.1
1-Apr	57	46.6	45	30.2	21	39.2	46.5	28.6	19.3
8-Apr	56	46.8	46.3	31.9	23	46.2	48	29.6	20.4
15-Apr	61	50	48.8	32.5	24	44.8	53.4	30.8	20.9
22-Apr	63	49.3	50.4	33.9	25	44.1	51.9	31.7	21.2
29-Apr	68	53.5	55.1	37	28	51.1	54.8	35.9	24.3
6-May	70	56.8	56.7	38.8	31	53.2	62.4	37.6	25.6
13-May	73	55.4	59.7	40.4	31	62.3	59.6	39.8	26.2
20-May	73	57.2	60	42.6	34	65.1	60.4	42.9	29.1
27-May	75	58.9	62.3	44.5	35	64.4	68.3	47.1	31.9
4-Jun	77	59.5	64	46.3	39	74.9	67.6	50.3	34.2
10-Jun	79	58.3	66.8	48.9	42	70	67	54	36.5
17-Jun	77	60.7	66.2	50	44	78.4	62.9	57.6	39.5
24-Jun	77	61.9	66.6	51.7	45	75.6	65.4	61.3	43.8
1-Jul	79	63.6	69.8	53.3	47	89.6	70.7	64.6	46.5
8-Jul	84	64.5	72.3	55.3	49	90.3	68.6	68.7	48.6
15-Jul	86	66.4	72.1	56.1	50	90.3	70.3	71.4	51.7
22-Jul	81	64.5	71.6	55.9	49	90.3	69.8	72.1	52.3
29-Jul	84	64.9	73.7	57.1	52	91	67.7	75.8	54.6
5-Aug	82	66.1	73.2	57.2	52	98.7	70	76.5	55.8
12-Aug	82	63.5	71.8	55.4	48	96.6	69.7	74.2	53.5
19-Aug	80	66.8	70.1	55.1	48	91.7	69.1	73.5	53.7
26-Aug	81	64.5	68.9	53.5	45	89.6	69.3	71	51.8
2-Sep	76	66.3	66	51.2	41	90.3	70.9	66.1	48.3
9-Sep	73	61.8	64.2	49.6	40	80.5	66.6	62.2	45.2
16-Sep	72	60.9	62	47.9	39	74.9	63.2	58.7	42.9
23-Sep	66	58.7	59.9	45.8	36	74.9	61.7	55.9	40.6
30-Sep	66	59	57.6	44.3	33	70	60.4	52.7	38.8
7-Oct	61	56	54.9	42.2	31	69.3	58.6	49.7	36.1
14-Oct	61	55.7	51.5	40.3	28	64.4	58	45.3	32.5
21-Oct	57	52.9	48.3	38	25	61.6	54.7	41.3	30.3
28-Oct	57	53.7	47.1	37.3	24	63	55.1	40.6	29.3
4-Nov	54	51.2	44.9	35.8	23	54.6	53.1	38.1	27.8
11-Nov	50	48	42.3	34	19	49.7	49.3	35.5	25.9
18-Nov	50	47.1	41.1	33.3	23	47.6	49.1	34	24.9
25-Nov	50	47.9	38.2	30.6	14	46.2	48.4	31.4	22.7
2-Dec	48	45.3	37.8	30.1	9	44.8	47.5	30.2	21.9
9-Dec	48	45.3	37.6	29.8	10	44.8	47.7	30.4	21.6
16-Dec	47	44.5	35.5	27.3	4	41.3	45.5	27.7	19.8
23-Dec	48	45.1	33.7	25	3	42	46.6	26	18
31-Dec	46	42.3	34.2	25.7	3	41.3	46.5	26.6	18.4

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	0	0	1098.9
FEB	0.1	0	1002.6
MAR	2.8	0	957.8
APR	29.7	0.9	686.8
MAY	139	12.3	423.6
JUN	288	36.1	208.6
JUL	454.8	88.5	99.4
AUG	392.3	58.5	134.7
SEP	166.8	6.7	327.5
OCT	27.6	0	628.1
NOV	1.1	0	836.5
DEC	0.3	0	1034.6
ANN	1502.5	203	7439.1

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	-30894	0	-4998
FEB	0	-28184	0	-4816
MAR	0	-27236	0	-4572
APR	1	-20120	0	-2846
MAY	12	-13226	0	-1019
JUN	63	-7306	28	-127
JUL	336	-4082	320	-8
AUG	151	-5208	418	-4
SEP	2	-10715	13	-85
OCT	0	-18690	0	-947
NOV	0	-24016	0	-2264
DEC	0	-29228	0	-4108
ANN	565	-218905	779	-25794

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													

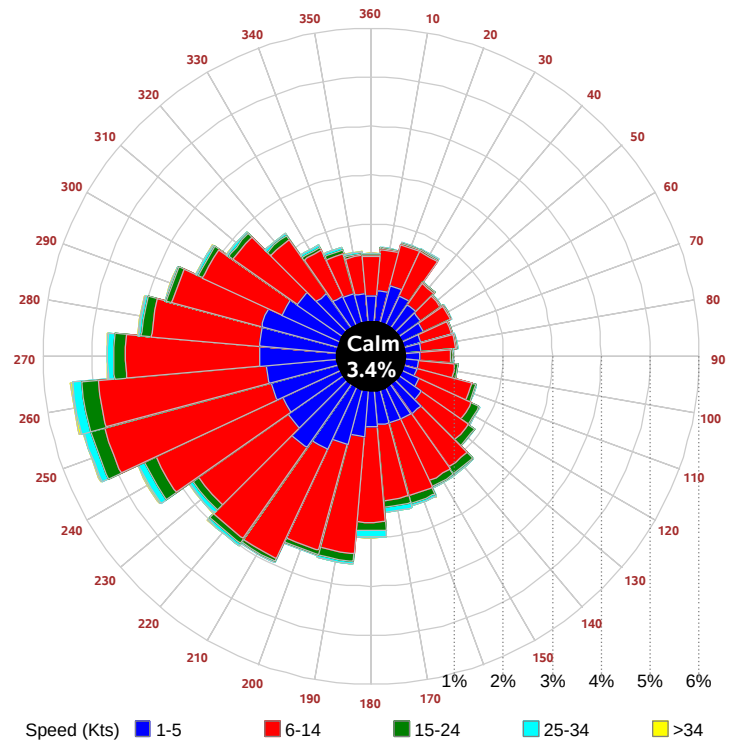
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

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													

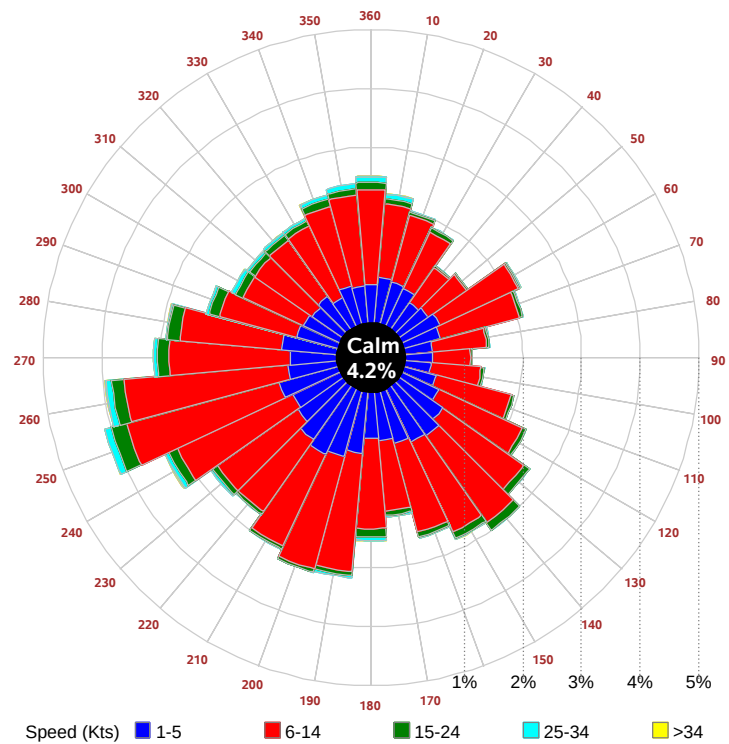
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9												
				March						June		
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear			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

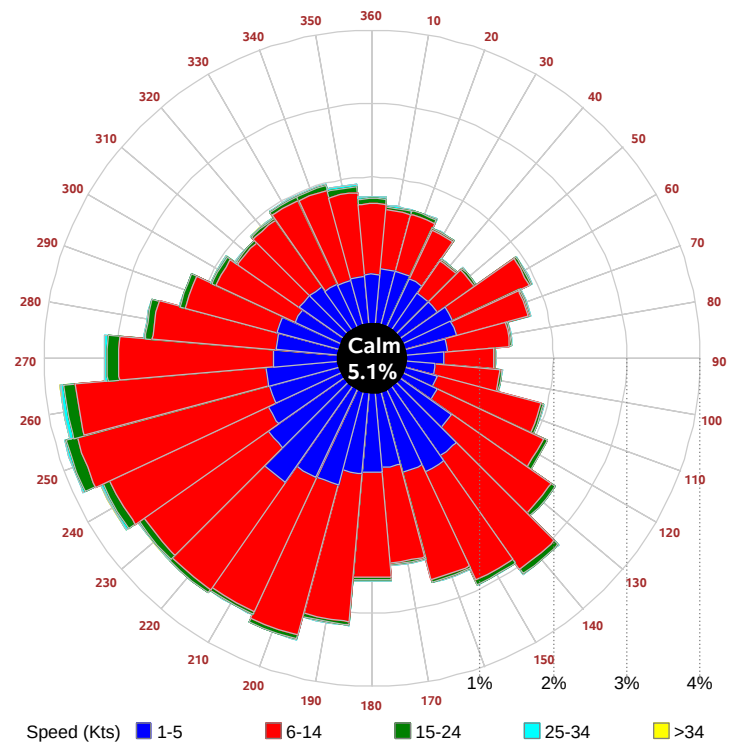
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

