

TONOPAH NV	
Latitude = 38.05 N	WMO No. 724855
Longitude = 117.00 W	Elevation = 5427 feet
Period of Record = 1973 to 1996	Average Pressure = 24.61 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	60	30	11.7	W
0.4% Occurrence	95	59	32	11.2	S
1.0% Occurrence	93	58	32	11.3	S
2.0% Occurrence	90	57	33	11.3	S
Mean Daily Range	27	-	-	-	-
97.5% Occurrence	19	17	11	8.2	N
99.0% Occurrence	13	11	9	7.9	N
99.6% Occurrence	8	7	7	8.0	N
Median of Extreme Lows	1	0	5	6.5	NNW
	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	65	85	76	10.0	S
0.4% Occurrence	63	84	67	9.9	S
1.0% Occurrence	61	83	60	10.2	S
2.0% Occurrence	60	83	56	10.2	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	98	66	0.54	6.6	S
0.4% Occurrence	82	67	0.45	7.4	SE
1.0% Occurrence	74	69	0.41	7.9	N
2.0% Occurrence	65	70	0.36	8.5	N
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		91	951	0	0

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
6	1.0	N/A	0.0 + 0.9
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 (#)
54.9	52	15	122

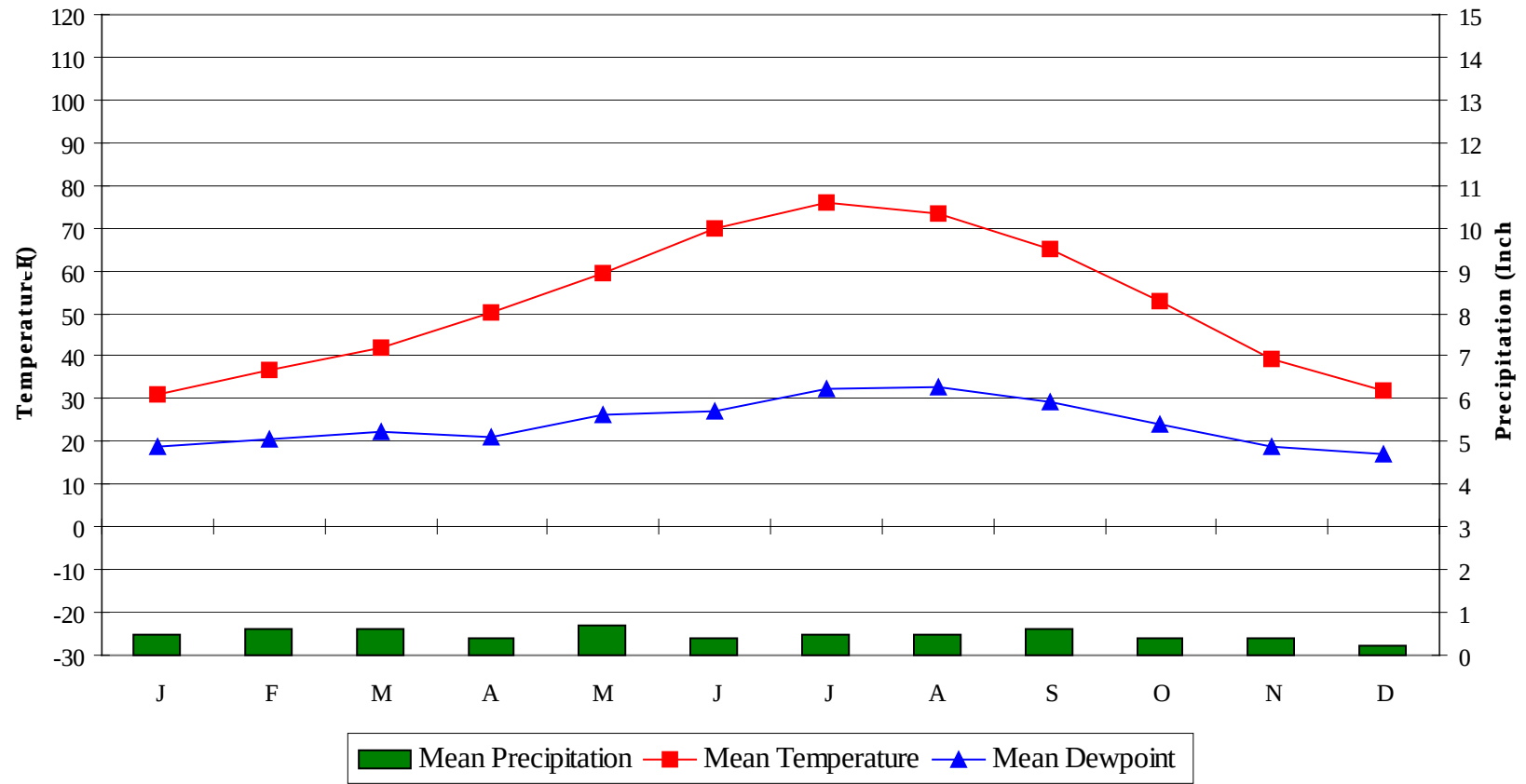
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

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Average Annual Climate

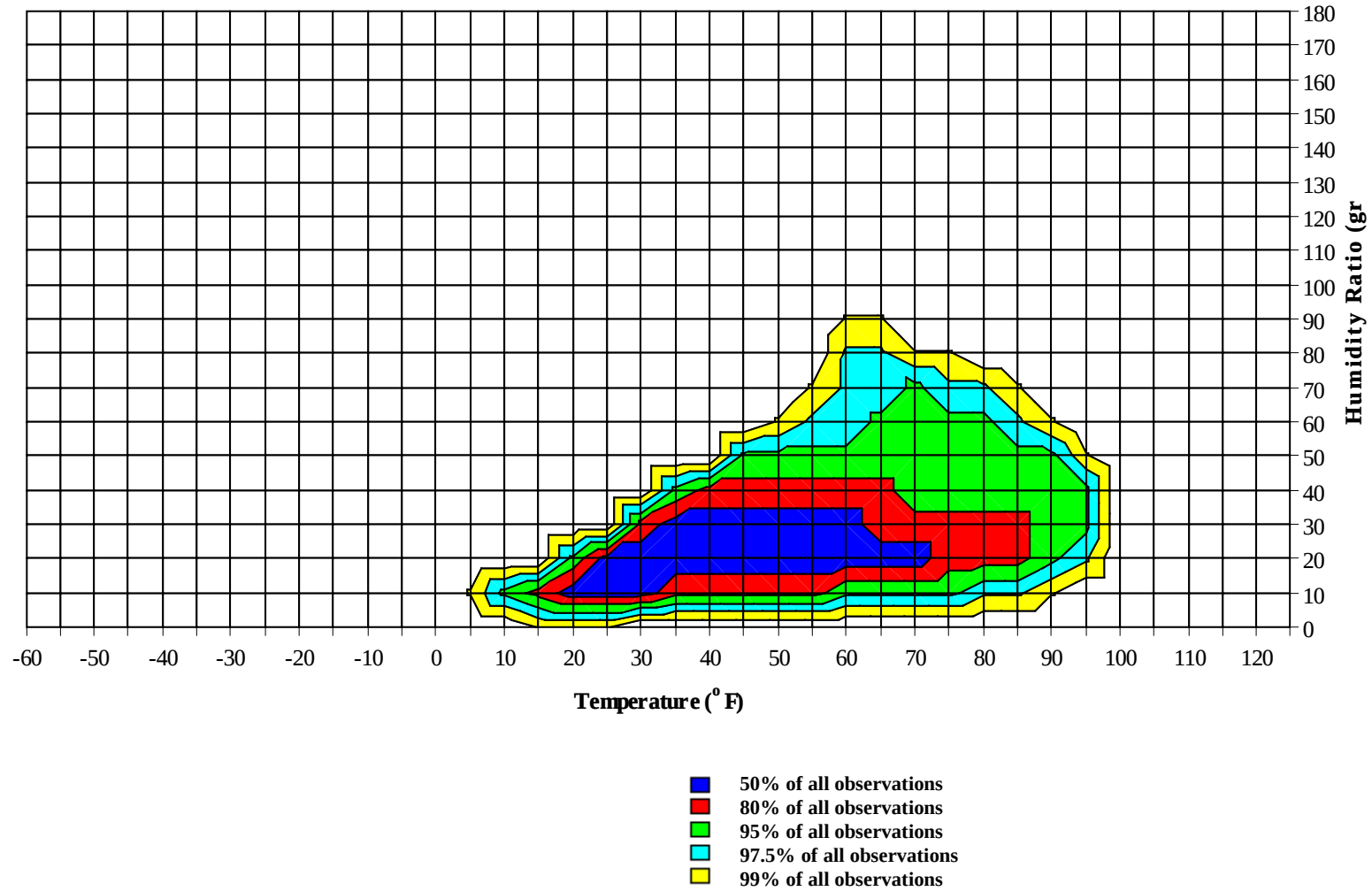


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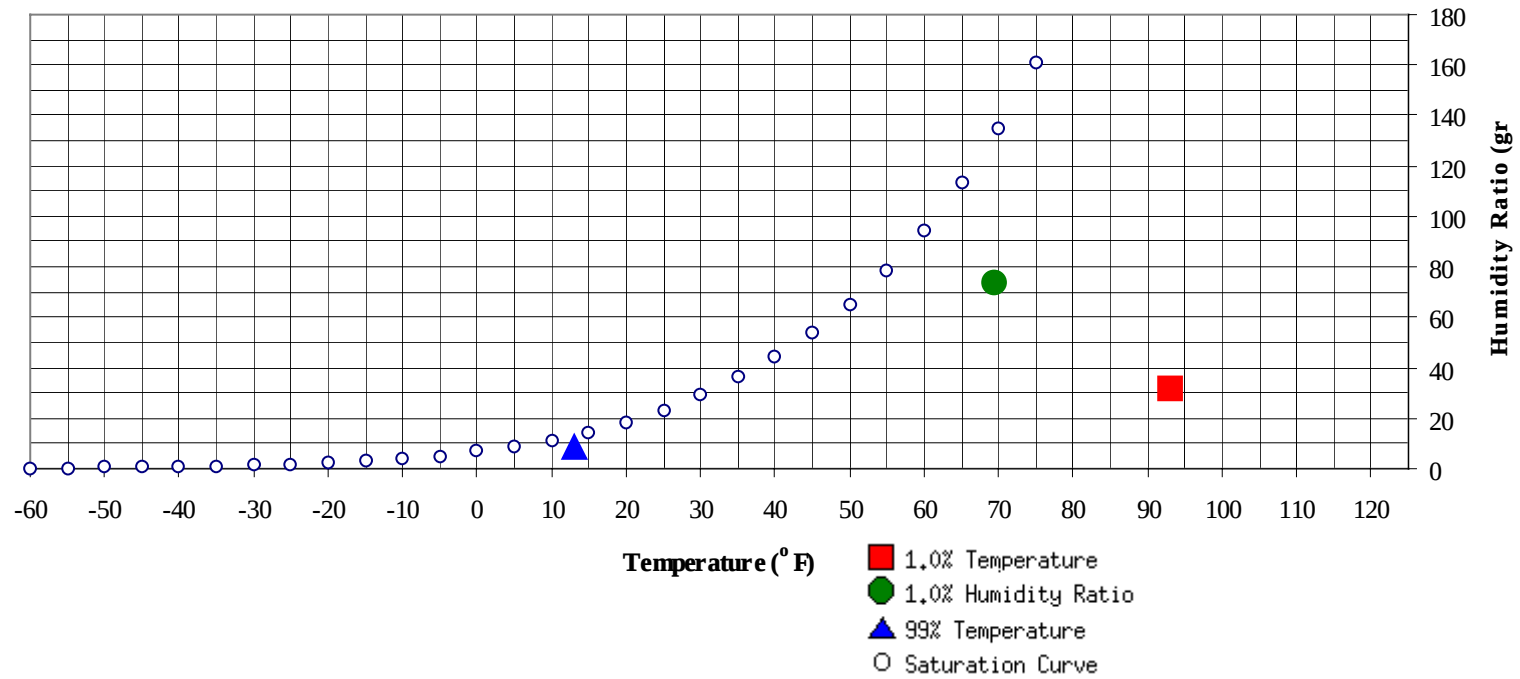
Long Term Psychrometric Summary



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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	13	8.7	4.4	Ratio	73.5	69.3	58.8	53.1	28.1

1.0% Dry Bulb	(°F)	MCHR	MCWB	Enthalpy
		(gr/lb)	(°F)	(btu/lb)
	93	31.8	58	27.3

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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	50.5
70 / 74							1	0	1	50.1		3	0	3	47.8
65 / 69							4	0	4	45.7		13	2	15	45.1
60 / 64		2		2	42.8		11	2	13	43.6		24	7	31	43.4
55 / 59		10	0	10	41.2		21	5	26	41.2	0	37	16	54	41.1
50 / 54	0	16	3	20	38.8		30	11	41	39.0	2	45	28	74	39.0
45 / 49	0	32	8	40	36.4	1	38	22	62	36.7	11	44	42	97	36.9
40 / 44	3	44	20	67	34.5	9	43	38	89	34.6	31	40	52	123	34.5
35 / 39	12	51	43	106	31.9	36	37	52	125	32.2	63	28	48	139	31.9
30 / 34	49	48	69	165	28.8	60	24	47	131	28.4	73	12	36	120	28.7
25 / 29	63	24	50	136	24.1	53	10	29	91	24.0	45	3	13	61	24.0
20 / 24	54	13	30	97	19.6	36	4	11	51	19.5	18	0	3	21	19.5
15 / 19	36	5	13	54	15.2	19	1	4	24	15.1	4		1	5	14.8
10 / 14	17	2	7	26	10.5	5	1	2	8	10.7	1		0	1	10.9
5 / 9	9	1	3	13	6.1	2	0	0	2	5.5					
0 / 4	4	0	2	6	1.4	1	0	1	2	1.7					
-5 / -1	1		0	1	-2.9	1	0	0	1	-2.1					
-10 / -6	1		0	1	-7.3	0			0	-7.2					
-15 / -11			0	0	-10.0										

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												0	0	0	61.0
95 / 99												3	1	4	59.2
90 / 94							1		1	55.3		24	7	31	56.6
85 / 89							7	2	9	55.7	0	46	18	64	55.1
80 / 84		4	0	4	50.9		24	6	30	52.9	1	50	28	80	53.0
75 / 79		12	3	15	49.4	0	42	17	59	50.7	8	47	37	93	51.4
70 / 74		25	9	34	47.3	3	46	27	77	48.8	18	33	42	93	49.6
65 / 69	1	35	16	52	45.0	9	41	34	84	46.9	31	19	38	88	47.6
60 / 64	2	41	24	67	43.0	19	31	40	90	45.2	46	10	32	88	45.8
55 / 59	9	39	34	82	40.9	34	23	40	96	43.1	53	5	20	78	43.0
50 / 54	23	34	41	98	38.7	53	14	33	99	40.9	46	3	9	58	40.6
45 / 49	37	24	38	99	36.3	51	13	25	89	38.2	23	1	4	28	37.6
40 / 44	54	17	36	107	33.9	44	5	14	63	35.4	8	0	2	10	35.9
35 / 39	57	8	24	89	31.2	24	2	8	34	32.4	3		1	4	33.4
30 / 34	40	2	12	54	28.1	9	0	2	12	29.6	1			1	29.1
25 / 29	14	0	2	16	24.1	1		0	1	25.3					
20 / 24	4		0	4	20.3										
15 / 19	0			0	14.8										
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															
-15 / -11															

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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	60.5		0		0	61.8					
95 / 99		19	4	23	58.9		10	1	11	59.3		0		0	58.0
90 / 94		61	22	83	57.8		40	10	51	58.3		6	0	6	56.6
85 / 89	0	69	36	105	56.5	0	63	26	90	56.7		30	6	37	56.0
80 / 84	5	52	41	99	55.1	2	62	40	103	55.1		52	15	66	54.1
75 / 79	18	28	48	95	53.8	10	39	42	92	53.9	0	50	23	73	52.2
70 / 74	36	11	45	92	52.1	26	21	47	94	52.3	5	42	34	80	50.5
65 / 69	54	5	32	91	50.7	42	8	39	89	50.8	12	30	41	82	48.6
60 / 64	65	2	15	81	47.8	60	3	25	88	48.7	29	18	44	92	46.9
55 / 59	48	0	4	52	44.0	55	1	14	70	44.1	57	8	43	108	44.6
50 / 54	18		1	19	39.5	40	0	4	44	39.9	66	4	24	94	41.0
45 / 49	4			4	36.3	11		0	11	36.9	47	1	8	56	37.8
40 / 44	0			0	32.9	1		0	1	34.5	18	0	2	20	34.7
35 / 39								0	0		5	0	0	5	31.6
30 / 34											1	0		1	29.1
25 / 29											0			0	24.5
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															
-15 / -11															

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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		2	0	2	53.8										
80 / 84		11	1	12	52.4										
75 / 79	0	21	3	24	50.6		0		0	51.8					
70 / 74	0	39	8	47	48.6		3		3	49.1					
65 / 69	1	47	15	63	46.7		11	0	11	45.8					
60 / 64	3	43	28	75	44.7		21	2	23	44.0		2		2	43.4
55 / 59	10	32	42	84	42.4	0	35	7	42	41.6		8	0	8	40.5
50 / 54	32	26	51	109	40.0	1	39	18	58	39.0		25	2	27	38.4
45 / 49	57	14	42	112	37.1	8	40	31	79	36.5	1	44	8	53	36.1
40 / 44	65	8	31	104	34.2	19	38	45	102	33.6	5	48	23	77	34.0
35 / 39	43	5	18	65	31.1	50	28	50	127	30.7	15	50	44	109	31.4
30 / 34	23	0	7	30	27.6	61	17	42	119	27.3	46	37	66	150	27.9
25 / 29	9		2	12	23.2	47	7	27	82	23.1	61	18	56	136	23.3
20 / 24	3		0	3	18.7	33	2	13	48	19.0	58	9	25	93	19.0
15 / 19	1		0	1	15.0	15	0	4	19	14.8	33	4	13	50	14.8
10 / 14						4	0	1	5	10.7	16	2	5	23	10.4
5 / 9						1			1	5.5	7	1	3	11	6.1
0 / 4											2	0	2	4	1.3
-5 / -1											1		0	1	-3.5
-10 / -6											1		0	1	-7.1
-15 / -11											0			0	-10.0

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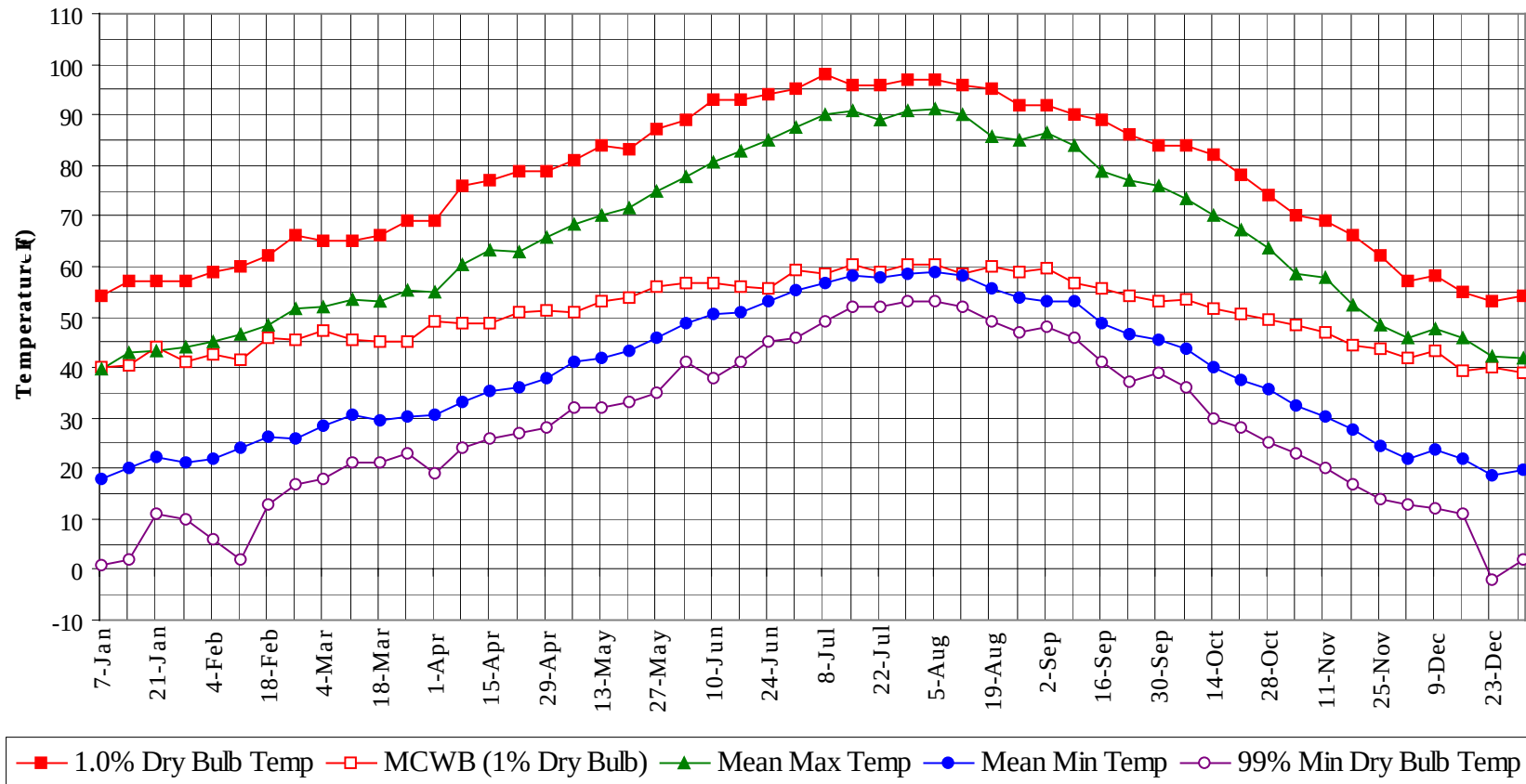
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

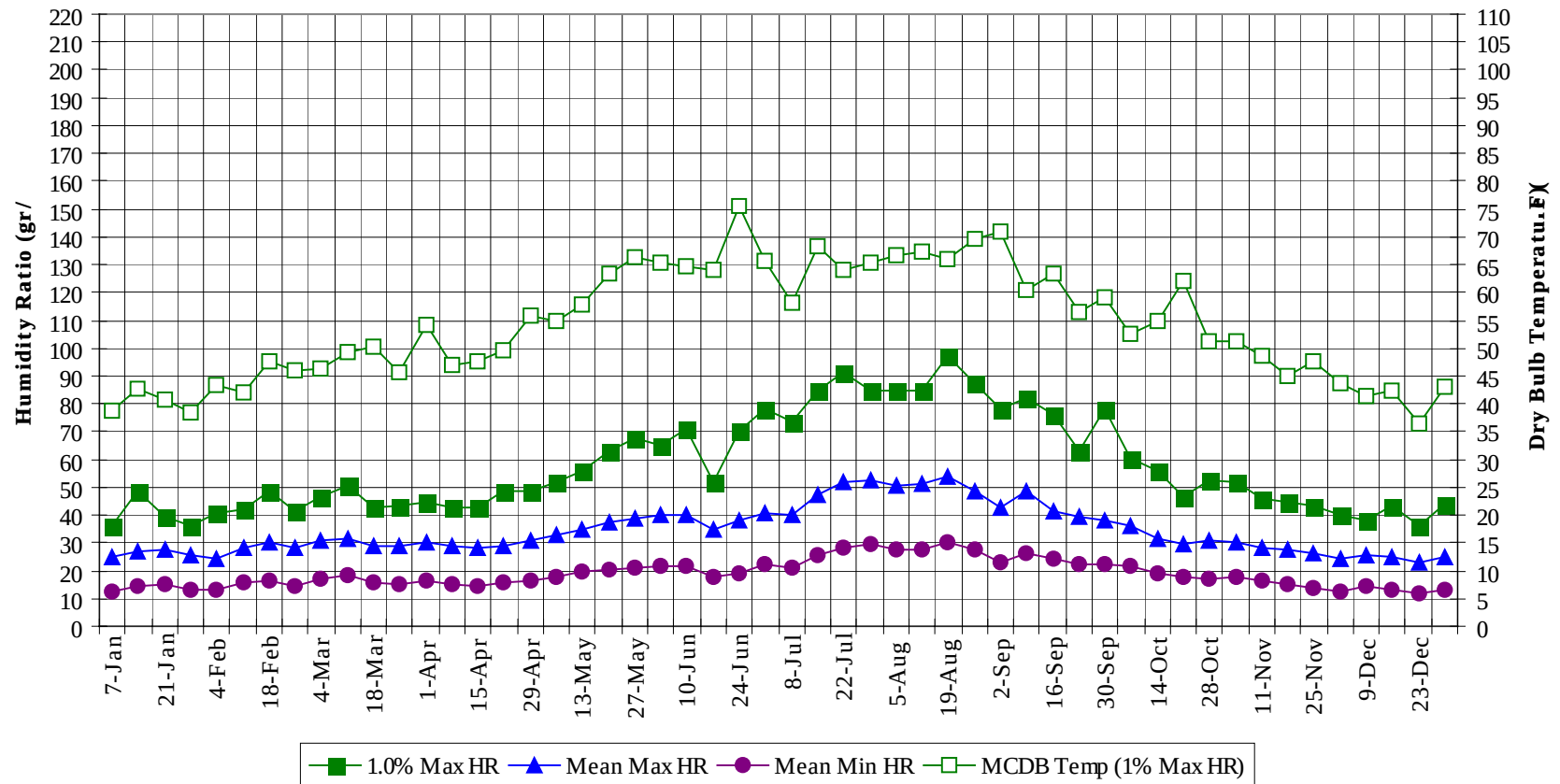
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
100 / 104		1	0	1	60.9
95 / 99		32	6	38	59.1
90 / 94		130	40	170	57.7
85 / 89	0	216	87	302	56.2
80 / 84	9	254	129	392	54.2
75 / 79	38	242	169	450	52.3
70 / 74	91	222	210	522	50.3
65 / 69	153	212	214	579	48.1
60 / 64	230	207	218	655	45.8
55 / 59	273	218	224	714	42.7
50 / 54	284	234	225	743	39.8
45 / 49	254	250	229	734	36.9
40 / 44	259	244	265	768	34.3
35 / 39	305	210	291	806	31.6
30 / 34	356	140	285	781	28.2
25 / 29	288	62	182	531	23.7
20 / 24	202	28	86	316	19.3
15 / 19	105	11	35	151	15.0
10 / 14	43	5	14	62	10.5
5 / 9	18	2	6	26	6.0
0 / 4	9	0	4	13	1.4
-5 / -1	3	0	1	4	-3.0
-10 / -6	2		0	2	-7.2
-15 / -11	0		0	0	-10.0

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



TONOPAH**NV****WMO No. 724855****Long Term Dry Bulb Temperature and Humidity Summary**

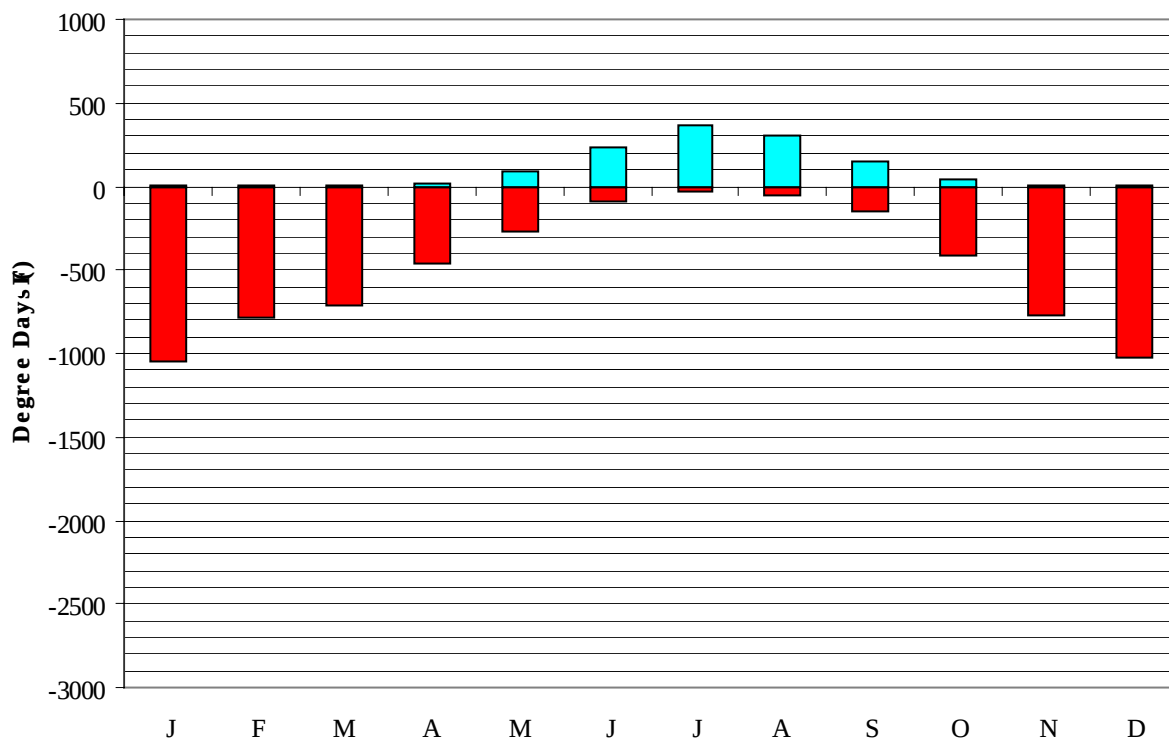
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	54.0	40.1	39.7	18.1	1.0	36.4	38.8	24.7	12.6
14-Jan	57.0	40.4	43.1	20.2	2.0	48.3	42.7	26.8	14.3
21-Jan	57.0	44.1	43.5	22.2	11.0	39.2	40.7	27.3	15.3
28-Jan	57.0	41.1	44.0	21.0	10.0	36.4	38.4	25.8	13.3
4-Feb	59.0	42.5	45.2	21.9	6.0	40.6	43.4	24.6	13.0
11-Feb	60.0	41.3	46.4	24.2	2.0	42.0	42.1	28.4	16.1
18-Feb	62.0	45.8	48.3	26.2	13.0	48.3	47.7	29.9	16.4
25-Feb	66.0	45.4	51.6	25.9	17.0	41.3	46.1	28.3	14.5
4-Mar	65.0	47.4	52.0	28.3	18.0	46.9	46.5	30.6	17.2
11-Mar	65.0	45.5	53.6	30.5	21.0	50.4	49.4	31.2	18.3
18-Mar	66.0	45.1	53.3	29.6	21.0	42.7	50.2	29.0	15.9
25-Mar	69.0	45.1	55.4	30.1	23.0	43.4	45.8	29.1	15.3
1-Apr	69.0	49.0	55.1	30.6	19.0	44.8	54.3	30.4	16.1
8-Apr	76.0	48.6	60.5	33.1	24.0	42.7	47.1	28.7	15.3
15-Apr	77.0	48.6	63.3	35.4	26.0	42.7	47.5	28.0	14.5
22-Apr	79.0	50.9	63.0	36.0	27.0	48.3	49.6	29.1	15.8
29-Apr	79.0	51.4	65.9	38.0	28.0	48.3	55.7	30.6	16.3
6-May	81.0	50.9	68.3	41.0	32.0	51.8	54.8	32.7	17.6
13-May	84.0	53.1	70.0	41.9	32.0	56.0	57.7	34.9	19.6
20-May	83.0	53.9	71.7	43.4	33.0	63.0	63.3	37.6	20.5
27-May	87.0	55.9	74.8	45.9	35.0	67.9	66.4	38.7	21.2
3-Jun	89.0	56.6	77.9	48.7	41.0	65.1	65.3	39.8	21.5
10-Jun	93.0	56.7	80.5	50.5	38.0	70.7	64.6	40.2	21.8
17-Jun	93.0	55.9	82.7	50.9	41.0	51.8	64.1	35.0	17.9
24-Jun	94.0	55.7	85.1	53.1	45.0	70.0	75.4	38.1	19.3
1-Jul	95.0	59.1	87.6	55.3	46.0	78.4	65.8	40.9	22.1
8-Jul	98.0	58.5	89.9	56.9	49.0	73.5	58.2	39.8	20.8
15-Jul	96.0	60.5	90.9	58.2	52.0	84.7	68.1	47.1	25.5
22-Jul	96.0	58.7	89.0	57.7	52.0	91.0	64.1	51.8	28.2
29-Jul	97.0	60.2	90.9	58.7	53.0	84.7	65.3	52.9	29.7
5-Aug	97.0	60.4	91.2	58.9	53.0	84.7	66.7	50.3	27.6
12-Aug	96.0	58.5	89.9	58.1	52.0	84.7	67.3	51.3	27.8
19-Aug	95.0	59.9	85.8	55.7	49.0	97.3	66.1	54.0	30.4
26-Aug	92.0	58.8	85.1	53.8	47.0	87.5	69.5	48.6	27.7
2-Sep	92.0	59.7	86.4	53.2	48.0	78.4	70.9	42.7	23.3
9-Sep	90.0	56.7	83.7	53.0	46.0	81.9	60.5	48.4	26.5
16-Sep	89.0	55.6	78.9	48.6	41.0	76.3	63.4	41.1	24.1
23-Sep	86.0	54.2	77.1	46.7	37.0	63.0	56.5	39.4	22.4
30-Sep	84.0	53.1	75.9	45.6	39.0	78.4	59.1	37.9	22.4
7-Oct	84.0	53.6	73.5	43.6	36.0	60.2	52.6	35.9	21.4
14-Oct	82.0	51.7	70.0	40.1	30.0	56.0	54.8	31.5	19.0
21-Oct	78.0	50.7	67.4	37.7	28.0	46.9	62.0	29.6	17.7
28-Oct	74.0	49.5	63.7	35.5	25.0	52.5	51.2	30.9	17.4
4-Nov	70.0	48.2	58.7	32.5	23.0	51.8	51.1	30.1	17.8
11-Nov	69.0	47.1	57.7	30.4	20.0	46.2	48.7	28.4	16.2
18-Nov	66.0	44.6	52.4	27.5	17.0	44.8	44.9	27.4	14.9
25-Nov	62.0	43.7	48.5	24.3	14.0	43.4	47.7	26.3	14.0
2-Dec	57.0	41.9	45.9	21.9	13.0	39.9	43.6	24.5	12.5
9-Dec	58.0	43.4	47.7	23.8	12.0	37.8	41.4	25.9	14.2
16-Dec	55.0	39.4	45.9	22.0	11.0	43.4	42.3	24.7	13.2
23-Dec	53.0	40.1	42.1	18.5	-2.0	36.4	36.3	22.9	11.5
31-Dec	54.0	38.9	41.7	19.6	2.0	44.1	43.0	24.9	13.1

TONOPAH

NV

WMO No. 724855

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



■ Mean Cooling Degree Days
 ■ Mean Heating Degree Days

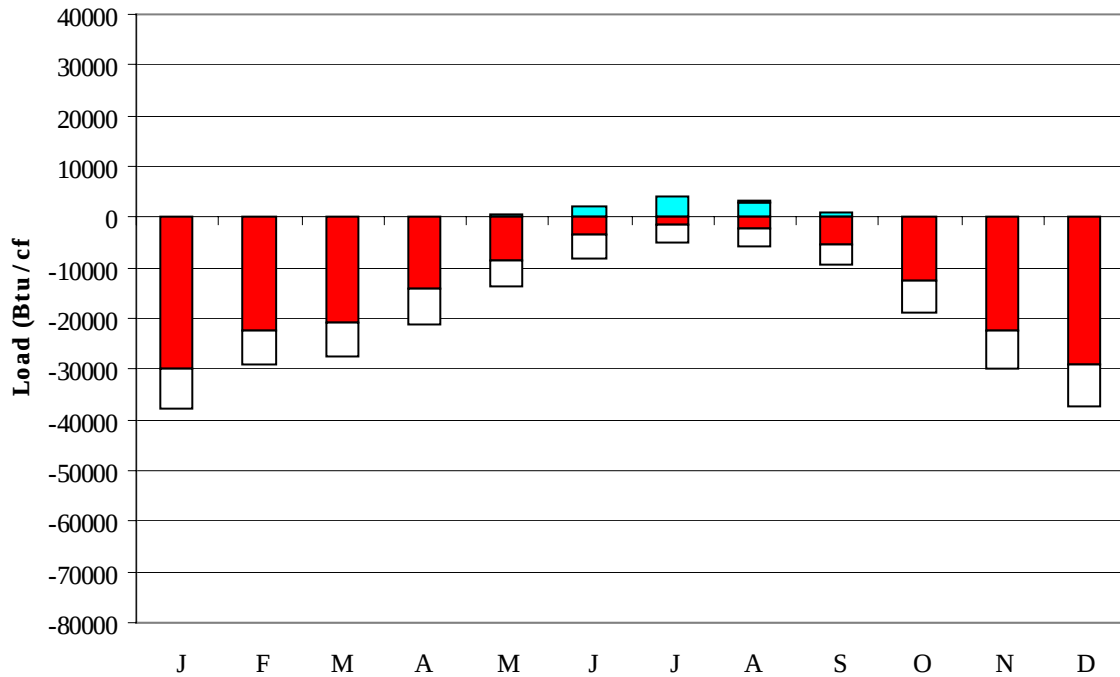
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	1052
FEB	0	784
MAR	2	711
APR	21	463
MAY	85	264
JUN	231	92
JUL	368	34
AUG	306	56
SEP	147	155
OCT	38	411
NOV	1	773
DEC	0	1022
ANN	1200	5817

TONOPAH

NV

WMO No. 724855

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

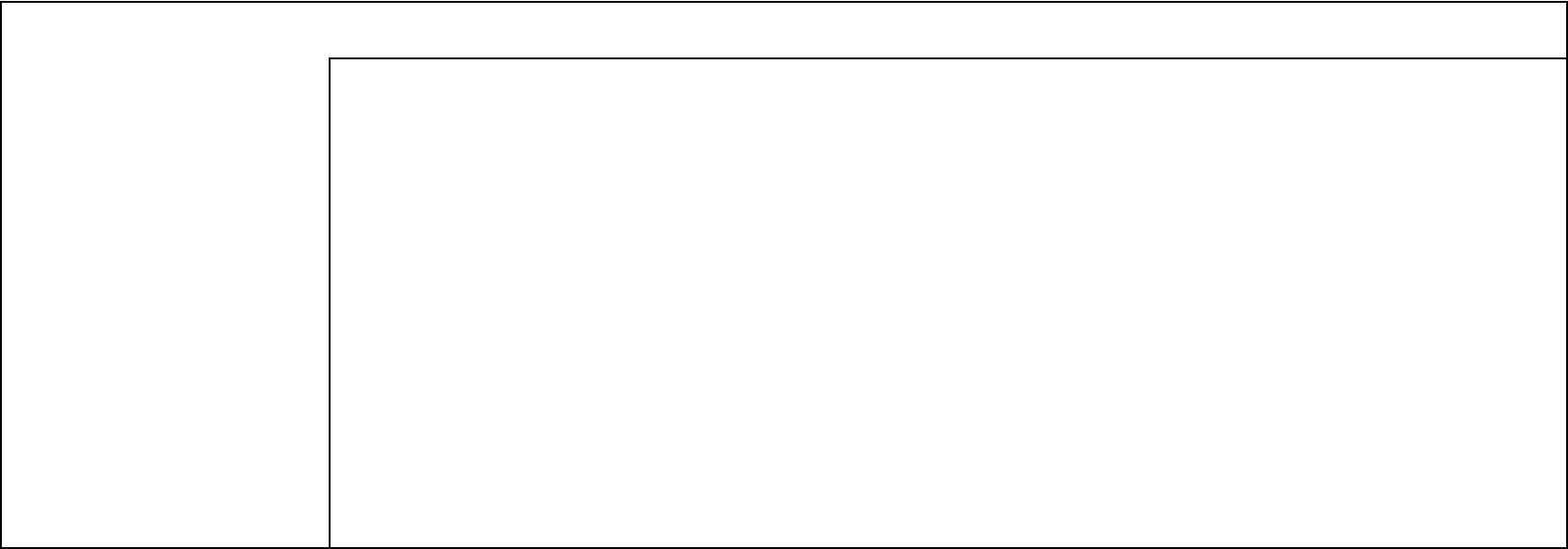


■ Average Sensible Cooling Load	■ Average Sensible Heating Load
■ Average Latent Cooling (Drying) Load	■ Average Latent Heating (Humidifying) Load

	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	-29690	0	-8094
FEB	0	-22501	0	-6472
MAR	0	-20832	0	-6667
APR	47	-14106	0	-6897
MAY	432	-8546	0	-5133
JUN	2098	-3317	0	-4717
JUL	4097	-1421	2	-3518
AUG	3087	-2160	8	-3511
SEP	1113	-5335	0	-4084
OCT	141	-12679	0	-6061
NOV	0	-22361	0	-7598
DEC	0	-28905	0	-8537
ANN	11015	-171853	10	-71289

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

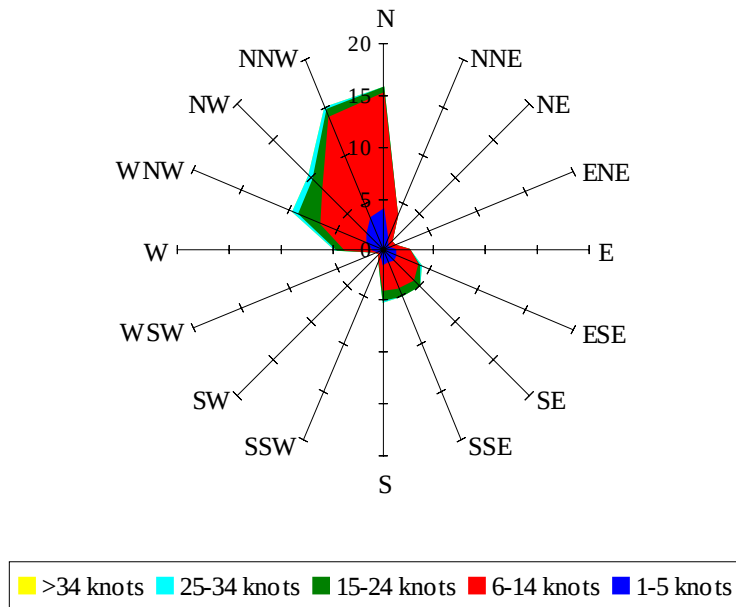
No Solar Radiation
Data Available



Average Annual Solar Heat and Illumination – Nearest Available Site

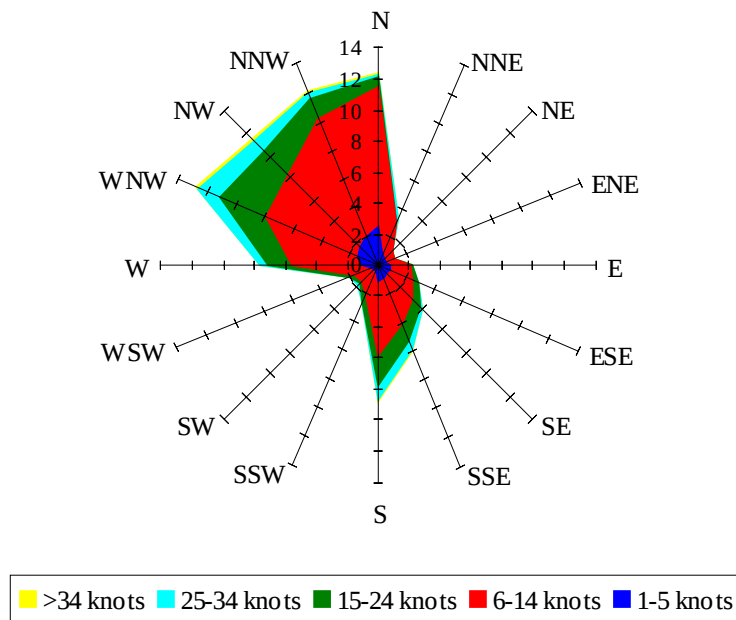
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

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



Percent Calm = 14.61

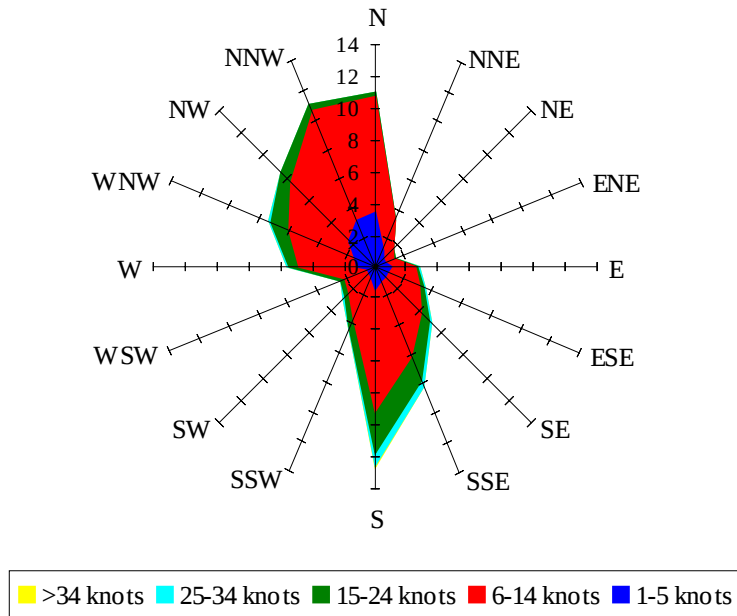
Wind Summary - March, April, and May **Labels of Percent Frequency on North Axis**



Percent Calm = 8.24

Wind Summary - June, July, and August

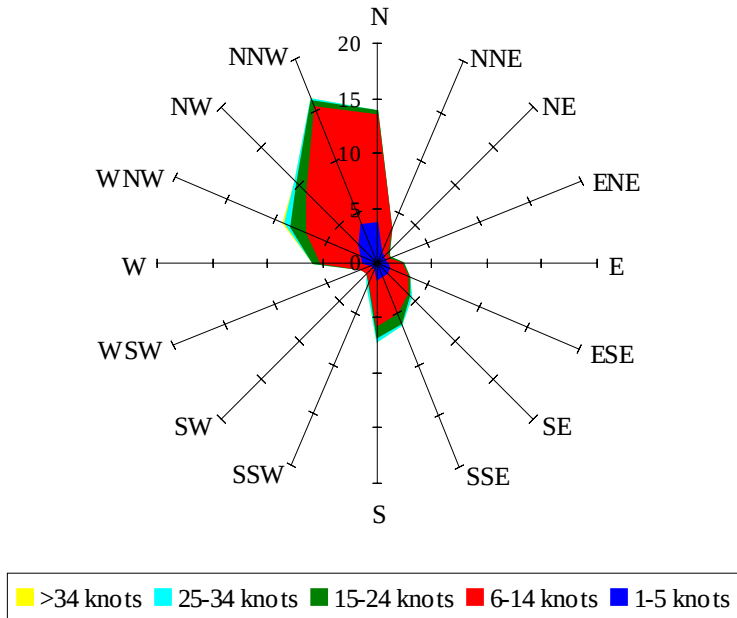
Labels of Percent Frequency on North Axis



Percent Calm = 9.05

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 10.90