PISA, ITALY

Latitude = 43.68 N	WMO No. 161580
Longitude = 10.38 E	Elevation = 3 feet
Period of Record = 1973 to 1996	Average Pressure = 29.95 inches Hg

Design Criteria Data

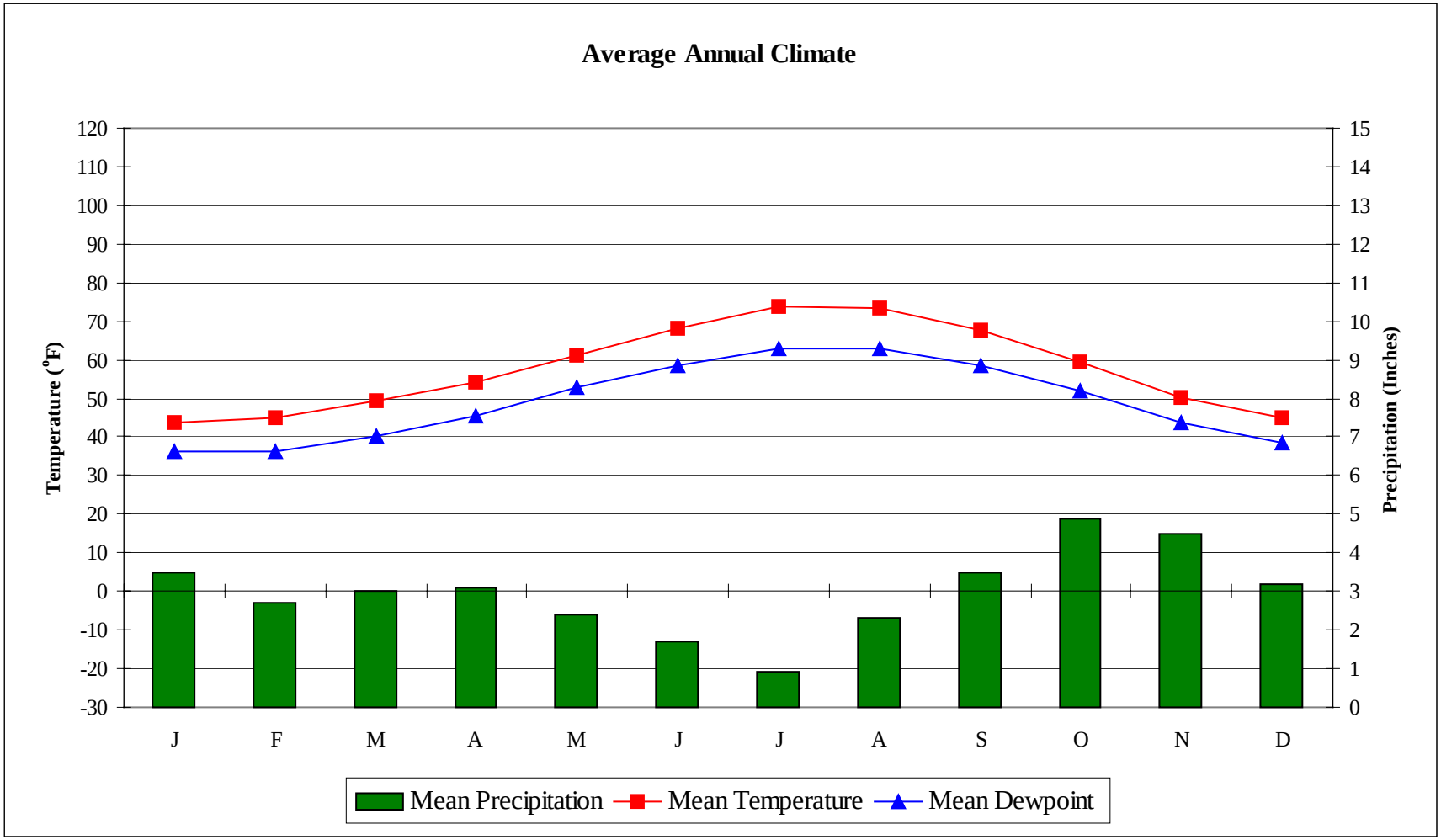
		Mean Coincident (Average) Values			
Dry Bulb Temperature (T)	**Design Value (^oF)**	Wet Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	95	72	83	7.1	W
0.4% Occurrence	90	71	87	8.4	W
1.0% Occurrence	86	71	89	8.1	W
2.0% Occurrence	84	70	89	8.0	W
Mean Daily Range	18	-	-	-	-
97.5% Occurrence	32	30	22	3.5	ESE
99.0% Occurrence	28	27	18	2.7	ESE
99.6% Occurrence	27	27	18	2.7	ESE
Median of Extreme Lows	22	20	12	3.3	ESE
		Mean Coincident (Average) Values			
Wet Bulb Temperature (T_{wb})	**Design Value (^oF)**	Dry Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	78	85	130	7.6	W
0.4% Occurrence	76	84	120	7.4	W
1.0% Occurrence	74	82	112	6.4	W
2.0% Occurrence	73	81	108	6.1	W
		Mean Coincident (Average) Values			
Humidity Ratio (HR)	**Design Value (gr/lb)**	Dry Bulb Temperature (^oF)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	138	83	0.92	7.4	S
0.4% Occurrence	125	80	0.83	5.2	W
1.0% Occurrence	117	79	0.78	4.9	W
2.0% Occurrence	110	77	0.74	4.8	W
Air Conditioning/		$T \geq 93^oF$	$T \geq 80^oF$	$T_{wb} \geq 73^oF$	$T_{wb} \geq 67^oF$
Humid Area Criteria	# of Hours	7	495	182	1081

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	1.2 + 0.5
Ground Water Temperature (^oF) 50 Foot Depth *	**Frost Depth 50 Year Recurrence (in.)**	**Ground Snow Load 50 Year Recurrence (lb/ft^2)**	**Average Annual Freeze-Thaw Cycles (#)**
60.1	N/A	N/A	26

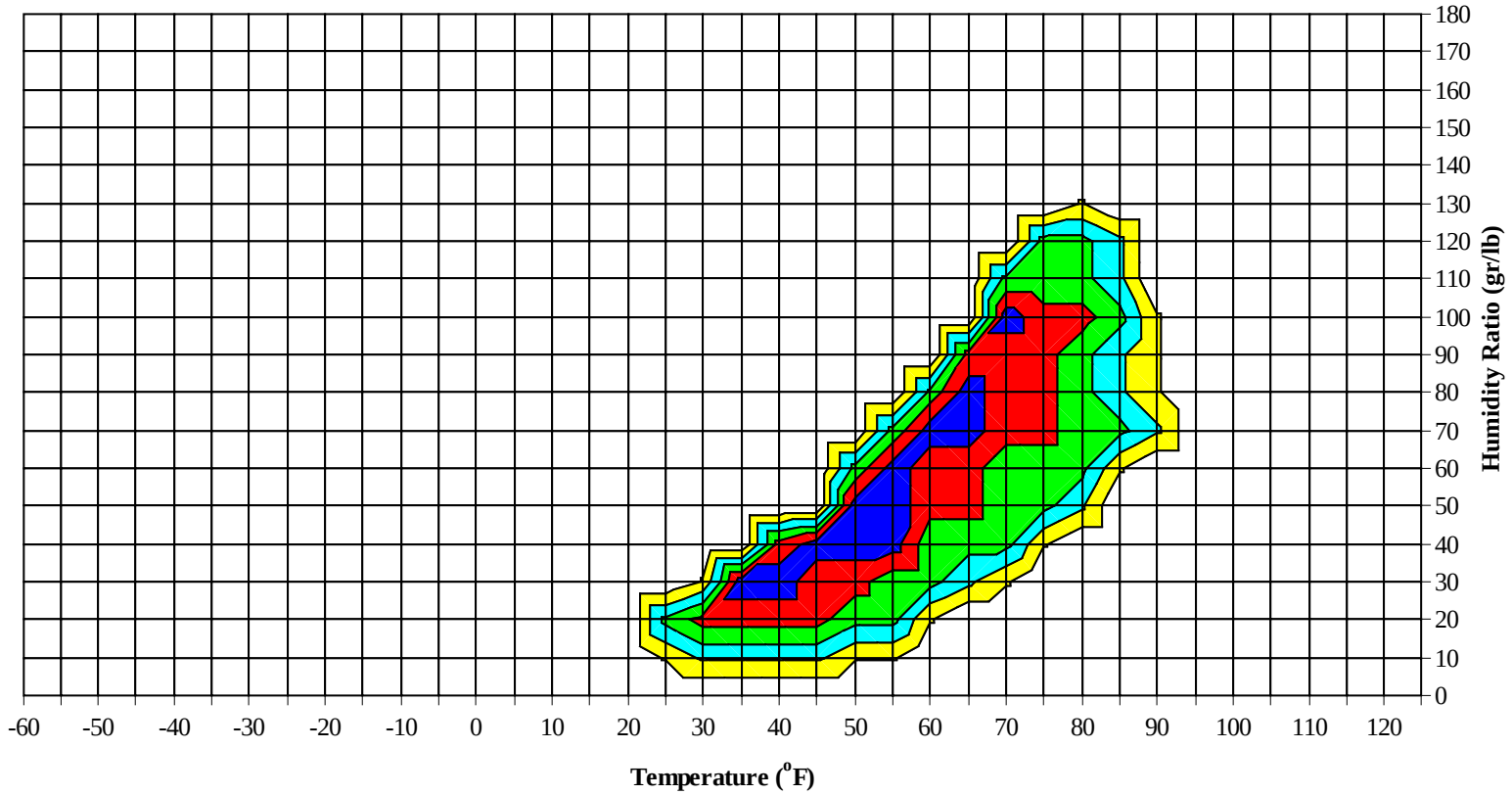
*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

PISA, ITALY WMO No. 161580



PISA, ITALY WMO No. 161580

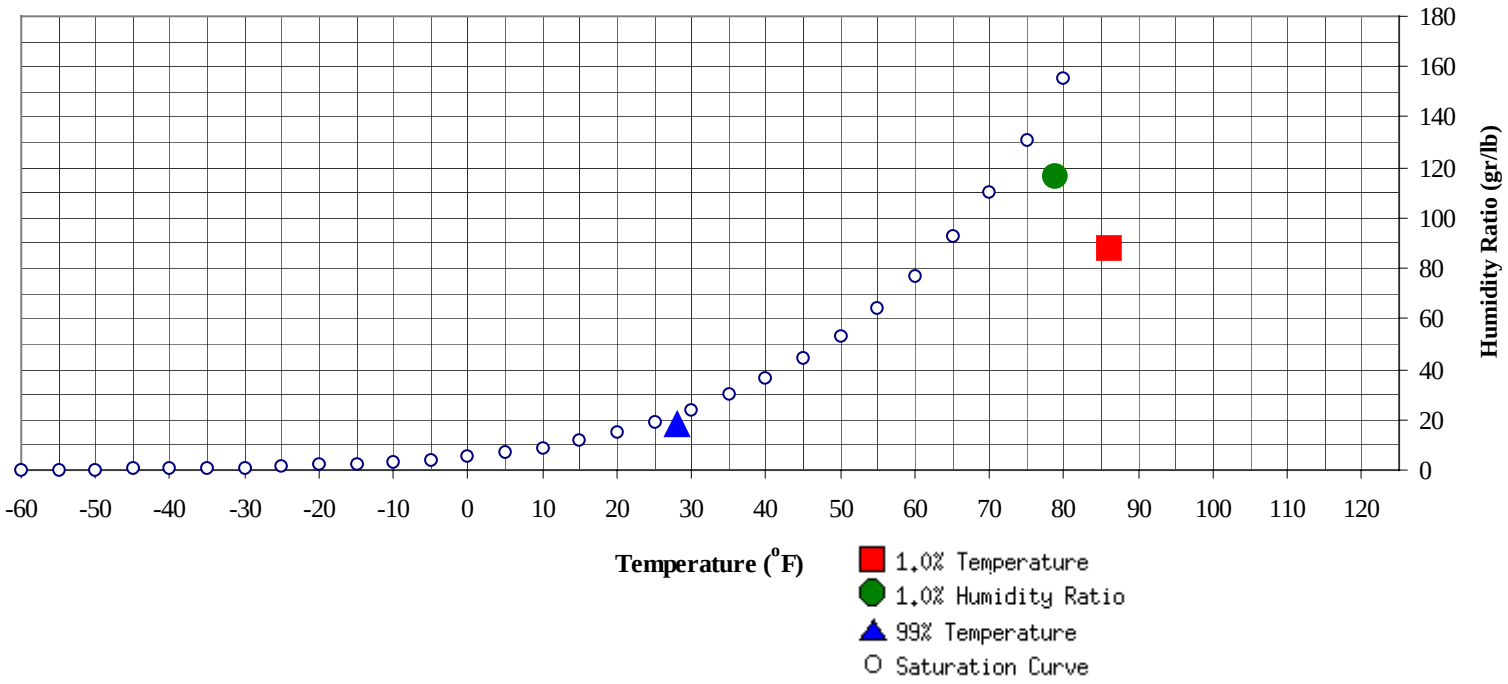
Long Term Psychrometric Summary



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

PISA, ITALY WMO No. 161580

Psychrometric Summary of Peak Design Values



	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)
99% Dry Bulb	28	18.3	9.5

	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
1.0% Humidity Ratio	116.9	78.7	73.7	71.6	37.2

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	86	88.3	70.4	34.5

PISA, ITALY WMO No. 161580

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

Period of Record = 1973 to 1996

Temperature Range (°F)	January Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	February Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	March Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99															
90 / 94															
85 / 89															
80 / 84															
75 / 79															
70 / 74												2	0	2	56.3
65 / 69		0		0			0	0	0	54.4		6	1	7	55.5
60 / 64		2	0	2	52.9	0	7	2	9	51.8	1	35	13	49	53.2
55 / 59	5	34	14	53	50.8	4	41	21	66	49.9	12	78	57	147	50.6
50 / 54	30	68	60	157	47.5	25	60	57	141	47.2	49	64	82	195	47.7
45 / 49	53	63	66	181	43.6	48	54	63	165	42.9	72	41	59	172	43.7
40 / 44	39	33	41	113	39.3	41	29	38	108	38.8	49	14	23	86	39.5
35 / 39	53	26	40	119	35.1	54	21	31	106	34.9	42	6	10	58	35.5
30 / 34	40	15	21	76	30.3	37	9	11	57	30.3	19	2	3	24	30.5
25 / 29	23	6	5	34	26.1	15	2	1	18	26.3	5	0	0	5	26.3
20 / 24	3	1	1	5	20.7	2	0		2	21.9	0		0	0	21.3
15 / 19	1	0	1	2	16.6	0			0	18.0	0			0	19.0
10 / 14	1	0		1	11.7										
5 / 9		0		0	8.5										

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.

PISA, ITALY WMO No. 161580

Dry-Bulb Temperature Hours For An Average Year (Sheet 2 of 5)

Period of Record = 1973 to 1996

Temperature Range (°F)	April Hour Group (LST) 01 To 08	April 09 To 16	April 17 To 00	April Total Obs	April MCWB (°F)	May Hour Group (LST) 01 To 08	May 09 To 16	May 17 To 00	May Total Obs	May MCWB (°F)	June Hour Group (LST) 01 To 08	June 09 To 16	June 17 To 00	June Total Obs	June MCWB (°F)
95 / 99												0		0	71.0
90 / 94												1	0	1	70.1
85 / 89							0	0	0	66.0		10	2	12	68.4
80 / 84		0		0	61.0		8	2	10	65.3	0	37	13	50	67.5
75 / 79		1	0	1	60.1		27	9	36	63.5	0	69	42	111	66.0
70 / 74		10	2	12	58.3	0	61	29	91	61.4	11	71	63	145	64.2
65 / 69		24	8	32	56.6	4	52	39	96	59.9	33	31	52	115	62.6
60 / 64	1	70	37	108	54.3	34	62	70	166	58.0	96	18	51	165	60.0
55 / 59	30	78	82	190	51.9	84	31	70	185	54.5	76	3	16	96	55.9
50 / 54	81	44	72	197	49.0	88	6	26	121	50.8	21	0	2	23	51.5
45 / 49	75	12	31	118	44.9	32	0	2	34	46.1	3		0	3	46.3
40 / 44	32	2	5	39	40.7	5		0	5	41.3	0			0	41.5
35 / 39	17	0	2	19	37.0	1			1	37.4					
30 / 34	4		0	4	32.2										
25 / 29	0			0	27.7										
20 / 24															
15 / 19															
10 / 14															
5 / 9															

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.

PISA, ITALY WMO No. 161580

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

Period of Record = 1973 to 1996

Temperature Range (°F)	July Hour Group (LST) 01 To 08	July 09 To 16	July 17 To 00	July Total Obs	July MCWB (°F)	August Hour Group (LST) 01 To 08	August 09 To 16	August 17 To 00	August Total Obs	August MCWB (°F)	September Hour Group (LST) 01 To 08	September 09 To 16	September 17 To 00	September Total Obs	September MCWB (°F)
95 / 99		1	0	1	70.8		2	0	2	72.5		0		0	68.0
90 / 94		11	2	13	72.3		15	3	18	71.4		1	0	1	70.2
85 / 89		38	13	51	70.9		36	11	47	71.2		5	1	6	68.6
80 / 84		88	52	140	69.8	0	73	44	117	70.3		32	8	40	68.7
75 / 79	7	68	71	146	68.4	8	69	75	152	68.8	1	67	37	105	66.7
70 / 74	51	33	67	151	67.0	56	37	72	164	67.1	16	67	68	151	64.9
65 / 69	79	7	29	115	64.7	82	12	30	124	64.6	38	33	55	126	62.9
60 / 64	84	2	12	98	61.2	80	4	12	96	61.0	92	26	53	170	60.0
55 / 59	24	0	1	25	56.6	20	0	1	21	56.3	65	8	16	89	55.7
50 / 54	3			3	52.0	3	0	0	3	51.1	25	1	3	29	51.0
45 / 49	0			0	46.5	0			0	47.3	4	0	0	4	46.1
40 / 44											0	0		0	41.5
35 / 39												0		0	
30 / 34															
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															

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 4 of 5)

Period of Record = 1973 to 1996

Temperature Range (°F)	October					November					December				
	Hour Group (LST)				MCWB	Hour Group (LST)				MCWB	Hour Group (LST)				MCWB
	01 To 08	09 To 16	17 To 00	Total Obs	(°F)	01 To 08	09 To 16	17 To 00	Total Obs	(°F)	01 To 08	09 To 16	17 To 00	Total Obs	(°F)
95 / 99															
90 / 94															
85 / 89		0		0	74.0										
80 / 84		2	0	2	67.3										
75 / 79		14	4	18	65.0		0	0	0	61.0					
70 / 74	1	46	19	67	62.6		1	0	1	61.5					
65 / 69	13	48	37	99	60.7	1	10	2	13	59.8		0		0	60.8
60 / 64	42	64	70	176	58.1	9	42	21	72	56.3	1	6	1	8	56.4
55 / 59	76	46	70	192	54.3	32	68	54	154	52.8	18	41	25	84	52.2
50 / 54	63	21	35	120	49.9	53	56	71	180	48.7	35	67	55	156	48.2
45 / 49	34	5	11	50	45.2	56	37	53	145	44.0	50	65	66	180	43.6
40 / 44	13	1	2	16	40.8	38	15	24	77	39.9	40	32	41	113	39.2
35 / 39	5	0	0	5	37.3	33	8	12	53	36.1	51	22	40	113	35.4
30 / 34	1			1	33.3	14	3	3	20	31.3	38	11	16	65	30.7
25 / 29						4	0	0	4	26.5	15	3	4	22	26.1
20 / 24						1		0	1	22.3	2	1	0	3	22.1
15 / 19						0			0	19.0	0	0		0	18.5
10 / 14															
5 / 9															

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.

PISA, ITALY WMO No. 161580

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) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99		2	0	2	72.0
90 / 94		28	5	33	71.6
85 / 89		89	27	116	70.6
80 / 84	0	238	117	356	69.4
75 / 79	16	314	235	565	67.3
70 / 74	133	327	319	780	64.9
65 / 69	247	224	252	723	62.3
60 / 64	438	336	339	1114	58.4
55 / 59	446	428	428	1302	53.2
50 / 54	476	386	465	1327	48.6
45 / 49	425	277	353	1056	43.9
40 / 44	257	127	177	561	39.5
35 / 39	256	85	136	477	35.4
30 / 34	154	41	54	250	30.5
25 / 29	62	13	10	85	26.2
20 / 24	8	2	1	11	21.4
15 / 19	1	0	1	2	17.0
10 / 14	1	0		1	11.7
5 / 9		0		0	8.5

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.

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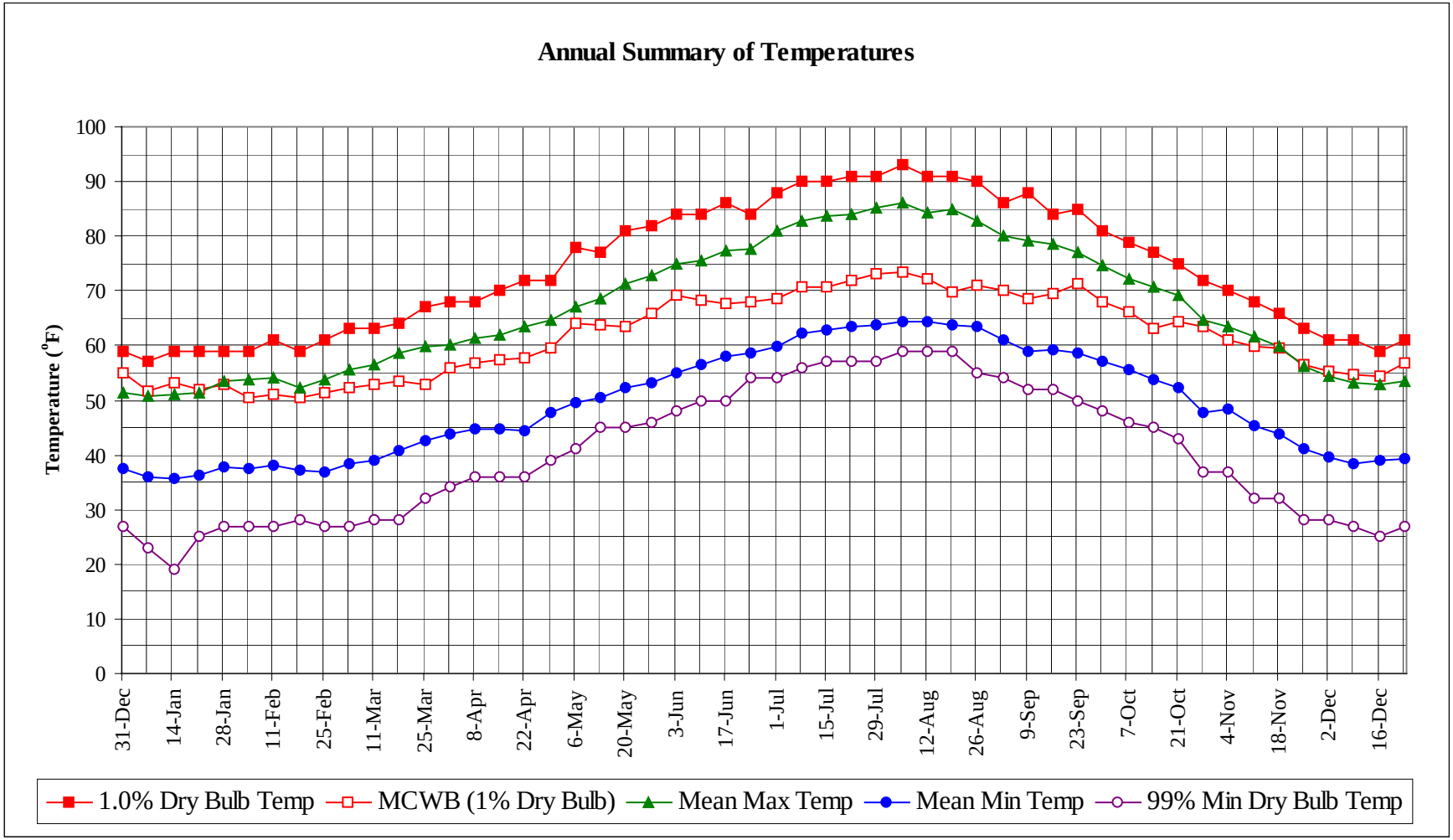

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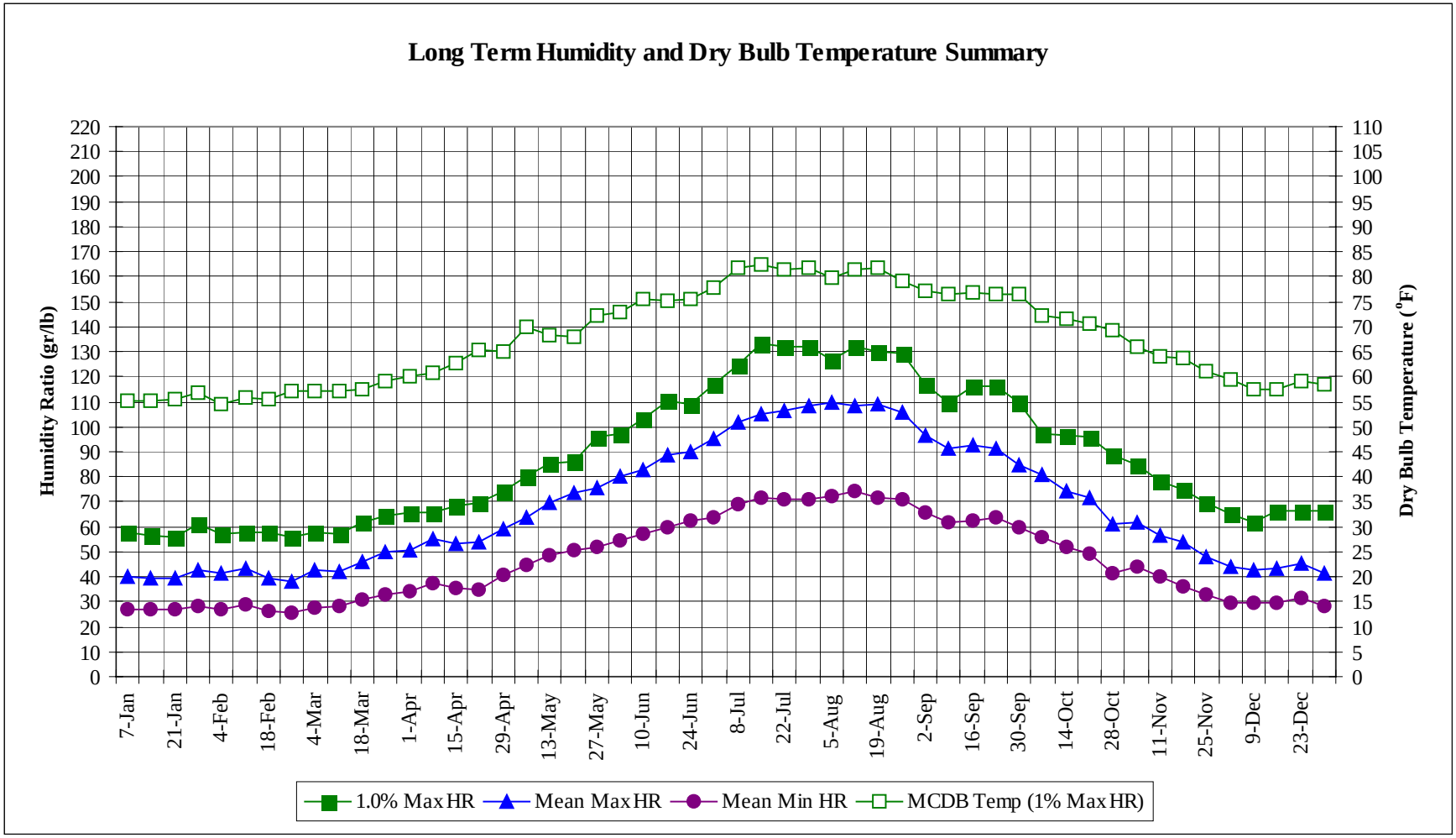
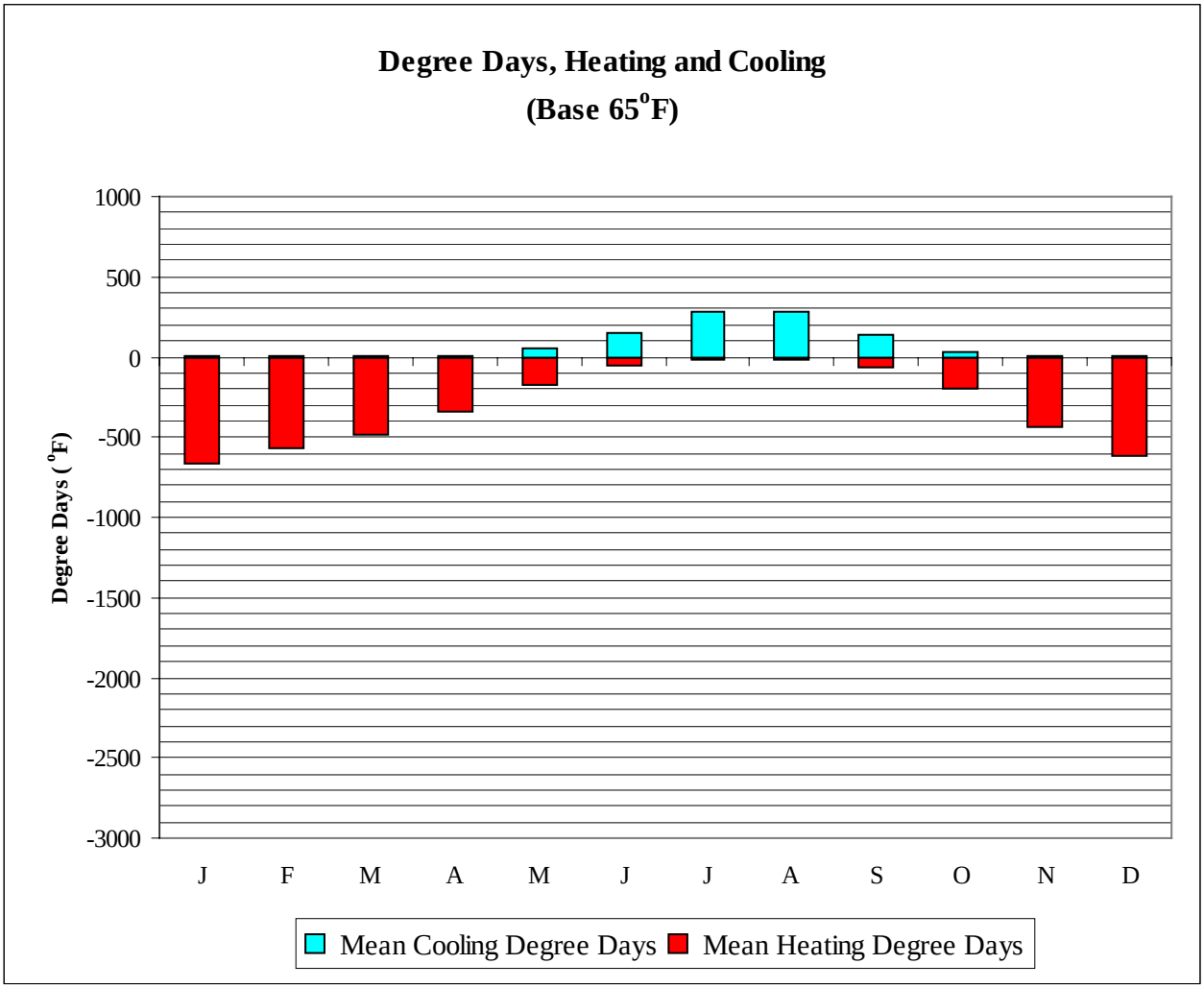


PISA, ITALY WMO No. 161580

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	51.5	50.8	35.9	23.0	58.1	55.1	39.8	27.1
14-Jan	59.0	53.1	51.1	35.7	19.0	56.7	55.2	39.3	26.9
21-Jan	59.0	52.0	51.5	36.4	25.0	56.0	55.5	39.5	26.8
28-Jan	59.0	52.9	53.4	37.7	27.0	60.9	57.0	42.4	28.4
4-Feb	59.0	50.4	53.7	37.3	27.0	57.4	54.5	41.3	27.2
11-Feb	61.0	51.1	54.2	38.0	27.0	58.1	55.7	43.2	28.9
18-Feb	59.0	50.6	52.3	37.1	28.0	58.1	55.6	39.2	26.1
25-Feb	61.0	51.3	53.7	36.8	27.0	56.0	57.1	38.3	25.8
4-Mar	63.0	52.3	55.6	38.2	27.0	58.1	57.1	42.7	27.7
11-Mar	63.0	52.9	56.5	39.1	28.0	57.4	57.0	42.2	28.2
18-Mar	64.0	53.3	58.7	40.8	28.0	61.6	57.3	46.2	31.2
25-Mar	67.0	53.0	59.9	42.7	32.0	64.4	59.3	49.9	32.9
1-Apr	68.0	55.8	60.2	43.9	34.0	65.8	60.0	50.6	34.3
8-Apr	68.0	56.7	61.4	44.9	36.0	65.8	60.7	55.0	37.7
15-Apr	70.0	57.5	61.9	44.6	36.0	68.6	62.7	53.2	35.3
22-Apr	72.0	57.7	63.5	44.3	36.0	69.3	65.4	54.0	35.1
29-Apr	72.0	59.5	64.6	47.7	39.0	74.2	64.9	59.1	40.6
6-May	78.0	64.0	67.0	49.4	41.0	79.8	69.8	63.9	44.4
13-May	77.0	63.7	68.7	50.5	45.0	85.4	68.5	69.8	48.8
20-May	81.0	63.6	71.4	52.3	45.0	86.1	68.0	73.4	50.5
27-May	82.0	65.8	72.8	53.3	46.0	95.9	72.4	75.4	51.7
3-Jun	84.0	69.1	75.0	55.0	48.0	97.3	72.8	80.0	54.8
10-Jun	84.0	68.2	75.5	56.4	50.0	102.9	75.5	82.9	56.9
17-Jun	86.0	67.6	77.4	58.1	50.0	110.6	75.3	88.5	59.8
24-Jun	84.0	68.0	77.7	58.6	54.0	109.2	75.4	89.8	62.1
1-Jul	88.0	68.6	81.1	59.9	54.0	116.9	77.8	95.5	63.7
8-Jul	90.0	70.6	82.7	62.1	56.0	124.6	81.7	101.5	68.9
15-Jul	90.0	70.6	83.8	62.9	57.0	133.0	82.3	105.1	71.5
22-Jul	91.0	71.8	84.1	63.4	57.0	132.3	81.5	106.2	70.8
29-Jul	91.0	73.1	85.1	63.9	57.0	132.3	81.8	108.0	70.9
5-Aug	93.0	73.4	86.2	64.4	59.0	126.7	79.7	109.9	72.1
12-Aug	91.0	72.2	84.4	64.5	59.0	132.3	81.4	108.2	73.9
19-Aug	91.0	69.9	84.8	63.6	59.0	130.2	81.6	108.7	71.6
26-Aug	90.0	71.1	82.8	63.4	55.0	129.5	79.2	105.6	70.7
2-Sep	86.0	70.0	80.1	61.0	54.0	116.9	77.1	96.8	65.7
9-Sep	88.0	68.5	79.1	59.0	52.0	109.9	76.4	91.4	61.7
16-Sep	84.0	69.4	78.4	59.1	52.0	116.2	76.9	92.8	62.5
23-Sep	85.0	71.4	77.1	58.7	50.0	116.2	76.6	91.3	63.7
30-Sep	81.0	68.1	74.6	57.2	48.0	109.9	76.6	84.5	59.6
7-Oct	79.0	66.0	72.3	55.7	46.0	97.3	72.4	80.6	56.0
14-Oct	77.0	63.3	70.6	53.8	45.0	96.6	71.5	74.2	52.1
21-Oct	75.0	64.2	69.2	52.2	43.0	95.9	70.6	71.6	49.1
28-Oct	72.0	63.5	64.8	47.6	37.0	88.9	69.4	61.1	41.4
4-Nov	70.0	61.0	63.4	48.4	37.0	84.7	66.1	62.0	43.8
11-Nov	68.0	59.9	61.5	45.2	32.0	78.4	64.1	56.2	39.8
18-Nov	66.0	59.5	59.9	43.9	32.0	74.9	63.6	53.9	36.2
25-Nov	63.0	56.4	56.1	41.0	28.0	69.3	61.2	47.9	33.0
2-Dec	61.0	55.2	54.4	39.5	28.0	65.1	59.5	43.9	29.8
9-Dec	61.0	54.7	53.3	38.5	27.0	61.6	57.4	42.5	29.7
16-Dec	59.0	54.4	52.8	39.0	25.0	66.5	57.5	43.3	29.8
23-Dec	61.0	56.8	53.4	39.2	27.0	66.5	59.0	45.3	31.3
31-Dec	59.0	55.0	51.4	37.4	27.0	66.5	58.3	41.5	28.5

PISA, ITALY WMO No. 161580



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	665
FEB	0	570
MAR	1	484
APR	6	336
MAY	55	172
JUN	149	58
JUL	286	17
AUG	279	15
SEP	136	61
OCT	35	202
NOV	1	440
DEC	0	622
ANN	949	3642

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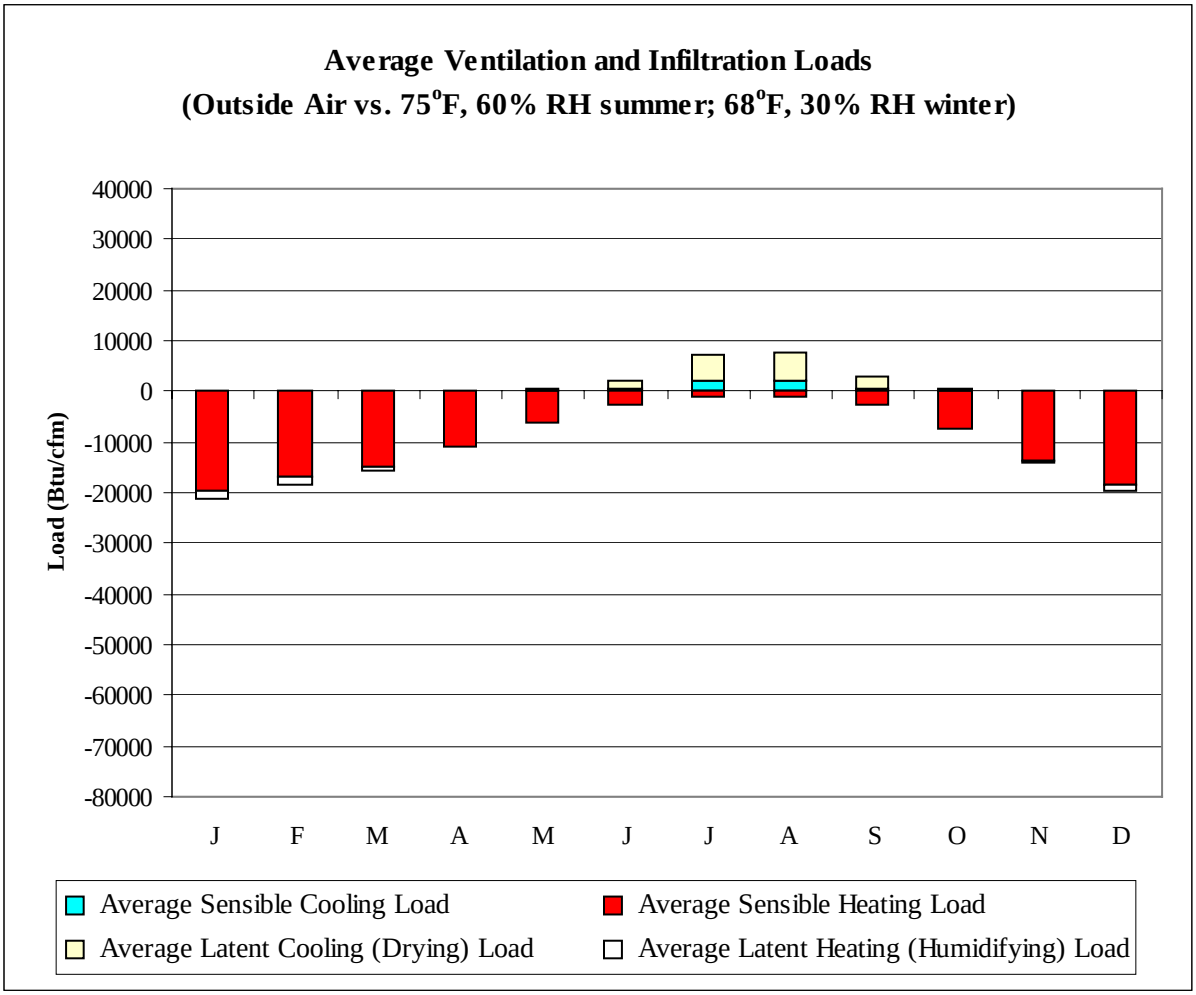


	Average Sensible Cooling Load (Btu/cfm)	Average Sensible Heating Load (Btu/cfm)	Average Latent Cooling Load (Btu/cfm)	Average Latent Heating Load (Btu/cfm)
JAN	0	-19650	0	-1612
FEB	0	-16967	0	-1451
MAR	0	-14943	0	-855
APR	1	-10943	1	-160
MAY	129	-6233	206	-4
JUN	722	-2554	1563	-2
JUL	2215	-931	4964	-1
AUG	2116	-901	5635	-1
SEP	552	-2654	2235	-5
OCT	41	-7174	376	-49
NOV	0	-13707	11	-480
DEC	0	-18530	0	-1216
ANN	5776	-115187	14991	-5836

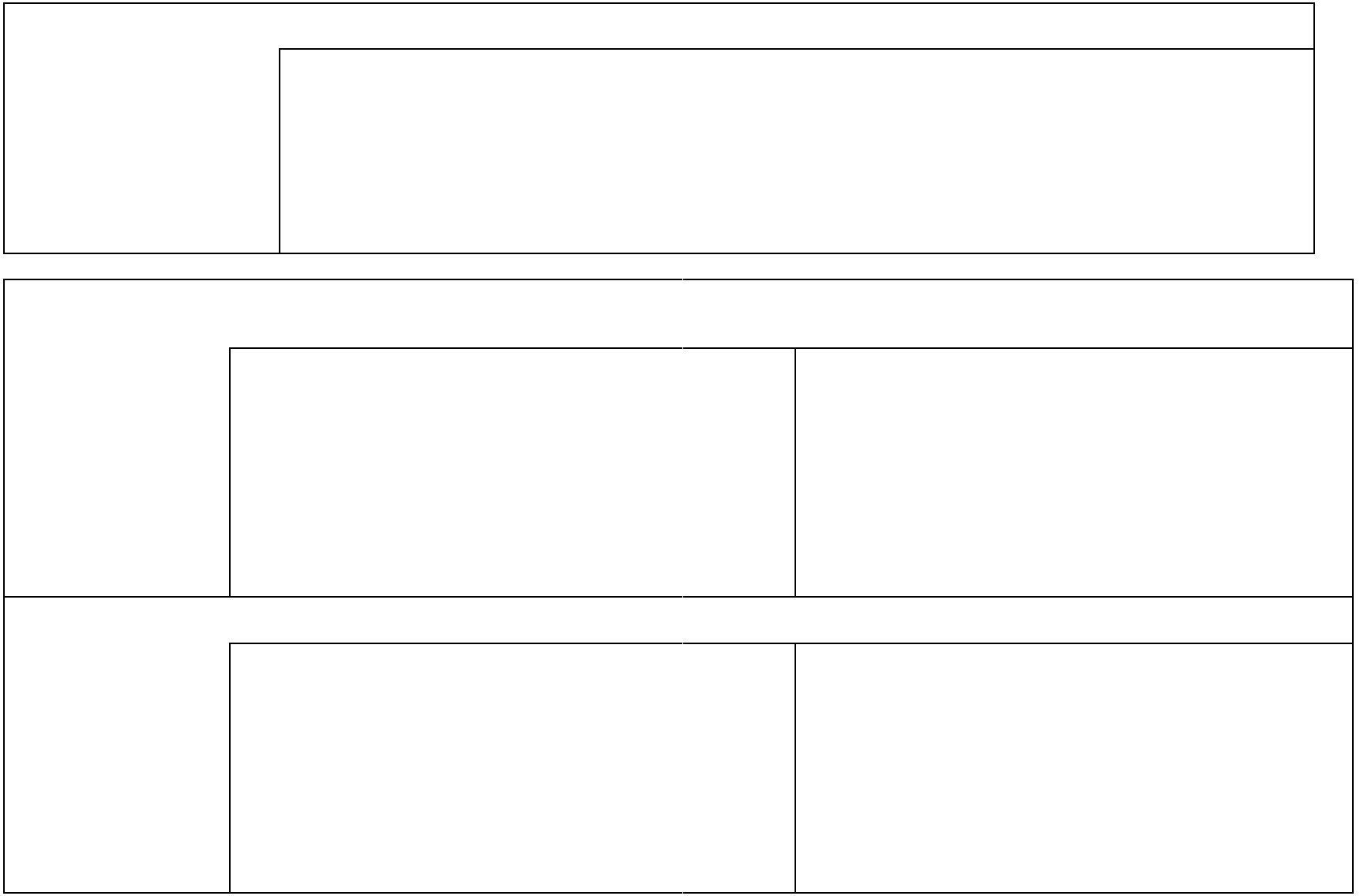
Average Annual Solar Radiation – Nearest Available Site

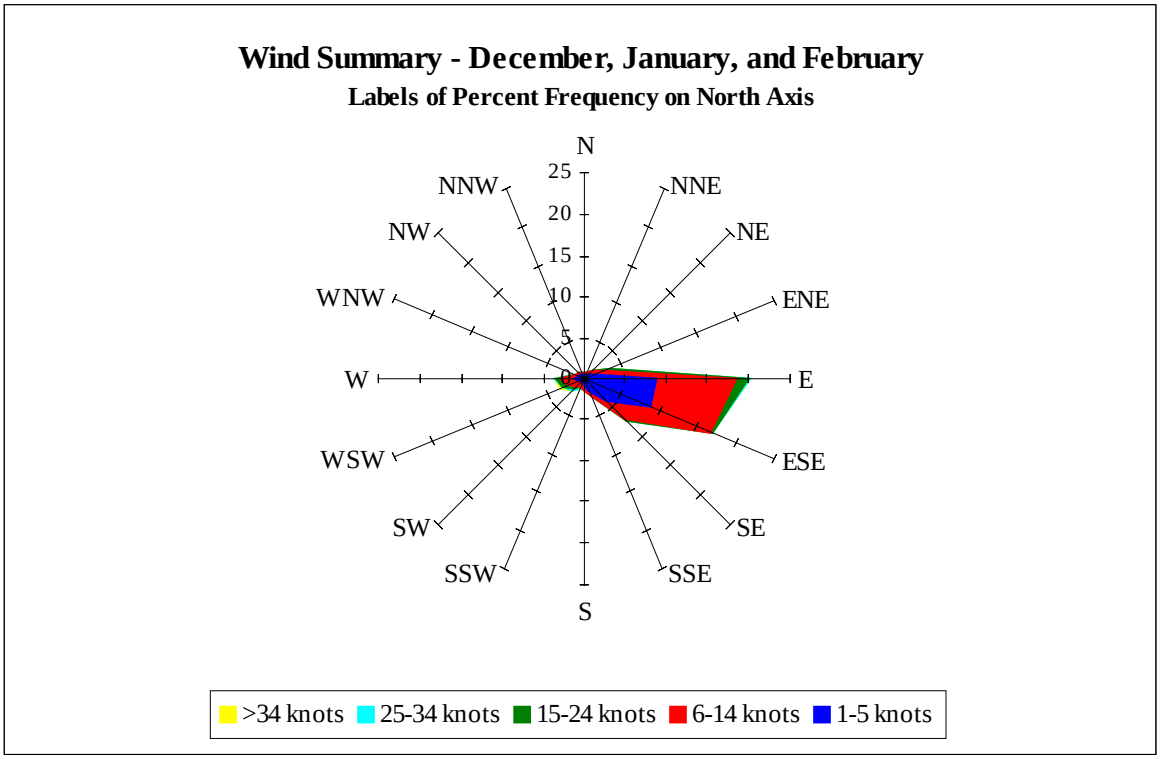
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

No Solar Radiation
Data Available

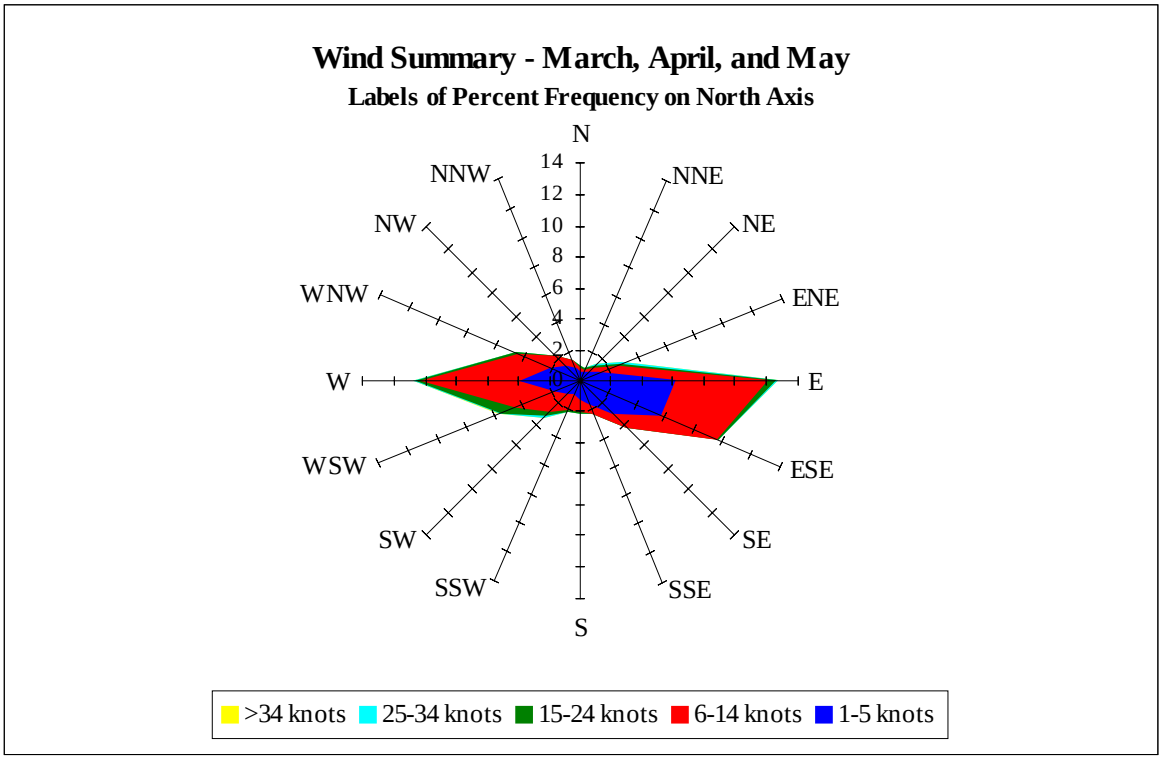
Average Annual Solar Heat and Illumination – Nearest Available Site

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

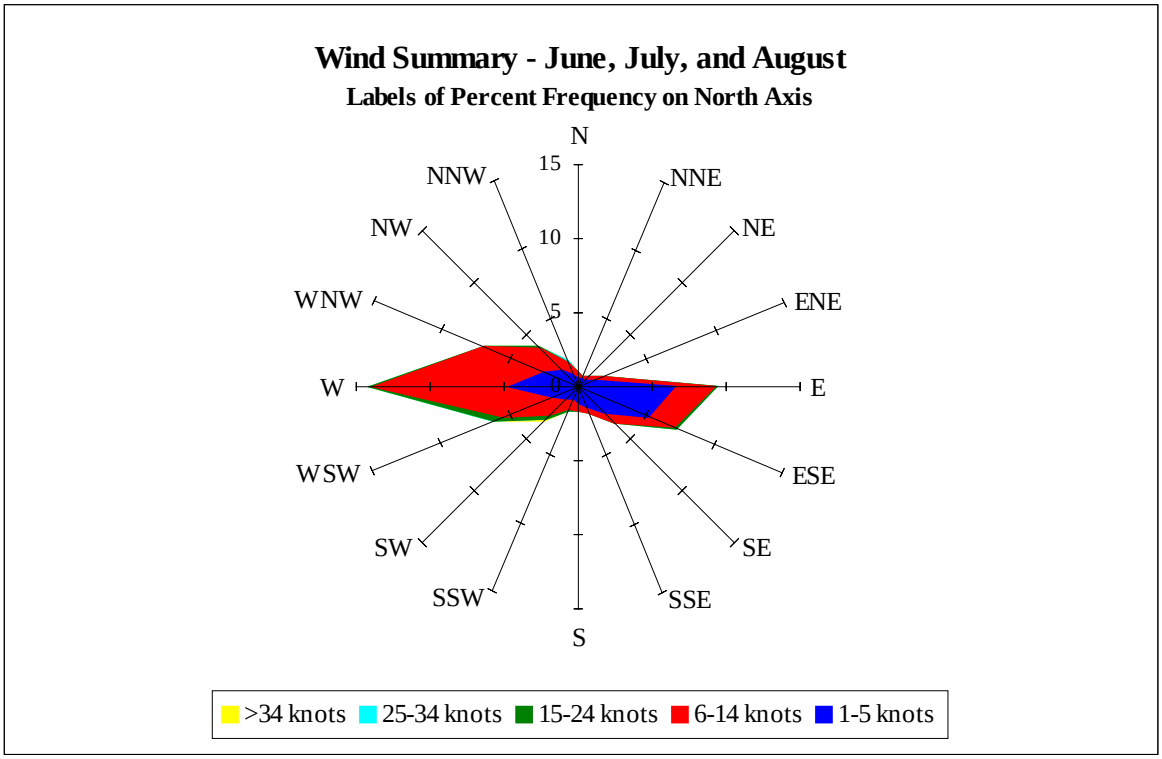




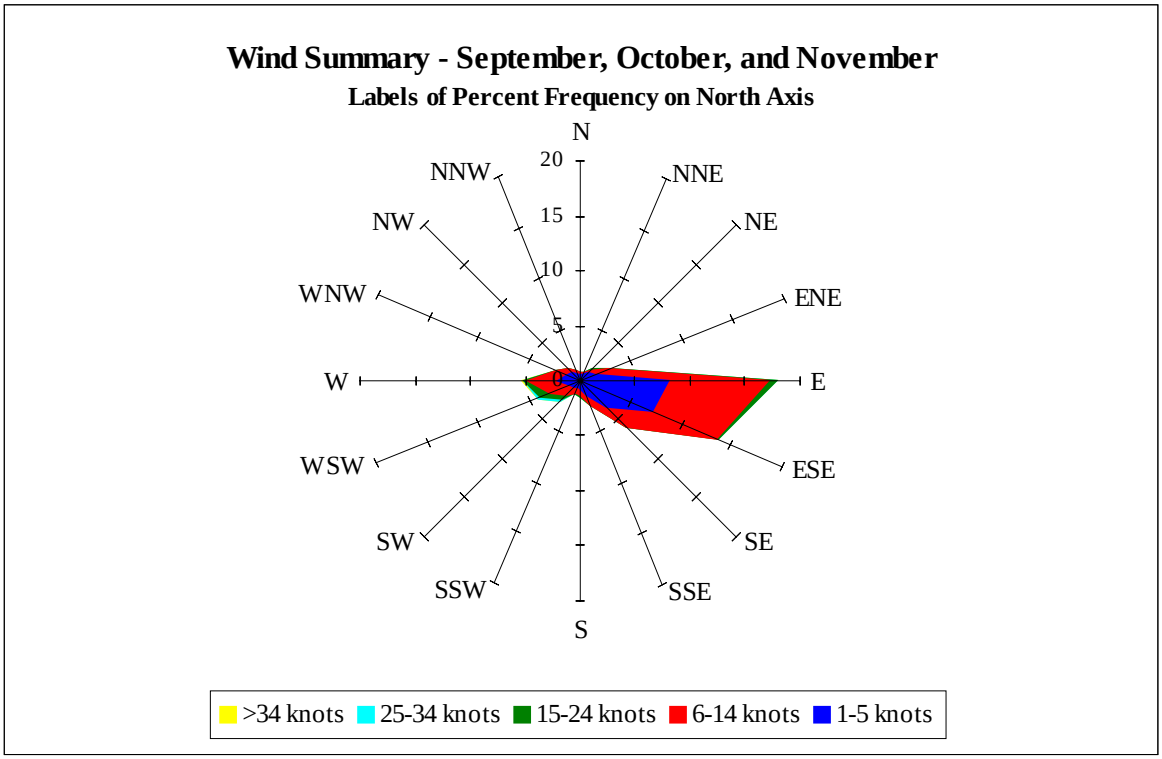
Percent Calm = 33.01



Percent Calm = 33.80



Percent Calm = 34.56



Percent Calm = 34.75