

HALL BEACH CN

Latitude = 68.78 N

Longitude = 81.25 W

Period of Record = 1973 to 1996

WMO No. 710810

Elevation = 26 feet

Average Pressure = 29.81 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	64	54	48	13.1	W
0.4% Occurrence	57	50	43	11.4	N
1.0% Occurrence	52	47	40	11.2	WNW
2.0% Occurrence	49	45	38	10.6	WNW
Mean Daily Range	12	-	-	-	-
97.5% Occurrence	-40	-40	1	11.0	WNW
99.0% Occurrence	-45	-44	0	10.0	WNW
99.6% Occurrence	-47	-47	0	9.3	WNW
Median of Extreme Lows	-51	.	.	9.4	WNW
	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	56	63	54	12.4	W
0.4% Occurrence	51	56	46	11.3	WNW
1.0% Occurrence	48	53	42	10.7	WNW
2.0% Occurrence	46	49	40	10.1	WNW
	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	58	58	0.39	12.2	WNW
0.4% Occurrence	47	53	0.32	10.3	NW
1.0% Occurrence	43	51	0.30	10.4	WNW
2.0% Occurrence	41	49	0.28	9.8	WNW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		0	0	0	0

Other Site Data

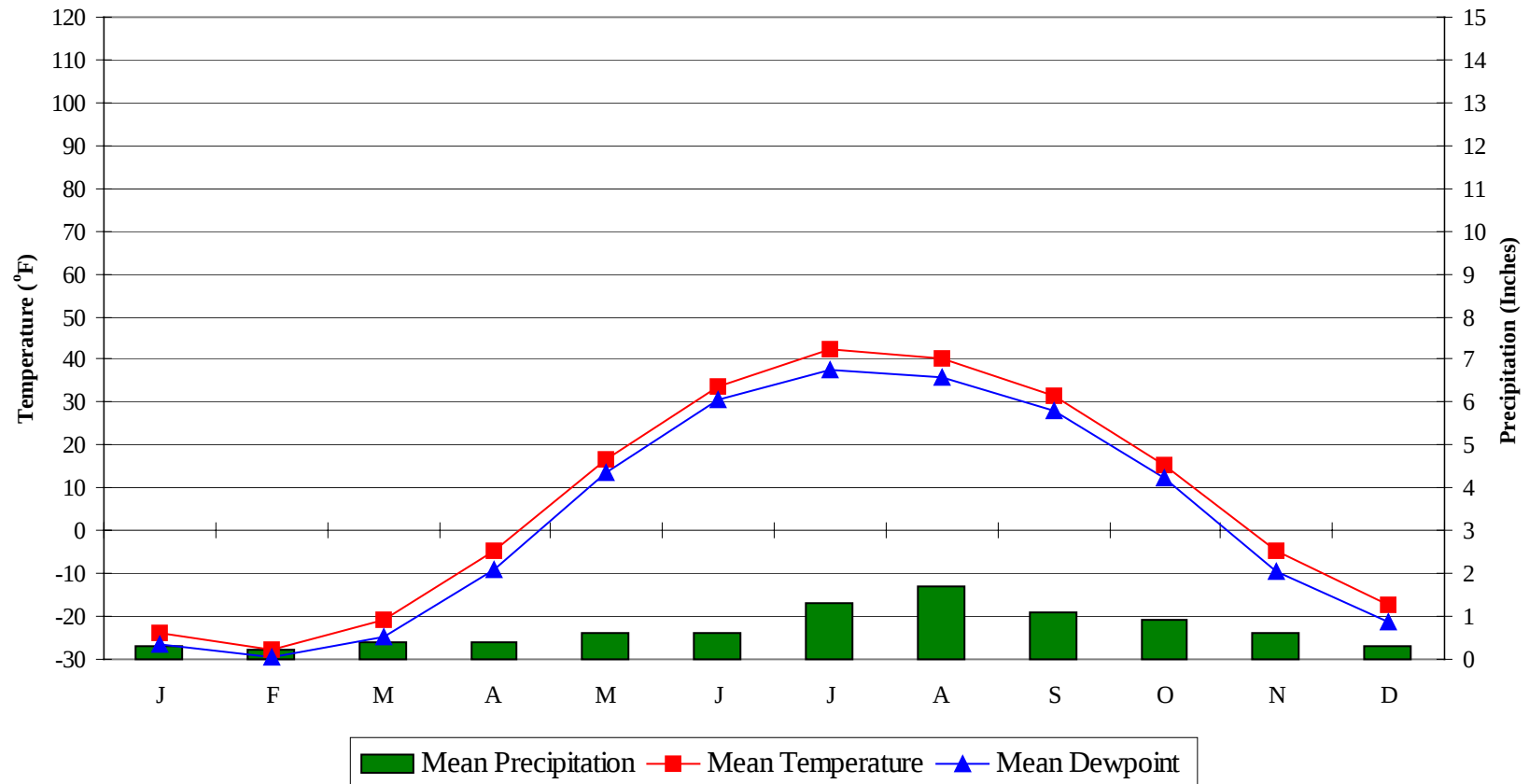
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
1	N/A	N/A	0.0 + 0.0
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
9.4	N/A	N/A	22

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

HALL BEACH CN

WMO No. 710810

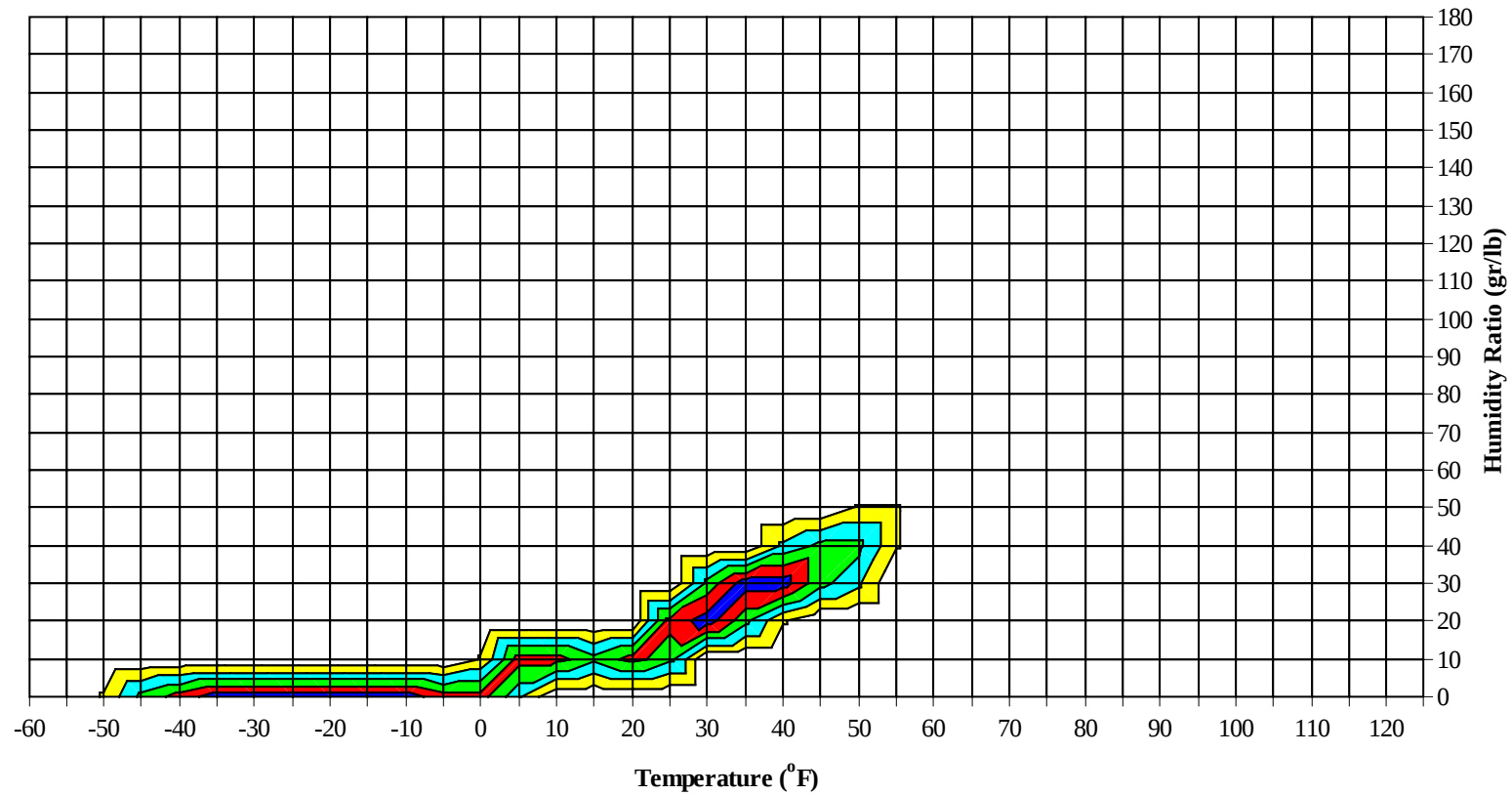
Average Annual Climate



HALL BEACH CN

WMO No. 710810

Long Term Psychrometric Summary

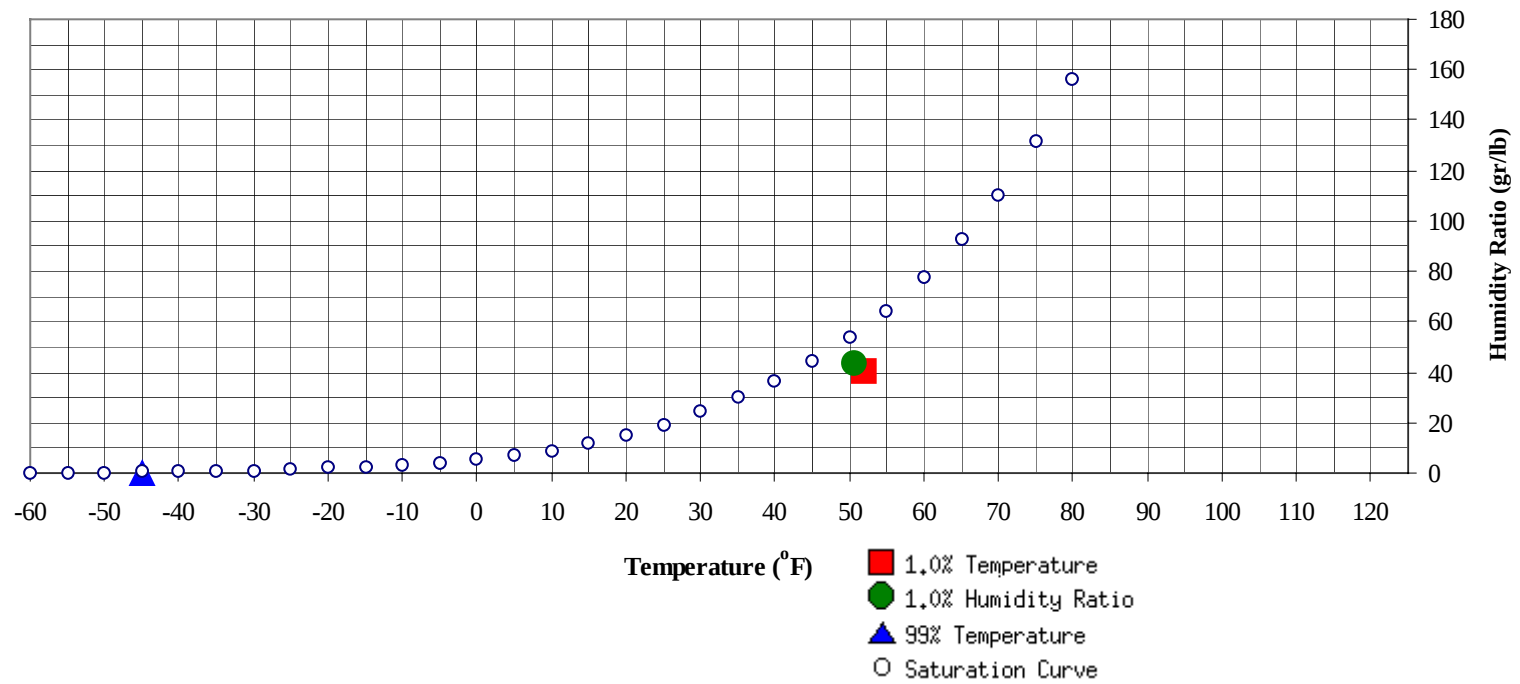


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

HALL BEACH CN

WMO No. 710810

Psychrometric Summary of Peak Design Values



	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)	1.0% Humidity Ratio	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
99% Dry Bulb	-45	0	-10.8		43.4	50.7	47.5	44.5	18.9

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	52	40.1	47	18.7

HALL BEACH CN

WMO No. 710810

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		
75 / 79															
70 / 74															
65 / 69															
60 / 64															
55 / 59															
50 / 54															
45 / 49															
40 / 44															
35 / 39															
30 / 34															
25 / 29	1	1	1	3	25.8						0	0	0	0	24.7
20 / 24	1	1	1	3	21.6						0	1	0	1	21.7
15 / 19	1	0	1	2	17.2	0	0		0	14.9	1	1	1	3	16.8
10 / 14	2	1	2	5	11.3	1	1	1	3	11.2	3	4	4	11	11.6
5 / 9	5	6	5	16	6.0	2	2	2	6	5.9	7	8	7	22	5.8
0 / 4	8	8	7	23	0.7	3	4	4	11	0.5	10	11	10	31	0.9
-5 / -1	8	9	10	27	-3.6	6	5	5	16	-3.5	7	12	10	29	-3.6
-10 / -6	19	19	19	57	-7.8	13	12	12	37	-8.1	13	20	17	50	-8.1
-15 / -11	15	15	15	45	-12.4	14	14	13	41	-12.4	16	22	18	56	-12.5
-20 / -16	27	23	25	76	-17.0	21	24	20	66	-17.1	29	38	35	102	-17.2
-25 / -21	28	31	30	90	-22.2	21	25	25	72	-22.2	34	46	40	120	-22.2
-30 / -26	36	36	34	106	-27.6	28	31	32	92	-27.5	41	45	46	132	-27.4
-35 / -31	31	30	32	93	-31.9	27	27	27	82	-32.0	34	19	29	82	-31.8
-40 / -36	37	37	39	113	-36.4	37	39	37	112	-36.5	28	13	18	59	-36.1
-45 / -41	20	20	20	60	-41.4	29	23	29	81	-41.6	15	6	8	29	-41.8
-50 / -46	9	7	9	25	-46.2	14	11	13	38	-45.8	6	2	4	12	-46.3
-55 / -51	0	1	0	1		6	3	3	12		2	0	1	3	
-60 / -56						1	1	1	3		0			0	
-65 / -61						1	0	1	2						

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.

HALL BEACH CN

WMO No. 710810

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		
75 / 79															
70 / 74															
65 / 69												0	0	0	54.7
60 / 64												1	0	1	53.5
55 / 59											0	3	2	5	49.5
50 / 54											1	5	4	10	46.4
45 / 49											5	15	10	30	42.6
40 / 44							0		0	39.0	11	21	18	50	39.3
35 / 39		0	0	0	34.3	0	3	1	4	34.5	47	77	63	186	35.4
30 / 34	2	2	2	6	31.2	21	38	36	95	30.9	111	89	104	304	31.5
25 / 29	5	7	5	17	25.6	34	49	45	128	25.9	41	22	27	90	26.5
20 / 24	4	6	7	17	21.5	28	34	30	93	21.3	13	5	7	25	21.6
15 / 19	9	13	12	34	16.6	36	47	44	127	16.6	8	2	3	13	16.9
10 / 14	13	21	19	53	11.2	36	36	37	109	11.5	3	0	1	4	12.1
5 / 9	17	32	26	75	6.0	34	26	28	88	6.3	1		0	1	6.8
0 / 4	17	36	26	79	0.8	23	11	16	50	1.2	0			0	3.0
-5 / -1	17	23	25	65	-3.6	15	2	6	23	-3.4					
-10 / -6	30	34	36	100	-7.9	16	0	4	20	-7.6					
-15 / -11	28	22	23	73	-12.3	5		1	6	-12.2					
-20 / -16	31	25	27	83	-17.0	2		0	2	-16.3					
-25 / -21	31	11	20	62	-21.9										
-30 / -26	23	4	10	37	-27.3										
-35 / -31	9	1	2	12	-31.5										
-40 / -36	4	0	1	5	-35.0										
-45 / -41	1		0	1											
-50 / -46															
-55 / -51															
-60 / -56															
-65 / -61															

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.

HALL BEACH CN

WMO No. 710810

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	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				
75 / 79						0	0	0	64.5								
70 / 74	0	0		0	57.8	0	0	0	59.6								
65 / 69	0	1	0	1	54.6	0	0	0	57.5								
60 / 64	0	4	3	7	52.8		2	1	3	54.5							
55 / 59	2	17	12	31	49.8	0	5	3	8	50.5							
50 / 54	13	31	28	72	46.7	5	18	12	35	46.9			1	0	1	46.0	
45 / 49	40	60	52	152	43.0	20	50	38	108	43.0			1	5	2	8	42.3
40 / 44	60	64	61	186	39.8	42	62	56	161	39.6			3	13	8	24	39.1
35 / 39	115	64	79	257	36.7	132	98	110	340	36.3			42	66	54	162	35.4
30 / 34	19	7	12	38	33.4	47	13	26	87	32.3			111	94	105	311	31.2
25 / 29	0			0	28.0	2	0	1	3	27.2			53	40	45	138	25.8
20 / 24													20	14	17	51	21.2
15 / 19													9	6	8	23	17.0
10 / 14													1	0	1	2	12.6
5 / 9																	
0 / 4																	
-5 / -1																	
-10 / -6																	
-15 / -11																	
-20 / -16																	
-25 / -21																	
-30 / -26																	
-35 / -31																	
-40 / -36																	
-45 / -41																	
-50 / -46																	
-55 / -51																	
-60 / -56																	
-65 / -61																	

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.

HALL BEACH CN

WMO No. 710810

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		
75 / 79															
70 / 74															
65 / 69															
60 / 64															
55 / 59															
50 / 54															
45 / 49															
40 / 44				0	0 36.0										
35 / 39	1	2	0	3	34.7										
30 / 34	24	26	26	76	30.8	0	0	1	1	29.8					
25 / 29	46	49	47	142	25.9	6	6	6	18	25.7	0	1	1	2	25.7
20 / 24	29	32	29	89	21.3	8	7	4	19	21.4	1	1	1	3	21.4
15 / 19	41	43	40	125	16.7	12	10	12	34	16.7	3	3	2	8	16.9
10 / 14	32	28	31	92	11.6	14	17	17	48	11.2	7	5	6	18	11.2
5 / 9	27	26	26	79	6.3	27	28	24	79	6.1	13	12	11	36	6.1
0 / 4	20	19	21	60	1.2	29	28	28	85	1.0	17	18	16	51	0.8
-5 / -1	11	8	9	28	-3.5	20	19	17	56	-3.6	14	14	15	43	-3.5
-10 / -6	9	7	9	25	-7.7	34	31	32	97	-7.9	22	23	21	66	-8.0
-15 / -11	5	4	5	14	-12.3	22	23	23	68	-12.3	19	18	18	55	-12.4
-20 / -16	4	2	3	9	-16.1	29	28	31	88	-17.1	28	27	30	85	-17.0
-25 / -21	0	1	0	1	-22.0	26	24	27	77	-22.0	35	32	34	101	-22.2
-30 / -26	0	0	0	0	-26.0	12	13	13	38	-27.1	42	40	42	124	-27.4
-35 / -31						2	3	3	8	-31.4	22	24	21	67	-31.8
-40 / -36						0	1	1	2	-35.1	20	19	21	60	-36.4
-45 / -41						0		0	0		6	7	6	19	-40.7
-50 / -46											1	1	1	3	
-55 / -51															
-60 / -56															
-65 / -61															

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.

HALL BEACH CN

WMO No. 710810

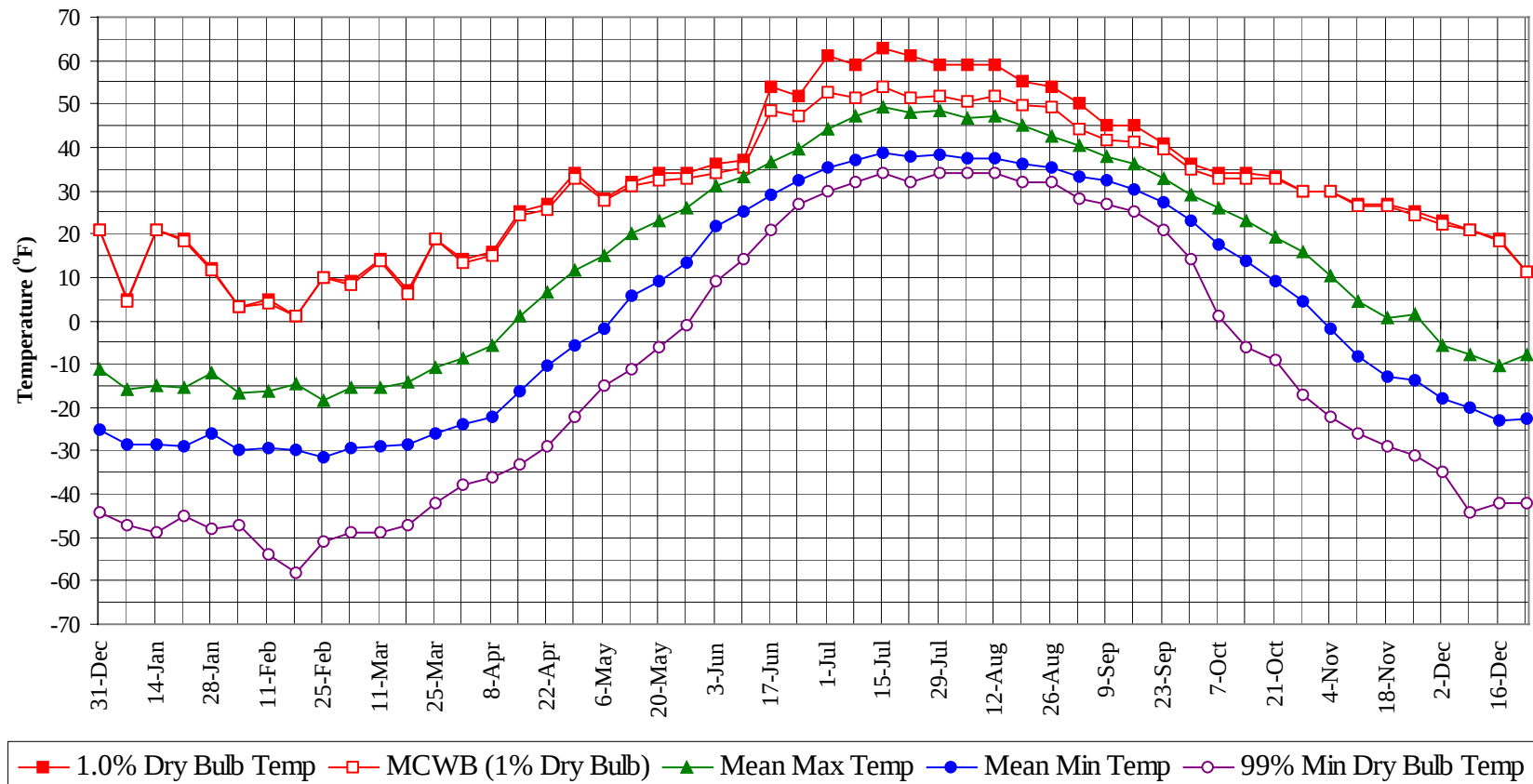
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

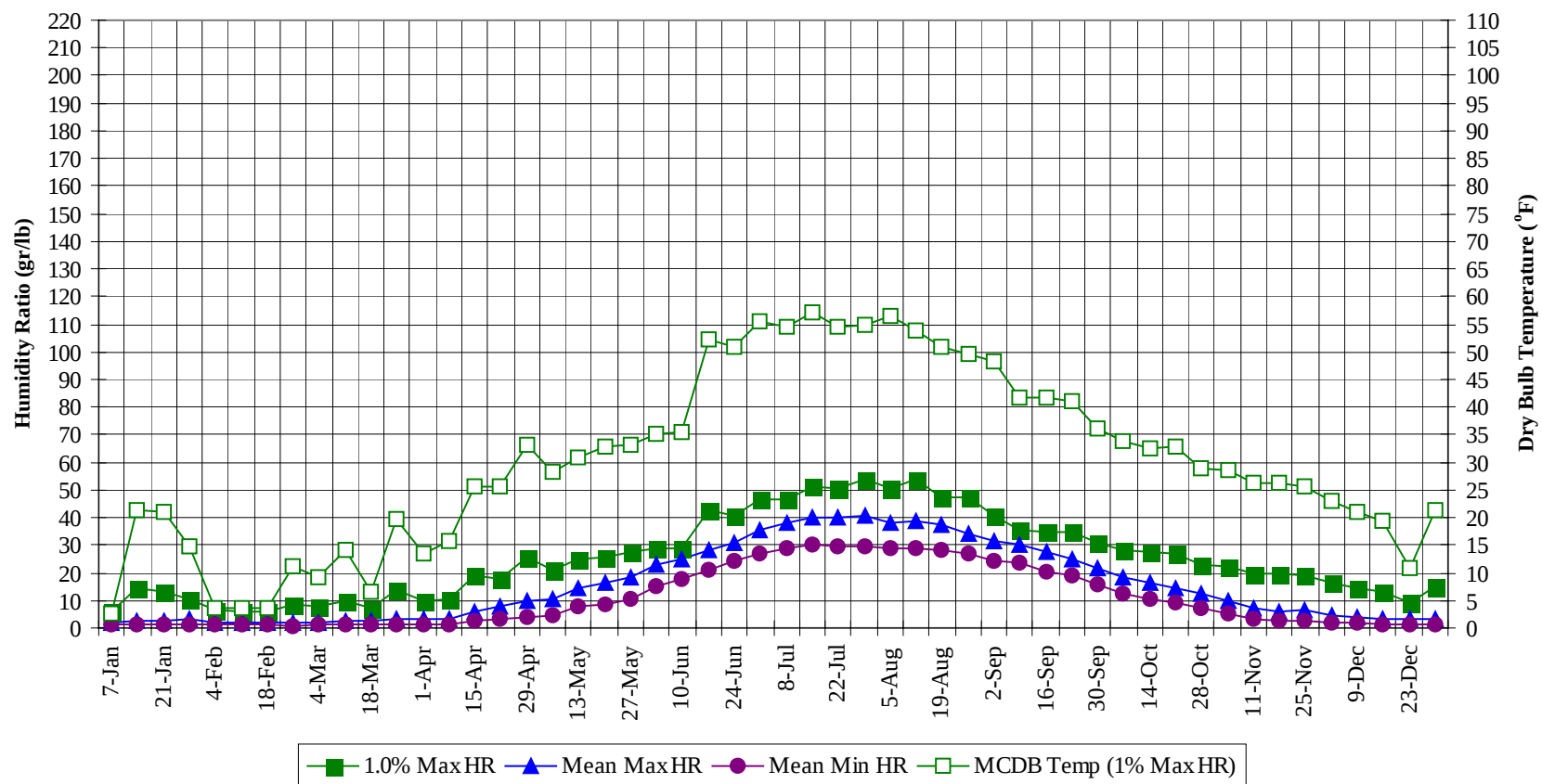
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
75 / 79		0	0	0	64.5
70 / 74		0	0	0	59.2
65 / 69		0	2	1	3 55.4
60 / 64		0	7	4	11 53.3
55 / 59		3	25	17	45 50.0
50 / 54		19	53	44	116 46.7
45 / 49		64	127	101	293 42.9
40 / 44		114	157	141	412 39.6
35 / 39		333	310	303	946 36.0
30 / 34		335	270	311	916 31.4
25 / 29		189	176	177	542 25.9
20 / 24		104	101	97	302 21.3
15 / 19		119	127	123	369 16.7
10 / 14		112	115	118	345 11.5
5 / 9		132	142	129	404 6.1
0 / 4		125	136	129	391 1.0
-5 / -1		97	94	99	290 -3.5
-10 / -6		155	149	153	457 -7.9
-15 / -11		125	121	117	363 -12.4
-20 / -16		171	169	172	512 -17.0
-25 / -21		177	172	177	526 -22.1
-30 / -26		184	170	178	532 -27.4
-35 / -31		126	105	114	346 -31.9
-40 / -36		126	109	117	353 -36.4
-45 / -41		71	55	63	190 -41.5
-50 / -46		30	20	26	76 -46.1
-55 / -51		8	4	4	16
-60 / -56		1	1	1	3
-65 / -61		1	0	1	2

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

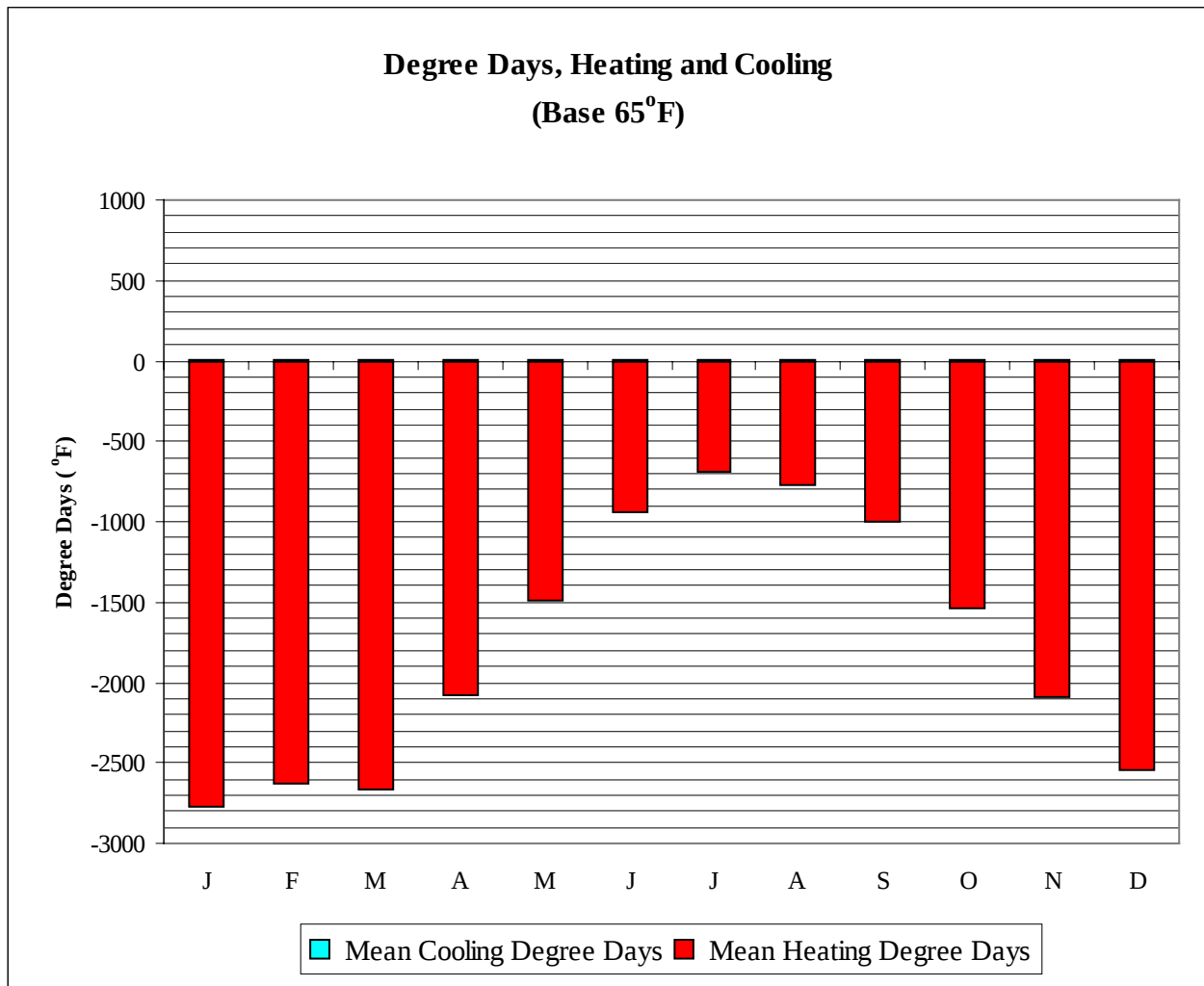


HALL BEACH CN

WMO No. 710810

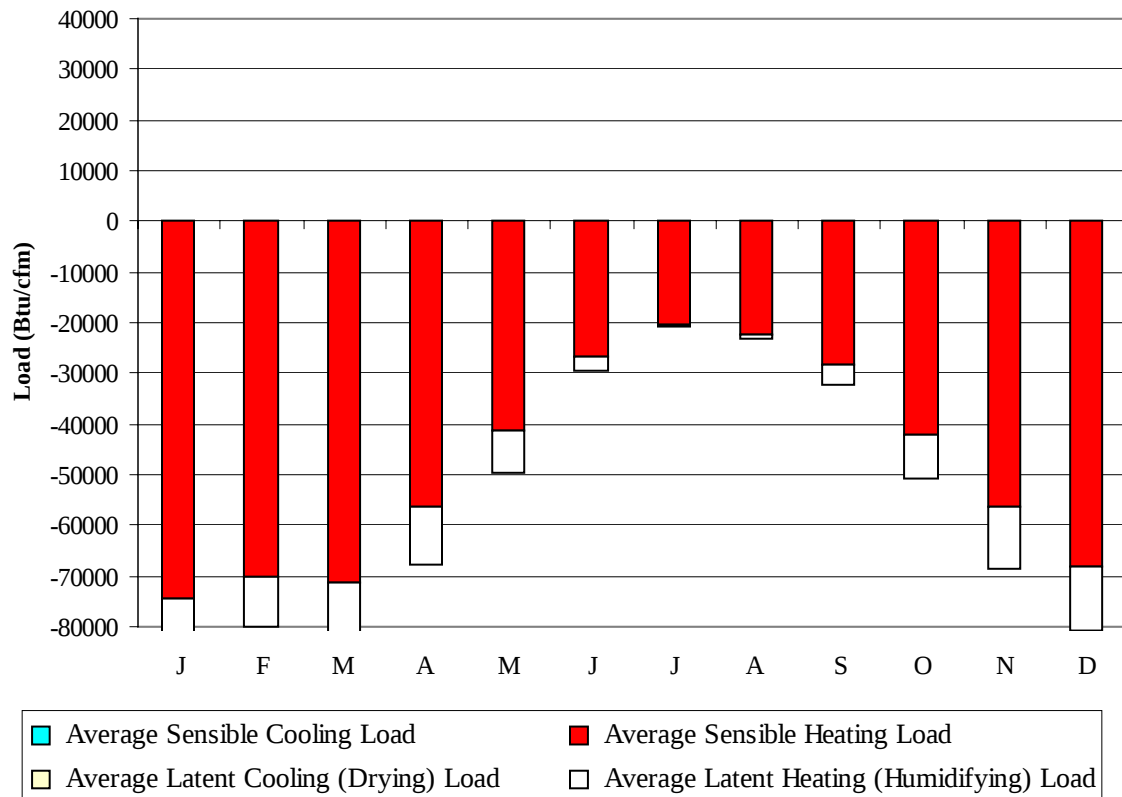
Long Term Dry Bulb Temperature and Humidity Summary

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	5.0	4.3	-15.9	-28.6	-47.0	5.6	2.5	2.2	1.0
14-Jan	21.0	21.0	-15.1	-28.6	-49.0	14.7	21.3	2.5	1.3
21-Jan	19.0	18.2	-15.3	-28.9	-45.0	13.3	20.9	2.8	1.3
28-Jan	12.0	11.6	-12.1	-25.9	-48.0	10.5	14.7	3.0	1.4
4-Feb	3.0	3.0	-16.6	-29.8	-47.0	6.3	3.7	2.1	1.0
11-Feb	5.0	4.2	-16.2	-29.4	-54.0	5.6	3.5	2.1	1.1
18-Feb	1.0	1.0	-14.5	-30.0	-58.0	5.6	3.8	2.3	1.0
25-Feb	10.0	9.8	-18.3	-31.6	-51.0	8.4	11.2	2.0	0.9
4-Mar	9.0	8.1	-15.6	-29.4	-49.0	7.7	9.2	2.2	1.1
11-Mar	14.0	13.9	-15.4	-29.1	-49.0	9.8	14.1	2.4	1.1
18-Mar	7.0	6.1	-14.1	-28.7	-47.0	7.0	6.7	2.4	1.0
25-Mar	19.0	18.8	-10.9	-25.9	-42.0	14.0	19.7	3.2	1.4
1-Apr	14.0	13.5	-8.5	-24.0	-38.0	9.8	13.4	3.2	1.3
8-Apr	16.0	15.0	-5.6	-22.3	-36.0	10.5	15.8	3.6	1.5
15-Apr	25.0	24.3	1.0	-16.2	-33.0	18.9	25.8	5.6	2.3
22-Apr	27.0	25.5	6.6	-10.2	-29.0	17.5	25.7	7.6	3.2
29-Apr	34.0	32.7	11.5	-5.7	-22.0	25.9	33.1	9.6	4.3
6-May	28.0	27.6	14.9	-1.8	-15.0	21.0	28.1	10.7	4.7
13-May	32.0	31.3	20.2	5.9	-11.0	25.2	30.9	14.6	7.6
20-May	34.0	32.4	23.0	9.3	-6.0	25.9	32.7	16.2	8.8
27-May	34.0	32.9	26.0	13.1	-1.0	27.3	33.0	18.1	10.2
3-Jun	36.0	34.2	31.0	21.9	9.0	28.7	35.2	22.8	15.2
10-Jun	37.0	35.4	33.1	25.3	14.0	28.7	35.5	25.0	18.0
17-Jun	54.0	48.4	36.6	29.1	21.0	42.7	52.1	28.1	21.1
24-Jun	52.0	47.0	39.7	32.3	27.0	40.6	50.8	30.7	24.2
1-Jul	61.0	52.7	44.4	35.2	30.0	46.9	55.6	35.2	27.0
8-Jul	59.0	51.5	47.0	37.1	32.0	46.9	54.6	37.8	29.2
15-Jul	63.0	53.7	49.1	38.6	34.0	51.1	57.1	40.0	30.0
22-Jul	61.0	51.3	48.1	37.7	32.0	50.4	54.4	40.0	29.9
29-Jul	59.0	51.7	48.4	38.2	34.0	53.9	54.9	40.5	29.3
5-Aug	59.0	50.5	46.9	37.4	34.0	50.4	56.3	38.3	29.2
12-Aug	59.0	51.9	47.1	37.2	34.0	53.9	53.9	38.6	29.1
19-Aug	55.0	49.8	45.1	36.1	32.0	47.6	50.8	37.3	28.1
26-Aug	54.0	49.1	42.6	35.2	32.0	47.6	49.7	34.4	26.9
2-Sep	50.0	44.4	40.5	33.2	28.0	40.6	48.2	31.6	24.5
9-Sep	45.0	41.6	38.0	32.2	27.0	35.7	41.8	30.0	23.6
16-Sep	45.0	41.3	36.0	30.1	25.0	35.0	41.8	27.5	20.6
23-Sep	41.0	39.4	33.0	27.4	21.0	35.0	41.1	24.9	18.8
30-Sep	36.0	34.8	29.2	22.9	14.0	30.8	36.0	21.6	15.6
7-Oct	34.0	33.0	26.0	17.5	1.0	28.0	33.9	18.6	12.3
14-Oct	34.0	32.9	22.9	13.8	-6.0	27.3	32.6	16.6	10.8
21-Oct	33.0	32.9	19.4	9.1	-9.0	26.6	32.9	14.6	8.9
28-Oct	30.0	29.8	15.7	4.4	-17.0	23.1	28.9	12.6	7.1
4-Nov	30.0	29.8	10.5	-1.9	-22.0	22.4	28.7	10.2	5.3
11-Nov	27.0	26.3	4.3	-8.4	-26.0	19.6	26.1	7.2	3.4
18-Nov	27.0	26.4	0.7	-12.8	-29.0	19.6	26.3	5.9	2.6
25-Nov	25.0	24.4	1.4	-13.6	-31.0	18.9	25.6	6.3	2.6
2-Dec	23.0	22.3	-5.8	-18.0	-35.0	16.1	23.1	4.4	2.0
9-Dec	21.0	20.9	-7.7	-20.0	-44.0	14.7	21.1	4.0	1.9
16-Dec	19.0	18.5	-10.3	-23.1	-42.0	13.3	19.5	3.5	1.6
23-Dec	11.0	11.0	-7.9	-22.4	-42.0	9.1	10.8	3.5	1.5
31-Dec	21.0	20.9	-11.4	-25.2	-44.0	15.4	21.3	3.4	1.5



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	2774
FEB	0	2624
MAR	0	2662
APR	0	2079
MAY	0	1495
JUN	0	938
JUL	0	690
AUG	0	774
SEP	0	1005
OCT	0	1533
NOV	0	2089
DEC	0	2541
ANN	0	21204

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	-74320	0	-11431
FEB	0	-70200	0	-9768
MAR	0	-71405	0	-12602
APR	0	-56198	0	-11761
MAY	0	-41168	0	-8611
JUN	0	-26666	0	-2716
JUL	0	-20286	0	-361
AUG	0	-22477	0	-831
SEP	0	-28386	0	-3665
OCT	0	-42144	0	-8712
NOV	0	-56495	0	-11905
DEC	0	-68271	0	-12395
ANN	0	-578016	0	-94758

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

No Solar Radiation
Data Available

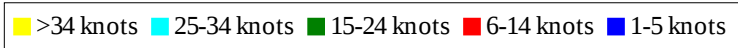
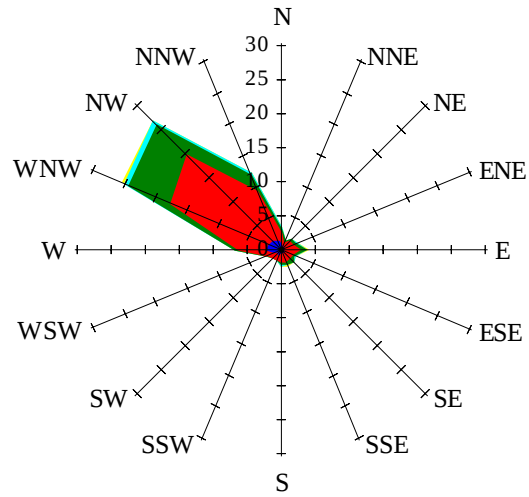


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

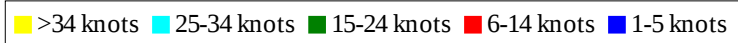
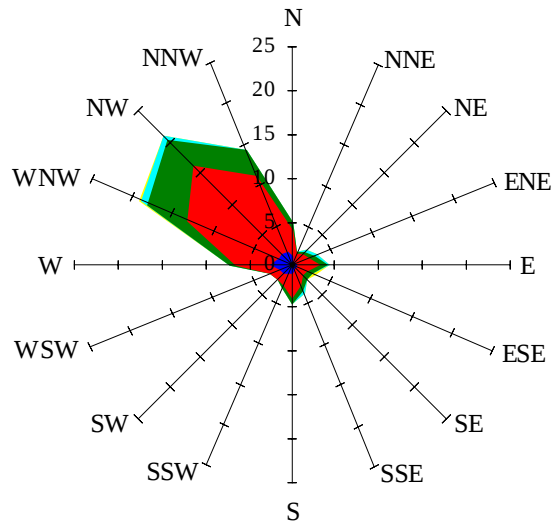
Labels of Percent Frequency on North Axis



Percent Calm = 2.28

Wind Summary - March, April, and May

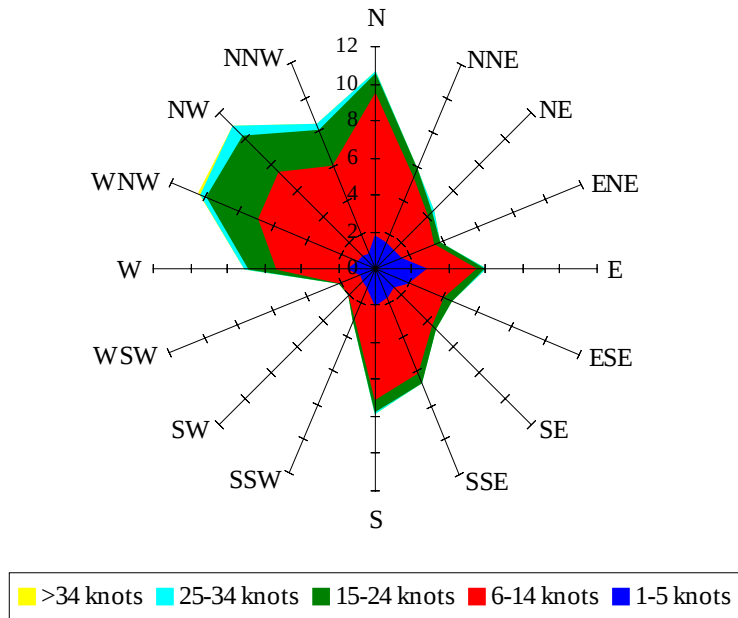
Labels of Percent Frequency on North Axis



Percent Calm = 2.18

Wind Summary - June, July, and August

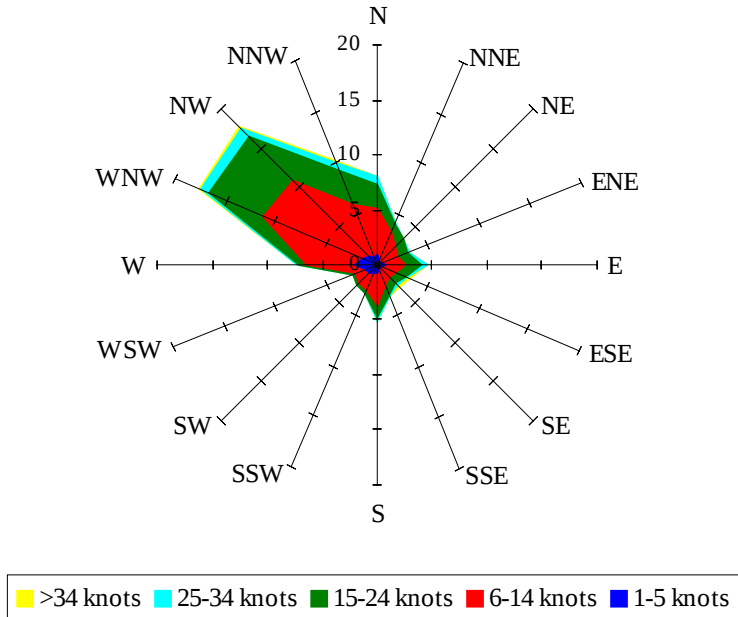
Labels of Percent Frequency on North Axis



Percent Calm = 2.25

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 1.93