KHORAT, TH

Latitude = 14.93 N	Station ID = ICAO_VTUN
Longitude =102.08 E	Elevation = 729 Feet
Period of Record = 1988 To 2017	Average Pressure = 29.18 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	104	77	102	3.5	W
0.4% Occurrence	101	77	106	3.5	S
1.0% Occurrence	100	77	108	3.5	S
2.0% Occurrence	97	78	114	3.8	W
Mean Daily Range	16	-	-	-	ENE
97.5% Occurrence	66	62	76	1.9	ENE
99.0% Occurrence	63	59	70	1.8	ENE
99.6% Occurrence	60	57	64	1.6	ENE
Median of Extreme Lows	56	53	55	1.3	E

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	85	92	167	4.2	S
0.4% Occurrence	81	92	142	3.7	W
1.0% Occurrence	81	92	142	3.7	W
2.0% Occurrence	80	90	138	3.4	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	165	89	1.06	3.5	S
0.4% Occurrence	153	85	0.99	2.5	S
1.0% Occurrence	150	85	0.97	2.2	S
2.0% Occurrence	147	84	0.95	1.9	W

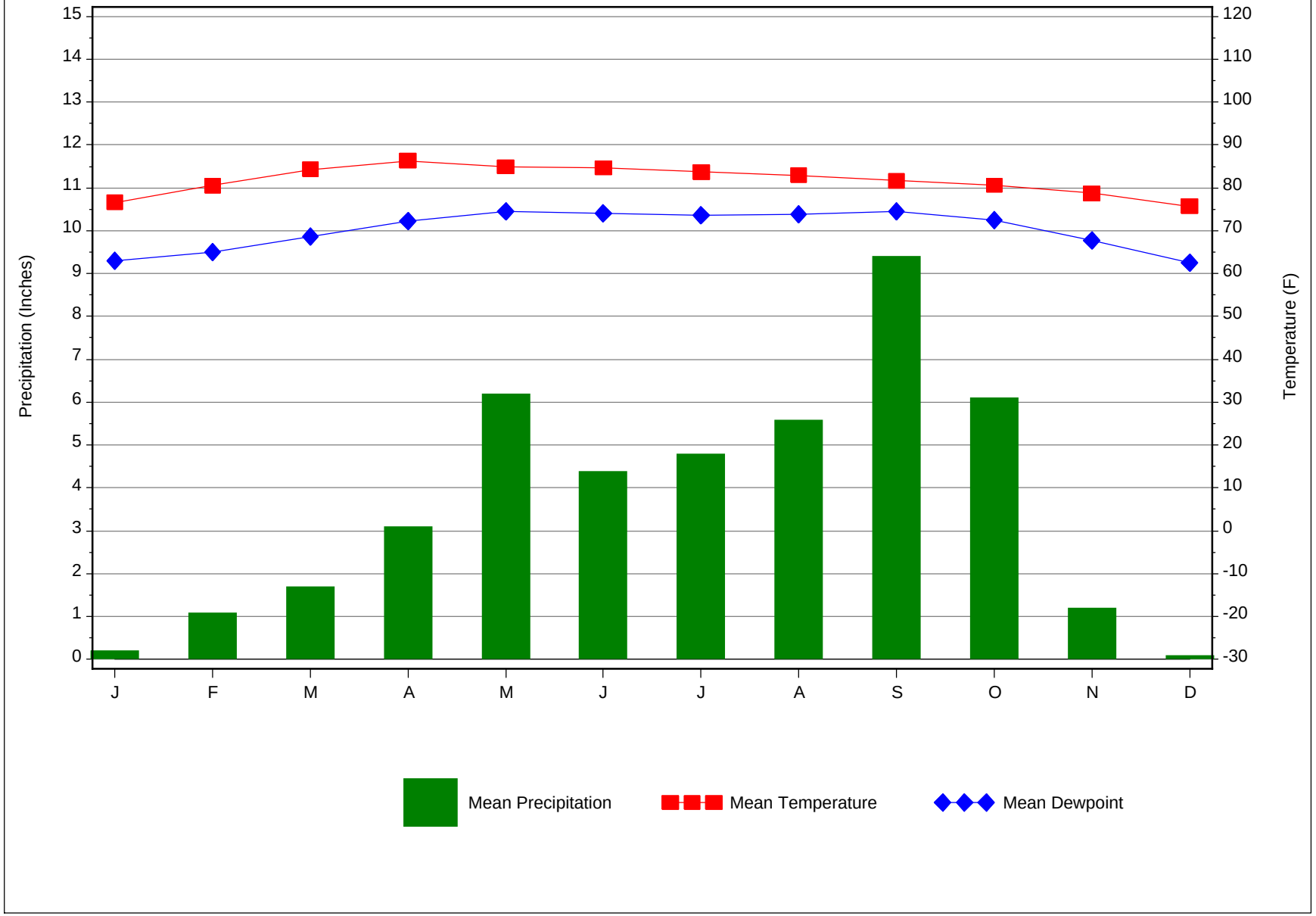
Air Conditioning/ Humid Area Criteria	**Threshold**	**T ≥ 93°F**	**T ≥ 80°F**	**Twb ≥ 73°F**	**Twb ≥ 67°F**
	# of Hours	237	1692	2027	2543

Other Site Data

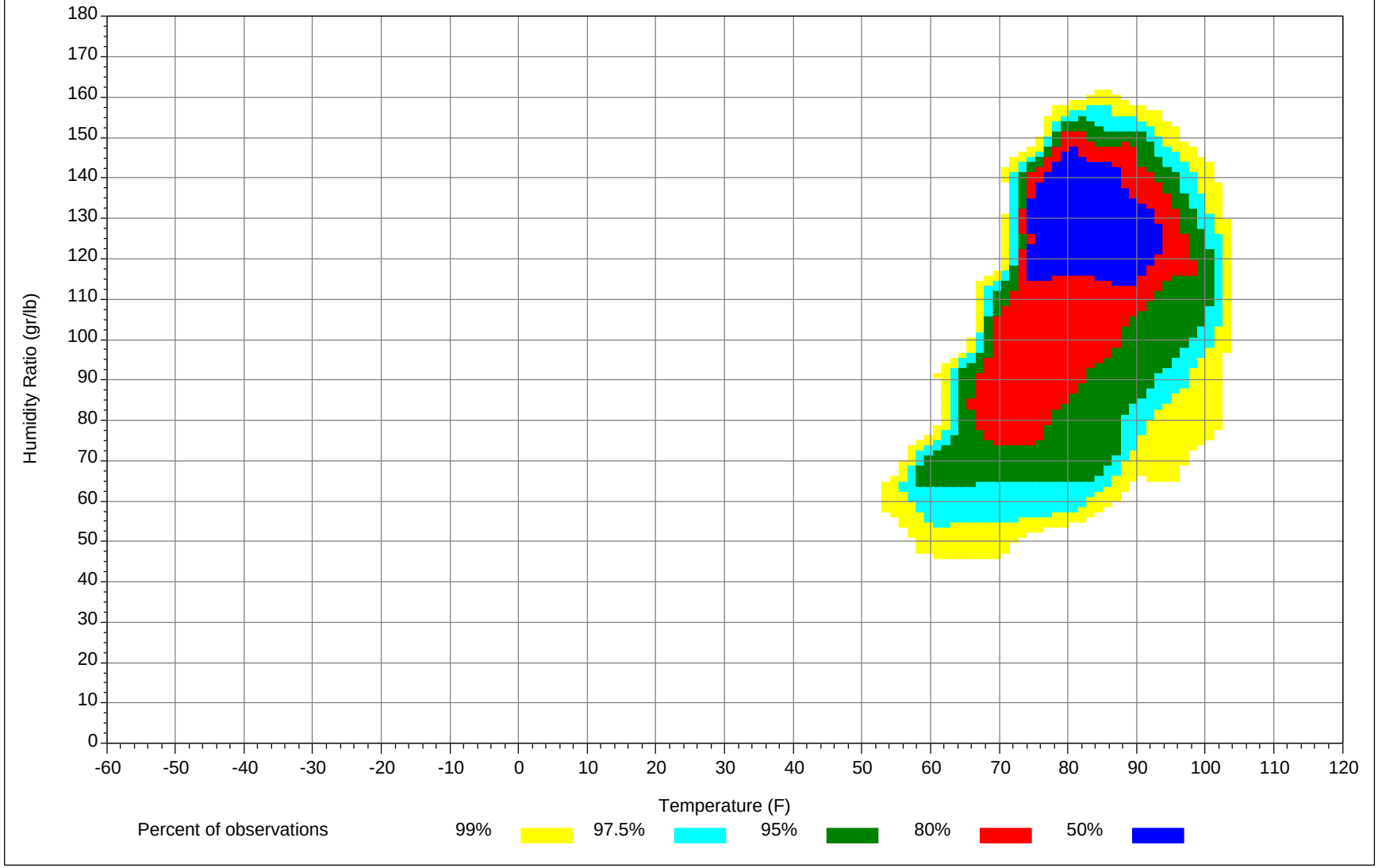
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
10	N/A	N/A	5.9 + 6.0
Ground Water Temperature (°F) 50 Foot Depth*	Frost Depth 50 Year Recurrence (in)	Ground Snow Load 50 Year Recurrence (lb/ft^2)	Average Annual Freeze-Thaw Cycles (#)
84.2	N/A	N/A	0

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

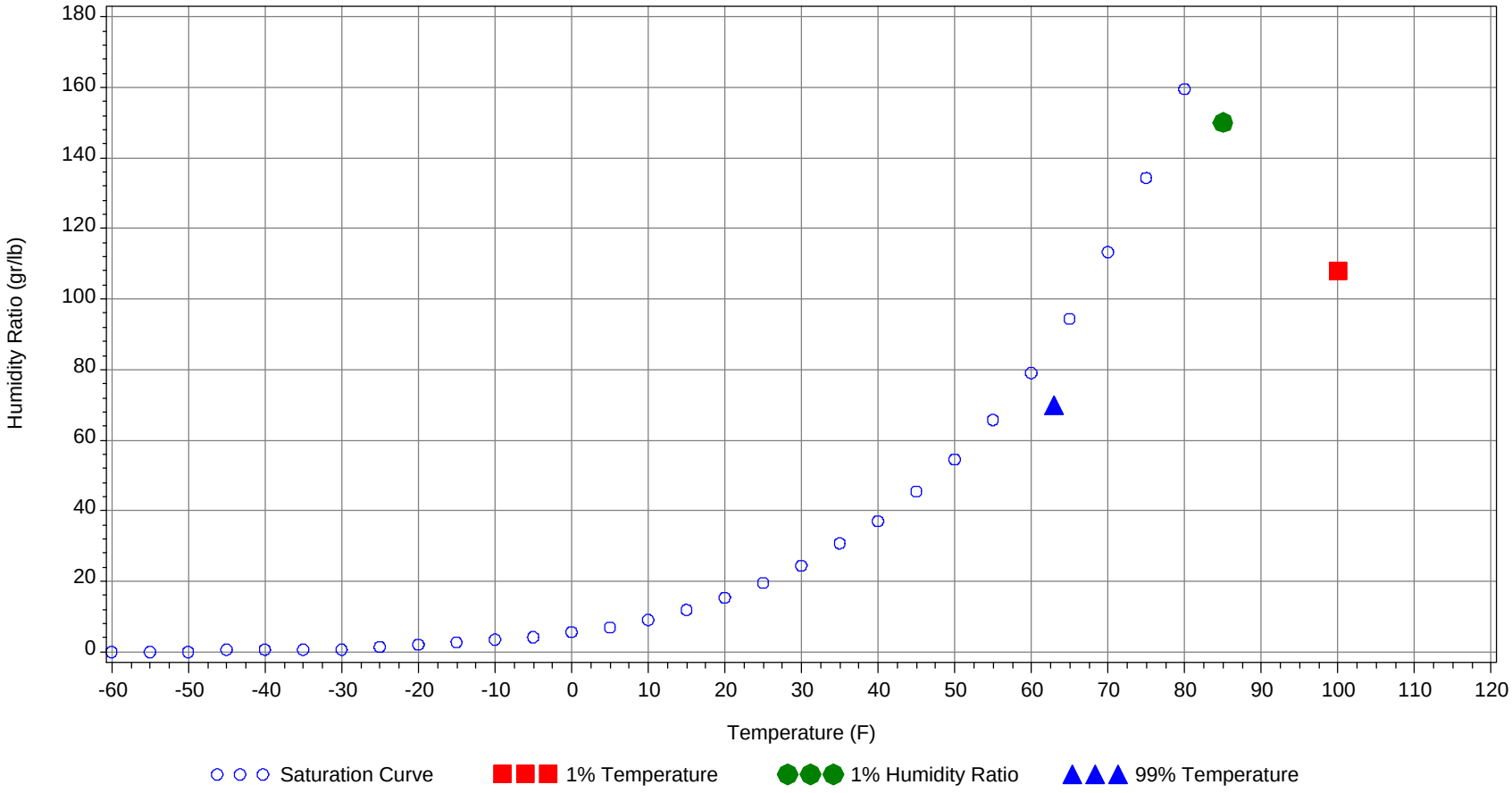
Average Annual Climate



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	100.0		77		108.0	40.9
99.0% Dry Bulb	63.0				70.0	26.1
1.0% Humidity Ratio	150.0	85.0	79.7	78.0		43.8

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**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**
105/109												0		0	76.8
100/104							3		3	75.1		24		24	75.4
95/ 99		5		5	73.4		35	0	35	74.3		62	9	71	76
90/ 94		43	1	44	73.2	0	53	17	70	73.9	0	55	49	104	75.6
85/ 89	0	56	30	86	72.1	0	50	62	112	73	5	61	88	154	75
80/ 84	4	63	80	147	70.3	19	44	85	148	71.4	74	24	64	162	73.7
75/ 79	42	43	82	167	68.7	81	23	43	147	69.9	117	12	29	158	72
70/ 74	77	26	42	145	66.1	68	11	13	92	66.5	38	7	8	53	67.6
65/ 69	75	10	11	96	62.5	37	4	3	44	62.1	11	2	2	15	62.5
60/ 64	37	2	2	41	58.8	15	1	1	17	58.7	2	0	1	3	59.3
55/ 59	11	0	1	12	54	3			3	53.8	0			0	53
50/ 54	1			1	49.9	0			0	53					
45/ 49															

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

	April					May					June				
Temperature Range (°F)	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**
105/109		2		2	77.4		0		0	81.7					
100/104	0	35	0	35	77.6		11		11	79.5		2		2	79.1
95/ 99	0	62	13	75	78.3	0	48	4	52	79.2		37	1	38	79
90/ 94	0	75	47	122	77.6	0	94	26	120	78.6	0	101	21	122	78.2
85/ 89	15	44	88	147	76.7	9	62	69	140	77.8	3	78	81	162	77.5
80/ 84	116	17	64	197	75.6	121	27	106	254	76.8	127	18	108	253	76.5
75/ 79	99	4	26	129	74.1	116	6	42	164	75.5	109	5	29	143	75.2
70/ 74	9	1	2	12	70.1	2	0	0	2	72.2	1	0		1	72.6
65/ 69	0			0	62										
60/ 64															
55/ 59															
50/ 54															
45/ 49															

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

	July					August					September				
Temperature Range (°F)	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**
105/109															
100/104		0	0	0	79.2		0		0	80					
95/ 99	0	23	0	23	78.5		12		12	78.9		2		2	79.6
90/ 94	0	98	12	110	77.9	0	87	4	91	78.2	0	59	1	60	78.7
85/ 89	1	91	71	163	77.2	0	101	61	162	77.3	0	108	34	142	77.7
80/ 84	86	30	116	232	76.2	62	40	117	219	76.4	27	54	117	198	77
75/ 79	158	6	48	212	75	182	7	66	255	75	204	16	87	307	75.3
70/ 74	3	0	1	4	72.8	3	0	1	4	72.7	9	0	2	11	72.5
65/ 69												0		0	69
60/ 64															
55/ 59															
50/ 54															
45/ 49															

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

	October					November					December				
Temperature Range (°F)	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**
105/109															
100/104															
95/ 99		0		0	77		3		3	77		1		1	75.4
90/ 94	0	32		32	77.5		31	0	31	76.3		22	0	22	74.5
85/ 89	0	116	23	139	76.5		81	21	102	74.5	0	61	13	74	72.2
80/ 84	12	75	126	213	75.4	7	78	96	181	72.5	3	72	72	147	70.3
75/ 79	190	23	91	304	74.4	93	37	91	221	71.4	40	55	87	182	68.4
70/ 74	40	2	8	50	70.5	93	9	27	129	68.1	78	27	54	159	65.9
65/ 69	5	0	0	5	64.9	38	1	4	43	63.9	72	9	18	99	62.3
60/ 64	0			0	60.3	8	0		8	59.8	44	1	3	48	58.7
55/ 59						0			0	57.2	9	0	1	10	54.2
50/ 54											1			1	48.8
45/ 49											0			0	44.5

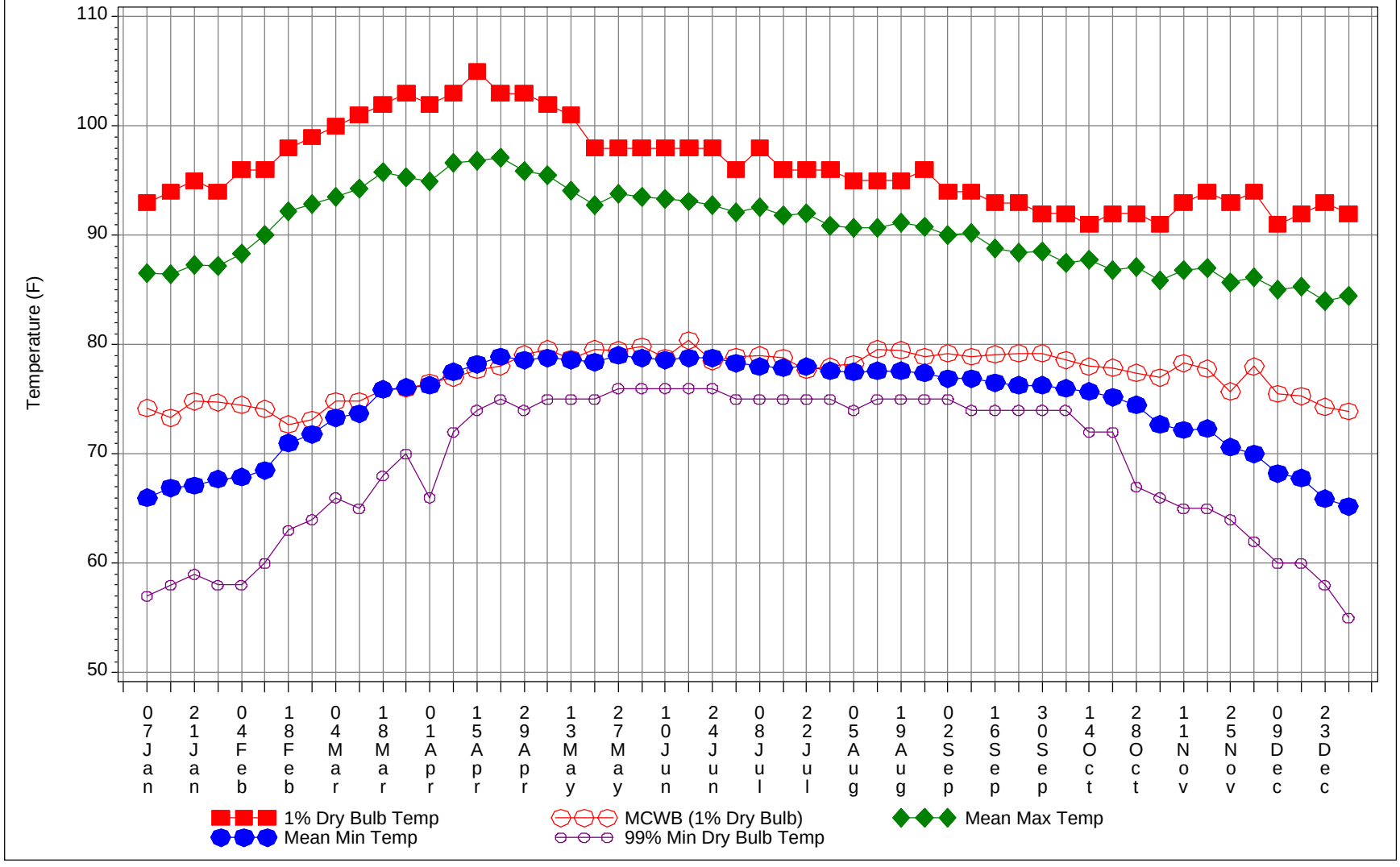
Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

Dry-Bulb Temperature Hours For An Average Year

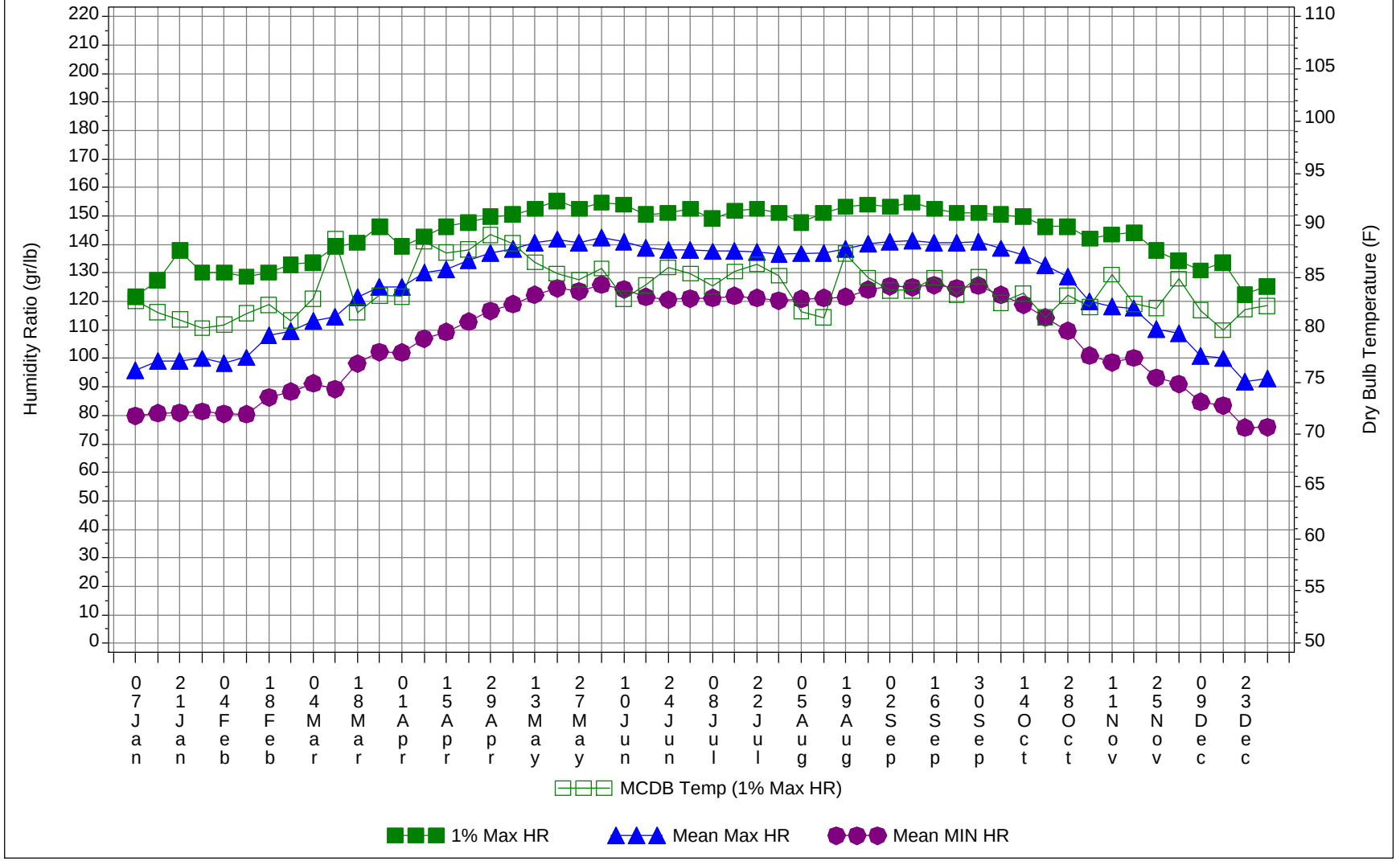
	Annual				
Temperature Range (°F)	**01 To 08 LST**	**09 To 16 LST**	**17 to 00 LST**	**Total Obs**	**MCWB (°F)**
105/109		3		3	77.7
100/104	0	75	0	75	77.1
95/ 99	0	288	26	314	77.5
90/ 94	1	749	178	928	77.2
85/ 89	35	909	641	1585	76
80/ 84	657	541	1153	2351	74.8
75/ 79	1434	238	719	2391	73.2
70/ 74	422	85	156	663	67.3
65/ 69	238	27	38	303	62.6
60/ 64	107	5	6	118	58.8
55/ 59	23	0	1	24	54.1
50/ 54	2			2	49.4
45/ 49	0			0	44.5

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.

Annual Summary of Temperatures



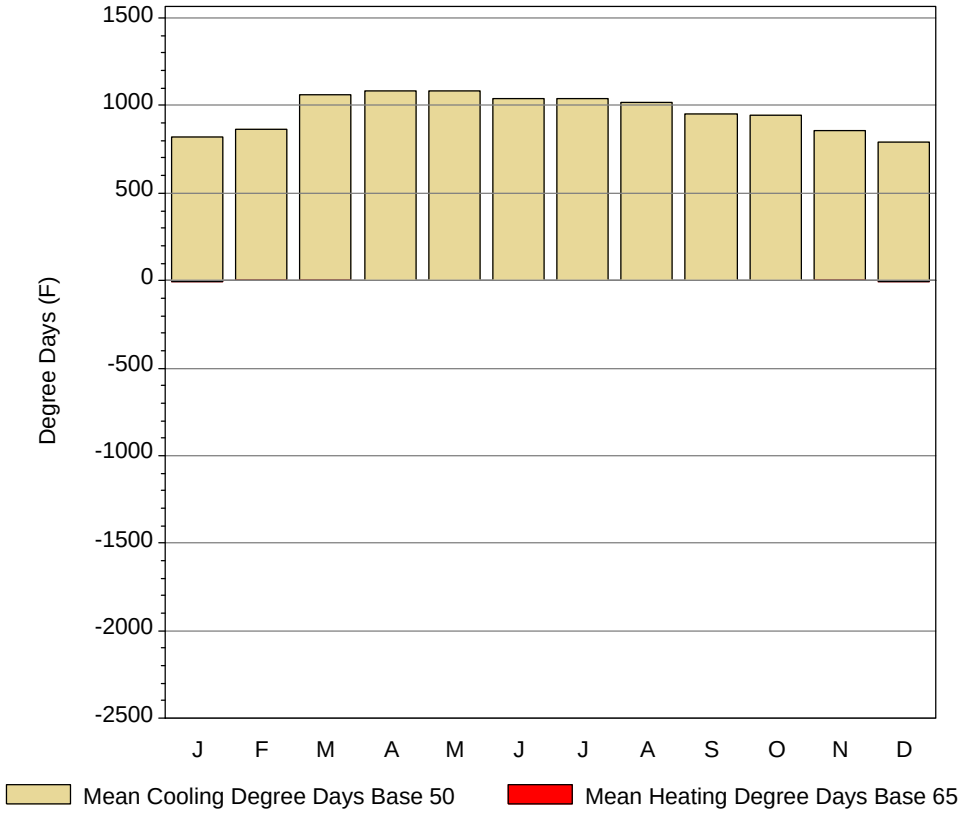
Long Term Humidity and Dry Bulb Temperature Summary



Long Term Humidity and Dry Bulb Temperature Summary

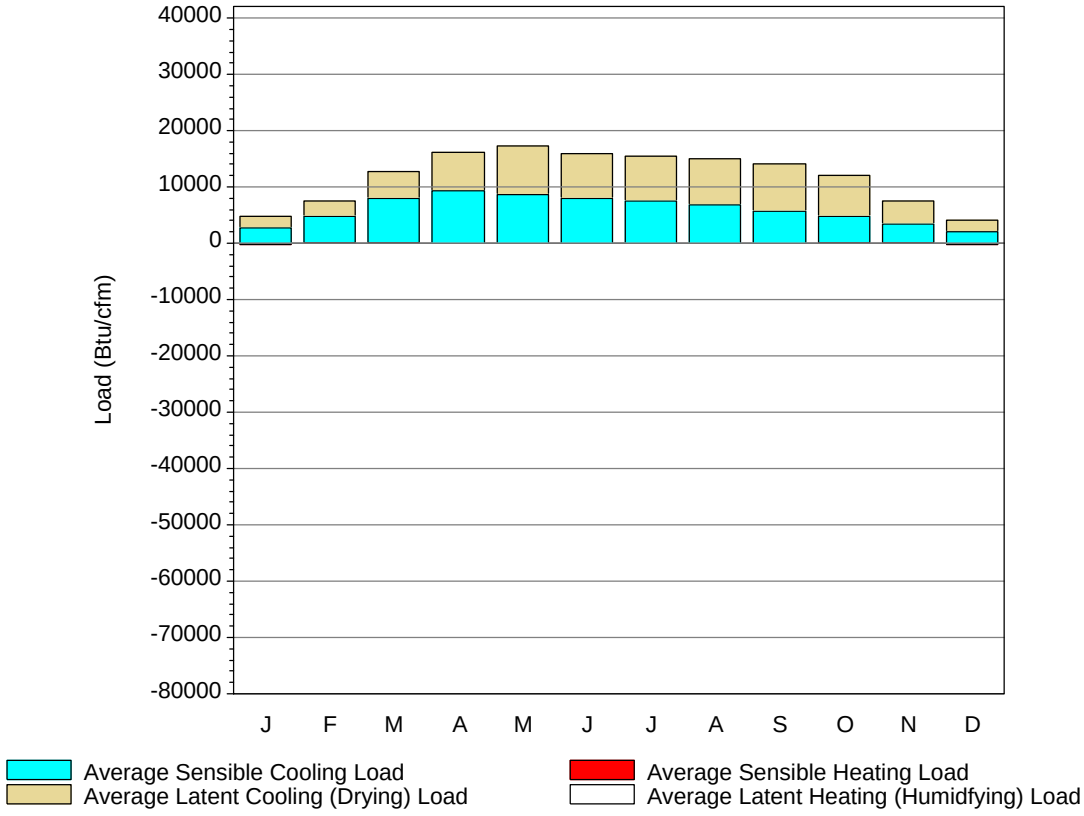
Week Ending	1.0% Temp (°F)	MCWB@ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB@ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	93	74.2	86.5	66	57	121.8	82.8	95.9	79.8
14-Jan	94	73.3	86.4	66.9	58	127.4	81.7	99	80.7
21-Jan	95	74.8	87.3	67.1	59	137.9	81	99.2	81
28-Jan	94	74.7	87.2	67.7	58	130.2	80.2	100	81.4
4-Feb	96	74.5	88.3	67.9	58	130.2	80.5	98.4	80.6
11-Feb	96	74.1	90	68.5	60	128.8	81.6	100.4	80.4
18-Feb	98	72.7	92.2	71	63	130.2	82.4	108	86.4
25-Feb	99	73.1	92.9	71.8	64	133	80.9	109.7	88.4
4-Mar	100	74.8	93.5	73.3	66	133.7	83	113.3	91.3
11-Mar	101	74.8	94.3	73.7	65	139.3	88.7	114.6	89.3
18-Mar	102	75.9	95.8	75.9	68	140.7	81.7	121.5	98.2
25-Mar	103	76	95.3	76.1	70	146.3	83.3	125	102.2
1-Apr	102	76.5	94.9	76.3	66	139.3	83.2	125	102.1
8-Apr	103	77	96.6	77.5	72	142.8	88.5	130.1	107
15-Apr	105	77.7	96.8	78.2	74	146.3	87.4	131.4	109.3
22-Apr	103	78	97.1	78.9	75	147.7	87.7	134.6	113
29-Apr	103	79.1	95.9	78.6	74	149.8	89.1	137	116.7
6-May	102	79.6	95.5	78.8	75	150.5	88.3	138.5	119
13-May	101	78.7	94.1	78.6	75	152.6	86.5	140.8	122.4
20-May	98	79.6	92.8	78.4	75	155.4	85.4	141.9	124.7
27-May	98	79.5	93.8	79	76	152.6	84.8	140.8	123.6
4-Jun	98	79.8	93.5	78.8	76	154.7	85.9	142.4	125.9
10-Jun	98	78.8	93.3	78.6	76	154	83	141	124.3
17-Jun	98	80.4	93.1	78.8	76	150.5	84.3	138.8	121.6
24-Jun	98	78.5	92.8	78.8	76	151.2	86	138	120.6
1-Jul	96	78.9	92.1	78.3	75	152.6	85.4	138.2	121.1
8-Jul	98	79	92.6	78	75	149.1	84.2	137.6	121.2
15-Jul	96	78.8	91.8	77.9	75	151.9	85.6	137.9	121.9
22-Jul	96	77.7	92	78	75	152.6	86.3	137.5	121.2
29-Jul	96	78	90.9	77.6	75	151.2	85.2	136.7	120.3
5-Aug	95	78.2	90.7	77.5	74	147.7	81.8	136.9	120.9
12-Aug	95	79.6	90.7	77.6	75	151.2	81.2	137.1	121.3
19-Aug	95	79.5	91.2	77.6	75	153.3	87.3	138.4	121.6
26-Aug	96	78.9	90.8	77.4	75	154	85	140.3	124.2
2-Sep	94	79.2	90	76.9	75	153.3	83.8	140.9	125.4
9-Sep	94	78.9	90.2	76.9	74	154.7	83.8	141.3	125
16-Sep	93	79.1	88.8	76.5	74	152.6	85	140.8	125.7
23-Sep	93	79.2	88.4	76.3	74	151.2	83.4	140.7	124.7
30-Sep	92	79.2	88.5	76.3	74	151.2	85.1	141.1	125.6
7-Oct	92	78.6	87.5	76	74	150.5	82.6	138.7	122.3
14-Oct	91	78	87.8	75.7	72	149.8	83.5	136.3	118.9
21-Oct	92	77.9	86.8	75.2	72	146.3	81.2	132.7	114.3
28-Oct	92	77.4	87.1	74.5	67	146.3	83.3	128.8	109.7
4-Nov	91	77	85.9	72.7	66	142.1	82.2	120.1	101
11-Nov	93	78.3	86.8	72.2	65	143.5	85.3	118.4	98.7
18-Nov	94	77.8	87	72.3	65	144.2	82.5	117.7	100.2
25-Nov	93	75.7	85.7	70.6	64	137.9	82.1	110.4	93.2
2-Dec	94	78	86.2	70	62	134.4	84.9	108.8	91.1
9-Dec	91	75.5	85	68.2	60	130.9	81.9	101	84.8
16-Dec	92	75.3	85.3	67.8	60	133.7	80	100	83.4
23-Dec	93	74.3	84	65.9	58	122.5	82	91.8	75.7
31-Dec	92	73.9	84.5	65.2	55	125.3	82.3	93.1	75.9

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	821.9	360.5	3.5
FEB	861	438	1
MAR	1060.3	595.9	0.1
APR	1086.1	636.1	0
MAY	1081.1	616.1	0
JUN	1040	590	0
JUL	1038.3	575.8	0
AUG	1019.7	554.7	0
SEP	949.5	499.5	0
OCT	946.1	481.1	0
NOV	857.1	407.4	0.3
DEC	793.7	332.5	3.8
ANN	11554.8	6087.6	8.7

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	2762	-222	2041	0
FEB	4756	-74	2714	0
MAR	7976	-18	4828	0
APR	9317	0	6740	0
MAY	8691	0	8491	0
JUN	8084	0	7931	0
JUL	7515	0	7851	0
AUG	6950	0	8142	0
SEP	5742	0	8385	0
OCT	4864	-2	7297	0
NOV	3412	-33	4118	0
DEC	2180	-256	1998	0
ANN	72249	-605	70536	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

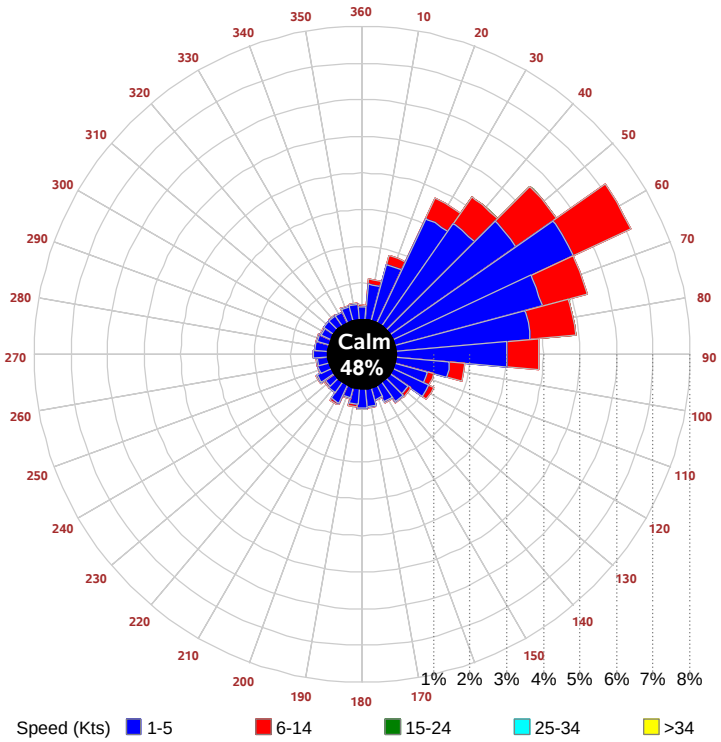
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
HORIZ.	Global													
	Std.Dev.													
	Minimum													
	Maximum													
	Diffuse													
Clear Day	Global													
NORTH	Global													
	Diffuse													
Clear Day	Global													
EAST	Global													
	Diffuse													
Clear Day	Global													
SOUTH	Global													
	Diffuse													
Clear Day	Global													
WEST	Global													
	Diffuse													
Clear Day	Global													

AVERAGE 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													

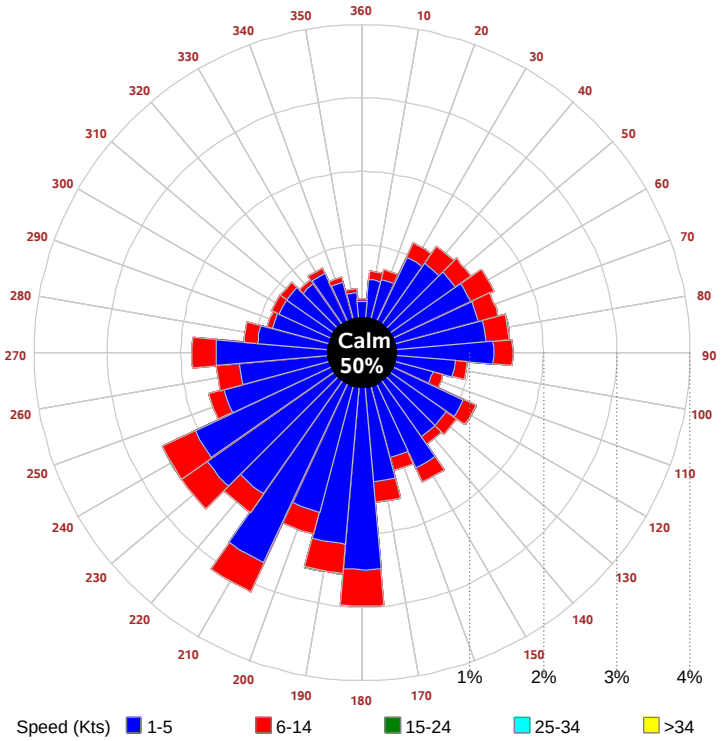
AVERAGE INCIDENT ILLUMINENCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9											
				March					June		
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear										
	M.Cloudy										
NORTH	M.Clear										
	M.Cloudy										
EAST	M.Clear										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

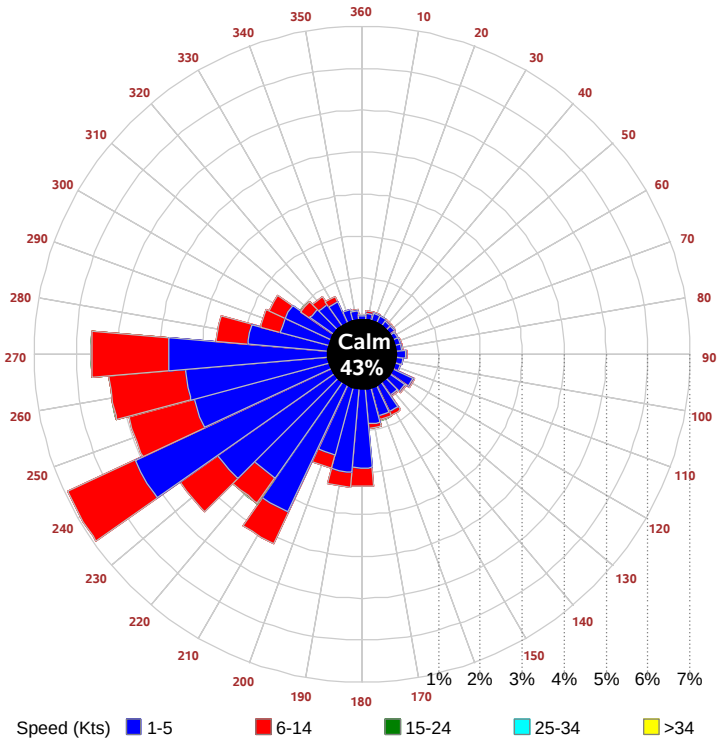
Wind Summary - December, January, and February



Wind Summary - March, April, and May



Wind Summary - June, July, and August



Wind Summary - September, October, and November