

BELEM/VAL DE CAES BZ

Latitude = 1.38 S

WMO No. 821930

Longitude = 48.48 W

Elevation = 52 feet

Period of Record = 1973 to 1996

Average Pressure = 29.75 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	95	79	127	7.9	ESE
0.4% Occurrence	91	78	126	8.2	E
1.0% Occurrence	90	78	126	8.2	E
2.0% Occurrence	90	78	126	8.2	E
Mean Daily Range	14	-	-	-	-
97.5% Occurrence	73	72	121	2.0	E
99.0% Occurrence	73	72	121	2.0	E
99.6% Occurrence	72	72	121	2.0	E
Median of Extreme Lows	70	69	108	1.9	NE
	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	84	87	174	8.6	N
0.4% Occurrence	81	87	145	9.5	N
1.0% Occurrence	80	87	139	9.5	N
2.0% Occurrence	80	87	139	9.5	N
	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	181	86	1.19	7.6	N
0.4% Occurrence	151	84	0.99	8.5	N
1.0% Occurrence	150	84	0.99	8.2	N
2.0% Occurrence	142	82	0.94	7.5	N
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		5	3505	8258	8615

Other Site Data

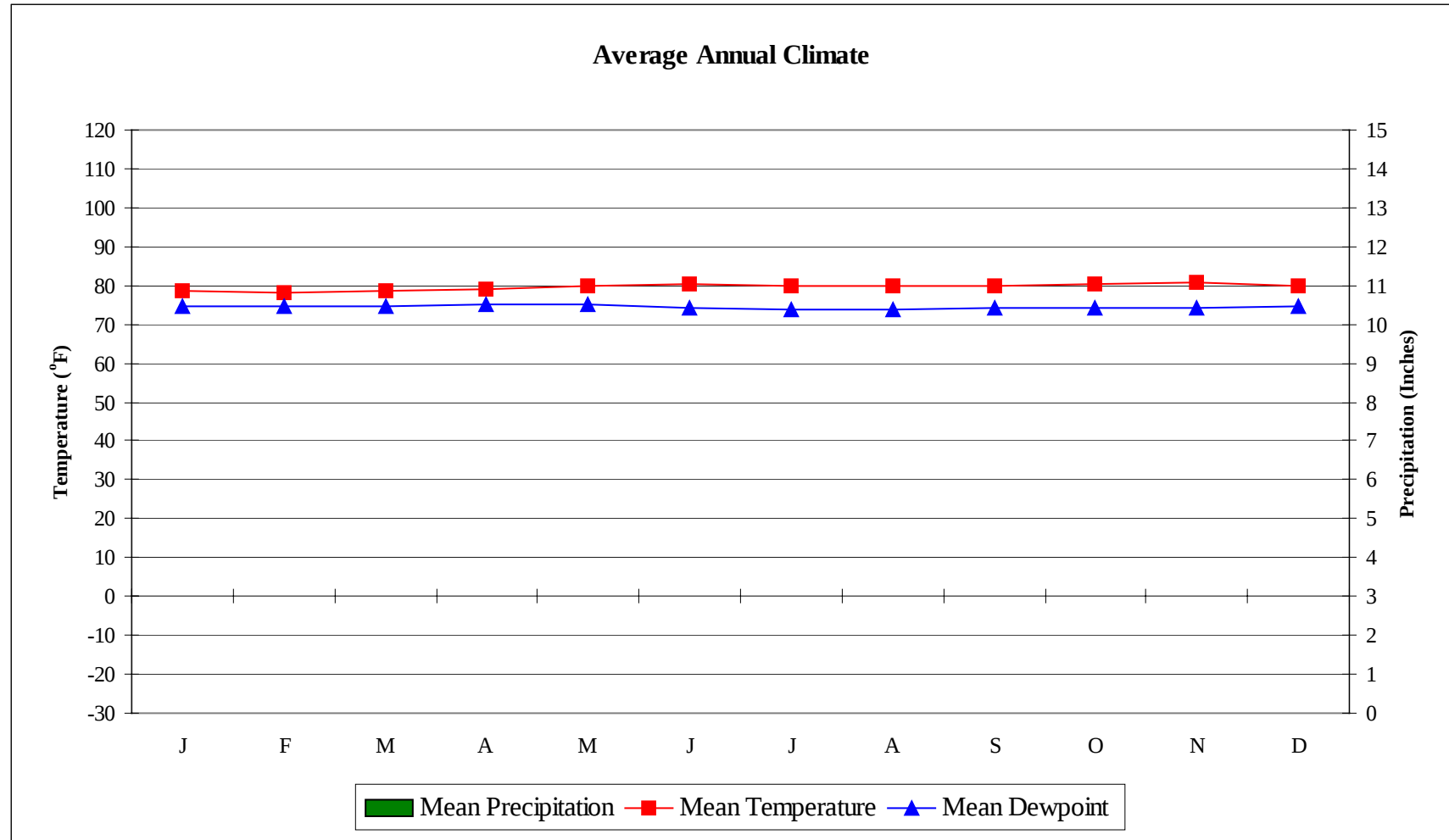
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
10	N/A	N/A	23.0 + 3.8
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
82.1	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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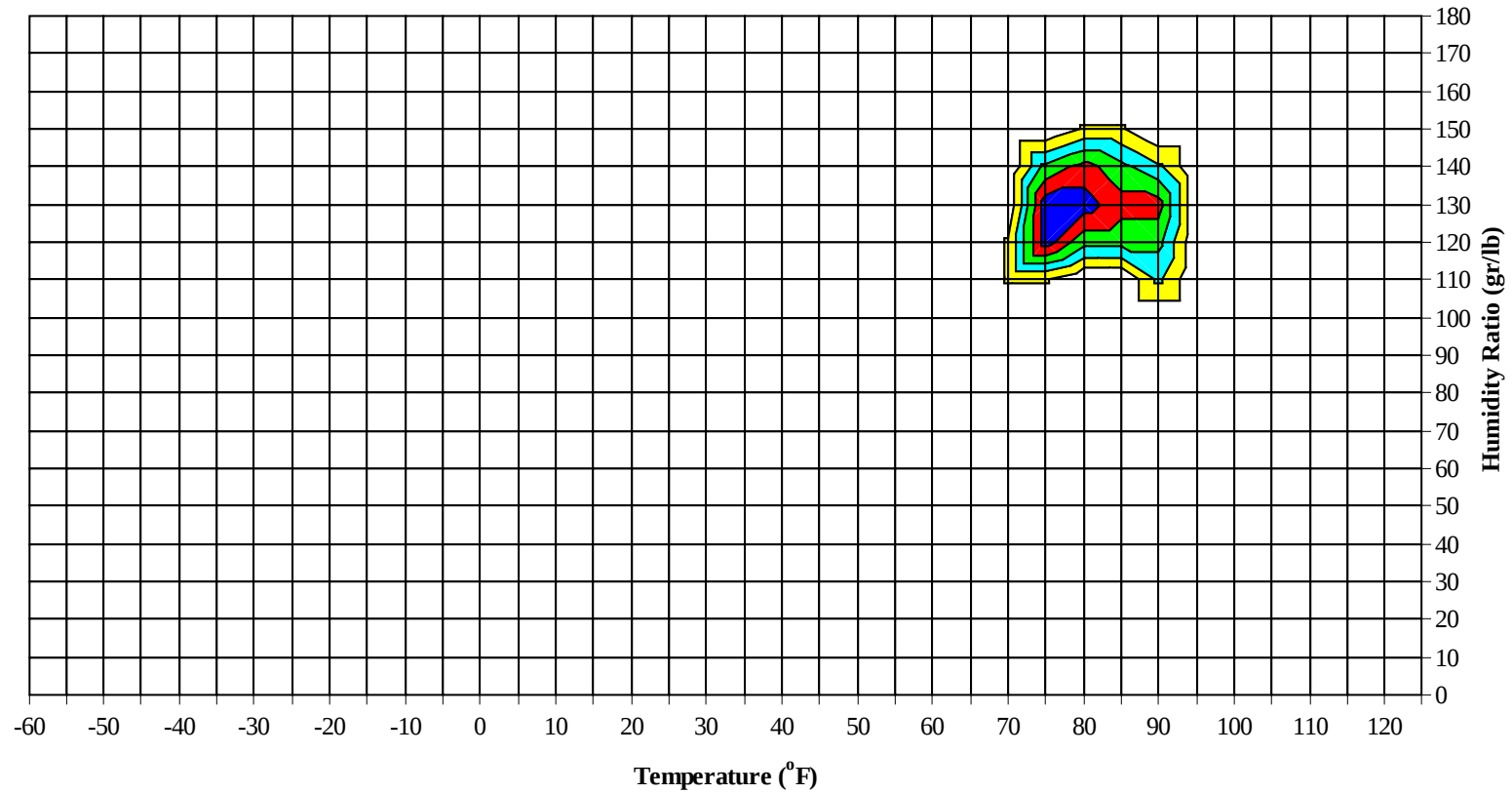
No Precipitation Data Available

BELEM/VAL DE CAES

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WMO No. 821930

Long Term Psychrometric Summary

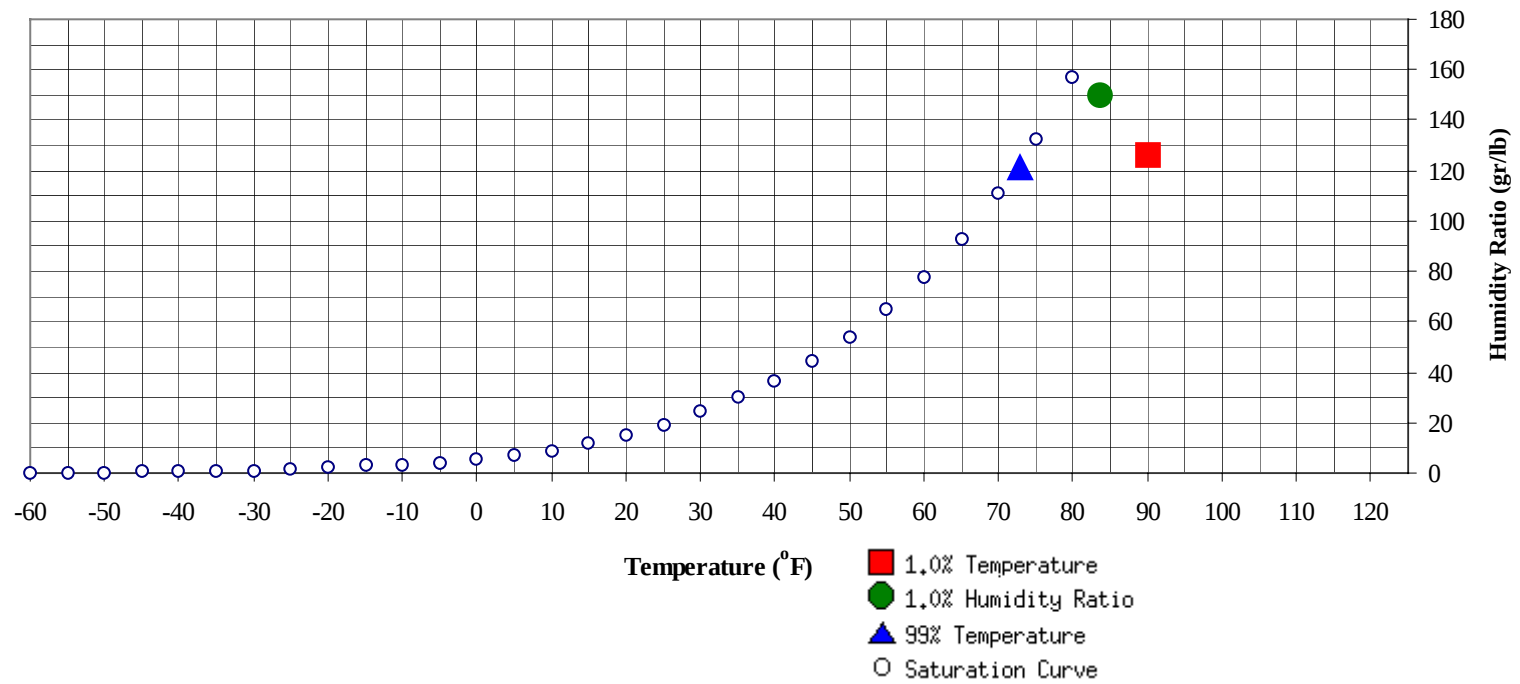


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

BELEM/VAL DE CAES BZ

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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	73	121.2	36.5		149.8	83.7	80.1	78.8	43.6

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	90	126.2	78.1	41.4

BELEM/VAL DE CAES BZ

WMO No. 821930

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		
100 / 104															
95 / 99		0	0	0	81.2		0	0	0	80.3					
90 / 94		13	1	14	78.4	0	9	0	9	78.9		6	0	6	78.9
85 / 89	0	71	5	76	78.2	0	46	3	49	78.2		55	2	57	78.2
80 / 84	2	113	53	167	77.3	1	107	36	144	77.3	2	122	43	166	77.4
75 / 79	186	48	170	404	75.2	159	60	168	386	75.2	198	64	193	455	75.3
70 / 74	60	3	19	82	72.5	64	3	17	84	72.7	48	2	10	60	72.7
65 / 69	0		0	0	66.5		0	0	0	68.0	0		0	0	64.0
60 / 64															
55 / 59															

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.

BELEM/VAL DE CAES BZ

WMO No. 821930

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		
100 / 104															
95 / 99							0		0	86.0		0	0	0	78.5
90 / 94		18	1	19	79.0		35	2	37	78.7	0	47	4	51	78.0
85 / 89	0	59	3	62	78.7		87	10	97	78.5	0	104	21	125	77.7
80 / 84	4	111	40	155	77.6	6	99	51	156	77.6	3	76	60	139	77.0
75 / 79	211	51	192	454	75.6	217	28	181	425	75.5	197	13	151	360	75.0
70 / 74	25	1	4	30	72.9	25	0	4	29	72.8	40	0	4	44	72.6
65 / 69							0		0	68.0			0	0	
60 / 64															
55 / 59															

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.

BELEM/VAL DE CAES BZ

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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		
100 / 104															
95 / 99							0		0	78.5		0		0	78.0
90 / 94		43	3	46	77.5		45	3	48	77.8	0	34	1	35	78.1
85 / 89	0	111	22	133	77.3		116	19	135	77.8	0	120	14	134	77.8
80 / 84	1	80	65	146	76.7	1	80	66	147	76.8	3	79	67	149	76.9
75 / 79	171	13	145	329	74.6	174	8	151	332	74.6	173	7	154	334	74.7
70 / 74	76	1	13	90	72.3	73	0	9	82	72.3	64	1	4	69	72.3
65 / 69			0	0	68.0	0			0	67.0	0			0	68.0
60 / 64															
55 / 59															

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.

BELEM/VAL DE CAES BZ

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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		
100 / 104		0		0	82.0							0		0	82.0
95 / 99		0	0	0	80.2		0		0	77.0		0		0	78.7
90 / 94	0	37	1	38	78.0		38	1	39	78.0	0	31	1	32	78.2
85 / 89	0	133	17	150	77.8		124	15	139	78.0	0	106	13	119	78.2
80 / 84	8	73	87	168	76.8	8	72	98	178	76.9	6	88	83	177	77.2
75 / 79	184	5	141	330	74.7	195	6	124	325	74.8	206	22	141	369	75.1
70 / 74	56	0	2	58	72.3	37	0	2	39	72.3	36	2	10	48	72.5
65 / 69	0			0	67.0	0		0	0	66.5	0			0	66.0
60 / 64	0			0	62.0	0			0	63.0					
55 / 59	0			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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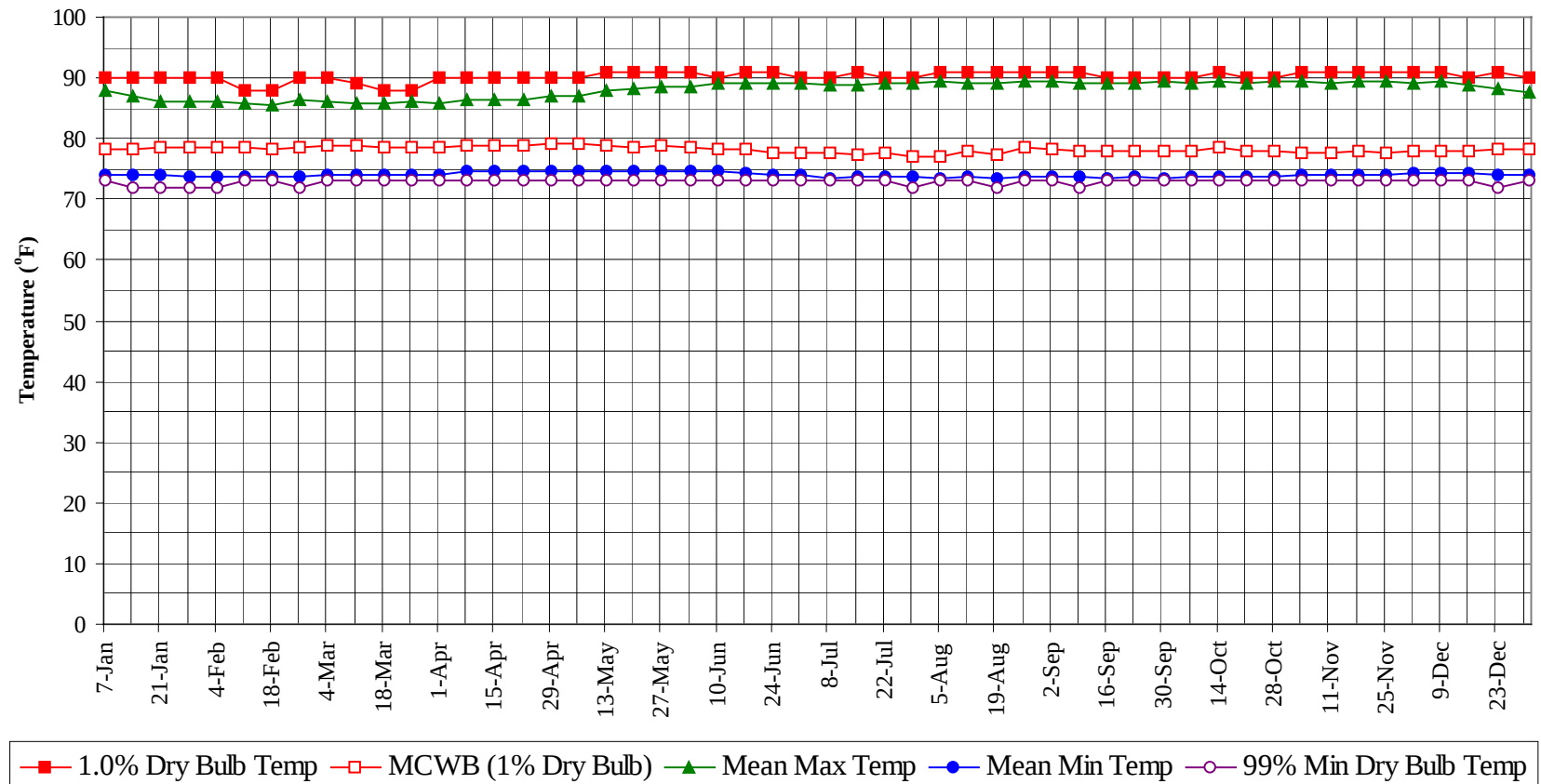
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

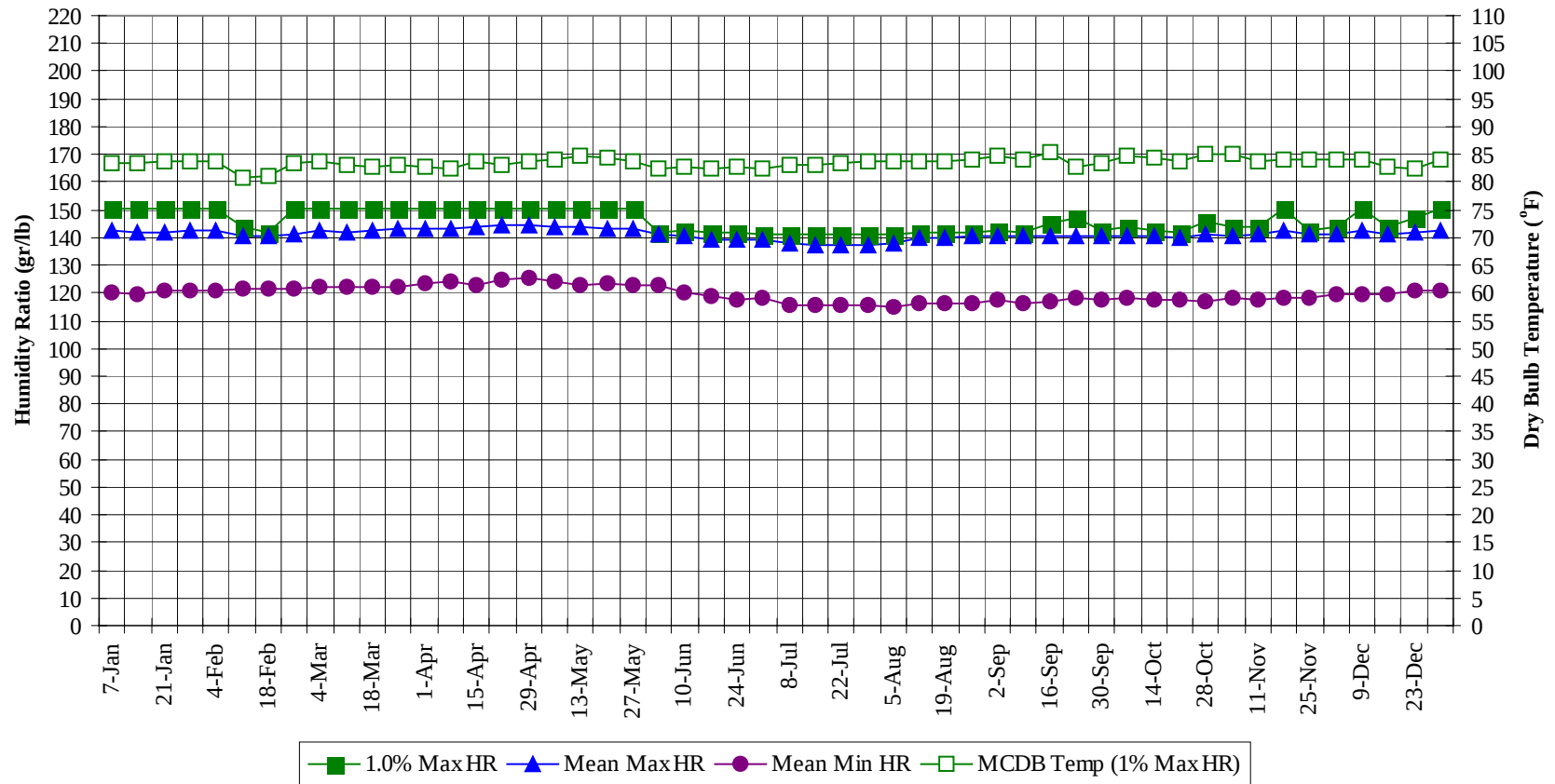
[illegible]

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

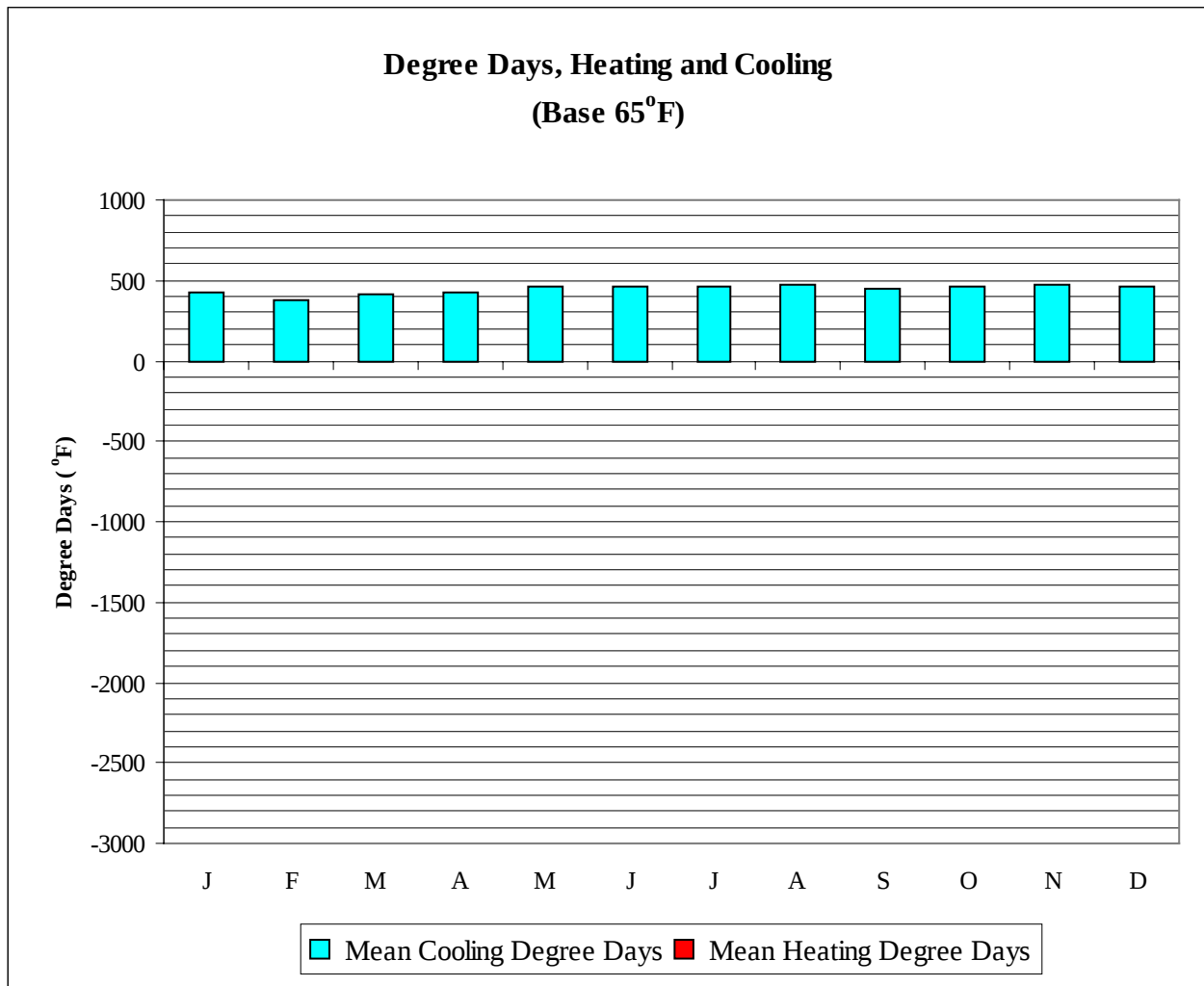


Long Term Humidity and Dry Bulb Temperature Summary



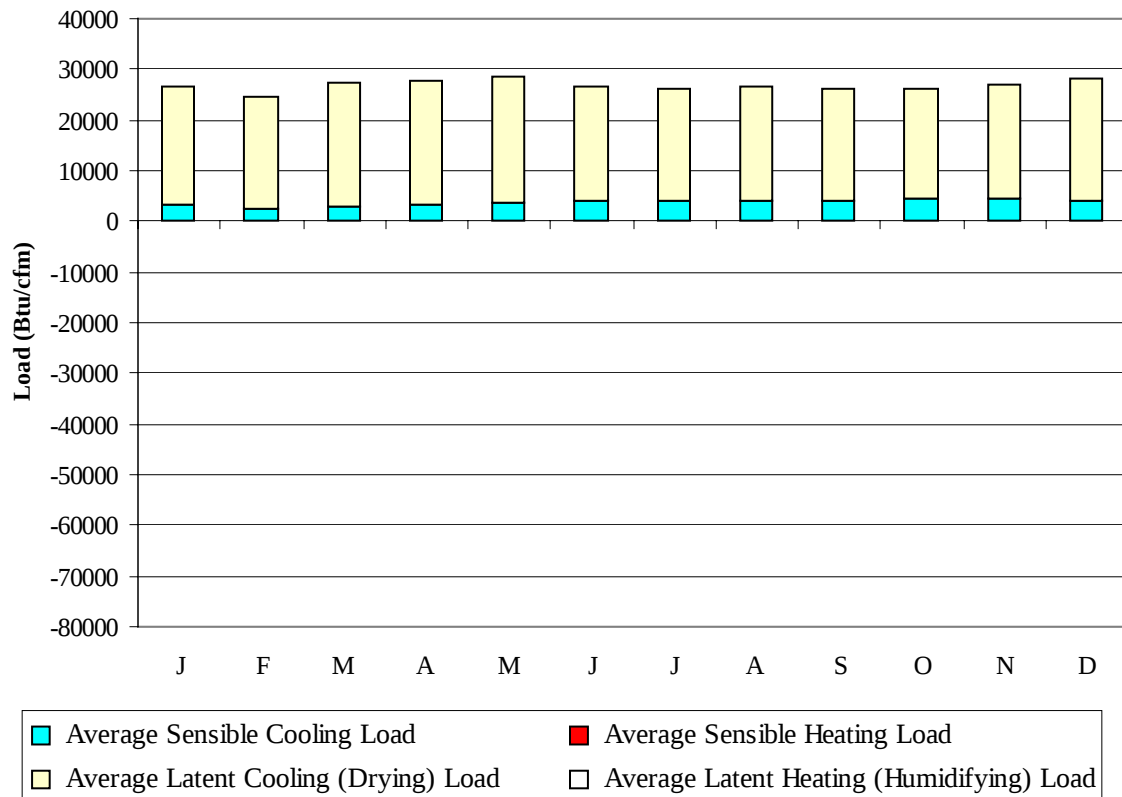
BELEM/VAL DE CAES BZ**WMO No. 821930****Long Term Dry Bulb Temperature and Humidity Summary**

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	90.0	78.2	87.8	74.1	73.0	150.5	83.5	142.7	120.2
14-Jan	90.0	78.2	87.1	73.9	72.0	150.5	83.3	141.8	119.7
21-Jan	90.0	78.6	86.3	73.9	72.0	150.5	83.7	141.8	120.5
28-Jan	90.0	78.4	86.2	73.9	72.0	150.5	83.6	142.8	121.0
4-Feb	90.0	78.7	86.0	73.7	72.0	150.5	83.7	142.4	120.7
11-Feb	88.0	78.5	85.8	73.7	73.0	143.5	80.7	140.7	121.5
18-Feb	88.0	78.1	85.4	73.7	73.0	142.1	81.2	140.5	121.5
25-Feb	90.0	78.6	86.3	73.8	72.0	150.5	83.2	141.2	121.5
4-Mar	90.0	79.0	86.0	74.0	73.0	150.5	83.6	142.7	122.2
11-Mar	89.0	78.8	85.8	74.1	73.0	150.5	83.0	141.8	121.9
18-Mar	88.0	78.4	85.9	74.1	73.0	150.5	82.6	142.7	122.0
25-Mar	88.0	78.6	86.1	74.1	73.0	150.5	83.1	143.4	122.4
1-Apr	90.0	78.6	85.8	74.1	73.0	150.5	82.7	142.9	123.2
8-Apr	90.0	78.9	86.3	74.5	73.0	150.5	82.6	143.2	124.4
15-Apr	90.0	78.8	86.3	74.5	73.0	150.5	83.8	143.9	123.1
22-Apr	90.0	78.8	86.5	74.8	73.0	150.5	83.2	144.2	124.7
29-Apr	90.0	79.0	86.9	74.7	73.0	150.5	83.9	144.3	125.2
6-May	90.0	79.1	87.1	74.6	73.0	150.5	84.1	143.7	123.8
13-May	91.0	78.8	87.8	74.6	73.0	150.5	84.7	143.5	123.0
20-May	91.0	78.7	88.3	74.7	73.0	150.5	84.3	143.5	123.6
27-May	91.0	79.0	88.4	74.6	73.0	150.5	83.6	143.0	122.8
3-Jun	91.0	78.6	88.6	74.6	73.0	142.1	82.5	141.3	122.6
10-Jun	90.0	78.2	89.1	74.5	73.0	142.8	82.7	140.6	120.4
17-Jun	91.0	78.3	89.2	74.3	73.0	142.1	82.5	139.5	118.6
24-Jun	91.0	77.6	89.1	74.1	73.0	142.1	82.7	139.0	117.6
1-Jul	90.0	77.7	89.1	74.2	73.0	141.4	82.4	139.1	118.0
8-Jul	90.0	77.7	89.0	73.5	73.0	141.4	83.2	138.1	115.8
15-Jul	91.0	77.5	88.8	73.6	73.0	141.4	83.1	137.5	115.5
22-Jul	90.0	77.6	89.0	73.7	73.0	141.4	83.3	137.0	115.4
29-Jul	90.0	77.2	89.1	73.6	72.0	141.4	83.9	137.4	115.6
5-Aug	91.0	77.1	89.4	73.4	73.0	141.4	83.9	137.8	114.6
12-Aug	91.0	77.8	89.2	73.7	73.0	142.1	83.7	140.0	116.3
19-Aug	91.0	77.4	89.2	73.5	72.0	142.1	83.8	139.6	116.0
26-Aug	91.0	78.4	89.5	73.7	73.0	142.1	83.9	140.4	116.4
2-Sep	91.0	78.3	89.4	73.6	73.0	142.8	84.7	140.4	117.4
9-Sep	91.0	78.0	89.2	73.6	72.0	142.1	84.2	140.6	116.2
16-Sep	90.0	78.0	89.2	73.5	73.0	144.9	85.3	140.7	116.8
23-Sep	90.0	78.0	89.3	73.7	73.0	147.0	82.7	140.6	118.0
30-Sep	90.0	77.9	89.4	73.5	73.0	142.8	83.5	140.4	117.7
7-Oct	90.0	78.0	89.2	73.7	73.0	143.5	84.6	140.6	117.9
14-Oct	91.0	78.6	89.5	73.7	73.0	142.8	84.3	140.7	117.5
21-Oct	90.0	77.8	89.2	73.8	73.0	142.1	83.7	140.1	117.4
28-Oct	90.0	77.9	89.4	73.8	73.0	145.6	85.0	140.9	117.2
4-Nov	91.0	77.8	89.3	74.0	73.0	143.5	85.1	140.3	118.1
11-Nov	91.0	77.7	89.2	74.1	73.0	143.5	83.8	141.0	117.9
18-Nov	91.0	77.8	89.4	74.0	73.0	150.5	84.0	142.3	118.1
25-Nov	91.0	77.8	89.5	74.0	73.0	142.8	84.0	141.1	118.2
2-Dec	91.0	78.0	89.2	74.2	73.0	143.5	84.0	141.3	119.6
9-Dec	91.0	77.8	89.5	74.4	73.0	150.5	84.1	142.4	119.5
16-Dec	90.0	78.1	88.7	74.3	73.0	143.5	82.7	141.2	119.6
23-Dec	91.0	78.4	88.3	74.1	72.0	147.0	82.4	141.8	120.7
31-Dec	90.0	78.2	87.7	74.1	73.0	150.5	84.0	142.3	121.0



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	427	0
FEB	375	0
MAR	417	0
APR	420	0
MAY	457	0
JUN	458	0
JUL	463	0
AUG	468	0
SEP	452	0
OCT	460	0
NOV	469	0
DEC	465	0
ANN	5331	0

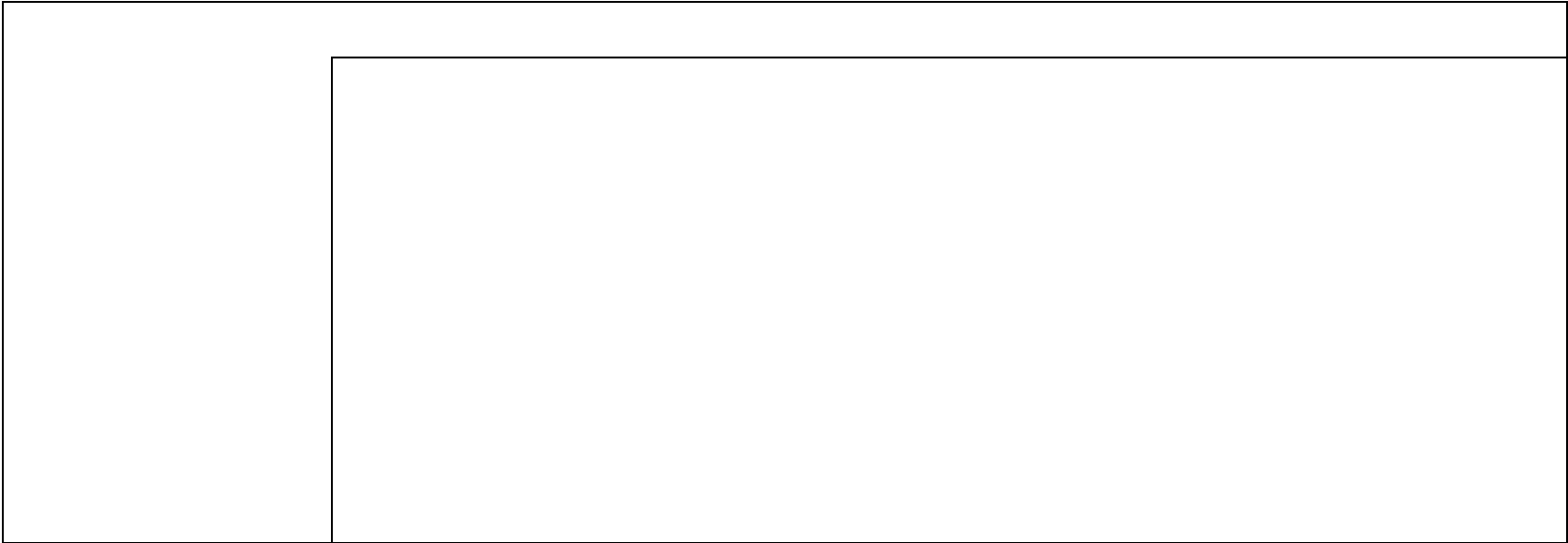
Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	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	3243	0	23353	0
FEB	2575	0	21961	0
MAR	2911	0	24431	0
APR	3166	0	24403	0
MAY	3879	0	24784	0
JUN	4190	0	22403	0
JUL	4167	0	21855	0
AUG	4267	0	22446	0
SEP	4088	0	22112	0
OCT	4326	-1	21835	0
NOV	4464	0	22623	0
DEC	4126	0	24023	0
ANN	45402	-1	276229	0

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

No Solar Radiation
Data Available

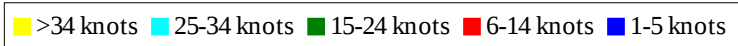
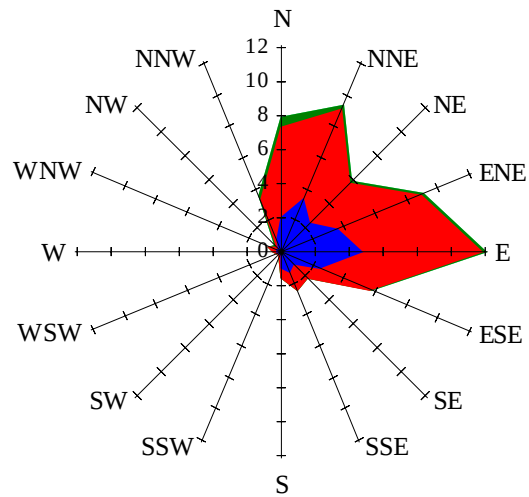


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

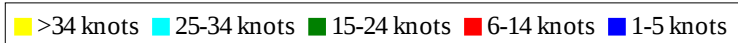
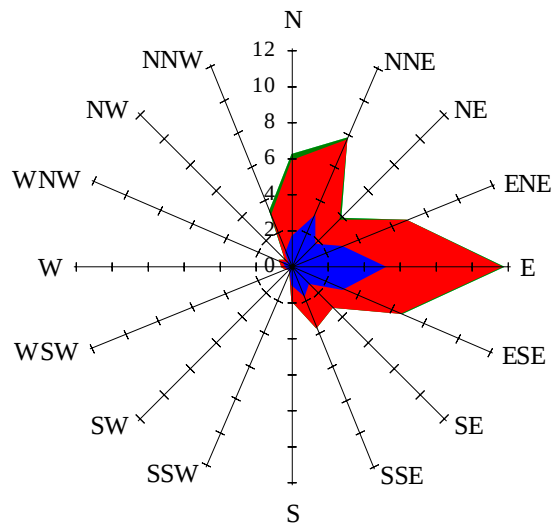
Labels of Percent Frequency on North Axis



Percent Calm = 38.71

Wind Summary - March, April, and May

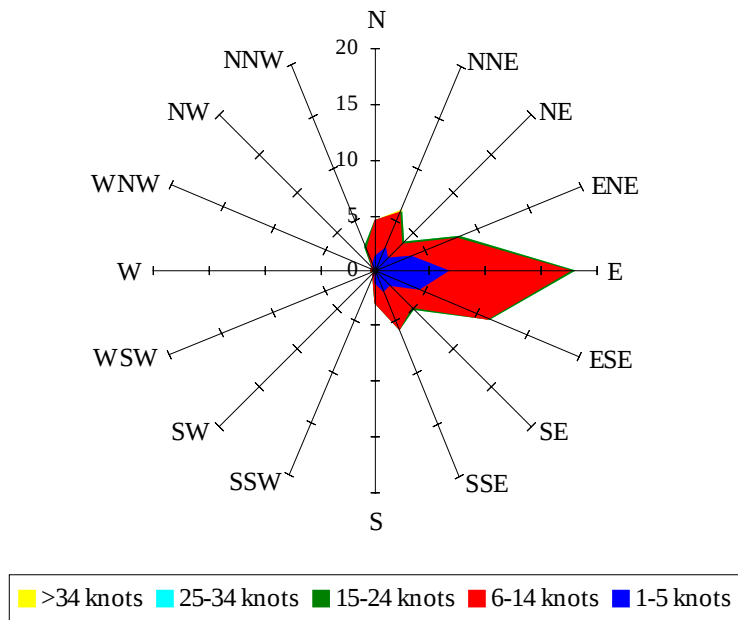
Labels of Percent Frequency on North Axis



Percent Calm = 42.82

Wind Summary - June, July, and August

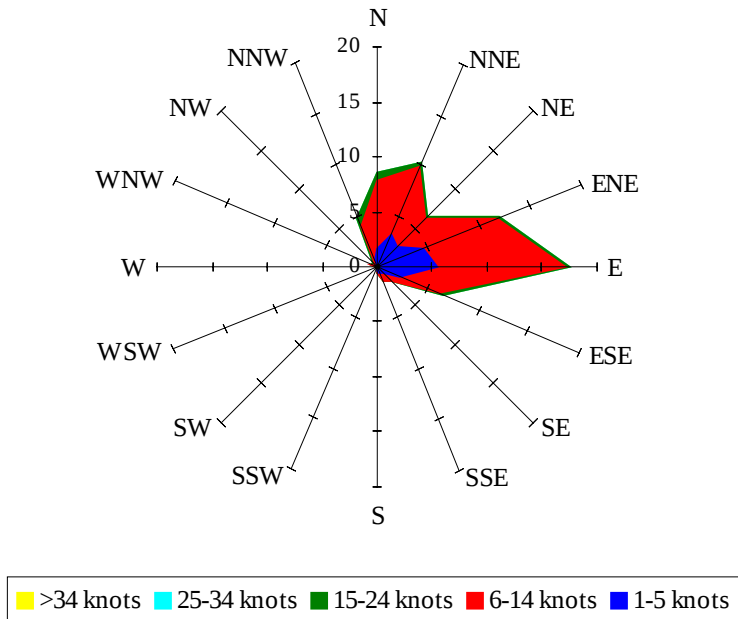
Labels of Percent Frequency on North Axis



Percent Calm = 31.74

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 28.68