

HANNOVER, GERMANY

Latitude = 52.47 N

Longitude = 9.70 E

Period of Record = 1973 to 1996

WMO No. 103380

Elevation = 177 feet

Average Pressure = 29.76 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	89	67	66	9.0	ESE
0.4% Occurrence	84	67	70	8.8	E
1.0% Occurrence	81	65	69	8.2	E
2.0% Occurrence	77	64	67	8.1	E
Mean Daily Range	14	-	-	-	-
97.5% Occurrence	22	21	14	7.1	E
99.0% Occurrence	16	15	11	7.6	E
99.6% Occurrence	10	9	8	6.2	E
Median of Extreme Lows	7	7	7	5.4	E
	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	72	84	97	8.3	E
0.4% Occurrence	69	80	87	7.7	E
1.0% Occurrence	67	77	81	7.4	W
2.0% Occurrence	65	74	77	7.3	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	104	76	0.69	6.4	E
0.4% Occurrence	92	72	0.61	6.7	W
1.0% Occurrence	86	70	0.57	6.8	W
2.0% Occurrence	81	68	0.54	7.1	W
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		1	104	2	98

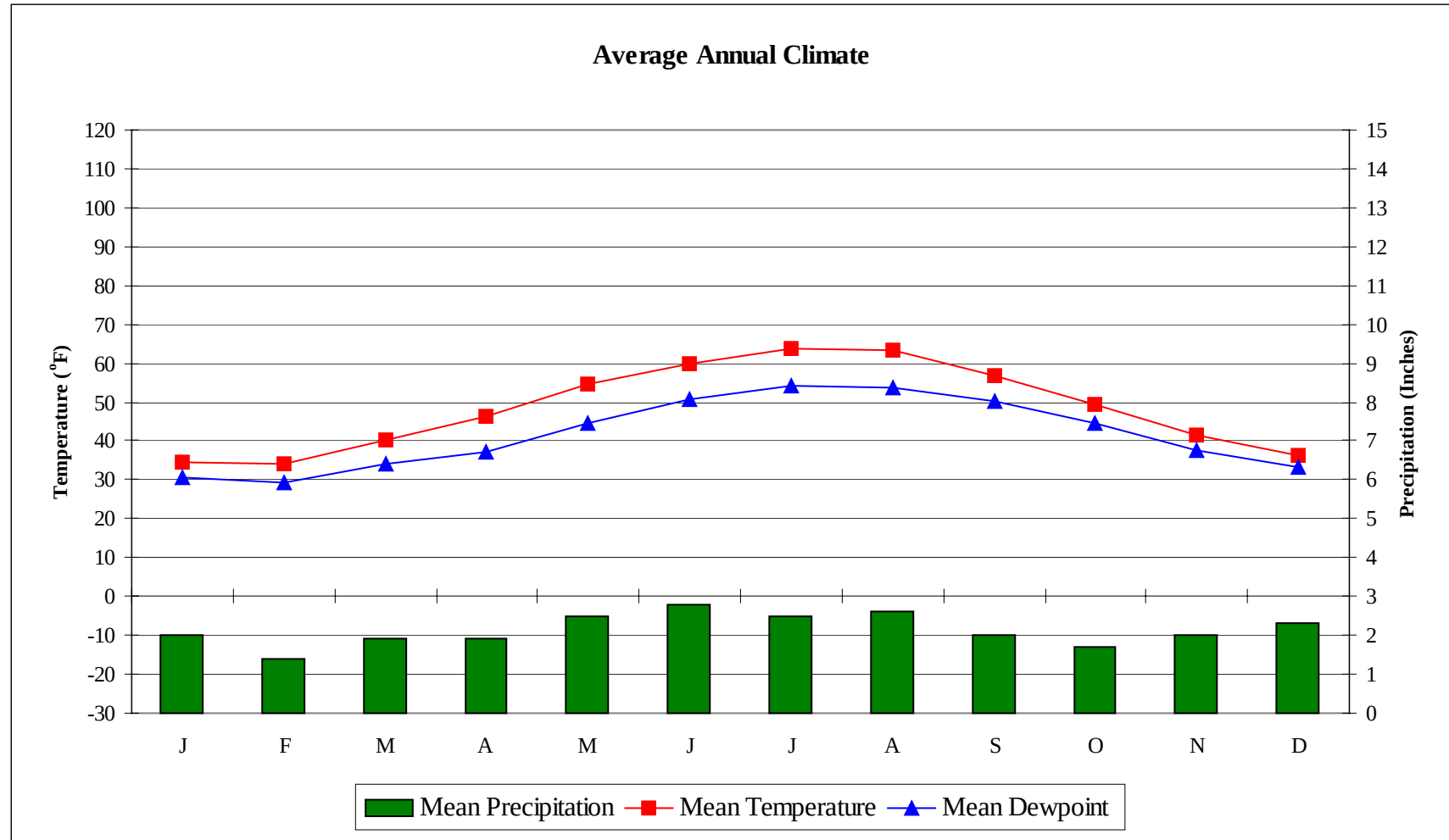
Other Site Data

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 (#)
50.9	N/A	N/A	38

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

HANNOVER, GERMANY

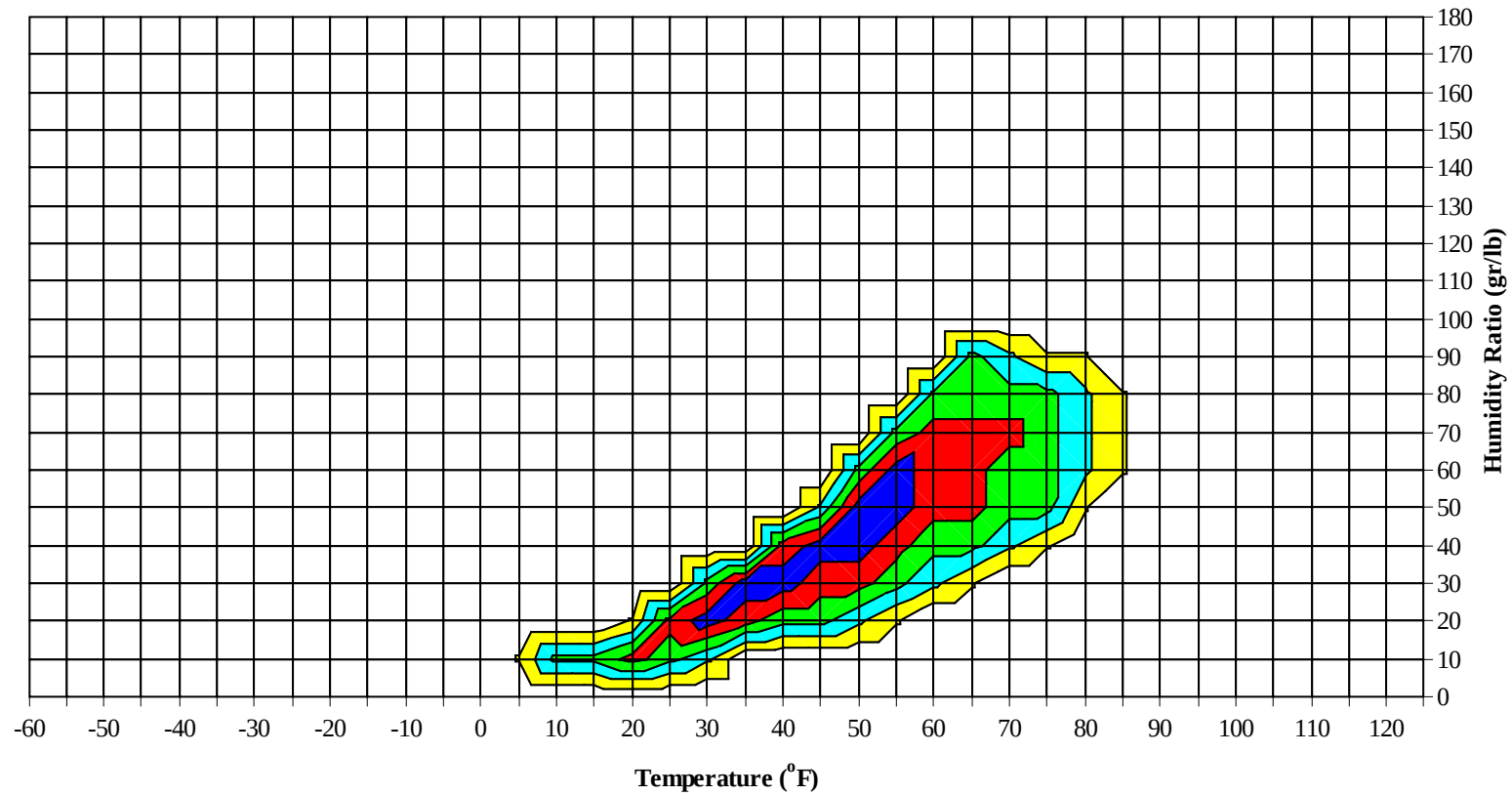
WMO No. 103380



HANNOVER, GERMANY

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Long Term Psychrometric Summary

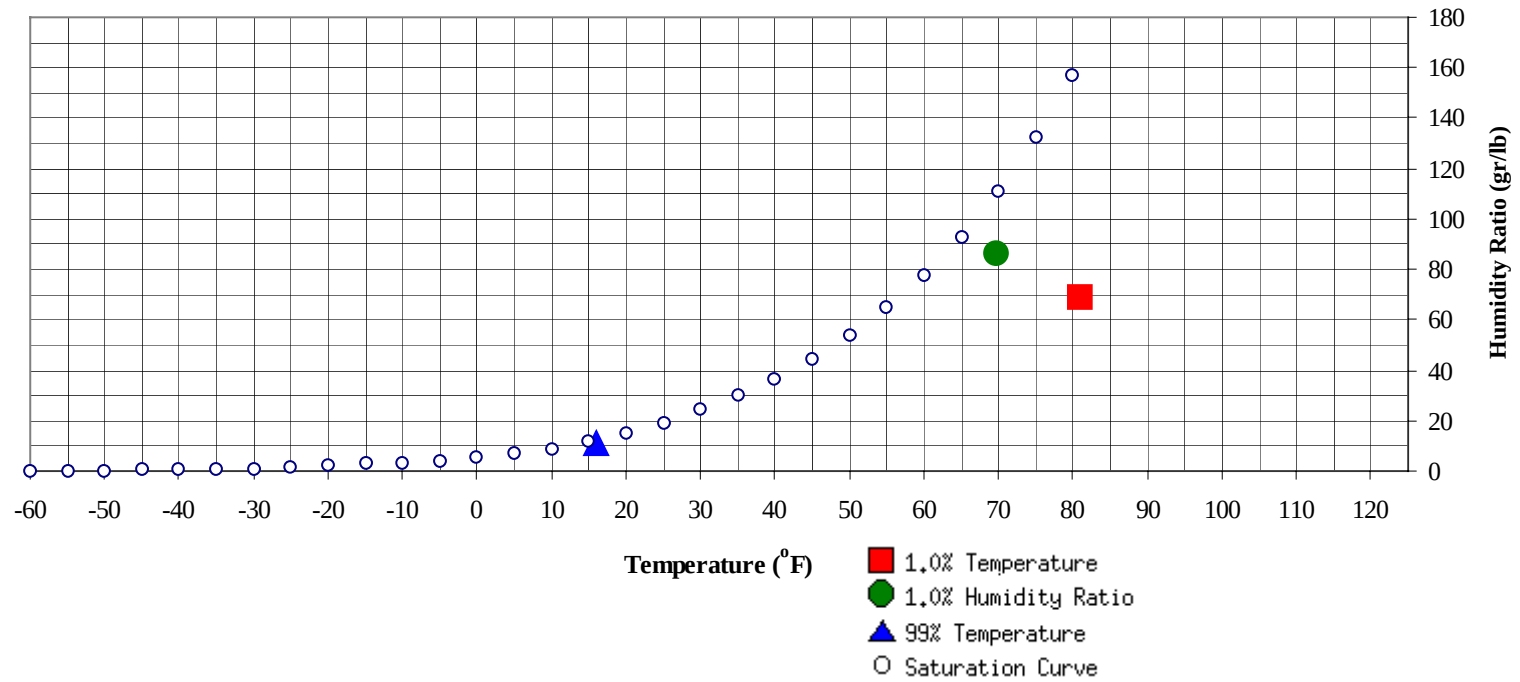


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

HANNOVER, GERMANY

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Psychrometric Summary of Peak Design Values



	(°F)	MCHR	Enthalpy	1.0% Humidity Ratio	(gr/lb)	MCDB	MCWB	MC Dewpt	Enthalpy
		(gr/lb)	(btu/lb)			(°F)	(°F)	(°F)	(btu/lb)
99% Dry Bulb	16	10.8	5.5	Ratio	86.1	69.7	65.1	62.7	30.2

1.0% Dry Bulb	(°F)	MCHR	MCWB	Enthalpy
		(gr/lb)	(°F)	(btu/lb)
81	69	65.4	30.3	

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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	0	56.1
65 / 69												1	0	1	52.3
60 / 64						0	1	0	1	52.5	0	4	2	6	50.9
55 / 59	0	1	0	1	50.5	1	3	2	6	49.3	2	14	8	24	49.7
50 / 54	6	8	6	20	47.7	3	10	6	19	46.4	9	34	26	69	46.7
45 / 49	23	30	26	79	44.0	14	28	20	62	43.2	32	54	50	136	43.2
40 / 44	39	53	46	138	39.7	27	37	37	101	39.5	47	55	53	155	39.2
35 / 39	59	60	60	179	35.7	47	44	48	139	35.5	64	51	60	175	35.2
30 / 34	54	42	51	147	31.3	51	49	53	153	30.8	59	26	35	120	30.9
25 / 29	24	20	22	66	26.0	35	27	32	94	25.9	24	6	10	40	25.8
20 / 24	13	14	13	40	21.2	18	13	15	46	20.9	7	2	2	11	21.1
15 / 19	12	11	12	35	16.6	15	7	8	30	16.5	3	0	1	4	16.7
10 / 14	11	6	7	24	11.7	7	4	3	14	11.7	1	0	0	1	11.9
5 / 9	3	2	3	8	7.0	3	1	1	5	6.9	1	0	0	1	6.7
0 / 4	3	1	1	5	2.0	2	0	0	2	2.0	0	0		0	2.0
-5 / -1	0	0	0	0	-2.8	1	0		1	-1.6					
-10 / -6	0	0	0	0	-6.3	0	0		0	-7.0					

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	67.0		0		0	69.8
80 / 84		0	0	0	57.5		3	2	5	63.6		3	1	4	68.2
75 / 79		2	1	3	57.4		12	6	18	60.8		9	6	15	66.3
70 / 74		6	2	8	56.3		0	23	13	58.6		2	31	21	63.5
65 / 69	0	10	6	16	54.2		1	32	21	56.6		7	39	29	61.2
60 / 64	1	20	13	34	51.6		8	47	39	54.3		30	58	55	59.1
55 / 59	7	32	24	63	49.1		34	53	54	51.7		66	58	59	56.9
50 / 54	19	47	44	110	46.4		69	49	58	48.6		85	21	46	53.5
45 / 49	41	64	56	162	42.8		70	22	37	44.4		42	1	10	50.0
40 / 44	62	38	50	150	39.6		40	5	14	40.5		7		1	46.1
35 / 39	62	18	32	112	35.7		22	1	5	36.6		1		0	41.8
30 / 34	36	2	10	48	31.1		4	0	0	31.6		0			36.8
25 / 29	11	0	1	12	26.3		0			27.2				0	32.7
20 / 24	1		0	1	21.4										
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															

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HANNOVER, GERMANY

WMO No. 103380

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	69.3						
90 / 94		2	1	3	67.0	1	1	2	67.5						
85 / 89		7	4	11	67.3	6	3	9	66.6		0			0	67.0
80 / 84		17	10	27	66.1	16	8	24	65.5		2	0		2	66.5
75 / 79	0	31	22	53	64.2	0	29	17	46	63.9	7	2		9	64.7
70 / 74	5	43	33	81	62.3	3	48	32	83	61.8	0	18	8	26	62.0
65 / 69	20	51	43	114	60.4	16	55	49	120	60.2	2	32	17	51	59.5
60 / 64	61	60	62	183	57.9	61	62	66	190	58.1	21	72	53	146	57.2
55 / 59	91	34	55	180	54.7	88	27	52	167	54.7	64	73	77	214	53.8
50 / 54	60	3	16	79	50.8	60	3	18	81	50.8	81	31	59	171	50.2
45 / 49	12		1	13	46.5	18		1	19	46.5	50	5	20	75	45.9
40 / 44	0			0	43.6	2		0	2	42.4	17	1	3	21	41.7
35 / 39						0			0	38.5	5		0	5	37.5
30 / 34											1		0	1	32.9
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															

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HANNOVER, 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		1	0	1	64.3										
70 / 74		4	1	5	62.0										
65 / 69	1	9	3	13	59.2										
60 / 64	4	25	14	43	56.7		1	0	1	54.2	0	0		0	55.7
55 / 59	25	55	41	121	53.3	5	14	8	27	52.0	1	3	2	6	51.2
50 / 54	56	70	63	189	49.4	21	34	25	80	48.8	12	14	11	37	48.7
45 / 49	66	50	67	183	45.0	42	61	53	156	44.4	28	36	32	95	44.6
40 / 44	45	22	35	102	40.8	56	53	57	166	40.4	42	48	45	135	40.0
35 / 39	35	10	20	65	36.7	56	43	53	152	36.1	60	58	63	181	35.9
30 / 34	14	2	3	19	31.6	38	25	30	93	31.2	50	46	48	144	31.1
25 / 29	3	0	0	3	27.5	15	7	10	32	26.2	29	26	28	83	26.1
20 / 24						6	2	3	11	22.0	10	8	11	29	21.4
15 / 19						2	1	1	4	17.8	11	5	5	21	17.0
10 / 14								0	0	14.0	3	2	3	8	11.9
5 / 9								0	0	6.2	1	1	1	3	6.7
0 / 4											1	1	0	2	1.3
-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

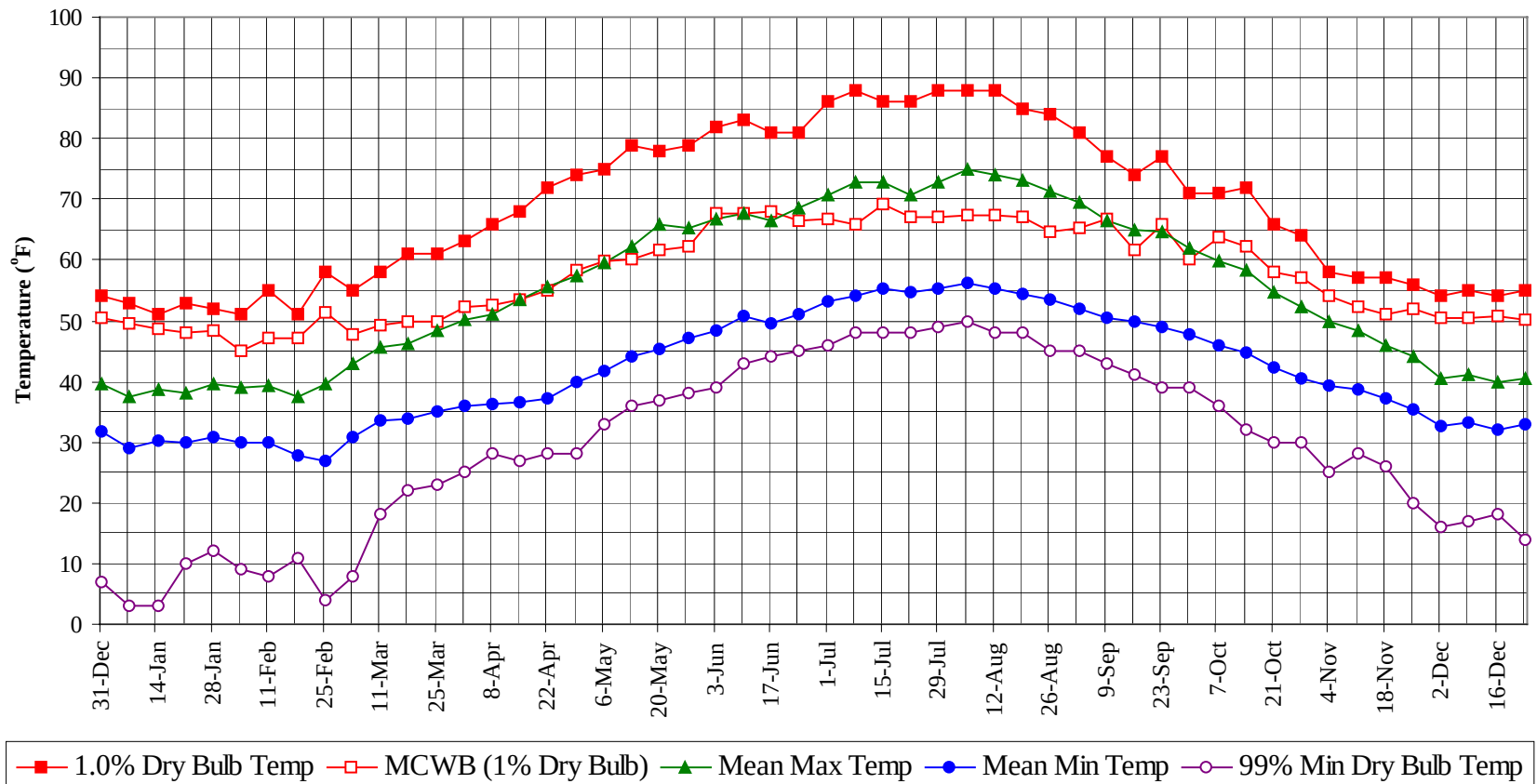
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99		0	0	0	69.3
90 / 94		4	1	5	67.4
85 / 89		16	9	25	67.2
80 / 84		48	26	74	65.8
75 / 79	1	101	61	163	63.5
70 / 74	10	173	110	293	61.3
65 / 69	47	229	168	444	59.3
60 / 64	185	350	303	838	56.8
55 / 59	382	368	383	1133	53.3
50 / 54	479	324	378	1181	49.1
45 / 49	436	351	374	1161	44.3
40 / 44	384	313	341	1038	40.0
35 / 39	410	285	341	1036	35.8
30 / 34	307	193	230	730	31.1
25 / 29	143	87	103	333	26.0
20 / 24	55	39	44	138	21.2
15 / 19	43	23	27	93	16.7
10 / 14	22	11	13	46	11.7
5 / 9	9	4	5	18	6.9
0 / 4	5	2	2	9	1.9
-5 / -1	1	0	0	1	-2.1
-10 / -6	1	0	0	1	-6.5

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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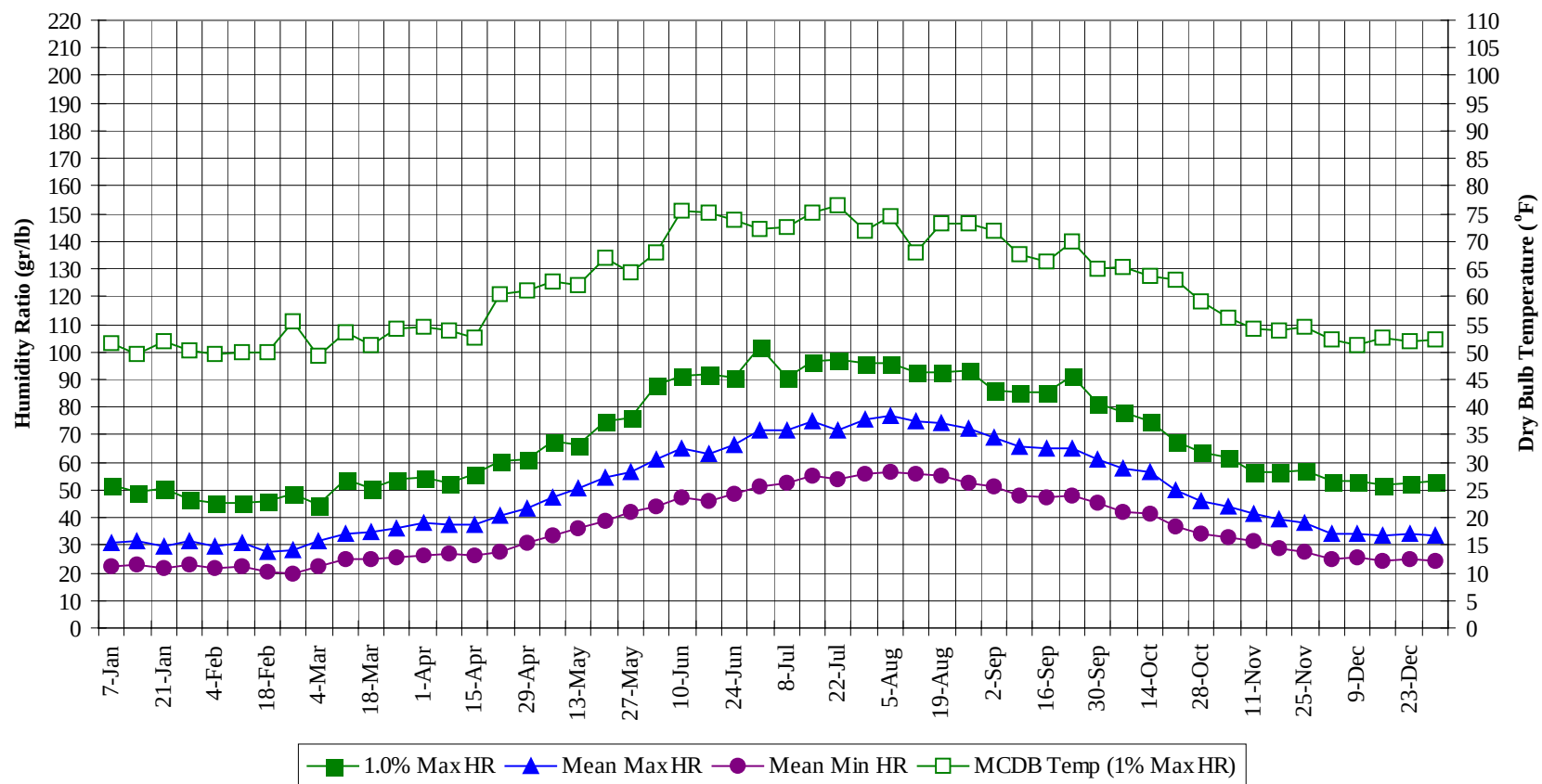
Annual Summary of Temperatures



HANNOVER, GERMANY

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Long Term Humidity and Dry Bulb Temperature Summary

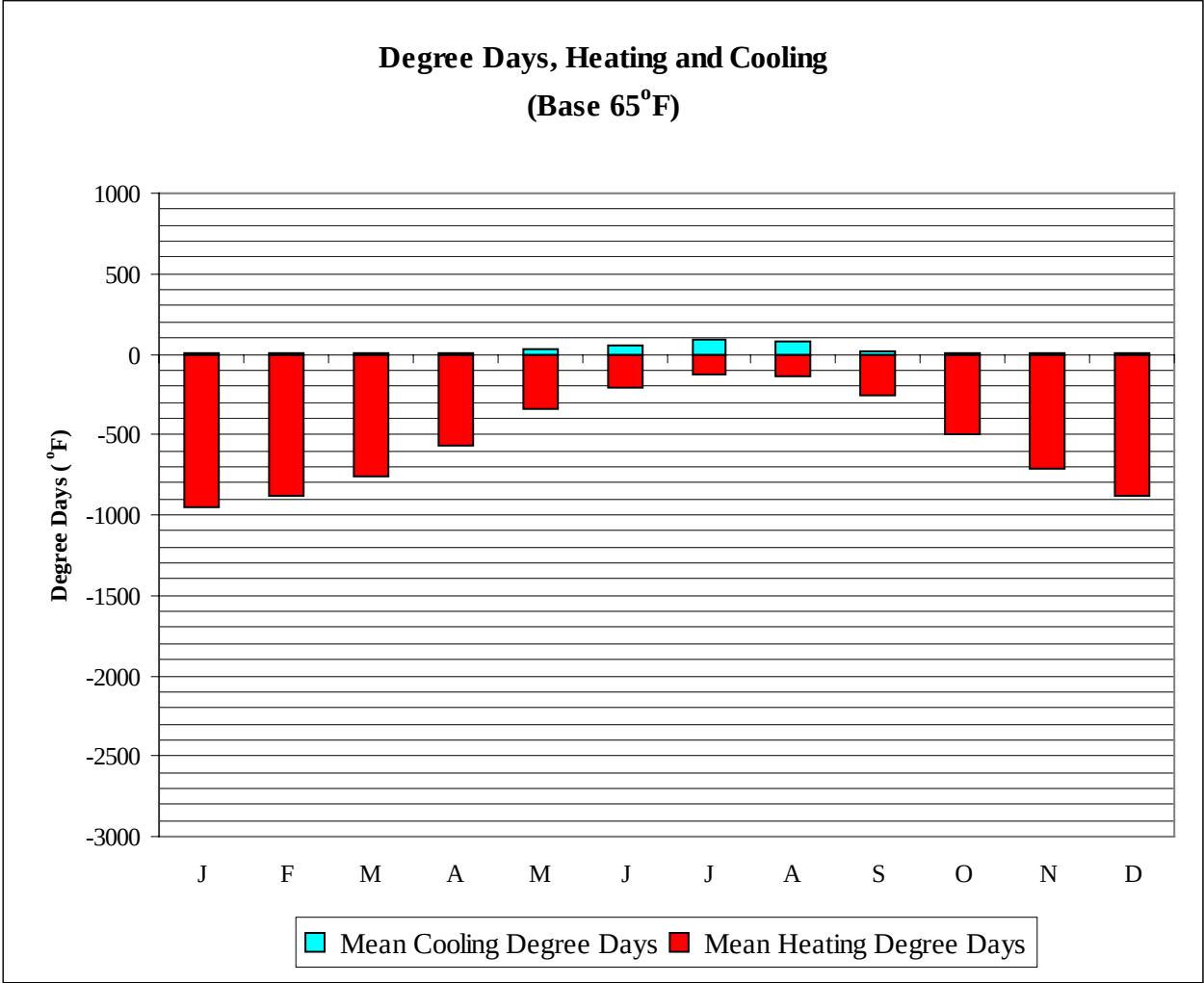


HANNOVER, GERMANY

WMO No. 103380

Long Term Dry Bulb Temperature and Humidity Summary

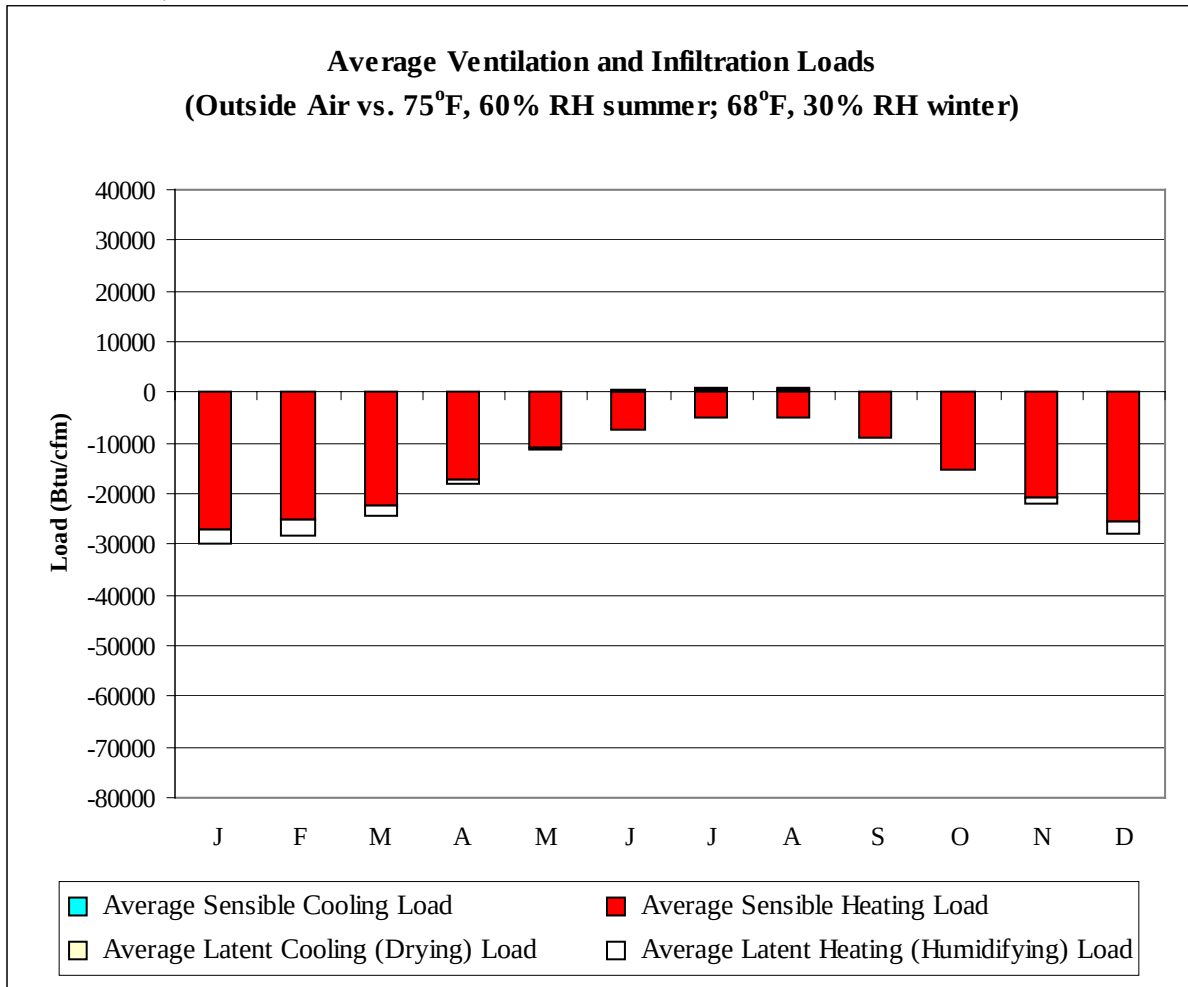
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	53.0	49.7	37.6	29.1	3.0	51.8	51.5	31.1	22.2
14-Jan	51.0	48.7	38.8	30.2	3.0	49.0	49.6	31.6	22.7
21-Jan	53.0	48.1	38.0	30.0	10.0	50.4	51.8	29.6	21.9
28-Jan	52.0	48.4	39.5	30.9	12.0	46.9	50.2	31.5	22.8
4-Feb	51.0	45.1	39.0	29.8	9.0	45.5	49.4	29.7	21.7
11-Feb	55.0	47.2	39.3	29.8	8.0	45.5	50.0	30.6	22.2
18-Feb	51.0	47.2	37.4	27.9	11.0	46.2	49.8	27.7	20.4
25-Feb	58.0	51.3	39.5	26.9	4.0	48.3	55.4	28.1	19.4
4-Mar	55.0	47.7	42.8	31.0	8.0	44.8	49.2	31.2	22.6
11-Mar	58.0	49.4	45.7	33.6	18.0	53.9	53.6	34.3	24.8
18-Mar	61.0	49.8	46.2	33.9	22.0	50.4	51.3	34.6	25.1
25-Mar	61.0	49.7	48.4	35.1	23.0	53.9	54.3	36.0	25.5
1-Apr	63.0	52.3	50.1	35.8	25.0	54.6	54.4	37.9	26.4
8-Apr	66.0	52.6	51.1	36.3	28.0	52.5	54.0	37.6	27.0
15-Apr	68.0	53.6	53.5	36.5	27.0	56.0	52.4	37.5	26.5
22-Apr	72.0	55.0	55.6	37.3	28.0	60.2	60.6	40.6	27.4
29-Apr	74.0	58.2	57.5	39.8	28.0	60.9	61.2	43.4	30.8
6-May	75.0	59.9	59.5	41.7	33.0	67.9	62.7	47.6	33.6
13-May	79.0	60.1	62.2	44.1	36.0	66.5	61.9	50.3	35.9
20-May	78.0	61.5	65.8	45.4	37.0	74.9	66.9	54.7	39.0
27-May	79.0	62.4	65.2	47.2	38.0	76.3	64.2	56.8	41.7
3-Jun	82.0	67.8	66.7	48.4	39.0	88.2	68.0	61.1	43.9
10-Jun	83.0	67.8	67.7	50.9	43.0	91.0	75.6	65.0	47.5
17-Jun	81.0	68.0	66.5	49.7	44.0	91.7	75.1	63.0	45.7
24-Jun	81.0	66.4	68.6	51.1	45.0	90.3	73.9	66.0	48.4
1-Jul	86.0	66.9	70.7	53.3	46.0	101.5	72.3	71.4	51.4
8-Jul	88.0	66.0	72.8	54.0	48.0	90.3	72.7	71.5	52.6
15-Jul	86.0	69.1	72.9	55.2	48.0	96.6	75.0	74.6	55.1
22-Jul	86.0	67.0	70.8	54.7	48.0	97.3	76.4	71.6	54.1
29-Jul	88.0	67.2	72.7	55.3	49.0	95.9	71.8	75.5	55.8
5-Aug	88.0	67.4	75.0	56.2	50.0	95.9	74.5	76.5	56.2
12-Aug	88.0	67.4	74.0	55.3	48.0	92.4	68.1	74.6	55.8
19-Aug	85.0	67.1	73.1	54.4	48.0	92.4	73.2	74.1	54.9
26-Aug	84.0	64.8	71.2	53.4	45.0	93.1	73.1	72.0	52.8
2-Sep	81.0	65.2	69.4	52.0	45.0	86.1	72.0	69.2	51.3
9-Sep	77.0	66.7	66.5	50.4	43.0	85.4	67.5	65.6	48.2
16-Sep	74.0	61.7	64.9	49.8	41.0	85.4	66.4	64.7	47.5
23-Sep	77.0	65.8	64.5	48.9	39.0	91.0	69.8	64.9	48.0
30-Sep	71.0	60.2	61.8	47.6	39.0	81.2	65.0	60.9	45.1
7-Oct	71.0	63.9	59.9	46.0	36.0	78.4	65.3	58.0	42.4
14-Oct	72.0	62.1	58.4	44.7	32.0	74.9	63.6	56.3	41.3
21-Oct	66.0	58.0	54.8	42.3	30.0	67.9	63.0	50.0	36.9
28-Oct	64.0	57.1	52.4	40.4	30.0	63.7	59.3	46.0	34.3
4-Nov	58.0	54.2	49.9	39.3	25.0	61.6	56.2	44.1	32.7
11-Nov	57.0	52.2	48.3	38.5	28.0	56.7	54.2	41.6	31.3
18-Nov	57.0	51.0	45.9	37.0	26.0	56.7	54.0	39.3	29.2
25-Nov	56.0	52.0	44.0	35.3	20.0	57.4	54.5	37.8	27.5
2-Dec	54.0	50.4	40.6	32.6	16.0	53.2	52.2	33.9	24.9
9-Dec	55.0	50.6	41.2	33.3	17.0	53.2	51.2	34.2	25.3
16-Dec	54.0	50.6	39.9	32.1	18.0	51.8	52.4	33.5	24.4
23-Dec	55.0	50.2	40.5	33.0	14.0	52.5	51.8	33.9	25.0
31-Dec	54.0	50.5	39.7	31.9	7.0	53.2	52.1	33.4	24.6



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	947
FEB	0	878
MAR	0	764
APR	5	571
MAY	26	345
JUN	51	206
JUL	89	130
AUG	83	134
SEP	17	262
OCT	3	492
NOV	0	711
DEC	0	885
ANN	274	6325

HANNOVER, GERMANY

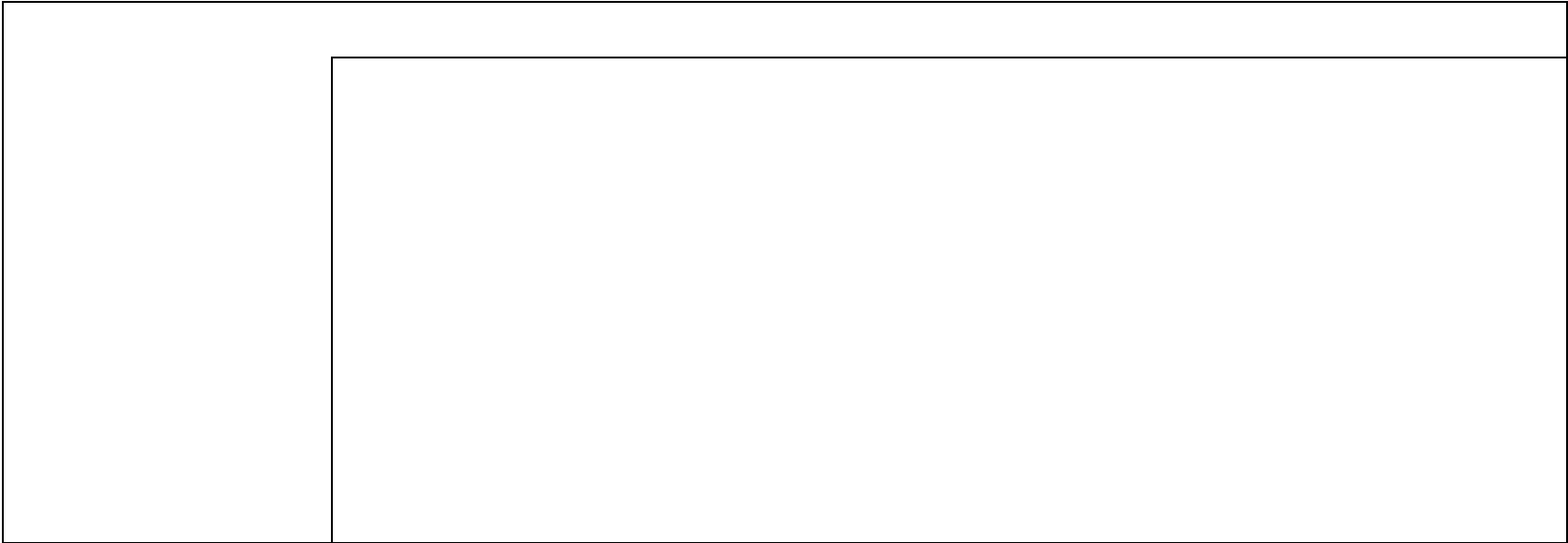
WMO No. 103380



	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	-26948	0	-2951
FEB	0	-24952	0	-3158
MAR	0	-22219	0	-1966
APR	6	-17063	0	-1082
MAY	67	-11060	6	-149
JUN	227	-7196	207	-4
JUL	490	-4978	405	-1
AUG	425	-5134	312	0
SEP	32	-8912	95	-3
OCT	1	-15127	3	-212
NOV	0	-20772	0	-1096
DEC	0	-25343	0	-2365
ANN	1248	-189704	1028	-12987

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

No Solar Radiation
Data Available

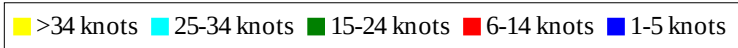
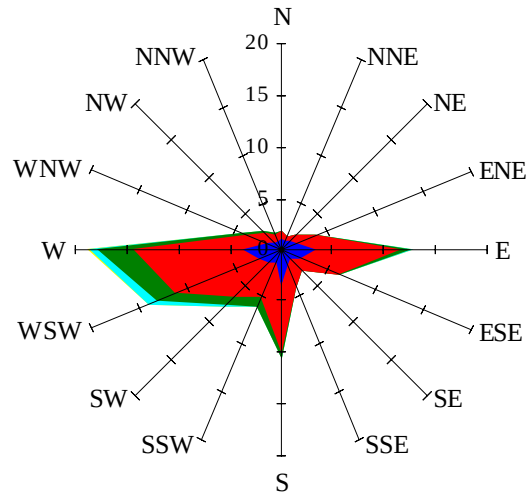


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

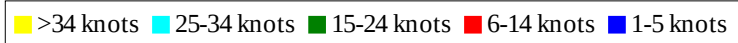
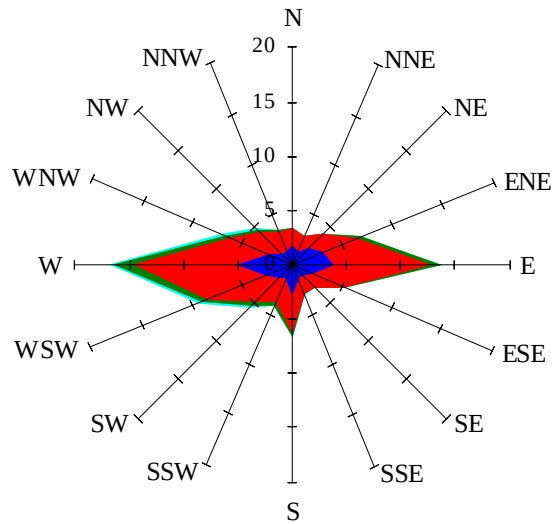
Labels of Percent Frequency on North Axis



Percent Calm = 1.61

Wind Summary - March, April, and May

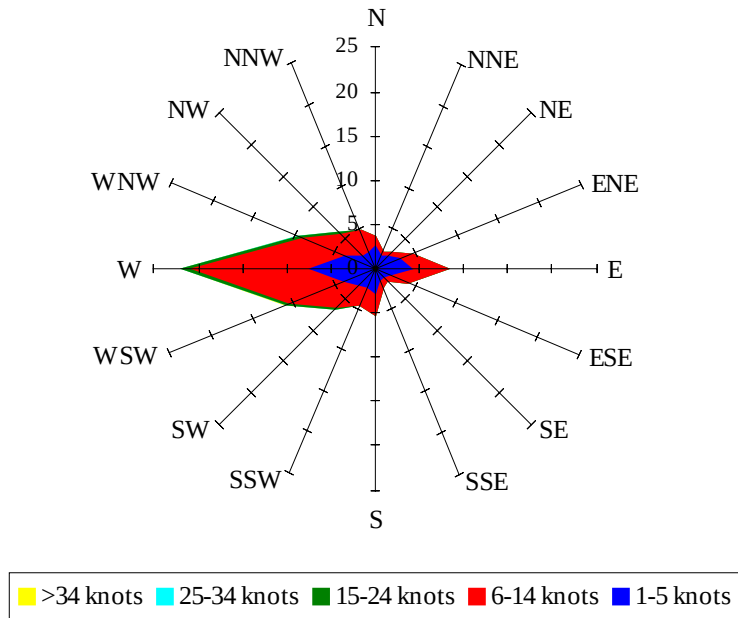
Labels of Percent Frequency on North Axis



Percent Calm = 2.51

Wind Summary - June, July, and August

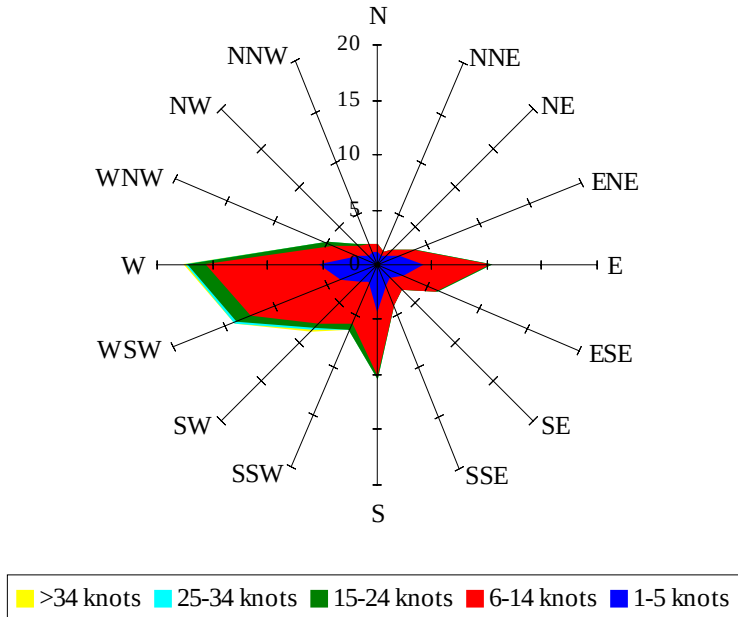
Labels of Percent Frequency on North Axis



Percent Calm = 3.01

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 2.38