BARCELONA, SPAIN	
Latitude = 41.28 N	WMO No. 081810
Longitude = 2.07 E	Elevation = 20 feet
Period of Record = 1973 to 1996	Average Pressure = 29.96 inches Hg

Design Criteria Data

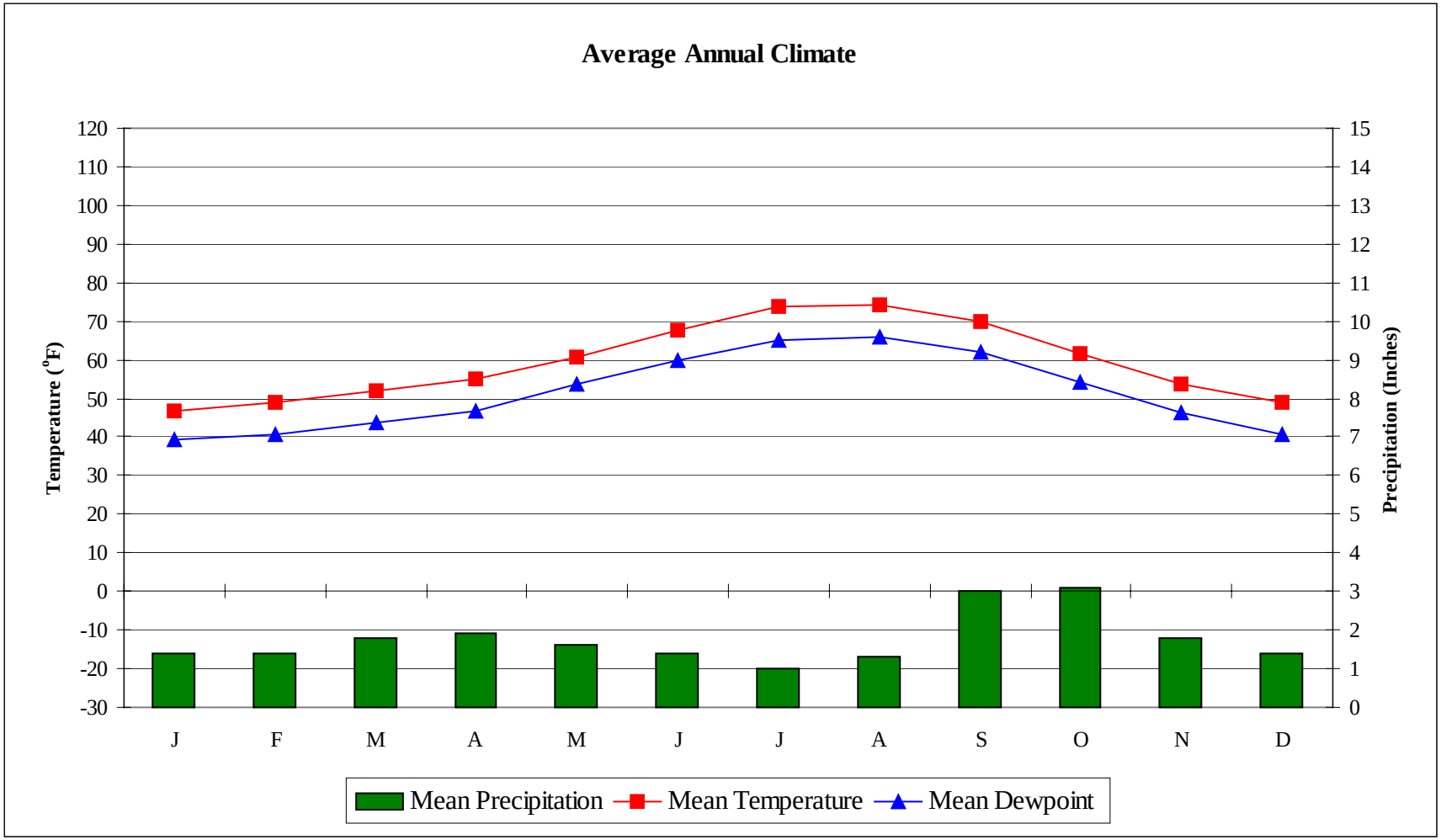
		Mean Coincident (Average) Values			
Dry Bulb Temperature (T)	**Design Value (^oF)**	Wet Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	90	72	91	10.3	SSW
0.4% Occurrence	84	74	111	9.9	S
1.0% Occurrence	83	74	109	9.9	S
2.0% Occurrence	82	73	106	9.8	SSW
Mean Daily Range	15	-	-	-	-
97.5% Occurrence	38	36	27	8.5	N
99.0% Occurrence	36	34	25	8.9	N
99.6% Occurrence	34	32	23	9.3	N
Median of Extreme Lows	30	28	18	8.0	N
		Mean Coincident (Average) Values			
Wet Bulb Temperature (T_{wb})	**Design Value (^oF)**	Dry Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	79	83	139	9.6	SSW
0.4% Occurrence	77	82	129	9.2	SSW
1.0% Occurrence	75	81	120	8.8	SSW
2.0% Occurrence	74	80	115	8.5	SSW
		Mean Coincident (Average) Values			
Humidity Ratio (HR)	**Design Value (gr/lb)**	Dry Bulb Temperature (^oF)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	142	82	0.94	9.8	SSW
0.4% Occurrence	132	81	0.88	8.5	SSW
1.0% Occurrence	125	80	0.83	7.8	SSW
2.0% Occurrence	117	78	0.78	7.6	SSW
Air Conditioning/		$T \geq 93^oF$	$T \geq 80^oF$	$T_{wb} \geq 73^oF$	$T_{wb} \geq 67^oF$
Humid Area Criteria	# of Hours	0	358	353	1476

Other Site Data

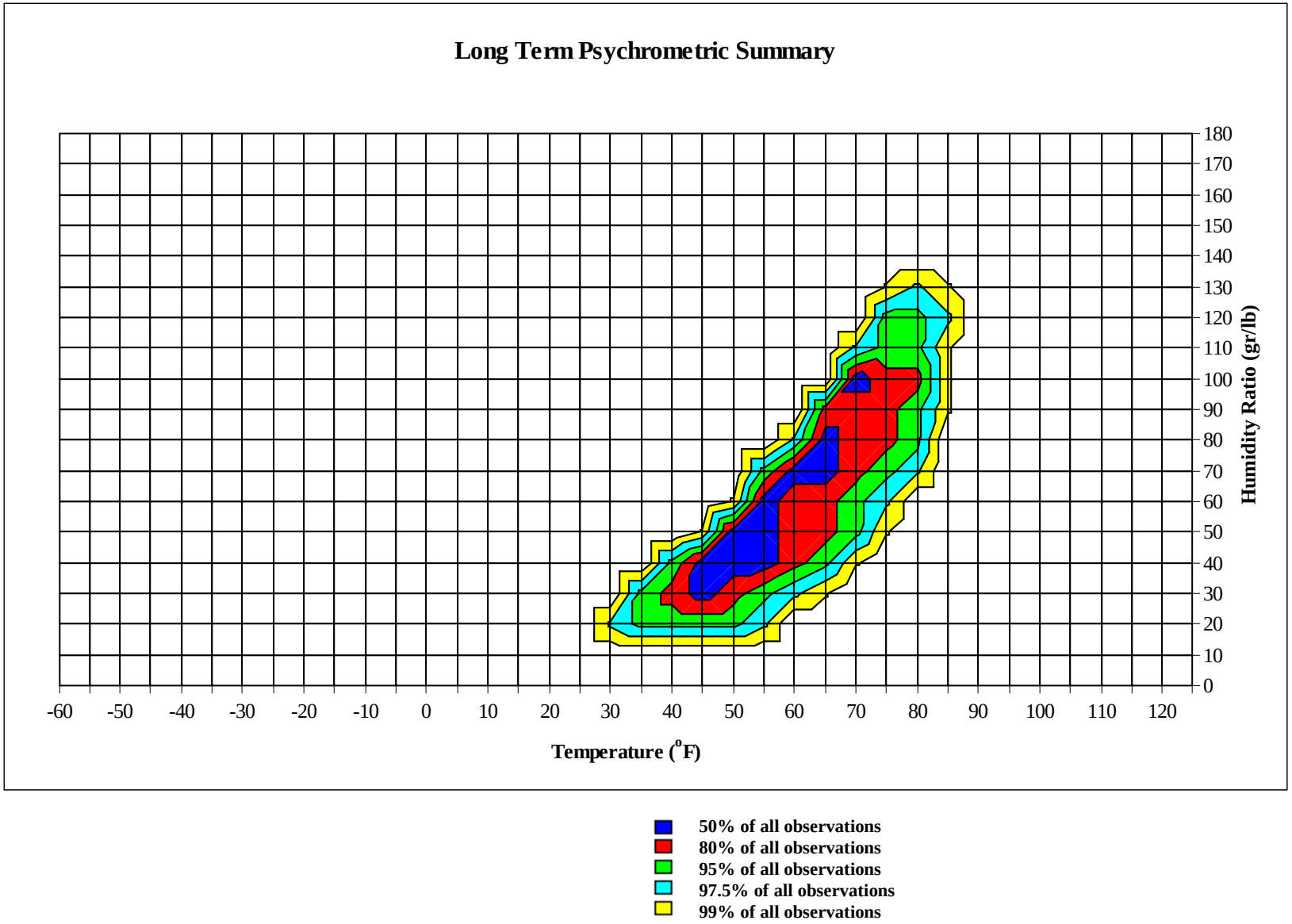
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
8	N/A	N/A	2.1 + 0.3
Ground Water Temperature (^oF) 50 Foot Depth *	**Frost Depth 50 Year Recurrence (in.)**	**Ground Snow Load 50 Year Recurrence (lb/ft^2)**	**Average Annual Freeze-Thaw Cycles (#)**
62.0	N/A	N/A	2

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

BARCELONA, SPAIN WMO No. 081810

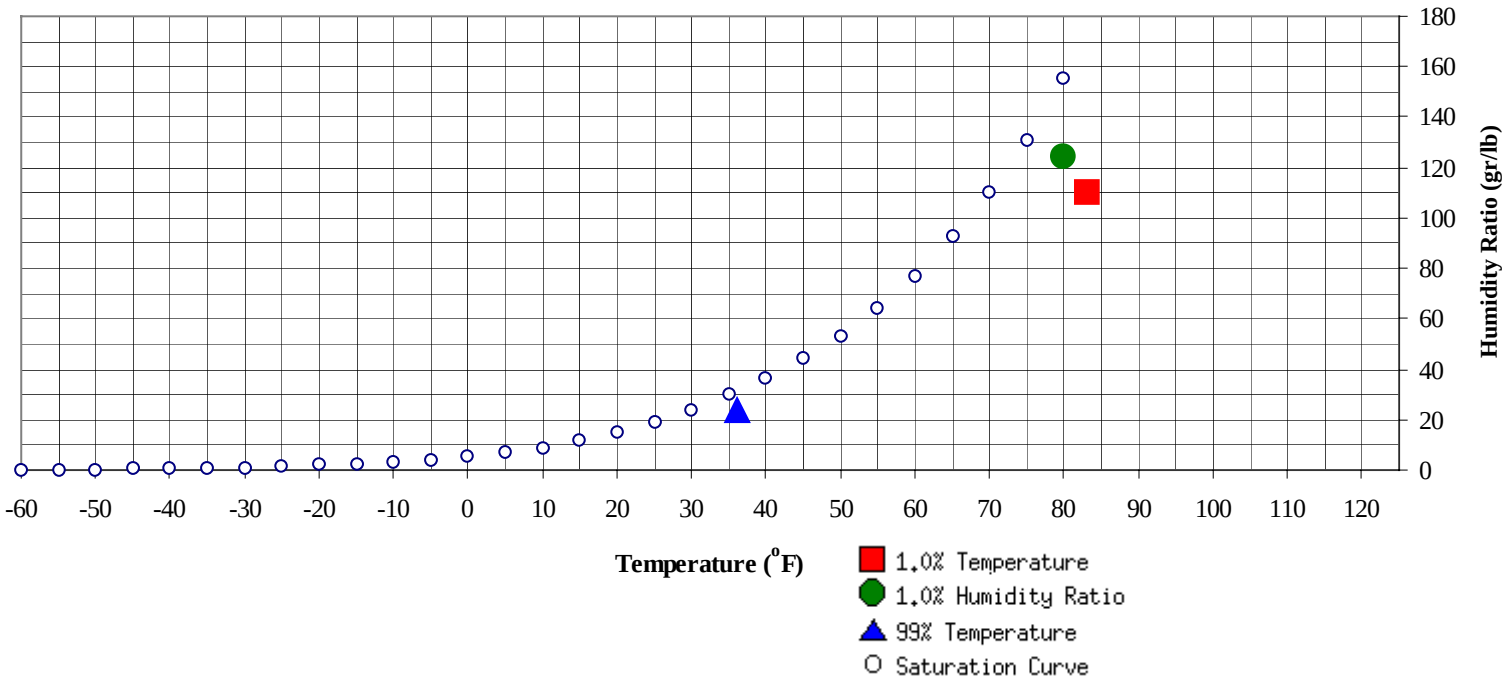


BARCELONA, SPAIN WMO No. 081810



BARCELONA, SPAIN WMO No. 081810

Psychrometric Summary of Peak Design Values



	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)
99% Dry Bulb	36	24	12.3

	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
1.0% Humidity Ratio	124.6	79.9	75.1	73.4	38.7

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	83	110	73.7	37.2

BARCELONA, SPAIN WMO No. 081810

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

Period of Record = 1973 to 1996

Temperature Range (°F)	January Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	February Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	March Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
90 / 94															
85 / 89															
80 / 84															
75 / 79												0		0	60.3
70 / 74							1	0	1	56.8		1	1	2	57.9
65 / 69		1	0	1	55.1	0	4	2	6	54.6	0	6	2	8	55.9
60 / 64	1	11	3	15	52.7	1	17	5	23	53.1	1	48	12	61	54.1
55 / 59	8	66	29	103	50.7	8	74	36	118	50.7	12	103	72	187	51.5
50 / 54	29	69	77	175	47.6	35	62	86	183	47.9	69	57	110	237	48.7
45 / 49	60	50	76	186	43.3	72	39	62	173	43.7	99	25	41	165	44.3
40 / 44	65	25	40	130	39.5	52	17	20	89	39.7	44	5	7	57	40.0
35 / 39	69	20	18	107	35.4	45	10	10	65	35.5	20	2	2	24	35.8
30 / 34	14	4	3	21	30.7	11	1	2	14	30.7	3	0	0	3	31.3
25 / 29	2	1	1	4	24.7	1	0	0	1	26.6					
20 / 24	1	0		1	20.3										
15 / 19	0	0		0	17.3										

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.

BARCELONA, SPAIN WMO No. 081810

Dry-Bulb Temperature Hours For An Average Year (Sheet 2 of 5)

Period of Record = 1973 to 1996

Temperature Range (°F)	April Hour Group (LST) 01 To 08	April 09 To 16	April 17 To 00	April Total Obs	April MCWB (°F)	May Hour Group (LST) 01 To 08	May 09 To 16	May 17 To 00	May Total Obs	May MCWB (°F)	June Hour Group (LST) 01 To 08	June 09 To 16	June 17 To 00	June Total Obs	June MCWB (°F)
90 / 94												0		0	79.0
85 / 89												1	0	1	69.4
80 / 84							0		0	62.0		13	2	15	69.7
75 / 79		0		0	59.3		4	1	5	65.5	1	70	25	96	68.2
70 / 74		3	0	3	57.4	1	53	13	67	63.4	19	101	77	197	65.3
65 / 69	0	15	2	17	56.8	7	75	38	120	60.9	52	38	71	161	62.9
60 / 64	1	98	32	131	55.2	40	81	98	220	58.1	112	14	57	183	60.0
55 / 59	32	90	109	231	52.4	106	28	78	213	54.6	50	3	8	61	55.6
50 / 54	100	28	80	209	49.3	72	6	17	95	50.2	6	0	0	6	51.5
45 / 49	87	5	14	106	44.6	20	1	2	23	45.4	0			0	46.8
40 / 44	17	1	2	20	40.2	1	0	0	1	41.8					
35 / 39	3	0	0	3	36.4										
30 / 34															
25 / 29															
20 / 24															
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.

BARCELONA, SPAIN WMO No. 081810

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

Period of Record = 1973 to 1996

Temperature Range (°F)	July Hour Group (LST) 01 To 08	July 09 To 16	July 17 To 00	July Total Obs	July MCWB (°F)	August Hour Group (LST) 01 To 08	August 09 To 16	August 17 To 00	August Total Obs	August MCWB (°F)	September Hour Group (LST) 01 To 08	September 09 To 16	September 17 To 00	September Total Obs	September MCWB (°F)
90 / 94		1	0	1	71.5		1	0	1	73.3		0	0	0	69.0
85 / 89		11	1	12	73.6	0	14	2	16	75.0		1	0	1	70.0
80 / 84	2	93	30	125	72.7	1	110	36	148	73.3	0	34	6	40	72.2
75 / 79	22	101	90	213	69.9	28	86	103	217	70.5	3	100	50	153	69.3
70 / 74	87	33	94	214	67.2	100	27	84	211	67.6	38	67	102	207	66.3
65 / 69	82	7	25	114	64.2	77	7	18	102	64.4	82	21	49	152	63.7
60 / 64	52	2	7	61	60.6	39	2	5	46	60.7	83	13	27	123	59.8
55 / 59	4	0	0	4	56.0	3	0	0	3	55.3	28	4	5	37	54.7
50 / 54											6	0	1	7	49.6
45 / 49											0			0	45.1
40 / 44															
35 / 39															
30 / 34															
25 / 29															
20 / 24															
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.

BARCELONA, SPAIN WMO No. 081810

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)				MCWB	Hour Group (LST)				MCWB	Hour Group (LST)				MCWB
	01 To 08	09 To 16	17 To 00	Total Obs	(°F)	01 To 08	09 To 16	17 To 00	Total Obs	(°F)	01 To 08	09 To 16	17 To 00	Total Obs	(°F)
90 / 94															
85 / 89															
80 / 84		1	0	1	71.0										
75 / 79		17	3	20	67.7		0		0	63.3					
70 / 74	3	71	27	101	64.2	0	4	1	5	62.8	0	0	0	0	56.9
65 / 69	17	57	55	130	61.7	1	27	6	34	60.1	0	3	1	4	56.4
60 / 64	63	57	82	203	58.6	12	70	40	122	57.1	3	25	7	35	54.7
55 / 59	84	31	56	172	54.0	39	63	72	174	53.0	15	72	43	130	51.6
50 / 54	56	11	19	86	49.7	71	42	67	180	49.0	42	67	75	185	47.7
45 / 49	22	2	5	29	44.4	69	24	37	130	44.0	72	47	75	194	43.6
40 / 44	3	0	0	3	40.1	30	7	12	49	39.4	60	20	31	111	39.4
35 / 39	0			0	37.0	16	3	4	23	35.4	49	12	14	75	35.3
30 / 34						3	0	0	3	29.8	7	1	1	9	30.5
25 / 29						0			0	27.0	0	0		0	26.0
20 / 24															
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.

BARCELONA, SPAIN WMO No. 081810

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

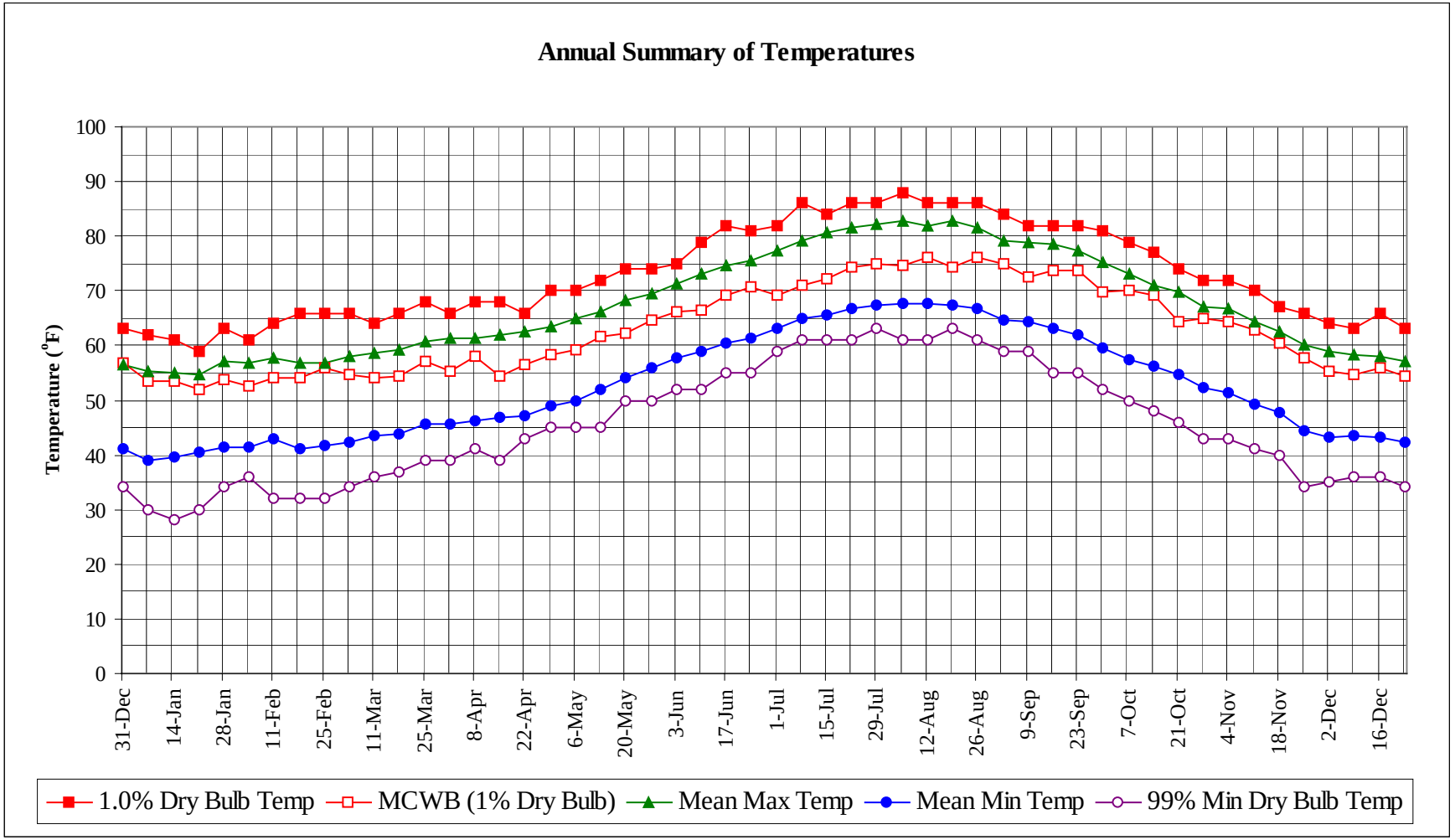
Period of Record = 1973 to 1996

Annual Totals

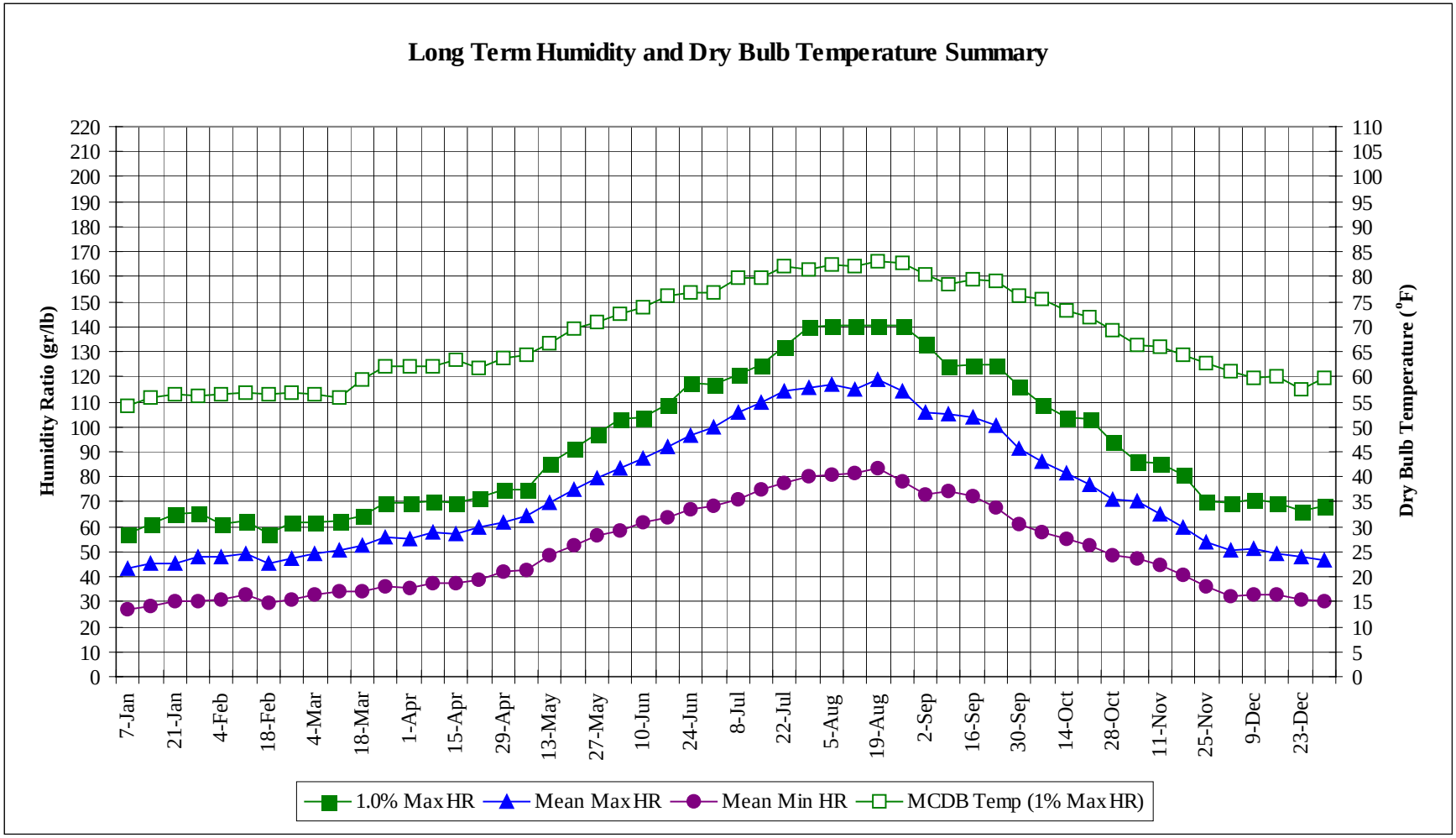
Temperature Range (°F)	Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
90 / 94		2	0	2	72.3
85 / 89	0	27	3	30	74.1
80 / 84	3	251	73	328	72.7
75 / 79	54	378	271	704	69.6
70 / 74	247	360	398	1005	66.0
65 / 69	316	260	269	846	62.5
60 / 64	407	440	375	1222	58.0
55 / 59	388	533	512	1432	52.8
50 / 54	486	345	537	1368	48.6
45 / 49	501	193	314	1008	43.9
40 / 44	275	75	111	461	39.6
35 / 39	202	46	48	296	35.4
30 / 34	38	7	7	52	30.7
25 / 29	3	1	1	5	25.2
20 / 24	1	0		1	20.3
15 / 19	0	0		0	17.3

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.

BARCELONA, SPAIN WMO No. 081810



BARCELONA, SPAIN WMO No. 081810

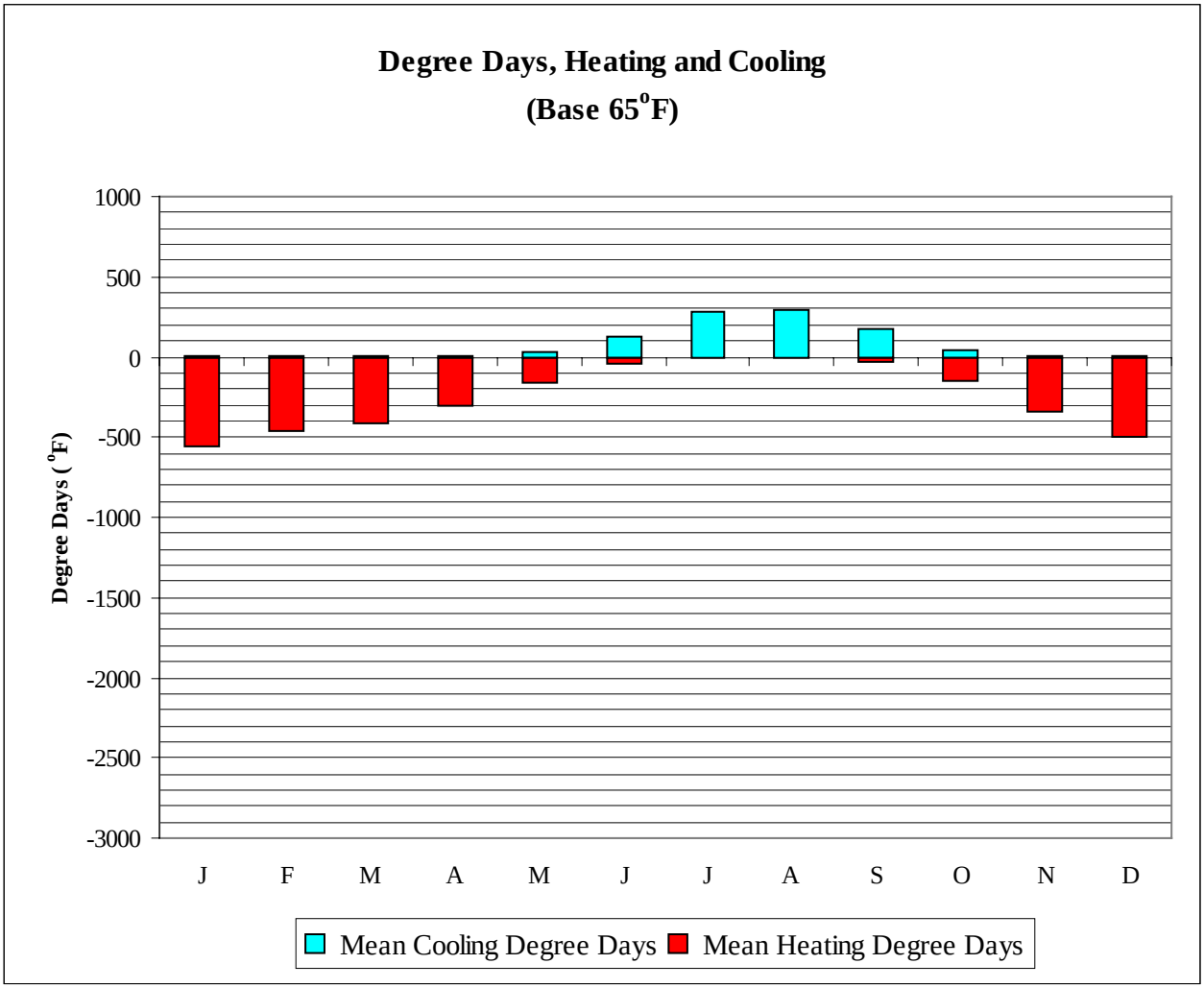


BARCELONA, SPAIN WMO No. 081810

Long Term Dry Bulb Temperature and Humidity Summary

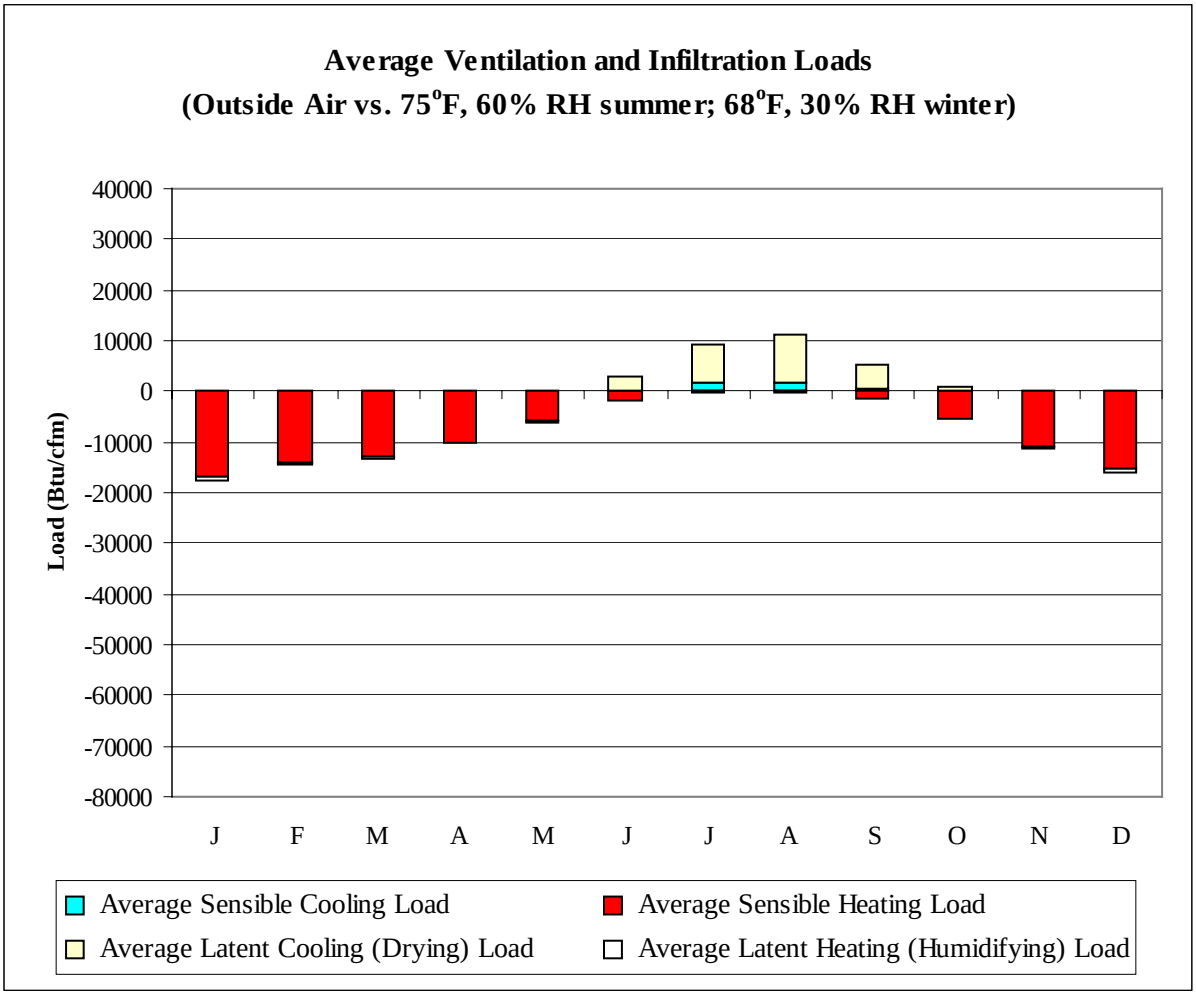
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	62.0	53.3	55.3	39.1	30.0	57.4	54.3	43.6	27.1
14-Jan	61.0	53.4	54.9	39.6	28.0	60.9	55.9	45.1	28.5
21-Jan	59.0	51.8	54.8	40.4	30.0	65.1	56.6	45.1	30.0
28-Jan	63.0	53.6	57.2	41.5	34.0	65.8	56.3	47.8	30.4
4-Feb	61.0	52.6	56.8	41.3	36.0	60.9	56.4	48.2	30.7
11-Feb	64.0	53.9	57.6	42.9	32.0	62.3	56.9	49.3	33.0
18-Feb	66.0	54.0	56.7	41.1	32.0	57.4	56.4	45.6	29.3
25-Feb	66.0	55.8	56.8	41.6	32.0	61.6	56.8	47.3	30.8
4-Mar	66.0	54.6	58.0	42.4	34.0	61.6	56.5	49.2	32.6
11-Mar	64.0	54.0	58.5	43.4	36.0	62.3	55.7	50.7	34.4
18-Mar	66.0	54.5	59.2	43.9	37.0	64.4	59.3	52.2	34.2
25-Mar	68.0	57.1	60.9	45.6	39.0	69.3	61.9	55.7	35.8
1-Apr	66.0	55.3	61.2	45.5	39.0	69.3	62.1	54.9	35.4
8-Apr	68.0	57.9	61.4	46.3	41.0	70.0	62.1	57.7	37.7
15-Apr	68.0	54.3	62.0	46.8	39.0	69.3	63.3	56.9	37.2
22-Apr	66.0	56.5	62.6	47.3	43.0	71.4	61.6	59.5	38.9
29-Apr	70.0	58.4	63.4	48.9	45.0	74.9	63.7	61.7	41.9
6-May	70.0	59.1	65.0	50.0	45.0	74.9	64.2	64.1	42.5
13-May	72.0	61.7	66.2	52.0	45.0	85.4	66.8	69.6	48.6
20-May	74.0	62.2	68.3	54.2	50.0	91.0	69.5	74.9	52.6
27-May	74.0	64.6	69.5	55.9	50.0	97.3	70.8	79.4	56.5
3-Jun	75.0	66.1	71.4	57.6	52.0	102.9	72.5	83.6	58.7
10-Jun	79.0	66.5	73.1	58.9	52.0	103.6	73.9	87.6	61.8
17-Jun	82.0	69.2	74.7	60.5	55.0	109.2	76.3	91.7	63.6
24-Jun	81.0	70.6	75.6	61.5	55.0	117.6	77.0	96.5	67.0
1-Jul	82.0	69.3	77.4	63.0	59.0	116.9	76.9	100.0	68.6
8-Jul	86.0	71.0	79.3	64.8	61.0	121.1	79.7	105.5	71.2
15-Jul	84.0	72.1	80.7	65.6	61.0	124.6	79.6	109.6	75.0
22-Jul	86.0	74.3	81.5	66.8	61.0	132.3	82.0	114.1	77.6
29-Jul	86.0	74.8	82.1	67.4	63.0	140.0	81.5	115.6	80.0
5-Aug	88.0	74.5	82.7	67.6	61.0	140.7	82.6	116.8	80.9
12-Aug	86.0	76.1	82.0	67.6	61.0	140.7	82.1	115.1	81.6
19-Aug	86.0	74.5	82.7	67.5	63.0	140.7	83.0	118.7	83.4
26-Aug	86.0	76.1	81.4	66.7	61.0	140.7	82.7	114.5	78.3
2-Sep	84.0	75.0	79.3	64.7	59.0	133.0	80.4	105.7	72.6
9-Sep	82.0	72.5	79.0	64.5	59.0	123.9	78.6	105.1	74.4
16-Sep	82.0	73.8	78.4	63.1	55.0	124.6	79.4	103.6	72.1
23-Sep	82.0	73.9	77.5	61.9	55.0	124.6	79.0	100.2	67.9
30-Sep	81.0	69.7	75.3	59.4	52.0	116.2	76.2	91.1	61.0
7-Oct	79.0	70.1	73.1	57.5	50.0	109.2	75.6	86.0	58.0
14-Oct	77.0	69.1	71.1	56.3	48.0	103.6	73.1	81.6	55.5
21-Oct	74.0	64.3	69.6	54.6	46.0	102.9	72.0	76.9	52.3
28-Oct	72.0	64.9	67.2	52.3	43.0	93.8	69.2	70.8	48.6
4-Nov	72.0	64.3	66.7	51.3	43.0	86.1	66.5	70.2	47.6
11-Nov	70.0	62.8	64.3	49.3	41.0	85.4	66.0	65.2	44.5
18-Nov	67.0	60.5	62.7	47.7	40.0	80.5	64.4	60.0	40.5
25-Nov	66.0	57.8	60.0	44.4	34.0	70.0	62.6	54.0	35.9
2-Dec	64.0	55.2	58.8	43.3	35.0	69.3	61.2	50.7	32.5
9-Dec	63.0	54.6	58.2	43.5	36.0	70.7	59.7	51.2	33.2
16-Dec	66.0	55.8	57.9	43.3	36.0	69.3	60.0	49.2	33.1
23-Dec	63.0	54.3	57.0	42.2	34.0	66.5	57.5	48.2	31.1
31-Dec	63.0	56.7	56.4	41.2	34.0	68.6	59.9	46.4	29.9

BARCELONA, SPAIN WMO No. 081810



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	556
FEB	1	456
MAR	1	409
APR	2	305
MAY	28	156
JUN	125	37
JUL	278	6
AUG	296	4
SEP	171	25
OCT	45	144
NOV	3	340
DEC	0	498
ANN	952	2936

BARCELONA, SPAIN WMO No. 081810



	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	-16829	0	-762
FEB	0	-14009	0	-548
MAR	0	-12991	0	-323
APR	0	-10190	1	-121
MAY	3	-5974	313	-14
JUN	264	-1919	2437	0
JUL	1521	-444	7830	0
AUG	1741	-353	9311	0
SEP	552	-1348	4885	0
OCT	31	-5498	966	-19
NOV	0	-11084	43	-243
DEC	0	-15300	0	-580
ANN	4112	-95939	25786	-2610

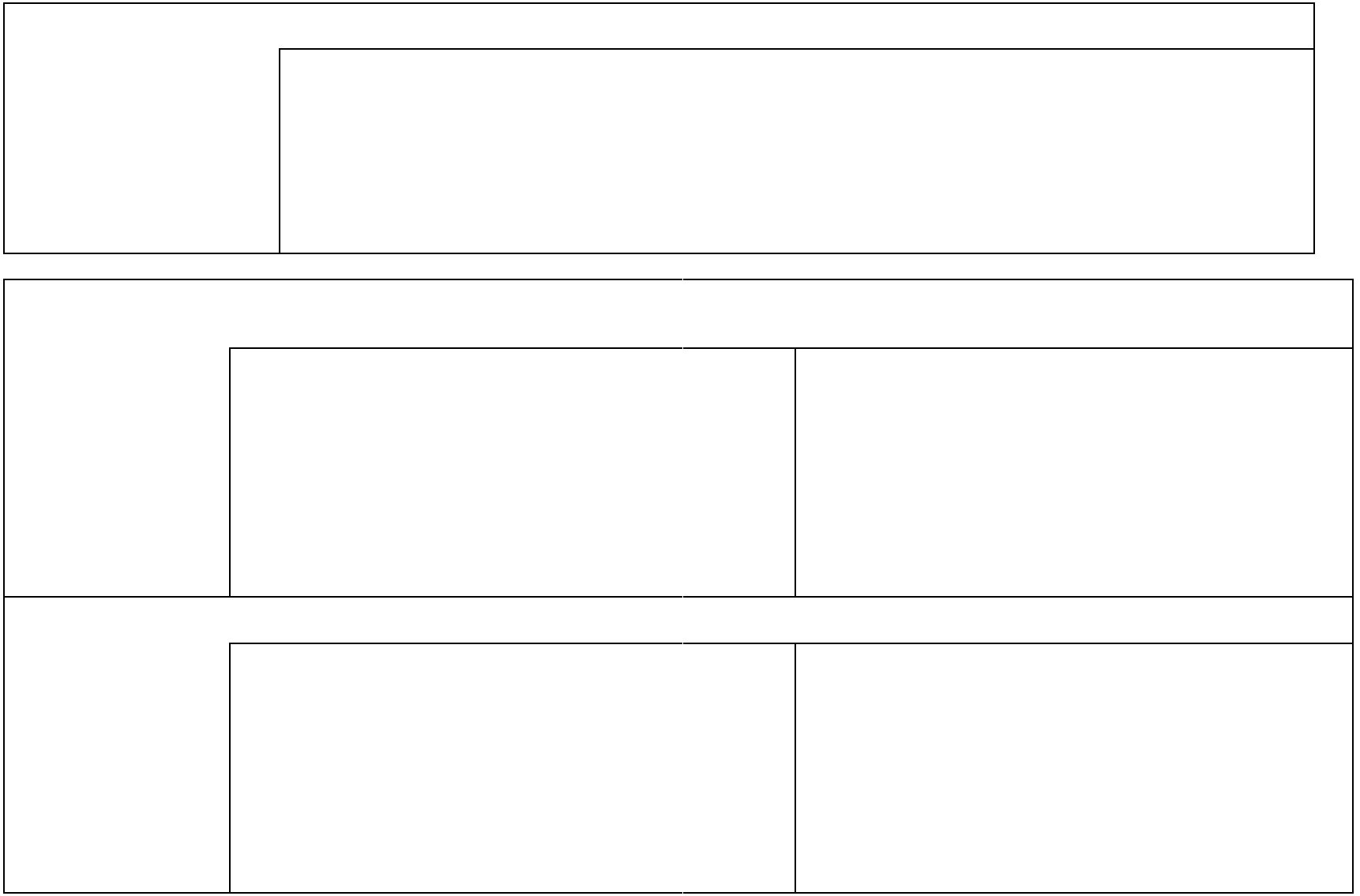
Average Annual Solar Radiation – Nearest Available Site

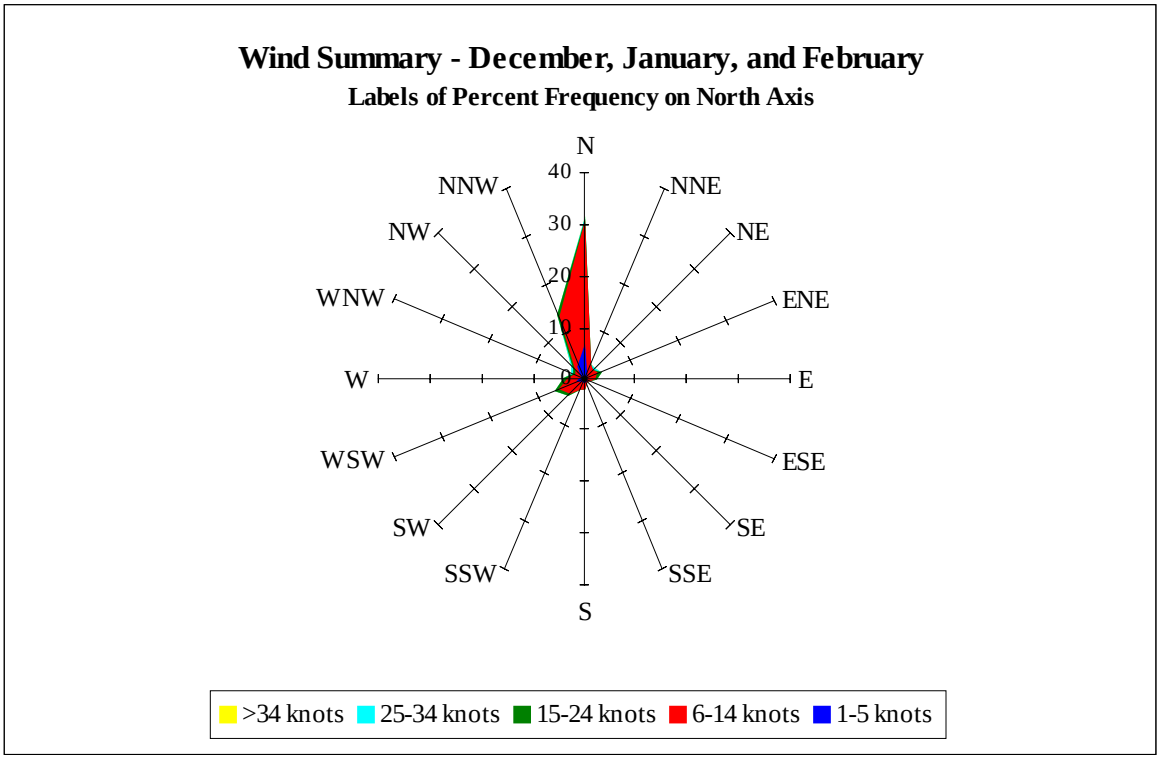
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

No Solar Radiation
Data Available

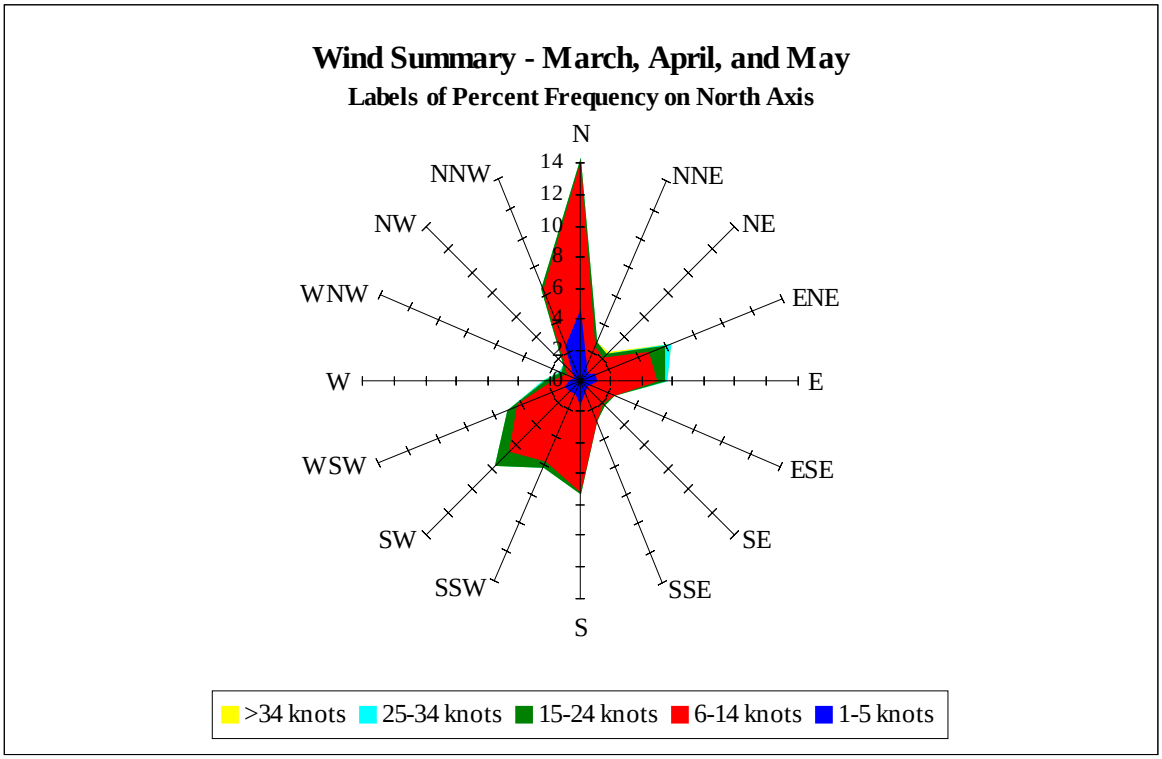
Average Annual Solar Heat and Illumination – Nearest Available Site

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

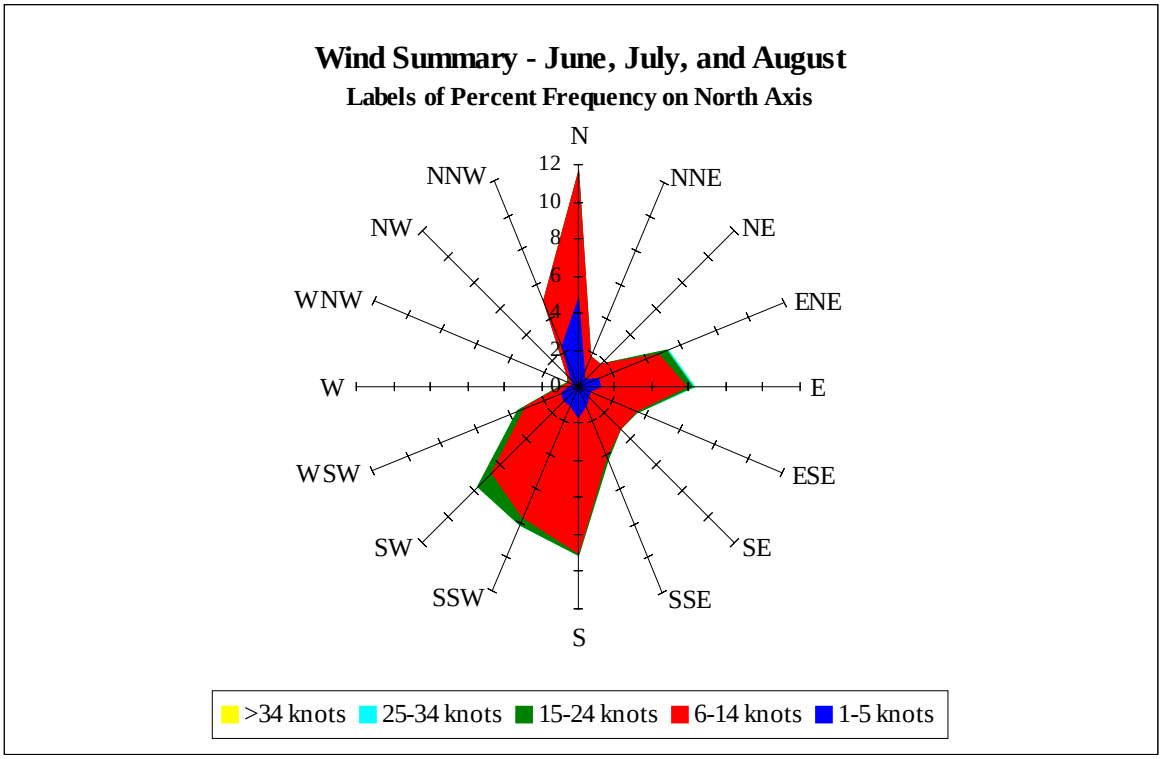




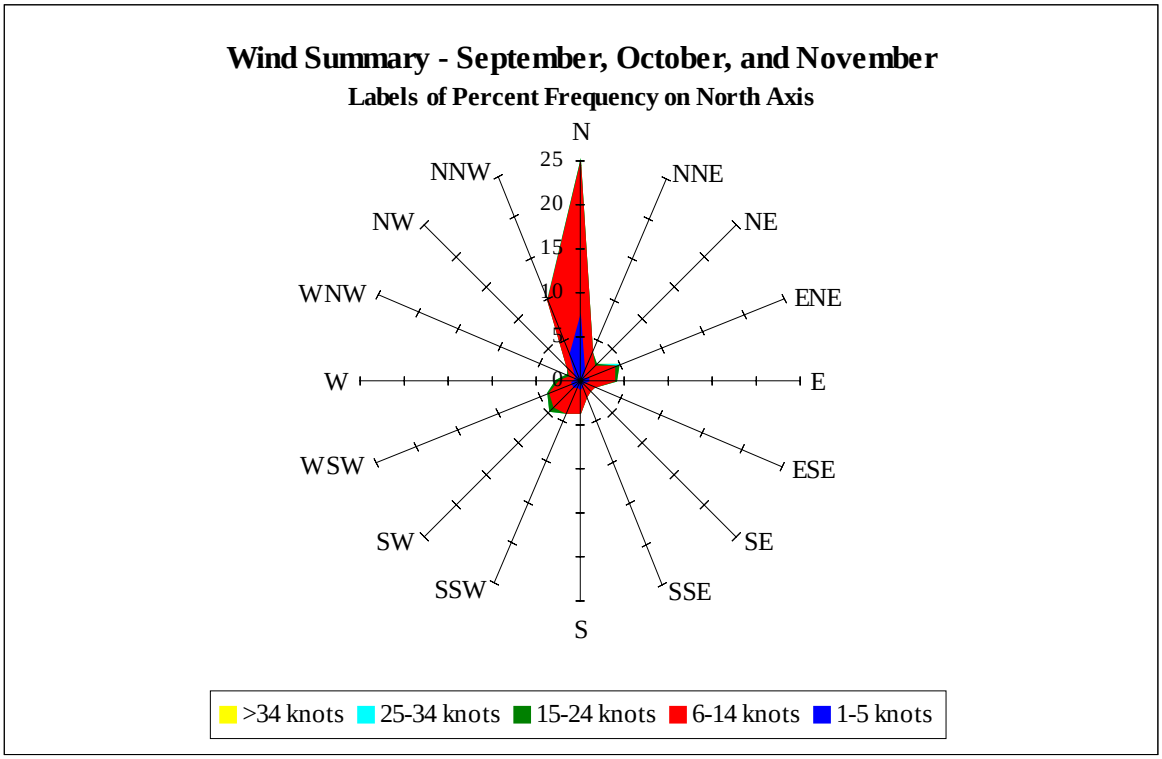
Percent Calm = 19.35



Percent Calm = 24.04



Percent Calm = 27.06



Percent Calm = 22.53