

SAN FRANCISCO CA

Latitude = 37.62 N

Longitude = 122.30 W

Period of Record = 1973 to 1996

WMO No. 724940

Elevation = 16 feet

Average Pressure = 29.98 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	96	66	49	9.0	NW
0.4% Occurrence	83	63	53	12.8	WNW
1.0% Occurrence	79	62	56	13.8	NW
2.0% Occurrence	74	61	58	13.6	WNW
Mean Daily Range	15	-	-	-	-
97.5% Occurrence	42	40	33	5.5	S
99.0% Occurrence	40	38	30	5.3	S
99.6% Occurrence	38	36	28	5.2	S
Median of Extreme Lows	34	32	22	5.7	S
	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	68	85	71	10.3	NW
0.4% Occurrence	65	79	68	11.9	NW
1.0% Occurrence	63	74	67	12.6	NW
2.0% Occurrence	62	71	66	13.1	NW
	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	83	71	0.56	8.8	NNE
0.4% Occurrence	77	68	0.52	9.7	WNW
1.0% Occurrence	72	66	0.49	11.5	WNW
2.0% Occurrence	71	66	0.48	11.2	WNW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		3	74	0	10

Other Site Data

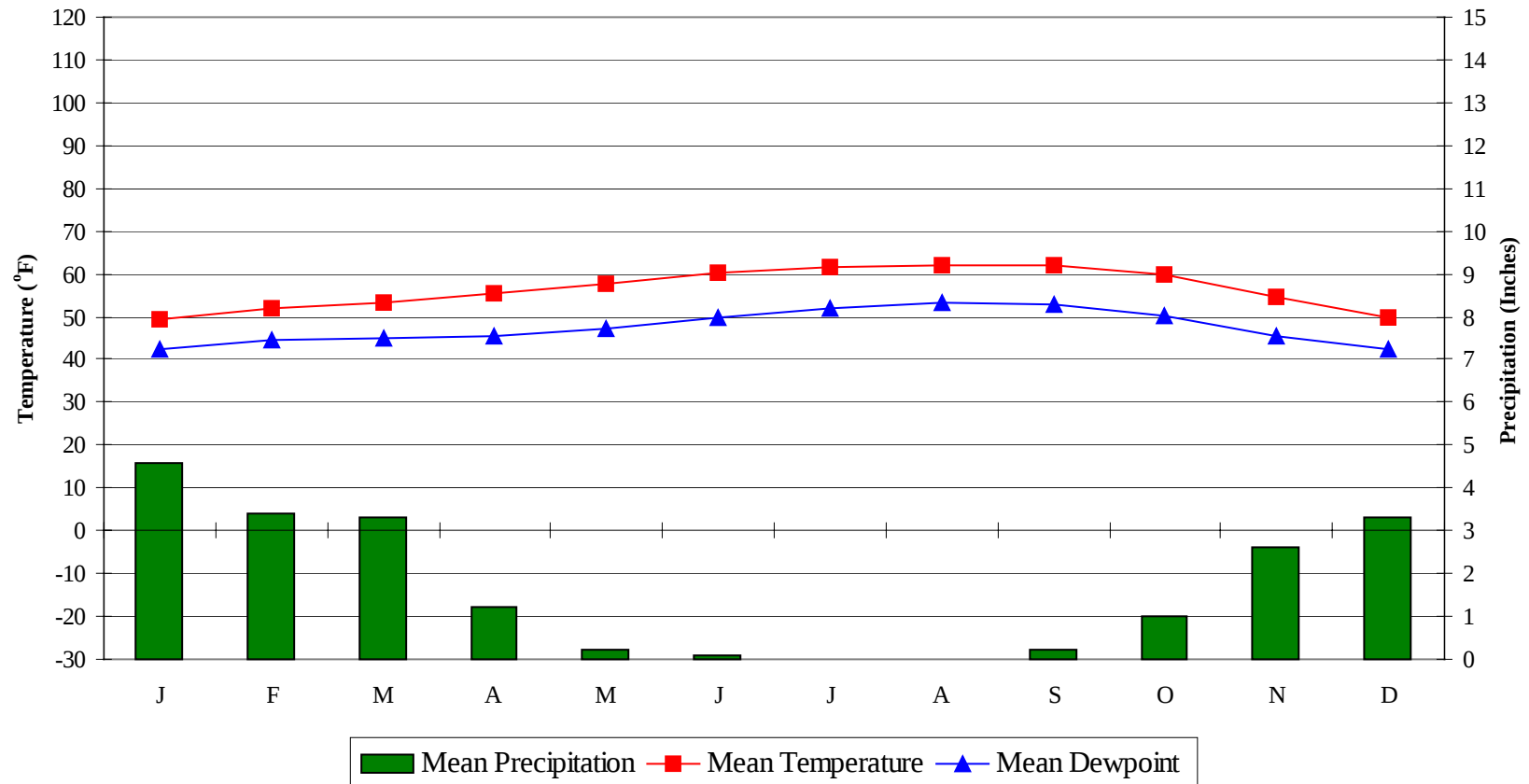
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
8	1.5	85	0.0 + 0.1
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
59.0	0	0	0

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

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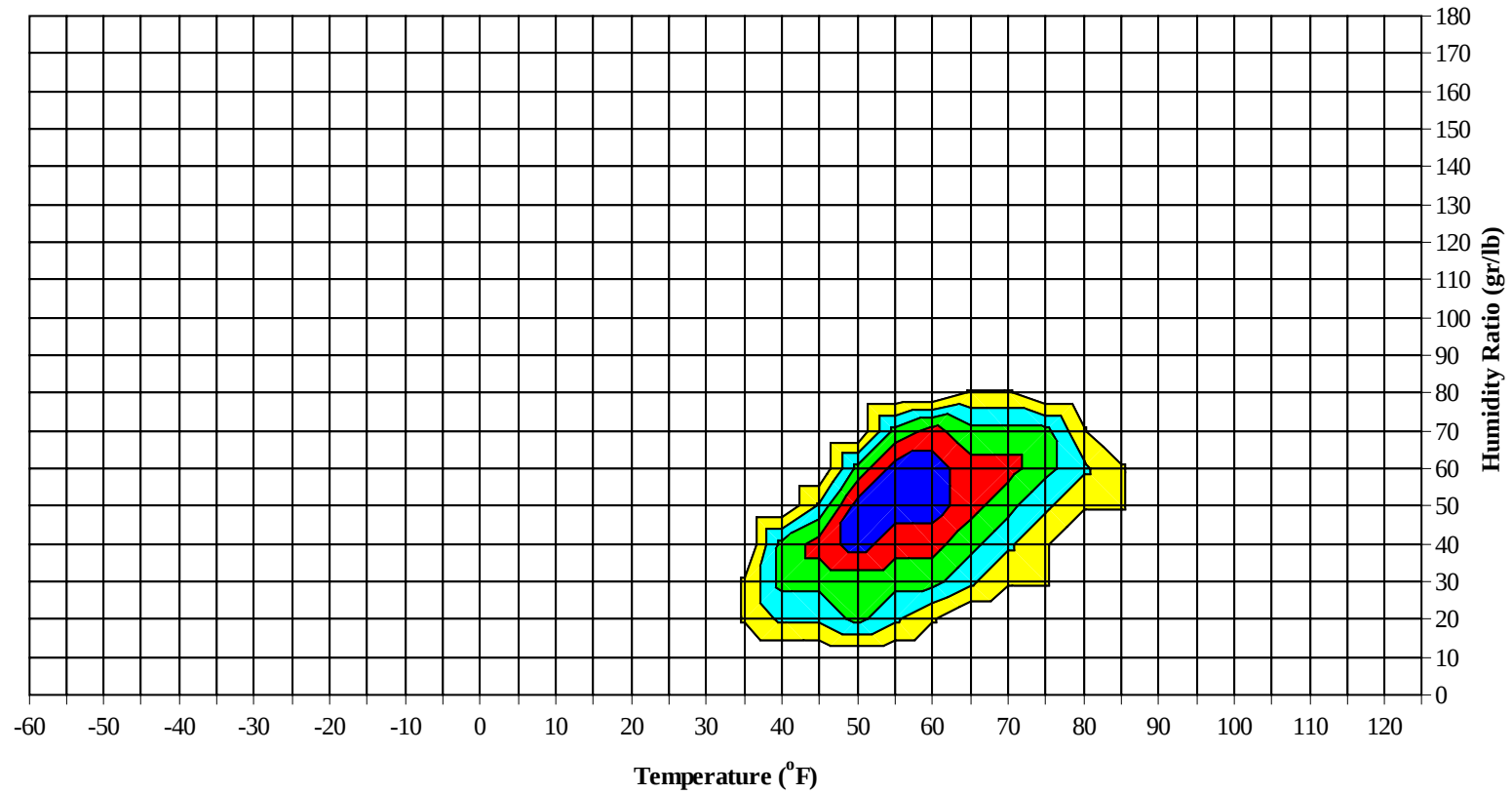
Average Annual Climate



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Long Term Psychrometric Summary

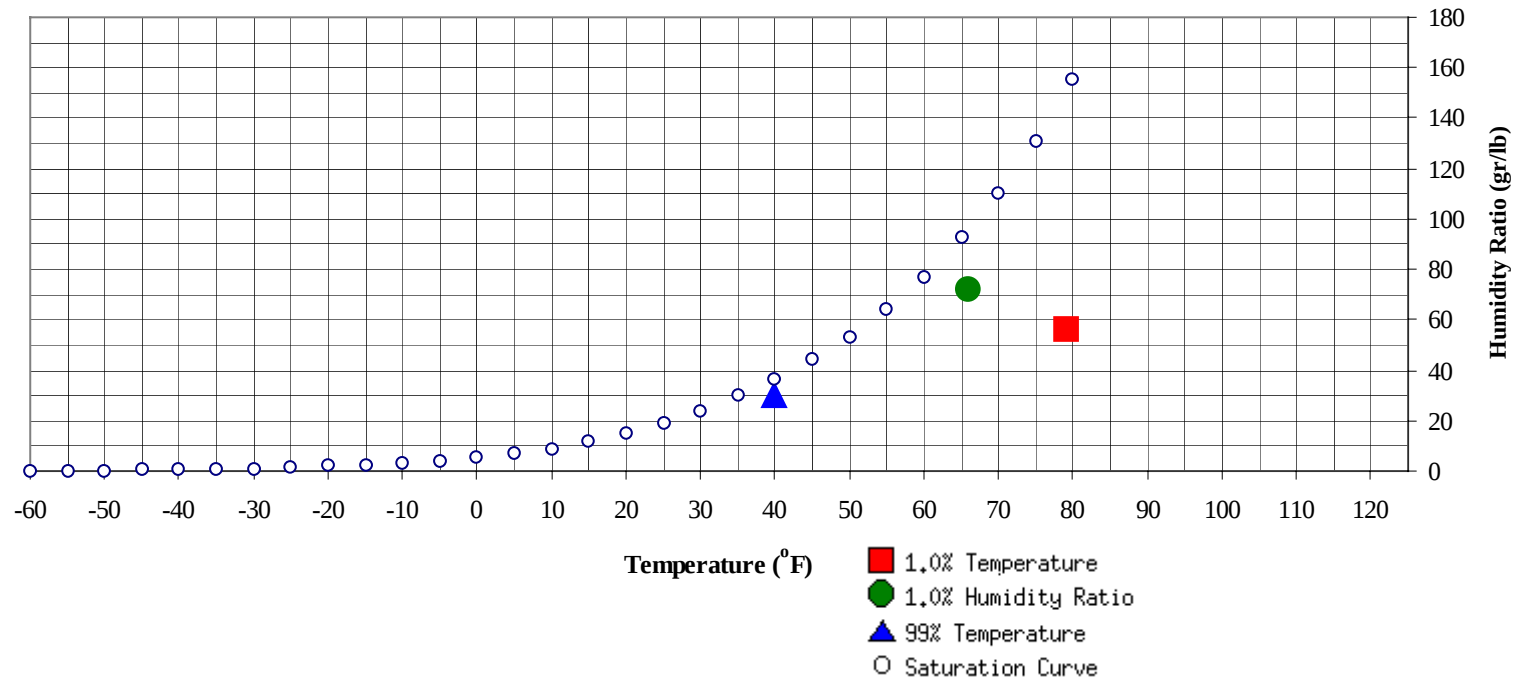


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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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)
	40	30.2	14.3		72.1	65.8	60.9	57.9	27.0

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	79	56.3	62.2	27.8

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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		
100 / 104															
95 / 99															
90 / 94															
85 / 89															
80 / 84															
75 / 79							0	0	0	62.4		1	0	1	60.3
70 / 74		0		0	53.0		2	0	2	58.0		4	1	5	57.0
65 / 69		3	0	3	52.4		7	2	9	55.1		14	2	16	55.5
60 / 64	1	16	4	21	53.3	2	32	13	47	54.6	2	61	15	78	54.3
55 / 59	12	56	32	100	51.8	18	84	54	156	52.0	31	99	68	198	51.9
50 / 54	47	99	95	240	48.2	76	75	104	255	48.7	102	59	119	280	48.5
45 / 49	81	55	85	221	44.5	81	19	44	144	44.7	85	8	40	133	44.5
40 / 44	79	17	30	126	40.2	39	3	7	49	40.1	27	1	4	32	40.3
35 / 39	26	1	3	30	36.1	7	1	1	9	35.3	1	0	0	1	36.7
30 / 34	2			2	31.4	1	0	0	1	28.3					
25 / 29															

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		
100 / 104															
95 / 99						0			0	62.0		0		0	66.8
90 / 94		0		0	67.0	1			1	62.6		3	0	3	64.2
85 / 89		1	0	1	64.5	2	0		2	62.4		4	1	5	62.8
80 / 84		2	0	2	61.9	0	4	1	5	61.8	0	7	1	8	62.3
75 / 79		5	1	6	59.6	0	8	1	9	60.2	1	10	3	14	61.3
70 / 74	0	12	2	14	57.3	1	20	3	24	59.1	2	33	5	40	60.0
65 / 69	1	28	6	35	55.7	3	46	9	58	57.1	5	80	17	102	57.6
60 / 64	5	79	19	103	54.0	13	99	32	144	54.4	26	79	52	157	55.3
55 / 59	37	86	68	191	51.5	57	61	85	203	52.1	94	22	111	228	53.0
50 / 54	113	25	118	256	48.5	137	7	111	254	49.0	108	2	49	160	50.0
45 / 49	74	2	25	101	44.7	36	0	7	43	45.4	3		0	3	46.1
40 / 44	10	0	1	11	40.3	1			1	41.0					
35 / 39	0			0	36.3										
30 / 34															
25 / 29															

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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		
100 / 104		0		0	68.5										
95 / 99		0		0	66.5		0		0	67.0		0		0	66.9
90 / 94	0	1	0	1	66.2		0	0	0	66.0		1	0	1	65.3
85 / 89	0	2	0	2	65.1		2	0	2	65.2		4	0	4	63.8
80 / 84	0	6	1	7	64.0		6	0	6	63.8		8	1	9	62.7
75 / 79	0	14	2	16	62.6		14	2	16	62.8	0	16	3	19	61.8
70 / 74	1	53	6	60	60.8	0	60	7	67	61.1	1	50	8	59	60.7
65 / 69	6	105	25	136	58.6	6	103	27	136	59.1	8	95	24	127	59.1
60 / 64	41	59	76	175	56.6	51	56	94	201	57.0	50	56	88	194	57.0
55 / 59	132	8	121	261	54.0	147	7	105	258	54.5	130	9	104	242	54.4
50 / 54	68	0	18	86	51.1	44	0	14	58	51.8	51	0	13	64	51.4
45 / 49	0		0	0	47.5						0			0	47.0
40 / 44															
35 / 39															
30 / 34															
25 / 29															

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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		
100 / 104															
95 / 99		0		0	65.8										
90 / 94		1	0	1	64.9										
85 / 89		3	0	3	62.6										
80 / 84		7	1	8	61.2										
75 / 79		12	3	15	60.3		2		2	57.7					
70 / 74	0	31	7	38	59.5		8	1	9	56.8					
65 / 69	4	70	17	91	58.1	0	23	4	27	56.0		1	0	1	53.0
60 / 64	32	89	63	185	56.0	7	69	26	101	54.9	2	23	4	29	54.5
55 / 59	103	32	112	247	53.4	40	86	84	210	52.1	19	69	38	125	51.9
50 / 54	95	2	44	140	50.1	100	44	95	239	48.7	48	97	97	242	48.0
45 / 49	14		1	15	45.6	65	8	28	100	44.5	86	46	82	215	44.3
40 / 44	0			0	41.6	26	0	3	29	40.2	70	11	23	104	40.2
35 / 39						2		0	2	35.9	19	1	3	23	35.2
30 / 34								0	0		3	0	1	4	29.0
25 / 29											1			1	23.3

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

Period of Record = 1973 to 1996

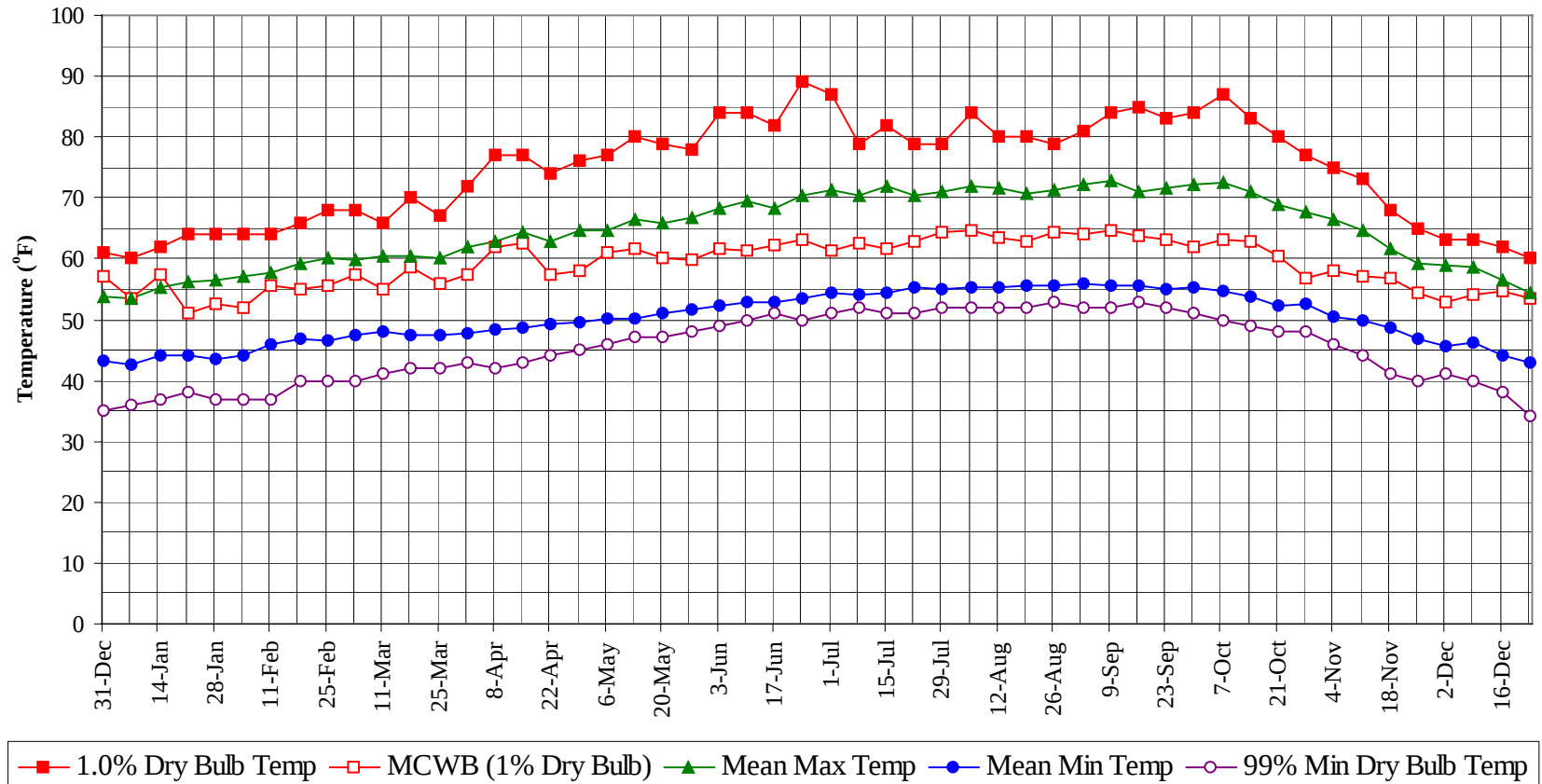
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
100 / 104		0		0	68.5
95 / 99		1		1	66.4
90 / 94	0	7	0	7	64.8
85 / 89	0	18	2	20	63.5
80 / 84	0	40	6	46	62.6
75 / 79	1	81	15	97	61.5
70 / 74	6	275	41	322	60.1
65 / 69	32	578	132	742	58.1
60 / 64	234	718	488	1439	55.7
55 / 59	821	617	980	2418	52.9
50 / 54	986	411	870	2267	49.0
45 / 49	524	139	310	973	44.6
40 / 44	254	32	69	354	40.2
35 / 39	56	3	7	66	35.7
30 / 34	5	0	1	6	29.6
25 / 29	1			1	23.3

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.

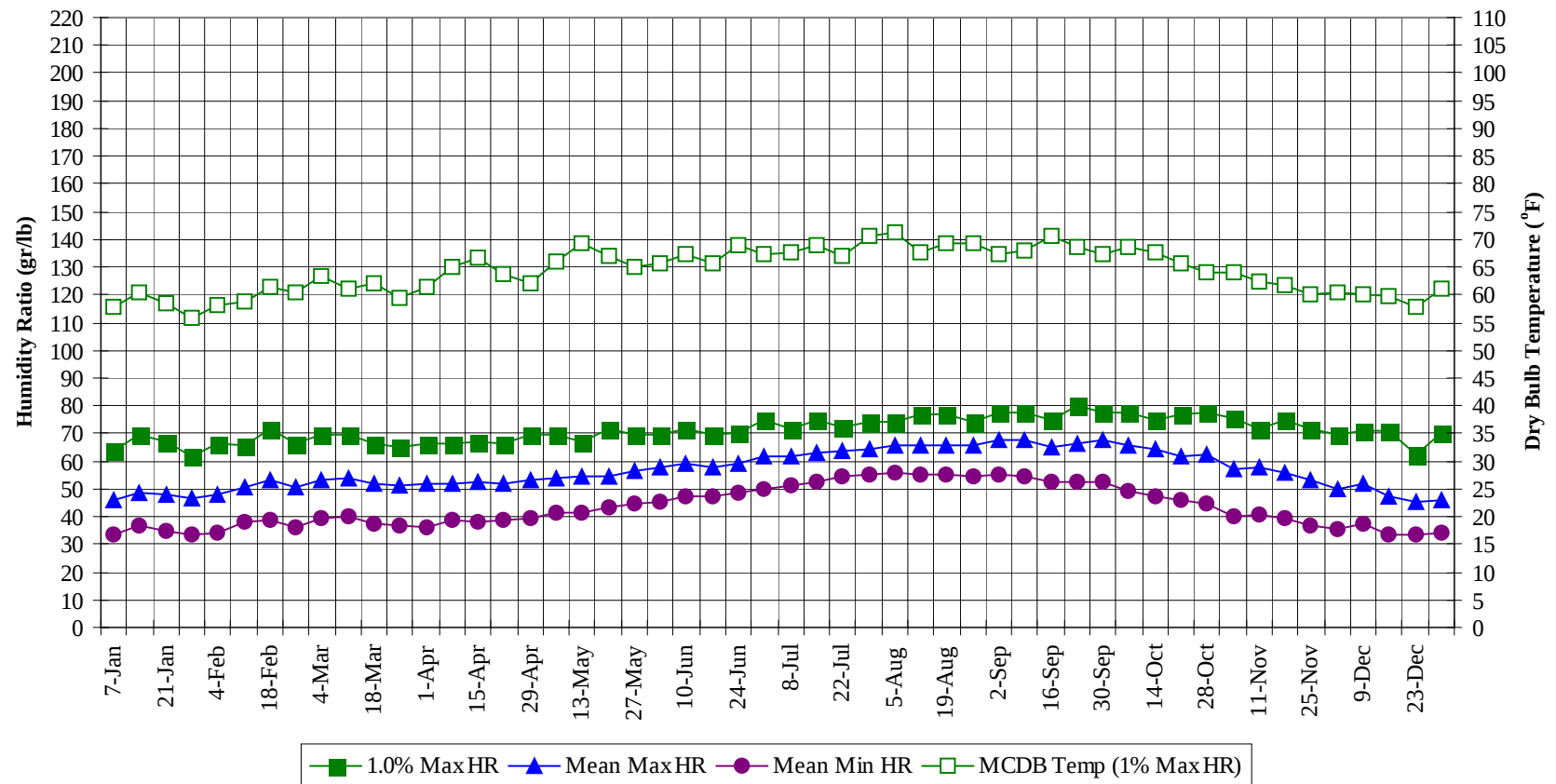
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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



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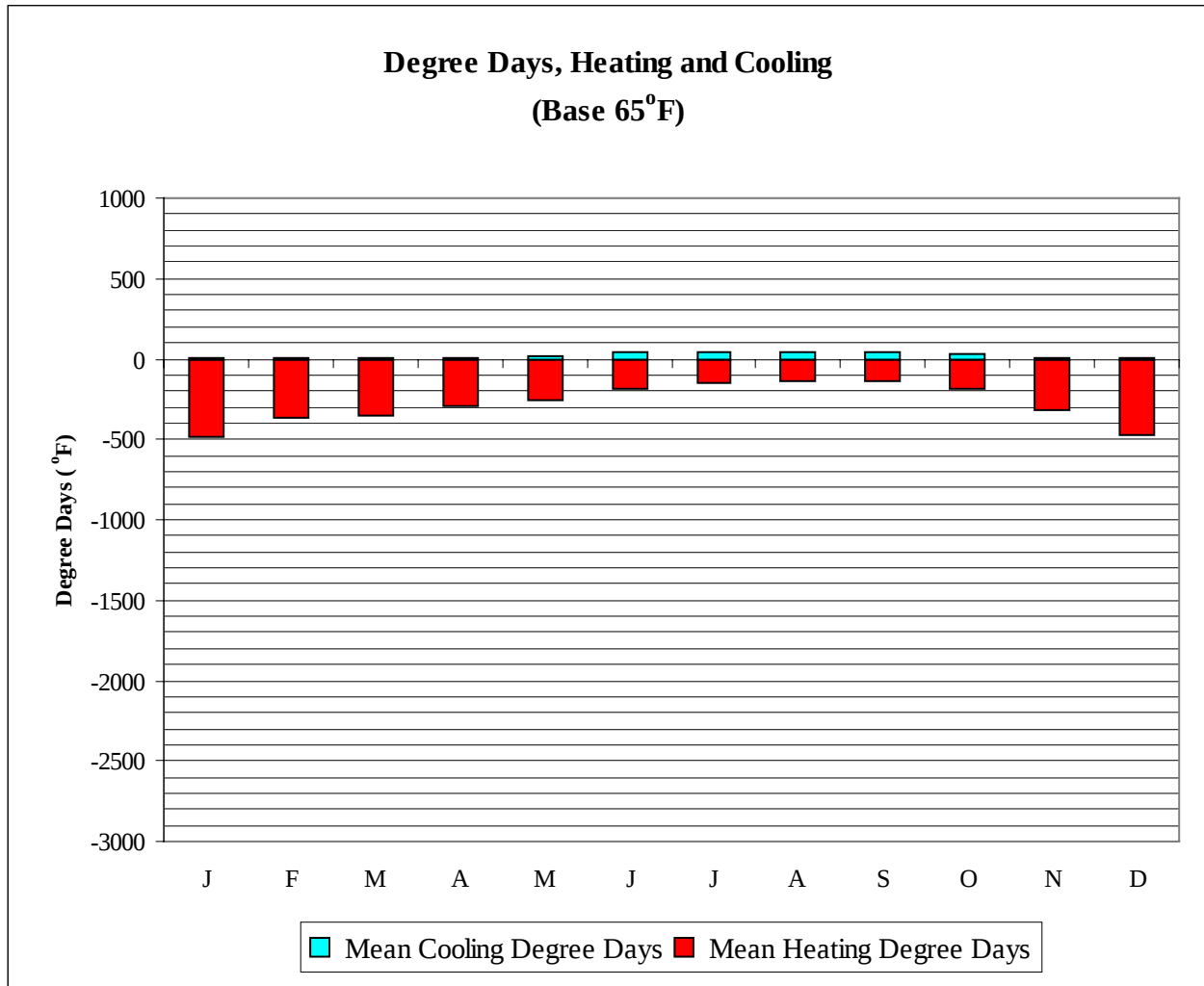
WMO No. 724940

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	60.0	53.6	53.5	42.6	36.0	63.7	57.7	45.7	33.8
14-Jan	62.0	57.5	55.2	44.0	37.0	69.3	60.4	48.8	36.9
21-Jan	64.0	51.1	56.3	44.2	38.0	67.2	58.5	48.0	34.9
28-Jan	64.0	52.6	56.5	43.6	37.0	61.6	55.7	46.4	33.5
4-Feb	64.0	51.9	57.2	44.0	37.0	66.5	58.2	47.7	34.3
11-Feb	64.0	55.7	57.8	45.8	37.0	65.8	58.9	50.8	37.9
18-Feb	66.0	54.9	59.2	46.8	40.0	71.4	61.4	53.2	38.5
25-Feb	68.0	55.4	60.1	46.4	40.0	66.5	60.4	50.9	36.3
4-Mar	68.0	57.4	59.8	47.6	40.0	69.3	63.5	53.2	39.5
11-Mar	66.0	55.0	60.4	47.9	41.0	69.3	61.0	53.8	39.8
18-Mar	70.0	58.6	60.4	47.3	42.0	66.5	62.2	51.7	37.4
25-Mar	67.0	56.0	60.3	47.3	42.0	65.1	59.5	51.5	36.7
1-Apr	72.0	57.4	61.9	47.8	43.0	66.5	61.4	51.7	36.2
8-Apr	77.0	62.0	62.9	48.2	42.0	66.5	65.2	52.0	38.7
15-Apr	77.0	62.7	64.2	48.5	43.0	67.2	66.6	52.8	38.0
22-Apr	74.0	57.3	63.0	49.1	44.0	66.5	63.5	52.1	38.7
29-Apr	76.0	57.9	64.6	49.5	45.0	69.3	62.0	53.0	39.7
6-May	77.0	61.1	64.7	50.2	46.0	69.3	65.9	53.8	41.5
13-May	80.0	61.8	66.6	50.3	47.0	67.2	69.2	54.5	41.6
20-May	79.0	60.1	66.0	51.0	47.0	71.4	66.9	54.7	43.4
27-May	78.0	59.9	66.8	51.7	48.0	69.3	64.9	56.6	44.8
3-Jun	84.0	61.5	68.3	52.2	49.0	69.3	65.8	57.5	45.5
10-Jun	84.0	61.3	69.4	52.9	50.0	71.4	67.4	59.1	47.5
17-Jun	82.0	62.3	68.3	52.9	51.0	69.3	65.7	57.6	47.2
24-Jun	89.0	63.3	70.4	53.4	50.0	70.0	69.0	59.4	48.7
1-Jul	87.0	61.4	71.4	54.4	51.0	74.9	67.4	62.0	50.1
8-Jul	79.0	62.5	70.3	54.2	52.0	71.4	67.6	61.9	51.3
15-Jul	82.0	61.6	71.8	54.4	51.0	74.9	69.1	63.0	52.8
22-Jul	79.0	62.9	70.4	55.2	51.0	72.1	67.1	63.9	54.5
29-Jul	79.0	64.5	71.1	55.1	52.0	74.2	70.6	64.6	55.5
5-Aug	84.0	64.7	71.8	55.4	52.0	74.2	71.1	65.4	55.6
12-Aug	80.0	63.5	71.7	55.3	52.0	77.0	67.8	65.8	55.2
19-Aug	80.0	62.9	70.8	55.6	52.0	77.0	69.1	65.6	55.1
26-Aug	79.0	64.3	71.4	55.6	53.0	74.2	69.3	65.8	54.6
2-Sep	81.0	64.0	72.1	55.9	52.0	77.7	67.2	67.6	55.1
9-Sep	84.0	64.6	72.9	55.7	52.0	77.7	67.9	67.7	54.4
16-Sep	85.0	63.7	71.1	55.5	53.0	74.9	70.7	65.1	52.6
23-Sep	83.0	63.1	71.7	55.0	52.0	79.8	68.5	66.6	52.8
30-Sep	84.0	62.0	72.3	55.3	51.0	77.7	67.5	67.4	52.5
7-Oct	87.0	63.2	72.6	54.7	50.0	77.7	68.6	65.5	49.2
14-Oct	83.0	62.8	71.1	53.7	49.0	74.9	67.6	64.5	47.0
21-Oct	80.0	60.5	68.8	52.4	48.0	77.0	65.7	62.0	46.0
28-Oct	77.0	56.8	67.7	52.5	48.0	77.7	64.2	62.5	45.0
4-Nov	75.0	58.1	66.3	50.6	46.0	75.6	64.1	57.3	40.3
11-Nov	73.0	57.0	64.6	49.9	44.0	71.4	62.6	57.8	40.6
18-Nov	68.0	56.7	61.6	48.8	41.0	74.9	61.9	55.7	39.7
25-Nov	65.0	54.2	59.4	46.7	40.0	71.4	60.1	53.0	37.0
2-Dec	63.0	53.0	59.1	45.6	41.0	69.3	60.3	50.0	35.2
9-Dec	63.0	54.2	58.6	46.1	40.0	70.7	60.1	52.1	37.4
16-Dec	62.0	54.7	56.5	44.1	38.0	70.7	59.7	47.4	33.8
23-Dec	60.0	53.3	54.5	42.8	34.0	62.3	57.7	45.5	33.3
31-Dec	61.0	57.1	53.9	43.2	35.0	70.0	60.9	46.1	34.0

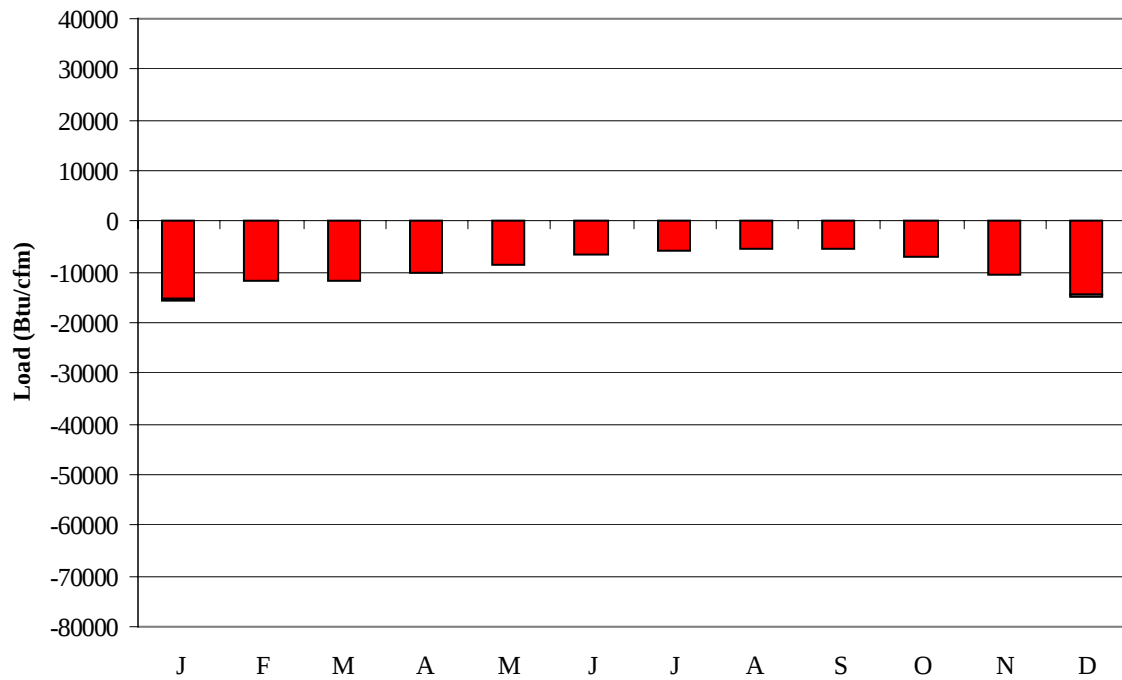
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	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	491
FEB	1	364
MAR	3	359
APR	11	298
MAY	21	252
JUN	37	180
JUL	42	151
AUG	41	137
SEP	46	134
OCT	33	188
NOV	5	317
DEC	0	470
ANN	241	3341

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

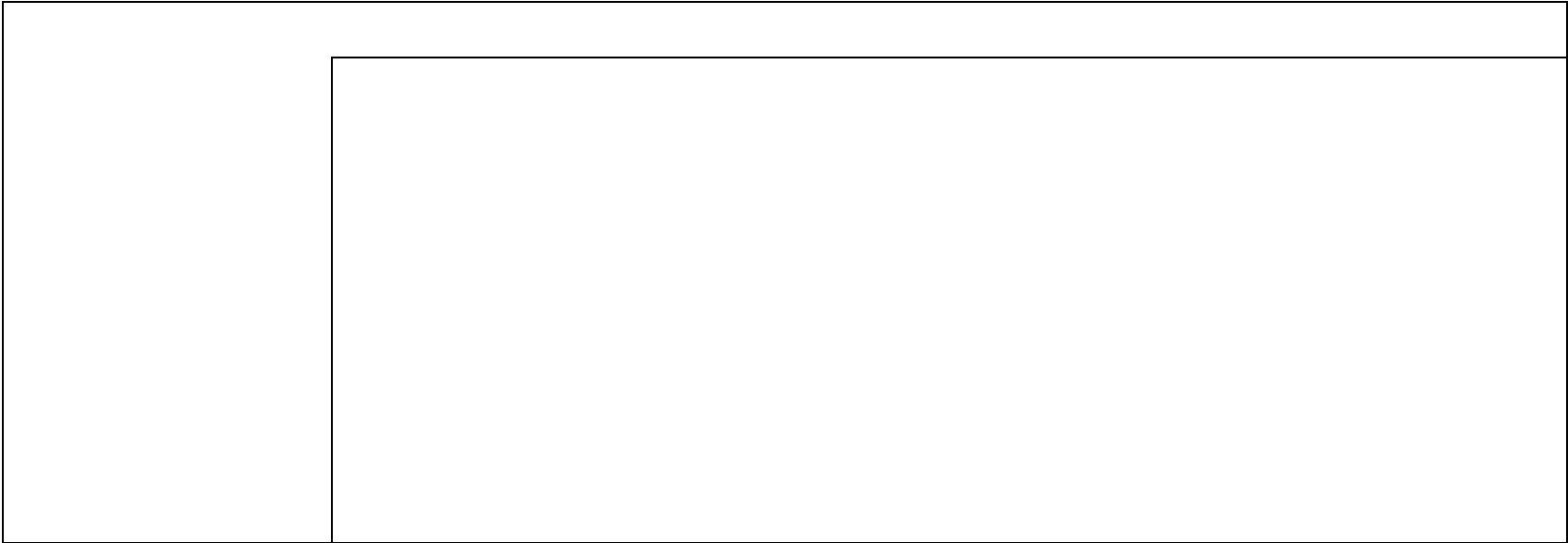


■ Average Sensible Cooling Load ■ Average Sensible Heating Load
■ Average Latent Cooling (Drying) Load ■ Average Latent Heating (Humidifying) Load

	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	-15139	0	-331
FEB	0	-11619	1	-209
MAR	0	-11683	0	-131
APR	40	-9939	0	-74
MAY	88	-8718	0	-8
JUN	197	-6602	1	-4
JUL	133	-5803	2	-1
AUG	100	-5427	10	0
SEP	184	-5296	10	-7
OCT	138	-6928	7	-53
NOV	2	-10479	2	-226
DEC	0	-14586	0	-458
ANN	882	-112219	33	-1502

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

No Solar Radiation
Data Available

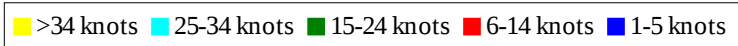
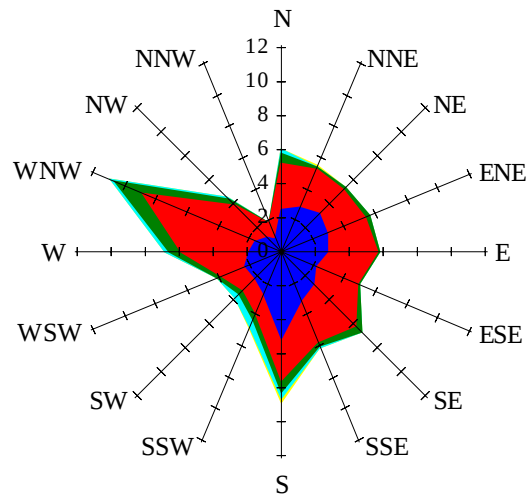


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

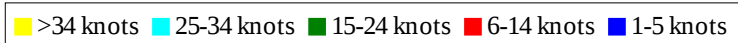
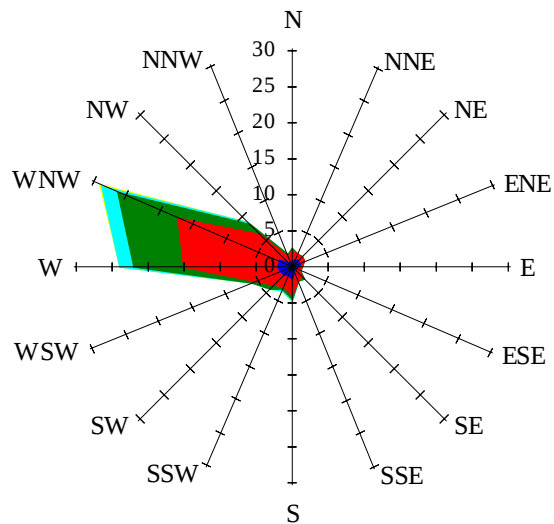
Labels of Percent Frequency on North Axis



Percent Calm = 9.53

Wind Summary - March, April, and May

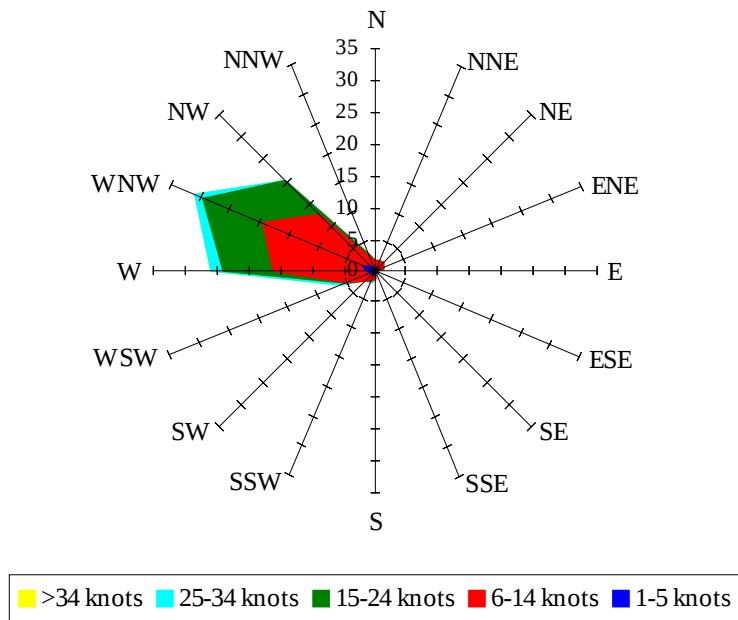
Labels of Percent Frequency on North Axis



Percent Calm = 2.95

Wind Summary - June, July, and August

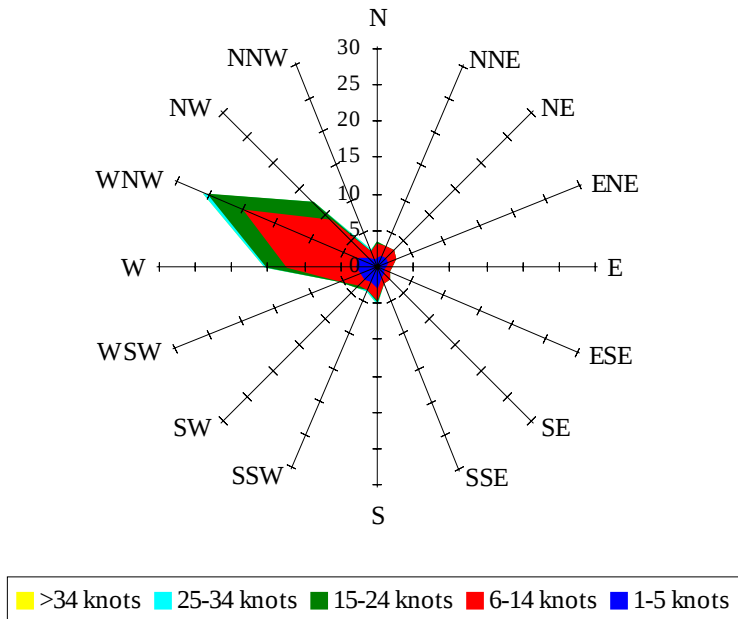
Labels of Percent Frequency on North Axis



Percent Calm = 1.53

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 6.40