

CALCUTTA, INDIA

Latitude = 22.65 N

Longitude = 88.45 E

Period of Record = 1973 to 1996

WMO No. 428090

Elevation = 20 feet

Average Pressure = 29.69 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	103	77	100	3.8	SW
0.4% Occurrence	100	79	121	5.4	S
1.0% Occurrence	98	80	126	5.6	S
2.0% Occurrence	96	80	132	6.1	S
Mean Daily Range	15	-	-	-	-
97.5% Occurrence	57	55	61	0.6	N
99.0% Occurrence	54	53	57	0.4	N
99.6% Occurrence	52	51	52	0.4	N
Median of Extreme Lows	50	49	49	0.2	N
	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	87	94	182	8.0	S
0.4% Occurrence	86	93	174	7.2	S
1.0% Occurrence	85	92	169	6.6	S
2.0% Occurrence	84	91	166	6.2	S
	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	190	90	1.24	5.8	E
0.4% Occurrence	181	90	1.18	9.4	S
1.0% Occurrence	172	89	1.12	6.9	S
2.0% Occurrence	171	89	1.12	6.8	S
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		508	4976	5171	6321

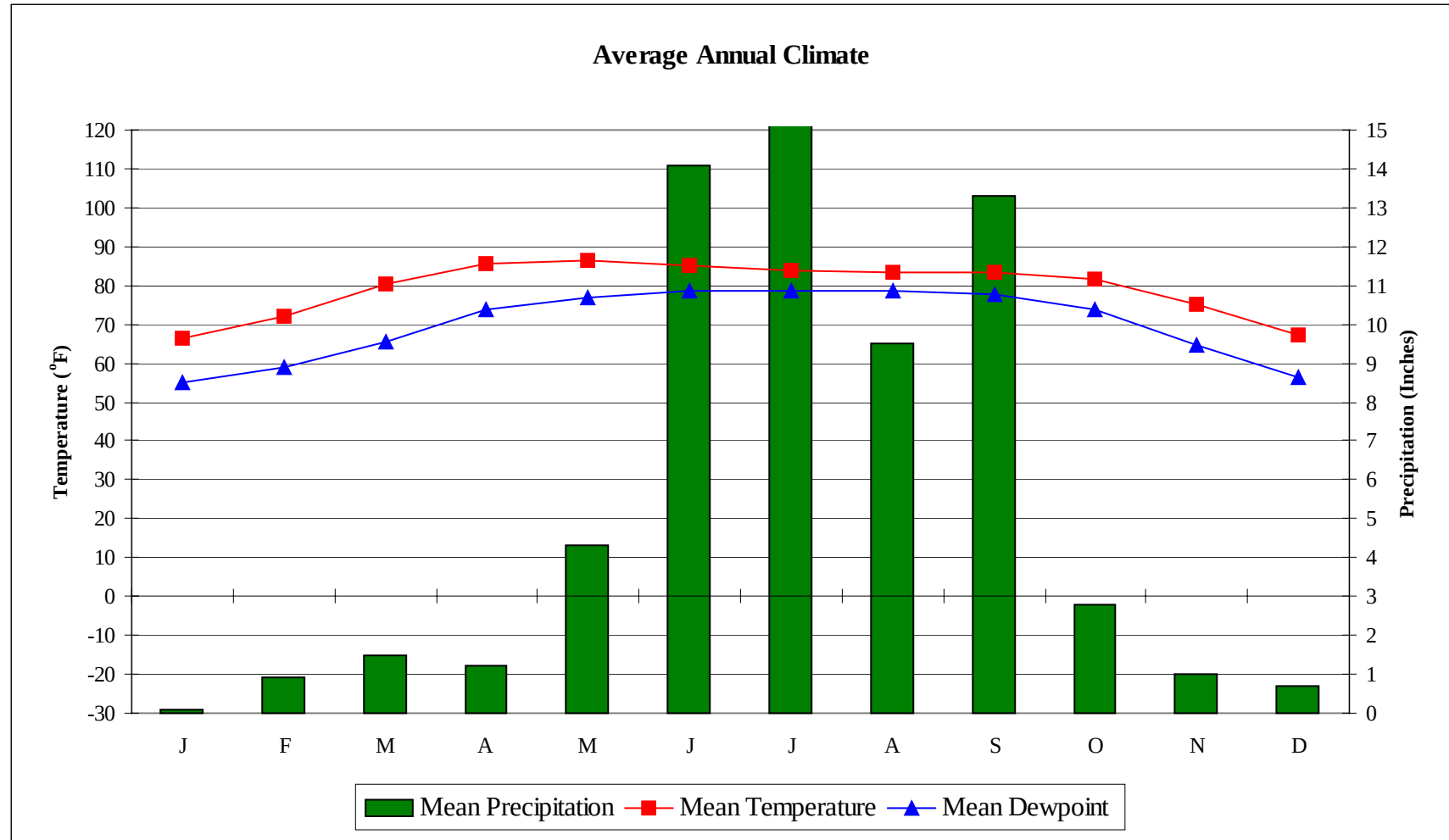
Other Site Data

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	6.5 + 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 (#)
81.7	N/A	N/A	0

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

CALCUTTA, INDIA

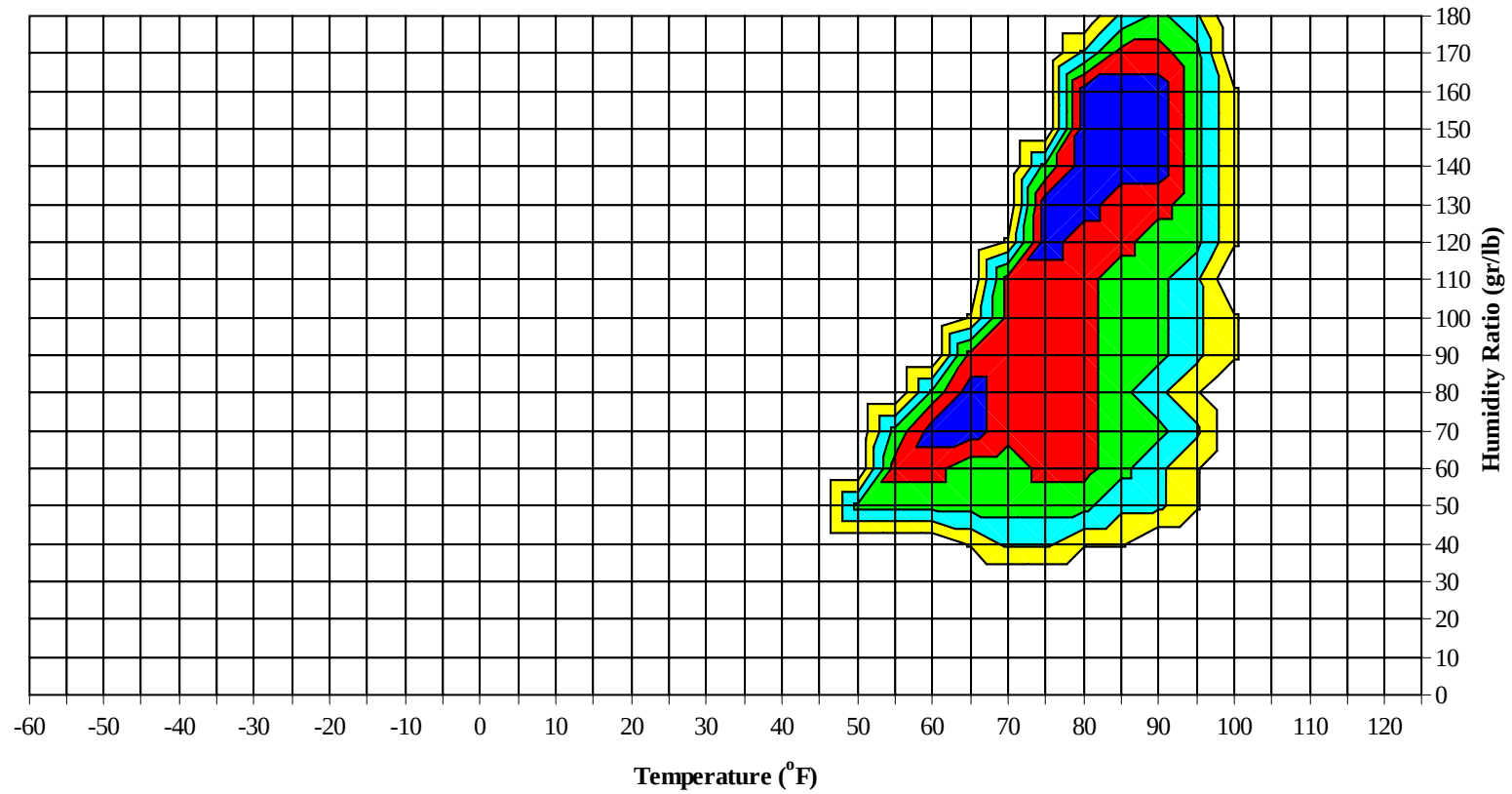
WMO No. 428090



CALCUTTA, INDIA

WMO No. 428090

Long Term Psychrometric Summary

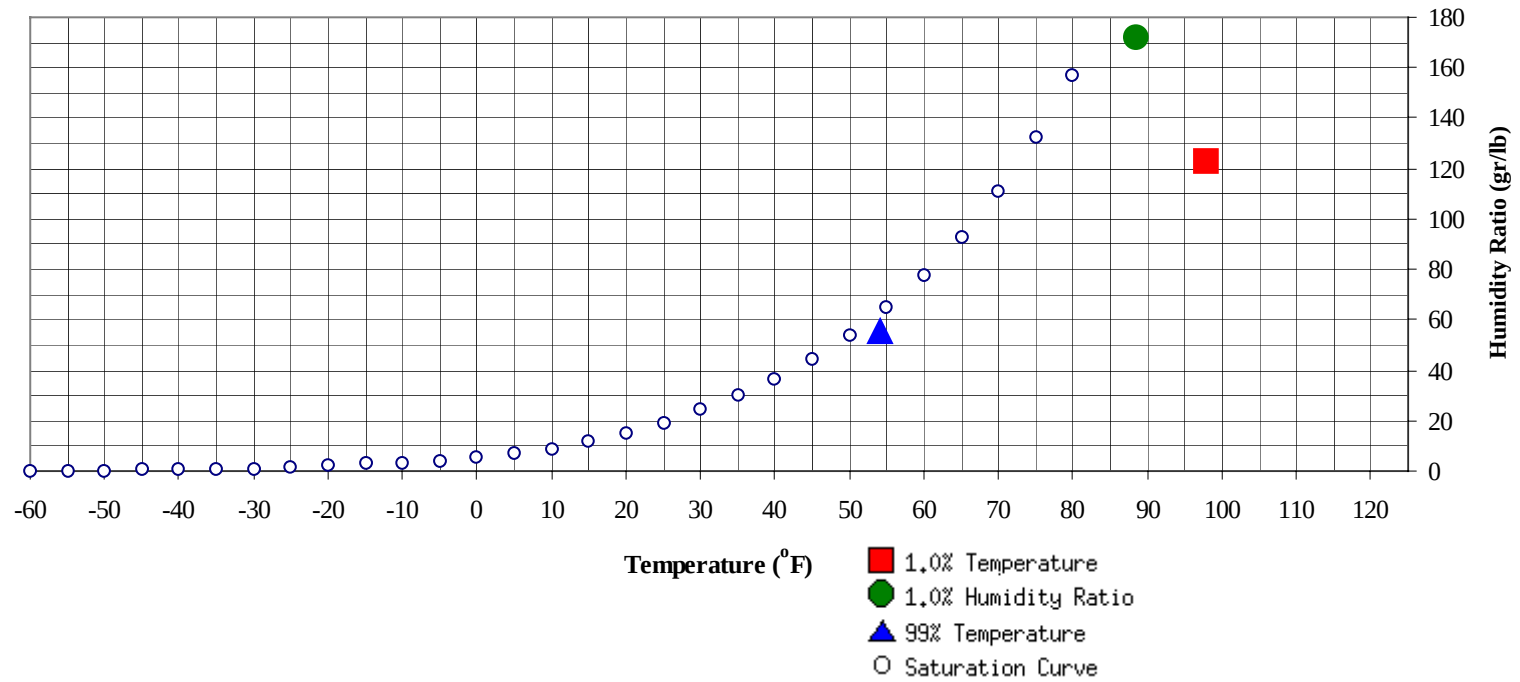


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

CALCUTTA, INDIA

WMO No. 428090

Psychrometric Summary of Peak Design Values



	(°F)	MCHR	Enthalpy	1.0% Humidity Ratio	(gr/lb)	MCDB	MCWB	MC Dewpt	Enthalpy
		(gr/lb)	(btu/lb)			(°F)	(°F)	(°F)	(btu/lb)
99% Dry Bulb	54	55.7	21.6	Ratio	172.2	88.6	83.9	82.4	48.3

1.0% Dry Bulb	(°F)	MCHR	MCWB	Enthalpy
		(gr/lb)	(°F)	(btu/lb)
98	123.2	79.2	43.0	

CALCUTTA, INDIA

WMO No. 428090

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		
105 / 109															
100 / 104												2	0	2	73.6
95 / 99							0		0	69.5	0	28	3	31	73.3
90 / 94							9	2	10	69.7	0	63	26	89	72.9
85 / 89		3	0	3	67.4	0	30	7	37	68.9	0	55	33	89	71.4
80 / 84		30	3	32	66.3	0	61	26	87	67.0	8	55	62	126	72.4
75 / 79	0	85	20	105	63.4	3	51	47	102	66.0	83	32	64	179	71.5
70 / 74	3	51	60	113	61.7	29	41	58	128	65.3	81	11	45	137	67.9
65 / 69	14	36	47	97	61.2	62	24	46	132	62.7	50	2	12	64	64.1
60 / 64	65	38	69	172	58.8	80	7	30	117	59.5	22	0	3	24	60.5
55 / 59	100	7	44	150	55.0	41	1	7	48	55.4	4		0	4	56.0
50 / 54	64	0	5	69	51.1	10	0	1	11	50.9					
45 / 49	3	0	0	3	47.6	0			0	45.7					
40 / 44															

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.

CALCUTTA, INDIA

WMO No. 428090

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		
105 / 109		1		1	73.7		1	0	1	73.8		1	0	1	78.0
100 / 104		13	0	13	76.8		12	2	13	80.0		3	0	3	82.6
95 / 99	0	63	13	75	78.4		62	11	73	82.4	0	28	4	32	83.4
90 / 94	0	75	39	114	79.1	1	97	48	146	81.8	0	85	29	114	82.6
85 / 89	1	60	46	107	78.6	25	50	73	147	80.7	17	72	67	156	81.4
80 / 84	107	21	102	230	77.5	134	20	70	224	78.8	174	42	115	331	79.6
75 / 79	101	6	29	136	74.1	69	5	34	109	74.4	49	10	24	83	76.5
70 / 74	28	1	11	40	69.7	17	2	10	29	70.7	0		1	1	72.4
65 / 69	3	0	2	4	66.5	1	0	1	2	67.3					
60 / 64	0		0	0	59.5										
55 / 59															
50 / 54															
45 / 49															
40 / 44															

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CALCUTTA, INDIA

WMO No. 428090

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		
105 / 109															
100 / 104		0		0	84.0										
95 / 99	0	5	1	5	84.1		2	0	2	82.7		2	0	2	82.0
90 / 94	0	59	10	69	82.3		53	5	59	82.1	0	70	4	74	81.1
85 / 89	3	109	55	166	81.1	1	111	47	160	81.1	1	89	42	133	80.6
80 / 84	180	66	158	404	79.6	190	70	177	437	79.6	148	61	158	367	79.3
75 / 79	66	9	25	99	77.2	56	12	19	86	77.1	90	18	34	143	76.9
70 / 74	0	0	0	0	72.3	1	0	0	1	71.4	0	0	1	1	68.5
65 / 69	0		0	0			0		0			0	0	0	
60 / 64	0			0									0	0	
55 / 59															
50 / 54															
45 / 49															
40 / 44															

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CALCUTTA, INDIA

WMO No. 428090

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		
105 / 109															
100 / 104															
95 / 99		0		0	78.0										
90 / 94	0	62	2	63	78.2		8		8	75.6					
85 / 89	0	101	28	129	77.0	0	56	3	58	72.0	0	2		2	69.5
80 / 84	42	64	116	223	77.0	1	95	36	133	70.2	0	42	0	42	65.9
75 / 79	141	20	90	251	74.9	24	48	76	149	70.2	0	96	17	113	63.6
70 / 74	61	1	12	74	70.4	73	29	76	178	67.8	4	43	66	113	63.1
65 / 69	4	0	0	4	66.6	75	4	35	114	64.4	18	38	53	108	61.9
60 / 64						56	0	12	68	60.6	78	26	77	181	59.3
55 / 59						11		1	12	56.8	111	1	33	145	55.4
50 / 54											36	0	2	38	51.7
45 / 49											1	0	0	1	47.2
40 / 44													0	0	41.0

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WMO No. 428090

Period of Record = 1973 to 1996

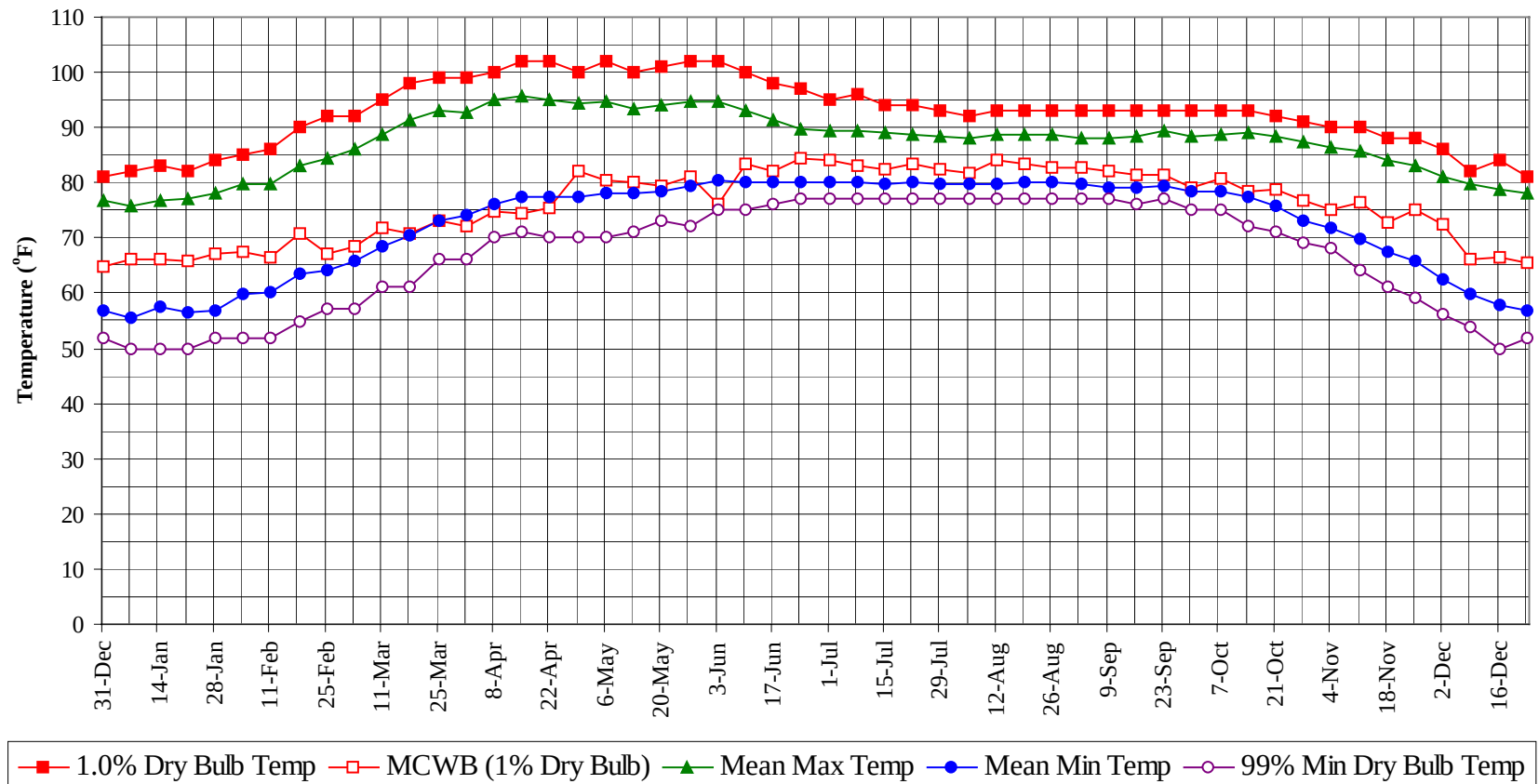
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109		3	0	3	74.8
100 / 104		29	3	32	78.6
95 / 99	1	189	31	221	79.9
90 / 94	4	579	165	748	79.9
85 / 89	51	735	399	1185	78.7
80 / 84	999	625	1028	2652	77.3
75 / 79	688	394	482	1564	71.9
70 / 74	296	179	337	812	66.1
65 / 69	220	106	194	520	62.8
60 / 64	293	71	191	555	59.4
55 / 59	256	9	83	348	55.3
50 / 54	105	1	8	114	51.3
45 / 49	5	0	0	5	47.3
40 / 44			0	0	41.0

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CALCUTTA, INDIA

WMO No. 428090

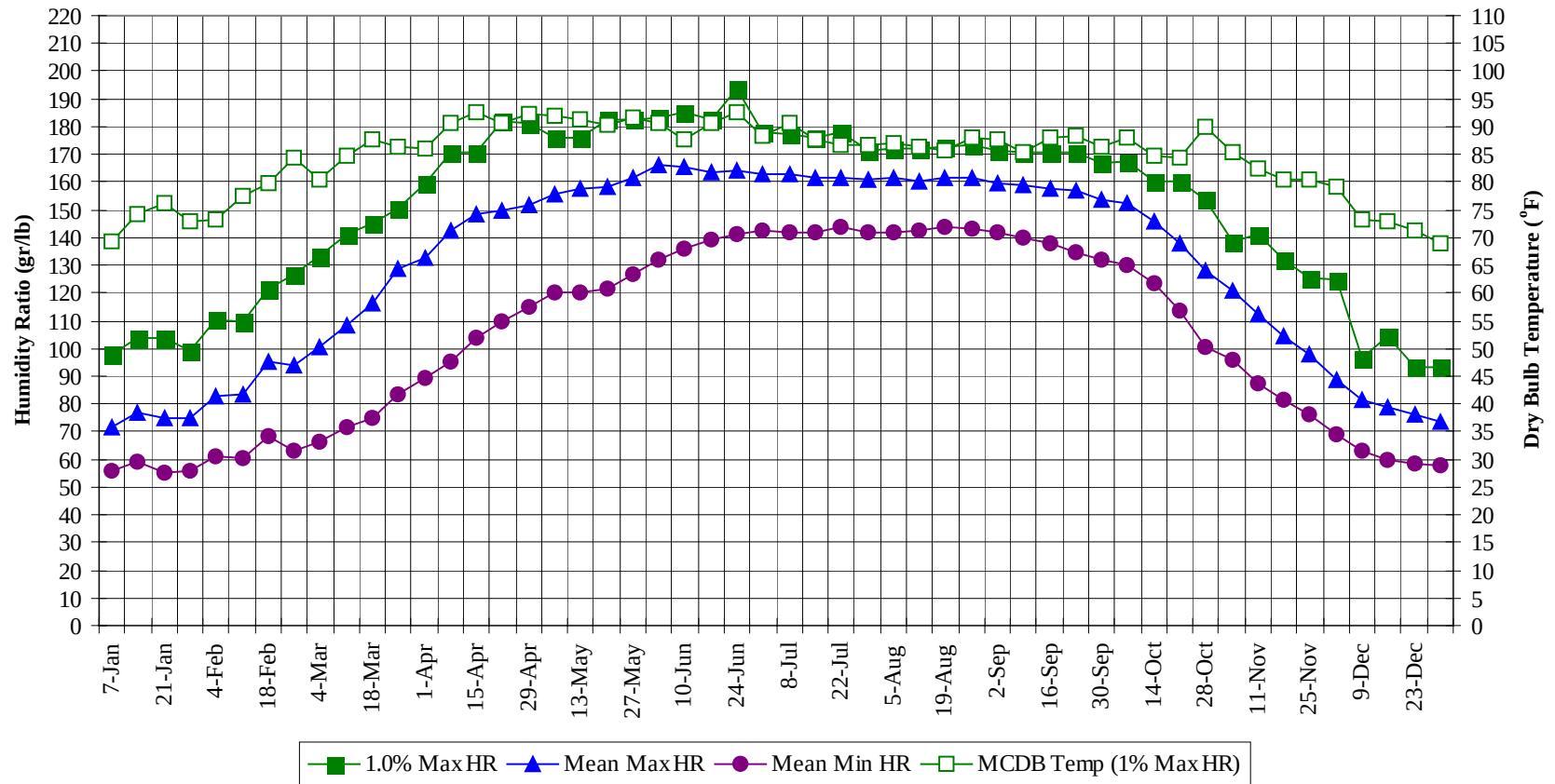
Annual Summary of Temperatures



CALCUTTA, INDIA

WMO No. 428090

Long Term Humidity and Dry Bulb Temperature Summary



CALCUTTA, INDIA

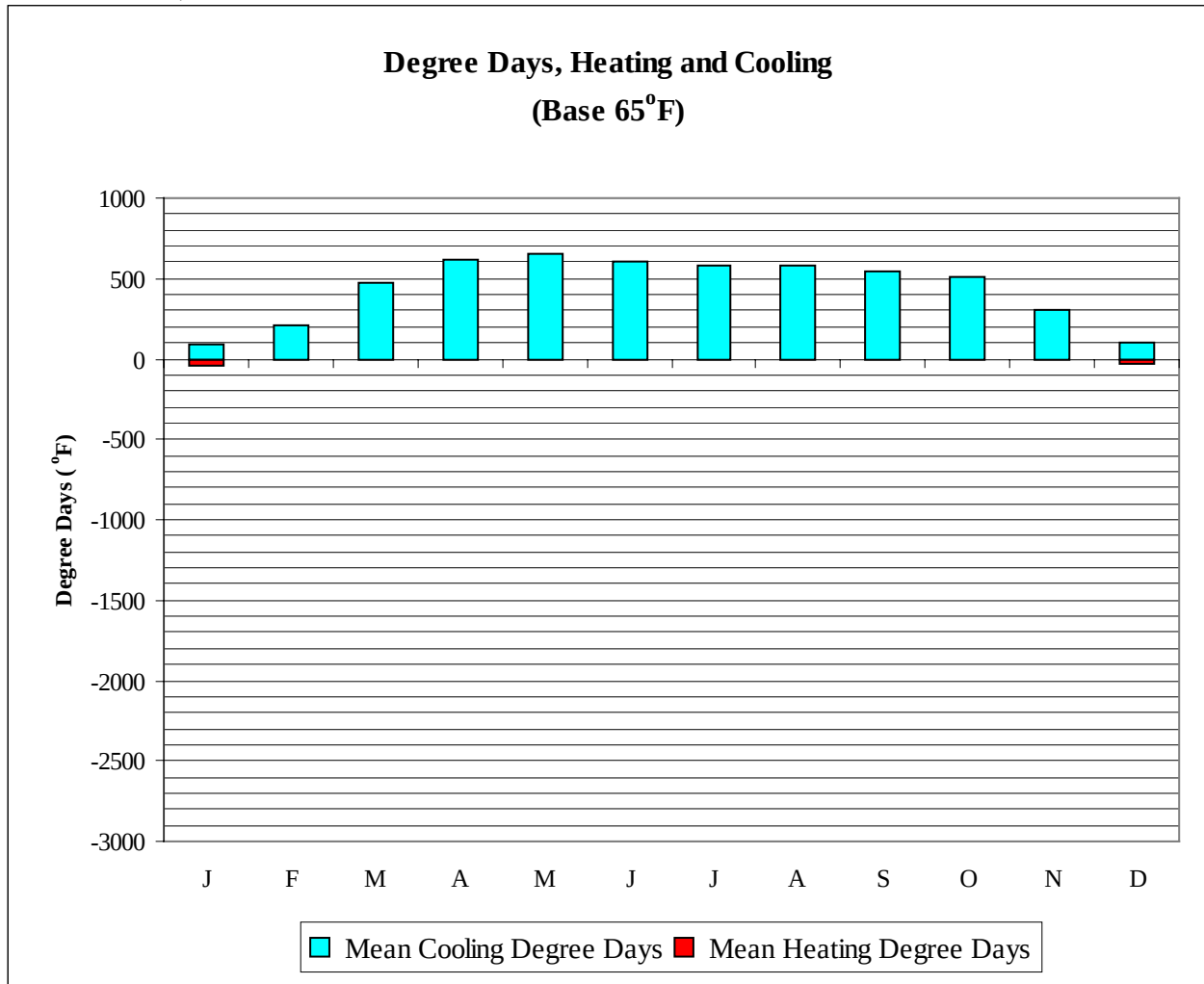
WMO No. 428090

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	82.0	66.2	75.8	55.6	50.0	98.0	69.3	71.5	55.5
14-Jan	83.0	66.0	76.9	57.3	50.0	103.6	74.1	76.5	58.9
21-Jan	82.0	65.8	77.1	56.5	50.0	103.6	76.1	74.8	55.2
28-Jan	84.0	67.0	78.2	56.7	52.0	99.4	72.8	75.1	55.6
4-Feb	85.0	67.6	79.6	59.8	52.0	110.6	73.2	82.7	60.8
11-Feb	86.0	66.6	79.9	60.2	52.0	109.9	77.6	83.2	60.5
18-Feb	90.0	70.7	83.0	63.6	55.0	121.8	79.7	95.5	68.4
25-Feb	92.0	67.0	84.5	64.3	57.0	126.7	84.5	94.0	62.8
4-Mar	92.0	68.5	86.2	65.8	57.0	133.0	80.5	100.3	66.5
11-Mar	95.0	71.7	88.6	68.6	61.0	141.4	84.8	108.5	71.7
18-Mar	98.0	70.9	91.5	70.5	61.0	144.9	87.8	116.3	75.1
25-Mar	99.0	73.0	93.1	73.3	66.0	150.5	86.4	128.9	83.6
1-Apr	99.0	72.1	92.7	74.1	66.0	159.6	86.0	132.7	89.0
8-Apr	100.0	74.8	95.2	76.3	70.0	170.8	90.7	142.8	94.9
15-Apr	102.0	74.4	95.8	77.6	71.0	170.8	92.7	148.2	104.0
22-Apr	102.0	75.4	95.0	77.5	70.0	182.0	90.6	149.4	109.4
29-Apr	100.0	82.1	94.3	77.6	70.0	181.3	92.3	151.5	115.1
6-May	102.0	80.4	94.7	78.1	70.0	175.7	92.0	155.6	120.4
13-May	100.0	80.0	93.5	78.0	71.0	175.7	91.3	157.4	120.0
20-May	101.0	79.3	93.9	78.4	73.0	182.7	90.2	158.4	121.5
27-May	102.0	81.2	94.8	79.4	72.0	182.7	91.7	161.4	126.5
3-Jun	102.0	76.3	94.6	80.5	75.0	183.4	90.7	166.1	132.2
10-Jun	100.0	83.5	93.1	80.1	75.0	185.5	87.7	165.8	135.7
17-Jun	98.0	82.3	91.2	80.2	76.0	182.7	90.7	163.3	139.5
24-Jun	97.0	84.4	89.7	80.0	77.0	193.9	92.7	164.5	141.1
1-Jul	95.0	84.2	89.2	80.0	77.0	177.8	88.2	163.0	142.7
8-Jul	96.0	83.0	89.5	79.9	77.0	177.1	90.5	162.6	141.7
15-Jul	94.0	82.6	89.0	79.9	77.0	175.7	87.6	161.5	141.7
22-Jul	94.0	83.3	88.6	79.9	77.0	177.8	86.8	161.9	143.8
29-Jul	93.0	82.5	88.2	79.9	77.0	171.5	86.8	160.7	141.8
5-Aug	92.0	81.9	88.1	79.7	77.0	172.2	87.1	161.4	142.1
12-Aug	93.0	84.0	88.7	79.8	77.0	172.2	86.5	160.0	142.3
19-Aug	93.0	83.4	88.6	80.0	77.0	172.9	85.7	161.2	144.0
26-Aug	93.0	82.6	88.8	80.1	77.0	173.6	88.0	161.7	143.1
2-Sep	93.0	82.6	88.2	79.7	77.0	171.5	87.7	159.8	142.0
9-Sep	93.0	82.0	88.2	79.2	77.0	170.8	85.5	159.2	139.8
16-Sep	93.0	81.6	88.3	79.2	76.0	170.8	87.9	157.5	137.7
23-Sep	93.0	81.6	89.5	79.3	77.0	170.8	88.3	157.0	134.9
30-Sep	93.0	79.2	88.5	78.6	75.0	166.6	86.4	153.9	131.9
7-Oct	93.0	80.7	88.9	78.3	75.0	167.3	88.0	152.6	130.0
14-Oct	93.0	78.3	89.0	77.3	72.0	160.3	84.8	146.1	123.7
21-Oct	92.0	78.9	88.5	75.7	71.0	160.3	84.3	137.7	113.5
28-Oct	91.0	76.9	87.6	73.2	69.0	154.0	90.0	127.7	100.5
4-Nov	90.0	75.3	86.5	71.9	68.0	138.6	85.5	121.0	95.7
11-Nov	90.0	76.3	85.6	69.8	64.0	141.4	82.5	112.6	87.0
18-Nov	88.0	72.7	84.2	67.4	61.0	132.3	80.4	104.6	81.7
25-Nov	88.0	75.0	83.1	65.9	59.0	125.3	80.6	97.9	76.5
2-Dec	86.0	72.6	81.0	62.4	56.0	124.6	79.2	88.9	68.8
9-Dec	82.0	66.3	79.8	59.9	54.0	96.6	73.3	81.4	63.2
16-Dec	84.0	66.6	78.9	58.0	50.0	104.3	72.8	79.0	59.9
23-Dec	81.0	65.5	78.1	56.9	52.0	93.1	71.4	75.9	58.4
31-Dec	81.0	65.0	76.7	56.7	52.0	93.1	69.0	73.8	57.5

CALCUTTA, INDIA

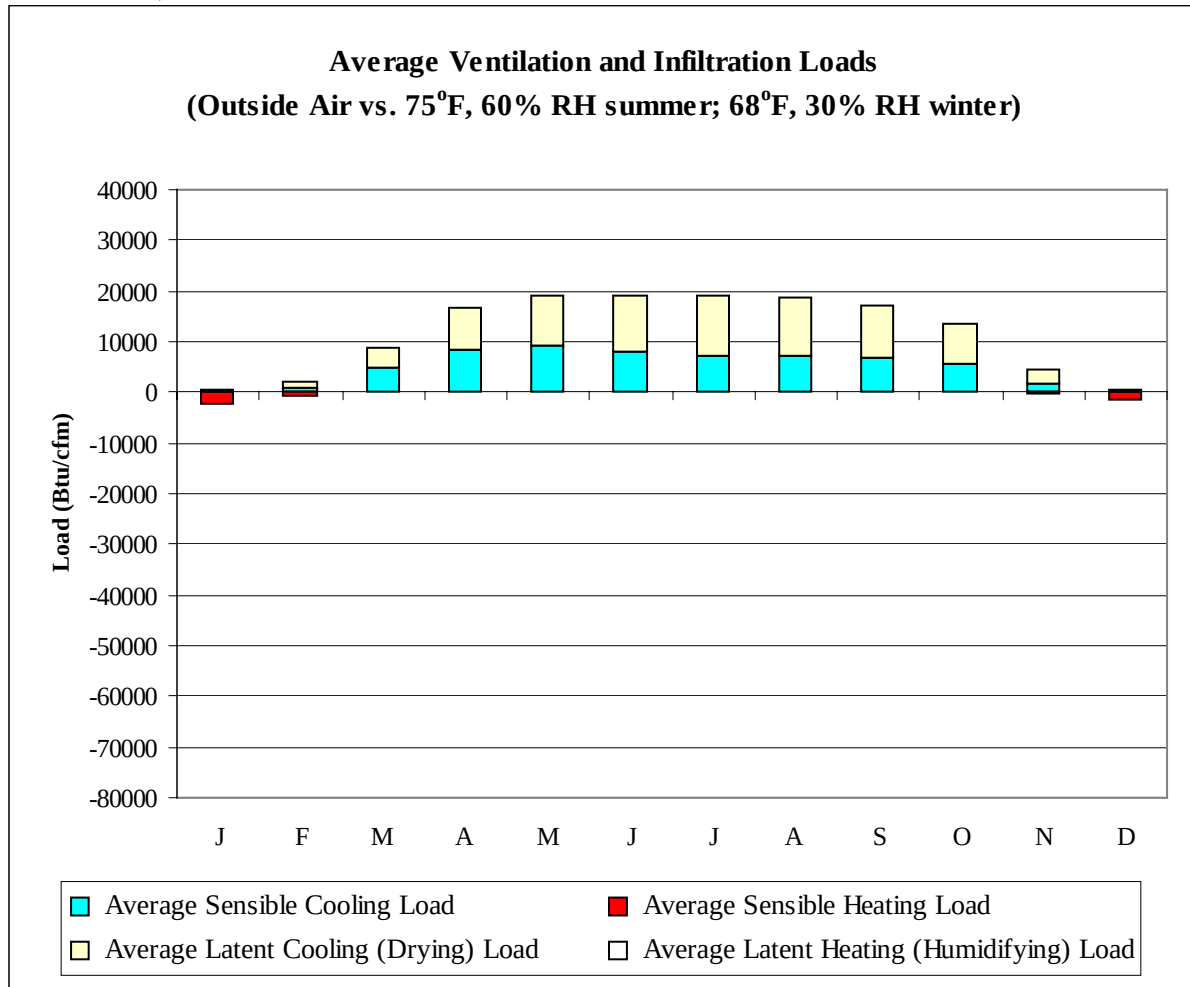
WMO No. 428090



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	88	47
FEB	213	10
MAR	476	1
APR	613	0
MAY	649	0
JUN	605	0
JUL	583	0
AUG	578	0
SEP	547	0
OCT	512	0
NOV	308	3
DEC	105	32
ANN	5276	93

CALCUTTA, INDIA

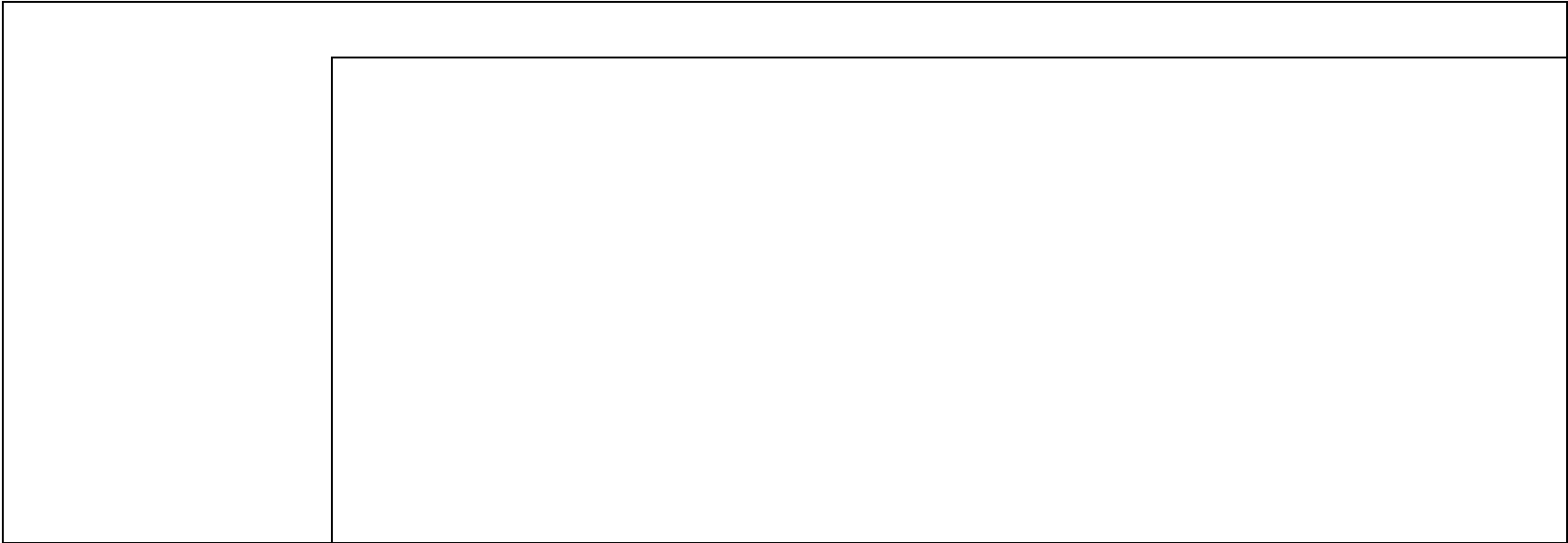
WMO No. 428090



	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	183	-2221	254	-1
FEB	987	-588	976	-1
MAR	5035	-62	3729	0
APR	8494	-1	8116	0
MAY	9093	0	10065	0
JUN	8185	0	11067	0
JUL	7348	0	11600	0
AUG	7226	0	11550	0
SEP	6703	-1	10562	0
OCT	5565	0	7821	0
NOV	1769	-177	2602	0
DEC	218	-1629	243	0
ANN	60806	-4679	78585	-2

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

No Solar Radiation
Data Available

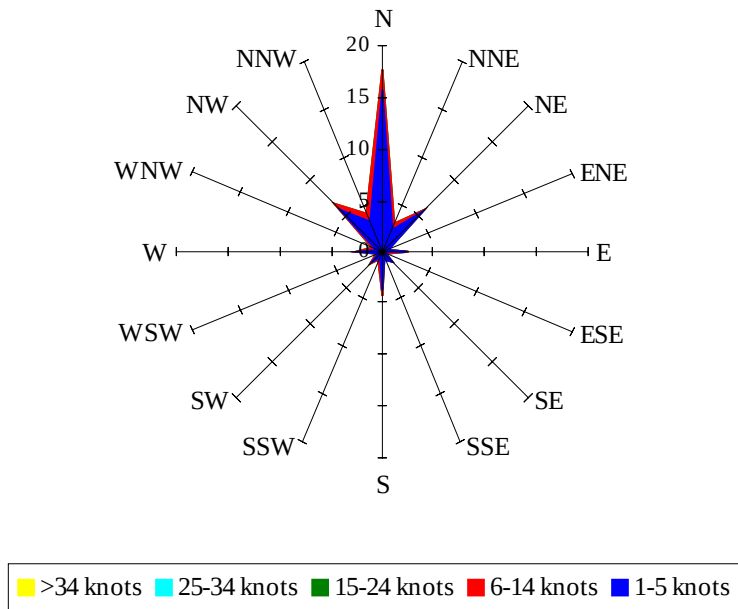


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

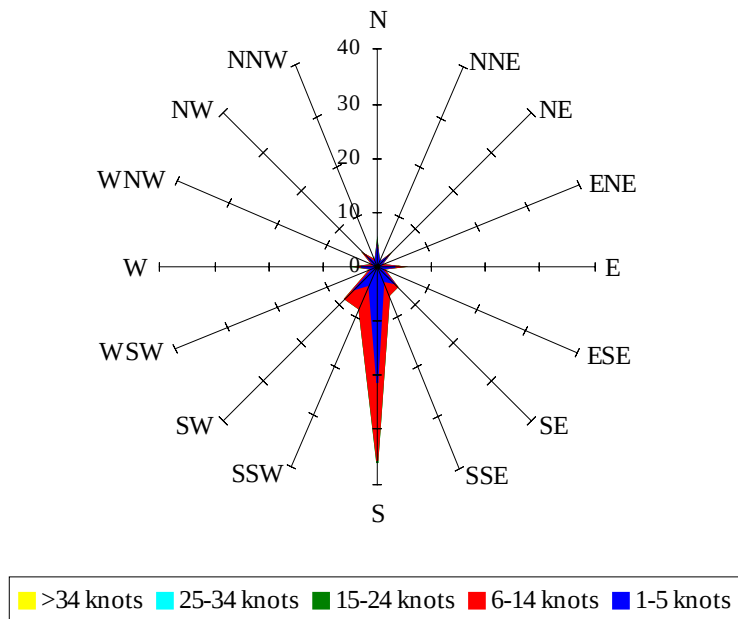
Labels of Percent Frequency on North Axis



Percent Calm = 46.22

Wind Summary - March, April, and May

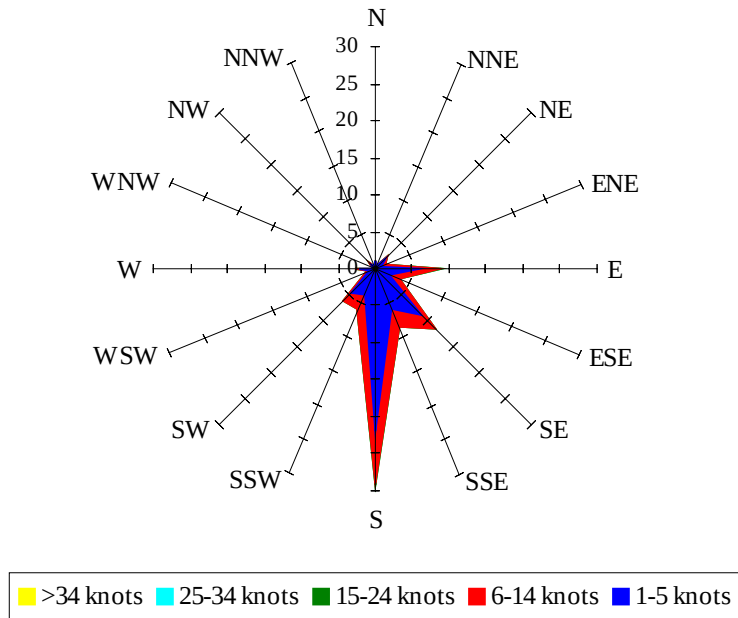
Labels of Percent Frequency on North Axis



Percent Calm = 14.02

Wind Summary - June, July, and August

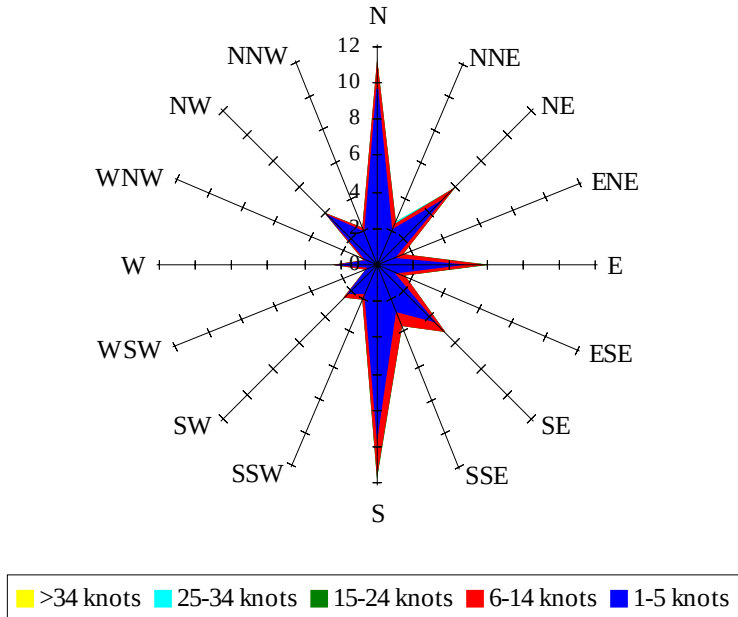
Labels of Percent Frequency on North Axis



Percent Calm = 15.94

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 39.00