

HELENA MT

Latitude = 46.60 N

Longitude = 112.00 W

Period of Record = 1973 to 1996

WMO No. 727720

Elevation = 3898 feet

Average Pressure = 25.99 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	62	41	12.9	W
0.4% Occurrence	91	61	43	11.1	W
1.0% Occurrence	88	60	45	10.5	W
2.0% Occurrence	84	59	46	10.3	W
Mean Daily Range	23	-	-	-	-
97.5% Occurrence	-2	-3	4	4.6	W
99.0% Occurrence	-10	-11	2	3.7	W
99.6% Occurrence	-17	-17	2	3.2	W
Median of Extreme Lows	-22	-22	1	4.3	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	66	84	79	8.2	N
0.4% Occurrence	64	83	69	8.3	N
1.0% Occurrence	62	82	62	8.5	N
2.0% Occurrence	61	80	60	8.5	N
	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	93	72	0.54	6.6	E
0.4% Occurrence	81	68	0.47	6.3	W
1.0% Occurrence	74	67	0.44	6.3	W
2.0% Occurrence	69	67	0.41	6.4	W
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		19	362	0	6

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
5	1.5	90	0.0 + 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 (#)
46.3	107	17	108

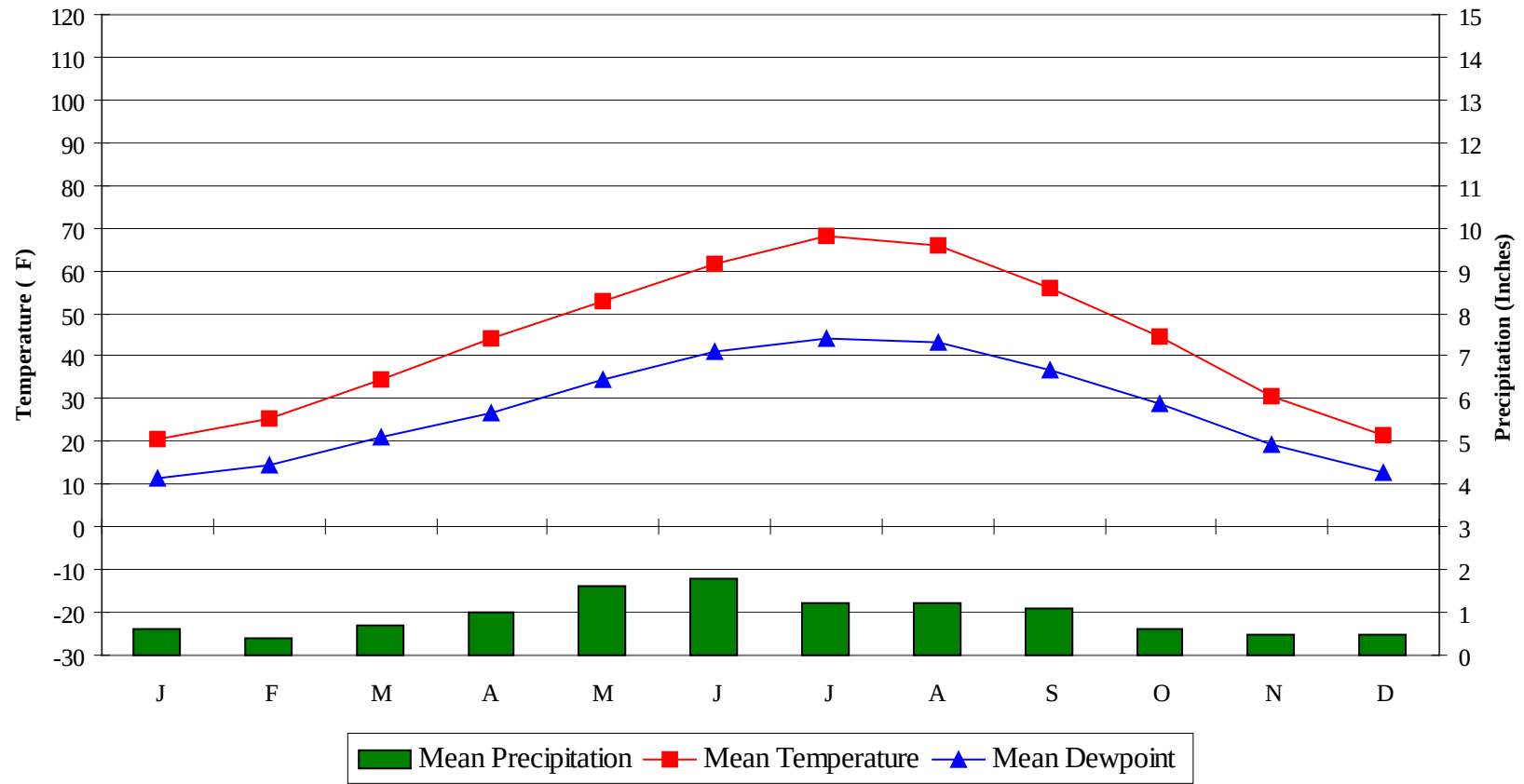
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

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Average Annual Climate

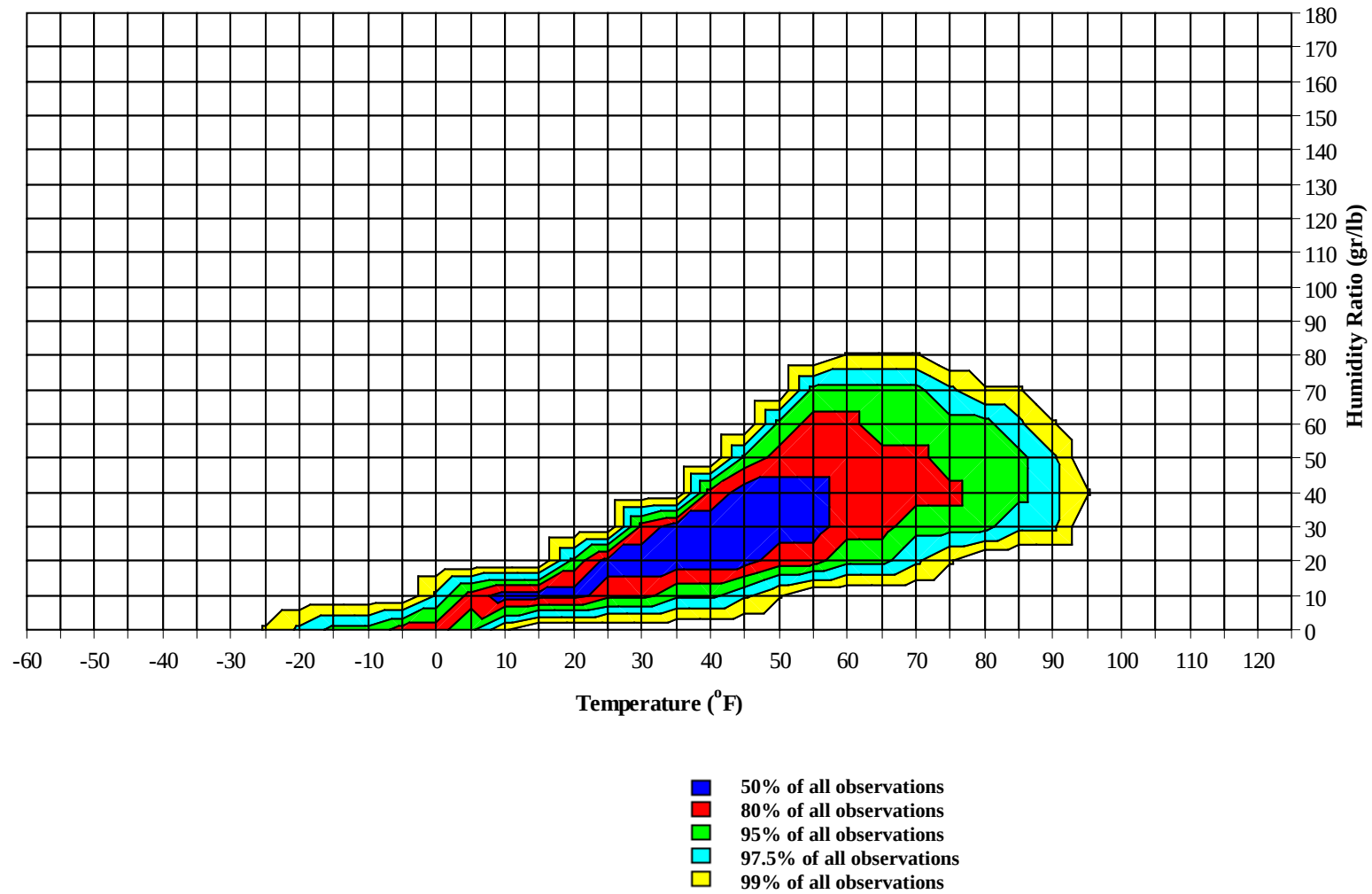


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Long Term Psychrometric Summary

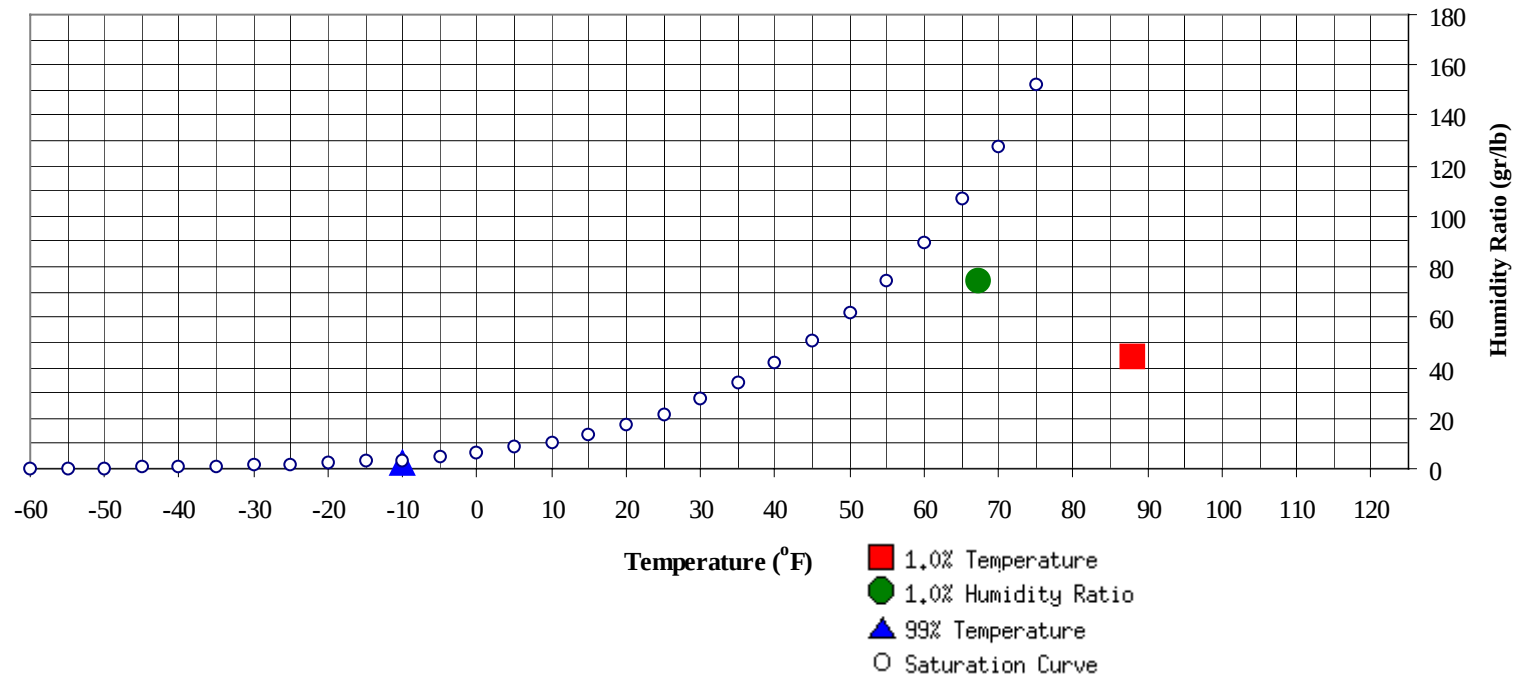


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Psychrometric Summary of Peak Design Values



	(°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	-10	2.4	-2.0	Ratio	74.2	67.4	59.4	55.1	27.7

1.0% Dry Bulb	(°F)	MCHR	MCWB	Enthalpy
		(gr/lb)	(°F)	(btu/lb)
88	44.7	60.2	28.1	

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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	52.3
70 / 74												1	0	1	49.2
65 / 69							0	0	0	47.5		3	1	4	47.1
60 / 64		0		0	42.5		1	0	1	46.5		6	4	10	44.6
55 / 59	0	1	1	2	42.2	0	4	1	5	42.6		13	7	20	42.5
50 / 54	1	3	2	6	40.9	1	13	5	19	40.4	1	23	14	38	40.1
45 / 49	4	11	6	21	38.2	4	18	12	34	37.5	5	36	25	66	37.5
40 / 44	12	25	15	52	35.0	9	31	22	62	34.5	14	49	40	103	34.9
35 / 39	18	31	26	76	31.6	19	35	37	91	31.4	39	42	54	134	31.9
30 / 34	27	33	37	97	28.2	35	30	43	109	28.1	64	34	47	144	28.5
25 / 29	29	28	32	89	24.4	38	20	27	84	24.5	55	15	26	95	24.6
20 / 24	30	23	27	80	20.2	29	15	17	61	20.2	32	11	14	57	20.2
15 / 19	29	21	21	70	15.5	26	13	15	54	15.4	19	7	7	32	15.7
10 / 14	23	19	21	62	10.7	13	11	11	35	10.5	7	4	5	16	10.6
5 / 9	17	18	17	52	5.8	11	10	10	31	5.6	4	3	3	10	5.7
0 / 4	18	13	16	47	1.0	11	9	8	28	0.9	4	2	2	8	1.2
-5 / -1	11	8	9	28	-3.2	7	6	7	20	-3.2	2	1	1	4	-3.3
-10 / -6	10	8	9	27	-7.7	9	4	5	18	-7.6	1	0	0	1	-7.3
-15 / -11	7	4	6	17	-12.4	4	2	2	8	-12.3	1	0	0	1	-12.4
-20 / -16	7	3	3	13	-17.0	2	1	1	4	-17.1	0			0	-16.4
-25 / -21	3	1	1	5	-21.4	2	1	1	4	-21.8	0			0	-20.0
-30 / -26	1	0	0	1	-26.1	1	1	1	3	-26.4					
-35 / -31	0			0		1	0	0	1	-30.9					
-40 / -36	0			0		0			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.

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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												1	0	1	64.1
90 / 94												5	3	8	61.4
85 / 89		0	0	0	55.5		0	0	0	60.6		11	6	17	60.4
80 / 84		1	0	1	55.2		8	3	11	56.3		22	13	35	58.6
75 / 79		4	2	6	52.4		12	7	19	54.9	0	32	19	51	57.0
70 / 74		9	5	14	50.9		22	11	33	53.0	2	38	27	66	55.3
65 / 69		15	8	23	48.5	1	32	21	54	50.8	10	42	37	89	53.1
60 / 64	0	24	13	37	46.4	5	42	31	78	48.6	28	40	42	111	51.1
55 / 59	3	28	23	54	44.1	16	43	43	102	46.5	53	28	43	123	49.0
50 / 54	10	40	32	82	41.2	45	41	47	133	44.3	70	15	33	118	46.1
45 / 49	24	44	38	106	38.5	64	26	43	133	40.9	50	6	15	70	42.6
40 / 44	45	37	47	129	35.7	62	15	29	106	37.5	23	1	3	27	39.0
35 / 39	61	24	40	124	32.5	39	4	11	54	33.6	4		0	4	35.2
30 / 34	55	9	20	84	29.1	12	1	2	15	30.1	0			0	32.0
25 / 29	26	3	8	37	24.9	3		0	3	26.3					
20 / 24	10	2	2	14	20.4	0			0	22.0					
15 / 19	3	1	1	5	16.1										
10 / 14	2	0	1	3	11.1										
5 / 9	0			0	6.1										
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 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	0	63.8		0	0	0	61.0					
95 / 99		3	2	5	61.7		2	1	3	61.9					
90 / 94		14	8	22	61.0		10	5	15	60.6		1	1	2	60.5
85 / 89		29	18	47	60.1	0	27	15	42	59.8		6	3	9	58.4
80 / 84	0	40	25	65	59.0	0	35	22	56	58.5		13	6	19	57.0
75 / 79	1	49	34	84	57.5	0	41	27	68	57.3	0	23	12	34	55.3
70 / 74	7	48	40	95	56.1	4	44	40	88	55.7	0	28	18	46	53.5
65 / 69	27	35	44	106	54.5	18	38	45	101	54.0	2	34	27	63	51.6
60 / 64	62	20	42	124	52.8	50	29	44	123	52.2	8	38	36	83	49.6
55 / 59	80	8	24	112	50.3	76	15	31	121	50.0	25	35	39	99	47.5
50 / 54	51	4	10	65	47.6	64	6	14	83	47.3	49	29	41	119	45.0
45 / 49	18	0	1	19	43.5	26	1	5	32	43.5	63	16	29	107	41.9
40 / 44	2		0	2	39.9	7	1	1	9	39.5	50	11	19	79	38.5
35 / 39						2	0	0	2	35.3	29	4	7	40	34.6
30 / 34						1		0	1	32.0	11	2	3	16	30.5
25 / 29											2	0	0	2	25.8
20 / 24											1			1	20.9
15 / 19											0			0	18.0
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 = 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															
80 / 84		1	0	1	53.9										
75 / 79		5	1	6	53.1										
70 / 74		10	3	13	51.4		0		0	47.5					
65 / 69	0	17	7	24	49.4		1		1	47.5					
60 / 64	2	25	14	41	47.1	0	3	2	5	45.3	0	0		0	45.3
55 / 59	6	32	23	61	44.9	2	10	3	15	43.9	1	2	1	4	43.4
50 / 54	10	42	36	87	42.3	3	16	7	26	41.4	1	5	2	8	40.9
45 / 49	26	42	44	112	39.6	7	25	16	48	38.4	4	9	6	19	38.1
40 / 44	48	35	48	131	36.7	17	40	30	87	35.1	7	18	11	36	35.2
35 / 39	60	22	37	119	33.5	31	41	40	111	31.8	18	34	26	79	31.7
30 / 34	50	11	21	82	29.7	45	35	47	128	28.5	31	38	37	106	27.9
25 / 29	28	4	8	40	25.3	41	22	32	95	24.6	33	33	32	98	24.1
20 / 24	12	2	4	18	20.9	32	15	22	69	20.3	33	28	34	95	20.1
15 / 19	3	1	2	6	16.0	23	11	14	47	15.6	33	26	30	89	15.8
10 / 14	1	1	1	3	10.7	13	7	10	30	10.5	26	17	21	63	11.0
5 / 9	1	0	0	1	6.1	9	5	7	21	5.9	21	12	17	50	6.2
0 / 4	0	0	0	0	1.0	7	5	5	17	1.1	15	8	9	32	1.4
-5 / -1	0	0	0	0	-3.0	3	2	3	8	-3.1	6	5	7	18	-3.1
-10 / -6	0			0	-6.6	4	2	2	8	-7.3	6	5	5	16	-7.5
-15 / -11						2	0	1	3	-11.9	5	3	4	12	-12.4
-20 / -16						0	0	1	1	-17.1	3	3	3	9	-17.3
-25 / -21						0	0	0	0	-22.0	3	2	2	7	-21.8
-30 / -26						0			0	-25.0	1	1	1	3	-26.3
-35 / -31											1	0		1	-31.2
-40 / -36											0	0		0	-35.0

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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	0	63.1
95 / 99		5	3	8	62.0
90 / 94		30	17	47	60.9
85 / 89	0	74	42	116	59.9
80 / 84	0	120	69	189	58.4
75 / 79	2	164	101	267	56.7
70 / 74	13	199	143	355	54.8
65 / 69	59	216	187	462	52.7
60 / 64	156	226	226	608	50.4
55 / 59	261	216	236	713	47.7
50 / 54	303	234	239	776	44.3
45 / 49	294	231	238	762	40.1
40 / 44	296	261	262	819	36.2
35 / 39	320	237	279	836	32.4
30 / 34	331	196	261	789	28.6
25 / 29	254	127	166	547	24.5
20 / 24	180	96	121	397	20.2
15 / 19	137	81	91	309	15.6
10 / 14	86	59	69	214	10.7
5 / 9	65	49	54	168	5.9
0 / 4	57	38	41	135	1.1
-5 / -1	31	22	27	79	-3.2
-10 / -6	32	19	22	72	-7.6
-15 / -11	18	9	13	40	-12.3
-20 / -16	13	7	7	27	-17.1
-25 / -21	8	3	4	15	-21.7
-30 / -26	2	1	2	5	-26.3
-35 / -31	2	0	0	2	-31.1
-40 / -36	0	0		0	-35.0

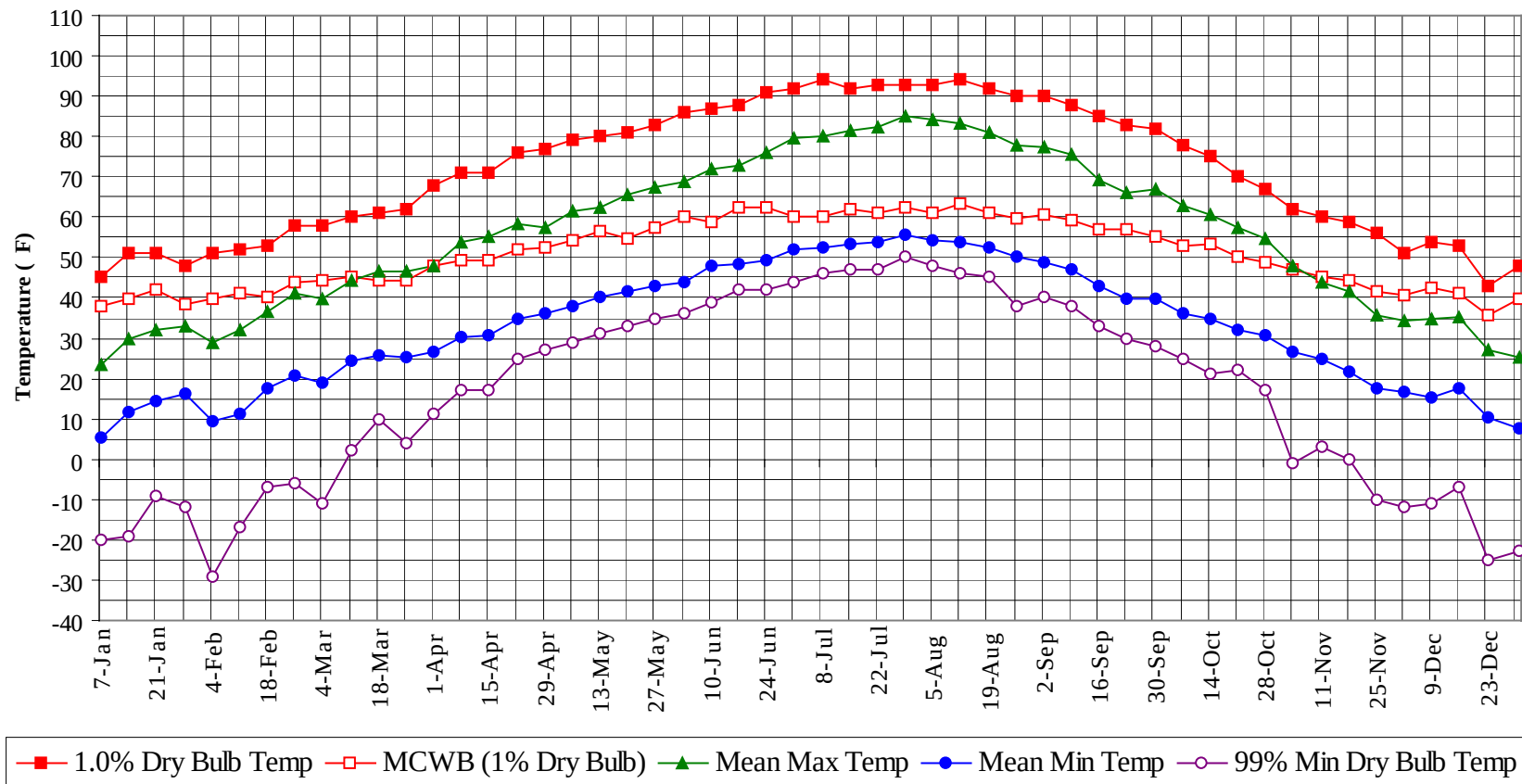
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

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Annual Summary of Temperatures

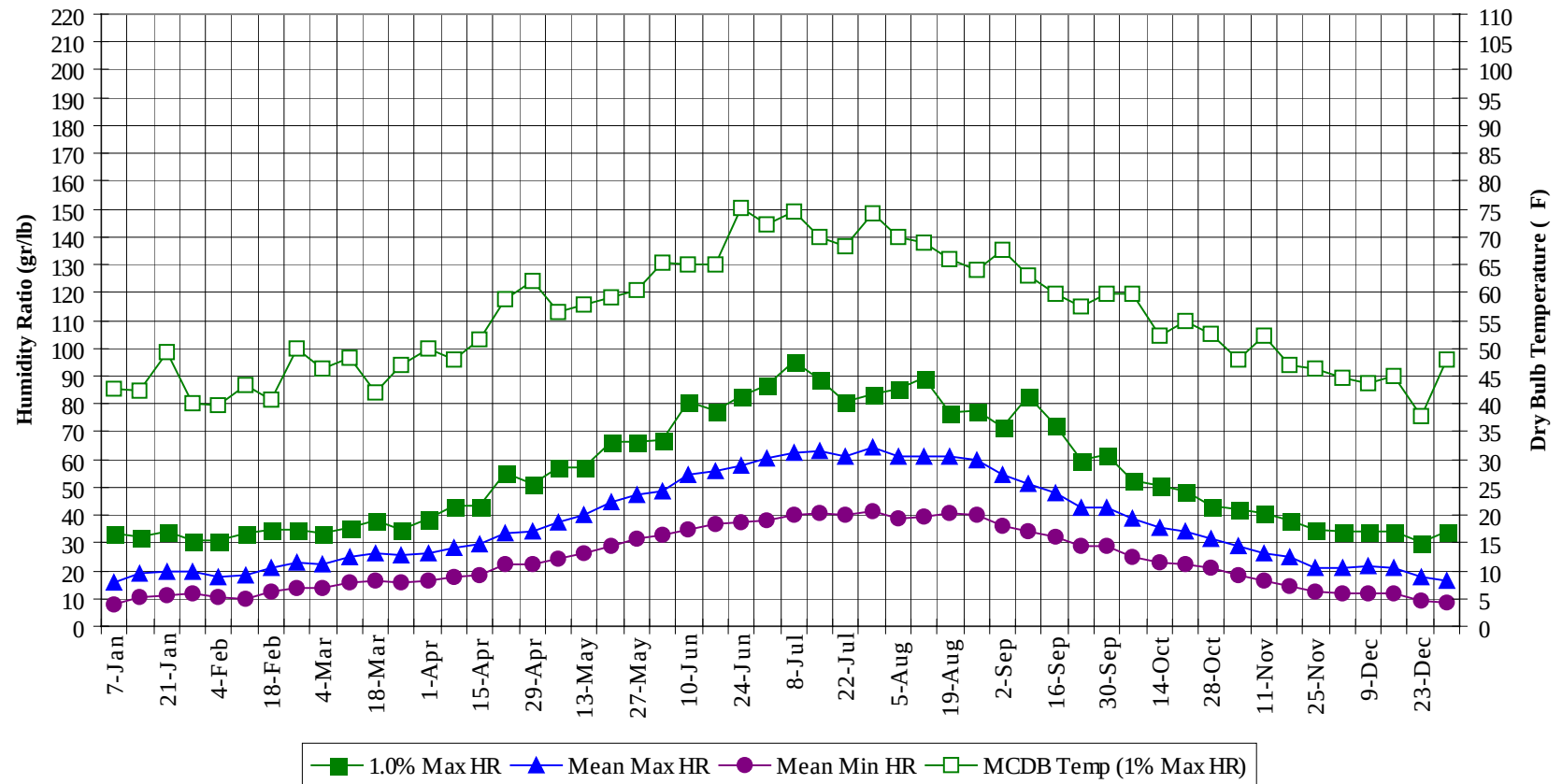


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Long Term Humidity and Dry Bulb Temperature Summary



HELENA**MT****WMO No. 727720****Long Term Dry Bulb Temperature and Humidity Summary**

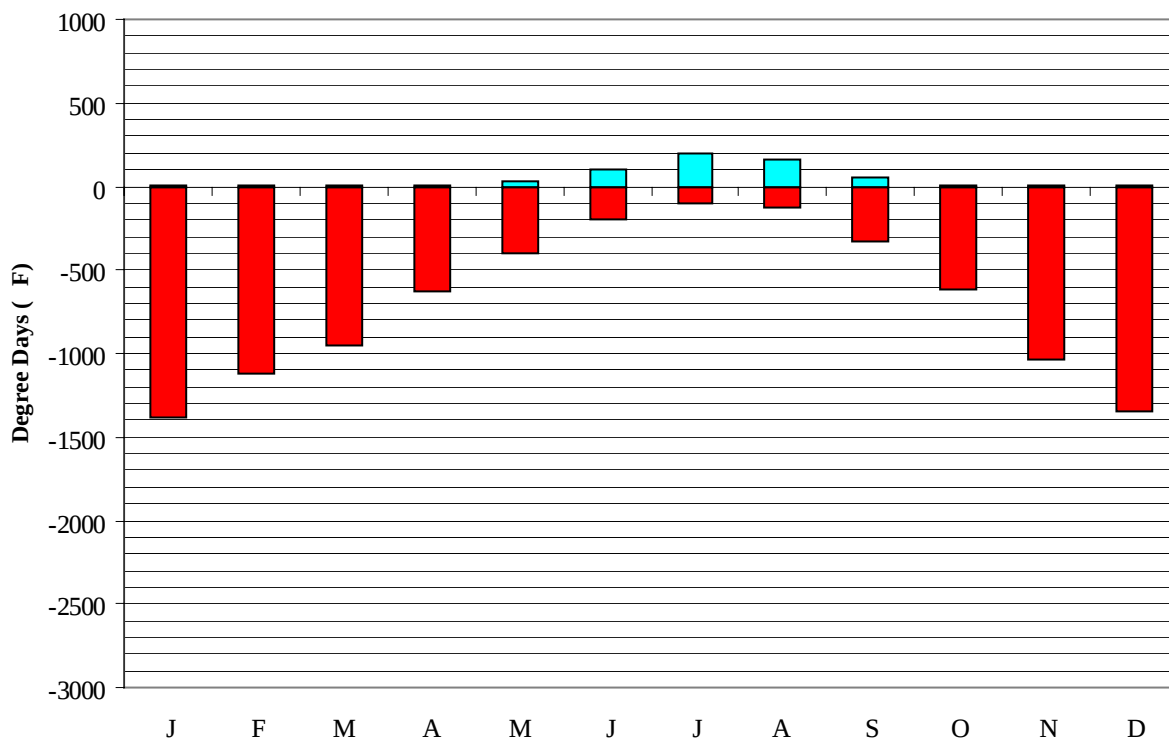
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	45.0	38.0	23.4	5.4	-20.0	33.6	42.7	15.7	8.1
14-Jan	51.0	39.8	29.6	11.5	-19.0	32.2	42.3	18.8	10.2
21-Jan	51.0	42.0	32.3	14.2	-9.0	34.3	49.2	20.0	11.1
28-Jan	48.0	38.3	33.1	16.2	-12.0	30.8	40.0	19.7	11.6
4-Feb	51.0	39.6	29.1	9.5	-29.0	30.8	39.7	17.5	10.2
11-Feb	52.0	41.0	32.1	11.2	-17.0	33.6	43.5	18.5	10.1
18-Feb	53.0	40.2	36.5	17.6	-7.0	35.0	40.8	21.2	12.5
25-Feb	58.0	44.0	41.0	20.8	-6.0	35.0	50.0	22.7	13.6
4-Mar	58.0	44.3	39.7	18.9	-11.0	33.6	46.3	22.3	13.7
11-Mar	60.0	45.0	44.5	24.3	2.0	35.7	48.2	25.1	15.9
18-Mar	61.0	44.2	46.8	25.7	10.0	37.8	42.1	26.3	16.6
25-Mar	62.0	44.2	46.6	25.4	4.0	35.0	47.1	25.8	15.6
1-Apr	68.0	47.9	48.1	26.4	11.0	38.5	49.8	26.3	16.4
8-Apr	71.0	49.3	53.6	30.2	17.0	43.4	48.1	28.6	18.0
15-Apr	71.0	49.1	55.0	30.8	17.0	43.4	51.6	29.9	18.4
22-Apr	76.0	52.2	58.5	34.9	25.0	55.3	58.7	33.7	22.5
29-Apr	77.0	52.4	57.3	36.2	27.0	51.1	62.1	34.5	22.2
6-May	79.0	54.1	61.4	37.7	29.0	57.4	56.3	37.4	24.4
13-May	80.0	56.3	62.3	40.3	31.0	57.4	57.7	40.4	26.3
20-May	81.0	54.9	65.5	41.8	33.0	66.5	59.1	44.5	29.2
27-May	83.0	57.3	67.2	43.1	35.0	66.5	60.4	47.2	31.3
3-Jun	86.0	60.1	68.6	44.0	36.0	67.2	65.2	48.7	32.5
10-Jun	87.0	58.9	72.1	47.8	39.0	80.5	65.0	54.3	34.5
17-Jun	88.0	62.5	72.6	48.2	42.0	77.7	65.1	56.1	36.5
24-Jun	91.0	62.4	75.9	49.4	42.0	82.6	75.1	57.7	37.6
1-Jul	92.0	60.3	79.7	52.0	44.0	86.8	72.4	60.6	38.2
8-Jul	94.0	60.2	80.3	52.3	46.0	95.2	74.7	62.5	40.0
15-Jul	92.0	61.9	81.3	53.3	47.0	88.9	69.9	62.8	40.6
22-Jul	93.0	61.2	82.2	53.9	47.0	80.5	68.3	61.0	40.1
29-Jul	93.0	62.5	85.1	55.7	50.0	83.3	74.2	64.3	41.6
5-Aug	93.0	61.1	84.2	54.2	48.0	85.4	69.8	61.0	38.9
12-Aug	94.0	63.4	83.1	53.8	46.0	89.6	68.9	60.9	39.1
19-Aug	92.0	60.9	81.0	52.5	45.0	77.0	66.2	60.8	40.4
26-Aug	90.0	59.7	77.8	50.3	38.0	77.7	64.1	59.5	39.8
2-Sep	90.0	60.8	77.4	48.6	40.0	71.4	67.6	54.3	35.9
9-Sep	88.0	59.1	75.4	46.9	38.0	82.6	63.2	51.4	34.1
16-Sep	85.0	57.0	69.4	42.9	33.0	72.1	59.9	47.9	32.0
23-Sep	83.0	57.2	65.9	39.6	30.0	59.5	57.4	42.6	29.2
30-Sep	82.0	55.1	67.1	39.9	28.0	61.6	59.8	42.9	29.1
7-Oct	78.0	52.7	62.7	36.1	25.0	52.5	59.8	38.4	25.1
14-Oct	75.0	53.5	60.5	34.7	21.0	50.4	52.2	35.5	23.3
21-Oct	70.0	50.0	57.3	32.1	22.0	48.3	54.8	34.5	22.4
28-Oct	67.0	48.7	54.7	30.9	17.0	43.4	52.4	31.8	20.7
4-Nov	62.0	46.9	48.0	26.8	-1.0	42.0	47.8	28.6	18.1
11-Nov	60.0	45.1	44.0	24.7	3.0	40.6	52.2	26.5	16.4
18-Nov	59.0	44.3	41.7	21.8	0.0	37.8	47.0	24.7	14.7
25-Nov	56.0	41.7	35.6	17.6	-10.0	35.0	46.1	20.8	12.2
2-Dec	51.0	40.6	34.1	16.5	-12.0	34.3	44.7	20.8	11.9
9-Dec	54.0	42.4	34.6	15.4	-11.0	34.3	43.7	21.4	12.1
16-Dec	53.0	41.0	35.2	17.3	-7.0	34.3	45.0	21.3	11.9
23-Dec	43.0	35.6	27.3	10.3	-25.0	30.1	37.9	17.6	9.5
31-Dec	48.0	39.7	25.1	7.7	-23.0	34.3	47.9	16.4	8.6

HELENA

MT

WMO No. 727720

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



■ Mean Cooling Degree Days ■ Mean Heating Degree Days

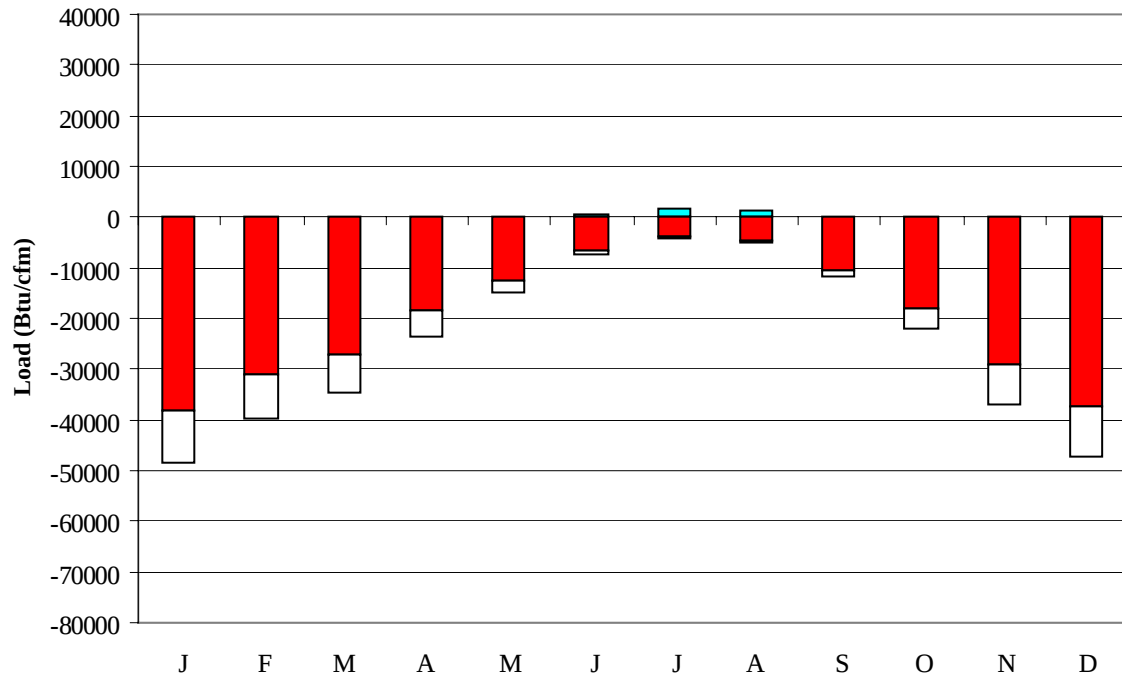
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	1379
FEB	0	1115
MAR	1	947
APR	9	631
MAY	31	407
JUN	98	195
JUL	195	98
AUG	162	130
SEP	55	331
OCT	8	617
NOV	0	1036
DEC	0	1344
ANN	559	8230

HELENA

MT

WMO No. 727720

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 (Btu/cfm)	Average Sensible Heating Load (Btu/cfm)	Average Latent Cooling Load (Btu/cfm)	Average Latent Heating Load (Btu/cfm)
JAN	0	-38161	0	-10321
FEB	0	-31086	0	-8606
MAR	0	-26950	0	-7559
APR	18	-18596	0	-4933
MAY	142	-12666	0	-2205
JUN	679	-6656	10	-742
JUL	1694	-3710	16	-335
AUG	1348	-4687	3	-350
SEP	317	-10435	0	-1294
OCT	18	-18217	0	-3924
NOV	0	-29196	0	-7844
DEC	0	-37243	0	-10189
ANN	4216	-237603	29	-58302

Average Annual Solar Radiation – Nearest Available Site

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

City: HELENA
 State: MT
 WBAN No: 24144
 Lat(N): 46.6
 Long(W): 112
 Elev(ft): 3898

Stn Type: Secondary
 SHADING GEOMETRY IN DIMENSIONLESS UNITS

Window: 1
 Overhang: 0.724
 Vert Gap: 0.329

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	460	730	1110	1510	1820	2050	2220	1870	1390	920	530	390	1250
	Std Dev	36	48	83	118	128	154	111	125	133	69	34	26	29
	Minimum	390	660	920	1330	1610	1790	1980	1620	1130	800	460	340	1210
	Maximum	530	870	1310	1780	2060	2390	2410	2140	1650	1060	580	440	1320
	Diffuse	260	370	530	670	760	750	600	540	460	350	270	220	480
Clear Day	Global	660	1020	1570	2160	2580	2750	2650	2280	1750	1160	730	560	1660
NORTH	Global	160	230	320	430	560	650	630	470	340	240	170	130	360
	Diffuse	160	230	320	420	490	520	490	420	340	240	170	130	330
Clear Day	Global	130	190	270	400	600	740	680	450	300	210	140	110	350
EAST	Global	330	510	730	940	1130	1240	1380	1210	930	650	380	290	810
	Diffuse	200	280	410	520	590	610	580	510	420	310	210	170	400
Clear Day	Global	590	830	1140	1440	1610	1660	1620	1460	1230	910	630	510	1140
SOUTH	Global	870	1100	1180	1100	980	950	1080	1200	1310	1270	950	810	1070
	Diffuse	310	400	490	550	580	580	550	520	470	400	320	280	450
Clear Day	Global	1870	2030	1990	1670	1330	1170	1220	1480	1830	2000	1880	1760	1680
WEST	Global	340	520	730	930	1060	1170	1270	1120	920	650	390	290	780
	Diffuse	200	290	410	520	590	620	590	520	420	310	220	170	410
Clear Day	Global	590	830	1140	1440	1610	1660	1620	1460	1230	910	630	510	1140

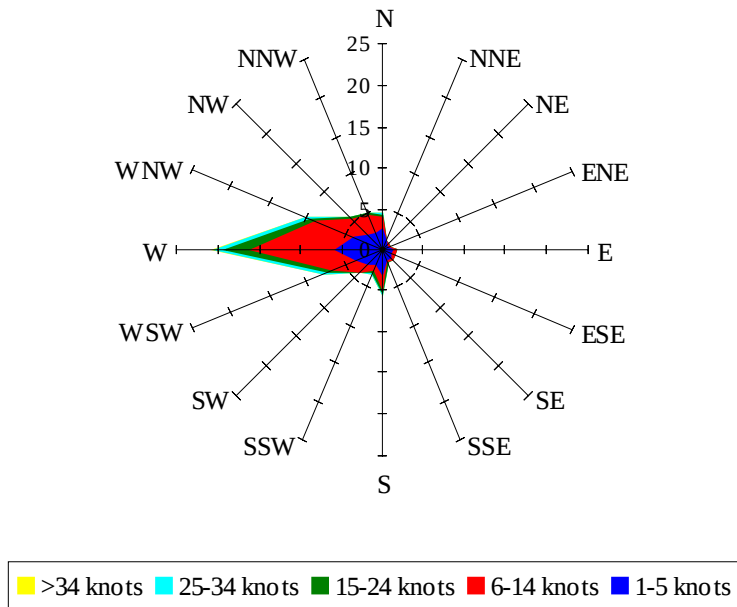
Average Annual Solar Heat and Illumination – Nearest Available Site

(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	280	480	770	1070	1310	1490	1620	1350	980	610	330	230	880
NORTH	Unshaded	110	160	220	290	370	420	400	310	230	170	120	92	240
	Shaded	88	130	190	250	310	360	350	270	200	150	96	75	210
EAST	Unshaded	230	350	520	680	810	890	990	880	660	460	260	190	580
	Shaded	190	300	430	550	640	700	790	710	550	380	220	160	470
SOUTH	Unshaded	660	820	840	740	630	590	660	780	910	930	720	620	740
	Shaded	630	740	620	420	330	340	330	360	580	790	690	600	530
WEST	Unshaded	230	360	520	660	760	840	910	810	660	460	270	200	560
	Shaded	200	310	430	530	600	660	720	650	550	380	230	170	450

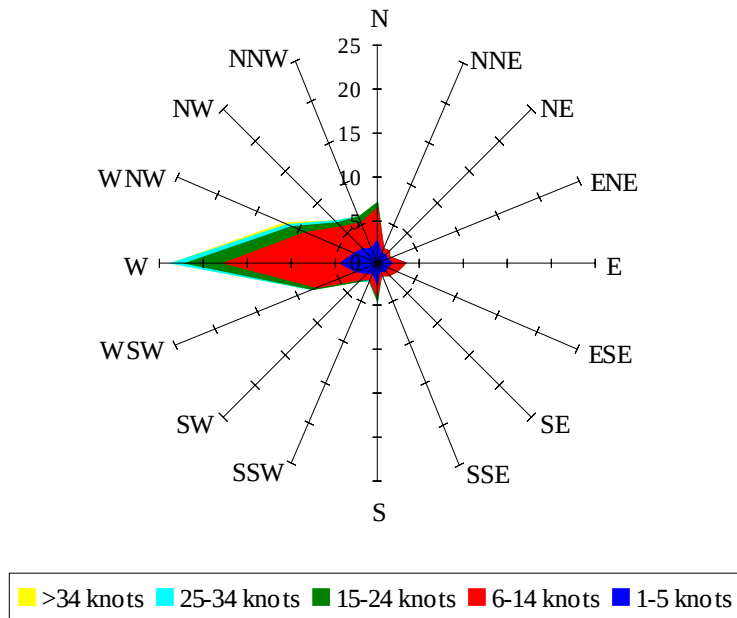
AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9		March					June				
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear	27	58	71	60	30	43	77	96	95	75
	M.Cloudy	18	40	50	43	21	28	53	69	66	53
NORTH	M.Clear	7	12	13	12	8	18	14	15	16	14
	M.Cloudy	7	13	15	14	8	13	16	18	17	15
EAST	M.Clear	69	61	17	12	8	83	78	40	16	14
	M.Cloudy	28	35	17	14	8	39	48	32	17	15
SOUTH	M.Clear	33	73	90	76	39	10	34	55	55	33
	M.Cloudy	16	40	52	43	19	10	26	41	40	26
WEST	M.Clear	7	12	13	57	71	10	14	15	41	77
	M.Cloudy	7	13	15	35	32	10	16	18	32	49
M.Clear	(% hrs)	21	21	19	19	19	40	38	34	31	27
		Sept					Dec				
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear	20	56	76	75	52	3	25	35	23	1
	M.Cloudy	12	36	52	50	35	3	16	23	16	1
NORTH	M.Clear	6	11	14	14	11	2	7	9	7	1
	M.Cloudy	5	12	16	15	12	1	7	9	7	1
EAST	M.Clear	63	75	37	14	11	16	38	9	7	1
	M.Cloudy	21	39	27	15	12	5	16	9	7	1
SOUTH	M.Clear	16	57	81	80	52	13	68	85	63	5
	M.Cloudy	8	32	49	47	30	4	25	36	25	2
WEST	M.Clear	6	11	14	43	76	2	7	11	39	6
	M.Cloudy	5	12	16	29	40	1	7	10	17	2
M.Clear	(% hrs)	46	44	43	42	43	18	21	20	21	22

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



Percent Calm = 26.03

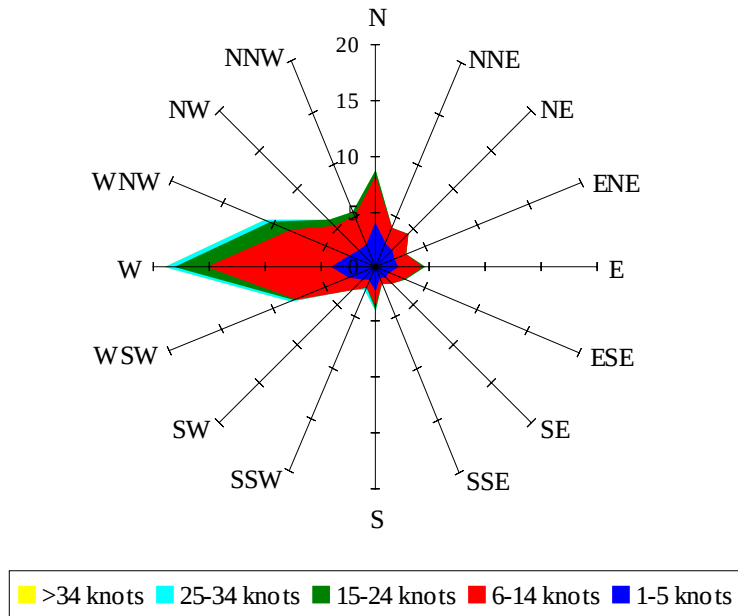
Wind Summary - March, April, and May **Labels of Percent Frequency on North Axis**



Percent Calm = 13.41

Wind Summary - June, July, and August

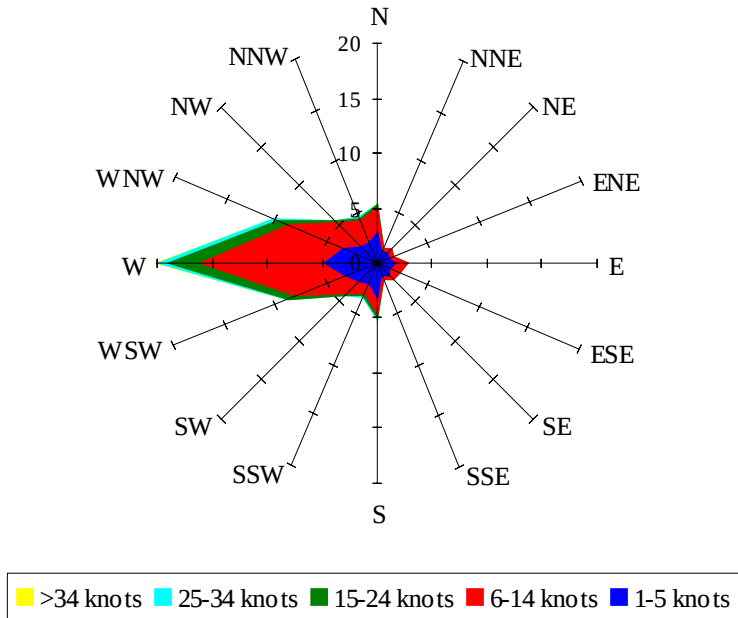
Labels of Percent Frequency on North Axis



Percent Calm = 12.56

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 19.72