

TUNIS/CARTHAGE	TS	
Latitude = 36.83 N		WMO No. 607150
Longitude = 10.23 E		Elevation = 13 feet
Period of Record = 1967 to 1996		Average Pressure = 29.97 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	106	74	73	10.9	ESE
0.4% Occurrence	97	74	87	11.3	E
1.0% Occurrence	93	73	90	11.8	E
2.0% Occurrence	90	72	92	12.3	E
Mean Daily Range	17	-	-	-	-
97.5% Occurrence	45	44	39	7.1	W
99.0% Occurrence	43	41	36	6.9	WSW
99.6% Occurrence	41	40	34	6.7	WSW
Median of Extreme Lows	36	36	29	7.3	SSW
	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	82	91	145	11.7	E
0.4% Occurrence	78	88	126	11.1	ESE
1.0% Occurrence	77	87	122	10.8	ESE
2.0% Occurrence	75	84	114	9.9	ESE
	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	149	87	0.99	10.2	ESE
0.4% Occurrence	132	83	0.88	9.3	ESE
1.0% Occurrence	125	82	0.83	8.5	ESE
2.0% Occurrence	118	81	0.78	8.5	ESE
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		110	1159	564	2115

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
9	N/A	N/A	2.2 + 1.3
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 (#)
67.4	N/A	N/A	0

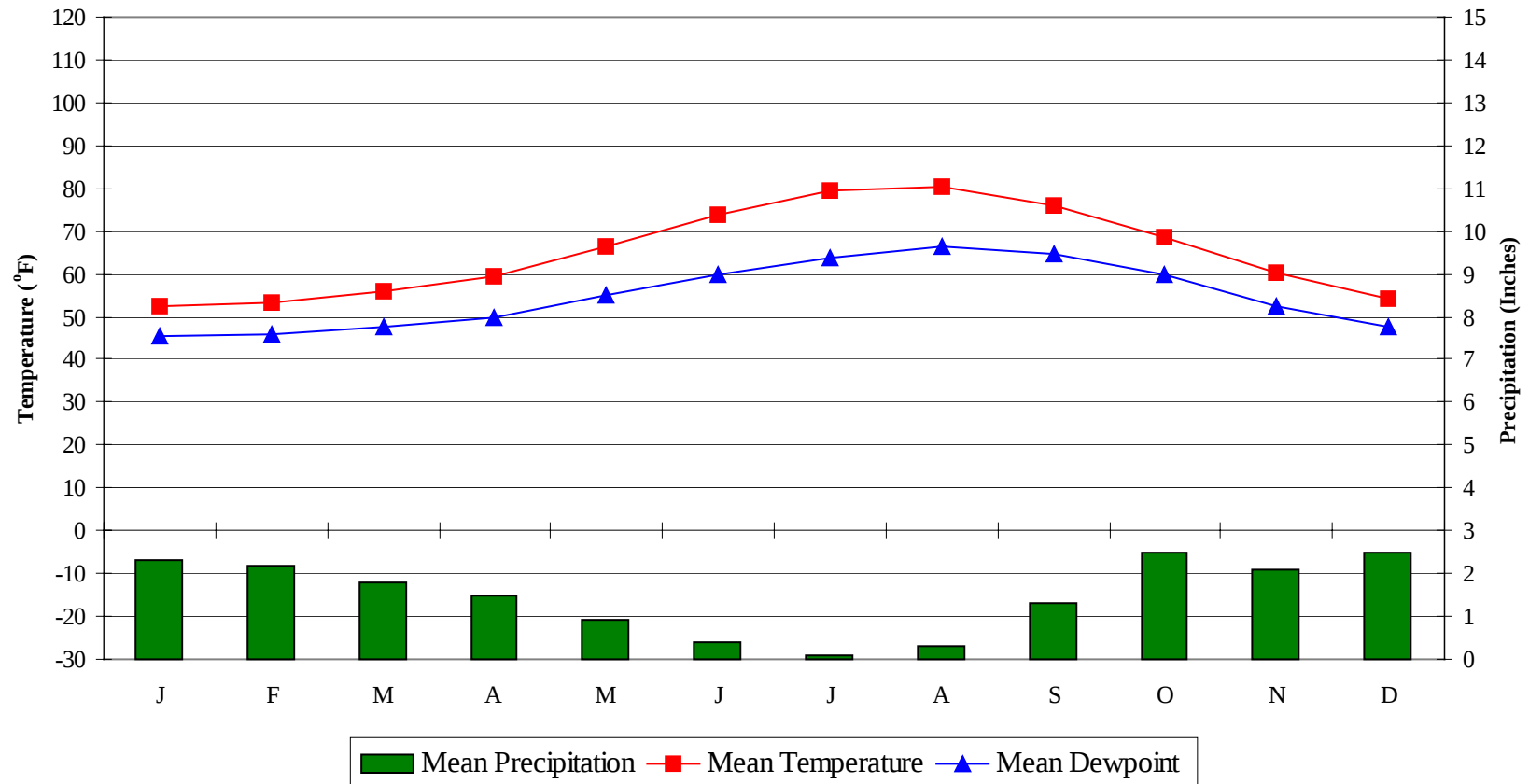
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

TUNIS/CARTHAGE

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Average Annual Climate

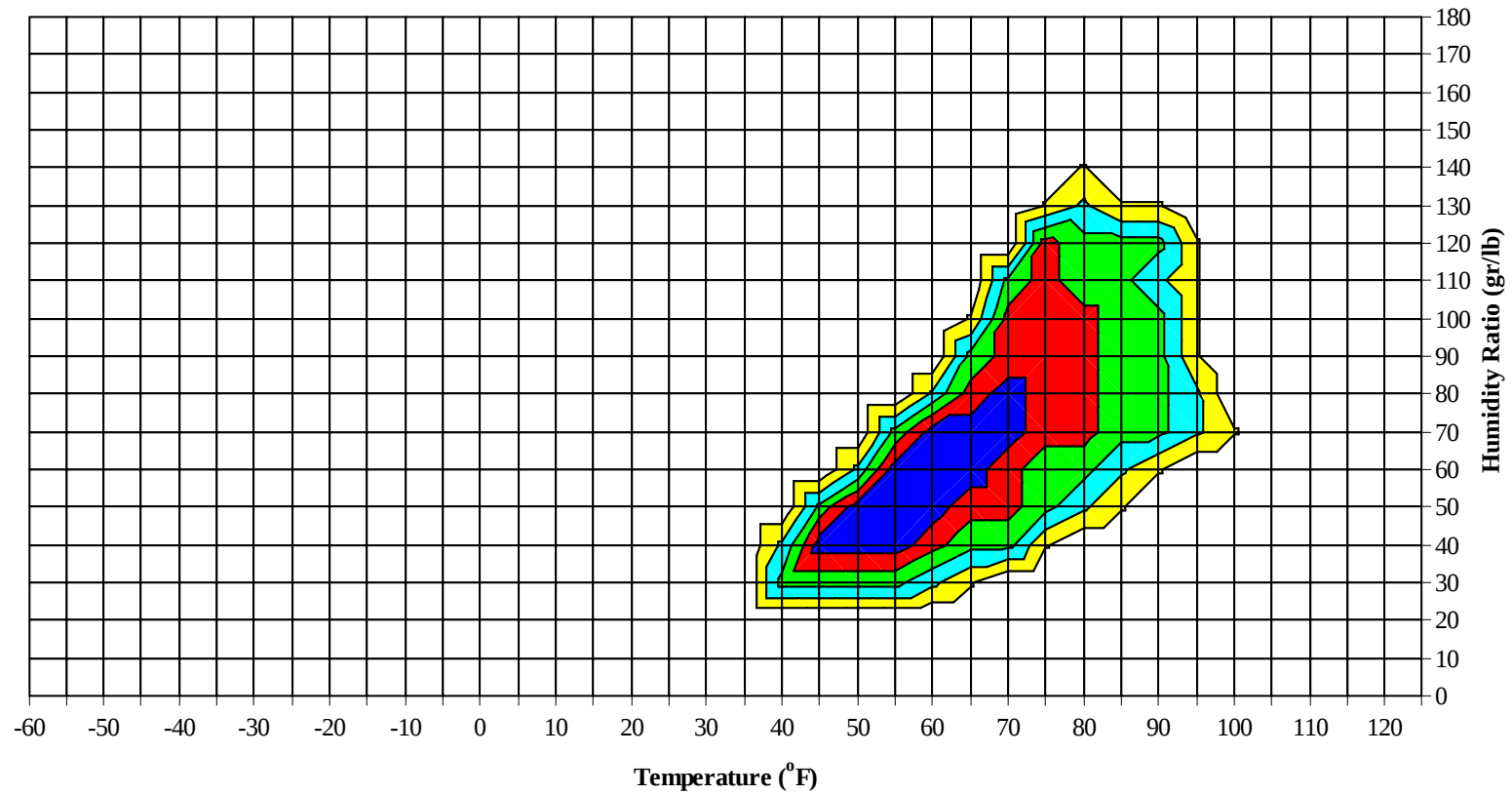


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Long Term Psychrometric Summary



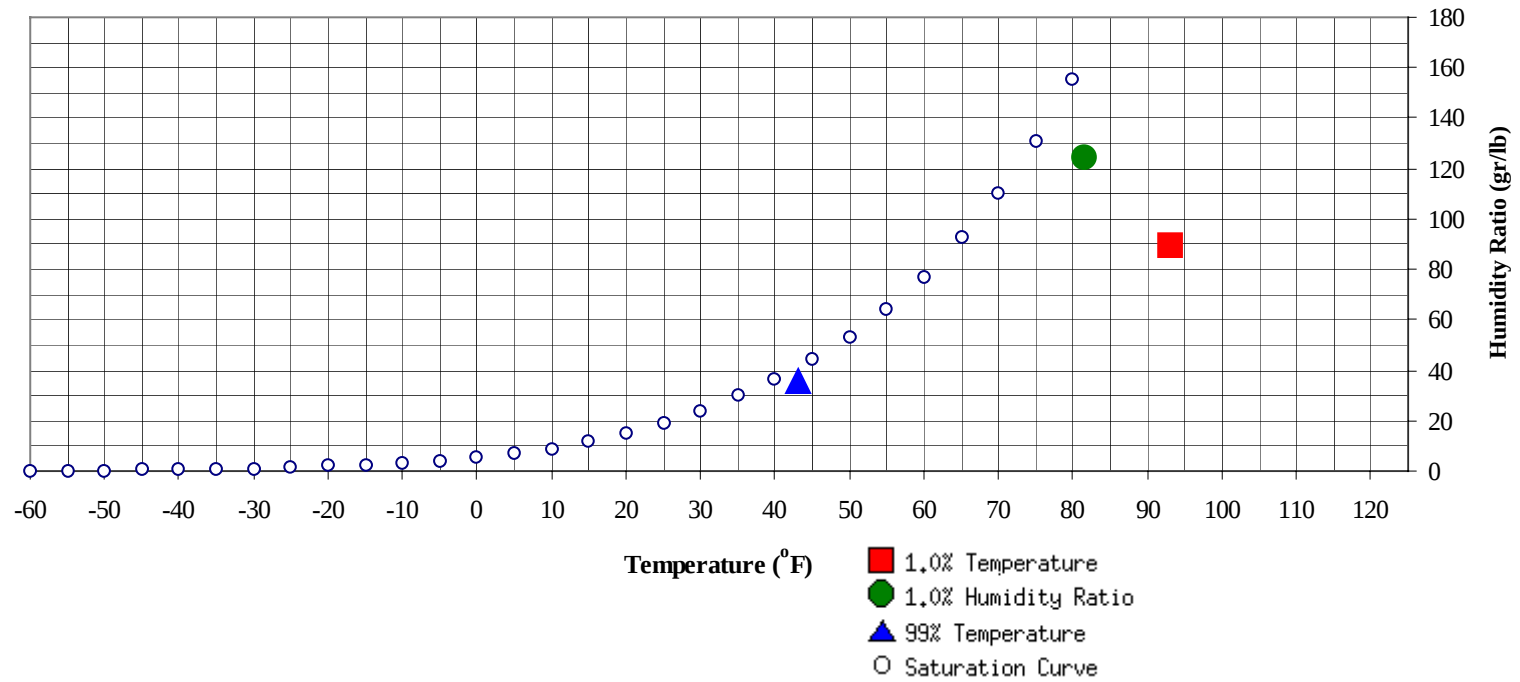
- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

TUNIS/CARTHAGE

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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)
	43	35.9	15.9		124.6	81.5	75.5	73.4	39.1

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	93	89.9	73.1	36.5

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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		
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99															
90 / 94															
85 / 89															
80 / 84							0	0	0	65.5		1	0	1	64.3
75 / 79		0		0	60.8		1	0	1	62.3		5	1	6	61.2
70 / 74	0	3	0	3	59.0		6	1	7	59.3	0	20	3	23	59.3
65 / 69	0	8	2	10	56.9	0	14	2	16	57.2	1	32	8	41	57.8
60 / 64	2	50	10	62	54.9	2	51	17	70	54.9	8	75	39	122	55.5
55 / 59	25	95	65	184	52.2	26	81	69	176	52.1	51	77	88	216	52.8
50 / 54	81	64	104	249	49.0	81	52	81	214	49.0	97	32	75	204	49.3
45 / 49	100	25	56	180	44.9	82	18	45	145	44.9	75	6	30	111	45.0
40 / 44	33	3	10	46	40.9	29	1	8	38	40.9	15	0	3	18	40.8
35 / 39	7	1	1	9	36.9	4	0	1	5	37.6	2		0	2	37.6
30 / 34	1	0	0	1	32.1	0		0	0	32.0					

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 = 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		
115 / 119															
110 / 114												0		0	71.5
105 / 109												1	0	1	72.7
100 / 104							1	0	1	68.8		1	0	1	73.3
95 / 99							1	0	1	68.0		3	0	3	73.0
90 / 94		0		0	67.0	0	3	1	4	69.2	0	14	1	15	71.0
85 / 89		1		1	64.4	0	6	1	7	67.4	0	30	6	36	69.5
80 / 84		3	0	3	63.7	1	25	5	31	66.1	2	79	25	107	67.8
75 / 79		13	2	15	62.4	2	60	17	79	63.8	18	79	61	158	66.2
70 / 74	0	40	8	48	60.1	13	81	47	142	62.0	69	27	84	180	64.9
65 / 69	3	55	20	78	58.0	35	45	55	135	60.5	75	4	41	120	62.7
60 / 64	28	81	69	178	56.1	90	22	79	190	58.5	61	1	20	82	59.7
55 / 59	85	37	89	211	53.3	78	4	36	118	54.7	14		2	16	55.8
50 / 54	92	8	44	144	49.6	28	1	6	35	50.8	1		0	1	52.4
45 / 49	31	1	8	40	45.3	2		0	2	46.3					
40 / 44	2	0	0	2	41.5										
35 / 39	0	0	0	0											
30 / 34															

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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		
115 / 119		0		0	72.0		0		0	72.0					
110 / 114		0		0	72.4		0		0	71.7					
105 / 109		2	0	2	73.6		1	0	1	73.3		0		0	70.3
100 / 104		5	1	6	73.8		5	0	5	74.9		1	0	1	70.8
95 / 99		16	3	19	73.4		21	2	23	74.3		5	0	5	73.3
90 / 94	0	57	13	70	72.0	0	60	13	73	73.7	0	19	2	21	73.5
85 / 89	2	65	23	90	71.0	1	71	27	100	73.0	0	40	7	48	72.4
80 / 84	14	76	62	152	70.2	21	69	73	163	72.0	5	93	37	135	70.9
75 / 79	66	26	84	177	69.2	90	19	92	201	70.9	44	58	92	194	69.7
70 / 74	106	2	52	160	66.9	103	2	37	142	67.9	89	20	69	178	67.0
65 / 69	49	0	8	57	64.0	29	0	3	32	64.4	66	3	23	92	64.1
60 / 64	11	0	1	12	61.0	5		0	5	60.8	33	1	8	42	60.4
55 / 59	0			0	55.0						3	0	1	4	56.5
50 / 54															
45 / 49															
40 / 44															
35 / 39															
30 / 34															

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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		
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99		0		0	69.8										
90 / 94		3	0	3	69.6										
85 / 89		9	1	10	69.3		0		0	61.0					
80 / 84	1	37	5	43	69.3		2	0	2	64.2		0		0	61.0
75 / 79	7	71	30	108	67.8	0	14	1	15	63.5		1		1	60.8
70 / 74	35	71	73	179	65.4	2	42	11	56	62.1	0	8	1	9	59.8
65 / 69	57	33	58	147	62.9	8	57	27	92	60.3	0	19	4	23	57.9
60 / 64	85	17	58	160	59.7	46	68	76	190	57.8	5	74	27	106	55.9
55 / 59	54	5	21	80	55.4	90	41	77	208	54.2	44	83	85	212	53.0
50 / 54	9	1	2	12	51.0	71	13	42	126	50.0	106	50	89	245	49.3
45 / 49	1		0	1	45.4	21	2	6	29	45.5	74	12	38	125	45.3
40 / 44						2	0	1	3	41.4	16	1	4	21	40.7
35 / 39						0	0	0	0	37.4	3	0	0	3	37.5
30 / 34											0	0		0	31.5

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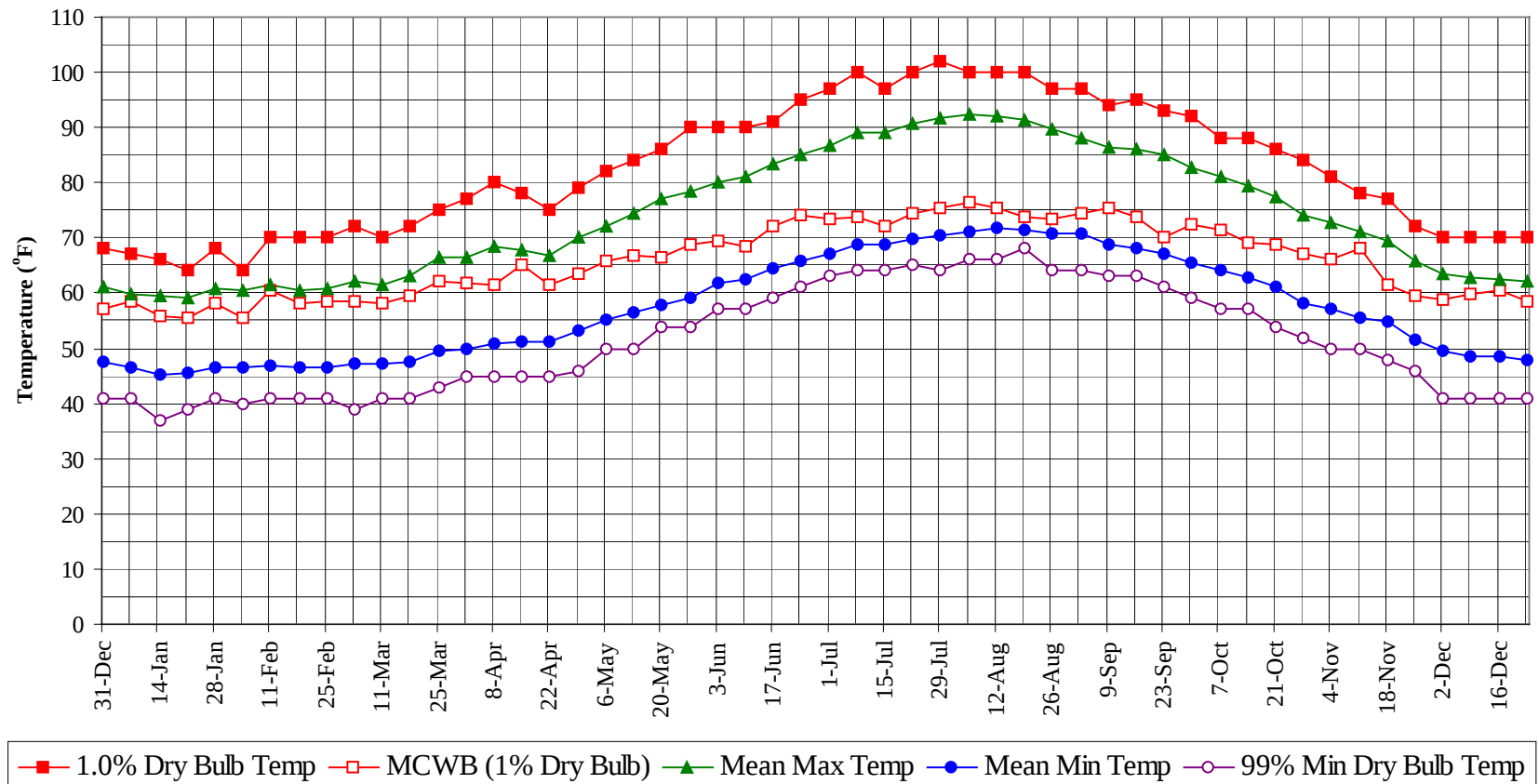
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1967 to 1996

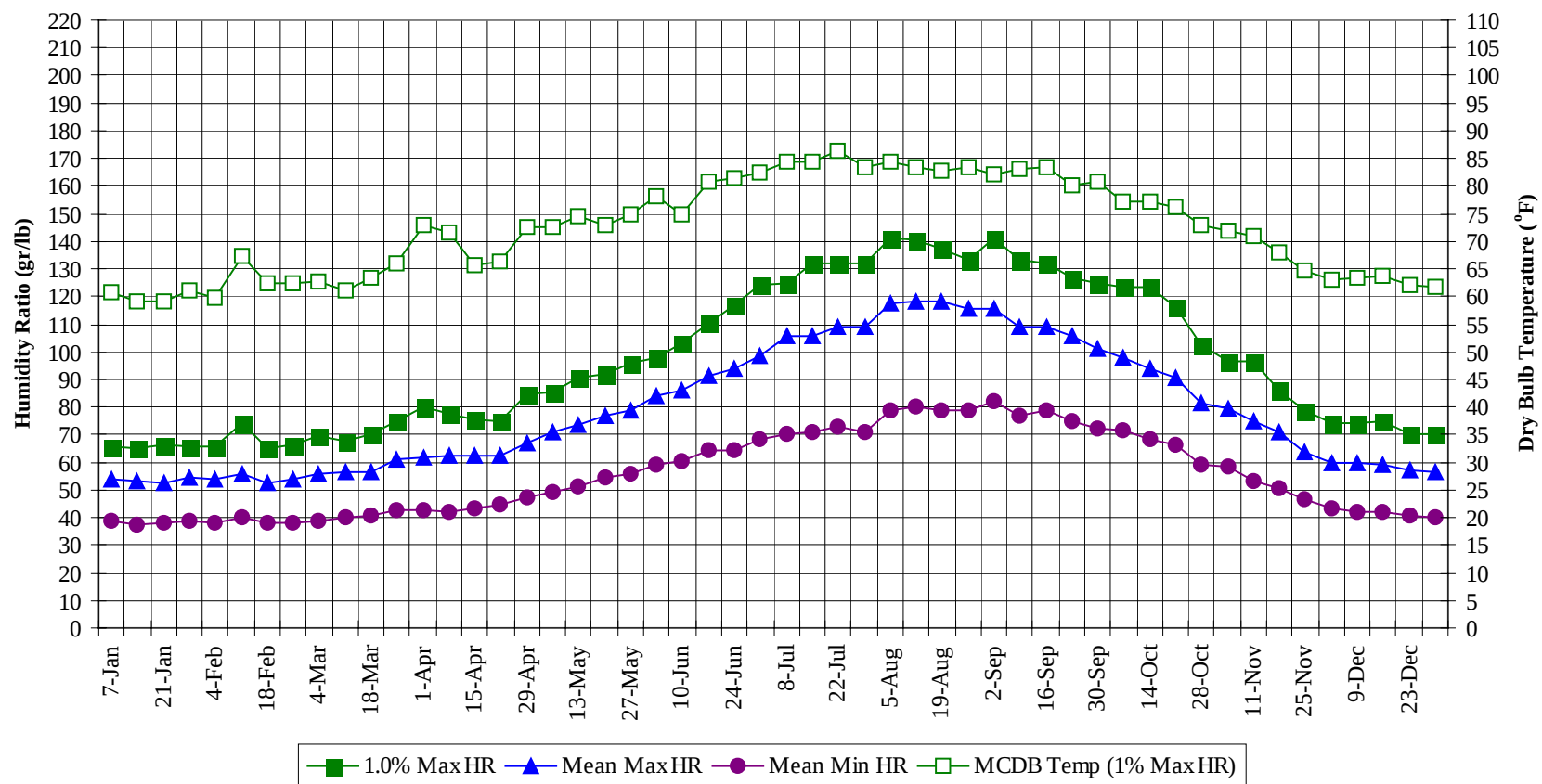
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
115 / 119	0			0	72.0
110 / 114	0			0	72.0
105 / 109	3 0			3	73.2
100 / 104	12 1			13	73.7
95 / 99	45 6			51	73.6
90 / 94	1	154	30	185	72.7
85 / 89	4	221	64	289	71.6
80 / 84	43	383	205	631	70.1
75 / 79	223	347	377	947	68.3
70 / 74	413	322	384	1119	65.0
65 / 69	319	273	253	845	61.4
60 / 64	377	442	404	1222	57.4
55 / 59	473	424	536	1433	53.3
50 / 54	566	221	446	1234	49.3
45 / 49	386	65	184	635	45.1
40 / 44	98	6	26	130	40.9
35 / 39	17	2	3	22	37.3
30 / 34	1	0	0	1	32.1

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.

Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



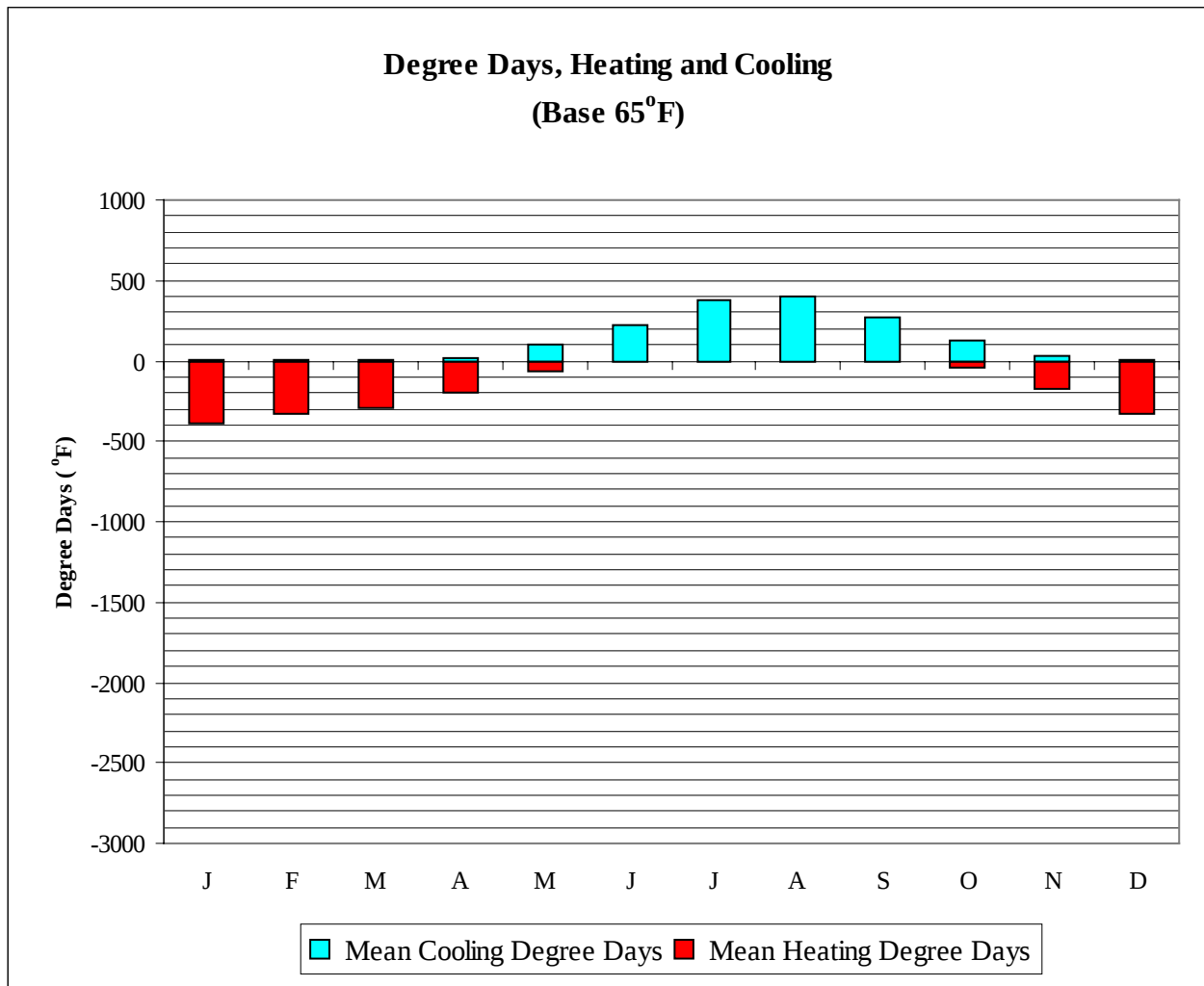
TUNIS/CARTHAGE TS WMO No. 607150
Long Term Dry Bulb Temperature and Humidity Summary

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	67.0	58.4	59.9	46.5	41.0	65.8	60.8	53.7	38.6
14-Jan	66.0	55.8	59.5	45.3	37.0	65.1	59.2	53.3	37.8
21-Jan	64.0	55.4	59.2	45.5	39.0	66.5	59.0	52.8	38.0
28-Jan	68.0	58.2	60.7	46.6	41.0	65.8	61.1	54.3	38.9
4-Feb	64.0	55.6	60.4	46.4	40.0	65.8	59.6	54.1	38.4
11-Feb	70.0	60.4	61.6	46.8	41.0	74.2	67.2	56.0	40.2
18-Feb	70.0	58.1	60.5	46.4	41.0	65.1	62.2	52.8	38.0
25-Feb	70.0	58.3	61.0	46.6	41.0	66.5	62.3	53.9	38.4
4-Mar	72.0	58.5	62.2	47.0	39.0	69.3	62.8	55.6	38.6
11-Mar	70.0	58.0	61.6	47.1	41.0	67.9	61.0	56.3	40.3
18-Mar	72.0	59.6	63.3	47.5	41.0	70.0	63.3	56.7	40.8
25-Mar	75.0	62.1	66.4	49.6	43.0	74.9	66.0	61.2	42.6
1-Apr	77.0	61.8	66.5	50.0	45.0	79.8	73.0	61.8	42.9
8-Apr	80.0	61.3	68.6	50.8	45.0	77.7	71.7	62.1	42.2
15-Apr	78.0	65.0	67.8	51.2	45.0	75.6	65.5	62.3	43.2
22-Apr	75.0	61.4	66.8	51.3	45.0	74.9	66.2	62.5	44.6
29-Apr	79.0	63.6	70.1	53.2	46.0	84.7	72.5	66.9	47.1
6-May	82.0	65.8	72.2	55.0	50.0	85.4	72.7	70.7	49.3
13-May	84.0	66.8	74.3	56.5	50.0	90.3	74.7	73.4	51.5
20-May	86.0	66.6	77.1	57.9	54.0	91.7	72.9	77.1	54.8
27-May	90.0	68.7	78.4	59.3	54.0	95.9	74.8	79.0	56.1
3-Jun	90.0	69.5	80.0	61.8	57.0	98.0	78.0	84.0	58.8
10-Jun	90.0	68.6	81.2	62.6	57.0	102.9	75.0	86.1	60.4
17-Jun	91.0	72.1	83.3	64.3	59.0	110.6	80.6	91.3	64.0
24-Jun	95.0	74.1	85.1	65.7	61.0	116.9	81.5	93.7	64.5
1-Jul	97.0	73.6	86.7	67.1	63.0	123.9	82.3	98.2	68.6
8-Jul	100.0	73.8	89.1	68.8	64.0	124.6	84.3	105.6	70.4
15-Jul	97.0	72.3	89.1	68.9	64.0	132.3	84.5	105.8	70.9
22-Jul	100.0	74.6	90.6	69.7	65.0	132.3	86.4	109.2	72.7
29-Jul	102.0	75.5	91.6	70.4	64.0	132.3	83.4	109.3	70.8
5-Aug	100.0	76.4	92.2	71.2	66.0	141.4	84.6	117.7	78.7
12-Aug	100.0	75.5	92.1	71.7	66.0	140.7	83.4	118.4	80.1
19-Aug	100.0	73.7	91.2	71.5	68.0	137.2	82.6	118.4	79.1
26-Aug	97.0	73.5	89.8	70.6	64.0	133.0	83.6	115.3	78.9
2-Sep	97.0	74.4	88.0	70.8	64.0	141.4	82.2	115.4	81.8
9-Sep	94.0	75.5	86.3	68.7	63.0	133.0	83.1	108.8	77.1
16-Sep	95.0	73.8	86.1	68.2	63.0	132.3	83.3	109.2	78.9
23-Sep	93.0	70.1	84.9	67.2	61.0	126.7	80.0	105.7	75.0
30-Sep	92.0	72.6	82.9	65.5	59.0	124.6	80.9	101.2	72.0
7-Oct	88.0	71.3	80.9	64.2	57.0	123.2	77.0	97.9	71.7
14-Oct	88.0	69.3	79.4	62.9	57.0	123.2	77.2	94.2	68.1
21-Oct	86.0	68.7	77.3	61.1	54.0	116.2	76.3	90.4	66.5
28-Oct	84.0	67.3	74.1	58.1	52.0	102.2	72.9	81.2	59.3
4-Nov	81.0	66.0	72.6	57.1	50.0	96.6	71.8	79.6	58.4
11-Nov	78.0	68.0	71.1	55.5	50.0	96.6	70.9	74.9	53.2
18-Nov	77.0	61.4	69.5	54.8	48.0	86.1	67.9	70.8	50.7
25-Nov	72.0	59.6	65.9	51.5	46.0	79.1	64.8	63.5	46.3
2-Dec	70.0	58.9	63.4	49.5	41.0	74.2	63.0	60.0	43.0
9-Dec	70.0	59.8	62.9	48.6	41.0	74.2	63.4	59.5	42.1
16-Dec	70.0	60.4	62.6	48.5	41.0	74.9	63.7	59.0	42.2
23-Dec	70.0	58.5	62.0	47.9	41.0	70.0	62.1	56.8	40.8
31-Dec	68.0	57.0	61.0	47.4	41.0	70.0	61.7	56.4	40.1

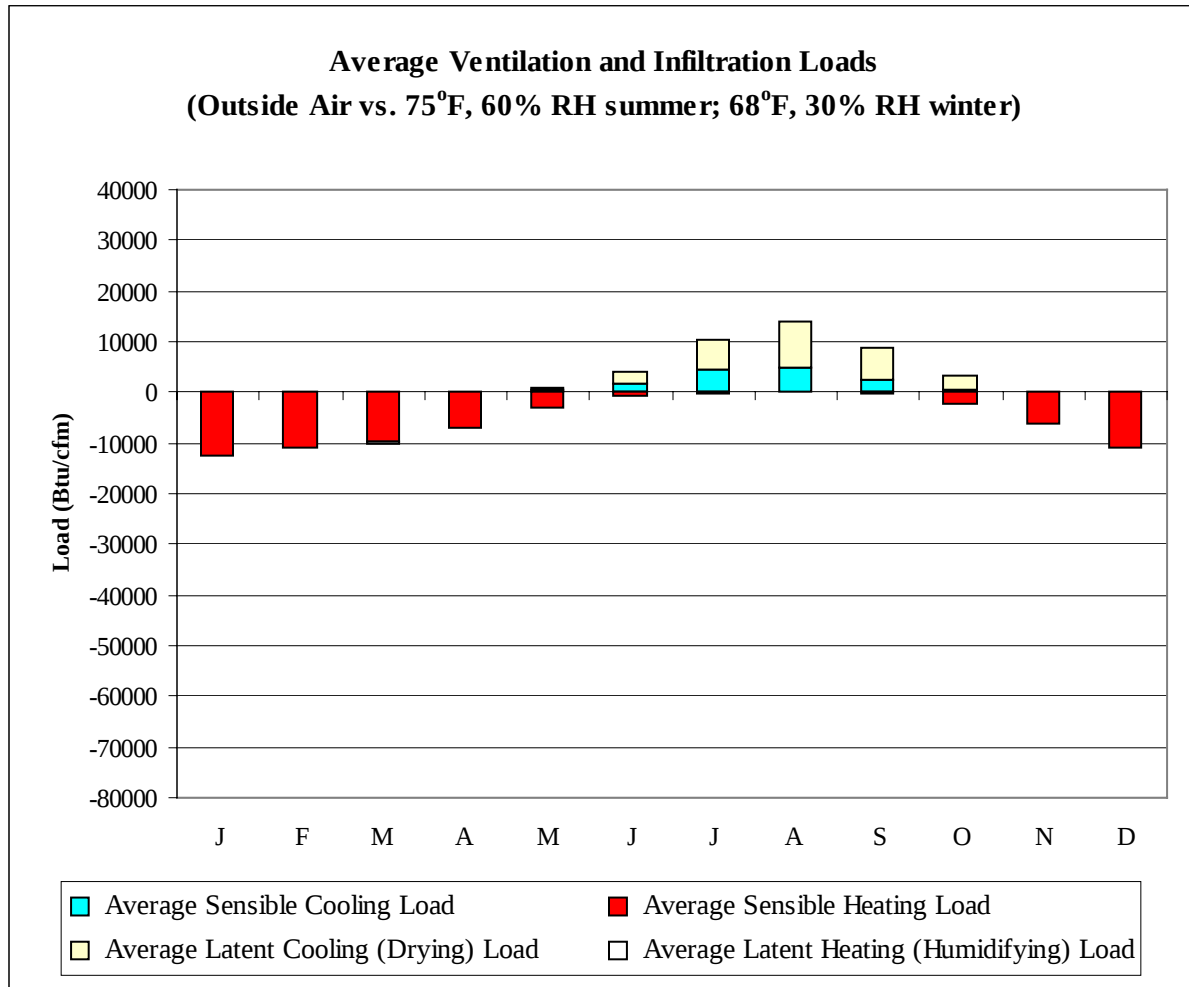
TUNIS/CARTHAGE

TS

WMO No. 607150



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	1	394
FEB	3	335
MAR	10	296
APR	22	193
MAY	99	69
JUN	225	10
JUL	372	1
AUG	398	0
SEP	272	4
OCT	130	43
NOV	25	171
DEC	3	330
ANN	1559	1846



	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	0	-12594	0	-43
FEB	2	-10827	1	-26
MAR	15	-9913	8	-27
APR	51	-6980	18	-8
MAY	510	-3051	382	-2
JUN	1841	-659	2276	0
JUL	4552	-93	5844	0
AUG	5056	-38	8965	0
SEP	2483	-296	6349	0
OCT	620	-2047	2559	0
NOV	33	-6336	185	-7
DEC	2	-10879	2	-26
ANN	15165	-63713	26589	-139

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

No Solar Radiation
Data Available

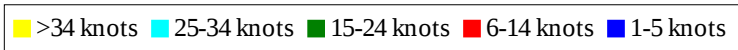
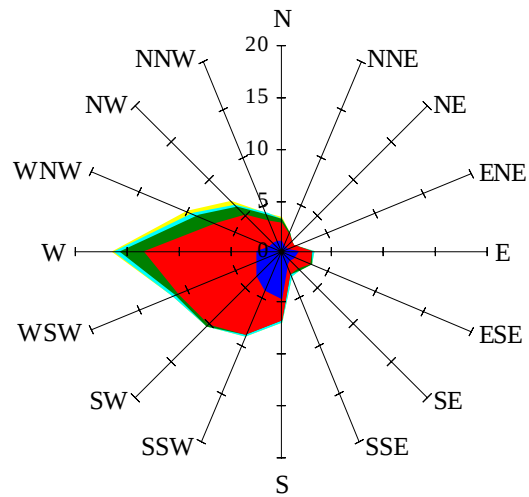


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

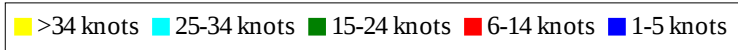
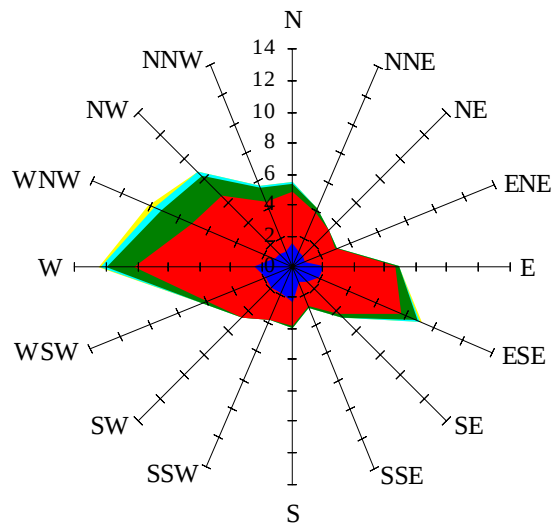
Labels of Percent Frequency on North Axis



Percent Calm = 6.92

Wind Summary - March, April, and May

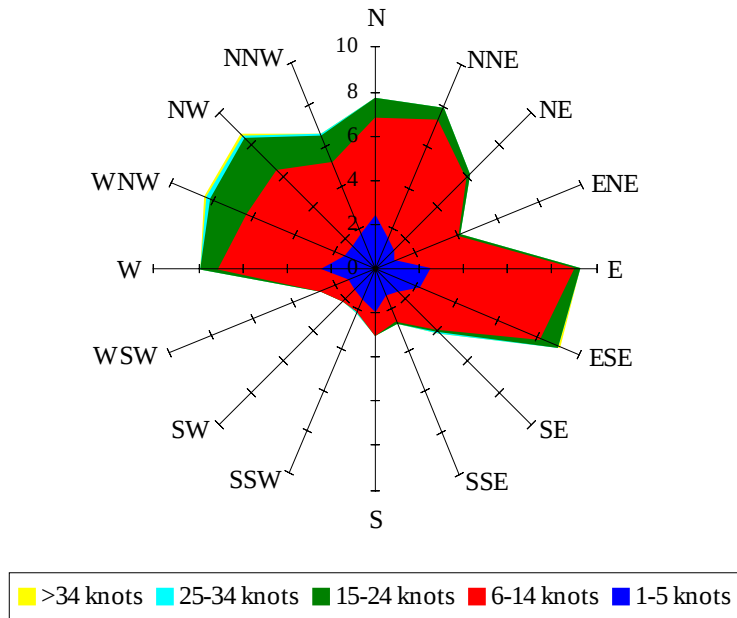
Labels of Percent Frequency on North Axis



Percent Calm = 6.46

Wind Summary - June, July, and August

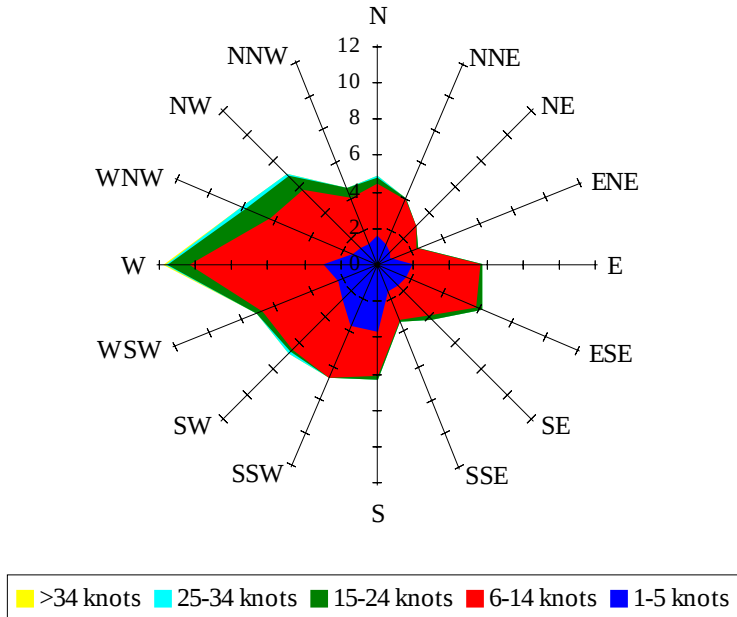
Labels of Percent Frequency on North Axis



Percent Calm = 8.79

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 9.05