

ZARAGOZA AB, SPAIN

Latitude = 41.67 N

Longitude = 1.05 W

Period of Record = 1963 to 1992

WMO No. 081605

Elevation = 863 feet

Average Pressure = 29.11 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	101	70	65	8.4	E
0.4% Occurrence	97	69	66	8.0	E
1.0% Occurrence	93	68	67	7.7	E
2.0% Occurrence	90	68	69	7.7	E
Mean Daily Range	18	-	-	-	-
97.5% Occurrence	34	32	24	6.5	WNW
99.0% Occurrence	30	29	21	5.0	W
99.6% Occurrence	27	26	19	4.8	W
Median of Extreme Lows	25	24	17	4.0	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	74	91	98	7.2	E
0.4% Occurrence	72	89	90	7.8	E
1.0% Occurrence	70	86	85	7.7	E
2.0% Occurrence	69	85	82	7.7	E
	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	113	81	0.74	6.0	E
0.4% Occurrence	99	77	0.65	6.8	E
1.0% Occurrence	94	77	0.61	6.8	E
2.0% Occurrence	90	75	0.59	7.9	E
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		95	733	20	471

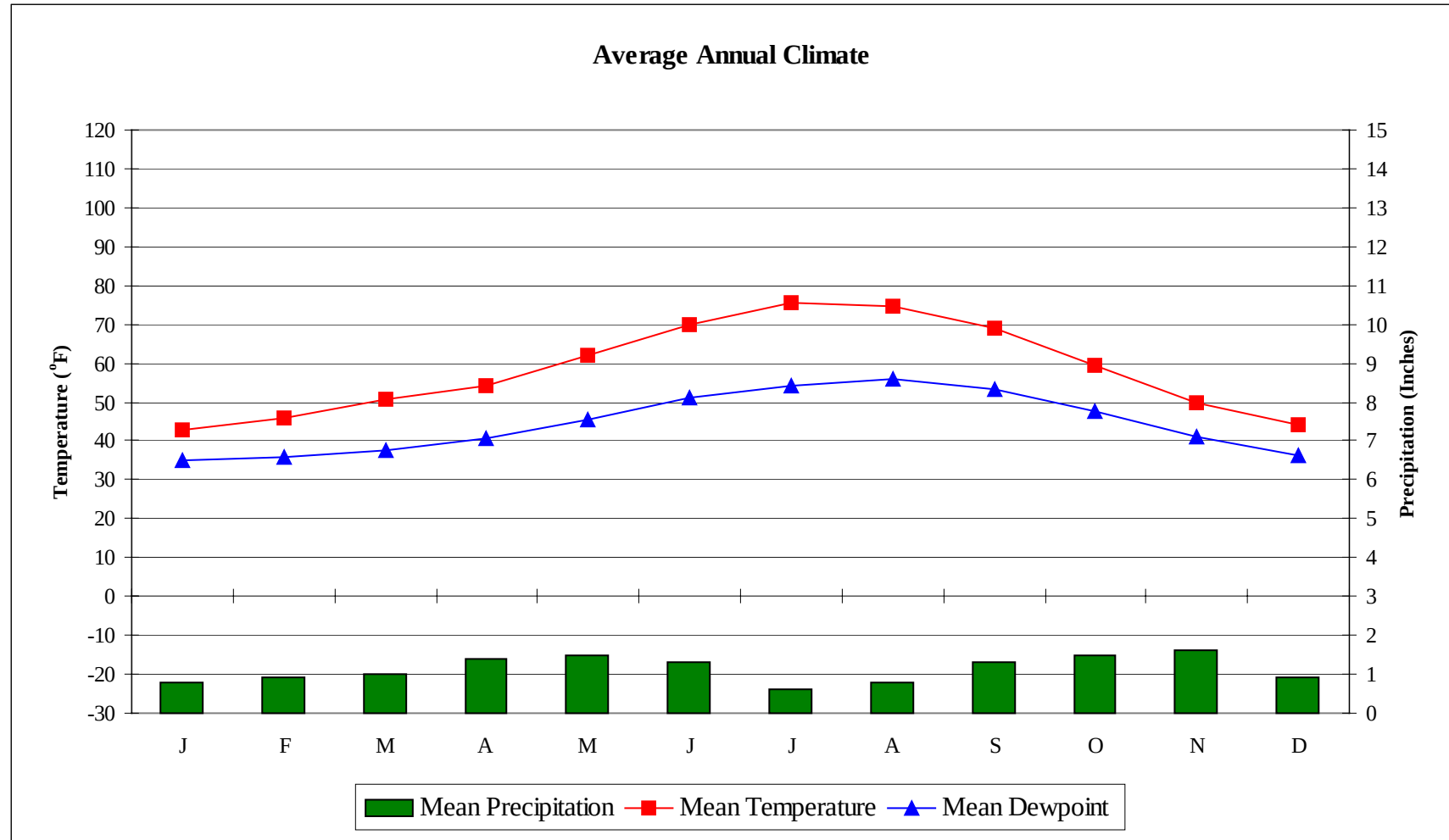
Other Site Data

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
8	N/A	N/A	0.2 + 0.8
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 (#)
60.8	N/A	N/A	16

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

ZARAGOZA AB, SPAIN

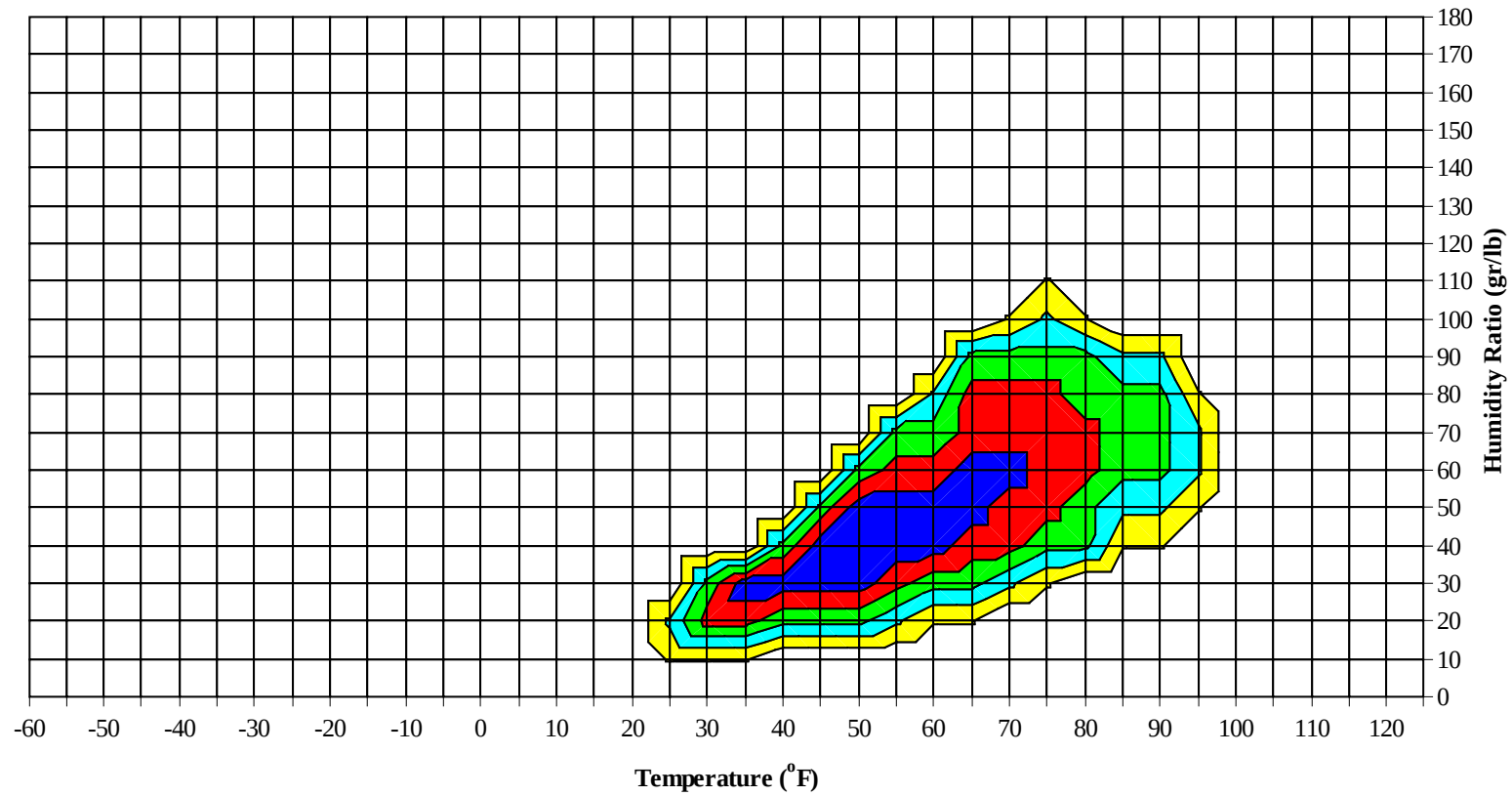
WMO No. 081605



ZARAGOZA AB, SPAIN

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Long Term Psychrometric Summary

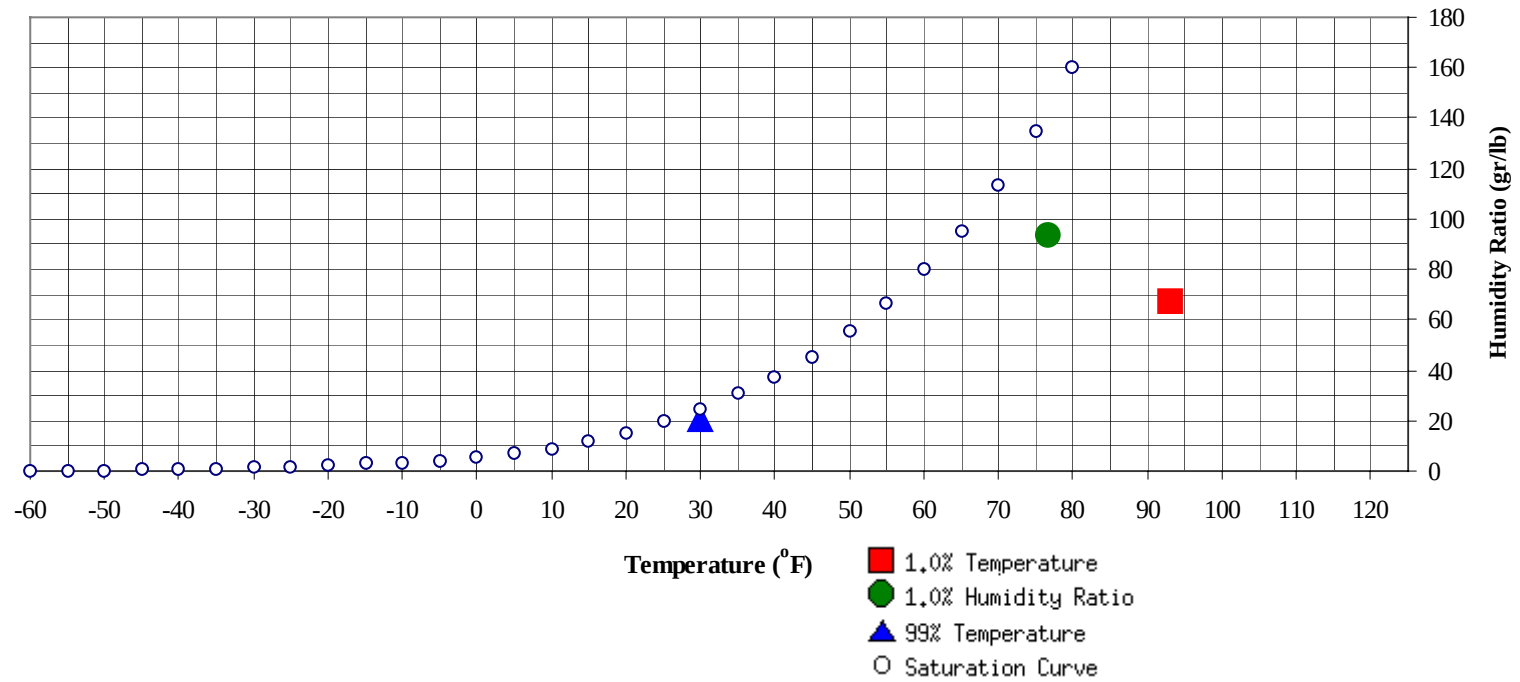


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

ZARAGOZA AB, SPAIN

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Psychrometric Summary of Peak Design Values



	(°F)	MCHR	Enthalpy	1.0% Humidity Ratio	(gr/lb)	MCDB	MCWB	MC Dewpt	Enthalpy
		(gr/lb)	(btu/lb)			(°F)	(°F)	(°F)	(btu/lb)
99% Dry Bulb	30	20.7	10.4	Ratio	93.8	76.7	68.4	64.4	33.1

1.0% Dry Bulb	(°F)	MCHR	MCWB	Enthalpy
		(gr/lb)	(°F)	(btu/lb)
	93	67.6	68.4	33.0

ZARAGOZA AB, SPAIN

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Dry-Bulb Temperature Hours For An Average Year (Sheet 1 of 5)

Period of Record = 1963 to 1992

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	63.0
80 / 84												0	0	0	61.1
75 / 79												1	1	2	58.7
70 / 74							0	0	0	56.9		0	7	7	15 56.3
65 / 69		0		0	52.0		2	1	3	54.2		0	13	9	22 54.3
60 / 64	0	6	2	9	52.2	0	14	9	23	52.4	2	36	28	67	51.8
55 / 59	3	25	14	42	49.1	5	34	29	69	49.0	10	59	51	120	48.7
50 / 54	19	49	45	113	46.0	24	55	55	134	46.0	47	66	71	184	45.8
45 / 49	54	59	72	184	42.6	53	55	62	170	42.1	81	42	53	176	42.2
40 / 44	48	39	43	130	39.2	50	33	36	118	38.5	56	16	19	90	38.4
35 / 39	60	35	42	137	35.2	58	22	24	104	34.7	40	6	7	54	34.4
30 / 34	45	26	25	97	30.6	28	7	6	42	29.8	10	1	1	12	30.1
25 / 29	19	8	4	31	26.3	6	2	1	9	24.9	2	0	0	2	26.0
20 / 24	1	0		1	22.2	1	0		1	20.8					
15 / 19							0		0	19.0					

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 = 1963 to 1992

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															
100 / 104															
95 / 99															
90 / 94															
85 / 89															
80 / 84		1	1	2	58.7										
75 / 79		5	5	10	58.5										
70 / 74		16	12	28	56.8	1	44	35	80	58.0	25	58	49	132	60.1
65 / 69	0	22	15	36	54.4	5	43	34	83	56.0	35	35	31	102	58.3
60 / 64	3	54	44	101	52.1	40	63	55	158	54.1	86	28	38	151	56.1
55 / 59	23	64	57	144	49.5	78	39	50	166	51.1	68	7	14	89	52.4
50 / 54	72	53	64	190	46.6	83	13	27	123	47.4	20	1	2	23	48.6
45 / 49	89	21	31	141	42.8	36	3	6	45	43.1	2			2	44.7
40 / 44	33	4	8	45	38.6	5	0	0	5	39.0					
35 / 39	19	1	2	22	35.5	0			0	36.4					
30 / 34	1			1	31.3										
25 / 29															
20 / 24															
15 / 19															

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Dry-Bulb Temperature Hours For An Average Year (Sheet 3 of 5)

Period of Record = 1963 to 1992

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	70.8			0	0	72.0					
100 / 104		1	3	4	70.3		2	2	4	70.3					
95 / 99		9	17	26	69.3		7	12	19	69.6		1	1	2	68.6
90 / 94		25	30	56	67.8		19	25	45	68.8		5	5	10	67.9
85 / 89	0	26	29	55	66.7	0	24	23	47	67.6		11	13	24	66.9
80 / 84	2	51	46	99	65.4	2	49	47	99	66.3	0	36	32	69	65.8
75 / 79	18	60	49	127	63.6	16	63	53	132	64.2	1	51	43	95	63.8
70 / 74	70	49	39	158	61.7	63	51	47	161	62.5	21	58	59	138	61.6
65 / 69	63	18	19	99	59.4	68	22	23	113	60.2	46	35	35	116	59.8
60 / 64	74	8	14	96	56.3	79	9	14	102	56.9	89	31	35	155	56.9
55 / 59	21	0	1	22	52.6	19	1	1	21	52.7	59	10	15	84	52.5
50 / 54	1			1	49.1	2	0	0	2	49.8	21	2	3	26	48.4
45 / 49											3	0	0	3	44.3
40 / 44											0			0	40.0
35 / 39															
30 / 34															
25 / 29															
20 / 24															
15 / 19															

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Dry-Bulb Temperature Hours For An Average Year (Sheet 4 of 5)

Period of Record = 1963 to 1992

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	63.3										
85 / 89		0	0	0	65.9										
80 / 84		4	2	6	63.8			0	0	60.0					
75 / 79		15	9	23	62.5		0	0	0	60.4					
70 / 74	1	36	28	65	59.8		3	1	4	59.3		1	0	1	59.4
65 / 69	5	39	32	76	57.9	0	7	3	11	56.7	0	1	1	2	55.6
60 / 64	33	65	67	165	55.7	3	34	18	55	54.2	3	9	5	18	52.9
55 / 59	68	52	62	181	52.1	21	57	54	132	51.4	7	25	16	48	49.5
50 / 54	84	27	39	151	47.9	62	62	70	194	47.9	24	56	47	127	46.5
45 / 49	43	8	9	59	43.5	65	42	52	159	43.1	58	60	74	193	43.1
40 / 44	10	2	1	13	39.6	39	18	22	79	39.1	49	37	41	127	39.4
35 / 39	3	0		3	36.7	35	12	17	63	35.4	55	34	39	128	35.3
30 / 34						14	4	3	20	30.9	34	19	19	73	30.9
25 / 29						2	1	0	3	26.3	15	5	5	25	26.1
20 / 24											2	1	0	3	21.5
15 / 19															

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

Period of Record = 1963 to 1992

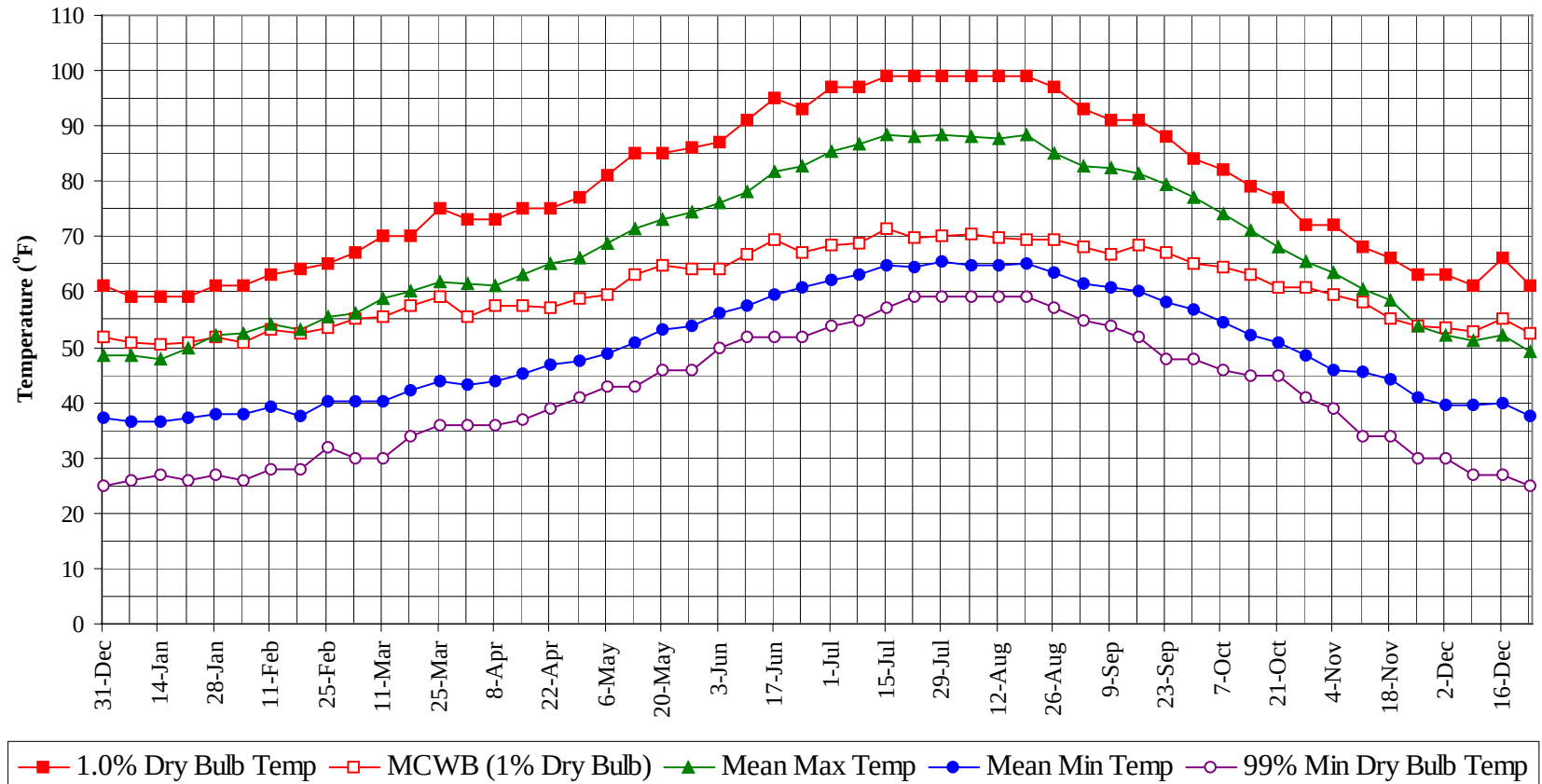
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109		0	0	0	70.9
100 / 104		3	5	8	70.3
95 / 99		20	33	53	69.3
90 / 94		60	74	134	68.0
85 / 89	0	78	83	161	66.7
80 / 84	4	189	177	370	65.1
75 / 79	37	270	225	532	63.0
70 / 74	177	324	281	782	60.7
65 / 69	222	234	205	661	58.3
60 / 64	414	357	329	1100	55.0
55 / 59	381	373	364	1117	50.8
50 / 54	457	387	423	1268	46.9
45 / 49	485	292	357	1134	42.7
40 / 44	290	149	171	610	38.9
35 / 39	271	111	130	512	35.1
30 / 34	134	57	54	245	30.6
25 / 29	44	16	11	70	26.0
20 / 24	4	1	0	5	21.5
15 / 19		0		0	19.0

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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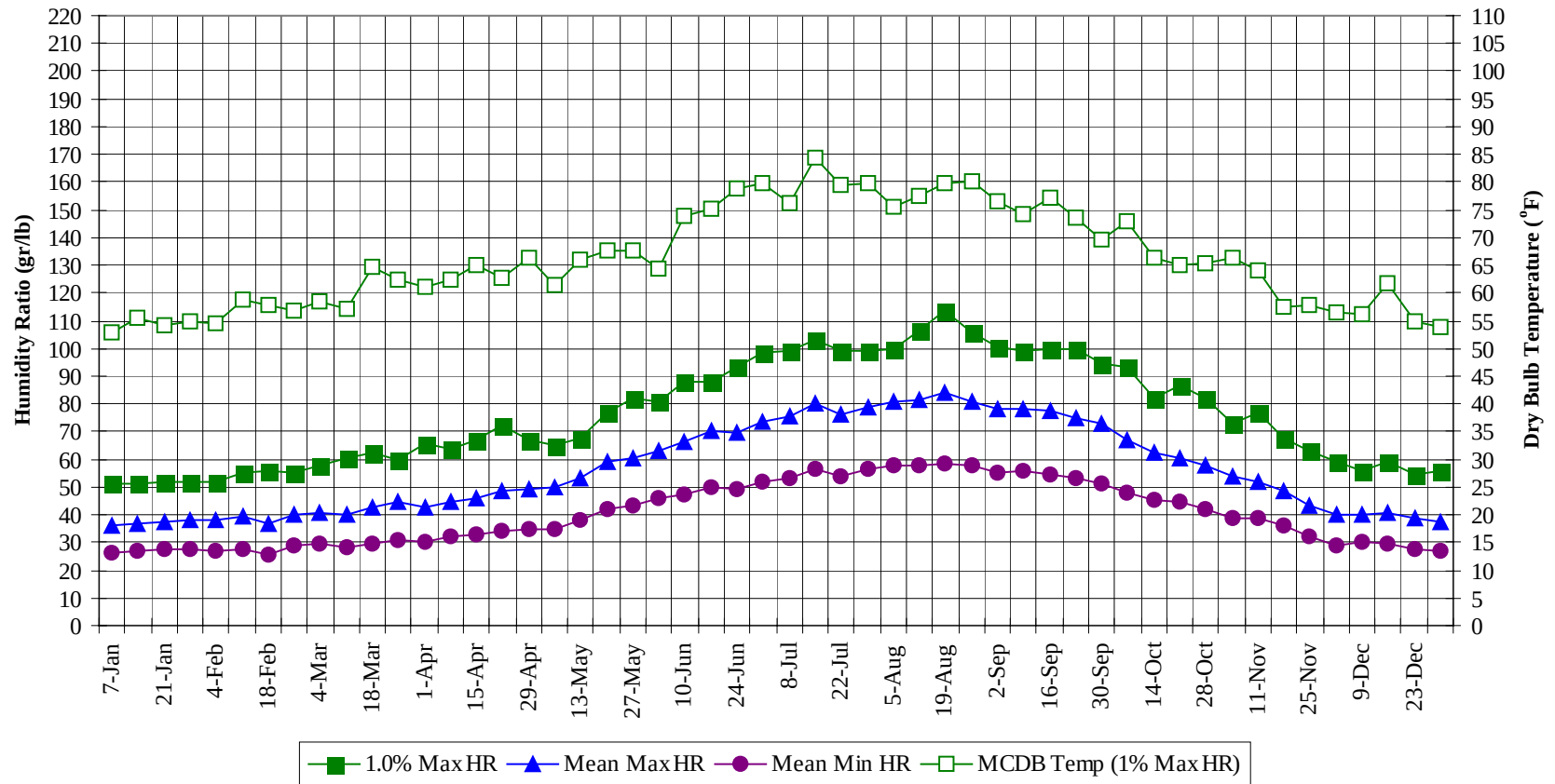
Annual Summary of Temperatures



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Long Term Humidity and Dry Bulb Temperature Summary

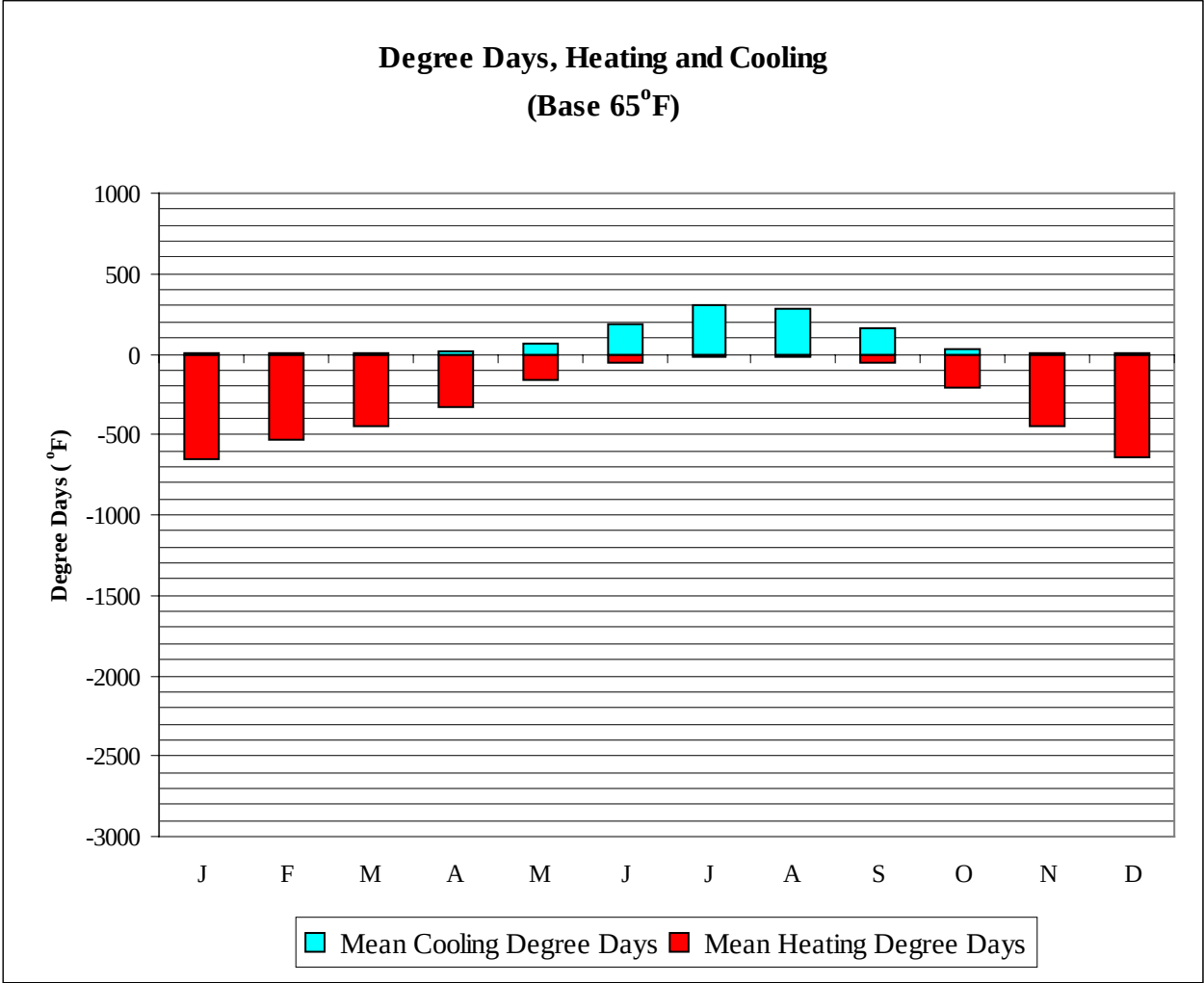


ZARAGOZA AB, SPAIN

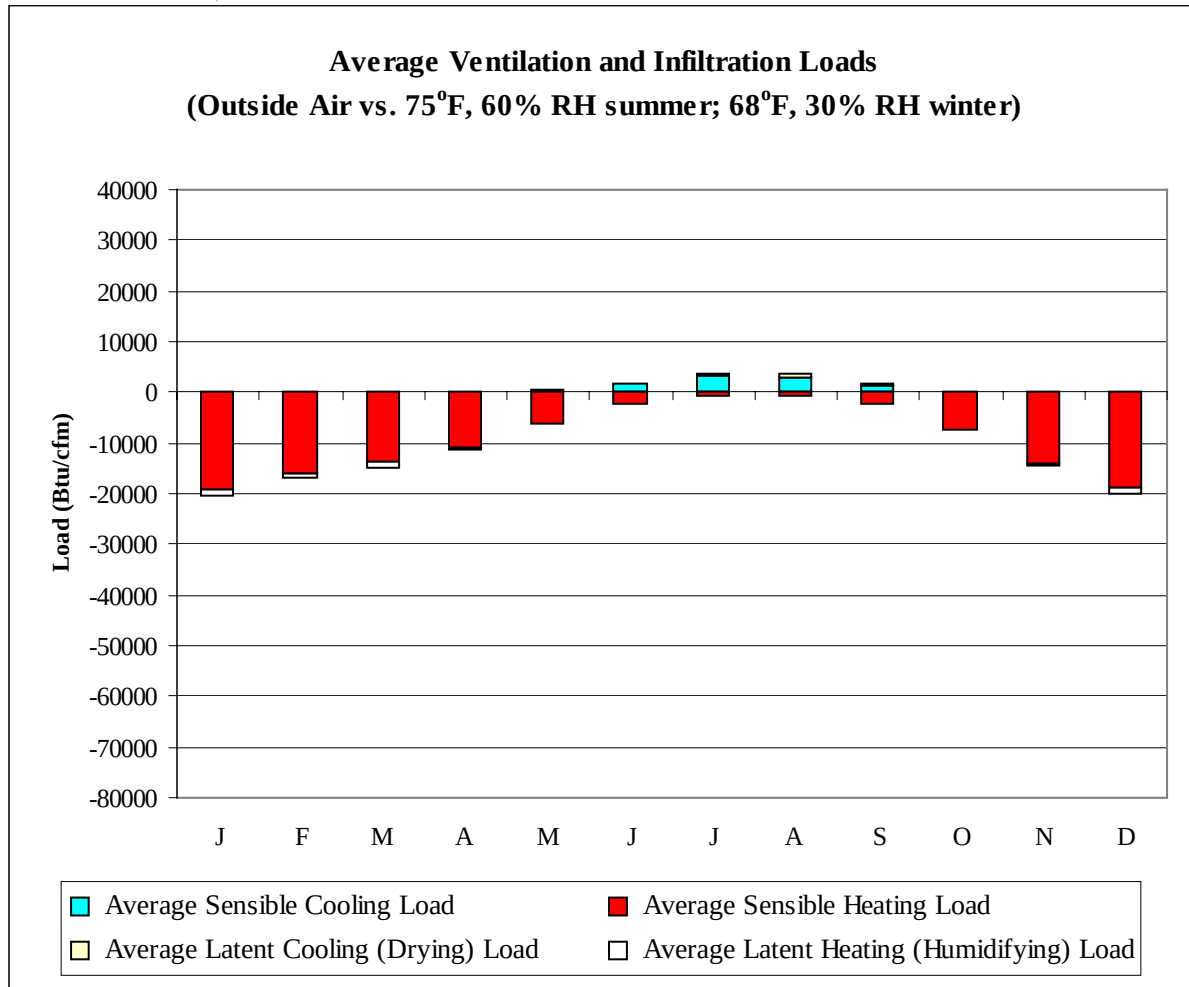
WMO No. 081605

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	59.0	51.0	48.5	36.4	26.0	51.1	52.9	36.3	26.3
14-Jan	59.0	50.4	47.7	36.7	27.0	51.1	55.4	36.6	27.1
21-Jan	59.0	50.9	49.8	37.2	26.0	51.8	54.2	37.7	27.7
28-Jan	61.0	52.0	52.3	38.0	27.0	51.8	54.9	38.3	27.5
4-Feb	61.0	50.9	52.6	37.7	26.0	51.8	54.6	38.4	27.2
11-Feb	63.0	53.3	54.2	39.2	28.0	55.3	58.6	39.3	27.9
18-Feb	64.0	52.6	53.2	37.5	28.0	56.0	57.9	36.6	25.4
25-Feb	65.0	53.6	55.4	40.2	32.0	55.3	56.9	40.0	28.9
4-Mar	67.0	55.3	56.3	40.2	30.0	58.1	58.4	40.8	29.4
11-Mar	70.0	55.6	58.8	40.4	30.0	60.2	57.0	40.2	28.4
18-Mar	70.0	57.4	60.2	42.1	34.0	62.3	64.8	42.7	29.6
25-Mar	75.0	59.3	61.8	43.9	36.0	59.5	62.5	44.5	30.8
1-Apr	73.0	55.5	61.6	43.3	36.0	65.8	61.0	42.8	30.1
8-Apr	73.0	57.5	61.0	43.9	36.0	63.7	62.4	45.0	32.2
15-Apr	75.0	57.6	63.0	45.3	37.0	67.2	65.2	46.0	32.7
22-Apr	75.0	57.2	65.1	46.7	39.0	72.1	62.8	48.4	34.2
29-Apr	77.0	58.7	66.1	47.4	41.0	67.2	66.3	49.2	34.9
6-May	81.0	59.3	68.7	48.8	43.0	65.1	61.5	50.1	34.7
13-May	85.0	63.0	71.5	50.8	43.0	67.9	66.1	53.2	38.1
20-May	85.0	64.9	73.2	53.3	46.0	77.0	67.6	58.9	41.8
27-May	86.0	64.1	74.5	53.8	46.0	81.9	67.6	60.7	43.5
3-Jun	87.0	64.2	76.2	56.0	50.0	80.5	64.2	63.3	46.0
10-Jun	91.0	66.7	78.1	57.4	52.0	88.2	73.7	66.5	47.4
17-Jun	95.0	69.4	81.8	59.6	52.0	88.2	75.1	70.4	49.9
24-Jun	93.0	67.2	82.7	60.7	52.0	93.1	78.8	69.7	49.5
1-Jul	97.0	68.4	85.4	62.1	54.0	98.7	79.9	73.5	52.1
8-Jul	97.0	68.8	86.6	63.2	55.0	99.4	76.0	75.6	53.1
15-Jul	99.0	71.5	88.5	64.9	57.0	102.9	84.5	79.8	56.7
22-Jul	99.0	69.7	88.2	64.4	59.0	99.4	79.4	76.1	53.5
29-Jul	99.0	70.3	88.5	65.3	59.0	99.4	79.9	78.9	56.4
5-Aug	99.0	70.4	88.2	64.8	59.0	100.1	75.5	81.0	57.6
12-Aug	99.0	69.9	87.8	64.8	59.0	106.4	77.5	81.7	58.1
19-Aug	99.0	69.5	88.3	65.1	59.0	113.4	79.7	84.1	58.2
26-Aug	97.0	69.6	85.2	63.4	57.0	105.7	80.0	80.7	57.9
2-Sep	93.0	68.3	82.8	61.5	55.0	100.8	76.4	78.2	55.1
9-Sep	91.0	66.9	82.4	61.0	54.0	99.4	74.1	78.1	55.9
16-Sep	91.0	68.6	81.4	60.1	52.0	100.1	77.1	77.3	54.7
23-Sep	88.0	67.1	79.3	58.1	48.0	100.1	73.7	75.1	53.2
30-Sep	84.0	65.1	76.9	56.9	48.0	94.5	69.5	72.7	51.5
7-Oct	82.0	64.3	74.2	54.3	46.0	93.1	72.9	67.1	48.2
14-Oct	79.0	63.2	71.1	52.2	45.0	81.9	66.5	62.3	45.1
21-Oct	77.0	60.8	68.2	50.9	45.0	86.8	65.1	60.2	44.4
28-Oct	72.0	60.9	65.5	48.6	41.0	81.9	65.2	57.6	41.8
4-Nov	72.0	59.5	63.3	46.0	39.0	72.8	66.3	54.2	38.7
11-Nov	68.0	58.1	60.5	45.6	34.0	77.0	63.9	51.6	38.7
18-Nov	66.0	55.3	58.5	44.1	34.0	67.9	57.6	48.9	35.9
25-Nov	63.0	53.9	53.7	41.0	30.0	63.0	57.7	43.3	32.0
2-Dec	63.0	53.4	52.3	39.6	30.0	58.8	56.4	40.0	28.8
9-Dec	61.0	52.9	51.0	39.5	27.0	56.0	56.3	40.2	30.0
16-Dec	66.0	55.3	52.0	39.9	27.0	58.8	61.7	40.4	29.6
23-Dec	61.0	52.4	49.2	37.6	25.0	54.6	54.9	38.5	27.7
31-Dec	61.0	51.9	48.6	37.1	25.0	56.0	53.8	37.6	27.2



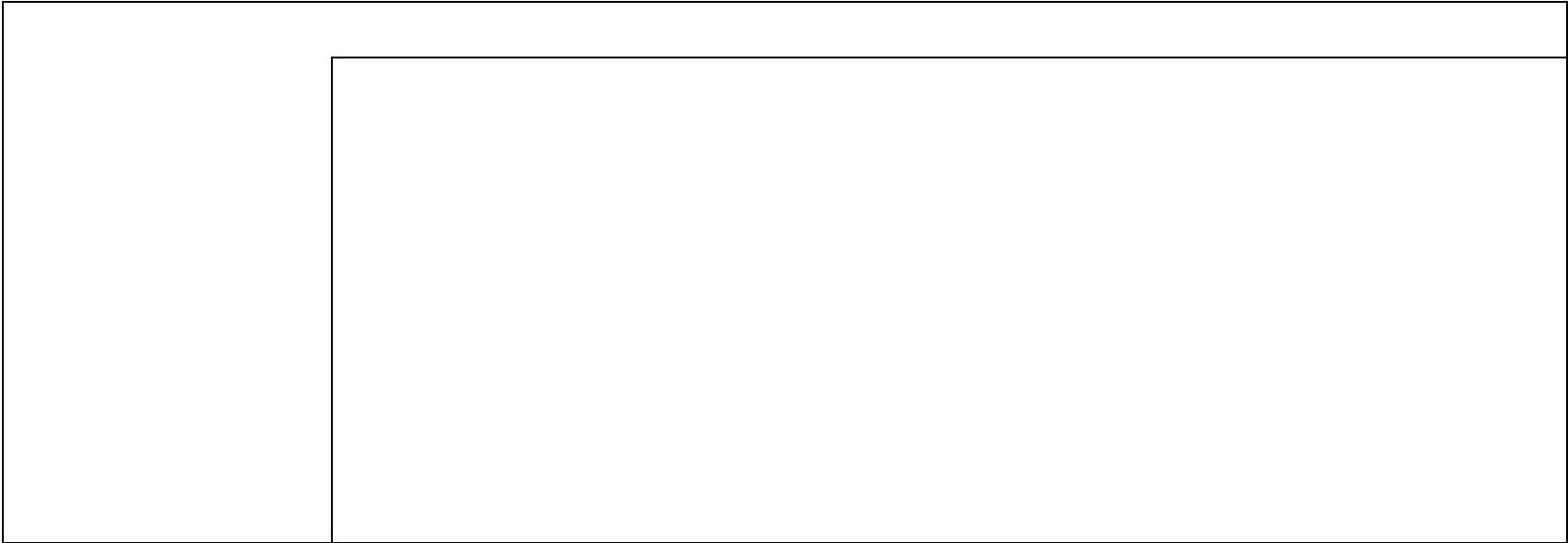
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	651
FEB	0	533
MAR	5	446
APR	13	330
MAY	68	166
JUN	180	50
JUL	310	13
AUG	284	13
SEP	159	52
OCT	32	204
NOV	1	449
DEC	0	635
ANN	1053	3542



	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	-19134	0	-1178
FEB	0	-15966	0	-1058
MAR	6	-13880	1	-881
APR	21	-10731	0	-472
MAY	343	-6011	8	-109
JUN	1542	-2213	132	-9
JUL	3320	-753	472	-1
AUG	2812	-807	824	-1
SEP	1128	-2308	560	-8
OCT	75	-7243	53	-63
NOV	0	-13915	1	-537
DEC	0	-18802	0	-1004
ANN	9247	-111763	2051	-5321

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

No Solar Radiation
Data Available

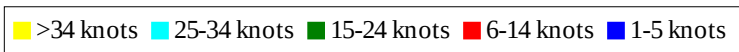
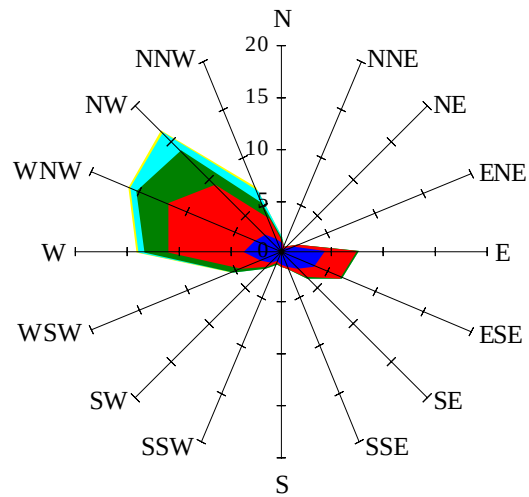


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

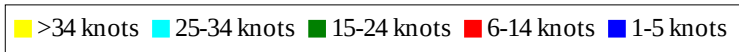
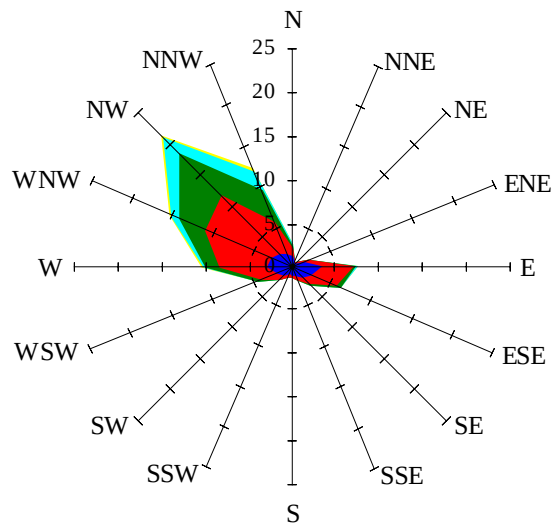
Labels of Percent Frequency on North Axis



Percent Calm = 13.53

Wind Summary - March, April, and May

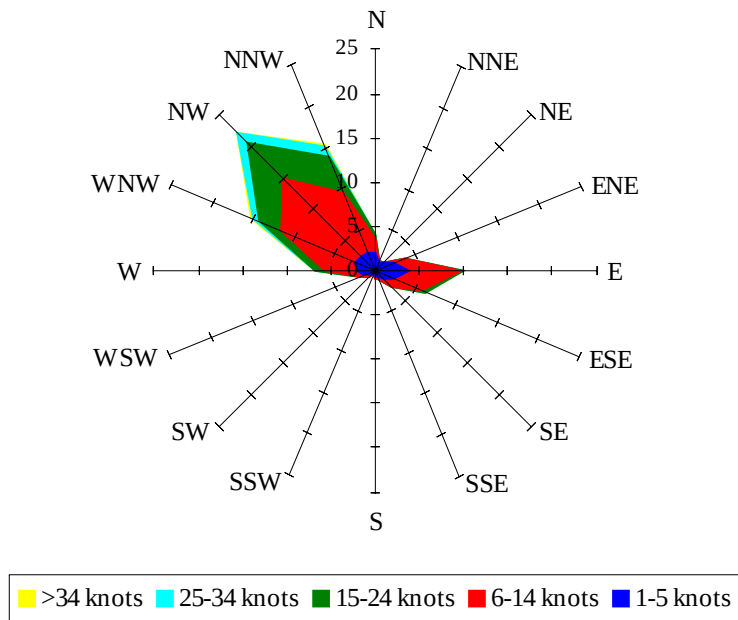
Labels of Percent Frequency on North Axis



Percent Calm = 9.13

Wind Summary - June, July, and August

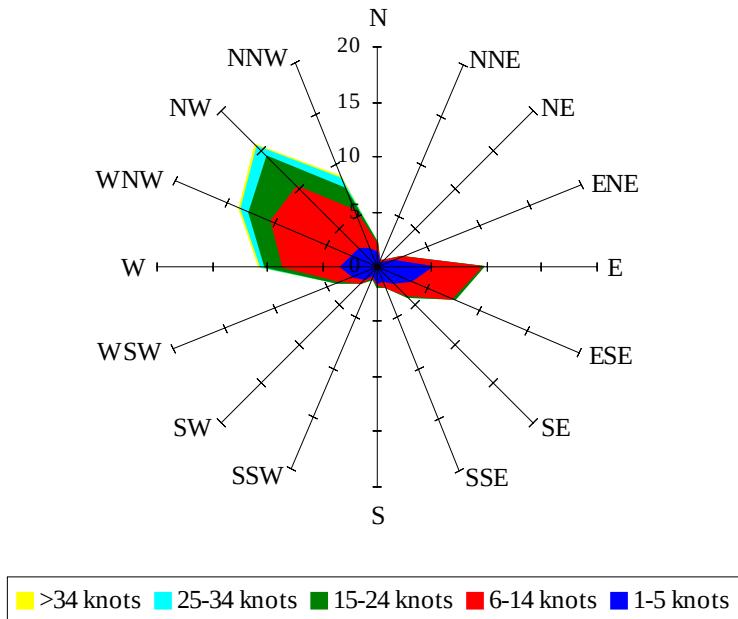
Labels of Percent Frequency on North Axis



Percent Calm = 6.83

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 13.70