

NORFOLK NAS/CHAMBER VA

Latitude = 36.93 N

WMO No. 723085

Longitude = 76.28 W

Elevation = 16 feet

Period of Record = 1973 to 1996

Average Pressure = 30.01 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	98	78	116	10.5	W
0.4% Occurrence	94	78	118	9.8	W
1.0% Occurrence	91	77	116	9.7	SSW
2.0% Occurrence	89	76	114	9.4	SSW
Mean Daily Range	15	-	-	-	-
97.5% Occurrence	29	25	12	10.3	N
99.0% Occurrence	25	21	9	11.3	N
99.6% Occurrence	21	18	8	12.5	N
Median of Extreme Lows	16	13	5	12.9	W
	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	83	92	152	8.3	WSW
0.4% Occurrence	80	89	137	8.7	SSW
1.0% Occurrence	79	88	133	8.9	SSW
2.0% Occurrence	78	86	129	8.8	SSW
	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	156	87	1.04	7.1	WSW
0.4% Occurrence	145	85	0.97	7.6	SSW
1.0% Occurrence	136	83	0.90	8.0	SSW
2.0% Occurrence	132	82	0.88	8.3	SSW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		62	1087	1171	2405

Other Site Data

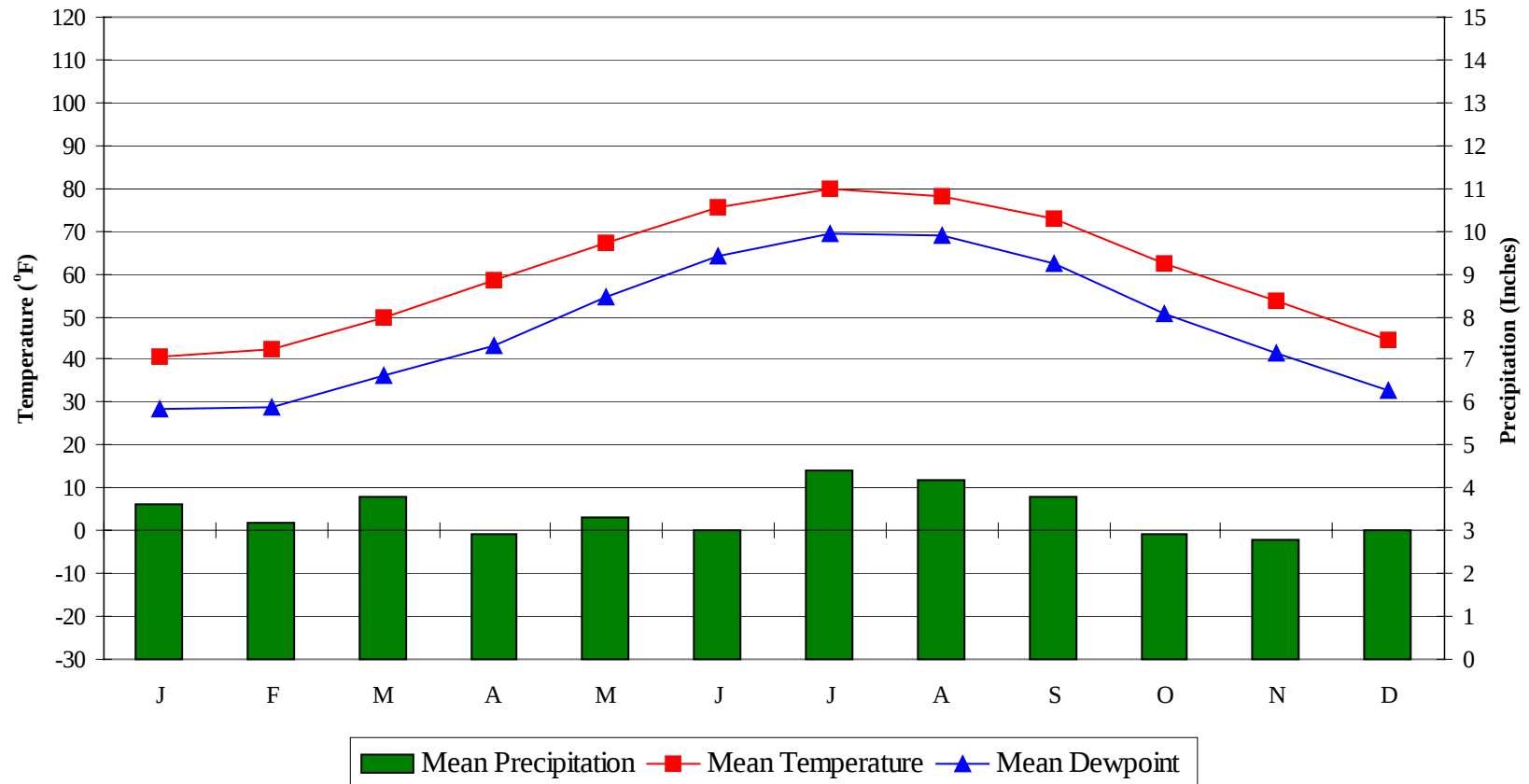
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
8	3.4	110	4.2 + 1.1
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
63.1	9	10	25

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

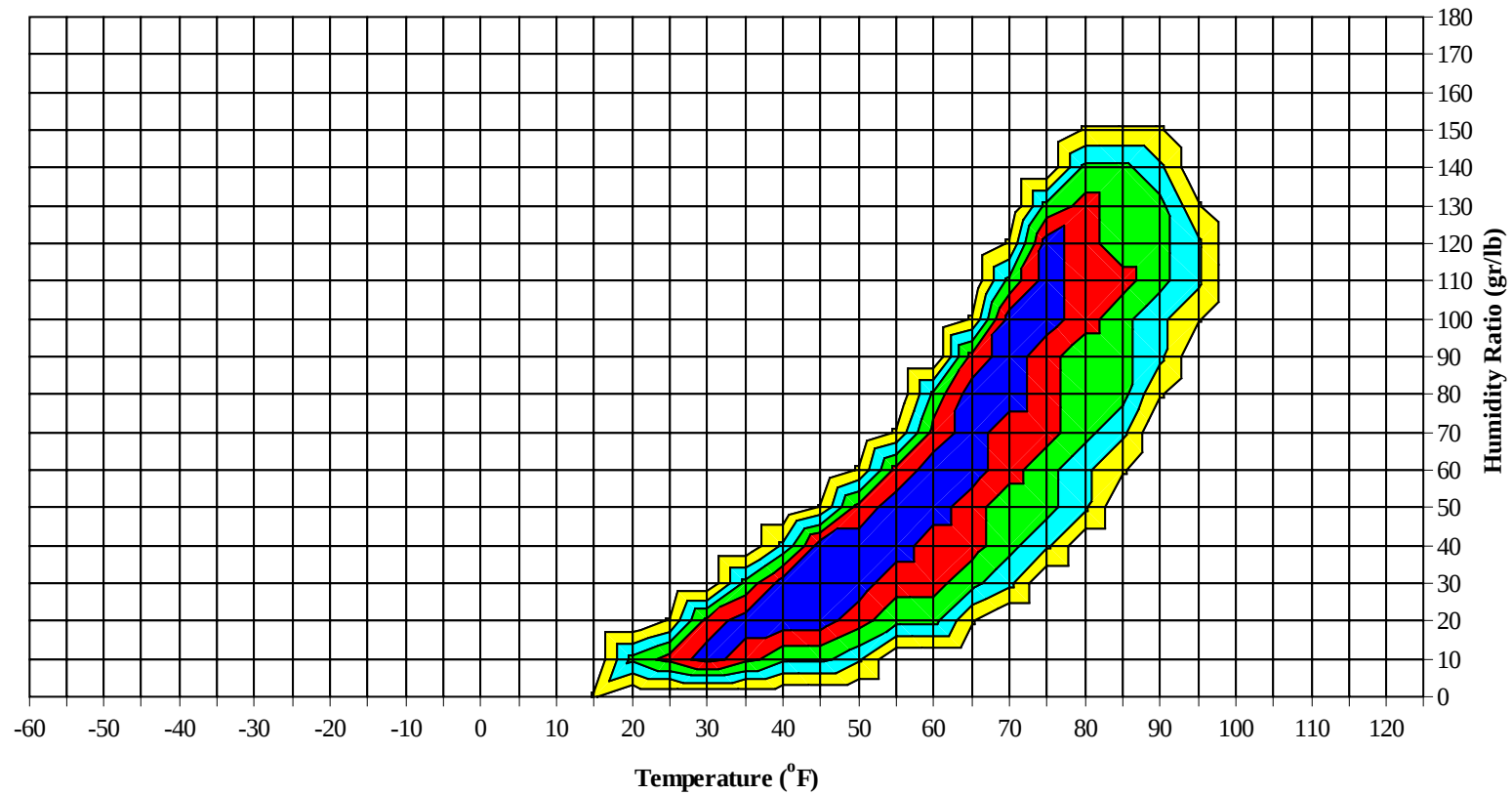
NORFOLK NAS/CHAMBER VA

WMO No. 723085

Average Annual Climate

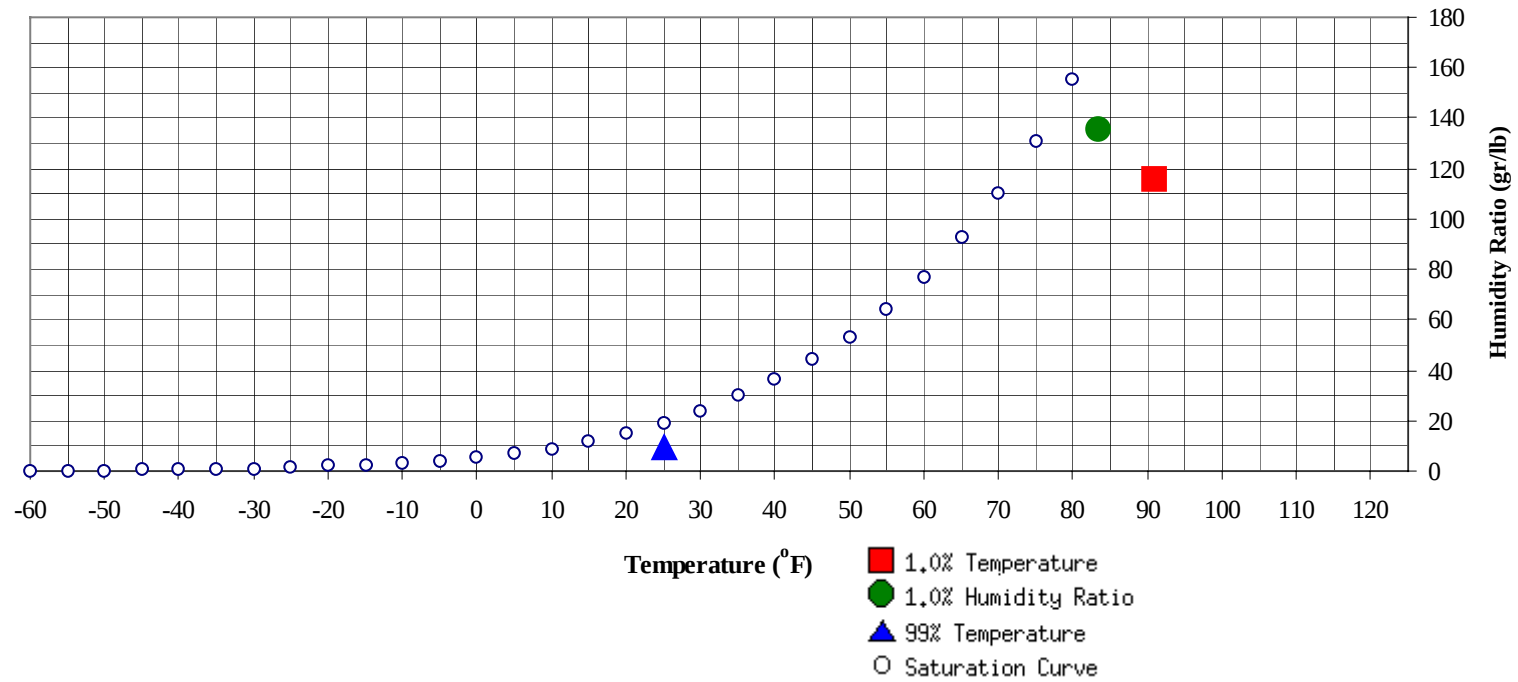


Long Term Psychrometric Summary



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

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)
	25	9.3	7.4		135.8	83.4	78	75.9	41.3

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	91	115.6	76.8	40.0

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	64.7		0		0	69.9			0	0	68.7
70 / 74	0	3	1	4	63.5	0	6	2	8	60.4	0	7	2	9	67.0
65 / 69	2	6	3	11	60.5	2	10	6	18	57.2	7	20	13	40	62.9
60 / 64	5	12	10	27	56.7	7	15	12	34	54.0	16	29	24	69	60.7
55 / 59	10	17	11	38	51.0	12	17	16	45	50.1	21	31	28	80	58.1
50 / 54	13	24	19	56	46.3	16	22	20	58	45.7	31	40	39	110	54.7
45 / 49	23	40	35	98	41.8	21	34	28	83	41.3	48	48	55	151	50.0
40 / 44	51	53	56	161	37.8	40	41	42	123	37.1	59	32	45	136	45.8
35 / 39	52	39	47	139	32.9	47	36	45	128	32.7	37	14	22	73	41.7
30 / 34	42	27	34	103	28.1	40	26	35	101	27.9	21	7	11	39	37.3
25 / 29	29	16	22	67	23.2	25	10	16	51	23.4	4	1	2	7	32.6
20 / 24	14	6	6	26	18.8	10	4	3	17	18.8	2	1	1	4	28.1
15 / 19	5	2	2	9	14.1	2	0	0	2	15.0					23.3
10 / 14	1	1	1	3	9.4	0		0	0	9.7					19.3
5 / 9	1	0	0	1	5.1	0		0	0						
0 / 4	0	0	0	0	-0.3										
-5 / -1	0			0	-3.0										

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.

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												0		0	77.5
95 / 99							1	0	1	77.0		3	1	4	77.6
90 / 94		1	0	1	67.3		3	1	4	73.3		18	5	23	76.3
85 / 89		6	1	7	66.8		17	6	23	71.1	1	44	17	62	74.1
80 / 84		13	5	18	65.0	1	29	15	45	68.9	11	65	39	115	72.0
75 / 79	0	20	10	30	62.9	8	44	28	80	66.6	56	59	63	178	69.7
70 / 74	6	29	21	56	60.9	35	50	43	128	64.2	89	35	64	188	66.7
65 / 69	23	36	28	87	57.9	58	48	53	159	60.5	54	13	37	104	62.1
60 / 64	38	43	39	120	53.9	68	35	51	154	56.5	23	3	11	37	57.0
55 / 59	46	41	46	133	50.0	45	16	34	95	52.1	6	1	2	9	53.8
50 / 54	52	29	45	126	45.8	27	5	14	46	47.7	0			0	50.4
45 / 49	44	17	30	91	41.4	5	0	2	7	43.3					
40 / 44	24	4	12	40	37.5	1		0	1	39.6					
35 / 39	7	1	2	10	32.5										
30 / 34	1	0	0	1	28.0										
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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NORFOLK NAS/CHAMBER VA

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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		1	0	1	79.0		0	0	0	78.1					
95 / 99		12	3	15	78.8		6	1	7	78.6		2	0	2	76.0
90 / 94	0	41	13	54	77.7		25	7	32	77.6		8	2	10	76.4
85 / 89	4	68	34	106	76.0	1	58	23	82	76.3		24	7	31	74.7
80 / 84	43	73	66	183	74.2	26	82	56	164	74.5	4	52	22	78	72.6
75 / 79	113	40	82	235	72.1	103	56	90	249	72.0	44	65	55	164	70.4
70 / 74	68	11	42	121	68.1	93	17	58	168	68.2	83	60	76	219	66.5
65 / 69	17	1	7	25	63.0	21	3	12	36	62.8	63	21	55	139	61.5
60 / 64	3	0	0	3	58.9	4	0	1	5	57.6	34	7	19	60	56.2
55 / 59	0			0	57.0	0	0	0	0	53.8	10	1	4	15	52.2
50 / 54						0			0	50.2	1		0	1	48.4
45 / 49															
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		
100 / 104															
95 / 99															
90 / 94		0		0	74.8										
85 / 89		4	0	4	72.5										
80 / 84	0	12	3	15	69.9			0	2	67.8					
75 / 79	3	27	11	41	67.7		12	1	13	65.8		1	0	1	67.8
70 / 74	16	46	29	91	64.7	3	20	10	33	64.0	1	5	2	8	64.0
65 / 69	41	56	46	143	60.7	14	29	24	67	60.9	5	11	9	25	60.8
60 / 64	58	57	65	180	55.8	29	34	31	94	56.4	9	18	13	40	56.5
55 / 59	59	29	52	140	50.8	34	37	37	108	51.3	14	22	15	51	51.7
50 / 54	42	11	28	81	46.6	42	46	47	135	46.1	22	42	33	96	46.5
45 / 49	21	4	10	35	42.3	48	35	43	126	41.4	44	52	50	146	42.0
40 / 44	7	1	3	11	37.2	37	17	28	82	36.8	50	45	52	147	37.4
35 / 39	1	0	0	1	32.9	25	5	14	44	32.8	45	25	36	106	32.5
30 / 34	0			0	28.7	8	1	4	13	28.6	31	18	25	74	27.9
25 / 29						1	0	1	2	22.8	19	6	10	35	23.3
20 / 24											5	2	3	10	19.2
15 / 19											1	1	1	3	14.4
10 / 14											1	0	0	1	8.9
5 / 9											0	0	0	0	6.0
0 / 4															
-5 / -1															

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.

NORFOLK NAS/CHAMBER VA

WMO No. 723085

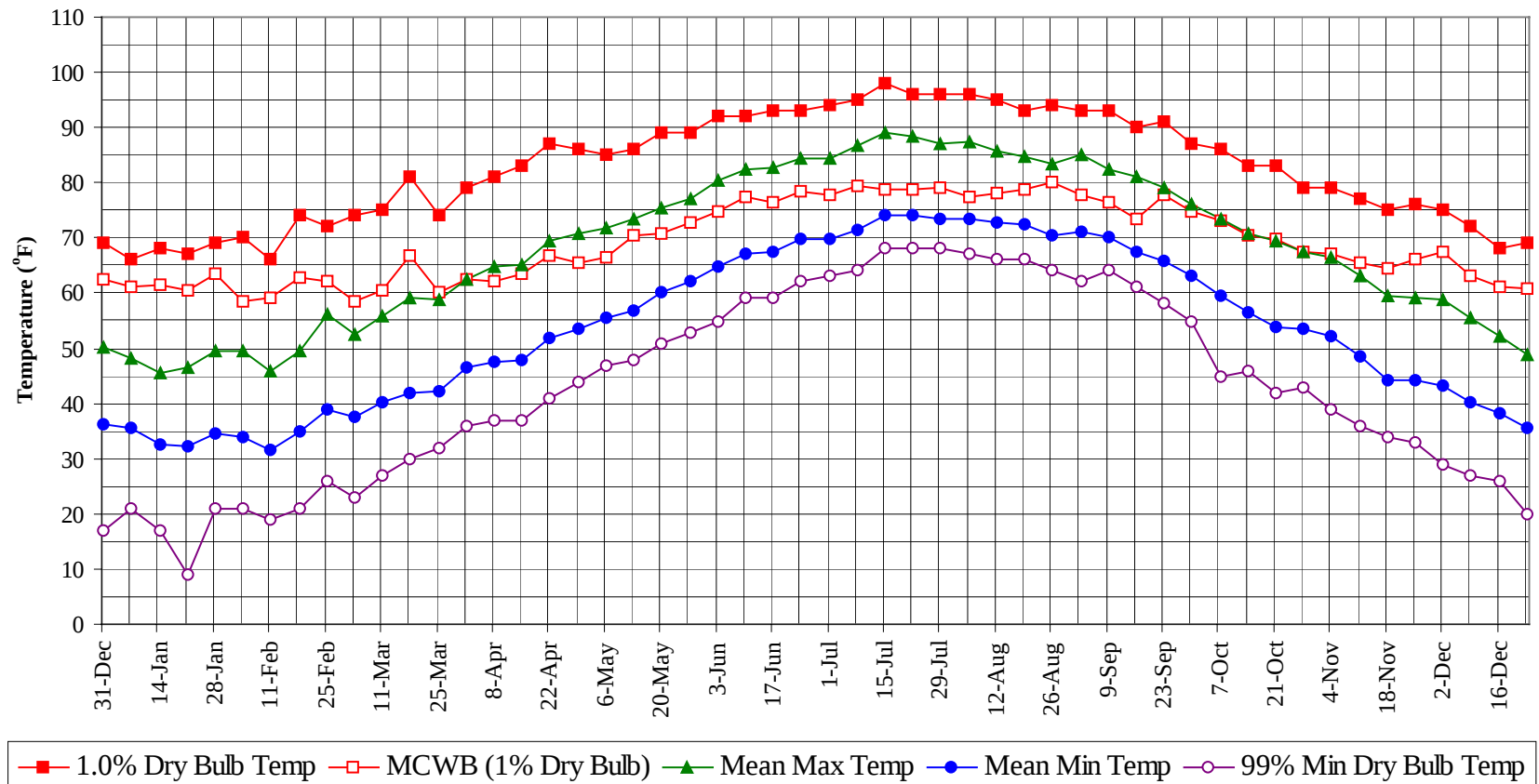
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

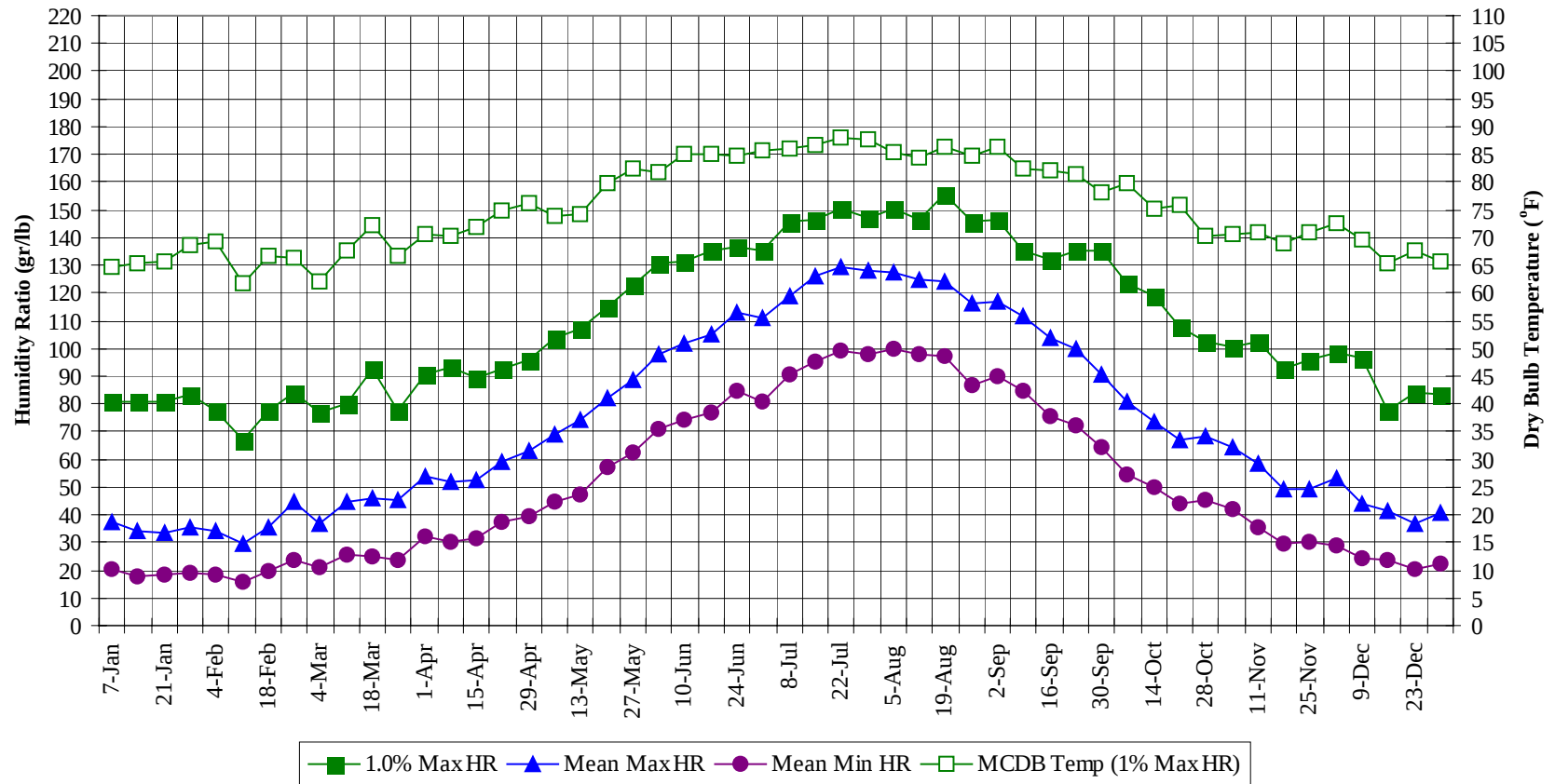
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
100 / 104		1	0	1	78.6
95 / 99		23	5	28	78.3
90 / 94	0	96	28	124	77.1
85 / 89	5	223	89	317	75.0
80 / 84	86	331	207	624	72.8
75 / 79	328	336	343	1007	70.3
70 / 74	395	296	352	1043	66.0
65 / 69	306	255	294	855	60.7
60 / 64	293	254	276	823	55.7
55 / 59	256	212	246	714	50.9
50 / 54	246	218	246	710	46.2
45 / 49	253	230	253	736	41.7
40 / 44	269	194	239	702	37.3
35 / 39	215	121	166	503	32.7
30 / 34	144	79	108	331	28.0
25 / 29	78	34	50	162	23.3
20 / 24	32	12	13	57	18.9
15 / 19	9	3	4	16	14.3
10 / 14	3	1	2	6	9.4
5 / 9	1	0	1	2	5.1
0 / 4	0	0	0	0	-0.3
-5 / -1	0			0	-3.0

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

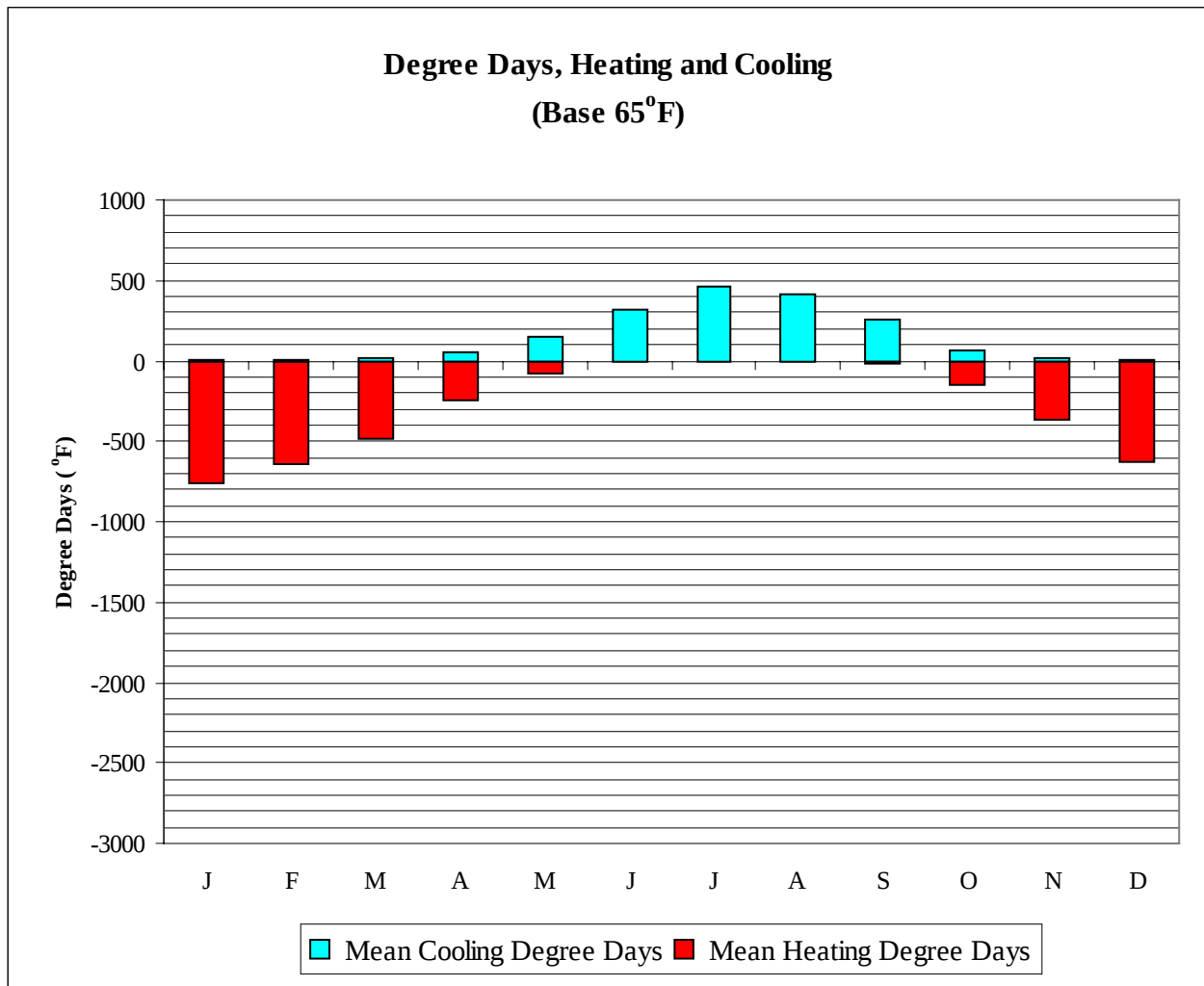


NORFOLK NAS/CHAMBER VA

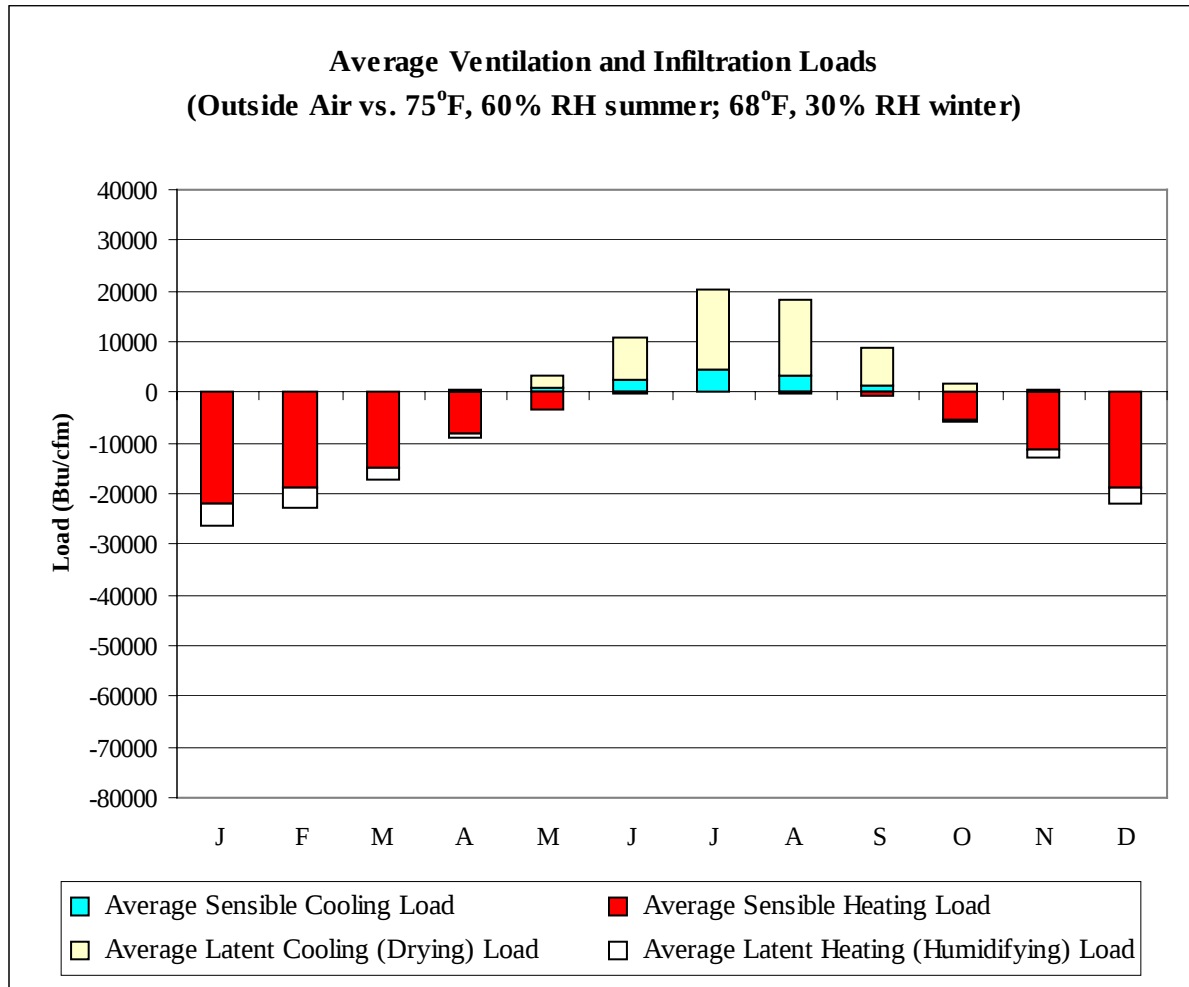
WMO No. 723085

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	61.3	48.2	35.6	21.0	80.5	64.8	37.2	20.7
14-Jan	68.0	61.5	45.6	32.4	17.0	80.5	65.3	34.4	17.7
21-Jan	67.0	60.5	46.6	32.1	9.0	80.5	65.8	33.5	18.4
28-Jan	69.0	63.4	49.5	34.4	21.0	83.3	68.6	35.2	18.8
4-Feb	70.0	58.3	49.4	34.0	21.0	77.7	69.2	34.3	18.3
11-Feb	66.0	59.0	45.9	31.5	19.0	67.2	61.6	29.3	15.8
18-Feb	74.0	62.8	49.6	34.8	21.0	77.7	66.5	35.3	20.0
25-Feb	72.0	62.2	56.0	38.9	26.0	84.0	66.3	44.7	23.8
4-Mar	74.0	58.4	52.6	37.6	23.0	77.0	62.0	36.9	21.1
11-Mar	75.0	60.4	55.8	40.1	27.0	79.8	67.7	44.8	25.6
18-Mar	81.0	66.6	59.0	41.8	30.0	92.4	72.4	45.8	25.1
25-Mar	74.0	60.2	59.0	42.1	32.0	77.7	66.7	45.2	24.0
1-Apr	79.0	62.6	62.5	46.5	36.0	90.3	70.5	53.7	31.9
8-Apr	81.0	62.1	64.9	47.5	37.0	93.1	70.4	52.1	30.0
15-Apr	83.0	63.4	65.1	47.9	37.0	89.6	71.9	52.8	31.7
22-Apr	87.0	66.8	69.5	51.9	41.0	92.4	74.9	58.9	37.6
29-Apr	86.0	65.6	70.7	53.4	44.0	95.9	76.1	62.9	39.4
6-May	85.0	66.4	71.9	55.4	47.0	103.6	74.0	68.7	44.4
13-May	86.0	70.4	73.5	56.9	48.0	107.1	74.3	74.3	47.3
20-May	89.0	70.8	75.3	60.0	51.0	114.8	79.6	82.3	57.1
27-May	89.0	72.9	77.1	62.1	53.0	122.5	82.5	88.4	62.1
3-Jun	92.0	74.9	80.3	64.7	55.0	130.9	81.7	97.7	70.6
10-Jun	92.0	77.3	82.3	67.1	59.0	131.6	84.9	101.8	73.9
17-Jun	93.0	76.4	82.9	67.6	59.0	135.1	85.0	105.3	76.6
24-Jun	93.0	78.4	84.4	69.7	62.0	136.5	84.8	113.1	84.4
1-Jul	94.0	77.8	84.4	69.7	63.0	135.1	85.7	111.2	80.7
8-Jul	95.0	79.6	86.7	71.6	64.0	145.6	86.0	118.6	90.7
15-Jul	98.0	78.6	89.1	74.0	68.0	146.3	86.6	126.2	95.3
22-Jul	96.0	78.8	88.5	74.0	68.0	150.5	88.2	129.1	99.2
29-Jul	96.0	79.0	87.0	73.5	68.0	147.0	87.6	128.0	97.7
5-Aug	96.0	77.4	87.6	73.6	67.0	150.5	85.4	127.1	99.9
12-Aug	95.0	78.1	85.9	72.6	66.0	146.3	84.3	124.7	97.6
19-Aug	93.0	78.7	84.8	72.6	66.0	155.4	86.3	124.4	97.1
26-Aug	94.0	80.2	83.3	70.6	64.0	145.6	84.8	116.0	87.0
2-Sep	93.0	77.9	84.9	71.2	62.0	146.3	86.3	116.8	89.9
9-Sep	93.0	76.4	82.3	70.1	64.0	135.1	82.5	111.4	84.8
16-Sep	90.0	73.4	81.0	67.6	61.0	132.3	82.1	103.9	75.6
23-Sep	91.0	77.6	79.0	65.9	58.0	135.1	81.5	99.6	72.5
30-Sep	87.0	74.8	76.0	63.1	55.0	135.1	78.0	90.4	64.3
7-Oct	86.0	73.0	73.4	59.4	45.0	123.2	79.9	80.6	54.5
14-Oct	83.0	70.4	70.8	56.6	46.0	119.0	75.1	73.3	49.8
21-Oct	83.0	70.0	69.4	53.8	42.0	107.8	75.9	67.2	44.3
28-Oct	79.0	67.4	67.6	53.5	43.0	102.2	70.1	68.0	45.1
4-Nov	79.0	67.2	66.3	52.1	39.0	100.8	70.7	64.1	42.1
11-Nov	77.0	65.4	63.3	48.5	36.0	102.2	70.8	58.5	35.5
18-Nov	75.0	64.3	59.6	44.3	34.0	92.4	68.8	49.4	29.8
25-Nov	76.0	66.3	59.0	44.3	33.0	95.9	71.1	49.5	30.2
2-Dec	75.0	67.6	58.9	43.1	29.0	98.7	72.4	53.0	28.6
9-Dec	72.0	63.1	55.6	40.1	27.0	96.6	69.7	44.0	24.1
16-Dec	68.0	61.1	52.1	38.3	26.0	77.7	65.4	41.3	23.8
23-Dec	69.0	60.8	48.9	35.7	20.0	84.0	67.5	36.9	20.5
31-Dec	69.0	62.4	50.3	36.3	17.0	83.3	65.6	40.6	22.4



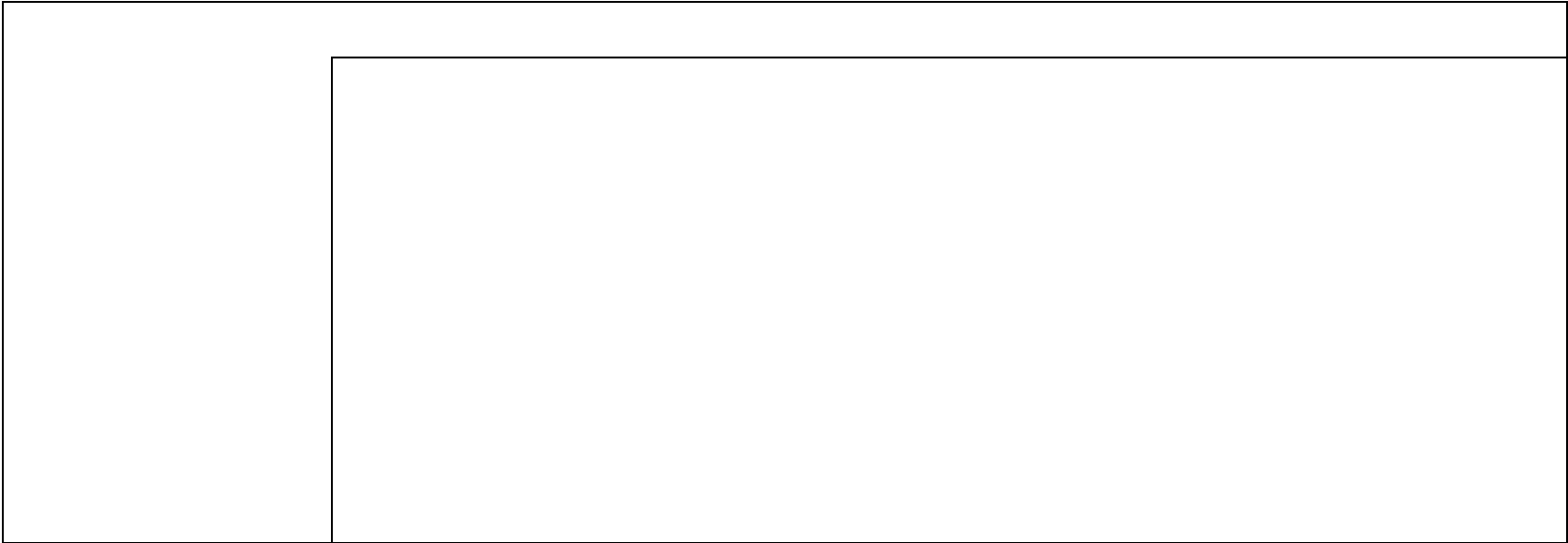
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	2	761
FEB	5	643
MAR	17	490
APR	56	244
MAY	146	79
JUN	321	7
JUL	466	0
AUG	413	1
SEP	254	12
OCT	71	149
NOV	22	364
DEC	4	634
ANN	1777	3384



	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	-22114	32	-4294
FEB	5	-18809	33	-3846
MAR	51	-14933	100	-2371
APR	277	-8131	238	-846
MAY	839	-3227	2306	-64
JUN	2467	-426	8334	0
JUL	4578	-34	15760	0
AUG	3479	-66	14838	0
SEP	1475	-690	7260	-2
OCT	248	-5510	1494	-238
NOV	33	-11486	422	-1472
DEC	2	-18772	102	-3246
ANN	13454	-104198	50919	-16379

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

No Solar Radiation
Data Available

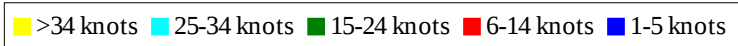
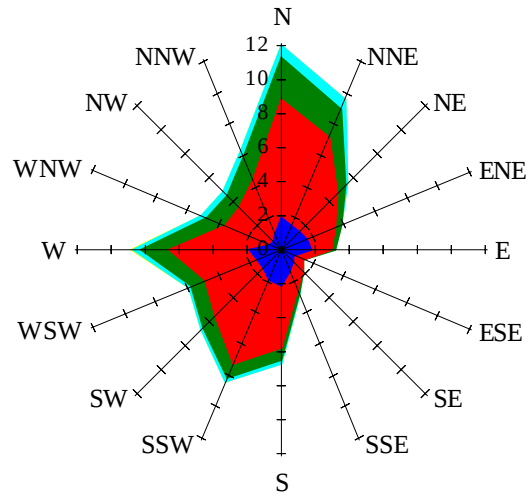


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

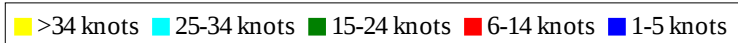
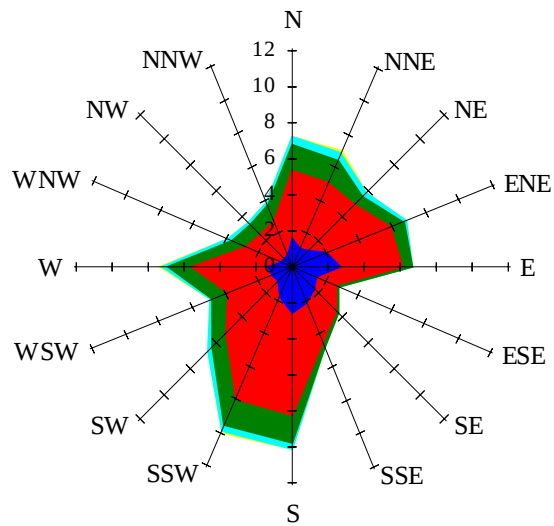
Labels of Percent Frequency on North Axis



Percent Calm = 7.61

Wind Summary - March, April, and May

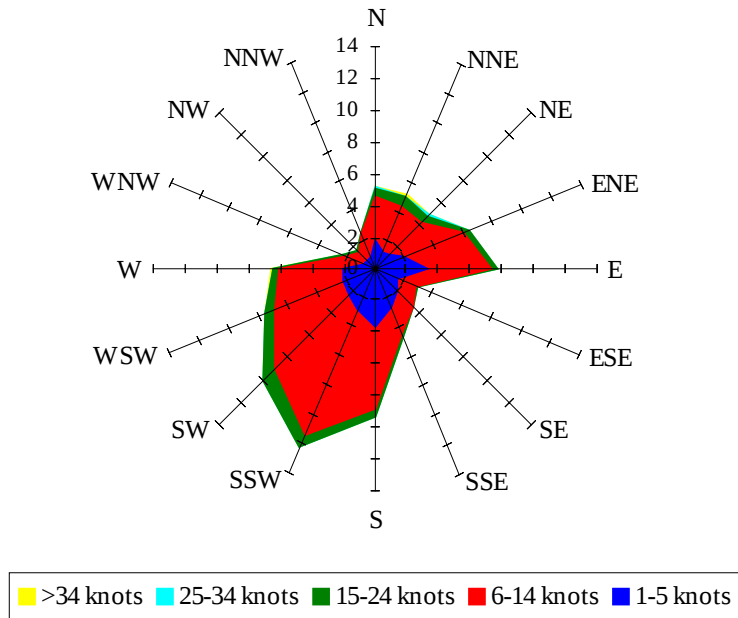
Labels of Percent Frequency on North Axis



Percent Calm = 5.65

Wind Summary - June, July, and August

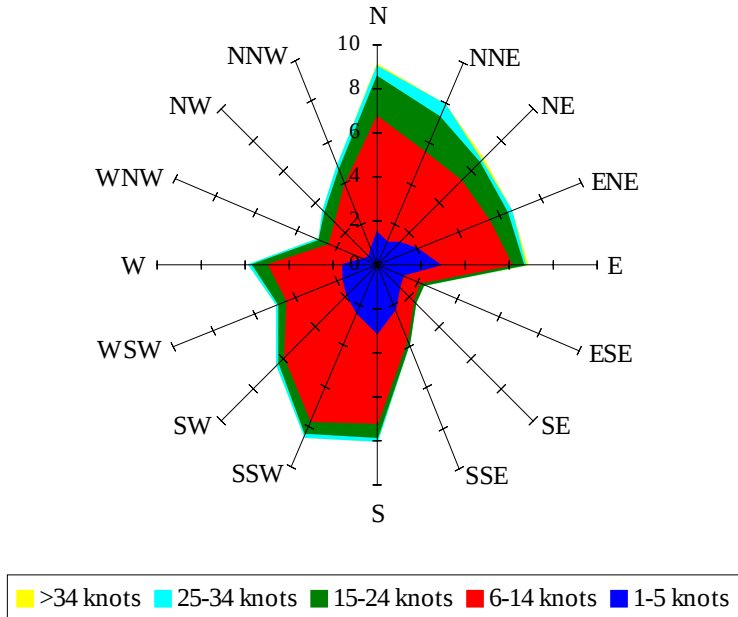
Labels of Percent Frequency on North Axis



Percent Calm = 8.12

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 9.49