

HANAU AAF, GERMANY

Latitude = 50.17 N

Longitude = 8.97 E

Period of Record = 1973 to 1996

WMO No. 106420

Elevation = 367 feet

Average Pressure = 29.60 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	91	69	74	5.3	E
0.4% Occurrence	88	69	74	5.6	E
1.0% Occurrence	84	68	75	5.0	E
2.0% Occurrence	82	66	72	5.1	E
Mean Daily Range	13	-	-	-	-
97.5% Occurrence	27	26	17	3.2	NNE
99.0% Occurrence	21	20	13	2.3	ENE
99.6% Occurrence	16	15	10	2.2	NNE
Median of Extreme Lows	15	14	10	2.4	NNE
	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	74	85	106	5.2	VARIABLE
0.4% Occurrence	71	83	93	4.7	VARIABLE
1.0% Occurrence	70	81	91	4.6	E
2.0% Occurrence	68	79	84	4.6	E
	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	111	80	0.74	4.8	VARIABLE
0.4% Occurrence	104	78	0.69	4.5	VARIABLE
1.0% Occurrence	92	76	0.61	4.4	S
2.0% Occurrence	88	70	0.57	4.8	SSW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		7	282	19	287

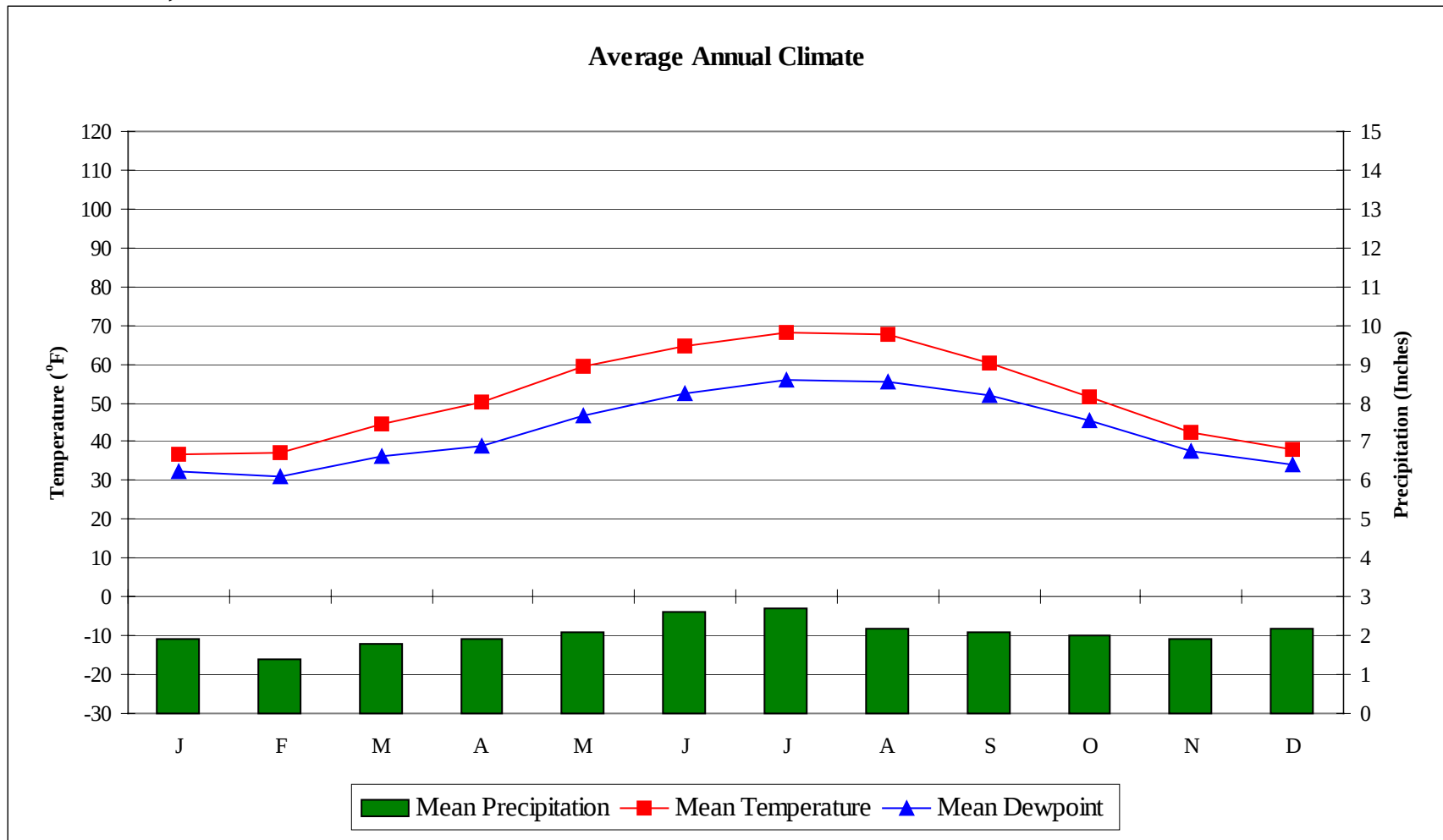
Other Site Data

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	0.1 + 0.2
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 (#)
54.9	N/A	N/A	25

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

HANAU AAF, GERMANY

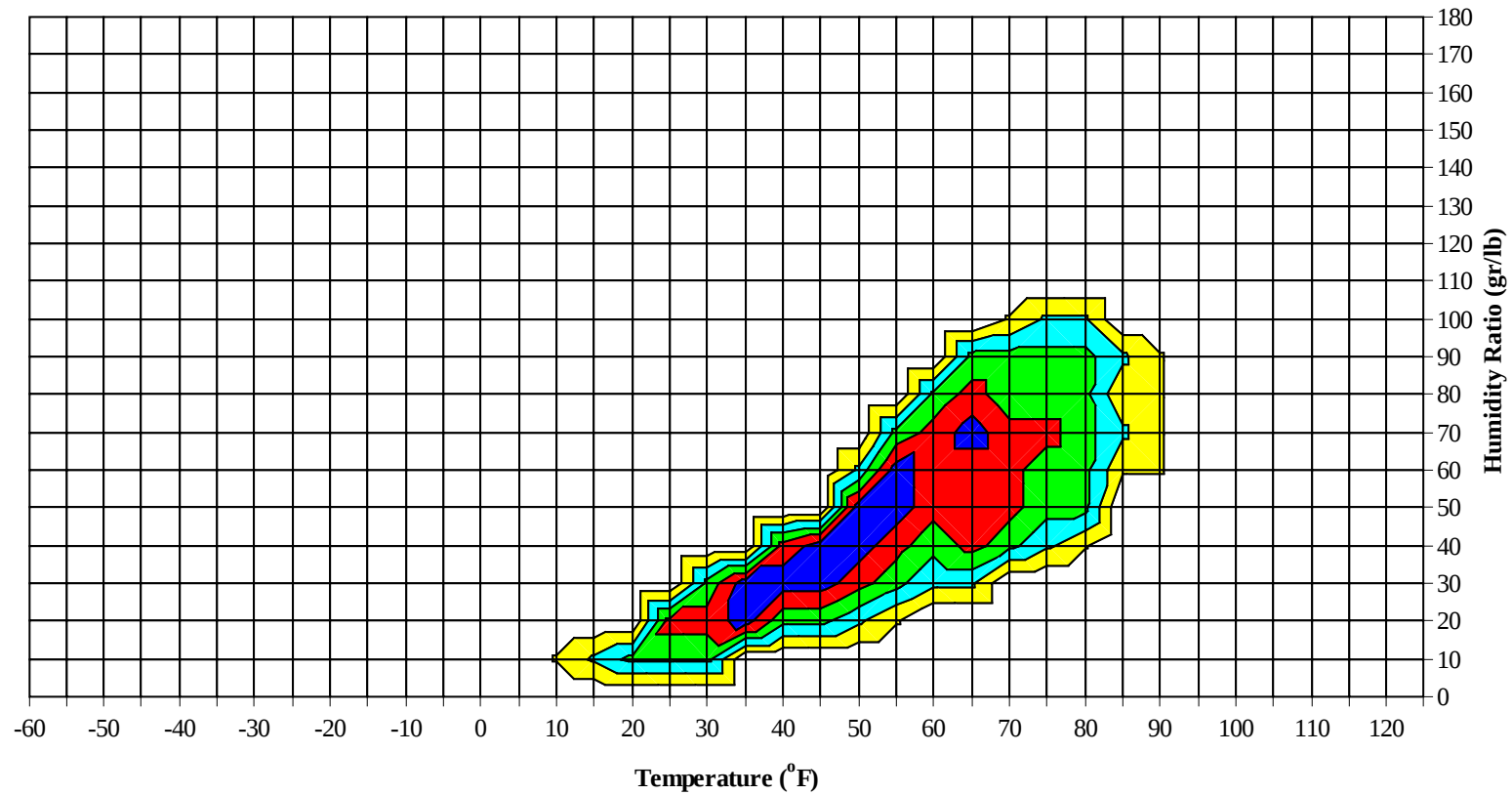
WMO No. 106420



HANAU AAF, GERMANY

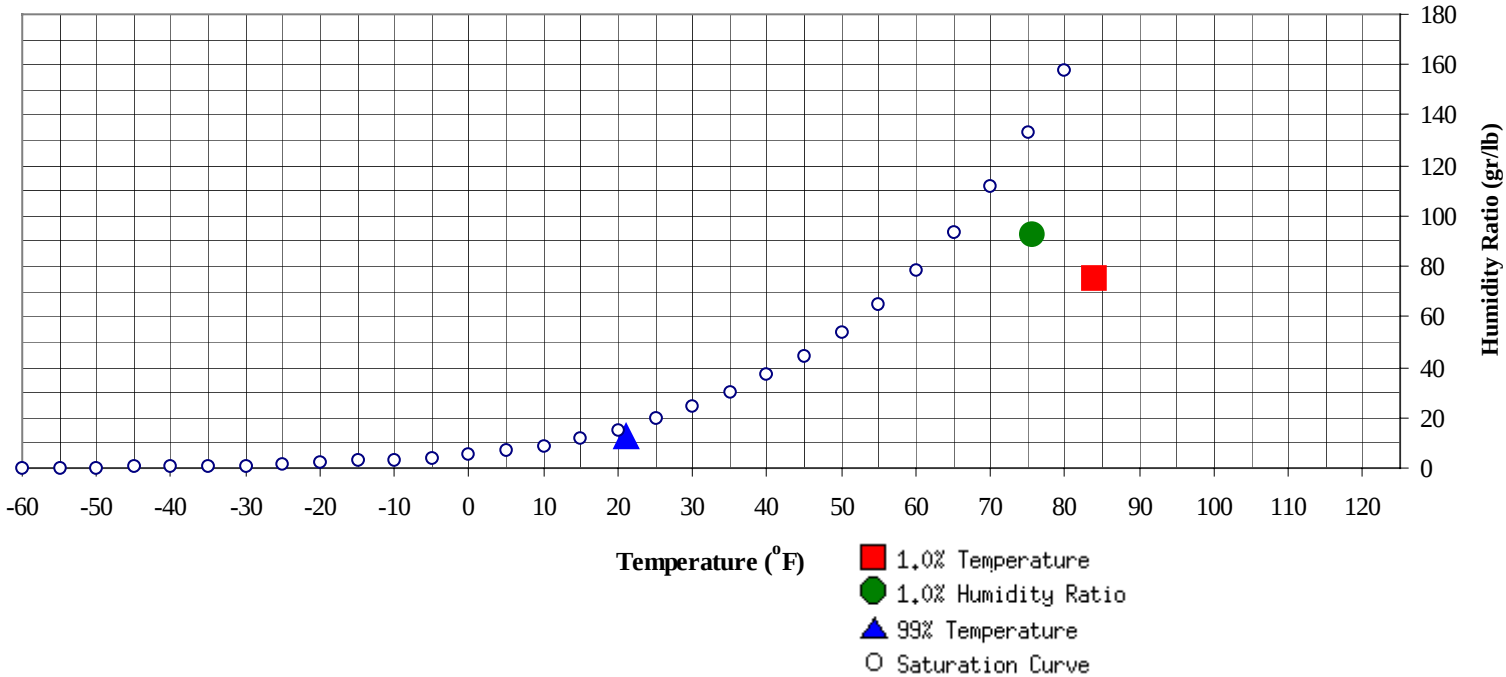
WMO No. 106420

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

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)
	21	12.7	7.0		92.4	75.6	68.1	64.4	32.6

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	84	75.4	67.8	32.0

HANAU AAF, GERMANY

WMO No. 106420

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		
95 / 99															
90 / 94															
85 / 89															
80 / 84															
75 / 79												0	0	0	58.5
70 / 74												1	1	2	56.6
65 / 69												3	2	5	55.1
60 / 64		0		0	55.0	0	1	0	1	54.7		12	9	21	52.8
55 / 59	1	2	1	4	51.0	1	3	3	7	49.7	2	24	20	46	50.1
50 / 54	7	12	11	30	48.3	2	11	9	22	46.7	12	45	41	98	46.7
45 / 49	34	45	47	125	43.7	14	39	30	83	42.7	48	73	68	189	42.4
40 / 44	36	34	35	105	39.8	22	30	34	86	39.4	38	36	40	114	39.1
35 / 39	74	76	72	222	35.5	72	72	76	220	35.2	79	42	46	168	35.3
30 / 34	48	40	45	132	31.1	63	42	46	151	30.6	45	10	16	71	30.6
25 / 29	21	19	19	59	25.5	32	18	21	71	25.2	15	2	4	21	25.5
20 / 24	7	7	5	19	20.8	6	4	2	12	20.5	6	0	0	6	21.2
15 / 19	10	8	7	25	16.8	7	3	2	12	16.4	2	0	0	2	17.5
10 / 14	4	4	5	13	11.5	3	1	1	5	10.9	0			0	13.0
5 / 9	4	1	2	7	7.2	2	0		2	5.8					
0 / 4	2	1	0	3	1.1	0			0	1.0					
-5 / -1	0		0	0	-4.0										
-10 / -6			0	0	-6.0										

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.

HANAU AAF, GERMANY

WMO No. 106420

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		
95 / 99															
90 / 94							1	0	1	68.7		2	2	4	68.3
85 / 89							1	1	2	66.4		4	4	8	68.5
80 / 84		0	0	0	60.8		8	7	15	63.6		19	14	33	66.0
75 / 79		4	2	6	59.2		17	14	31	61.0	1	32	27	60	63.6
70 / 74		11	6	17	56.8	1	38	28	67	58.9	9	46	38	93	61.7
65 / 69	0	12	7	19	55.1	4	28	23	55	57.0	15	31	32	78	59.5
60 / 64	1	29	26	56	52.7	24	55	54	133	54.8	58	57	59	174	57.0
55 / 59	7	42	39	88	49.3	57	49	57	163	51.7	78	38	42	158	53.2
50 / 54	32	52	53	137	46.5	71	37	42	150	48.6	55	10	19	84	50.0
45 / 49	70	57	61	188	42.5	63	12	19	94	44.1	21	1	2	24	45.0
40 / 44	42	20	26	88	39.2	18	1	3	22	40.3	3			3	41.7
35 / 39	66	13	18	97	35.9	10	0	1	11	37.0	1			1	38.1
30 / 34	21	1	1	23	31.4										
25 / 29	1			1	26.8										
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															

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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		
95 / 99		1	1	2	70.3	0	0	0	0	72.7					
90 / 94		7	4	11	69.8	3	3	3	9	69.5	0	0	0	0	67.5
85 / 89		11	9	20	68.7	4	7	4	15	68.4	0	0	0	0	68.4
80 / 84		31	24	55	67.3	20	30	20	70	66.7	3	5	3	11	68.2
75 / 79	3	39	32	74	65.2	34	44	33	112	64.5	8	16	8	32	65.7
70 / 74	17	53	49	118	62.6	56	61	55	172	62.5	22	37	22	81	62.3
65 / 69	28	37	36	101	60.7	38	34	38	110	60.7	24	33	24	81	59.6
60 / 64	87	51	61	198	58.1	62	52	62	176	58.2	69	73	68	210	57.4
55 / 59	79	18	30	127	54.3	26	14	26	66	54.4	67	52	67	186	53.7
50 / 54	29	1	4	34	51.1	5	2	5	12	50.7	36	20	36	92	50.1
45 / 49	5			5	46.1	1	0	1	2	46.1	11	3	11	25	45.7
40 / 44	0			0	40.0					41.6	1	0	0	1	41.2
35 / 39										37.5	0		0	0	37.6
30 / 34															
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															

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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		
95 / 99															
90 / 94															
85 / 89															
80 / 84	0 0 66.7														
75 / 79	2 1 3 64.9														
70 / 74	8 3 11 61.8														
65 / 69	9 6 15 59.3														
60 / 64	2	39	23	64	56.7	3	1	4	55.0	0	0	51.5			
55 / 59	22	56	48	126	53.1	2	14	8	24	51.8	3	5	3	11	51.7
50 / 54	48	66	63	177	49.0	13	40	26	79	48.4	13	16	15	44	48.6
45 / 49	79	48	64	192	44.4	57	70	75	202	44.1	28	41	35	104	43.9
40 / 44	35	11	21	67	40.7	42	42	46	130	39.9	32	38	42	112	40.0
35 / 39	45	8	17	70	36.9	67	47	48	162	36.2	76	78	76	230	35.9
30 / 34	14	1	1	16	31.8	36	17	24	77	31.1	47	43	46	136	31.1
25 / 29	2			2	27.1	18	7	10	35	26.1	28	19	23	70	25.7
20 / 24						3	1	1	5	21.2	9	4	5	18	20.8
15 / 19						2	0	0	2	18.1	8	3	2	13	17.5
10 / 14											2	0	1	3	12.1
5 / 9											1	0	1	2	7.7
0 / 4											0	0		0	1.5
-5 / -1															
-10 / -6															

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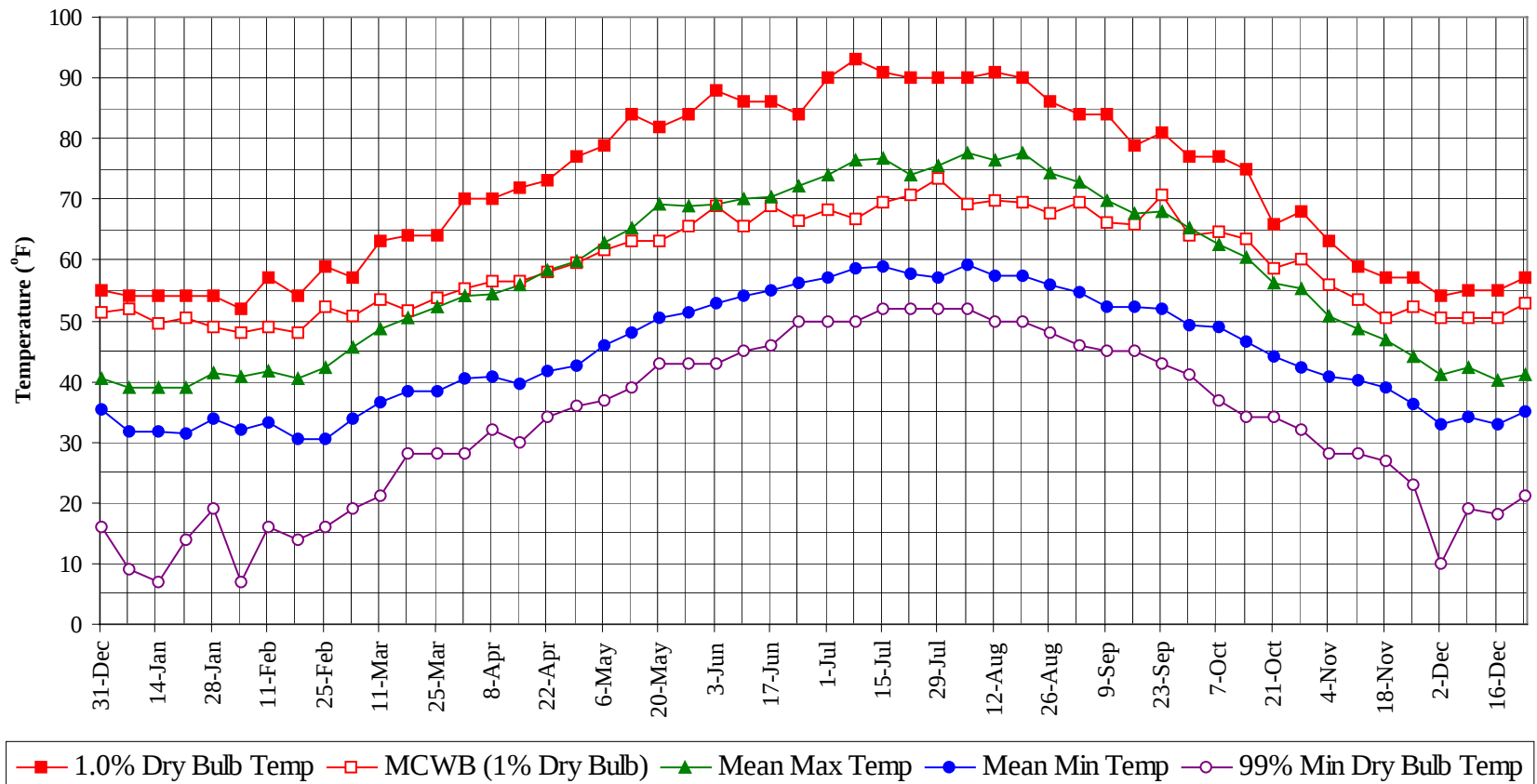
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

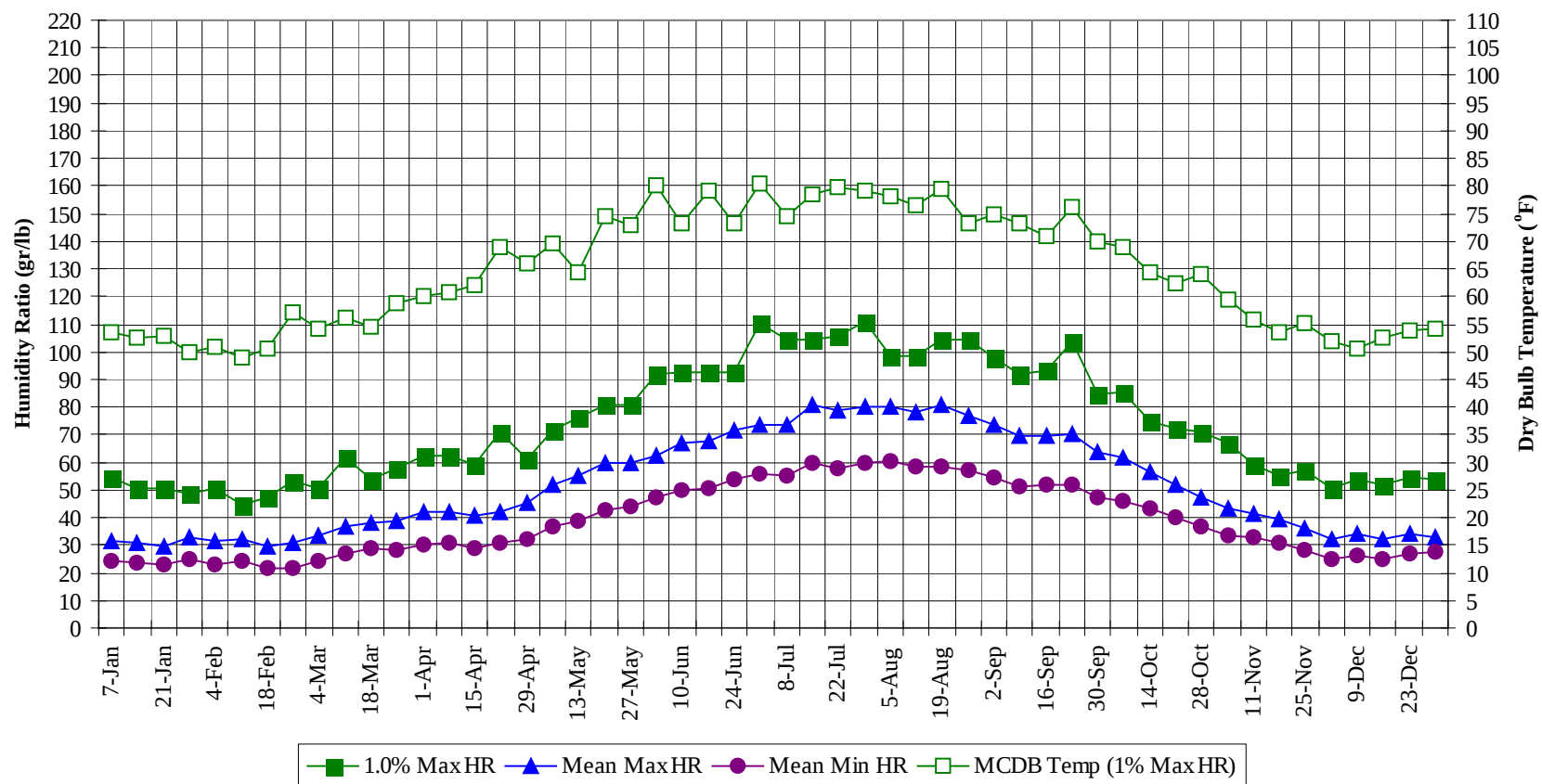
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99		1	1	2	70.9
90 / 94		13	11	24	69.4
85 / 89		25	19	44	68.4
80 / 84		96	74	170	66.6
75 / 79	6	158	128	292	64.1
70 / 74	39	259	219	517	61.6
65 / 69	81	190	180	451	59.5
60 / 64	329	378	387	1094	56.8
55 / 59	441	319	355	1115	52.7
50 / 54	415	311	322	1048	48.5
45 / 49	465	385	398	1248	43.6
40 / 44	261	208	232	701	39.7
35 / 39	455	328	330	1113	35.7
30 / 34	251	150	165	566	30.9
25 / 29	106	64	69	239	25.6
20 / 24	28	16	12	56	20.8
15 / 19	27	14	10	51	16.9
10 / 14	9	5	6	20	11.5
5 / 9	5	2	2	9	7.0
0 / 4	2	1	0	3	1.1
-5 / -1	0		0	0	-4.0
-10 / -6			0	0	-6.0
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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

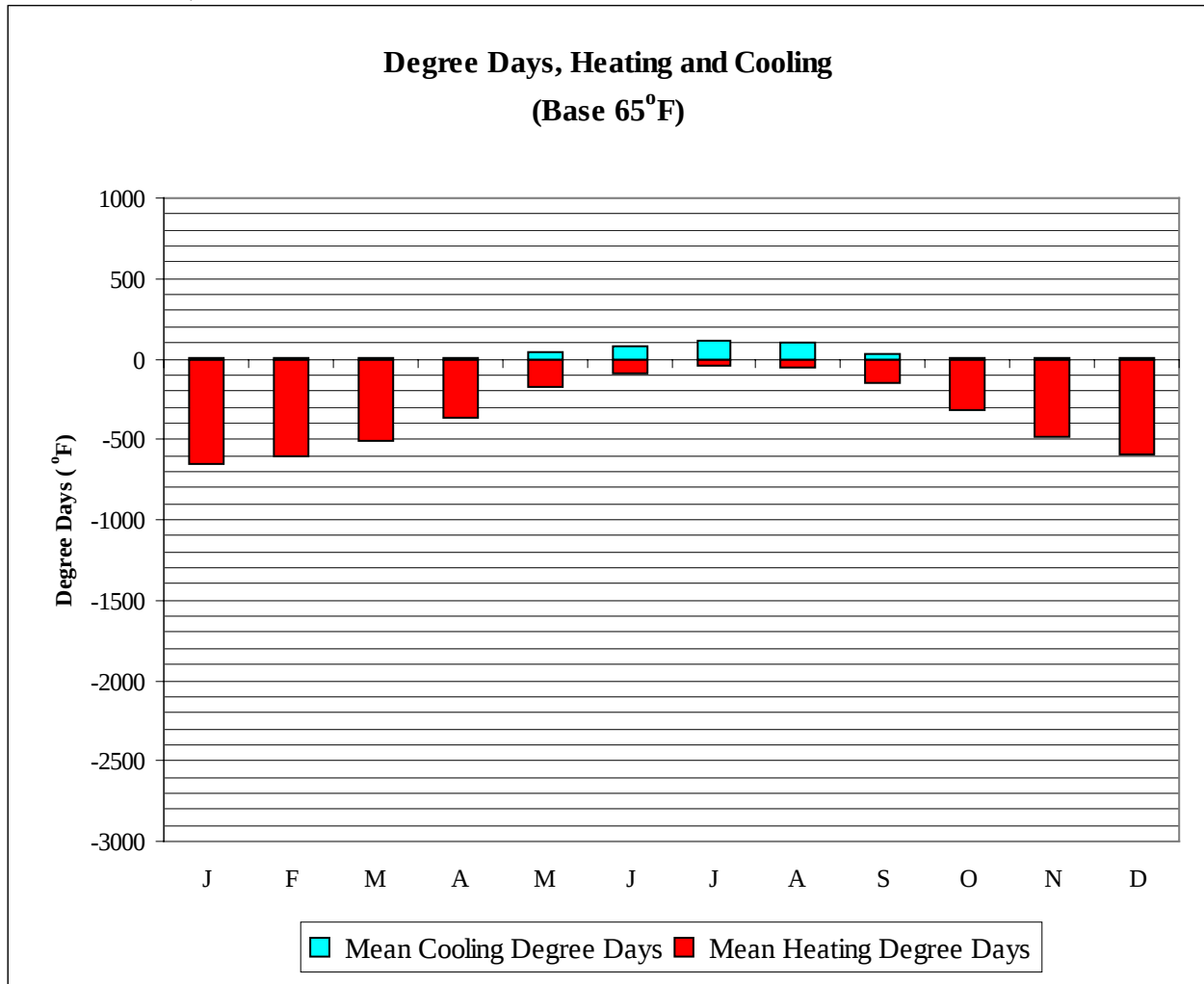


HANAU AAF, GERMANY

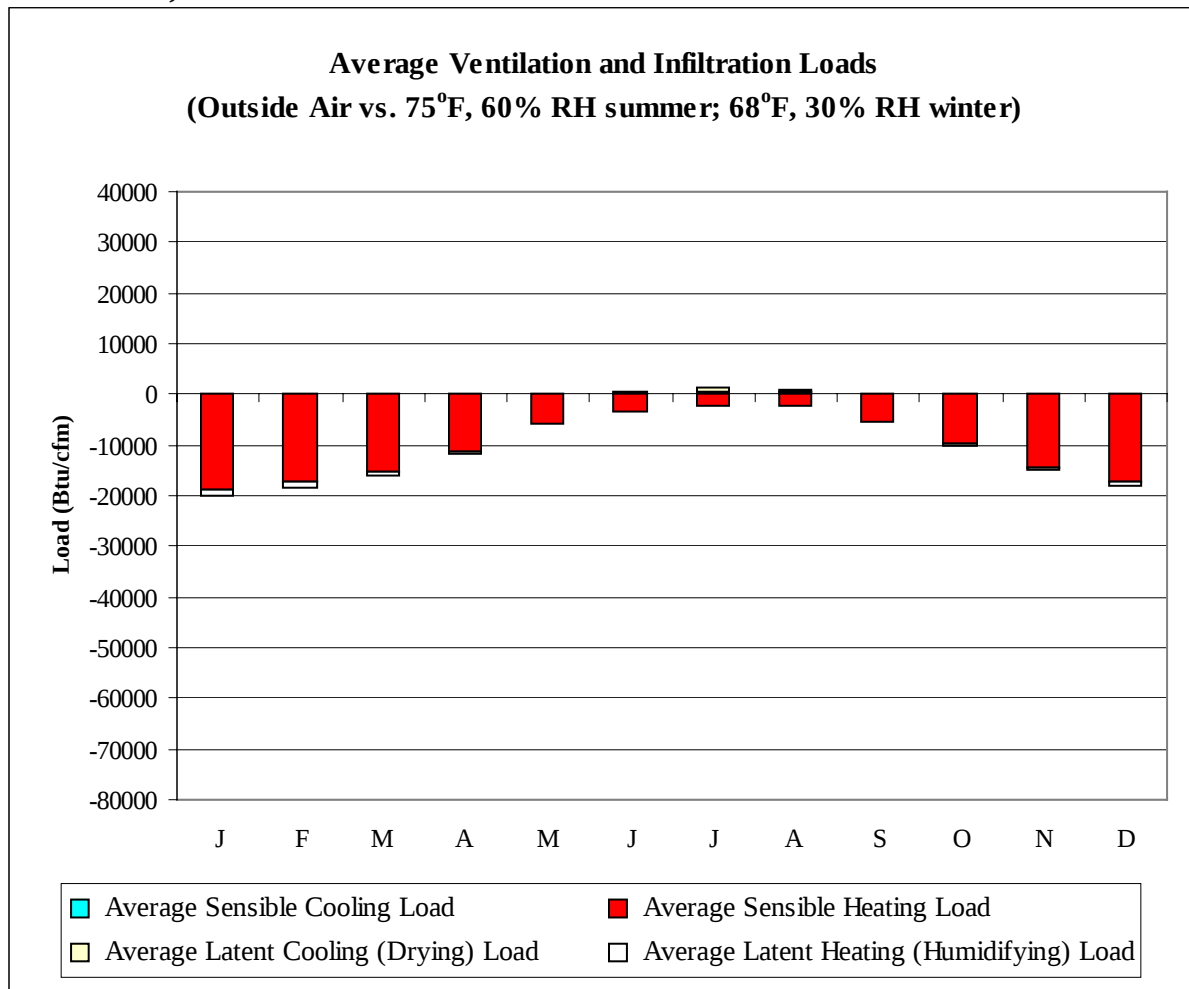
WMO No. 106420

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	54.0	51.8	39.1	31.9	9.0	54.6	53.6	31.5	24.6
14-Jan	54.0	49.6	38.9	31.6	7.0	50.4	52.5	30.9	23.7
21-Jan	54.0	50.6	39.0	31.4	14.0	50.4	52.9	29.4	22.7
28-Jan	54.0	48.9	41.3	33.8	19.0	48.3	50.0	32.8	24.8
4-Feb	52.0	48.1	40.9	32.0	7.0	50.4	50.8	31.3	23.2
11-Feb	57.0	49.0	41.6	33.2	16.0	44.8	48.9	32.0	24.0
18-Feb	54.0	48.1	40.4	30.4	14.0	47.6	50.5	29.3	21.8
25-Feb	59.0	52.2	42.3	30.5	16.0	53.2	57.2	30.6	21.5
4-Mar	57.0	50.7	45.8	33.7	19.0	50.4	54.3	33.8	24.5
11-Mar	63.0	53.5	48.7	36.5	21.0	61.6	56.1	36.6	26.9
18-Mar	64.0	51.6	50.4	38.3	28.0	53.9	54.6	38.1	28.8
25-Mar	64.0	53.8	52.1	38.3	28.0	58.1	58.7	38.9	28.4
1-Apr	70.0	55.4	54.1	40.4	28.0	62.3	60.0	42.0	30.4
8-Apr	70.0	56.4	54.5	40.9	32.0	62.3	60.9	42.2	30.6
15-Apr	72.0	56.4	55.8	39.7	30.0	58.8	61.9	40.9	28.8
22-Apr	73.0	57.9	58.2	41.8	34.0	70.7	69.0	42.3	30.6
29-Apr	77.0	59.5	59.8	42.7	36.0	60.9	65.9	45.0	32.0
6-May	79.0	61.7	62.8	45.9	37.0	71.4	69.7	51.8	36.7
13-May	84.0	63.0	65.2	48.2	39.0	76.3	64.4	55.4	38.8
20-May	82.0	63.1	69.2	50.5	43.0	80.5	74.5	59.8	42.7
27-May	84.0	65.6	68.8	51.3	43.0	80.5	72.9	59.9	44.2
3-Jun	88.0	68.8	69.3	52.8	43.0	91.7	80.2	62.3	47.3
10-Jun	86.0	65.6	69.9	54.0	45.0	92.4	73.3	67.1	50.2
17-Jun	86.0	68.8	70.5	54.9	46.0	92.4	79.0	67.3	50.3
24-Jun	84.0	66.6	72.3	56.1	50.0	92.4	73.1	71.7	53.7
1-Jul	90.0	68.3	74.0	57.1	50.0	110.6	80.5	73.8	55.6
8-Jul	93.0	66.9	76.5	58.6	50.0	104.3	74.6	73.5	55.3
15-Jul	91.0	69.5	76.8	58.8	52.0	104.3	78.4	80.9	59.7
22-Jul	90.0	70.6	74.0	57.7	52.0	105.7	79.7	78.5	58.1
29-Jul	90.0	73.5	75.5	57.2	52.0	111.3	79.2	80.2	60.1
5-Aug	90.0	69.3	77.7	59.3	52.0	98.7	78.1	80.3	60.2
12-Aug	91.0	69.8	76.5	57.4	50.0	98.7	76.4	78.0	58.4
19-Aug	90.0	69.5	77.6	57.3	50.0	104.3	79.4	81.0	58.3
26-Aug	86.0	67.6	74.3	55.9	48.0	104.3	73.3	76.9	57.4
2-Sep	84.0	69.5	72.7	54.7	46.0	98.0	74.9	73.6	54.4
9-Sep	84.0	66.1	69.7	52.4	45.0	91.7	73.2	69.8	51.3
16-Sep	79.0	65.8	67.8	52.2	45.0	93.1	70.8	69.4	52.0
23-Sep	81.0	70.6	68.0	51.9	43.0	103.6	76.3	70.3	51.8
30-Sep	77.0	64.2	65.2	49.3	41.0	84.7	70.0	63.6	47.5
7-Oct	77.0	64.8	62.7	48.9	37.0	85.4	68.9	61.6	46.3
14-Oct	75.0	63.4	60.3	46.4	34.0	74.9	64.5	56.4	43.4
21-Oct	66.0	58.7	56.3	44.3	34.0	72.1	62.3	51.9	40.0
28-Oct	68.0	60.1	55.2	42.3	32.0	70.7	63.9	47.6	37.0
4-Nov	63.0	55.9	50.7	40.7	28.0	67.2	59.6	43.4	33.8
11-Nov	59.0	53.5	48.7	40.3	28.0	58.8	55.9	41.7	32.8
18-Nov	57.0	50.4	46.9	39.0	27.0	55.3	53.5	39.3	30.9
25-Nov	57.0	52.3	44.0	36.2	23.0	57.4	55.3	36.4	28.2
2-Dec	54.0	50.3	41.0	33.0	10.0	50.4	52.0	32.2	25.1
9-Dec	55.0	50.4	42.3	34.0	19.0	53.9	50.6	34.4	26.4
16-Dec	55.0	50.3	40.0	33.1	18.0	51.8	52.5	32.3	24.9
23-Dec	57.0	52.8	41.1	35.1	21.0	54.6	54.0	34.0	27.3
31-Dec	55.0	51.3	40.4	35.3	16.0	53.9	54.1	33.2	27.5



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	653
FEB	0	604
MAR	1	509
APR	6	362
MAY	36	171
JUN	75	92
JUL	114	46
AUG	107	52
SEP	28	144
OCT	4	313
NOV	0	491
DEC	0	598
ANN	370	4035



	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	-18709	0	-1164
FEB	0	-17333	0	-1264
MAR	1	-15177	0	-751
APR	11	-11199	1	-352
MAY	135	-5936	16	-34
JUN	356	-3565	202	-1
JUL	686	-2057	498	0
AUG	548	-2287	412	0
SEP	72	-5285	160	0
OCT	6	-9904	8	-87
NOV	0	-14416	0	-439
DEC	0	-17229	0	-793
ANN	1815	-123097	1297	-4885

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

No Solar Radiation
Data Available

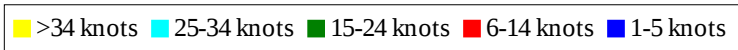
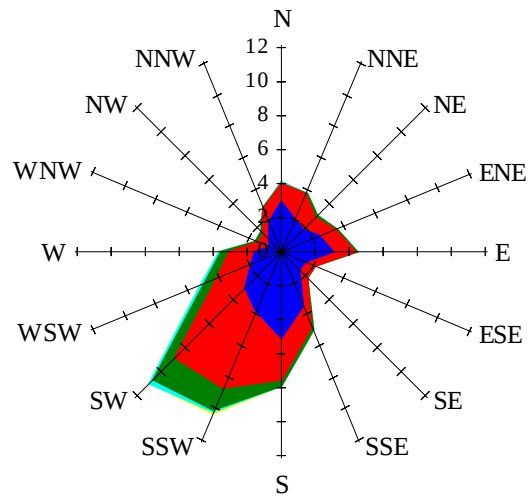


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

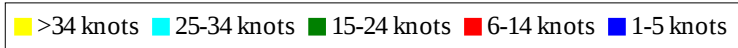
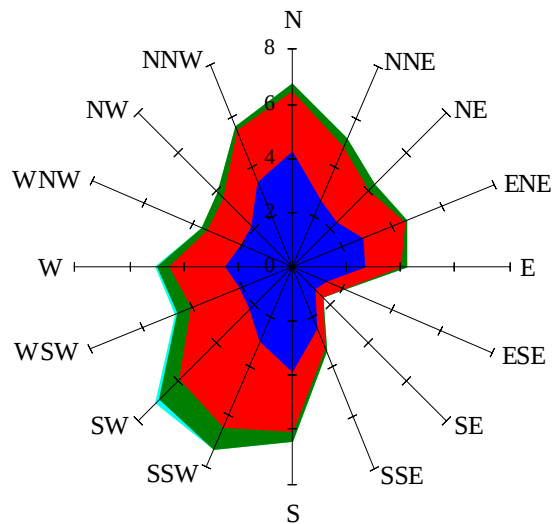
Labels of Percent Frequency on North Axis



Percent Calm = 28.80

Wind Summary - March, April, and May

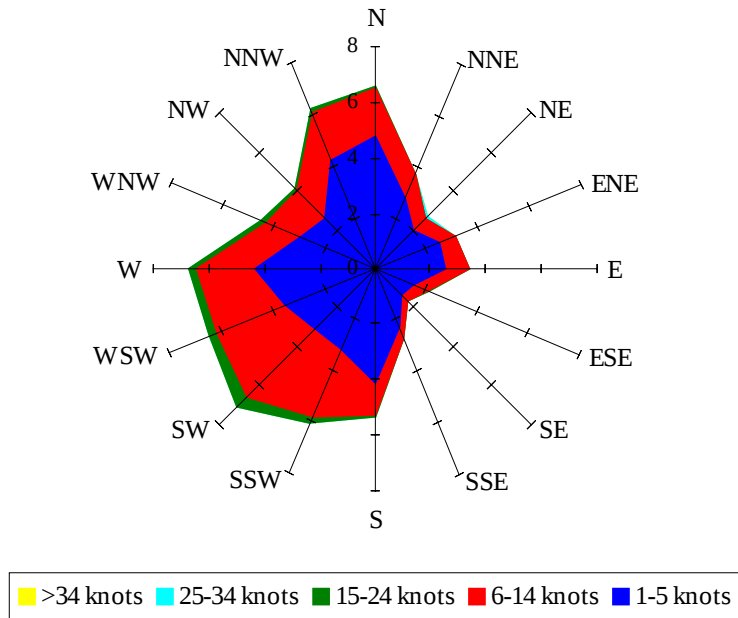
Labels of Percent Frequency on North Axis



Percent Calm = 25.05

Wind Summary - June, July, and August

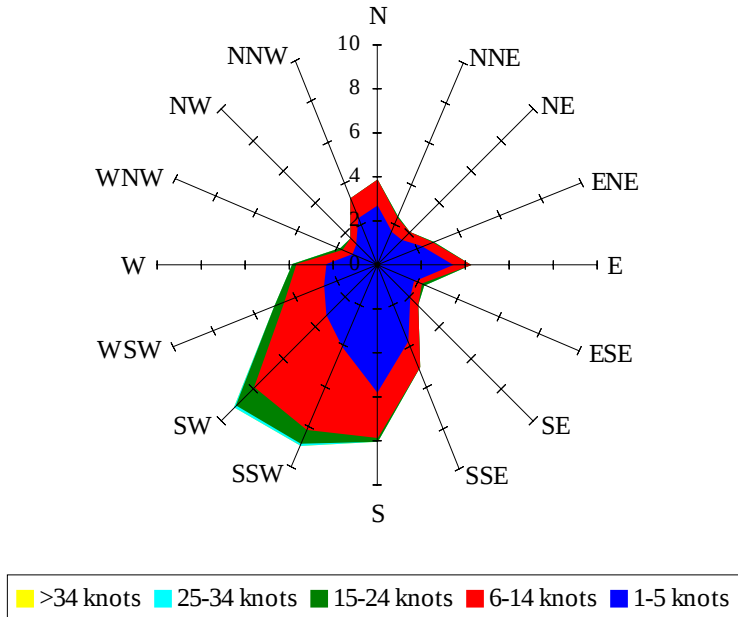
Labels of Percent Frequency on North Axis



Percent Calm = 27.75

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 33.36