

SULTAN ABDUL AZIZ SHAH I, MY

Latitude = 3.13 N

Longitude = 101.55 E

Period of Record = 1988 To 2017

Station ID = ICAO_WMSA

Elevation = 90 Feet

Average Pressure = 29.73 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	96	80	132	6.7	W
0.4% Occurrence	95	80	131	6.7	W
1.0% Occurrence	94	80	131	6.9	W
2.0% Occurrence	93	79	131	7	W
Mean Daily Range	14	-	-	-	N
97.5% Occurrence	75	74	124	1.7	N
99.0% Occurrence	73	72	117	1.5	N
99.6% Occurrence	73	72	117	1.5	N
Median of Extreme Lows	71	70	109	1.3	N

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	86	91	175	7	W
0.4% Occurrence	83	91	154	6.6	W
1.0% Occurrence	82	90	150	6.2	W
2.0% Occurrence	82	90	150	6.2	W

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	169	86	1.11	2.6	NW
0.4% Occurrence	160	88	1.05	5.2	W
1.0% Occurrence	158	87	1.04	5.5	W
2.0% Occurrence	151	85	0.99	4.2	W

Air Conditioning/ Humid Area Criteria	Threshold	T ≥ 93 °F	T ≥ 80 °F	Twb ≥ 73 °F	Twb ≥ 67 °F
	# of Hours	187	3004	4752	4846

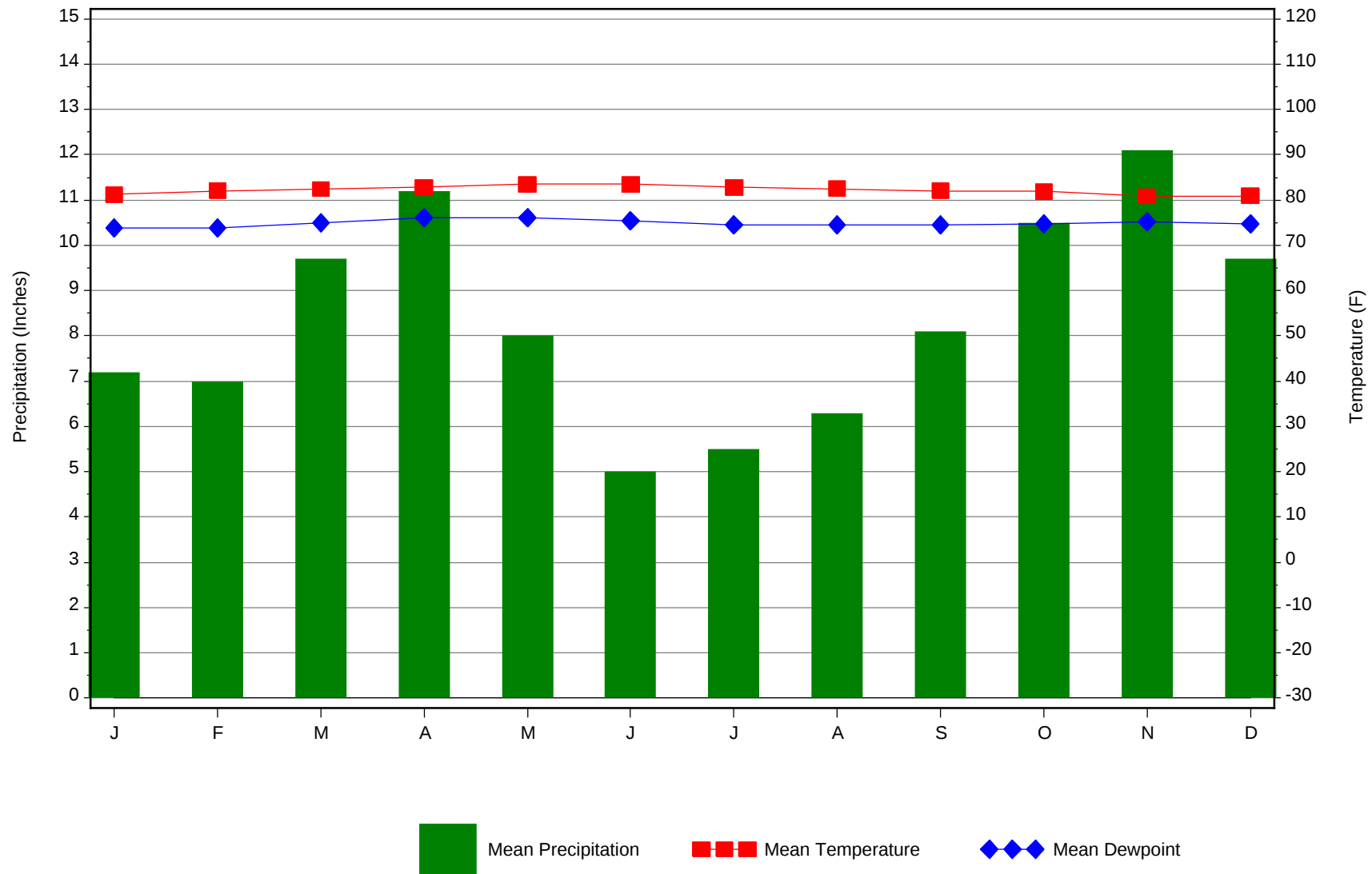
Other Site Data

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	16.6 + 5.6
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 (#)
84.7	N/A	N/A	0

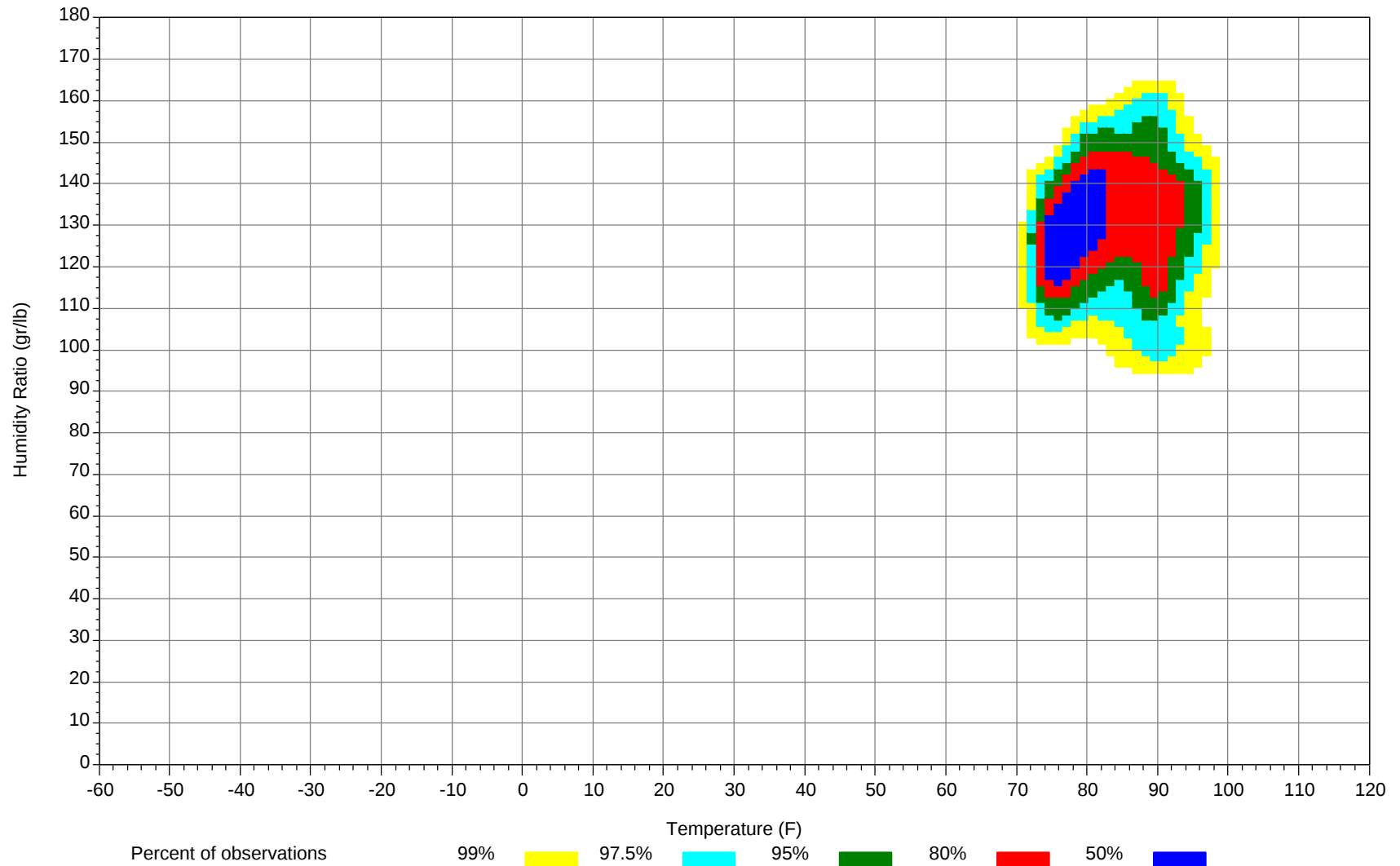
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.



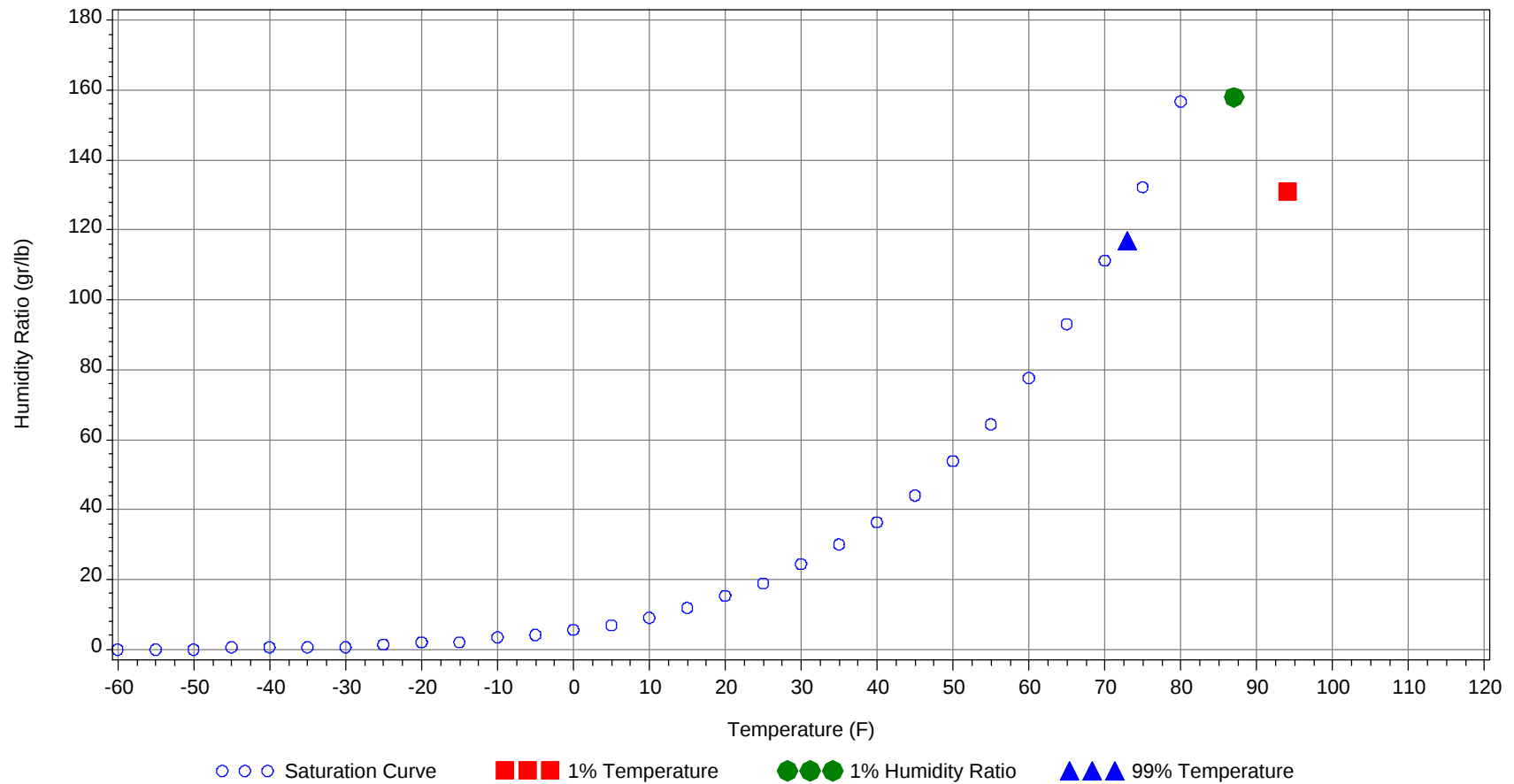
Average Annual Climate



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	94.0		80		131.0	43.0
99.0% Dry Bulb	73.0				117.0	35.6
1.0% Humidity Ratio	158.0	87.0	81.9	80.1		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)
100/104		0		0	102										
95/ 99		2	0	2	77.9		5	1	6	77.7		9	2	11	78.6
90/ 94	0	70	13	83	77.9		86	19	105	77.9		97	27	124	79.2
85/ 89	0	88	36	124	77.3		66	38	104	77.4		69	41	110	78.4
80/ 84	17	63	97	177	76.6	24	48	97	169	76.7	46	54	103	203	77.6
75/ 79	200	26	100	326	74.9	177	18	68	263	75	192	18	74	284	75.5
70/ 74	31	1	1	33	71.8	23	1	0	24	71.7	10	1	1	12	72.4
65/ 69			0	0	68	0	0		0	68					

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)
100/104															
95/ 99		13	2	15	80.7		12	2	14	81.3	0	9	2	11	80.5
90/ 94	0	95	21	116	80.2		104	32	136	80	0	92	37	129	79.4
85/ 89	0	73	46	119	79.2	0	75	58	133	79.2	0	78	65	143	78.6
80/ 84	69	48	103	220	78.1	95	47	109	251	78.2	86	48	100	234	77.6
75/ 79	166	12	69	247	75.9	152	10	46	208	76	148	12	36	196	75.5
70/ 74	5	0	0	5	72.5	1	0	0	1	72.6	5	0	1	6	72.3
65/ 69							0		0	69					

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)
100/104							0		0	80					
95/ 99		3	1	4	79.7		4	0	4	79.8		2	0	2	80.2
90/ 94		82	35	117	78.6		78	28	106	78.7	0	73	19	92	78.4
85/ 89	0	84	61	145	77.9	0	83	59	142	77.8	0	78	48	126	77.8
80/ 84	62	59	107	228	77	63	60	109	232	77	40	64	107	211	77
75/ 79	175	18	43	236	75	174	22	51	247	75.1	185	23	64	272	75.1
70/ 74	10	1	1	12	72.1	11	2	1	14	72.2	15	1	1	17	72.3
65/ 69															

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)
100/104															
95/ 99		3	0	3	79.7		1		1	80.9		0		0	80.5
90/ 94	0	80	14	94	78.8		55	5	60	79.2		55	6	61	78.7
85/ 89	0	83	42	125	78.1	0	84	24	108	78.3	0	88	30	118	77.9
80/ 84	39	63	109	211	77.2	13	73	93	179	77.5	13	75	100	188	77.2
75/ 79	197	18	81	296	75.3	216	27	117	360	75.5	216	29	110	355	75.4
70/ 74	12	1	1	14	72.5	11	0	1	12	72.7	19	1	2	22	72.3
65/ 69															

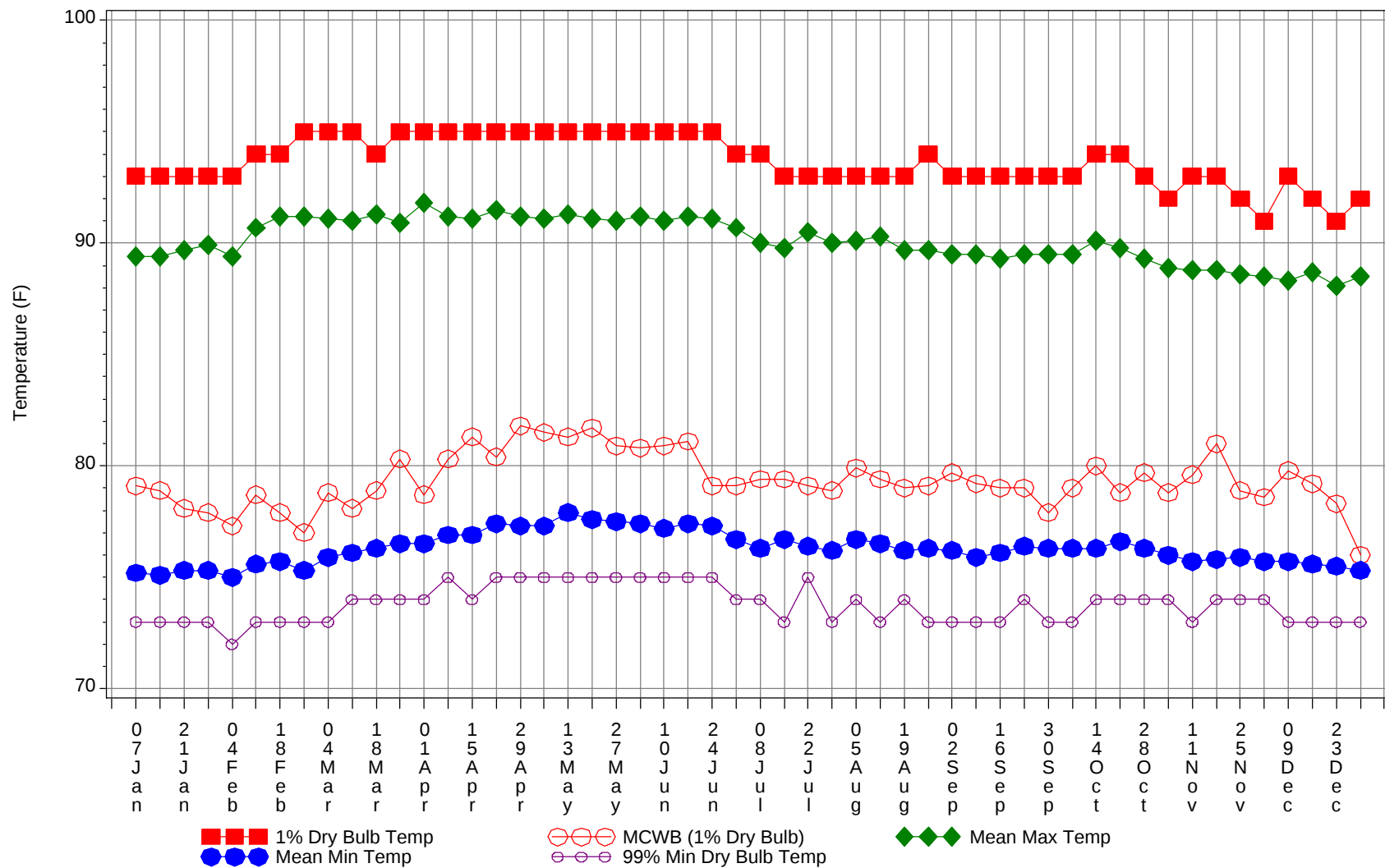
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

Dry-Bulb Temperature Hours For An Average Year

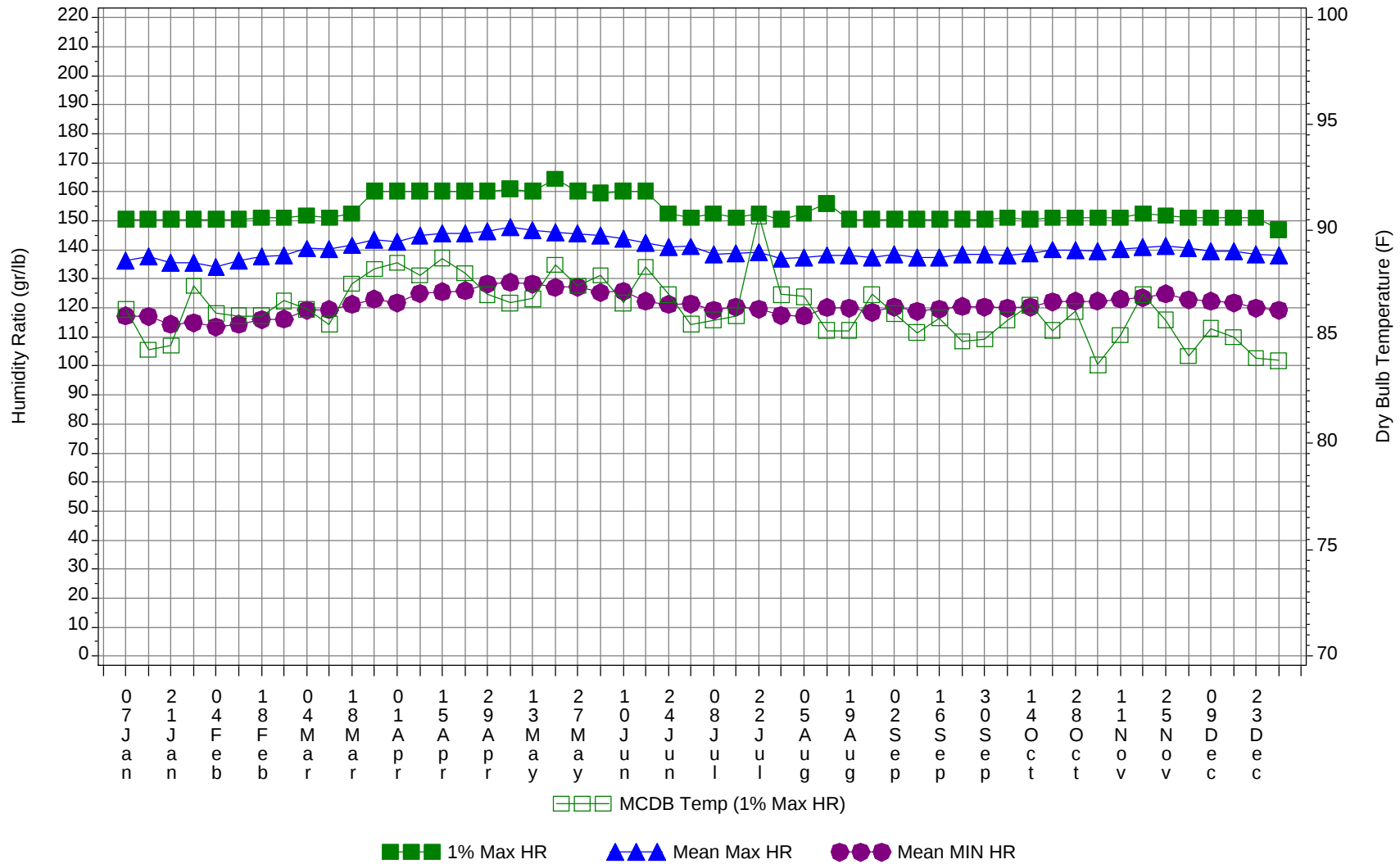
	Annual				
Temperature Range (°F)	01 To 08 LST	09 To 16 LST	17 to 00 LST	Total Obs	M C W B (°F)
100/104		0		0	91
95/ 99	0	62	10	72	80
90/ 94	0	962	254	1216	79
85/ 89	2	950	548	1500	78.2
80/ 84	564	704	1233	2501	77.3
75/ 79	2201	234	863	3298	75.3
70/ 74	153	7	12	172	72.2
65/ 69	0	0	0	0	68.2

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



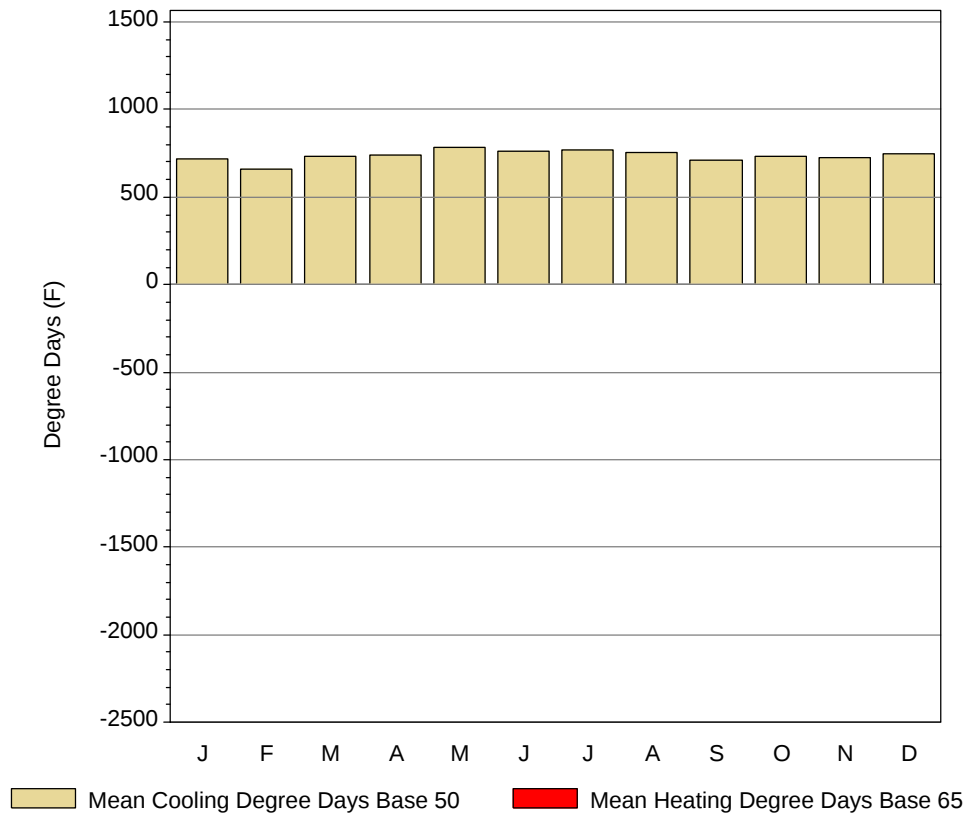
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

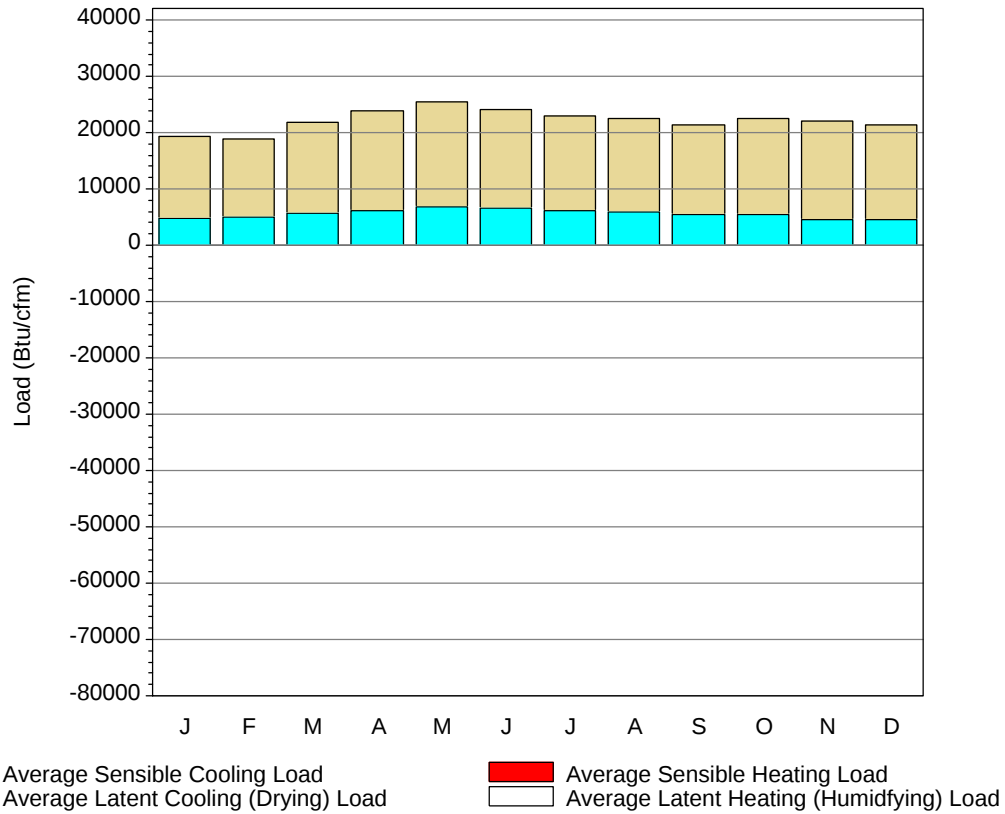
Week Ending	1.0% Temp (° F)	MCWB@ 1% Temp (° F)	Mean Max Temp (° F)	Mean Min Temp (° F)	99% Temp (° F)	1.0% HR (gr/lb)	MCDB@ 1% HR (° F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	93	79.1	89.4	75.2	73	150.5	86.3	136.2	117.3
14-Jan	93	78.9	89.4	75.1	73	150.5	84.4	137.9	117
21-Jan	93	78.1	89.7	75.3	73	150.5	84.6	135.5	114.4
28-Jan	93	77.9	89.9	75.3	73	150.5	87.4	135.6	114.9
4-Feb	93	77.3	89.4	75	72	150.5	86.1	134.3	113.5
11-Feb	94	78.7	90.7	75.6	73	150.5	86	136.3	114.4
18-Feb	94	77.9	91.2	75.7	73	151.2	86	137.9	116
25-Feb	95	77	91.2	75.3	73	151.2	86.7	138.2	116.2
4-Mar	95	78.8	91.1	75.9	73	151.9	86.3	140.5	119.2
11-Mar	95	78.1	91	76.1	74	151.2	85.6	140.4	119.5
18-Mar	94	78.9	91.3	76.3	74	152.6	87.5	141.6	121.3
25-Mar	95	80.3	90.9	76.5	74	160.3	88.2	143.6	123.1
1-Apr	95	78.7	91.8	76.5	74	160.3	88.5	142.9	121.7
8-Apr	95	80.3	91.2	76.9	75	160.3	87.9	144.9	125.1
15-Apr	95	81.3	91.1	76.9	74	160.3	88.7	145.8	125.6
22-Apr	95	80.4	91.5	77.4	75	160.3	88	145.6	126
29-Apr	95	81.8	91.2	77.3	75	160.3	87	146.4	128.2
6-May	95	81.5	91.1	77.3	75	161	86.6	147.8	128.8
13-May	95	81.3	91.3	77.9	75	160.3	86.8	146.7	128.2
20-May	95	81.7	91.1	77.6	75	164.5	88.4	146.1	127.1
27-May	95	80.9	91	77.5	75	160.3	87.4	145.6	127.2
4-Jun	95	80.8	91.2	77.4	75	159.6	87.9	145.1	125.3
10-Jun	95	80.9	91	77.2	75	160.3	86.6	143.9	125.8
17-Jun	95	81.1	91.2	77.4	75	160.3	88.3	142.6	122.3
24-Jun	95	79.1	91.1	77.3	75	152.6	87	141	121.3
1-Jul	94	79.1	90.7	76.7	74	151.2	85.6	141.2	121.4
8-Jul	94	79.4	90	76.3	74	152.6	85.8	138.6	119.2
15-Jul	93	79.4	89.8	76.7	73	151.2	86	138.9	120.4
22-Jul	93	79.1	90.5	76.4	75	152.6	90.7	139.1	119.6
29-Jul	93	78.9	90	76.2	73	150.5	87	136.9	117.4
5-Aug	93	79.9	90.1	76.7	74	152.6	86.9	137.3	117.2
12-Aug	93	79.4	90.3	76.5	73	156.1	85.3	138.3	120.1
19-Aug	93	79	89.7	76.2	74	150.5	85.3	138.1	120
26-Aug	94	79.1	89.7	76.3	73	150.5	87	137.5	118.5
2-Sep	93	79.7	89.5	76.2	73	150.5	86.1	138.6	120.3
9-Sep	93	79.2	89.5	75.9	73	150.5	85.2	137.5	118.9
16-Sep	93	79	89.3	76.1	73	150.5	85.9	137.5	119.6
23-Sep	93	79	89.5	76.4	74	150.5	84.8	138.6	120.5
30-Sep	93	77.9	89.5	76.3	73	150.5	84.9	138.6	120.3
7-Oct	93	79	89.5	76.3	73	151.2	85.8	138	119.9
14-Oct	94	80	90.1	76.3	74	150.5	86.5	138.8	120.3
21-Oct	94	78.8	89.8	76.6	74	151.2	85.3	140.1	122.2
28-Oct	93	79.7	89.3	76.3	74	151.2	86.2	139.8	122.4
4-Nov	92	78.8	88.9	76	74	151.2	83.7	139.7	122.4
11-Nov	93	79.6	88.8	75.7	73	151.2	85.1	140.4	123.1
18-Nov	93	81	88.8	75.8	74	152.6	87	140.9	123.5
25-Nov	92	78.9	88.6	75.9	74	151.9	85.8	141.4	124.8
2-Dec	91	78.6	88.5	75.7	74	151.2	84.1	140.7	122.9
9-Dec	93	79.8	88.3	75.7	73	151.2	85.4	139.6	122.3
16-Dec	92	79.2	88.7	75.6	73	151.2	85	139.7	121.7
23-Dec	91	78.3	88.1	75.5	73	151.2	84	138.4	120
31-Dec	92	76	88.5	75.3	73	147	83.9	138.1	119.3

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	715.6	369.3	0
FEB	662.8	349.3	0
MAR	735.2	392.7	0
APR	741.3	399.3	0
MAY	780.9	427.4	0
JUN	759.7	415.7	0
JUL	769.6	413.1	0
AUG	753.4	401.4	0
SEP	714.6	376.1	0
OCT	733.9	385.4	0
NOV	723.8	369.3	0
DEC	750.1	382.1	0
ANN	8840.9	4681.1	0

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	4847	0	14435	0
FEB	5099	0	13827	0
MAR	5710	0	16040	0
APR	6199	0	17638	0
MAY	6800	0	18677	0
JUN	6548	0	17523	0
JUL	6168	0	16873	0
AUG	5903	0	16634	0
SEP	5363	0	16041	0
OCT	5501	0	16972	0
NOV	4662	0	17345	0
DEC	4563	0	16776	0
ANN	67363	0	198781	0

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													

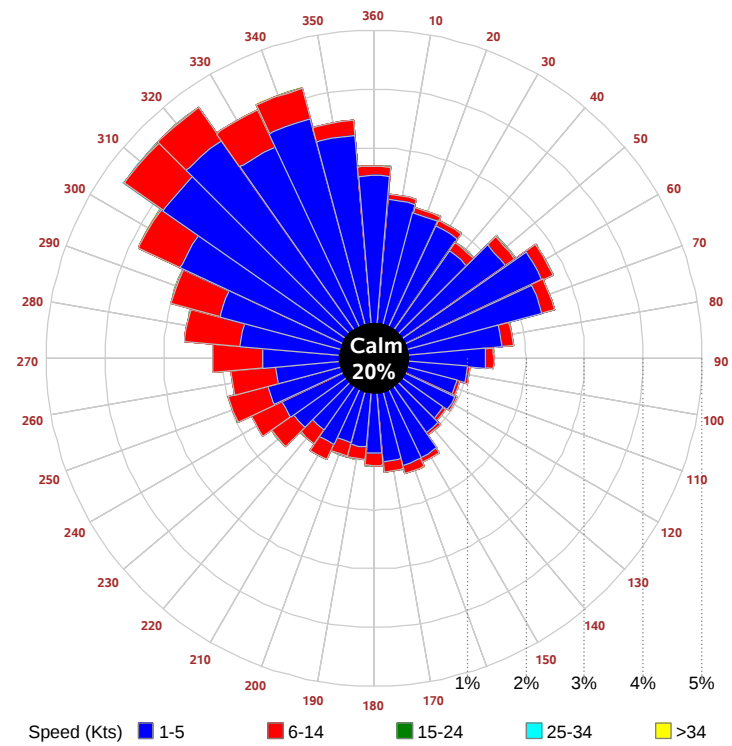
Average Annual Solar Radiation - Nearest Available Site Source: National Renewable Energy Laboratory, Golden CO, 1995

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													

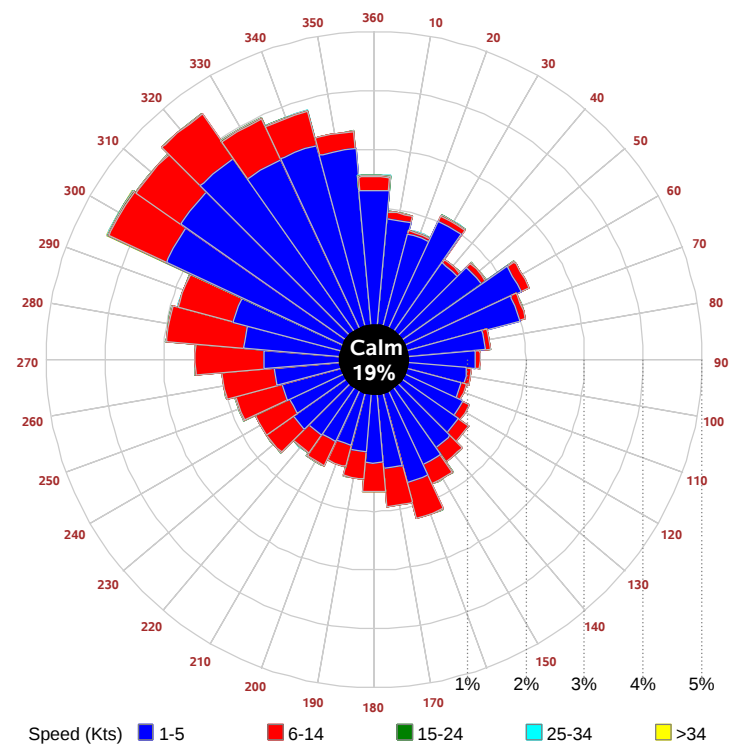
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9												
		March						June				
		9am	11am	1pm	3pm	5pm		9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear											
	M.Cloudy											
NORTH	M.Clear											
	M.Cloudy											
EAST	M.Clear			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

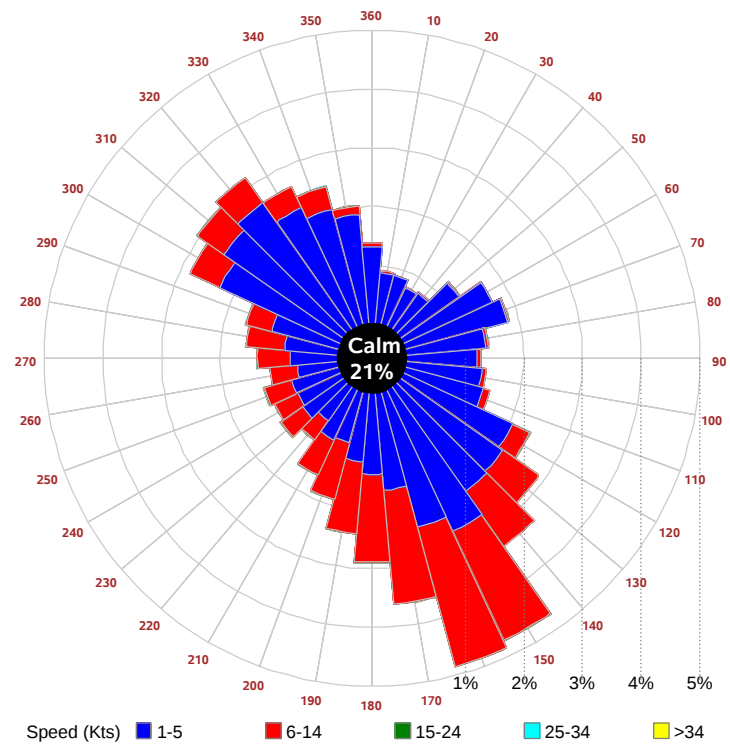
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November

