

TORREJON (USAFB) SP

Latitude = 40.48 N

Longitude = 3.47 W

Period of Record = 1967 to 1996

WMO No. 082270

Elevation = 1995 feet

Average Pressure = 27.94 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	66	44	10.0	SW
0.4% Occurrence	97	65	50	7.6	VARIABLE
1.0% Occurrence	93	64	51	7.0	VARIABLE
2.0% Occurrence	91	64	52	6.5	VARIABLE
Mean Daily Range	23	-	-	-	-
97.5% Occurrence	30	28	20	2.3	NNE
99.0% Occurrence	27	26	18	2.0	NNE
99.6% Occurrence	25	23	15	1.9	NE
Median of Extreme Lows	19	17	11	1.2	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	70	91	81	5.6	S
0.4% Occurrence	68	88	74	5.9	SSW
1.0% Occurrence	67	88	70	5.9	VARIABLE
2.0% Occurrence	65	85	64	6.0	VARIABLE
	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	98	74	0.61	6.1	N
0.4% Occurrence	86	72	0.54	4.8	NE
1.0% Occurrence	85	73	0.54	4.7	NE
2.0% Occurrence	75	72	0.47	4.9	NE
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		126	827	2	92

Other Site Data

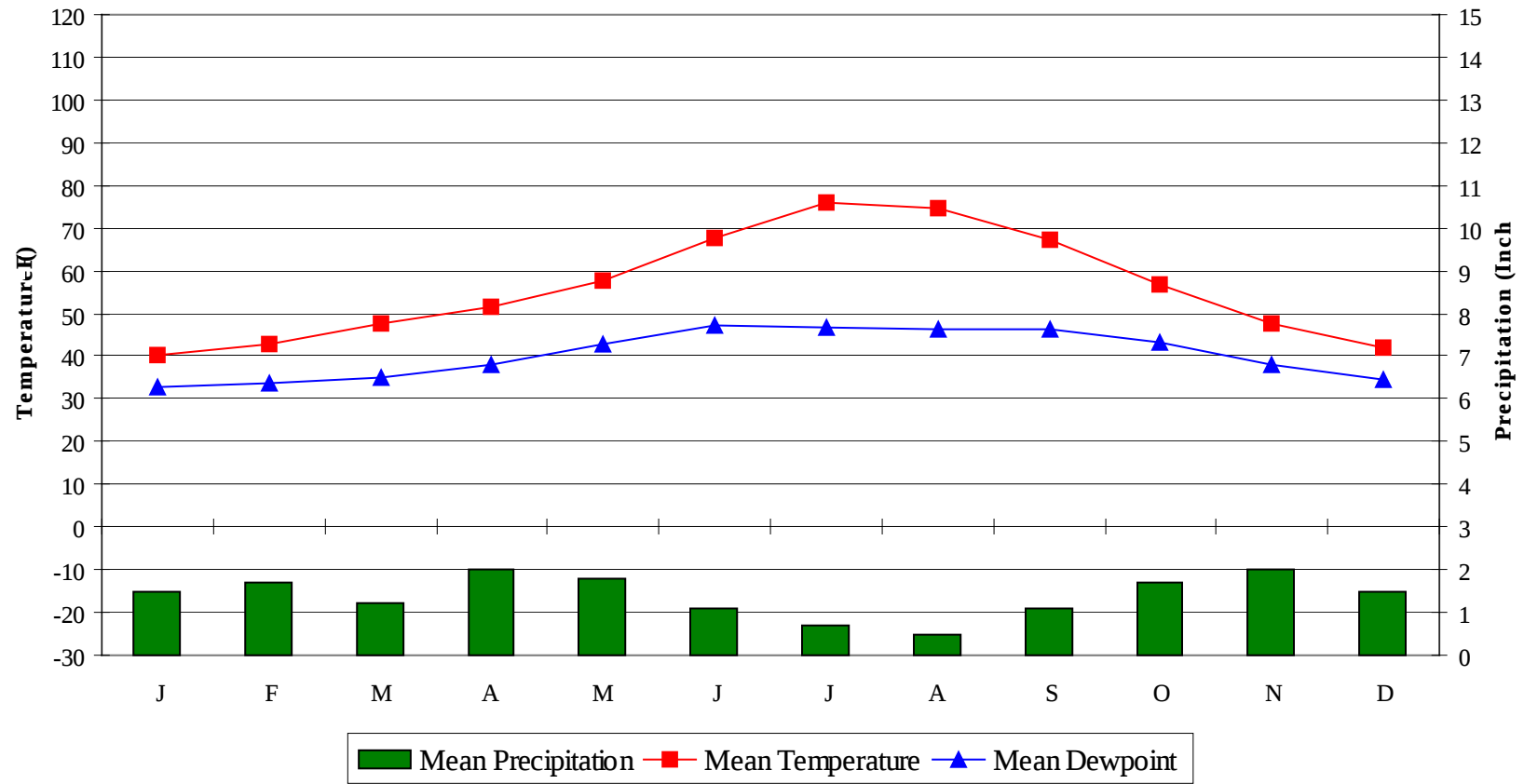
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
7	N/A	N/A	0.0 + 0.9
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
58.5	N/A	N/A	48

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

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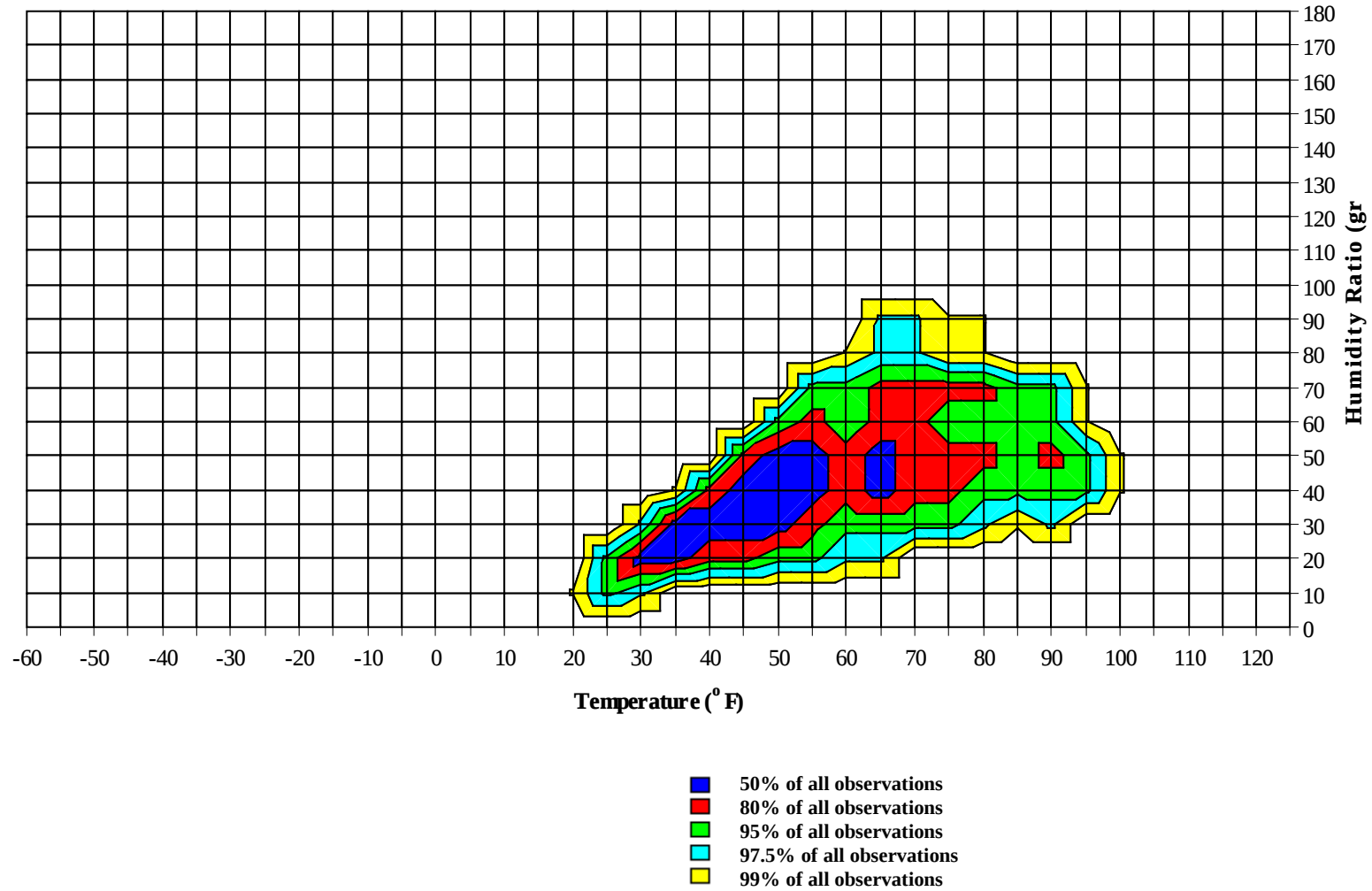
Average Annual Climate



TORREJON (USAFB) SP

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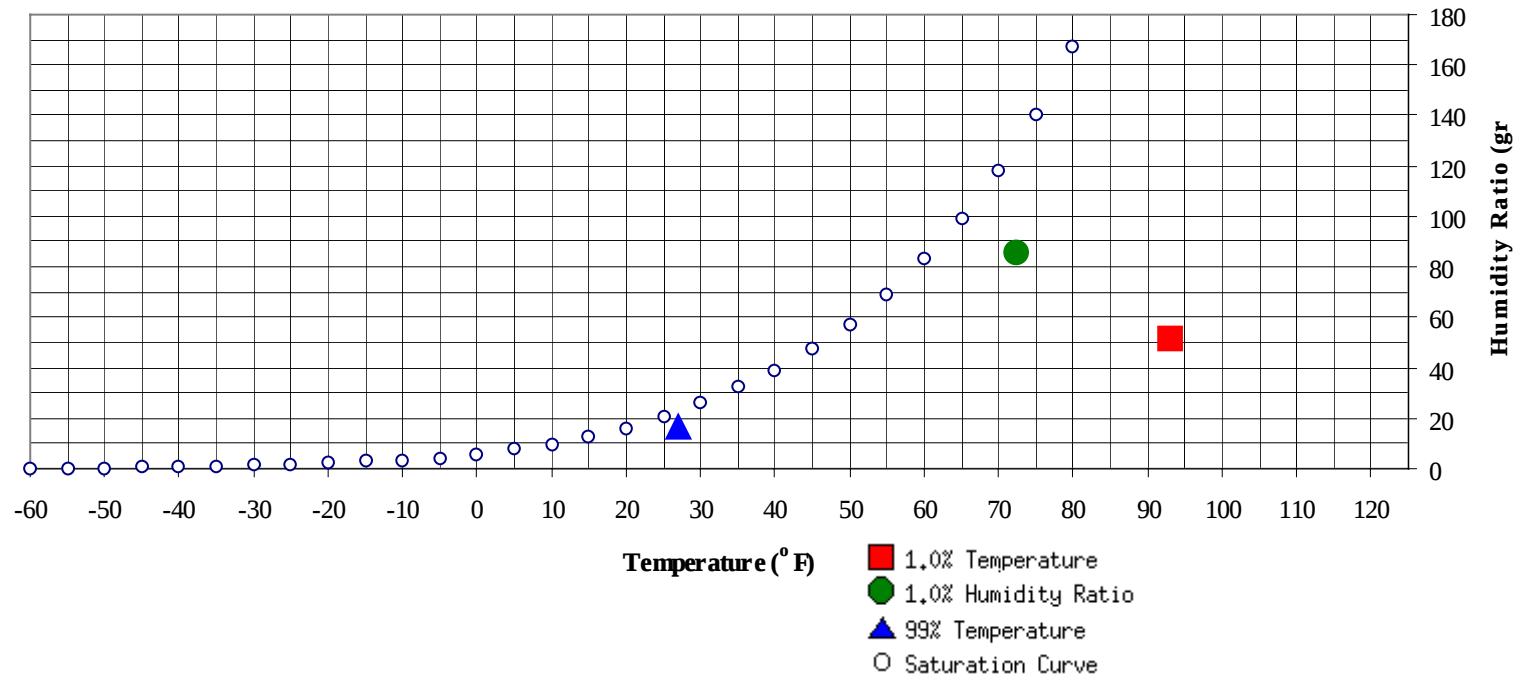
Long Term Psychrometric Summary



TORREJON (USAFB) SP

WMO No. 082270

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	27	16.8	9.1		85.4	72.5	64.7	60.8	30.7

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	93	51.6	64.5	30.4

TORREJON (USAFB) SP

WMO No. 082270

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		
105 / 109															
100 / 104															
95 / 99															
90 / 94															
85 / 89															
80 / 84															
75 / 79												1	1	1	54.2
70 / 74		0		0	48.5			0	0	56.0		5	4	9	53.8
65 / 69		0	0	0	49.7		1	0	1	51.8		8	7	15	51.9
60 / 64		2	1	3	49.0		7	7	14	49.8		30	22	52	50.5
55 / 59	0	15	7	22	47.9	1	24	17	42	48.2	1	45	37	83	47.6
50 / 54	8	43	34	85	46.2	8	49	40	97	45.7	17	61	61	140	45.1
45 / 49	34	71	64	169	42.5	37	64	70	172	42.3	58	58	67	183	41.9
40 / 44	31	35	43	109	39.1	32	30	38	99	38.6	44	20	26	90	38.4
35 / 39	56	43	61	160	34.8	68	32	37	137	34.6	77	15	20	112	34.5
30 / 34	62	25	31	118	30.0	50	13	12	75	29.8	37	5	3	44	29.8
25 / 29	47	11	6	64	25.3	23	5	2	30	25.1	12	1	0	12	25.1
20 / 24	8	2	0	10	20.8	3	1	0	4	20.3	1	0		1	20.7
15 / 19	2	0	0	2	16.8	2	0	0	2	16.0	0	0		0	17.5
10 / 14	0	0		0	12.4	0			0	12.0					

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.

TORREJON (USAFB) SP

WMO No. 082270

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		
105 / 109															
100 / 104												0	0	0	64.5
95 / 99												2	2	4	64.9
90 / 94							0	0	0	63.7		10	10	21	63.9
85 / 89							1	1	2	61.4		16	14	30	62.8
80 / 84		0	0	1	57.6		10	9	19	60.1	0	39	32	71	61.4
75 / 79		3	3	6	56.3		17	14	31	58.2	1	44	34	79	59.7
70 / 74		12	10	22	55.2	0	39	29	68	56.2	8	52	45	105	57.9
65 / 69		15	12	26	53.4	1	32	23	56	54.5	14	28	29	71	56.2
60 / 64	1	46	37	84	50.9	10	58	52	120	52.7	61	34	43	138	54.7
55 / 59	7	59	47	114	48.5	37	49	52	139	50.5	78	14	23	114	51.8
50 / 54	31	60	63	154	46.1	72	32	43	147	47.6	55	2	6	63	48.4
45 / 49	79	37	50	166	42.6	75	10	21	106	43.4	19	0	1	21	44.1
40 / 44	51	7	13	71	38.8	31	0	3	34	39.4	3			3	39.9
35 / 39	51	3	7	61	35.0	18	0	1	19	35.9	0			0	37.4
30 / 34	13	0	0	14	30.2	2			2	30.6					
25 / 29	2		0	2	25.7	0			0	26.7					
20 / 24	0			0	20.0										
15 / 19															
10 / 14															

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TORREJON (USAFB) SP

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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		
105 / 109							0	0	0	67.1					
100 / 104		3	3	7	65.9		2	2	3	66.3		0	0	0	64.6
95 / 99		19	20	39	65.3		11	11	22	65.8		1	1	2	65.1
90 / 94		41	40	81	63.9		36	36	72	63.9		12	11	23	63.8
85 / 89	0	34	29	63	62.5	0	30	27	57	62.6		13	9	22	63.0
80 / 84	2	58	48	109	61.4	1	59	49	109	61.6		39	30	69	61.7
75 / 79	13	45	41	98	59.9	9	47	45	100	59.8	1	45	36	82	60.0
70 / 74	45	32	40	117	57.9	37	40	47	123	57.8	10	51	51	111	58.1
65 / 69	48	9	13	69	56.0	44	12	18	74	55.7	18	28	31	76	56.2
60 / 64	87	6	12	105	54.0	97	9	13	119	53.4	69	33	45	147	54.2
55 / 59	39	1	2	42	50.2	46	1	2	49	49.6	72	13	19	104	50.6
50 / 54	12		0	13	46.7	12	0	0	12	46.0	45	4	7	56	46.9
45 / 49	1			1	44.6	2			2	42.4	21	1	1	23	42.6
40 / 44											3	0		3	38.4
35 / 39											1			1	34.4
30 / 34															
25 / 29															
20 / 24															
15 / 19															
10 / 14															

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TORREJON (USAFB) SP

WMO No. 082270

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		
105 / 109															
100 / 104															
95 / 99															
90 / 94															
85 / 89		0	0	1	59.5										
80 / 84		5	3	9	60.5										
75 / 79		15	9	24	58.6		0		0	53.0					
70 / 74	0	34	23	57	57.2		4	1	4	55.2					
65 / 69	1	29	22	52	55.3		6	3	9	54.3		0	0	0	52.7
60 / 64	16	61	56	133	53.6	1	31	16	48	52.5	0	5	2	7	51.9
55 / 59	45	52	61	158	50.9	12	48	36	96	50.1	3	20	11	34	50.1
50 / 54	69	32	50	150	47.4	36	60	60	156	47.3	15	53	36	105	47.0
45 / 49	70	15	21	106	42.8	56	51	65	171	42.6	44	71	74	189	43.0
40 / 44	26	2	3	31	38.9	36	18	28	82	38.8	30	33	40	103	38.9
35 / 39	17	2	1	20	35.1	59	16	24	99	34.9	63	40	55	158	35.0
30 / 34	3	0	0	3	30.2	29	5	7	42	29.9	54	18	24	95	30.0
25 / 29	0			0	26.7	11	2	0	13	25.6	32	7	5	45	25.3
20 / 24						0	0		1	21.4	5	1	0	7	21.1
15 / 19											0	0	0	0	17.6
10 / 14															

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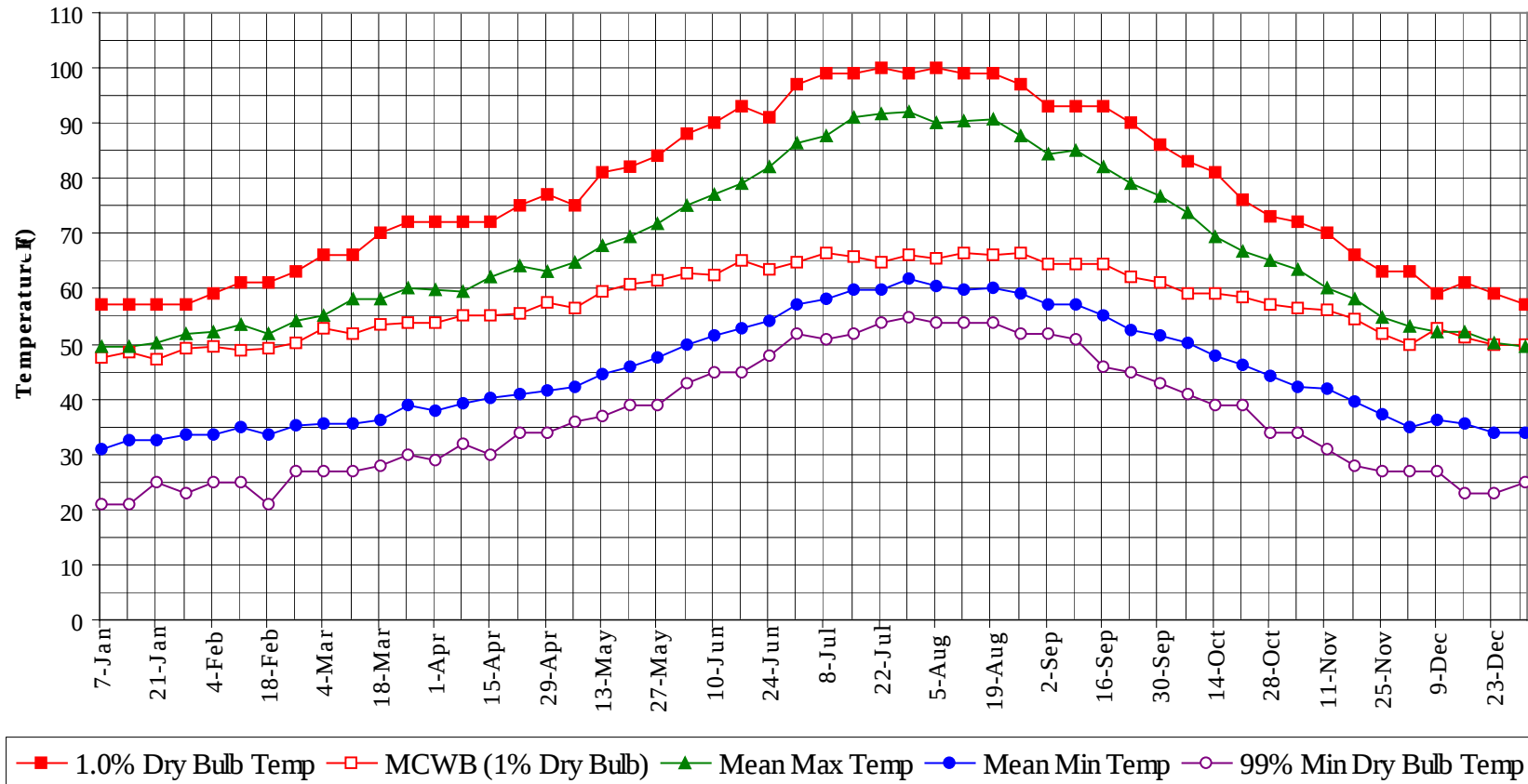
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1967 to 1996

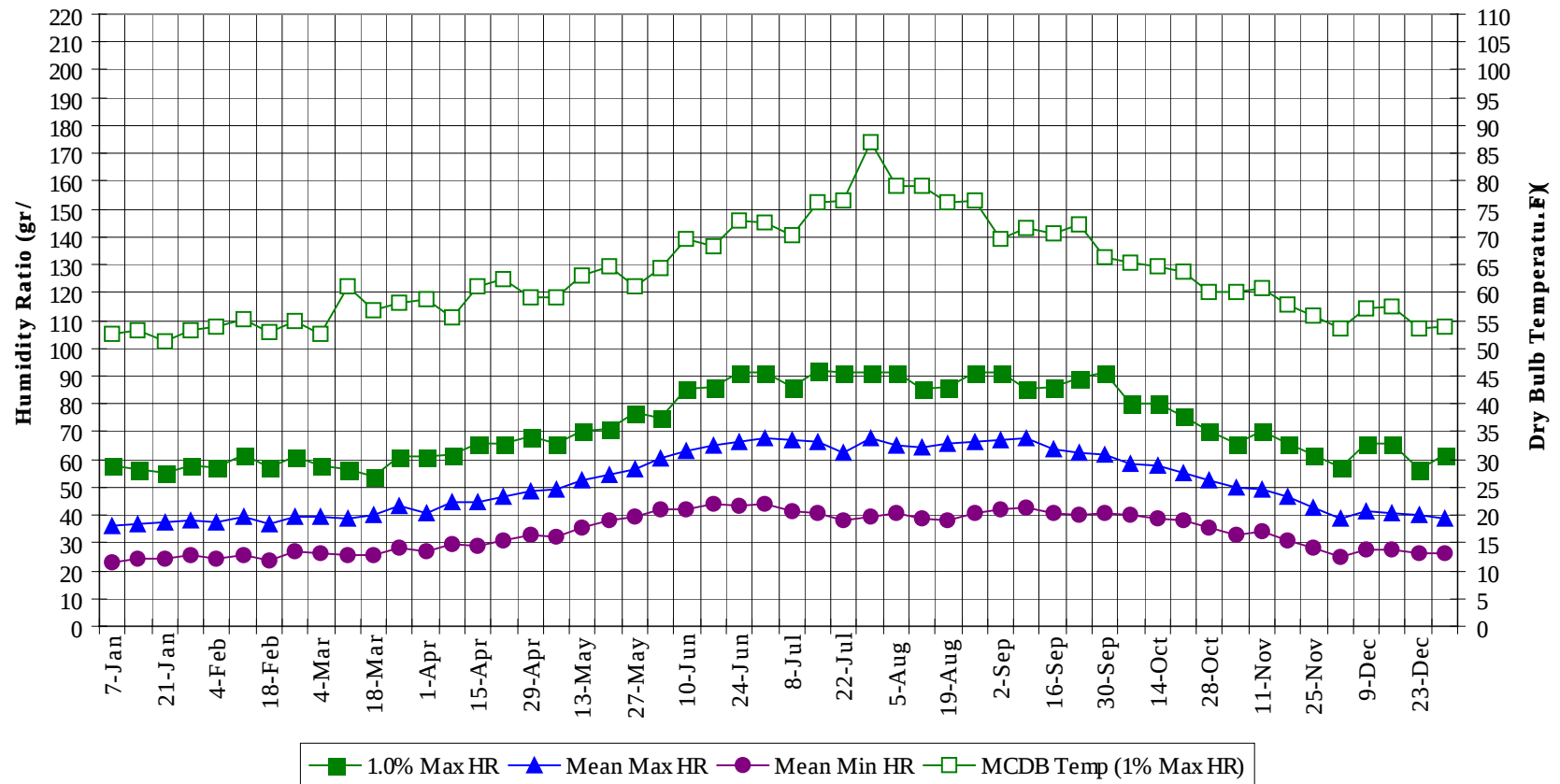
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
105 / 109		0	0	0	67.1
100 / 104		5	5	10	65.9
95 / 99		32	33	65	65.4
90 / 94		99	96	196	63.9
85 / 89	0	93	80	173	62.6
80 / 84	3	210	169	382	61.4
75 / 79	23	214	181	418	59.6
70 / 74	98	265	249	612	57.5
65 / 69	125	166	156	447	55.4
60 / 64	338	322	304	963	53.2
55 / 59	339	340	314	993	50.0
50 / 54	378	399	403	1180	46.7
45 / 49	498	381	439	1318	42.6
40 / 44	288	147	196	631	38.8
35 / 39	414	153	208	775	34.8
30 / 34	254	66	78	399	30.0
25 / 29	128	26	15	169	25.3
20 / 24	19	4	1	24	20.8
15 / 19	4	1	0	5	16.5
10 / 14	0	0		0	12.3

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



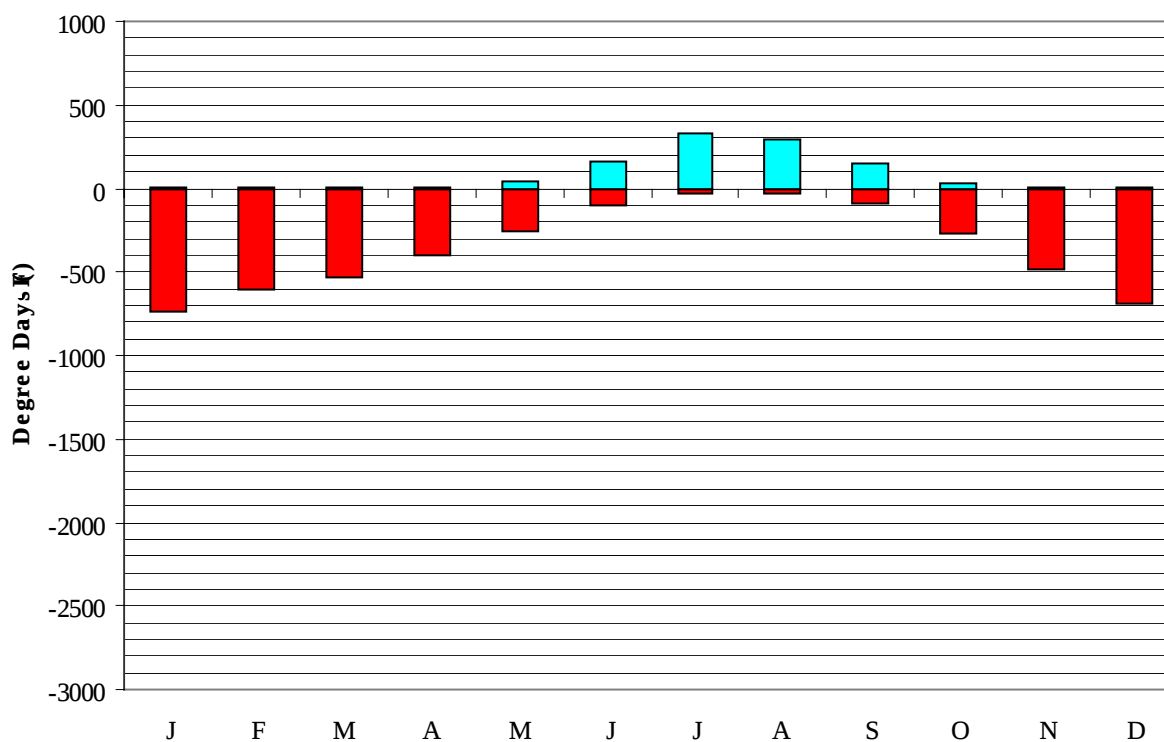
TORREJON (USAFB) SP**WMO No. 082270****Long Term Dry Bulb Temperature and Humidity Summary**

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	47.6	49.5	30.9	21.0	58.1	52.5	35.9	23.0
14-Jan	57.0	48.4	49.4	32.6	21.0	56.7	53.3	36.7	24.3
21-Jan	57.0	47.2	50.3	32.5	25.0	55.3	51.1	37.5	24.2
28-Jan	57.0	49.2	51.9	33.5	23.0	58.1	53.3	38.3	25.4
4-Feb	59.0	49.6	52.0	33.5	25.0	57.4	53.9	37.4	24.5
11-Feb	61.0	48.9	53.5	34.8	25.0	61.6	55.2	39.5	25.9
18-Feb	61.0	49.1	51.7	33.6	21.0	57.4	52.7	36.8	23.9
25-Feb	63.0	50.1	54.1	35.3	27.0	60.9	54.8	39.4	26.9
4-Mar	66.0	53.0	55.3	35.4	27.0	58.1	52.7	39.2	26.1
11-Mar	66.0	51.8	58.0	35.6	27.0	56.7	61.1	39.0	25.5
18-Mar	70.0	53.4	58.1	36.3	28.0	53.9	56.7	40.0	25.9
25-Mar	72.0	53.8	60.2	38.8	30.0	60.9	58.1	43.0	28.0
1-Apr	72.0	53.8	59.7	37.8	29.0	60.9	58.8	41.0	27.2
8-Apr	72.0	55.3	59.6	39.4	32.0	61.6	55.6	44.4	29.8
15-Apr	72.0	55.3	62.0	40.1	30.0	65.8	61.1	44.4	29.2
22-Apr	75.0	55.5	64.1	40.9	34.0	65.8	62.3	46.5	30.9
29-Apr	77.0	57.5	63.0	41.7	34.0	68.6	59.0	48.5	32.9
6-May	75.0	56.4	64.8	42.3	36.0	65.8	59.0	49.1	32.4
13-May	81.0	59.5	68.0	44.5	37.0	70.0	63.0	52.8	35.7
20-May	82.0	60.7	69.4	46.0	39.0	70.7	64.8	54.2	37.9
27-May	84.0	61.4	71.9	47.4	39.0	77.0	61.0	56.6	39.2
3-Jun	88.0	63.0	75.1	49.8	43.0	74.9	64.4	60.5	41.8
10-Jun	90.0	62.4	77.1	51.4	45.0	85.4	69.6	62.8	42.0
17-Jun	93.0	65.2	79.3	52.8	45.0	86.1	68.2	64.7	43.8
24-Jun	91.0	63.6	82.2	54.2	48.0	91.0	72.8	66.1	43.2
1-Jul	97.0	64.9	86.3	57.1	52.0	91.0	72.5	67.8	43.9
8-Jul	99.0	66.5	87.7	58.1	51.0	86.1	70.2	66.8	41.7
15-Jul	99.0	65.8	91.1	59.7	52.0	91.7	76.0	66.1	41.0
22-Jul	100.0	64.9	91.7	59.8	54.0	91.0	76.6	62.3	37.9
29-Jul	99.0	66.0	92.1	61.8	55.0	91.0	86.9	67.9	39.4
5-Aug	100.0	65.6	90.2	60.4	54.0	91.0	79.2	64.8	40.5
12-Aug	99.0	66.3	90.2	59.8	54.0	85.4	79.3	64.6	38.5
19-Aug	99.0	66.3	90.8	60.2	54.0	86.1	76.3	65.4	38.2
26-Aug	97.0	66.6	87.7	59.1	52.0	91.0	76.5	66.1	40.5
2-Sep	93.0	64.3	84.5	57.3	52.0	91.0	69.6	66.9	41.9
9-Sep	93.0	64.5	85.0	57.3	51.0	85.4	71.6	67.6	42.7
16-Sep	93.0	64.4	82.2	55.0	46.0	86.1	70.6	63.8	40.5
23-Sep	90.0	62.1	79.2	52.6	45.0	89.6	72.2	62.2	40.0
30-Sep	86.0	61.3	76.9	51.5	43.0	91.0	66.5	61.5	40.5
7-Oct	83.0	59.0	73.9	50.2	41.0	79.8	65.3	58.7	40.2
14-Oct	81.0	59.3	69.6	48.0	39.0	79.8	64.6	57.5	38.8
21-Oct	76.0	58.6	66.7	46.2	39.0	75.6	63.7	55.1	37.9
28-Oct	73.0	57.2	65.3	44.1	34.0	70.0	60.2	52.8	35.7
4-Nov	72.0	56.7	63.5	42.1	34.0	65.8	60.0	49.9	33.1
11-Nov	70.0	56.1	60.1	42.0	31.0	70.0	60.8	49.4	33.9
18-Nov	66.0	54.4	58.2	39.7	28.0	65.8	57.8	46.9	30.9
25-Nov	63.0	51.9	54.8	37.3	27.0	61.6	55.8	42.5	28.4
2-Dec	63.0	50.0	53.1	34.9	27.0	57.4	53.7	38.9	25.1
9-Dec	59.0	52.7	52.0	36.3	27.0	65.8	57.1	41.2	27.8
16-Dec	61.0	51.3	52.2	35.6	23.0	65.8	57.3	40.8	27.5
23-Dec	59.0	49.9	50.3	33.9	23.0	56.7	53.4	39.8	26.1
31-Dec	57.0	49.8	49.6	34.0	25.0	61.6	53.9	38.6	26.3

TORREJON (USAFB) SP

WMO No. 082270

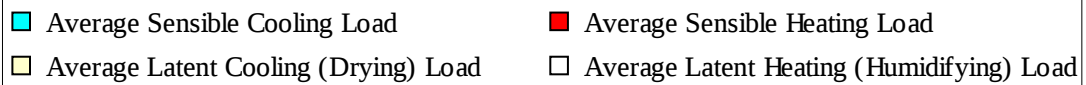
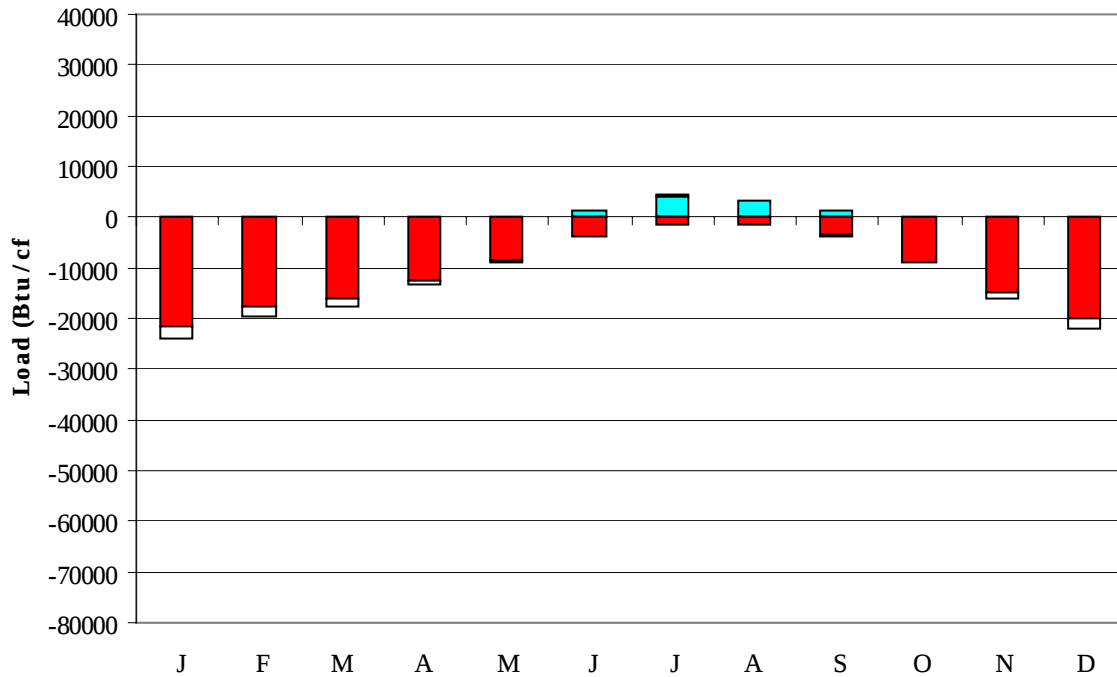
Degree Days, Heating and Cooling
(Base 65°F)



Mean Cooling Degree Days Mean Heating Degree Days

	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	736
FEB	0	600
MAR	4	529
APR	10	402
MAY	46	261
JUN	157	99
JUL	324	30
AUG	290	32
SEP	151	94
OCT	33	266
NOV	1	491
DEC	0	686
ANN	1018	4226

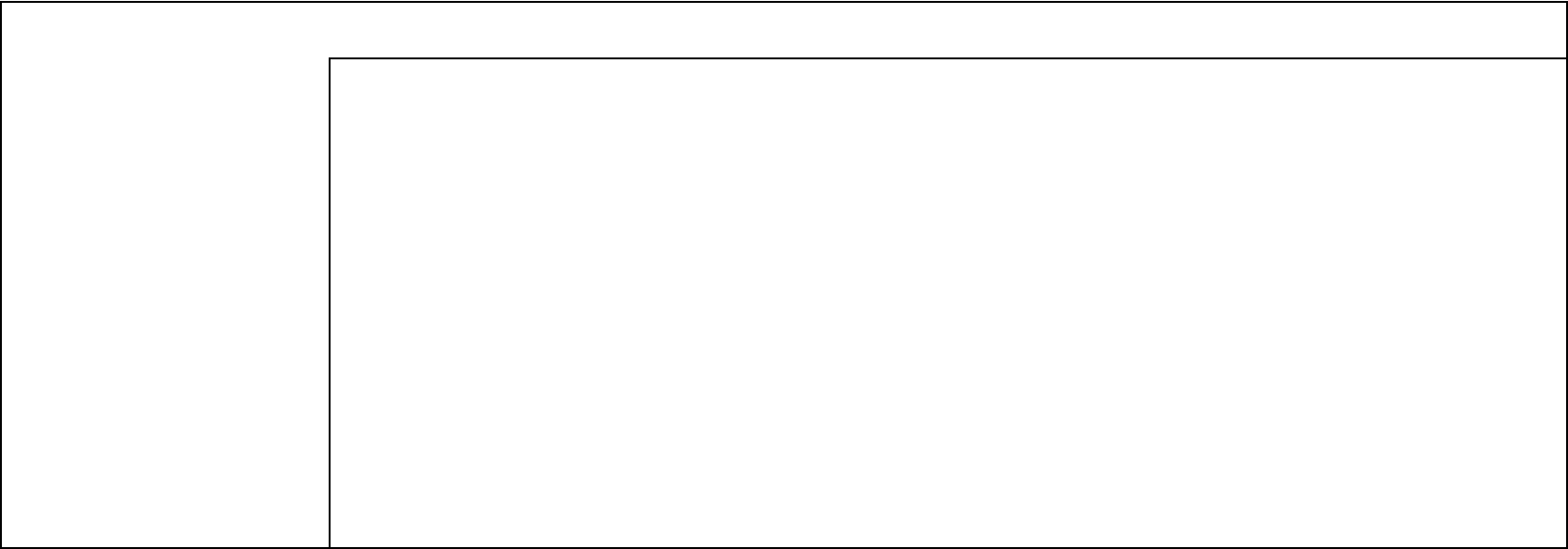
Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	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	-21405	0	-2420
FEB	0	-17678	0	-1930
MAR	1	-15976	0	-1736
APR	14	-12552	0	-932
MAY	211	-8554	2	-280
JUN	1451	-3706	45	-103
JUL	4252	-1355	60	-86
AUG	3416	-1473	44	-127
SEP	1328	-3528	35	-142
OCT	105	-8784	1	-358
NOV	0	-14869	0	-1165
DEC	0	-20105	0	-1759
ANN	10778	-129985	187	-11038

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

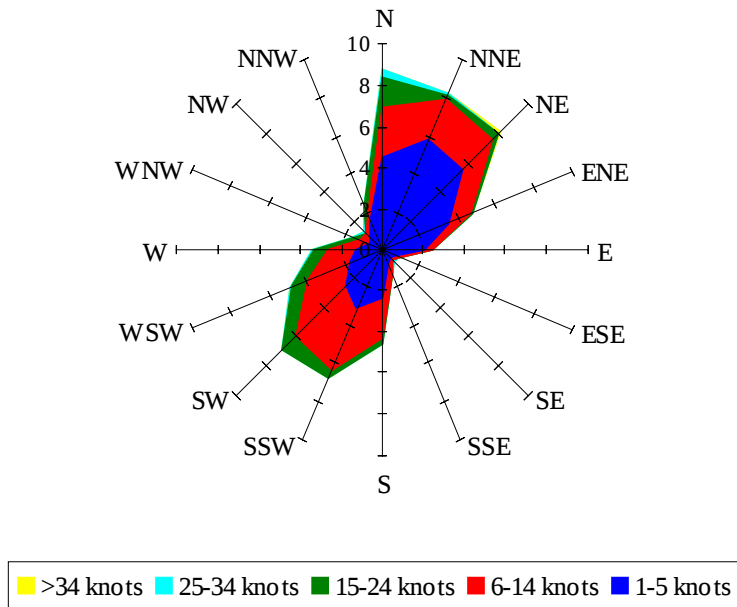
No Solar Radiation
Data Available



Average Annual Solar Heat and Illumination – Nearest Available Site

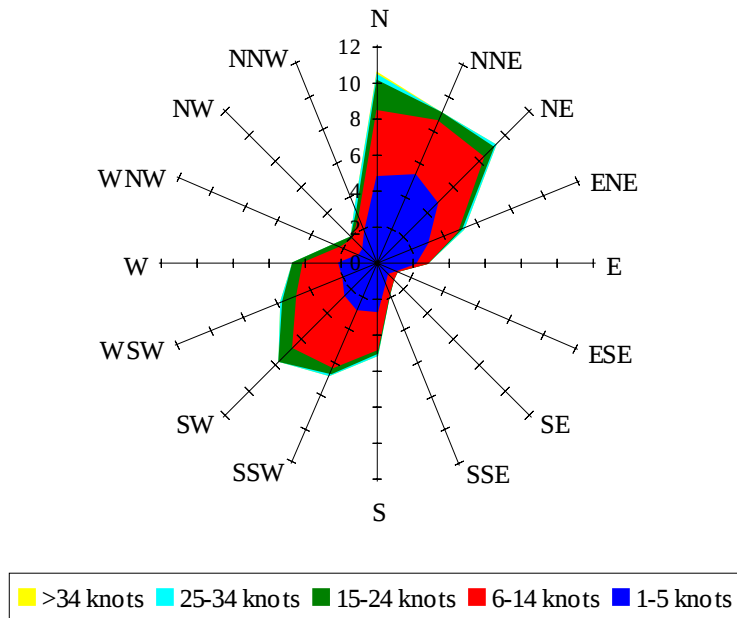
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

Wind Summary - December, January, and February **Labels of Percent Frequency on North Axis**



Percent Calm = 33.19

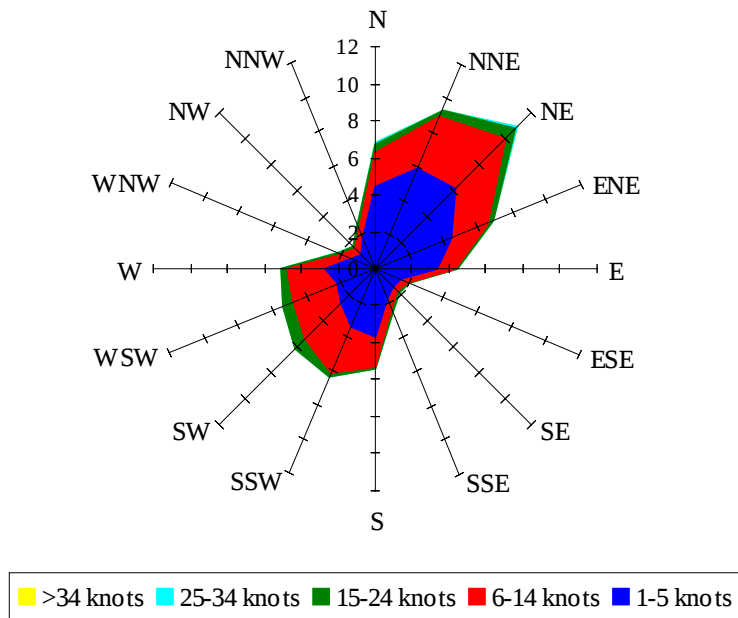
Wind Summary - March, April, and May **Labels of Percent Frequency on North Axis**



Percent Calm = 21.58

Wind Summary - June, July, and August

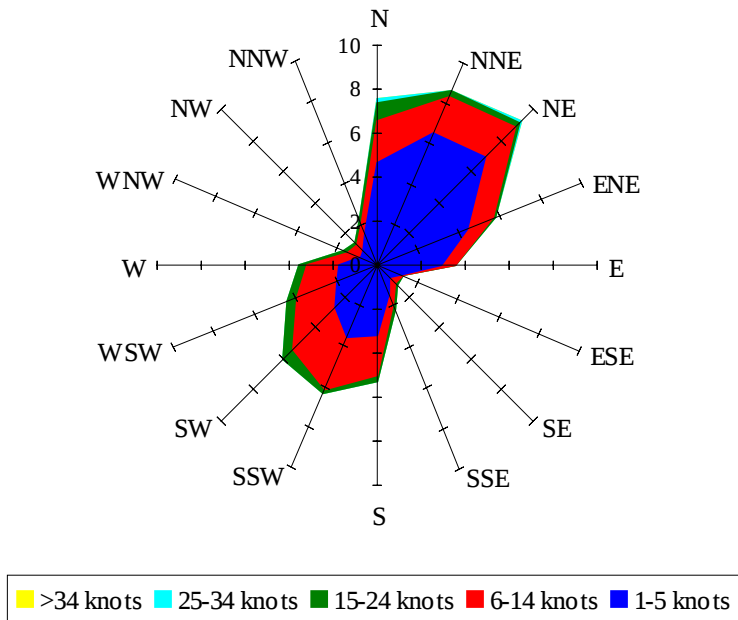
Labels of Percent Frequency on North Axis



Percent Calm = 20.92

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 29.55