

LIHUE/KAUAI ISLAND HI

Latitude = 21.98 N

Longitude = 159.30 W

Period of Record = 1973 to 1996

WMO No. 911650

Elevation = 148 feet

Average Pressure = 29.84 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	87	76	117	13.1	ENE
0.4% Occurrence	86	75	115	13.4	ENE
1.0% Occurrence	85	75	113	13.7	ENE
2.0% Occurrence	84	74	112	14.0	ENE
Mean Daily Range	10	-	-	-	-
97.5% Occurrence	65	62	77	7.9	W
99.0% Occurrence	62	59	68	7.6	W
99.6% Occurrence	60	57	64	7.7	W
Median of Extreme Lows	57	54	57	8.2	W
	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	79	84	137	12.4	ENE
0.4% Occurrence	77	82	128	12.9	ENE
1.0% Occurrence	76	82	123	13.2	ENE
2.0% Occurrence	76	82	123	13.2	ENE
	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	147	82	0.97	12.7	ENE
0.4% Occurrence	132	80	0.88	12.4	ENE
1.0% Occurrence	128	80	0.85	12.6	ENE
2.0% Occurrence	127	80	0.85	12.7	ENE
Air Conditioning/ Humid Area Criteria	# of Hours	T ≥ 93°F	T ≥ 80°F	T _{wb} ≥ 73°F	T _{wb} ≥ 67°F
		0	1740	1903	6929

Other Site Data

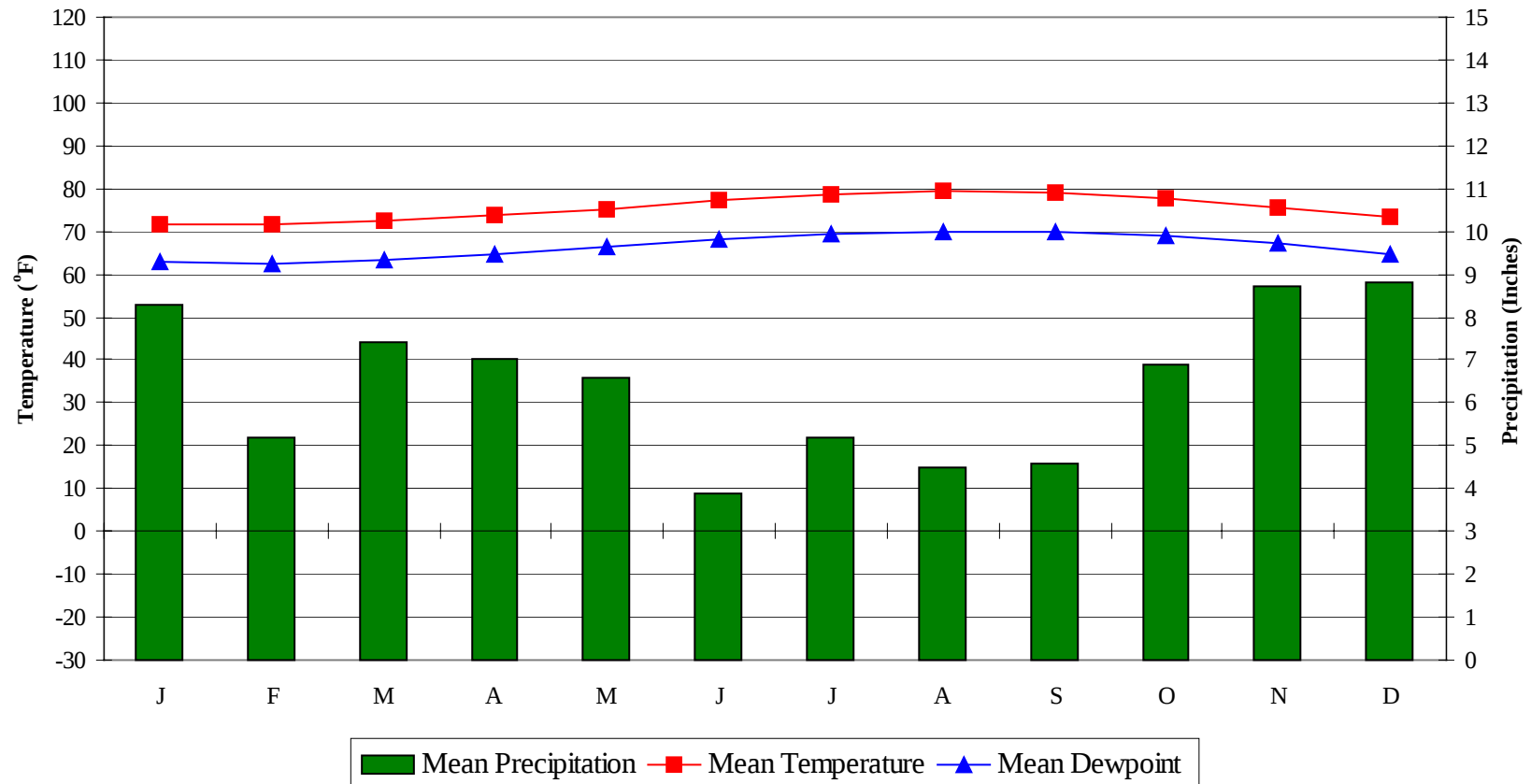
Weather Region	Rain Rate 100 Year Recurrence (in./hr)	Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph)	Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible
10	4.0	105	10.0 + 1.7
Ground Water Temperature (°F) 50 Foot Depth *	Frost Depth 50 Year Recurrence (in.)	Ground Snow Load 50 Year Recurrence (lb/ft ²)	Average Annual Freeze-Thaw Cycles (#)
78.0	0	0	0

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

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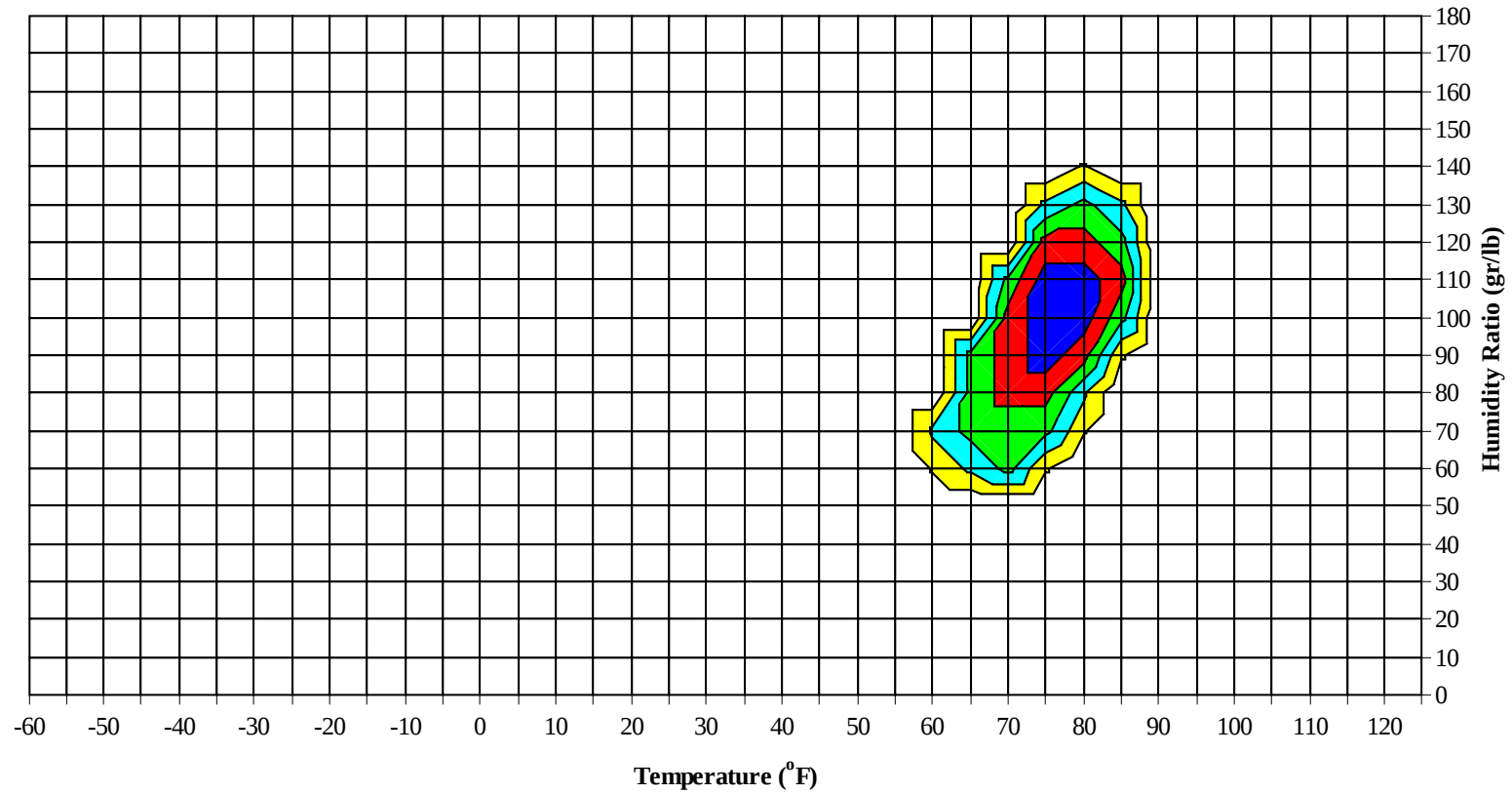
Average Annual Climate



LIHUE/KAUAI ISLAND HI

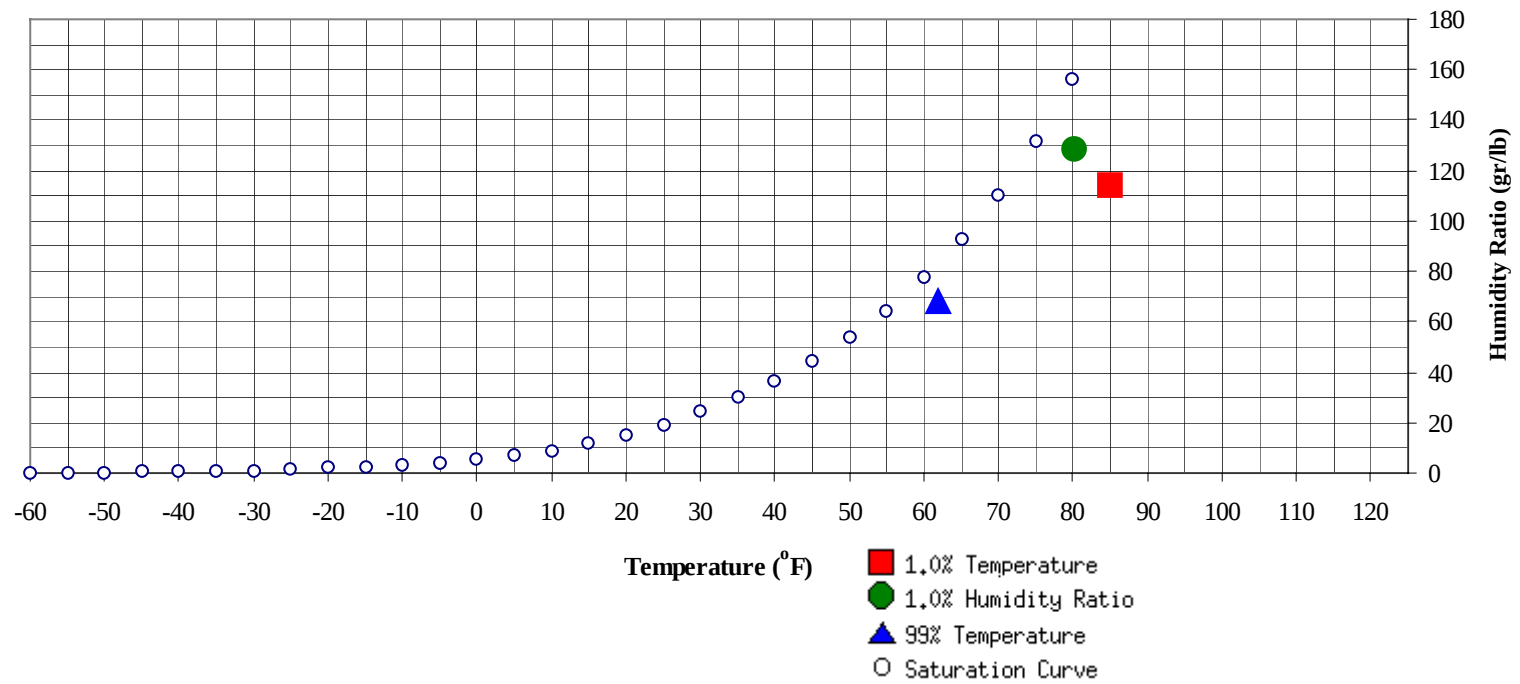
WMO No. 911650

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

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)
	62	67.9	25.4		128.1	80.1	75.7	74	39.3

1.0% Dry Bulb	(°F)	MCHR (gr/lb)	MCWB (°F)	Enthalpy (btu/lb)
	85	114.1	74.8	38.3

LIHUE/KAUAI ISLAND HI

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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		
90 / 94															
85 / 89		0		0	72.0		0		0	73.0		0	0	0	72.4
80 / 84		25	1	26	70.8		23	2	25	70.2		30	2	32	70.8
75 / 79	14	139	45	198	69.0	5	122	35	162	68.7	10	148	46	203	68.9
70 / 74	97	70	127	294	66.4	88	65	114	267	66.5	135	63	150	349	66.5
65 / 69	87	13	63	164	63.2	85	13	61	158	62.9	76	7	45	128	63.4
60 / 64	45	1	12	58	59.3	39	1	11	51	58.7	24	0	5	29	59.1
55 / 59	4		0	4	55.1	8		1	9	54.5	3		0	3	54.9
50 / 54			0	0		0		0	0	51.0					

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.

LIHUE/KAUAI ISLAND HI

WMO No. 911650

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		
90 / 94															
85 / 89		0	0	0	74.0		2	0	2	73.9	0	8	0	8	75.2
80 / 84	0	47	2	49	71.4	1	109	10	120	72.2	2	173	26	201	72.6
75 / 79	25	153	69	247	69.5	67	119	123	309	70.2	153	55	187	395	70.9
70 / 74	151	37	143	332	67.3	137	16	103	257	68.0	79	4	26	109	69.3
65 / 69	53	3	25	81	64.1	38	1	11	50	64.4	6	0	1	7	65.5
60 / 64	11	0	1	12	60.1	5		1	6	59.6	0		0	0	60.8
55 / 59	0			0	57.0	0			0	54.7					
50 / 54															

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.

LIHUE/KAUAI ISLAND HI

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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		
90 / 94			0	0	76.0		0		0	77.0			0	0	75.0
85 / 89		16	0	16	75.3	0	38	2	40	75.3		42	1	43	75.2
80 / 84	7	195	48	250	73.4	14	189	72	275	73.8	16	182	76	274	73.8
75 / 79	203	35	190	428	71.7	199	20	168	387	72.1	165	15	149	329	72.1
70 / 74	36	2	10	48	69.9	33	1	6	40	69.9	54	1	14	69	69.7
65 / 69	2	0	0	2	66.0	2	0	0	2	67.0	5		0	5	65.9
60 / 64	0			0	62.3										
55 / 59															
50 / 54															

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 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		
90 / 94															
85 / 89		14	0	14	74.9		1		1	74.1		0		0	73.4
80 / 84	7	185	37	229	73.3	0	104	5	109	72.6		37	1	38	71.9
75 / 79	149	43	172	364	71.5	105	113	145	363	70.9	43	156	80	279	69.6
70 / 74	76	5	37	118	69.3	92	20	76	188	68.3	110	49	119	278	67.3
65 / 69	15	1	2	18	65.7	39	1	13	53	64.5	71	6	40	117	63.7
60 / 64	1		0	1	60.4	5	0	1	6	60.3	21	0	8	29	59.0
55 / 59						0			0	56.0	3		0	3	55.0
50 / 54															

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.

HI

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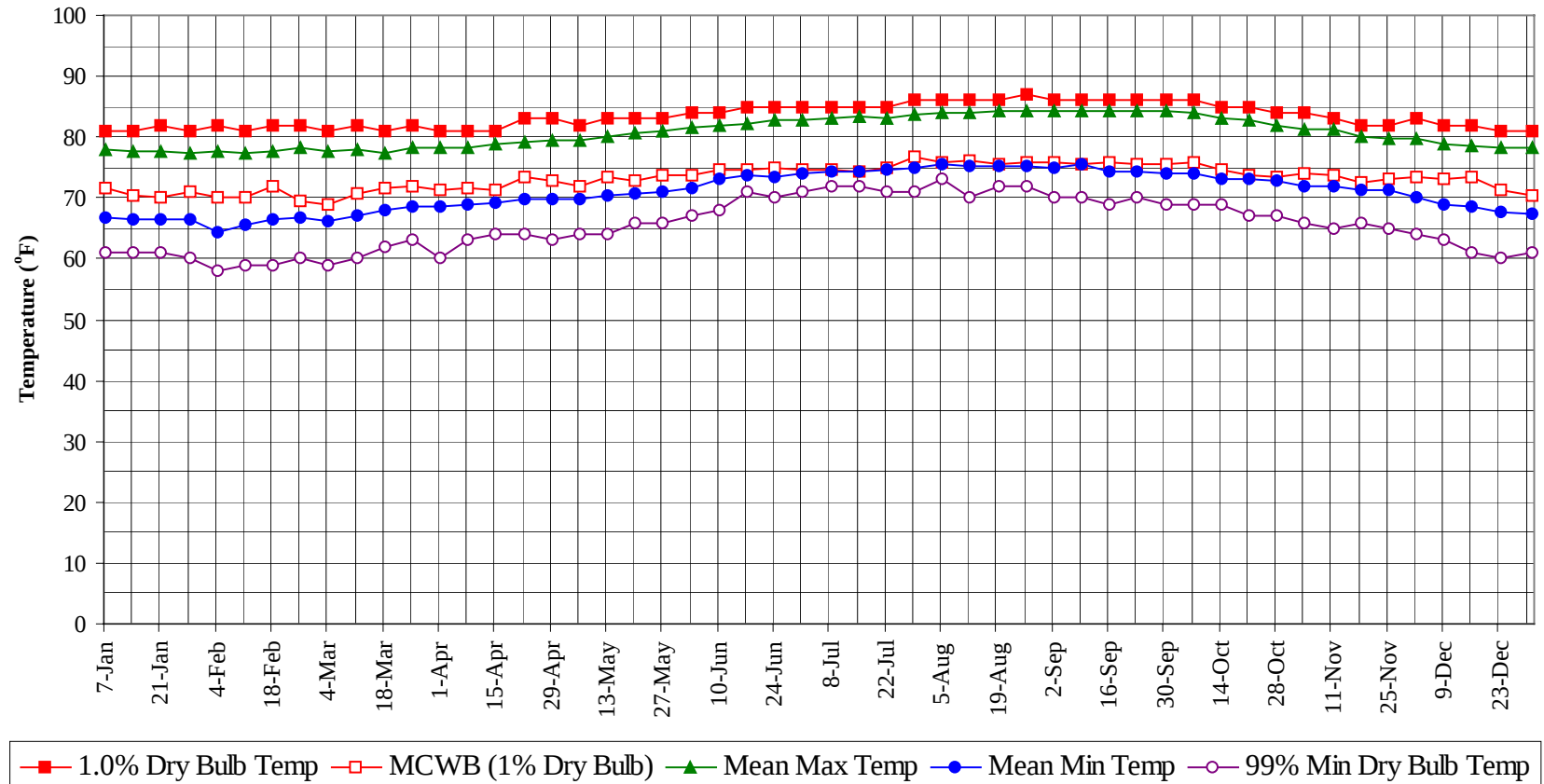
Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)

Period of Record = 1973 to 1996

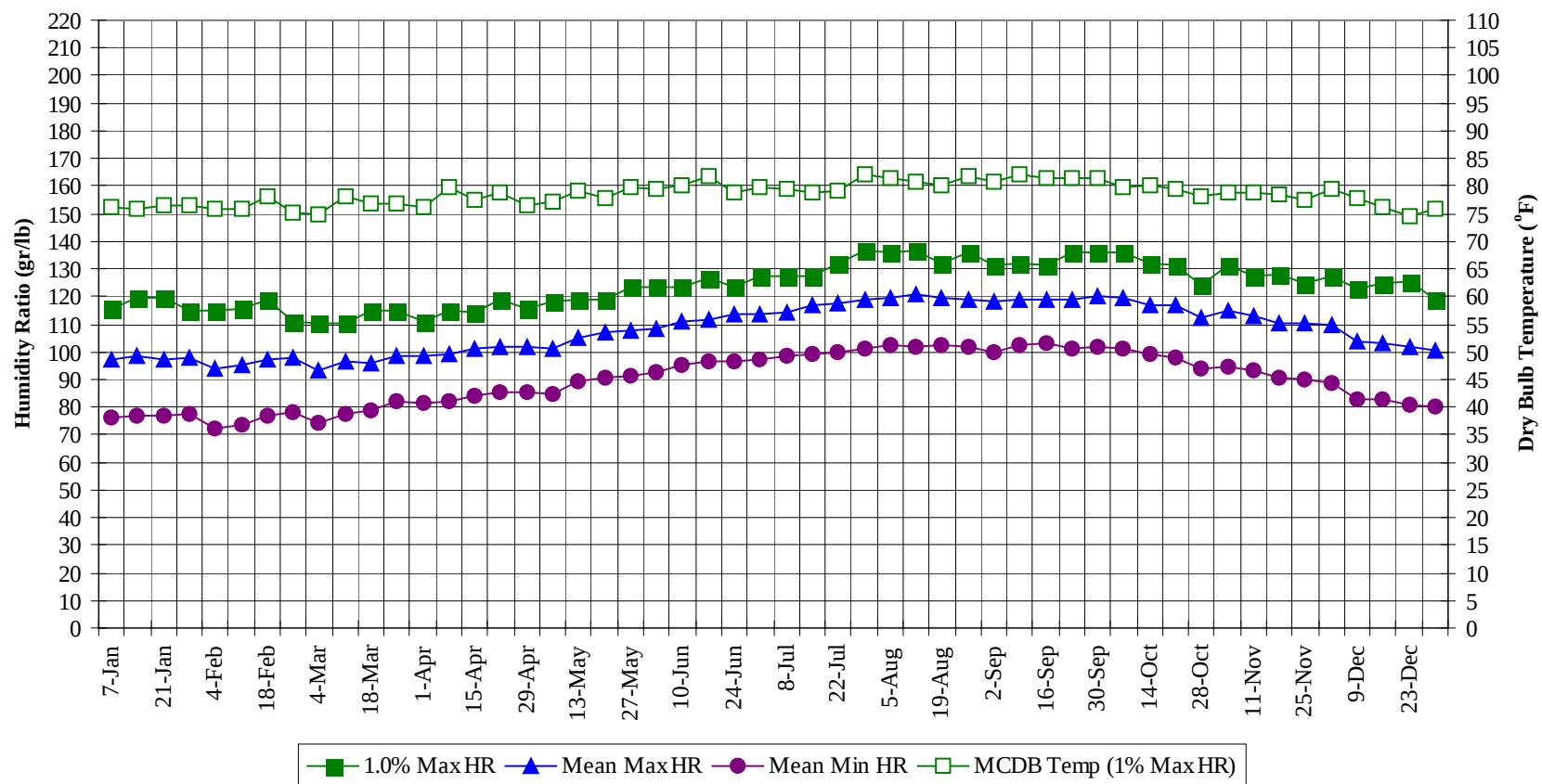
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Caution: This summary reflects the typical distribution of temperature in a typical year. It does not reflect the typical moisture distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary and the ventilation and infiltration load pages in this manual.

Annual Summary of Temperatures



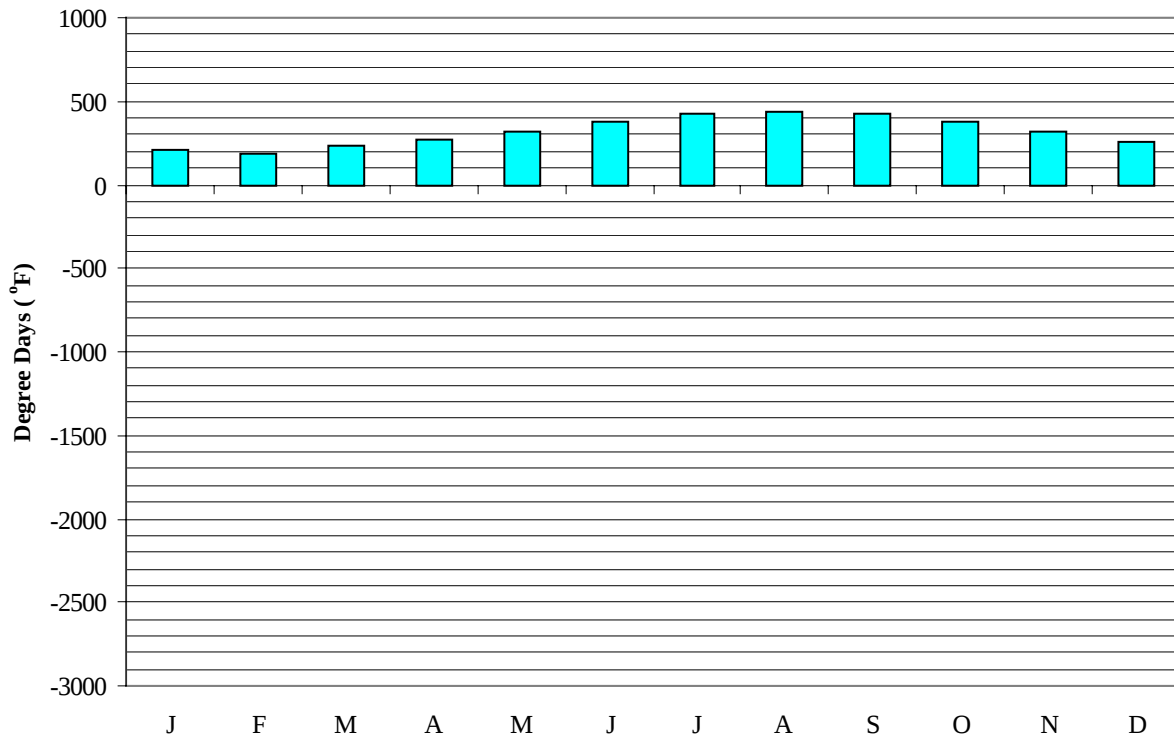
Long Term Humidity and Dry Bulb Temperature Summary



LIHUE/KAUAI ISLAND HI
WMO No. 911650
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	81.0	71.6	77.8	66.7	61.0	115.5	76.1	97.0	76.0
14-Jan	81.0	70.5	77.7	66.4	61.0	119.7	76.0	98.8	77.0
21-Jan	82.0	70.0	77.6	66.5	61.0	119.7	76.4	97.2	76.9
28-Jan	81.0	71.0	77.5	66.6	60.0	114.8	76.5	98.1	77.7
4-Feb	82.0	70.0	77.5	64.4	58.0	114.8	76.0	93.8	71.9
11-Feb	81.0	70.2	77.4	65.6	59.0	115.5	76.0	94.9	73.4
18-Feb	82.0	72.0	77.7	66.5	59.0	119.0	78.1	97.1	77.2
25-Feb	82.0	69.5	78.2	66.7	60.0	111.3	75.1	98.0	78.2
4-Mar	81.0	68.9	77.7	66.3	59.0	110.6	75.0	93.5	73.9
11-Mar	82.0	70.8	78.0	67.1	60.0	110.6	78.2	96.7	77.4
18-Mar	81.0	71.5	77.4	68.0	62.0	114.8	76.8	95.9	78.6
25-Mar	82.0	71.8	78.3	68.6	63.0	114.8	76.7	98.7	82.2
1-Apr	81.0	71.2	78.3	68.5	60.0	111.3	76.3	98.7	81.6
8-Apr	81.0	71.5	78.4	68.8	63.0	114.8	79.8	99.3	82.4
15-Apr	81.0	71.4	78.7	69.2	64.0	114.1	77.4	101.0	84.2
22-Apr	83.0	73.3	79.2	69.9	64.0	119.0	78.7	102.1	85.2
29-Apr	83.0	73.0	79.4	69.8	63.0	115.5	76.6	101.9	85.5
6-May	82.0	72.0	79.5	69.9	64.0	118.3	77.1	101.2	84.7
13-May	83.0	73.4	80.0	70.5	64.0	119.0	79.1	104.9	89.0
20-May	83.0	72.8	80.7	70.8	66.0	119.0	78.0	106.9	90.9
27-May	83.0	73.6	80.9	70.9	66.0	123.2	79.8	107.6	91.2
3-Jun	84.0	73.7	81.6	71.7	67.0	123.2	79.3	108.3	92.5
10-Jun	84.0	74.6	82.0	73.0	68.0	123.2	80.3	110.8	95.5
17-Jun	85.0	74.7	82.2	73.7	71.0	126.7	81.6	111.6	96.8
24-Jun	85.0	74.9	82.7	73.4	70.0	123.2	78.8	113.3	96.6
1-Jul	85.0	74.7	82.8	73.9	71.0	127.4	79.8	113.4	97.3
8-Jul	85.0	74.6	83.1	74.4	72.0	127.4	79.6	114.0	98.6
15-Jul	85.0	74.4	83.3	74.5	72.0	127.4	78.9	116.8	99.0
22-Jul	85.0	75.0	83.1	74.7	71.0	132.3	79.3	117.4	99.6
29-Jul	86.0	76.9	83.7	75.0	71.0	136.5	82.2	118.9	101.4
5-Aug	86.0	76.0	84.0	75.5	73.0	135.8	81.3	119.4	102.3
12-Aug	86.0	76.1	84.1	75.1	70.0	136.5	80.6	120.6	102.1
19-Aug	86.0	75.5	84.2	75.2	72.0	132.3	80.1	119.3	102.2
26-Aug	87.0	75.9	84.3	75.3	72.0	135.8	81.9	118.9	102.0
2-Sep	86.0	76.0	84.4	74.9	70.0	131.6	80.7	118.3	100.1
9-Sep	86.0	75.4	84.4	75.4	70.0	132.3	82.0	118.8	102.2
16-Sep	86.0	75.8	84.3	74.4	69.0	131.6	81.6	119.1	102.8
23-Sep	86.0	75.6	84.3	74.3	70.0	135.8	81.6	119.1	101.0
30-Sep	86.0	75.5	84.2	74.0	69.0	135.8	81.3	120.0	101.6
7-Oct	86.0	75.7	83.9	73.9	69.0	135.8	79.9	119.5	101.5
14-Oct	85.0	74.7	83.1	73.2	69.0	132.3	80.2	116.9	99.0
21-Oct	85.0	73.8	82.6	73.0	67.0	131.6	79.5	116.6	98.0
28-Oct	84.0	73.4	82.0	72.8	67.0	123.9	78.1	112.5	94.0
4-Nov	84.0	73.9	81.3	71.9	66.0	131.6	79.0	114.8	94.8
11-Nov	83.0	73.7	81.1	71.9	65.0	127.4	78.8	112.8	93.4
18-Nov	82.0	72.4	79.9	71.2	66.0	128.1	78.6	110.1	90.6
25-Nov	82.0	73.1	79.7	71.2	65.0	124.6	77.5	110.0	89.7
2-Dec	83.0	73.5	79.8	70.1	64.0	127.4	79.6	109.7	89.0
9-Dec	82.0	73.1	78.8	68.9	63.0	122.5	78.0	104.0	82.5
16-Dec	82.0	73.3	78.6	68.7	61.0	124.6	76.1	103.0	83.0
23-Dec	81.0	71.3	78.1	67.6	60.0	125.3	74.6	101.7	81.0
31-Dec	81.0	70.3	78.2	67.2	61.0	119.0	76.0	100.3	80.1

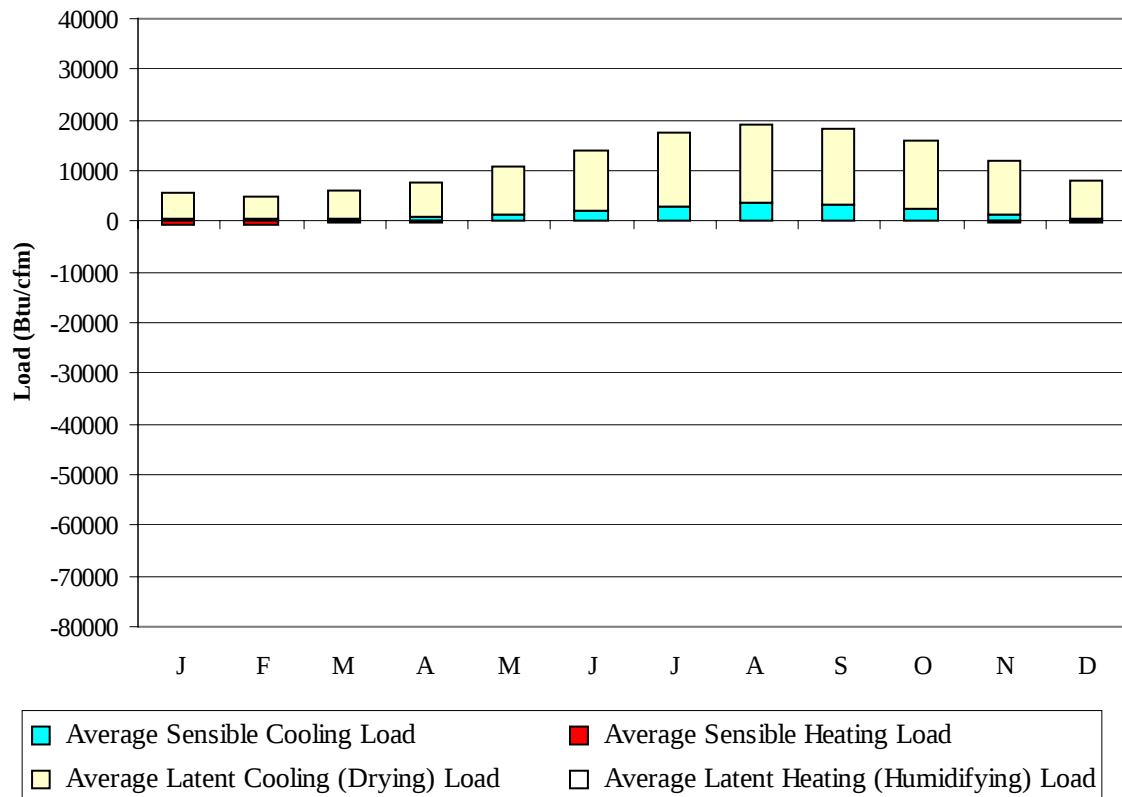
Degree Days, Heating and Cooling
(Base 65°F)



■ Mean Cooling Degree Days ■ Mean Heating Degree Days

	Mean Cooling Degree Days (°F)	Mean Heating Degree Days (°F)
JAN	214	7
FEB	191	8
MAR	236	4
APR	265	1
MAY	320	0
JUN	373	0
JUL	422	0
AUG	443	0
SEP	422	0
OCT	378	0
NOV	317	0
DEC	256	4
ANN	3838	24

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	494	-546	5266	0
FEB	445	-572	4453	0
MAR	563	-314	5482	0
APR	763	-129	6881	0
MAY	1364	-65	9546	0
JUN	2194	-7	11886	0
JUL	3004	-2	14511	0
AUG	3561	-1	15618	0
SEP	3395	-2	14915	0
OCT	2528	-9	13231	0
NOV	1453	-68	10689	0
DEC	701	-313	7461	0
ANN	20465	-2028	119939	0

Average Annual Solar Radiation – Nearest Available Site

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

City: LIHUE
 State: HI
 WBAN No: 22536
 Lat(N): 21.98
 Long(W): 159.35
 Elev(ft): 148

Stn Type: Secondary
 SHADING GEOMETRY IN DIMENSIONLESS UNITS
 Window: 1
 Overhang: 1.22
 Vert Gap: 0.2

AVERAGE INCIDENT SOLAR RADIATION (Btu/sq.ft./day), Percentage Uncertainty = 9		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
HORIZ	Global	1170	1380	1540	1690	1870	1920	1900	1880	1790	1480	1190	1100	1570
	Std Dev	91	132	163	121	110	108	111	114	84	76	82	86	48
	Minimum	890	1080	1150	1430	1630	1700	1650	1640	1570	1310	980	910	1450
	Maximum	1340	1600	1890	1910	2110	2250	2120	2060	1930	1610	1350	1280	1690
	Diffuse	470	540	660	750	730	720	720	670	600	560	510	450	610
Clear Day	Global	1620	1910	2230	2490	2590	2620	2590	2500	2300	1980	1670	1530	2170
NORTH	Global	310	350	400	460	570	690	630	490	410	360	320	290	440
	Diffuse	310	350	400	440	470	500	480	440	400	360	320	290	400
Clear Day	Global	270	310	340	430	670	890	770	490	350	310	280	260	450
EAST	Global	690	800	850	910	970	970	950	970	960	830	680	650	850
	Diffuse	380	440	500	550	560	560	560	550	520	450	400	360	480
Clear Day	Global	1010	1150	1300	1390	1410	1410	1400	1390	1310	1180	1030	950	1250
SOUTH	Global	1250	1180	920	650	480	440	450	570	870	1100	1160	1250	860
	Diffuse	480	500	510	490	450	440	440	450	490	500	500	470	480
Clear Day	Global	2000	1800	1340	760	430	380	390	600	1090	1630	1940	2030	1200
WEST	Global	680	790	850	890	950	1000	990	1010	980	820	680	640	860
	Diffuse	380	440	500	550	560	560	560	540	520	450	400	360	490
Clear Day	Global	1010	1150	1300	1390	1410	1410	1400	1390	1310	1180	1030	950	1250

Average Annual Solar Heat and Illumination – Nearest Available Site

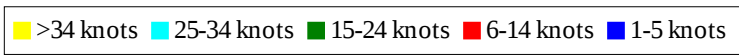
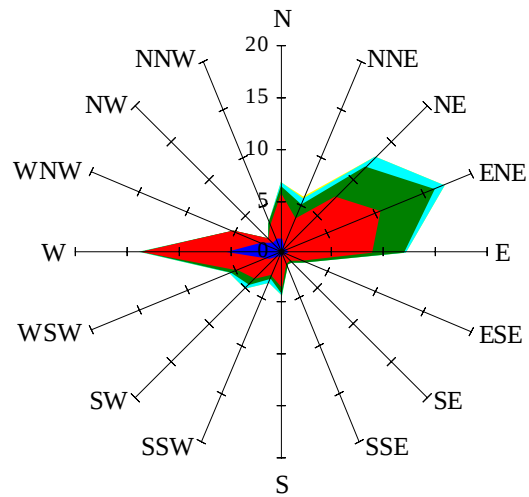
(Source: National Renewable Energy Laboratory, Golden CO, 1995)

AVERAGE TRANSMITTED SOLAR RADIATION (Btu/sq.ft./day) FOR DOUBLE GLAZING, Percentage Uncertainty = 9		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
HORIZ	Unshaded	820	990	1120	1230	1370	1410	1400	1380	1310	1070	850	770	1140
NORTH	Unshaded	210	240	280	310	350	410	380	320	280	250	220	200	290
	Shaded	160	180	200	220	250	270	260	240	220	190	160	150	210
EAST	Unshaded	480	570	600	640	680	680	670	680	690	580	480	450	600
	Shaded	280	330	340	350	370	370	370	370	380	330	270	260	340
SOUTH	Unshaded	900	810	570	390	320	310	310	340	510	720	830	910	580
	Shaded	270	230	240	240	240	240	240	240	250	230	240	300	250
WEST	Unshaded	480	560	600	630	680	710	700	720	700	580	480	450	610
	Shaded	280	320	340	350	370	390	380	390	380	330	280	260	340

AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS, Percentage Uncertainty = 9		March					June				
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear	35	79	97	87	48	51	89	104	92	57
	M.Cloudy	23	52	68	59	31	36	65	82	71	41
NORTH	M.Clear	9	15	16	16	11	28	23	17	22	28
	M.Cloudy	9	16	19	18	12	21	22	18	22	21
EAST	M.Clear	74	70	24	16	11	77	64	18	16	13
	M.Cloudy	32	42	23	18	12	44	47	19	18	14
SOUTH	M.Clear	24	49	59	54	32	12	16	15	16	13
	M.Cloudy	14	32	42	37	19	13	18	16	18	14
WEST	M.Clear	9	15	16	60	79	12	16	15	60	78
	M.Cloudy	9	16	19	40	36	13	18	16	47	47
M.Clear	(% hrs)	25	29	29	28	26	24	33	34	34	32
		Sept					Dec				
		9am	11am	1pm	3pm	5pm	9am	11am	1pm	3pm	5pm
HORIZ.	M.Clear	43	84	100	85	45	22	61	75	61	25
	M.Cloudy	32	66	79	67	33	15	39	52	41	16
NORTH	M.Clear	11	16	16	16	11	7	13	15	13	8
	M.Cloudy	12	17	18	18	12	7	14	16	14	7
EAST	M.Clear	76	66	18	16	11	54	56	16	13	8
	M.Cloudy	46	51	19	18	12	21	32	17	14	7
SOUTH	M.Clear	21	42	50	42	22	38	74	85	74	41
	M.Cloudy	17	35	43	36	17	16	39	51	41	17
WEST	M.Clear	11	16	17	64	77	7	13	15	54	56
	M.Cloudy	12	17	18	50	46	7	14	16	32	22
M.Clear	(% hrs)	30	42	44	42	37	33	39	37	37	33

Wind Summary - December, January, and February

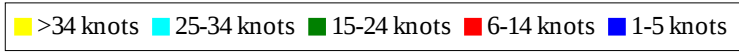
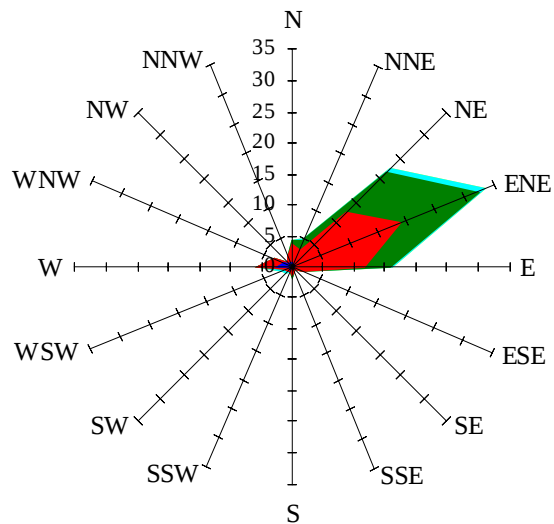
Labels of Percent Frequency on North Axis



Percent Calm = 0.49

Wind Summary - March, April, and May

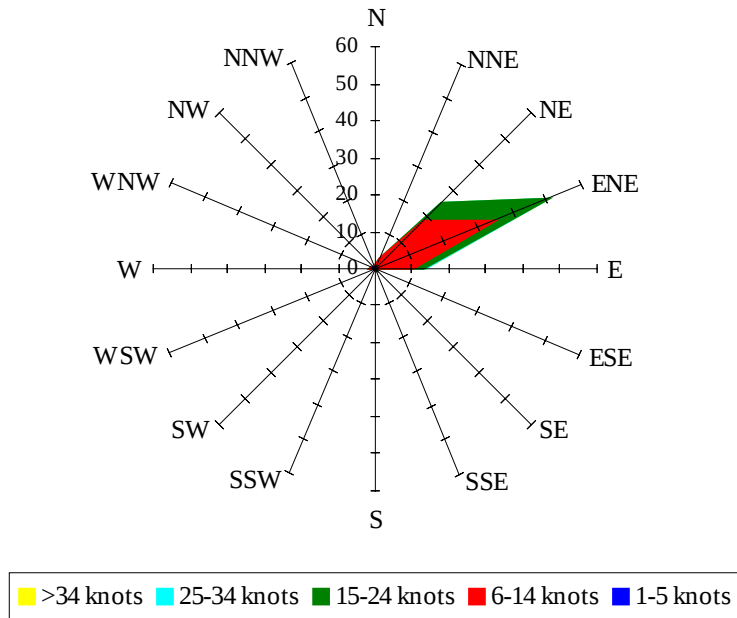
Labels of Percent Frequency on North Axis



Percent Calm = 0.19

Wind Summary - June, July, and August

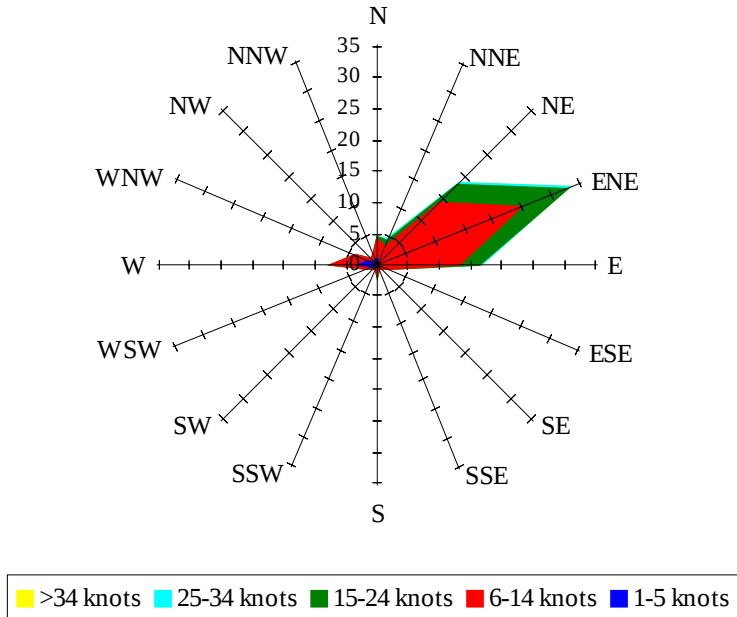
Labels of Percent Frequency on North Axis



Percent Calm = 0.06

Wind Summary - September, October, and November

Labels of Percent Frequency on North Axis



Percent Calm = 0.36