

TUCSON AZ

Latitude = 32.12 N

Longitude = 110.90 W

Period of Record = 1973 to 1996

WMO No. 722740

Elevation = 2556 feet

Average Pressure = 27.29 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	109	67	39	12.3	NW
0.4% Occurrence	106	66	43	11.3	NW
1.0% Occurrence	103	66	45	10.9	WNW
2.0% Occurrence	101	66	48	10.5	NW
Mean Daily Range	26	-	-	-	-
97.5% Occurrence	38	34	25	6.6	SE
99.0% Occurrence	34	30	22	6.4	SE
99.6% Occurrence	32	29	20	6.2	SE
Median of Extreme Lows	27	24	16	5.7	SSE
	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	75	90	112	8.2	S
0.4% Occurrence	72	89	98	8.4	S
1.0% Occurrence	71	88	94	8.4	S
2.0% Occurrence	71	88	94	8.4	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	130	76	0.79	7.6	S
0.4% Occurrence	113	76	0.69	7.3	S
1.0% Occurrence	109	77	0.67	7.3	S
2.0% Occurrence	105	77	0.65	7.4	S
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		826	2551	29	1134

Other Site Data

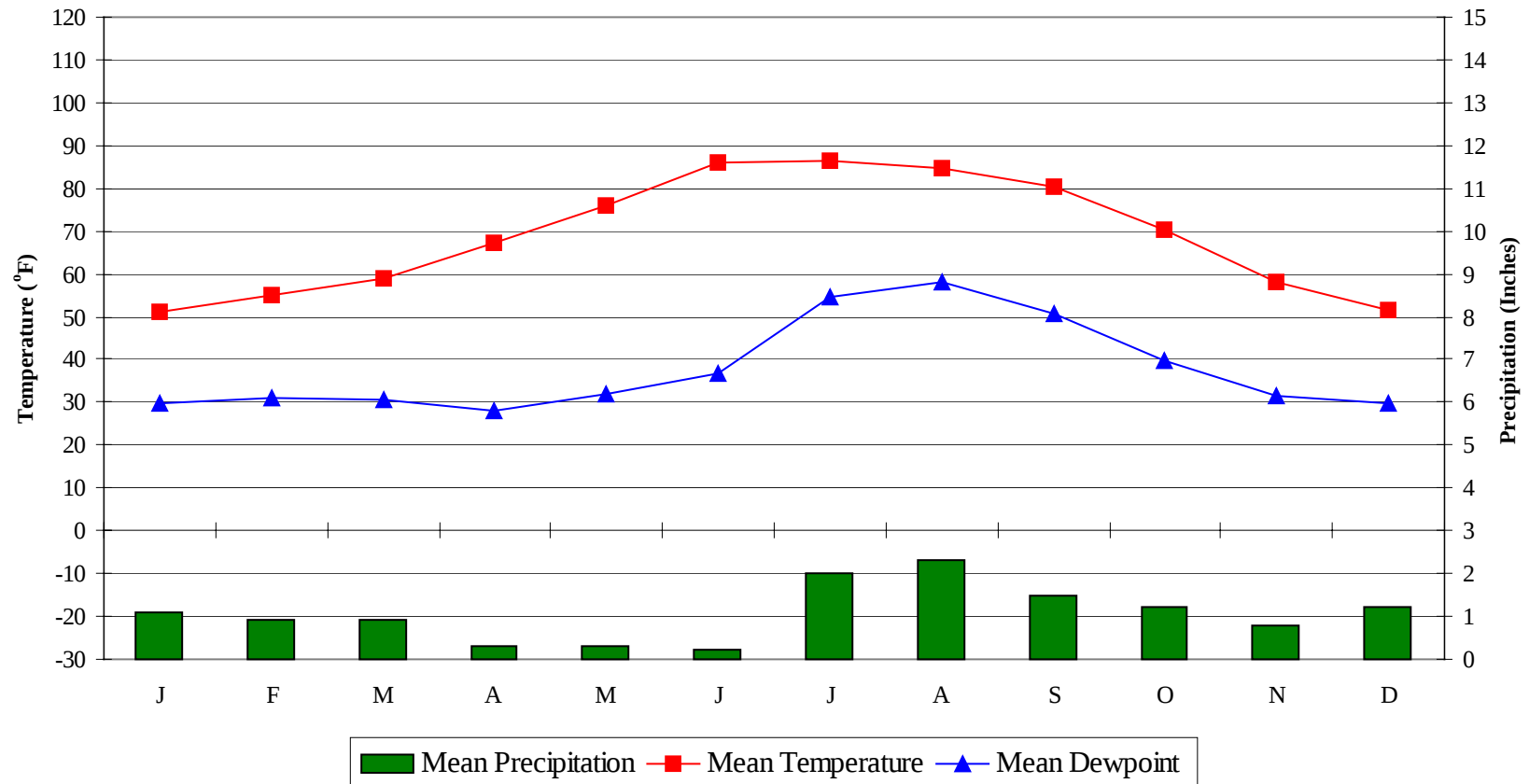
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
10	3.0	90	0.5 + 3.5
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
71.4	0	3	8

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

TUCSON AZ

WMO No. 722740

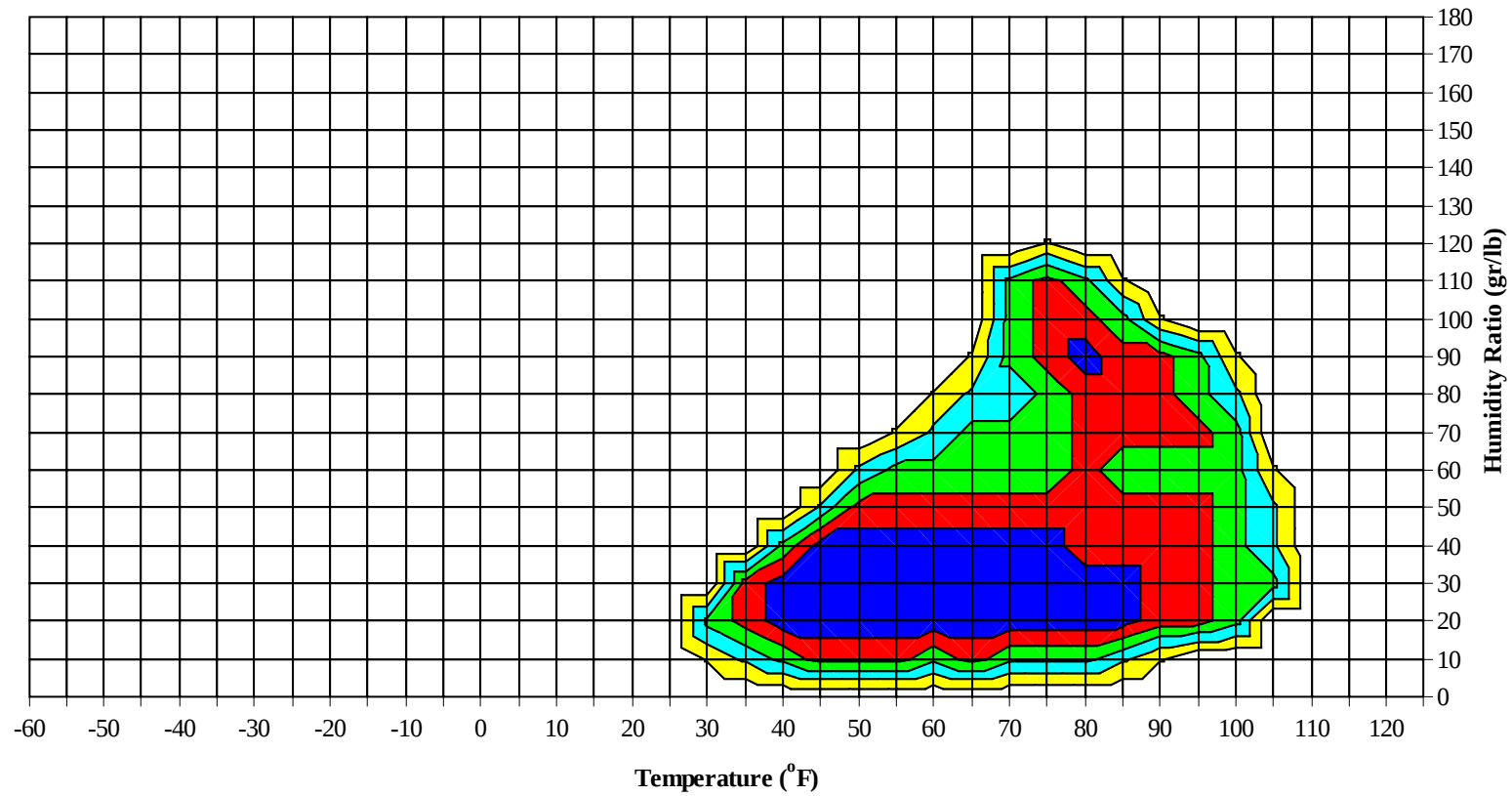
Average Annual Climate



TUCSON AZ

WMO No. 722740

Long Term Psychrometric Summary

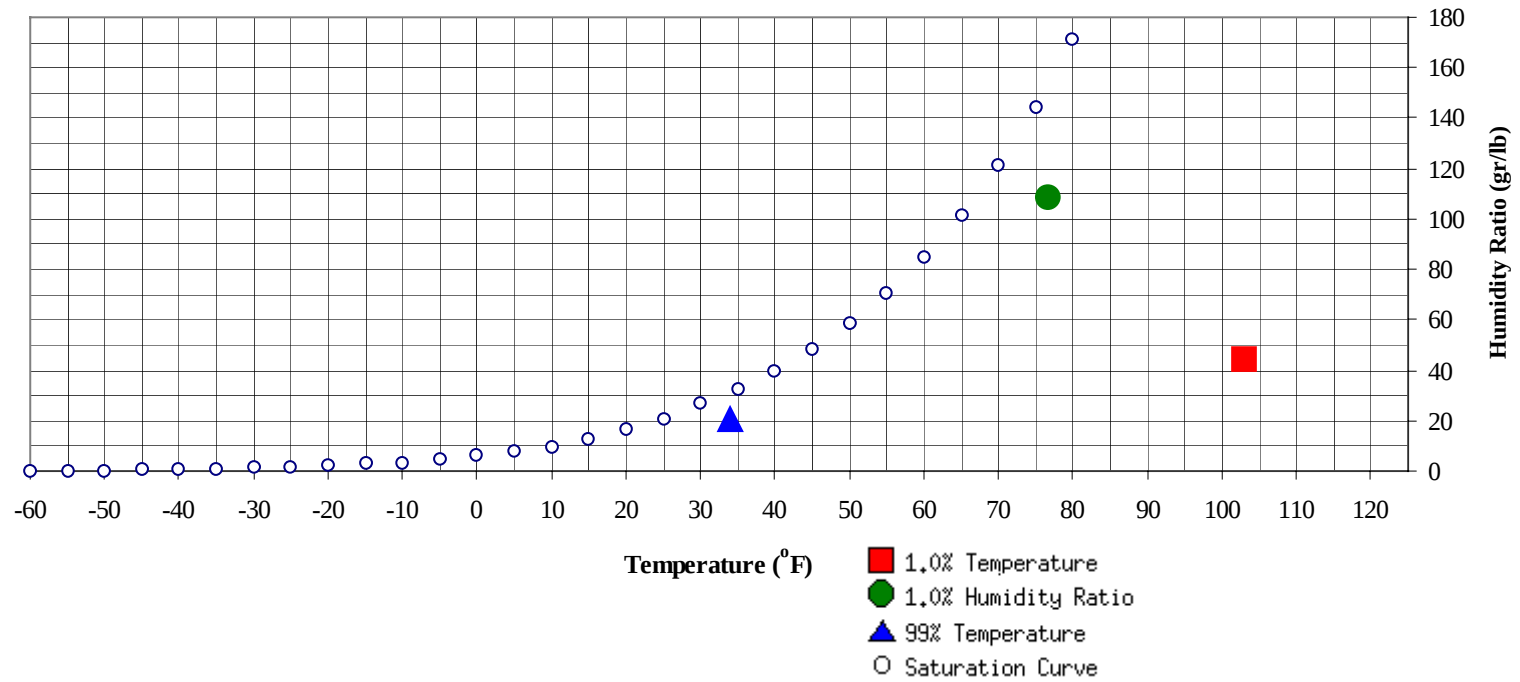


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

TUCSON AZ

WMO No. 722740

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)
	34	21	11.4		108.5	76.6	69.8	66.9	35.4

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	103	44.4	65.7	31.7

TUCSON AZ

WMO No. 722740

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		
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99												0	0	0	58.3
90 / 94												1	0	1	56.5
85 / 89		0		0	54.0		1	0	1	55.4		6	2	8	55.7
80 / 84		2	0	2	52.7		5	2	7	53.5		20	8	28	54.0
75 / 79		7	1	8	51.1		18	7	25	52.2		31	16	47	52.1
70 / 74		20	6	26	49.5		30	14	44	50.4	0	39	27	67	50.6
65 / 69	0	34	14	48	48.2	0	37	25	62	49.0	3	44	39	86	48.8
60 / 64	2	45	29	76	46.9	4	40	38	82	47.6	16	40	48	105	47.1
55 / 59	13	49	45	107	45.4	18	38	48	104	45.6	37	34	47	119	45.5
50 / 54	34	42	59	135	43.5	51	29	45	125	43.6	68	19	33	120	43.3
45 / 49	55	29	51	135	40.2	62	16	28	106	40.5	62	9	19	90	41.0
40 / 44	68	12	28	108	36.7	50	6	12	68	37.0	44	3	7	54	37.6
35 / 39	49	6	12	67	33.1	27	2	4	33	33.3	15	0	1	16	33.7
30 / 34	23	1	3	27	29.2	10	0	1	11	29.0	3	0	0	3	30.1
25 / 29	5	0	0	5	25.9	2	0	0	2	23.9	0			0	28.0
20 / 24	0	0		0	21.5	0			0	22.0					
15 / 19															

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.

TUCSON AZ

WMO No. 722740

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		
115 / 119												0		0	69.8
110 / 114												3	1	4	67.7
105 / 109							0	0	0	61.3		16	7	23	65.5
100 / 104		1	0	1	61.0		7	3	10	61.8		48	28	76	63.7
95 / 99		4	1	5	58.9	0	21	10	31	60.3	0	58	40	98	62.0
90 / 94		14	5	19	57.3	0	43	23	66	58.5	2	55	46	103	60.5
85 / 89		32	15	47	55.8	0	57	37	94	57.0	13	34	44	91	59.5
80 / 84		47	28	75	54.0	3	51	44	98	55.5	36	17	38	91	58.3
75 / 79	1	45	38	84	52.3	14	35	48	97	54.1	59	6	23	88	56.5
70 / 74	8	36	41	85	50.6	39	18	41	98	52.6	63	1	11	75	53.8
65 / 69	25	26	42	93	48.9	67	9	26	102	50.6	45	0	2	47	50.0
60 / 64	46	17	33	96	46.8	65	4	11	80	48.1	18	0	1	19	47.3
55 / 59	57	11	20	88	44.4	38	1	4	43	45.2	3		0	3	44.9
50 / 54	53	5	11	69	41.7	17	0	1	18	42.7	0			0	45.7
45 / 49	33	1	5	39	39.3	5	0		5	39.1					
40 / 44	14	1	1	16	36.7	1			1	35.3					
35 / 39	3	0	0	3	33.9										
30 / 34	0			0	32.3										
25 / 29															
20 / 24															
15 / 19															

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TUCSON AZ

WMO No. 722740

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		
115 / 119															
110 / 114		1	0	1	66.4		0		0	69.0					
105 / 109		13	7	20	66.7		4	2	6	69.3		0	0	0	68.7
100 / 104		41	23	64	66.9		24	8	32	68.9		10	3	13	66.8
95 / 99		55	35	90	67.1		59	32	91	68.2		38	14	52	65.4
90 / 94	2	59	41	102	67.0	1	70	42	113	67.9	0	61	32	93	64.9
85 / 89	21	44	49	114	66.7	7	49	49	106	67.7	1	54	40	95	64.3
80 / 84	65	23	47	135	66.3	49	29	55	134	67.2	14	43	53	110	63.3
75 / 79	96	8	34	138	65.9	107	9	38	154	66.6	53	22	51	126	62.5
70 / 74	57	2	12	71	64.8	69	3	19	91	65.4	88	8	33	129	61.0
65 / 69	7	1	1	9	60.2	14	0	3	17	62.3	58	3	12	73	57.7
60 / 64	0			0	50.0	0		0	0	60.8	20	0	2	22	53.7
55 / 59											5		0	5	49.8
50 / 54											0			0	47.3
45 / 49															
40 / 44															
35 / 39															
30 / 34															
25 / 29															
20 / 24															
15 / 19															

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TUCSON AZ

WMO No. 722740

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		
115 / 119															
110 / 114															
105 / 109															
100 / 104		0		0	61.6										
95 / 99		9	2	11	61.9										
90 / 94		23	7	30	60.5		0		0	60.0					
85 / 89		44	17	60	59.3		4	0	4	56.2					
80 / 84	0	50	30	79	58.4		20	4	24	54.8		1		1	53.4
75 / 79	5	44	40	88	56.9		35	10	45	53.4		11	1	12	51.4
70 / 74	22	34	49	105	55.4	0	39	20	59	51.8		25	6	31	50.2
65 / 69	53	23	46	122	53.9	4	43	30	77	50.1		38	14	52	48.5
60 / 64	70	13	34	117	51.5	14	36	45	95	48.2	2	46	28	76	47.3
55 / 59	55	5	16	76	47.6	39	29	51	119	46.1	11	48	47	107	45.6
50 / 54	24	2	7	33	43.9	69	18	40	127	43.1	38	37	59	135	43.4
45 / 49	14	1	2	17	39.9	56	10	24	90	39.8	64	22	47	134	39.8
40 / 44	4	0	0	4	36.8	33	4	12	49	36.1	59	12	28	99	36.5
35 / 39	1	0	0	1	35.4	17	1	3	21	32.4	48	6	13	67	33.1
30 / 34						8		1	9	28.4	20	1	4	25	28.9
25 / 29						1			1	24.4	4	0	1	5	24.5
20 / 24						0			0	19.0	1	0		1	20.6
15 / 19											0			0	15.8

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TUCSON AZ

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

Period of Record = 1973 to 1996

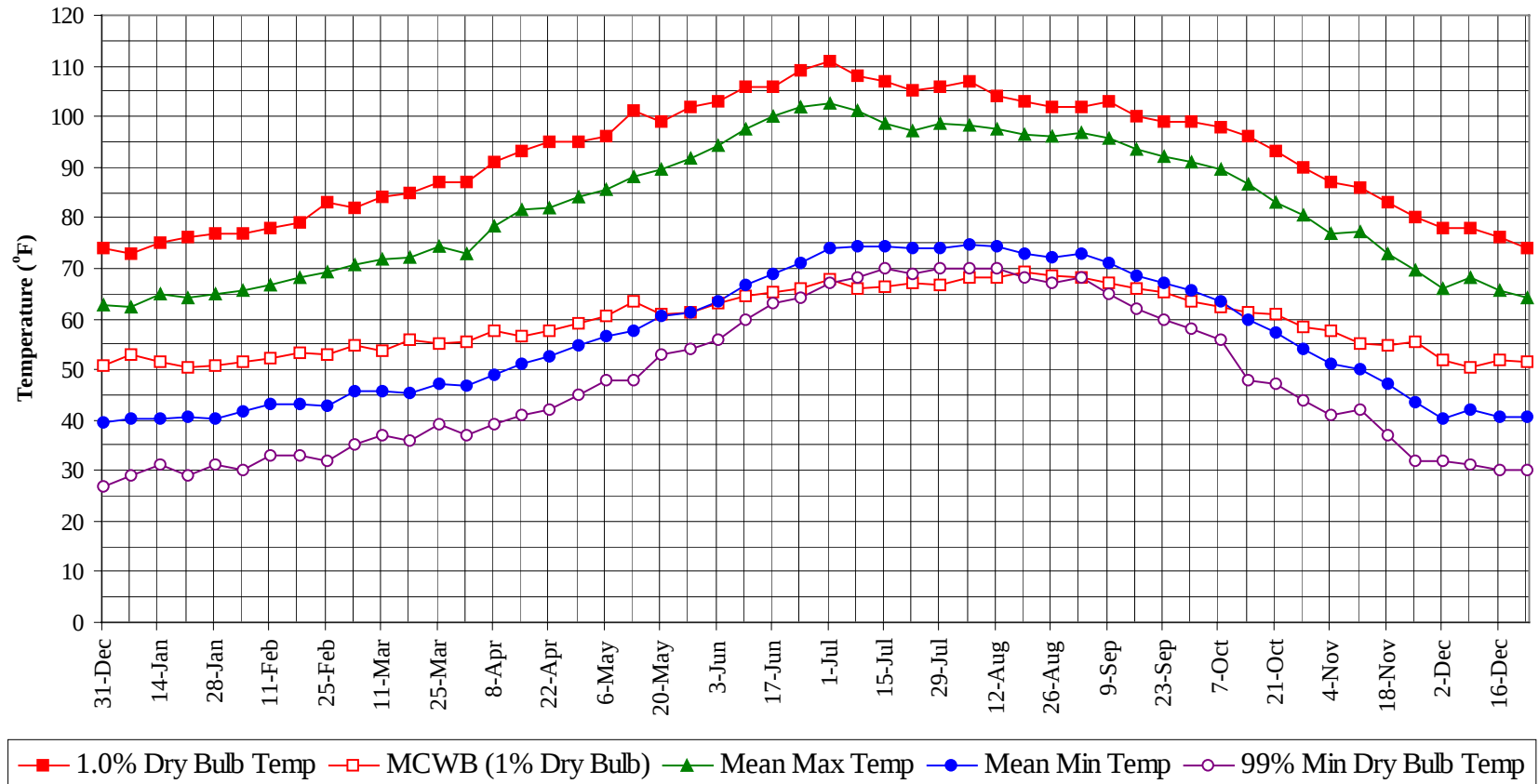
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
115 / 119		0		0	69.8
110 / 114		4	1	5	67.4
105 / 109		34	16	50	66.3
100 / 104		132	65	196	65.7
95 / 99	0	244	131	375	65.0
90 / 94	4	325	196	526	63.7
85 / 89	41	326	254	621	62.2
80 / 84	167	309	308	784	60.8
75 / 79	333	271	305	909	59.2
70 / 74	345	258	278	881	55.9
65 / 69	276	259	254	789	51.2
60 / 64	257	243	268	768	48.2
55 / 59	277	216	280	773	45.7
50 / 54	356	155	257	768	43.2
45 / 49	351	88	176	616	40.2
40 / 44	273	38	89	400	36.8
35 / 39	161	15	33	209	33.1
30 / 34	64	2	9	75	29.0
25 / 29	11	0	1	12	24.9
20 / 24	2	0		2	20.8
15 / 19	0			0	15.8

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TUCSON AZ

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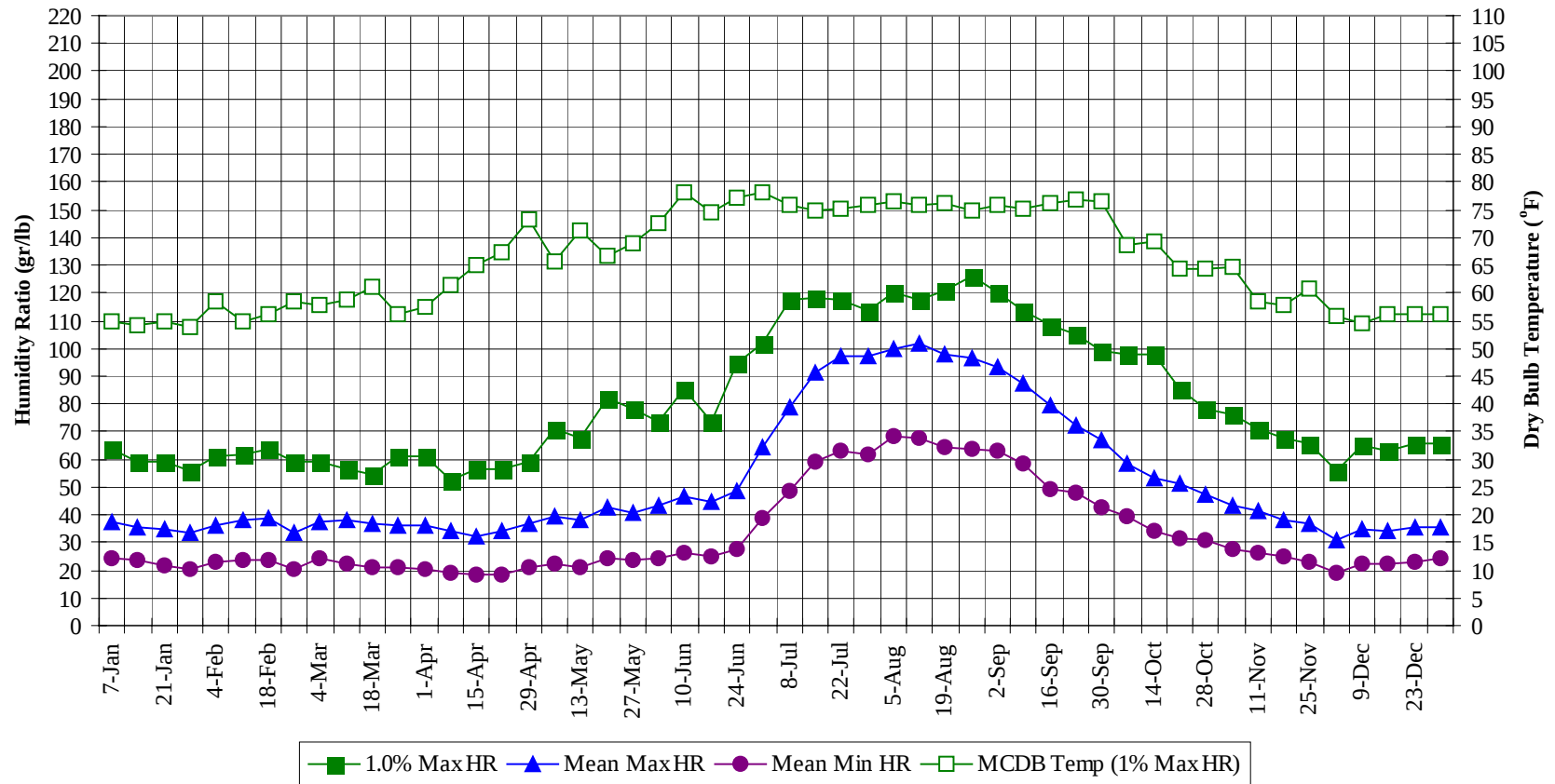
Annual Summary of Temperatures



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Long Term Humidity and Dry Bulb Temperature Summary



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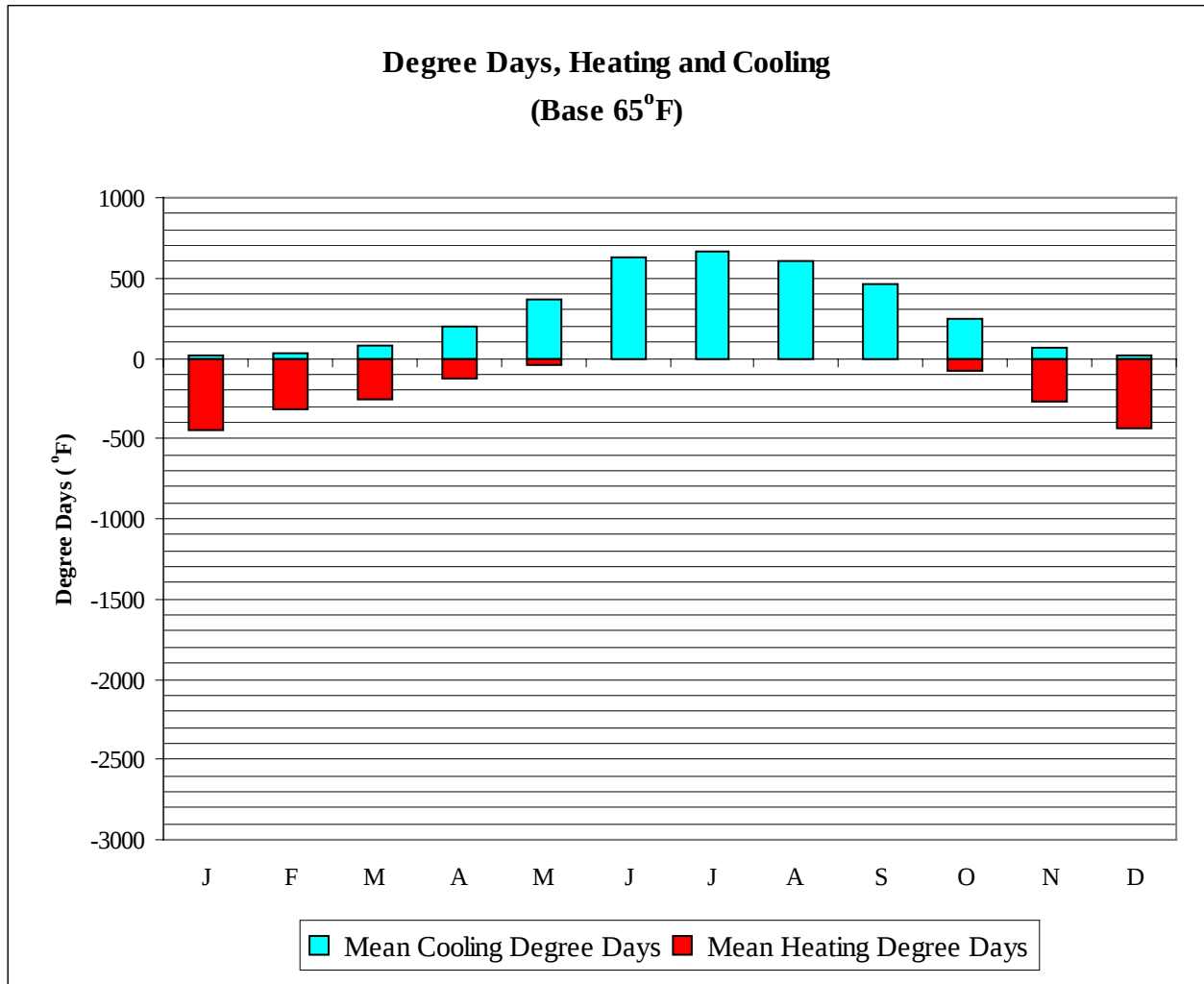
WMO No. 722740

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	73.0	52.8	62.2	40.1	29.0	63.7	54.9	37.2	24.1
14-Jan	75.0	51.4	64.8	40.1	31.0	58.8	54.2	35.4	23.3
21-Jan	76.0	50.5	64.0	40.5	29.0	58.8	54.8	34.6	21.9
28-Jan	77.0	50.8	64.8	40.1	31.0	56.0	53.9	33.3	20.6
4-Feb	77.0	51.5	65.5	41.7	30.0	60.9	58.5	36.2	22.8
11-Feb	78.0	52.3	66.7	43.1	33.0	61.6	54.7	38.4	23.9
18-Feb	79.0	53.3	68.3	43.3	33.0	63.7	56.1	39.0	23.9
25-Feb	83.0	53.1	69.4	42.7	32.0	58.8	58.3	33.6	20.0
4-Mar	82.0	54.6	70.8	45.6	35.0	58.8	57.8	37.7	24.0
11-Mar	84.0	53.7	71.8	45.9	37.0	56.7	58.8	38.2	22.6
18-Mar	85.0	55.7	72.2	45.3	36.0	54.6	61.2	36.7	21.1
25-Mar	87.0	54.9	74.5	47.1	39.0	60.9	56.2	36.1	20.7
1-Apr	87.0	55.5	73.0	46.6	37.0	60.9	57.5	36.2	20.4
8-Apr	91.0	57.8	78.3	48.9	39.0	52.5	61.3	34.1	18.8
15-Apr	93.0	56.4	81.5	51.1	41.0	56.7	65.0	32.0	18.2
22-Apr	95.0	57.8	81.8	52.7	42.0	56.7	67.4	33.9	18.7
29-Apr	95.0	59.1	84.0	54.9	45.0	58.8	73.1	37.0	20.7
6-May	96.0	60.5	85.6	56.7	48.0	70.7	65.7	39.1	22.0
13-May	101.0	63.5	88.2	57.7	48.0	67.9	71.4	37.9	20.8
20-May	99.0	61.1	89.6	60.5	53.0	81.9	66.7	42.7	24.2
27-May	102.0	61.1	91.8	61.2	54.0	78.4	69.1	40.9	23.4
3-Jun	103.0	63.1	94.1	63.4	56.0	73.5	72.6	43.4	24.4
10-Jun	106.0	64.5	97.4	66.6	60.0	85.4	78.2	46.8	26.2
17-Jun	106.0	65.2	100.2	68.8	63.0	73.5	74.6	44.9	25.3
24-Jun	109.0	66.2	101.8	71.1	64.0	94.5	77.1	48.5	27.9
1-Jul	111.0	67.6	102.7	74.0	67.0	101.5	78.2	64.3	38.5
8-Jul	108.0	66.0	101.0	74.2	68.0	117.6	76.0	79.1	48.6
15-Jul	107.0	66.5	98.7	74.4	70.0	118.3	74.9	91.6	59.0
22-Jul	105.0	67.1	97.3	74.0	69.0	117.6	75.1	97.5	62.8
29-Jul	106.0	66.6	98.6	74.0	70.0	113.4	75.8	97.0	61.9
5-Aug	107.0	68.3	98.1	74.6	70.0	120.4	76.6	99.9	68.4
12-Aug	104.0	68.1	97.6	74.3	70.0	117.6	75.8	101.7	67.9
19-Aug	103.0	69.4	96.4	72.9	68.0	121.1	76.0	98.1	64.6
26-Aug	102.0	68.6	96.2	72.1	67.0	126.0	75.0	96.5	63.9
2-Sep	102.0	68.2	96.8	72.8	68.0	120.4	75.9	93.0	63.3
9-Sep	103.0	67.1	95.5	71.1	65.0	113.4	75.1	87.4	58.4
16-Sep	100.0	66.1	93.4	68.5	62.0	108.5	76.1	79.5	49.3
23-Sep	99.0	65.3	91.9	67.1	60.0	105.0	76.9	72.2	47.7
30-Sep	99.0	63.5	91.0	65.6	58.0	99.4	76.6	66.9	42.4
7-Oct	98.0	62.3	89.4	63.3	56.0	98.0	68.7	58.4	39.3
14-Oct	96.0	61.4	86.6	59.7	48.0	98.0	69.2	53.0	33.9
21-Oct	93.0	60.8	83.2	57.4	47.0	85.4	64.4	51.1	31.6
28-Oct	90.0	58.4	80.5	54.0	44.0	78.4	64.3	47.5	31.1
4-Nov	87.0	57.7	76.8	51.1	41.0	76.3	64.6	43.1	27.4
11-Nov	86.0	55.2	77.1	50.2	42.0	70.7	58.5	41.5	26.5
18-Nov	83.0	54.9	72.9	47.3	37.0	67.9	57.9	38.1	25.2
25-Nov	80.0	55.4	69.5	43.6	32.0	65.8	60.7	36.6	23.1
2-Dec	78.0	51.9	66.0	40.2	32.0	56.0	55.7	30.7	18.9
9-Dec	78.0	50.3	68.3	42.0	31.0	65.1	54.6	34.5	22.5
16-Dec	76.0	51.7	65.5	40.8	30.0	63.0	56.3	34.3	22.4
23-Dec	74.0	51.4	64.1	40.6	30.0	65.8	56.1	35.6	23.3
31-Dec	74.0	50.9	62.6	39.5	27.0	65.8	56.2	35.8	24.2

TUCSON AZ

WMO No. 722740

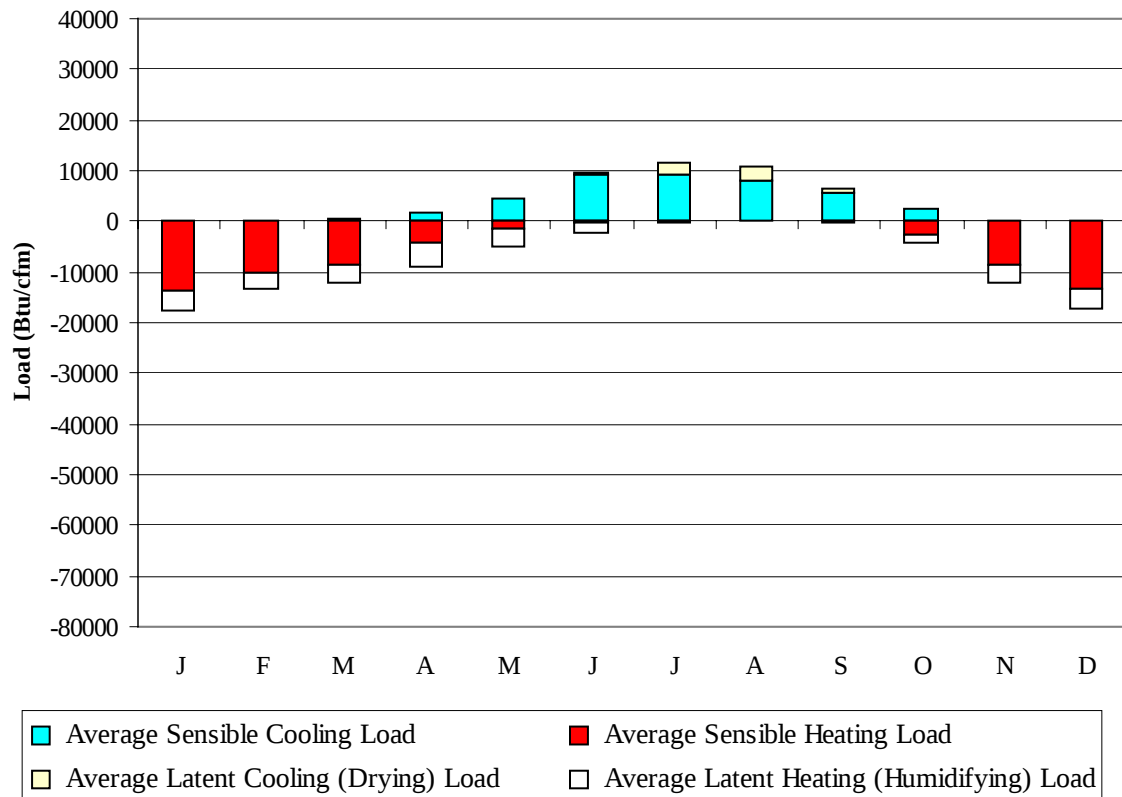


	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	16	446
FEB	35	316
MAR	77	258
APR	196	125
MAY	368	36
JUN	631	3
JUL	660	0
AUG	605	0
SEP	466	4
OCT	242	72
NOV	64	267
DEC	19	433
ANN	3378	1960

TUCSON AZ

WMO No. 722740

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 Load	Average Latent Heating Load
	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)
JAN	25	-13783	0	-3905
FEB	112	-10020	0	-3231
MAR	422	-8459	0	-3542
APR	1779	-4367	0	-4384
MAY	4289	-1543	2	-3418
JUN	9403	-193	67	-2044
JUL	9321	-4	2086	-208
AUG	8015	-9	2681	-20
SEP	5588	-257	791	-202
OCT	2308	-2817	63	-1535
NOV	303	-8697	1	-3359
DEC	25	-13391	0	-4003
ANN	41590	-63540	5691	-29851

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

No Solar Radiation
Data Available

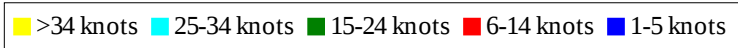
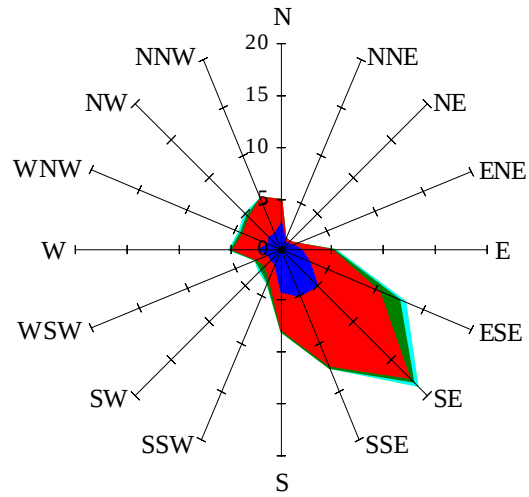


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

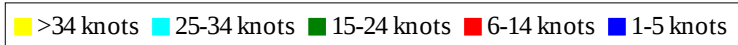
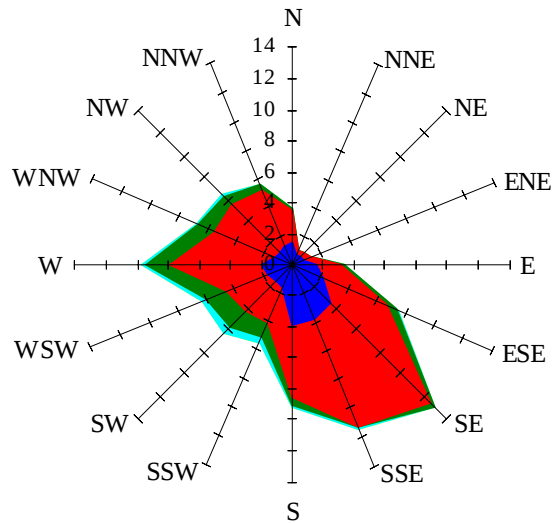
Labels of Percent Frequency on North Axis



Percent Calm = 5.17

Wind Summary - March, April, and May

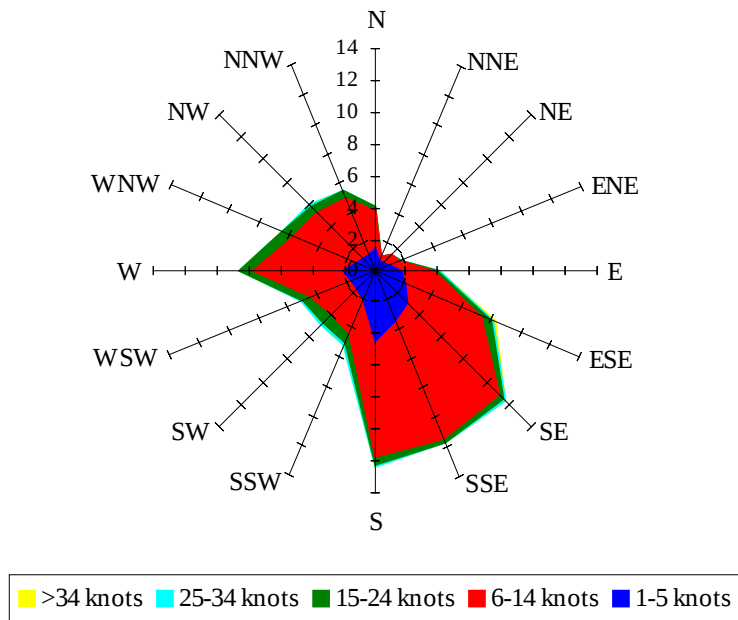
Labels of Percent Frequency on North Axis



Percent Calm = 3.00

Wind Summary - June, July, and August

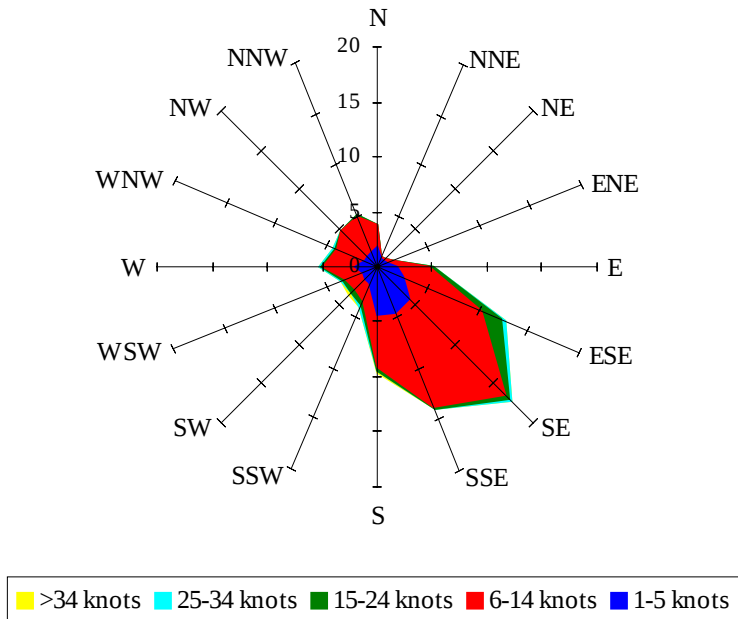
Labels of Percent Frequency on North Axis



Percent Calm = 2.83

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 3.38