STUTTGART/ECHTERDINGEN DL	
Latitude = 48.68 N	WMO No. 107380
Longitude = 9.22 E	Elevation = 1375 feet
Period of Record = 1967 to 1996	Average Pressure = 28.57 inches Hg

Design Criteria Data

		Mean Coincident (Average) Values			
Dry Bulb Temperature (T)	**Design Value (^oF)**	Wet Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	88	66	65	7.0	E
0.4% Occurrence	84	66	69	6.5	E
1.0% Occurrence	81	65	70	6.5	E
2.0% Occurrence	78	64	69	6.7	E
Mean Daily Range	15	-	-	-	-
97.5% Occurrence	21	20	14	3.8	E
99.0% Occurrence	16	15	11	2.9	E
99.6% Occurrence	10	10	9	3.0	E
Median of Extreme Lows	7	7	7	2.5	W
		Mean Coincident (Average) Values			
Wet Bulb Temperature (T_{wb})	**Design Value (^oF)**	Dry Bulb Temperature (^oF)	Humidity Ratio (gr/lb)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	71	85	96	5.8	E
0.4% Occurrence	68	81	86	5.5	E
1.0% Occurrence	66	77	82	5.4	E
2.0% Occurrence	65	76	79	5.4	E
		Mean Coincident (Average) Values			
Humidity Ratio (HR)	**Design Value (gr/lb)**	Dry Bulb Temperature (^oF)	Vapor Pressure (in. Hg)	Wind Speed (mph)	Prevailing Direction (NSEW)
Median of Extreme Highs	102	75	0.65	4.1	E
0.4% Occurrence	91	73	0.59	4.6	E
1.0% Occurrence	87	71	0.56	4.1	E
2.0% Occurrence	83	69	0.53	3.8	E
Air Conditioning/		$T \geq 93^oF$	$T \geq 80^oF$	$T_{wb} \geq 73^oF$	$T_{wb} \geq 67^oF$
Humid Area Criteria	# of Hours	1	106	0	68

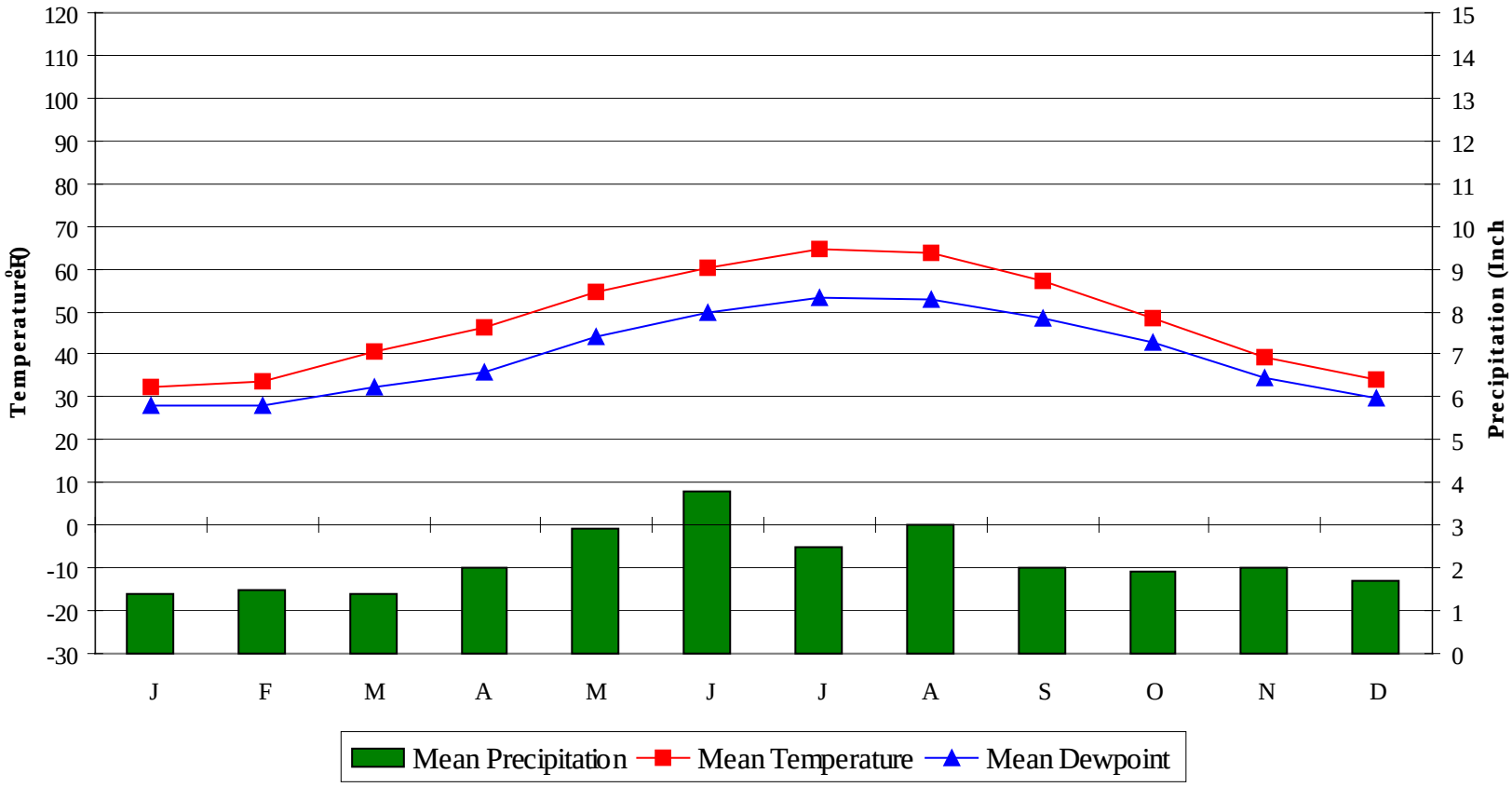
Other Site Data

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^oF-RH 60% Latent + Sensible
6	N/A	N/A	0.0 + 0.1
Ground Water Temperature (^oF) 50 Foot Depth *	**Frost Depth 50 Year Recurrence (in.)**	**Ground Snow Load 50 Year Recurrence (lb/ft^2)**	**Average Annual Freeze-Thaw Cycles (#)**
50.5	N/A	N/A	52

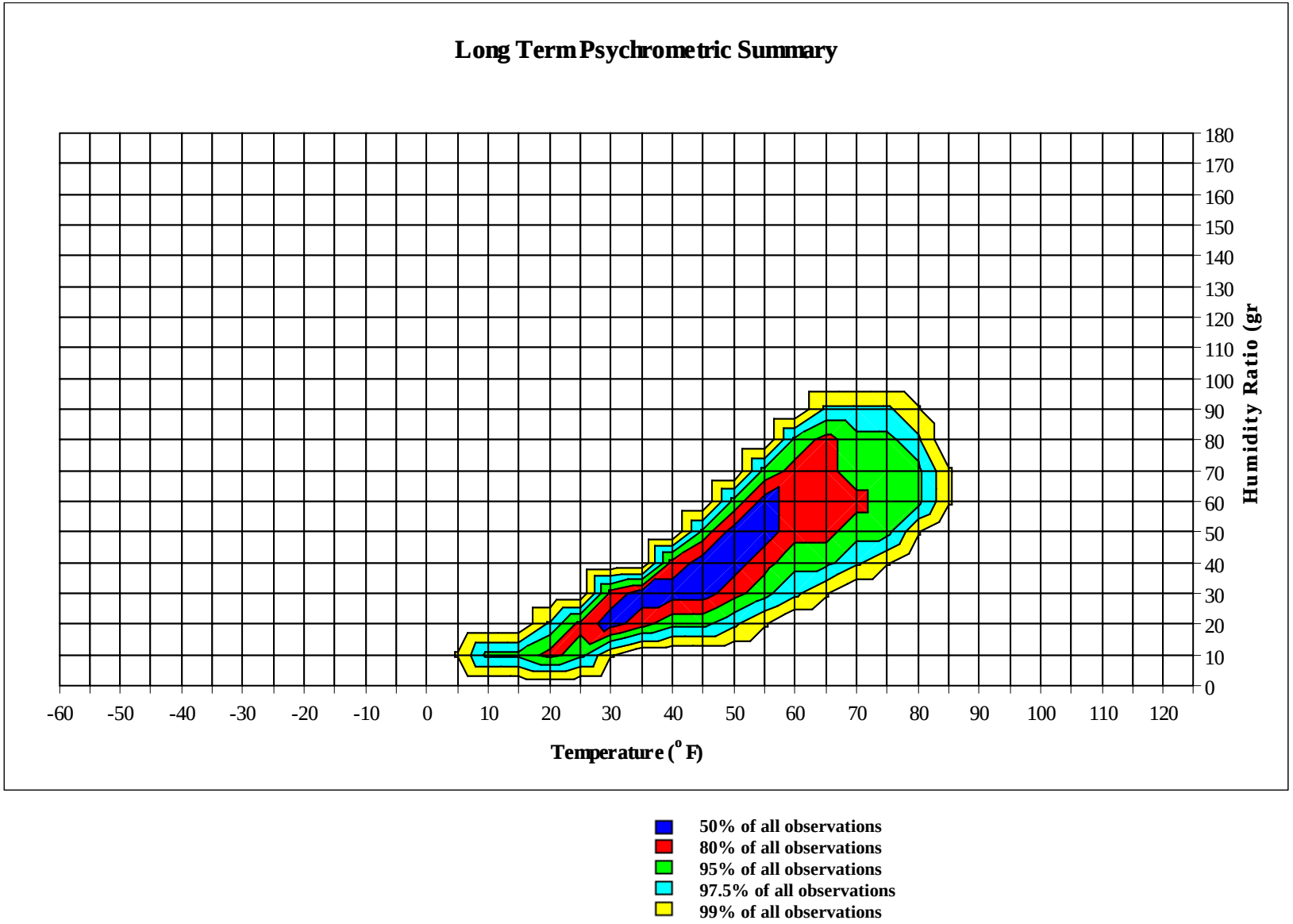
*Note: Temperatures at greater depths can be estimated by adding 1.5^oF per 100 feet additional depth.

STUTTGART/ECHTERDINGEN DL WMO No. 107380

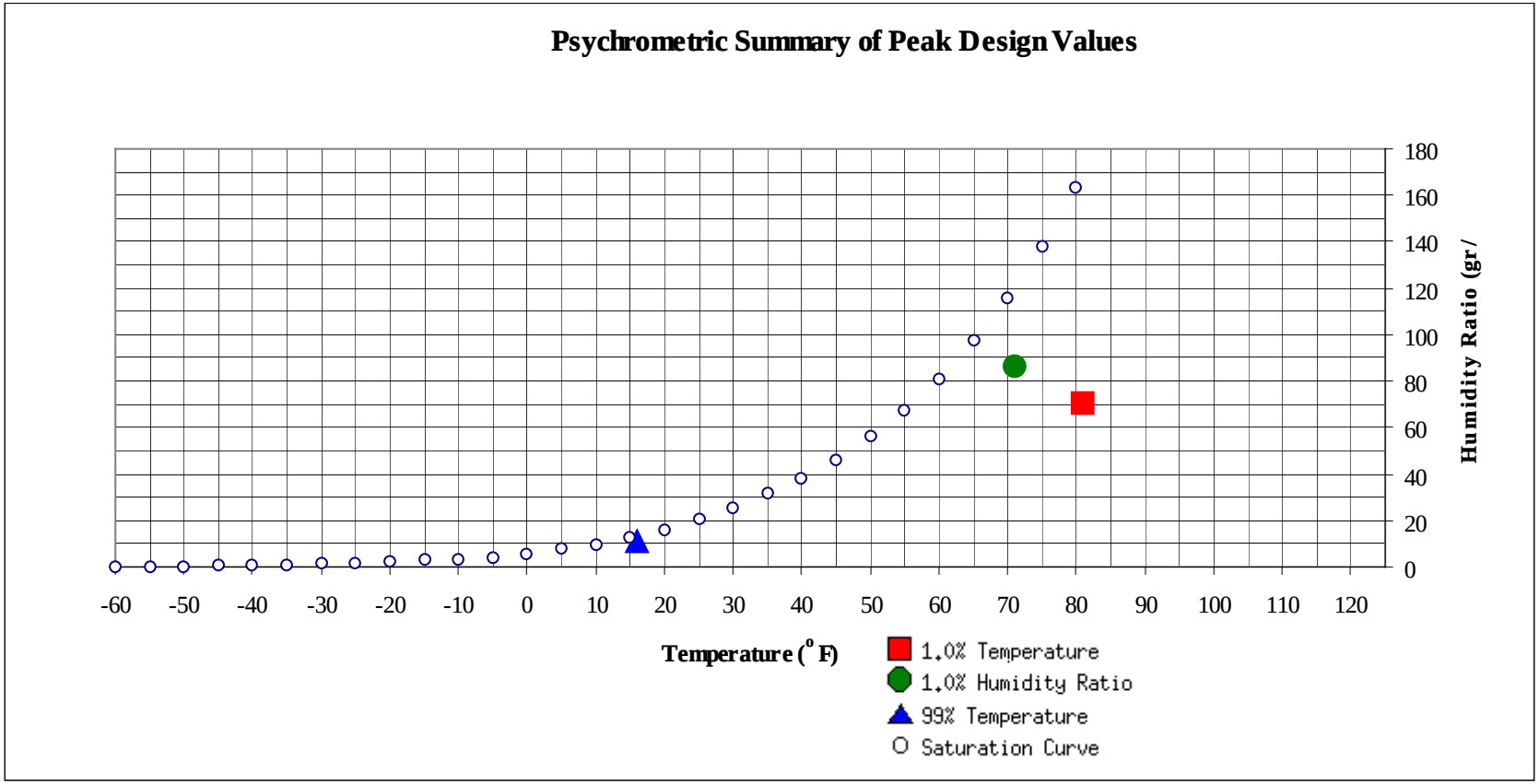
Average Annual Climate



STUTTGART/ECHTERDINGEN DL WMO No. 107380



STUTTGART/ECHTERDINGEN DL WMO No. 107380



	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)
99% Dry Bulb	16	11.2	5.5

	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
1.0% Humidity Ratio	86.8	71.1	64.9	61.8	30.6

	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
1.0% Dry Bulb	81	70.2	64.9	30.4

STUTTGART/ECHTERDINGEN DL WMO No. 107380

Dry-Bulb Temperature Hours For An Average Year (Sheet 1 of 5)

Period of Record = 1967 to 1996

Temperature Range (°F)	January Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	February Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)	March Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99															
90 / 94															
85 / 89															
80 / 84															
75 / 79												0	0	0	55.0
70 / 74							0		0	53.0		1	0	1	54.0
65 / 69							0	0	0	51.7		2	1	3	53.6
60 / 64		0		0	50.6		1	0	1	50.6		10	4	14	50.4
55 / 59	0	2	1	2	48.2	0	3	1	4	48.1	1	21	11	34	48.0
50 / 54	4	8	5	16	46.4	2	12	5	18	45.1	8	37	29	74	45.6
45 / 49	11	24	17	51	42.8	7	26	17	49	42.1	28	47	48	123	42.1
40 / 44	25	36	30	90	39.2	20	35	31	85	38.8	41	49	47	137	38.4
35 / 39	43	54	55	152	35.0	43	46	50	139	35.0	62	47	57	166	34.5
30 / 34	69	61	66	197	30.7	59	54	62	174	30.5	66	26	36	128	30.4
25 / 29	42	33	34	109	26.0	44	29	31	104	25.7	29	7	10	46	25.7
20 / 24	22	14	17	52	21.2	24	12	14	50	21.0	10	2	2	14	21.0
15 / 19	19	9	11	39	16.9	16	5	6	27	16.6	4	0	0	4	17.0
10 / 14	8	5	6	19	11.8	7	2	3	12	11.7	0	0	0	1	12.2
5 / 9	5	2	2	9	6.9	4	1	1	5	7.0	0			0	7.7
0 / 4	1	1	0	3	2.1	1	0	0	1	2.2					
-5 / -1	0	0	1	1	-2.9	0			0	-1.5					
-10 / -6	1	0	0	1	-7.3										
-15 / -11	0	0	0	1	-11.3										

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.

STUTTGART/ECHTERDINGEN DL WMO No. 107380

Dry-Bulb Temperature Hours For An Average Year (Sheet 2 of 5)

Period of Record = 1967 to 1996

Temperature Range (°F)	April Hour Group (LST) 01 To 08	April 09 To 16	April 17 To 00	April Total Obs	April MCWB (°F)	May Hour Group (LST) 01 To 08	May 09 To 16	May 17 To 00	May Total Obs	May MCWB (°F)	June Hour Group (LST) 01 To 08	June 09 To 16	June 17 To 00	June Total Obs	June MCWB (°F)
95 / 99															
90 / 94															
85 / 89							0		0	61.0		1	0	2	65.0
80 / 84		0		0	57.0		2	1	3	63.2		10	5	15	65.1
75 / 79		2	1	2	56.0		9	4	13	59.9	0	26	14	39	63.1
70 / 74		6	3	9	54.5	0	24	13	37	57.7	1	40	25	66	60.6
65 / 69		11	6	17	52.5	1	33	20	54	55.9	8	39	35	81	58.6
60 / 64	1	24	14	39	50.7	7	53	40	99	53.6	38	54	54	145	56.1
55 / 59	4	35	27	66	48.3	37	54	58	149	51.2	71	43	56	170	52.8
50 / 54	23	48	42	113	45.8	72	43	57	172	48.1	79	26	39	143	49.2
45 / 49	43	47	50	140	42.3	72	23	35	131	44.1	37	4	10	51	45.1
40 / 44	54	41	47	143	38.8	38	7	12	57	40.0	7	0	0	7	40.7
35 / 39	67	24	35	126	35.1	18	1	4	24	36.1	1			1	37.4
30 / 34	42	4	11	57	30.9	4		1	5	31.6					
25 / 29	8	1	1	9	26.6	0			0	28.0					
20 / 24	0			0	22.4										
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															
-15 / -11															

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.

STUTTGART/ECHTERDINGEN DL WMO No. 107380

Dry-Bulb Temperature Hours For An Average Year (Sheet 3 of 5)

Period of Record = 1967 to 1996

Temperature Range (°F)	July Hour Group (LST) 01 To 08	July 09 To 16	July 17 To 00	July Total Obs	July MCWB (°F)	August Hour Group (LST) 01 To 08	August 09 To 16	August 17 To 00	August Total Obs	August MCWB (°F)	September Hour Group (LST) 01 To 08	September 09 To 16	September 17 To 00	September Total Obs	September MCWB (°F)
95 / 99		0	0	0	68.1										
90 / 94		2	1	3	68.1		1	1	2	68.3					
85 / 89		8	4	11	66.7		6	2	8	66.5		0	0	0	65.1
80 / 84		23	13	36	65.6		21	9	30	65.1		5	1	7	63.6
75 / 79	0	39	25	65	63.7	0	39	21	59	63.2		15	4	20	62.9
70 / 74	6	52	39	97	61.6	3	54	36	93	61.4		27	13	41	60.7
65 / 69	24	46	48	118	59.7	15	46	48	109	59.7	2	36	22	60	58.5
60 / 64	69	45	56	170	57.3	71	49	66	186	57.6	17	57	49	124	56.1
55 / 59	82	29	43	154	53.6	87	28	44	159	53.9	60	59	68	187	53.0
50 / 54	55	5	15	76	49.9	54	6	16	76	49.9	77	31	50	159	49.2
45 / 49	12		1	13	45.7	17	0	2	20	45.4	52	9	23	84	45.2
40 / 44	1		0	1	41.8	3	0	0	3	41.3	24	1	4	29	40.9
35 / 39						0			0	38.2	10		0	10	37.3
30 / 34											0			0	34.0
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															
-5 / -1															
-10 / -6															
-15 / -11															

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.

STUTTGART/ECHTERDINGEN DL WMO No. 107380

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)				MCWB	Hour Group (LST)				MCWB	Hour Group (LST)				MCWB
	01 To 08	09 To 16	17 To 00	Total Obs	(°F)	01 To 08	09 To 16	17 To 00	Total Obs	(°F)	01 To 08	09 To 16	17 To 00	Total Obs	(°F)
95 / 99															
90 / 94															
85 / 89															
80 / 84		0	0	0	61.6										
75 / 79		2	0	2	60.6										
70 / 74		6	1	7	59.8		0		0	56.5					
65 / 69		12	3	15	57.6		0		0	54.4					
60 / 64	1	29	13	43	55.1	0	4	1	5	53.4		0		0	50.6
55 / 59	17	51	39	107	52.4	4	12	5	20	50.4	1	3	1	5	49.4
50 / 54	50	60	60	170	48.9	11	33	18	62	47.6	8	11	10	29	47.0
45 / 49	58	51	59	168	44.3	26	46	39	110	43.7	16	28	21	64	43.5
40 / 44	55	26	42	123	40.3	44	48	50	141	39.8	26	35	31	92	39.5
35 / 39	43	10	22	75	36.4	60	53	59	171	35.6	48	57	55	160	35.1
30 / 34	20	2	6	28	31.5	51	27	39	117	31.0	64	60	68	193	30.8
25 / 29	6	0	0	6	27.1	32	16	20	68	26.1	45	33	33	111	26.0
20 / 24	0			0	22.9	11	3	5	19	21.6	18	11	13	43	21.3
15 / 19						4	1	1	5	17.6	14	6	9	30	16.8
10 / 14						1	0	0	1	12.2	6	3	3	12	12.0
5 / 9						0	0		0	6.2	3	1	1	5	7.0
0 / 4											1	0	0	1	2.4
-5 / -1															
-10 / -6															
-15 / -11															

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.

STUTTGART/ECHTERDINGEN DL WMO No. 107380

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

Period of Record = 1967 to 1996

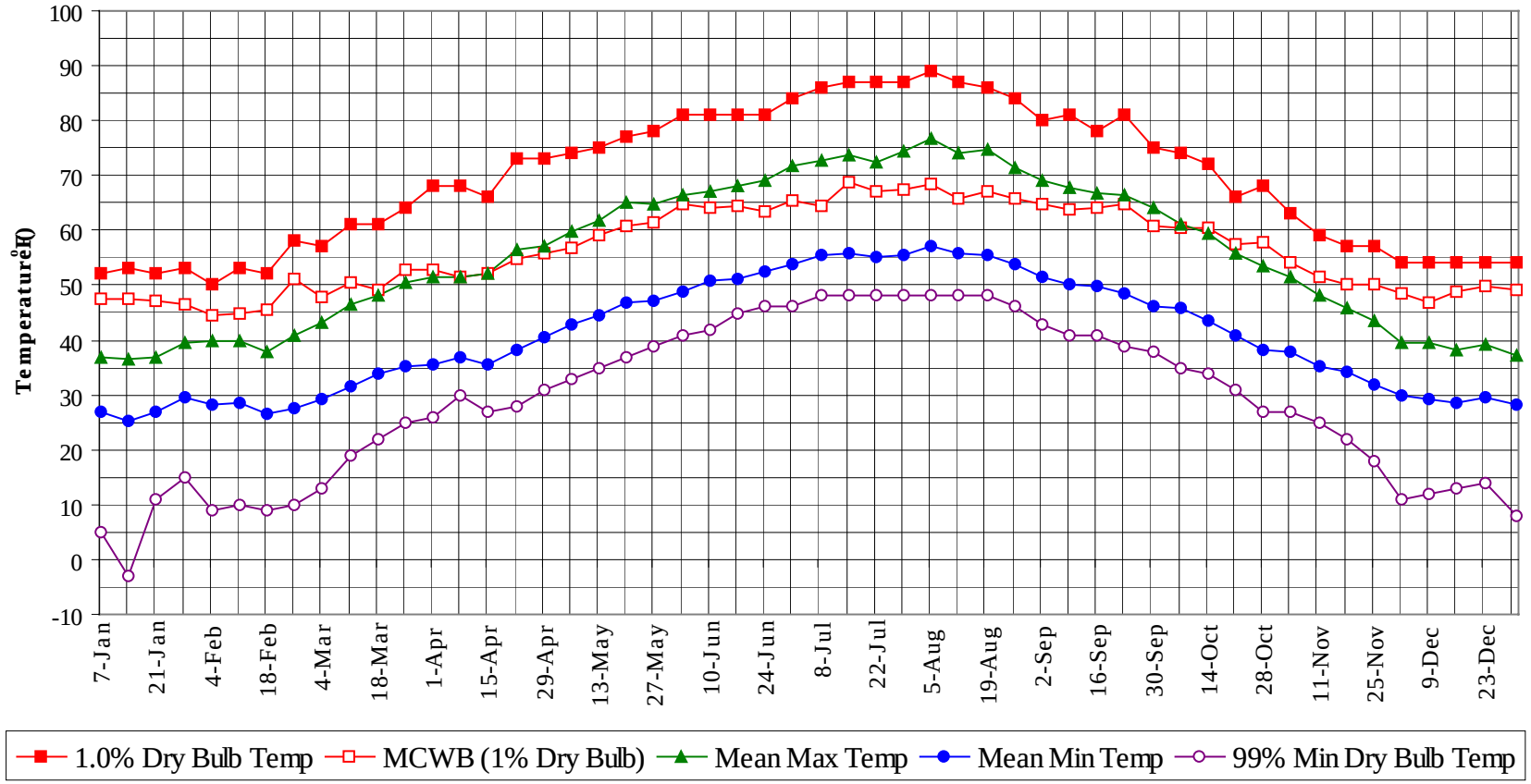
Annual Totals

Temperature Range (°F)	Hour Group (LST) 01 To 08	09 To 16	17 To 00	Total Obs	MCWB (°F)
95 / 99		0	0	0	68.1
90 / 94		3	2	5	68.2
85 / 89		15	6	21	66.4
80 / 84		62	29	91	65.1
75 / 79	1	131	69	200	63.0
70 / 74	9	210	130	350	60.6
65 / 69	49	226	183	457	58.5
60 / 64	203	326	296	825	56.0
55 / 59	363	339	354	1056	52.3
50 / 54	443	319	346	1108	48.2
45 / 49	378	304	322	1004	43.6
40 / 44	337	277	294	908	39.4
35 / 39	395	293	338	1026	35.2
30 / 34	375	236	288	899	30.7
25 / 29	206	119	129	453	25.9
20 / 24	86	43	51	179	21.2
15 / 19	56	22	27	105	16.8
10 / 14	22	10	12	45	11.8
5 / 9	12	3	4	19	7.0
0 / 4	3	1	1	5	2.2
-5 / -1	0	0	1	1	-2.9
-10 / -6	1	0	0	1	-7.3
-15 / -11	0	0	0	1	-11.3

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.

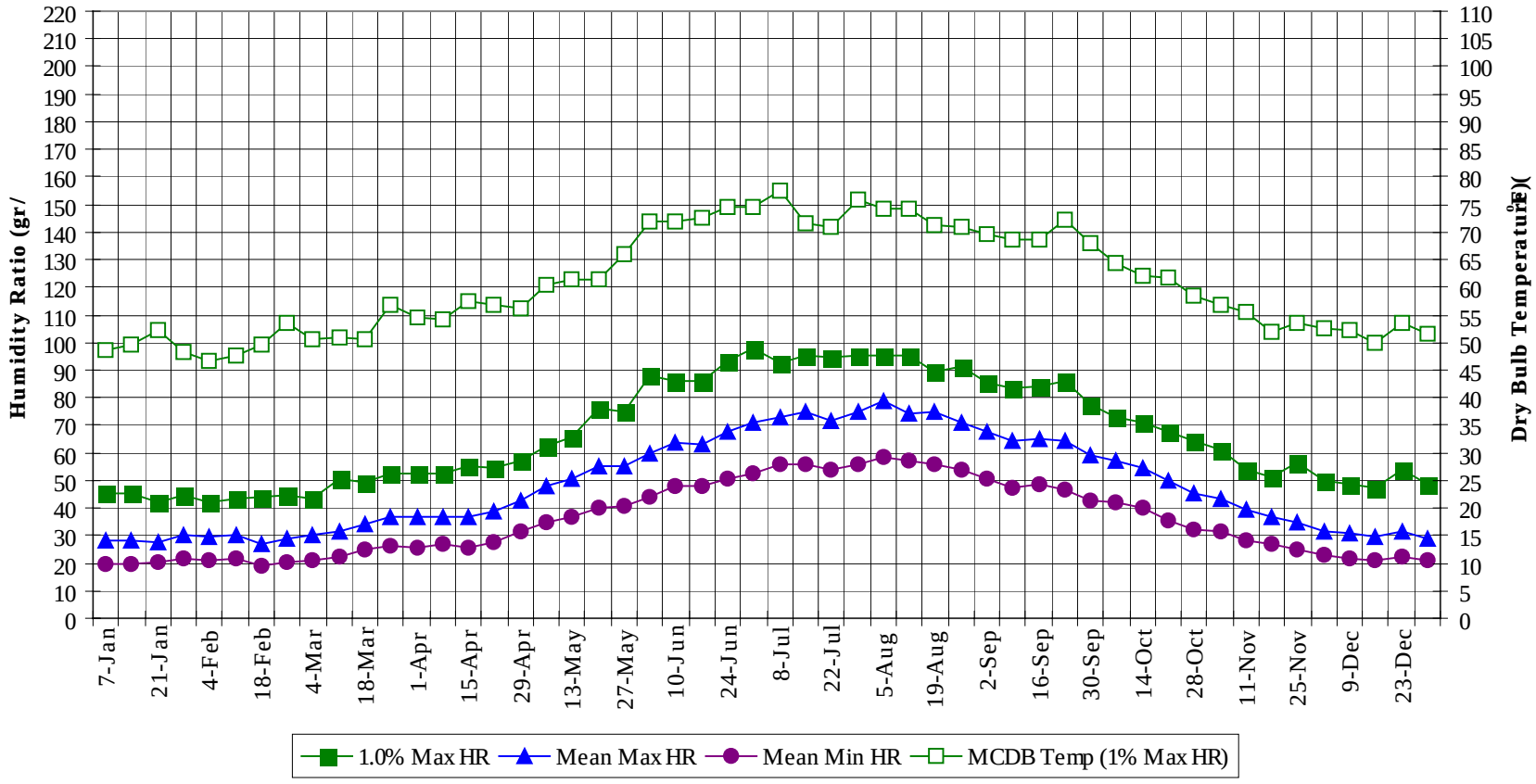
STUTTGART/ECHTERDINGEN DL WMO No. 107380

Annual Summary of Temperatures



STUTTGART/ECHTERDINGEN DL WMO No. 107380

Long Term Humidity and Dry Bulb Temperature Summary



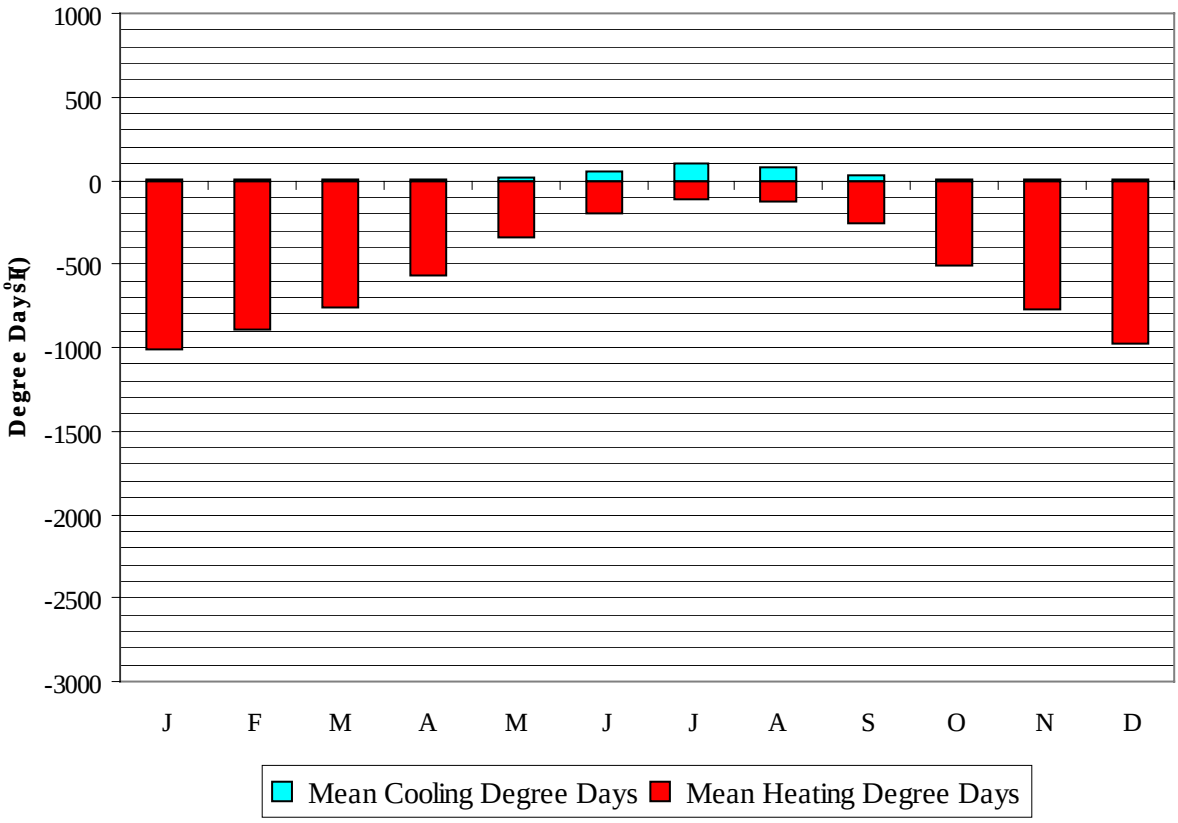
STUTTGART/ECHTERDINGEN DL WMO No. 107380

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	47.6	37.0	26.8	5.0	45.5	48.7	28.4	19.7
14-Jan	53.0	47.5	36.4	25.4	-3.0	45.5	49.7	28.0	19.5
21-Jan	52.0	47.1	36.8	27.0	11.0	42.0	52.3	27.6	20.3
28-Jan	53.0	46.6	39.5	29.4	15.0	44.8	48.4	30.5	21.9
4-Feb	50.0	44.5	39.9	28.4	9.0	42.0	46.7	29.6	21.1
11-Feb	53.0	44.8	40.0	28.7	10.0	43.4	47.6	30.3	21.4
18-Feb	52.0	45.6	37.9	26.5	9.0	44.1	49.5	27.1	19.2
25-Feb	58.0	51.2	40.8	27.5	10.0	44.8	53.6	29.0	20.2
4-Mar	57.0	47.7	43.2	29.1	13.0	43.4	50.6	29.9	21.2
11-Mar	61.0	50.4	46.4	31.4	19.0	50.4	50.8	31.7	22.5
18-Mar	61.0	49.2	48.2	33.9	22.0	49.0	50.6	34.2	24.7
25-Mar	64.0	52.7	50.4	35.3	25.0	52.5	56.7	36.7	26.4
1-Apr	68.0	52.9	51.5	35.6	26.0	52.5	54.5	36.6	25.8
8-Apr	68.0	51.5	51.6	37.0	30.0	52.5	54.3	36.9	26.7
15-Apr	66.0	52.3	52.3	35.6	27.0	55.3	57.6	36.8	25.9
22-Apr	73.0	54.8	56.4	38.1	28.0	54.6	56.9	39.1	27.5
29-Apr	73.0	55.9	57.2	40.4	31.0	57.4	56.0	42.9	31.2
6-May	74.0	56.8	59.7	42.8	33.0	62.3	60.4	47.7	34.8
13-May	75.0	59.0	61.7	44.4	35.0	65.8	61.5	50.8	36.7
20-May	77.0	60.7	65.1	46.9	37.0	76.3	61.3	55.0	40.2
27-May	78.0	61.5	64.9	47.1	39.0	74.9	65.9	55.4	40.8
3-Jun	81.0	64.8	66.4	48.7	41.0	88.2	71.8	60.0	44.2
10-Jun	81.0	64.3	67.1	50.9	42.0	86.1	71.8	64.0	47.9
17-Jun	81.0	64.4	68.1	51.3	45.0	86.1	72.7	63.3	47.8
24-Jun	81.0	63.5	69.0	52.6	46.0	93.1	74.5	67.8	50.7
1-Jul	84.0	65.4	71.8	53.9	46.0	98.0	74.7	70.6	52.5
8-Jul	86.0	64.3	72.8	55.4	48.0	92.4	77.5	73.1	55.6
15-Jul	87.0	68.6	73.7	55.9	48.0	95.2	71.5	74.8	55.9
22-Jul	87.0	67.0	72.3	55.2	48.0	94.9	70.9	71.3	54.2
29-Jul	87.0	67.3	74.4	55.6	48.0	95.2	75.9	74.9	55.9
5-Aug	89.0	68.4	76.9	57.1	48.0	95.2	74.1	78.9	58.6
12-Aug	87.0	65.7	74.0	55.7	48.0	95.2	74.3	73.9	56.9
19-Aug	86.0	67.1	74.7	55.5	48.0	89.6	71.2	74.7	55.8
26-Aug	84.0	65.9	71.5	53.7	46.0	91.0	70.9	71.1	54.1
2-Sep	80.0	64.9	69.2	51.6	43.0	85.4	69.5	67.4	50.6
9-Sep	81.0	63.7	67.7	50.0	41.0	83.3	68.7	64.5	47.5
16-Sep	78.0	64.2	66.7	50.0	41.0	84.0	68.5	65.0	48.3
23-Sep	81.0	64.8	66.6	48.5	39.0	86.1	72.3	64.6	46.7
30-Sep	75.0	60.7	64.1	46.1	38.0	77.7	68.0	59.1	43.0
7-Oct	74.0	60.5	61.1	45.7	35.0	72.8	64.3	57.1	42.3
14-Oct	72.0	60.4	59.5	43.5	34.0	70.7	62.1	54.6	39.8
21-Oct	66.0	57.4	55.8	40.8	31.0	67.9	61.6	49.9	35.5
28-Oct	68.0	57.8	53.6	38.1	27.0	64.4	58.3	45.6	32.4
4-Nov	63.0	54.0	51.5	37.8	27.0	60.9	56.7	43.2	31.2
11-Nov	59.0	51.4	48.2	35.1	25.0	53.9	55.3	39.3	28.1
18-Nov	57.0	50.2	45.8	34.2	22.0	51.1	51.8	37.1	26.8
25-Nov	57.0	50.3	43.6	32.0	18.0	56.7	53.7	34.6	24.7
2-Dec	54.0	48.5	39.7	29.9	11.0	49.7	52.5	31.5	22.8
9-Dec	54.0	46.9	39.6	29.2	12.0	48.3	52.2	30.9	22.0
16-Dec	54.0	48.7	38.2	28.5	13.0	47.6	50.0	29.9	21.0
23-Dec	54.0	49.7	39.3	29.5	14.0	53.9	53.5	31.8	22.3
31-Dec	54.0	49.2	37.2	28.3	8.0	48.3	51.6	29.0	21.1

STUTTGART/ECHTERDINGEN DL WMO No. 107380

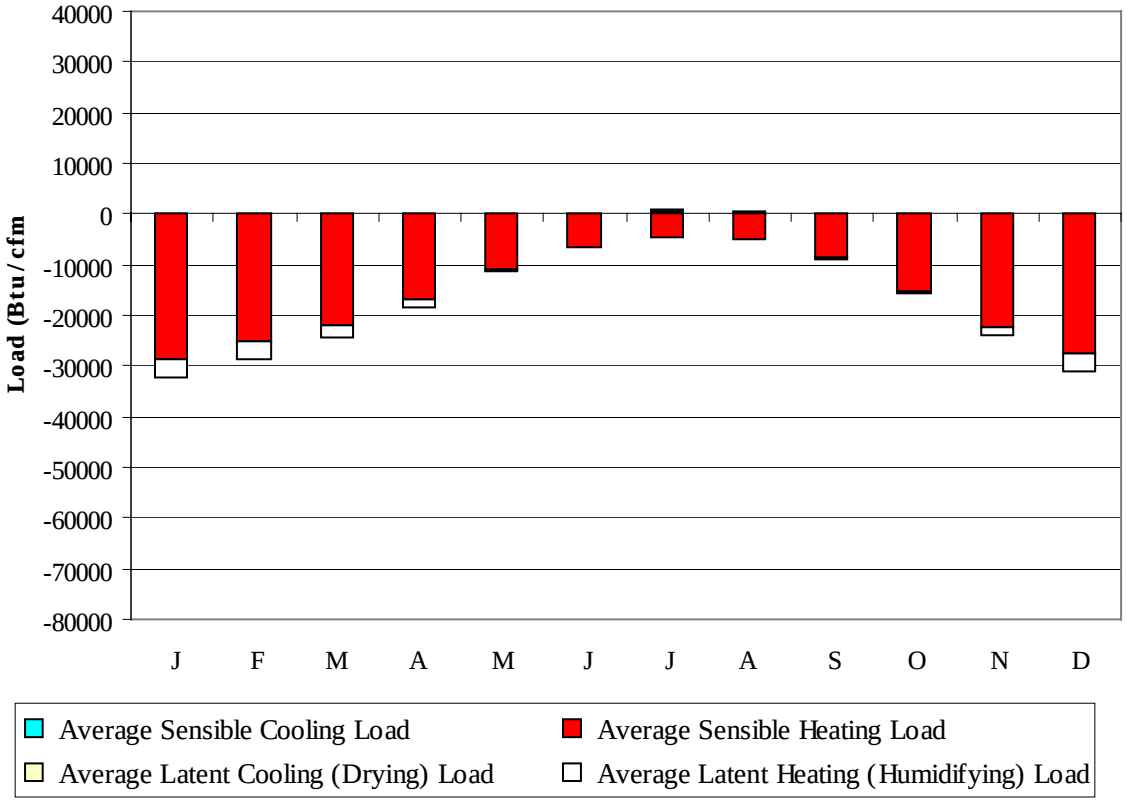
Degree Days, Heating and Cooling
(Base 65°F)



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	1008
FEB	0	890
MAR	1	757
APR	4	569
MAY	19	341
JUN	49	192
JUL	97	116
AUG	83	127
SEP	26	260
OCT	4	506
NOV	0	770
DEC	0	972
ANN	282	6508

STUTTGART/ECHTERDINGEN DL WMO No. 107380

Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	Average Sensible Cooling Load (Btu/cfm)	Average Sensible Heating Load (Btu/cfm)	Average Latent Cooling Load (Btu/cfm)	Average Latent Heating Load (Btu/cfm)
JAN	0	-28524	0	-3850
FEB	0	-25234	0	-3547
MAR	0	-22005	0	-2456
APR	3	-17009	0	-1391
MAY	36	-10966	1	-204
JUN	181	-6763	111	-13
JUL	525	-4465	250	0
AUG	427	-4867	160	0
SEP	75	-8747	26	-10
OCT	5	-15438	0	-320
NOV	0	-22271	0	-1786
DEC	0	-27618	0	-3358
ANN	1252	-193907	548	-16935

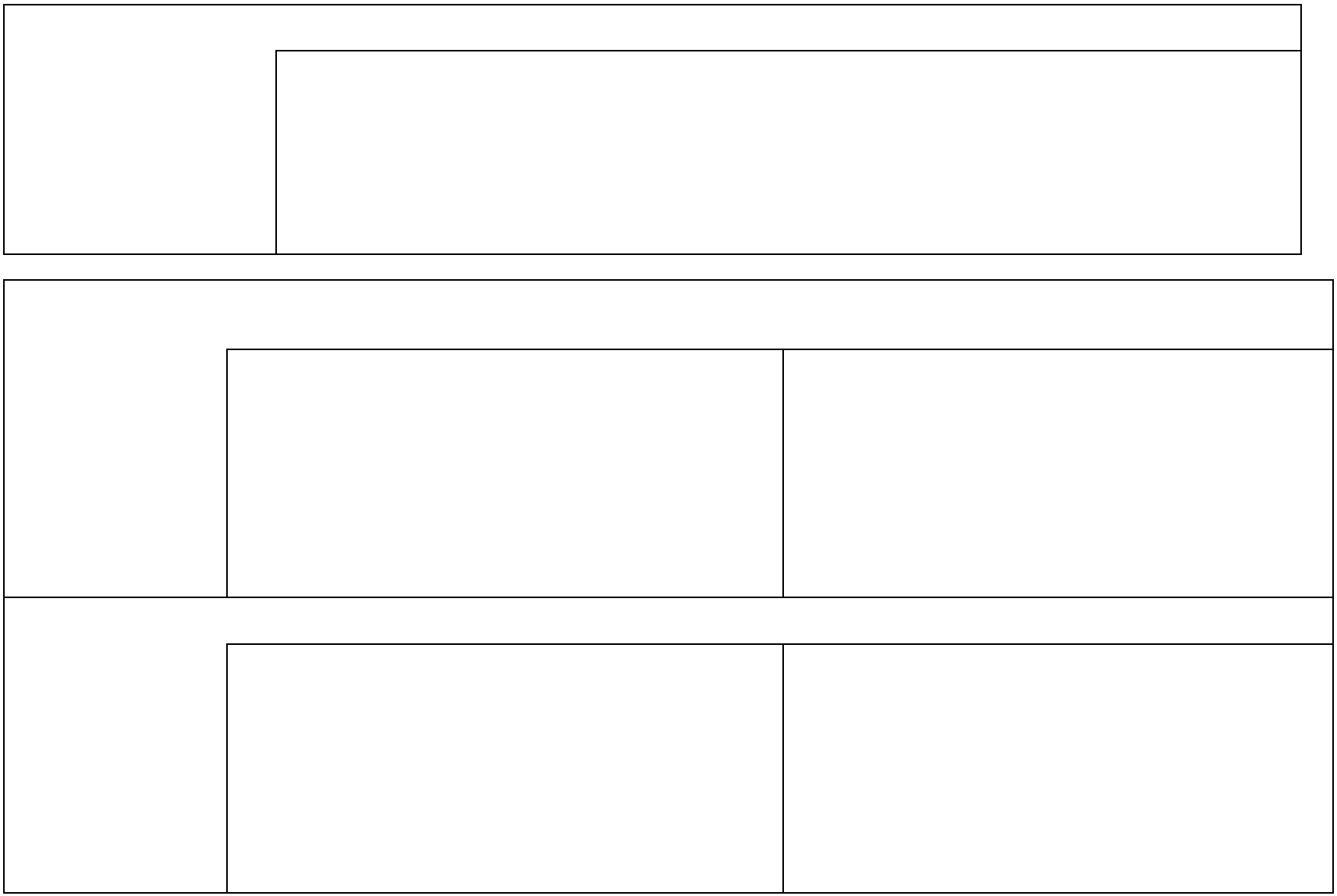
Average Annual Solar Radiation – Nearest Available Site

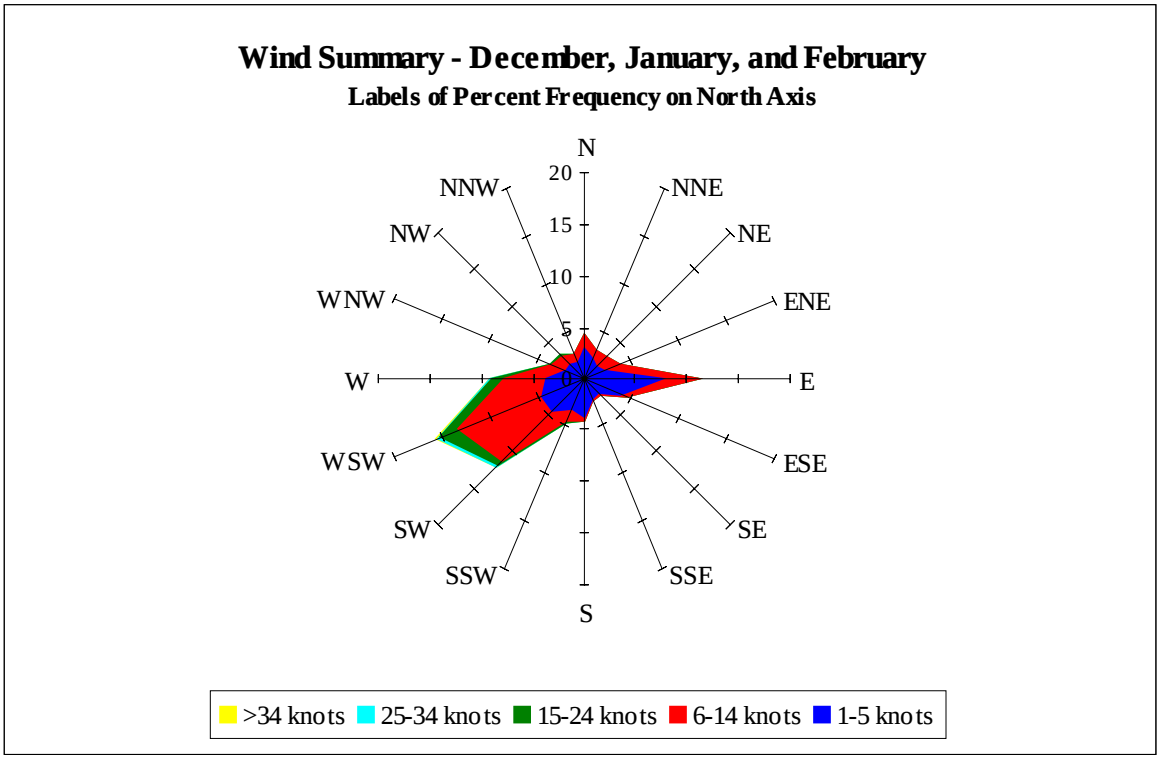
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

No Solar Radiation
Data Available

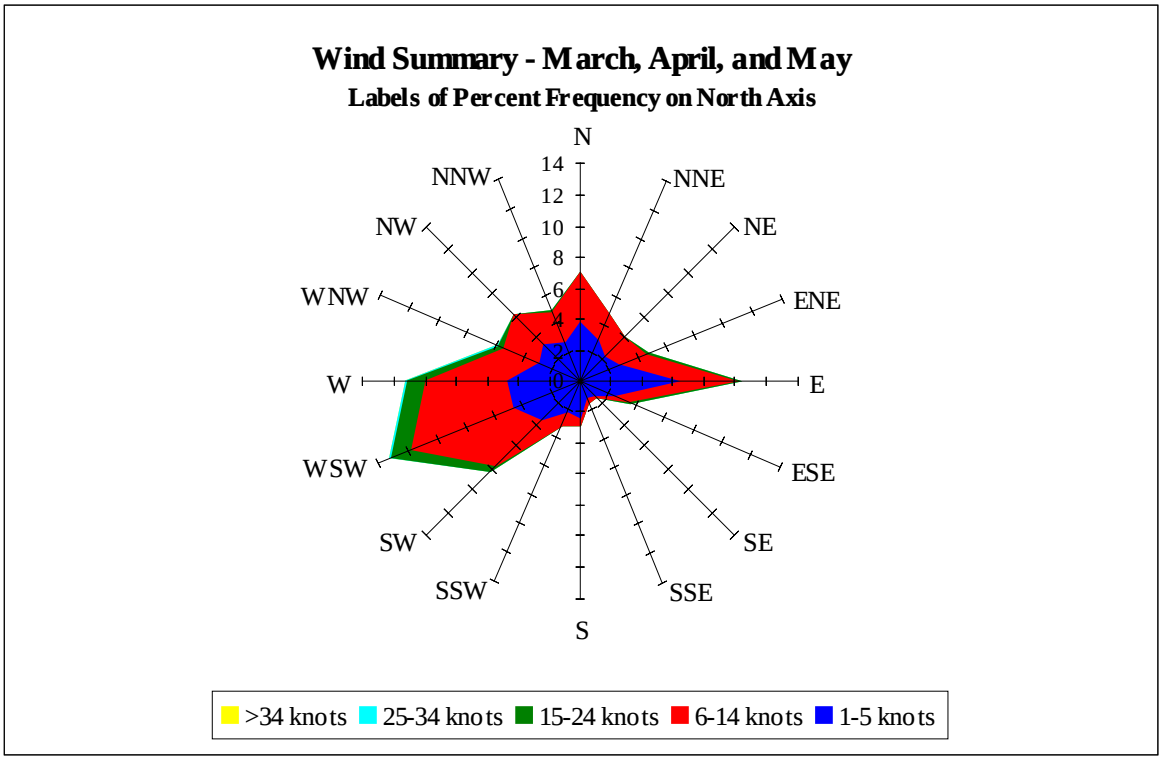
Average Annual Solar Heat and Illumination – Nearest Available Site

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





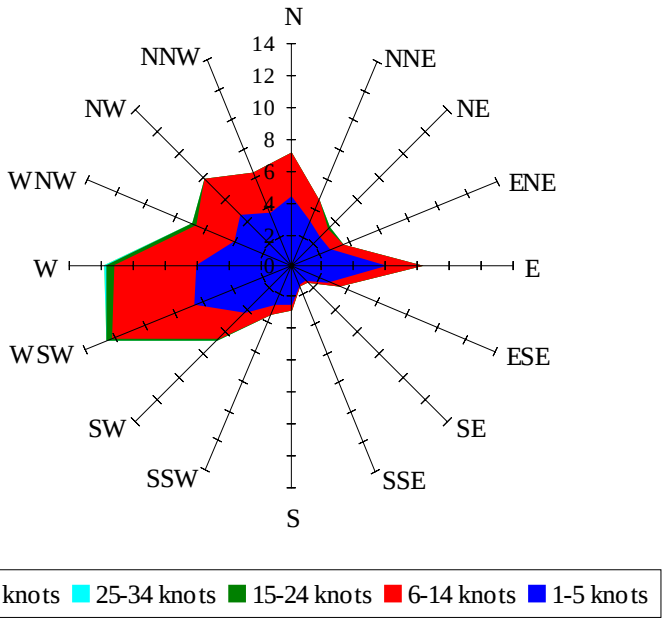
Percent Calm = 11.09



Percent Calm = 7.77

Wind Summary - June, July, and August

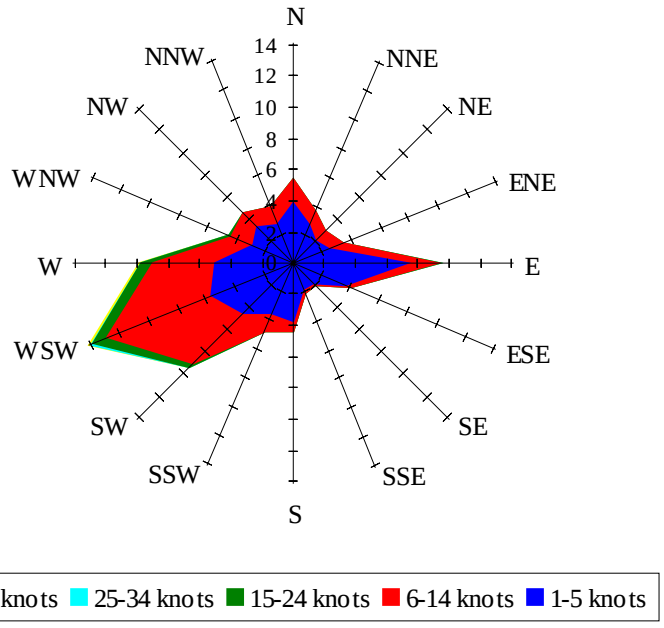
Labels of Percent Frequency on North Axis



Percent Calm = 9.87

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 12.46