HOWARD AFB PM	
Latitude = 8.92 N	WMO No. 788060
Longitude = 79.60 W	Elevation = 52 feet
Period of Record = 1967 to 1996	Average Pressure = 29.74 inches Hg

Design Criteria Data

		Mean Coincident (Average) Values			
Dry Bulb Temperature (T)	**Design Value (^oF)**	Wet Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	95	78	115	11.6	N
0.4% Occurrence	93	77	115	11.3	N
1.0% Occurrence	93	77	115	11.3	N
2.0% Occurrence	91	77	120	10.1	N
Mean Daily Range	12	-	-	-	-
97.5% Occurrence	73	71	109	2.2	N
99.0% Occurrence	73	71	109	2.2	N
99.6% Occurrence	72	71	109	2.1	N
Median of Extreme Lows	70	68	98	1.6	N
		Mean Coincident (Average) Values			
Wet Bulb Temperature (T_{wb})	**Design Value (^oF)**	Dry Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	84	90	162	6.7	S
0.4% Occurrence	82	88	151	6.3	NNW
1.0% Occurrence	81	87	147	6.4	NNW
2.0% Occurrence	80	86	142	6.5	NNW
		Mean Coincident (Average) Values			
Humidity Ratio (HR)	**Design Value (gr/lb)**	Dry Bulb Temperature (^oF)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	170	88	1.12	6.6	S
0.4% Occurrence	151	85	0.99	5.4	NNW
1.0% Occurrence	151	85	0.99	5.3	NNW
2.0% Occurrence	151	85	0.99	5.3	NNW
Air Conditioning/		$T \geq 93^oF$	$T \geq 80^oF$	$T_{wb} \geq 73^oF$	$T_{wb} \geq 67^oF$
Humid Area Criteria	# of Hours	94	4410	7476	8695

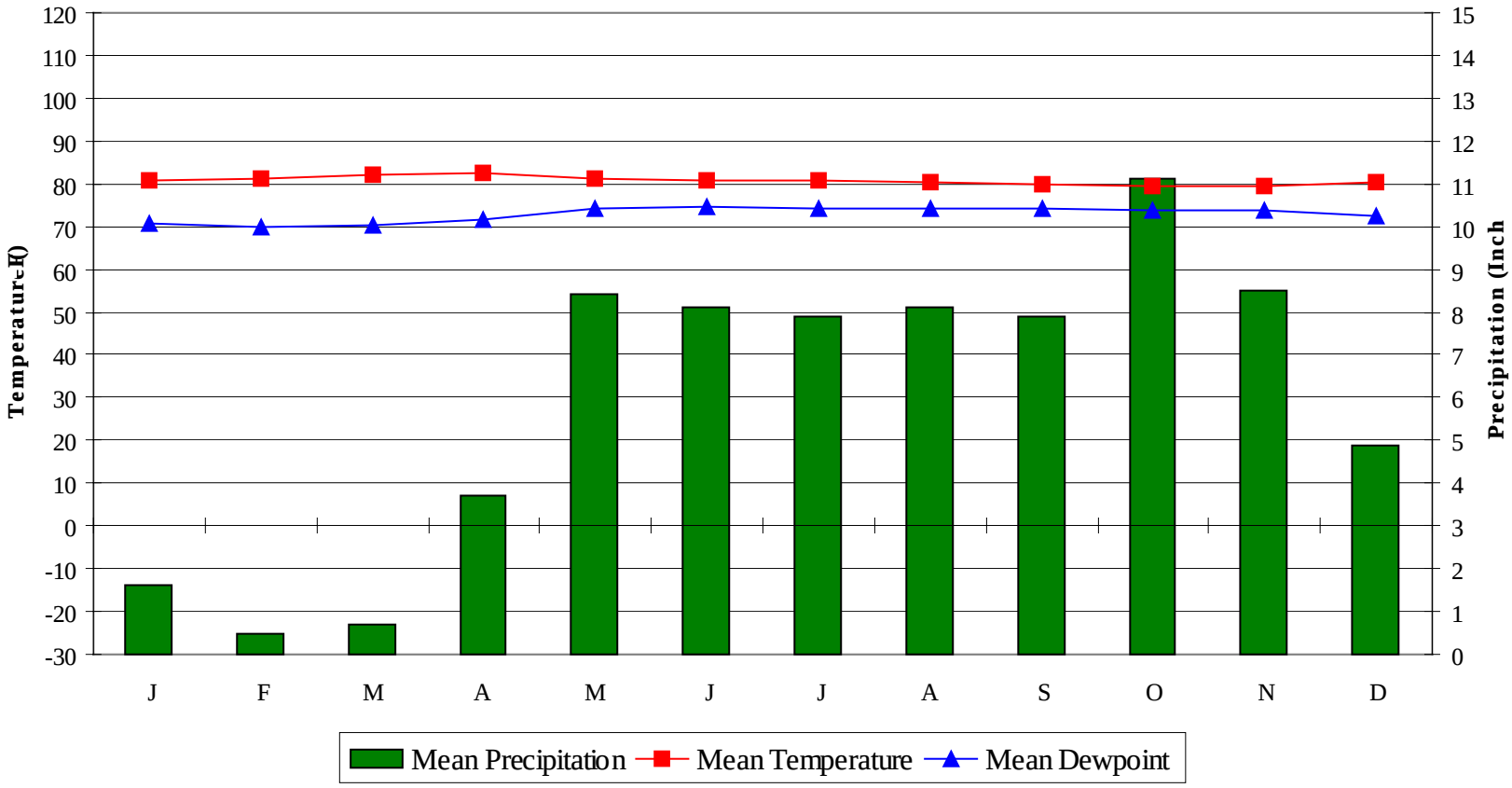
Other Site Data

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^oF-RH 60% Latent + Sensible
10	N/A	N/A	19.2 + 4.6
Ground Water Temperature (^oF) 50 Foot Depth *	**Frost Depth 50 Year Recurrence (in.)**	**Ground Snow Load 50 Year Recurrence (lb/ft^2)**	**Average Annual Freeze-Thaw Cycles (#)**
83.2	N/A	N/A	0

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

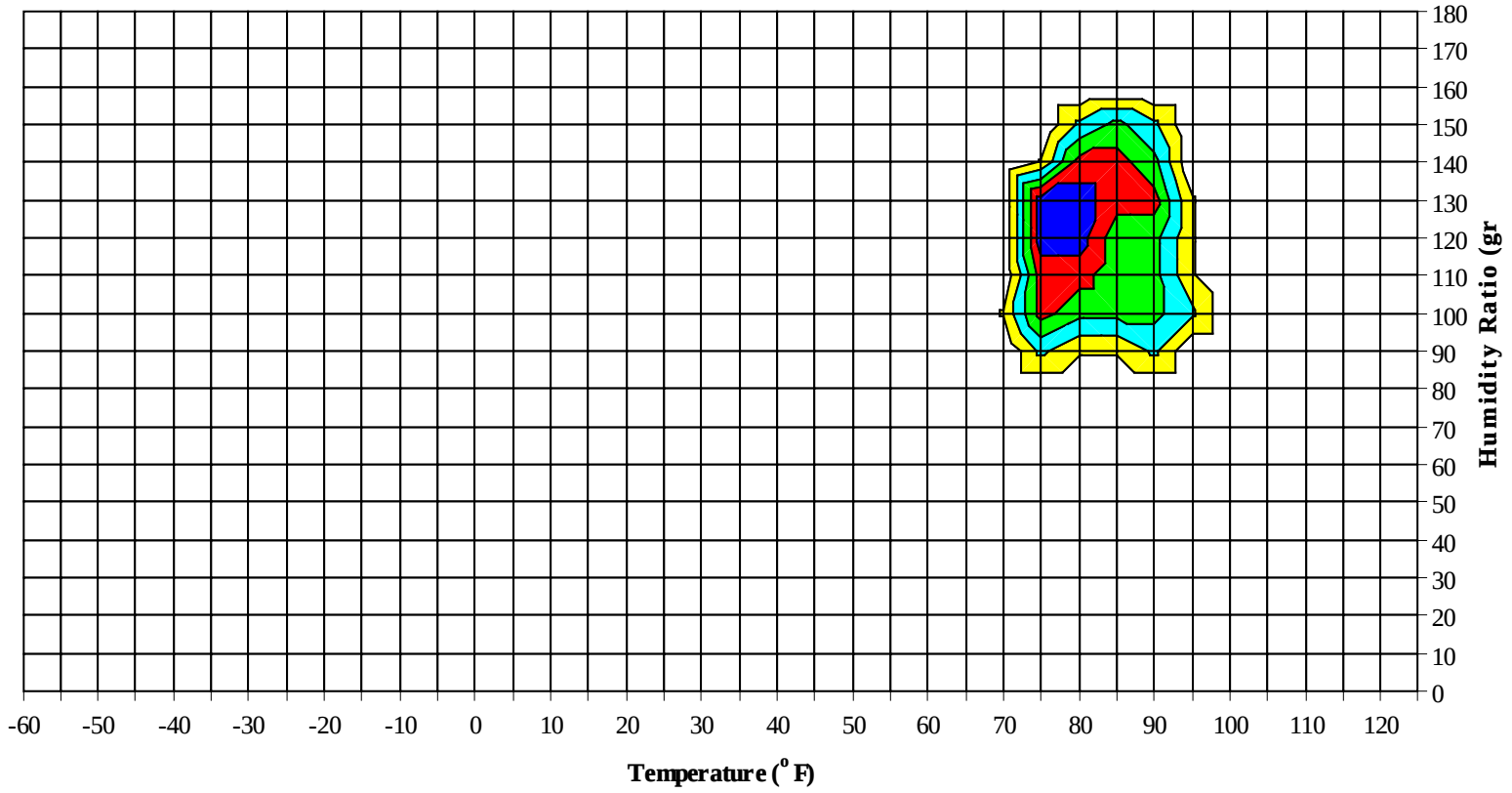
HOWARD AFB **PM** WMO No. 788060

Average Annual Climate



HOWARD AFB **PM** WMO No. 788060

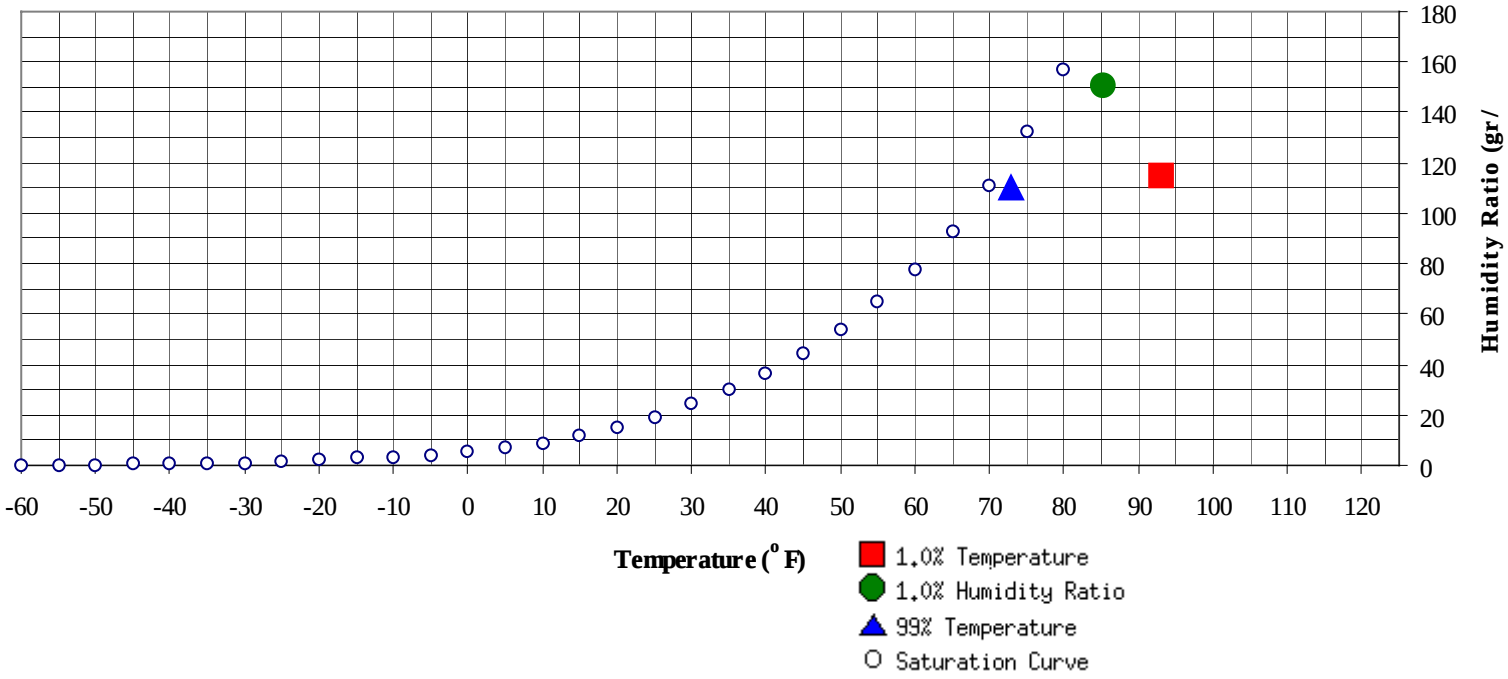
Long Term Psychrometric Summary



- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

HOWARD AFB **PM** WMO No. 788060

Psychrometric Summary of Peak Design Values



	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)
99% Dry Bulb	73	109.9	34.7

		MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
1.0% Humidity Ratio	150.5	85.3	80.6	78.8	44.1

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	93	114.9	77	40.4

HOWARD AFB **PM** WMO No. 788060

Dry-Bulb Temperature Hours For An Average Year (Sheet 1 of 5)

Period of Record = 1967 to 1996

Temperature Range (°F)	January Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	February Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	March Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99		0		0	76.3		3		3	77.4		8		8	77.1
90 / 94		52	1	53	76.5		80	3	84	75.7		105	6	111	75.8
85 / 89		109	15	123	75.7	0	86	22	108	75.0	0	89	29	119	75.1
80 / 84	19	78	79	175	74.8	24	50	77	151	74.2	41	43	97	181	74.4
75 / 79	198	8	149	355	72.6	168	5	117	289	72.2	182	3	112	297	72.5
70 / 74	30	0	5	35	69.7	32		5	37	69.6	25	0	3	28	69.6
65 / 69	1		0	2	66.2	1			1	66.2	0			0	67.9

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.

HOWARD AFB **PM** WMO No. 788060

Dry-Bulb Temperature Hours For An Average Year (Sheet 2 of 5)

Period of Record = 1967 to 1996

Temperature Range (°F)	April Hour Group (LST) 01 To 08	April 09 To 16	April 17 To 00	April Total Obs	April MCWB (°F)	May Hour Group (LST) 01 To 08	May 09 To 16	May 17 To 00	May Total Obs	May MCWB (°F)	June Hour Group (LST) 01 To 08	June 09 To 16	June 17 To 00	June Total Obs	June MCWB (°F)
95 / 99		10	0	10	77.4		1		1	80.3		0		0	82.8
90 / 94	0	94	8	102	76.8		43	2	45	79.2	0	21	1	22	80.6
85 / 89	2	79	26	107	76.1	1	89	14	104	78.2	1	75	8	84	79.1
80 / 84	55	47	113	214	75.2	68	94	129	291	76.8	65	117	119	300	77.3
75 / 79	169	9	92	270	73.5	172	19	102	294	74.6	163	26	108	297	74.7
70 / 74	15	0	1	17	70.0	8	0	2	10	71.7	12	0	5	17	71.4
65 / 69	0			0	65.6										

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.

HOWARD AFB **PM** WMO No. 788060

Dry-Bulb Temperature Hours For An Average Year (Sheet 3 of 5)

Period of Record = 1967 to 1996

Temperature Range (°F)	July Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	August Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	September Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99		0		0	82.3										
90 / 94	0	21	1	22	80.0		16	0	16	80.2		10	0	10	80.1
85 / 89	0	82	9	91	78.8	0	73	5	79	78.8	0	61	3	64	78.9
80 / 84	55	115	112	282	76.9	44	124	104	271	76.9	39	134	90	262	76.9
75 / 79	181	28	123	331	74.4	185	33	135	353	74.5	174	33	140	346	74.5
70 / 74	13	1	3	18	71.0	18	1	6	25	71.5	28	1	8	37	71.5
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.

HOWARD AFB **PM** WMO No. 788060

Dry-Bulb Temperature Hours For An Average Year (Sheet 4 of 5)

Period of Record = 1967 to 1996

Temperature Range (°F)	October Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	November Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	December Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99							0		0	79.0		0		0	84.0
90 / 94		5	0	5	79.9		8	0	8	79.0		28	0	29	78.1
85 / 89	0	55	1	56	78.7	0	62	2	65	78.4	0	93	8	101	77.2
80 / 84	24	151	67	242	76.9	26	135	67	228	76.7	27	104	77	208	76.0
75 / 79	193	36	172	401	74.4	192	35	165	393	74.3	193	21	158	372	73.6
70 / 74	32	1	8	41	71.7	20	1	6	26	71.7	28	0	5	33	70.4
65 / 69											0			0	66.4

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.

HOWARD AFB **PM** WMO No. 788060

Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1967 to 1996

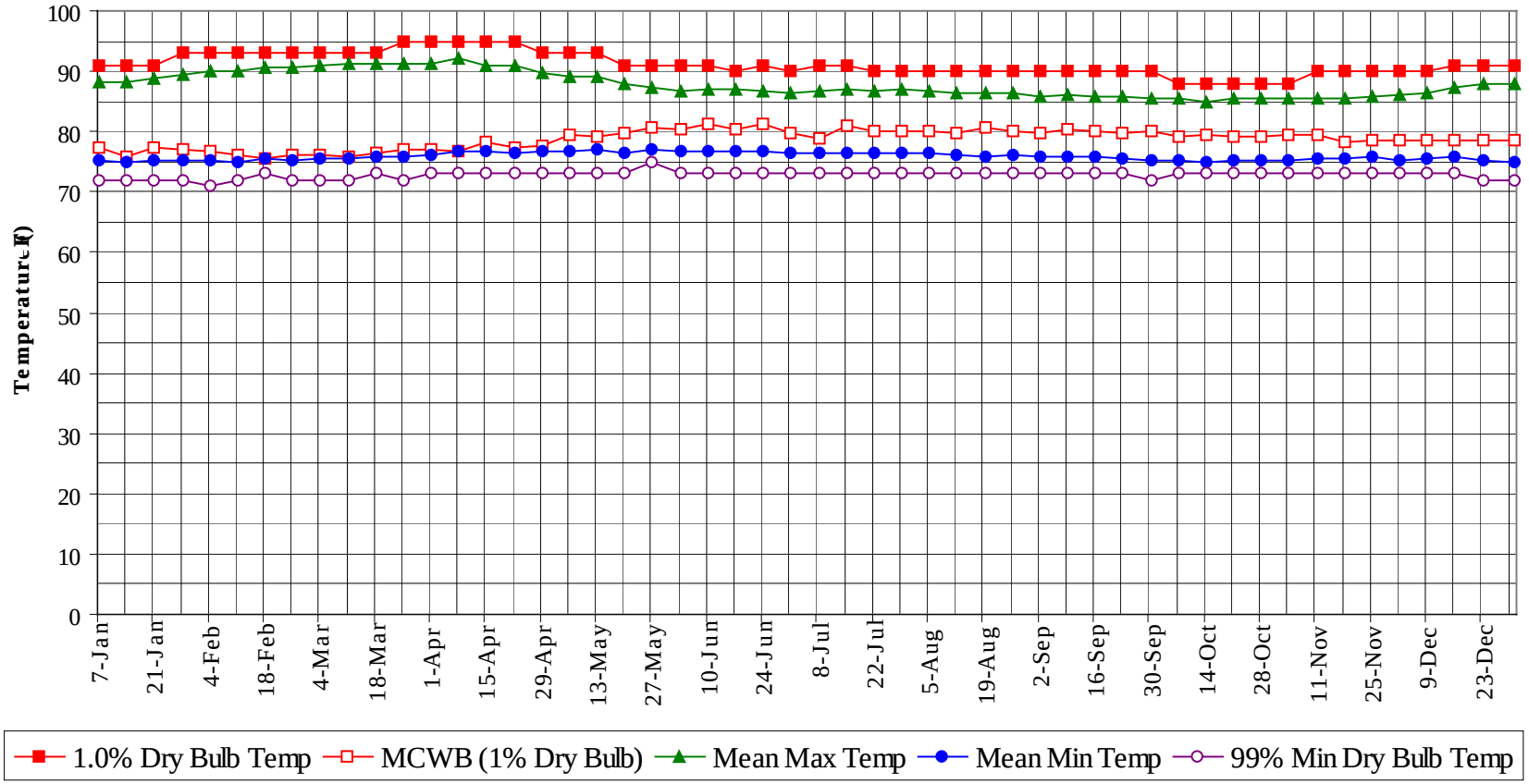
Annual Totals

Temperature Range (°F)	Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99		23	0	23	77.6
90 / 94	0	486	22	508	77.2
85 / 89	5	954	143	1101	77.2
80 / 84	484	1190	1130	2803	76.3
75 / 79	2170	254	1573	3997	73.9
70 / 74	262	6	56	324	70.7
65 / 69	3		0	3	66.3

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.

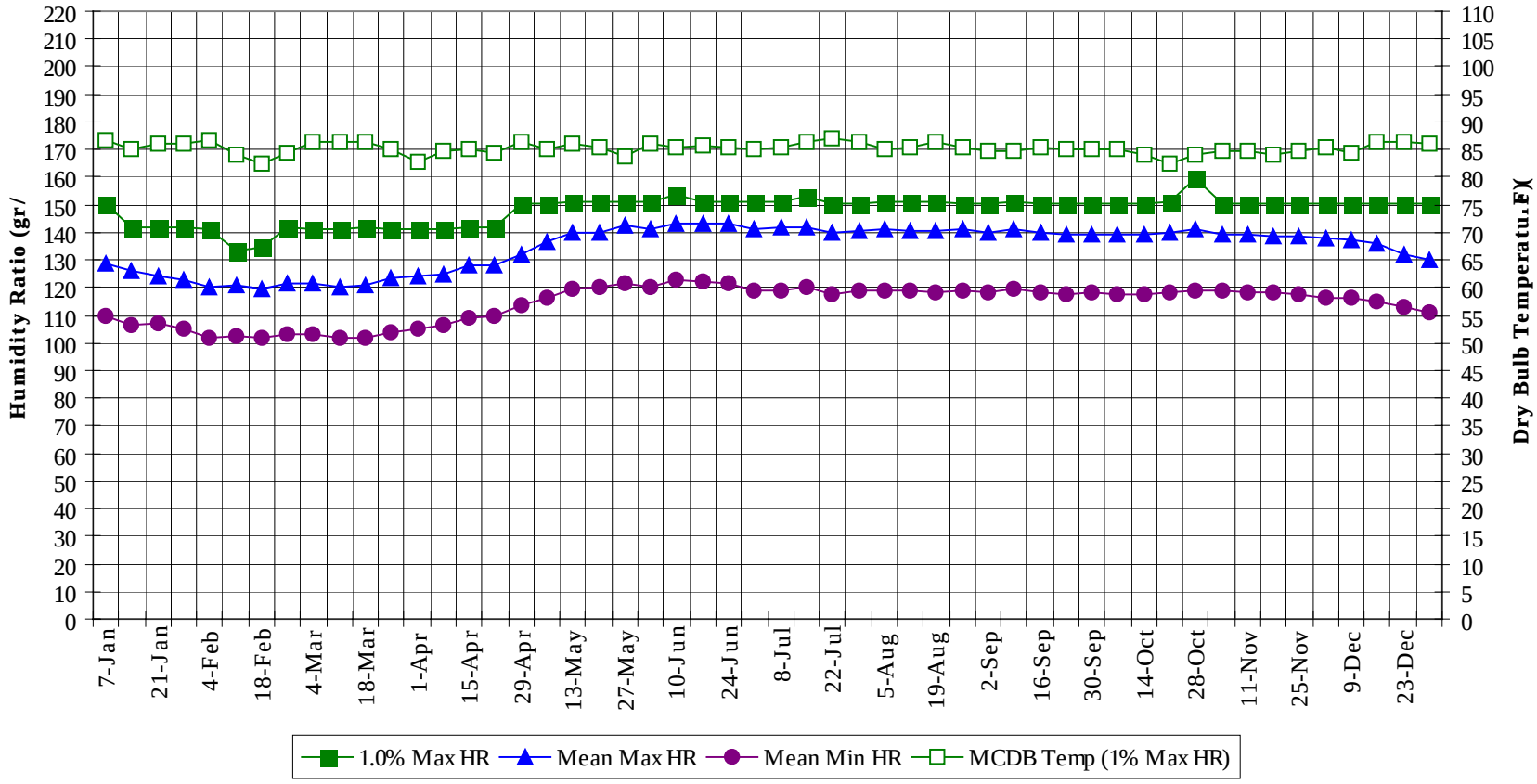
HOWARD AFB **PM** WMO No. 788060

Annual Summary of Temperatures



HOWARD AFB **PM** WMO No. 788060

Long Term Humidity and Dry Bulb Temperature Summary



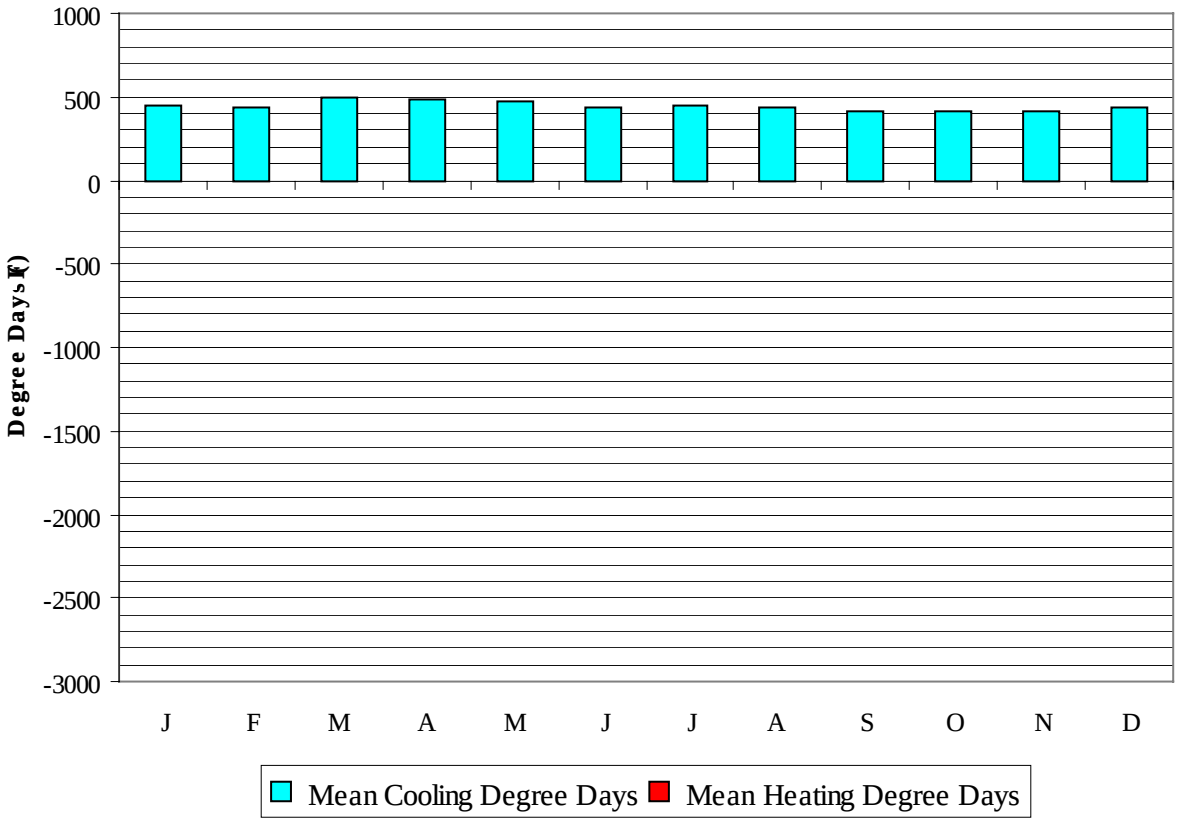
HOWARD AFB **PM** WMO No. 788060

Long Term Dry Bulb Temperature and Humidity 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	91.0	77.5	88.3	75.2	72.0	150.5	86.7	128.8	109.5
14-Jan	91.0	75.9	88.2	75.0	72.0	142.1	84.9	125.9	106.5
21-Jan	91.0	77.3	88.8	75.1	72.0	142.1	86.2	124.0	106.8
28-Jan	93.0	76.9	89.6	75.1	72.0	142.1	86.2	123.1	105.1
4-Feb	93.0	76.8	89.9	75.2	71.0	141.4	86.6	120.3	102.0
11-Feb	93.0	76.0	90.0	75.1	72.0	133.0	84.0	120.6	102.2
18-Feb	93.0	75.7	90.5	75.5	73.0	134.4	82.4	119.6	101.7
25-Feb	93.0	76.0	90.7	75.4	72.0	142.1	84.3	121.7	103.3
4-Mar	93.0	76.1	90.9	75.7	72.0	141.4	86.3	121.8	103.0
11-Mar	93.0	76.0	91.1	75.5	72.0	141.4	86.5	120.3	101.7
18-Mar	93.0	76.5	91.4	75.7	73.0	142.1	86.5	120.7	101.5
25-Mar	95.0	77.1	91.4	75.8	72.0	141.4	84.9	123.4	103.5
1-Apr	95.0	76.9	91.4	76.2	73.0	141.4	82.9	123.9	105.2
8-Apr	95.0	76.7	92.1	76.8	73.0	141.4	84.7	124.9	106.2
15-Apr	95.0	78.3	91.1	76.7	73.0	142.1	85.1	127.9	109.0
22-Apr	95.0	77.5	90.9	76.3	73.0	142.1	84.5	128.2	109.4
29-Apr	93.0	77.8	89.7	76.6	73.0	150.5	86.4	132.3	113.3
6-May	93.0	79.5	89.2	76.7	73.0	150.5	85.2	136.6	116.4
13-May	93.0	79.2	89.0	77.0	73.0	151.2	86.1	139.6	119.2
20-May	91.0	79.7	87.8	76.6	73.0	151.2	85.4	140.1	120.3
27-May	91.0	80.6	87.3	77.0	75.0	151.2	83.9	142.8	121.8
3-Jun	91.0	80.4	86.8	76.7	73.0	151.2	85.9	140.9	120.4
10-Jun	91.0	81.2	87.0	76.8	73.0	154.0	85.2	143.5	122.6
17-Jun	90.0	80.2	87.1	76.7	73.0	151.2	85.8	143.1	121.9
24-Jun	91.0	81.4	86.7	76.7	73.0	151.2	85.2	143.3	121.7
1-Jul	90.0	79.8	86.4	76.4	73.0	151.2	84.9	141.3	118.9
8-Jul	91.0	79.0	86.9	76.4	73.0	151.2	85.3	141.8	118.7
15-Jul	91.0	80.8	87.1	76.6	73.0	153.3	86.5	141.9	119.9
22-Jul	90.0	80.0	86.8	76.5	73.0	150.5	87.1	139.8	117.9
29-Jul	90.0	80.0	87.1	76.5	73.0	150.5	86.2	140.4	118.7
5-Aug	90.0	80.2	86.6	76.4	73.0	151.2	85.0	141.5	119.1
12-Aug	90.0	79.8	86.3	76.3	73.0	151.2	85.5	140.4	119.2
19-Aug	90.0	80.5	86.4	75.9	73.0	151.2	86.5	140.2	118.4
26-Aug	90.0	80.2	86.4	76.0	73.0	150.5	85.3	141.1	118.9
2-Sep	90.0	79.7	85.7	75.7	73.0	150.5	84.8	139.7	118.1
9-Sep	90.0	80.4	86.3	75.9	73.0	151.2	84.8	141.0	119.4
16-Sep	90.0	80.0	85.8	75.7	73.0	150.5	85.4	139.9	118.1
23-Sep	90.0	79.7	85.8	75.4	73.0	150.5	85.0	139.5	117.8
30-Sep	90.0	80.0	85.6	75.3	72.0	150.5	84.9	139.0	118.4
7-Oct	88.0	79.3	85.6	75.3	73.0	150.5	85.2	139.5	117.7
14-Oct	88.0	79.5	84.8	75.0	73.0	150.5	84.0	139.4	117.5
21-Oct	88.0	79.1	85.4	75.3	73.0	151.2	82.6	139.7	118.1
28-Oct	88.0	79.2	85.5	75.1	73.0	159.6	84.1	140.9	119.1
4-Nov	88.0	79.5	85.4	75.3	73.0	150.5	84.8	139.5	118.9
11-Nov	90.0	79.3	85.5	75.5	73.0	150.5	84.8	139.4	118.2
18-Nov	90.0	78.2	85.6	75.6	73.0	150.5	84.1	138.3	118.2
25-Nov	90.0	78.6	85.9	75.7	73.0	150.5	84.9	138.5	117.3
2-Dec	90.0	78.6	86.1	75.4	73.0	150.5	85.2	138.0	115.9
9-Dec	90.0	78.4	86.4	75.6	73.0	150.5	84.3	137.5	116.3
16-Dec	91.0	78.6	87.4	75.8	73.0	150.5	86.4	135.9	115.1
23-Dec	91.0	78.7	87.9	75.3	72.0	150.5	86.2	131.7	112.8
31-Dec	91.0	78.4	88.0	75.0	72.0	150.5	86.1	130.0	110.7

HOWARD AFB **PM** WMO No. 788060

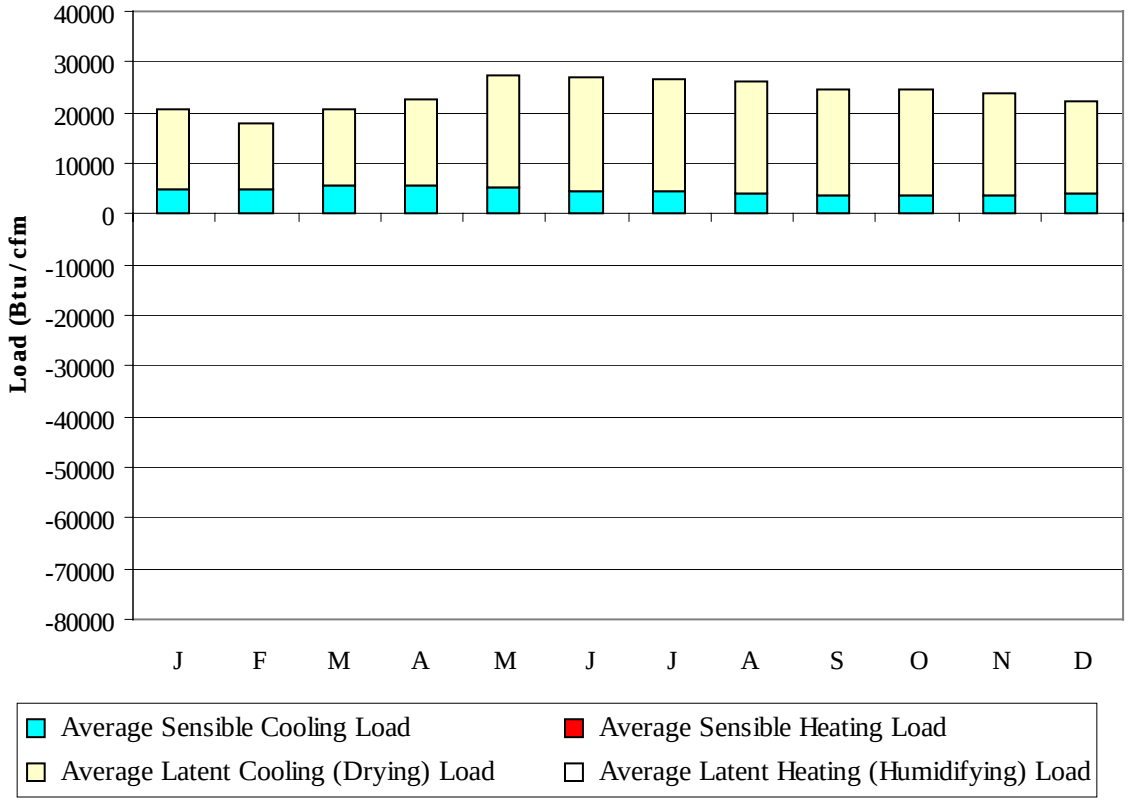
Degree Days, Heating and Cooling
(Base 65°F)



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	454	0
FEB	432	0
MAR	495	0
APR	486	0
MAY	475	0
JUN	443	0
JUL	454	0
AUG	440	0
SEP	416	0
OCT	414	0
NOV	410	0
DEC	441	0
ANN	5359	0

HOWARD AFB **PM** WMO No. 788060

Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	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	4674	-1	16113	0
FEB	4762	0	13221	0
MAR	5776	0	14869	0
APR	5763	0	16979	0
MAY	5178	0	22151	0
JUN	4562	0	22480	0
JUL	4609	0	22116	0
AUG	4248	0	21935	0
SEP	3850	0	20942	0
OCT	3558	0	21074	0
NOV	3659	0	20128	0
DEC	4132	0	18248	0
ANN	54771	-1	230256	0

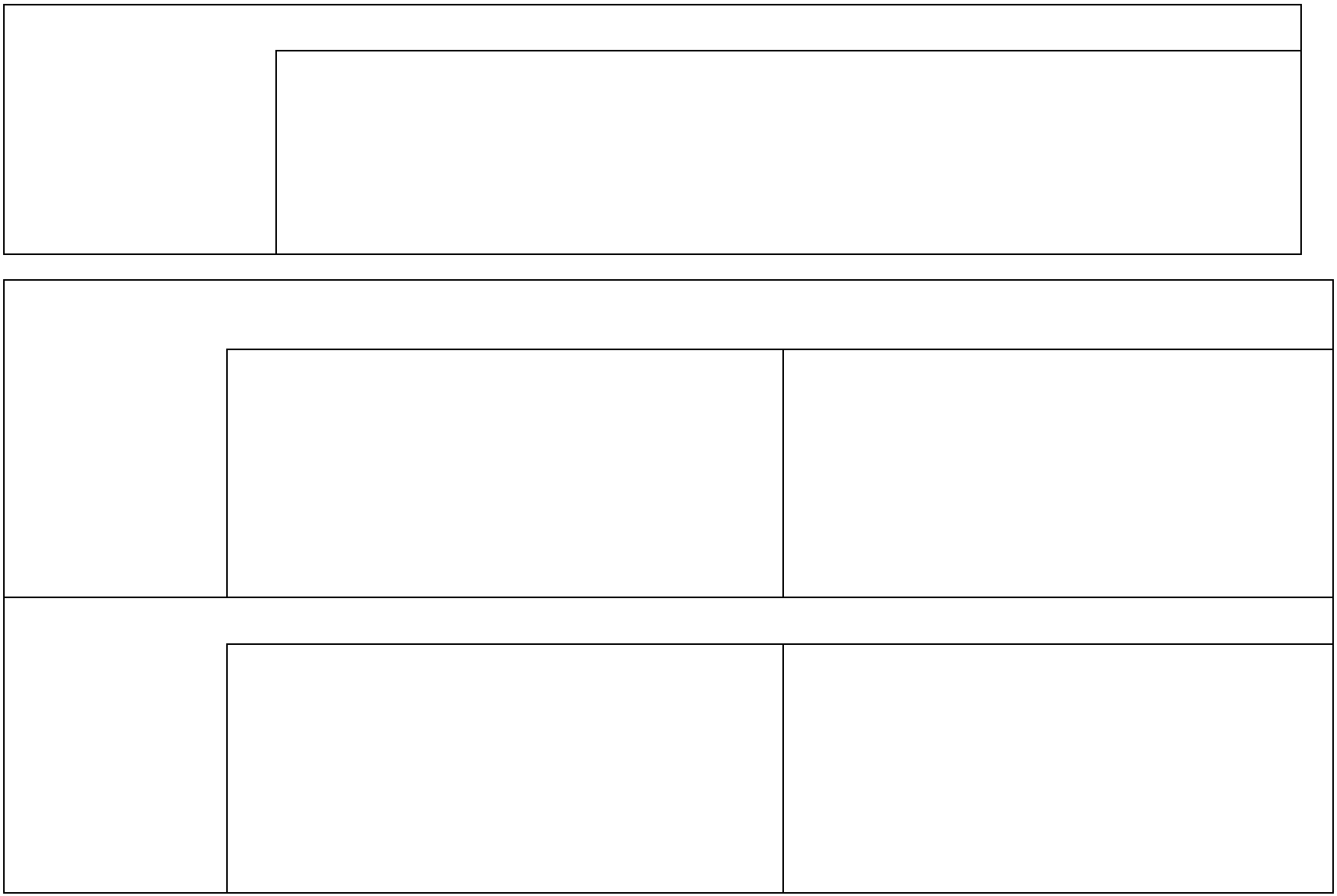
Average Annual Solar Radiation – Nearest Available Site

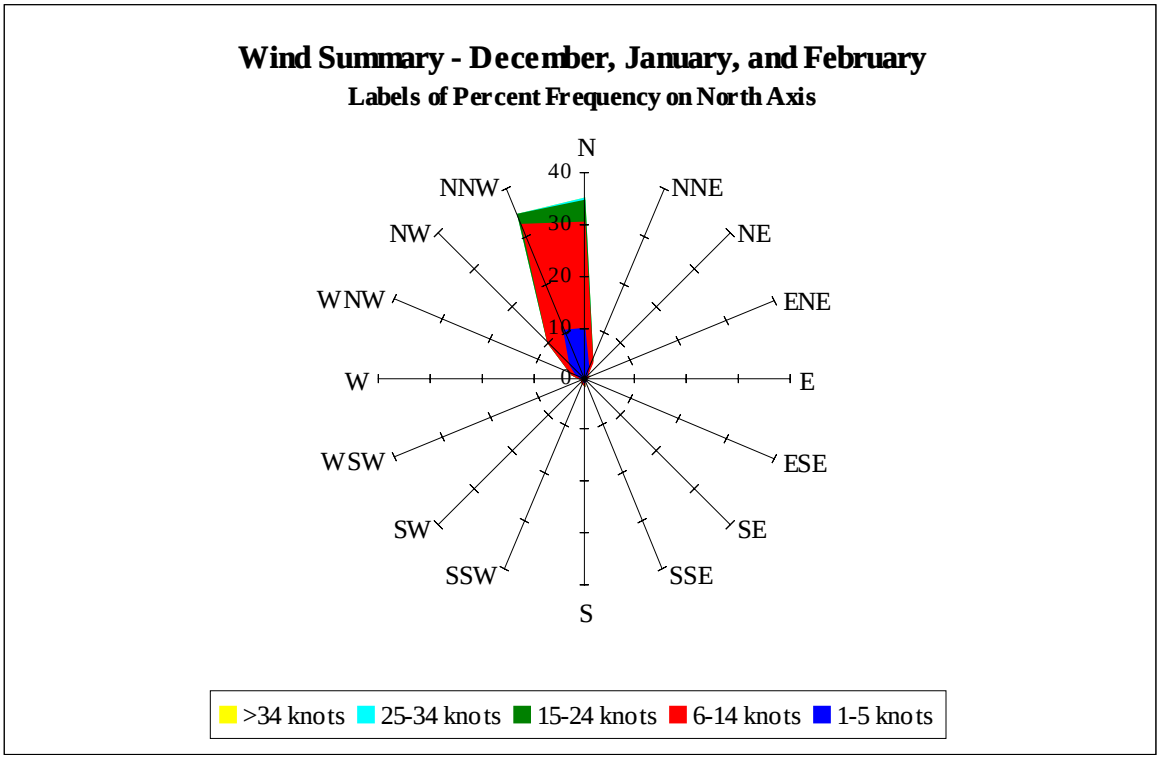
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

No Solar Radiation
Data Available

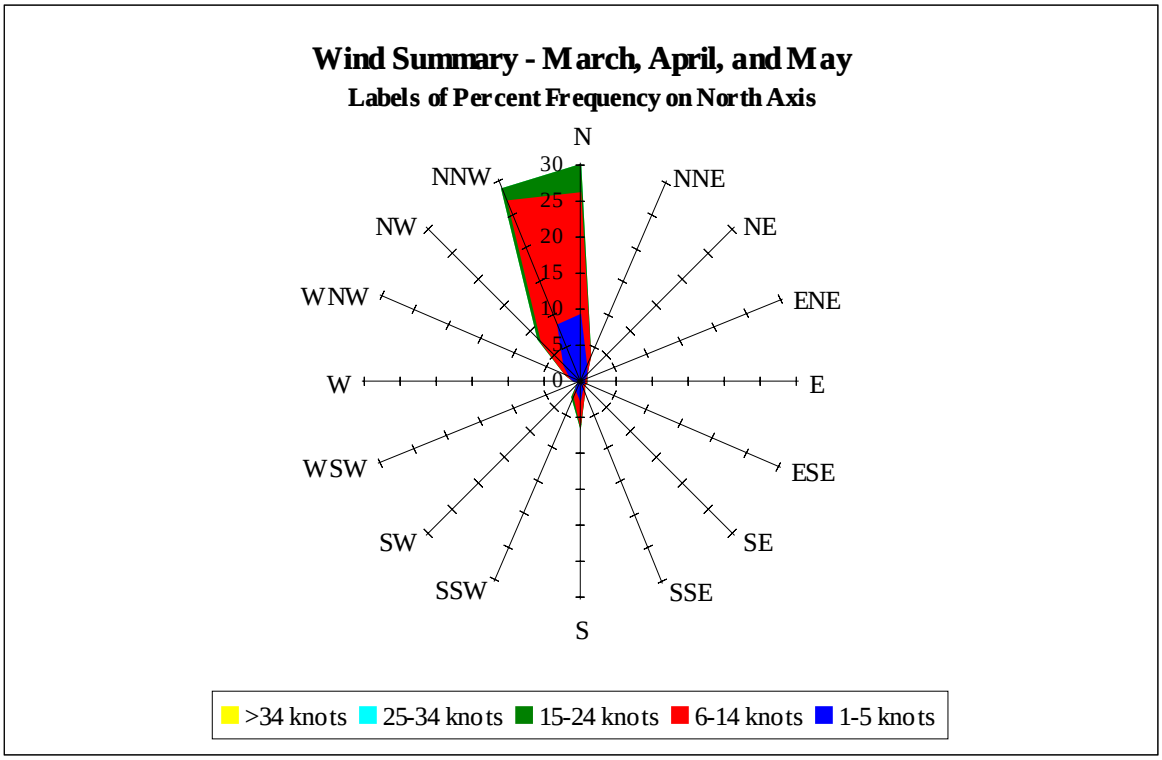
Average Annual Solar Heat and Illumination – Nearest Available Site

(Source: National Renewable Energy Laboratory, Golden CO, 1995)

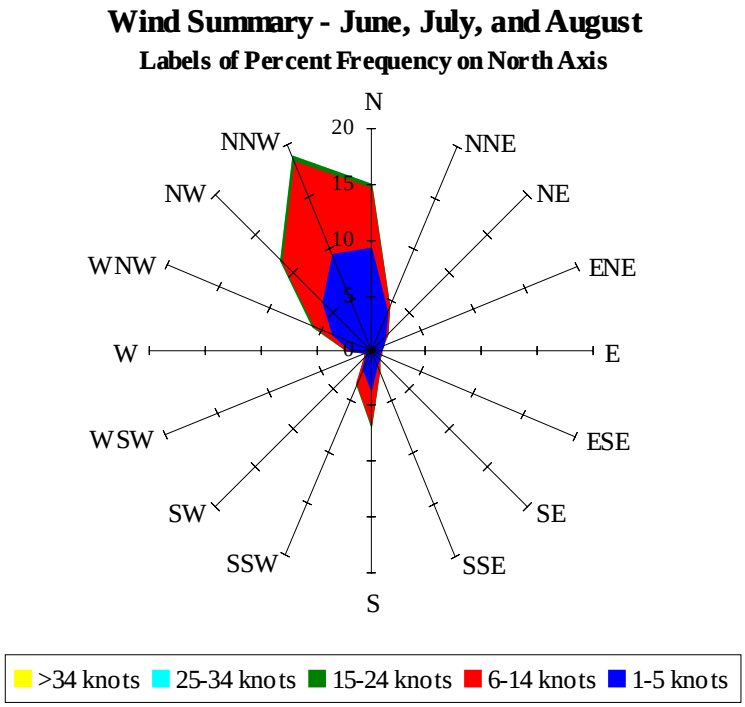




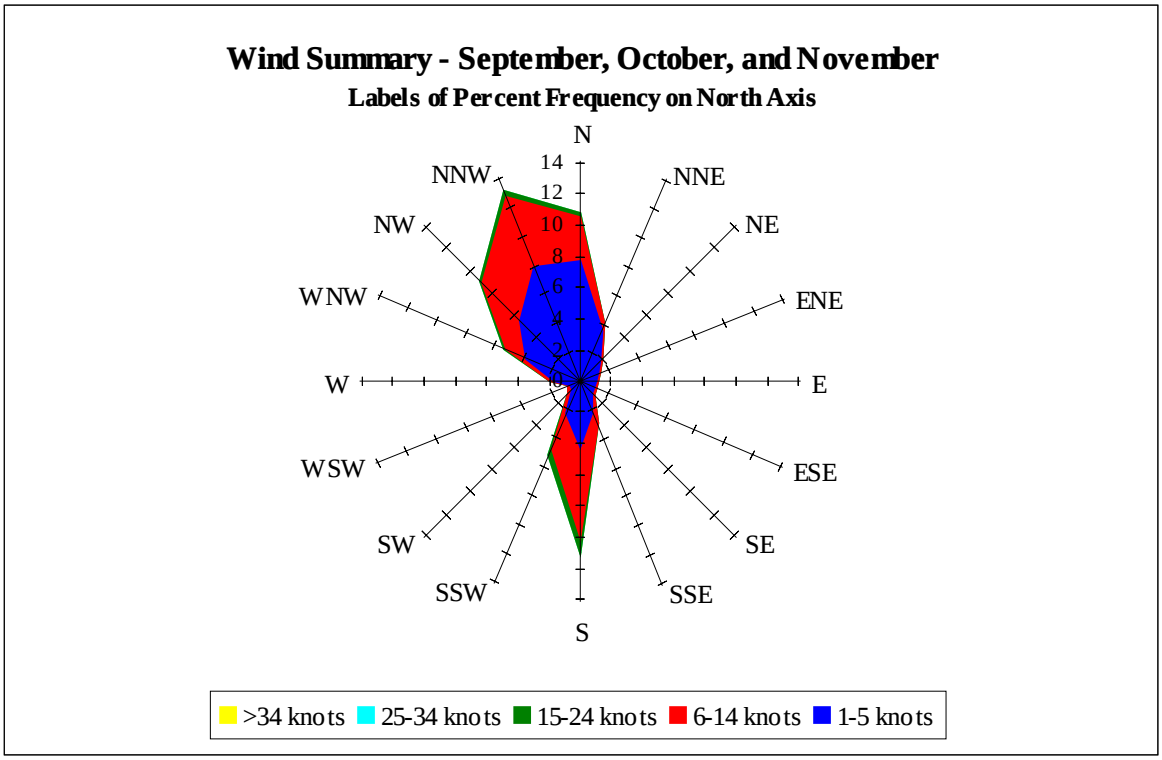
Percent Calm = 8.05



Percent Calm = 11.51



Percent Calm = 23.32



Percent Calm = 28.64