

SHANGHAI/HONGQIAO CI

Latitude = 31.17 N

Longitude = 121.43 E

Period of Record = 1973 to 1996

WMO No. 583670

Elevation = 23 feet

Average Pressure = 29.96 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	99	82	143	6.6	W
0.4% Occurrence	95	82	146	8.3	SW
1.0% Occurrence	92	82	147	9.6	S
2.0% Occurrence	90	81	145	9.9	SSE
Mean Daily Range	12	-	-	-	-
97.5% Occurrence	32	30	20	5.5	NW
99.0% Occurrence	28	26	16	5.0	NW
99.6% Occurrence	27	26	16	5.0	WNW
Median of Extreme Lows	21	19	11	7.0	WNW
	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	86	93	171	7.9	S
0.4% Occurrence	84	92	162	8.3	S
1.0% Occurrence	82	89	154	8.7	SSE
2.0% Occurrence	82	89	154	8.7	SSE
	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	92	1.19	6.8	S
0.4% Occurrence	162	87	1.06	8.4	S
1.0% Occurrence	161	87	1.06	8.2	SSE
2.0% Occurrence	152	85	0.99	8.5	SSE
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		83	1344	1844	2872

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
8	N/A	N/A	4.0 + 1.3
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 (#)
63.8	N/A	N/A	24

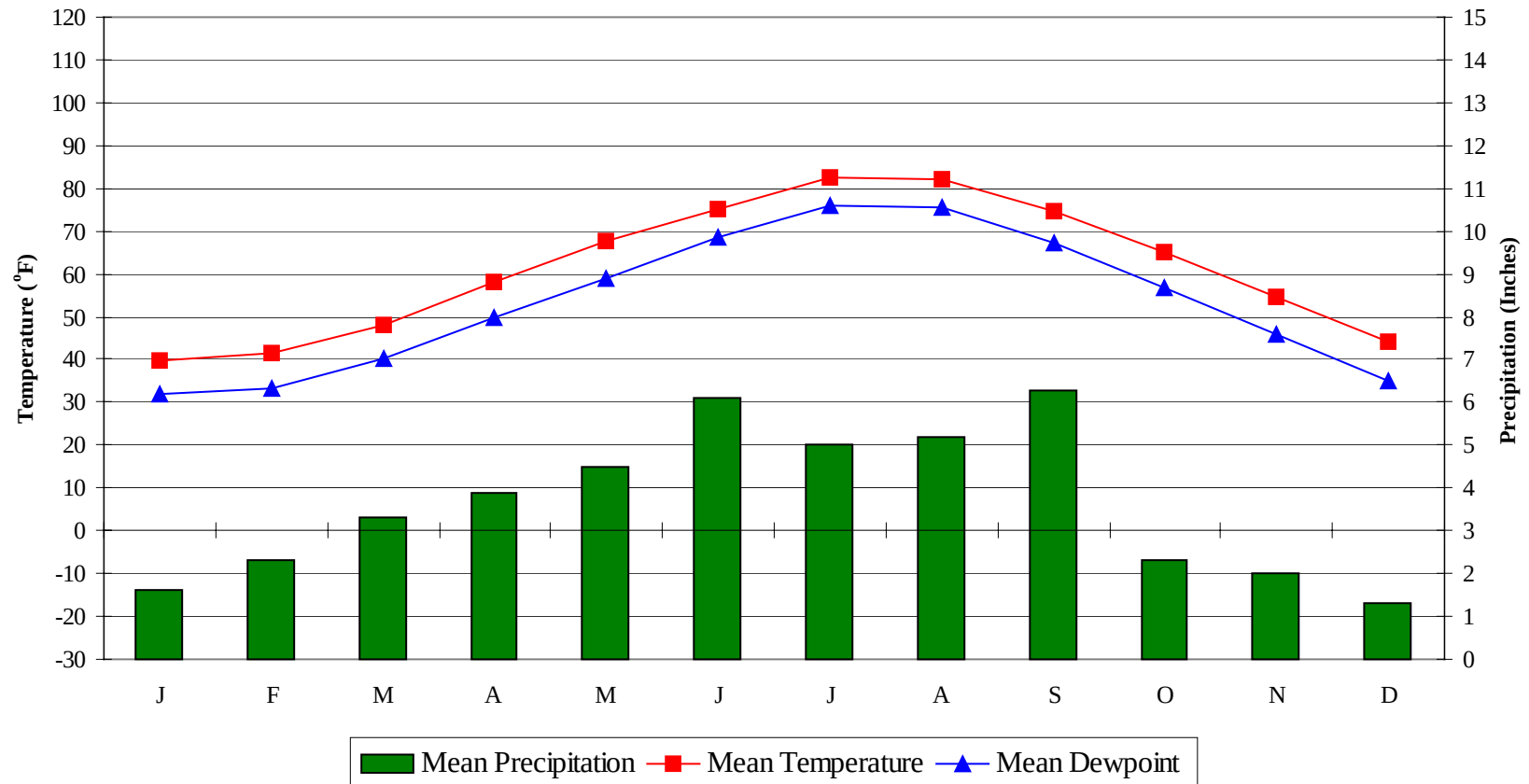
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

SHANGHAI/HONGQIAO

CI

WMO No. 583670

Average Annual Climate

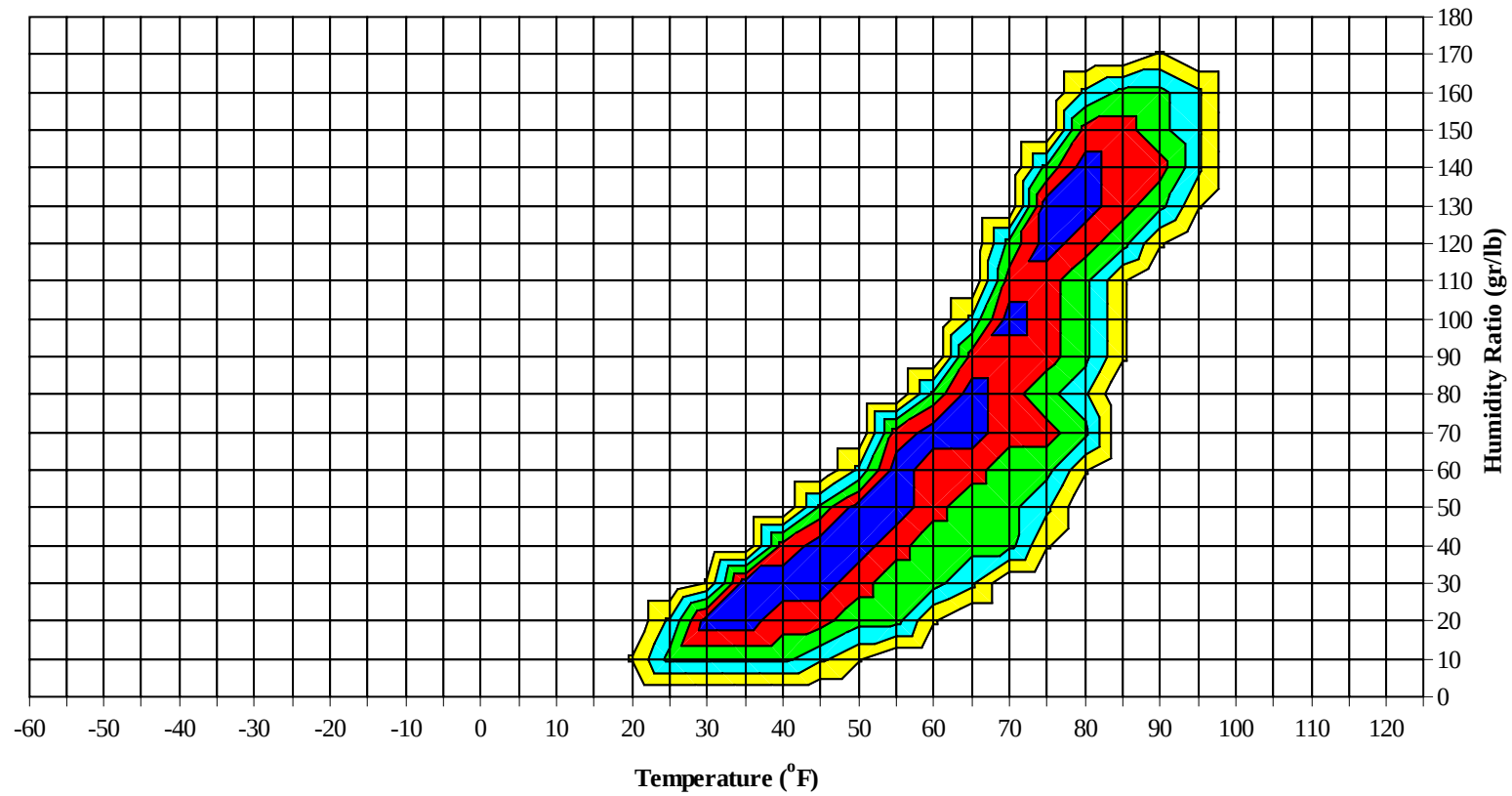


SHANGHAI/HONGQIAO

CI

WMO No. 583670

Long Term Psychrometric Summary



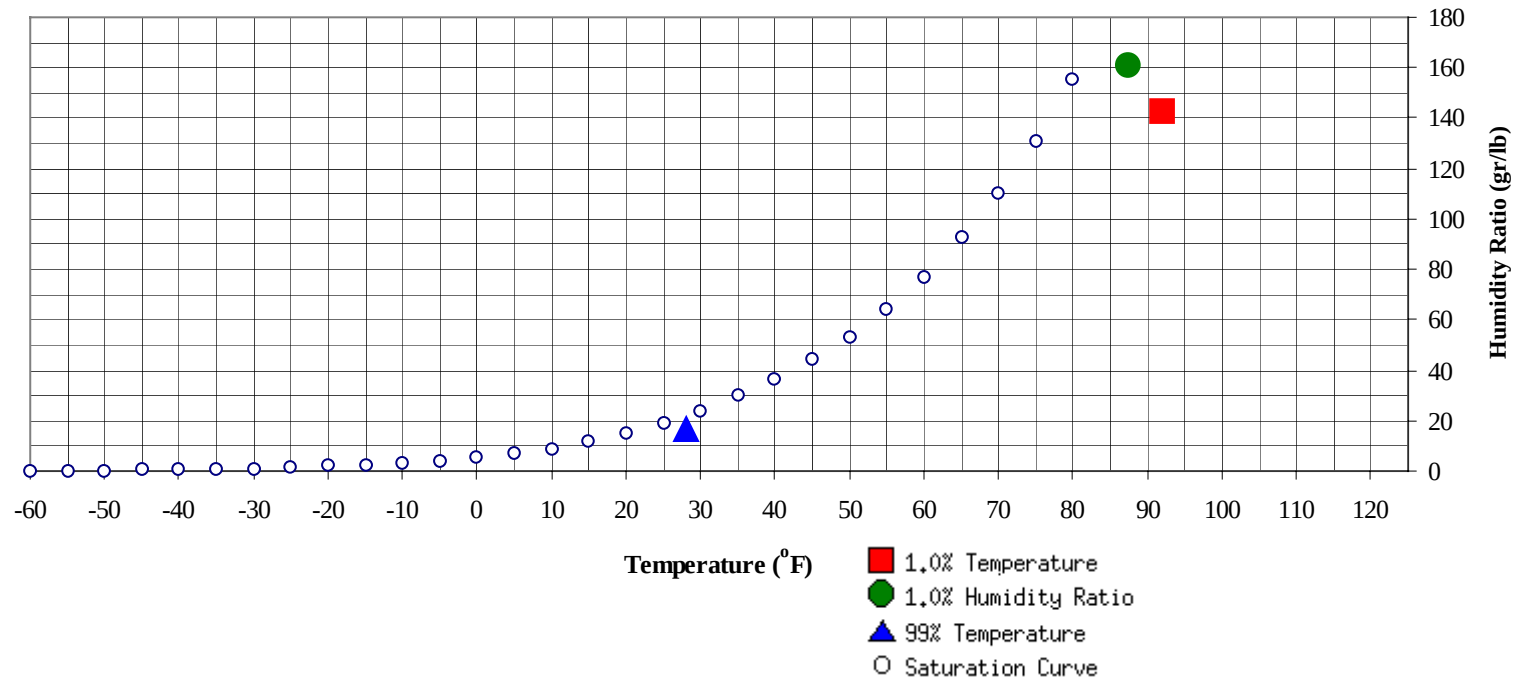
- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

SHANGHAI/HONGQIAO

CI

WMO No. 583670

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)
	28	16.8	9.3		161	87.4	82.3	80.6	46.3

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	92	142.5	80.8	44.5

SHANGHAI/HONGQIAO CI WMO No. 583670

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															
95 / 99															
90 / 94															
85 / 89															
80 / 84							0		0	65.0		0		0	69.5
75 / 79							1		1	59.2		1	0	1	64.0
70 / 74		0		0	56.0		2	0	2	58.2		5	1	6	59.7
65 / 69		0	0	0	54.1		1	1	2	57.3	0	6	3	9	58.9
60 / 64		2	0	2	50.9	0	4	2	6	53.9	3	18	8	29	55.1
55 / 59		10	2	12	49.6	1	14	6	21	49.2	8	46	23	77	50.9
50 / 54	4	30	15	49	46.7	9	31	18	58	46.4	36	70	61	167	47.8
45 / 49	26	65	44	135	42.7	30	67	49	146	42.7	81	70	88	240	43.6
40 / 44	45	66	60	170	38.7	43	54	60	156	38.5	64	25	43	132	39.5
35 / 39	68	56	80	203	34.6	67	39	61	167	34.5	42	6	20	68	35.5
30 / 34	69	16	38	123	30.1	51	9	24	85	29.9	13	0	1	14	31.1
25 / 29	31	3	9	43	25.3	20	1	4	24	25.3	1			1	25.5
20 / 24	4	0	1	5	20.5	3	0	0	3	20.7					
15 / 19	1		0	1	17.4										

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.

SHANGHAI/HONGQIAO CI WMO No. 583670
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															
100 / 104															
95 / 99							0		0	78.3		3	1	4	81.3
90 / 94							3	0	3	73.5	0	14	3	17	79.7
85 / 89		1		1	71.8	0	8	1	9	72.5	1	25	9	35	77.4
80 / 84		6			70.0	0	30	7	37	69.5	14	57	30	101	74.8
75 / 79	0	13	3	16	66.0	4	57	21	82	67.1	48	78	65	191	72.2
70 / 74	2	28	12	42	62.8	32	67	59	158	65.5	99	53	97	248	69.0
65 / 69	6	39	17	62	59.7	58	41	60	159	62.9	59	8	30	97	65.6
60 / 64	33	61	55	149	57.4	85	32	69	186	59.3	18	1	5	24	61.7
55 / 59	71	59	75	204	53.3	54	9	28	92	55.1	1	0	0	1	57.9
50 / 54	76	27	55	157	49.1	13	1	3	17	51.1					
45 / 49	37	6	19	63	44.2	1		0	1	46.0					
40 / 44	10	0	3	13	40.0										
35 / 39	4		1	5	36.2										
30 / 34	1			1	32.3										
25 / 29															
20 / 24															
15 / 19															

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.

SHANGHAI/HONGQIAO CI WMO No. 583670

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			0	0	86.0										
100 / 104		1	0	1	82.3	0	0		0	83.5					
95 / 99		22	5	26	82.5	0	6	1	7	82.5		2	0	2	83.0
90 / 94	1	81	20	102	81.6	0	58	10	68	80.9		7	1	8	81.6
85 / 89	16	57	41	114	80.1	6	88	31	126	79.0	1	24	5	30	78.4
80 / 84	106	40	100	245	78.4	101	64	119	284	77.8	17	71	29	117	74.8
75 / 79	88	36	57	181	75.3	111	27	74	212	75.2	62	91	79	231	71.5
70 / 74	30	11	23	65	70.7	28	4	13	44	70.7	75	35	83	193	67.9
65 / 69	6	0	2	8	67.2	2	0	1	3	67.0	46	8	30	84	64.6
60 / 64	0		0	0	61.8						33	2	13	47	61.2
55 / 59	0			0							6	0	1	7	57.4
50 / 54											0			0	52.5
45 / 49															
40 / 44															
35 / 39															
30 / 34															
25 / 29															
20 / 24															
15 / 19															

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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		
105 / 109															
100 / 104															
95 / 99															
90 / 94		0		0	77.6										
85 / 89	0	1	0	1	76.6										
80 / 84	0	8	1	9	71.6		0		0	69.7					
75 / 79	2	48	8	57	66.7	0	5	0	5	65.9					
70 / 74	22	91	47	161	64.4	1	25	4	29	63.5		1		1	57.9
65 / 69	49	54	67	169	61.9	8	35	16	58	60.9		4	0	4	56.5
60 / 64	78	38	74	190	58.7	31	61	43	135	57.1	0	16	4	20	54.5
55 / 59	55	7	35	97	54.8	41	55	58	155	52.4	7	34	16	57	51.3
50 / 54	29	1	13	43	50.0	54	36	55	146	48.0	19	63	40	122	47.2
45 / 49	11	0	3	14	44.7	47	17	37	102	43.2	48	62	65	174	42.8
40 / 44	2		1	3	40.7	25	4	15	44	38.9	44	32	47	123	38.6
35 / 39	0			0	38.0	20	2	9	31	34.9	52	25	47	124	34.3
30 / 34						10	0	4	14	30.5	54	7	25	85	29.8
25 / 29						1			1	26.7	21	2	5	28	25.3
20 / 24											3	1	0	4	19.9
15 / 19											0		0	0	17.5

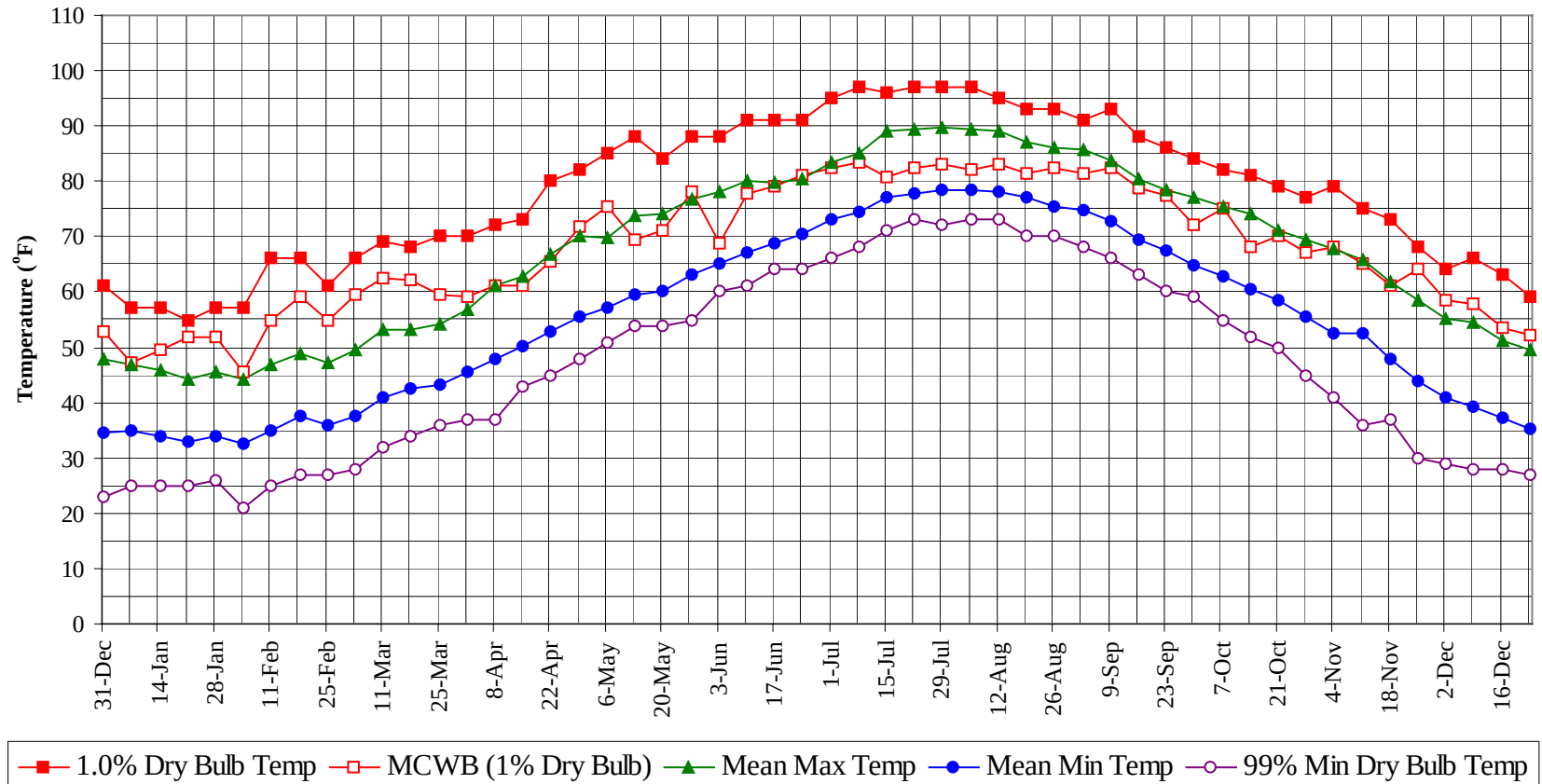
Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary and the ventilation and infiltration load pages in this manual.

SHANGHAI/HONGQIAO CI WMO No. 583670
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)
Period of Record = 1973 to 1996

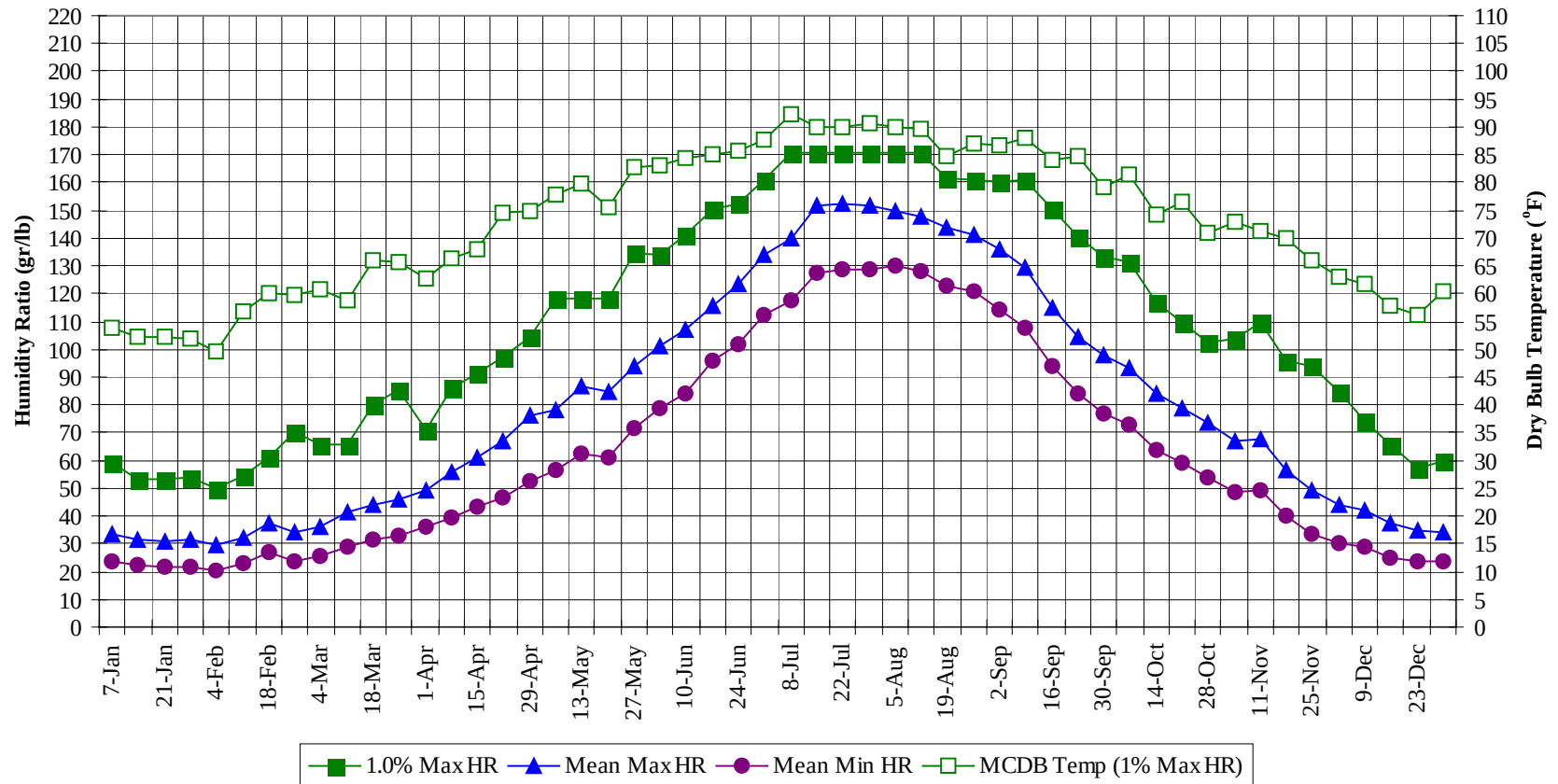
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109			0	0	86.0
100 / 104	0	1	0	1	82.5
95 / 99	0	32	6	37	82.4
90 / 94	1	164	35	200	81.1
85 / 89	25	207	86	319	78.9
80 / 84	238	280	286	804	76.6
75 / 79	317	361	308	986	72.3
70 / 74	293	326	344	963	67.1
65 / 69	237	199	229	665	62.8
60 / 64	286	238	275	798	58.3
55 / 59	247	233	246	726	53.0
50 / 54	242	254	257	754	48.0
45 / 49	277	282	300	858	43.1
40 / 44	226	178	224	627	38.8
35 / 39	248	127	215	590	34.6
30 / 34	197	33	91	320	30.0
25 / 29	74	6	16	97	25.3
20 / 24	10	1	1	12	20.4
15 / 19	1		1	2	17.4

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

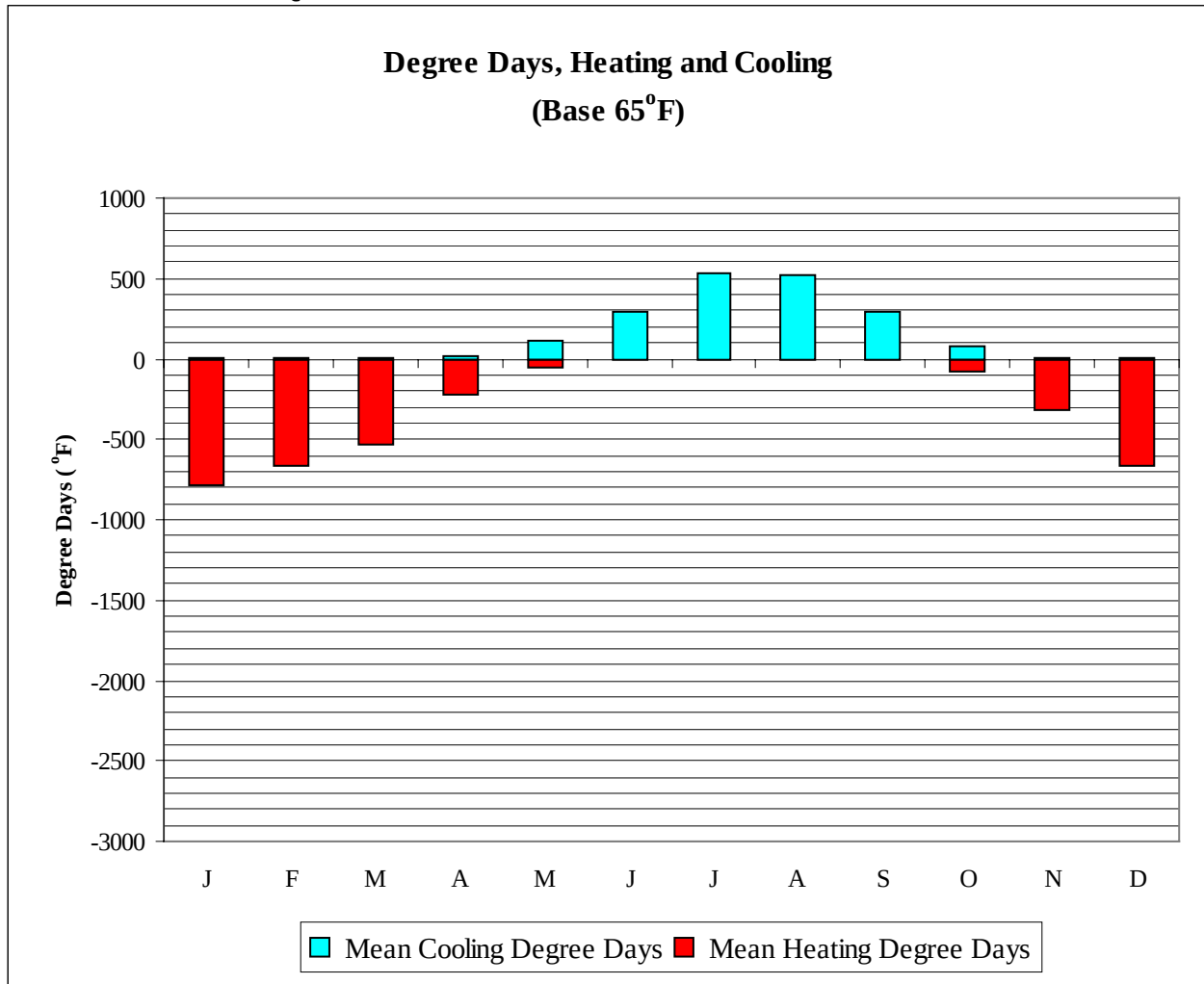


SHANGHAI/HONGQIAO CI

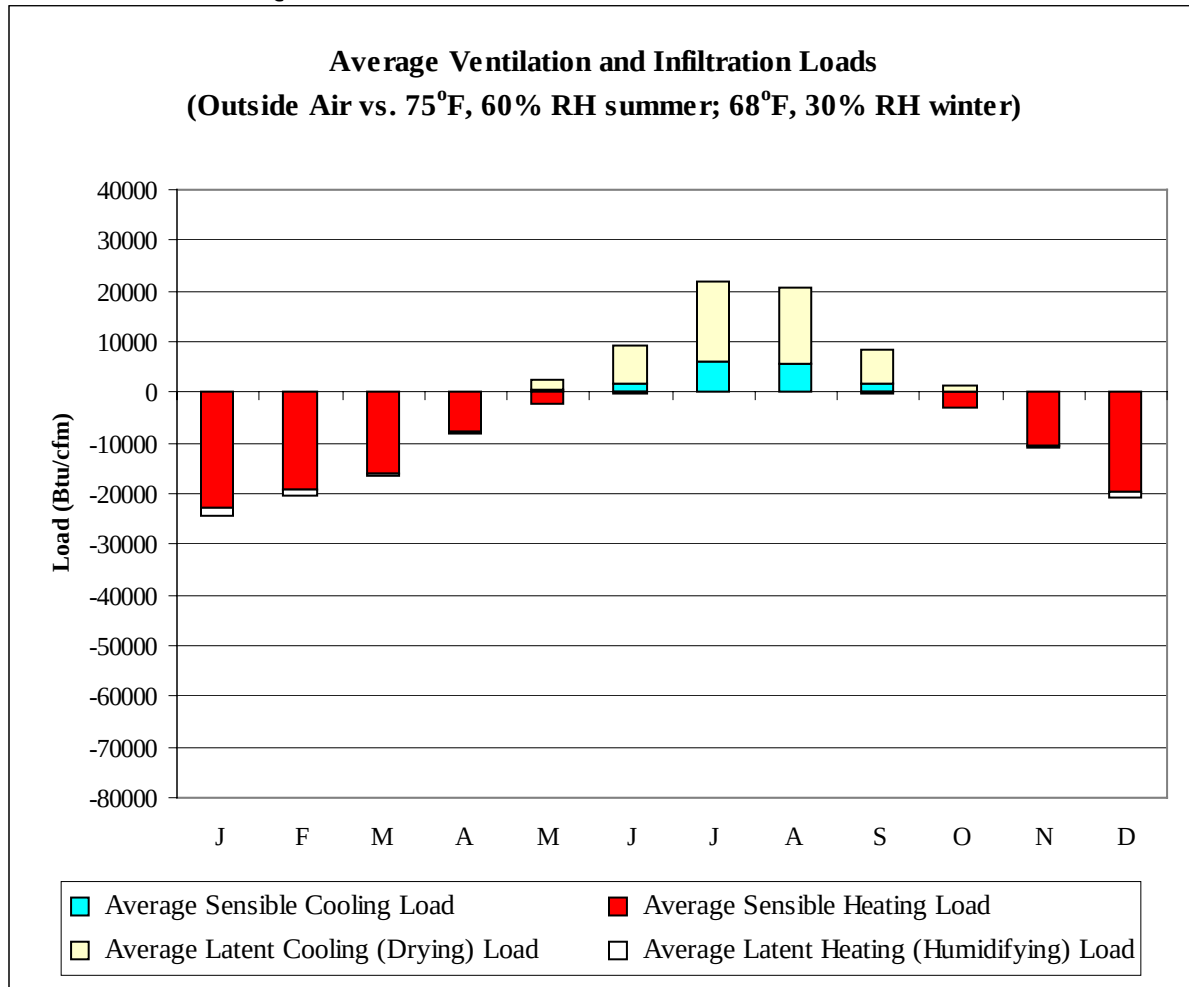
WMO No. 583670

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	57.0	47.1	46.8	34.9	25.0	58.8	54.0	33.4	23.5
14-Jan	57.0	49.4	45.9	33.9	25.0	53.2	52.1	31.7	22.3
21-Jan	55.0	51.8	44.2	33.0	25.0	53.2	52.1	31.0	21.5
28-Jan	57.0	52.0	45.5	33.8	26.0	53.9	52.0	31.7	21.9
4-Feb	57.0	45.6	44.2	32.6	21.0	49.7	49.7	29.7	20.5
11-Feb	66.0	55.0	46.9	35.0	25.0	54.6	56.9	32.1	22.7
18-Feb	66.0	59.0	48.9	37.7	27.0	60.9	59.9	37.4	26.9
25-Feb	61.0	54.8	47.2	36.0	27.0	70.0	59.8	34.2	23.9
4-Mar	66.0	59.6	49.4	37.5	28.0	65.8	60.7	35.8	25.3
11-Mar	69.0	62.5	53.3	40.8	32.0	65.8	58.7	41.6	28.9
18-Mar	68.0	62.3	53.1	42.4	34.0	79.8	66.0	44.3	31.6
25-Mar	70.0	59.6	54.0	43.1	36.0	85.4	65.8	46.0	32.9
1-Apr	70.0	59.2	56.9	45.5	37.0	70.7	62.6	49.1	36.0
8-Apr	72.0	61.1	61.3	47.9	37.0	86.1	66.5	55.7	39.3
15-Apr	73.0	61.1	62.9	50.0	43.0	91.0	67.8	61.3	43.2
22-Apr	80.0	65.5	66.9	52.7	45.0	97.3	74.4	66.9	46.9
29-Apr	82.0	71.8	70.2	55.6	48.0	104.3	74.8	76.1	52.6
6-May	85.0	75.5	69.9	57.3	51.0	118.3	77.7	77.9	56.8
13-May	88.0	69.6	73.9	59.3	54.0	118.3	79.8	86.6	62.5
20-May	84.0	71.1	74.1	60.2	54.0	118.3	75.4	85.0	60.8
27-May	88.0	78.0	76.8	63.2	55.0	134.4	82.6	94.2	71.5
3-Jun	88.0	68.9	78.3	65.2	60.0	133.7	83.2	101.1	78.9
10-Jun	91.0	77.9	80.2	67.0	61.0	141.4	84.4	106.8	84.3
17-Jun	91.0	79.2	79.8	68.8	64.0	150.5	85.1	115.4	95.6
24-Jun	91.0	80.9	80.5	70.4	64.0	152.6	85.7	123.2	101.7
1-Jul	95.0	82.4	83.4	73.0	66.0	161.0	87.7	133.7	112.5
8-Jul	97.0	83.4	85.0	74.3	68.0	170.8	92.4	140.2	117.8
15-Jul	96.0	80.8	89.1	77.2	71.0	170.8	89.9	151.4	127.2
22-Jul	97.0	82.5	89.5	77.9	73.0	170.8	90.0	152.5	128.6
29-Jul	97.0	83.0	89.7	78.5	72.0	170.8	90.5	151.6	128.5
5-Aug	97.0	82.2	89.5	78.5	73.0	170.8	89.9	149.9	130.1
12-Aug	95.0	83.1	89.0	78.0	73.0	170.8	89.6	147.6	127.9
19-Aug	93.0	81.4	87.1	77.2	70.0	161.7	84.7	143.6	123.1
26-Aug	93.0	82.6	86.0	75.5	70.0	161.0	87.1	141.4	120.5
2-Sep	91.0	81.3	85.6	74.8	68.0	160.3	86.8	136.1	114.1
9-Sep	93.0	82.5	83.9	72.8	66.0	161.0	88.0	129.2	107.6
16-Sep	88.0	78.8	80.5	69.4	63.0	150.5	83.9	114.7	93.7
23-Sep	86.0	77.3	78.3	67.3	60.0	140.7	84.8	104.4	83.9
30-Sep	84.0	72.1	77.2	64.8	59.0	133.0	79.1	97.7	77.1
7-Oct	82.0	75.0	75.3	62.9	55.0	131.6	81.5	93.4	72.8
14-Oct	81.0	68.3	74.0	60.5	52.0	116.9	74.1	84.2	63.8
21-Oct	79.0	70.1	71.0	58.4	50.0	109.9	76.4	78.6	59.2
28-Oct	77.0	67.1	69.4	55.5	45.0	102.2	70.9	73.5	54.0
4-Nov	79.0	68.2	67.9	52.6	41.0	103.6	72.9	66.8	48.4
11-Nov	75.0	65.0	65.8	52.6	36.0	109.9	71.2	67.3	49.3
18-Nov	73.0	61.1	61.8	48.0	37.0	95.9	70.0	56.3	40.4
25-Nov	68.0	64.3	58.5	43.8	30.0	93.8	66.0	49.0	33.8
2-Dec	64.0	58.5	55.2	40.9	29.0	84.7	63.1	43.9	30.1
9-Dec	66.0	57.7	54.5	39.2	28.0	74.2	61.7	42.1	28.9
16-Dec	63.0	53.4	51.2	37.2	28.0	65.8	57.9	37.6	25.2
23-Dec	59.0	52.2	49.4	35.4	27.0	57.4	56.2	35.1	23.7
31-Dec	61.0	52.9	47.7	34.6	23.0	59.5	60.5	34.2	23.5



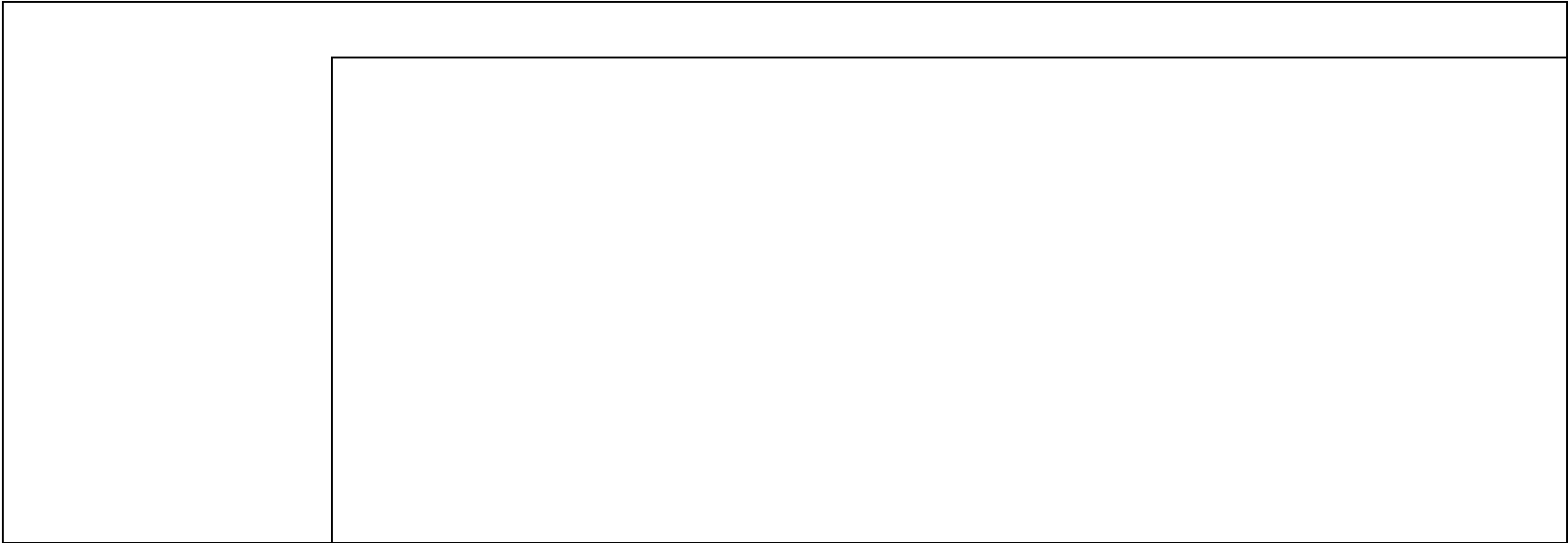
	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	789
FEB	1	662
MAR	2	529
APR	22	227
MAY	118	48
JUN	293	1
JUL	532	0
AUG	521	0
SEP	289	3
OCT	82	72
NOV	10	322
DEC	0	661
ANN	1870	3314



	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	-22819	0	-1459
FEB	1	-19282	0	-1208
MAR	2	-16014	12	-436
APR	48	-7870	259	-94
MAY	393	-2365	2004	-4
JUN	1688	-138	7679	0
JUL	6093	-2	15560	0
AUG	5720	0	14795	0
SEP	1642	-267	6798	0
OCT	131	-3194	1149	-17
NOV	4	-10482	249	-333
DEC	0	-19460	1	-1209
ANN	15722	-101893	48506	-4760

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

No Solar Radiation
Data Available

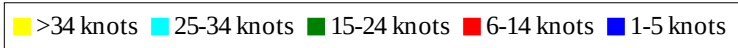
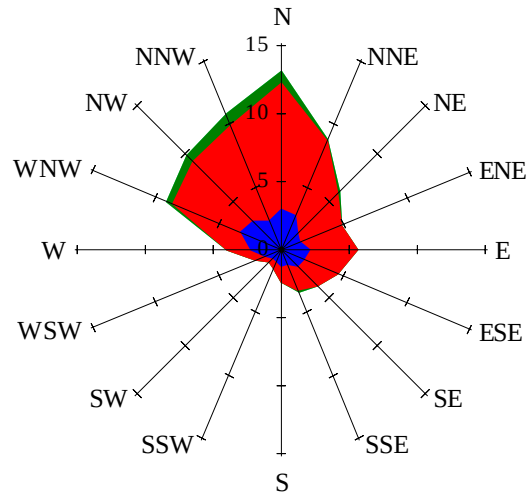


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

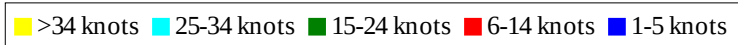
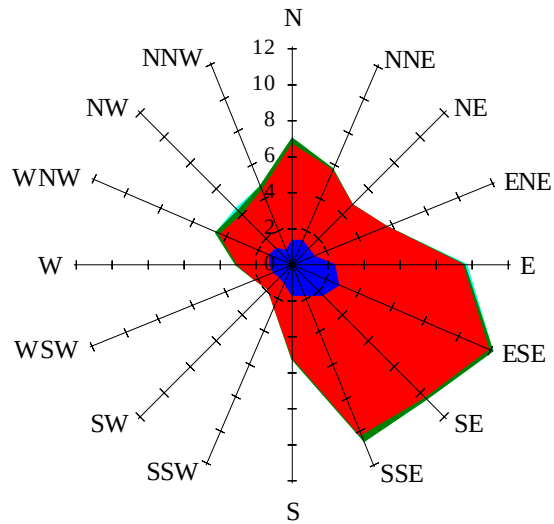
Labels of Percent Frequency on North Axis



Percent Calm = 10.30

Wind Summary - March, April, and May

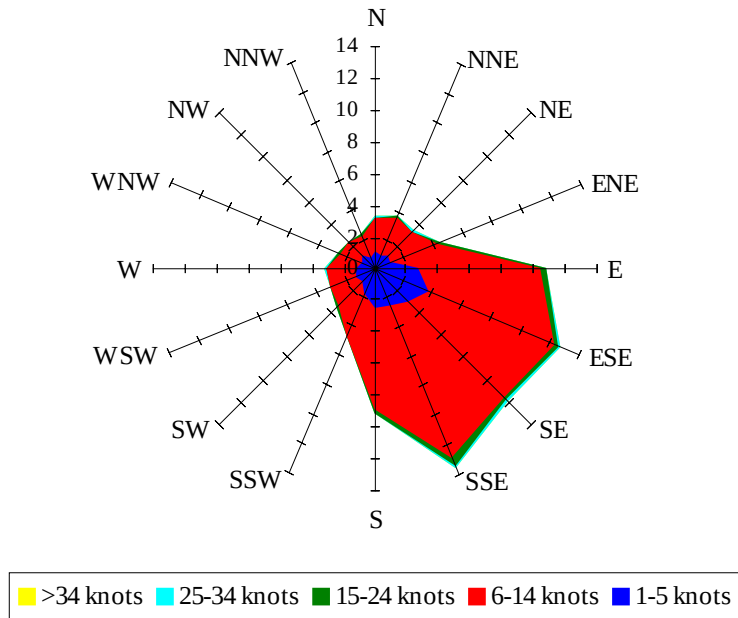
Labels of Percent Frequency on North Axis



Percent Calm = 6.22

Wind Summary - June, July, and August

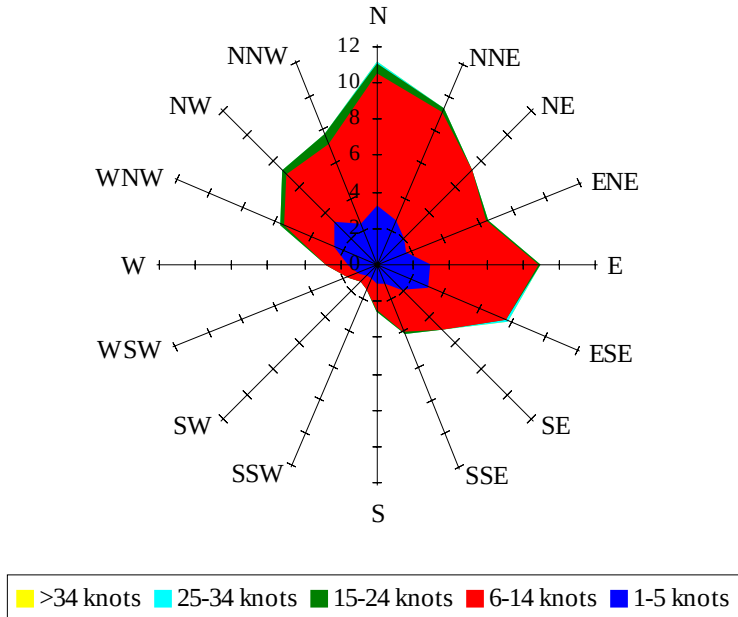
Labels of Percent Frequency on North Axis



Percent Calm = 6.53

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 10.33