

MIDDLETOWN/OLMSTED PA

Latitude = 40.20 N

WMO No. 725115

Longitude = 76.77 W

Elevation = 308 feet

Period of Record = 1973 to 1996

Average Pressure = 29.69 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	97	76	101	9.5	W
0.4% Occurrence	92	75	103	8.9	W
1.0% Occurrence	89	73	101	8.9	W
2.0% Occurrence	87	72	97	8.7	W
Mean Daily Range	16	-	-	-	-
97.5% Occurrence	19	16	8	10.1	NW
99.0% Occurrence	14	12	6	9.6	NW
99.6% Occurrence	10	8	5	9.6	NW
Median of Extreme Lows	3	1	3	9.8	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	81	91	140	8.2	S
0.4% Occurrence	78	87	129	7.8	W
1.0% Occurrence	76	85	120	7.8	W
2.0% Occurrence	74	82	113	7.3	S
	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	148	85	0.97	5.8	SSW
0.4% Occurrence	132	83	0.88	6.6	W
1.0% Occurrence	124	81	0.82	7.2	S
2.0% Occurrence	117	79	0.77	7.1	NW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		26	669	328	1292

Other Site Data

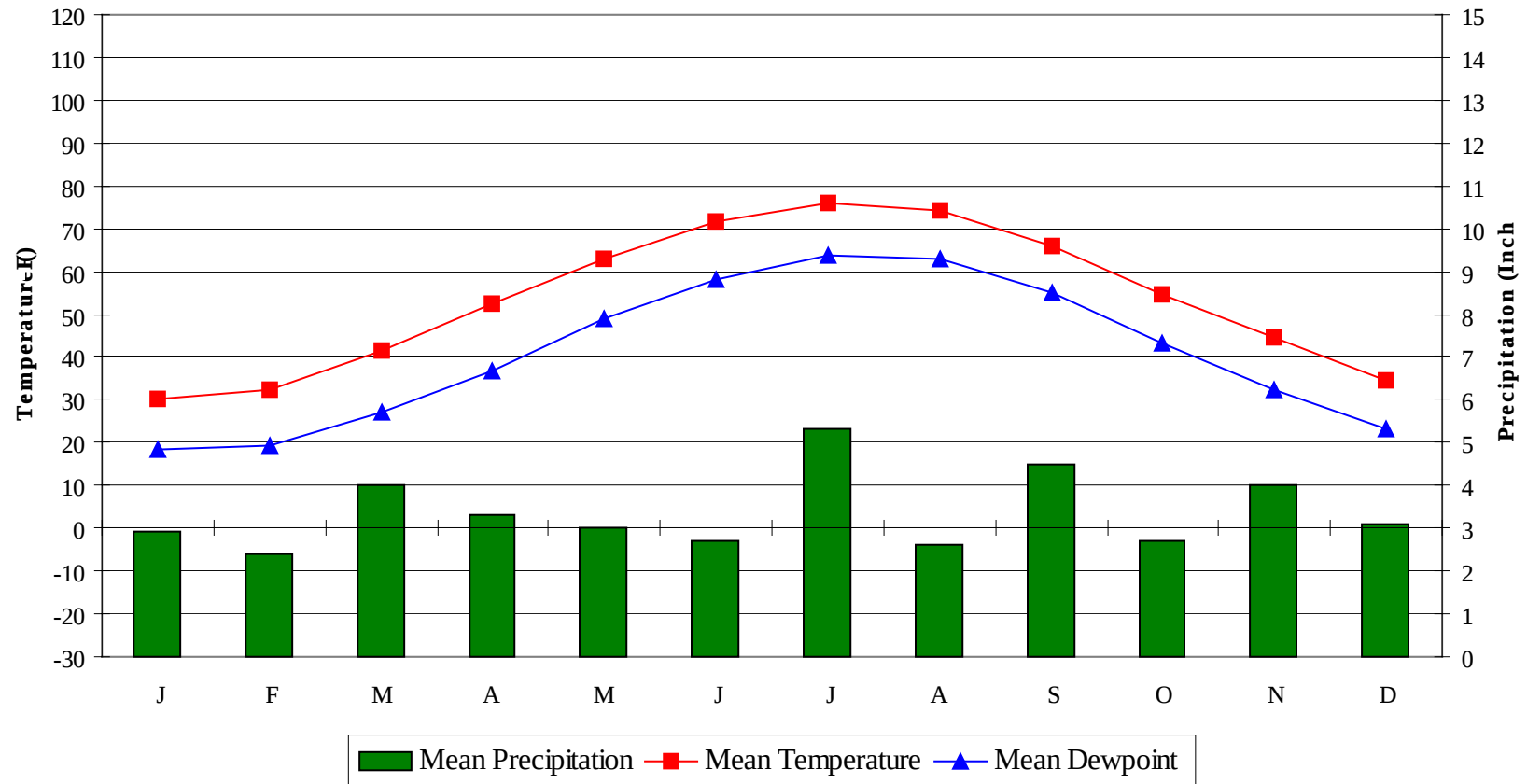
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
7	2.8	90	1.6 + 0.6
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
56.0	38	23	53

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

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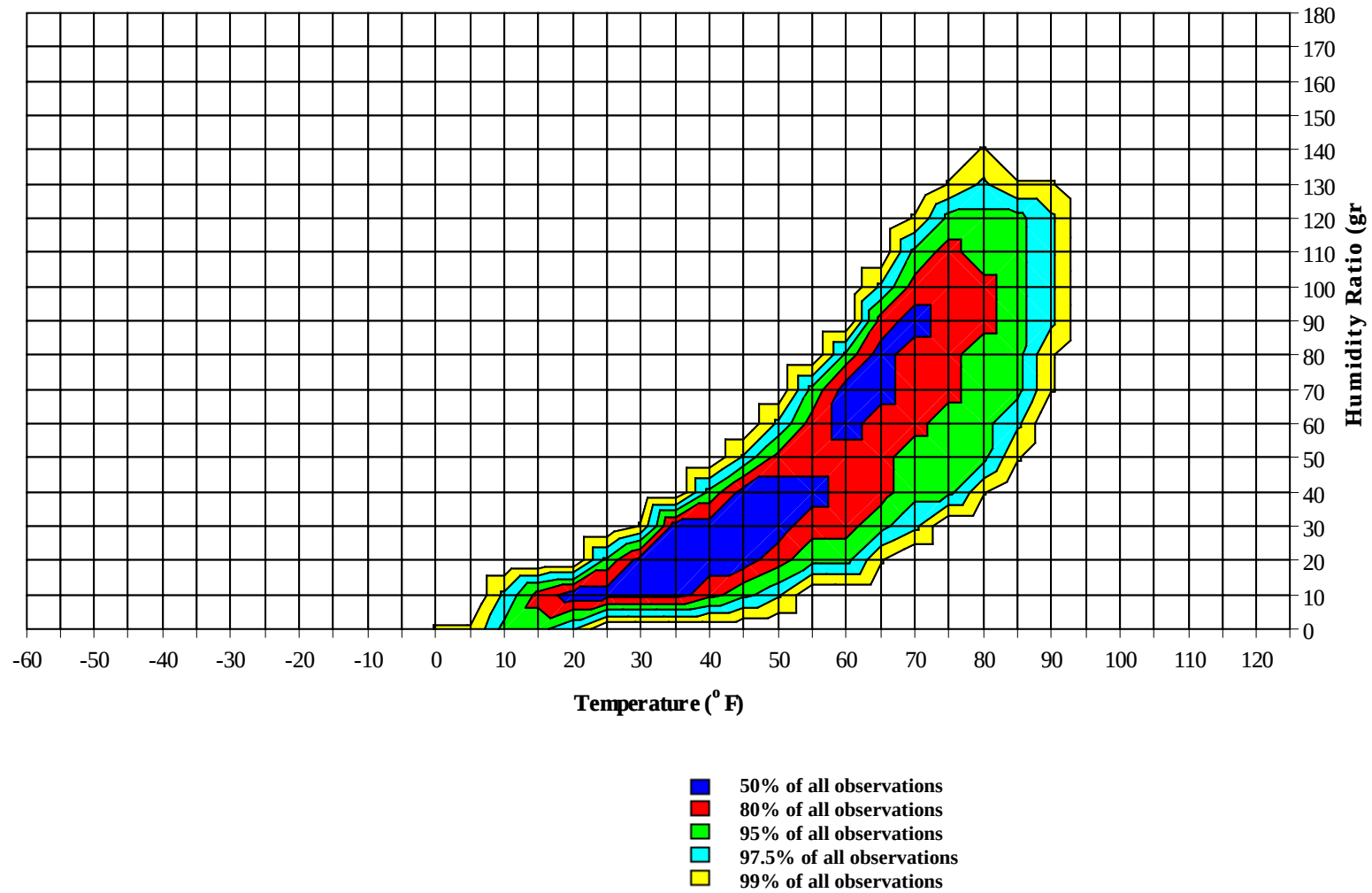
Average Annual Climate



MIDDLETOWN/OLMSTED PA

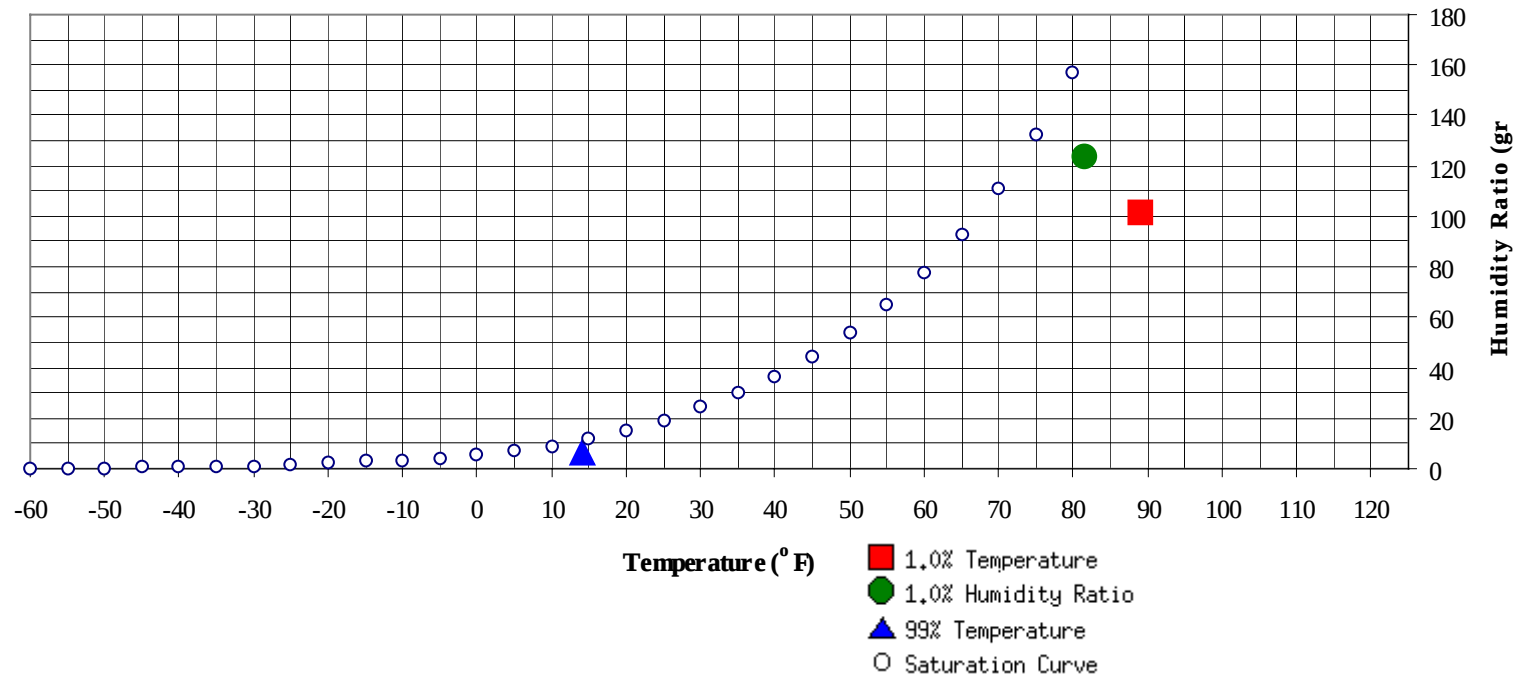
WMO No. 725115

Long Term Psychrometric Summary



MIDDLETOWN/OLMSTED PA

WMO No. 725115

Psychrometric Summary of Peak Design Values

	(°F)	MCHR	Enthalpy	1.0% Humidity	(gr/lb)	MCDB	MCWB	MC Dewpt	Enthalpy
		(gr/lb)	(btu/lb)			(°F)	(°F)	(°F)	(btu/lb)
99% Dry Bulb	14	6.2	4.3	Ratio	123.9	81.4	75.3	73	39.0

	(°F)	MCHR	MCWB	Enthalpy
		(gr/lb)	(°F)	(btu/lb)
1.0% Dry Bulb	89	101.7	73.6	37.3

MIDDLETOWN/OLMSTED PA

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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												1	0	1	64.1
75 / 79											0	2	1	3	61.8
70 / 74		0		0	59.0		0	0	0	54.3	0	4	3	7	57.9
65 / 69		0	0	0	55.7		2	1	3	50.9	2	6	5	13	55.2
60 / 64	0	2	1	3	54.0	0	3	1	4	49.9	3	10	8	21	52.2
55 / 59	2	2	2	6	50.9	1	5	4	10	48.2	6	21	15	42	48.0
50 / 54	2	5	3	10	45.8	4	12	9	25	45.5	13	32	28	72	44.6
45 / 49	4	14	9	27	41.0	6	18	17	41	40.9	24	41	41	105	40.9
40 / 44	15	32	26	73	36.7	20	36	30	85	36.7	42	51	54	147	36.7
35 / 39	37	51	53	141	32.6	35	39	44	118	32.6	59	41	45	145	32.5
30 / 34	57	50	53	160	28.5	42	42	45	129	28.0	53	25	29	106	28.1
25 / 29	42	40	42	123	23.6	39	33	34	105	23.3	26	10	12	48	23.3
20 / 24	37	27	32	95	19.1	35	21	23	79	19.0	11	5	6	22	19.1
15 / 19	25	13	17	54	14.6	24	10	12	45	14.5	6	1	2	9	14.7
10 / 14	15	7	8	30	10.0	13	3	4	20	10.3	2	0	0	2	10.1
5 / 9	7	4	2	13	5.7	4	1	1	6	5.9	0			0	6.4
0 / 4	3	1	2	6	0.6	1	0	0	1	1.5					
-5 / -1	1	1	0	2	-3.2	0			0	-3.0					
-10 / -6	0	0	0	0	-7.2										
-15 / -11	0	0	0	0	-12.4										
-20 / -16	0	0		0	-17.3										
-25 / -21	0			0	-22.0										

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.

MIDDLETOWN/OLMSTED PA

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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												0		0	73.3
95 / 99		0	0	0	68.4							2	0	2	74.8
90 / 94		1	0	1	67.6		2	0	2	72.3		9	4	13	73.2
85 / 89		2	1	3	66.2		9	4	13	69.4	0	25	13	38	71.3
80 / 84		5	3	8	63.7	0	19	12	31	66.7	2	52	32	86	68.7
75 / 79	0	8	6	14	61.1	2	29	22	53	64.3	18	57	50	124	66.3
70 / 74	2	12	12	26	58.6	11	39	35	86	61.4	56	46	63	164	64.6
65 / 69	6	23	17	46	55.5	31	47	44	122	58.3	71	32	44	147	61.3
60 / 64	13	32	30	75	52.3	46	44	49	139	55.3	53	14	24	90	57.0
55 / 59	21	43	38	102	48.7	53	34	39	127	51.6	28	4	8	40	52.5
50 / 54	41	44	48	133	45.3	58	20	31	109	47.8	11	1	3	15	48.4
45 / 49	55	39	43	137	41.5	34	6	10	50	43.1	2	0	0	2	44.0
40 / 44	57	22	28	106	37.2	10	0	2	12	38.2	0			0	41.0
35 / 39	30	8	12	50	32.8	2	0	0	2	34.3					
30 / 34	12	3	3	18	29.0	0	0		0	33.0					
25 / 29	3	0	0	3	23.8										
20 / 24	0	0	0	0	19.3										
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															
-15 / -11															
-20 / -16															
-25 / -21															

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MIDDLETOWN/OLMSTED PA

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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		1	78.3		1	0	1	77.6					
95 / 99		4	2	6	76.2		2	1	3	76.7			1	0	1 75.0
90 / 94		19	8	27	75.0		13	4	17	75.5			2	1	3 74.3
85 / 89	1	51	27	79	72.7	0	35	16	50	73.5			9	3	12 71.7
80 / 84	7	68	54	130	70.6	3	66	41	110	70.7	0	23	11	33	69.7
75 / 79	46	57	68	170	69.1	28	63	67	158	68.6	7	39	26	72	66.9
70 / 74	94	34	58	186	66.8	86	43	68	197	66.6	27	53	50	130	64.5
65 / 69	64	12	24	99	62.9	74	19	36	129	62.7	49	53	56	158	60.7
60 / 64	29	3	7	39	58.5	39	5	13	57	58.4	50	40	47	136	56.8
55 / 59	6	0	1	7	54.0	13	1	3	17	53.8	49	16	32	97	52.9
50 / 54	1		0	1	49.9	4		0	4	48.5	41	4	11	55	48.4
45 / 49						0			0	45.0	14	1	3	17	43.3
40 / 44											3	0	1	4	40.0
35 / 39											0			0	36.3
30 / 34															
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															
-15 / -11															
-20 / -16															
-25 / -21															

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MIDDLETOWN/OLMSTED PA

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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															
85 / 89		0		0	69.1										
80 / 84		4	1	5	67.6										
75 / 79	1	10	4	15	65.6		1	0	1	63.2		0	0	0	62.0
70 / 74	2	20	14	35	62.5		5	2	7	61.4		0	0	0	62.9
65 / 69	10	36	23	69	59.1	2	9	7	18	58.8	0	0	1	1	60.3
60 / 64	23	46	40	108	55.3	6	14	12	32	55.8	1	2	2	5	56.5
55 / 59	34	50	43	127	50.8	13	25	20	58	50.8	2	4	3	9	51.1
50 / 54	50	44	51	145	46.7	21	41	35	97	46.0	4	12	9	25	46.6
45 / 49	52	28	43	123	42.4	31	47	41	120	41.1	11	27	18	55	41.9
40 / 44	47	10	22	79	38.5	51	48	53	152	36.8	31	49	43	122	37.2
35 / 39	22	2	6	30	34.4	57	33	42	132	32.7	50	61	61	171	32.7
30 / 34	6	0	1	7	29.3	38	13	20	71	28.7	59	45	54	158	28.4
25 / 29	0			0	26.6	17	3	7	27	24.7	42	25	27	94	23.8
20 / 24						4	1	1	6	20.4	23	16	19	59	19.1
15 / 19						0	0		0	14.2	15	6	9	29	14.5
10 / 14											7	2	2	11	10.5
5 / 9											2	1	0	3	5.7
0 / 4											1	0	0	1	0.6
-5 / -1															
-10 / -6															
-15 / -11															
-20 / -16															
-25 / -21															

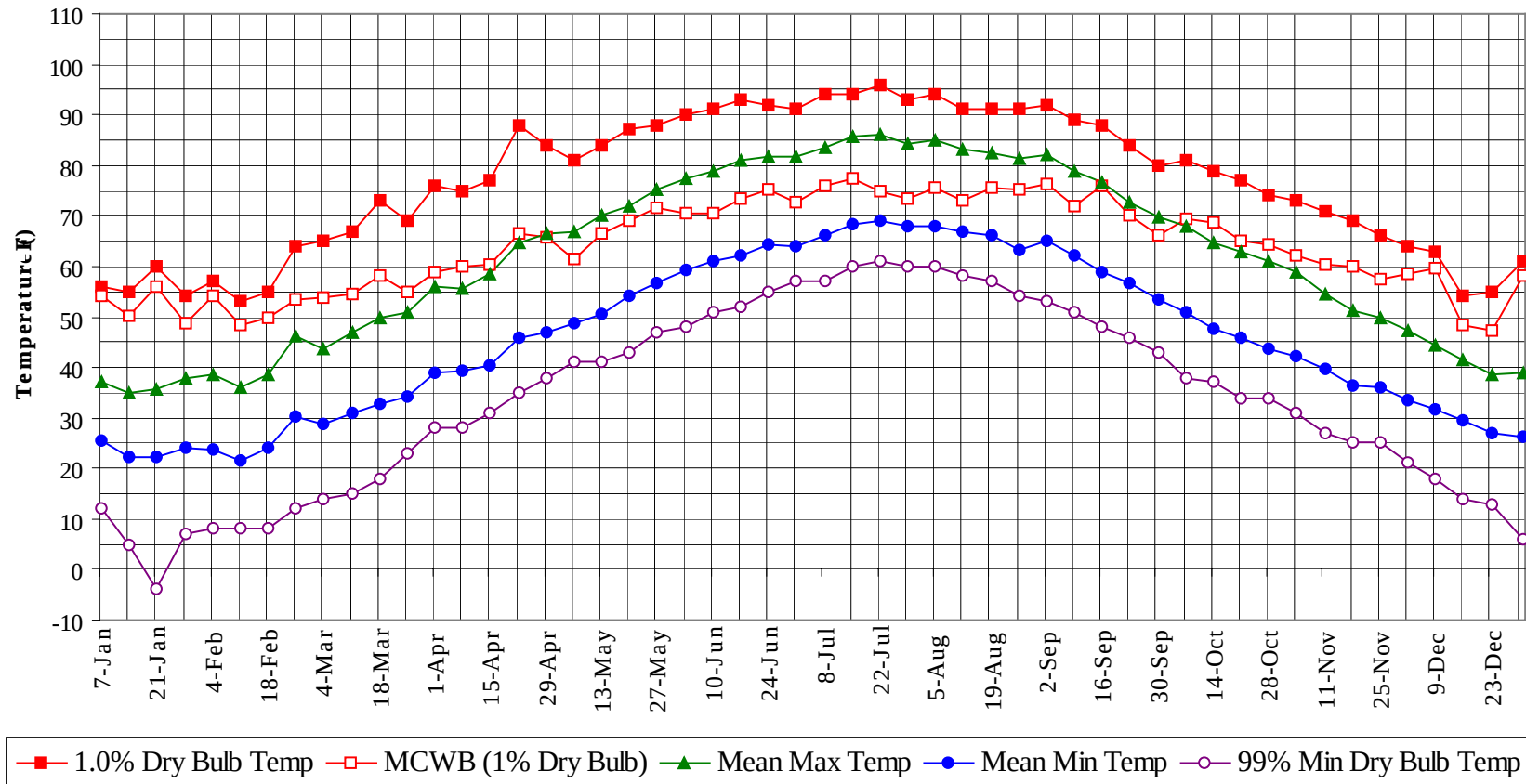
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MIDDLETOWN/OLMSTED PA WMO No. 725115
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)
Period of Record = 1973 to 1996

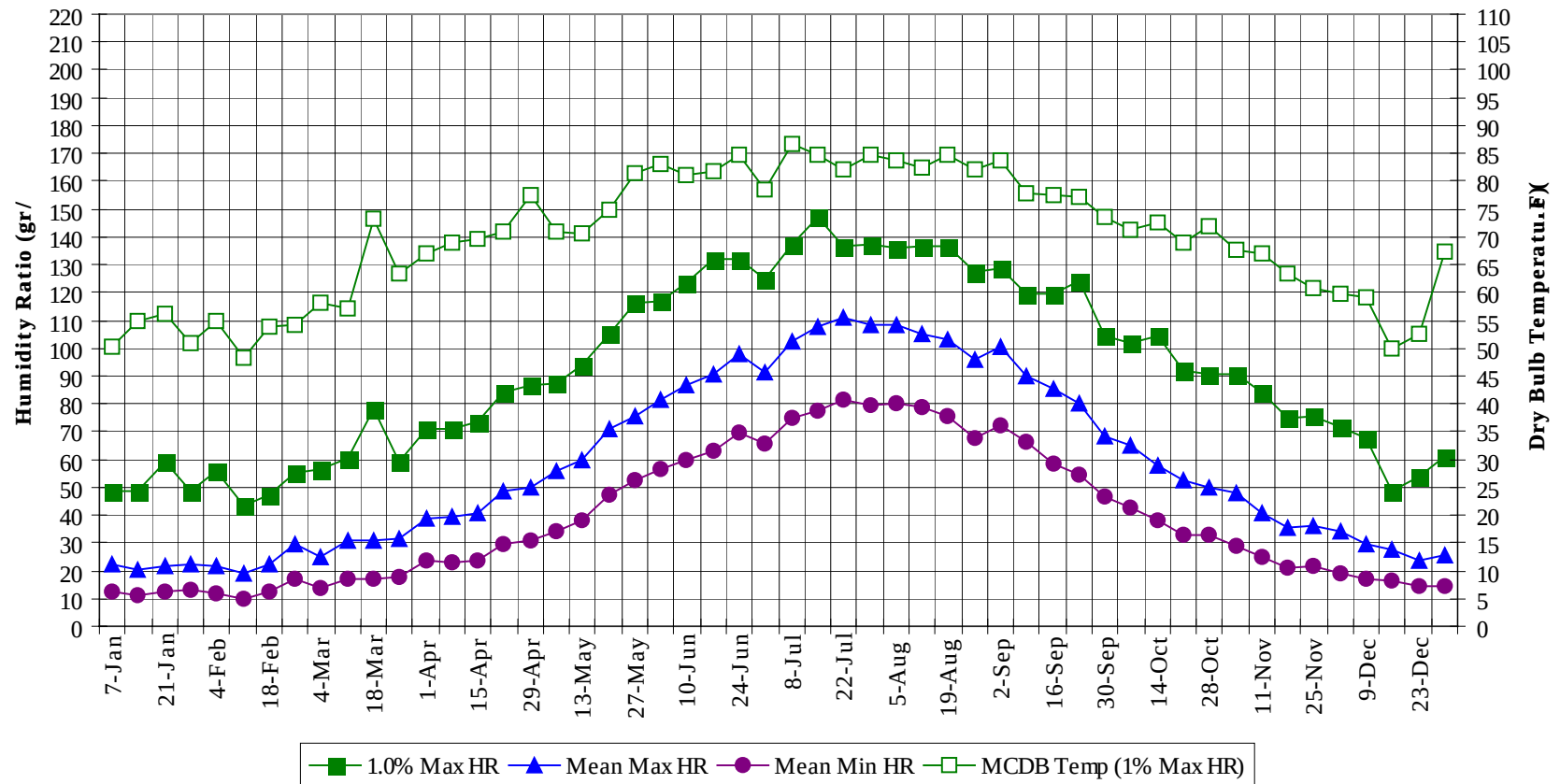
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
100 / 104		1	0	1	77.2
95 / 99		9	3	12	75.7
90 / 94		47	17	63	74.4
85 / 89	1	130	64	194	72.2
80 / 84	14	237	154	405	69.6
75 / 79	102	263	243	609	67.4
70 / 74	278	254	303	835	64.8
65 / 69	308	237	255	799	60.4
60 / 64	263	212	230	705	55.8
55 / 59	227	203	208	638	50.9
50 / 54	249	214	227	690	46.4
45 / 49	232	221	224	677	41.6
40 / 44	274	248	258	780	37.1
35 / 39	291	236	264	790	32.7
30 / 34	267	178	206	651	28.4
25 / 29	169	112	123	405	23.6
20 / 24	113	70	81	264	19.1
15 / 19	71	31	40	142	14.6
10 / 14	39	12	15	66	10.2
5 / 9	13	5	3	21	5.7
0 / 4	5	1	3	9	0.8
-5 / -1	2	1	0	3	-3.2
-10 / -6	0	0	0	0	-7.2
-15 / -11	0	0	0	0	-12.4
-20 / -16	0	0		0	-17.3
-25 / -21	0			0	-22.0

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



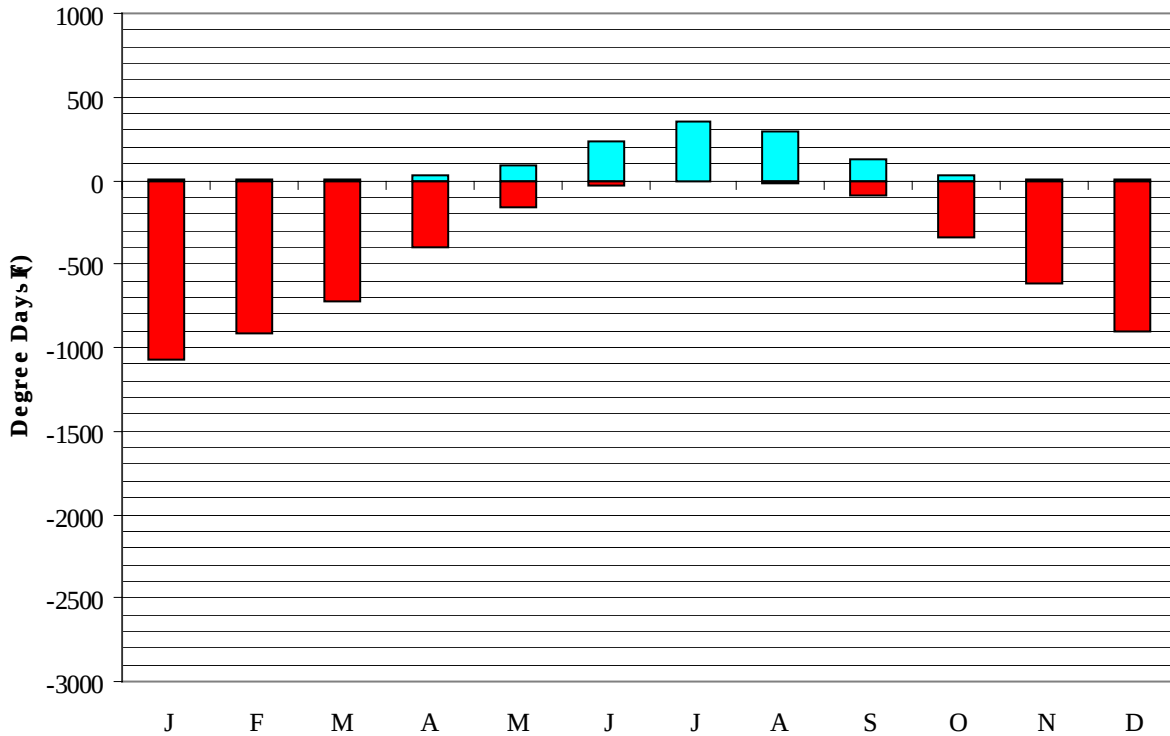
MIDDLETOWN/OLMSTED PA

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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	56.0	54.2	37.0	25.6	12.0	48.3	50.1	22.1	12.8
14-Jan	55.0	50.1	34.9	22.3	5.0	48.3	54.8	20.4	11.1
21-Jan	60.0	56.1	35.8	22.4	-4.0	58.8	56.1	21.8	12.3
28-Jan	54.0	48.7	38.0	24.1	7.0	48.3	51.0	22.3	12.8
4-Feb	57.0	54.0	38.4	23.7	8.0	56.0	54.9	21.8	11.9
11-Feb	53.0	48.4	36.0	21.5	8.0	43.4	48.4	18.7	10.1
18-Feb	55.0	49.7	38.7	24.2	8.0	47.6	54.0	22.3	12.6
25-Feb	64.0	53.4	46.1	30.2	12.0	55.3	54.1	29.4	17.2
4-Mar	65.0	53.7	43.6	28.8	14.0	56.7	58.0	24.9	14.0
11-Mar	67.0	54.4	47.0	31.1	15.0	60.2	57.2	31.0	17.4
18-Mar	73.0	58.0	49.7	33.0	18.0	78.4	73.2	31.0	17.3
25-Mar	69.0	54.8	50.8	34.1	23.0	58.8	63.2	31.5	17.9
1-Apr	76.0	59.0	56.0	39.0	28.0	70.7	67.0	38.6	23.5
8-Apr	75.0	59.9	55.8	39.3	28.0	70.7	69.1	39.5	23.0
15-Apr	77.0	60.4	58.6	40.2	31.0	73.5	69.6	40.5	23.6
22-Apr	88.0	66.7	64.7	45.7	35.0	84.0	70.9	48.3	29.6
29-Apr	84.0	65.8	66.5	47.0	38.0	86.8	77.6	49.9	31.0
6-May	81.0	61.4	66.9	48.6	41.0	87.5	71.0	55.6	34.2
13-May	84.0	66.5	70.1	50.7	41.0	93.8	70.6	59.6	38.0
20-May	87.0	69.0	72.0	54.0	43.0	105.0	74.9	70.8	47.4
27-May	88.0	71.7	75.0	56.8	47.0	116.2	81.3	75.7	52.4
3-Jun	90.0	70.5	77.2	59.2	48.0	116.9	83.2	81.1	56.6
10-Jun	91.0	70.6	78.8	60.9	51.0	123.2	81.3	87.0	59.6
17-Jun	93.0	73.3	80.9	62.3	52.0	132.3	81.9	90.9	63.0
24-Jun	92.0	75.2	81.7	64.3	55.0	132.3	84.7	97.7	69.7
1-Jul	91.0	72.6	81.6	64.0	57.0	124.6	78.6	91.3	65.7
8-Jul	94.0	75.9	83.6	66.2	57.0	137.2	86.6	102.4	74.7
15-Jul	94.0	77.3	85.8	68.4	60.0	147.0	84.8	107.8	77.2
22-Jul	96.0	74.8	86.2	69.1	61.0	136.5	82.2	110.9	81.4
29-Jul	93.0	73.3	84.4	68.1	60.0	137.2	84.6	108.2	79.4
5-Aug	94.0	75.5	85.0	68.1	60.0	135.8	83.9	108.6	80.3
12-Aug	91.0	73.2	83.1	66.9	58.0	136.5	82.3	105.4	78.7
19-Aug	91.0	75.6	82.6	66.3	57.0	136.5	84.9	103.3	75.5
26-Aug	91.0	75.3	81.2	63.2	54.0	127.4	82.0	95.8	67.8
2-Sep	92.0	76.2	82.1	65.1	53.0	128.8	83.6	100.7	72.1
9-Sep	89.0	72.0	78.7	62.3	51.0	119.7	77.8	90.2	66.1
16-Sep	88.0	75.8	76.5	58.8	48.0	119.7	77.4	85.6	58.2
23-Sep	84.0	70.1	72.6	56.7	46.0	123.9	77.1	79.9	54.8
30-Sep	80.0	66.0	69.7	53.4	43.0	104.3	73.5	68.0	46.5
7-Oct	81.0	69.5	67.9	50.7	38.0	101.5	71.1	65.1	42.4
14-Oct	79.0	68.8	64.7	47.6	37.0	104.3	72.6	57.5	38.2
21-Oct	77.0	64.9	62.8	45.7	34.0	91.7	69.0	52.8	33.0
28-Oct	74.0	64.3	61.1	43.8	34.0	90.3	71.9	50.1	32.5
4-Nov	73.0	62.0	58.9	42.1	31.0	90.3	67.7	47.6	29.2
11-Nov	71.0	60.3	54.5	39.5	27.0	84.0	67.1	40.9	24.7
18-Nov	69.0	59.9	51.3	36.3	25.0	74.9	63.4	35.4	21.1
25-Nov	66.0	57.4	49.8	35.9	25.0	75.6	60.6	36.3	21.7
2-Dec	64.0	58.4	47.5	33.5	21.0	71.4	59.8	34.1	19.2
9-Dec	63.0	59.6	44.3	31.6	18.0	67.9	59.0	29.3	17.0
16-Dec	54.0	48.5	41.4	29.7	14.0	48.3	49.8	27.4	16.6
23-Dec	55.0	47.3	38.4	26.9	13.0	53.9	52.6	23.4	14.2
31-Dec	61.0	58.3	39.1	26.2	6.0	60.9	67.2	25.4	14.2

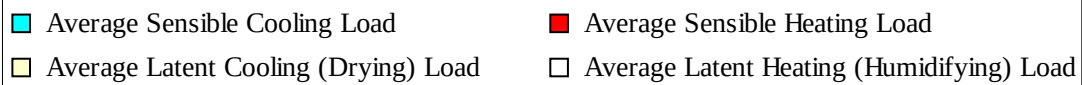
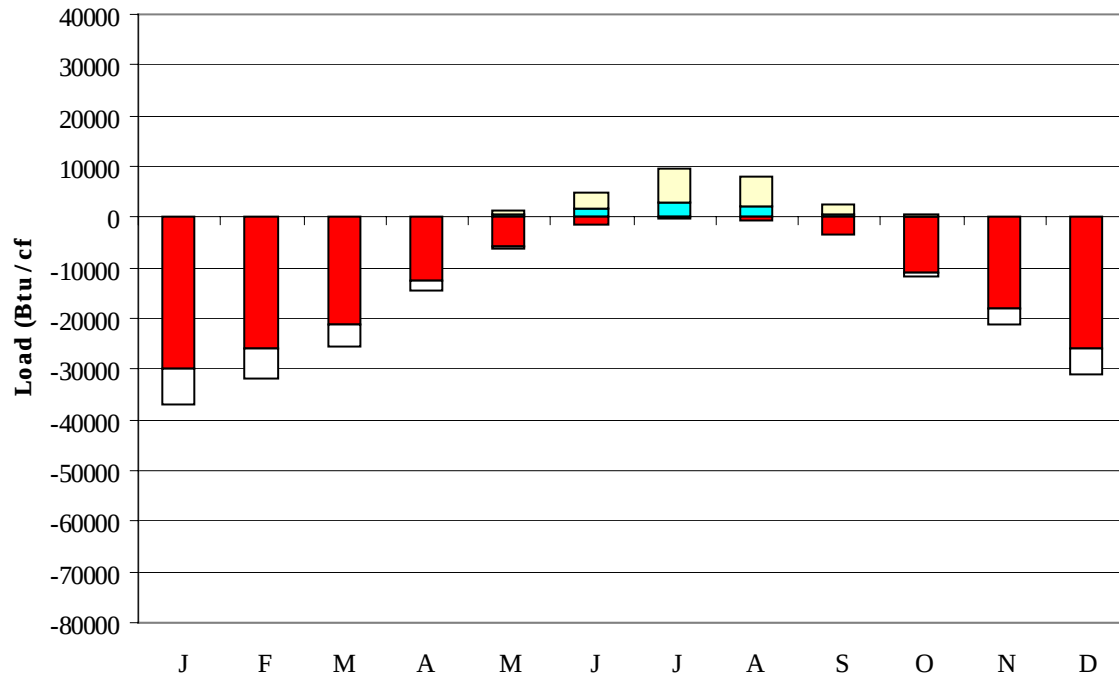
Degree Days, Heating and Cooling
(Base 65°F)



■ Mean Cooling Degree Days
 ■ Mean Heating Degree Days

	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	1066
FEB	0	914
MAR	5	729
APR	27	405
MAY	94	164
JUN	229	31
JUL	350	6
AUG	293	12
SEP	123	88
OCT	24	338
NOV	3	612
DEC	0	910
ANN	1149	5275

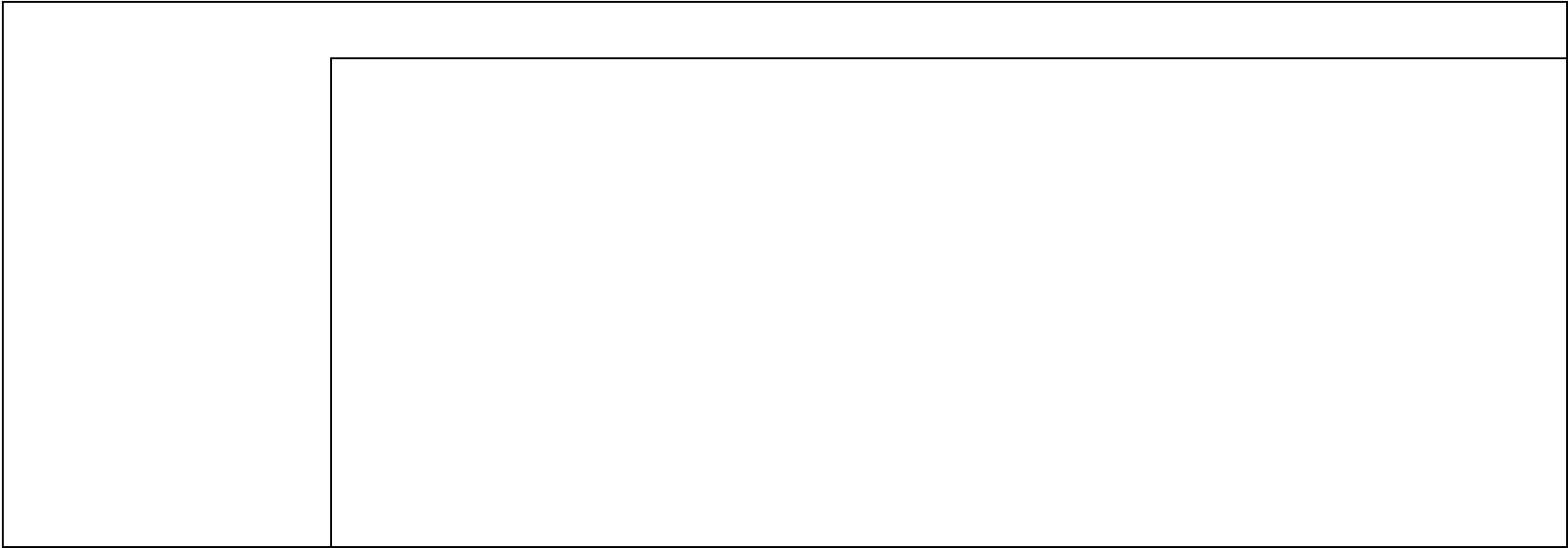
Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	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	-30012	0	-6814
FEB	0	-25881	0	-6002
MAR	13	-21234	4	-4310
APR	143	-12578	38	-1871
MAY	501	-5833	781	-296
JUN	1534	-1425	3188	-15
JUL	2875	-389	6798	0
AUG	2055	-688	6011	-4
SEP	565	-3468	1994	-53
OCT	54	-10837	300	-718
NOV	3	-18149	39	-2916
DEC	0	-25931	5	-5270
ANN	7743	-156425	19158	-28269

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

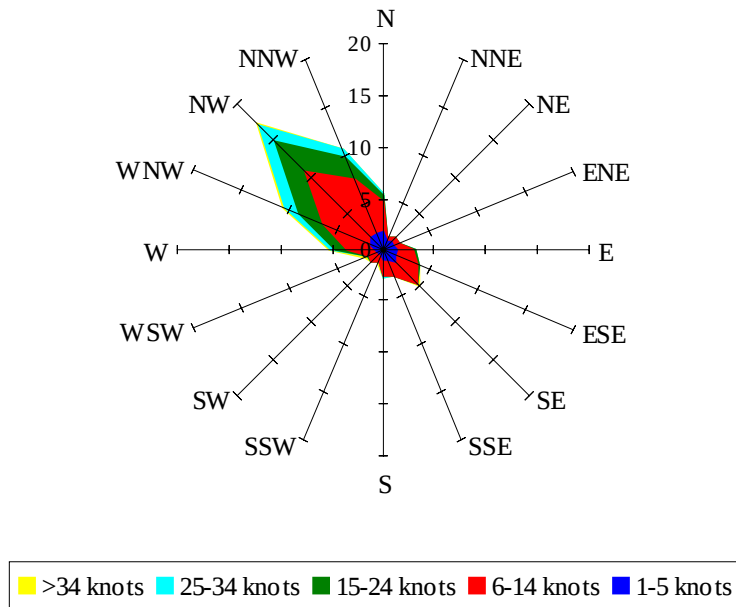
No Solar Radiation
Data Available



Average Annual Solar Heat and Illumination – Nearest Available Site

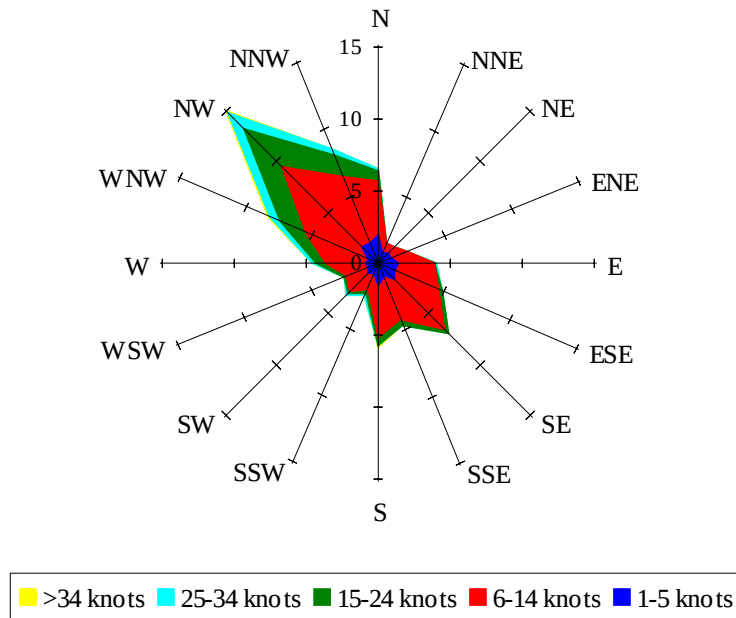
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

Wind Summary - December, January, and February **Labels of Percent Frequency on North Axis**



Percent Calm = 24.70

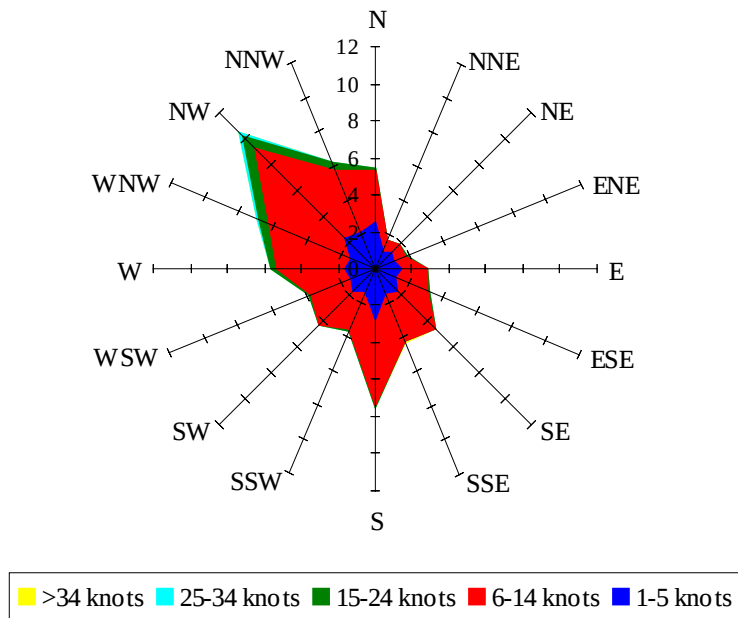
Wind Summary - March, April, and May **Labels of Percent Frequency on North Axis**



Percent Calm = 18.26

Wind Summary - June, July, and August

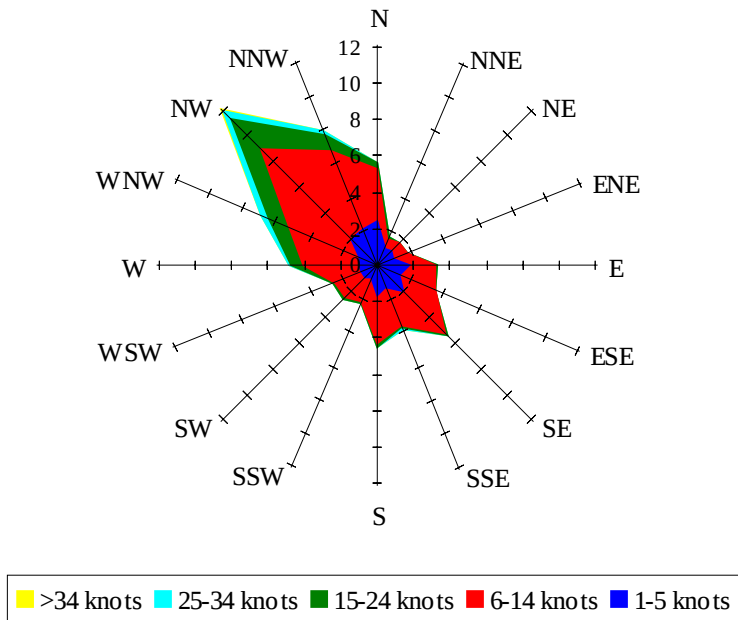
Labels of Percent Frequency on North Axis



Percent Calm = 26.27

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 29.95