

GRAND FORKS AFB ND

Latitude = 47.97 N

WMO No. 727575

Longitude = 97.40 W

Elevation = 912 feet

Period of Record = 1967 to 1996

Average Pressure = 28.97 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	72	86	15.0	S
0.4% Occurrence	91	71	85	12.8	S
1.0% Occurrence	87	69	81	12.2	S
2.0% Occurrence	84	68	79	11.5	S
Mean Daily Range	20	-	-	-	-
97.5% Occurrence	-12	-12	2	9.5	N
99.0% Occurrence	-18	-18	1	8.7	WNW
99.6% Occurrence	-22	-22	1	7.6	W
Median of Extreme Lows	-27	-26	1	6.8	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	78	88	132	11.1	S
0.4% Occurrence	74	85	111	11.1	S
1.0% Occurrence	72	83	103	10.7	S
2.0% Occurrence	70	80	96	10.5	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	137	85	0.88	9.5	S
0.4% Occurrence	119	81	0.77	9.2	S
1.0% Occurrence	107	78	0.69	9.6	S
2.0% Occurrence	99	76	0.65	9.3	S
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		20	377	79	409

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
4	3.0	90	0.4 + 0.4
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 (#)
42.6	166	40	58

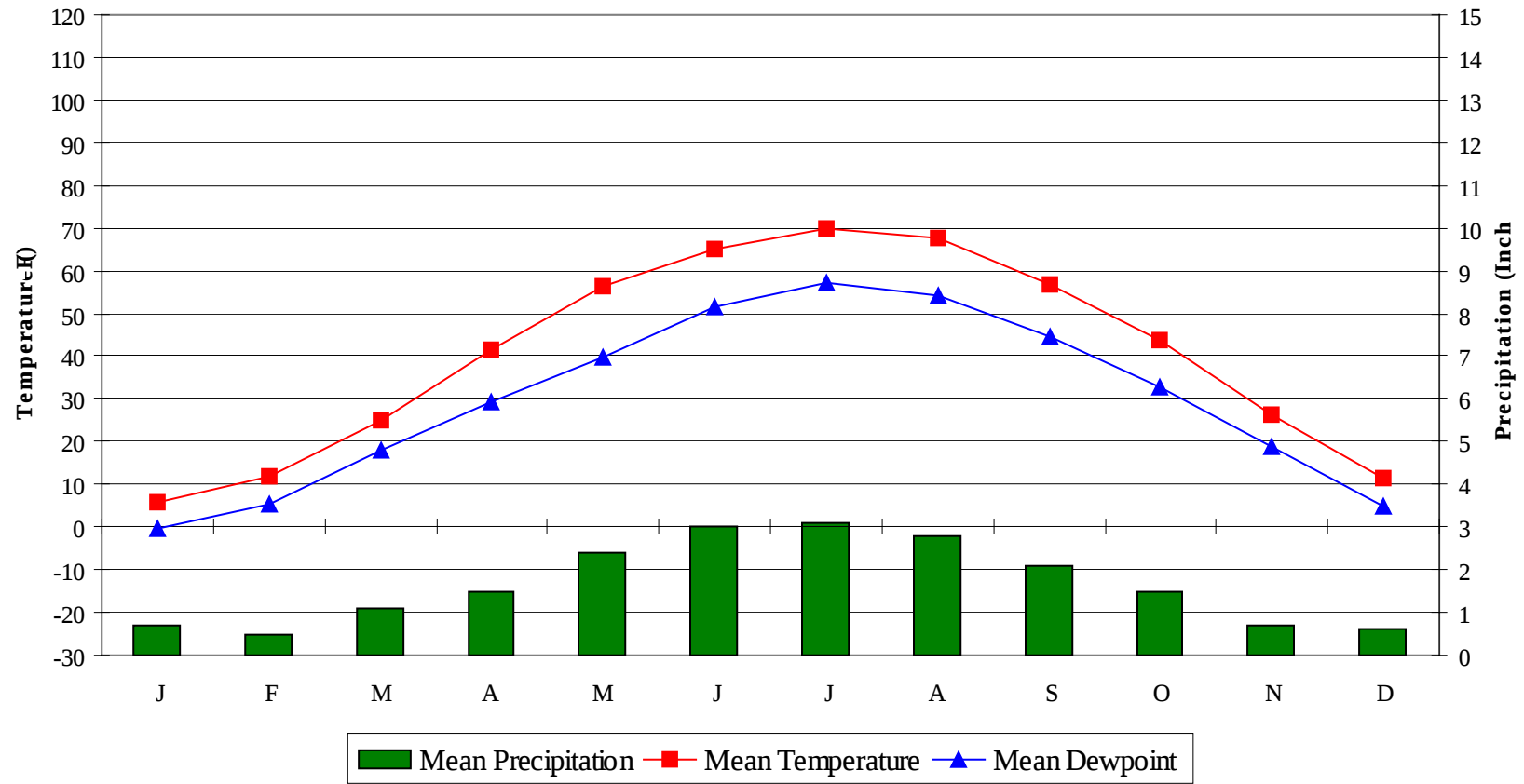
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

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Average Annual Climate

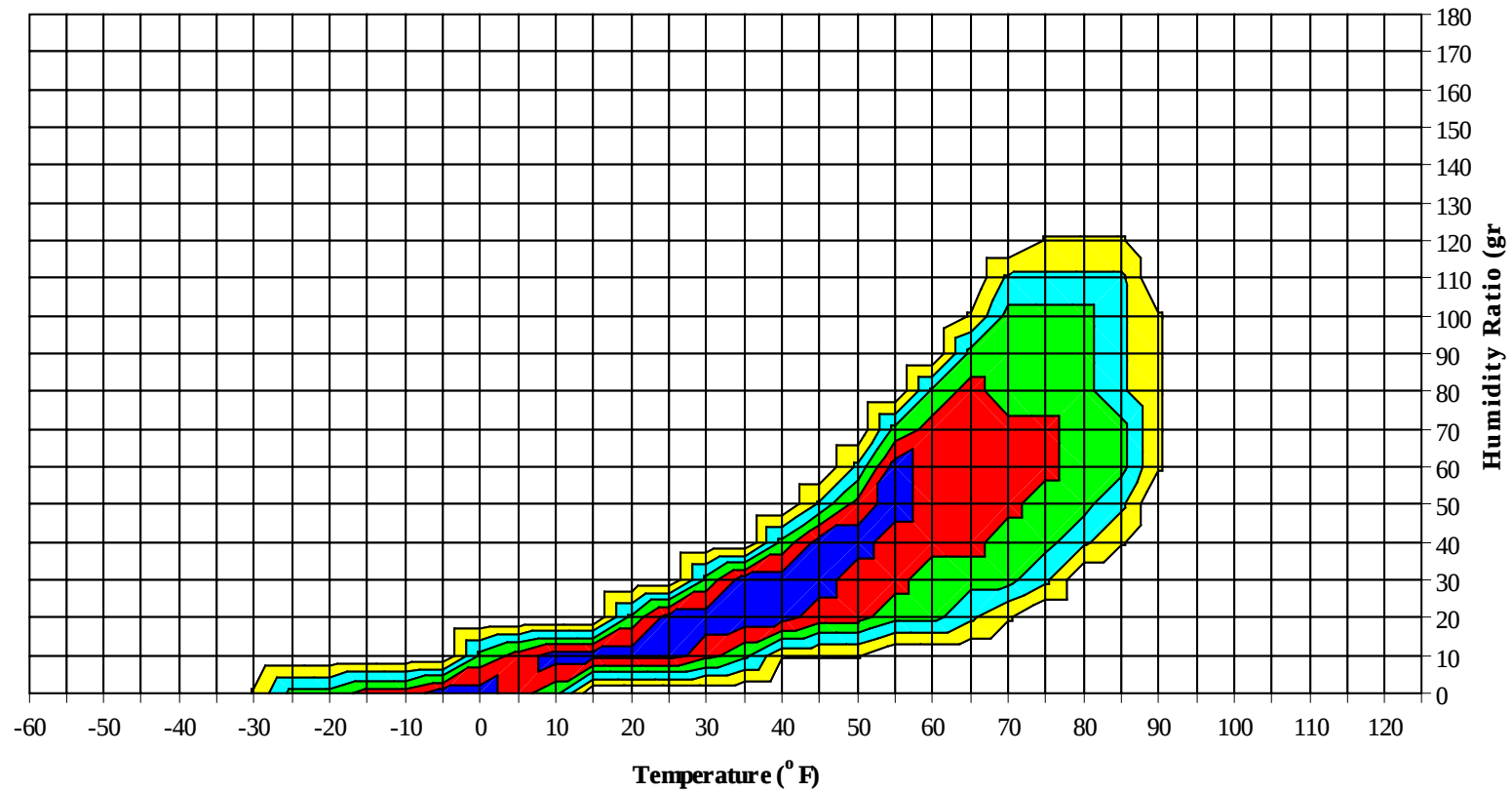


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WMO No. 727575

Long Term Psychrometric Summary

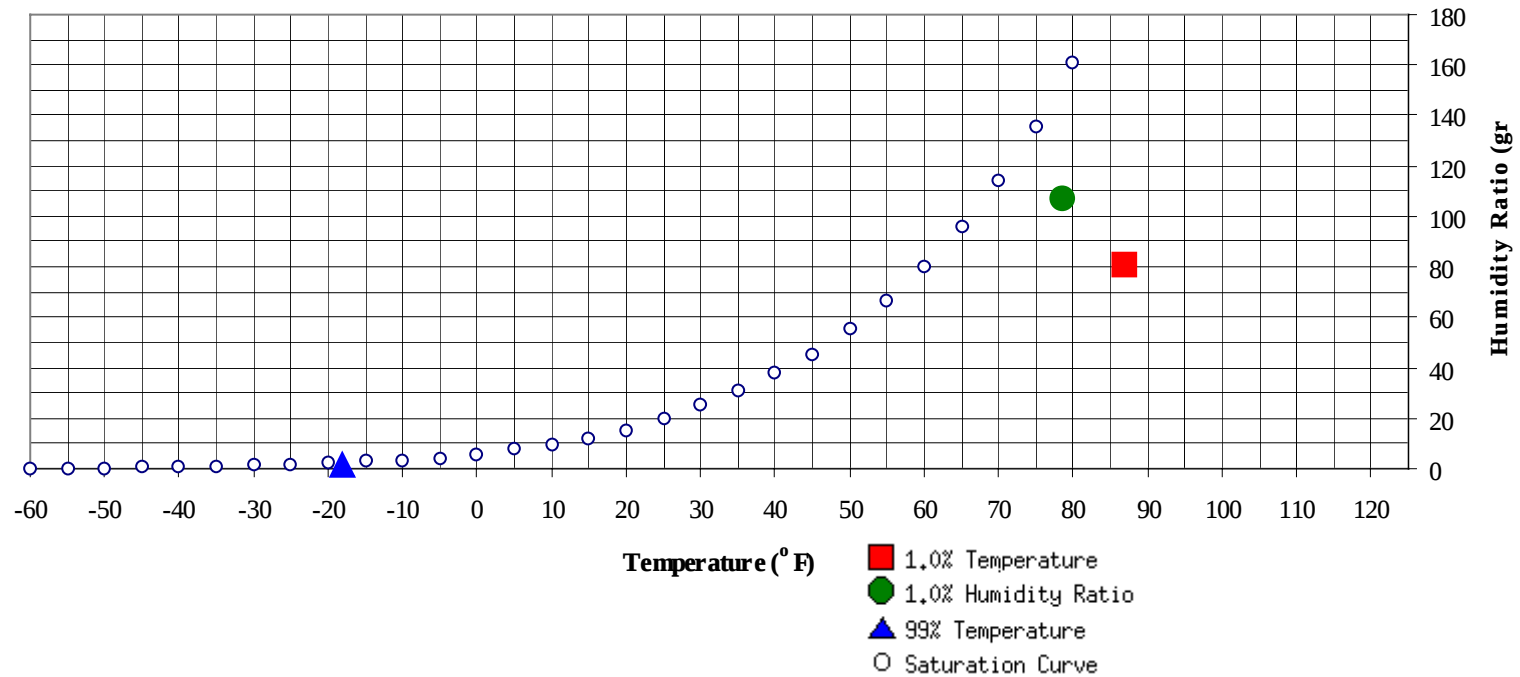


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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Psychrometric Summary of Peak Design Values

	(°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	-18	1.5	-4.1		107.1	78.5	71.1	68	35.6

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	87	81.1	69	33.6

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Dry-Bulb Temperature Hours For An Average Year (Sheet 1 of 5)

Period of Record = 1967 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		
105 / 109															
100 / 104															
95 / 99															
90 / 94															
85 / 89															
80 / 84															
75 / 79															
70 / 74															
65 / 69												0		0	54.3
60 / 64												1	0	1	49.5
55 / 59							0		0	45.2	0	4	1	5	48.0
50 / 54		0		0	45.0		0	0	0	44.2	0	7	3	10	43.8
45 / 49		0		0	41.5		2	1	3	40.5	1	10	7	18	41.2
40 / 44	0	2	1	4	36.9	0	6	3	9	36.9	5	22	15	42	38.0
35 / 39	3	7	5	14	33.5	5	13	12	30	33.8	26	40	41	107	34.2
30 / 34	7	12	12	30	29.6	14	18	19	51	29.9	51	42	49	142	30.2
25 / 29	17	17	18	52	25.4	22	24	24	70	25.4	38	31	35	104	25.2
20 / 24	20	23	22	66	20.7	26	27	25	79	20.7	26	26	24	75	20.3
15 / 19	23	25	27	75	16.0	22	23	22	67	15.9	26	23	23	71	15.6
10 / 14	23	24	21	68	11.0	19	21	21	61	10.8	22	16	18	57	10.8
5 / 9	26	27	24	78	6.0	23	22	24	69	6.0	19	14	14	47	6.0
0 / 4	25	29	28	82	1.1	23	23	24	70	1.1	14	7	10	30	1.2
-5 / -1	22	20	21	63	-3.1	16	15	16	48	-3.2	8	3	5	16	-3.1
-10 / -6	22	23	24	68	-7.7	18	13	14	46	-7.7	6	2	3	11	-7.3
-15 / -11	23	20	20	62	-12.4	16	9	10	34	-12.4	3	0	1	4	-12.0
-20 / -16	17	11	14	43	-17.0	10	4	6	20	-17.0	1		0	1	-16.0
-25 / -21	12	6	8	25	-21.6	6	2	2	9	-21.5					
-30 / -26	5	1	2	8	-26.4	1	1	1	3	-26.7					
-35 / -31	2	0	0	2	-31.2	1	0	0	2	-31.7					
-40 / -36						0			0	-35.7					

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 = 1967 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		
105 / 109															
100 / 104												0		0	73.3
95 / 99		0	0	0	62.7		0	0	0	63.9		1	0	2	71.4
90 / 94		0	0	0	64.0		2	0	3	66.7		6	3	8	70.8
85 / 89		1	0	1	62.5		7	3	10	64.6		13	7	20	69.0
80 / 84		2	1	3	58.8		13	7	20	62.4	1	26	15	41	66.4
75 / 79		4	2	5	57.2	1	21	13	34	59.9	3	38	24	65	63.7
70 / 74	0	6	3	10	55.0	3	32	20	54	57.3	12	48	37	96	61.0
65 / 69	0	10	6	17	52.5	9	37	28	74	54.9	30	48	45	122	58.9
60 / 64	2	17	11	29	49.5	23	38	36	97	52.4	52	35	46	133	56.3
55 / 59	5	25	15	45	46.8	34	33	39	107	49.5	60	19	35	114	52.9
50 / 54	8	33	26	67	44.0	44	28	38	110	46.0	45	6	18	69	48.7
45 / 49	19	37	35	91	41.1	45	19	27	90	42.0	25	2	7	33	44.5
40 / 44	35	36	42	112	37.7	37	11	21	70	38.2	11	0	2	13	40.0
35 / 39	53	32	41	126	33.8	30	5	11	46	34.0	3	0	0	3	36.3
30 / 34	58	21	32	111	29.6	16	1	4	21	29.6					
25 / 29	34	10	15	59	25.2	5	0	1	6	25.2					
20 / 24	15	4	6	25	20.2	1	0	0	2	20.3					
15 / 19	5	2	2	9	15.7										
10 / 14	2	1	1	5	10.8										
5 / 9	1	0	1	3	5.8										
0 / 4	2		0	2	1.0										
-5 / -1	0			0	-2.0										
-10 / -6															
-15 / -11															
-20 / -16															
-25 / -21															
-30 / -26															
-35 / -31															
-40 / -36															

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Dry-Bulb Temperature Hours For An Average Year (Sheet 3 of 5)**Period of Record = 1967 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		
105 / 109		0		0	76.5										
100 / 104		0	0	0	75.0		1	0	1	72.5		0		0	72.8
95 / 99		2	1	3	74.8		2	1	3	72.8		1	0	1	70.6
90 / 94		10	4	14	72.5		11	4	15	70.9		2	1	3	69.9
85 / 89		23	12	34	70.5	0	22	11	33	69.4		5	2	7	67.1
80 / 84	1	51	29	81	67.8	1	37	21	60	67.1	0	11	5	17	65.0
75 / 79	7	61	39	107	65.5	4	49	32	85	64.7	1	18	10	28	62.3
70 / 74	25	53	50	128	63.8	15	52	43	111	62.6	4	28	16	49	59.9
65 / 69	54	33	50	137	61.5	41	40	47	128	60.4	9	37	25	71	57.3
60 / 64	72	12	38	122	58.3	63	24	43	131	57.2	19	42	36	96	54.5
55 / 59	55	3	17	74	54.2	58	10	27	95	53.5	39	41	46	125	51.3
50 / 54	25	1	6	32	50.1	38	2	13	54	49.3	51	32	41	124	47.7
45 / 49	8		1	9	45.7	18	0	4	22	44.8	50	15	33	99	43.3
40 / 44	1			1	41.3	6		1	7	40.6	36	7	16	59	39.1
35 / 39						1			1	35.5	22	1	7	30	34.8
30 / 34						0			0	32.3	7		2	8	30.5
25 / 29											2		0	3	26.1
20 / 24											0			0	22.3
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															
-15 / -11															
-20 / -16															
-25 / -21															
-30 / -26															
-35 / -31															
-40 / -36															

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Dry-Bulb Temperature Hours For An Average Year (Sheet 4 of 5)

Period of Record = 1967 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		
105 / 109															
100 / 104															
95 / 99															
90 / 94		0		0	61.3										
85 / 89		0	0	0	62.6										
80 / 84		1	0	1	60.6										
75 / 79		3	1	3	58.7										
70 / 74		7	2	9	56.5		0		0	54.2					
65 / 69	1	12	5	18	54.0		1		1	52.1					
60 / 64	3	22	10	35	52.0		1	0	2	49.4					
55 / 59	8	29	21	58	48.8	0	3	1	4	47.4					
50 / 54	16	42	34	92	45.4	1	8	3	12	45.1		0	0	0	42.5
45 / 49	33	44	43	119	42.0	4	14	9	27	41.2	0	1	0	2	39.4
40 / 44	51	39	47	138	38.0	9	18	15	42	37.6	0	2	1	4	36.5
35 / 39	55	28	40	123	33.8	20	31	26	77	33.4	4	8	6	18	33.2
30 / 34	43	13	25	82	29.7	45	44	46	135	29.7	13	22	17	52	29.8
25 / 29	20	5	13	38	25.2	47	44	44	134	25.1	23	26	27	76	25.4
20 / 24	11	2	5	18	20.7	38	28	31	96	20.4	33	30	30	93	20.8
15 / 19	4	1	2	6	15.8	26	19	27	72	15.7	30	31	29	90	15.9
10 / 14	2	0	1	2	11.7	20	13	16	49	10.9	32	28	28	88	11.0
5 / 9	0	0	0	1	6.8	12	9	10	31	6.1	23	27	28	78	6.1
0 / 4	0			0	3.3	9	5	7	21	1.4	23	24	22	69	1.1
-5 / -1						4	2	2	7	-3.2	18	18	17	53	-3.3
-10 / -6						3	1	2	7	-7.6	22	14	18	53	-7.4
-15 / -11						1	0	1	2	-11.7	13	9	13	35	-12.3
-20 / -16						1	0	0	1	-16.3	9	5	7	22	-16.8
-25 / -21								0	0	-21.4	4	1	2	8	-21.5
-30 / -26											1	0	1	2	-26.5
-35 / -31											0	0		0	-30.0
-40 / -36															

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GRAND FORKS AFB ND

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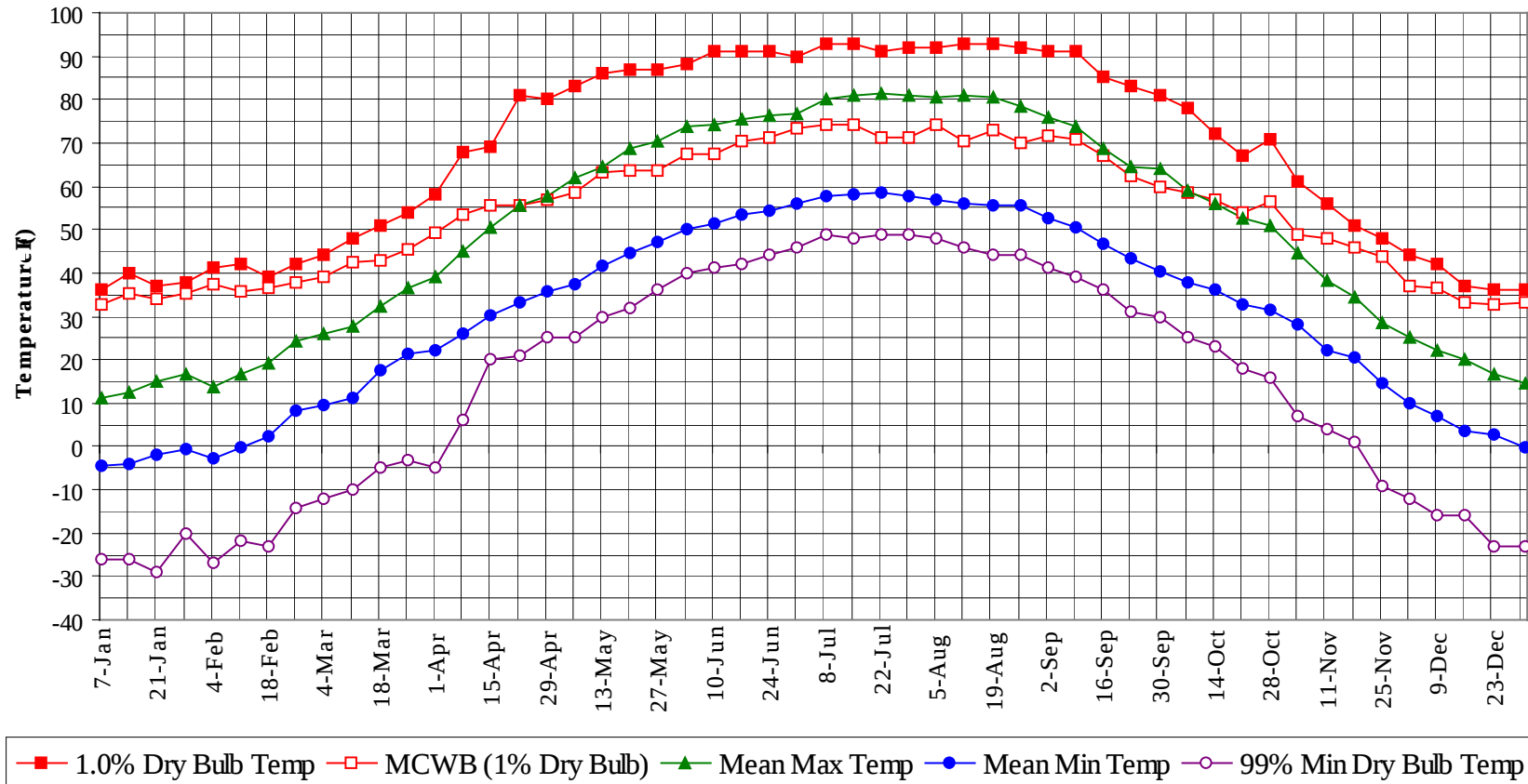
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1967 to 1996

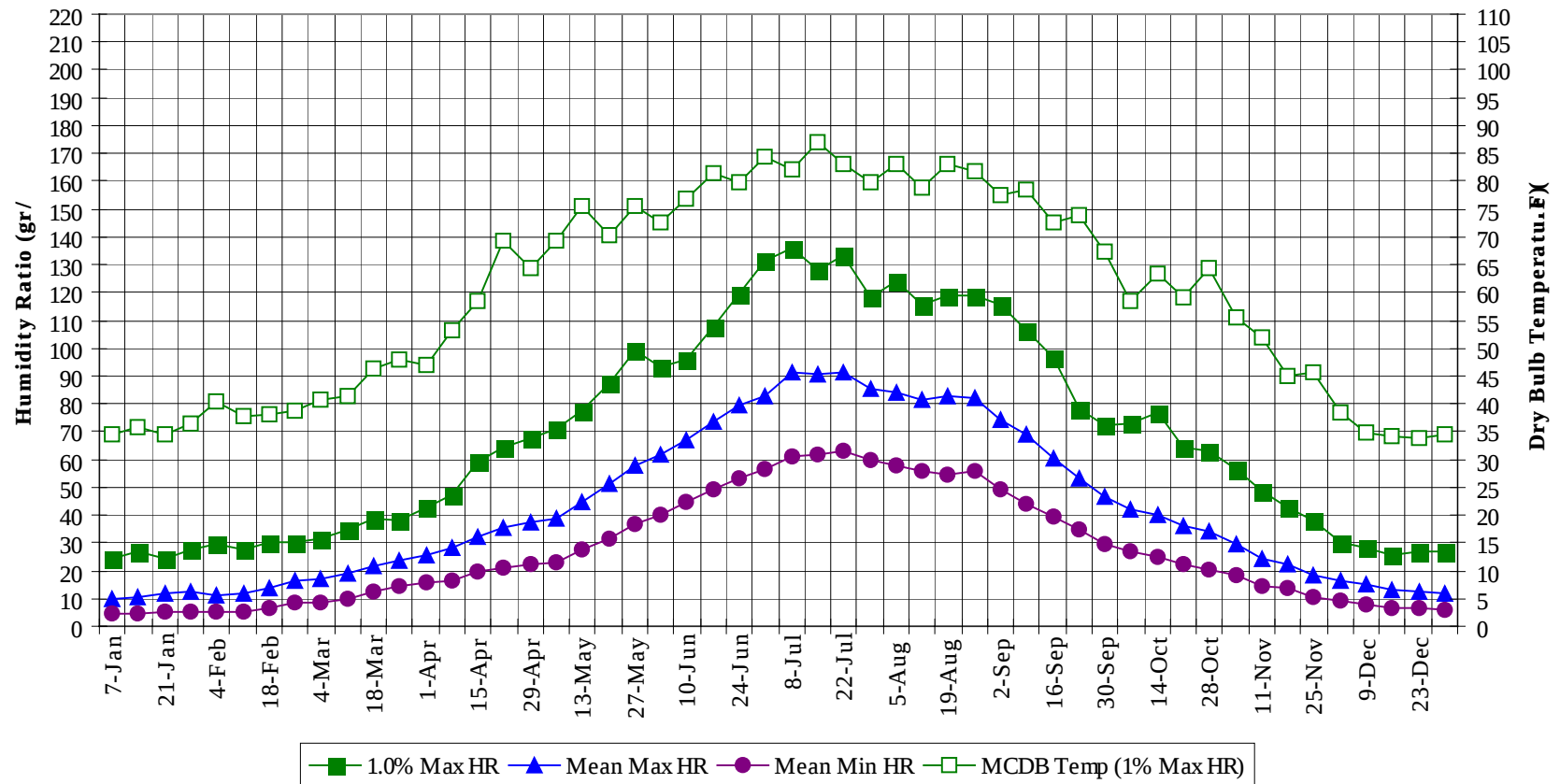
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109		0		0	76.5
100 / 104		1	0	1	72.8
95 / 99		7	2	9	72.6
90 / 94		30	12	43	71.0
85 / 89	0	70	34	105	68.9
80 / 84	2	140	77	220	66.5
75 / 79	15	192	119	326	63.9
70 / 74	59	225	170	454	61.4
65 / 69	142	217	204	563	58.8
60 / 64	231	192	219	642	55.4
55 / 59	256	167	202	625	51.3
50 / 54	228	160	183	571	46.9
45 / 49	205	143	166	514	42.4
40 / 44	192	144	164	500	38.1
35 / 39	222	165	189	576	33.9
30 / 34	255	174	207	636	29.8
25 / 29	210	159	177	545	25.2
20 / 24	173	142	144	458	20.6
15 / 19	136	123	133	393	15.8
10 / 14	121	104	107	333	10.9
5 / 9	107	100	102	309	6.0
0 / 4	97	87	91	275	1.1
-5 / -1	69	58	62	189	-3.2
-10 / -6	71	53	62	186	-7.6
-15 / -11	56	39	44	139	-12.3
-20 / -16	39	21	29	88	-16.9
-25 / -21	22	9	12	42	-21.5
-30 / -26	7	2	4	13	-26.5
-35 / -31	3	0	1	4	-31.3
-40 / -36	0			0	-35.7

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



GRAND FORKS AFB**ND****WMO No. 727575****Long Term Dry Bulb Temperature and Humidity Summary**

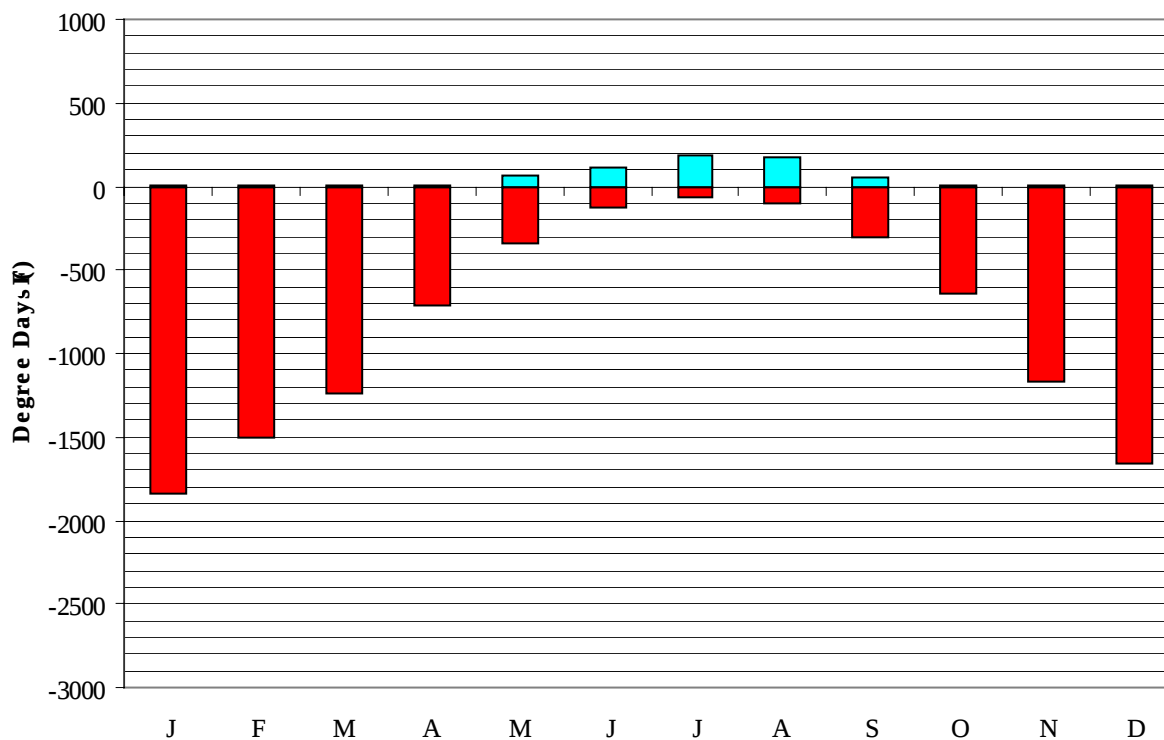
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	36.0	32.9	11.0	-4.4	-26.0	24.5	34.5	9.6	4.4
14-Jan	40.0	35.5	12.5	-4.1	-26.0	26.6	35.7	10.7	4.7
21-Jan	37.0	33.8	15.0	-2.0	-29.0	24.5	34.5	12.0	5.4
28-Jan	38.0	35.2	16.7	-0.7	-20.0	27.3	36.6	12.5	5.2
4-Feb	41.0	37.5	13.8	-2.6	-27.0	29.4	40.4	11.4	5.4
11-Feb	42.0	35.7	16.5	-0.3	-22.0	27.3	37.7	11.8	5.5
18-Feb	39.0	36.4	19.0	2.5	-23.0	30.1	38.3	13.6	6.5
25-Feb	42.0	37.8	24.4	8.3	-14.0	30.1	38.8	16.7	8.4
4-Mar	44.0	39.0	25.9	9.4	-12.0	31.5	40.6	16.8	8.5
11-Mar	48.0	42.4	27.8	11.0	-10.0	35.0	41.2	18.9	9.9
18-Mar	51.0	42.7	32.5	17.5	-5.0	38.5	46.4	21.8	12.7
25-Mar	54.0	45.4	36.5	21.2	-3.0	37.8	48.0	23.9	14.2
1-Apr	58.0	49.2	39.0	22.3	-5.0	42.7	47.1	25.9	15.6
8-Apr	68.0	53.4	45.0	26.1	6.0	47.6	53.3	28.1	16.6
15-Apr	69.0	55.6	50.6	30.3	20.0	58.8	58.4	32.4	19.6
22-Apr	81.0	55.7	55.8	33.1	21.0	64.4	69.2	35.7	21.1
29-Apr	80.0	57.0	57.7	35.6	25.0	67.9	64.5	37.2	22.5
6-May	83.0	58.4	61.9	37.2	25.0	70.7	69.2	39.0	22.7
13-May	86.0	63.0	64.3	41.5	30.0	77.7	75.5	44.6	27.5
20-May	87.0	63.5	68.9	44.6	32.0	87.5	70.2	51.4	31.7
27-May	87.0	63.6	70.5	47.0	36.0	99.4	75.5	57.6	37.1
3-Jun	88.0	67.2	73.9	50.0	40.0	93.1	72.5	61.9	40.3
10-Jun	91.0	67.6	74.2	51.5	41.0	95.9	76.9	67.0	44.5
17-Jun	91.0	70.5	75.6	53.7	42.0	107.8	81.5	73.6	49.1
24-Jun	91.0	71.4	76.3	54.5	44.0	119.7	79.9	79.2	53.3
1-Jul	90.0	73.4	76.9	55.8	46.0	131.6	84.4	83.1	56.3
8-Jul	93.0	74.3	80.1	57.9	49.0	135.8	82.1	91.4	61.3
15-Jul	93.0	74.2	80.9	58.0	48.0	128.1	87.0	90.7	61.4
22-Jul	91.0	71.0	81.3	58.5	49.0	133.0	83.2	91.0	62.9
29-Jul	92.0	71.1	81.0	57.7	49.0	118.3	79.7	85.5	60.0
5-Aug	92.0	74.3	80.6	56.8	48.0	123.9	83.1	84.3	57.6
12-Aug	93.0	70.6	80.8	56.2	46.0	115.5	78.8	81.2	56.1
19-Aug	93.0	73.1	80.4	55.5	44.0	119.0	83.1	82.7	54.8
26-Aug	92.0	70.2	78.2	55.4	44.0	119.0	81.9	82.4	56.1
2-Sep	91.0	71.8	76.0	52.6	41.0	115.5	77.4	74.5	49.0
9-Sep	91.0	71.0	73.8	50.5	39.0	106.4	78.4	69.2	44.0
16-Sep	85.0	66.9	68.7	46.6	36.0	96.6	72.7	60.4	39.1
23-Sep	83.0	62.6	64.3	43.3	31.0	78.1	73.7	53.3	34.7
30-Sep	81.0	60.0	63.9	40.4	30.0	72.1	67.3	46.3	29.2
7-Oct	78.0	58.7	59.1	38.0	25.0	72.8	58.5	42.1	26.7
14-Oct	72.0	56.9	55.8	36.3	23.0	77.0	63.3	39.8	25.0
21-Oct	67.0	53.8	52.5	32.6	18.0	64.4	59.3	36.0	22.2
28-Oct	71.0	56.5	51.1	31.3	16.0	63.0	64.5	34.0	20.6
4-Nov	61.0	48.7	44.5	27.9	7.0	56.7	55.3	29.4	18.1
11-Nov	56.0	47.9	38.1	22.2	4.0	48.3	52.0	24.3	14.5
18-Nov	51.0	46.0	34.6	20.4	1.0	42.7	45.0	22.3	13.6
25-Nov	48.0	43.6	28.5	14.4	-9.0	37.8	45.5	18.6	10.5
2-Dec	44.0	36.9	25.1	10.1	-12.0	30.1	38.5	16.5	8.9
9-Dec	42.0	36.7	22.3	7.1	-16.0	28.0	34.7	14.8	7.6
16-Dec	37.0	33.1	19.9	3.6	-16.0	25.9	34.3	13.4	6.3
23-Dec	36.0	32.7	16.7	2.7	-23.0	26.6	33.7	12.7	6.5
31-Dec	36.0	33.3	14.7	-0.2	-23.0	26.6	34.5	11.7	5.7

GRAND FORKS AFB

ND

WMO No. 727575

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



■ Mean Cooling Degree Days ■ Mean Heating Degree Days

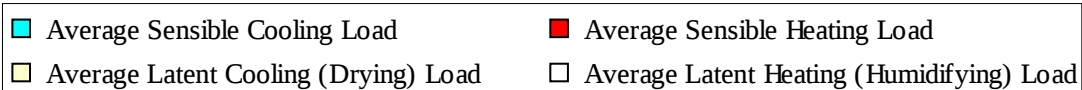
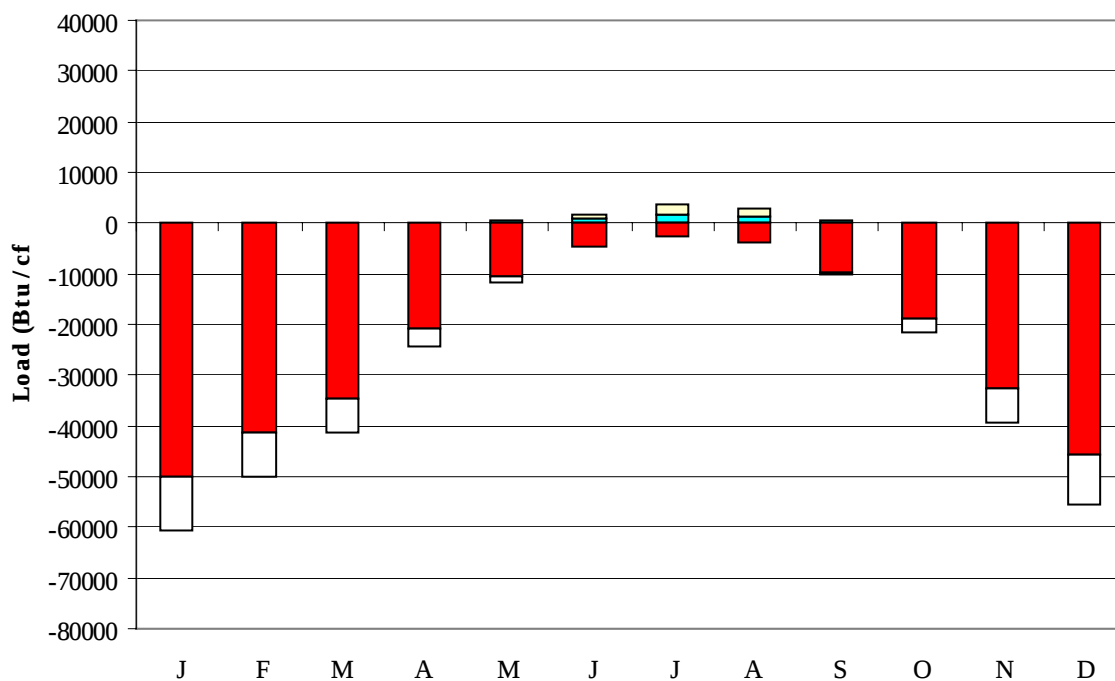
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	1834
FEB	0	1504
MAR	0	1241
APR	10	709
MAY	60	337
JUN	118	129
JUL	191	61
AUG	170	98
SEP	53	301
OCT	6	642
NOV	0	1163
DEC	0	1663
ANN	607	9682

GRAND FORKS AFB

ND

WMO No. 727575

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	-49959	0	-10805
FEB	0	-41190	0	-8840
MAR	0	-34577	0	-6686
APR	55	-20608	0	-3538
MAY	385	-10618	90	-1278
JUN	849	-4669	826	-51
JUL	1530	-2538	2282	-1
AUG	1360	-3688	1449	-18
SEP	334	-9674	256	-464
OCT	20	-18885	3	-2580
NOV	0	-32473	0	-6746
DEC	0	-45516	0	-10029
ANN	4533	-274395	4906	-51036

Average Annual Solar Radiation – Nearest Available Site

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

City: FARGO
 State: ND
 WBAN No: 14914
 Lat(N): 46.9
 Long(W): 96.8
 Elev(ft): 899

Stn Type: Secondary
 SHADING GEOMETRY IN DIMENSIONLESS UNITS

Window: 1
 Overhang: 0.733
 Vert Gap: 0.328

AVERAGE INCIDENT SOLAR RADIATION (Btu/sq.ft./day), Percentage Uncertainty = 9		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
HORIZ	Global	510	800	1160	1490	1810	1970	2040	1750	1260	840	500	400	1210
	Std Dev	37	72	110	159	184	139	102	115	109	69	43	31	37
	Minimum	420	600	930	1210	1280	1790	1840	1540	1020	700	410	320	1160
	Maximum	570	930	1410	1800	2080	2260	2250	1970	1470	990	570	460	1310
	Diffuse	280	420	590	670	760	810	730	630	520	370	280	230	520
Clear Day	Global	650	1020	1540	2100	2510	2660	2560	2200	1680	1110	690	540	1610
NORTH	Global	170	250	350	430	550	640	610	470	340	240	170	140	360
	Diffuse	170	250	350	420	490	530	510	430	340	240	170	140	340
Clear Day	Global	140	210	290	410	590	710	650	450	310	220	150	120	350
EAST	Global	380	560	770	940	1090	1150	1210	1070	820	590	360	290	770
	Diffuse	220	320	440	510	590	630	620	540	420	300	210	170	410
Clear Day	Global	570	820	1120	1380	1540	1590	1540	1390	1170	860	600	490	1090
SOUTH	Global	1030	1180	1210	1090	990	930	1020	1130	1150	1130	870	840	1050
	Diffuse	350	460	540	550	580	600	590	550	480	390	310	290	470
Clear Day	Global	1820	2020	1970	1640	1330	1170	1220	1460	1780	1900	1790	1700	1650
WEST	Global	380	560	750	910	1070	1160	1220	1080	820	580	360	300	770
	Diffuse	220	320	440	520	600	640	630	550	430	300	210	170	420
Clear Day	Global	570	820	1120	1380	1540	1590	1540	1390	1170	860	600	490	1090

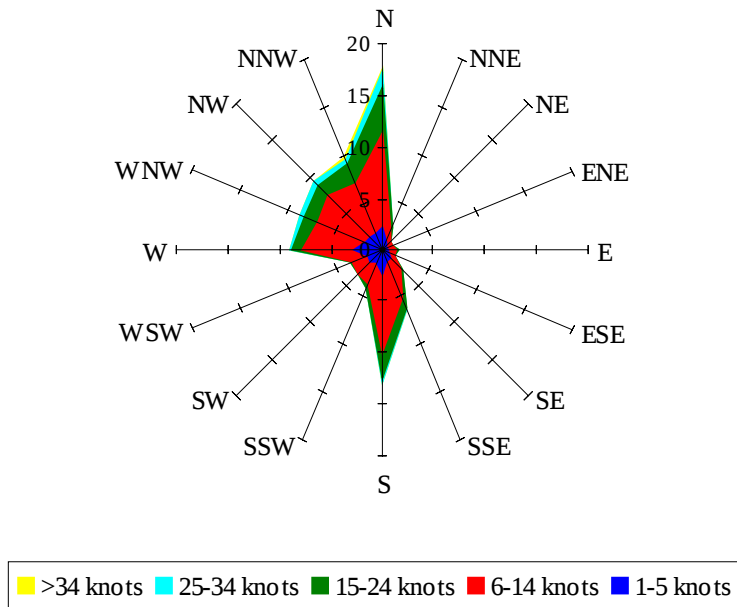
Average Annual Solar Heat and Illumination – Nearest Available Site

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

AVERAGE TRANSMITTED SOLAR RADIATION (Btu/sq.ft./day) FOR DOUBLE GLAZING, Percentage Uncertainty = 9		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
HORIZ	Unshaded	310	520	800	1060	1300	1430	1480	1260	880	560	320	240	850
NORTH	Unshaded	120	170	240	290	360	420	400	310	240	170	120	95	240
	Shaded	95	140	200	240	310	350	340	270	200	140	95	77	210
EAST	Unshaded	260	390	550	670	780	830	860	770	590	410	250	200	550
	Shaded	220	320	450	540	610	640	680	610	480	350	210	170	440
SOUTH	Unshaded	780	880	860	730	640	580	640	740	800	820	660	640	730
	Shaded	750	790	640	410	330	350	350	360	520	700	620	620	530
WEST	Unshaded	260	390	530	650	760	840	880	780	590	410	250	200	550
	Shaded	220	330	430	520	600	650	690	620	480	340	210	170	440

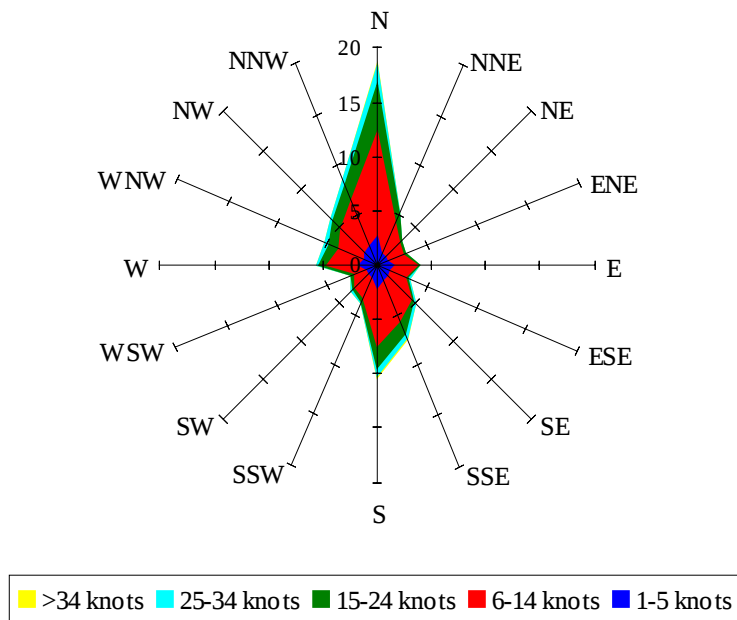
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9											
		March					June				
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear	27	59	72	61	30	42	76	95	93	72
	M.Cloudy	18	41	51	42	21	27	51	64	66	52
NORTH	M.Clear	8	12	14	13	8	17	15	16	16	15
	M.Cloudy	7	14	17	15	9	13	16	18	18	16
EAST	M.Clear	67	62	17	13	8	78	77	40	16	15
	M.Cloudy	26	35	18	15	9	36	45	30	18	16
SOUTH	M.Clear	33	74	91	76	37	10	35	56	55	33
	M.Cloudy	15	39	50	40	18	10	26	39	40	26
WEST	M.Clear	8	12	14	58	67	10	15	16	42	75
	M.Cloudy	7	14	17	33	29	10	16	18	32	48
M.Clear	(% hrs)	30	28	26	25	27	38	36	32	30	34
		Sept					Dec				
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear	19	54	74	72	49	3	25	34	23	1
	M.Cloudy	11	32	47	47	32	3	17	23	15	0
NORTH	M.Clear	6	12	14	14	11	2	7	9	7	0
	M.Cloudy	5	12	15	15	12	1	7	9	7	0
EAST	M.Clear	56	72	36	14	11	14	37	9	7	0
	M.Cloudy	18	32	24	15	12	4	15	9	7	0
SOUTH	M.Clear	15	55	79	77	50	12	66	84	61	2
	M.Cloudy	7	26	42	43	26	3	23	33	22	1
WEST	M.Clear	6	12	14	42	72	2	7	11	39	2
	M.Cloudy	5	12	15	27	35	1	7	10	16	1
M.Clear	(% hrs)	41	41	36	35	38	28	29	27	28	34

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



Percent Calm = 6.09

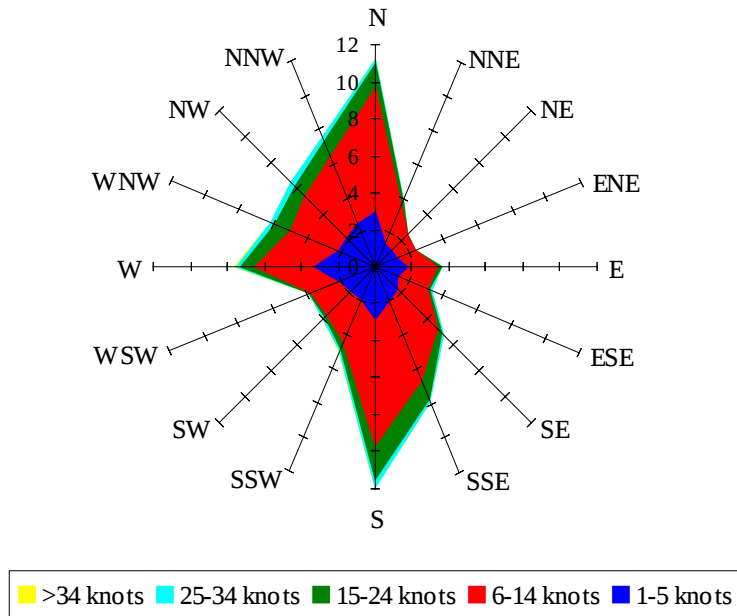
Wind Summary - March, April, and May **Labels of Percent Frequency on North Axis**



Percent Calm = 6.13

Wind Summary - June, July, and August

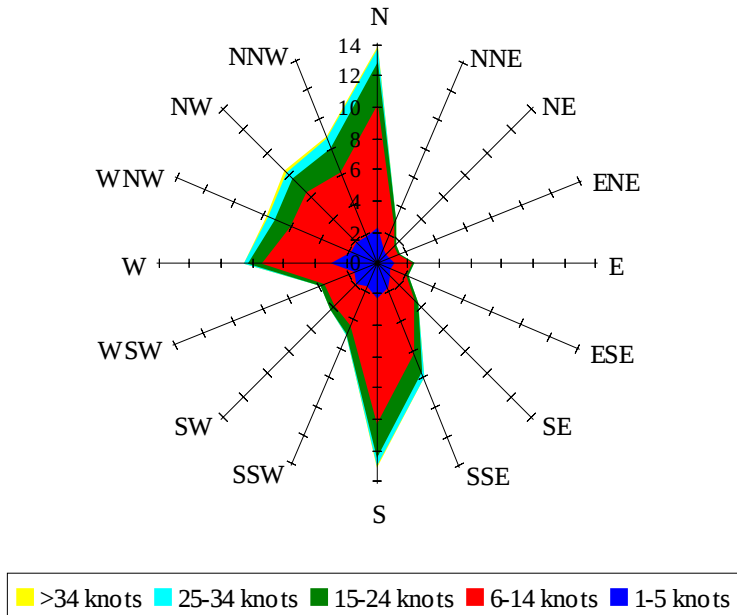
Labels of Percent Frequency on North Axis



Percent Calm = 8.08

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 5.98