

ROTA NAVAL STATION SP

Latitude = 36.65 N

WMO No. 084490

Longitude = 6.35 W

Elevation = 85 feet

Period of Record = 1973 to 1996

Average Pressure = 29.92 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	100	71	68	11.3	SE
0.4% Occurrence	93	70	74	11.1	ESE
1.0% Occurrence	91	70	77	10.6	SSE
2.0% Occurrence	88	69	78	10.6	W
Mean Daily Range	16	-	-	-	-
97.5% Occurrence	44	41	34	5.6	NNE
99.0% Occurrence	41	38	30	6.1	NNE
99.6% Occurrence	37	35	25	6.8	NNE
Median of Extreme Lows	34	31	21	7.6	NNE
	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	79	88	131	8.5	W
0.4% Occurrence	75	86	114	8.8	S
1.0% Occurrence	73	84	104	8.8	W
2.0% Occurrence	72	83	100	8.6	W
	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	134	86	0.89	6.5	S
0.4% Occurrence	117	79	0.78	7.5	S
1.0% Occurrence	110	77	0.74	6.8	W
2.0% Occurrence	104	77	0.69	7.7	S
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		57	695	130	1257

Other Site Data

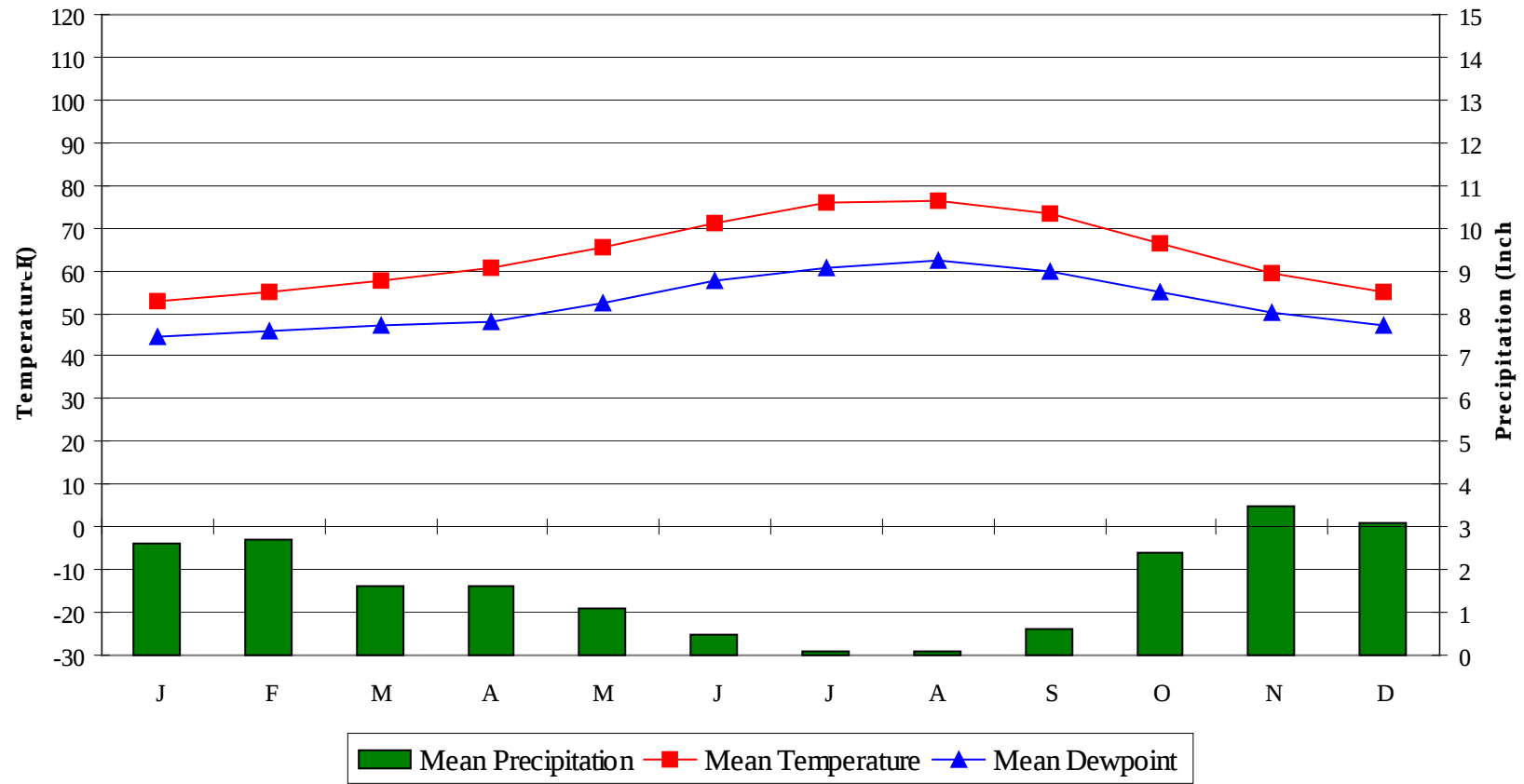
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
9	N/A	N/A	1.1 + 0.7
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
66.6	N/A	N/A	0

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

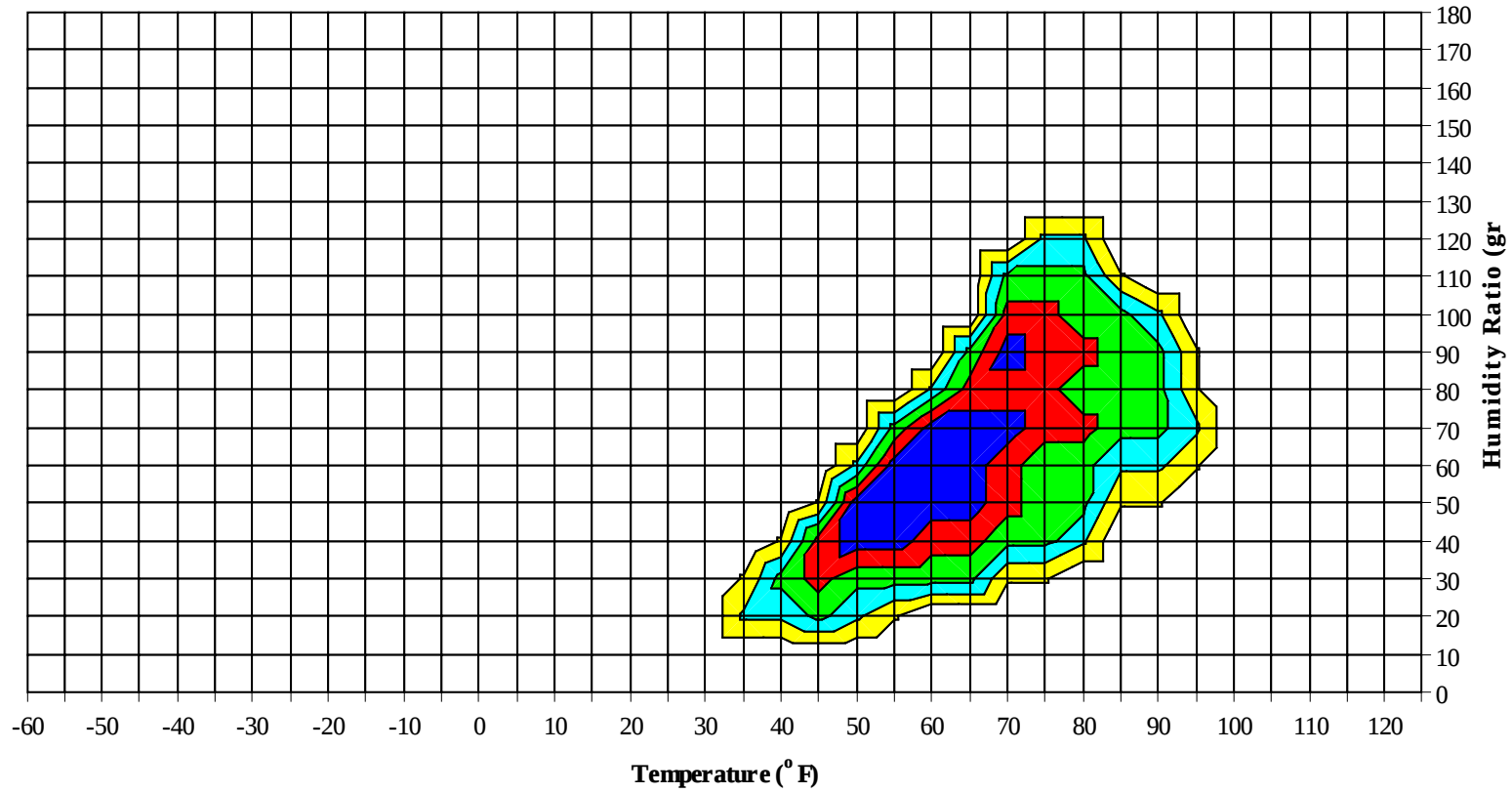
ROTA NAVAL STATION SP

WMO No. 84490

Average Annual Climate



Long Term Psychrometric Summary

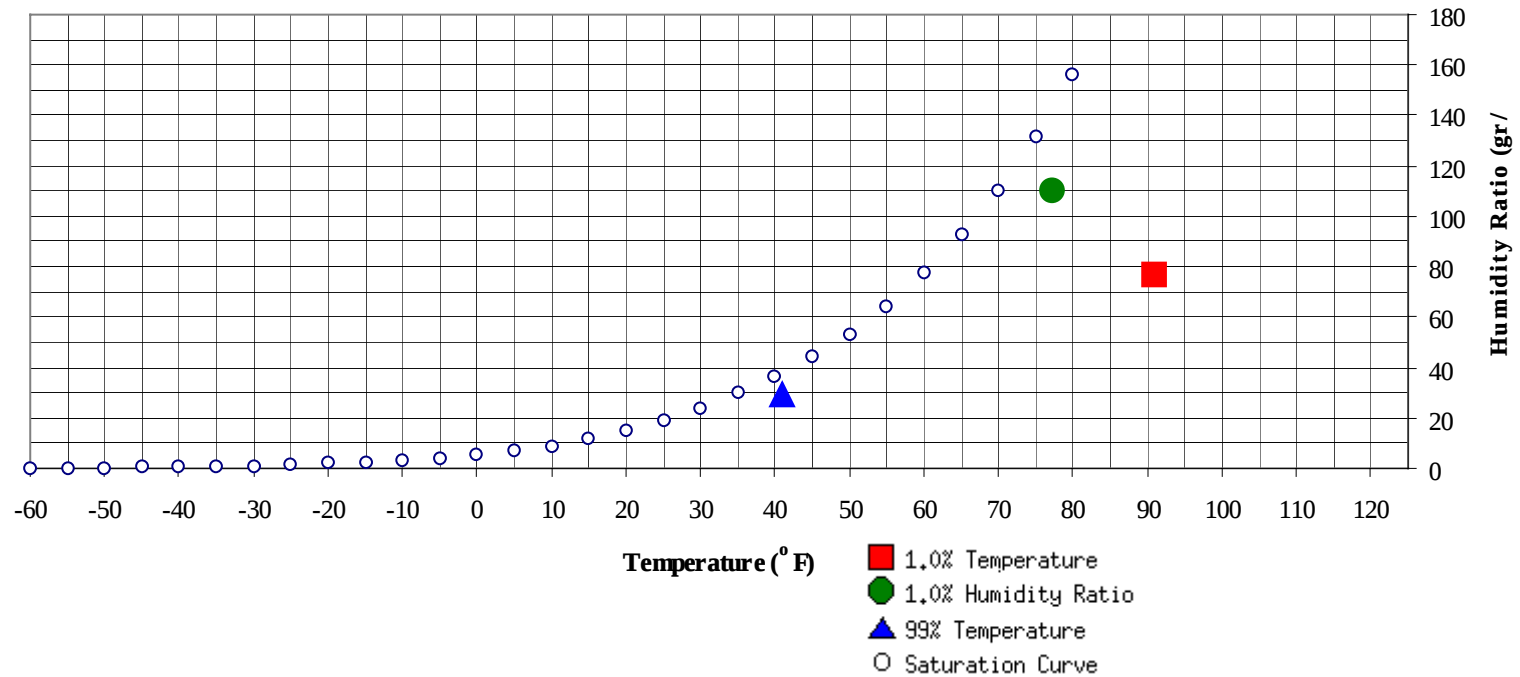


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

ROTA NAVAL STATION SP

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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	41	29.7	14.4		109.9	77.2	72	69.8	35.7

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	91	76.8	70.2	33.9

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		
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99															
90 / 94															
85 / 89															
80 / 84												1	0	1	63.1
75 / 79							0	0	1	61.5		7	2	9	61.2
70 / 74		1	0	2	58.0		7	2	9	59.1		26	10	36	59.5
65 / 69	0	8	2	11	57.2	0	18	7	26	56.9	0	34	17	52	57.6
60 / 64	12	72	39	124	55.7	14	69	52	135	55.9	16	86	82	184	55.2
55 / 59	45	67	89	201	52.3	53	66	88	206	52.2	77	59	98	233	52.1
50 / 54	53	42	72	168	48.3	64	35	56	154	48.5	87	25	31	144	48.5
45 / 49	74	30	39	143	43.9	64	20	17	101	43.7	59	7	6	72	44.3
40 / 44	40	13	5	58	39.7	19	5	2	26	39.3	10	1	0	11	39.7
35 / 39	24	8	2	34	35.5	11	2	0	14	35.5	2	0		2	35.8
30 / 34	3	1	0	4	30.2	0	0		1	31.0					
25 / 29															
20 / 24															

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. 84490

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		
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99							0		0	64.0		0		0	71.0
90 / 94		0		0	67.0		1	0	2	64.7		1	0	2	68.5
85 / 89		0	0	0	64.5		6	1	7	64.0	0	8	2	10	68.2
80 / 84		5	1	6	61.8	0	17	6	22	63.5	1	12	5	17	67.5
75 / 79		15	5	20	60.4	1	35	16	53	62.6	6	36	20	57	66.8
70 / 74	0	36	18	55	59.0	9	76	48	133	61.3	6	62	40	108	65.7
65 / 69	3	45	30	78	57.4	26	51	59	136	59.4	50	86	91	226	63.5
60 / 64	39	86	98	223	55.4	99	51	93	243	57.1	74	22	57	153	61.8
55 / 59	91	38	71	201	52.2	82	8	23	113	53.2	92	8	25	125	58.8
50 / 54	80	9	14	102	48.5	31	1	1	33	49.5	18	0	1	19	54.3
45 / 49	29	1	1	31	44.1	3			3	44.5	2			2	50.5
40 / 44	2	0		2	39.4						0			0	47.0
35 / 39	0			0	34.5										
30 / 34															
25 / 29															
20 / 24															

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 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		
115 / 119							0		0	72.0					
110 / 114							0		0	72.0					
105 / 109		0	0	0	73.2		0	0	0	71.6					
100 / 104		1	0	2	72.0		1	0	2	71.6		0		0	71.3
95 / 99		9	3	13	70.9		8	2	10	71.7		3	1	4	70.7
90 / 94		33	13	46	69.9	0	27	10	37	70.6		16	4	20	70.0
85 / 89	0	27	14	42	69.3	0	26	12	38	70.6		21	7	28	69.5
80 / 84	6	59	45	111	68.5	4	73	45	122	69.5	2	54	28	85	68.3
75 / 79	35	71	77	183	67.1	34	75	86	196	68.0	20	73	65	157	66.9
70 / 74	112	38	81	231	65.2	133	30	85	248	66.2	86	50	98	234	65.1
65 / 69	64	4	14	82	62.8	56	2	8	66	62.8	61	11	26	99	62.2
60 / 64	33	0	1	34	59.5	24	0	0	24	58.5	55	6	11	72	57.9
55 / 59	1			1	56.0	1			1	52.9	17	1	1	18	53.2
50 / 54											2	0	0	2	49.2
45 / 49											0			0	45.0
40 / 44															
35 / 39															
30 / 34															
25 / 29															
20 / 24															

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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		
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99															
90 / 94		0	0	0	68.4										
85 / 89		3	0	3	67.2										
80 / 84		20	4	24	66.0		0	0	1	61.1					
75 / 79	1	47	17	66	64.6		8	2	10	62.0					
70 / 74	16	75	64	155	63.0	1	45	13	59	61.3	0	7	1	9	61.1
65 / 69	47	46	73	166	61.2	11	42	30	83	60.1	4	24	8	36	60.2
60 / 64	96	38	71	206	58.2	55	75	95	225	57.5	36	85	69	190	57.2
55 / 59	63	11	15	88	53.3	65	37	67	169	52.9	50	58	80	188	52.7
50 / 54	25	3	3	30	49.0	64	20	26	109	49.1	54	34	60	148	48.7
45 / 49	6	1	0	6	43.9	36	8	7	52	44.0	66	23	27	116	43.7
40 / 44	0	0		0	36.4	8	1	0	10	39.2	25	9	3	37	39.6
35 / 39	0			0	34.0	3	1		4	35.7	13	4	1	18	35.1
30 / 34											2	0		2	29.7
25 / 29											0			0	24.0
20 / 24											0			0	23.0

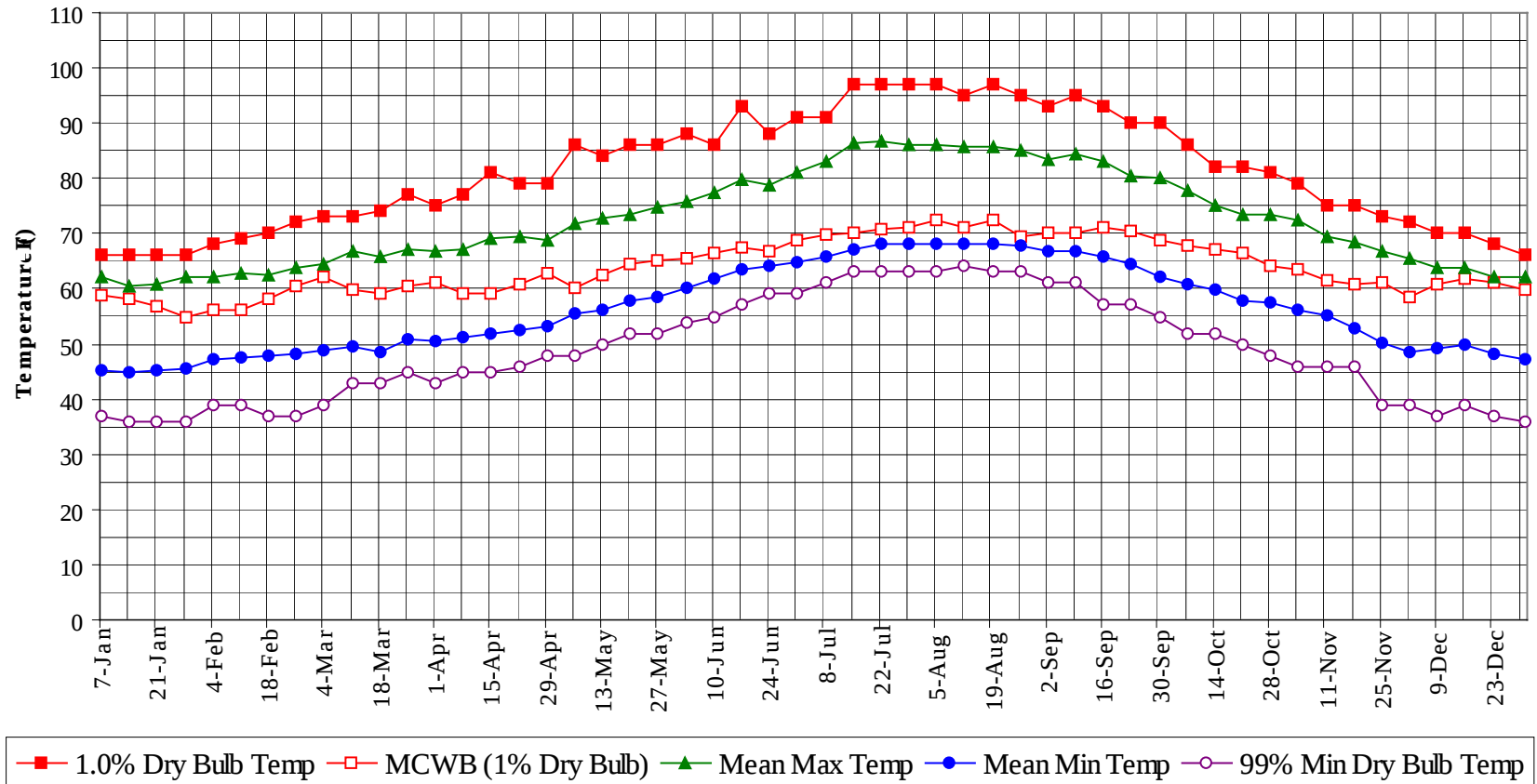
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

ROTA NAVAL STATION SP WMO No. 84490
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)
Period of Record = 1973 to 1996

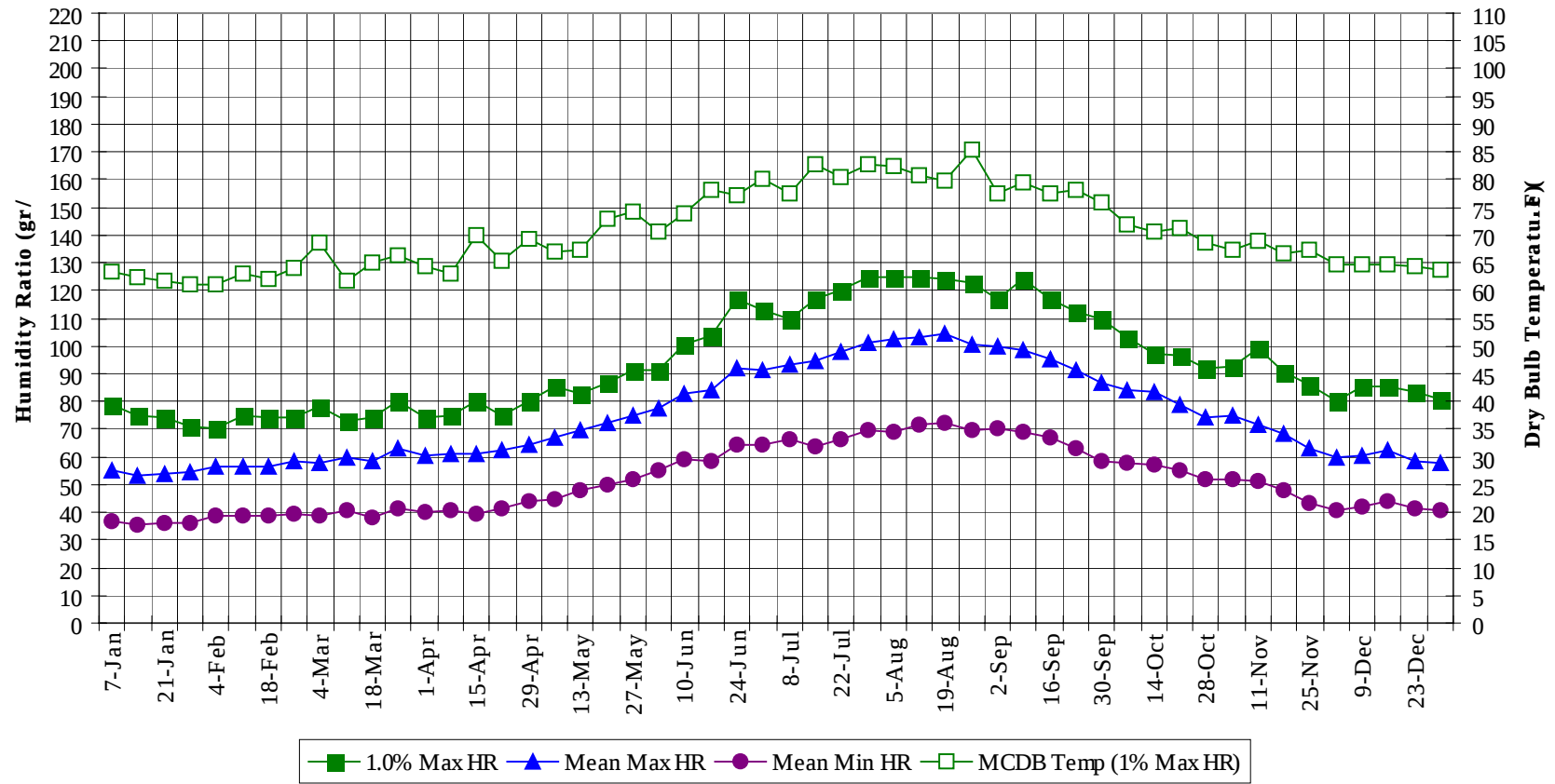
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
115 / 119	0			0	72.0
110 / 114	0			0	72.0
105 / 109	0			0	72.4
100 / 104	3			0	71.7
95 / 99	22			6	71.0
90 / 94	0	85	30	115	69.9
85 / 89	0	95	39	135	69.1
80 / 84	14	265	151	429	68.0
75 / 79	98	393	311	801	66.3
70 / 74	407	474	512	1392	63.8
65 / 69	344	308	331	982	60.6
60 / 64	569	577	636	1783	56.9
55 / 59	562	345	534	1441	52.5
50 / 54	463	169	264	896	48.6
45 / 49	338	90	98	526	43.9
40 / 44	105	29	11	146	39.6
35 / 39	55	15	3	74	35.4
30 / 34	5	1	0	6	30.1
25 / 29	0			0	24.0
20 / 24	0			0	23.0

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.

Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



ROTA NAVAL STATION SP

WMO No. 84490

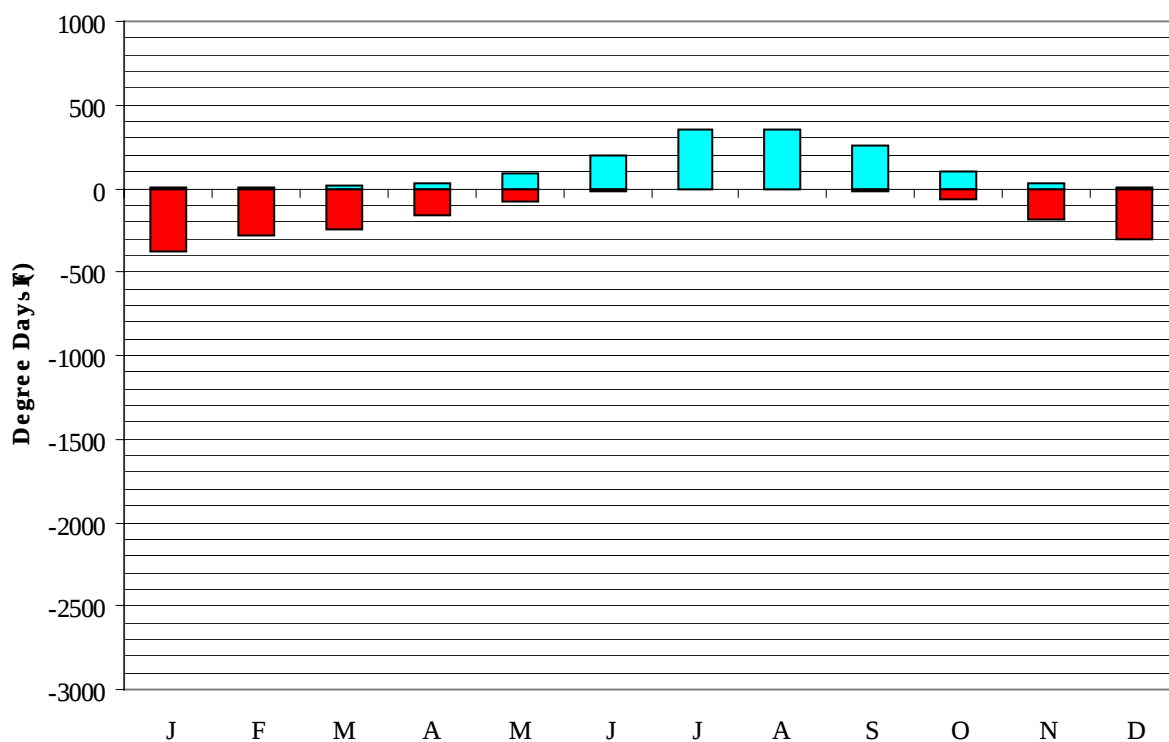
Long Term Dry Bulb Temperature and Humidity Summary

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	66.0	58.7	62.0	45.2	37.0	79.1	63.5	55.3	36.8
14-Jan	66.0	58.0	60.6	44.7	36.0	74.9	62.4	53.0	35.3
21-Jan	66.0	56.9	60.9	45.3	36.0	74.2	61.7	53.8	36.4
28-Jan	66.0	54.7	62.0	45.6	36.0	70.7	61.2	54.5	36.3
4-Feb	68.0	56.1	62.1	47.0	39.0	70.0	60.9	56.3	38.6
11-Feb	69.0	56.0	62.7	47.5	39.0	74.9	63.2	56.8	38.9
18-Feb	70.0	58.0	62.4	47.7	37.0	74.2	62.1	56.2	38.5
25-Feb	72.0	60.6	63.7	48.2	37.0	74.2	63.9	58.5	39.5
4-Mar	73.0	62.2	64.5	48.9	39.0	78.4	68.5	57.8	39.0
11-Mar	73.0	59.7	66.7	49.5	43.0	72.8	61.6	60.0	40.4
18-Mar	74.0	59.0	65.9	48.6	43.0	74.2	65.1	58.2	38.1
25-Mar	77.0	60.5	67.1	50.8	45.0	79.8	66.4	62.9	41.3
1-Apr	75.0	61.0	66.9	50.4	43.0	74.2	64.4	60.7	39.8
8-Apr	77.0	59.2	67.2	51.3	45.0	74.9	63.0	60.8	40.9
15-Apr	81.0	59.2	69.1	52.0	45.0	79.8	70.1	61.3	39.4
22-Apr	79.0	61.0	69.5	52.6	46.0	74.9	65.3	62.5	41.3
29-Apr	79.0	62.7	68.9	53.3	48.0	79.8	69.1	64.5	44.0
6-May	86.0	60.0	71.7	55.4	48.0	85.4	66.9	66.8	44.5
13-May	84.0	62.3	72.9	56.1	50.0	82.6	67.2	69.9	48.1
20-May	86.0	64.3	73.6	58.0	52.0	86.8	72.8	72.2	50.0
27-May	86.0	65.2	74.8	58.6	52.0	91.0	74.1	74.7	51.8
3-Jun	88.0	65.5	75.9	60.2	54.0	91.0	70.7	77.3	55.3
10-Jun	86.0	66.4	77.3	61.8	55.0	100.8	74.0	82.7	58.8
17-Jun	93.0	67.6	79.8	63.4	57.0	103.6	78.1	84.1	58.5
24-Jun	88.0	66.8	78.9	64.1	59.0	116.9	77.2	91.6	64.5
1-Jul	91.0	68.8	81.1	64.9	59.0	112.7	80.0	91.4	64.6
8-Jul	91.0	69.9	83.1	65.9	61.0	109.9	77.6	93.1	66.1
15-Jul	97.0	70.1	86.4	67.3	63.0	116.9	82.9	94.8	64.0
22-Jul	97.0	70.7	86.8	68.2	63.0	120.4	80.3	97.8	66.2
29-Jul	97.0	71.1	86.2	68.1	63.0	124.6	82.9	101.1	69.5
5-Aug	97.0	72.6	86.1	68.0	63.0	124.6	82.3	102.3	68.8
12-Aug	95.0	71.0	85.8	68.2	64.0	124.6	80.9	103.3	71.3
19-Aug	97.0	72.5	85.7	68.1	63.0	123.9	79.8	104.7	72.2
26-Aug	95.0	69.4	85.2	67.9	63.0	122.5	85.5	100.7	69.4
2-Sep	93.0	70.1	83.5	67.0	61.0	116.9	77.5	99.7	70.0
9-Sep	95.0	70.1	84.3	66.9	61.0	123.9	79.4	98.6	69.0
16-Sep	93.0	71.0	83.2	65.8	57.0	116.9	77.4	95.4	67.0
23-Sep	90.0	70.3	80.6	64.4	57.0	112.0	78.2	91.2	63.3
30-Sep	90.0	68.8	80.2	62.3	55.0	109.9	75.8	86.4	58.7
7-Oct	86.0	67.8	77.9	60.8	52.0	102.9	72.0	84.1	57.8
14-Oct	82.0	67.3	75.1	59.8	52.0	97.3	70.6	83.3	57.0
21-Oct	82.0	66.6	73.4	57.7	50.0	96.6	71.2	78.9	55.0
28-Oct	81.0	64.0	73.5	57.4	48.0	91.7	68.7	74.2	51.9
4-Nov	79.0	63.5	72.3	56.0	46.0	92.4	67.3	74.9	52.1
11-Nov	75.0	61.5	69.6	55.2	46.0	99.4	69.0	71.3	51.2
18-Nov	75.0	60.7	68.4	52.9	46.0	90.3	66.5	68.5	48.0
25-Nov	73.0	61.2	66.8	50.2	39.0	86.1	67.2	62.8	43.4
2-Dec	72.0	58.5	65.4	48.6	39.0	79.8	64.6	59.5	40.6
9-Dec	70.0	60.9	63.7	49.2	37.0	85.4	64.7	60.1	42.2
16-Dec	70.0	61.9	63.8	49.8	39.0	85.4	64.8	62.1	44.2
23-Dec	68.0	61.3	62.1	48.1	37.0	83.3	64.3	58.6	41.4
31-Dec	66.0	59.7	62.0	47.3	36.0	80.5	63.6	58.0	40.6

ROTA NAVAL STATION SP

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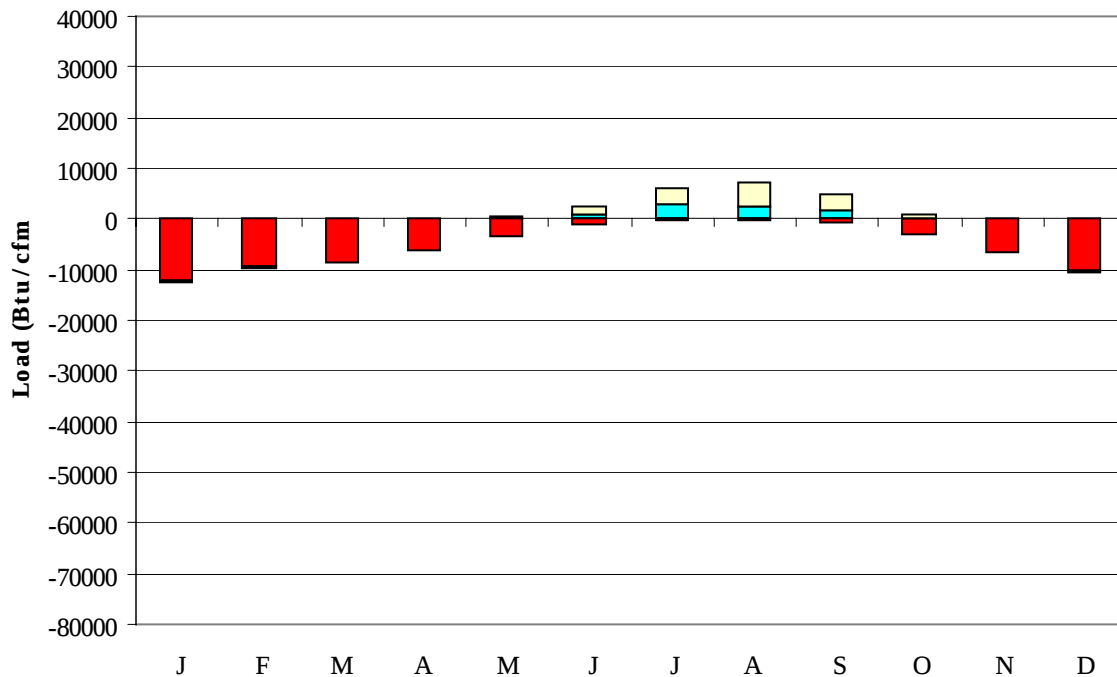
Degree Days, Heating and Cooling **(Base 65°F)**



■ Mean Cooling Degree Days ■ Mean Heating Degree Days

	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	1	377
FEB	4	286
MAR	16	240
APR	32	166
MAY	92	76
JUN	197	16
JUL	348	3
AUG	350	2
SEP	260	12
OCT	102	65
NOV	25	181
DEC	4	307
ANN	1430	1731

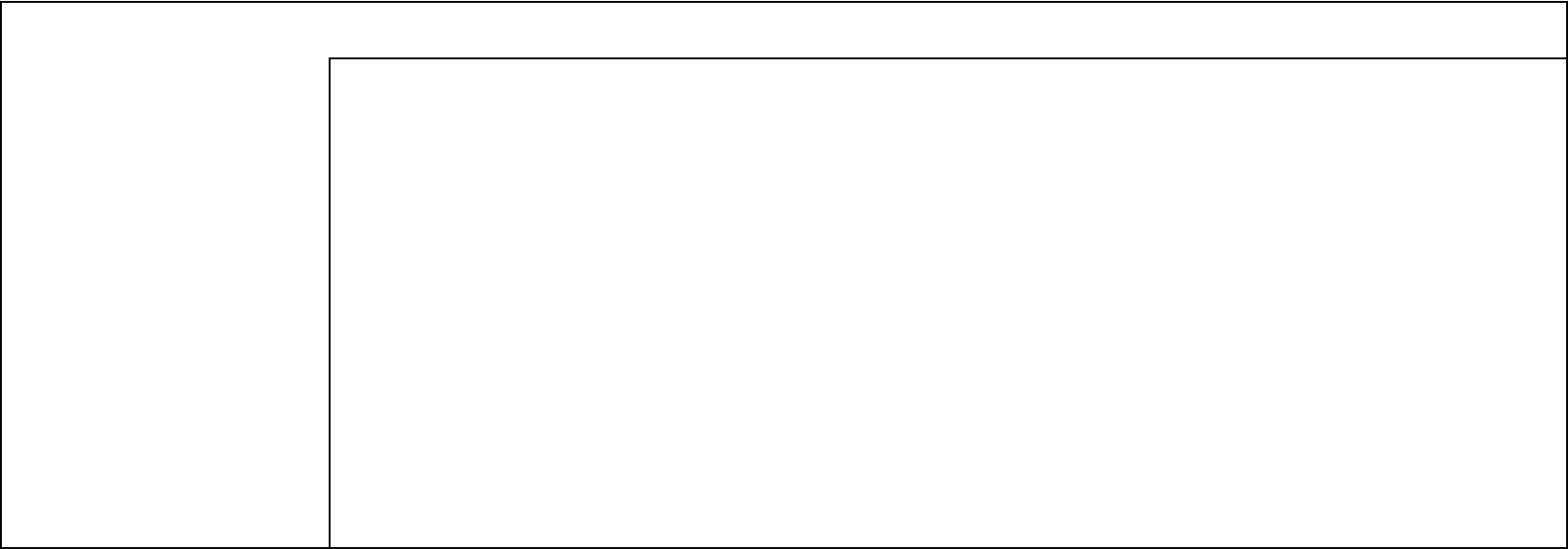
Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	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	0	-12174	6	-260
FEB	0	-9535	5	-166
MAR	16	-8407	22	-73
APR	73	-6225	12	-67
MAY	354	-3422	144	-15
JUN	998	-1013	1323	-1
JUL	2811	-240	3225	0
AUG	2644	-177	4720	0
SEP	1658	-715	3056	-10
OCT	296	-2951	762	-24
NOV	14	-6611	187	-70
DEC	0	-10277	61	-192
ANN	8864	-61747	13523	-878

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

No Solar Radiation
Data Available

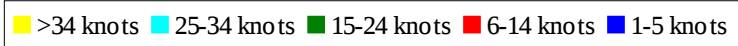
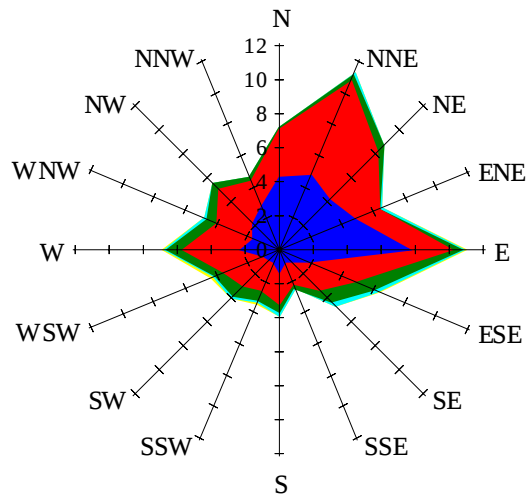


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

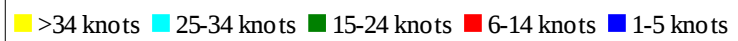
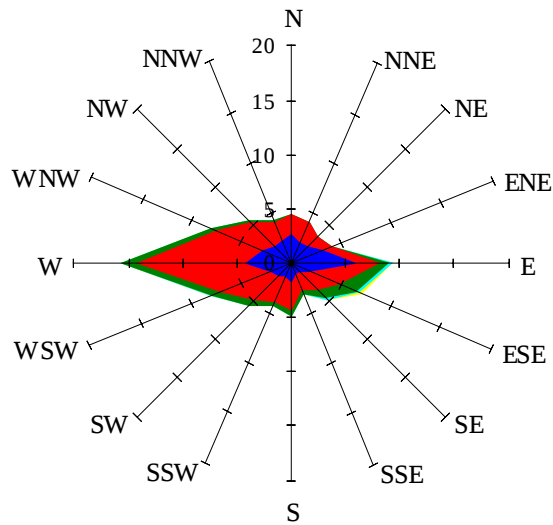
Labels of Percent Frequency on North Axis



Percent Calm = 5.77

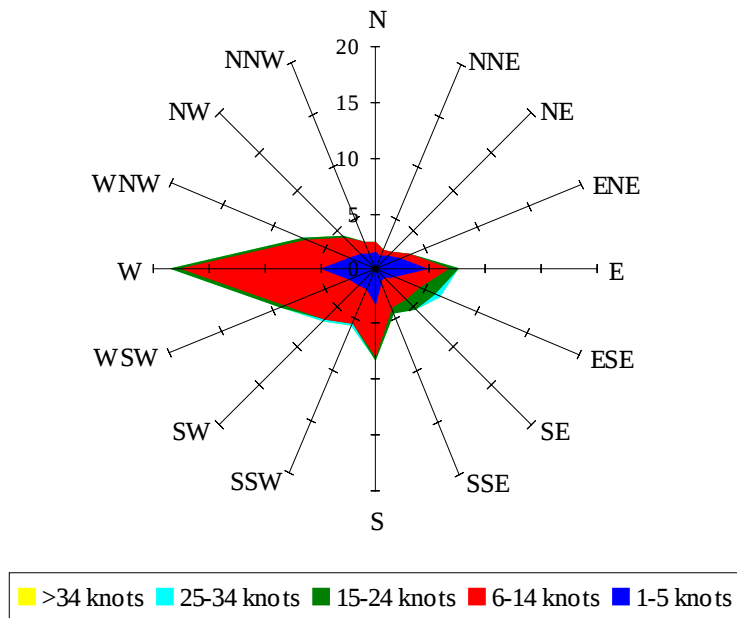
Wind Summary - March, April, and May

Labels of Percent Frequency on North Axis



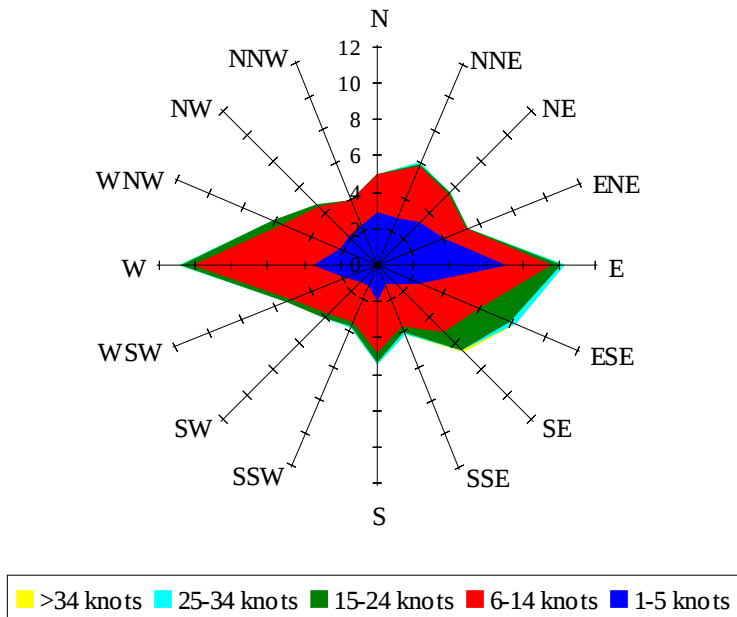
Percent Calm = 5.00

Wind Summary - June, July, and August **Labels of Percent Frequency on North Axis**



Percent Calm = 6.37

Wind Summary - September, October, and November **Labels of Percent Frequency on North Axis**



Percent Calm = 5.77