

NAHA, JA	
Latitude = 26.20 N	Station ID = ICAO_ROAH
Longitude = 127.65 E	Elevation = 12 Feet
Period of Record = 1988 To 2017	Average Pressure = 29.89 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	91	80	140	12.6	E
0.4% Occurrence	90	80	140	12.6	E
1.0% Occurrence	90	80	140	12.6	E
2.0% Occurrence	88	80	140	12.3	SSW
Mean Daily Range	7	-	-	-	N
97.5% Occurrence	57	50	42	14.8	N
99.0% Occurrence	55	48	39	16.8	N
99.6% Occurrence	55	48	39	16.8	N
Median of Extreme Lows	52	46	36	20.2	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	83	88	157	12.5	SSW
0.4% Occurrence	82	87	153	12.5	SSW
1.0% Occurrence	82	87	153	12.5	SSW
2.0% Occurrence	81	86	150	12.2	SSW

	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	169	87	1.11	10.9	SSW
0.4% Occurrence	160	86	1.05	12.3	SSW
1.0% Occurrence	160	86	1.05	12.1	SSW
2.0% Occurrence	151	84	0.99	12.7	SSW

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	7	2906	3527	5016

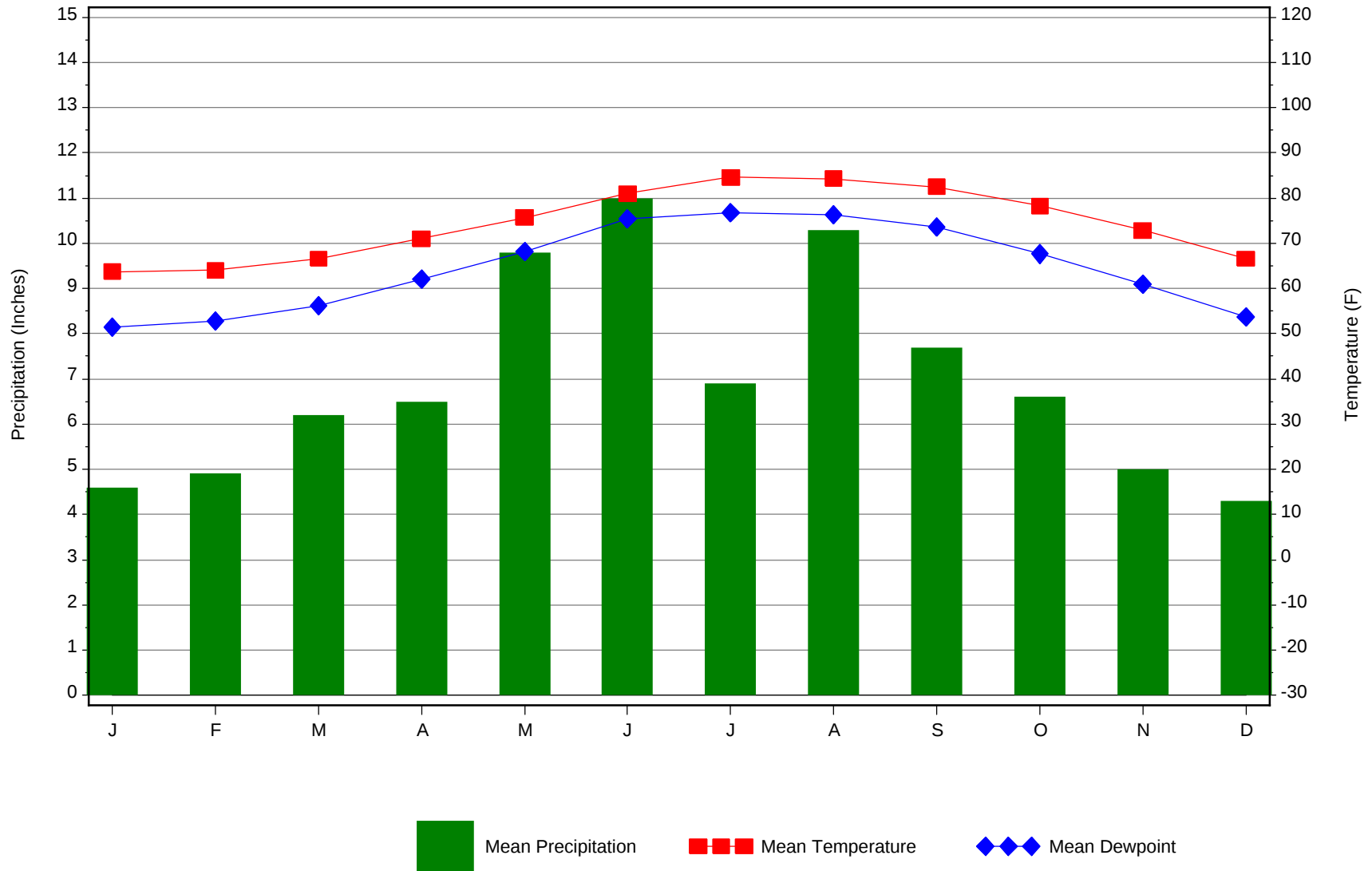
Other Site Data

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	N/A	13.1 + 2.6
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 (#)
76.8	N/A	N/A	0

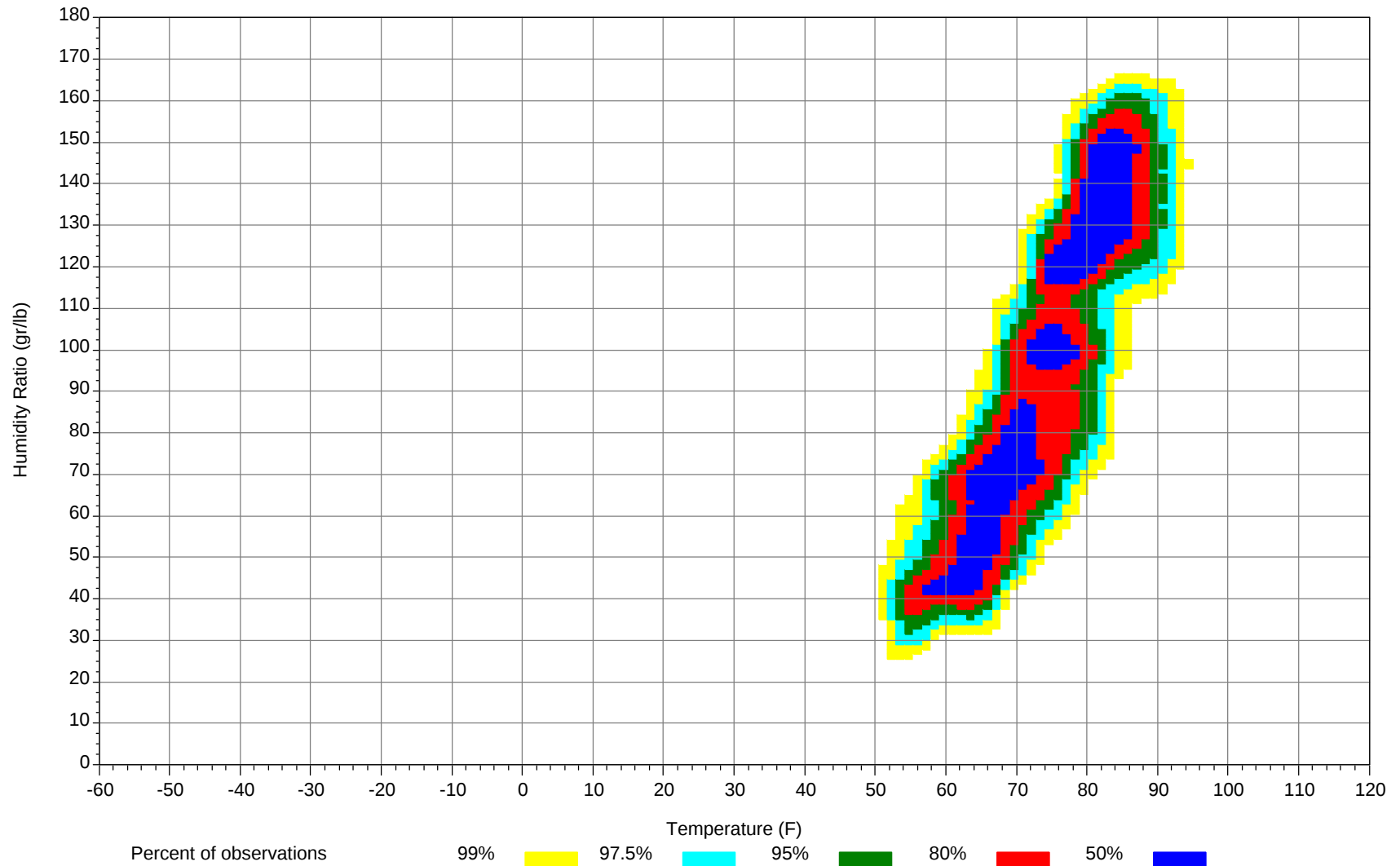
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



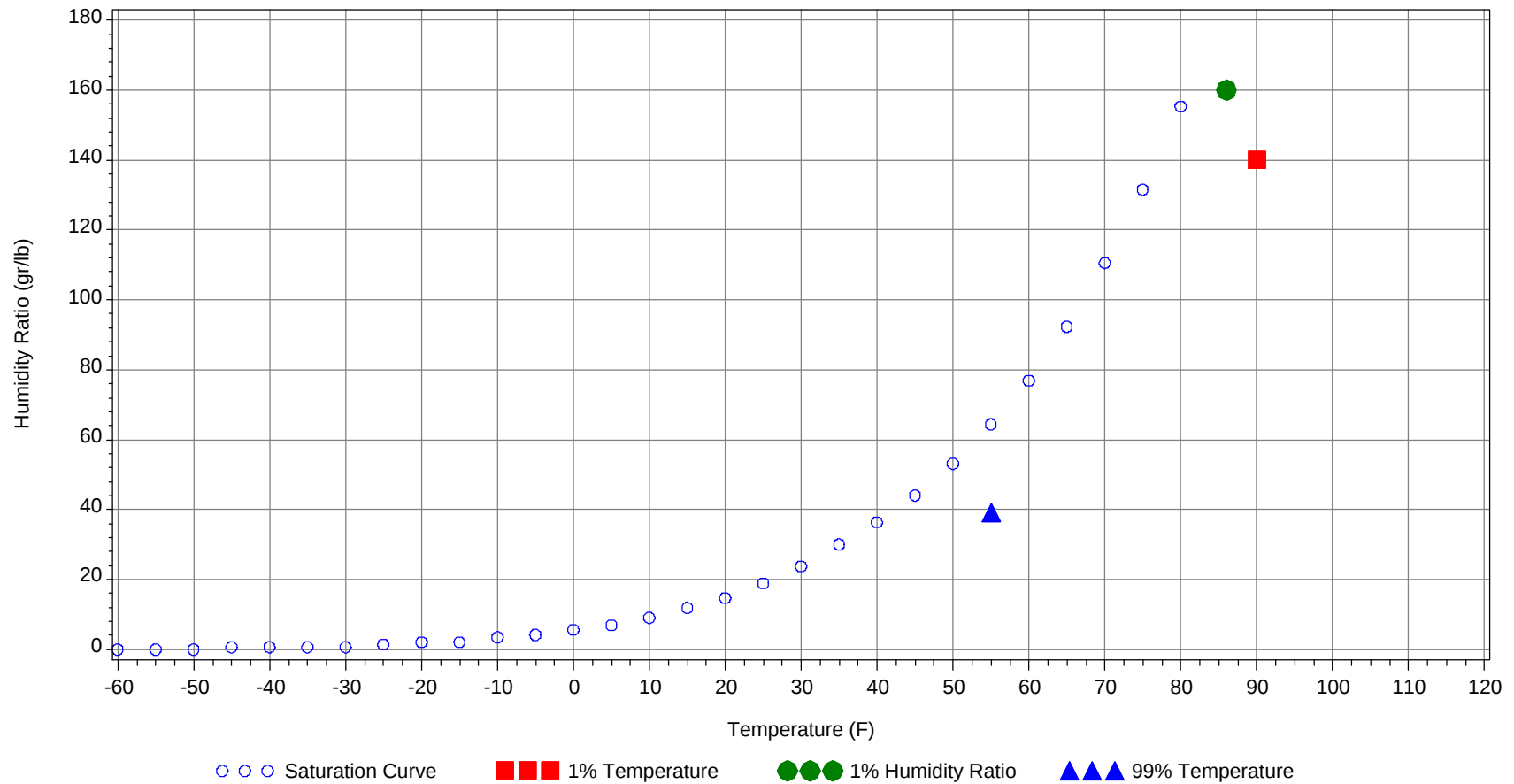
Average Annual Climate



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	90.0		80		140.0	43.7
99.0% Dry Bulb	55.0				39.0	19.3
1.0% Humidity Ratio	160.0	86.0	82	80.6		45.7

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)
95/ 99															
90/ 94															
85/ 89															
80/ 84							0		0	70		1		1	73.2
75/ 79	0	7	1	8	68.3		12	1	13	69.7	2	37	8	47	70.2
70/ 74	18	56	30	104	64.4	23	58	37	118	65.4	55	90	76	221	66.1
65/ 69	47	63	56	166	60.5	43	51	50	144	61	69	55	68	192	61.2
60/ 64	100	89	102	291	55.5	83	72	81	236	56	76	52	70	198	55.8
55/ 59	75	30	55	160	50.8	69	30	53	152	50.8	43	13	25	81	50.8
50/ 54	8	2	4	14	46.9	6	1	2	9	46.8	3	1	2	6	46.4
45/ 49	0	0	0	0	42.3						0		0	0	41.9
40/ 44			0	0	40										

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)
95/ 99															
90/ 94												5	0	5	81.2
85/ 89							4	0	4	78.9	2	82	18	102	80.4
80/ 84	0	15	1	16	75.2	8	79	24	111	75.9	122	109	132	363	78.2
75/ 79	25	86	43	154	71.4	112	124	131	367	72	98	40	80	218	74.1
70/ 74	106	98	118	322	66.4	108	37	83	228	67.1	17	4	10	31	69.3
65/ 69	65	30	53	148	60.9	18	4	8	30	62.7	0	0	0	0	65.8
60/ 64	39	10	22	71	56.3	2	0	2	4	58.7	0		0	0	62.8
55/ 59	5	1	2	8	52.3										
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

	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)
95/ 99							0		0	82.5					
90/ 94		54	5	59	80.2	0	48	4	52	80.1		16	1	17	79.6
85/ 89	21	149	78	248	79.6	19	141	68	228	79.3	4	108	25	137	78.2
80/ 84	215	40	159	414	78.3	211	53	167	431	78	161	103	173	437	76.3
75/ 79	12	4	6	22	76.2	18	6	8	32	75.9	74	13	41	128	72.5
70/ 74	0		0	0	70.1		0	0	0	71.7	1	0	1	2	68.3
65/ 69											0		0	0	64.3
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)
95/ 99															
90/ 94		1		1	78.7										
85/ 89		24	2	26	77.4		1		1	78.6					
80/ 84	37	129	67	233	74.3	1	33	4	38	73.4		1		1	74.3
75/ 79	150	81	143	374	70.4	51	105	76	232	69.5	2	31	6	39	68
70/ 74	59	12	35	106	65	118	82	112	312	64.3	47	87	62	196	63.9
65/ 69	2	1	1	4	62.9	53	15	38	106	59.5	65	70	77	212	59.5
60/ 64			0	0	63	16	5	10	31	55.1	107	53	86	246	55.2
55/ 59						0	0	0	0	52	26	7	17	50	51.2
50/ 54											1	1	1	3	47.1
45/ 49												0		0	46
40/ 44															

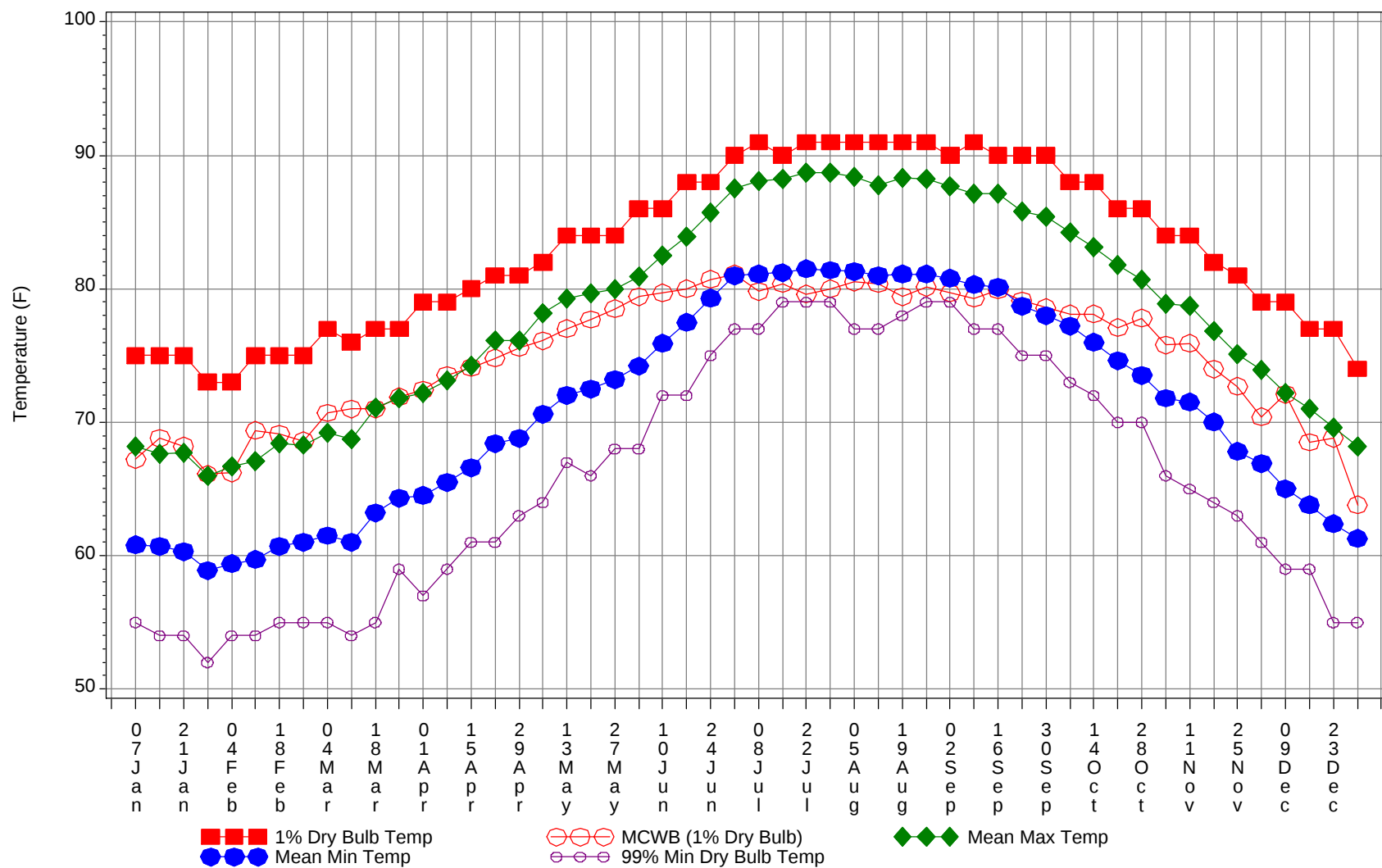
Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

Dry-Bulb Temperature Hours For An Average Year

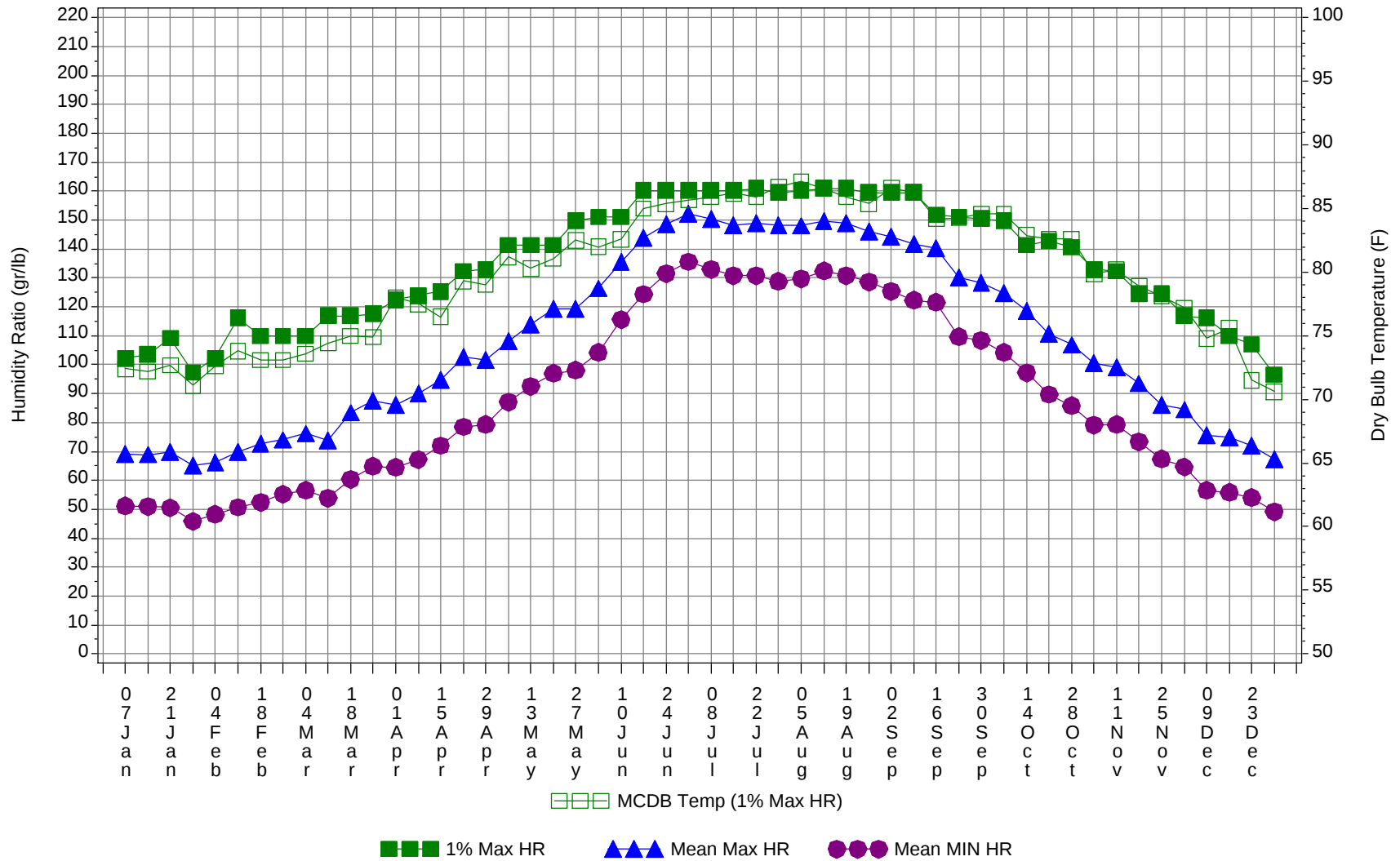
	Annual				
Temperature Range (° F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (° F)
95/ 99		0		0	82.5
90/ 94	0	124	11	135	80.1
85/ 89	45	509	191	745	79.3
80/ 84	757	562	728	2047	77.1
75/ 79	545	546	544	1635	71.5
70/ 74	553	524	563	1640	65.5
65/ 69	362	290	351	1003	60.5
60/ 64	421	280	373	1074	55.6
55/ 59	218	81	151	450	50.9
50/ 54	18	5	9	32	46.8
45/ 49	0	0	0	0	42.3
40/ 44			0	0	40

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



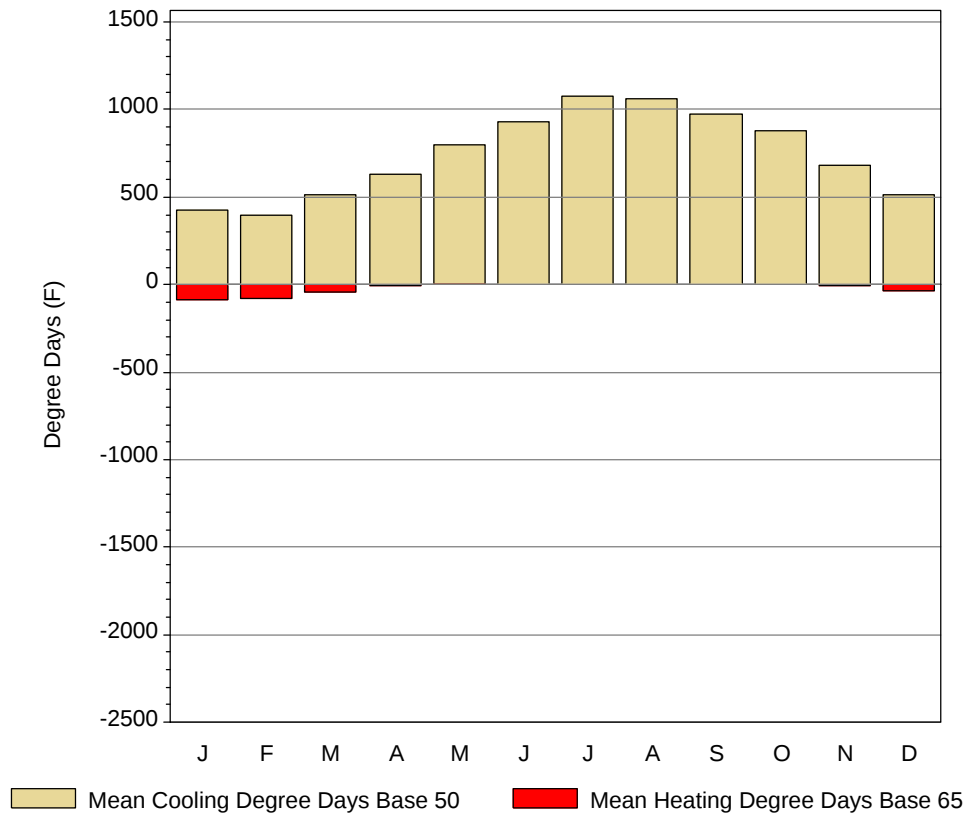
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

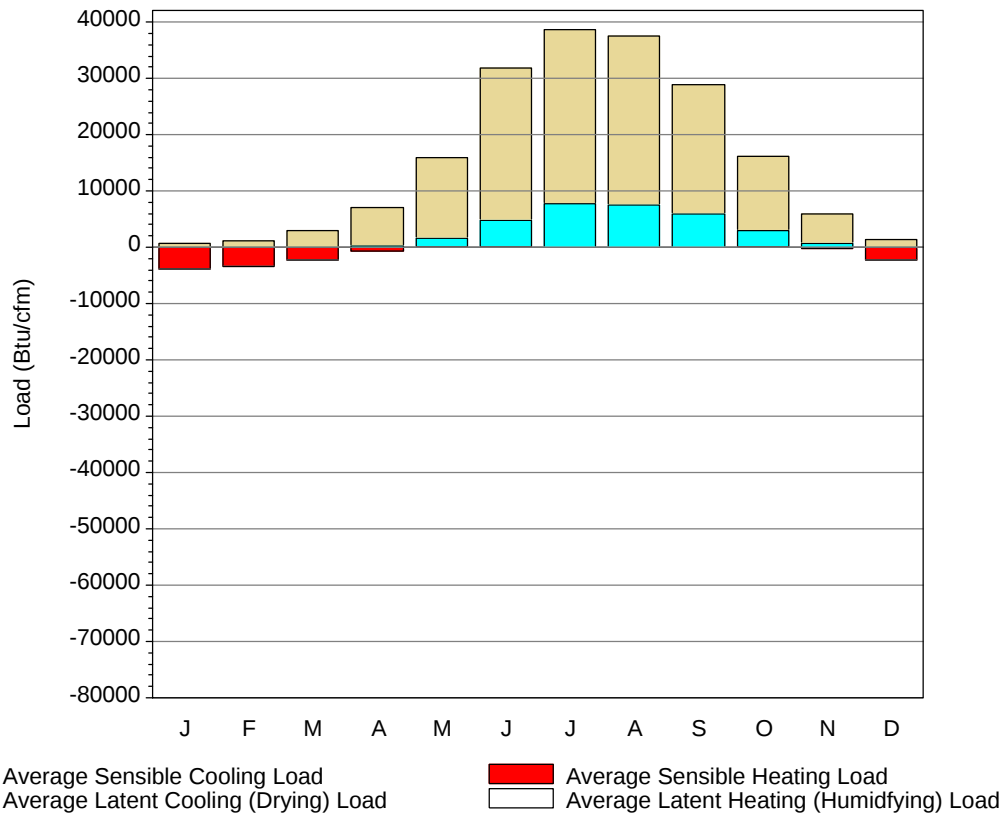
Week Ending	1.0% Temp (° F)	MCWB@ 1% Temp (° F)	Mean Max Temp (° F)	Mean Min Temp (° F)	99% Temp (° F)	1.0% HR (gr/lb)	MCDB@ 1% HR (° F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	75	67.2	68.2	60.8	55	102.2	72.4	69	51.2
14-Jan	75	68.8	67.6	60.7	54	103.6	72.2	68.9	51
21-Jan	75	68.2	67.7	60.3	54	109.2	72.7	69.7	50.5
28-Jan	73	66.1	66	58.9	52	97.3	71.1	65.2	45.8
4-Feb	73	66.2	66.7	59.4	54	102.2	72.6	66.2	48.2
11-Feb	75	69.4	67.1	59.7	54	116.2	73.8	69.8	50.7
18-Feb	75	69.1	68.4	60.7	55	109.9	73.1	72.6	52.4
25-Feb	75	68.6	68.3	61	55	109.9	73.1	74	55.2
4-Mar	77	70.7	69.2	61.5	55	109.9	73.6	76.2	56.5
11-Mar	76	71	68.7	61	54	116.9	74.4	73.9	53.8
18-Mar	77	71	71.1	63.2	55	116.9	75	83.4	60.4
25-Mar	77	71.9	71.8	64.3	59	117.6	74.9	87.6	64.8
1-Apr	79	72.4	72.2	64.5	57	122.5	78	86	64.5
8-Apr	79	73.5	73.1	65.5	59	123.9	77.5	90.1	67.2
15-Apr	80	74.1	74.2	66.6	61	125.3	76.5	94.8	72
22-Apr	81	74.8	76.1	68.4	61	132.3	79.3	102.6	78.5
29-Apr	81	75.6	76.1	68.8	63	133	79	101.7	79.3
6-May	82	76.1	78.2	70.6	64	141.4	81.2	108.1	87.1
13-May	84	77	79.3	72	67	141.4	80.3	113.9	92.5
20-May	84	77.7	79.7	72.5	66	141.4	81.1	119.4	97.1
27-May	84	78.5	80	73.2	68	149.8	82.5	119.3	98.1
4-Jun	86	79.4	80.9	74.2	68	151.2	82	126.4	104.3
10-Jun	86	79.7	82.5	75.9	72	151.2	82.6	135.6	115.7
17-Jun	88	80	83.9	77.5	72	160.3	85	144	124.4
24-Jun	88	80.7	85.7	79.3	75	160.3	85.4	148.6	131.6
1-Jul	90	81.1	87.5	81	77	160.3	85.7	152.1	135.6
8-Jul	91	79.8	88.1	81.1	77	160.3	85.9	150.3	133
15-Jul	90	80.4	88.2	81.2	79	160.3	86.2	148.3	130.8
22-Jul	91	79.6	88.7	81.5	79	161	85.9	148.9	130.8
29-Jul	91	80	88.7	81.4	79	159.6	86.7	148.2	128.8
5-Aug	91	80.5	88.4	81.3	77	160.3	87.1	148.1	129.7
12-Aug	91	80.4	87.8	81	77	161	86.6	149.8	132.4
19-Aug	91	79.4	88.3	81.1	78	161	85.9	149.1	130.8
26-Aug	91	80.1	88.2	81.1	79	159.6	85.4	146	128.6
2-Sep	90	79.7	87.7	80.8	79	159.6	86.6	144.4	125.4
9-Sep	91	79.3	87.1	80.3	77	159.6	86.3	141.8	122.3
16-Sep	90	79.9	87.1	80.1	77	151.9	84.2	140.3	121.6
23-Sep	90	79.1	85.8	78.7	75	151.2	84.3	130.2	109.7
30-Sep	90	78.6	85.4	78	75	150.5	84.6	128.3	108.4
7-Oct	88	78.1	84.2	77.2	73	149.8	84.6	124.7	104.3
14-Oct	88	78.1	83.1	76	72	141.4	82.9	118.6	97.2
21-Oct	86	77.1	81.8	74.6	70	142.8	82.6	110.6	89.7
28-Oct	86	77.8	80.7	73.5	70	140.7	82.6	106.9	85.8
4-Nov	84	75.8	78.9	71.8	66	133	79.9	100.6	79.2
11-Nov	84	75.9	78.7	71.5	65	132.3	80.2	99.2	79.3
18-Nov	82	74	76.8	70	64	124.6	78.9	93.5	73.3
25-Nov	81	72.7	75.1	67.8	63	124.6	78.1	86.2	67.4
2-Dec	79	70.4	73.9	66.9	61	116.9	77.2	84.5	64.6
9-Dec	79	72.1	72.2	65	59	116.2	74.8	75.6	56.5
16-Dec	77	68.5	71	63.8	59	109.9	75.6	75	55.9
23-Dec	77	68.8	69.6	62.4	55	107.1	71.5	71.9	54
31-Dec	74	63.8	68.2	61.3	55	96.6	70.6	67.3	49.2

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	423.1	43.6	85.5
FEB	395.5	48.2	76.7
MAR	516.5	97	45.6
APR	630.1	187.6	7.5
MAY	798	333.2	0.2
JUN	929.3	479.3	0
JUL	1073.3	608.3	0
AUG	1063.6	598.6	0
SEP	975.4	525.4	0
OCT	876.9	411.9	0
NOV	685	237.1	2.1
DEC	515.9	87.5	36.6
ANN	8882.6	3657.7	254.2

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	6	-3908	752	-4
FEB	13	-3450	1228	-5
MAR	52	-2286	3036	-3
APR	331	-577	6809	0
MAY	1582	-32	14262	0
JUN	4735	-1	27000	0
JUL	7732	0	30851	0
AUG	7481	0	30011	0
SEP	5850	0	22974	0
OCT	2971	-1	13171	0
NOV	680	-235	5327	0
DEC	47	-2139	1297	-1
ANN	31480	-12629	156718	-13

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													

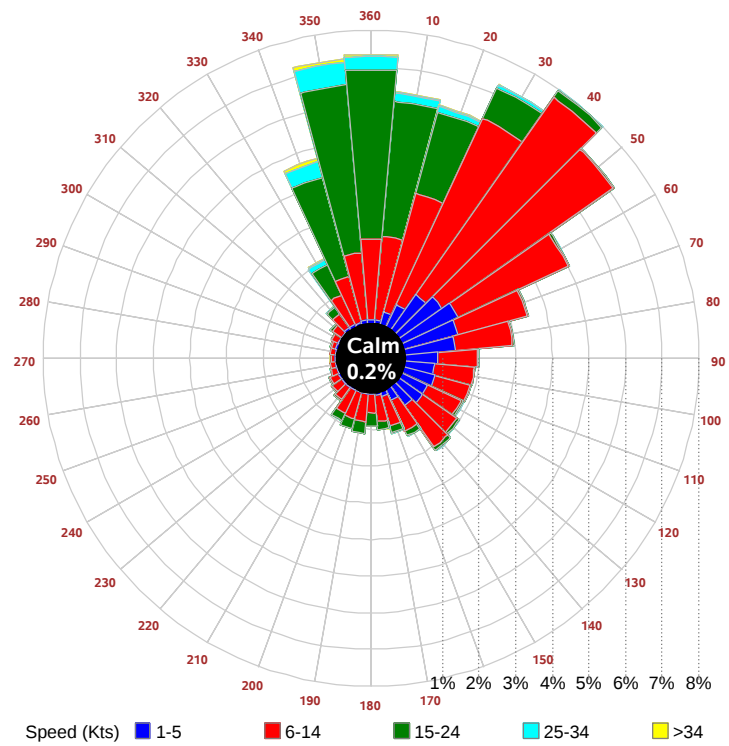
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

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													

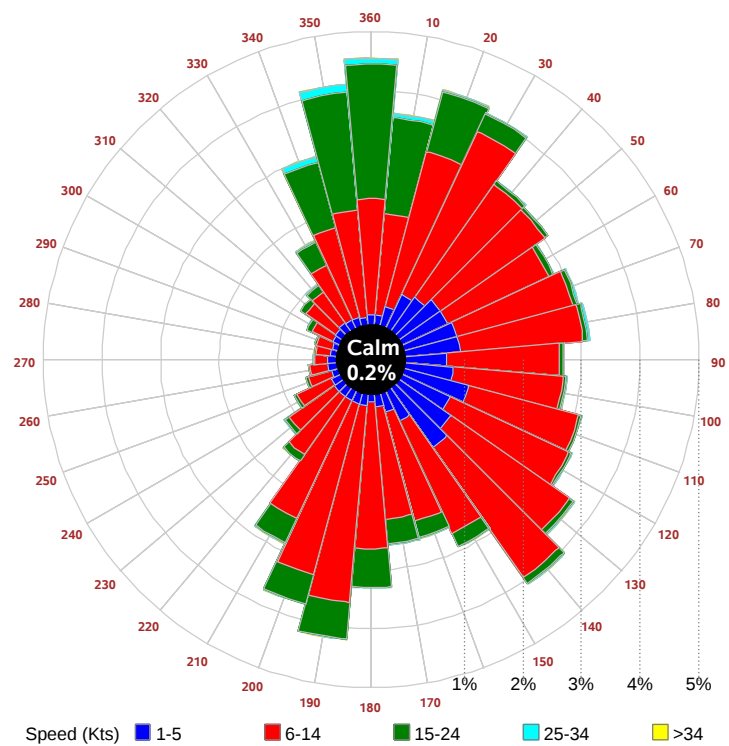
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9												
				March						June		
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm	
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear			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

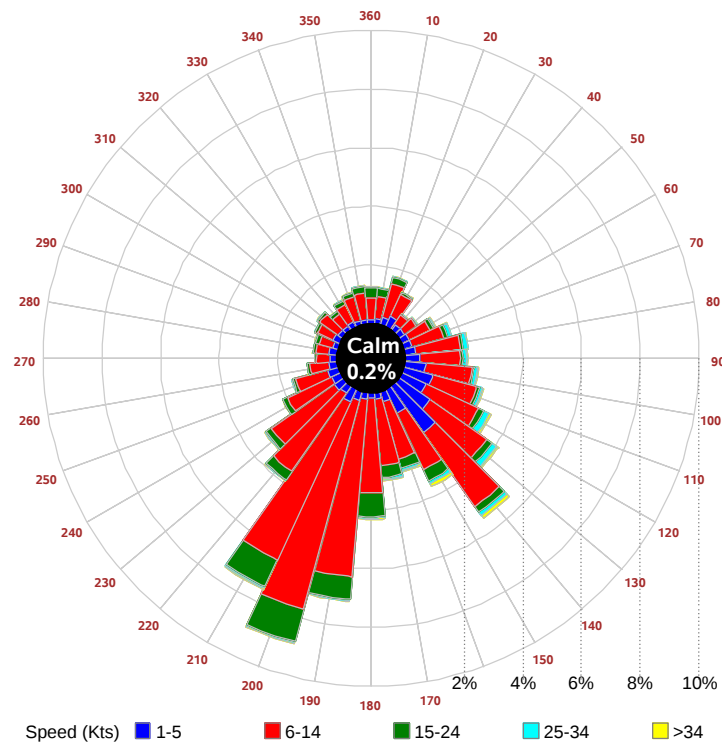
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

