

RIYADH, SAUDI ARABIA

Latitude = 24.72 N

Longitude = 46.72 E

Period of Record = 1967 to 1996

WMO No. 404380

Elevation = 2008 feet

Average Pressure = 27.77 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	115	66	27	9.4	N
0.4% Occurrence	111	65	29	10.4	N
1.0% Occurrence	109	65	28	10.4	N
2.0% Occurrence	108	65	28	10.4	N
Mean Daily Range	22	-	-	-	-
97.5% Occurrence	48	41	29	4.6	NNW
99.0% Occurrence	45	39	27	4.0	NNW
99.6% Occurrence	43	37	26	3.6	NNW
Median of Extreme Lows	36	31	17	3.1	NNW
	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	75	99	99	8.4	ENE
0.4% Occurrence	70	99	70	8.6	N
1.0% Occurrence	68	99	59	8.6	N
2.0% Occurrence	67	98	54	8.8	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	111	79	0.69	10.4	SSE
0.4% Occurrence	92	75	0.57	8.1	SSE
1.0% Occurrence	85	72	0.54	7.7	SSE
2.0% Occurrence	76	73	0.47	7.5	SSE
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		2232	4450	10	242

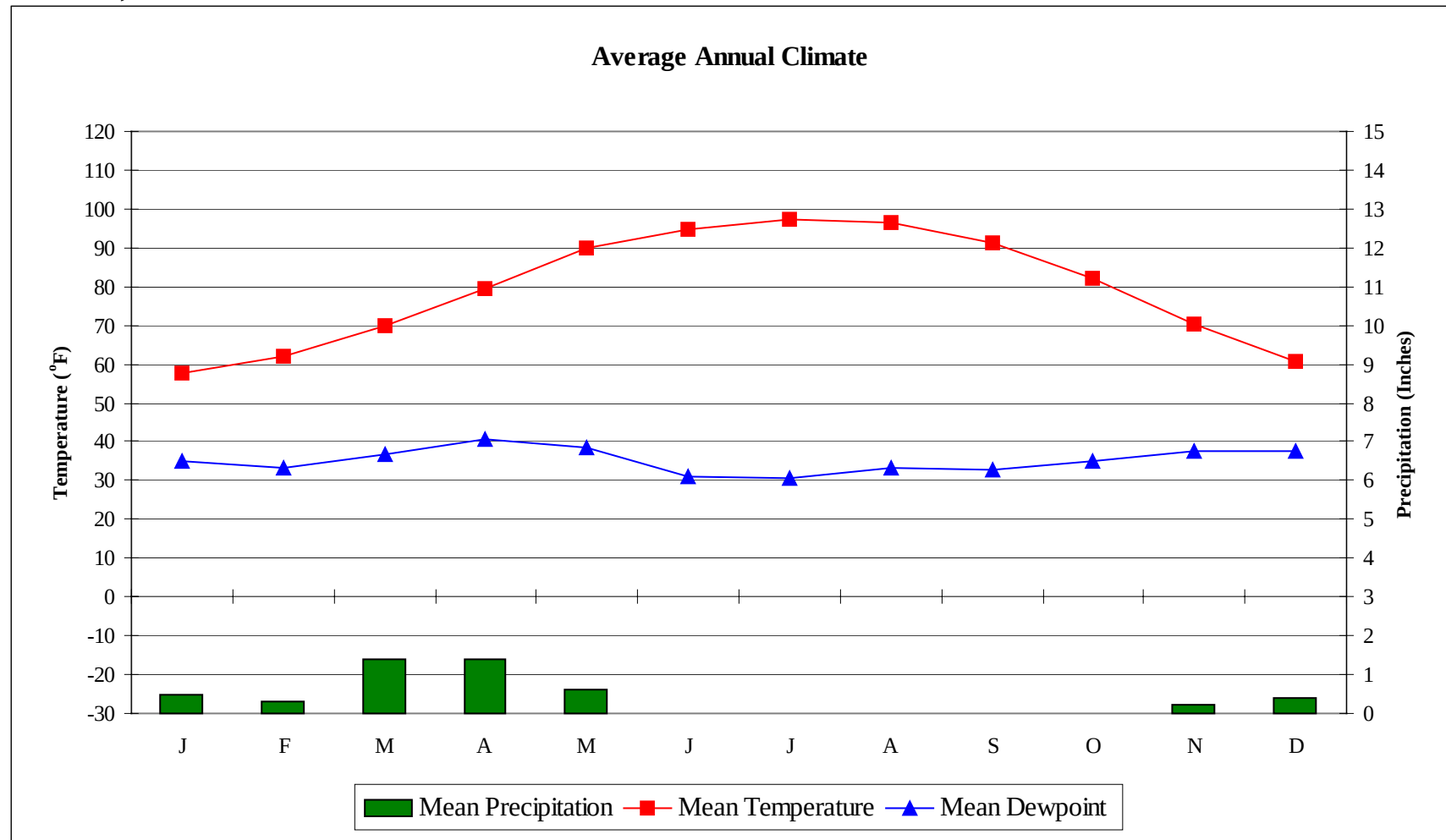
Other Site Data

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	0.0 + 7.4
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 (#)
82.0	N/A	N/A	0

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

RIYADH, SAUDI ARABIA

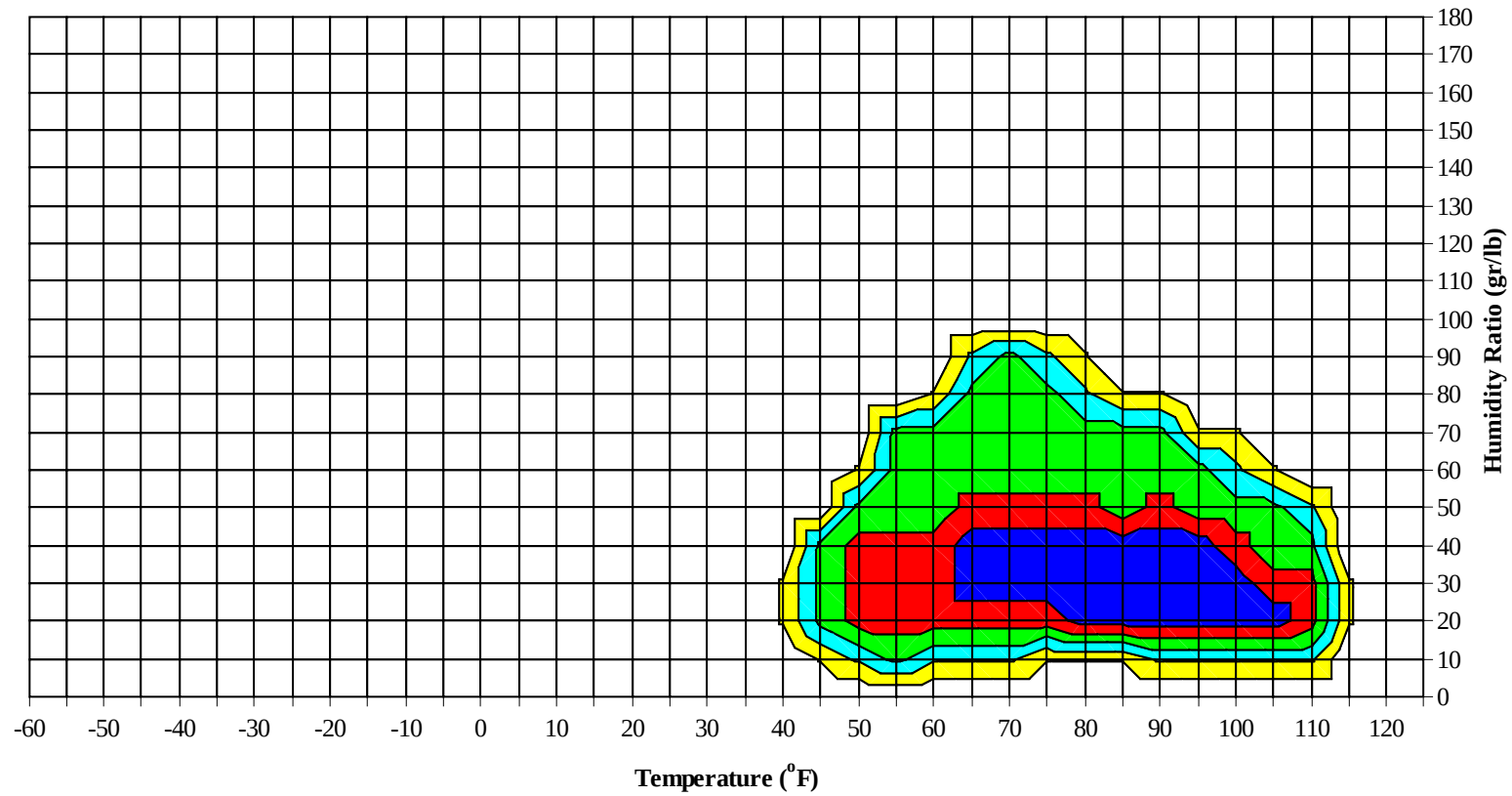
WMO No. 404380



RIYADH, SAUDI ARABIA

WMO No. 404380

Long Term Psychrometric Summary

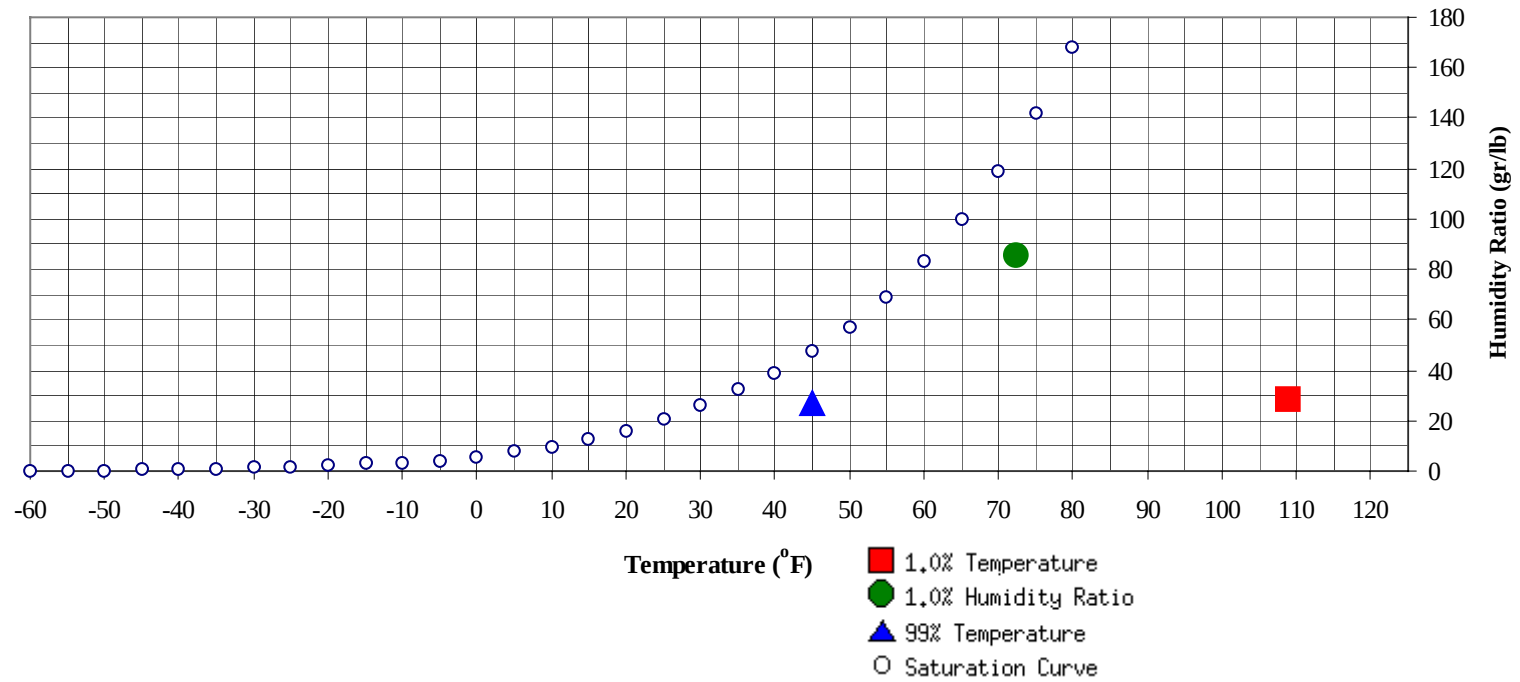


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

RIYADH, SAUDI ARABIA

WMO No. 404380

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	45	26.7	14.9		85.4	72.5	64.7	60.8	30.7

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	109	28.4	64.9	30.7

RIYADH, SAUDI ARABIA

WMO No. 404380

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		
115 / 119															
110 / 114															
105 / 109															
100 / 104															
95 / 99							0		0	60.3		4	1	5	62.2
90 / 94							1	0	1	60.1		14	6	20	60.4
85 / 89		1	0	1	60.7	0	3	1	4	58.2	0	18	12	30	59.4
80 / 84		7	2	9	57.9	0	13	6	19	57.0	1	38	29	68	57.7
75 / 79		18	8	26	55.9	0	26	15	42	54.8	8	48	47	103	55.9
70 / 74	0	31	20	51	53.4	3	44	35	83	52.8	27	52	59	138	53.8
65 / 69	1	32	29	62	51.6	7	37	41	85	50.9	42	32	38	113	52.3
60 / 64	18	58	56	132	49.3	29	48	59	136	48.9	75	29	36	139	50.8
55 / 59	50	53	67	171	47.0	64	32	44	140	46.3	59	10	16	85	47.2
50 / 54	75	34	48	157	43.7	70	14	18	103	42.8	28	3	3	34	42.7
45 / 49	71	12	16	99	40.0	40	4	5	49	38.8	6	0	0	6	37.7
40 / 44	23	2	2	26	36.5	8	1	0	9	34.7	1			1	33.5
35 / 39	9	0	1	10	32.0	1	0	0	1	32.1					
30 / 34	1			1	27.3	0		0	0	27.3					

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.

RIYADH, SAUDI ARABIA

WMO No. 404380

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		
115 / 119												1	0	1	65.4
110 / 114							1	0	1	65.2		9	2	11	65.8
105 / 109		1	0	1	64.2		25	6	31	64.7		73	30	103	63.8
100 / 104		11	3	14	63.5		63	34	97	63.6	0	81	60	141	62.5
95 / 99		28	13	41	62.3	1	67	59	127	62.8	4	50	65	119	61.0
90 / 94	0	43	29	72	61.1	14	51	70	135	61.3	40	23	58	121	59.4
85 / 89	2	39	36	77	60.0	39	22	38	99	60.1	67	4	21	92	57.8
80 / 84	19	54	57	130	58.8	94	15	28	137	58.7	101	0	4	105	55.9
75 / 79	52	37	51	141	57.4	71	4	10	85	57.7	25	0	0	25	54.0
70 / 74	73	20	33	127	56.1	24	1	2	27	57.0	2	0		2	51.7
65 / 69	50	5	10	65	55.0	4		0	4	58.7	0			0	49.7
60 / 64	34	3	6	42	53.4	1		0	1	59.1					
55 / 59	8	0	1	9	49.9										
50 / 54	1			1	47.8										
45 / 49															
40 / 44															
35 / 39															
30 / 34															

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RIYADH, SAUDI ARABIA

WMO No. 404380

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		
115 / 119		2	0	2	65.7		1	0	1	68.6					
110 / 114		27	5	32	65.5		13	2	15	66.1		0		0	65.6
105 / 109	0	98	51	149	64.0		97	44	141	64.5	0	35	6	41	64.2
100 / 104	1	66	64	131	62.6	0	74	67	141	63.2	0	88	39	126	62.7
95 / 99	13	44	70	126	61.0	9	44	67	120	61.6	0	62	61	123	61.5
90 / 94	70	10	48	129	59.2	59	17	54	129	60.0	10	37	69	116	59.9
85 / 89	85	1	9	95	57.3	80	1	13	94	58.0	37	14	40	91	58.2
80 / 84	70	0	1	71	55.7	84	0	2	86	56.1	100	4	22	126	56.4
75 / 79	9	0		9	54.0	16		0	16	54.1	74	0	3	77	54.1
70 / 74	0	0		0	54.0	1			1	53.2	17	0	0	17	51.5
65 / 69											2	0	0	2	48.5
60 / 64											0			0	48.8
55 / 59															
50 / 54															
45 / 49															
40 / 44															
35 / 39															
30 / 34															

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WMO No. 404380

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		
115 / 119															
110 / 114															
105 / 109		0		0	64.7										
100 / 104		11	1	12	62.1										
95 / 99	0	62	17	79	61.4		0		0	59.0					
90 / 94	0	64	41	105	60.1		11	1	12	59.8					
85 / 89	1	46	47	94	58.7	0	27	7	34	59.0		1	0	1	59.0
80 / 84	22	39	71	133	57.5	0	55	28	83	57.7		14	2	16	58.4
75 / 79	73	18	46	137	55.6	2	55	56	113	56.2	0	33	13	46	56.4
70 / 74	84	6	19	108	53.6	28	44	67	138	54.6	1	45	34	79	54.4
65 / 69	38	1	4	43	50.8	47	24	38	109	52.4	4	35	41	80	52.6
60 / 64	26	1	1	28	47.9	83	16	29	128	50.1	35	53	63	152	50.7
55 / 59	3			3	43.9	54	7	12	72	46.5	73	39	52	163	47.7
50 / 54						23	2	3	27	42.8	72	20	32	123	44.6
45 / 49						4	0	0	4	39.8	46	7	11	64	41.1
40 / 44											14	1	1	16	37.6
35 / 39											3			3	33.1
30 / 34															

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WMO No. 404380

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

Period of Record = 1967 to 1996

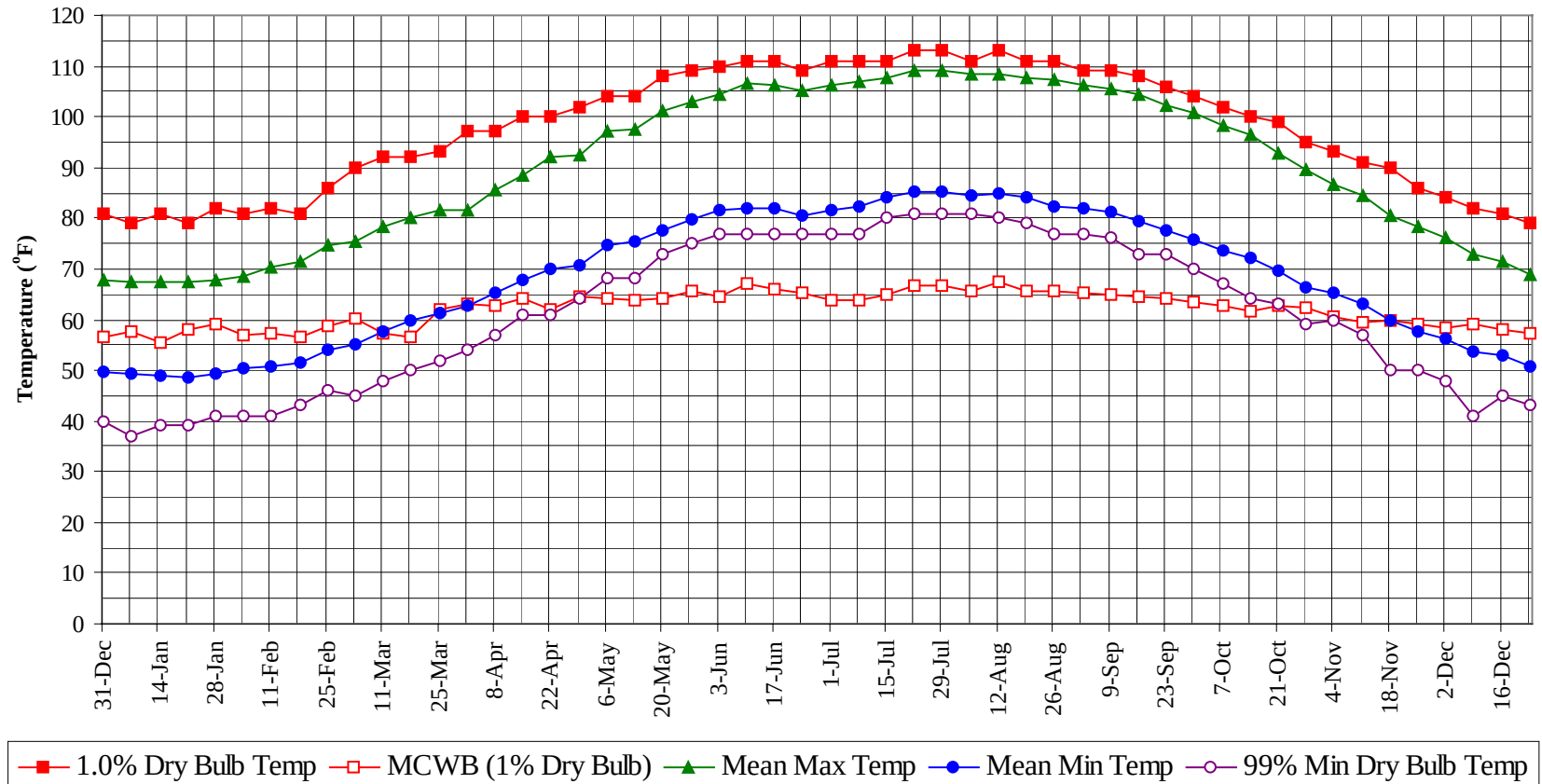
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
115 / 119		4	0	4	66.2
110 / 114		49	10	59	65.7
105 / 109	0	330	138	468	64.2
100 / 104	1	393	269	663	62.9
95 / 99	26	362	354	742	61.6
90 / 94	193	274	379	845	60.1
85 / 89	314	178	224	715	58.6
80 / 84	495	240	253	988	57.3
75 / 79	334	239	250	823	56.0
70 / 74	264	240	269	773	54.3
65 / 69	198	166	198	562	52.3
60 / 64	300	205	248	753	50.1
55 / 59	308	141	190	639	47.0
50 / 54	265	71	102	438	43.6
45 / 49	165	23	32	220	40.0
40 / 44	44	4	4	52	36.5
35 / 39	13	1	1	15	32.2
30 / 34	1		0	1	27.3

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.

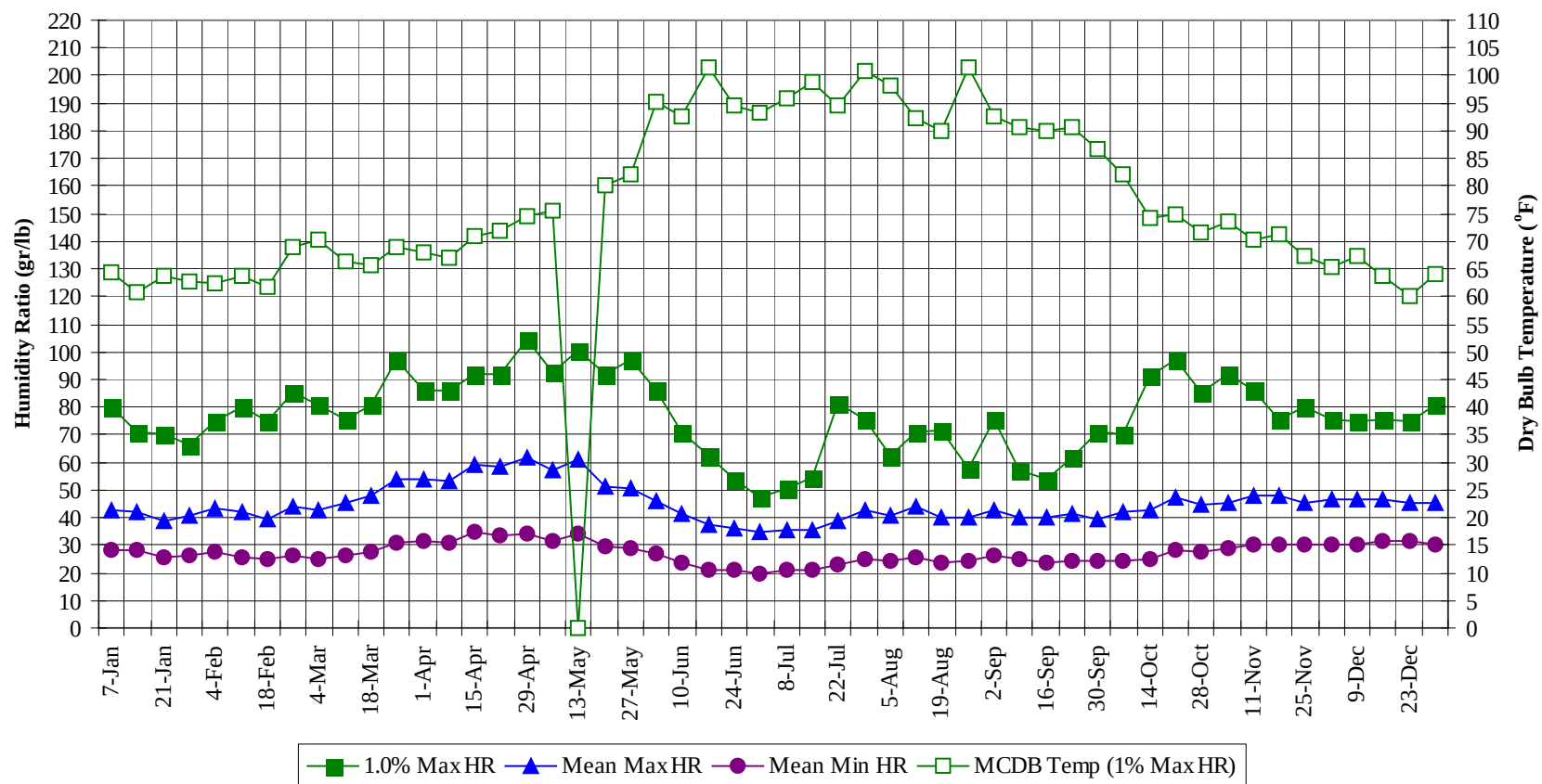
RIYADH, SAUDI ARABIA

WMO No. 404380

Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

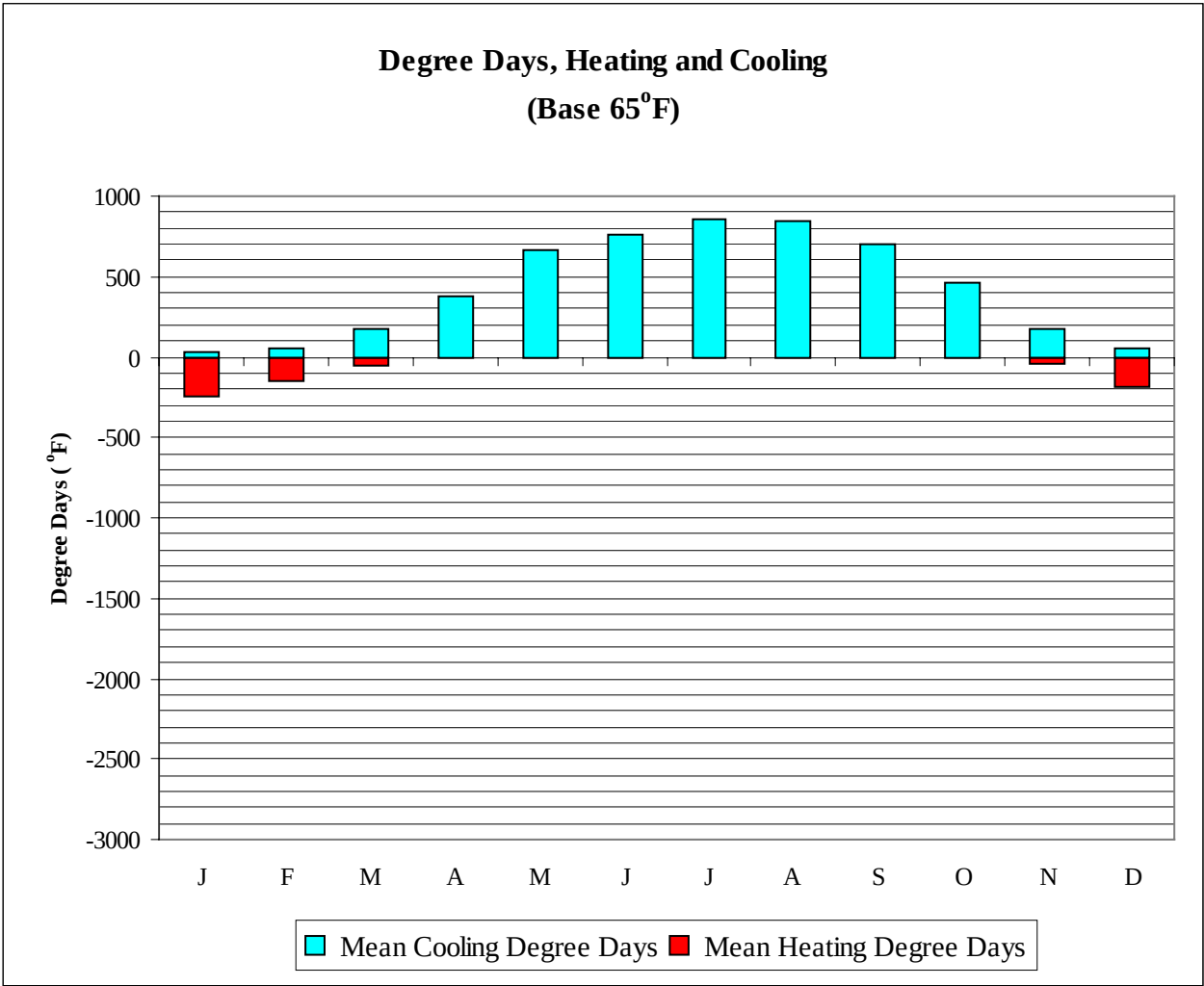


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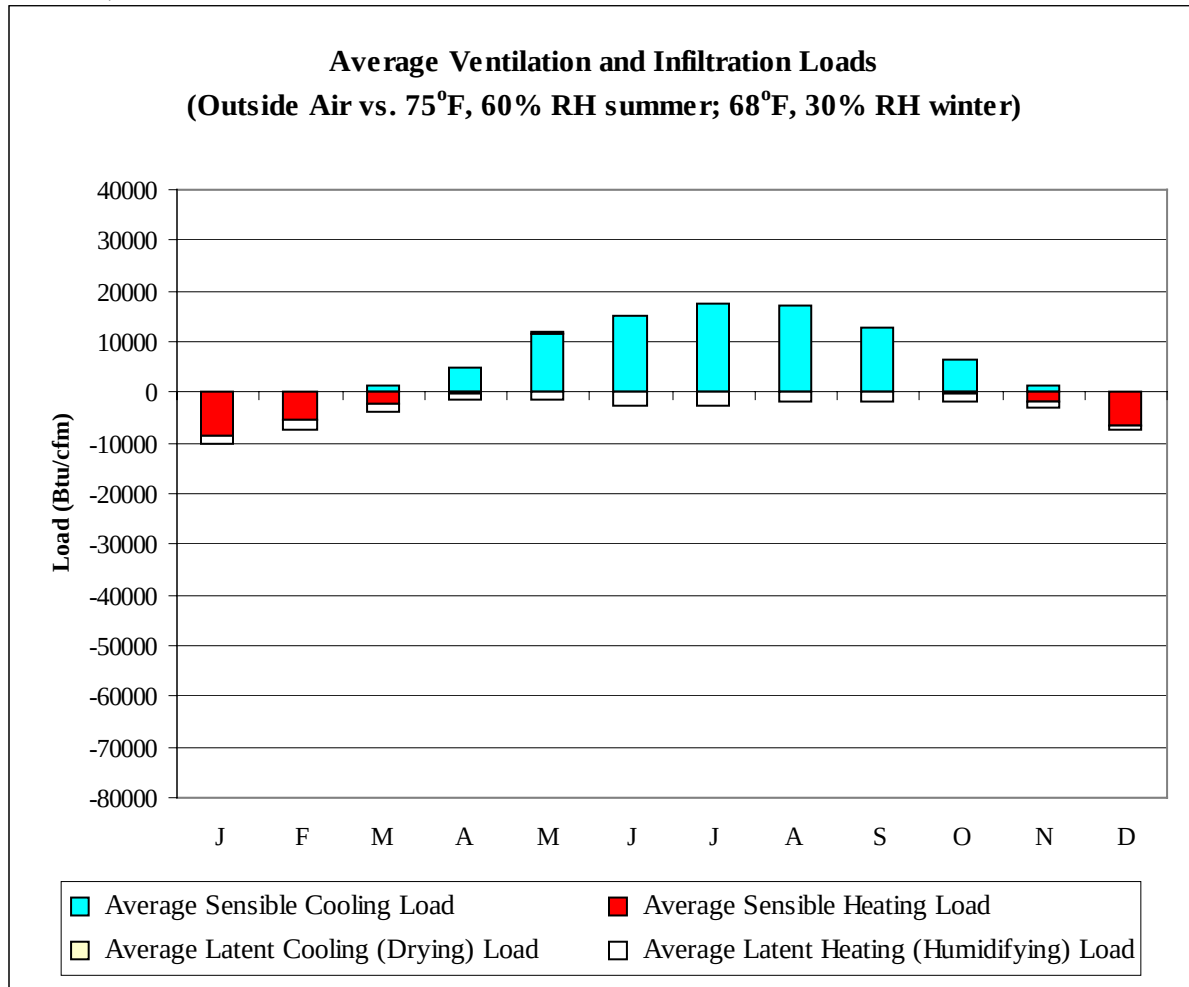
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Long Term Dry Bulb Temperature and Humidity Summary

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	79.0	57.8	67.3	49.2	37.0	79.8	64.3	42.5	28.4
14-Jan	81.0	55.4	67.3	48.9	39.0	70.7	60.8	42.3	28.0
21-Jan	79.0	58.1	67.5	48.5	39.0	70.0	63.9	39.0	25.8
28-Jan	82.0	59.0	67.7	49.4	41.0	66.5	62.8	40.4	26.6
4-Feb	81.0	57.0	68.6	50.3	41.0	74.9	62.5	43.3	27.8
11-Feb	82.0	57.2	70.3	50.6	41.0	79.8	63.6	42.2	25.9
18-Feb	81.0	56.6	71.4	51.5	43.0	74.9	61.9	39.7	24.8
25-Feb	86.0	58.9	74.5	53.9	46.0	85.4	69.0	44.2	26.4
4-Mar	90.0	60.3	75.5	55.0	45.0	80.5	70.3	42.7	25.1
11-Mar	92.0	57.3	78.3	57.8	48.0	75.6	66.4	45.4	26.3
18-Mar	92.0	56.5	80.3	59.7	50.0	80.5	65.8	47.7	27.5
25-Mar	93.0	61.9	81.5	61.4	52.0	97.3	68.8	54.0	31.2
1-Apr	97.0	63.0	81.8	62.6	54.0	86.1	67.9	53.7	31.4
8-Apr	97.0	62.7	85.6	65.2	57.0	86.1	67.1	53.2	30.6
15-Apr	100.0	64.1	88.6	67.8	61.0	91.7	70.9	59.1	34.9
22-Apr	100.0	62.1	92.0	69.9	61.0	91.7	72.0	58.2	33.4
29-Apr	102.0	64.4	92.5	70.5	64.0	104.3	74.5	61.6	33.9
6-May	104.0	64.1	97.1	74.8	68.0	92.4	75.4	57.1	31.3
13-May	104.0	63.9	97.7	75.5	68.0	100.8	.	61.0	33.8
20-May	108.0	64.2	101.3	77.6	73.0	91.7	80.3	51.2	29.6
27-May	109.0	65.6	103.1	79.9	75.0	97.3	82.0	50.6	29.0
3-Jun	110.0	64.6	104.5	81.5	77.0	86.1	95.2	45.8	27.0
10-Jun	111.0	66.9	106.4	82.1	77.0	70.7	92.5	41.1	23.5
17-Jun	111.0	65.8	106.2	81.9	77.0	62.3	101.5	37.2	21.2
24-Jun	109.0	65.2	105.2	80.6	77.0	53.9	94.5	36.1	21.3
1-Jul	111.0	63.7	106.2	81.5	77.0	47.6	93.3	34.8	19.9
8-Jul	111.0	63.7	107.1	82.5	77.0	50.4	95.9	35.7	20.8
15-Jul	111.0	65.0	107.8	84.2	80.0	54.6	98.7	35.3	21.3
22-Jul	113.0	66.5	109.1	85.2	81.0	81.2	94.5	39.0	23.1
29-Jul	113.0	66.6	109.2	85.3	81.0	75.6	100.9	42.8	25.2
5-Aug	111.0	65.6	108.3	84.6	81.0	62.3	98.1	40.4	24.0
12-Aug	113.0	67.4	108.6	84.8	80.0	70.7	92.2	43.7	25.4
19-Aug	111.0	65.7	107.8	84.0	79.0	71.4	90.0	40.1	23.8
26-Aug	111.0	65.7	107.3	82.2	77.0	58.1	101.5	40.2	24.0
2-Sep	109.0	65.1	106.4	81.8	77.0	75.6	92.6	42.9	26.1
9-Sep	109.0	65.1	105.7	81.1	76.0	57.4	90.5	40.2	24.9
16-Sep	108.0	64.5	104.3	79.5	73.0	53.9	90.0	39.9	23.8
23-Sep	106.0	64.3	102.3	77.7	73.0	61.6	90.7	41.4	24.5
30-Sep	104.0	63.3	100.8	75.8	70.0	70.7	86.7	39.5	24.1
7-Oct	102.0	62.7	98.2	73.7	67.0	70.0	82.1	41.8	24.6
14-Oct	100.0	61.5	96.3	72.2	64.0	91.0	74.2	42.4	24.8
21-Oct	99.0	62.7	92.8	69.5	63.0	97.3	74.8	47.3	28.3
28-Oct	95.0	62.3	89.6	66.5	59.0	85.4	71.7	45.0	27.7
4-Nov	93.0	60.5	86.8	65.2	60.0	91.7	73.7	45.4	29.0
11-Nov	91.0	59.6	84.5	63.0	57.0	86.1	70.2	48.2	29.9
18-Nov	90.0	59.8	80.3	59.9	50.0	75.6	71.1	47.8	30.1
25-Nov	86.0	59.0	78.2	57.5	50.0	79.8	67.3	45.4	30.2
2-Dec	84.0	58.5	76.2	56.4	48.0	75.6	65.3	46.6	30.5
9-Dec	82.0	59.1	72.9	53.7	41.0	74.9	67.2	46.5	30.3
16-Dec	81.0	57.9	71.3	52.9	45.0	75.6	63.8	46.5	31.2
23-Dec	79.0	57.4	68.9	50.8	43.0	74.9	60.2	45.6	31.7
31-Dec	81.0	56.6	67.9	49.8	40.0	80.5	64.2	45.4	30.4



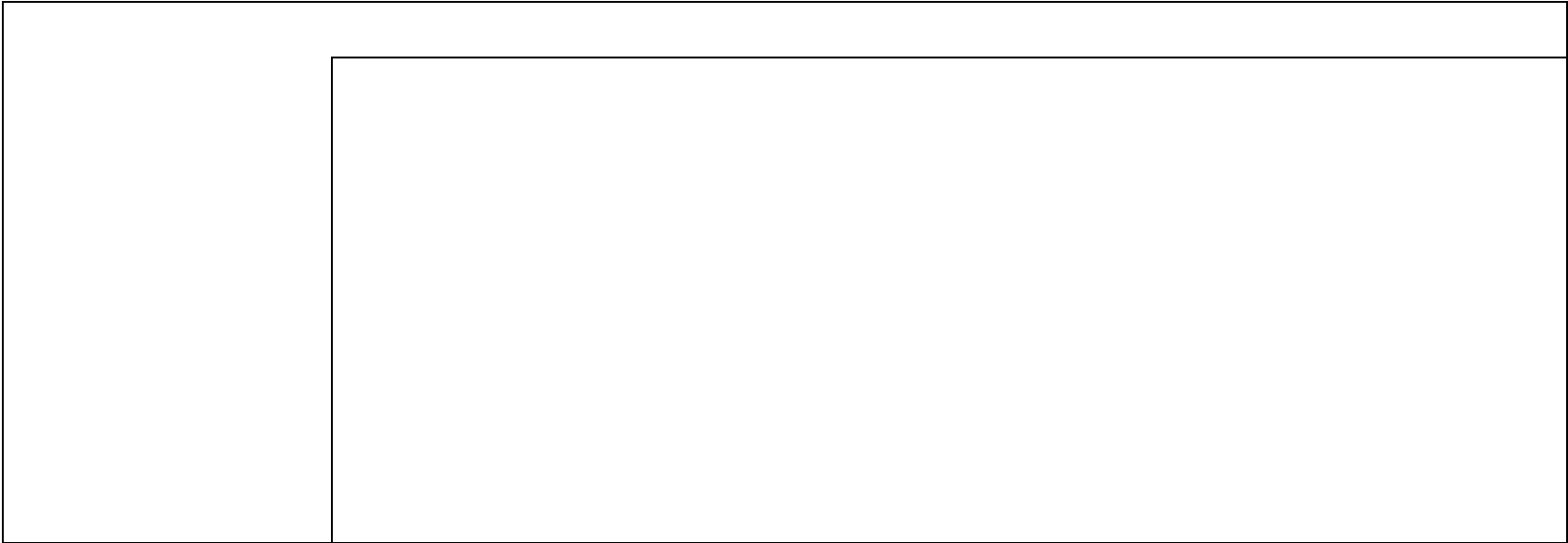
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	30	248
FEB	57	151
MAR	174	55
APR	372	5
MAY	659	0
JUN	763	0
JUL	862	0
AUG	840	0
SEP	695	0
OCT	457	2
NOV	179	44
DEC	53	180
ANN	5142	685



	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	101	-8460	3	-1589
FEB	262	-5453	5	-1897
MAR	1419	-2346	39	-1622
APR	4720	-331	95	-1007
MAY	11740	-5	79	-1275
JUN	14998	0	3	-2552
JUL	17609	0	16	-2557
AUG	16987	0	7	-1767
SEP	12936	-2	16	-1705
OCT	6493	-172	48	-1604
NOV	1371	-1930	12	-1114
DEC	183	-6429	7	-1005
ANN	88819	-25128	330	-19694

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

No Solar Radiation
Data Available

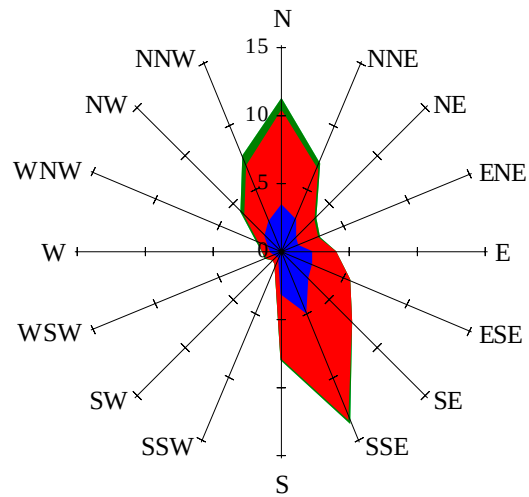


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

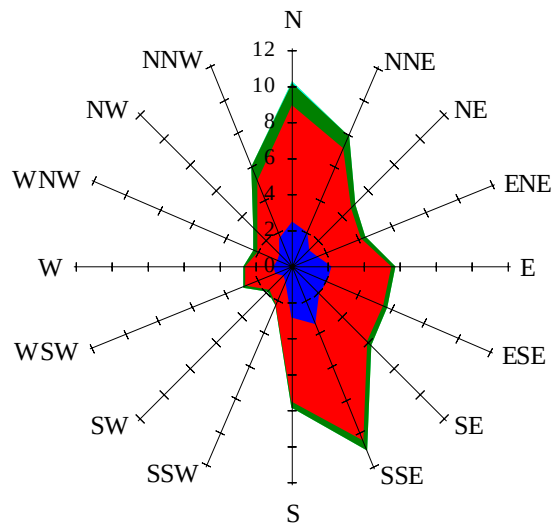
Labels of Percent Frequency on North Axis



Percent Calm = 19.51

Wind Summary - March, April, and May

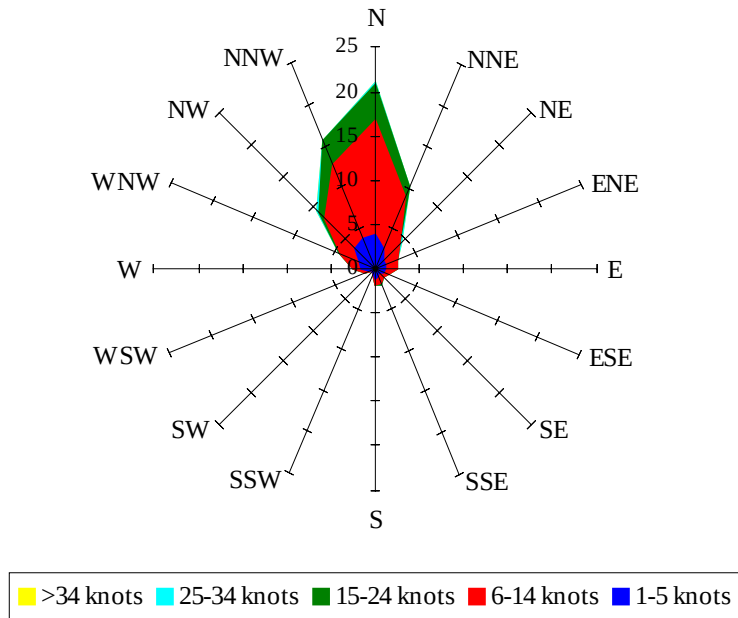
Labels of Percent Frequency on North Axis



Percent Calm = 16.27

Wind Summary - June, July, and August

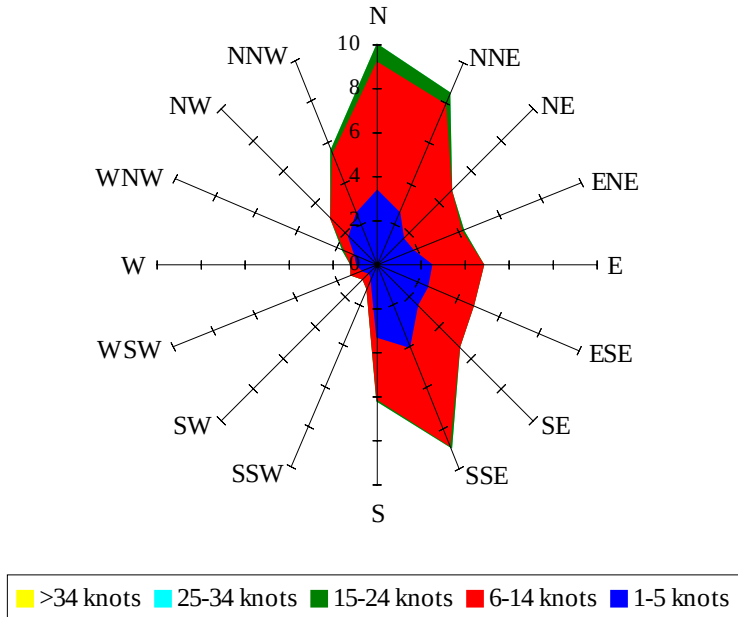
Labels of Percent Frequency on North Axis



Percent Calm = 19.06

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 27.83