

BEIRUT, LEBANON

Latitude = 33.82 N

Longitude = 35.48 E

Period of Record = 1967 to 1996

WMO No. 401000

Elevation = 62 feet

Average Pressure = 29.80 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	66	49	12.2	SSW
0.4% Occurrence	88	72	96	10.2	WSW
1.0% Occurrence	86	75	114	11.3	WSW
2.0% Occurrence	86	75	114	11.3	WSW
Mean Daily Range	11	-	-	-	-
97.5% Occurrence	48	44	37	5.2	E
99.0% Occurrence	46	42	34	5.1	E
99.6% Occurrence	45	42	34	5.1	E
Median of Extreme Lows	41	38	29	4.6	E
	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	81	85	150	9.8	SW
0.4% Occurrence	79	85	138	10.4	WSW
1.0% Occurrence	78	84	134	10.0	WSW
2.0% Occurrence	77	84	129	10.0	WSW
	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	151	84	0.99	9.7	SW
0.4% Occurrence	142	84	0.94	9.7	WSW
1.0% Occurrence	134	83	0.88	9.2	SW
2.0% Occurrence	129	83	0.85	9.6	WSW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		6	1452	1147	2820

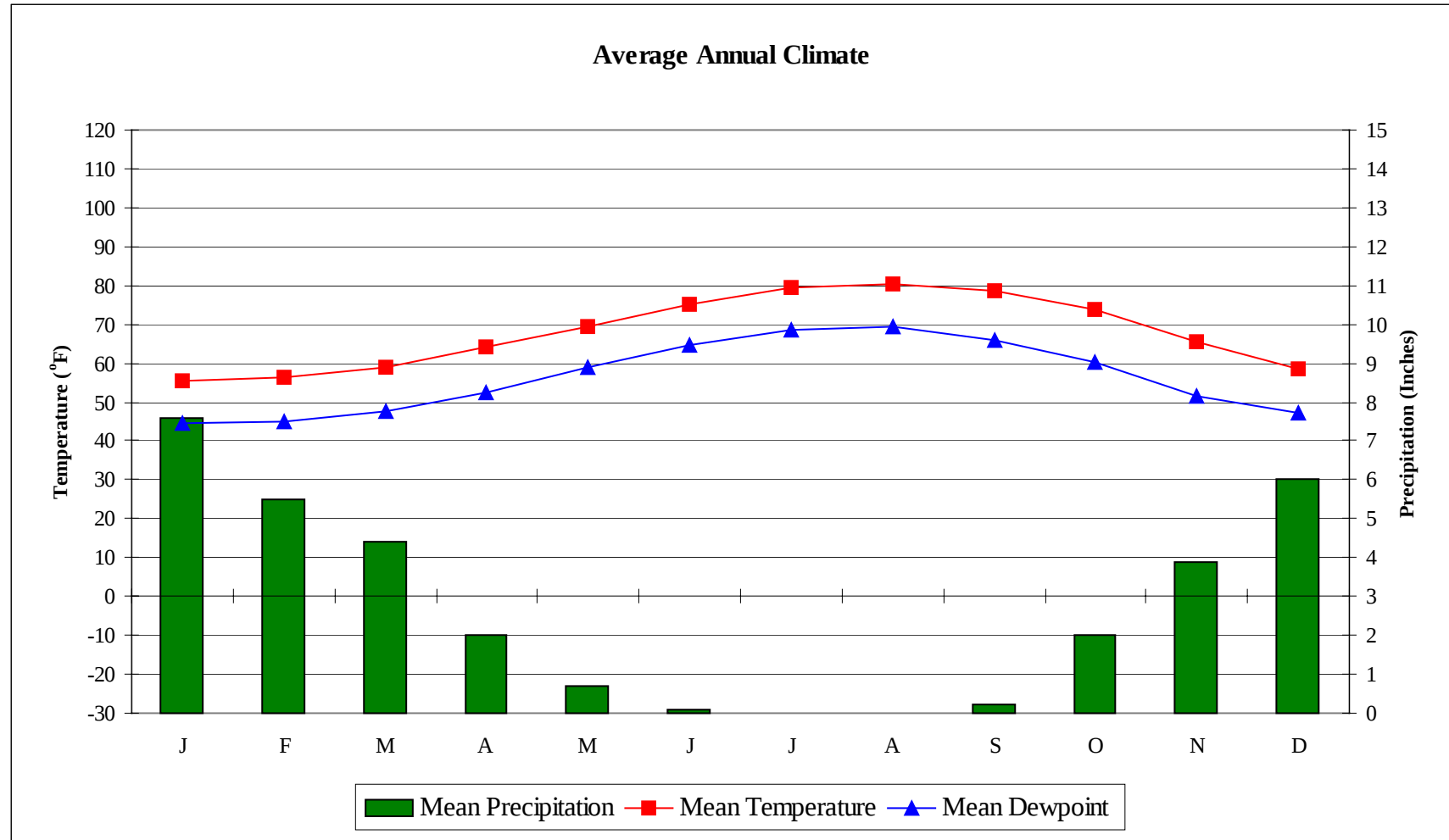
Other Site Data

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	3.0 + 1.1
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 (#)
70.4	N/A	N/A	0

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

BEIRUT, LEBANON

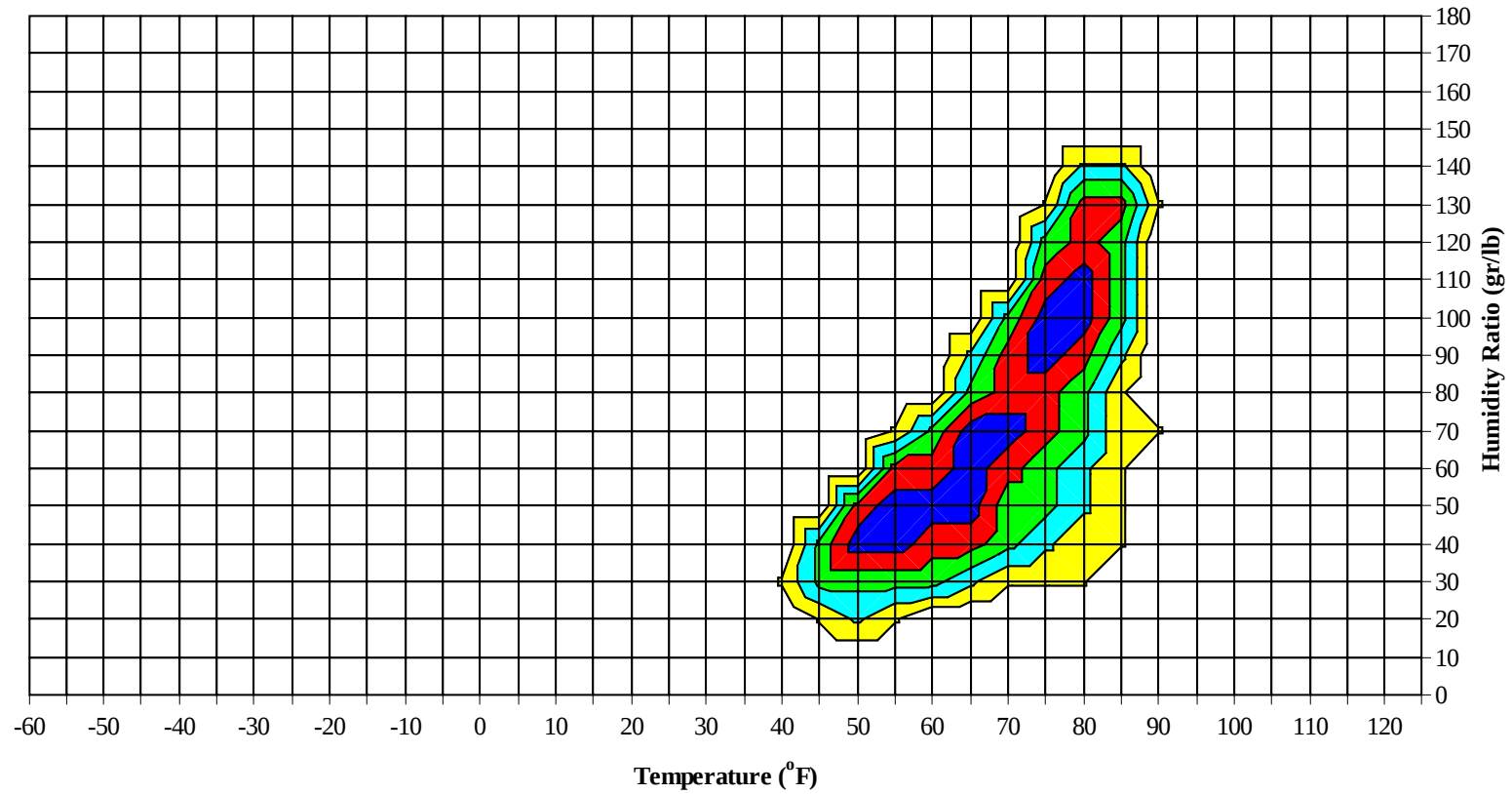
WMO No. 401000



BEIRUT, LEBANON

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Long Term Psychrometric Summary

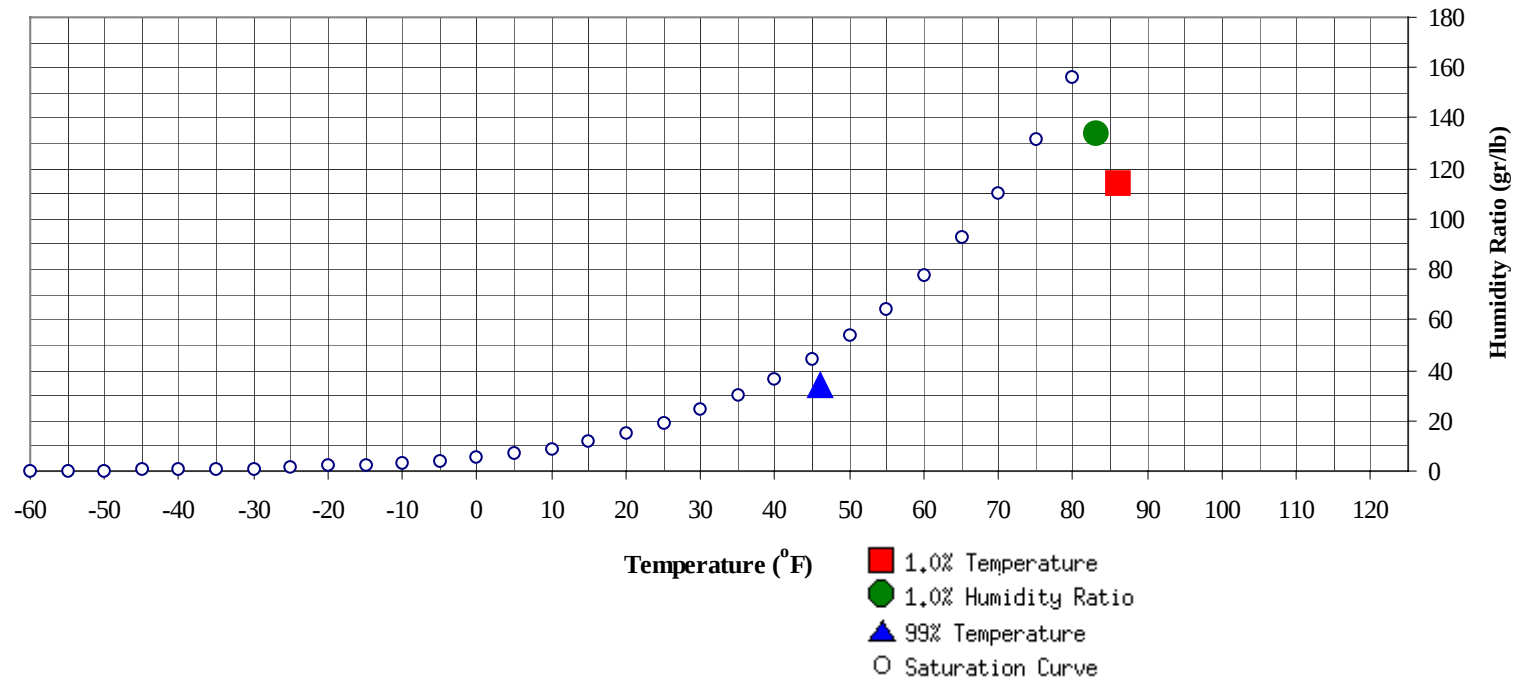


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

BEIRUT, LEBANON

WMO No. 401000

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)
	46	34.4	16.4		133.7	83.2	77.5	75.2	40.9

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	86	113.8	74.8	38.5

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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		
105 / 109															
100 / 104															
95 / 99												0		0	61.0
90 / 94											0	1		1	60.3
85 / 89						0			0	59.0	0	0	1	1	61.1
80 / 84						0	1	0	1	58.7	1	2	1	4	59.9
75 / 79	0	0		0	56.0	0	1	1	2	56.8	2	5	1	8	58.6
70 / 74	0	3	1	4	56.4	1	8	1	10	56.0	3	18	7	28	58.5
65 / 69	1	17	3	21	56.5	1	20	4	25	56.3	4	41	15	59	58.5
60 / 64	13	106	29	147	54.2	12	98	36	145	54.6	37	123	72	231	55.7
55 / 59	71	82	98	251	51.2	63	63	91	217	51.2	86	43	93	223	51.9
50 / 54	107	34	91	232	47.7	97	26	67	190	47.9	88	14	51	153	48.3
45 / 49	48	6	23	77	43.6	43	7	21	71	43.3	24	2	8	34	43.6
40 / 44	6	1	3	10	38.9	5	1	3	9	39.2	2	0	0	2	39.1
35 / 39	1	0	1	2	35.3	1	0	1	2	35.3	0	0	0	0	35.1
30 / 34											0			0	30.0

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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WMO No. 401000

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		
105 / 109															
100 / 104		0		0	63.3										
95 / 99	0	0	0	0	64.6	0	1	0	1	67.6		0		0	66.0
90 / 94	1	2	1	4	62.2	0	2	1	3	66.2		1	0	1	67.1
85 / 89	1	3	1	5	61.4	0	4	2	6	65.7	0	4	2	6	69.6
80 / 84	4	9	5	18	61.3	2	14	7	23	67.0	5	84	23	112	72.5
75 / 79	6	17	7	30	61.1	10	61	26	97	67.6	65	139	114	318	69.8
70 / 74	10	41	21	72	61.4	48	130	76	254	64.8	108	12	85	205	65.8
65 / 69	18	92	41	152	60.0	72	33	82	187	61.8	47		14	61	62.3
60 / 64	85	69	106	260	57.1	90	3	50	143	58.6	15		2	17	58.8
55 / 59	87	7	51	145	53.3	25		5	30	54.4					
50 / 54	26	1	7	34	49.7	1			1	50.1					
45 / 49	1			1	44.6										
40 / 44															
35 / 39															
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		
105 / 109			0	0	64.0										
100 / 104		0	0	0	66.3										
95 / 99		0	0	0	70.0							0		0	68.8
90 / 94	0	2	0	2	71.9		1	0	1	76.7	0	3	0	3	71.1
85 / 89	0	27	5	32	76.2	1	69	11	81	76.8	1	25	5	31	74.5
80 / 84	42	211	111	364	74.2	53	177	135	365	74.2	27	192	71	289	72.3
75 / 79	127	8	116	251	70.6	136	1	95	232	70.5	109	20	129	258	69.3
70 / 74	77	0	17	94	66.0	58	0	7	65	66.4	94	0	35	129	65.6
65 / 69	2			2	60.1	0			0	62.7	9	0	0	9	61.5
60 / 64	0			0	57.0						0			0	57.5
55 / 59															
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		
105 / 109															
100 / 104															
95 / 99		0		0	64.5										
90 / 94	0	5	0	5	67.6		0		0	74.0					
85 / 89	2	10	5	17	68.7	1	2	0	3	63.9		0		0	61.7
80 / 84	8	70	14	92	70.1	1	8	1	10	65.2		0		0	62.2
75 / 79	32	132	75	239	67.8	4	44	7	55	63.9		1	0	1	60.4
70 / 74	99	25	105	229	64.0	16	103	36	154	61.8	1	16	1	18	59.6
65 / 69	72	4	36	112	61.1	39	36	56	131	58.9	3	58	11	72	57.7
60 / 64	30	2	13	45	57.4	101	35	89	226	56.3	34	105	63	203	55.3
55 / 59	4	0	1	5	52.6	51	11	40	101	51.6	102	53	110	265	51.9
50 / 54						24	2	12	38	46.3	86	14	52	151	48.0
45 / 49						3	0	0	3	43.1	20	2	10	32	43.3
40 / 44											2	0	1	3	38.9
35 / 39															
30 / 34															

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Period of Record = 1967 to 1996

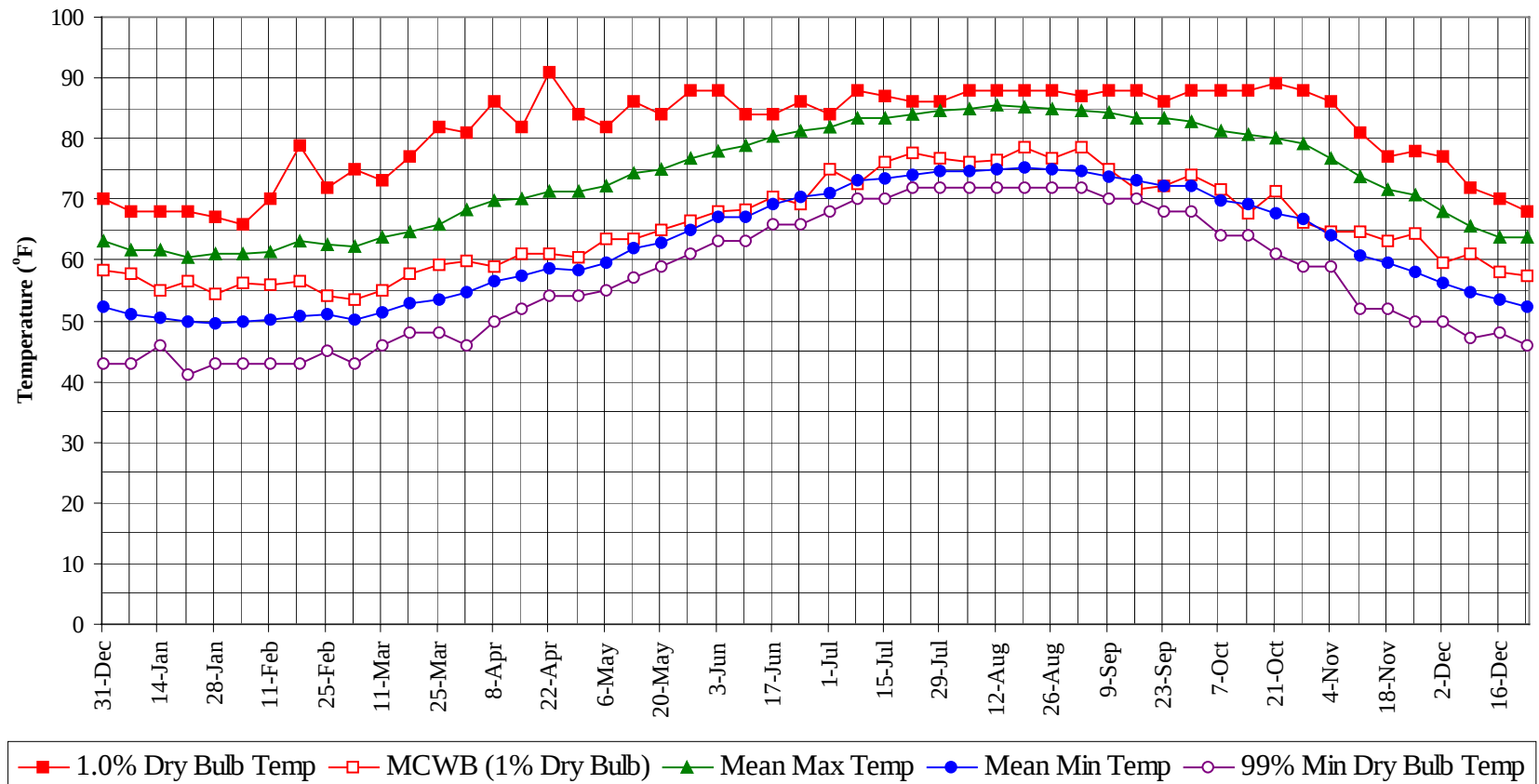
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109			0	0	64.0
100 / 104		1	0	1	64.2
95 / 99	0	2	0	2	66.3
90 / 94	2	15	3	20	67.4
85 / 89	6	142	30	178	74.3
80 / 84	143	747	363	1252	72.9
75 / 79	484	416	557	1456	69.0
70 / 74	505	358	384	1247	64.2
65 / 69	268	308	262	837	60.0
60 / 64	423	556	468	1446	56.1
55 / 59	496	265	497	1258	51.8
50 / 54	434	93	287	814	48.0
45 / 49	141	17	63	221	43.5
40 / 44	17	2	7	25	39.0
35 / 39	2	0	1	3	35.3
30 / 34	0			0	30.0
	</				

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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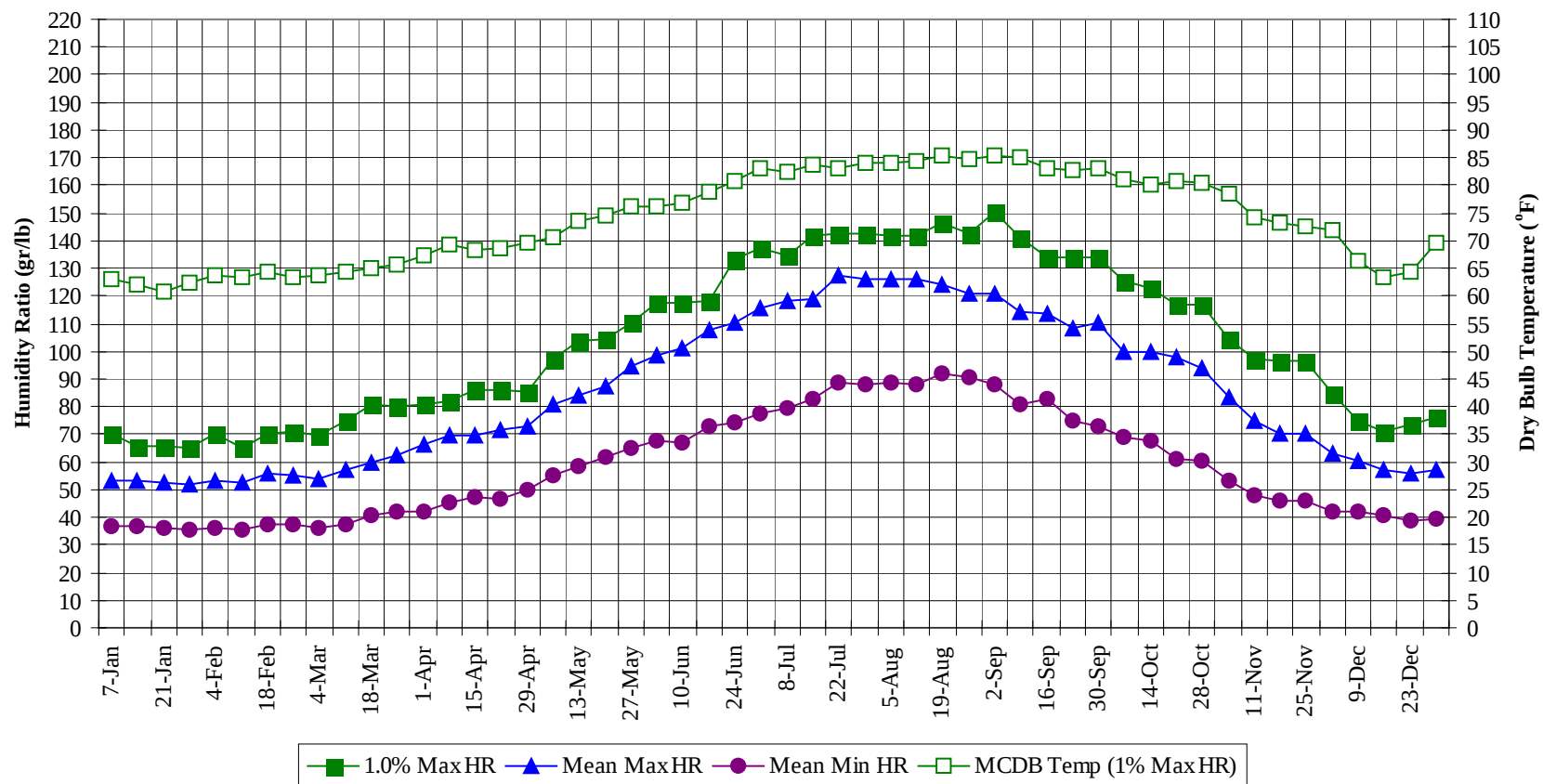
Annual Summary of Temperatures



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Long Term Humidity and Dry Bulb Temperature Summary



BEIRUT, LEBANON

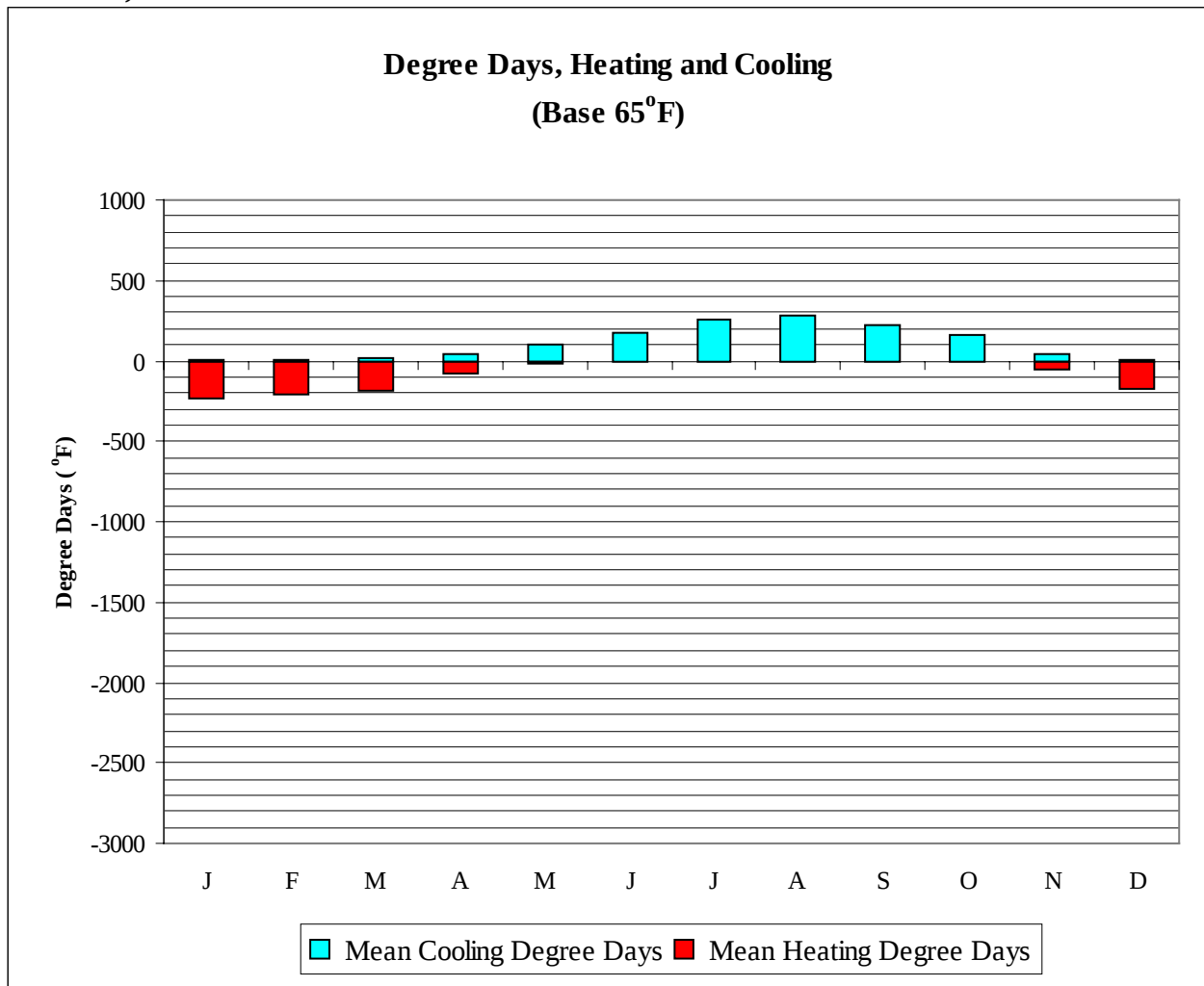
WMO No. 401000

Long Term Dry Bulb Temperature and Humidity Summary

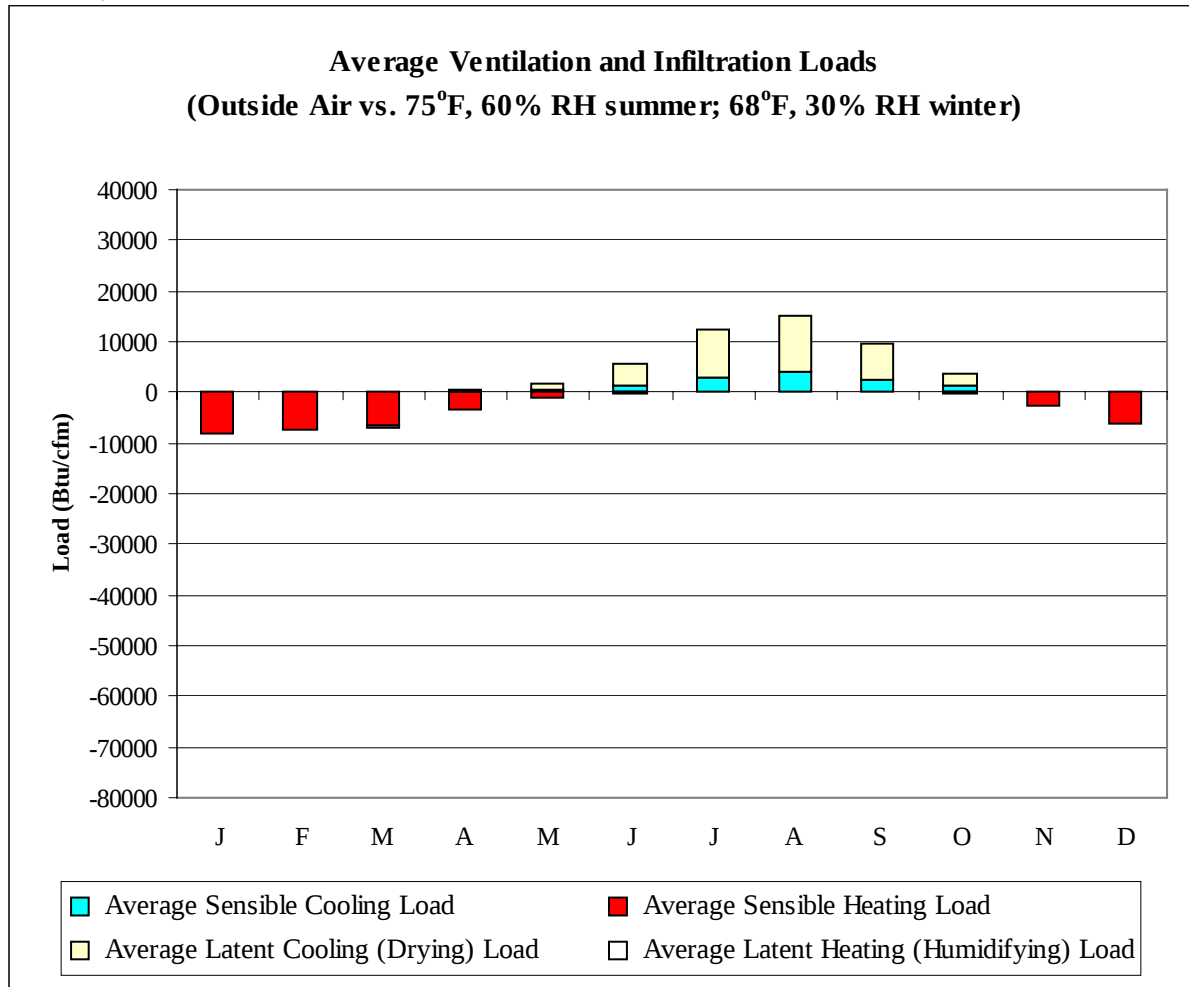
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	68.0	57.7	61.6	50.9	43.0	70.0	63.0	53.5	36.7
14-Jan	68.0	54.9	61.6	50.4	46.0	65.8	62.0	53.0	36.9
21-Jan	68.0	56.6	60.5	49.8	41.0	65.8	60.7	52.5	36.0
28-Jan	67.0	54.5	61.2	49.7	43.0	65.1	62.5	51.7	35.2
4-Feb	66.0	56.1	61.1	49.8	43.0	70.0	63.8	53.1	35.9
11-Feb	70.0	55.8	61.2	50.2	43.0	65.1	63.3	52.4	35.7
18-Feb	79.0	56.5	63.1	50.8	43.0	70.0	64.5	55.6	37.4
25-Feb	72.0	54.0	62.6	51.0	45.0	70.7	63.3	55.2	37.4
4-Mar	75.0	53.4	62.1	50.1	43.0	69.3	63.7	54.2	35.8
11-Mar	73.0	54.9	63.6	51.4	46.0	74.9	64.4	57.3	37.2
18-Mar	77.0	57.8	64.7	53.0	48.0	80.5	64.9	59.9	40.5
25-Mar	82.0	59.2	65.9	53.5	48.0	79.8	65.8	62.2	42.0
1-Apr	81.0	59.8	68.1	54.7	46.0	80.5	67.5	66.0	42.2
8-Apr	86.0	58.9	69.7	56.6	50.0	81.9	69.3	69.5	45.2
15-Apr	82.0	60.9	70.0	57.4	52.0	86.1	68.4	69.9	47.0
22-Apr	91.0	61.1	71.4	58.5	54.0	86.1	68.7	71.3	46.3
29-Apr	84.0	60.5	71.2	58.3	54.0	85.4	69.6	73.1	49.7
6-May	82.0	63.4	72.2	59.6	55.0	97.3	70.8	80.7	55.0
13-May	86.0	63.4	74.4	61.9	57.0	103.6	73.5	84.3	58.2
20-May	84.0	65.1	75.1	63.0	59.0	104.3	74.5	87.3	61.7
27-May	88.0	66.6	76.8	64.9	61.0	110.6	76.1	94.5	65.0
3-Jun	88.0	68.0	77.9	67.0	63.0	117.6	76.3	98.5	67.6
10-Jun	84.0	68.3	78.8	67.0	63.0	117.6	76.7	101.0	66.9
17-Jun	84.0	70.4	80.3	69.3	66.0	118.3	78.9	108.0	73.0
24-Jun	86.0	69.1	81.2	70.5	66.0	133.0	80.7	110.4	74.4
1-Jul	84.0	74.9	81.9	71.1	68.0	137.2	83.0	115.7	77.3
8-Jul	88.0	72.6	83.3	73.0	70.0	134.4	82.4	118.3	79.8
15-Jul	87.0	76.0	83.4	73.3	70.0	142.1	83.8	119.1	82.5
22-Jul	86.0	77.5	83.9	74.1	72.0	142.8	83.2	127.2	88.5
29-Jul	86.0	76.9	84.7	74.6	72.0	142.8	84.0	125.9	88.3
5-Aug	88.0	76.1	84.9	74.7	72.0	142.1	84.0	126.4	88.9
12-Aug	88.0	76.4	85.4	75.0	72.0	142.1	84.4	126.2	87.7
19-Aug	88.0	78.7	85.2	75.3	72.0	146.3	85.5	124.1	92.0
26-Aug	88.0	76.8	84.8	74.9	72.0	142.8	84.8	121.1	90.8
2-Sep	87.0	78.7	84.7	74.7	72.0	150.5	85.5	121.1	88.3
9-Sep	88.0	74.9	84.3	73.8	70.0	141.4	85.1	114.5	81.0
16-Sep	88.0	71.6	83.4	73.1	70.0	133.7	83.2	113.8	82.9
23-Sep	86.0	72.3	83.3	72.1	68.0	133.7	82.7	108.1	74.9
30-Sep	88.0	73.9	82.9	72.1	68.0	133.7	83.2	110.6	72.7
7-Oct	88.0	71.6	81.2	69.9	64.0	125.3	81.1	99.9	69.2
14-Oct	88.0	67.8	80.7	69.2	64.0	122.5	80.0	99.7	67.5
21-Oct	89.0	71.3	80.2	67.8	61.0	116.9	80.6	97.6	61.2
28-Oct	88.0	66.3	79.1	66.7	59.0	116.9	80.6	94.2	60.4
4-Nov	86.0	64.6	76.9	64.0	59.0	104.3	78.4	83.3	53.2
11-Nov	81.0	64.6	73.8	60.8	52.0	97.3	74.1	75.0	47.8
18-Nov	77.0	63.1	71.5	59.4	52.0	96.6	73.3	70.3	46.3
25-Nov	78.0	64.3	70.6	58.0	50.0	96.6	72.5	70.5	46.2
2-Dec	77.0	59.6	68.0	56.1	50.0	84.7	72.0	62.9	41.9
9-Dec	72.0	61.1	65.4	54.7	47.0	74.9	66.2	60.6	41.8
16-Dec	70.0	58.1	63.9	53.4	48.0	70.7	63.5	57.1	40.6
23-Dec	68.0	57.3	63.9	52.1	46.0	73.5	64.5	56.1	39.0
31-Dec	70.0	58.4	63.3	52.4	43.0	76.3	69.7	57.2	39.5

BEIRUT, LEBANON

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	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	2	237
FEB	4	215
MAR	12	184
APR	40	76
MAY	99	15
JUN	179	1
JUL	261	0
AUG	286	0
SEP	219	0
OCT	166	3
NOV	47	57
DEC	6	170
ANN	1320	958



	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	-8035	1	-82
FEB	10	-7358	1	-81
MAR	50	-6728	7	-72
APR	271	-3517	72	-26
MAY	349	-949	1366	0
JUN	1125	-76	4537	0
JUL	3027	0	9290	0
AUG	4056	0	11212	0
SEP	2664	-2	6964	0
OCT	1152	-269	2544	-2
NOV	118	-2484	204	-37
DEC	8	-6205	4	-47
ANN	12830	-35623	36202	-347

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

No Solar Radiation
Data Available

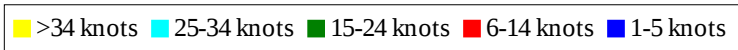
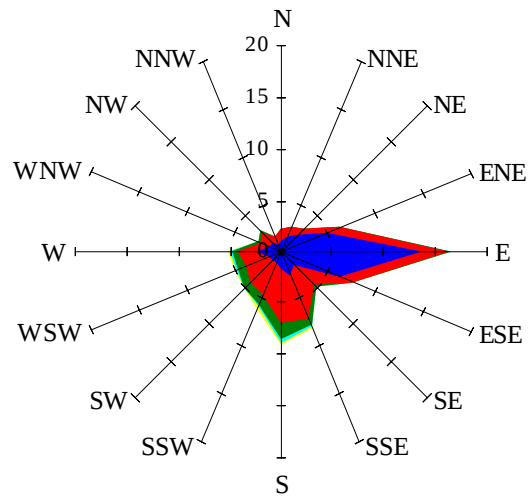


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

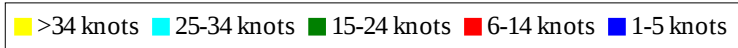
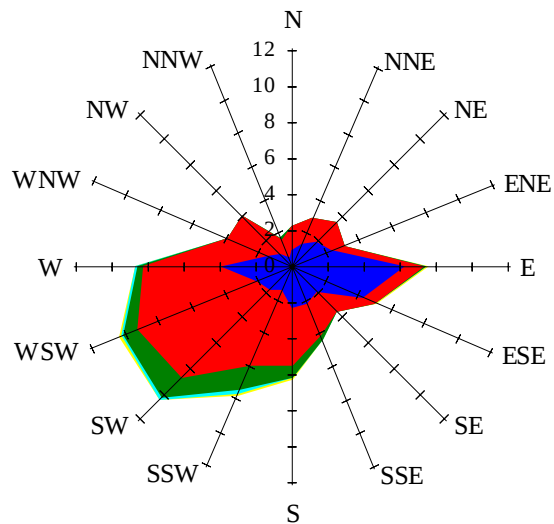
Labels of Percent Frequency on North Axis



Percent Calm = 13.91

Wind Summary - March, April, and May

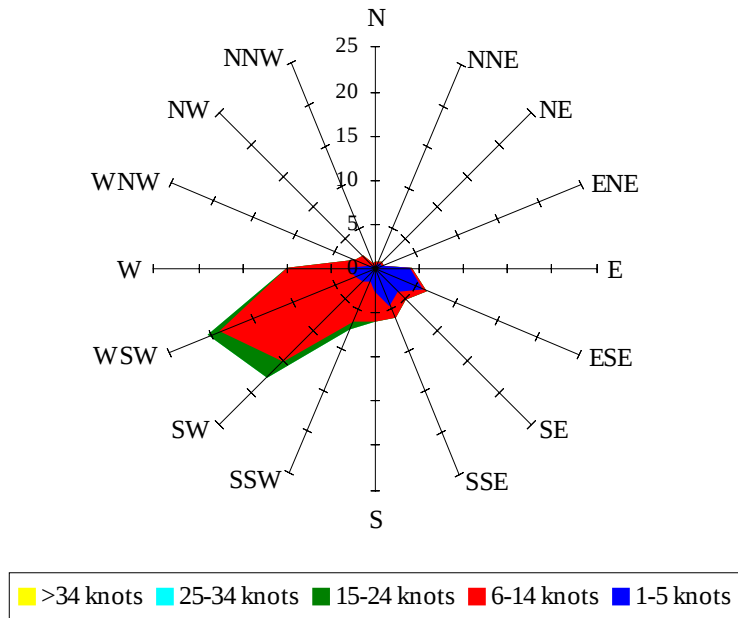
Labels of Percent Frequency on North Axis



Percent Calm = 15.87

Wind Summary - June, July, and August

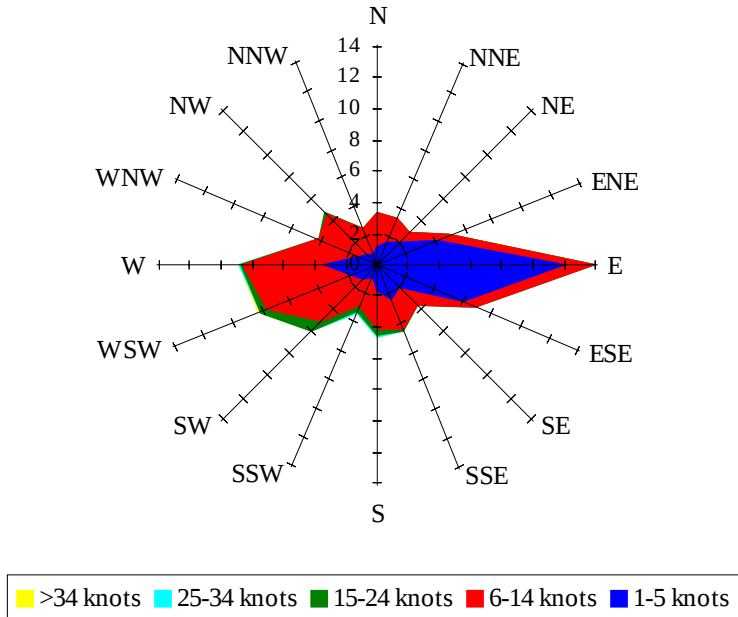
Labels of Percent Frequency on North Axis



Percent Calm = 10.22

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 14.89