

NAKHON PHANOM	TH	
Latitude = 17.42 N		WMO No. 483570
Longitude = 104.78 E		Elevation = 486 feet
Period of Record = 1973 to 1996		Average Pressure = 29.25 inches Hg

Design Criteria Data

	Design Value	Mean Coincident (Average) Values			
		Wet Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Dry Bulb Temperature (T)	(°F)				
Median of Extreme Highs	102	77	100	3.3	WSW
0.4% Occurrence	100	77	105	4.3	W
1.0% Occurrence	98	77	110	4.1	E
2.0% Occurrence	95	77	117	2.9	E
Mean Daily Range	15	-	-	-	-
97.5% Occurrence	61	58	67	1.2	E
99.0% Occurrence	57	54	60	0.7	NE
99.6% Occurrence	54	52	54	0.8	N
Median of Extreme Lows	48	46	42	0.3	N
	Design Value	Mean Coincident (Average) Values			
		Dry Bulb Temperature (°F)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Wet Bulb Temperature (T_{wb})	(°F)				
Median of Extreme Highs	83	91	158	2.5	S
0.4% Occurrence	82	89	154	2.2	S
1.0% Occurrence	81	88	149	2.0	S
2.0% Occurrence	81	88	149	2.0	S
	Design Value	Mean Coincident (Average) Values			
		Dry Bulb Temperature (°F)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Humidity Ratio (HR)	(gr/lb)				
Median of Extreme Highs	165	84	1.06	2.7	S
0.4% Occurrence	164	85	1.06	2.6	S
1.0% Occurrence	156	85	1.01	1.1	WNW
2.0% Occurrence	154	84	0.99	2.3	S
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		382	4264	5063	6870

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	5.7 + 4.4
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 (#)
81.8	N/A	N/A	0

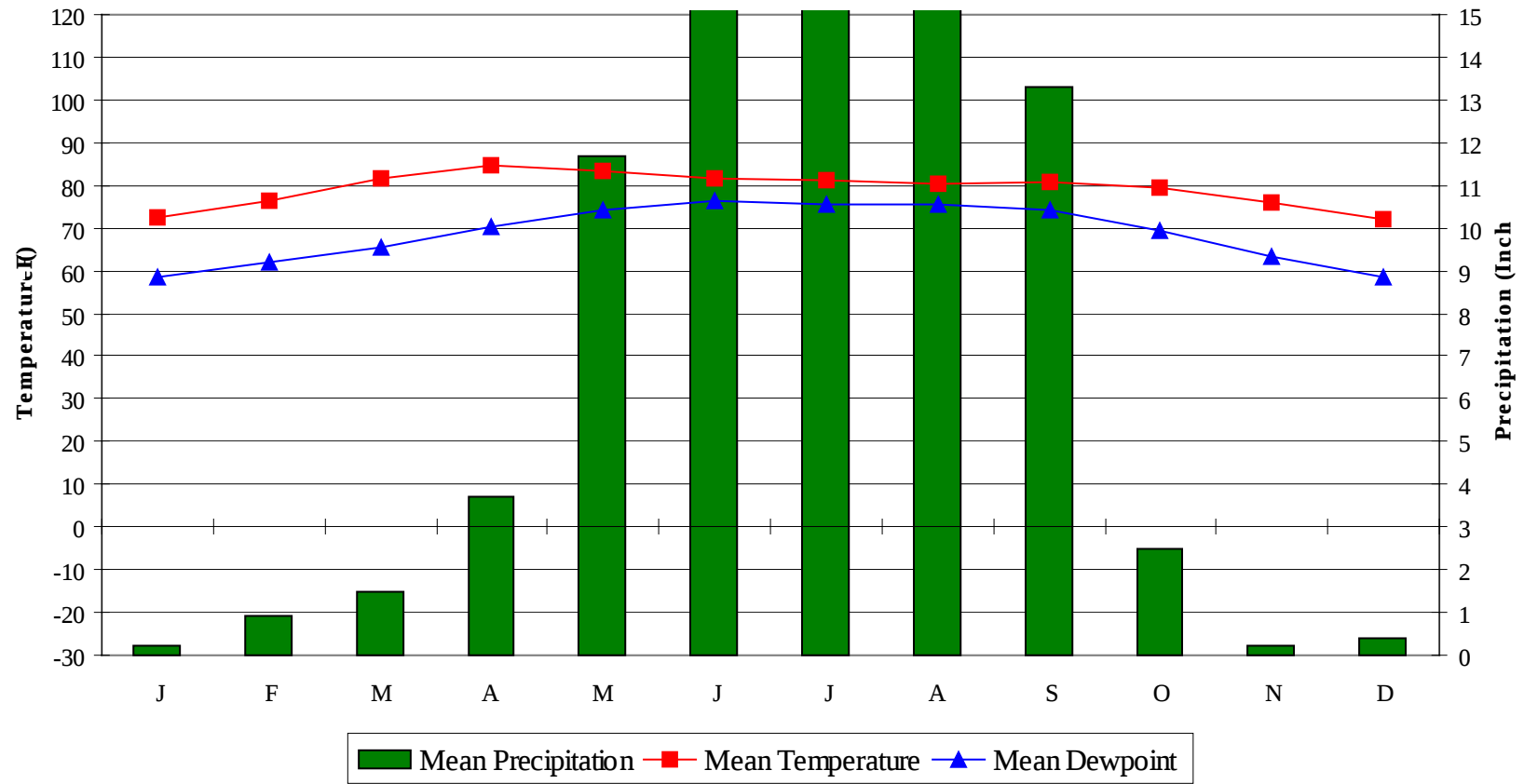
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

NAKHON PHANOM

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Average Annual Climate

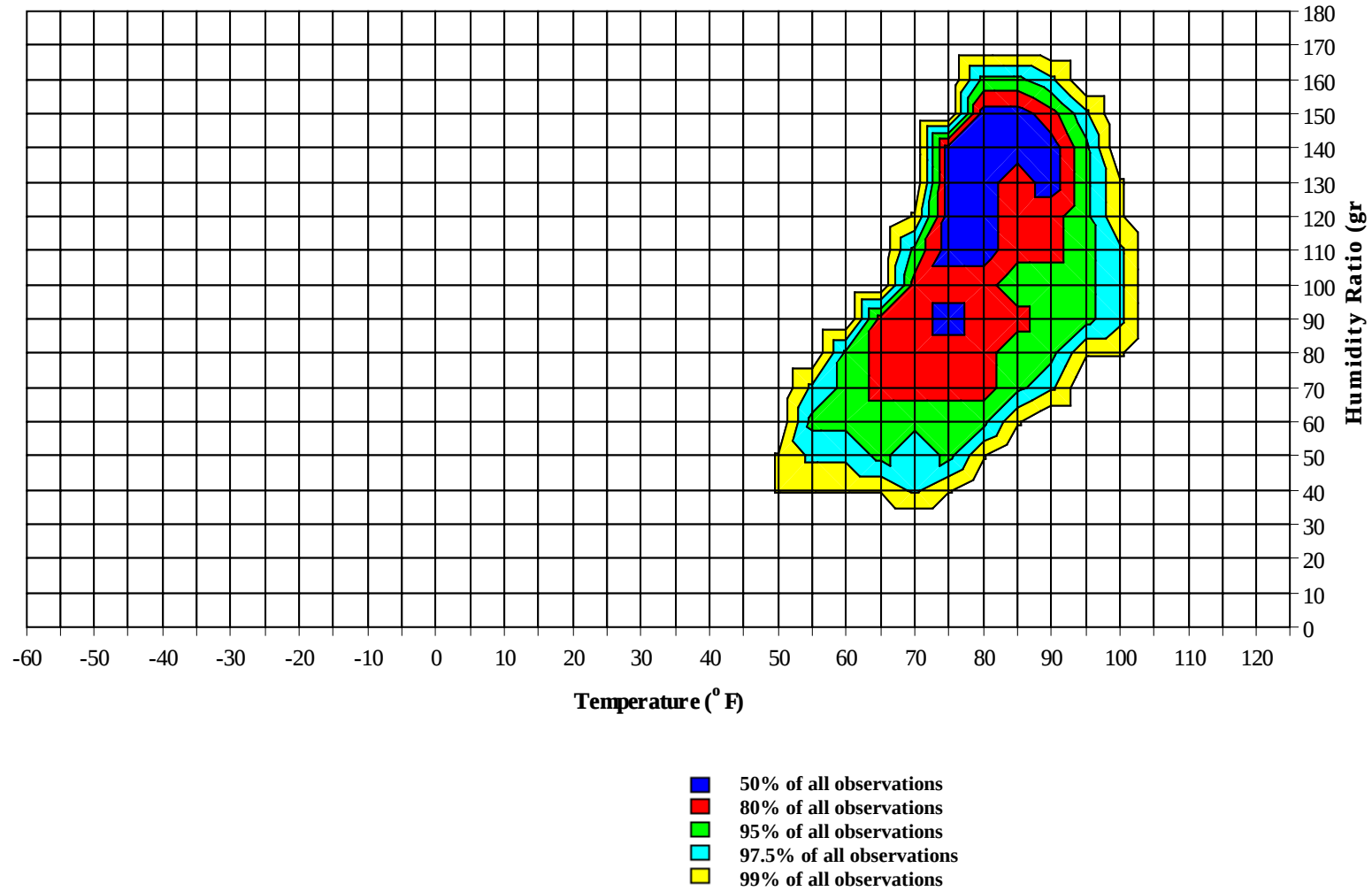


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WMO No. 483570

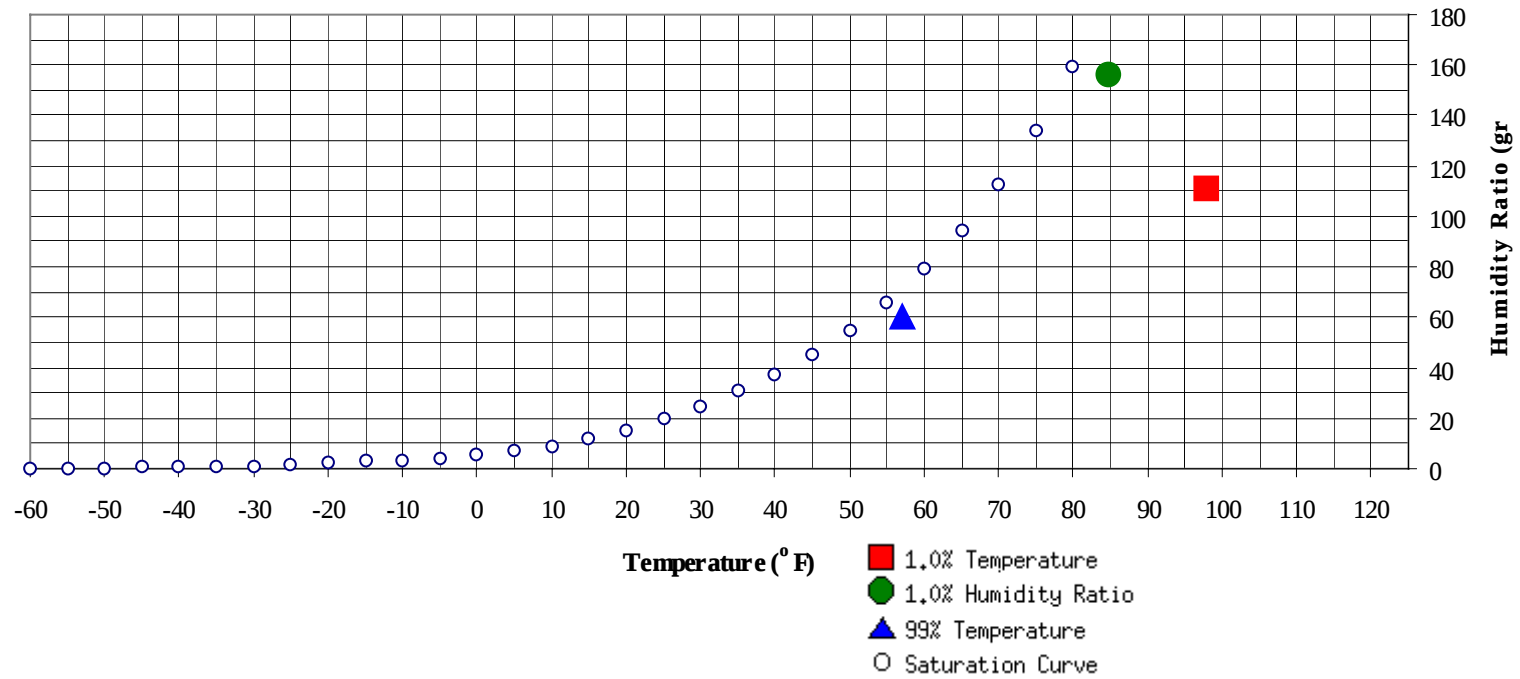
Long Term Psychrometric Summary



NAKHON PHANOM

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Psychrometric Summary of Peak Design Values

	(°F)	MCHR	Enthalpy	1.0% Humidity	(gr/lb)	MCDB	MCWB	MC Dewpt	Enthalpy
		(gr/lb)	(btu/lb)			(°F)	(°F)	(°F)	(btu/lb)
99% Dry Bulb	57	60.6	23.1	Ratio	156.1	84.7	80.5	79.2	44.8

1.0% Dry Bulb	(°F)	MCHR	MCWB	Enthalpy
		(gr/lb)	(°F)	(btu/lb)
98	110.9	77.3	41.0	

NAKHON PHANOM

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WMO No. 483570

Dry-Bulb Temperature Hours For An Average Year (Sheet 1 of 5)**Period of Record = 1973 to 1996**

Temperature Range (°F)	January					February					March				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01	09	17			01	09	17			01	09	17		
	To 08	To 16	To 00			To 08	To 16	To 00			To 08	To 16	To 00		
105 / 109											1 1 77.2				
100 / 104						2 1 4 72.8					14 1 15 75.4				
95 / 99	0 0 74.0					0 14 3 17 73.7					40 9 49 75.6				
90 / 94	13 3 15 70.7					0 38 9 48 72.6					66 32 98 74.5				
85 / 89	0	44	5	50	69.8	0	40	17	57	71.7	1	46	54	101	73.6
80 / 84	1	78	26	105	67.8	4	62	54	120	70.1	37	45	71	153	71.8
75 / 79	1	66	64	132	66.0	27	36	57	120	68.1	84	22	44	150	69.9
70 / 74	31	35	80	146	64.1	71	24	45	140	65.9	73	10	25	108	66.8
65 / 69	65	10	39	113	62.1	52	5	20	77	62.4	28	3	8	39	62.5
60 / 64	91	2	28	121	59.4	46	2	13	62	58.7	19	2	4	25	58.4
55 / 59	44	0	4	47	55.2	17	0	4	21	53.7	4	0	0	4	53.7
50 / 54	9	0	0	9	50.4	5		0	5	49.5	1			1	48.8
45 / 49	4		0	4	44.3	1			1	45.5	0			0	44.0
40 / 44	1			1	41.1										
35 / 39	1			1	37.1										

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.

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WMO No. 483570

Dry-Bulb Temperature Hours For An Average Year (Sheet 2 of 5)**Period of Record = 1973 to 1996**

Temperature Range (°F)	April					May					June				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00		
105 / 109		0		0	76.3										
100 / 104	0	15	3	18	77.7		2	0	2	80.6					
95 / 99	0	53	12	65	77.9	0	24	3	26	79.7	0	5	0	5	80.5
90 / 94	0	78	51	129	76.8	0	78	23	102	78.9	0	42	7	49	80.4
85 / 89	10	44	61	115	76.0	4	64	55	123	78.3	1	78	33	112	79.5
80 / 84	86	32	72	190	74.6	80	56	100	236	77.0	64	84	121	269	78.3
75 / 79	92	12	31	136	72.4	139	21	61	221	75.0	161	30	76	268	75.9
70 / 74	44	5	9	58	68.6	25	2	6	34	71.8	14	1	3	17	72.8
65 / 69	7	1	1	9	64.4										
60 / 64	1		0	1	59.4										
55 / 59															
50 / 54															
45 / 49															
40 / 44															
35 / 39															

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.

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WMO No. 483570

Dry-Bulb Temperature Hours For An Average Year (Sheet 3 of 5)**Period of Record = 1973 to 1996**

Temperature Range (°F)	July					August					September				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00		
105 / 109															
100 / 104															
95 / 99	0	2	0	2	79.8	0	0		0	81.7		0		0	83.0
90 / 94	0	41	5	47	80.1	0	29	1	30	80.1	0	47	3	50	78.6
85 / 89	0	71	32	104	79.2	0	69	19	88	79.3	0	87	16	102	77.9
80 / 84	52	93	118	263	77.9	29	93	108	229	78.0	17	74	114	205	77.0
75 / 79	173	36	87	296	75.7	194	53	113	360	75.6	189	30	102	321	75.0
70 / 74	24	3	5	32	71.9	25	5	6	36	71.7	34	2	5	42	71.3
65 / 69		0		0											
60 / 64															
55 / 59															
50 / 54															
45 / 49															
40 / 44															
35 / 39															

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.

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Dry-Bulb Temperature Hours For An Average Year (Sheet 4 of 5)**Period of Record = 1973 to 1996**

Temperature Range (°F)	October					November					December				
	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00			01 To 08	09 To 16	17 To 00		
105 / 109															
100 / 104															
95 / 99		0		0	80.0		0		0	80.0		0		0	77.0
90 / 94		42	3	45	76.9		15	1	16	74.7		9	1	10	74.6
85 / 89	0	94	9	103	75.2	0	69	3	72	73.1	0	35	3	37	71.3
80 / 84	7	83	89	179	73.6	3	98	39	140	70.5	1	82	13	96	68.7
75 / 79	122	23	111	255	72.6	28	45	96	169	68.3	3	71	53	127	65.8
70 / 74	94	4	35	133	68.9	91	12	69	172	66.4	28	39	92	160	63.5
65 / 69	21	1	3	24	64.0	59	1	23	83	63.2	61	8	48	117	61.8
60 / 64	5		0	5	59.5	44	0	8	52	59.4	90	4	31	125	58.8
55 / 59						11	0	1	12	54.6	44	1	5	50	54.6
50 / 54						3			3	51.6	16	0	1	18	49.2
45 / 49						0			0	48.0	4		0	4	43.9
40 / 44											1			1	39.2
35 / 39															

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.

NAKHON PHANOM TH WMO No. 483570
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)
Period of Record = 1973 to 1996

Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109		1		1	76.9
100 / 104	0	34	5	39	76.6
95 / 99	1	141	27	169	77.2
90 / 94	2	501	139	642	77.1
85 / 89	18	739	312	1069	76.1
80 / 84	383	876	935	2193	74.8
75 / 79	1228	445	897	2569	72.9
70 / 74	551	145	372	1067	66.9
65 / 69	287	28	137	452	62.5
60 / 64	289	10	82	381	59.1
55 / 59	115	2	13	130	54.6
50 / 54	34	0	1	35	49.8
45 / 49	10		0	10	44.3
40 / 44	2			2	40.3
35 / 39	1			1	37.1

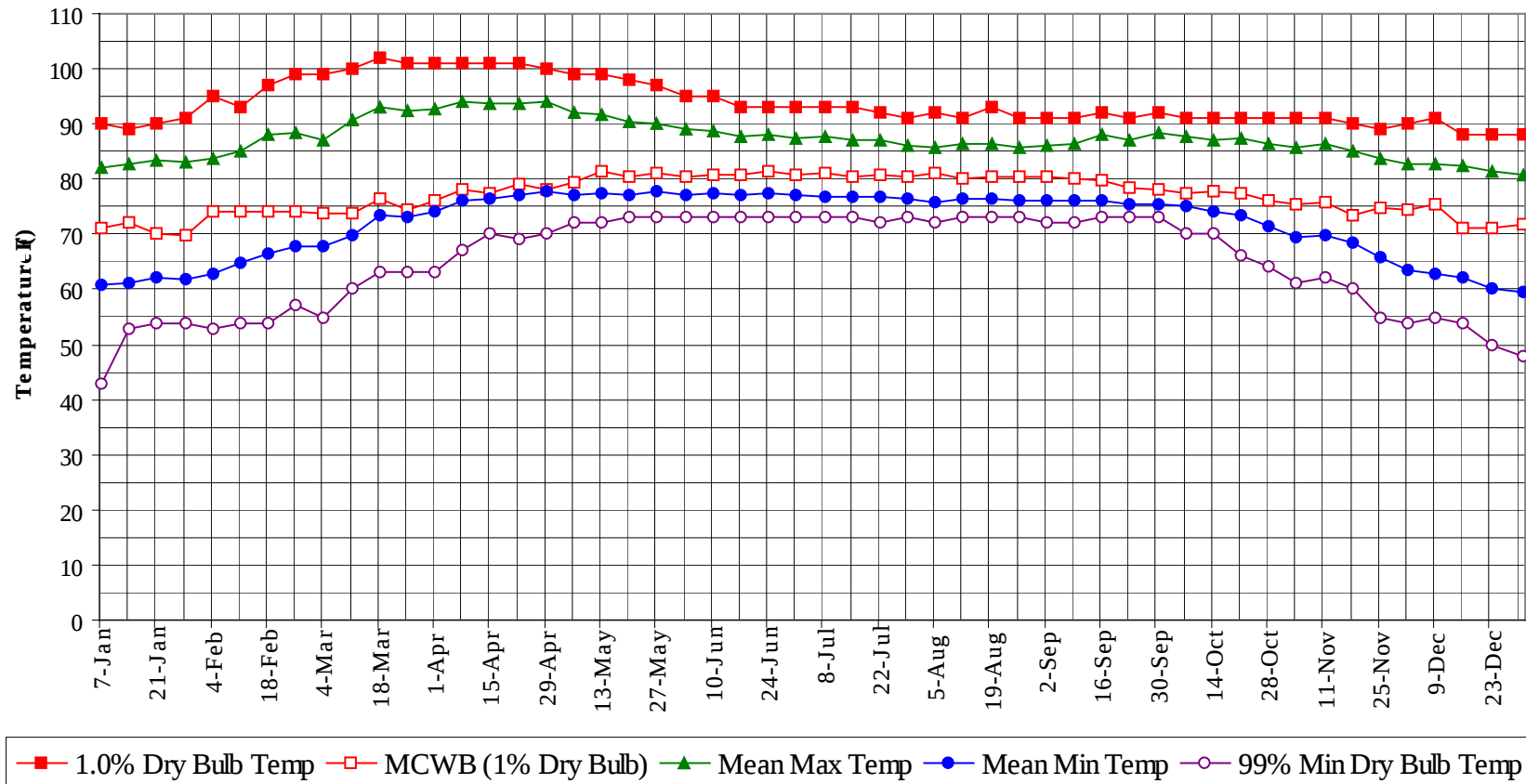
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

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Annual Summary of Temperatures

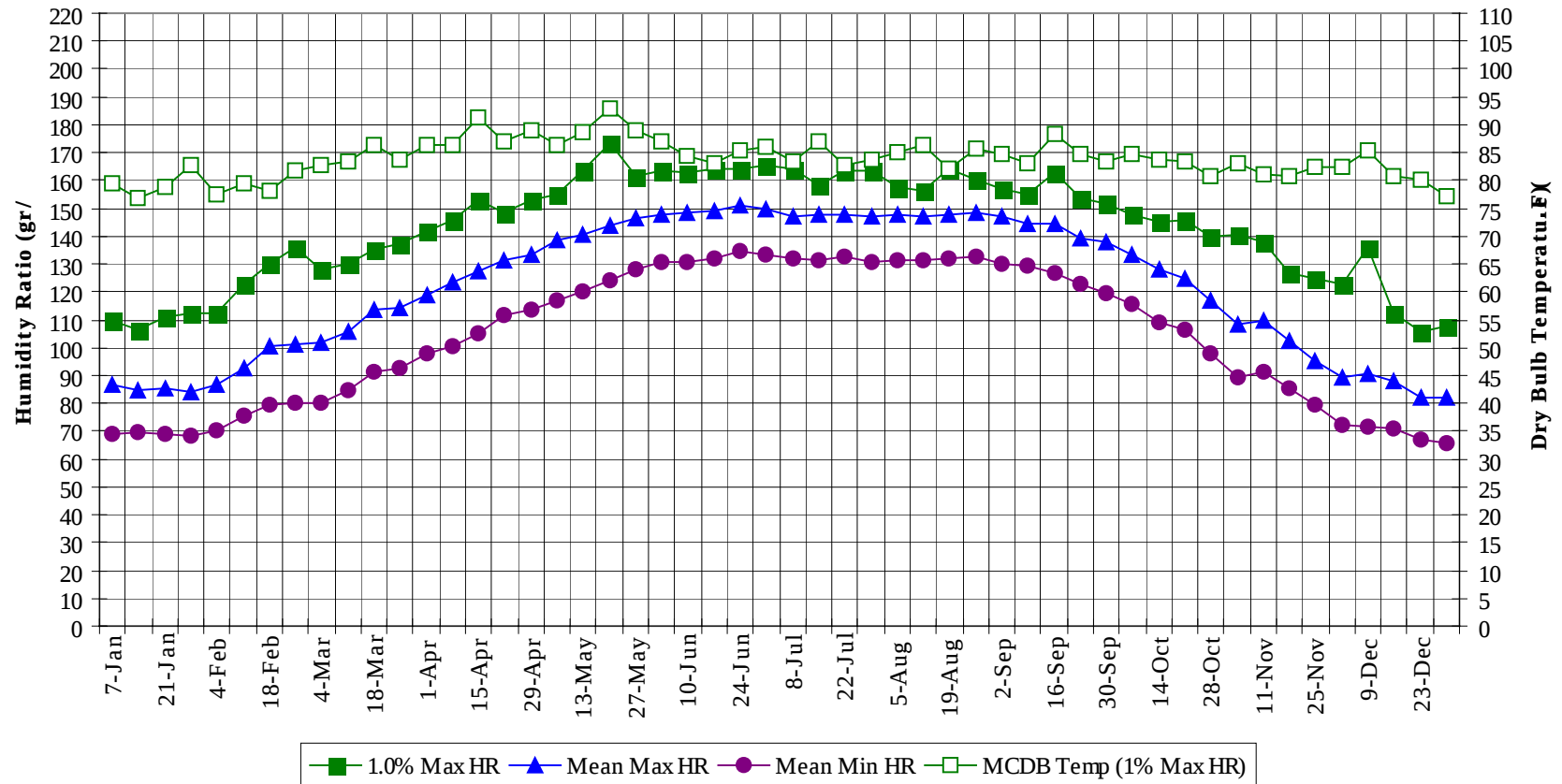


NAKHON PHANOM

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Long Term Humidity and Dry Bulb Temperature Summary



NAKHON PHANOM

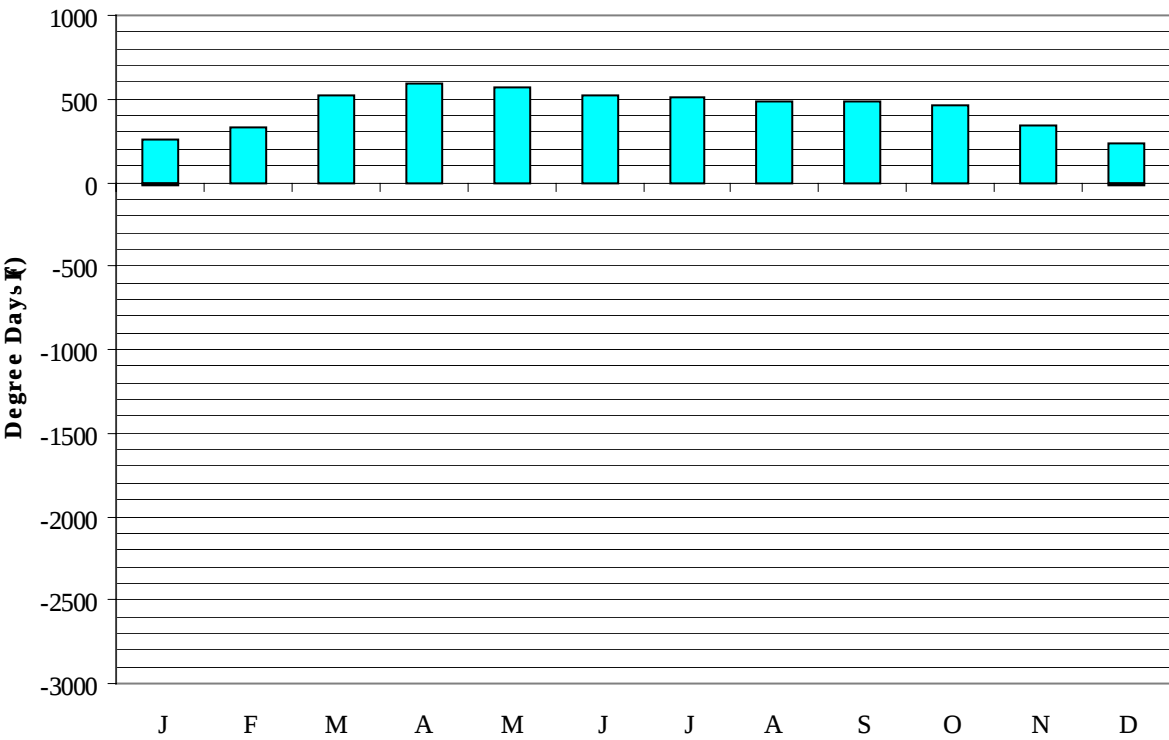
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WMO No. 483570

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	90.0	71.0	82.0	60.9	43.0	109.9	79.4	86.5	69.3
14-Jan	89.0	72.0	82.7	61.1	53.0	106.4	77.0	85.0	69.6
21-Jan	90.0	70.1	83.5	62.1	54.0	111.3	78.7	85.2	68.9
28-Jan	91.0	69.8	82.9	61.9	54.0	112.0	82.8	84.1	68.4
4-Feb	95.0	74.1	83.8	62.8	53.0	112.0	77.7	86.5	70.6
11-Feb	93.0	74.1	85.0	64.9	54.0	122.5	79.4	92.5	75.3
18-Feb	97.0	74.0	88.2	66.6	54.0	130.2	78.0	100.2	79.4
25-Feb	99.0	74.2	88.4	67.9	57.0	135.8	81.7	101.1	79.9
4-Mar	99.0	73.6	87.1	67.8	55.0	128.1	82.7	101.7	80.3
11-Mar	100.0	73.8	90.8	69.9	60.0	130.2	83.3	105.6	84.6
18-Mar	102.0	76.3	93.2	73.4	63.0	135.1	86.2	113.8	91.2
25-Mar	101.0	74.3	92.5	73.1	63.0	137.2	83.8	114.3	92.8
1-Apr	101.0	76.2	92.7	74.2	63.0	142.1	86.4	118.9	97.6
8-Apr	101.0	78.0	93.9	76.0	67.0	145.6	86.3	123.2	100.5
15-Apr	101.0	77.3	93.6	76.3	70.0	153.3	91.3	127.7	105.4
22-Apr	101.0	79.3	93.7	77.1	69.0	148.4	87.0	131.4	111.7
29-Apr	100.0	78.1	93.9	77.7	70.0	153.3	89.1	133.2	113.3
6-May	99.0	79.6	91.9	77.1	72.0	154.7	86.4	138.5	116.8
13-May	99.0	81.3	91.6	77.4	72.0	163.8	88.7	140.4	120.4
20-May	98.0	80.5	90.5	77.0	73.0	173.6	92.9	143.6	124.3
27-May	97.0	81.3	90.0	77.8	73.0	161.7	88.9	146.7	128.0
3-Jun	95.0	80.5	88.9	77.0	73.0	163.8	87.0	148.0	130.5
10-Jun	95.0	80.6	88.6	77.3	73.0	163.1	84.5	148.7	130.8
17-Jun	93.0	80.6	87.6	77.2	73.0	164.5	83.0	149.0	132.3
24-Jun	93.0	81.4	88.1	77.5	73.0	164.5	85.3	150.7	134.6
1-Jul	93.0	80.8	87.3	77.1	73.0	165.2	86.2	150.0	133.4
8-Jul	93.0	81.0	87.9	76.9	73.0	164.5	83.4	147.3	131.8
15-Jul	93.0	80.3	87.2	76.9	73.0	158.2	87.0	147.9	131.5
22-Jul	92.0	80.8	87.1	76.9	72.0	163.8	82.8	147.9	132.4
29-Jul	91.0	80.5	86.2	76.4	73.0	163.8	83.8	147.3	130.9
5-Aug	92.0	81.0	85.8	75.9	72.0	157.5	85.2	147.7	131.1
12-Aug	91.0	80.0	86.4	76.5	73.0	156.1	86.3	147.0	131.2
19-Aug	93.0	80.6	86.4	76.4	73.0	164.5	82.1	147.8	131.7
26-Aug	91.0	80.6	85.8	76.2	73.0	160.3	85.7	148.1	132.6
2-Sep	91.0	80.6	86.0	76.2	72.0	156.8	84.7	147.4	130.3
9-Sep	91.0	80.1	86.4	76.0	72.0	154.7	83.0	144.6	129.3
16-Sep	92.0	79.7	88.1	76.2	73.0	163.1	88.3	144.4	126.7
23-Sep	91.0	78.4	87.0	75.5	73.0	154.0	84.6	139.0	123.0
30-Sep	92.0	78.1	88.3	75.3	73.0	151.9	83.3	137.7	119.6
7-Oct	91.0	77.5	87.6	75.0	70.0	147.7	84.8	133.6	115.4
14-Oct	91.0	77.7	86.9	74.0	70.0	144.9	83.9	128.2	108.7
21-Oct	91.0	77.5	87.3	73.3	66.0	145.6	83.3	125.0	106.5
28-Oct	91.0	76.2	86.5	71.4	64.0	140.0	80.7	116.7	97.7
4-Nov	91.0	75.4	85.7	69.6	61.0	140.7	83.0	108.1	89.3
11-Nov	91.0	75.8	86.4	69.8	62.0	137.9	81.0	109.6	91.3
18-Nov	90.0	73.5	85.0	68.4	60.0	126.7	80.9	102.5	85.5
25-Nov	89.0	74.9	83.6	65.7	55.0	124.6	82.3	95.2	79.1
2-Dec	90.0	74.5	82.7	63.6	54.0	122.5	82.6	89.5	72.2
9-Dec	91.0	75.4	82.7	63.0	55.0	135.8	85.3	90.8	71.9
16-Dec	88.0	71.3	82.3	62.2	54.0	112.0	80.9	88.0	70.7
23-Dec	88.0	71.2	81.4	60.2	50.0	105.7	80.3	82.4	66.9
31-Dec	88.0	71.9	80.7	59.5	48.0	107.8	77.2	82.0	65.6

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



Mean Cooling Degree Days Mean Heating Degree Days

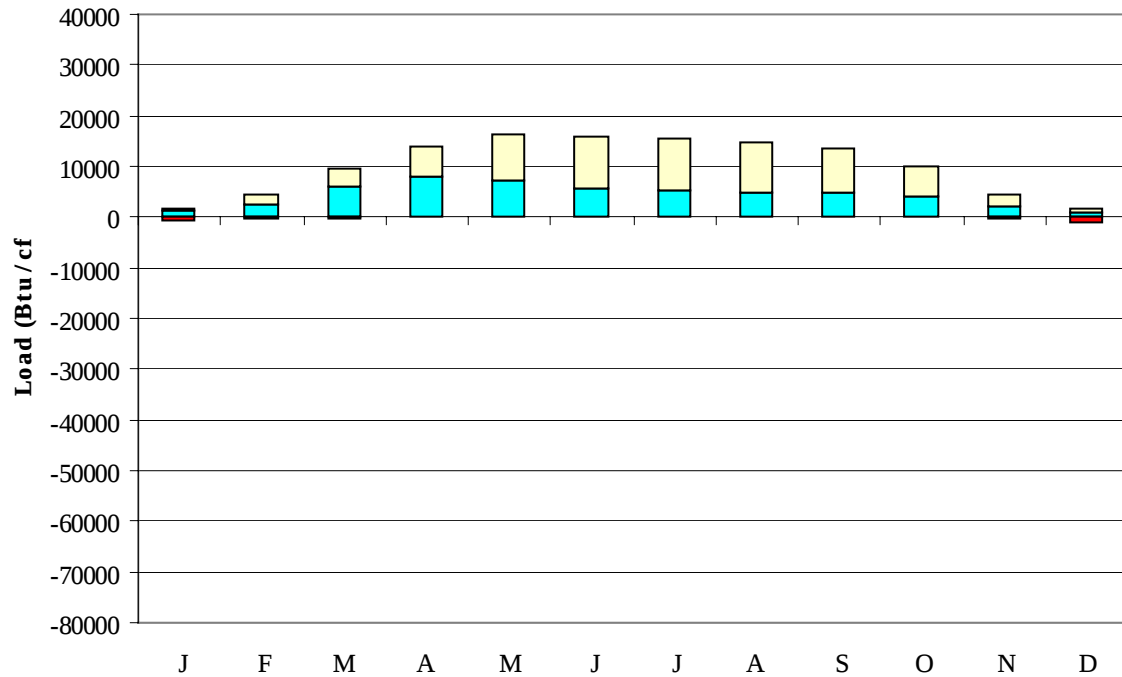
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	255	15
FEB	334	6
MAR	523	2
APR	595	0
MAY	573	0
JUN	515	0
JUL	510	0
AUG	487	0
SEP	485	0
OCT	458	0
NOV	338	3
DEC	232	17
ANN	5305	43

NAKHON PHANOM

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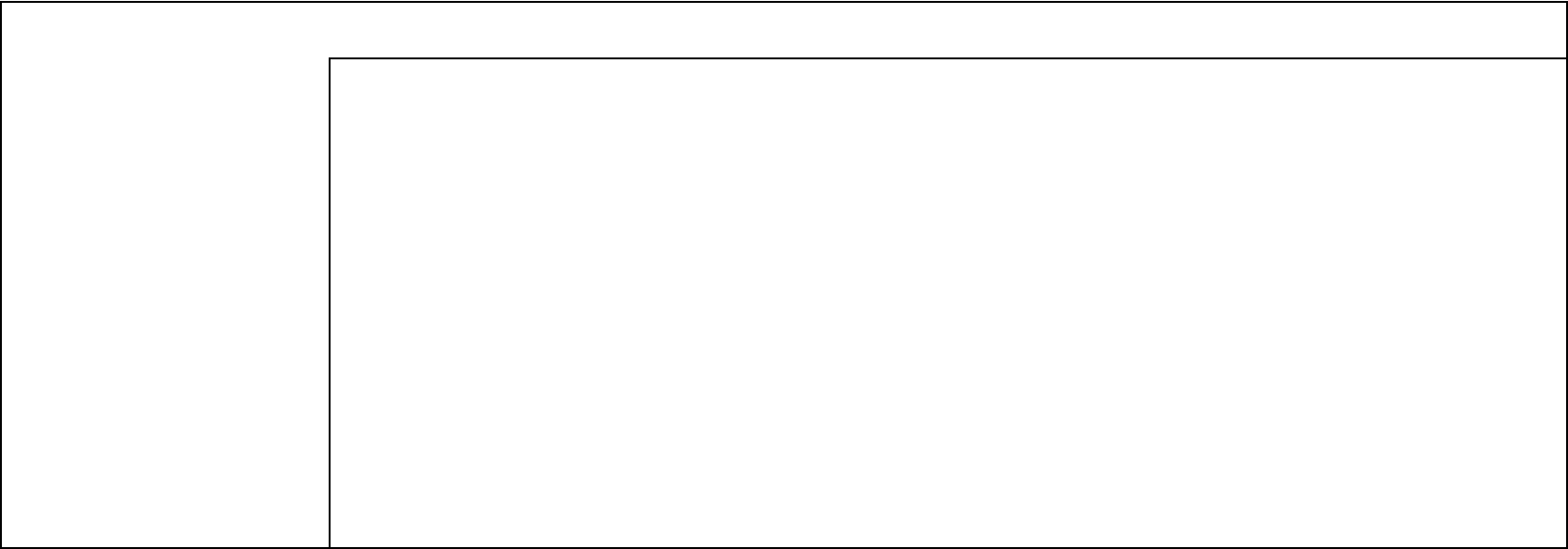
Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	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	1131	-838	759	-5
FEB	2676	-356	1788	0
MAR	6103	-120	3562	0
APR	7906	-4	6008	0
MAY	7072	0	9091	0
JUN	5767	0	10014	0
JUL	5391	0	9969	0
AUG	4859	0	9990	0
SEP	5001	0	8653	0
OCT	4216	-20	5705	0
NOV	2159	-212	2238	0
DEC	897	-941	903	-1
ANN	53178	-2491	68680	-6

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

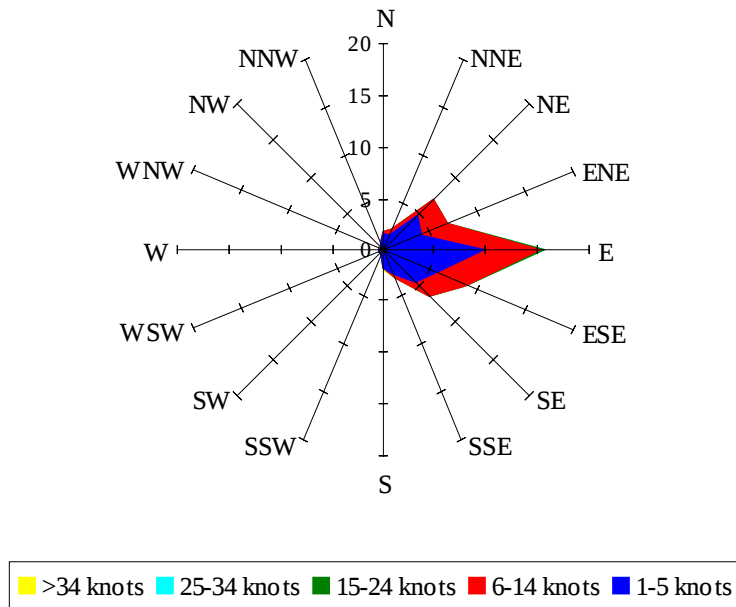
No Solar Radiation
Data Available



Average Annual Solar Heat and Illumination – Nearest Available Site

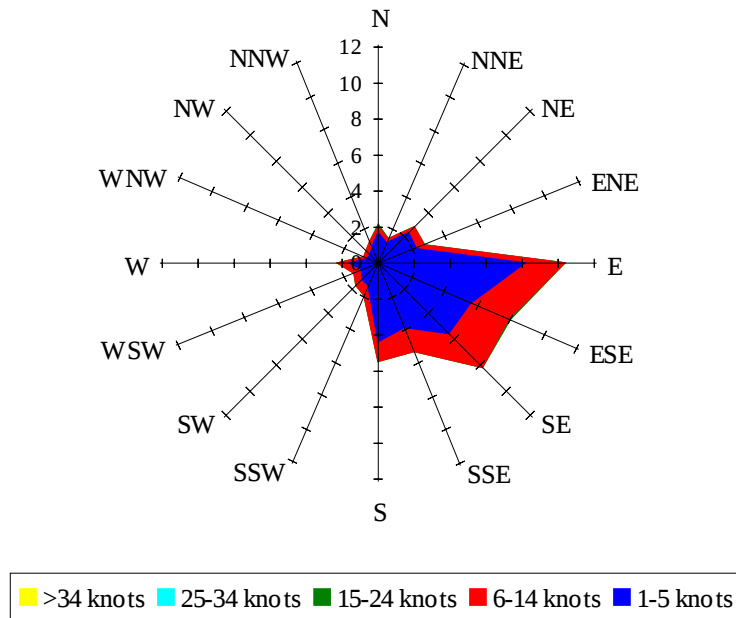
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

Wind Summary - December, January, and February **Labels of Percent Frequency on North Axis**



Percent Calm = 43.67

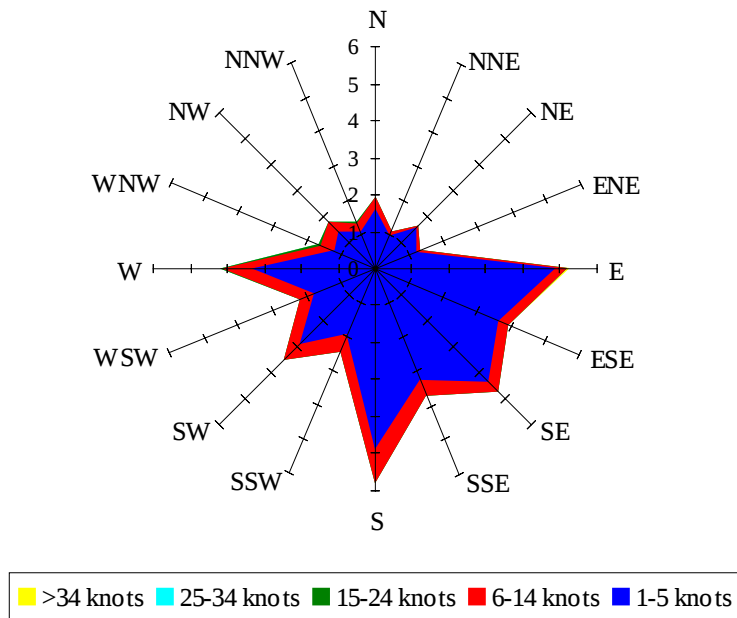
Wind Summary - March, April, and May **Labels of Percent Frequency on North Axis**



Percent Calm = 43.50

Wind Summary - June, July, and August

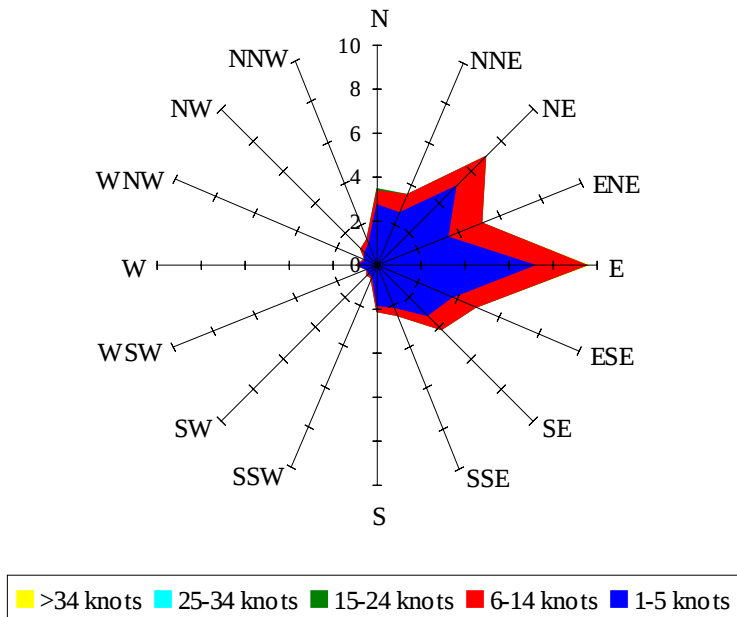
Labels of Percent Frequency on North Axis



Percent Calm = 54.15

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 52.76