

BOMBAY, INDIA

Latitude = 19.12 N

Longitude = 72.85 E

Period of Record = 1973 to 1995

WMO No. 430030

Elevation = 46 feet

Average Pressure = 29.72 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	102	74	88	4.6	NW
0.4% Occurrence	96	74	90	6.1	NW
1.0% Occurrence	94	74	99	5.9	NW
2.0% Occurrence	93	75	104	5.9	NW
Mean Daily Range	13	-	-	-	-
97.5% Occurrence	66	61	71	0.9	E
99.0% Occurrence	63	58	65	0.8	NE
99.6% Occurrence	61	57	61	0.7	NE
Median of Extreme Lows	55	51	49	0.9	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	85	90	170	8.0	W
0.4% Occurrence	82	88	151	7.8	W
1.0% Occurrence	82	88	151	7.8	W
2.0% Occurrence	81	87	148	7.6	W
	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	88	1.19	6.5	WSW
0.4% Occurrence	160	86	1.05	7.2	W
1.0% Occurrence	155	86	1.02	6.6	W
2.0% Occurrence	152	85	1.00	8.0	W
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		209	5426	5253	6906

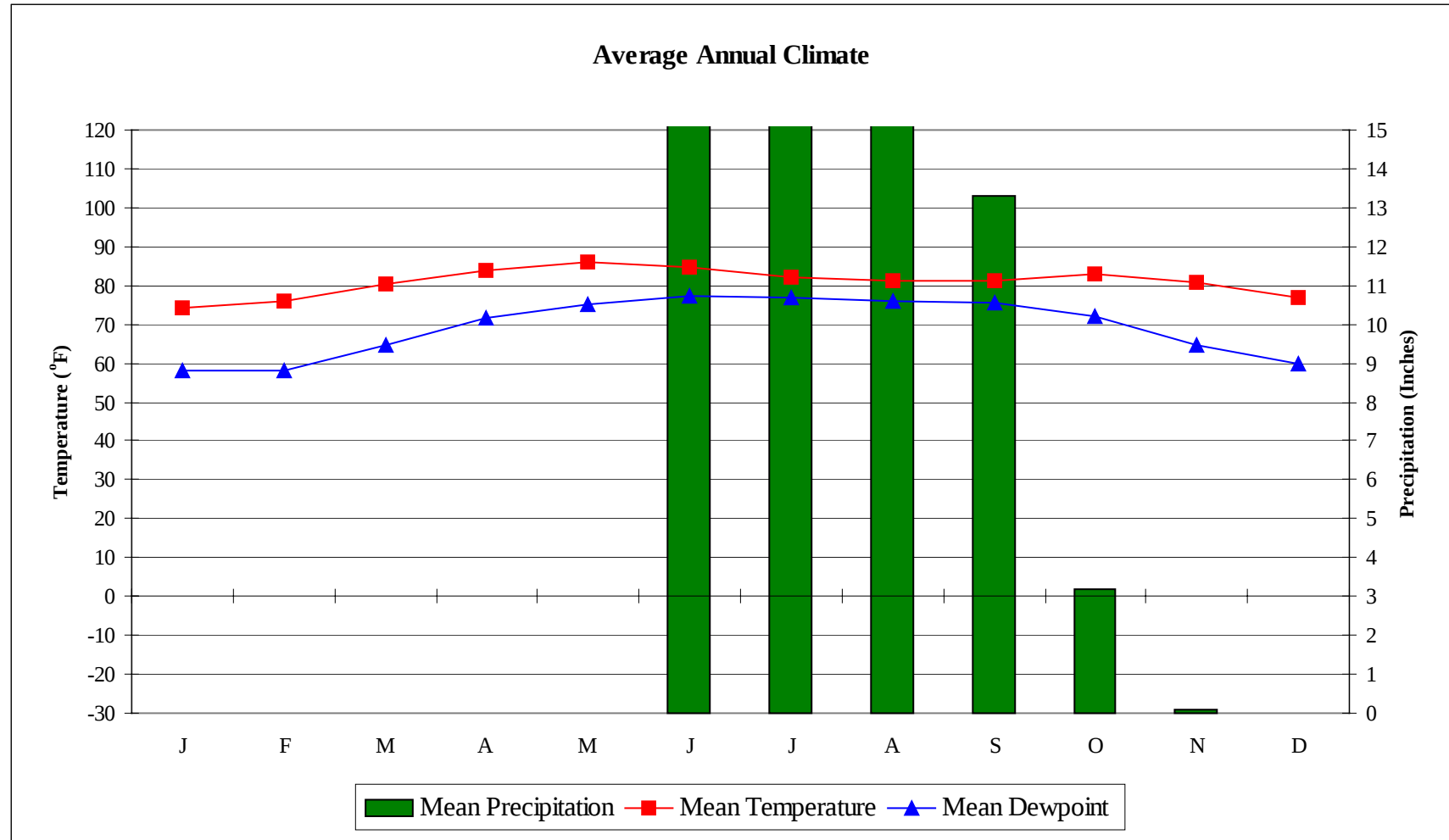
Other Site Data

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	5.1 + 5.1
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 (#)
83.3	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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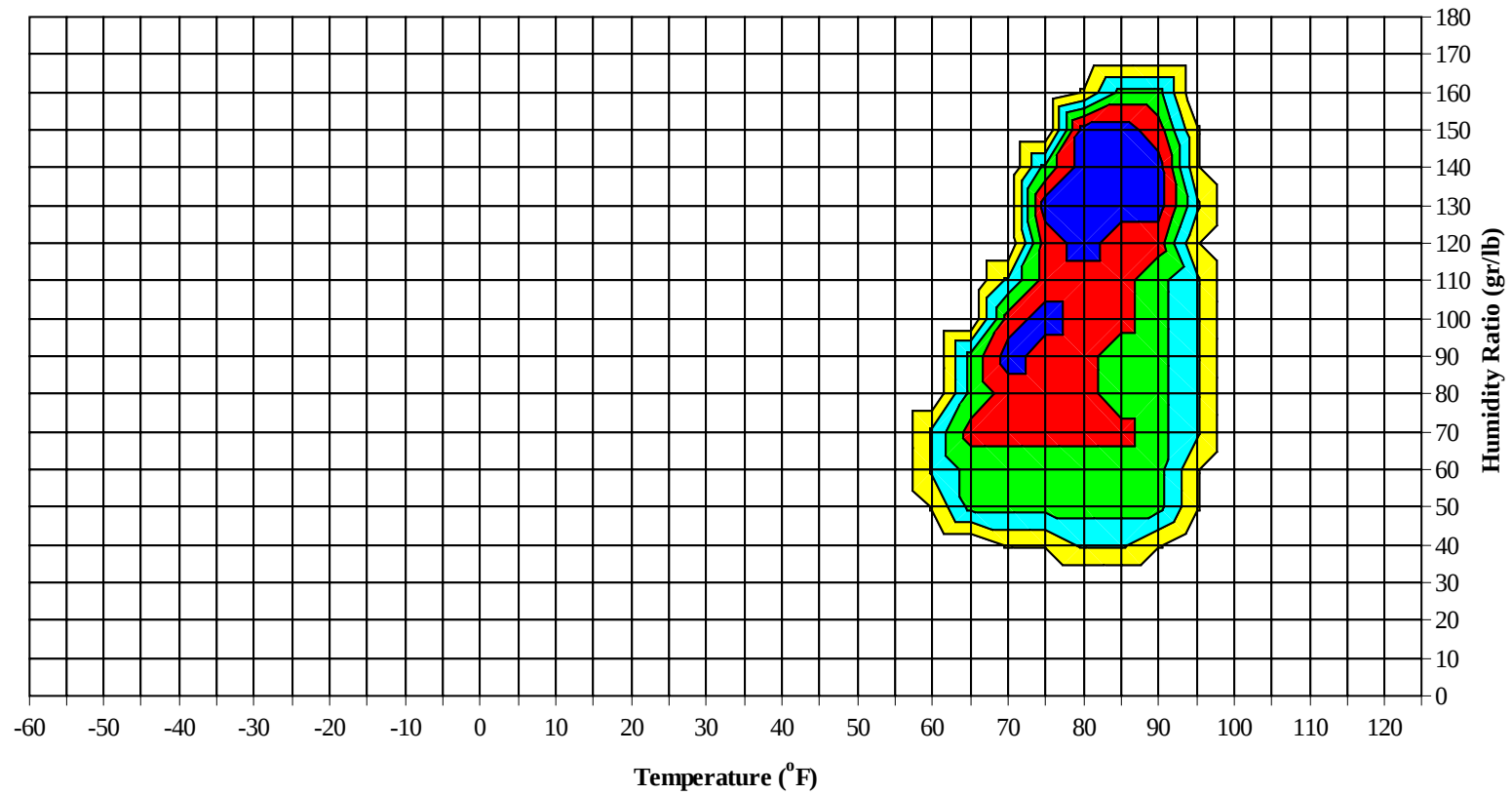
WMO No. 430030



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Long Term Psychrometric Summary

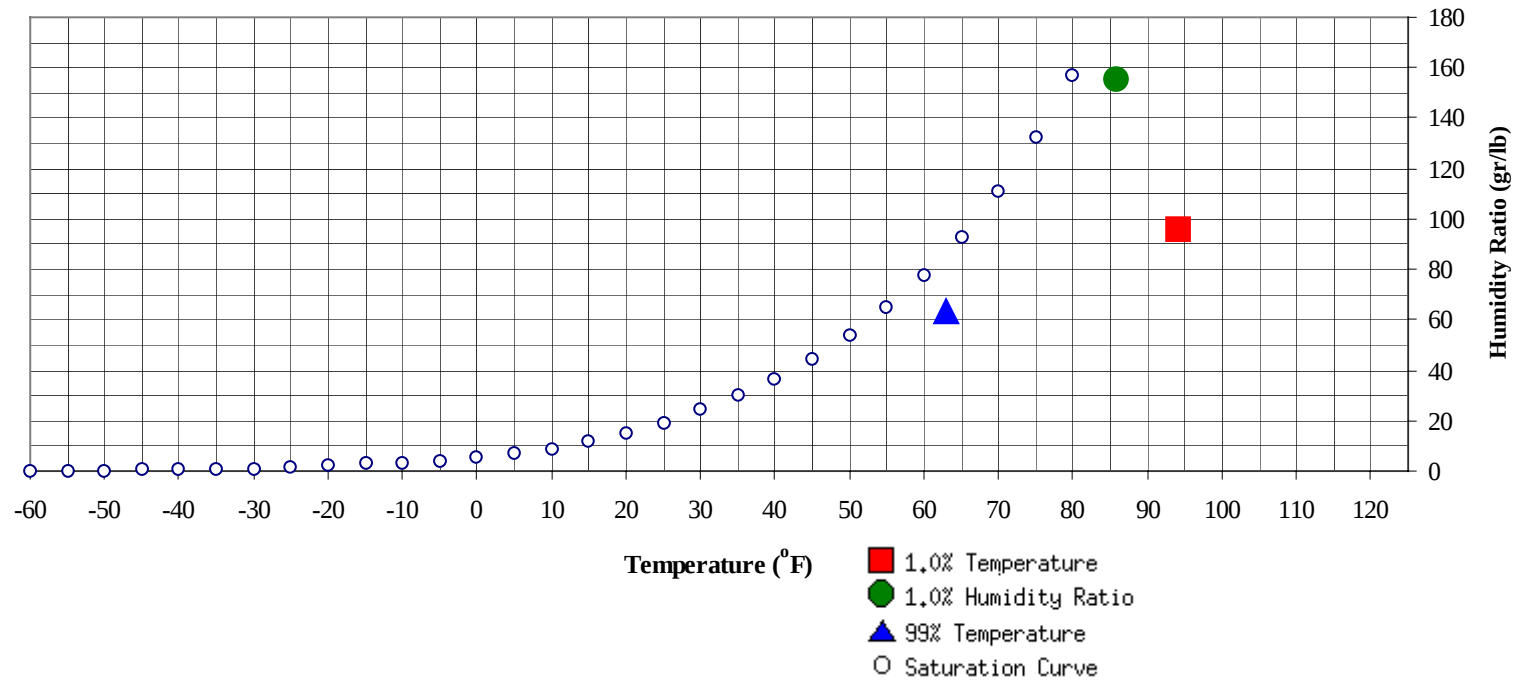


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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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	63	63.3	25.0		155.4	85.9	81.1	79.5	45.0

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	94	95.8	73.9	37.7

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

Period of Record = 1973 to 1995

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												3		3	68.2
95 / 99		1		1	68.1		3		3	67.1		13	1	14	70.5
90 / 94	0	19	0	19	68.8	0	28	2	29	67.7	0	48	12	61	71.3
85 / 89	0	50	11	60	67.9	0	46	17	62	67.7	0	71	39	109	72.3
80 / 84	0	72	47	120	67.0	1	63	50	114	67.2	11	48	83	143	71.2
75 / 79	3	22	76	100	65.8	11	22	76	110	66.4	77	48	87	212	70.2
70 / 74	46	35	81	161	64.3	74	39	63	175	64.4	119	16	24	159	66.8
65 / 69	108	36	28	172	61.4	84	18	15	117	61.2	35	1	2	38	63.1
60 / 64	76	12	5	93	57.9	45	5	3	53	57.5	6		0	6	57.7
55 / 59	16	2		17	53.3	7	0	0	7	52.9					
50 / 54	0			0	48.0	1			1	46.8					

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 = 1973 to 1995

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		0		0											
100 / 104	0	2	0	2	74.0	0	1	0	1	76.2		0	0	0	83.8
95 / 99	0	11	2	12	74.8	0	5	1	6	78.0		2	0	2	81.4
90 / 94	0	71	15	86	77.0	0	126	29	155	79.4	0	65	19	84	80.4
85 / 89	1	91	68	160	76.4	17	99	124	241	78.5	37	101	107	245	79.8
80 / 84	61	58	123	242	75.5	192	16	92	300	77.3	159	53	89	300	78.5
75 / 79	145	8	32	185	73.2	38	1	2	40	74.8	43	20	24	87	76.7
70 / 74	31	0	1	32	69.8	1		0	1	71.0	1	0	1	2	72.1
65 / 69	1		0	1	63.5								0	0	
60 / 64															
55 / 59															
50 / 54															

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

Period of Record = 1973 to 1995

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															
100 / 104	0	0		0	83.5										
95 / 99	0	0	0	0	82.3			0	0	82.0	0	1		1	79.8
90 / 94	0	3	0	3	80.1		2	0	2	78.3	0	10	1	11	79.5
85 / 89	3	82	29	114	79.9	0	58	12	70	79.3	1	87	26	114	78.7
80 / 84	174	127	174	475	78.4	128	138	169	434	77.7	59	104	144	306	77.3
75 / 79	71	36	46	152	76.6	120	49	67	237	76.4	176	39	68	283	75.7
70 / 74	0	0	0	0	72.3	0	1	0	1	70.9	4	0	1	5	71.0
65 / 69			0	0		0	0		0	69.0	0	0	0	0	66.0
60 / 64															
55 / 59															
50 / 54															

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

Period of Record = 1973 to 1995

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						0		0							
100 / 104						0	0	0	76.5						
95 / 99		16	1	17	74.2	7	0	7	73.0		0	0	0	71.5	
90 / 94	0	76	15	90	76.0	0	79	4	83	72.4		35	1	36	69.5
85 / 89	0	63	58	121	77.5	0	64	43	106	71.9	0	80	13	93	68.5
80 / 84	44	72	117	233	76.0	17	37	96	150	72.2	0	43	72	115	68.8
75 / 79	160	21	55	237	73.8	83	38	67	188	69.9	16	31	84	131	67.4
70 / 74	43	0	2	44	68.3	87	14	26	127	65.8	84	44	58	186	64.7
65 / 69	1		0	1	63.1	42	1	4	47	62.1	103	11	18	132	61.7
60 / 64						11	0	0	11	59.7	40	3	2	45	58.6
55 / 59						0			0	56.0	6	0		6	54.6
50 / 54						0			0	53.0	0			0	48.0

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 1995

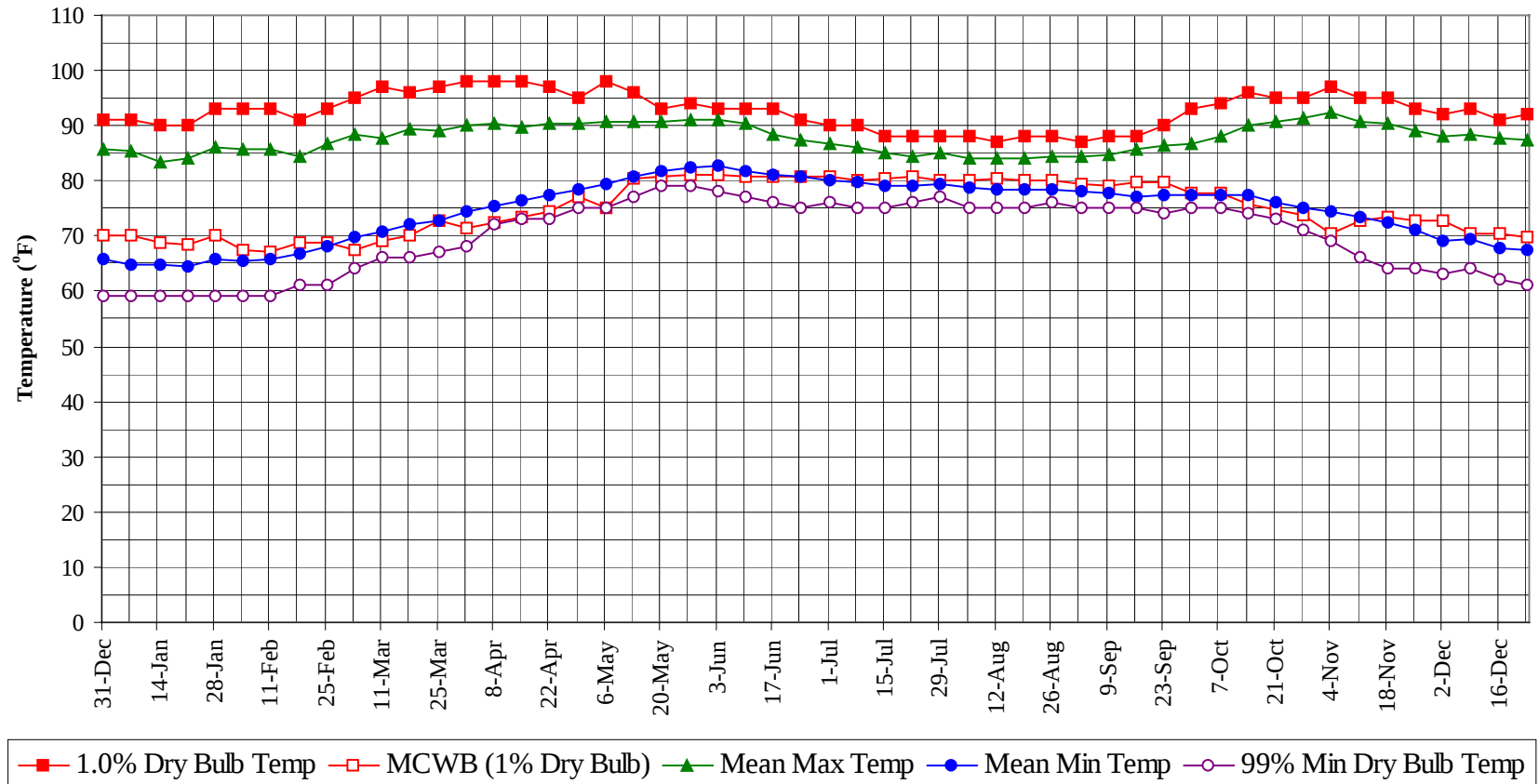
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109	0			0	
100 / 104	1	5	1	8	73.7
95 / 99	1	57	5	64	73.6
90 / 94	3	559	99	661	75.7
85 / 89	61	891	544	1495	76.0
80 / 84	840	829	1251	2920	75.4
75 / 79	943	336	684	1963	72.4
70 / 74	491	152	257	901	65.4
65 / 69	374	67	67	509	61.6
60 / 64	176	21	10	207	58.0
55 / 59	28	3	0	31	53.5
50 / 54	1			1	48.0
		</			

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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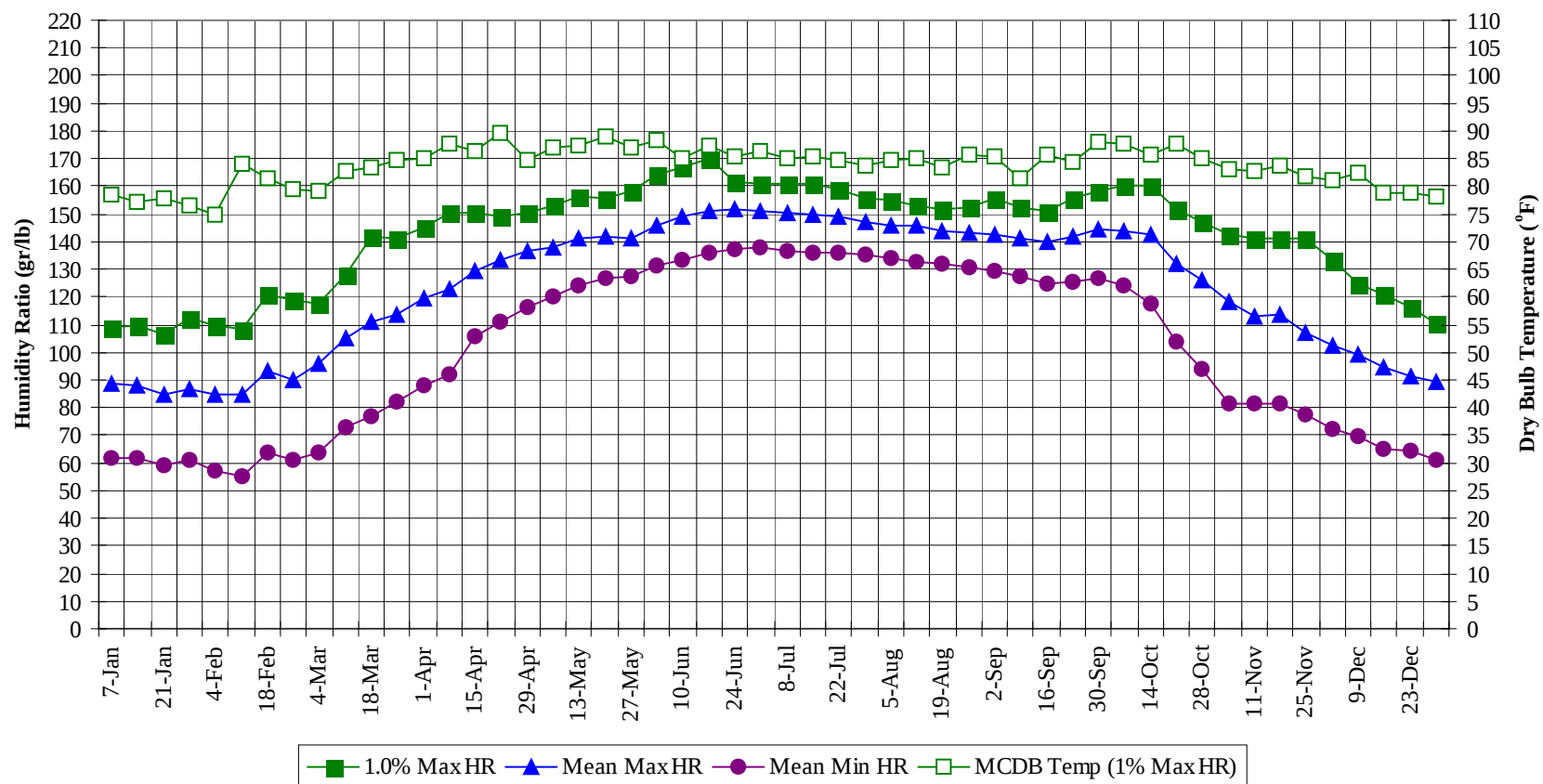
Annual Summary of Temperatures



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Long Term Humidity and Dry Bulb Temperature Summary

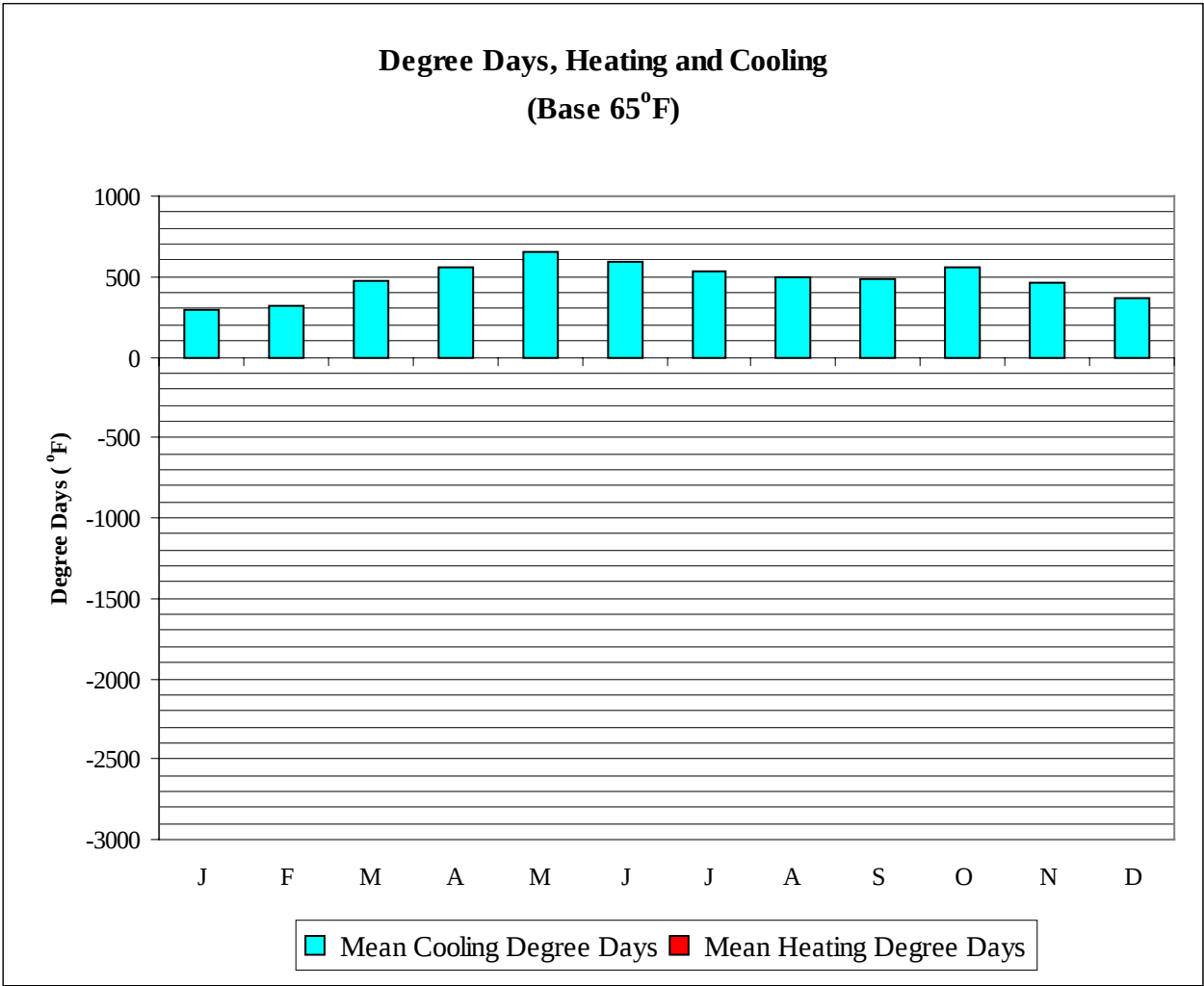


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Long Term Dry Bulb Temperature and Humidity Summary

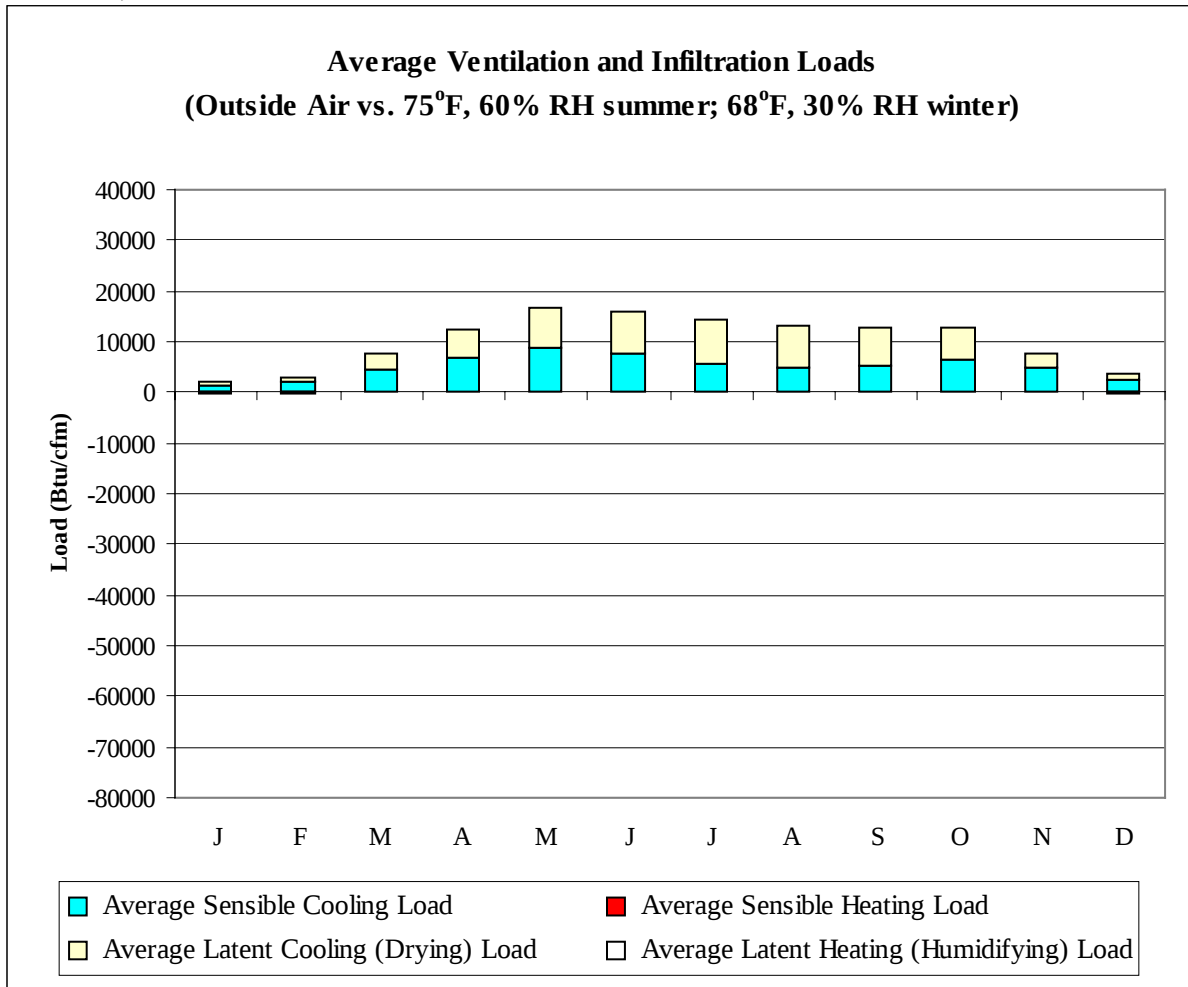
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	91.0	70.2	85.3	64.9	59.0	109.2	78.4	88.8	61.9
14-Jan	90.0	68.9	83.5	64.6	59.0	109.9	77.1	87.9	62.1
21-Jan	90.0	68.5	84.2	64.5	59.0	106.4	77.8	84.9	59.2
28-Jan	93.0	70.0	85.9	65.9	59.0	112.0	76.4	87.0	61.3
4-Feb	93.0	67.4	85.7	65.4	59.0	109.9	74.9	84.8	57.2
11-Feb	93.0	67.2	85.8	65.7	59.0	108.5	84.0	85.0	54.9
18-Feb	91.0	68.6	84.6	66.8	61.0	121.1	81.5	93.2	63.6
25-Feb	93.0	68.8	86.6	68.0	61.0	119.0	79.3	90.1	61.1
4-Mar	95.0	67.4	88.3	69.6	64.0	117.6	79.3	95.9	63.7
11-Mar	97.0	69.0	87.9	70.7	66.0	128.1	82.7	104.9	73.1
18-Mar	96.0	70.0	89.4	72.1	66.0	142.1	83.5	111.2	76.7
25-Mar	97.0	72.8	89.0	72.8	67.0	141.4	84.6	113.6	82.0
1-Apr	98.0	71.5	90.0	74.5	68.0	144.9	85.1	119.6	88.3
8-Apr	98.0	72.4	90.4	75.3	72.0	150.5	87.8	123.1	92.3
15-Apr	98.0	73.6	89.8	76.5	73.0	150.5	86.4	129.4	106.0
22-Apr	97.0	74.6	90.5	77.4	73.0	149.1	89.5	133.5	111.1
29-Apr	95.0	77.0	90.3	78.6	75.0	150.5	84.8	136.5	116.1
6-May	98.0	75.0	90.8	79.4	75.0	153.3	87.0	137.6	120.0
13-May	96.0	80.5	90.9	80.6	77.0	156.1	87.4	141.1	124.0
20-May	93.0	80.6	90.8	81.8	79.0	155.4	89.0	141.8	126.5
27-May	94.0	81.3	91.0	82.4	79.0	158.2	87.0	141.2	127.5
3-Jun	93.0	81.0	91.0	82.7	78.0	164.5	88.3	145.6	131.4
10-Jun	93.0	80.8	90.3	81.9	77.0	166.6	85.0	149.1	133.4
17-Jun	93.0	80.8	88.3	80.9	76.0	170.1	87.5	151.3	136.1
24-Jun	91.0	80.6	87.3	80.9	75.0	161.7	85.3	151.4	137.2
1-Jul	90.0	80.6	86.6	80.2	76.0	161.0	86.4	150.9	137.8
8-Jul	90.0	80.2	86.0	79.8	75.0	161.0	85.1	150.1	136.5
15-Jul	88.0	80.3	85.2	79.2	75.0	161.0	85.3	149.7	135.8
22-Jul	88.0	80.8	84.5	79.1	76.0	158.9	84.7	148.9	136.1
29-Jul	88.0	79.9	85.0	79.4	77.0	155.4	83.7	147.1	135.3
5-Aug	88.0	80.1	84.0	78.9	75.0	154.7	84.7	145.5	133.9
12-Aug	87.0	80.3	84.2	78.5	75.0	153.3	85.1	145.6	132.3
19-Aug	88.0	80.0	84.0	78.4	75.0	151.9	83.3	144.1	132.0
26-Aug	88.0	80.0	84.3	78.5	76.0	152.6	85.6	143.4	130.9
2-Sep	87.0	79.5	84.3	78.0	75.0	155.4	85.3	142.2	129.5
9-Sep	88.0	79.2	84.7	77.9	75.0	152.6	81.3	141.4	127.2
16-Sep	88.0	79.7	85.8	77.1	75.0	151.2	85.7	140.1	124.8
23-Sep	90.0	79.9	86.5	77.4	74.0	155.4	84.5	141.5	125.5
30-Sep	93.0	77.7	86.9	77.6	75.0	158.2	88.0	144.7	126.7
7-Oct	94.0	77.8	88.2	77.6	75.0	160.3	87.6	143.9	124.0
14-Oct	96.0	75.8	90.0	77.6	74.0	160.3	85.7	142.6	117.6
21-Oct	95.0	74.8	90.6	76.0	73.0	151.9	87.6	132.1	104.1
28-Oct	95.0	73.6	91.5	75.0	71.0	147.0	85.0	125.8	93.8
4-Nov	97.0	70.6	92.2	74.4	69.0	142.8	82.9	118.2	81.4
11-Nov	95.0	72.9	90.7	73.5	66.0	141.4	82.9	113.3	81.3
18-Nov	95.0	73.5	90.5	72.6	64.0	141.4	83.9	113.6	81.3
25-Nov	93.0	72.8	89.0	71.1	64.0	141.4	81.9	106.9	77.4
2-Dec	92.0	72.8	88.2	69.0	63.0	133.0	81.1	102.5	72.3
9-Dec	93.0	70.5	88.3	69.3	64.0	124.6	82.4	99.5	69.4
16-Dec	91.0	70.5	87.6	67.7	62.0	121.1	78.9	94.4	64.7
23-Dec	92.0	69.7	87.5	67.4	61.0	116.2	78.8	91.4	64.4
31-Dec	91.0	70.3	85.6	65.9	59.0	110.6	78.1	89.0	61.2



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	293	3
FEB	314	1
MAR	475	0
APR	559	0
MAY	652	0
JUN	588	0
JUL	527	0
AUG	497	0
SEP	488	0
OCT	554	0
NOV	466	0
DEC	364	1
ANN	5776	5

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	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	1486	-237	596	-5
FEB	1989	-113	791	-5
MAR	4643	-11	2821	-2
APR	6720	0	5740	0
MAY	8910	0	7702	0
JUN	7579	0	8508	0
JUL	5752	0	8764	0
AUG	5006	0	8301	0
SEP	5095	0	7682	0
OCT	6620	0	6142	0
NOV	4825	-22	2678	0
DEC	2638	-109	1039	-1
ANN	61263	-492	60764	-13

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

No Solar Radiation
Data Available

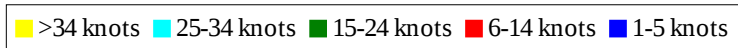
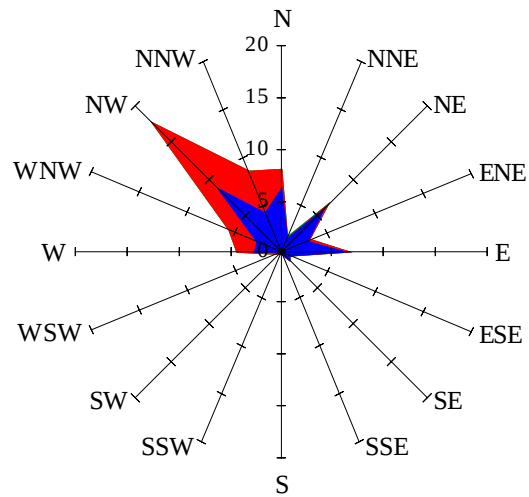


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

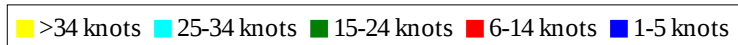
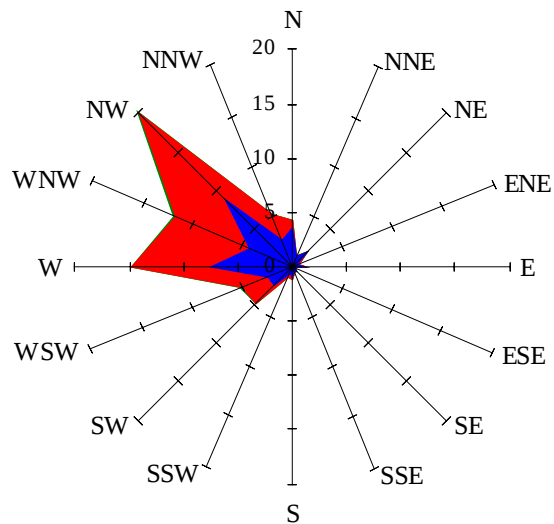
Labels of Percent Frequency on North Axis



Percent Calm = 35.30

Wind Summary - March, April, and May

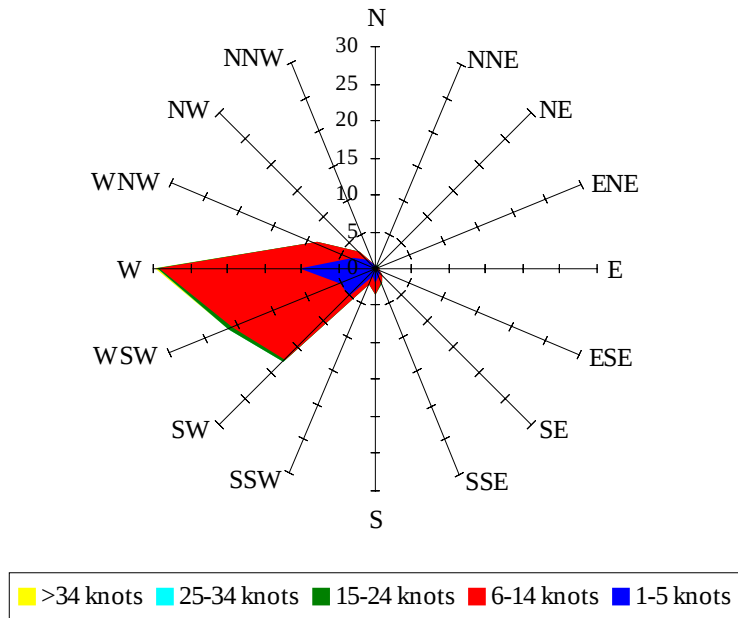
Labels of Percent Frequency on North Axis



Percent Calm = 26.75

Wind Summary - June, July, and August

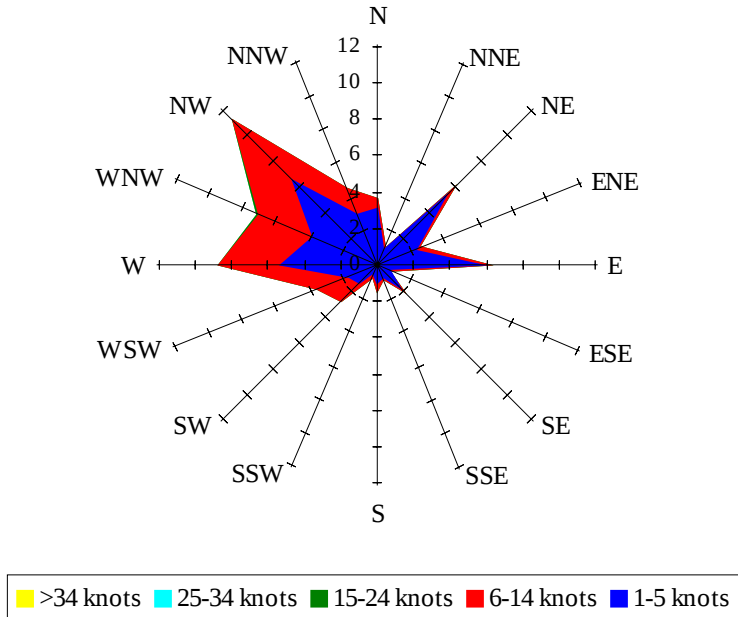
Labels of Percent Frequency on North Axis



Percent Calm = 9.91

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 37.55