

MALAGA, SPAIN

Latitude = 36.67 N

Longitude = 4.48 W

Period of Record = 1973 to 1996

WMO No. 084820

Elevation = 23 feet

Average Pressure = 29.98 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	102	69	53	12.5	NW
0.4% Occurrence	93	68	64	12.9	NW
1.0% Occurrence	90	68	66	12.3	NW
2.0% Occurrence	86	68	73	11.0	S
Mean Daily Range	16	-	-	-	-
97.5% Occurrence	45	43	37	8.1	NW
99.0% Occurrence	41	39	31	8.9	NW
99.6% Occurrence	39	37	29	9.5	NW
Median of Extreme Lows	34	32	23	10.0	NW
	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	76	83	120	7.3	SE
0.4% Occurrence	75	82	117	6.9	SE
1.0% Occurrence	74	81	113	6.5	SE
2.0% Occurrence	73	80	109	6.5	SE
	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	128	79	0.86	4.3	SE
0.4% Occurrence	123	79	0.83	5.1	SE
1.0% Occurrence	117	78	0.78	5.3	SE
2.0% Occurrence	110	77	0.74	4.9	SE
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		44	713	214	1444

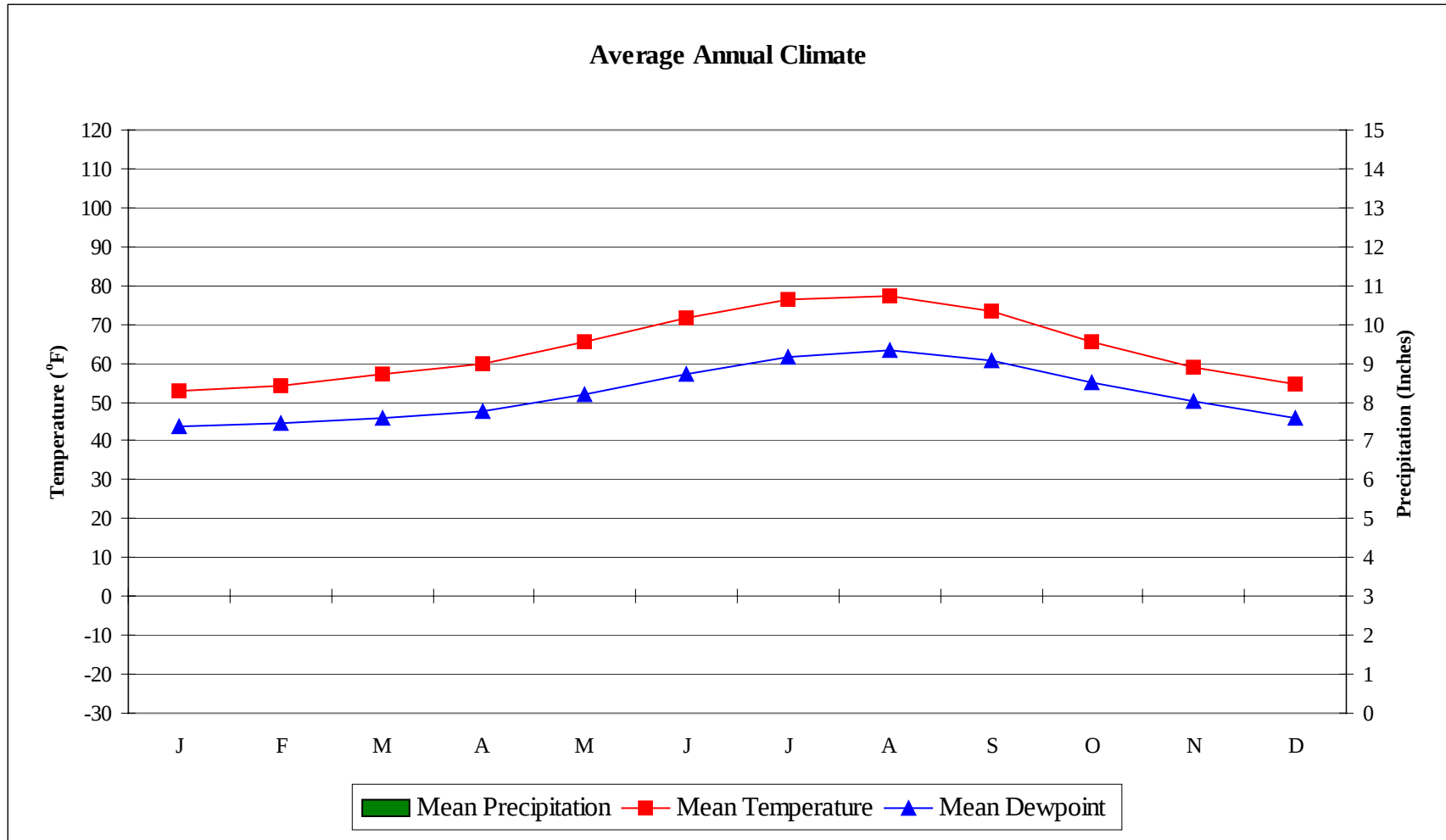
Other Site Data

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	1.6 + 0.7
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 (#)
66.4	N/A	N/A	0

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

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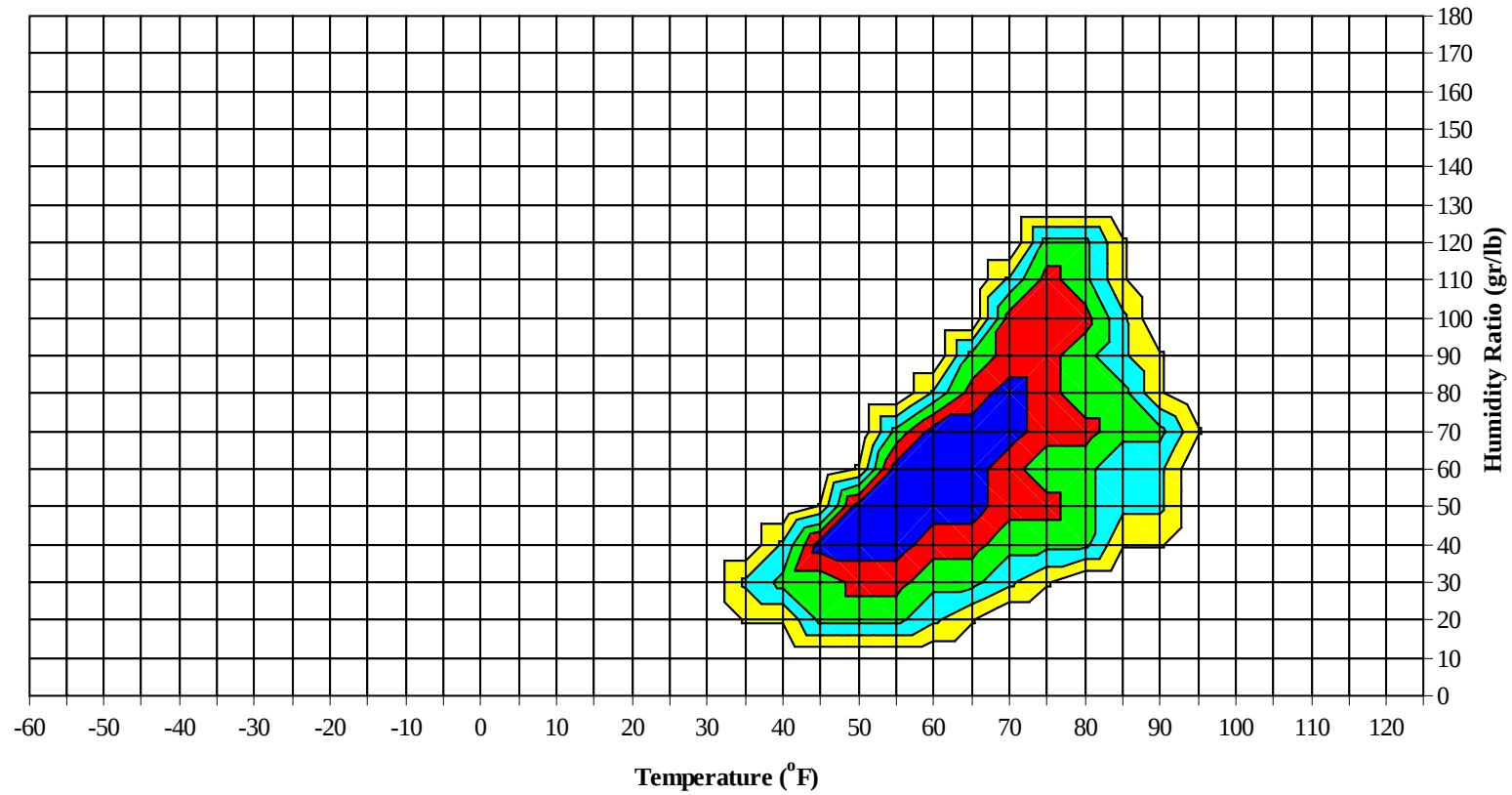


No Precipitation Data Available

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Long Term Psychrometric Summary

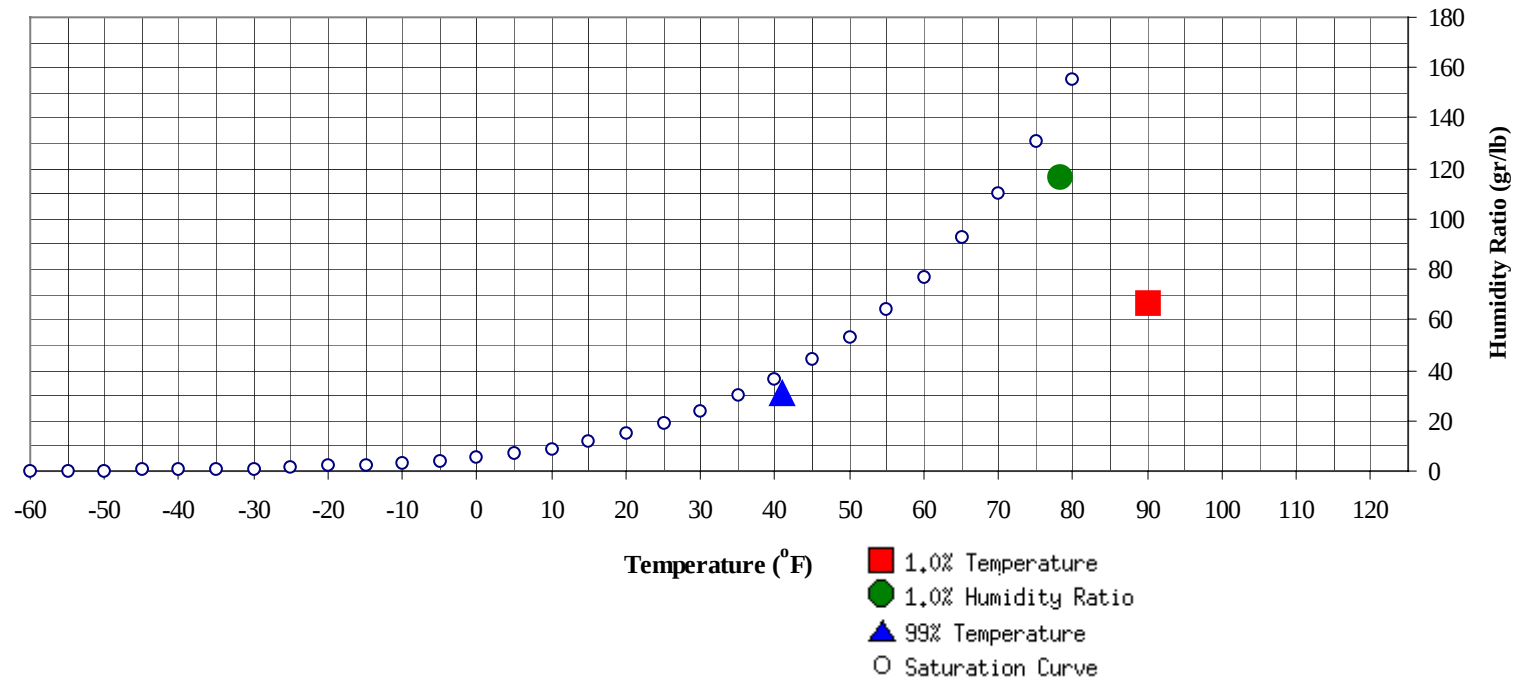


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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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	41	31.1	14.6		116.9	78.4	73.6	71.6	37.1

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	90	66.6	67.7	32.1

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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		
105 / 109															
100 / 104															
95 / 99															
90 / 94															
85 / 89												0	0	0	59.5
80 / 84												1	1	2	60.1
75 / 79		0	0	0	58.3		1	0	1	58.9		4	2	6	59.8
70 / 74		2	0	2	57.0		6	3	9	58.4	0	17	10	27	57.5
65 / 69	0	11	3	14	55.7	0	16	7	23	56.4	1	33	18	52	56.2
60 / 64	3	56	27	86	53.8	7	62	39	108	54.2	10	89	64	163	54.6
55 / 59	43	86	101	230	51.5	44	72	90	206	51.6	63	65	99	227	52.0
50 / 54	70	48	72	190	48.2	70	40	58	168	48.4	92	29	43	164	48.7
45 / 49	75	29	37	141	44.1	62	18	22	102	44.0	65	9	9	83	44.4
40 / 44	39	12	6	57	39.9	29	6	3	38	39.7	14	1	1	16	39.9
35 / 39	18	5	1	24	35.9	11	3	1	15	36.0	3	0	0	3	35.6
30 / 34	1	0		1	30.5	1	0	0	1	30.6	0	0		0	31.3
25 / 29	0	0		0	25.7										

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 = 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		
105 / 109												0		0	70.0
100 / 104												0	0	0	67.1
95 / 99												1	1	2	65.4
90 / 94		0	0	0	65.0		0	0	0	66.4		5	4	9	66.6
85 / 89		0	0	0	63.7		2	1	3	63.8	0	9	7	16	66.1
80 / 84		2	1	3	61.4	0	10	8	18	63.0	1	36	22	59	65.1
75 / 79		10	6	16	59.5	1	35	20	56	61.4	11	98	56	165	64.7
70 / 74	1	33	16	50	58.0	5	90	52	148	60.3	42	74	86	201	63.6
65 / 69	3	57	32	92	56.8	21	65	60	147	58.9	74	12	46	133	61.7
60 / 64	23	83	80	186	55.1	81	37	81	198	57.2	92	5	17	114	58.8
55 / 59	77	42	79	198	52.8	97	7	24	128	53.6	19	0	0	19	54.3
50 / 54	90	12	23	125	48.9	40	1	1	42	49.5	1	0		1	50.4
45 / 49	40	2	2	44	44.7	4			4	45.4		0		0	47.0
40 / 44	6			6	39.9										
35 / 39	0			0	35.4										
30 / 34	0			0	31.0										
25 / 29															

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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		
105 / 109		0	0	0	69.3		0	0	0	70.6					
100 / 104		1	1	2	69.1		1	1	2	69.0					
95 / 99		5	5	10	69.1		6	4	10	69.4		1	0	1	69.0
90 / 94	0	12	10	22	67.9	0	14	9	23	68.8		6	4	10	67.5
85 / 89	1	25	13	39	67.7	1	26	14	41	69.1	0	11	5	16	67.5
80 / 84	7	91	48	146	68.9	10	109	58	178	70.4	2	62	26	90	68.7
75 / 79	35	91	94	220	68.1	51	76	104	232	69.2	20	102	83	205	68.0
70 / 74	113	20	66	200	66.1	118	14	54	186	67.0	79	42	87	208	65.8
65 / 69	68	2	10	80	63.2	54	1	3	58	63.3	73	11	22	106	62.7
60 / 64	23	0	1	24	59.9	13	0	0	13	59.4	49	4	11	64	58.7
55 / 59	1			1	54.9	1			1	52.5	17	1	1	19	53.2
50 / 54											1	0		1	49.3
45 / 49															
40 / 44															
35 / 39															
30 / 34															
25 / 29															

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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		
105 / 109															
100 / 104															
95 / 99															
90 / 94		0	0	0	64.9										
85 / 89		2	1	3	64.6										
80 / 84		7	3	10	64.6		1	0	1	62.4					
75 / 79	0	45	15	60	64.5	0	4	2	6	61.2					
70 / 74	10	85	58	153	62.8	1	24	8	33	60.3	0	6	1	7	59.6
65 / 69	40	49	70	159	61.3	6	56	26	88	59.3	0	18	6	24	57.4
60 / 64	88	38	71	198	58.4	43	78	85	206	57.1	12	76	44	132	55.2
55 / 59	73	16	26	116	54.3	71	47	81	200	53.7	59	76	105	239	52.6
50 / 54	32	5	3	40	49.5	77	21	32	130	49.3	80	43	64	187	48.7
45 / 49	5	0	0	5	44.5	35	7	6	48	44.4	64	21	25	110	44.3
40 / 44						6	1	0	7	40.1	25	6	3	34	39.9
35 / 39						1	0		1	36.7	8	2	0	10	36.3
30 / 34											1	0		1	30.3
25 / 29															

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

Period of Record = 1973 to 1996

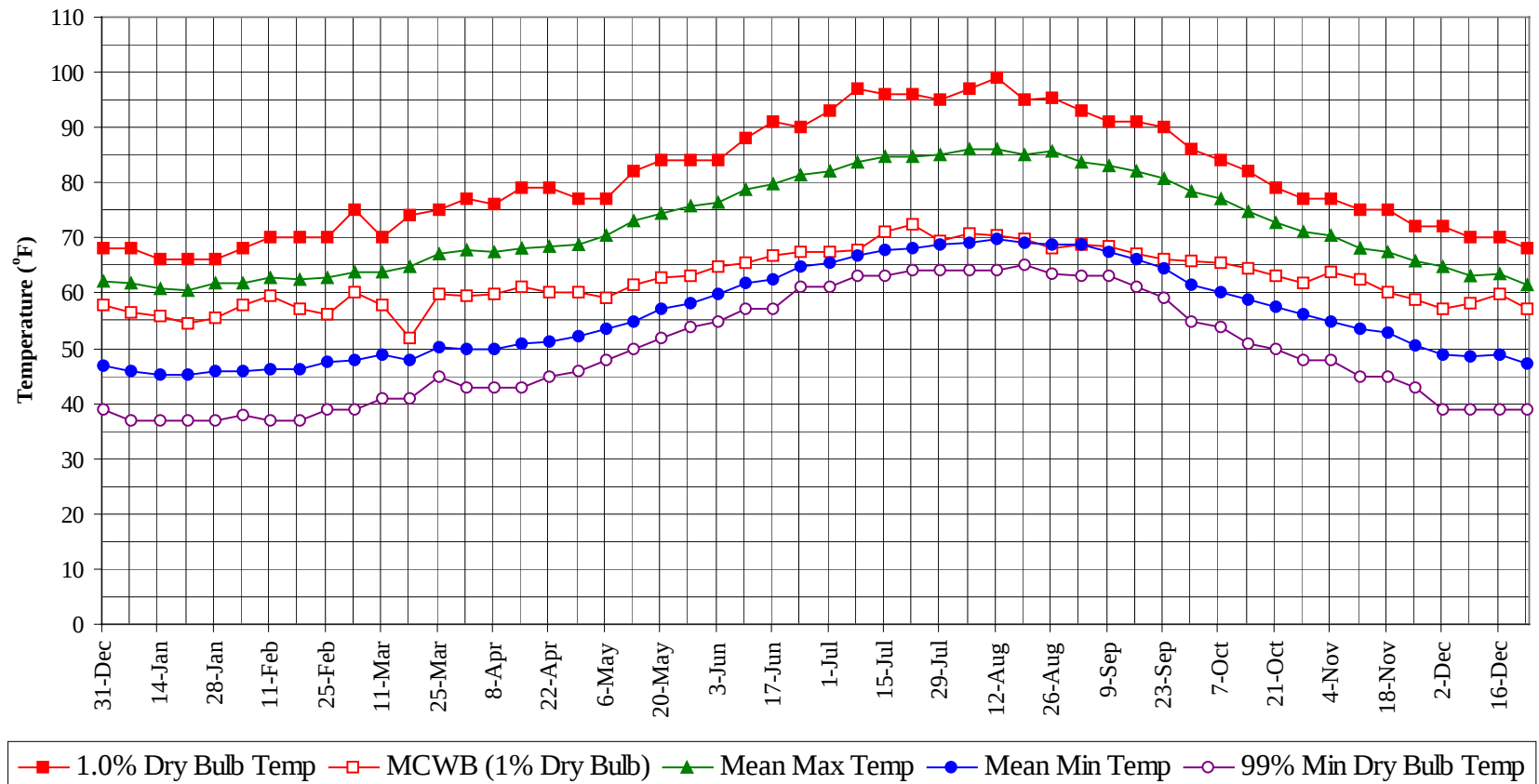
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109		1	0	1	69.9
100 / 104		3	2	5	68.8
95 / 99		12	10	22	69.0
90 / 94	0	38	26	64	68.0
85 / 89	2	75	41	118	67.7
80 / 84	20	320	167	506	68.6
75 / 79	117	465	385	968	66.9
70 / 74	367	413	443	1223	63.9
65 / 69	340	333	303	976	60.3
60 / 64	442	527	520	1489	56.5
55 / 59	564	411	609	1584	52.6
50 / 54	554	197	297	1049	48.7
45 / 49	349	86	101	537	44.2
40 / 44	118	27	13	158	39.8
35 / 39	43	11	2	56	36.0
30 / 34	3	1	0	4	30.6
25 / 29	0	0		0	25.7

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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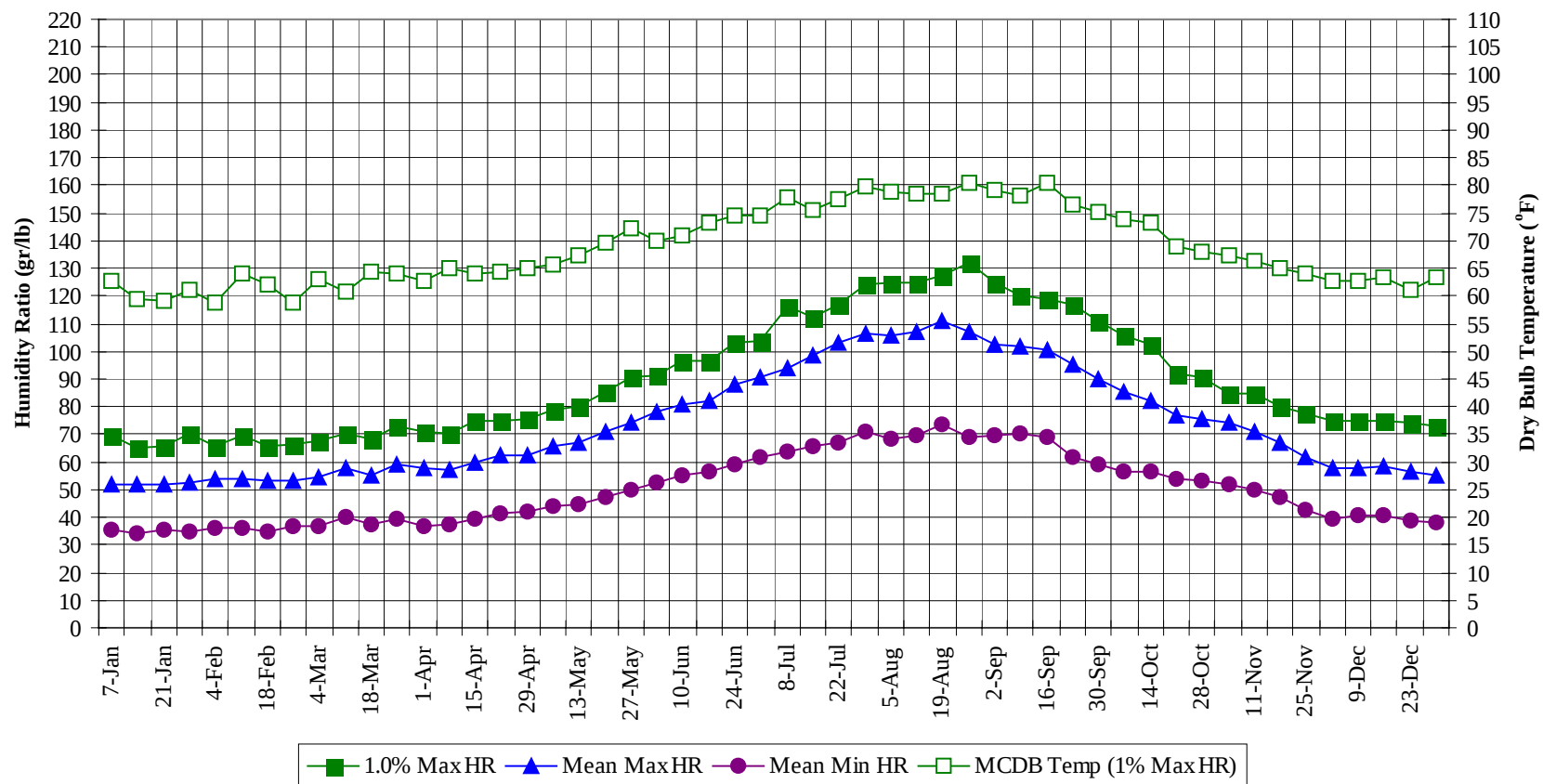
Annual Summary of Temperatures



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Long Term Humidity and Dry Bulb Temperature Summary



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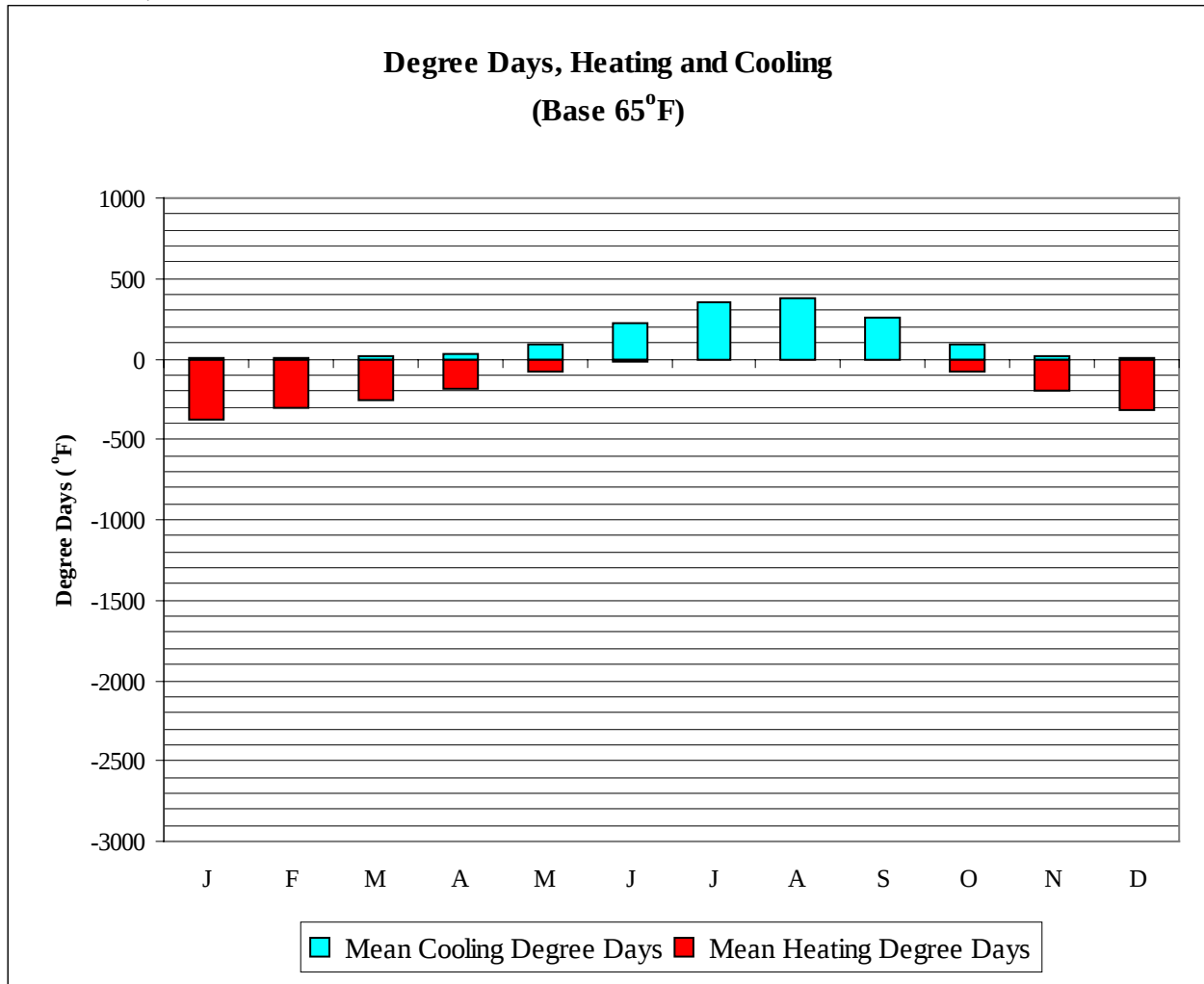
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Long Term Dry Bulb Temperature and Humidity Summary

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	68.0	56.6	61.7	45.9	37.0	69.3	62.7	52.1	35.4
14-Jan	66.0	55.7	60.9	45.3	37.0	65.1	59.4	51.8	34.3
21-Jan	66.0	54.4	60.5	45.3	37.0	65.8	59.0	52.1	35.4
28-Jan	66.0	55.3	61.8	45.8	37.0	70.0	61.1	52.6	35.0
4-Feb	68.0	57.9	61.9	46.0	38.0	65.8	58.9	54.0	36.0
11-Feb	70.0	59.4	62.8	46.2	37.0	69.3	64.0	54.2	36.4
18-Feb	70.0	57.1	62.5	46.1	37.0	65.8	61.9	53.2	34.9
25-Feb	70.0	56.1	62.8	47.5	39.0	66.5	58.9	53.1	37.0
4-Mar	75.0	60.2	63.9	47.7	39.0	67.9	63.0	54.2	36.8
11-Mar	70.0	57.8	63.8	48.7	41.0	70.0	60.7	57.5	40.1
18-Mar	74.0	52.0	64.8	47.7	41.0	68.6	64.4	55.5	37.3
25-Mar	75.0	59.7	67.0	50.1	45.0	72.8	64.0	58.8	39.4
1-Apr	77.0	59.6	67.8	49.9	43.0	70.7	62.6	57.7	37.1
8-Apr	76.0	59.8	67.6	49.7	43.0	70.0	64.9	57.3	37.6
15-Apr	79.0	61.0	68.2	50.7	43.0	74.9	64.1	59.8	39.5
22-Apr	79.0	60.3	68.4	51.2	45.0	74.9	64.3	62.1	41.5
29-Apr	77.0	60.1	68.9	52.1	46.0	75.6	65.1	62.5	42.1
6-May	77.0	59.0	70.4	53.6	48.0	79.1	65.6	65.4	43.7
13-May	82.0	61.5	73.2	54.9	50.0	79.8	67.3	66.8	44.5
20-May	84.0	62.7	74.4	57.1	52.0	85.4	69.6	70.8	47.6
27-May	84.0	63.0	75.7	58.3	54.0	90.3	72.2	74.4	49.7
3-Jun	84.0	64.7	76.4	59.8	55.0	91.0	69.9	78.1	52.8
10-Jun	88.0	65.6	78.7	61.9	57.0	96.6	71.0	81.0	55.1
17-Jun	91.0	66.7	79.6	62.4	57.0	96.6	73.1	82.3	56.5
24-Jun	90.0	67.4	81.3	64.6	61.0	102.9	74.6	87.8	59.2
1-Jul	93.0	67.5	82.1	65.3	61.0	103.6	74.5	90.5	62.0
8-Jul	97.0	67.7	83.7	67.0	63.0	116.2	77.8	94.2	63.4
15-Jul	96.0	71.0	84.6	67.8	63.0	112.0	75.7	98.7	65.9
22-Jul	96.0	72.3	84.7	68.0	64.0	116.9	77.6	103.3	67.1
29-Jul	95.0	69.5	85.1	68.6	64.0	123.9	79.9	106.5	71.1
5-Aug	97.0	70.8	86.1	69.3	64.0	124.6	78.7	105.7	68.1
12-Aug	99.0	70.3	86.0	69.7	64.0	124.6	78.5	107.0	69.8
19-Aug	95.0	69.9	85.1	69.2	65.0	127.4	78.6	111.3	73.7
26-Aug	95.5	68.3	85.6	68.9	63.5	132.3	80.5	106.8	68.7
2-Sep	93.0	68.9	83.8	68.6	63.0	124.6	79.0	102.3	69.8
9-Sep	91.0	68.6	83.2	67.4	63.0	120.4	78.1	101.8	70.0
16-Sep	91.0	67.2	82.1	66.2	61.0	119.0	80.3	100.5	68.9
23-Sep	90.0	66.0	80.9	64.6	59.0	116.9	76.4	95.2	61.9
30-Sep	86.0	65.8	78.6	61.5	55.0	111.3	75.2	89.8	58.8
7-Oct	84.0	65.4	77.0	60.2	54.0	105.7	73.9	85.4	56.7
14-Oct	82.0	64.5	74.7	58.9	51.0	102.2	73.2	82.0	56.2
21-Oct	79.0	63.2	72.8	57.5	50.0	91.7	69.1	77.1	54.0
28-Oct	77.0	61.9	71.2	56.3	48.0	90.3	68.0	75.2	53.4
4-Nov	77.0	63.7	70.4	54.8	48.0	84.7	67.3	74.4	52.0
11-Nov	75.0	62.5	68.0	53.4	45.0	84.7	66.3	70.8	50.0
18-Nov	75.0	60.0	67.4	52.7	45.0	79.8	65.0	66.8	47.0
25-Nov	72.0	58.9	65.9	50.6	43.0	77.7	64.1	61.9	42.7
2-Dec	72.0	57.1	64.9	48.7	39.0	74.9	62.6	57.8	39.4
9-Dec	70.0	58.3	63.2	48.4	39.0	74.9	62.7	58.0	40.4
16-Dec	70.0	59.8	63.5	48.9	39.0	74.9	63.4	58.5	40.8
23-Dec	68.0	57.0	61.6	47.3	39.0	74.2	61.2	56.3	39.0
31-Dec	68.0	57.9	62.2	46.8	39.0	72.8	63.2	55.4	38.2

MALAGA, SPAIN

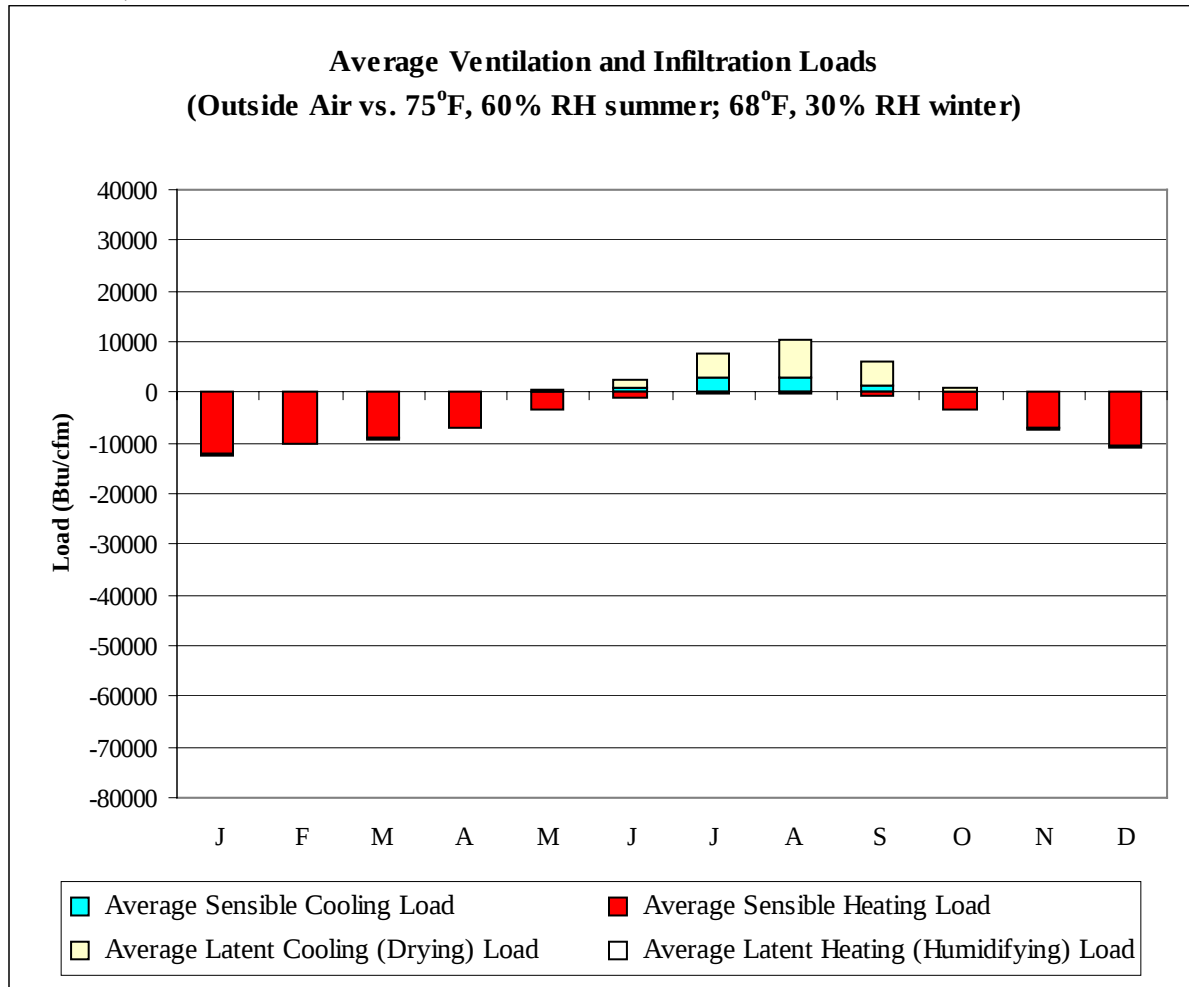
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	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	2	377
FEB	4	306
MAR	15	262
APR	29	188
MAY	94	83
JUN	217	15
JUL	354	2
AUG	381	1
SEP	256	11
OCT	91	78
NOV	18	197
DEC	3	320
ANN	1463	1840

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	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	-12145	0	-299
FEB	1	-10056	1	-237
MAR	26	-8982	1	-181
APR	47	-6809	3	-80
MAY	259	-3514	127	-28
JUN	1098	-926	1217	-4
JUL	2706	-175	4939	-4
AUG	3053	-110	7246	-10
SEP	1406	-654	4511	-7
OCT	184	-3351	851	-17
NOV	17	-7130	43	-84
DEC	0	-10635	4	-241
ANN	8797	-64487	18943	-1192

Average Annual Solar Radiation – Nearest Available Site

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

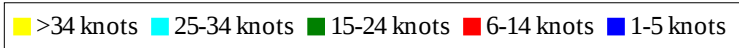
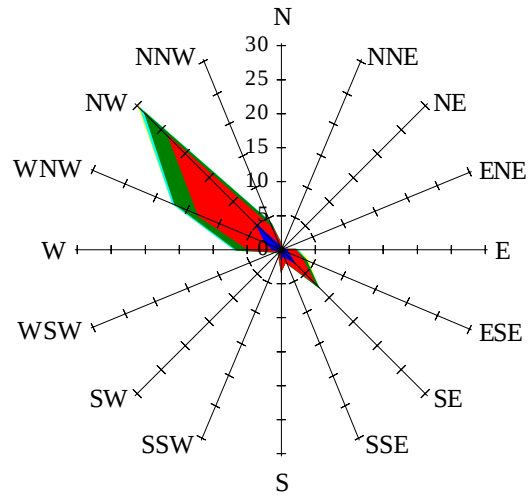


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

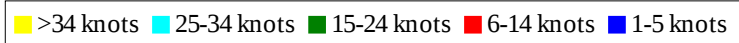
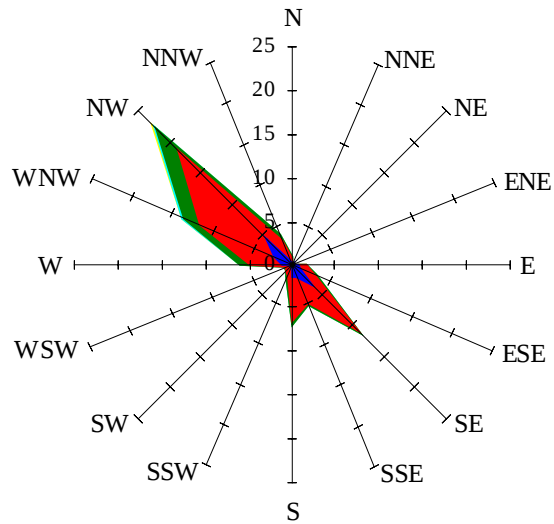
Labels of Percent Frequency on North Axis



Percent Calm = 20.32

Wind Summary - March, April, and May

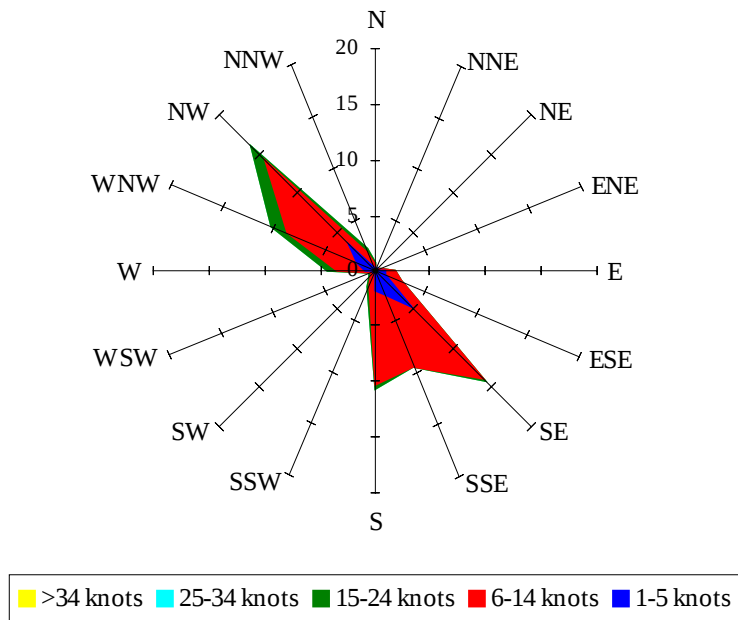
Labels of Percent Frequency on North Axis



Percent Calm = 21.16

Wind Summary - June, July, and August

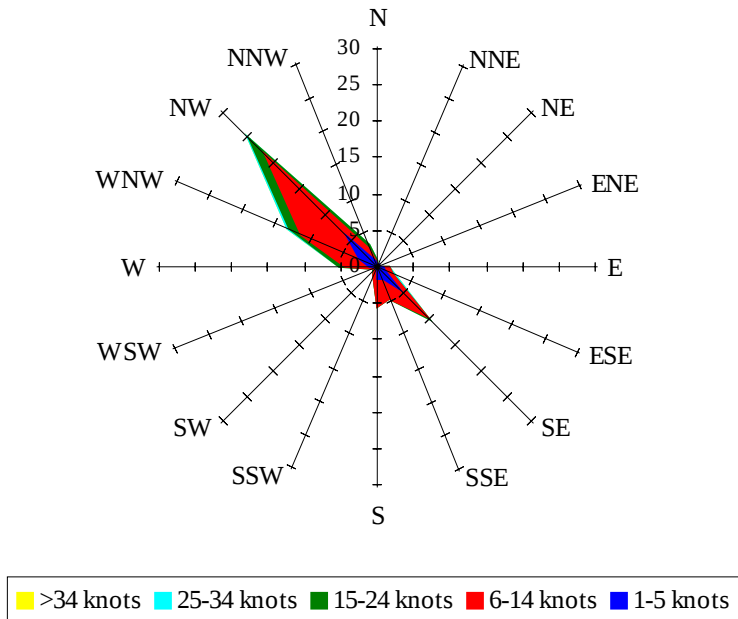
Labels of Percent Frequency on North Axis



Percent Calm = 24.61

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 24.38