

IDAR-OBERSTEIN DL

Latitude = 49.70 N

WMO No. 106180

Longitude = 7.33 E

Elevation = 1237 feet

Period of Record = 1973 to 1996

Average Pressure = 28.66 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	86	66	68	7.9	ENE
0.4% Occurrence	85	65	66	8.0	ENE
1.0% Occurrence	81	64	66	8.7	ENE
2.0% Occurrence	79	63	66	8.9	ENE
Mean Daily Range	14	-	-	-	-
97.5% Occurrence	21	20	14	6.3	ENE
99.0% Occurrence	16	15	12	5.3	ENE
99.6% Occurrence	12	12	10	6.9	ENE
Median of Extreme Lows	10	9	9	7.6	ENE
	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	70	82	92	7.0	WSW
0.4% Occurrence	68	80	86	7.5	WSW
1.0% Occurrence	66	78	80	7.8	WSW
2.0% Occurrence	64	75	74	7.9	WSW
	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	101	74	0.65	5.5	SW
0.4% Occurrence	90	72	0.58	6.8	WSW
1.0% Occurrence	85	70	0.55	6.3	WSW
2.0% Occurrence	81	69	0.53	5.7	SW
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		1	137	1	69

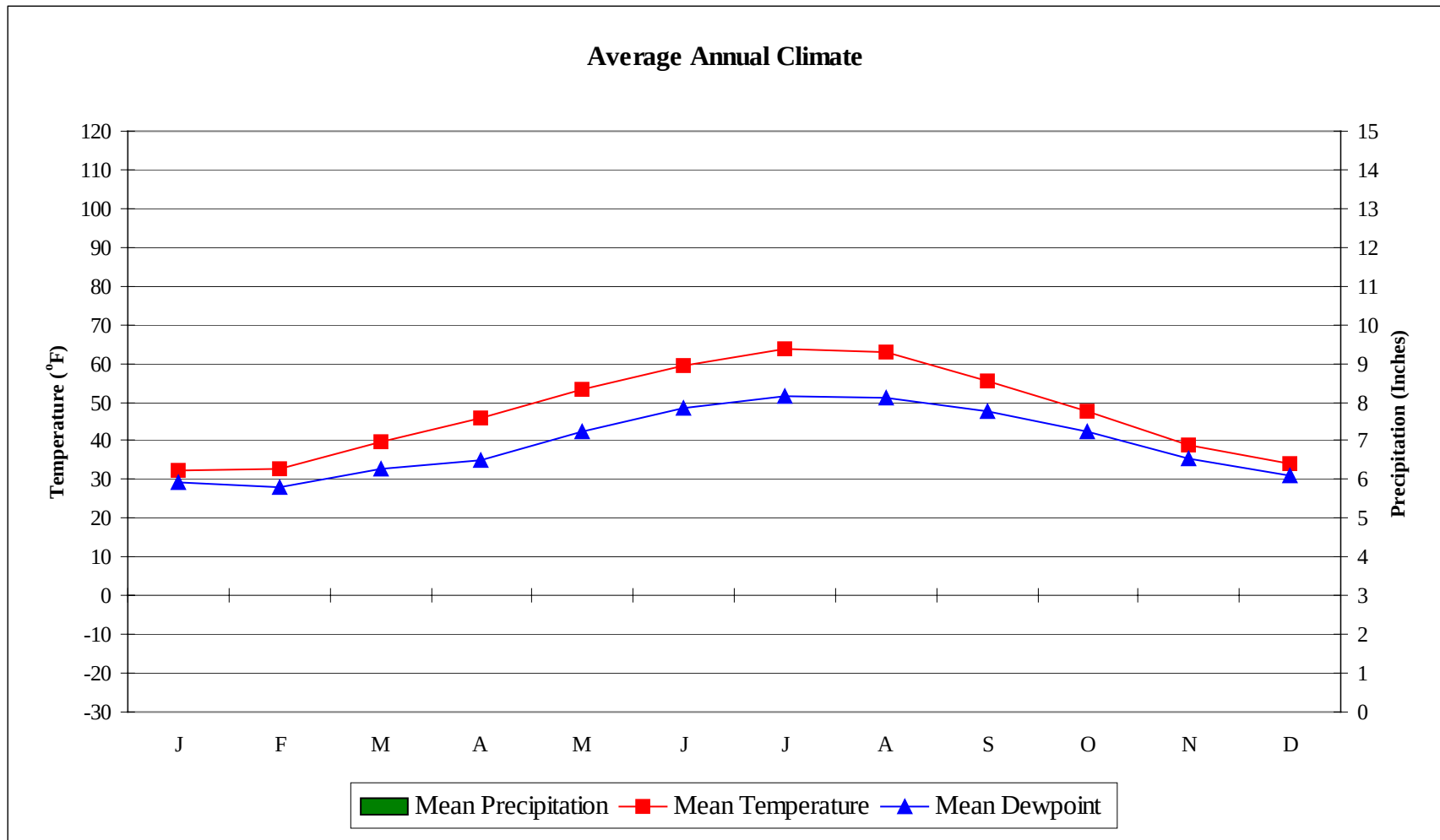
Other Site Data

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	0.0 + 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 (#)
50.2	N/A	N/A	35

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

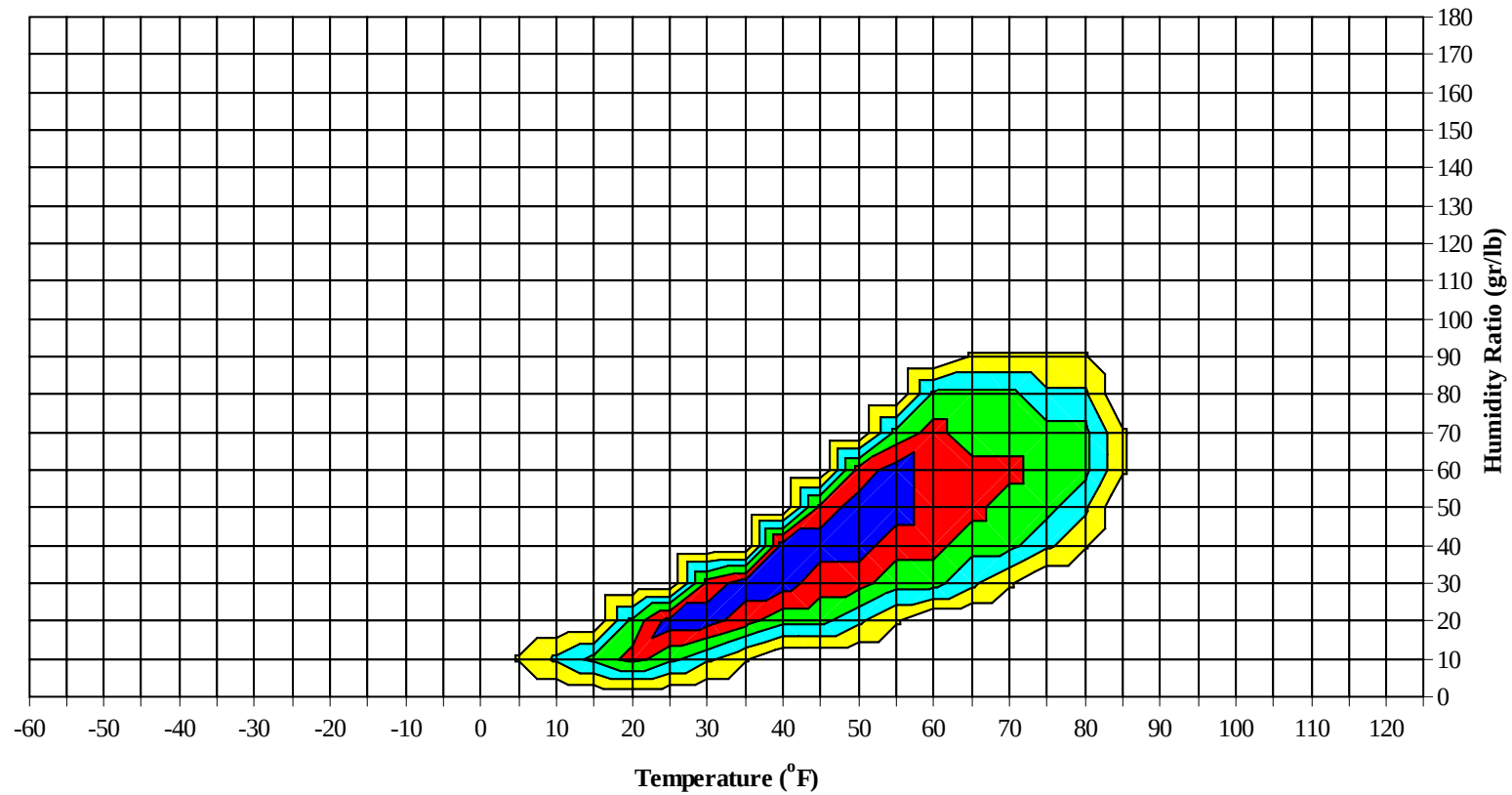
IDAR-OBERSTEIN DL

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No Precipitation Data Available

Long Term Psychrometric Summary

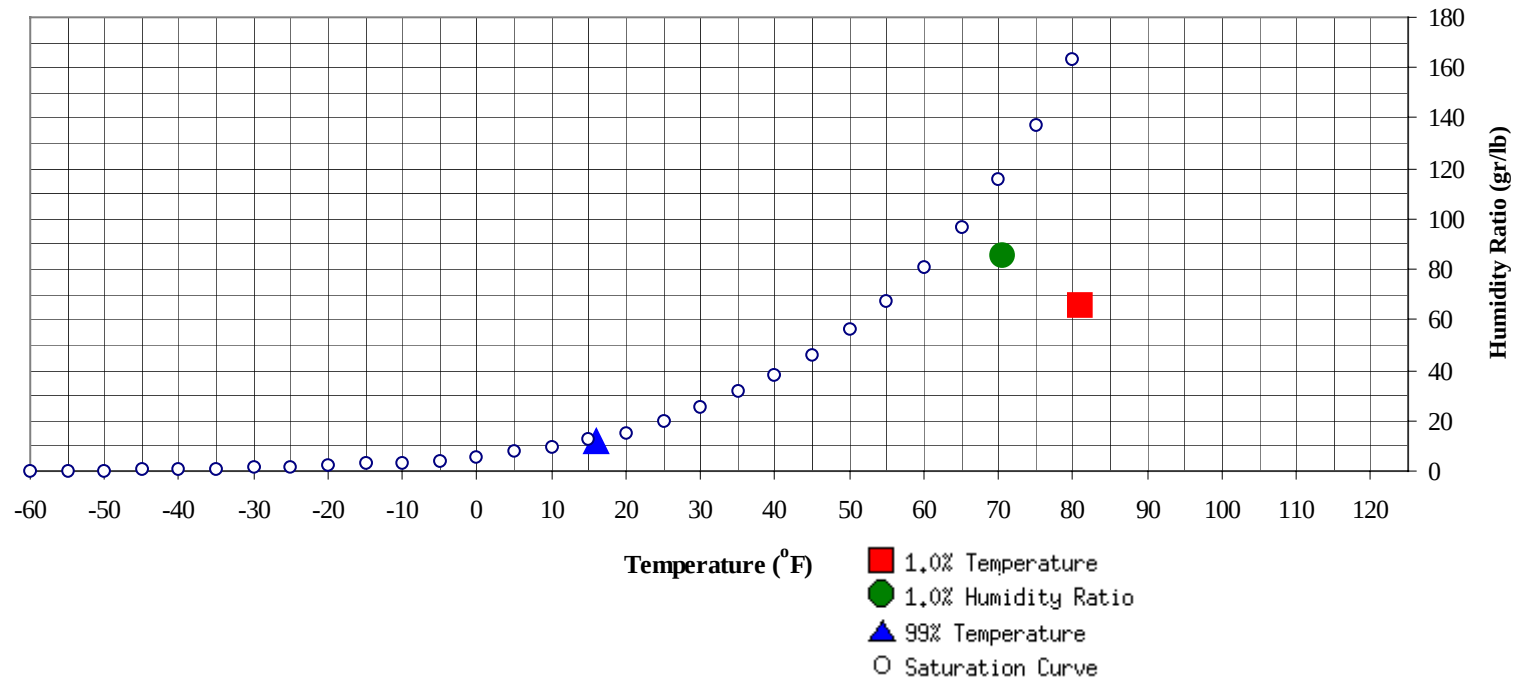


- 50% of all observations
- 80% of all observations
- 95% of all observations
- 97.5% of all observations
- 99% of all observations

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Psychrometric Summary of Peak Design Values



99% Dry Bulb	(°F)	MCHR (gr/lb)	Enthalpy (btu/lb)	1.0% Humidity Ratio	(gr/lb)	MCDB (°F)	MCWB (°F)	MC Dewpt (°F)	Enthalpy (btu/lb)
	16	11.5	5.6		85.4	70.4	64.5	61.5	30.2

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	81	66	64	29.8

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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												1	0	1	55.2
65 / 69												1	0	1	54.9
60 / 64							0		0	53.0		4	1	6	50.5
55 / 59						0	1	0	1	48.9	1	13	10	25	47.8
50 / 54	1	4	3	8	46.8	1	6	3	10	45.5	8	26	26	61	46.0
45 / 49	16	20	21	56	44.0	6	17	13	36	42.8	21	49	47	117	42.2
40 / 44	28	30	25	83	39.9	19	23	29	72	39.4	39	56	54	149	38.6
35 / 39	43	56	49	148	35.6	38	56	59	152	35.1	63	59	62	183	34.9
30 / 34	68	67	71	206	31.0	63	61	57	181	30.7	67	31	35	133	30.9
25 / 29	40	36	42	117	26.1	44	38	41	123	25.4	34	6	10	51	25.9
20 / 24	21	15	19	56	21.5	20	12	13	45	21.0	11	1	1	14	20.9
15 / 19	18	12	10	40	17.0	18	7	6	30	16.8	3	1	0	4	17.2
10 / 14	9	7	6	22	11.9	9	3	1	14	12.2	1	0		1	13.3
5 / 9	3	1	1	6	6.9	4	1		5	7.5	0			0	6.3
0 / 4	1	0	0	1	1.0	1			1	2.1					

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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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												0	0	0	64.7
85 / 89												2	3	5	64.9
80 / 84							1	2	3	62.8		10	8	18	64.2
75 / 79		1	0	1	56.6		8	8	16	59.6	0	24	19	43	62.1
70 / 74		5	5	10	55.0	0	20	18	38	56.9	2	33	25	61	60.0
65 / 69		9	6	15	52.4	0	23	18	41	55.2	5	27	27	59	57.4
60 / 64	1	19	16	36	50.4	3	45	34	82	52.8	24	53	47	125	55.4
55 / 59	4	35	29	68	47.7	22	56	50	128	50.4	55	54	54	162	52.6
50 / 54	12	47	44	103	45.0	58	50	52	160	47.9	78	29	41	148	49.1
45 / 49	36	52	50	139	42.1	74	32	42	148	44.2	56	7	14	76	45.1
40 / 44	51	40	44	135	38.8	49	9	19	78	40.1	17	0	2	18	41.0
35 / 39	70	26	32	128	35.4	32	4	5	40	36.2	4		0	4	37.3
30 / 34	50	6	11	67	31.0	10	0	0	10	31.6	0			0	32.8
25 / 29	16	0	2	17	26.5	0			0	28.3					
20 / 24	0			0	22.3										
15 / 19															
10 / 14															
5 / 9															
0 / 4															

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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	66.0										
90 / 94		2	2	4	67.3		1	0	1	66.8					
85 / 89		8	6	14	66.5		4	3	8	65.5		0	0	0	63.8
80 / 84		20	19	39	64.6		17	12	30	64.2		3	2	5	64.2
75 / 79	1	40	30	71	62.9	0	34	28	62	62.3		7	3	11	62.5
70 / 74	5	45	37	87	60.6	2	51	42	94	60.3	0	20	12	32	59.9
65 / 69	11	32	38	81	58.8	7	39	33	79	58.5	0	27	16	43	57.9
60 / 64	50	51	51	151	56.8	37	56	59	152	56.7	7	56	41	104	55.5
55 / 59	78	40	42	160	53.6	86	36	45	167	53.9	35	67	65	167	52.7
50 / 54	70	11	19	101	50.1	71	10	20	101	50.0	72	43	62	177	49.4
45 / 49	27	0	3	30	45.6	32	0	5	37	45.4	78	15	31	124	45.4
40 / 44	6			6	41.7	11		2	13	41.4	27	1	8	36	41.2
35 / 39	0			0	38.2	2			2	37.6	19		0	19	36.9
30 / 34											2			2	32.7
25 / 29															
20 / 24															
15 / 19															
10 / 14															
5 / 9															
0 / 4															

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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	60.7										
70 / 74		3	1	4	60.5										
65 / 69		5	1	7	58.0										
60 / 64	2	19	10	31	55.7		0	0	0	53.6					
55 / 59	14	47	35	96	52.6	1	5	1	8	50.9		1	0	1	51.3
50 / 54	44	63	65	171	49.1	11	22	19	52	48.7	4	7	9	19	48.3
45 / 49	67	58	60	185	44.5	35	52	42	129	44.4	24	25	20	69	44.5
40 / 44	46	31	44	121	40.1	46	48	59	153	40.2	29	38	36	103	40.0
35 / 39	40	16	26	82	36.3	55	57	56	168	35.8	52	62	54	169	35.9
30 / 34	29	4	4	38	31.9	48	38	38	124	31.2	58	62	63	182	31.1
25 / 29	7	1	0	8	27.1	29	14	19	62	26.0	43	34	40	117	26.3
20 / 24	0			0	23.0	9	4	4	17	21.4	14	11	13	39	21.4
15 / 19						4	1	1	6	17.4	16	7	9	32	16.9
10 / 14						1	0		1	12.2	6	2	3	11	12.1
5 / 9											1	0	1	2	7.4
0 / 4											0	0		0	1.8

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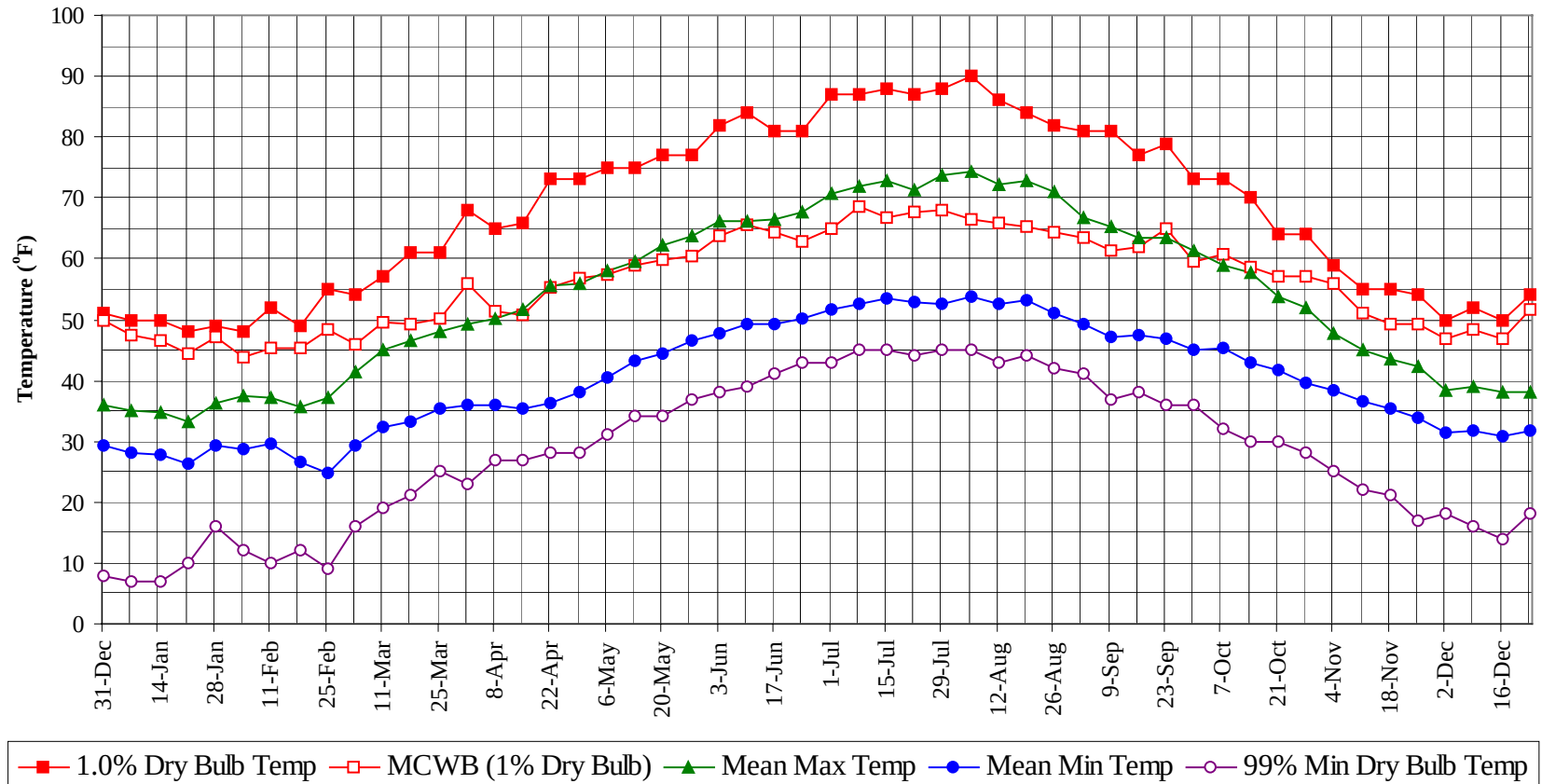
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

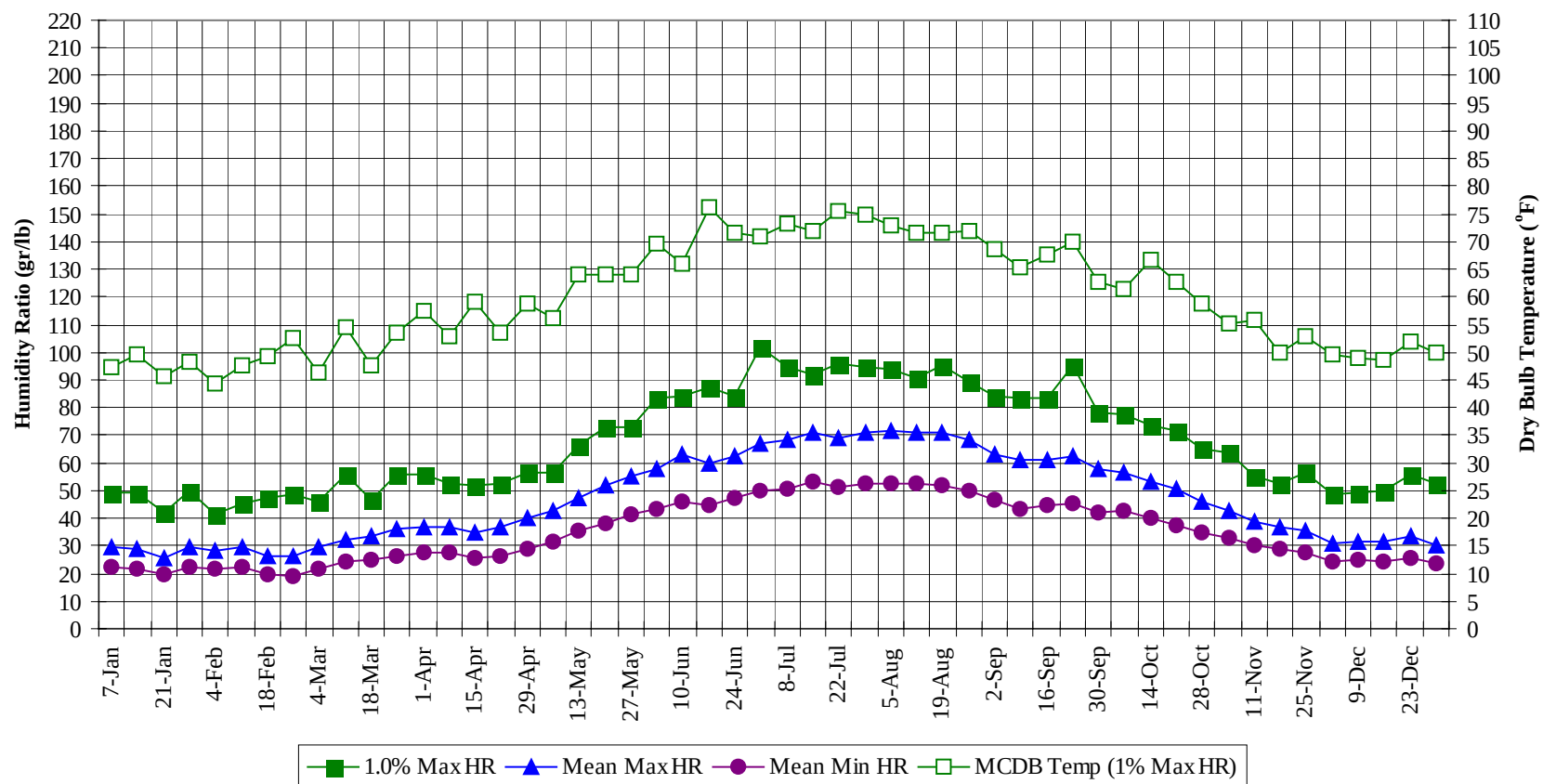
Annual Totals					
Temperature Range (°F)	Hour Group (LST)			Total Obs	M C W B (°F)
	01 To 08	09 To 16	17 To 00		
95 / 99	0			0	66.0
90 / 94	4			3	7
85 / 89	16			12	28
80 / 84	54			43	96
75 / 79	1	121	91	213	62.3
70 / 74	10	187	141	338	59.8
65 / 69	26	170	141	338	57.7
60 / 64	135	312	260	707	55.5
55 / 59	315	363	328	1006	52.3
50 / 54	452	317	362	1130	48.6
45 / 49	477	317	345	1139	44.1
40 / 44	359	267	319	945	39.7
35 / 39	400	326	345	1071	35.6
30 / 34	377	262	283	922	31.0
25 / 29	203	126	155	483	26.0
20 / 24	73	42	50	165	21.3
15 / 19	57	25	29	111	17.0
10 / 14	25	11	11	47	12.1
5 / 9	8	2	2	12	7.2
0 / 4	2	0	0	2	1.5

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.

Annual Summary of Temperatures



Long Term Humidity and Dry Bulb Temperature Summary



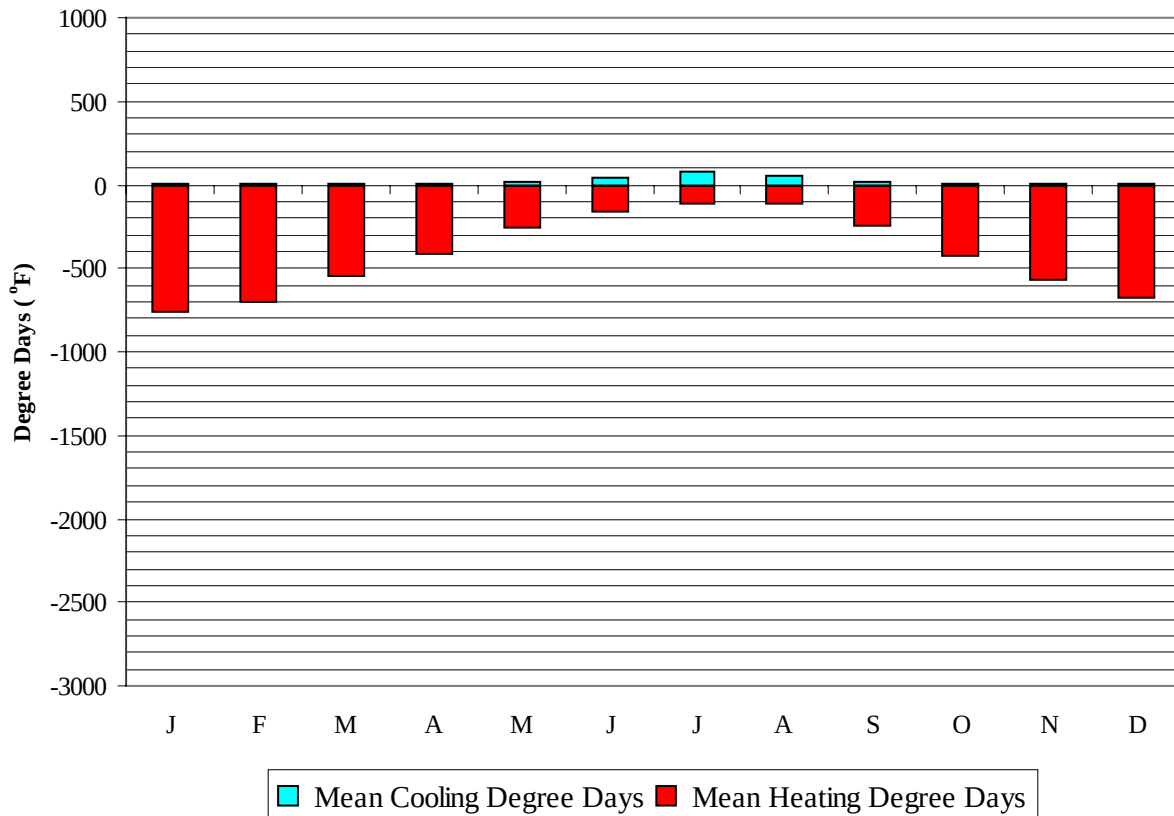
IDAR-OBERSTEIN DL

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Long Term Dry Bulb Temperature and Humidity Summary

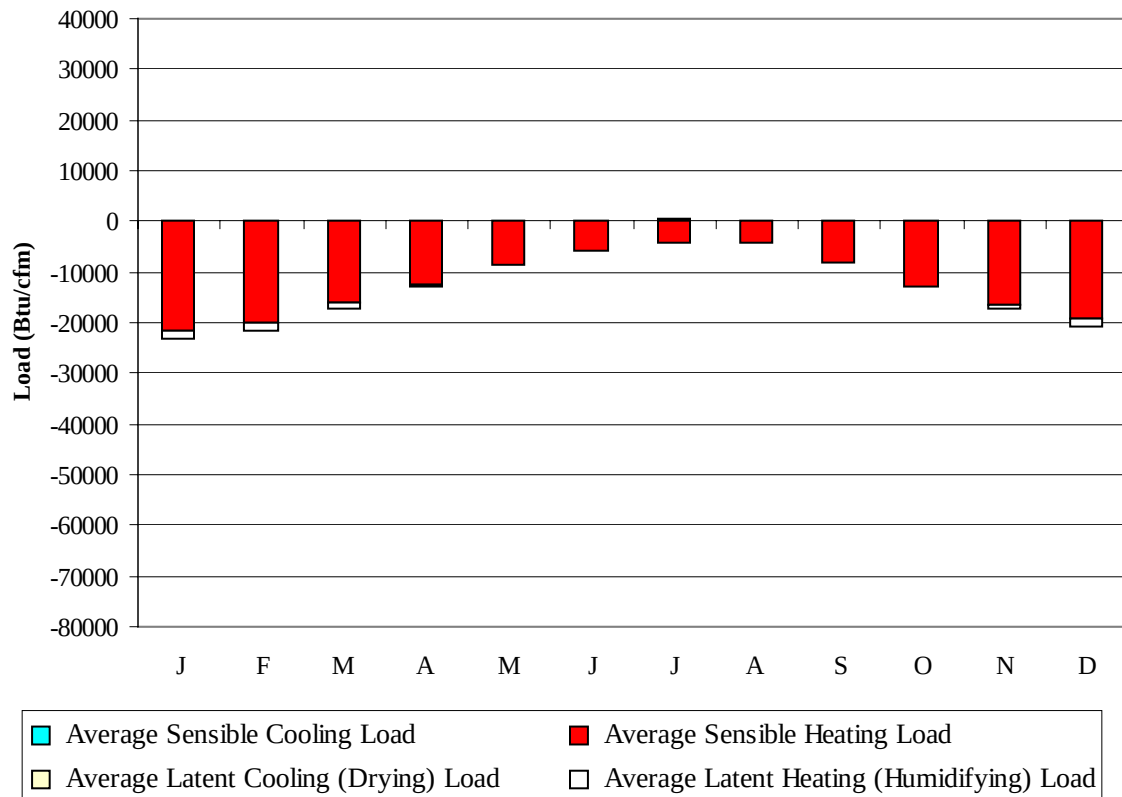
Week Ending	1.0% Temp (°F)	MCWB @ 1% Temp (°F)	Mean Max Temp (°F)	Mean Min Temp (°F)	99% Temp (°F)	1.0% HR (gr/lb)	MCDB @ 1% HR (°F)	Mean Max HR (gr/lb)	Mean Min HR (gr/lb)
7-Jan	50.0	47.3	34.9	28.1	7.0	49.0	47.4	29.3	22.1
14-Jan	50.0	46.5	34.8	27.7	7.0	49.0	49.4	28.7	21.9
21-Jan	48.0	44.3	33.2	26.1	10.0	42.0	45.5	25.5	19.6
28-Jan	49.0	47.0	36.4	29.3	16.0	49.7	48.3	29.5	22.5
4-Feb	48.0	43.7	37.4	28.7	12.0	41.3	44.3	28.5	21.7
11-Feb	52.0	45.3	37.1	29.6	10.0	45.5	47.7	29.5	22.3
18-Feb	49.0	45.3	35.7	26.5	12.0	47.6	49.3	26.2	19.8
25-Feb	55.0	48.4	37.2	24.8	9.0	48.3	52.4	26.3	19.0
4-Mar	54.0	45.8	41.2	29.4	16.0	46.2	46.2	29.7	21.8
11-Mar	57.0	49.6	45.0	32.4	19.0	56.0	54.6	32.4	24.4
18-Mar	61.0	49.2	46.4	33.4	21.0	46.9	47.8	33.7	25.0
25-Mar	61.0	50.3	48.0	35.3	25.0	56.0	53.6	36.3	26.5
1-Apr	68.0	56.0	49.1	36.0	23.0	56.0	57.6	36.9	27.4
8-Apr	65.0	51.5	50.1	35.9	27.0	52.5	52.7	36.5	27.6
15-Apr	66.0	50.9	51.7	35.2	27.0	51.8	59.0	35.1	25.7
22-Apr	73.0	55.1	55.6	36.4	28.0	52.5	53.5	37.1	26.0
29-Apr	73.0	56.9	55.9	38.1	28.0	56.7	58.9	40.2	29.1
6-May	75.0	57.3	58.1	40.4	31.0	56.7	56.0	43.0	31.6
13-May	75.0	58.8	59.6	43.1	34.0	66.5	64.0	47.2	35.5
20-May	77.0	59.7	62.2	44.6	34.0	72.8	64.1	52.2	38.1
27-May	77.0	60.6	63.7	46.6	37.0	72.8	63.9	55.3	41.5
3-Jun	82.0	63.7	66.1	47.6	38.0	83.3	69.7	57.5	43.4
10-Jun	84.0	65.6	66.1	49.1	39.0	84.0	65.9	63.0	46.2
17-Jun	81.0	64.4	66.6	49.1	41.0	87.5	76.1	59.9	44.4
24-Jun	81.0	62.8	67.8	50.3	43.0	84.0	71.5	62.3	47.3
1-Jul	87.0	65.0	70.6	51.8	43.0	101.5	70.9	66.7	49.6
8-Jul	87.0	68.6	71.9	52.5	45.0	94.5	73.2	68.6	50.8
15-Jul	88.0	66.6	73.0	53.5	45.0	91.7	72.0	70.9	53.3
22-Jul	87.0	67.8	71.3	52.9	44.0	95.9	75.6	68.8	51.2
29-Jul	88.0	68.1	73.8	52.6	45.0	94.5	74.7	70.9	52.6
5-Aug	90.0	66.4	74.3	53.7	45.0	93.8	72.9	71.4	52.7
12-Aug	86.0	65.8	72.3	52.6	43.0	90.3	71.7	71.2	52.3
19-Aug	84.0	65.2	72.8	53.0	44.0	95.2	71.7	71.0	52.1
26-Aug	82.0	64.2	70.9	51.0	42.0	89.6	71.8	68.1	49.6
2-Sep	81.0	63.4	66.9	49.1	41.0	84.0	68.8	63.1	46.7
9-Sep	81.0	61.4	65.3	47.3	37.0	83.3	65.3	61.0	43.6
16-Sep	77.0	61.9	63.4	47.4	38.0	83.3	67.6	61.3	44.6
23-Sep	79.0	64.9	63.5	47.0	36.0	95.2	70.0	62.5	45.2
30-Sep	73.0	59.4	61.3	45.1	36.0	78.4	62.9	57.5	42.0
7-Oct	73.0	60.8	58.9	45.2	32.0	77.7	61.4	56.2	42.5
14-Oct	70.0	58.5	57.6	43.0	30.0	73.5	66.8	53.0	39.8
21-Oct	64.0	57.1	53.8	41.7	30.0	71.4	62.7	50.3	37.7
28-Oct	64.0	57.1	51.9	39.7	28.0	65.1	58.9	45.7	34.8
4-Nov	59.0	56.0	47.7	38.3	25.0	63.7	55.3	42.9	32.8
11-Nov	55.0	51.1	45.0	36.4	22.0	55.3	55.7	38.8	30.2
18-Nov	55.0	49.3	43.4	35.5	21.0	52.5	50.0	37.1	28.8
25-Nov	54.0	49.3	42.2	33.9	17.0	56.7	53.0	35.5	27.6
2-Dec	50.0	46.8	38.2	31.4	18.0	48.3	49.7	31.0	24.5
9-Dec	52.0	48.2	38.8	31.8	16.0	49.0	48.9	31.8	25.0
16-Dec	50.0	46.8	38.0	30.8	14.0	49.7	48.6	31.6	24.4
23-Dec	54.0	51.8	38.0	31.8	18.0	56.0	52.0	33.2	25.4
31-Dec	51.0	49.8	36.0	29.2	8.0	52.5	50.0	30.1	23.5

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



	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	0	761
FEB	0	702
MAR	0	548
APR	2	412
MAY	12	261
JUN	37	162
JUL	76	115
AUG	59	114
SEP	14	242
OCT	1	421
NOV	0	572
DEC	0	675
ANN	201	4985

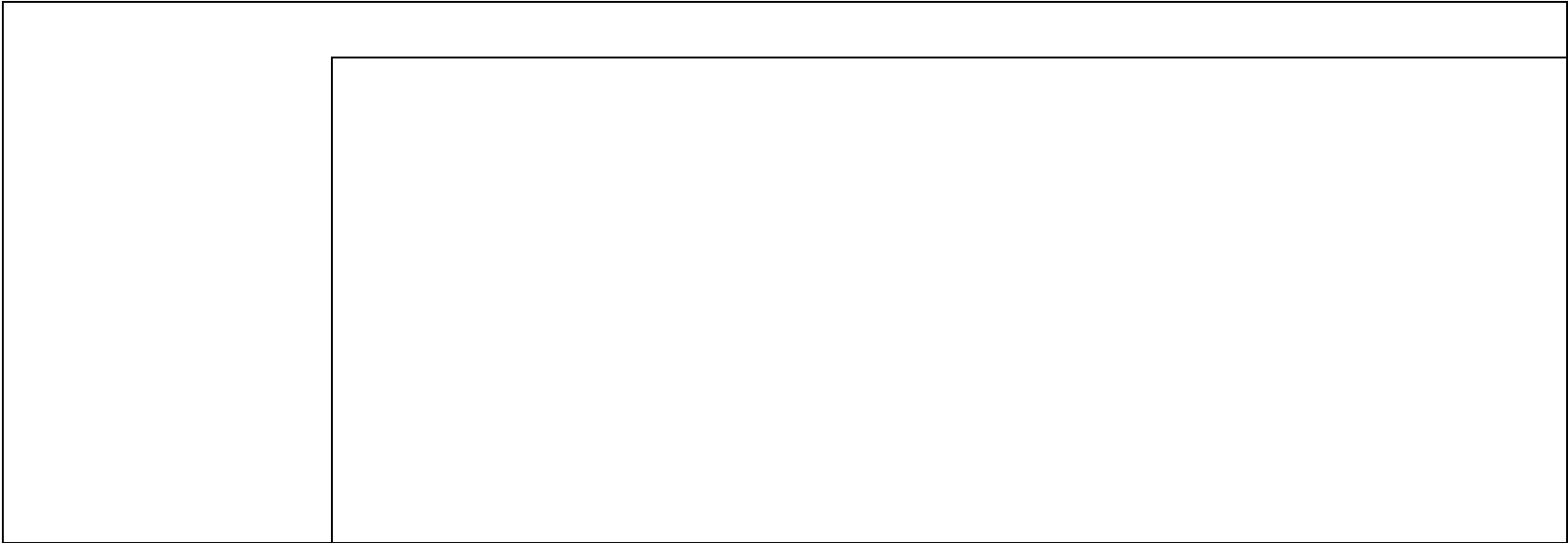
Average Ventilation and Infiltration Loads
(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)



	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	-21537	0	-1683
FEB	0	-19869	0	-1711
MAR	0	-15920	0	-1121
APR	1	-12355	0	-681
MAY	19	-8384	0	-118
JUN	134	-5677	48	-5
JUL	375	-4387	121	0
AUG	245	-4340	65	-1
SEP	29	-8019	32	-18
OCT	0	-12767	0	-195
NOV	0	-16484	0	-763
DEC	0	-19194	0	-1405
ANN	803	-148933	266	-7701

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

No Solar Radiation
Data Available

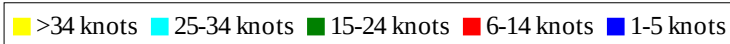
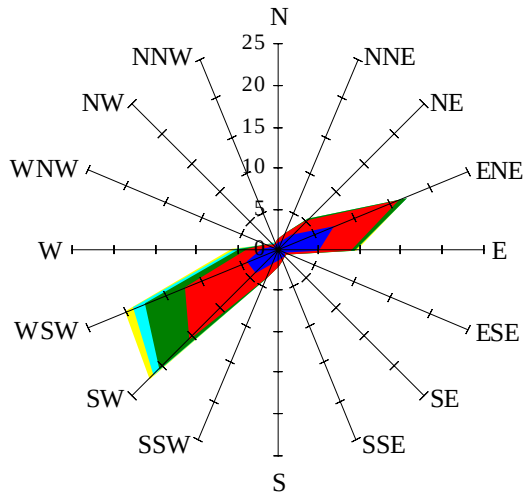


Average Annual Solar Heat and Illumination – Nearest Available Site

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

Wind Summary - December, January, and February

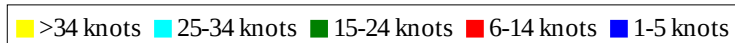
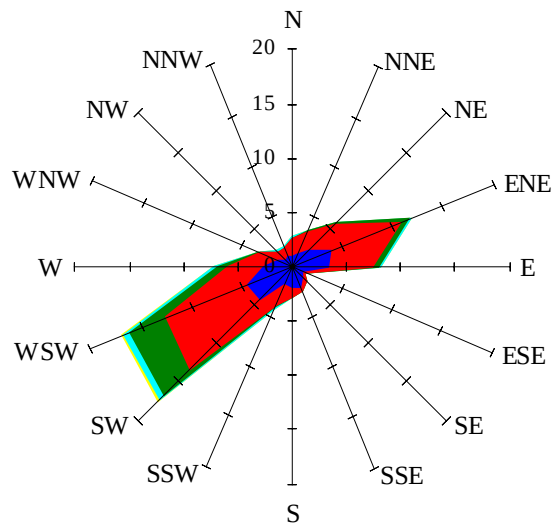
Labels of Percent Frequency on North Axis



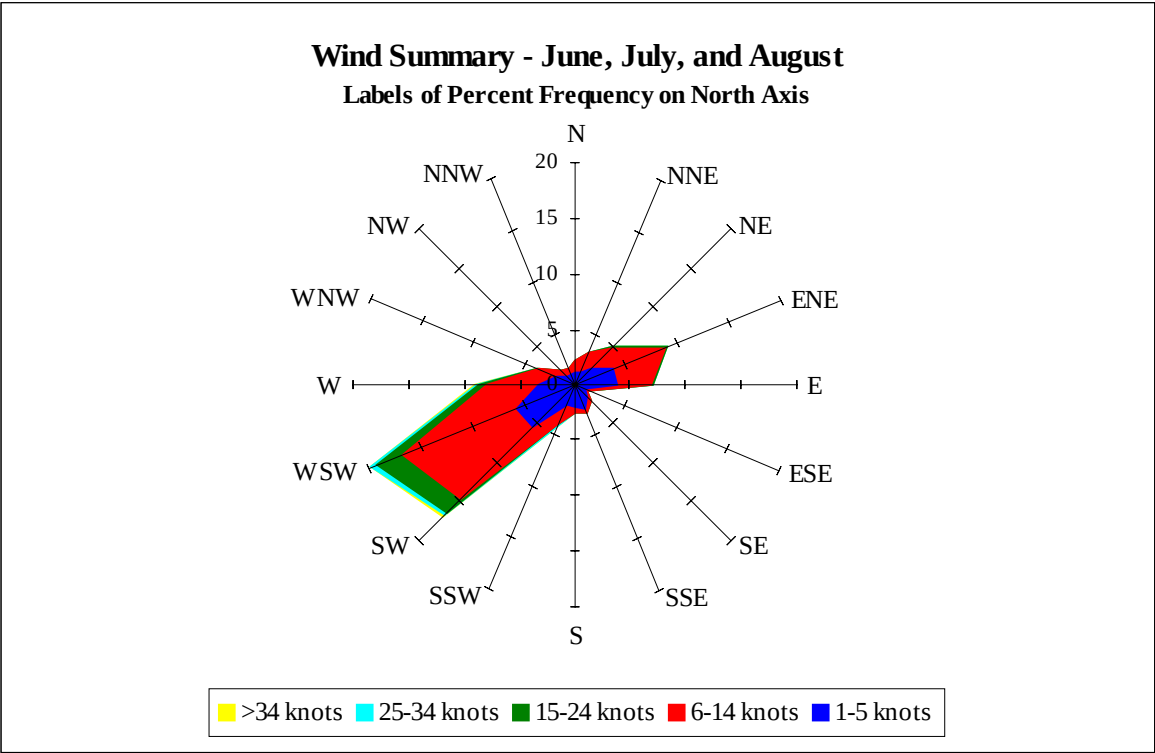
Percent Calm = 6.38

Wind Summary - March, April, and May

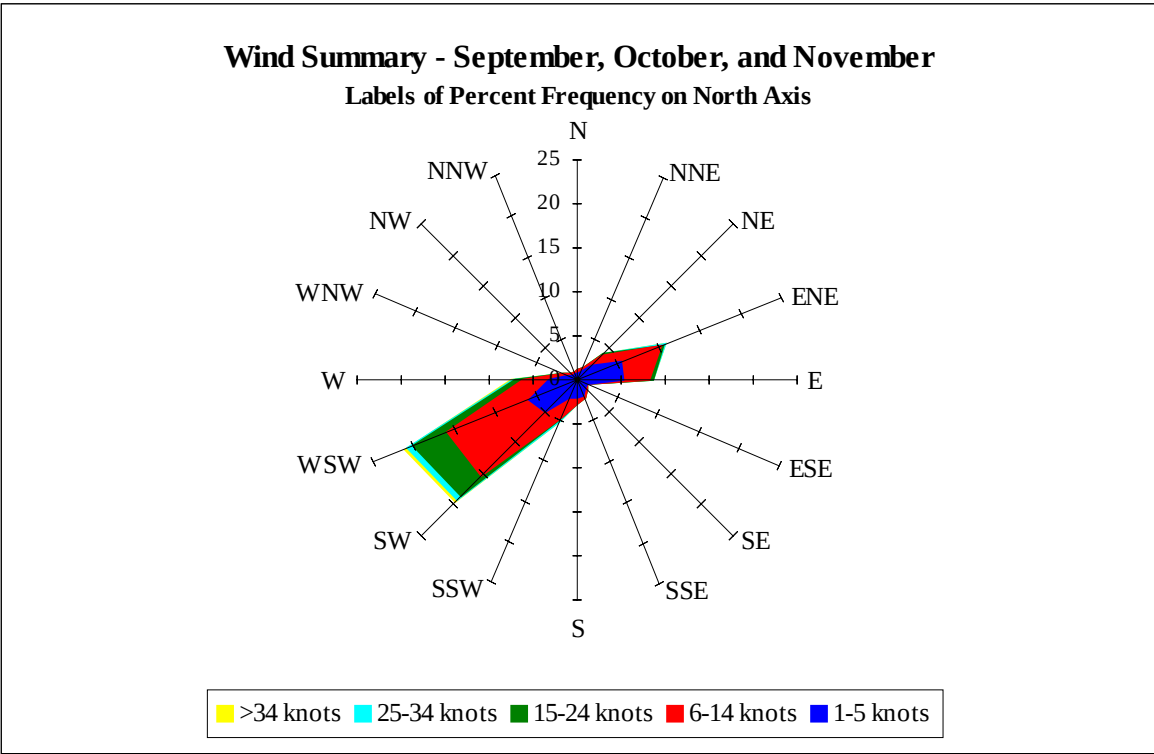
Labels of Percent Frequency on North Axis



Percent Calm = 6.64



Percent Calm = 8.51



Percent Calm = 8.92