

KANGNUNG, SOUTH KOREA

Latitude = 37.75 N

Longitude = 128.95 E

Period of Record = 1973 to 1996

WMO No. 471070

Elevation = 36 feet

Average Pressure = 29.93 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	80	133	9.1	W
0.4% Occurrence	91	78	124	8.3	W
1.0% Occurrence	88	77	123	7.6	W
2.0% Occurrence	84	75	115	7.1	W
Mean Daily Range	15	-	-	-	-
97.5% Occurrence	23	20	10	8.6	W
99.0% Occurrence	18	16	8	9.9	W
99.6% Occurrence	16	14	7	10.3	W
Median of Extreme Lows	9	8	6	7.2	WSW
	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	84	92	162	8.2	W
0.4% Occurrence	80	88	140	6.8	E
1.0% Occurrence	78	85	133	5.9	E
2.0% Occurrence	77	83	130	5.4	E
	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	171	91	1.12	7.5	WSW
0.4% Occurrence	142	84	0.94	4.8	E
1.0% Occurrence	135	80	0.88	6.4	W
2.0% Occurrence	133	82	0.88	4.2	E
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		18	428	559	1398

Other Site Data

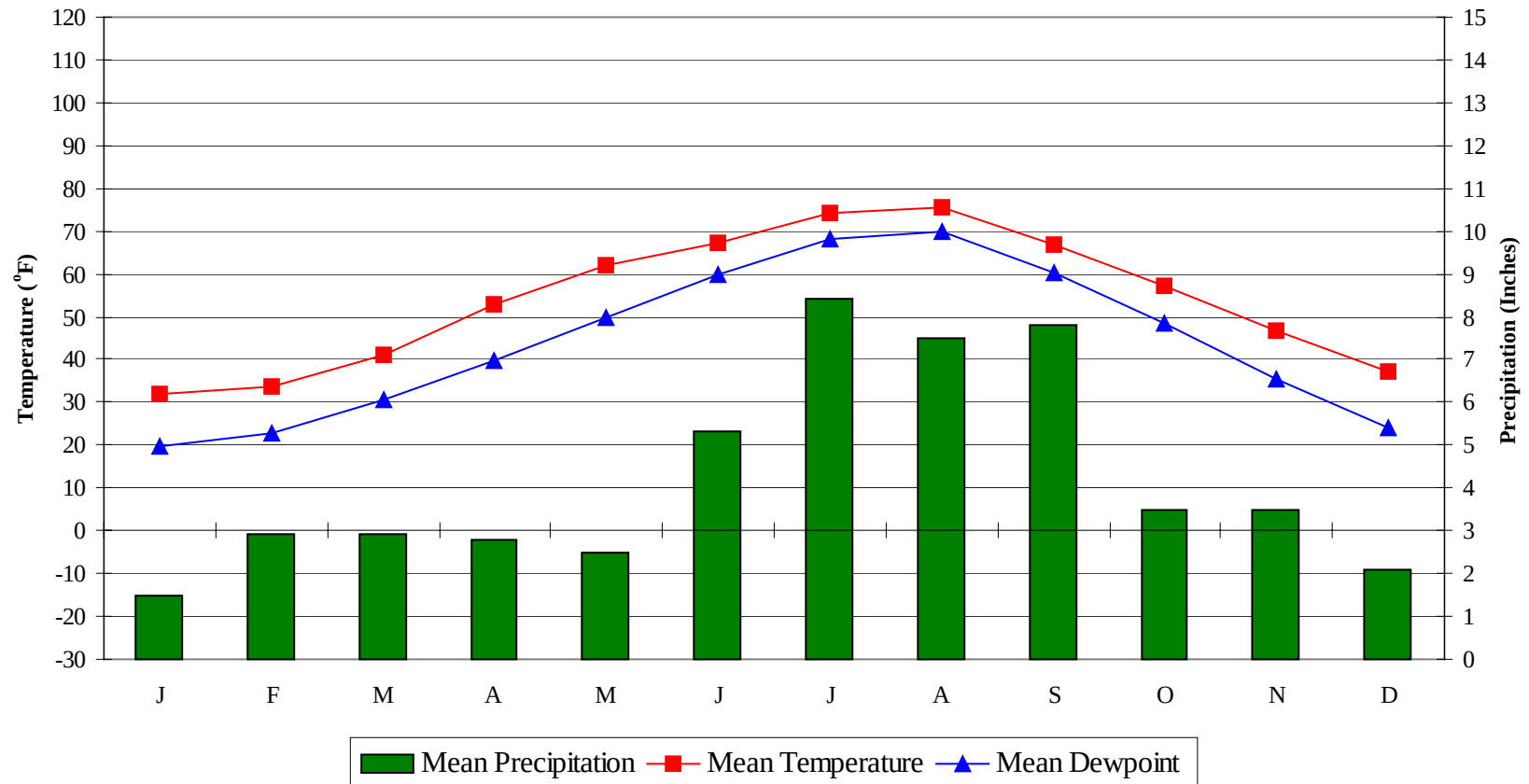
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
7	N/A	N/A	2.0 + 0.4
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
56.6	N/A	N/A	63

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

KANGNUNG, SOUTH KOREA

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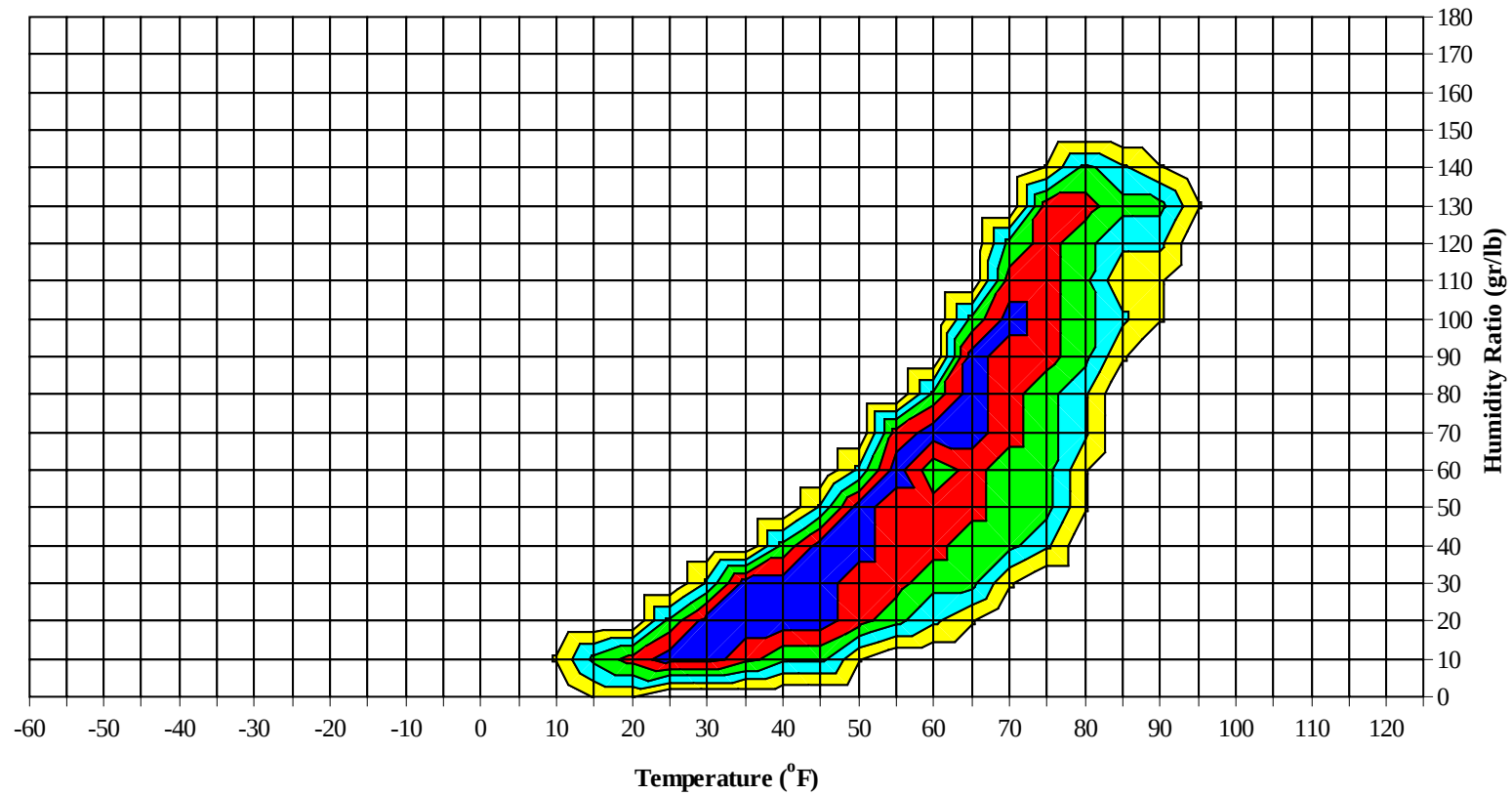
Average Annual Climate



KANGNUNG, SOUTH KOREA

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Long Term Psychrometric Summary

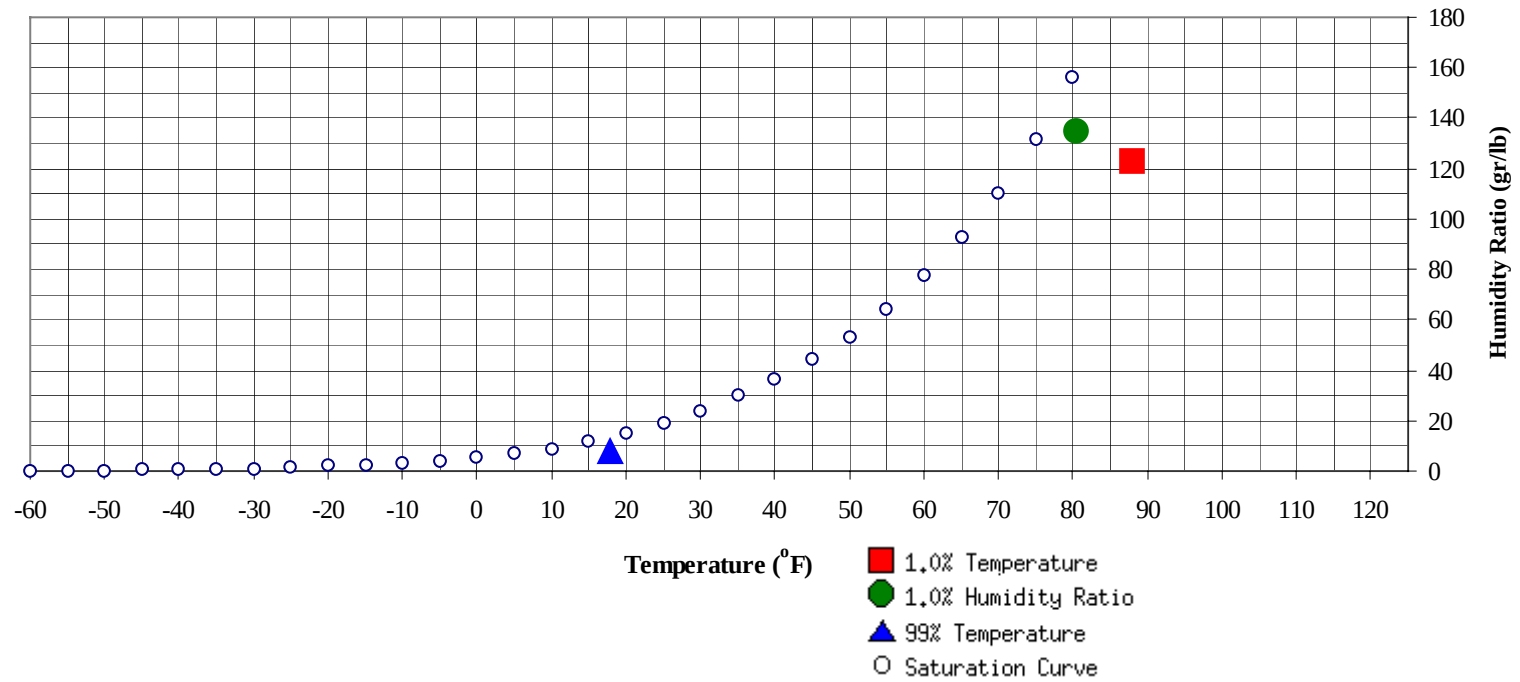


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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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)
	18	7.8	5.5		135.1	80.3	76.7	75.1	40.4

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	88	122.7	76.8	40.4

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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	57.5
65 / 69							0	0	0	58.7		0	1	0	1 54.3
60 / 64	1	0	0	1	46.8		1	0	1	54.3	0	6	2	8	50.3
55 / 59	0	2	0	2	46.6	0	4	1	5	47.6	2	19	7	28	47.5
50 / 54	0	8	2	10	42.9	1	10	3	14	43.0	5	49	27	81	44.1
45 / 49	4	27	9	40	39.4	4	31	14	49	40.0	26	72	54	151	40.7
40 / 44	11	39	19	69	36.1	11	39	24	74	36.5	34	46	49	129	37.7
35 / 39	33	70	58	160	32.8	36	64	63	164	33.5	75	41	67	183	34.4
30 / 34	59	55	69	182	28.5	58	45	59	163	29.2	70	11	35	117	30.0
25 / 29	61	32	50	143	23.6	54	19	38	110	24.1	31	2	6	39	25.1
20 / 24	33	10	24	66	19.2	29	7	12	48	19.5	3	0	1	4	20.6
15 / 19	34	6	16	55	15.6	23	3	8	34	15.5	2	0	0	2	16.6
10 / 14	11	1	2	14	10.7	6	1	2	9	10.7	1			1	11.4
5 / 9	2	0	0	2	6.1	1	0	0	1	5.8	0			0	8.0
0 / 4	0			0	0.7										
-5 / -1	0			0	-5.0										

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								0	0	79.0		0	0	0	72.3
90 / 94							1	0	1	70.6		2	1	3	73.0
85 / 89		0		0	65.0	0	3	1	4	66.6	0	6	1	7	71.1
80 / 84		2	1	3	62.0	0	14	5	19	65.4	1	25	11	37	68.7
75 / 79		7	3	10	59.7	3	32	15	50	62.5	11	37	27	75	66.7
70 / 74	1	16	8	25	57.1	14	44	28	86	59.5	24	60	42	127	65.2
65 / 69	4	24	12	40	54.7	17	38	27	82	57.9	41	49	60	149	63.7
60 / 64	11	45	30	86	52.1	42	59	60	161	56.0	99	50	76	224	60.7
55 / 59	30	54	43	127	49.3	71	38	64	173	53.3	55	10	21	85	56.5
50 / 54	47	53	61	161	46.5	70	19	41	129	49.7	8	1	2	11	51.3
45 / 49	71	33	52	156	43.0	28	2	8	38	45.7	1	0	0	1	46.3
40 / 44	35	6	19	60	39.4	3		0	3	40.8		0	0	0	
35 / 39	30	2	10	42	35.5	0			0	38.0					
30 / 34	11	0	1	12	30.4										
25 / 29	0			0	26.8										
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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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	80.2		4	1	5	81.4					
90 / 94		21	6	27	78.2	0	22	6	28	78.6		0	0	0	80.3
85 / 89	3	25	14	42	76.8	2	26	11	39	77.3		3	0	3	75.2
80 / 84	22	49	38	108	74.8	15	62	36	112	75.4	1	15	4	20	71.6
75 / 79	48	51	58	158	72.4	54	76	82	213	73.1	4	66	18	88	68.3
70 / 74	73	59	71	203	69.3	95	45	76	216	69.9	20	98	61	179	65.8
65 / 69	55	22	34	111	65.8	50	12	28	89	66.2	36	36	60	133	63.8
60 / 64	39	18	26	82	61.5	28	2	8	38	62.3	81	20	64	165	60.6
55 / 59	8	1	1	10	57.6	4		0	4	56.8	62	3	26	91	55.9
50 / 54											30	0	6	36	51.1
45 / 49											6	0	0	6	46.5
40 / 44															
35 / 39															
30 / 34															
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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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		
95 / 99															
90 / 94															
85 / 89	0	0		0	65.0	0		0	0	60.0					
80 / 84	0	2	0	2	65.5	0	0	0	0	68.0					
75 / 79	0	11	2	13	64.6	0	1	0	1	59.9					
70 / 74	1	44	9	54	61.7	0	4	0	4	58.4					
65 / 69	4	54	22	80	59.5	1	8	1	10	56.6					
60 / 64	21	71	55	147	56.6	2	28	7	37	53.5	0	3	1	4	51.0
55 / 59	52	40	70	163	53.3	10	56	26	92	50.2	1	12	3	16	47.8
50 / 54	75	19	54	148	49.4	36	60	52	148	46.7	5	30	11	47	43.9
45 / 49	56	6	27	88	44.5	52	45	56	154	42.0	15	53	30	98	40.1
40 / 44	24	1	6	31	39.9	36	18	35	88	37.7	21	45	35	101	36.2
35 / 39	12	0	4	16	35.2	49	14	40	103	33.6	59	53	67	179	32.9
30 / 34	3	0	0	3	31.0	40	6	19	65	29.1	63	32	59	154	28.4
25 / 29						12	1	4	17	24.6	50	13	31	94	23.6
20 / 24						1	0	0	1	20.3	20	4	7	31	19.4
15 / 19						0			0	16.4	11	2	4	16	15.5
10 / 14						0			0		2	0	1	3	11.0
5 / 9											1		0	1	5.6
0 / 4											0		0	0	0.7
-5 / -1															

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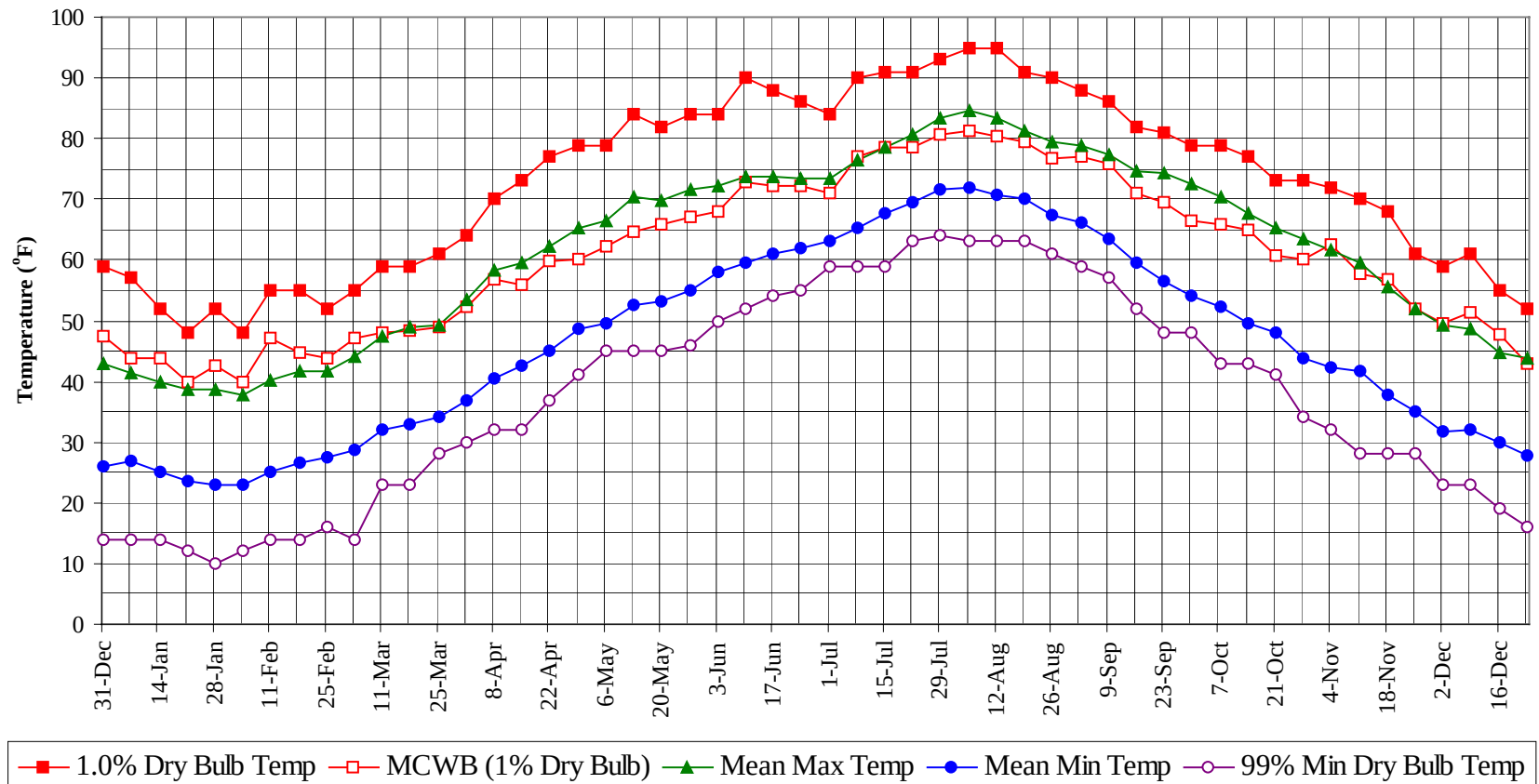
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

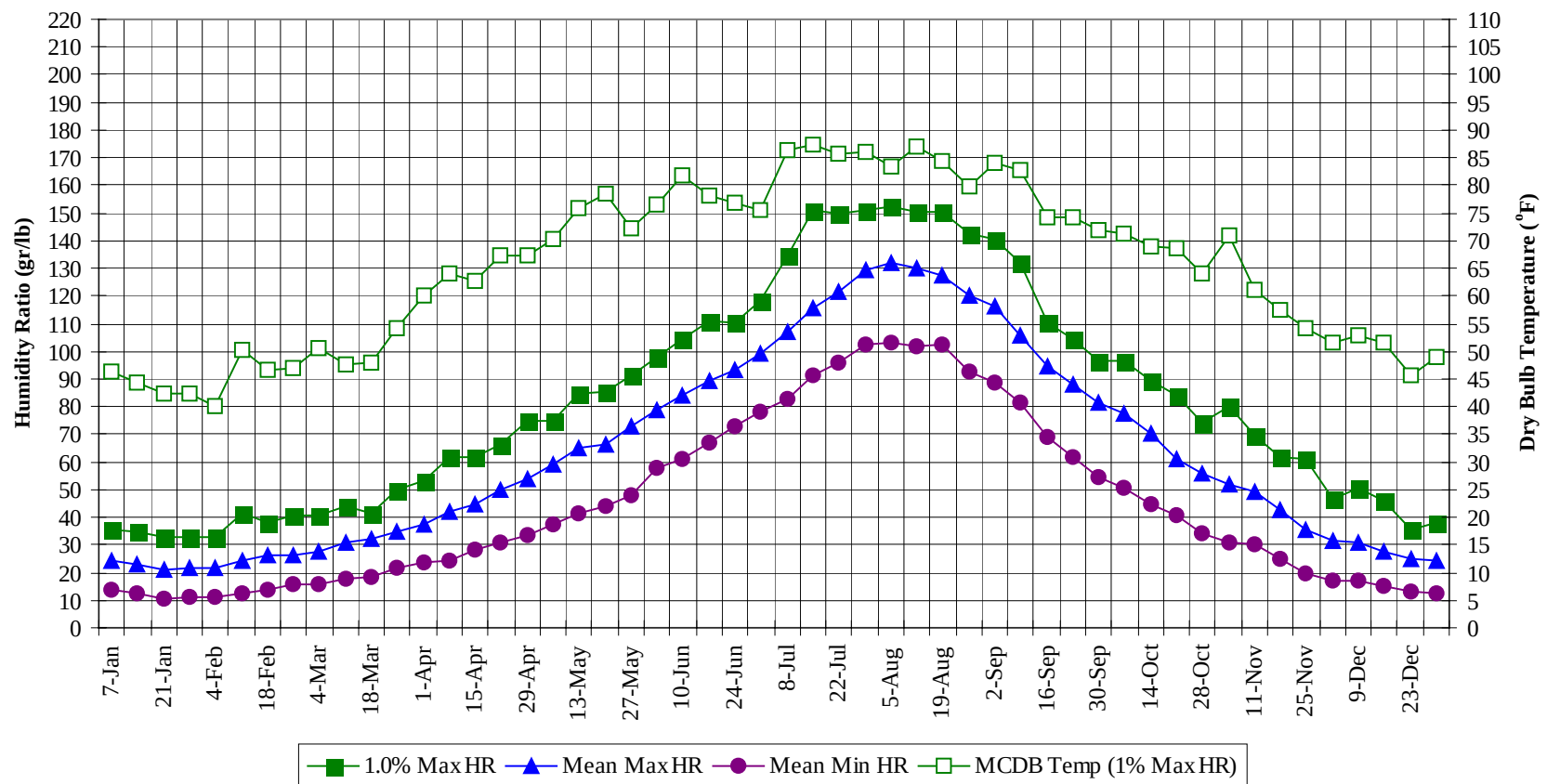
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99		7	2	9	80.5
90 / 94	0	46	13	59	78.0
85 / 89	5	64	27	96	76.1
80 / 84	39	169	96	304	73.3
75 / 79	124	282	206	612	70.1
70 / 74	232	373	299	903	66.4
65 / 69	212	244	244	700	62.5
60 / 64	325	302	328	955	58.2
55 / 59	299	238	266	803	52.6
50 / 54	283	249	263	795	47.4
45 / 49	266	266	252	784	42.0
40 / 44	176	191	185	552	37.4
35 / 39	291	241	304	837	33.6
30 / 34	298	148	236	682	29.0
25 / 29	202	66	125	392	23.9
20 / 24	83	21	42	145	19.4
15 / 19	65	11	28	104	15.6
10 / 14	19	2	5	26	10.7
5 / 9	3	0	1	4	6.0
0 / 4	0		0	0	0.7
-5 / -1	0			0	-5.0

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

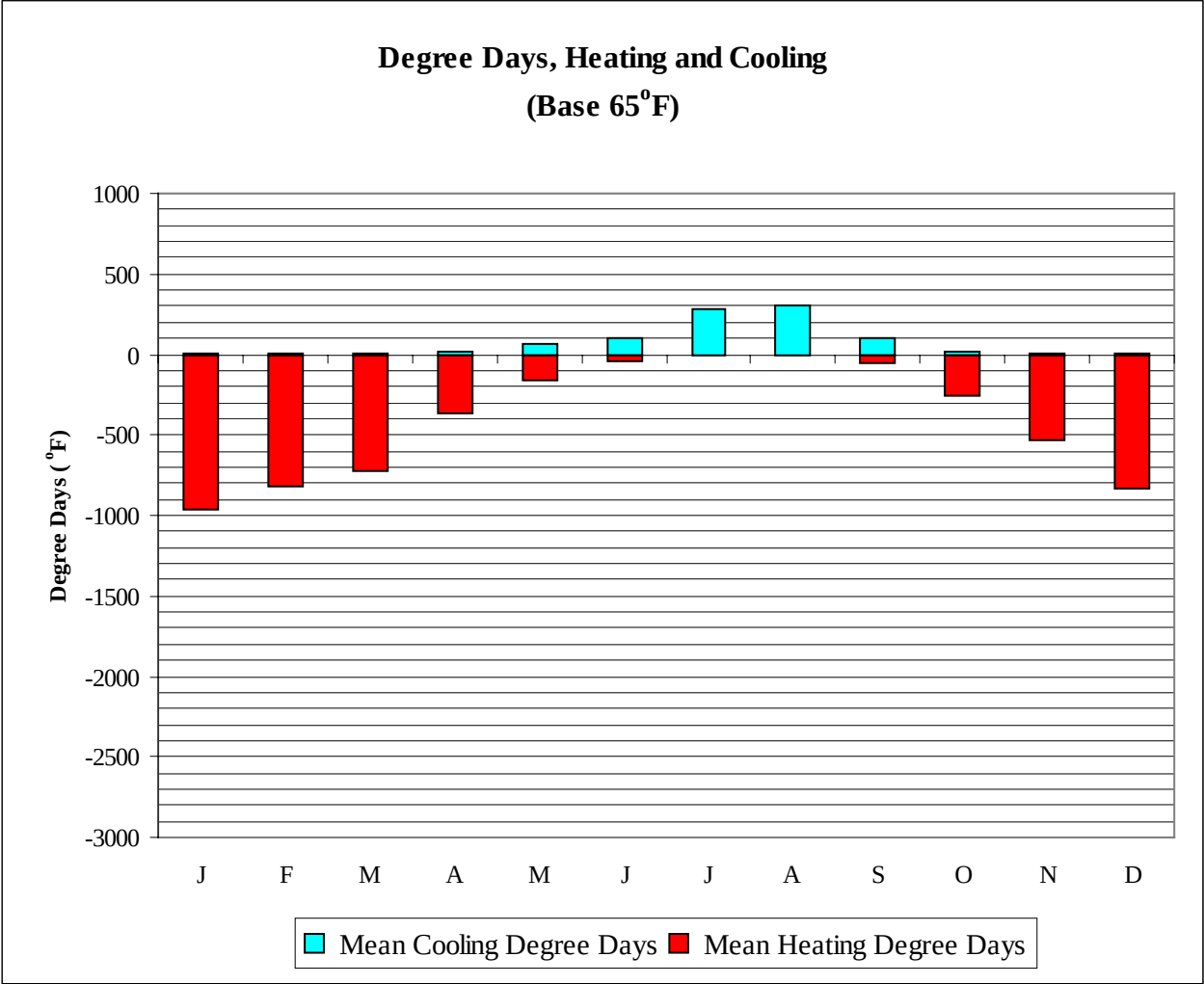


KANGNUNG, SOUTH KOREA

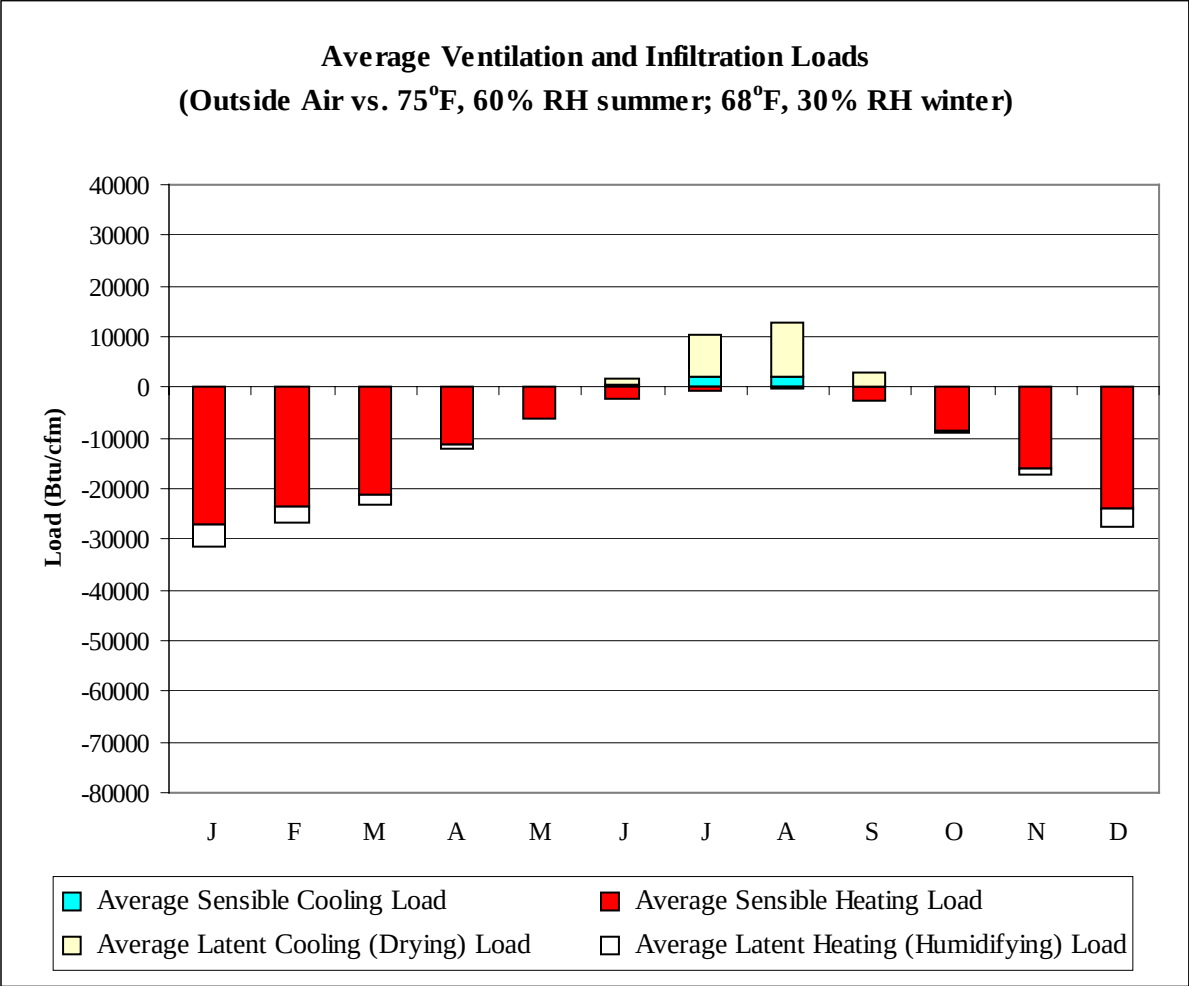
WMO No. 471070

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	57.0	43.8	41.4	26.8	14.0	35.7	46.2	24.2	13.5
14-Jan	52.0	43.8	39.8	25.0	14.0	35.0	44.5	22.7	12.2
21-Jan	48.0	40.0	38.6	23.7	12.0	32.9	42.3	21.0	10.6
28-Jan	52.0	42.7	38.8	23.0	10.0	32.9	42.5	21.5	11.0
4-Feb	48.0	39.9	37.7	23.1	12.0	32.9	39.9	21.4	11.1
11-Feb	55.0	47.1	40.2	25.0	14.0	41.3	50.1	24.0	12.6
18-Feb	55.0	44.6	41.7	26.5	14.0	37.8	46.6	26.0	14.0
25-Feb	52.0	43.9	41.7	27.6	16.0	40.6	47.1	26.5	15.5
4-Mar	55.0	47.2	44.0	28.7	14.0	40.6	50.7	27.7	15.8
11-Mar	59.0	48.1	47.5	31.9	23.0	44.1	47.5	31.0	17.5
18-Mar	59.0	48.4	49.1	32.8	23.0	41.3	48.0	32.3	18.6
25-Mar	61.0	48.9	49.4	34.1	28.0	49.7	54.1	34.5	21.9
1-Apr	64.0	52.1	53.4	37.0	30.0	53.2	60.2	37.4	23.7
8-Apr	70.0	56.9	58.2	40.5	32.0	61.6	64.0	42.1	24.6
15-Apr	73.0	55.9	59.4	42.5	32.0	61.6	62.6	44.7	28.4
22-Apr	77.0	59.7	62.3	44.9	37.0	66.5	67.4	49.9	30.8
29-Apr	79.0	60.2	65.4	48.6	41.0	74.9	67.3	54.1	33.7
6-May	79.0	62.1	66.4	49.6	45.0	74.9	70.1	59.0	37.2
13-May	84.0	64.7	70.4	52.6	45.0	84.7	75.8	64.8	41.3
20-May	82.0	65.8	69.8	53.1	45.0	85.4	78.4	66.3	43.7
27-May	84.0	67.2	71.7	55.0	46.0	91.0	72.3	72.6	48.2
3-Jun	84.0	68.0	72.2	57.9	50.0	98.0	76.6	78.8	57.5
10-Jun	90.0	72.8	73.6	59.4	52.0	104.3	81.7	84.4	61.4
17-Jun	88.0	72.3	73.8	60.9	54.0	111.3	78.3	89.1	67.0
24-Jun	86.0	72.3	73.5	62.0	55.0	110.6	76.8	93.5	72.8
1-Jul	84.0	71.1	73.5	63.1	59.0	118.3	75.4	99.4	78.2
8-Jul	90.0	77.2	76.4	65.3	59.0	134.4	86.3	107.2	83.1
15-Jul	91.0	78.6	78.6	67.8	59.0	151.2	87.3	115.8	91.3
22-Jul	91.0	78.6	80.8	69.5	63.0	149.8	85.7	121.7	96.2
29-Jul	93.0	80.7	83.4	71.6	64.0	151.2	86.0	129.6	102.4
5-Aug	95.0	81.2	84.7	71.8	63.0	152.6	83.5	132.1	103.4
12-Aug	95.0	80.3	83.5	70.7	63.0	150.5	87.2	129.7	101.9
19-Aug	91.0	79.5	81.4	70.0	63.0	150.5	84.3	127.6	102.8
26-Aug	90.0	76.6	79.5	67.3	61.0	142.8	79.7	120.1	92.8
2-Sep	88.0	76.9	78.7	66.1	59.0	140.7	84.2	115.9	88.8
9-Sep	86.0	75.9	77.5	63.5	57.0	132.3	82.8	105.8	81.3
16-Sep	82.0	70.9	74.7	59.5	52.0	110.6	74.1	94.7	68.7
23-Sep	81.0	69.5	74.3	56.6	48.0	104.3	74.1	88.1	61.5
30-Sep	79.0	66.4	72.5	54.1	48.0	96.6	71.8	81.3	54.6
7-Oct	79.0	65.7	70.4	52.4	43.0	96.6	71.3	77.5	50.8
14-Oct	77.0	64.9	67.6	49.5	43.0	89.6	69.1	70.0	44.9
21-Oct	73.0	60.6	65.3	48.0	41.0	84.0	68.8	61.1	40.5
28-Oct	73.0	60.2	63.4	43.8	34.0	74.2	64.1	55.7	33.9
4-Nov	72.0	62.5	61.7	42.3	32.0	79.8	71.0	51.7	31.2
11-Nov	70.0	57.8	59.4	41.7	28.0	69.3	61.2	49.0	30.1
18-Nov	68.0	56.9	55.6	37.8	28.0	61.6	57.6	42.7	25.2
25-Nov	61.0	52.0	52.1	35.1	28.0	60.9	54.2	35.2	20.0
2-Dec	59.0	49.4	49.4	31.8	23.0	46.9	51.5	31.4	17.0
9-Dec	61.0	51.4	48.6	32.0	23.0	50.4	52.9	30.6	17.1
16-Dec	55.0	47.8	44.8	29.9	19.0	46.2	51.7	27.5	15.3
23-Dec	52.0	43.0	43.9	27.8	16.0	35.7	45.6	24.9	12.9
31-Dec	59.0	47.6	42.8	26.1	14.0	37.8	49.1	24.1	12.4



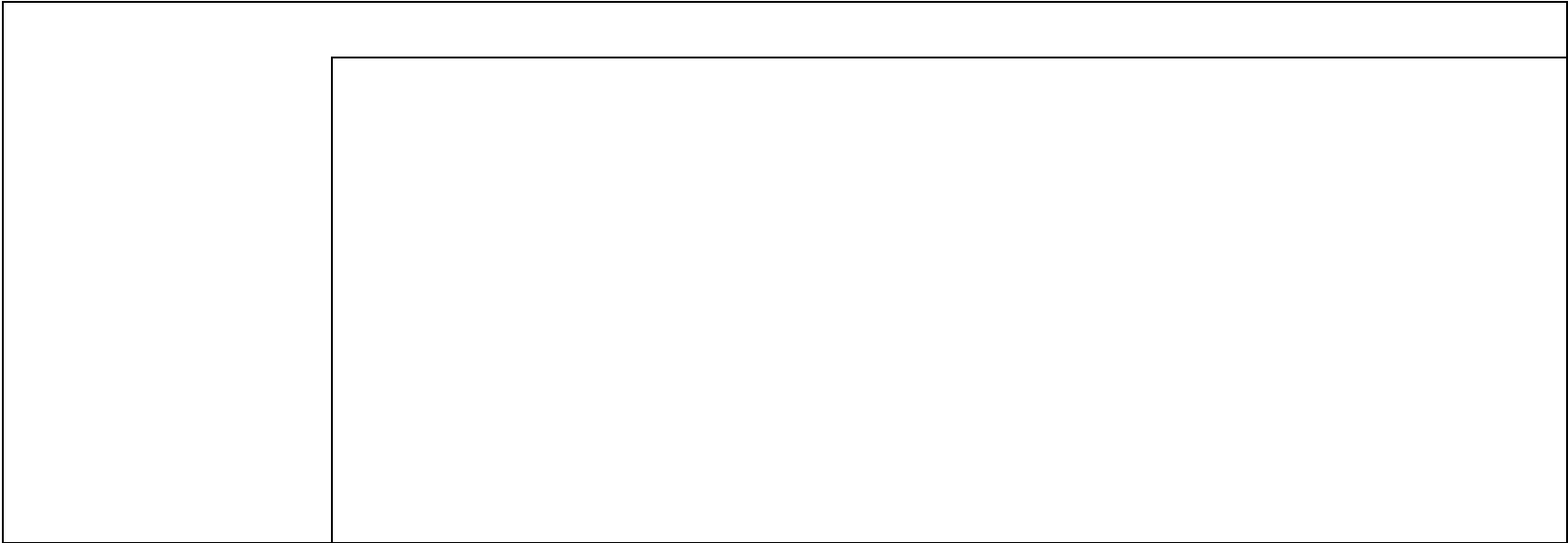
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	963
FEB	0	824
MAR	0	725
APR	12	363
MAY	64	165
JUN	107	44
JUL	280	8
AUG	310	3
SEP	106	55
OCT	21	255
NOV	2	529
DEC	0	838
ANN	903	4772



	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	-27222	0	-4251
FEB	0	-23390	0	-3327
MAR	0	-21155	0	-2069
APR	23	-11511	5	-564
MAY	221	-5990	81	-41
JUN	419	-2296	1447	0
JUL	1975	-540	8571	0
AUG	2111	-253	10846	0
SEP	272	-2488	2485	0
OCT	25	-8656	122	-174
NOV	2	-15895	2	-1465
DEC	0	-24019	0	-3520
ANN	5048	-143415	23559	-15411

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

No Solar Radiation
Data Available

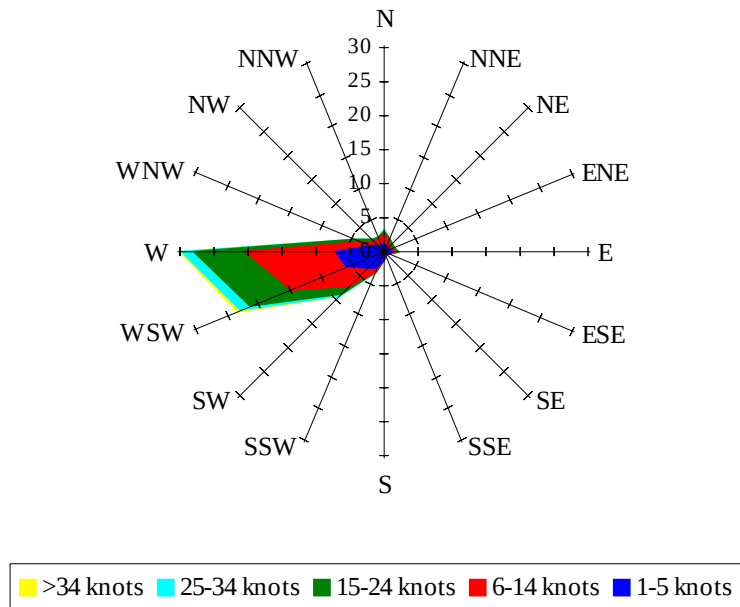


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

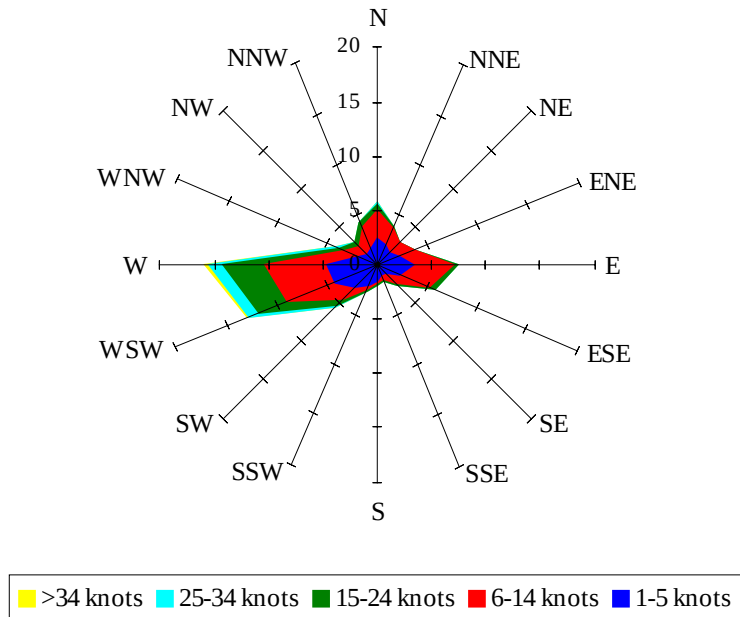
Labels of Percent Frequency on North Axis



Percent Calm = 12.58

Wind Summary - March, April, and May

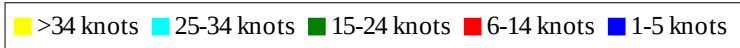
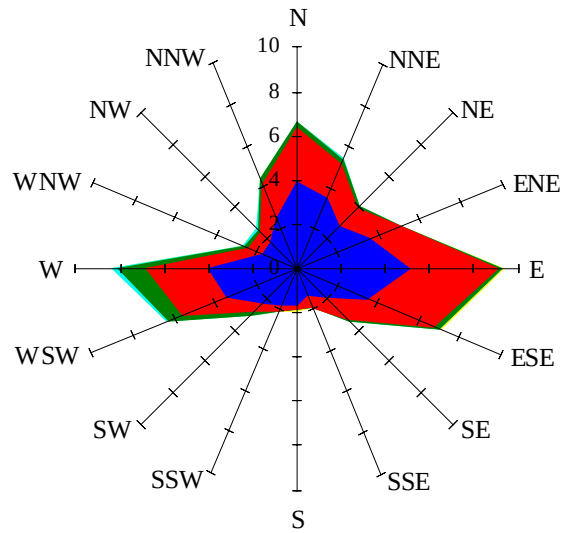
Labels of Percent Frequency on North Axis



Percent Calm = 17.46

Wind Summary - June, July, and August

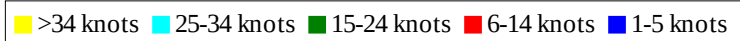
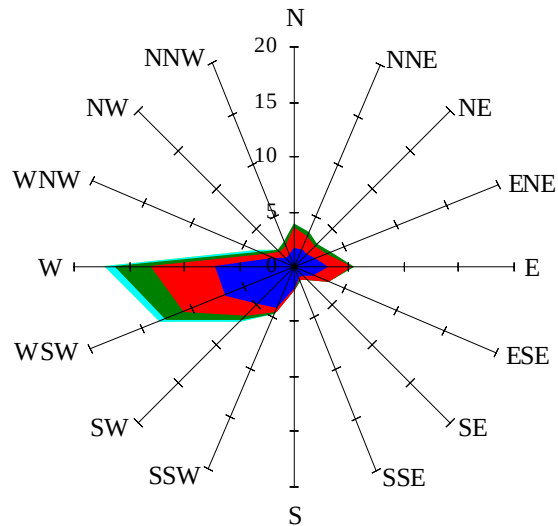
Labels of Percent Frequency on North Axis



Percent Calm = 26.58

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 23.25