

HEIDELBERG, GERMANY

Latitude = 49.40 N

Longitude = 8.65 E

Period of Record = 1967 to 1996

WMO No. 107340

Elevation = 358 feet

Average Pressure = 29.62 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	93	70	72	6.0	VARIABLE
0.4% Occurrence	90	69	75	6.2	VARIABLE
1.0% Occurrence	86	68	74	5.7	VARIABLE
2.0% Occurrence	82	66	70	5.5	VARIABLE
Mean Daily Range	14	-	-	-	-
97.5% Occurrence	27	26	17	3.7	N
99.0% Occurrence	21	20	13	3.0	S
99.6% Occurrence	16	15	10	3.1	N
Median of Extreme Lows	14	13	10	3.4	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	75	88	106	5.9	VARIABLE
0.4% Occurrence	71	84	91	5.1	VARIABLE
1.0% Occurrence	69	82	84	4.8	VARIABLE
2.0% Occurrence	68	80	83	4.8	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	112	79	0.74	7.6	VARIABLE
0.4% Occurrence	98	76	0.65	4.3	VARIABLE
1.0% Occurrence	92	75	0.61	4.0	S
2.0% Occurrence	86	72	0.57	3.7	S
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		11	273	13	260

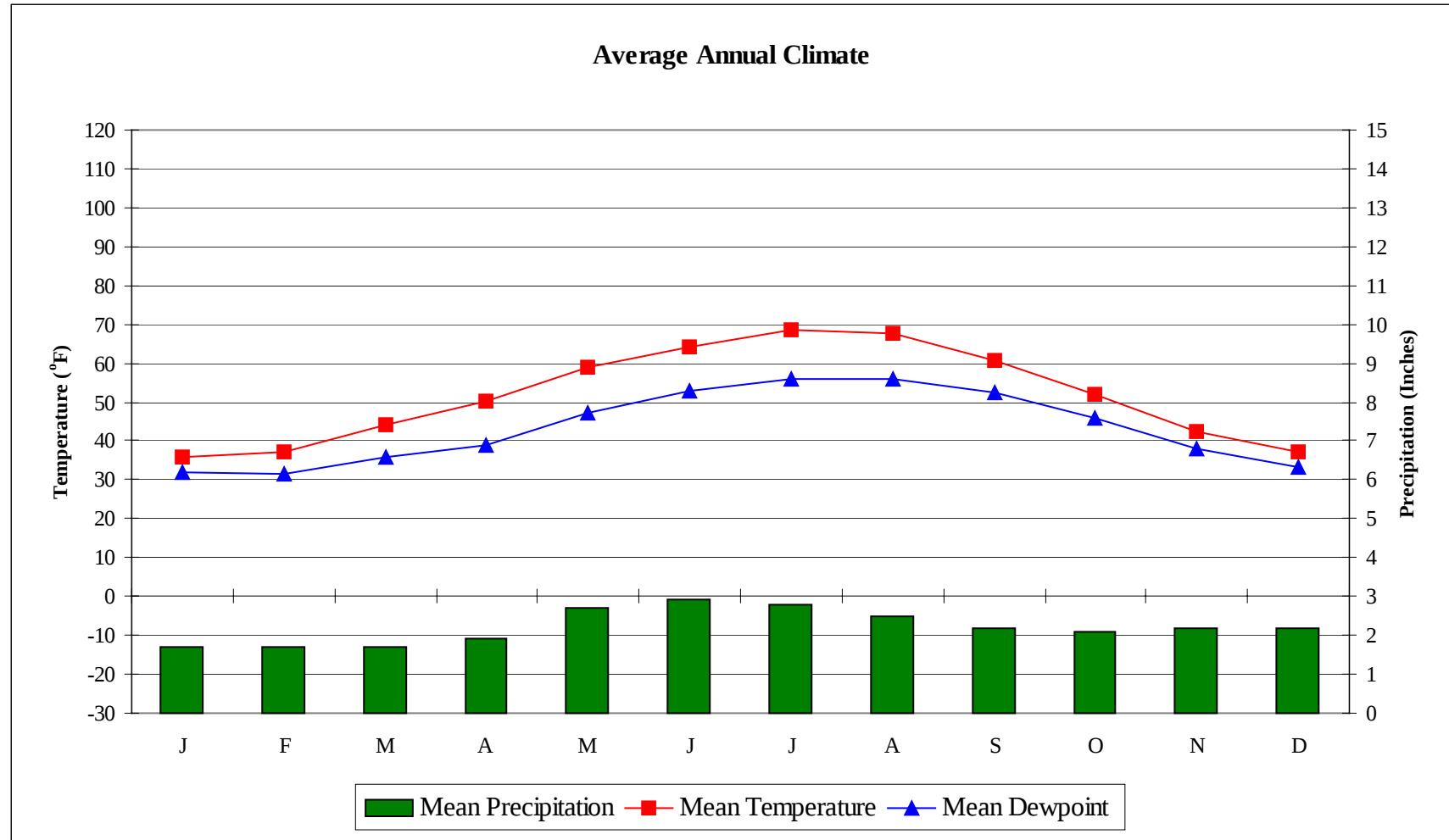
Other Site Data

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	0.2 + 0.3
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 (#)
54.2	N/A	N/A	30

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

HEIDELBERG, GERMANY

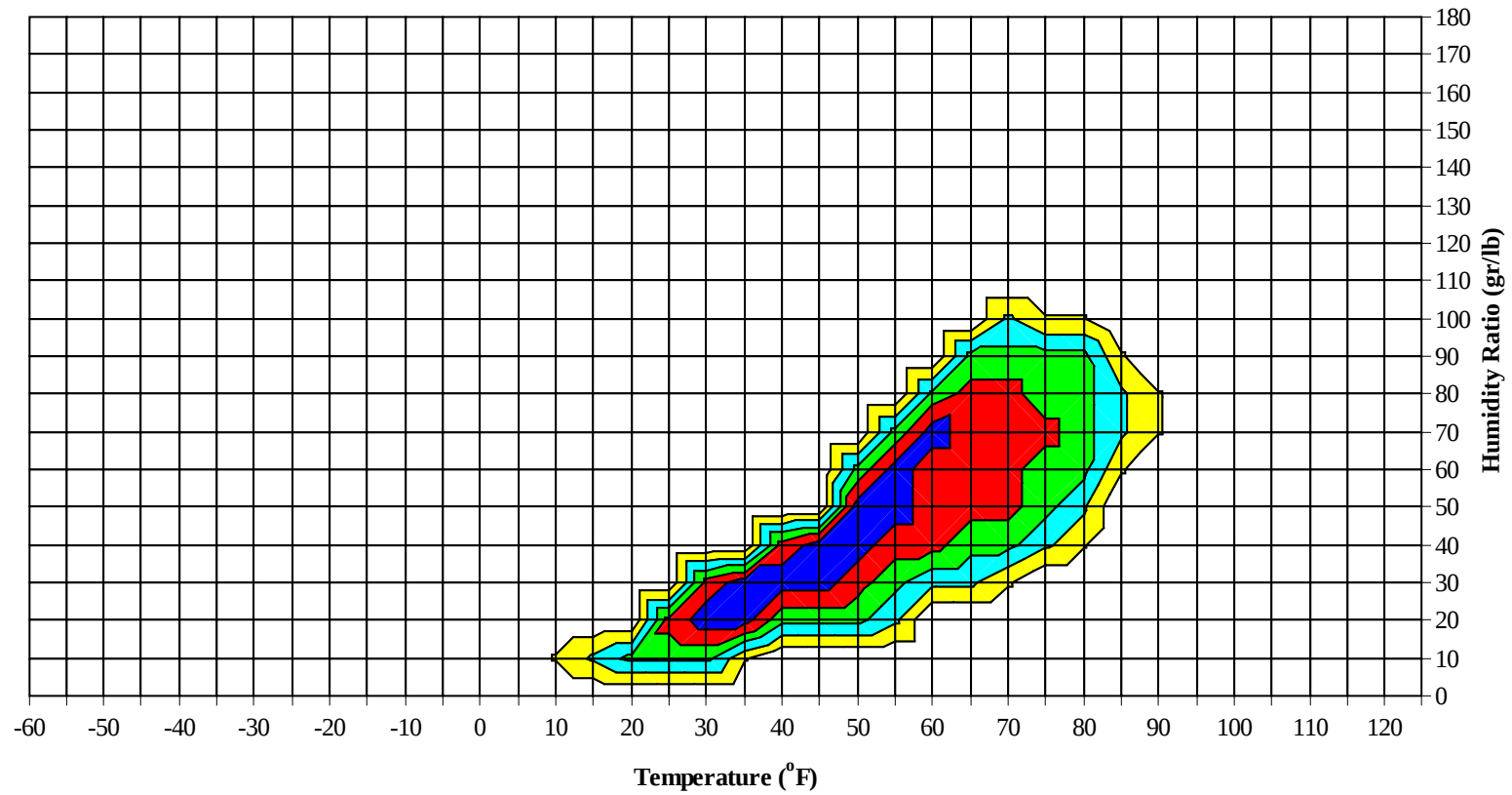
WMO No. 107340



HEIDELBERG, GERMANY

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Long Term Psychrometric Summary

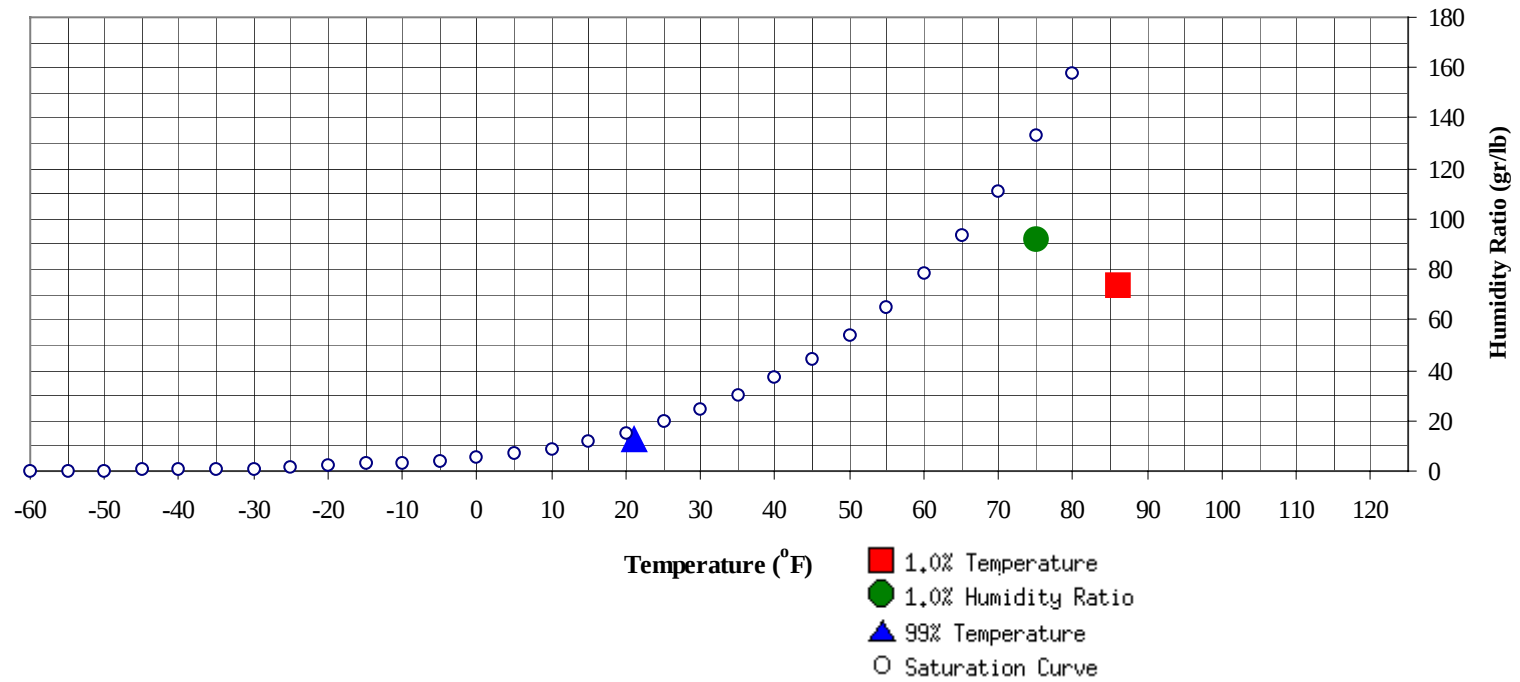


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

HEIDELBERG, 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	21	12.6	7.0		91.7	75	67.9	64.4	32.3

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	86	73.6	67.8	32.2

HEIDELBERG, GERMANY

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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		
95 / 99															
90 / 94															
85 / 89															
80 / 84												0		0	59.7
75 / 79												1	0	1	58.4
70 / 74												2	1	3	57.5
65 / 69							0	0	0	55.9		4	2	6	55.1
60 / 64		0		0	53.0		2	0	2	51.9	0	12	6	18	52.4
55 / 59	1	2	1	4	50.2	1	5	3	9	49.4	4	28	20	52	49.8
50 / 54	7	12	11	30	47.6	4	17	10	31	46.5	19	51	45	115	46.6
45 / 49	24	41	30	95	43.7	21	41	33	95	43.1	51	67	64	182	42.7
40 / 44	31	40	38	109	39.8	29	36	39	104	39.4	51	41	50	142	39.1
35 / 39	66	66	66	198	35.7	58	59	63	179	35.3	70	32	43	144	35.2
30 / 34	63	48	59	170	31.4	60	42	50	152	30.7	38	10	15	63	30.6
25 / 29	27	22	22	71	25.8	33	16	18	67	25.5	13	1	2	16	25.5
20 / 24	11	8	9	28	21.3	9	3	4	16	20.8	1	0	0	1	20.7
15 / 19	10	6	7	23	17.0	6	2	2	10	16.9	0		0	0	17.5
10 / 14	5	3	3	11	11.8	3	1	1	5	12.0					
5 / 9	3	1	1	5	6.9	1	0	0	1	7.0					
0 / 4	1	0	0	1	1.9	0			0	3.0					
-5 / -1	0	0		0	-3.4										

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.

HEIDELBERG, GERMANY

WMO No. 107340

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		
95 / 99												0	0	0	66.3
90 / 94							0	0	0	70.1		3	1	4	69.1
85 / 89							2	1	3	66.9		7	3	10	68.3
80 / 84		0	0	0	60.2		9	4	13	63.6	0	25	11	36	66.0
75 / 79		5	2	7	58.8		24	13	37	61.2	2	36	24	62	63.9
70 / 74	0	15	8	23	56.1	3	37	26	66	58.8	10	47	39	96	61.6
65 / 69	1	15	10	26	54.3	6	34	25	65	56.9	23	35	34	92	59.6
60 / 64	3	31	23	57	52.0	31	54	51	136	55.0	58	47	58	163	57.4
55 / 59	17	46	40	103	49.4	63	47	60	170	52.3	78	32	48	158	53.7
50 / 54	46	53	51	151	46.6	75	31	46	151	48.8	54	9	19	82	50.2
45 / 49	62	47	55	164	42.7	47	9	17	73	44.6	13	1	2	16	45.9
40 / 44	48	22	32	103	39.4	16	2	4	22	40.5	1			1	40.9
35 / 39	47	6	15	68	35.9	7		1	8	37.2	0			0	36.5
30 / 34	14	1	2	17	31.7	0			0	32.8					
25 / 29	1		0	1	26.5										
20 / 24	0			0	21.0										
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 = 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		
95 / 99		2	1	3	70.1		2	1	3	70.5					
90 / 94		11	6	17	69.6		6	3	9	69.5		0	0	0	67.8
85 / 89		17	9	26	68.6	0	13	6	19	68.4		2	0	2	68.1
80 / 84	1	37	24	62	66.8	0	35	18	53	66.4		10	3	13	66.9
75 / 79	7	44	38	90	64.7	3	50	36	90	64.4	0	24	11	35	64.3
70 / 74	27	52	48	127	62.6	19	54	53	126	62.7	2	41	25	68	61.9
65 / 69	40	33	38	111	61.1	39	38	45	121	61.2	9	39	31	79	59.8
60 / 64	74	38	52	163	58.5	89	37	56	181	58.9	43	63	67	173	57.5
55 / 59	72	15	27	114	54.8	68	13	25	106	55.0	83	46	65	193	54.0
50 / 54	24	0	4	28	51.1	26	1	5	32	50.8	67	15	32	114	50.3
45 / 49	3		0	3	46.5	4		0	4	46.2	29	1	6	36	45.7
40 / 44	0			0	44.0	0			0	41.6	6		0	6	41.6
35 / 39											1		0	1	38.2
30 / 34															
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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HEIDELBERG, GERMANY

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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		
95 / 99															
90 / 94															
85 / 89															
80 / 84		0	0	0	64.9										
75 / 79		3	1	4	63.3										
70 / 74	0	9	3	12	61.1										
65 / 69	0	15	6	21	58.9										
60 / 64	7	40	25	72	56.8	1	4	1	6	54.9		0	0	0	53.0
55 / 59	39	66	57	162	53.4	7	16	10	33	52.4	2	4	3	9	51.2
50 / 54	71	60	68	199	49.2	24	45	33	102	48.3	13	18	16	47	48.4
45 / 49	65	41	57	163	44.6	49	64	61	174	44.1	29	39	33	101	44.2
40 / 44	36	10	20	66	40.9	47	46	49	142	40.1	29	37	34	100	39.9
35 / 39	22	5	9	36	36.9	55	39	47	141	36.1	66	69	68	203	35.8
30 / 34	7	0	1	8	32.4	39	22	31	92	31.3	59	51	56	166	31.0
25 / 29	0			0	28.0	15	5	7	27	26.6	30	21	25	76	26.1
20 / 24						2	0	0	2	22.2	10	6	7	23	21.2
15 / 19						0		0	0	18.2	7	3	4	14	17.2
10 / 14						0			0	11.5	1	1	1	3	12.4
5 / 9											1	0	0	1	7.0
0 / 4											0	0	0	0	1.8
-5 / -1															

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

Period of Record = 1967 to 1996

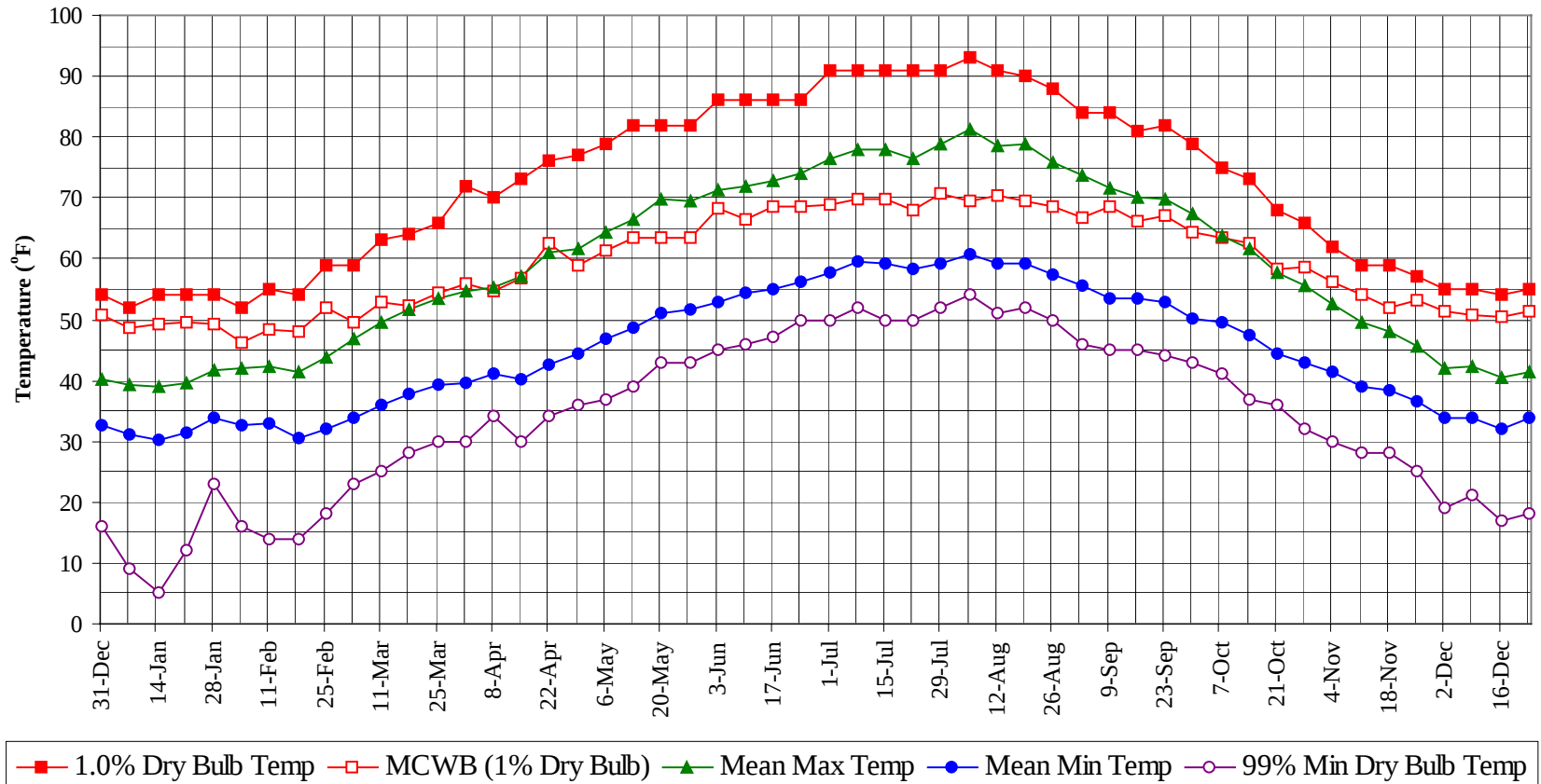
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99		4	2	6	69.9
90 / 94		20	10	30	69.5
85 / 89	0	40	20	60	68.4
80 / 84	1	115	60	176	66.3
75 / 79	13	187	125	324	63.9
70 / 74	61	256	201	518	61.5
65 / 69	118	209	191	519	59.6
60 / 64	306	328	337	970	57.0
55 / 59	434	319	357	1110	53.0
50 / 54	431	312	341	1084	48.5
45 / 49	397	349	360	1106	43.7
40 / 44	294	233	268	795	39.8
35 / 39	393	275	315	983	35.7
30 / 34	279	176	215	670	31.1
25 / 29	121	65	75	261	25.9
20 / 24	34	17	22	73	21.2
15 / 19	24	11	13	48	17.0
10 / 14	9	5	5	19	11.9
5 / 9	4	1	2	7	6.9
0 / 4	1	0	0	1	2.0
-5 / -1	0	0		0	-3.4
			</		

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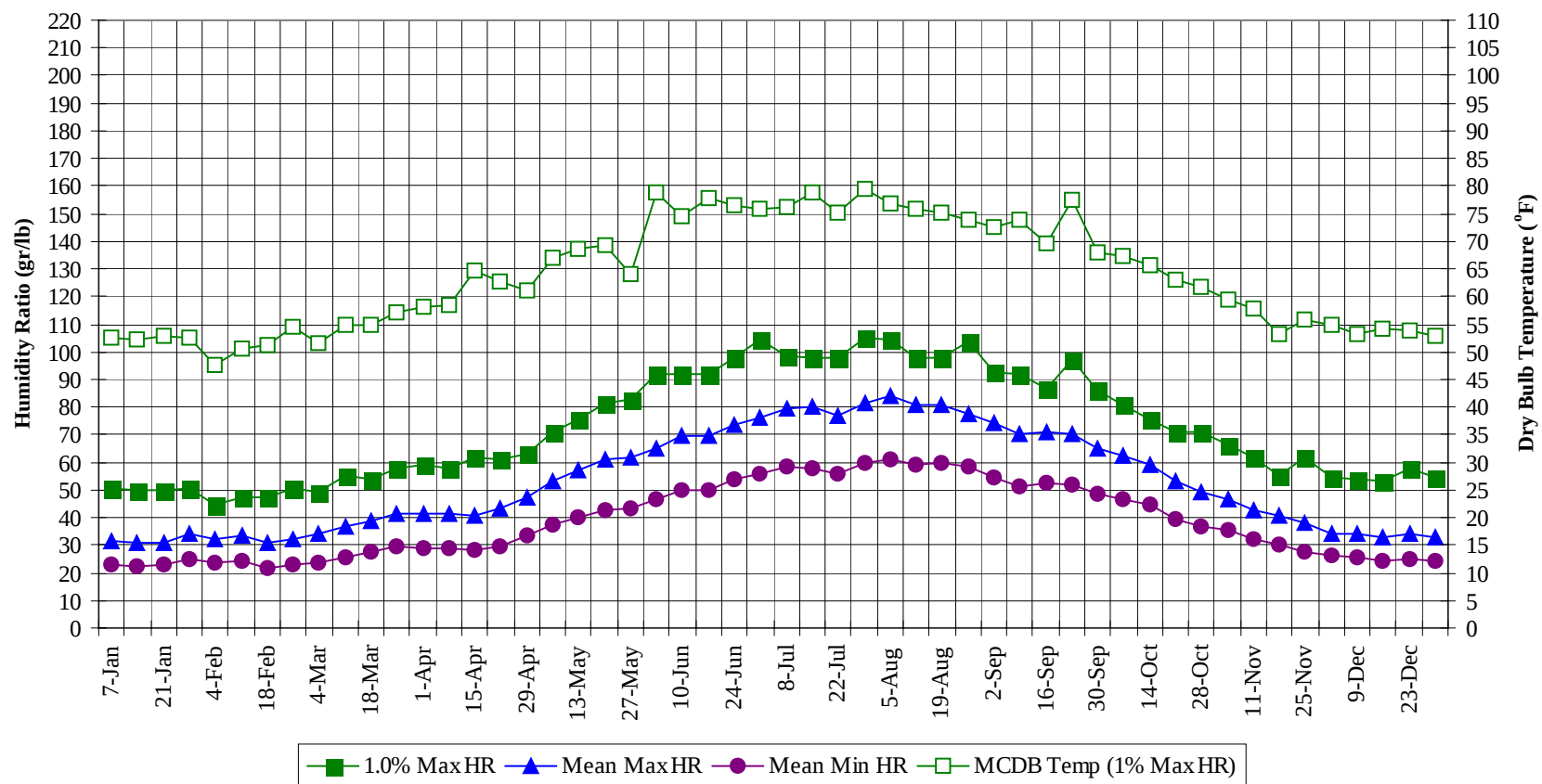
HEIDELBERG, GERMANY

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Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary

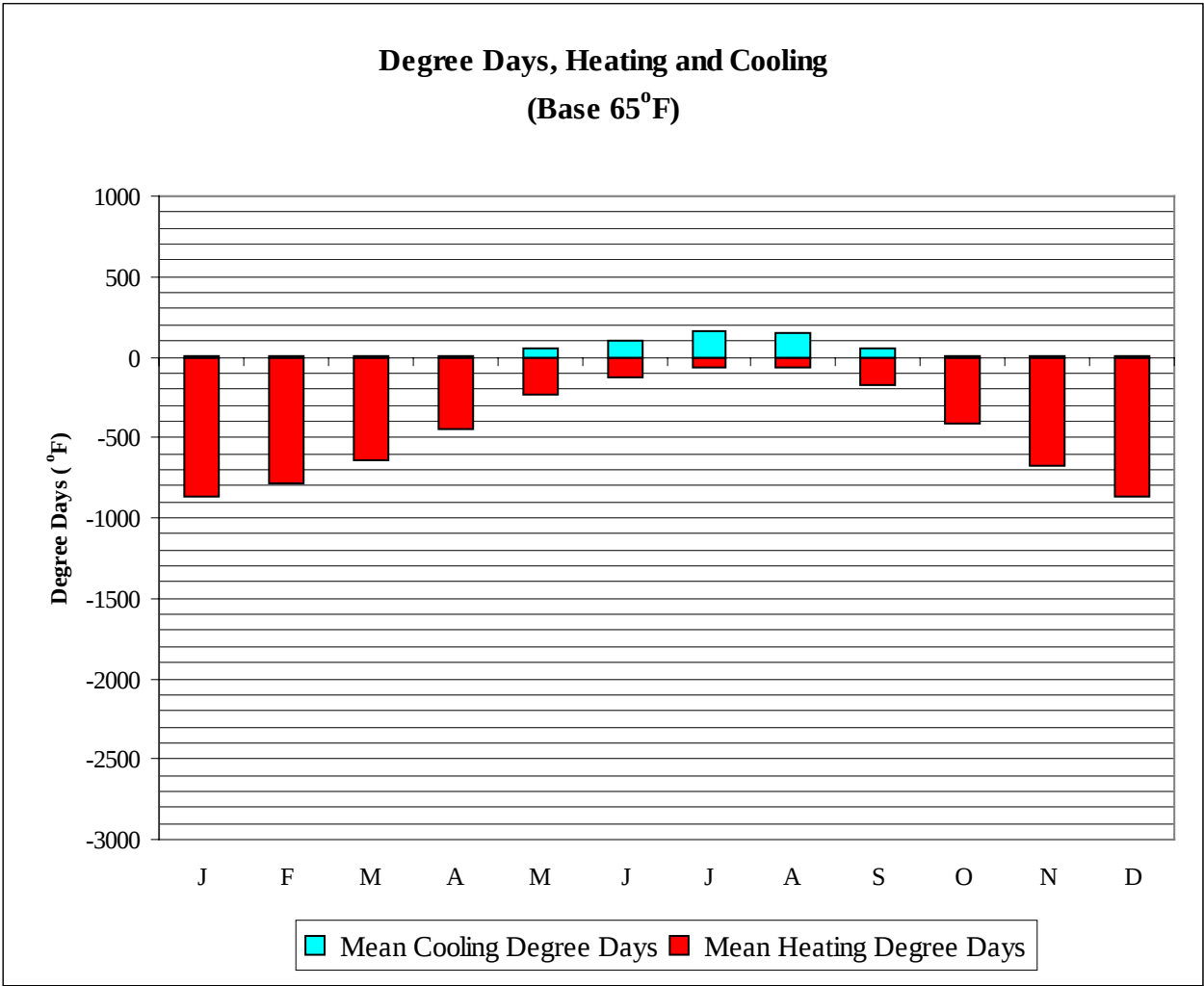


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Long Term Dry Bulb Temperature and Humidity Summary

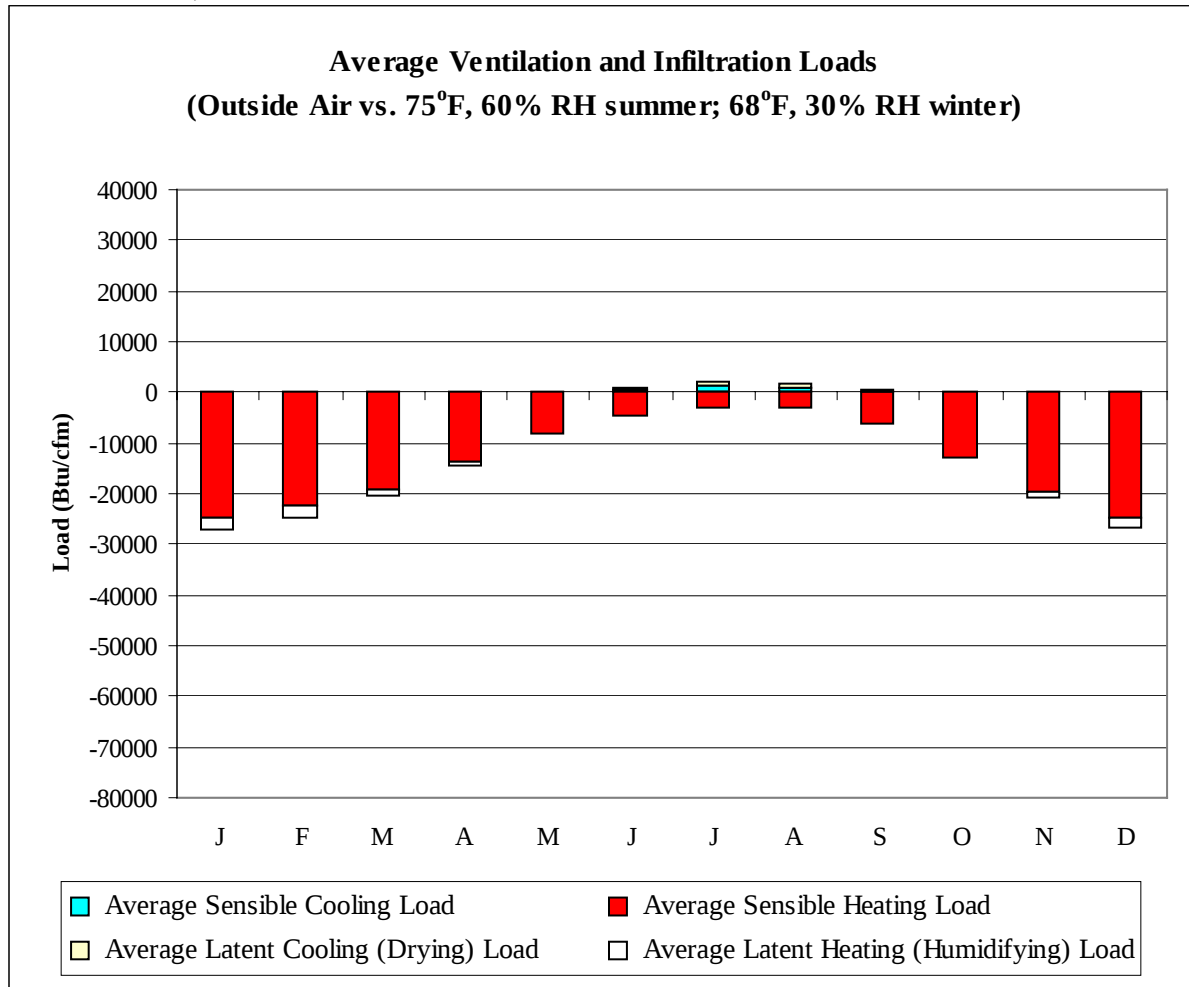
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	52.0	48.6	39.2	31.1	9.0	50.4	52.6	31.5	23.2
14-Jan	54.0	49.2	39.0	30.2	5.0	49.7	52.1	30.7	22.4
21-Jan	54.0	49.7	39.5	31.4	12.0	49.7	53.0	30.7	23.1
28-Jan	54.0	49.3	41.8	33.7	23.0	50.4	52.7	33.9	24.8
4-Feb	52.0	46.3	42.1	32.7	16.0	44.8	47.5	32.4	23.7
11-Feb	55.0	48.4	42.3	33.0	14.0	47.6	50.6	33.3	24.2
18-Feb	54.0	48.0	41.5	30.6	14.0	47.6	51.1	30.7	21.4
25-Feb	59.0	51.9	44.0	32.0	18.0	50.4	54.6	32.4	22.7
4-Mar	59.0	49.6	46.9	33.8	23.0	49.0	51.7	34.0	23.8
11-Mar	63.0	52.8	49.6	36.0	25.0	55.3	54.9	36.5	25.6
18-Mar	64.0	52.3	51.6	37.7	28.0	53.9	54.7	38.5	27.5
25-Mar	66.0	54.4	53.5	39.3	30.0	58.1	57.1	41.1	29.2
1-Apr	72.0	55.9	54.8	39.5	30.0	58.8	58.0	41.6	28.8
8-Apr	70.0	54.7	55.3	41.0	34.0	58.1	58.3	41.2	29.1
15-Apr	73.0	56.8	57.2	40.2	30.0	61.6	64.5	41.0	28.4
22-Apr	76.0	62.5	61.0	42.6	34.0	60.9	62.7	43.6	29.8
29-Apr	77.0	59.1	61.8	44.6	36.0	63.0	61.1	47.6	33.2
6-May	79.0	61.3	64.3	46.8	37.0	70.7	67.1	53.3	37.6
13-May	82.0	63.4	66.6	48.6	39.0	75.6	68.6	57.2	40.1
20-May	82.0	63.5	69.9	50.9	43.0	81.2	69.2	61.1	42.8
27-May	82.0	63.3	69.6	51.8	43.0	82.6	64.0	61.6	43.4
3-Jun	86.0	68.4	71.3	53.0	45.0	91.7	78.7	65.0	46.5
10-Jun	86.0	66.5	71.9	54.4	46.0	91.7	74.7	69.8	49.9
17-Jun	86.0	68.7	73.0	54.9	47.0	91.7	77.9	69.4	49.9
24-Jun	86.0	68.6	73.9	56.2	50.0	98.0	76.6	73.8	54.1
1-Jul	91.0	68.8	76.3	57.7	50.0	104.3	75.8	76.4	55.9
8-Jul	91.0	69.8	77.8	59.4	52.0	98.4	76.1	79.6	58.1
15-Jul	91.0	69.9	78.1	59.3	50.0	98.0	78.7	80.2	58.0
22-Jul	91.0	68.1	76.5	58.3	50.0	98.0	75.3	77.1	56.1
29-Jul	91.0	70.8	78.7	59.2	52.0	105.0	79.6	81.4	59.5
5-Aug	93.0	69.4	81.4	60.9	54.0	104.3	76.7	84.3	61.4
12-Aug	91.0	70.3	78.6	59.2	51.0	98.0	75.7	80.7	59.4
19-Aug	90.0	69.5	78.7	59.2	52.0	98.0	75.3	80.8	59.5
26-Aug	88.0	68.7	75.9	57.4	50.0	103.6	74.0	77.6	58.2
2-Sep	84.0	66.8	73.8	55.6	46.0	92.4	72.6	74.5	54.8
9-Sep	84.0	68.5	71.7	53.5	45.0	91.7	73.9	70.3	51.1
16-Sep	81.0	66.3	70.2	53.6	45.0	86.8	69.5	71.1	52.6
23-Sep	82.0	67.2	69.7	52.8	44.0	97.3	77.5	70.1	51.8
30-Sep	79.0	64.4	67.4	50.2	43.0	86.1	68.0	65.1	48.4
7-Oct	75.0	63.4	63.8	49.5	41.0	80.5	67.2	62.3	46.4
14-Oct	73.0	62.4	61.7	47.3	37.0	75.6	65.5	59.0	44.5
21-Oct	68.0	58.3	57.7	44.5	36.0	70.7	62.9	53.3	39.5
28-Oct	66.0	58.7	55.7	42.9	32.0	70.7	61.9	49.2	37.0
4-Nov	62.0	56.3	52.4	41.5	30.0	66.5	59.4	46.5	35.2
11-Nov	59.0	54.2	49.5	39.0	28.0	61.6	57.7	42.7	32.0
18-Nov	59.0	51.9	48.1	38.3	28.0	55.3	53.2	40.9	30.1
25-Nov	57.0	53.3	45.7	36.5	25.0	61.6	55.8	38.1	27.9
2-Dec	55.0	51.3	42.1	33.7	19.0	54.6	54.7	34.3	26.2
9-Dec	55.0	50.7	42.3	33.9	21.0	53.9	53.2	34.3	25.4
16-Dec	54.0	50.4	40.4	32.1	17.0	53.2	54.3	32.7	24.1
23-Dec	55.0	51.3	41.3	33.8	18.0	58.1	53.8	34.5	25.2
31-Dec	54.0	50.7	40.1	32.5	16.0	54.6	52.9	32.6	24.5



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	871
FEB	0	784
MAR	1	642
APR	11	448
MAY	49	236
JUN	96	123
JUL	167	67
AUG	146	70
SEP	48	175
OCT	6	408
NOV	0	674
DEC	0	865
ANN	524	5363

HEIDELBERG, 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	-24898	0	-2176
FEB	0	-22511	0	-2291
MAR	2	-19028	0	-1365
APR	14	-13792	0	-712
MAY	195	-8026	31	-67
JUN	578	-4642	313	-5
JUL	1324	-2857	721	0
AUG	1022	-2994	650	0
SEP	180	-6334	176	-1
OCT	7	-12888	3	-135
NOV	0	-19790	0	-856
DEC	0	-24815	0	-1856
ANN	3322	-162575	1894	-9464

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

No Solar Radiation
Data Available

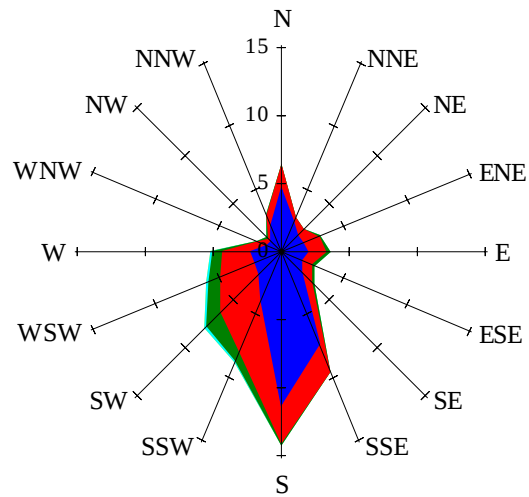


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

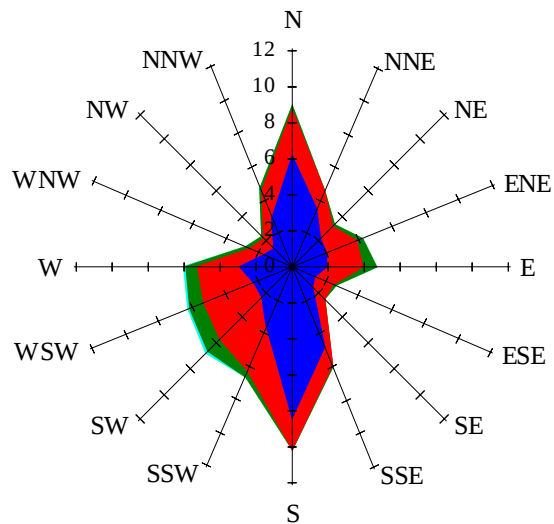
Labels of Percent Frequency on North Axis



Percent Calm = 19.04

Wind Summary - March, April, and May

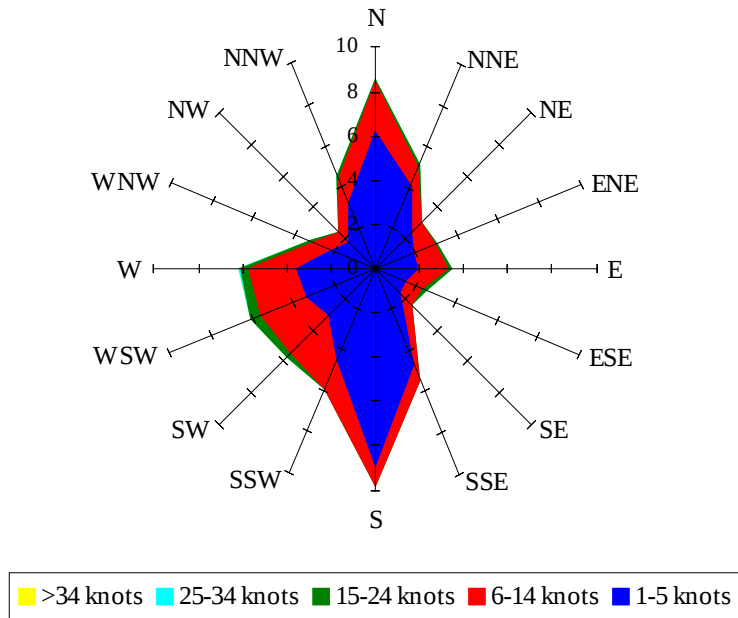
Labels of Percent Frequency on North Axis



Percent Calm = 18.44

Wind Summary - June, July, and August

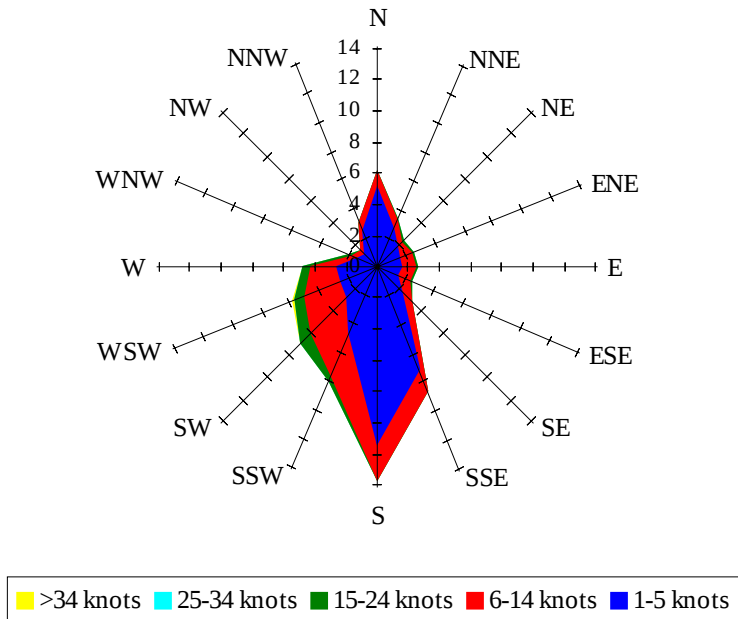
Labels of Percent Frequency on North Axis



Percent Calm = 23.72

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 24.35