

GIESSEN, GERMANY

Latitude = 50.58 N

Longitude = 8.70 E

Period of Record = 1973 to 1996

WMO No. 105320

Elevation = 640 feet

Average Pressure = 29.30 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	90	67	65	6.6	ESE
0.4% Occurrence	86	66	68	6.7	ESE
1.0% Occurrence	82	65	66	6.4	ESE
2.0% Occurrence	79	63	64	6.6	E
Mean Daily Range	14	-	-	-	-
97.5% Occurrence	22	21	14	4.0	N
99.0% Occurrence	16	15	11	3.6	N
99.6% Occurrence	12	11	9	4.1	NNE
Median of Extreme Lows	9	9	7	4.0	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	71	83	93	5.2	N
0.4% Occurrence	68	80	84	5.8	N
1.0% Occurrence	67	79	81	5.9	W
2.0% Occurrence	65	76	76	5.7	W
	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	105	74	0.69	4.2	W
0.4% Occurrence	92	73	0.61	4.4	N
1.0% Occurrence	87	71	0.57	4.5	N
2.0% Occurrence	82	69	0.54	4.7	W
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		2	153	2	91

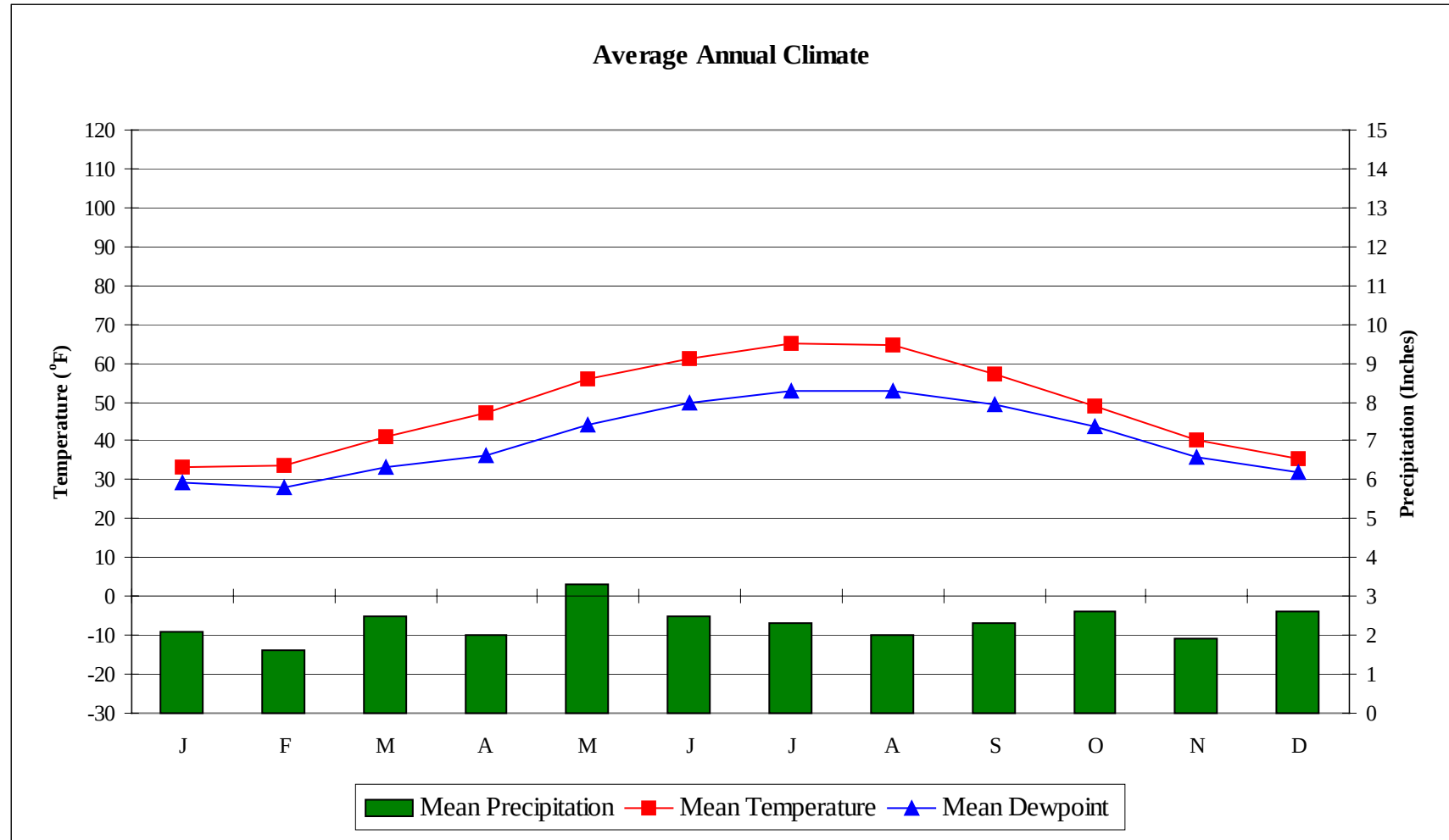
Other Site Data

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
6	N/A	N/A	0.1 + 0.1
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 (#)
51.3	N/A	N/A	38

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

GIESSEN, GERMANY

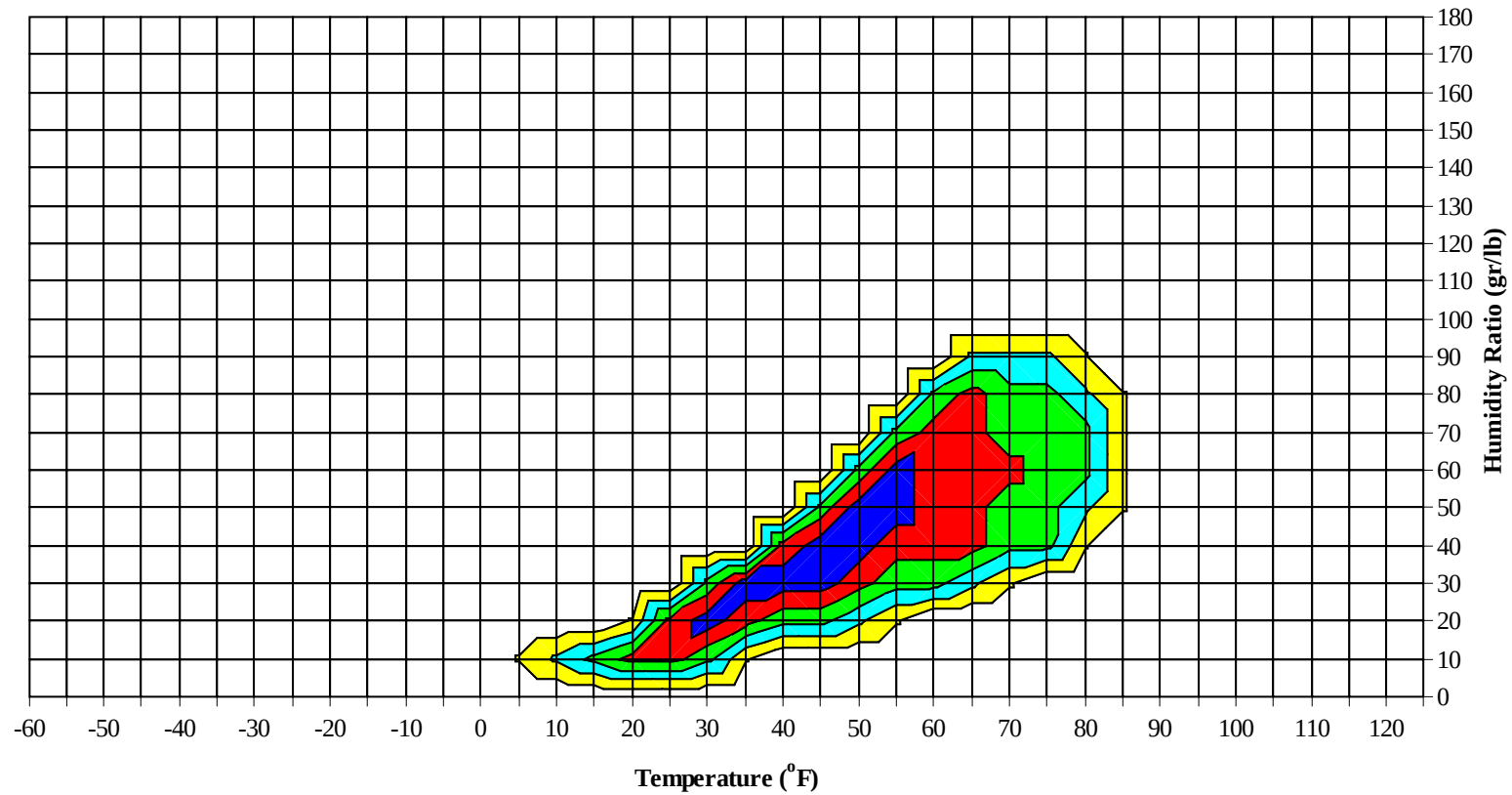
WMO No. 105320



GIESSEN, GERMANY

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Long Term Psychrometric Summary

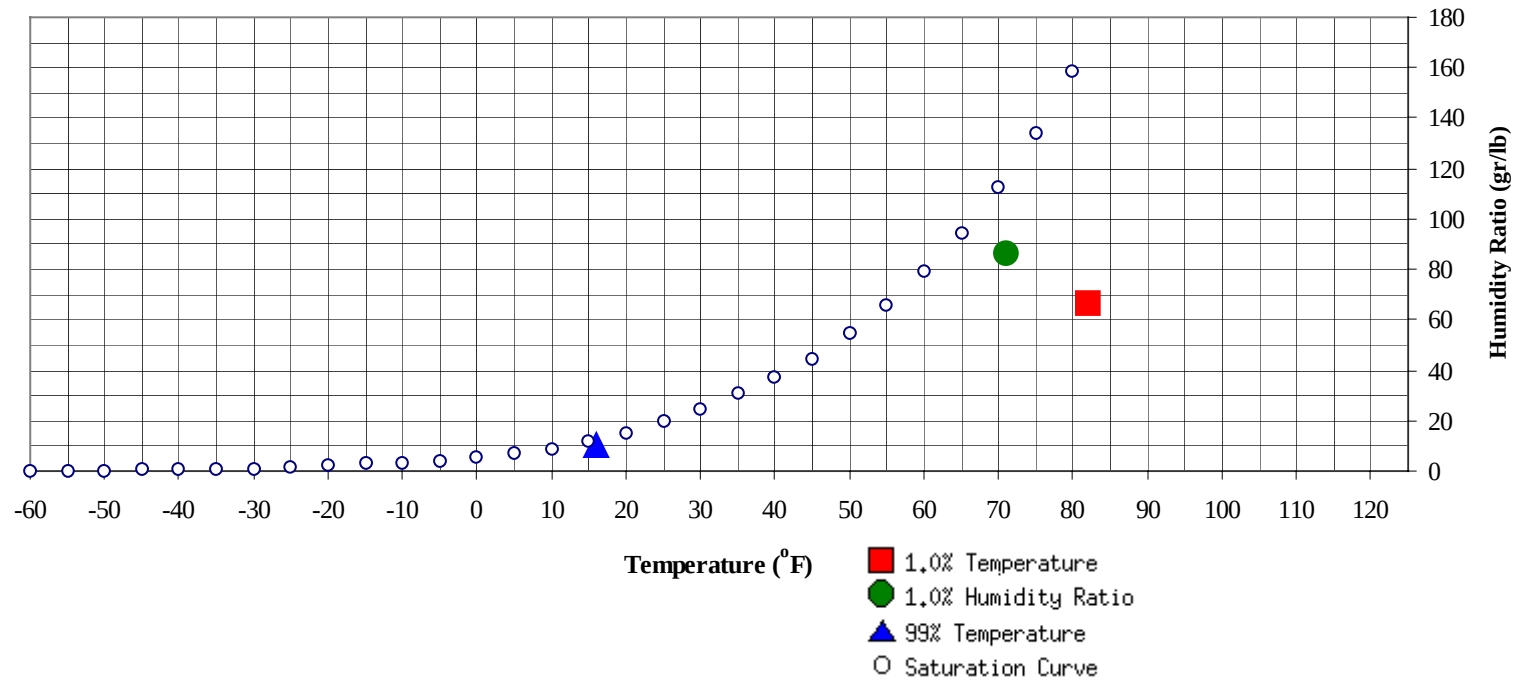


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

GIESSEN, GERMANY

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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	16	10.5	5.4		86.8	71	65.5	62.6	30.6

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	82	66.8	64.9	30.2

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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	54.0
70 / 74												0	0	0	54.6
65 / 69												1	1	2	52.7
60 / 64		0		0	52.0		0	0	0	52.8		6	5	11	50.9
55 / 59	0	0	0	0	49.2	1	2	1	4	49.0	2	16	13	31	48.8
50 / 54	4	5	5	14	47.7	2	8	5	15	46.0	9	33	32	73	46.1
45 / 49	17	24	24	65	43.7	9	22	19	50	42.8	31	55	52	138	42.4
40 / 44	32	41	37	109	39.5	22	34	33	90	39.0	48	60	60	169	38.8
35 / 39	57	64	58	178	35.2	46	56	53	154	35.0	66	50	53	169	34.8
30 / 34	62	57	59	179	30.8	57	53	54	165	30.4	59	21	24	105	30.5
25 / 29	31	24	28	83	25.8	41	30	36	106	25.3	23	5	6	34	25.7
20 / 24	14	14	14	41	21.0	24	12	13	49	20.7	7	1	1	9	20.8
15 / 19	15	12	12	38	16.4	14	5	6	25	16.5	2	0	0	2	16.4
10 / 14	10	6	7	23	11.6	6	2	2	10	11.4	1	0	0	1	12.3
5 / 9	5	2	3	10	6.7	2	1	1	4	7.1	0	0		0	8.5
0 / 4	2	1	0	3	2.1	1	0		1	2.3					
-5 / -1	0	0		0	-2.0										

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.

GIESSEN, GERMANY

WMO No. 105320

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	65.1
85 / 89							0	0	0	66.6		4	3	7	66.7
80 / 84		0		0	61.0		4	2	6	62.3		11	9	20	64.6
75 / 79		2	1	3	56.8		14	11	25	59.5	0	25	18	44	62.3
70 / 74		6	4	10	54.9		25	18	43	57.4	1	37	30	68	60.3
65 / 69	0	13	12	25	52.9	1	32	26	59	55.5	9	39	36	83	58.2
60 / 64	1	22	17	40	50.9	9	47	42	98	53.5	39	52	53	143	56.0
55 / 59	5	36	32	73	48.3	37	55	54	145	51.2	71	48	53	172	52.9
50 / 54	24	48	47	119	45.8	73	44	54	171	48.3	78	22	33	133	49.4
45 / 49	47	54	52	152	42.3	68	21	31	120	44.2	36	2	5	43	45.3
40 / 44	60	39	44	143	39.0	39	6	9	53	40.1	6		0	6	41.2
35 / 39	65	18	26	109	35.0	19	1	1	21	36.2	1			1	37.1
30 / 34	34	3	4	41	30.9	3			3	32.0	0			0	
25 / 29	5	0	0	5	26.4										
20 / 24	0			0	21.5										
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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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		0		0	65.3		0	0	0	70.5					
90 / 94		3	2	5	67.1		2	1	3	67.5					
85 / 89		10	8	18	66.6		7	5	12	66.0		0	0	0	64.8
80 / 84		24	18	42	65.2		21	13	34	64.7		3	1	4	63.9
75 / 79	0	34	28	62	63.4	0	37	28	65	62.7		9	5	14	63.1
70 / 74	5	44	44	93	61.4	2	51	43	96	61.0	0	24	14	38	60.8
65 / 69	27	50	48	125	59.6	19	46	49	114	59.6	2	34	27	63	58.5
60 / 64	68	52	55	175	57.3	62	53	57	172	57.5	17	62	53	132	56.2
55 / 59	85	29	37	150	54.0	89	29	40	158	54.2	60	64	73	197	53.4
50 / 54	52	3	9	63	50.1	58	4	11	72	50.2	84	35	51	169	49.8
45 / 49	11		0	11	46.1	16	0	1	17	46.1	55	9	15	78	45.7
40 / 44	0			0	41.3	2			2	42.1	19	1	1	21	41.4
35 / 39											4		0	4	37.4
30 / 34											0			0	34.0
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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GIESSEN, GERMANY

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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															
75 / 79		0	0	0	61.9										
70 / 74		3	1	4	60.0										
65 / 69		8	4	12	58.1										
60 / 64	2	25	15	42	55.9	0	0		0	54.8		0	0	0	53.5
55 / 59	20	50	43	113	52.8	3	8	5	16	51.8	0	2	2	4	51.4
50 / 54	54	69	68	190	49.1	13	26	22	61	48.7	9	11	9	29	48.3
45 / 49	72	56	62	190	44.7	35	54	47	136	44.3	21	30	25	76	44.3
40 / 44	45	24	35	103	40.6	56	57	57	169	40.1	33	37	38	107	39.8
35 / 39	37	12	17	66	36.6	62	53	57	172	35.8	61	69	63	193	35.5
30 / 34	15	2	3	20	31.8	39	29	34	102	31.2	66	60	62	187	31.0
25 / 29	4	0	0	4	27.6	22	12	16	49	25.9	29	21	29	79	25.9
20 / 24						7	3	3	13	21.7	15	10	12	36	21.2
15 / 19						2	0	0	2	17.9	10	6	6	22	16.9
10 / 14						0			0	14.0	4	2	1	7	11.8
5 / 9											1	1	1	3	6.7
0 / 4													0	0	3.0
-5 / -1															

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

Period of Record = 1973 to 1996

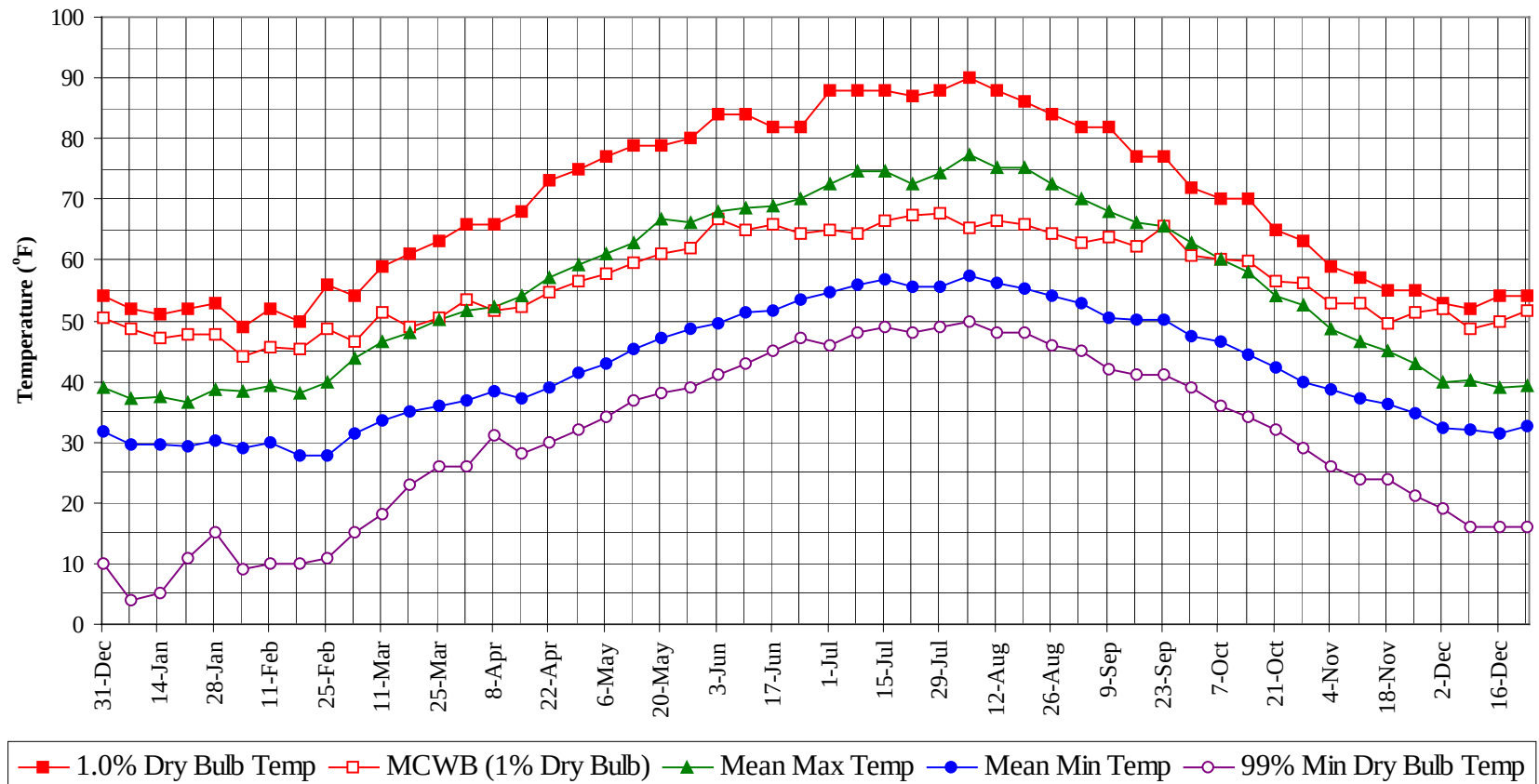
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99		0	0	0	68.3
90 / 94		5	3	8	67.1
85 / 89		22	16	38	66.4
80 / 84		62	44	106	64.7
75 / 79	1	121	90	212	62.4
70 / 74	9	191	153	353	60.3
65 / 69	57	223	200	480	58.3
60 / 64	196	320	293	810	56.0
55 / 59	374	341	351	1066	52.6
50 / 54	459	309	343	1111	48.6
45 / 49	417	324	336	1077	43.9
40 / 44	361	295	318	974	39.6
35 / 39	415	319	332	1066	35.4
30 / 34	335	223	242	800	30.8
25 / 29	155	91	117	363	25.7
20 / 24	66	38	41	146	21.0
15 / 19	44	22	24	90	16.6
10 / 14	21	10	11	41	11.6
5 / 9	8	4	4	16	6.8
0 / 4	3	1	0	4	2.2
-5 / -1	0	0		0	-2.0

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.

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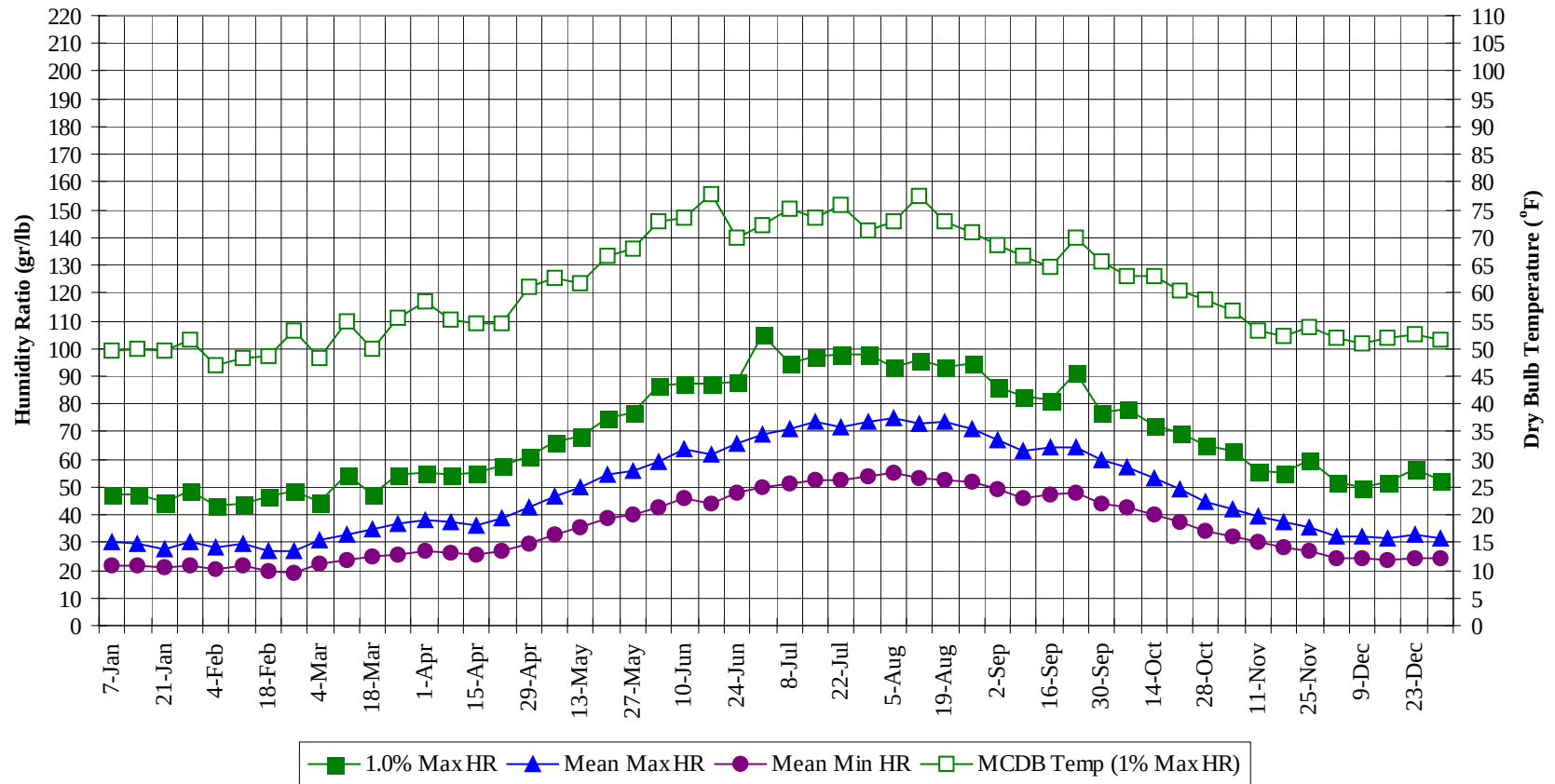
Annual Summary of Temperatures



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Long Term Humidity and Dry Bulb Temperature Summary

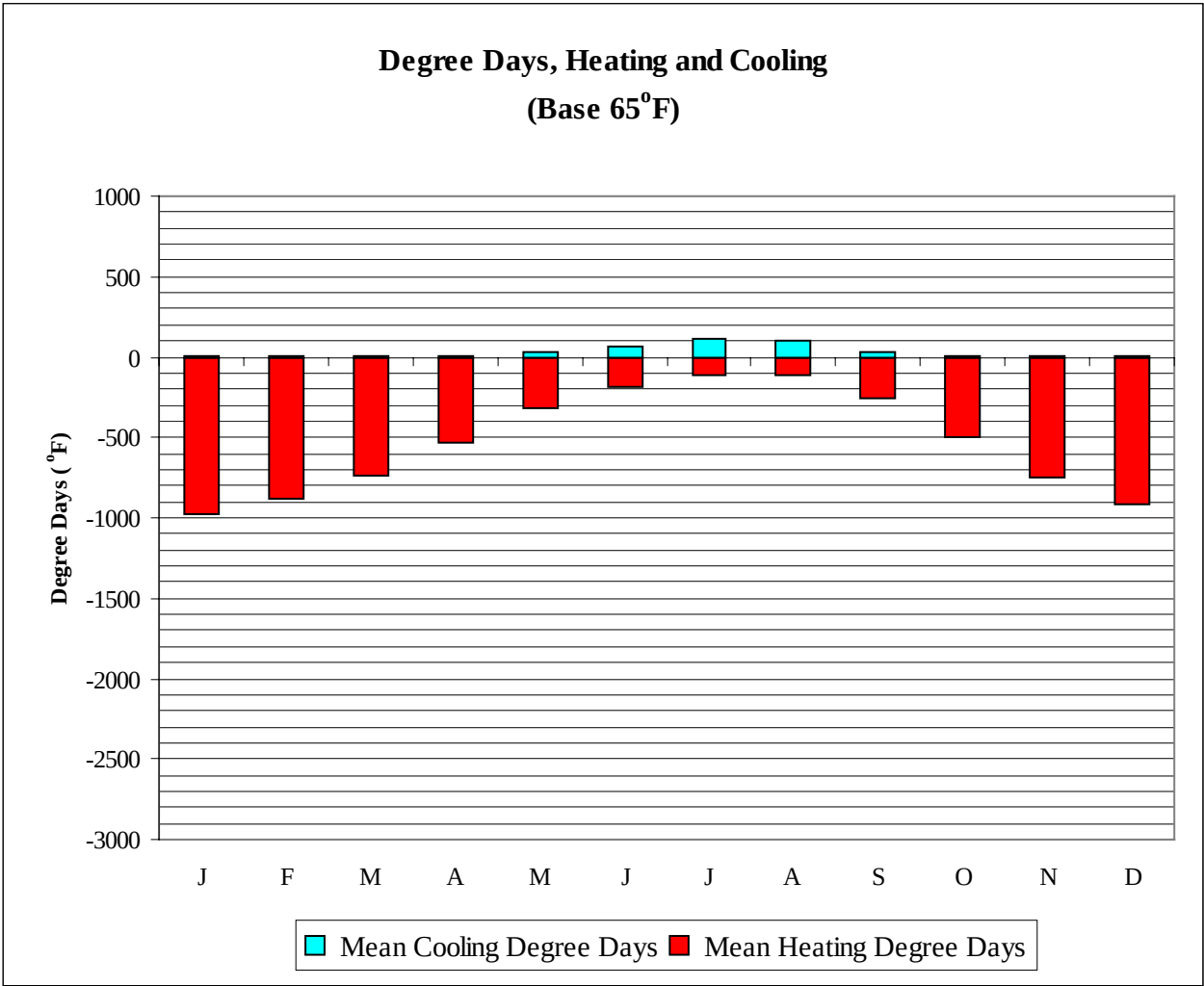


GIESSEN, GERMANY

WMO No. 105320

Long Term Dry Bulb Temperature and Humidity Summary

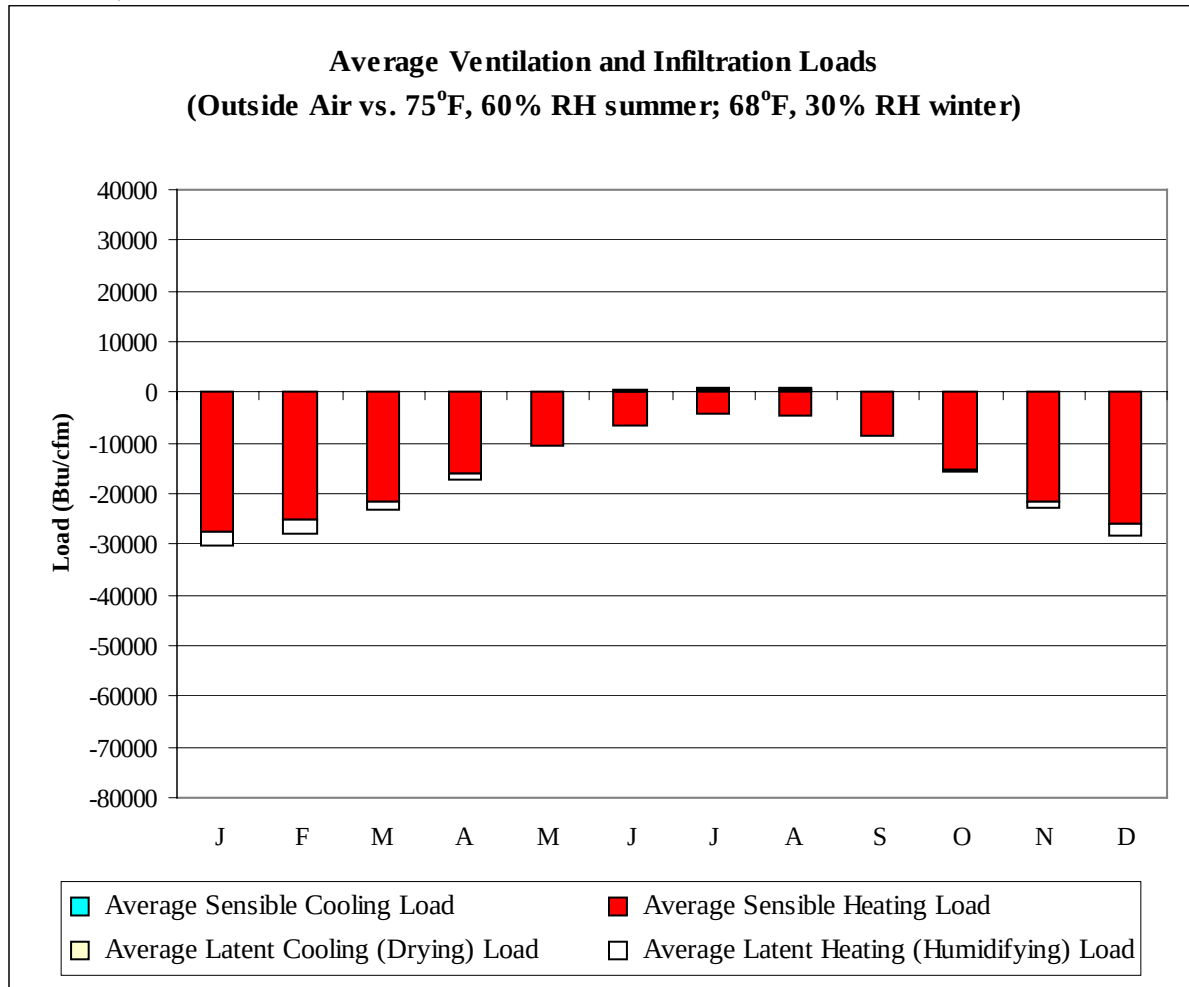
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	52.0	48.5	37.3	29.7	4.0	47.6	49.5	30.1	22.0
14-Jan	51.0	47.1	37.5	29.7	5.0	47.6	50.0	29.5	21.9
21-Jan	52.0	47.9	36.6	29.3	11.0	44.8	49.6	27.5	21.0
28-Jan	53.0	47.9	38.6	30.3	15.0	48.3	51.5	30.1	21.6
4-Feb	49.0	44.2	38.4	29.1	9.0	43.4	46.8	28.5	20.6
11-Feb	52.0	45.7	39.2	30.0	10.0	44.1	48.4	29.6	21.6
18-Feb	50.0	45.4	38.2	27.9	10.0	46.9	48.6	27.0	19.5
25-Feb	56.0	48.8	39.9	27.7	11.0	48.3	53.1	26.9	19.2
4-Mar	54.0	46.5	43.7	31.3	15.0	44.8	48.4	30.6	22.1
11-Mar	59.0	51.2	46.6	33.7	18.0	54.6	54.9	33.1	23.9
18-Mar	61.0	49.0	48.0	35.1	23.0	47.6	50.1	34.7	24.8
25-Mar	63.0	50.4	50.1	36.0	26.0	54.6	55.6	37.1	25.6
1-Apr	66.0	53.4	51.6	37.0	26.0	55.3	58.4	38.2	26.6
8-Apr	66.0	51.7	52.2	38.3	31.0	54.6	55.1	37.4	26.1
15-Apr	68.0	52.3	54.0	37.1	28.0	55.3	54.5	36.3	25.4
22-Apr	73.0	54.6	57.1	39.1	30.0	58.1	54.6	39.0	26.6
29-Apr	75.0	56.4	59.3	41.2	32.0	60.9	61.0	42.5	29.8
6-May	77.0	57.7	60.9	43.0	34.0	66.5	62.6	46.9	33.1
13-May	79.0	59.4	63.0	45.4	37.0	68.6	61.7	49.7	35.2
20-May	79.0	60.9	66.6	47.2	38.0	74.9	66.7	54.6	38.7
27-May	80.0	61.8	66.3	48.6	39.0	77.0	68.1	56.1	40.1
3-Jun	84.0	66.8	68.0	49.6	41.0	86.8	72.8	59.2	42.4
10-Jun	84.0	64.9	68.6	51.5	43.0	87.5	73.7	63.7	46.1
17-Jun	82.0	65.7	68.8	51.6	45.0	87.5	77.8	61.4	44.1
24-Jun	82.0	64.3	70.2	53.6	47.0	88.2	70.0	65.7	48.2
1-Jul	88.0	64.9	72.5	54.7	46.0	105.0	72.1	69.1	49.9
8-Jul	88.0	64.4	74.7	56.0	48.0	94.5	75.1	70.7	51.5
15-Jul	88.0	66.6	74.8	56.8	49.0	97.3	73.5	73.6	52.7
22-Jul	87.0	67.4	72.5	55.5	48.0	98.0	75.8	71.4	52.3
29-Jul	88.0	67.7	74.3	55.7	49.0	98.0	71.2	73.6	54.0
5-Aug	90.0	65.1	77.3	57.4	50.0	93.1	72.9	75.2	54.9
12-Aug	88.0	66.3	75.1	56.1	48.0	95.9	77.3	73.1	53.2
19-Aug	86.0	66.0	75.3	55.4	48.0	93.1	73.0	73.4	52.6
26-Aug	84.0	64.3	72.5	54.2	46.0	94.5	71.1	70.6	51.8
2-Sep	82.0	62.8	70.2	52.8	45.0	86.1	68.7	66.9	49.2
9-Sep	82.0	63.7	68.1	50.4	42.0	82.6	66.6	63.3	46.0
16-Sep	77.0	62.1	66.1	50.3	41.0	81.2	64.7	64.4	47.1
23-Sep	77.0	65.7	65.5	50.1	41.0	91.0	69.9	64.5	48.0
30-Sep	72.0	60.6	62.8	47.5	39.0	77.0	65.6	59.9	44.3
7-Oct	70.0	60.1	60.1	46.6	36.0	78.4	63.0	57.4	42.8
14-Oct	70.0	59.8	58.1	44.5	34.0	72.1	63.2	53.5	40.3
21-Oct	65.0	56.5	54.2	42.4	32.0	69.3	60.5	49.5	37.3
28-Oct	63.0	56.3	52.6	40.0	29.0	65.1	58.8	44.8	33.9
4-Nov	59.0	53.0	48.6	38.8	26.0	63.0	56.7	42.3	32.0
11-Nov	57.0	52.9	46.6	37.2	24.0	56.0	53.3	39.3	30.0
18-Nov	55.0	49.5	44.9	36.2	24.0	55.3	52.3	37.2	28.5
25-Nov	55.0	51.4	42.8	34.8	21.0	59.5	54.0	35.7	26.8
2-Dec	53.0	51.9	39.7	32.4	19.0	51.8	51.9	32.0	24.6
9-Dec	52.0	48.8	40.3	32.2	16.0	49.7	50.8	32.5	24.3
16-Dec	54.0	49.9	39.0	31.4	16.0	51.8	52.0	31.7	23.4
23-Dec	54.0	51.6	39.4	32.6	16.0	56.7	52.5	32.8	24.4
31-Dec	54.0	50.5	38.9	31.7	10.0	52.5	51.7	31.3	24.1



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	972
FEB	0	881
MAR	0	735
APR	6	537
MAY	31	320
JUN	64	180
JUL	113	108
AUG	102	117
SEP	24	252
OCT	2	501
NOV	0	748
DEC	0	912
ANN	342	6263

GIESSEN, GERMANY

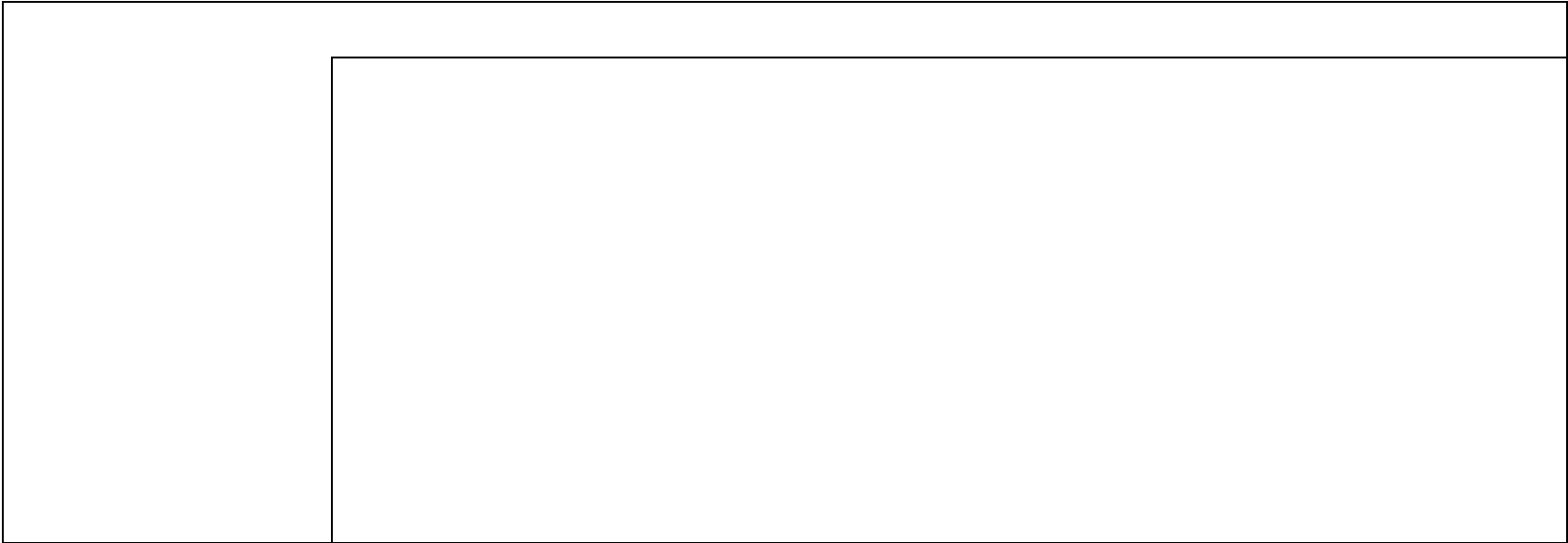
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	Average Sensible Cooling Load	Average Sensible Heating Load	Average Latent Cooling Load	Average Latent Heating Load
	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)	(Btu/cfm)
JAN	0	-27592	0	-2815
FEB	0	-25003	0	-2980
MAR	0	-21450	0	-1739
APR	6	-16177	0	-1021
MAY	82	-10367	3	-163
JUN	296	-6396	137	-9
JUL	698	-4270	304	-1
AUG	527	-4554	220	-2
SEP	55	-8569	41	-4
OCT	1	-15371	1	-212
NOV	0	-21709	0	-1130
DEC	0	-26058	0	-2164
ANN	1665	-187516	706	-12240

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

No Solar Radiation
Data Available

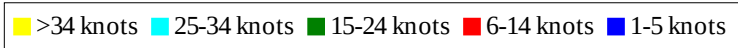
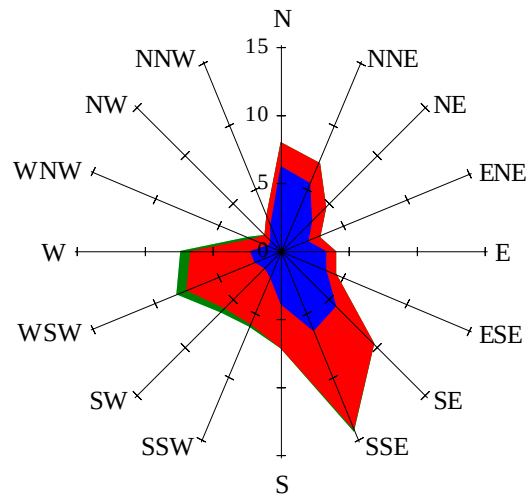


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

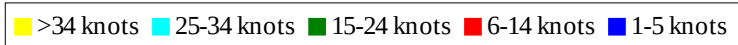
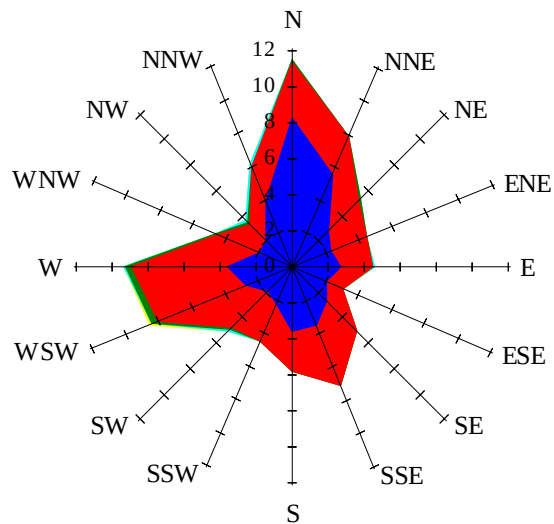
Labels of Percent Frequency on North Axis



Percent Calm = 4.84

Wind Summary - March, April, and May

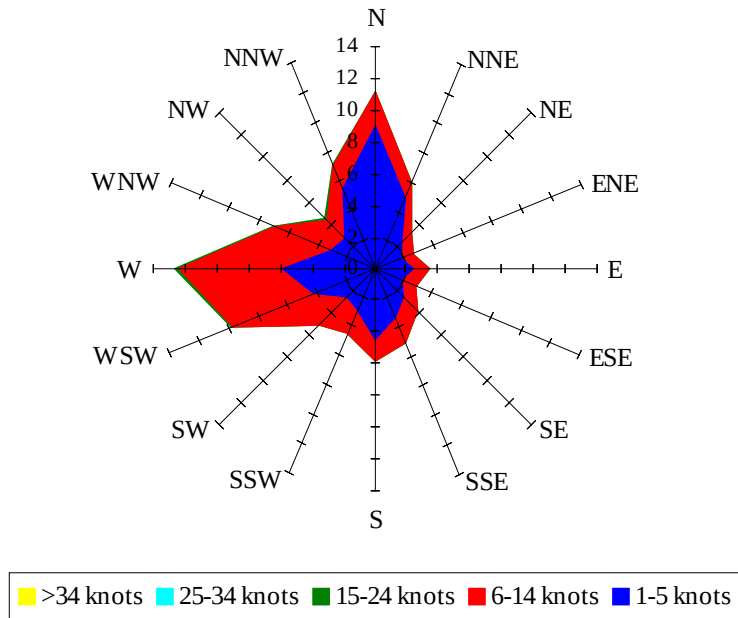
Labels of Percent Frequency on North Axis



Percent Calm = 4.97

Wind Summary - June, July, and August

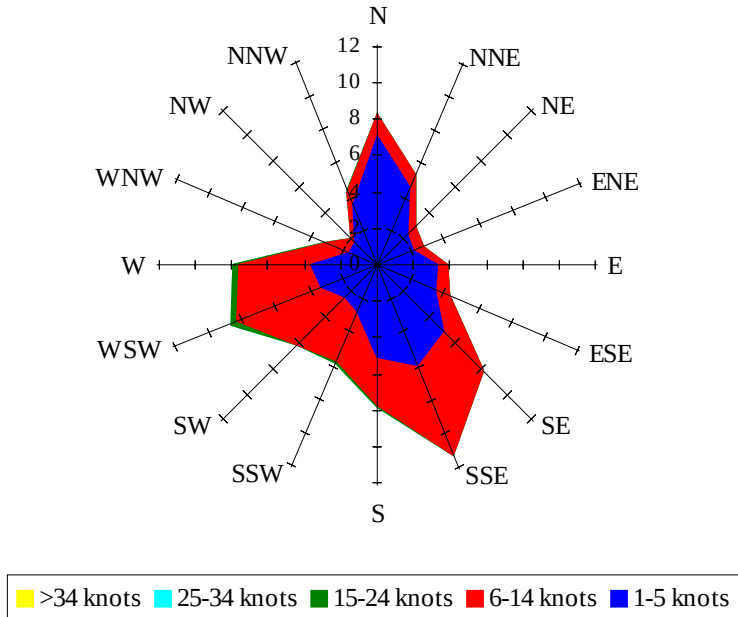
Labels of Percent Frequency on North Axis



Percent Calm = 6.10

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 7.73