

NAGASAKI JP

Latitude = 32.92 N

Longitude = 129.92 E

Period of Record = 1973 to 1996

WMO No. 478550

Elevation = 16 feet

Average Pressure = 29.91 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	95	79	126	9.2	VARIABLE
0.4% Occurrence	93	79	129	10.2	VARIABLE
1.0% Occurrence	90	79	130	10.3	WSW
2.0% Occurrence	90	79	130	10.3	WSW
Mean Daily Range	13	-	-	-	-
97.5% Occurrence	36	33	23	10.4	NNW
99.0% Occurrence	32	29	20	8.1	ESE
99.6% Occurrence	30	28	18	8.2	E
Median of Extreme Lows	28	26	16	8.5	E
	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	82	89	150	9.9	WSW
0.4% Occurrence	81	88	146	9.7	WSW
1.0% Occurrence	80	87	142	9.8	WSW
2.0% Occurrence	79	85	138	9.9	WSW
	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	160	86	1.06	8.7	WSW
0.4% Occurrence	151	85	0.99	9.5	WSW
1.0% Occurrence	151	85	0.99	9.2	WSW
2.0% Occurrence	142	84	0.94	9.9	WSW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		37	1312	1719	2727

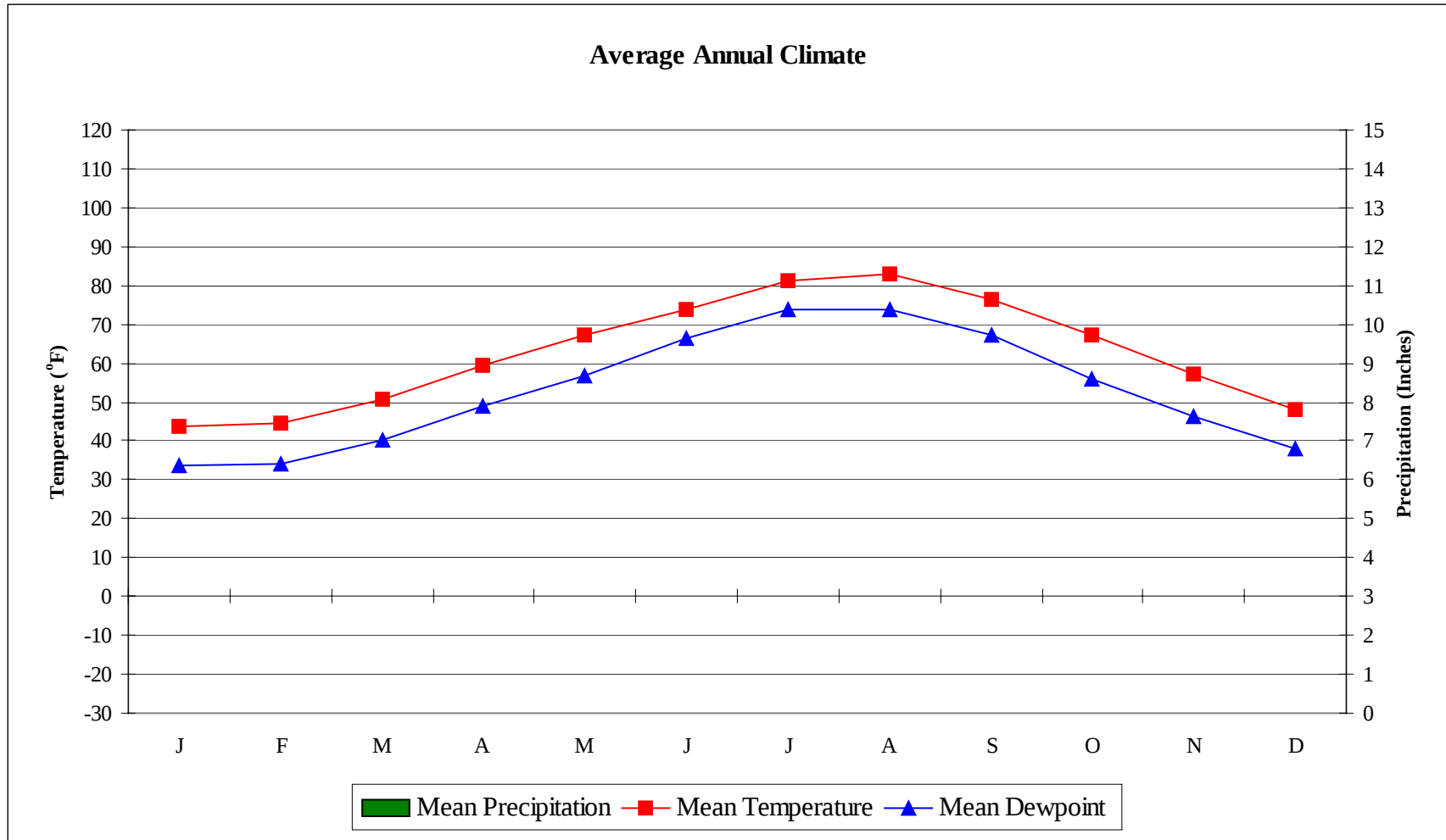
Other Site Data

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
8	N/A	N/A	4.7 + 1.3
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 (#)
65.2	N/A	N/A	9

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

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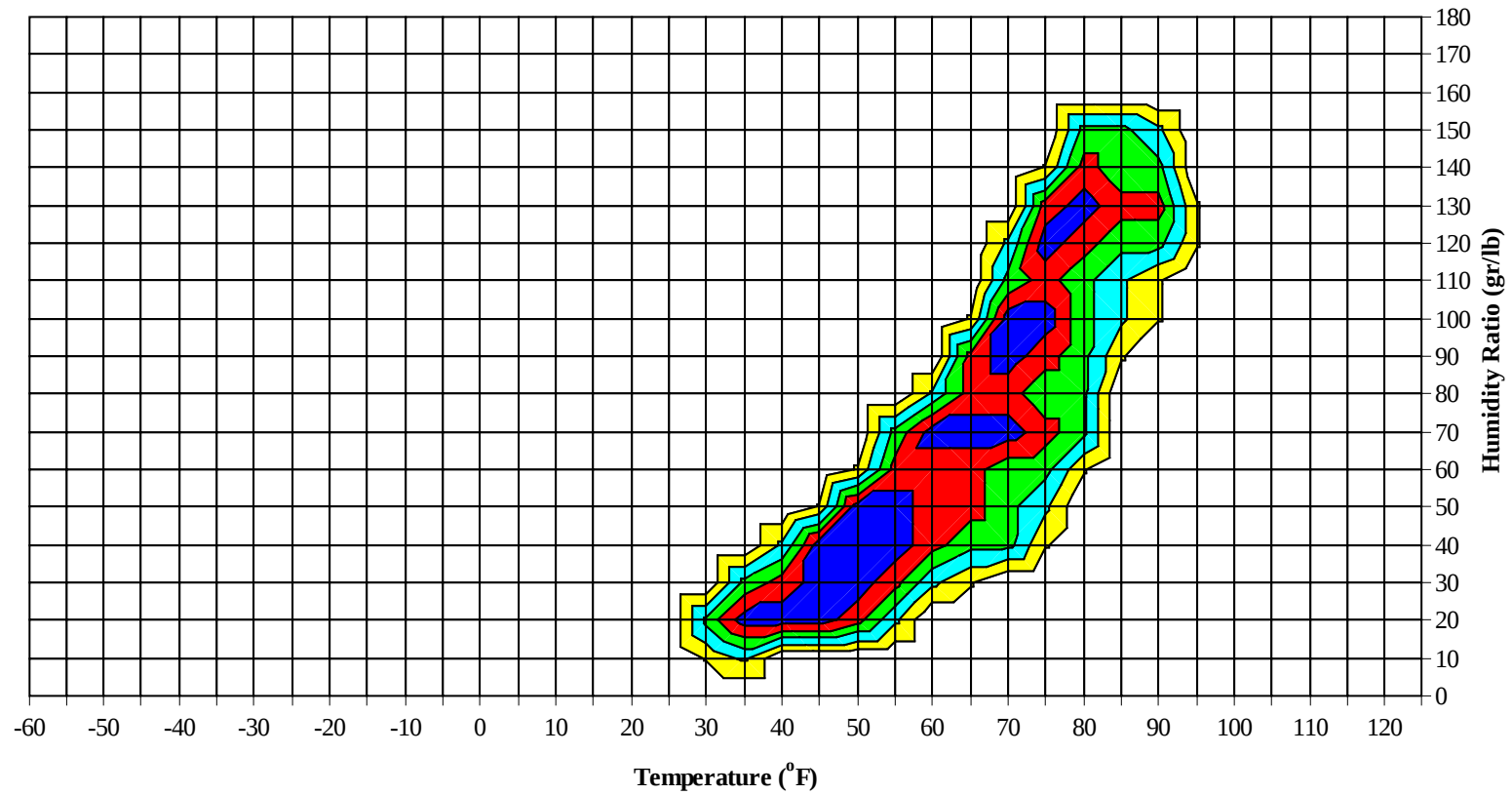
WMO No. 478550



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WMO No. 478550

Long Term Psychrometric Summary

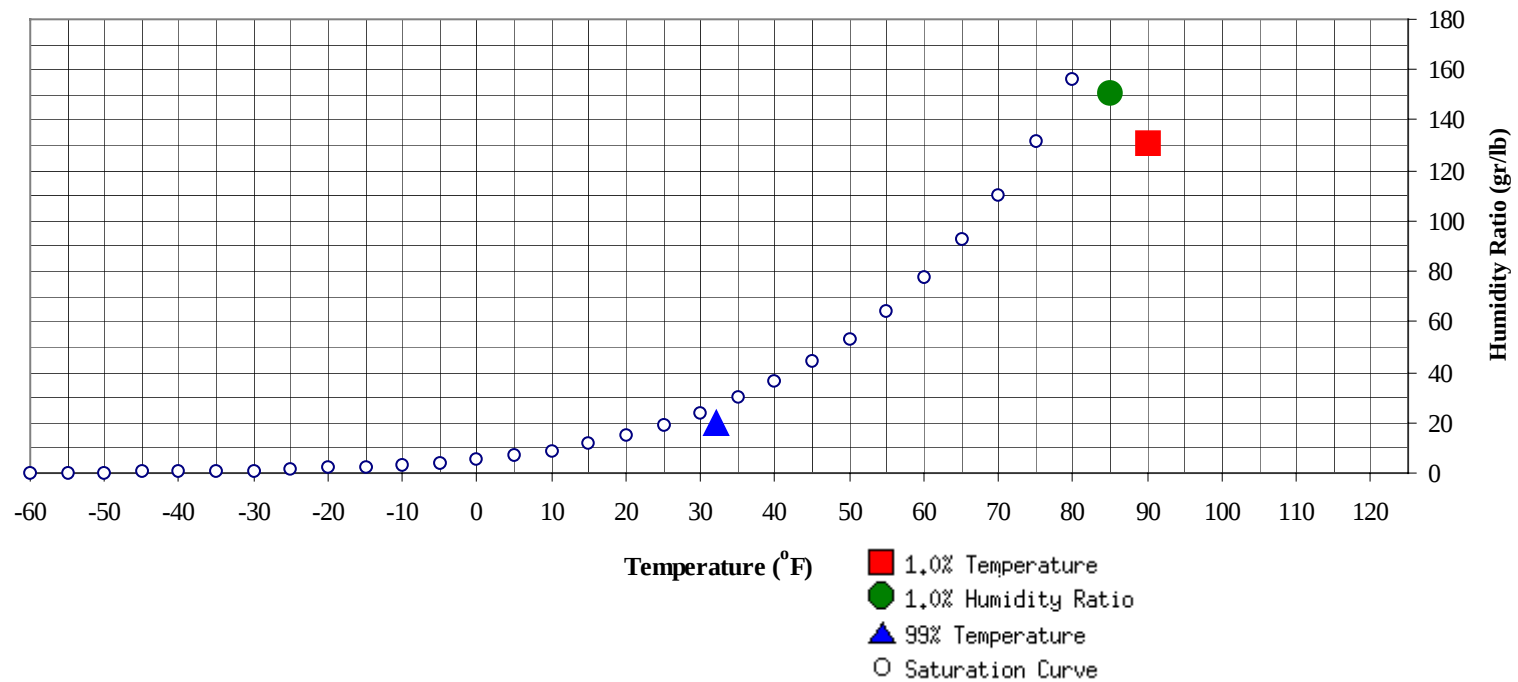


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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Psychrometric Summary of Peak Design Values



99% Dry Bulb	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)	1.0% Humidity Ratio	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
	32	19.7	10.7		150.5	85	80.5	78.8	44.0

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	90	130.6	78.7	42.1

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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 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		
95 / 99															
90 / 94															
85 / 89															
80 / 84															
75 / 79															
70 / 74						0	0		0	65.7	0	1	0	1	62.1
65 / 69						0	2	0	2	61.5	1	3	2	7	59.9
60 / 64	0	3	1	4	57.4	2	5	4	11	57.8	5	28	16	49	55.5
55 / 59	4	17	9	30	51.9	6	22	11	38	51.1	18	75	56	148	50.8
50 / 54	22	56	40	118	46.7	14	59	46	119	46.1	55	89	90	233	46.9
45 / 49	43	85	73	202	41.4	43	75	73	191	41.6	74	42	57	173	42.1
40 / 44	49	49	52	150	37.4	42	32	38	112	37.5	44	9	16	69	38.2
35 / 39	78	33	52	163	33.9	68	25	40	133	33.6	42	2	9	54	34.9
30 / 34	42	5	17	64	29.7	39	5	12	55	29.8	9	0	1	11	30.6
25 / 29	9		2	12	25.8	8	1	2	11	25.1	0	0	0	0	26.0
20 / 24	0			0	21.3	1			1	21.3					

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.

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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		
95 / 99															
90 / 94															
85 / 89							0		0	72.3		0	4	1	5 75.2
80 / 84		0		0	65.7		8	1	10	68.3	6	55	26	87	73.2
75 / 79	0	5	1	7	64.6	1	53	25	79	66.0	33	95	90	218	70.9
70 / 74	4	32	15	51	61.4	23	90	80	193	63.8	96	72	95	264	68.0
65 / 69	7	40	31	78	59.5	45	53	64	162	61.9	65	13	23	100	64.6
60 / 64	35	85	79	199	56.7	97	37	58	192	58.7	33	1	5	38	60.2
55 / 59	73	58	73	205	52.5	57	5	18	80	54.0	6		0	6	54.5
50 / 54	68	17	31	116	47.5	21	1	2	24	49.2	1		0	1	49.8
45 / 49	39	2	8	49	43.1	4		0	4	44.5					
40 / 44	9	0	1	11	39.1										
35 / 39	5		0	5	35.9										
30 / 34															
25 / 29															
20 / 24															

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WMO No. 478550

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		
95 / 99		3	1	4	79.1		5	1	7	79.2		0	0	0	79.4
90 / 94	0	34	9	44	79.3	0	68	21	89	78.7		6	1	7	77.7
85 / 89	2	64	38	105	78.5	4	73	56	133	77.9	0	27	8	36	76.7
80 / 84	75	89	115	279	77.0	81	77	116	275	76.7	14	82	56	152	73.9
75 / 79	120	46	68	234	74.2	138	23	50	211	74.3	70	85	90	244	70.9
70 / 74	44	11	15	70	69.9	24	1	5	29	70.0	90	35	67	192	67.2
65 / 69	6	1	1	8	65.7	1		0	1	65.1	40	5	14	59	63.7
60 / 64	1			1	61.2	0			0	61.0	24	0	4	28	59.7
55 / 59	0			0	56.0						2		0	2	55.0
50 / 54											0			0	48.7
45 / 49															
40 / 44															
35 / 39															
30 / 34															
25 / 29															
20 / 24															

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WMO No. 478550

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		
95 / 99															
90 / 94															
85 / 89		0		0	68.3										
80 / 84	0	9	1	10	69.4										
75 / 79	3	63	22	89	66.6	0	2	0	2	67.7					
70 / 74	27	90	71	187	63.7	2	23	5	30	63.2		0		0	61.0
65 / 69	45	48	62	156	60.8	6	40	19	65	59.9	0	2	0	2	61.0
60 / 64	83	31	60	174	57.3	29	71	60	160	56.1	2	19	7	28	55.8
55 / 59	62	6	24	91	53.3	59	61	69	189	51.6	12	52	32	95	51.3
50 / 54	21	1	6	28	48.9	70	32	52	153	47.2	36	78	66	180	46.4
45 / 49	6		2	8	44.3	47	12	27	85	42.7	77	66	78	220	41.9
40 / 44	1		0	1	40.4	16	0	7	23	38.9	54	19	35	108	38.2
35 / 39						9		2	12	35.7	53	11	25	88	34.5
30 / 34						1		0	1	31.2	13	2	6	21	30.3
25 / 29											1		0	1	27.1
20 / 24															

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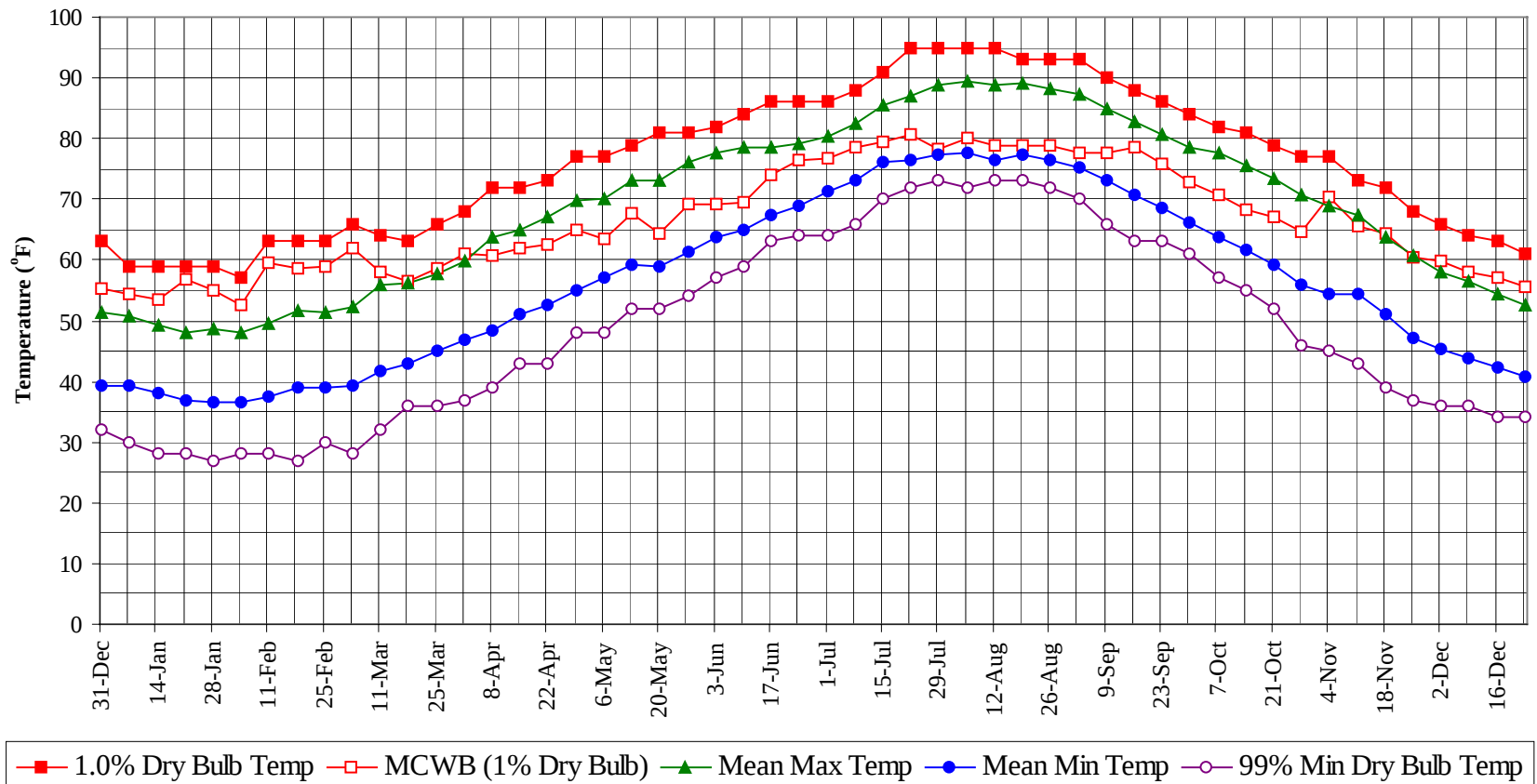
WMO No. 478550

Period of Record = 1973 to 1996

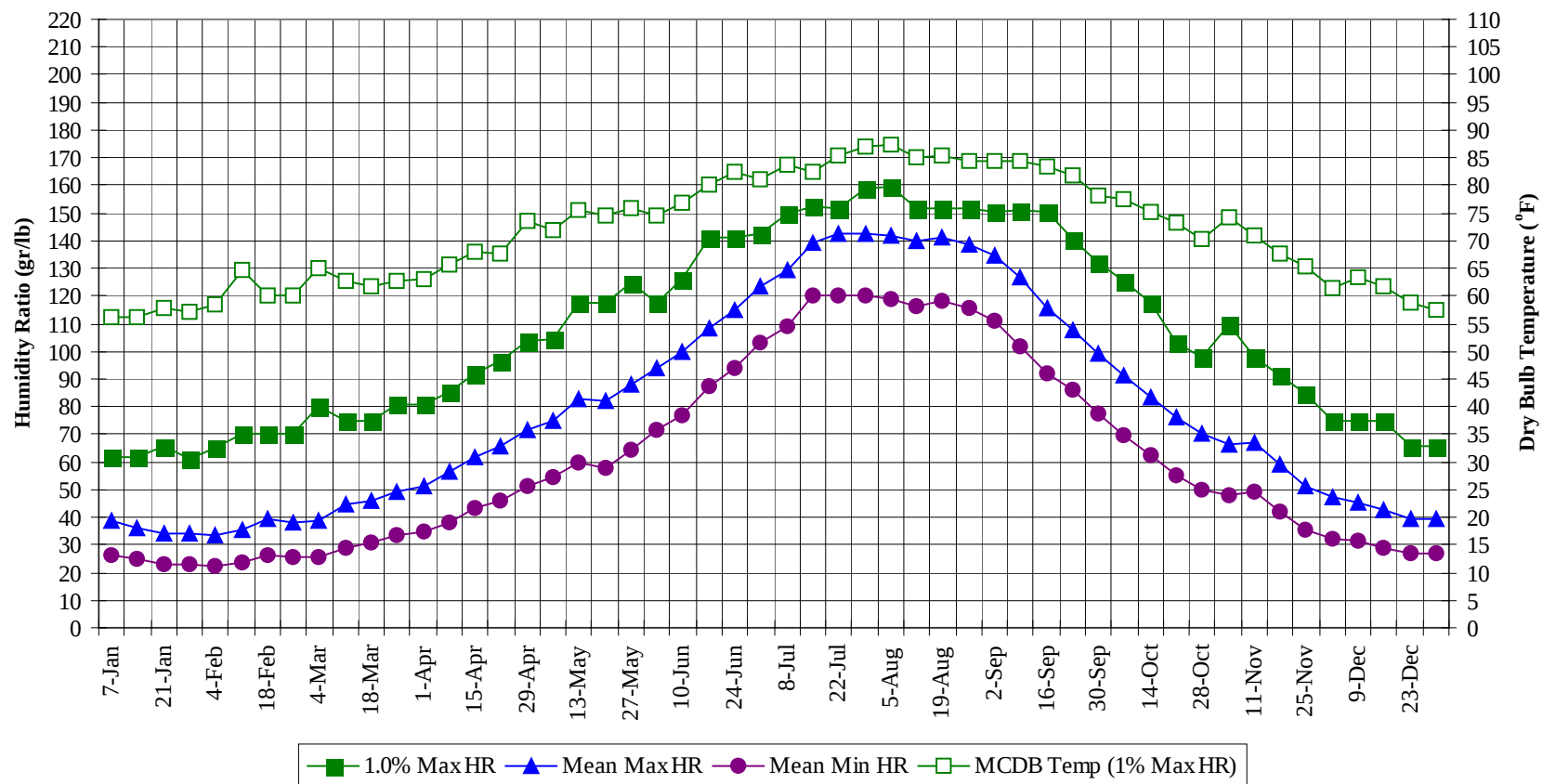
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99	8	2	11	79.2	
90 / 94	0	108	31	139	78.8
85 / 89	6	169	100	275	77.9
80 / 84	173	319	310	803	75.6
75 / 79	359	371	341	1071	71.2
70 / 74	303	354	348	1004	65.8
65 / 69	214	207	214	635	61.6
60 / 64	311	278	293	881	57.2
55 / 59	300	296	295	891	52.0
50 / 54	312	333	336	981	46.9
45 / 49	337	282	323	942	41.9
40 / 44	220	109	153	482	37.8
35 / 39	257	72	132	461	34.1
30 / 34	107	12	38	156	29.9
25 / 29	20	1	5	25	25.5
20 / 24	1			1	21.3
</					

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.

Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

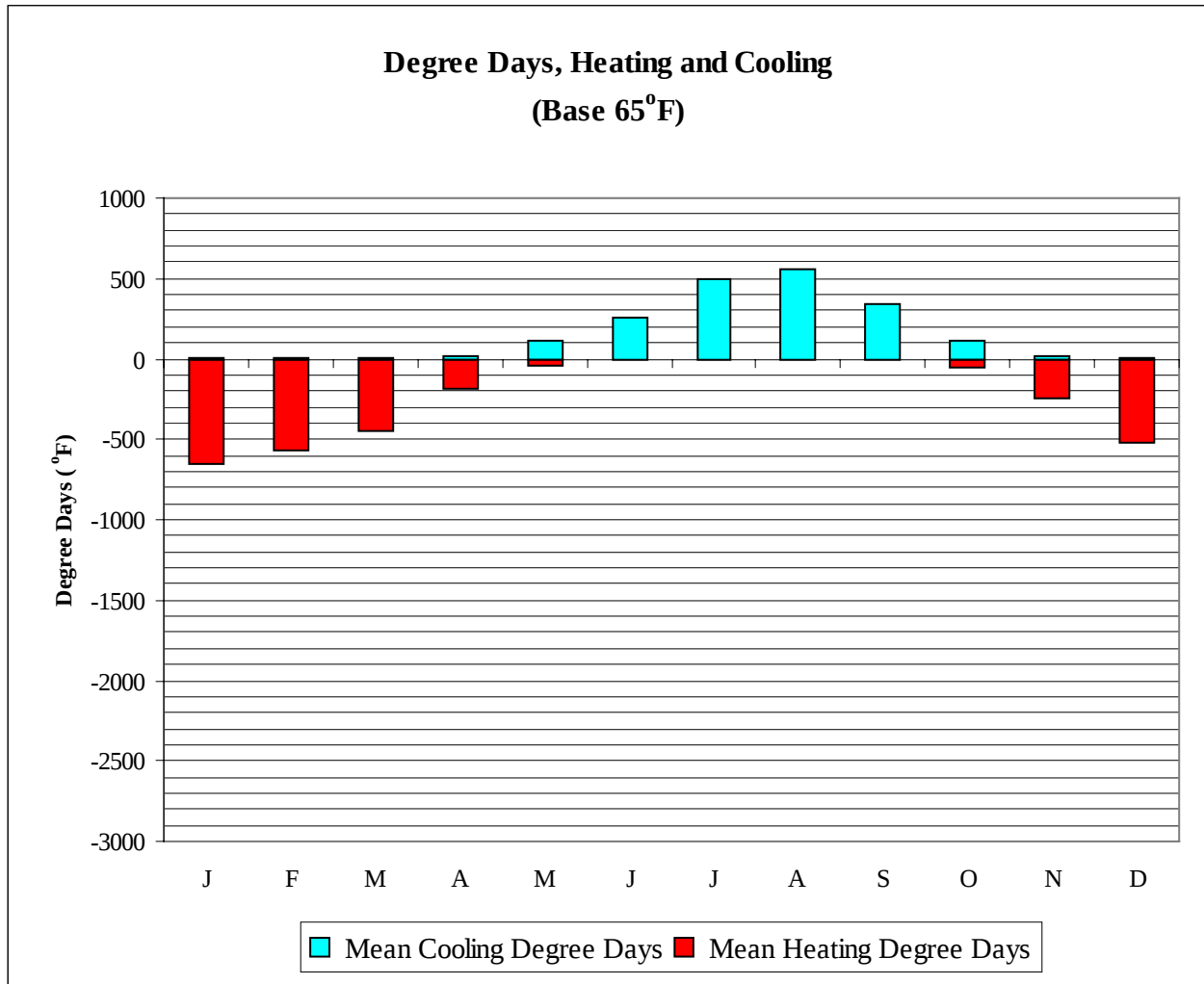


NAGASAKI JP**WMO No. 478550****Long Term Dry Bulb Temperature and Humidity Summary**

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	59.0	54.4	50.8	39.3	30.0	61.6	56.2	38.8	26.4
14-Jan	59.0	53.4	49.3	38.1	28.0	61.6	56.0	36.2	24.8
21-Jan	59.0	56.9	48.1	36.8	28.0	65.8	57.8	34.3	23.0
28-Jan	59.0	55.0	48.5	36.6	27.0	60.9	57.1	33.8	22.9
4-Feb	57.0	52.7	48.1	36.6	28.0	65.1	58.4	33.7	22.5
11-Feb	63.0	59.4	49.5	37.4	28.0	70.0	64.6	35.4	23.5
18-Feb	63.0	58.6	51.7	38.9	27.0	70.0	60.1	39.6	26.1
25-Feb	63.0	58.8	51.3	39.0	30.0	70.0	60.0	38.0	25.3
4-Mar	66.0	61.9	52.4	39.3	28.0	79.8	65.1	39.0	25.4
11-Mar	64.0	58.0	55.8	41.8	32.0	74.9	62.9	44.7	28.7
18-Mar	63.0	56.5	56.3	43.0	36.0	74.9	61.8	45.9	30.6
25-Mar	66.0	58.6	57.7	45.0	36.0	80.5	62.8	49.2	33.8
1-Apr	68.0	61.0	59.8	46.9	37.0	80.5	63.0	51.0	34.9
8-Apr	72.0	60.7	63.6	48.4	39.0	85.4	65.8	56.2	37.8
15-Apr	72.0	61.9	64.9	51.1	43.0	91.7	68.1	61.9	43.1
22-Apr	73.0	62.7	67.2	52.5	43.0	96.6	67.7	65.6	46.0
29-Apr	77.0	64.9	69.8	55.0	48.0	103.6	73.4	71.8	50.9
6-May	77.0	63.6	70.0	57.1	48.0	104.3	72.0	74.8	54.3
13-May	79.0	67.7	73.1	59.1	52.0	117.6	75.5	82.7	59.5
20-May	81.0	64.2	73.2	58.8	52.0	117.6	74.7	82.0	57.9
27-May	81.0	69.2	76.1	61.3	54.0	124.6	75.8	88.0	64.7
3-Jun	82.0	69.1	77.5	63.7	57.0	117.6	74.4	93.7	71.4
10-Jun	84.0	69.4	78.6	64.8	59.0	126.0	76.9	99.7	76.8
17-Jun	86.0	74.0	78.6	67.3	63.0	141.4	80.1	108.3	87.6
24-Jun	86.0	76.4	79.2	68.9	64.0	141.1	82.4	115.0	94.0
1-Jul	86.0	76.8	80.5	71.4	64.0	142.8	81.0	123.2	103.0
8-Jul	88.0	78.6	82.5	73.1	66.0	149.8	83.6	129.3	109.3
15-Jul	91.0	79.4	85.4	76.1	70.0	152.6	82.6	139.3	120.1
22-Jul	95.0	80.5	87.0	76.6	72.0	151.9	85.5	142.4	120.5
29-Jul	95.0	78.4	88.9	77.3	73.0	158.9	87.1	142.8	120.1
5-Aug	95.0	80.0	89.5	77.7	72.0	159.6	87.3	141.5	119.1
12-Aug	95.0	78.8	88.9	76.4	73.0	151.9	85.0	139.8	116.6
19-Aug	93.0	78.9	89.3	77.4	73.0	151.9	85.4	141.0	118.4
26-Aug	93.0	79.0	88.2	76.4	72.0	151.9	84.4	138.5	115.7
2-Sep	93.0	77.8	87.4	75.4	70.0	150.5	84.3	134.5	110.8
9-Sep	90.0	77.5	85.0	73.0	66.0	151.2	84.5	126.8	102.0
16-Sep	88.0	78.6	82.7	70.7	63.0	150.5	83.5	115.7	91.9
23-Sep	86.0	75.8	80.6	68.7	63.0	140.7	81.8	107.4	85.9
30-Sep	84.0	72.7	78.6	66.3	61.0	132.3	78.1	99.1	77.7
7-Oct	82.0	70.8	77.5	63.8	57.0	125.3	77.3	91.2	69.4
14-Oct	81.0	68.2	75.5	61.7	55.0	117.6	75.2	83.1	62.2
21-Oct	79.0	66.9	73.4	59.2	52.0	102.9	73.1	75.9	55.3
28-Oct	77.0	64.6	70.7	55.8	46.0	98.0	70.4	70.2	50.0
4-Nov	77.0	70.3	68.8	54.3	45.0	109.9	74.3	66.4	47.9
11-Nov	73.0	65.5	67.5	54.4	43.0	98.0	70.9	67.2	49.0
18-Nov	72.0	64.5	63.7	51.0	39.0	91.0	67.8	59.1	42.1
25-Nov	68.0	60.4	60.8	47.1	37.0	84.7	65.5	51.6	35.7
2-Dec	66.0	59.8	58.1	45.3	36.0	74.9	61.4	47.3	32.5
9-Dec	64.0	58.0	56.5	43.9	36.0	74.9	63.3	45.6	31.8
16-Dec	63.0	57.0	54.3	42.2	34.0	74.9	61.6	42.4	29.2
23-Dec	61.0	55.7	52.7	40.9	34.0	65.8	58.7	39.6	27.2
31-Dec	63.0	55.4	51.3	39.3	32.0	65.8	57.3	39.6	26.8

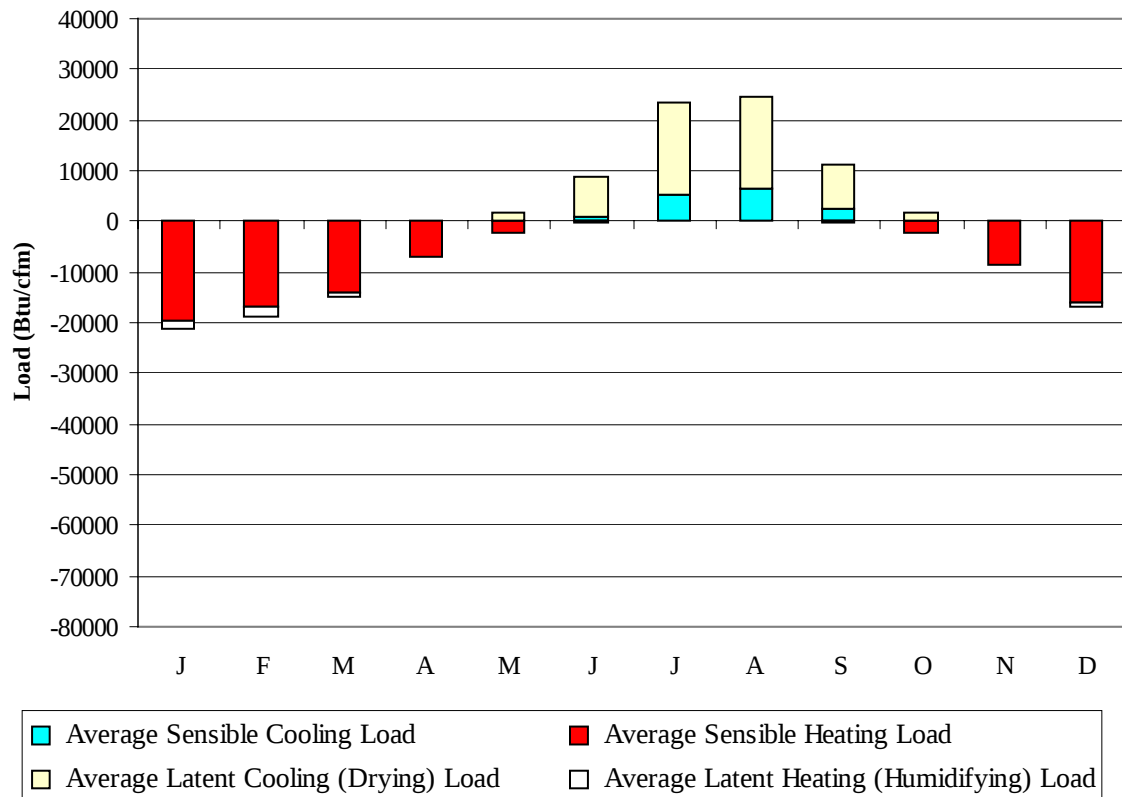
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	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	657
FEB	0	572
MAR	1	448
APR	21	187
MAY	111	44
JUN	263	3
JUL	500	0
AUG	557	0
SEP	343	2
OCT	119	52
NOV	14	244
DEC	0	525
ANN	1929	2734

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



	Average Sensible Cooling Load	Average Sensible Heating Load	Average Latent Cooling Load	Average Latent Heating Load
	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)
JAN	0	-19447	1	-1861
FEB	0	-17020	3	-1677
MAR	0	-14013	24	-712
APR	8	-6843	223	-148
MAY	168	-2198	1575	-8
JUN	1074	-247	7670	0
JUL	5149	-7	18112	0
AUG	6461	-1	18230	0
SEP	2347	-158	8964	0
OCT	203	-2410	1421	-3
NOV	2	-8417	212	-189
DEC	0	-16012	3	-963
ANN	15412	-86773	56438	-5561

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

No Solar Radiation
Data Available

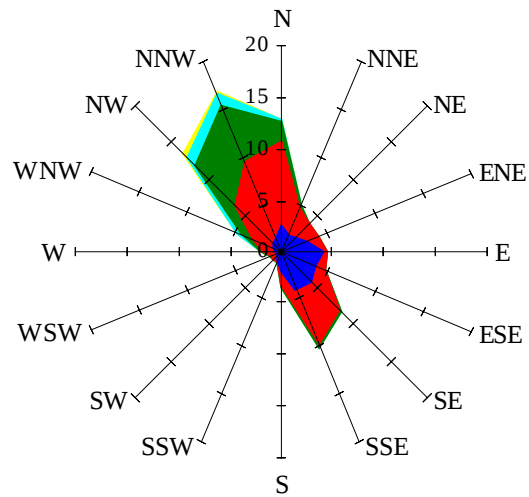


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

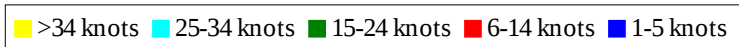
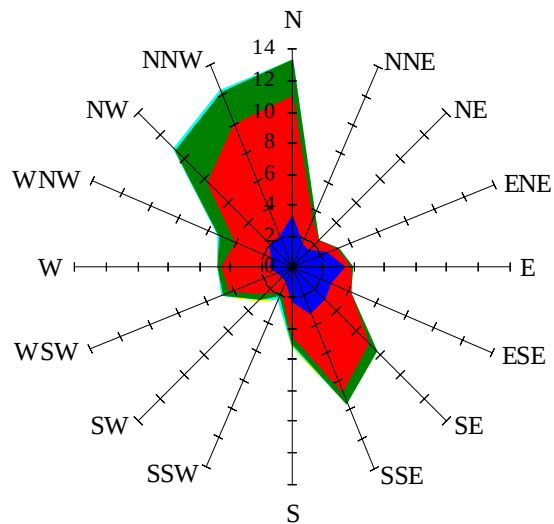
Labels of Percent Frequency on North Axis



Percent Calm = 3.40

Wind Summary - March, April, and May

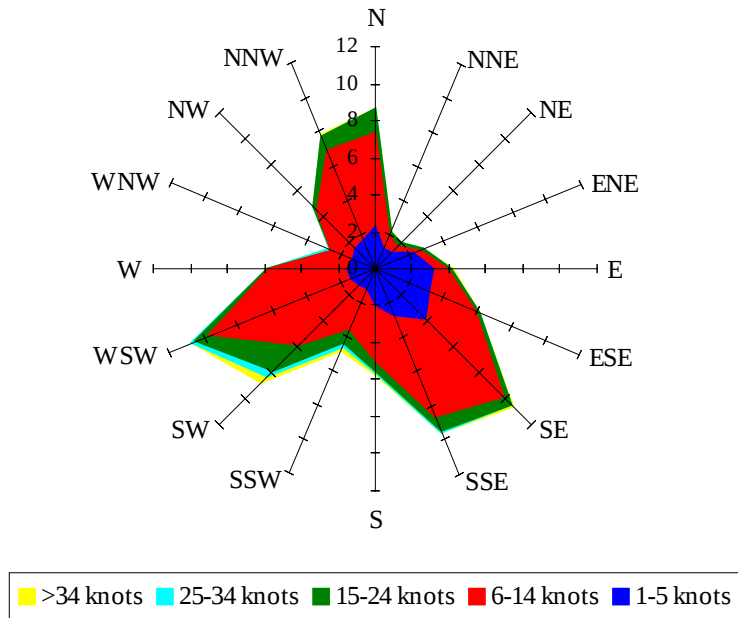
Labels of Percent Frequency on North Axis



Percent Calm = 4.02

Wind Summary - June, July, and August

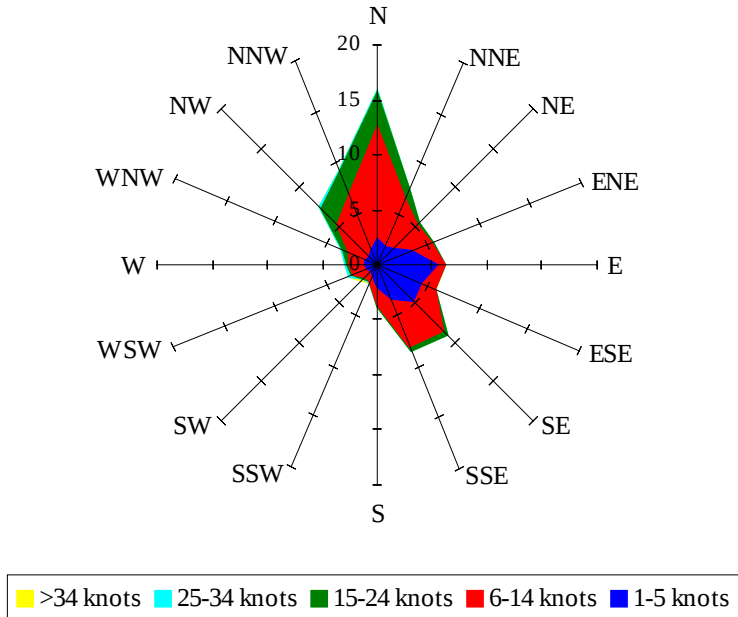
Labels of Percent Frequency on North Axis



Percent Calm = 3.00

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 3.04