

KASSEL, GERMANY

Latitude = 51.30 N

Longitude = 9.45 E

Period of Record = 1973 to 1996

WMO No. 104380

Elevation = 764 feet

Average Pressure = 29.19 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	68	70	6.1	S
0.4% Occurrence	84	66	69	5.9	E
1.0% Occurrence	80	64	67	5.5	E
2.0% Occurrence	77	63	65	5.8	S
Mean Daily Range	13	-	-	-	-
97.5% Occurrence	22	21	13	5.4	N
99.0% Occurrence	16	15	10	4.6	N
99.6% Occurrence	11	10	8	4.8	N
Median of Extreme Lows	9	9	7	4.7	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	94	5.6	S
0.4% Occurrence	68	79	85	5.4	S
1.0% Occurrence	66	76	80	5.2	SSW
2.0% Occurrence	64	73	75	5.1	SSW
	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	76	0.69	4.9	SSW
0.4% Occurrence	92	72	0.60	4.6	S
1.0% Occurrence	86	71	0.57	4.5	S
2.0% Occurrence	81	68	0.54	4.6	SSW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		1	100	1	65

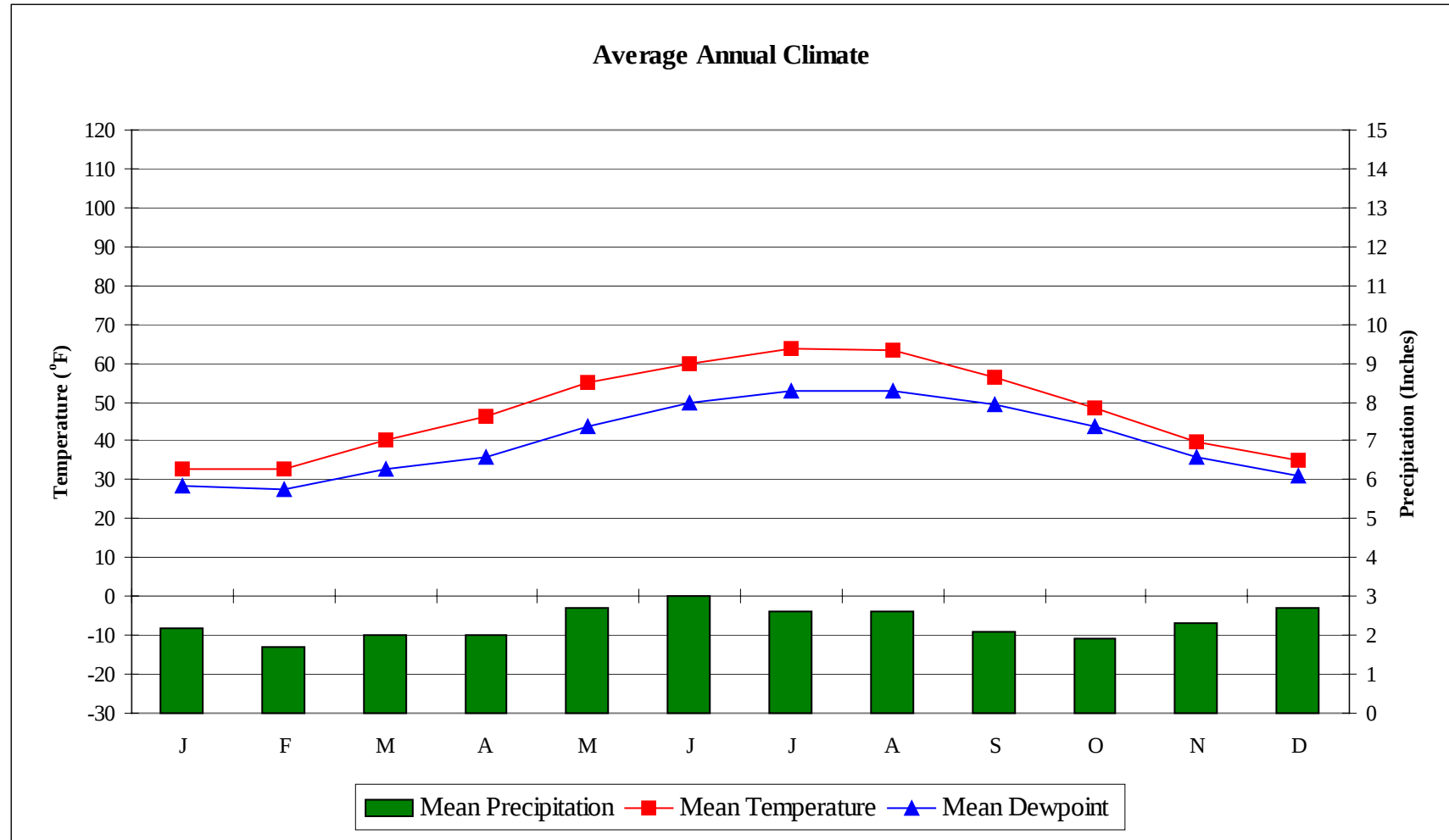
Other Site Data

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	0.0 + 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 (#)
50.4	N/A	N/A	33

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

KASSEL, GERMANY

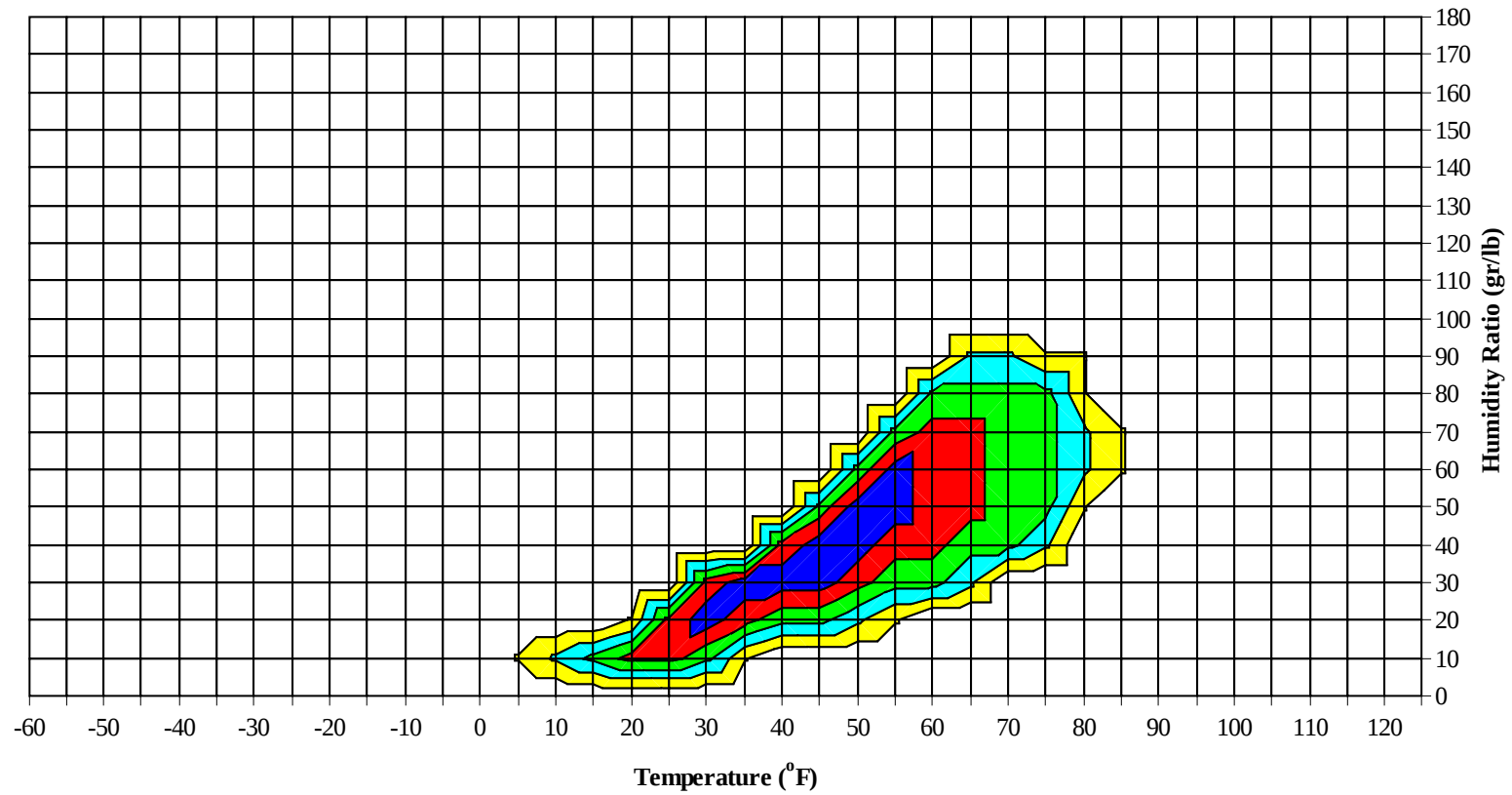
WMO No. 104380



KASSEL, GERMANY

WMO No. 104380

Long Term Psychrometric Summary

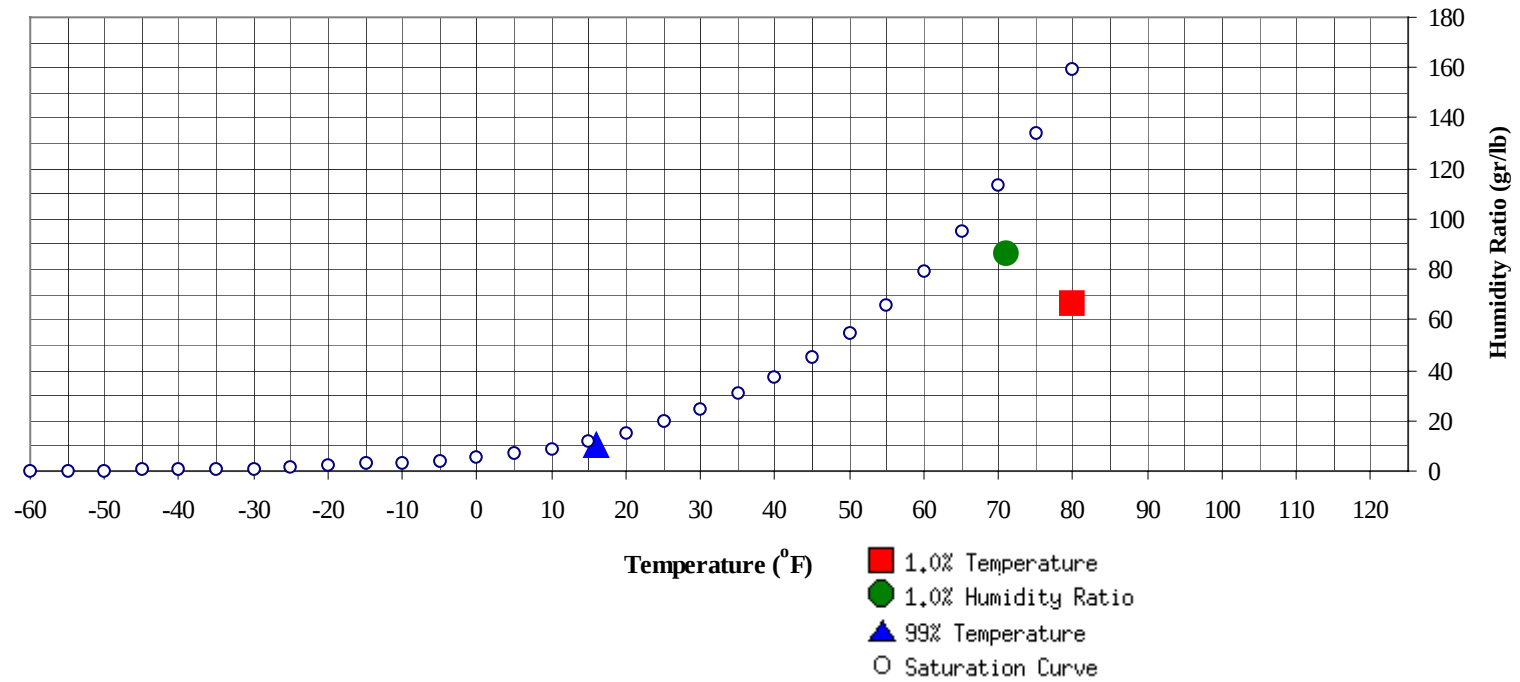


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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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	10.4	5.4		86.1	70.9	65.2	62.3	30.5

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	80	66.7	64.2	29.6

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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															
70 / 74												0		0	54.8
65 / 69												1	0	1	52.2
60 / 64							0		0	52.0	0	5	4	9	50.7
55 / 59		0		0	50.5	0	2	1	3	49.2	1	13	9	23	48.5
50 / 54	3	4	2	9	46.9	2	7	5	14	46.0	7	27	27	61	46.2
45 / 49	15	20	18	53	43.6	8	20	16	44	42.9	30	50	45	125	42.7
40 / 44	28	38	33	99	39.6	19	30	31	80	39.1	44	58	57	158	38.7
35 / 39	59	61	59	180	35.4	51	54	55	160	35.1	70	58	63	190	34.9
30 / 34	65	63	69	197	30.8	56	54	53	163	30.5	64	28	34	126	30.5
25 / 29	32	26	30	88	25.6	38	31	38	107	25.3	24	7	7	38	25.5
20 / 24	14	14	15	42	20.9	23	17	14	54	20.5	5	1	1	7	20.5
15 / 19	17	12	13	41	16.2	16	7	8	31	16.3	2	1	1	4	15.9
10 / 14	9	6	6	21	11.3	7	2	2	11	11.3	1	0	0	1	11.3
5 / 9	4	3	3	10	6.5	3	1	1	5	6.6	0	0		0	6.8
0 / 4	2	1	0	3	1.6	1	0		1	1.3	0			0	4.0
-5 / -1	1	0	0	1	-2.5	0			0	-1.0					

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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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															
85 / 89							0	0	0	62.2		0	0	0	66.4
80 / 84							2	1	3	63.0		8	5	13	65.5
75 / 79		2	1	3	57.1		11	6	17	60.0		20	13	34	62.7
70 / 74		5	3	8	55.5	0	23	16	39	57.6	2	32	27	61	60.7
65 / 69		10	7	17	52.9	1	30	25	56	55.4	8	36	32	76	58.6
60 / 64	1	20	16	38	50.6	11	43	39	94	53.3	36	53	53	141	56.3
55 / 59	5	30	28	63	48.1	38	52	53	143	51.1	66	54	56	176	53.0
50 / 54	24	44	44	113	45.7	69	49	57	175	48.2	75	32	41	149	49.4
45 / 49	45	54	53	152	42.2	69	27	33	129	44.2	45	4	10	59	45.7
40 / 44	58	44	47	150	38.8	39	9	13	61	40.3	7		1	8	41.5
35 / 39	66	25	32	123	35.1	19	2	4	25	36.3	1			1	37.1
30 / 34	36	5	7	48	30.9	3	0	0	3	32.2					
25 / 29	5	1	1	7	26.1	0			0	28.0					
20 / 24	0		0	0	21.9										
15 / 19	0			0	19.0										
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	0	71.7						
90 / 94		2	0	2	67.7		2	1	3	69.1		0		0	66.7
85 / 89		7	4	11	66.5	0	5	3	8	65.9		0	0	0	65.8
80 / 84		18	13	32	65.2	0	16	8	24	64.7		2	1	3	63.5
75 / 79	0	30	25	55	63.5	1	31	21	53	63.0		8	3	11	62.8
70 / 74	6	42	37	85	61.6	3	44	36	83	61.0	0	19	10	29	60.9
65 / 69	25	46	47	117	59.6	16	49	51	115	59.3	2	29	21	52	59.0
60 / 64	60	56	58	174	57.2	62	57	61	180	57.5	17	59	47	123	56.5
55 / 59	82	40	49	171	53.9	84	37	51	171	54.1	56	69	74	199	53.3
50 / 54	62	8	15	84	50.3	64	8	15	86	50.3	86	42	61	188	49.8
45 / 49	14	0	0	14	46.5	17	0	1	18	46.4	58	12	21	90	45.8
40 / 44	0			0	42.4	2			2	42.3	18	1	2	21	41.8
35 / 39											4	0	0	4	37.3
30 / 34											0			0	34.0
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															

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KASSEL, GERMANY

WMO No. 104380

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	62.5										
70 / 74		3	1	4	60.4										
65 / 69	0	7	3	10	58.9										
60 / 64	2	21	13	36	56.2		0		0	53.9					
55 / 59	18	48	39	105	52.9	2	5	2	9	51.4	0	1	0	1	51.1
50 / 54	57	65	66	188	49.2	12	24	19	55	48.6	6	10	6	22	48.2
45 / 49	70	60	68	198	44.7	36	56	48	139	44.2	19	25	22	66	44.3
40 / 44	50	30	38	117	40.5	57	55	55	166	40.0	34	35	38	107	39.9
35 / 39	37	12	18	67	36.5	61	56	61	178	35.8	63	70	68	201	35.5
30 / 34	14	2	2	18	31.6	45	31	38	113	31.2	67	62	63	192	31.1
25 / 29	1	0		1	27.7	19	12	14	45	25.9	30	25	29	84	25.8
20 / 24						7	3	3	13	21.6	14	10	12	36	21.0
15 / 19						1	0	0	1	16.8	11	7	7	25	16.5
10 / 14						0			0	13.0	4	2	1	7	12.2
5 / 9											1	1	0	2	6.6
0 / 4											0	0	0	0	2.2
-5 / -1															

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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WMO No. 104380

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

Period of Record = 1973 to 1996

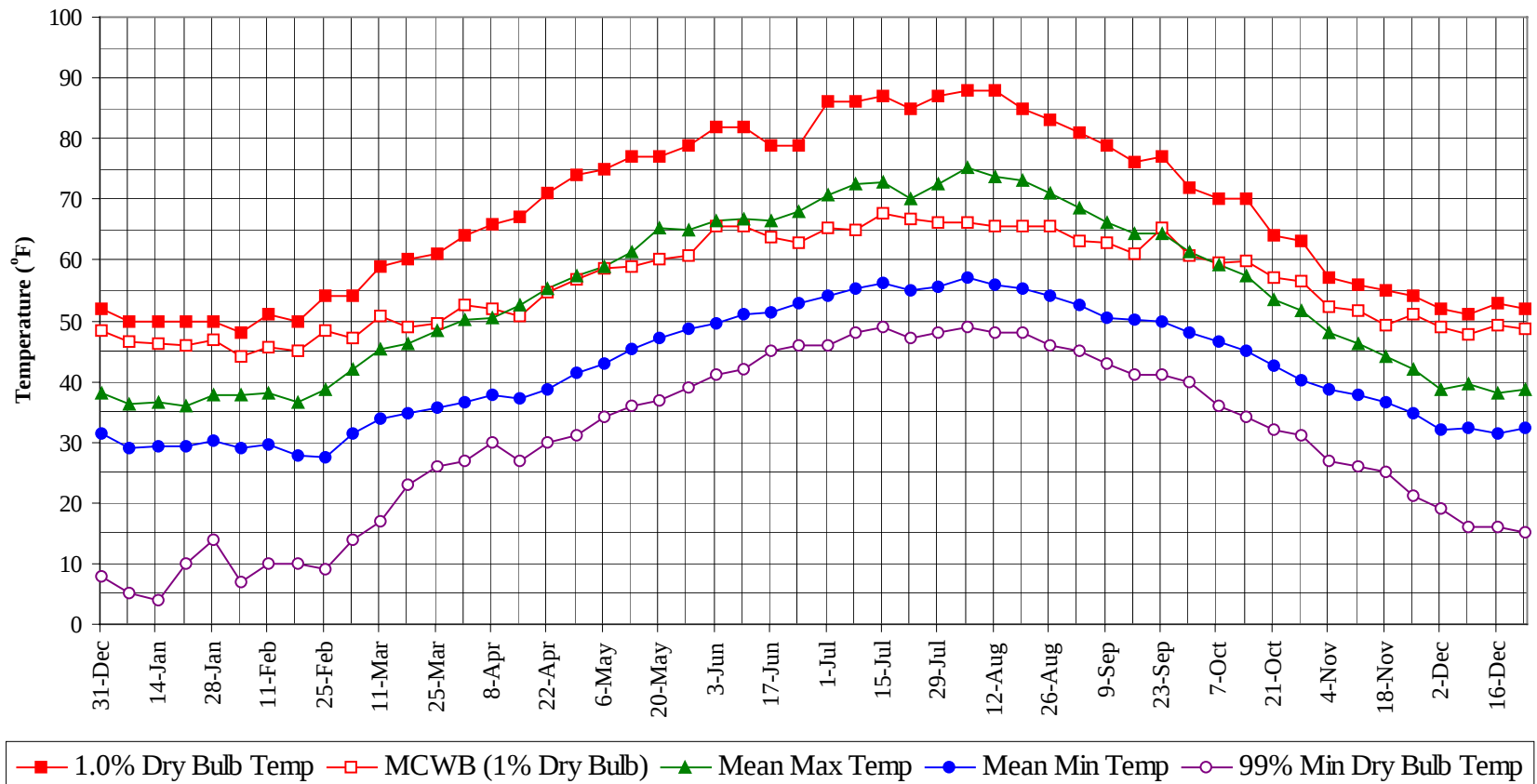
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99		0	0	0	71.7
90 / 94		4	1	5	68.2
85 / 89	0	15	8	23	66.2
80 / 84	0	45	28	73	64.9
75 / 79	1	102	69	172	62.7
70 / 74	11	167	128	306	60.5
65 / 69	52	207	185	444	58.4
60 / 64	187	315	291	794	56.1
55 / 59	353	351	362	1066	52.7
50 / 54	466	320	359	1146	48.7
45 / 49	426	327	335	1088	44.1
40 / 44	356	298	318	971	39.6
35 / 39	432	335	361	1127	35.4
30 / 34	350	243	265	858	30.8
25 / 29	147	103	120	370	25.6
20 / 24	63	44	46	153	20.8
15 / 19	45	25	29	99	16.3
10 / 14	20	11	10	41	11.5
5 / 9	8	5	4	17	6.6
0 / 4	3	1	1	5	1.6
-5 / -1	1	0	0	1	-2.4
					</

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.

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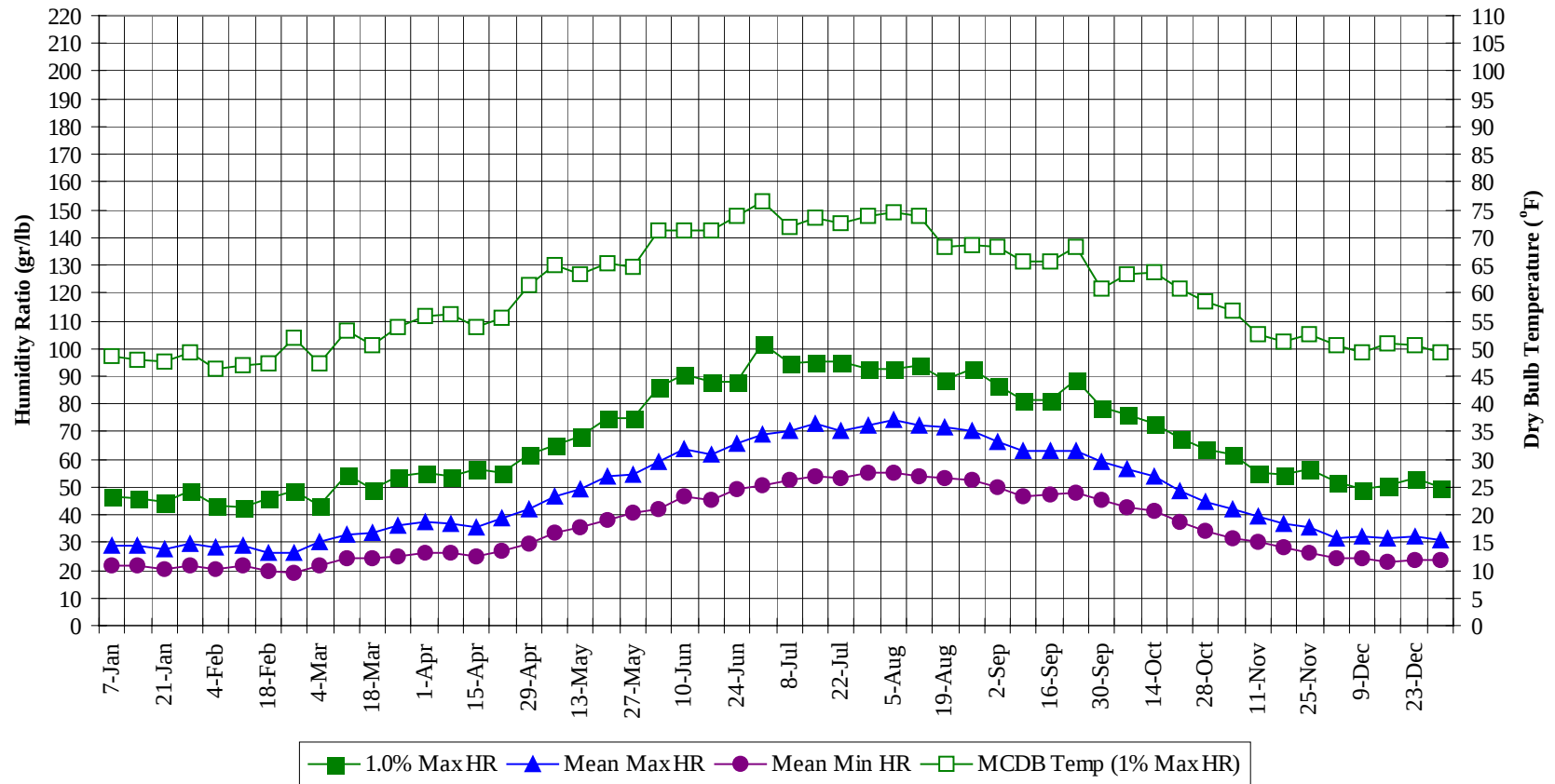
Annual Summary of Temperatures



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Long Term Humidity and Dry Bulb Temperature Summary

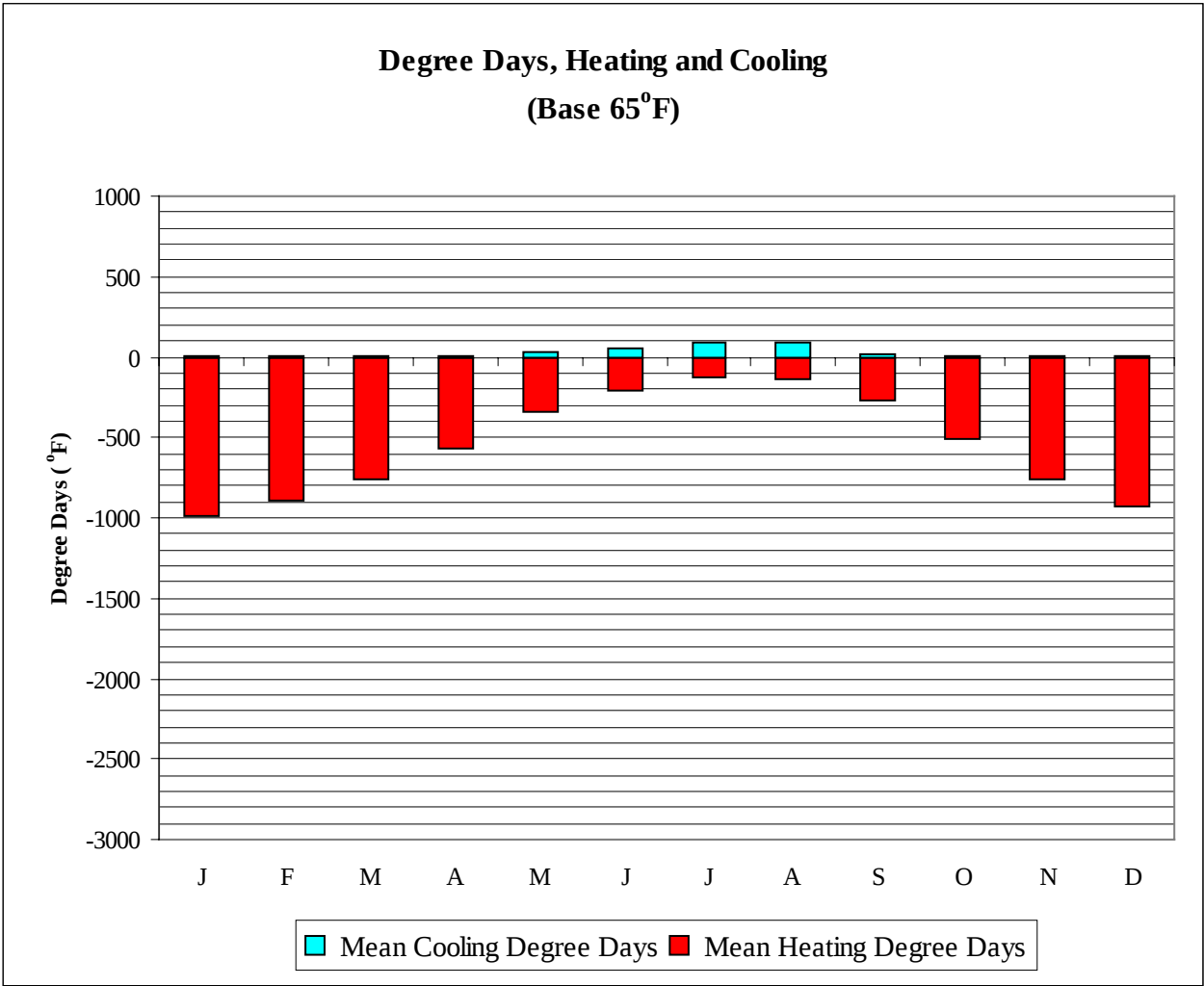


KASSEL, GERMANY

WMO No. 104380

Long Term Dry Bulb Temperature and Humidity Summary

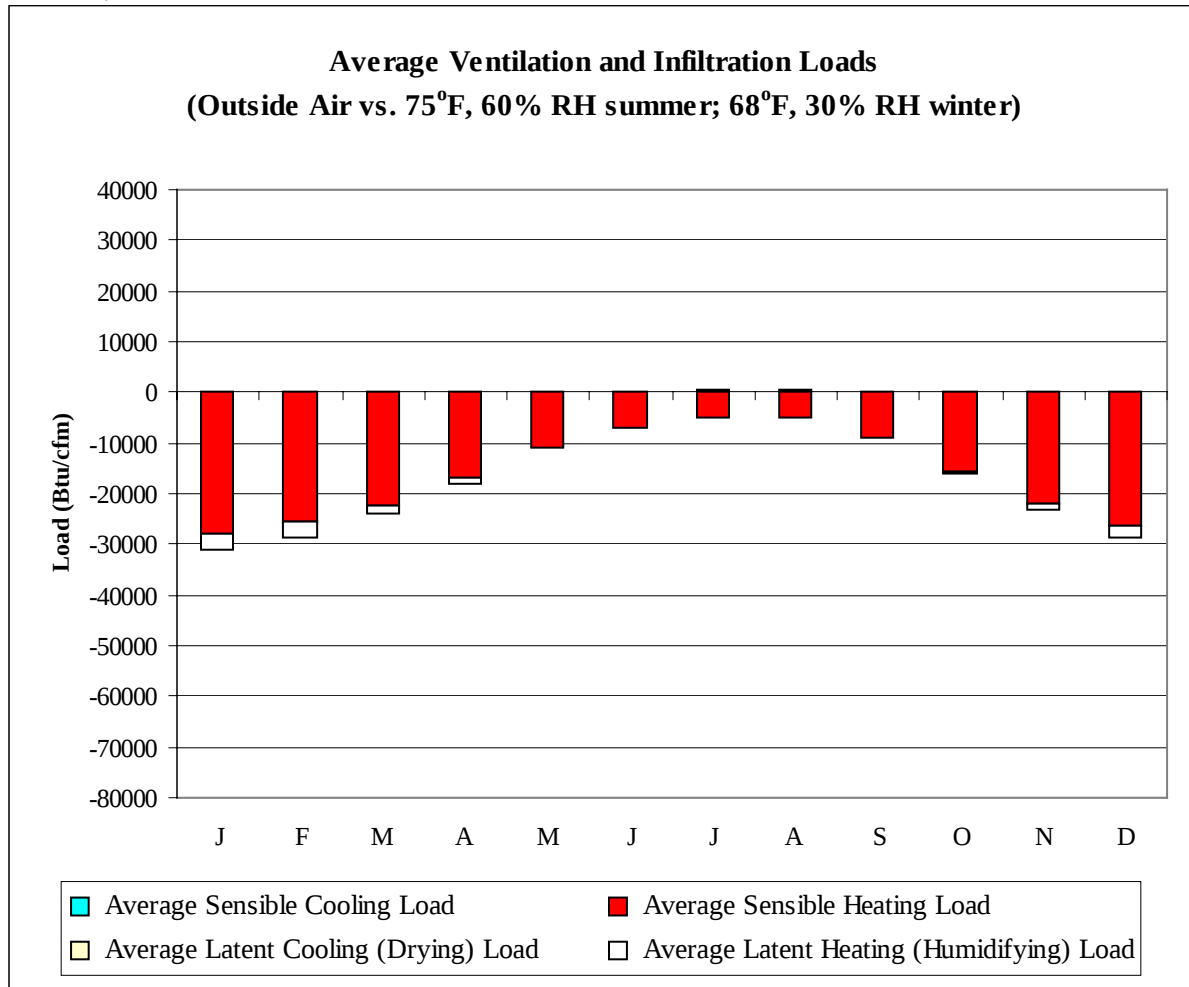
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	50.0	46.5	36.2	29.0	5.0	46.9	48.5	29.2	21.4
14-Jan	50.0	46.1	36.7	29.4	4.0	46.2	47.9	29.1	21.9
21-Jan	50.0	45.8	36.0	29.2	10.0	44.8	47.7	27.3	20.6
28-Jan	50.0	47.0	37.7	30.4	14.0	48.3	49.4	29.6	21.5
4-Feb	48.0	44.0	37.7	29.0	7.0	43.4	46.4	28.0	20.6
11-Feb	51.0	45.8	38.1	29.5	10.0	42.7	47.0	28.7	21.5
18-Feb	50.0	45.1	36.6	27.7	10.0	46.2	47.2	26.3	19.5
25-Feb	54.0	48.3	38.6	27.4	9.0	48.3	51.8	26.6	19.3
4-Mar	54.0	47.3	42.0	31.3	14.0	43.4	47.2	30.0	22.0
11-Mar	59.0	50.7	45.2	34.0	17.0	54.6	53.2	32.9	24.2
18-Mar	60.0	49.0	46.3	34.6	23.0	49.0	50.6	33.8	24.4
25-Mar	61.0	49.6	48.4	35.6	26.0	53.9	53.8	35.9	25.0
1-Apr	64.0	52.6	50.2	36.7	27.0	55.3	55.9	37.6	26.2
8-Apr	66.0	52.0	50.6	37.7	30.0	53.9	56.0	36.6	26.0
15-Apr	67.0	50.8	52.6	37.1	27.0	56.7	54.0	35.6	24.9
22-Apr	71.0	54.8	55.2	38.8	30.0	55.3	55.5	38.6	26.6
29-Apr	74.0	56.9	57.3	41.4	31.0	61.6	61.4	41.8	29.5
6-May	75.0	58.5	59.1	43.0	34.0	65.1	64.9	46.6	33.5
13-May	77.0	58.9	61.3	45.4	36.0	68.6	63.5	49.0	35.7
20-May	77.0	60.3	65.2	47.2	37.0	74.9	65.3	53.9	38.4
27-May	79.0	60.7	64.9	48.7	39.0	74.9	64.6	54.5	40.6
3-Jun	82.0	65.5	66.3	49.6	41.0	86.1	71.2	58.9	42.3
10-Jun	82.0	65.5	66.8	51.1	42.0	90.3	71.2	63.9	46.9
17-Jun	79.0	63.7	66.4	51.3	45.0	88.2	71.2	61.8	45.1
24-Jun	79.0	62.8	68.1	52.8	46.0	88.2	73.8	65.5	49.3
1-Jul	86.0	65.3	70.6	54.0	46.0	101.5	76.5	69.2	50.7
8-Jul	86.0	65.0	72.4	55.4	48.0	94.5	71.9	70.4	52.4
15-Jul	87.0	67.6	72.7	56.3	49.0	95.2	73.4	73.2	53.7
22-Jul	85.0	66.9	70.1	55.0	47.0	95.2	72.4	70.4	53.0
29-Jul	87.0	66.2	72.4	55.7	48.0	92.4	73.9	72.2	54.9
5-Aug	88.0	66.2	75.3	57.1	49.0	92.4	74.5	74.1	55.1
12-Aug	88.0	65.6	73.8	55.9	48.0	93.8	73.8	72.1	54.1
19-Aug	85.0	65.4	73.1	55.3	48.0	88.9	68.2	71.9	53.3
26-Aug	83.0	65.7	71.0	54.2	46.0	92.4	68.5	70.5	52.7
2-Sep	81.0	63.3	68.7	52.6	45.0	86.8	68.2	66.6	50.1
9-Sep	79.0	62.9	66.3	50.5	43.0	81.2	65.8	63.2	46.5
16-Sep	76.0	61.0	64.4	50.1	41.0	81.2	65.8	62.8	47.6
23-Sep	77.0	65.2	64.3	49.9	41.0	88.9	68.2	63.1	48.1
30-Sep	72.0	60.6	61.3	47.9	40.0	79.1	60.9	59.3	45.1
7-Oct	70.0	59.6	59.1	46.4	36.0	76.3	63.4	56.7	42.9
14-Oct	70.0	60.0	57.5	44.9	34.0	72.8	63.8	53.6	41.2
21-Oct	64.0	57.2	53.6	42.5	32.0	67.9	60.7	48.7	37.2
28-Oct	63.0	56.4	51.7	40.3	31.0	63.7	58.3	44.4	34.1
4-Nov	57.0	52.2	48.1	38.7	27.0	61.6	56.7	41.8	31.6
11-Nov	56.0	51.7	46.2	37.7	26.0	55.3	52.6	39.4	30.2
18-Nov	55.0	49.4	44.1	36.6	25.0	54.6	51.2	36.8	28.1
25-Nov	54.0	51.1	42.1	34.7	21.0	56.7	52.6	35.4	26.5
2-Dec	52.0	48.9	38.8	32.0	19.0	51.8	50.5	31.5	24.3
9-Dec	51.0	47.7	39.5	32.2	16.0	49.0	49.2	32.0	24.3
16-Dec	53.0	49.3	38.2	31.3	16.0	50.4	51.0	31.3	23.2
23-Dec	52.0	48.8	38.6	32.3	15.0	53.2	50.6	31.9	23.9
31-Dec	52.0	48.4	38.0	31.3	8.0	49.7	49.4	30.7	23.5



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	987
FEB	0	898
MAR	0	763
APR	4	564
MAY	24	339
JUN	50	204
JUL	91	126
AUG	85	133
SEP	19	269
OCT	2	512
NOV	0	757
DEC	0	928
ANN	274	6480

KASSEL, GERMANY

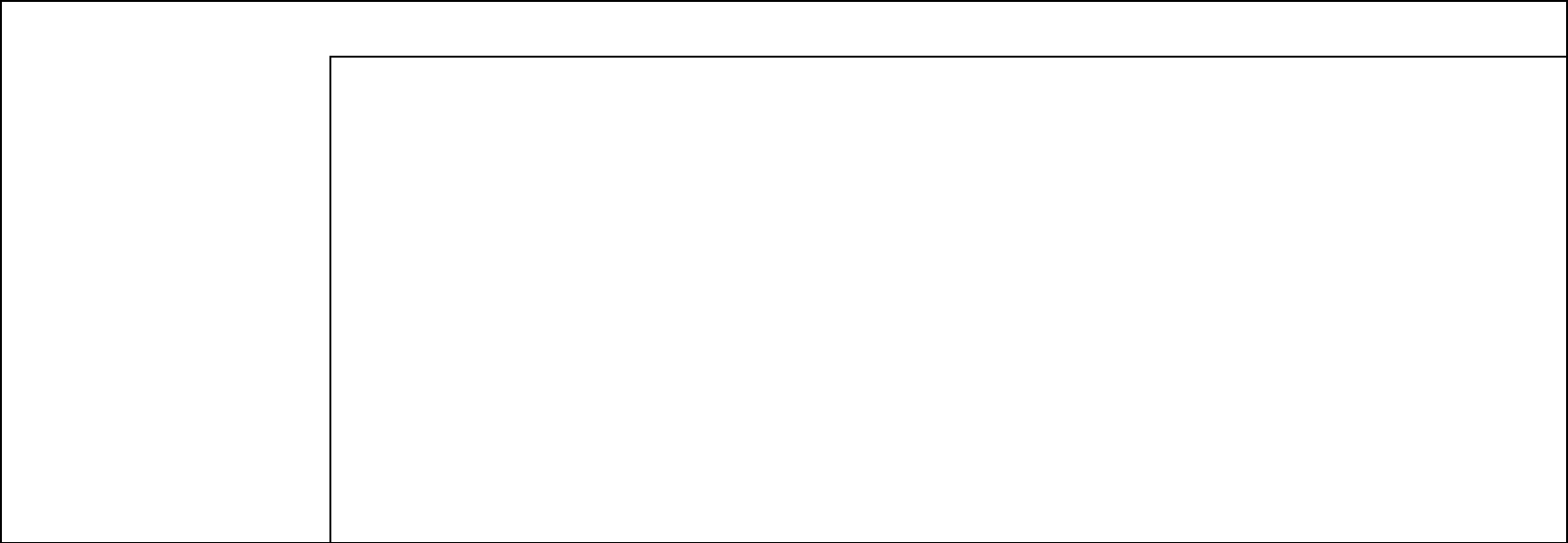
WMO No. 104380



	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	-27995	0	-2984
FEB	0	-25463	0	-3123
MAR	0	-22180	0	-1895
APR	4	-16904	0	-1137
MAY	50	-10917	4	-162
JUN	184	-7113	128	-8
JUL	478	-4862	236	0
AUG	403	-5071	171	0
SEP	38	-9064	33	-3
OCT	0	-15642	0	-221
NOV	0	-21945	0	-1197
DEC	0	-26468	0	-2355
ANN	1157	-193624	572	-13085

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

No Solar Radiation
Data Available

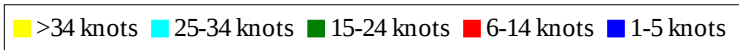
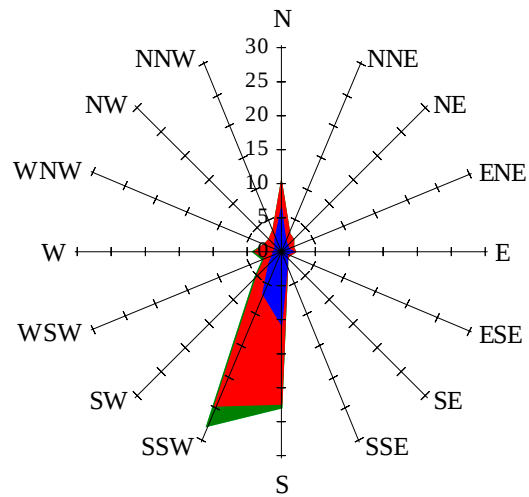


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

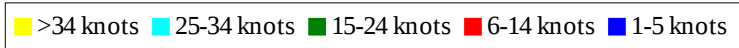
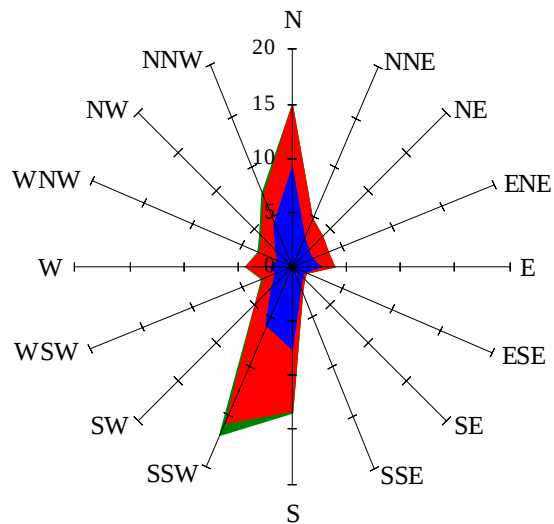
Labels of Percent Frequency on North Axis



Percent Calm = 5.80

Wind Summary - March, April, and May

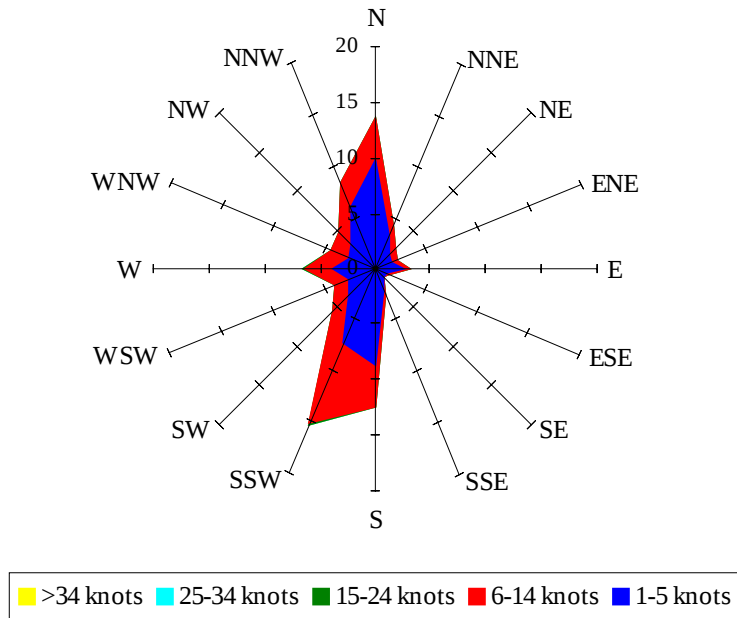
Labels of Percent Frequency on North Axis



Percent Calm = 7.03

Wind Summary - June, July, and August

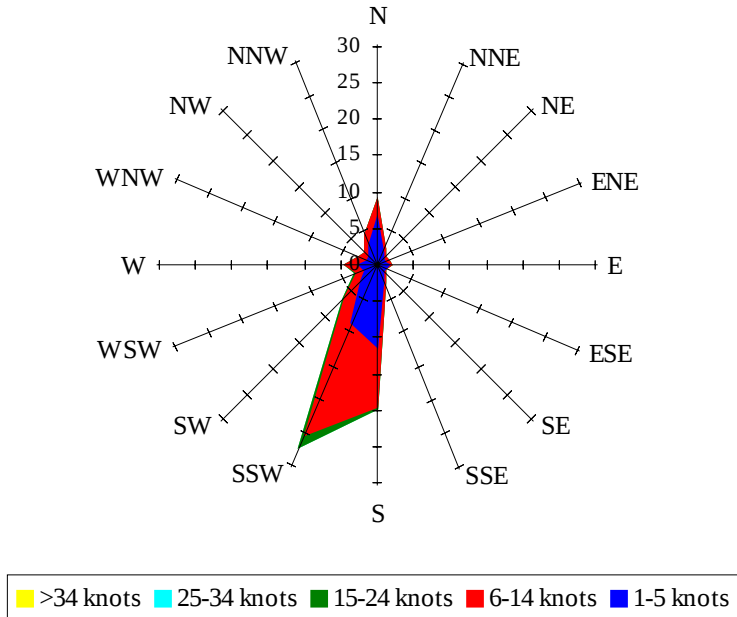
Labels of Percent Frequency on North Axis



Percent Calm = 8.95

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 8.21