| | |
|---|---|
| **GRAY AAF, WA** | |
| Latitude = 47.08 N | Station ID = MSWT_KGRF |
| Longitude =122.58 W | Elevation = 302 Feet |
| Period of Record = 1988 To 2017 | Average Pressure = 29.71 inches Hg |

**Design Criteria Data**

| | Mean Coincident (Average) Values | | | | |
|---|---|---|---|---|---|
| **Dry Bulb Temperature (T)** | **Design Value (°F)** | **Wet Bulb Temperature (°F)** | **Humidity Ratio (gr/lb)** | **Wind Speed (mph)** | **Prevailing Direction (NSEW)** |
| Median of Extreme Highs | 95 | 68 | 60 | 7 | NNE |
| 0.4% Occurrence | 88 | 66 | 61 | 7.2 | N |
| 1.0% Occurrence | 84 | 65 | 61 | 7.1 | N |
| 2.0% Occurrence | 81 | 64 | 60 | 7.1 | N |
| Mean Daily Range | 18 | - | - | - | S |
| 97.5% Occurrence | 28 | 27 | 19 | 3 | S |
| 99.0% Occurrence | 25 | 24 | 17 | 3 | SSE |
| 99.6% Occurrence | 21 | 20 | 13 | 3.5 | SE |
| Median of Extreme Lows | 16 | 15 | 10 | 4.1 | SE |

| **Wet Bulb Temperature ($T_{wb}$)** | **Design Value (°F)** | **Dry Bulb Temperature (°F)** | **Humidity Ratio (gr/lb)** | **Wind Speed (mph)** | **Prevailing Direction (NSEW)** |
|---|---|---|---|---|---|
| Median of Extreme Highs | 70 | 87 | 80 | 7.1 | W |
| 0.4% Occurrence | 68 | 84 | 75 | 7.1 | W |
| 1.0% Occurrence | 66 | 81 | 71 | 7 | N |
| 2.0% Occurrence | 64 | 76 | 68 | 6.7 | N |

| **Humidity Ratio (HR)** | **Design Value (gr/lb)** | **Dry Bulb Temperature (°F)** | **Vapor Pressure (in. Hg)** | **Wind Speed (mph)** | **Prevailing Direction (NSEW)** |
|---|---|---|---|---|---|
| Median of Extreme Highs | 92 | 73 | 0.61 | 6.3 | W |
| 0.4% Occurrence | 84 | 70 | 0.56 | 6 | W |
| 1.0% Occurrence | 80 | 69 | 0.54 | 5.7 | W |
| 2.0% Occurrence | 76 | 68 | 0.5 | 5.8 | W |

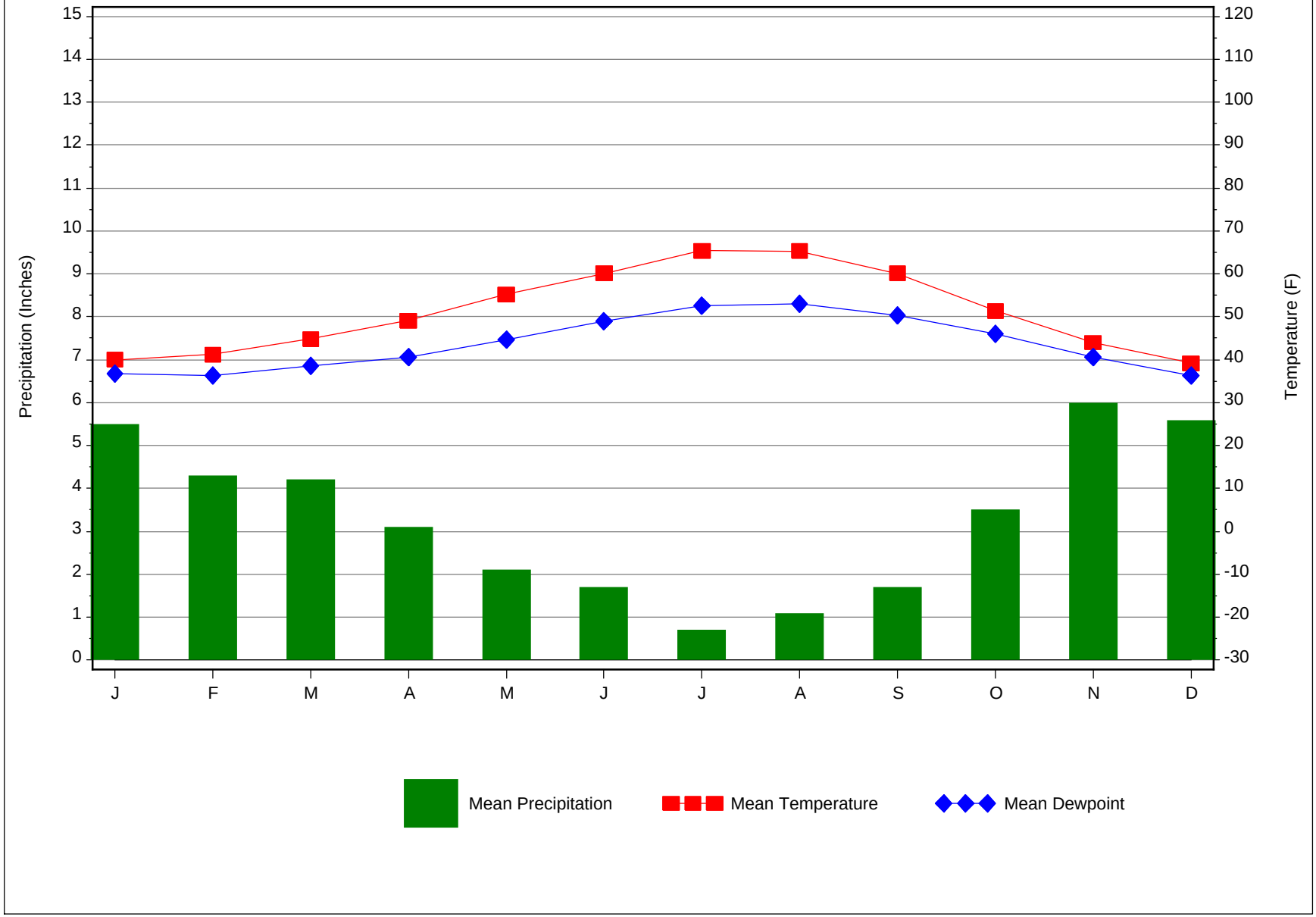
| **Air Conditioning/ Humid Area Criteria** | **Threshold** | **T ≥ 93°F** | **T ≥ 80°F** | **Twb ≥ 73°F** | **Twb ≥ 67°F** |
|---|---|---|---|---|---|
| | # of Hours | 11 | 187 | 7 | 59 |

**Other Site Data**

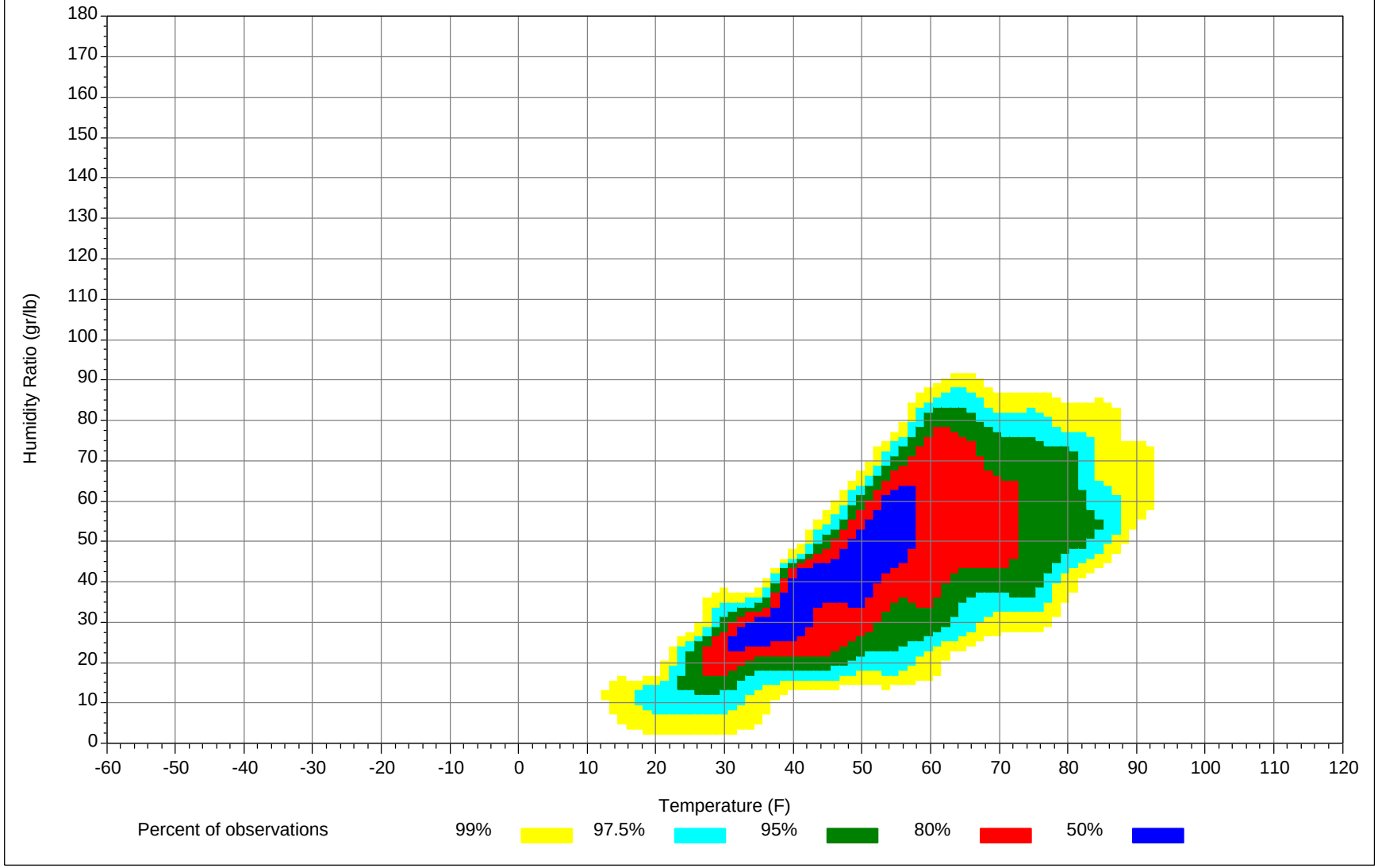
| Weather Region | Rain Rate 100 Year Recurrence (in./hr) | Basic Wind Speed 3 sec gust @ 33 ft 50 Year Recurrence (mph) | Ventilation Cooling Load Index (Ton-hr/cfm/yr) Base 75°F-RH 60% Latent + Sensible |
|---|---|---|---|
| 7 | 1 | 85 | 0.0 + 0.2 |
| Ground Water Temperature (°F) 50 Foot Depth* | Frost Depth 50 Year Recurrence (in) | Ground Snow Load 50 Year Recurrence ($lb/ft^2$) | Average Annual Freeze-Thaw Cycles (#) |
| 53.9 | 9 | 20 | 41 |

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

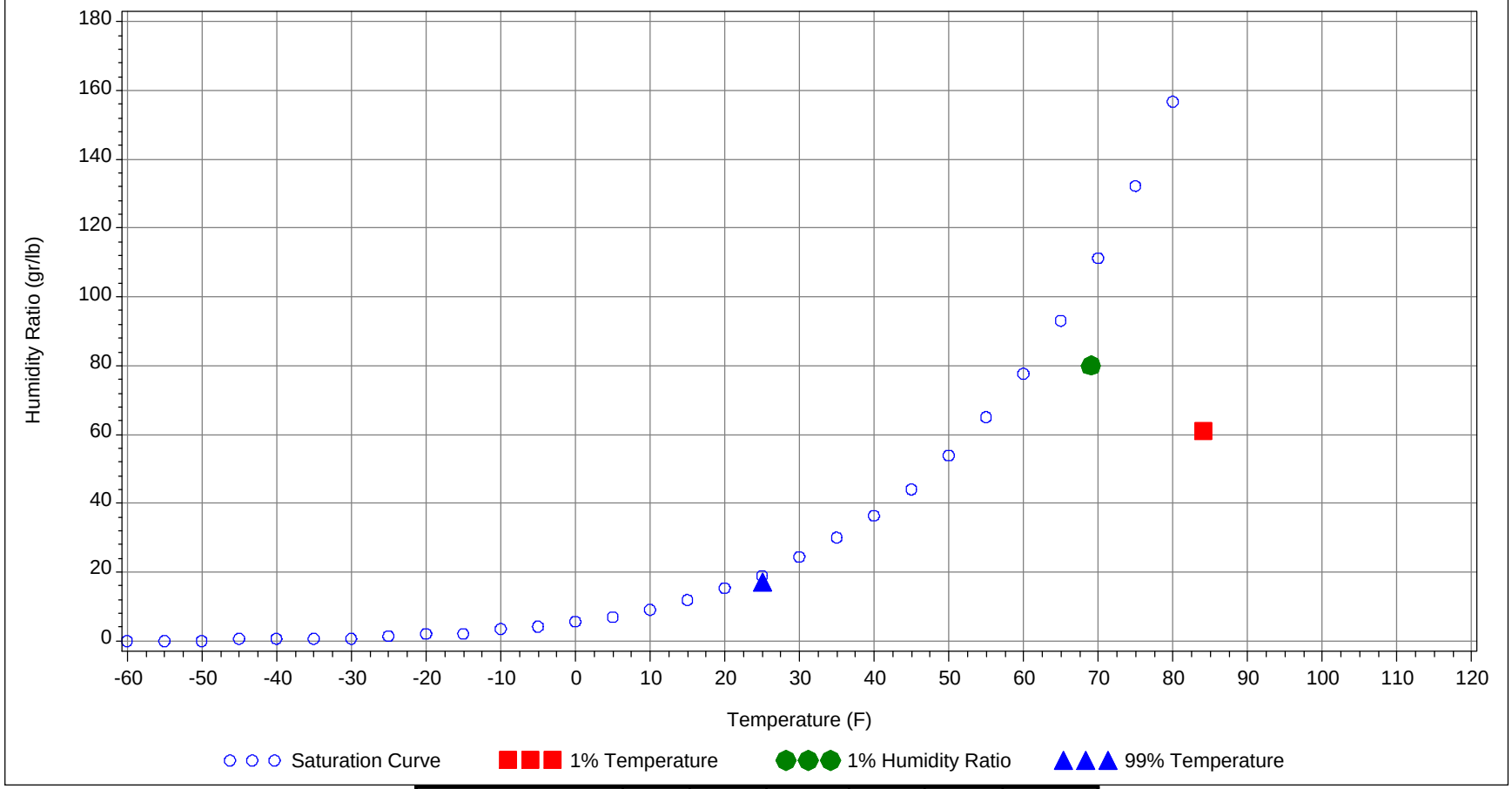
# Average Annual Climate



# Long Term Psychrometric Summary



# Psychrometric Summary of Peak Design Values




| | (°F) / (gr/lb) | MCDB (°F) | MCWB (°F) | MCDP (°F) | MCHR (gr/lb) | Enthalpy (btu/lb) |
|---|---|---|---|---|---|---|
| 1.0% Dry Bulb | 84.0 | | 65 | | 61.0 | 29.6 |
| 99.0% Dry Bulb | 25.0 | | | | 17.0 | 8.6 |
| 1.0% Humidity Ratio | 80.0 | 69.0 | 63.7 | 60.8 | | 29.0 |

## *Dry-Bulb Temperature Hours For An Average Year*

| | January | | | | | February | | | | | March | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Temperature Range (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** |
| 100/104 | | | | | | | | | | | | | | | |
| 95/ 99 | | | | | | | | | | | | | | | |
| 90/ 94 | | | | | | | | | | | | | | | |
| 85/ 89 | | | | | | | | | | | | | | | |
| 80/ 84 | | | | | | | | | | | | | | | |
| 75/ 79 | | | | | | | | | | | | | | | |
| 70/ 74 | | | | | | | | | | | | 1 | 0 | 1 | 54.9 |
| 65/ 69 | | | | | | | 0 | 0 | 0 | 54 | 0 | 4 | 1 | 5 | 53.1 |
| 60/ 64 | 0 | 1 | 0 | 1 | 55.5 | | 3 | 1 | 4 | 50.8 | 0 | 12 | 4 | 16 | 51.2 |
| 55/ 59 | 2 | 7 | 3 | 12 | 52.6 | 1 | 15 | 4 | 20 | 50.1 | 2 | 33 | 15 | 50 | 49.5 |
| 50/ 54 | 14 | 36 | 17 | 67 | 48.9 | 6 | 48 | 21 | 75 | 47.5 | 14 | 73 | 45 | 132 | 47.1 |
| 45/ 49 | 36 | 67 | 53 | 156 | 44.8 | 32 | 69 | 62 | 163 | 44.1 | 52 | 79 | 75 | 206 | 44 |
| 40/ 44 | 48 | 55 | 55 | 158 | 40.7 | 48 | 43 | 50 | 141 | 40.4 | 60 | 32 | 54 | 146 | 40.4 |
| 35/ 39 | 60 | 50 | 60 | 170 | 36.3 | 52 | 30 | 48 | 130 | 36.2 | 61 | 13 | 39 | 113 | 36.5 |
| 30/ 34 | 49 | 24 | 39 | 112 | 31.4 | 49 | 12 | 28 | 89 | 31.3 | 44 | 2 | 14 | 60 | 31.7 |
| 25/ 29 | 23 | 6 | 16 | 45 | 26.4 | 27 | 2 | 7 | 36 | 26.3 | 15 | 0 | 1 | 16 | 27.3 |
| 20/ 24 | 10 | 2 | 4 | 16 | 21.4 | 5 | 1 | 2 | 8 | 21.1 | 1 | 0 | 0 | 1 | 22.1 |
| 15/ 19 | 6 | 1 | 1 | 8 | 17.5 | 3 | 1 | 1 | 5 | 15.8 | 0 | | 0 | 0 | 15.5 |
| 10/ 14 | 0 | 0 | | 0 | 12.4 | 1 | 0 | 0 | 1 | 11.6 | 0 | | 0 | 0 | 13.5 |
| 5/ 9 | 0 | | | 0 | 8.5 | 0 | | | 0 | 7.4 | | | | | |
| 0/ 4 | | | | | | | | | | | | | | | |

Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure 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.

## *Dry-Bulb Temperature Hours For An Average Year*

| | April | | | | | May | | | | | June | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Temperature Range (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** |
| 100/104 | | | | | | | | | | | | | | | |
| 95/ 99 | | | | | | | | | | | | 0 | 0 | 0 | 70.7 |
| 90/ 94 | | | | | | | 0 | 0 | 0 | 66.9 | | 2 | 1 | 3 | 66.5 |
| 85/ 89 | | 0 | 0 | 0 | 62.5 | | 1 | 1 | 2 | 62.2 | | 4 | 3 | 7 | 65 |
| 80/ 84 | | 1 | 0 | 1 | 60.1 | | 4 | 2 | 6 | 61.1 | | 9 | 5 | 14 | 63.5 |
| 75/ 79 | | 2 | 1 | 3 | 58.4 | | 12 | 6 | 18 | 59.5 | 0 | 17 | 11 | 28 | 61.1 |
| 70/ 74 | | 7 | 3 | 10 | 56.1 | 0 | 22 | 11 | 33 | 57.4 | 1 | 34 | 21 | 56 | 59.1 |
| 65/ 69 | | 12 | 6 | 18 | 53.9 | 1 | 28 | 17 | 46 | 55.7 | 3 | 42 | 29 | 74 | 57.1 |
| 60/ 64 | 0 | 26 | 13 | 39 | 51.9 | 5 | 54 | 36 | 95 | 53.5 | 19 | 72 | 58 | 149 | 55.3 |
| 55/ 59 | 4 | 58 | 32 | 94 | 49.5 | 28 | 68 | 61 | 157 | 51.2 | 70 | 50 | 66 | 186 | 52.9 |
| 50/ 54 | 29 | 78 | 63 | 170 | 47.3 | 80 | 48 | 66 | 194 | 48.6 | 93 | 9 | 38 | 140 | 49.8 |
| 45/ 49 | 72 | 46 | 67 | 185 | 44.3 | 81 | 11 | 37 | 129 | 44.9 | 46 | 0 | 8 | 54 | 45.8 |
| 40/ 44 | 62 | 8 | 34 | 104 | 40.6 | 33 | 0 | 10 | 43 | 40.8 | 7 | | 1 | 8 | 41.7 |
| 35/ 39 | 49 | 1 | 19 | 69 | 36.7 | 17 | | 3 | 20 | 36.8 | 0 | | | 0 | 37.6 |
| 30/ 34 | 21 | 0 | 2 | 23 | 32 | 3 | | | 3 | 32.4 | | | | | |
| 25/ 29 | 2 | | | 2 | 27.9 | 0 | | | 0 | 28.5 | | | | | |
| 20/ 24 | | | | | | | | | | | | | | | |
| 15/ 19 | | | | | | | | | | | | | | | |
| 10/ 14 | | | | | | | | | | | | | | | |
| 5/ 9 | | | | | | | | | | | | | | | |
| 0/ 4 | | | | | | | | | | | | | | | |

Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure 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.

## *Dry-Bulb Temperature Hours For An Average Year*

| | July | | | | | August | | | | | September | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Temperature Range (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** |
| 100/104 | | 0 | 0 | 0 | 71.1 | | | | | | | | | | |
| 95/ 99 | | 2 | 1 | 3 | 68.8 | | 1 | 0 | 1 | 67.3 | | 0 | 0 | 0 | 67.3 |
| 90/ 94 | | 5 | 3 | 8 | 67.3 | | 4 | 2 | 6 | 67.5 | | 1 | 0 | 1 | 65.4 |
| 85/ 89 | | 10 | 6 | 16 | 65.9 | | 9 | 5 | 14 | 66.2 | | 3 | 1 | 4 | 65.1 |
| 80/ 84 | 0 | 25 | 16 | 41 | 64.3 | | 28 | 15 | 43 | 64.5 | | 13 | 4 | 17 | 62.9 |
| 75/ 79 | 1 | 42 | 28 | 71 | 62.4 | 0 | 45 | 25 | 70 | 62.6 | | 28 | 10 | 38 | 61.8 |
| 70/ 74 | 3 | 55 | 40 | 98 | 60.5 | 2 | 62 | 40 | 104 | 60.7 | 0 | 42 | 20 | 62 | 59.8 |
| 65/ 69 | 10 | 49 | 44 | 103 | 58.9 | 8 | 50 | 48 | 106 | 59.2 | 2 | 48 | 29 | 79 | 58.1 |
| 60/ 64 | 54 | 47 | 64 | 165 | 57.2 | 61 | 41 | 69 | 171 | 57.8 | 21 | 64 | 61 | 146 | 56.7 |
| 55/ 59 | 109 | 12 | 39 | 160 | 54.2 | 107 | 9 | 35 | 151 | 54.6 | 68 | 34 | 66 | 168 | 54.1 |
| 50/ 54 | 57 | 0 | 7 | 64 | 50.6 | 54 | 0 | 7 | 61 | 50.4 | 76 | 7 | 36 | 119 | 50.3 |
| 45/ 49 | 13 | | 0 | 13 | 46.4 | 15 | | 0 | 15 | 46.1 | 50 | 1 | 11 | 62 | 45.7 |
| 40/ 44 | 0 | | | 0 | 41.4 | 1 | | | 1 | 41.7 | 18 | | 1 | 19 | 41.3 |
| 35/ 39 | | | | | | | | | | | 6 | | 0 | 6 | 37 |
| 30/ 34 | | | | | | | | | | | 0 | | | 0 | 33.2 |
| 25/ 29 | | | | | | | | | | | | | | | |
| 20/ 24 | | | | | | | | | | | | | | | |
| 15/ 19 | | | | | | | | | | | | | | | |
| 10/ 14 | | | | | | | | | | | | | | | |
| 5/ 9 | | | | | | | | | | | | | | | |
| 0/ 4 | | | | | | | | | | | | | | | |

Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure 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.

## *Dry-Bulb Temperature Hours For An Average Year*

| | October | | | | | November | | | | | December | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Temperature Range (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** |
| 100/104 | | | | | | | | | | | | | | | |
| 95/ 99 | | | | | | | | | | | | | | | |
| 90/ 94 | | | | | | | | | | | | | | | |
| 85/ 89 | | 0 | | 0 | 61.7 | | | | | | | | | | |
| 80/ 84 | | 0 | | 0 | 61.1 | | | | | | | | | | |
| 75/ 79 | | 2 | 0 | 2 | 59.7 | | | | | | | | | | |
| 70/ 74 | | 7 | 1 | 8 | 58.2 | 0 | 0 | | 0 | 59.8 | | | | | |
| 65/ 69 | 0 | 15 | 4 | 19 | 57.2 | 0 | 1 | 0 | 1 | 59 | 0 | 0 | | 0 | 54.3 |
| 60/ 64 | 3 | 49 | 17 | 69 | 55.6 | 1 | 6 | 2 | 9 | 57.3 | 0 | 1 | 0 | 1 | 54.9 |
| 55/ 59 | 28 | 80 | 53 | 161 | 53.3 | 8 | 29 | 12 | 49 | 53.3 | 3 | 5 | 3 | 11 | 53.1 |
| 50/ 54 | 61 | 64 | 81 | 206 | 49.6 | 28 | 66 | 41 | 135 | 49.3 | 11 | 22 | 13 | 46 | 49 |
| 45/ 49 | 68 | 23 | 56 | 147 | 45.5 | 54 | 76 | 64 | 194 | 44.8 | 32 | 69 | 41 | 142 | 44.6 |
| 40/ 44 | 42 | 5 | 24 | 71 | 41.2 | 50 | 34 | 54 | 138 | 40.8 | 47 | 63 | 60 | 170 | 40.6 |
| 35/ 39 | 32 | 1 | 10 | 43 | 36.9 | 43 | 17 | 36 | 96 | 36.6 | 64 | 51 | 65 | 180 | 36.4 |
| 30/ 34 | 11 | 0 | 2 | 13 | 32.1 | 32 | 8 | 22 | 62 | 31.8 | 49 | 25 | 41 | 115 | 31.6 |
| 25/ 29 | 2 | | 1 | 3 | 26.7 | 17 | 2 | 8 | 27 | 26.5 | 27 | 7 | 17 | 51 | 26.4 |
| 20/ 24 | 0 | | | 0 | 21.9 | 6 | 0 | 1 | 7 | 21.7 | 9 | 3 | 4 | 16 | 21.1 |
| 15/ 19 | | | | | | 1 | 0 | 0 | 1 | 17 | 4 | 1 | 2 | 7 | 16.4 |
| 10/ 14 | | | | | | 1 | | 0 | 1 | 11.7 | 2 | 0 | 1 | 3 | 11.4 |
| 5/ 9 | | | | | | | | | | | 1 | 0 | 0 | 1 | 7.7 |
| 0/ 4 | | | | | | | | | | | 0 | 0 | | 0 | 3 |

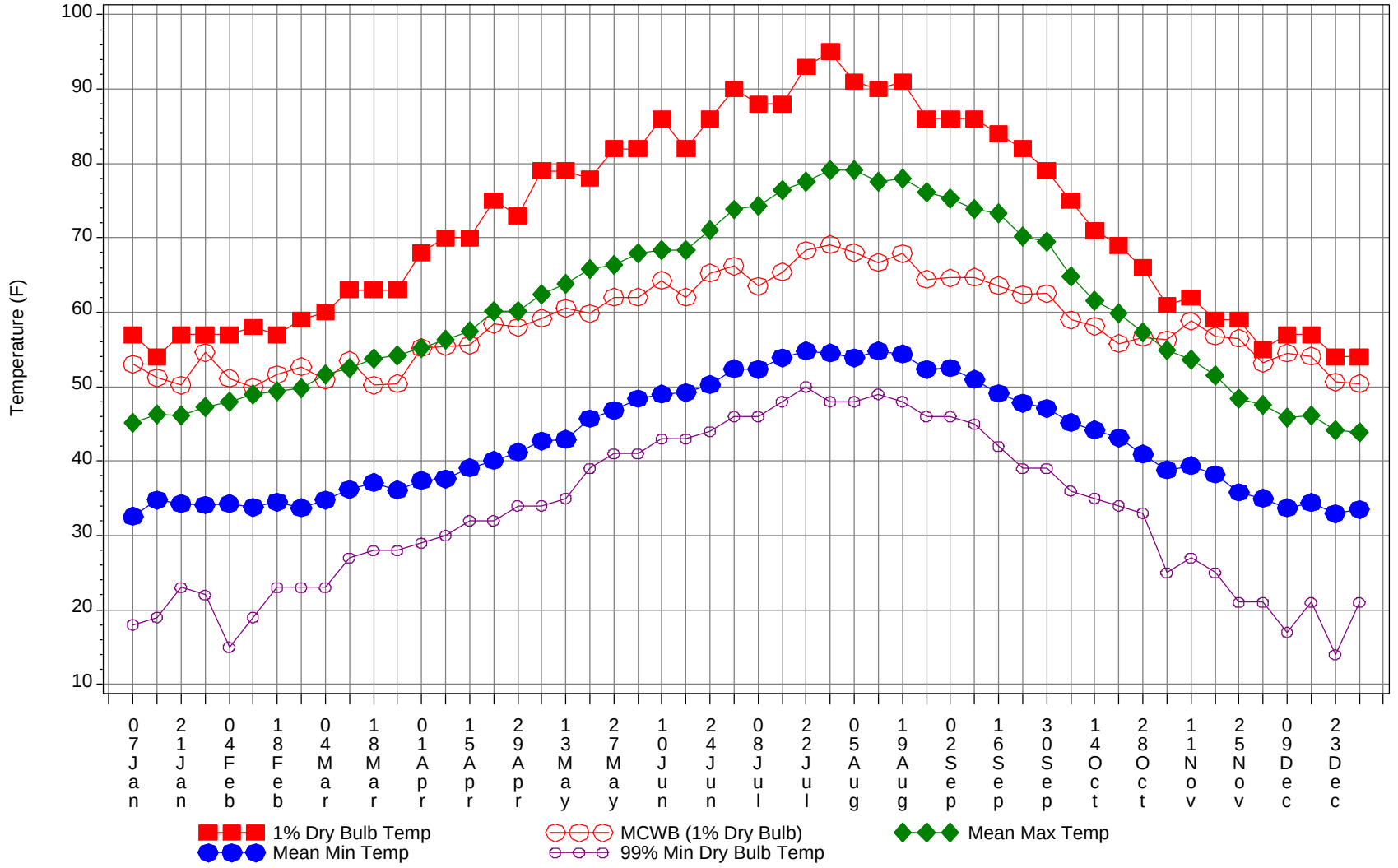
Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure distribution. Because wet bulb temperatures are averaged, this summary understates the annual moisture load. For accurate moisture load data, see the long-term humidity summary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

# *Dry-Bulb Temperature Hours For An Average Year*

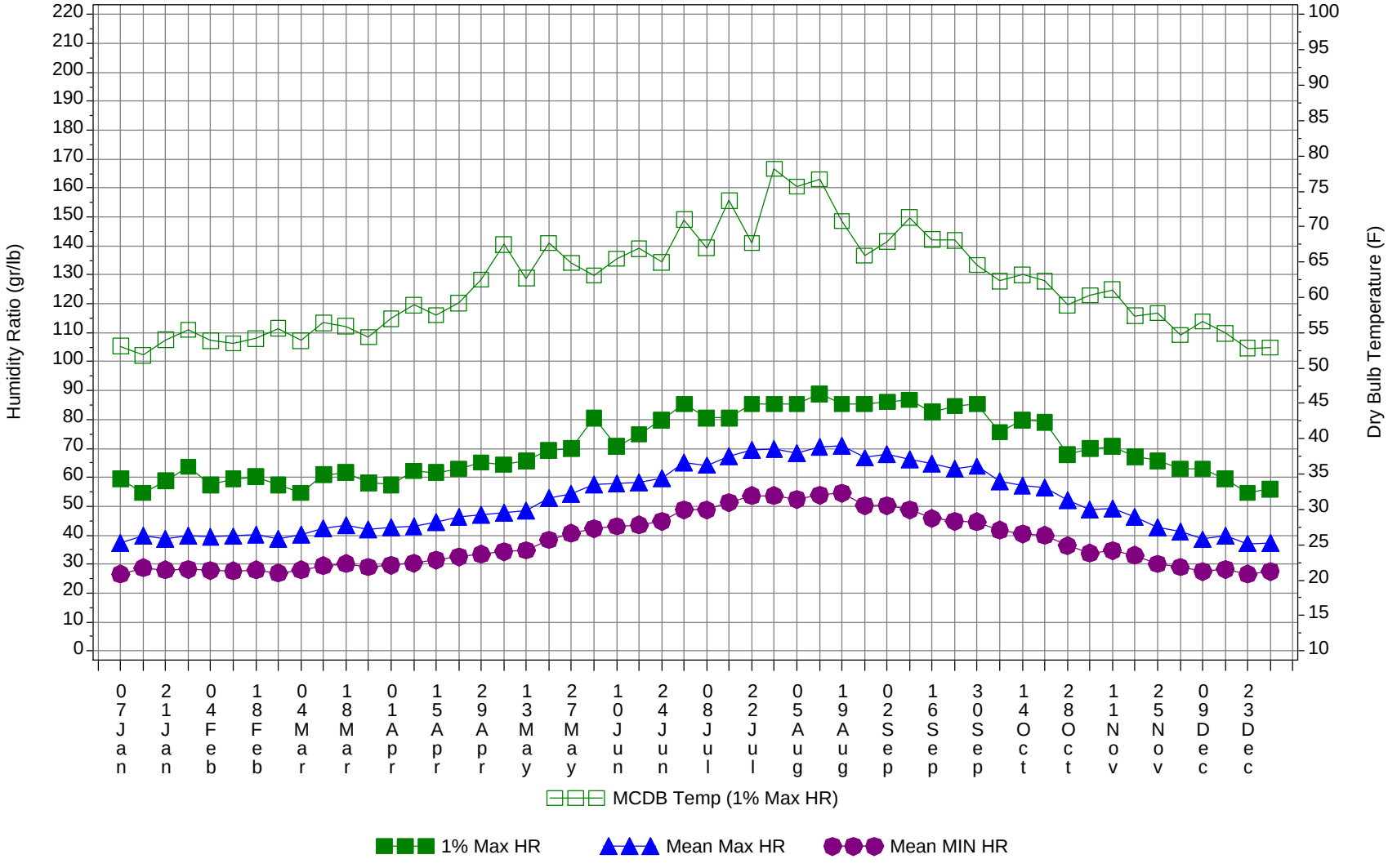
| | Annual | | | | |
|---|---|---|---|---|---|
| **Temperature Range (°F)** | **01 To 08 LST** | **09 To 16 LST** | **17 to 00 LST** | **Total Obs** | **MCWB (°F)** |
| 100/104 | | 0 | 0 | 0 | 71.1 |
| 95/ 99 | | 3 | 1 | 4 | 68.6 |
| 90/ 94 | | 13 | 7 | 20 | 67.1 |
| 85/ 89 | | 28 | 16 | 44 | 65.6 |
| 80/ 84 | 0 | 80 | 43 | 123 | 63.9 |
| 75/ 79 | 1 | 149 | 82 | 232 | 61.9 |
| 70/ 74 | 7 | 231 | 137 | 375 | 59.8 |
| 65/ 69 | 25 | 250 | 180 | 455 | 57.9 |
| 60/ 64 | 166 | 375 | 326 | 867 | 56 |
| 55/ 59 | 433 | 399 | 389 | 1221 | 52.9 |
| 50/ 54 | 522 | 452 | 433 | 1407 | 48.9 |
| 45/ 49 | 550 | 440 | 474 | 1464 | 44.7 |
| 40/ 44 | 415 | 240 | 340 | 995 | 40.7 |
| 35/ 39 | 381 | 163 | 278 | 822 | 36.5 |
| 30/ 34 | 256 | 71 | 146 | 473 | 31.6 |
| 25/ 29 | 112 | 18 | 50 | 180 | 26.5 |
| 20/ 24 | 31 | 6 | 10 | 47 | 21.3 |
| 15/ 19 | 14 | 2 | 4 | 20 | 16.7 |
| 10/ 14 | 4 | 1 | 2 | 7 | 11.6 |
| 5/ 9 | 1 | 0 | 0 | 1 | 7.7 |
| 0/ 4 | 0 | 0 | | 0 | 3 |

Caution: This summary reflects the typical distribtion of temperature in a typical year. It does not reflect the typical mositure 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



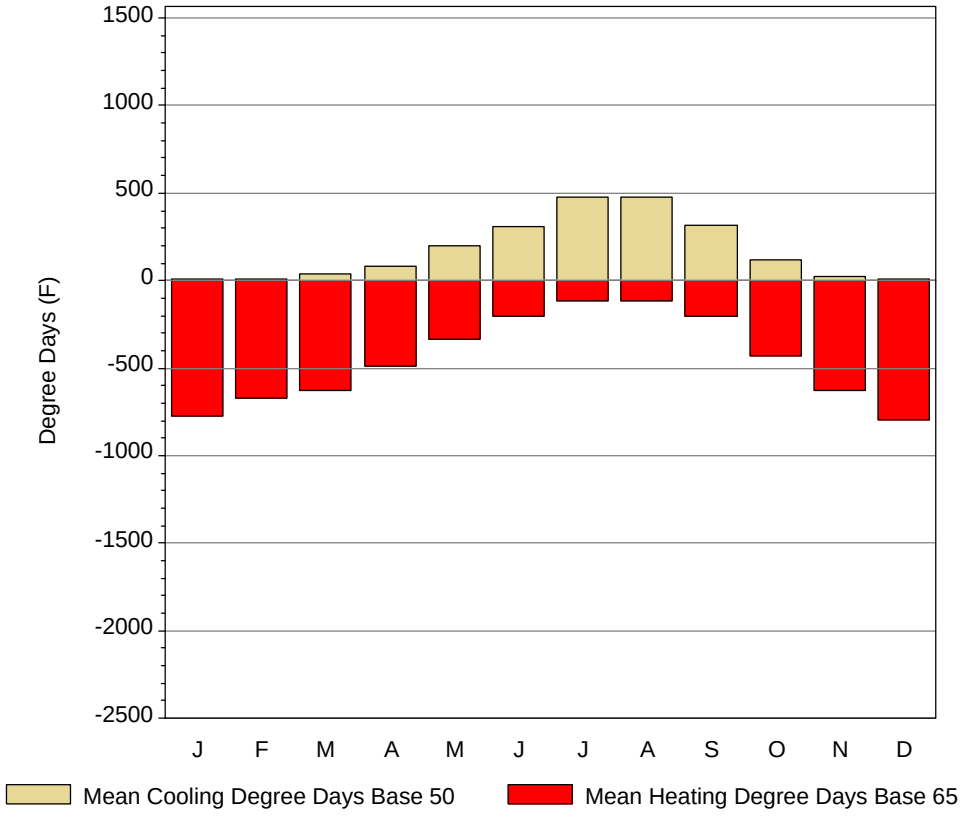
# Long Term Humidity and Dry Bulb Temperature Summary



## *Long Term Humidity and Dry Bulb Temperature Summary*

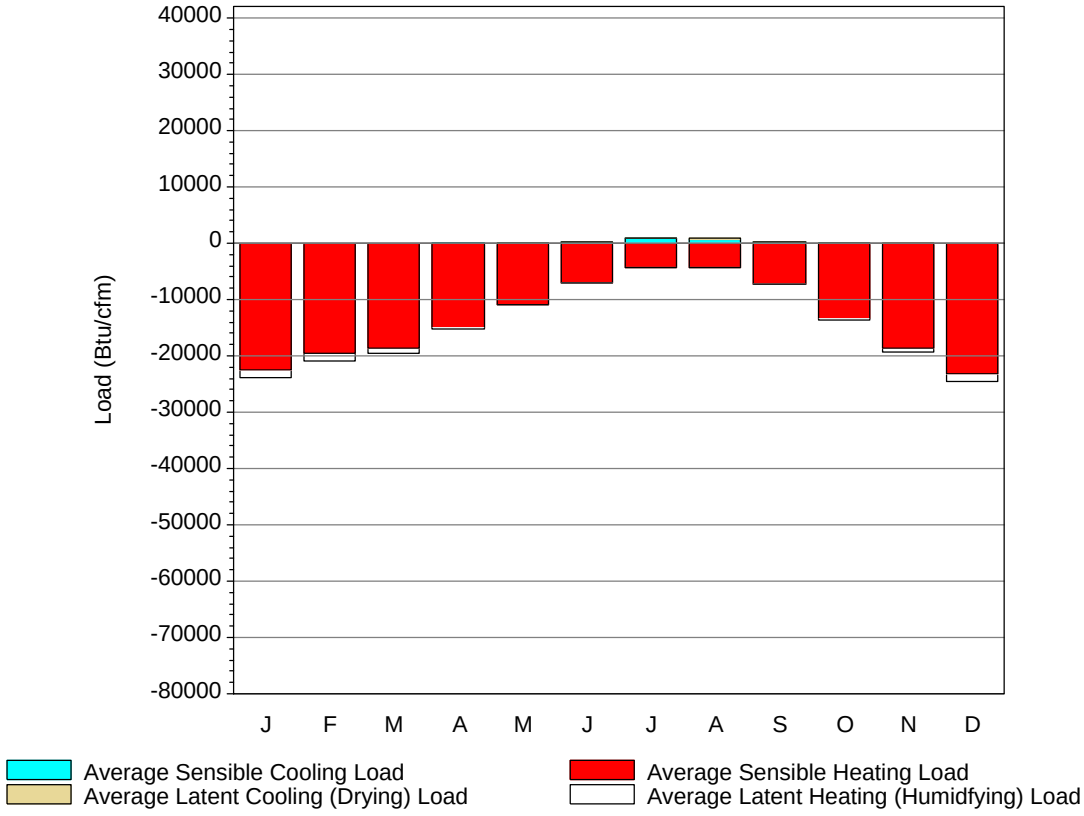
| Week Ending | 1.0% Temp (°F) | MCWB@ 1% Temp (°F) | Mean Max Temp (°F) | Mean Min Temp (°F) | 99% Temp (°F) | 1.0% HR (gr/lb) | MCDB@ 1% HR (°F) | Mean Max HR (gr/lb) | Mean Min HR (gr/lb) |
|---|---|---|---|---|---|---|---|---|---|
| 7-Jan | 57 | 53 | 45.1 | 32.6 | 18 | 59.5 | 53.1 | 37.3 | 26.5 |
| 14-Jan | 54 | 51.2 | 46.2 | 34.8 | 19 | 54.6 | 51.8 | 39.9 | 28.7 |
| 21-Jan | 57 | 50.2 | 46.1 | 34.3 | 23 | 58.8 | 54 | 38.8 | 28 |
| 28-Jan | 57 | 54.6 | 47.3 | 34.1 | 22 | 63.7 | 55.4 | 39.9 | 28.2 |
| 4-Feb | 57 | 51.1 | 47.9 | 34.3 | 15 | 57.4 | 53.9 | 39.5 | 27.8 |
| 11-Feb | 58 | 49.9 | 48.9 | 33.8 | 19 | 59.5 | 53.5 | 39.7 | 27.6 |
| 18-Feb | 57 | 51.6 | 49.4 | 34.5 | 23 | 60.2 | 54.2 | 40.2 | 28 |
| 25-Feb | 59 | 52.7 | 49.8 | 33.7 | 23 | 57.4 | 55.6 | 38.7 | 27 |
| 4-Mar | 60 | 50.9 | 51.6 | 34.8 | 23 | 54.6 | 53.9 | 40.1 | 28 |
| 11-Mar | 63 | 53.5 | 52.5 | 36.2 | 27 | 60.9 | 56.4 | 42.4 | 29.5 |
| 18-Mar | 63 | 50.2 | 53.7 | 37.1 | 28 | 61.6 | 55.9 | 43.4 | 30.2 |
| 25-Mar | 63 | 50.4 | 54.2 | 36.1 | 28 | 58.1 | 54.4 | 42.1 | 29 |
| 1-Apr | 68 | 55.2 | 55.2 | 37.4 | 29 | 57.4 | 57 | 42.7 | 29.7 |
| 8-Apr | 70 | 55.4 | 56.3 | 37.6 | 30 | 62.3 | 58.9 | 43.2 | 30.3 |
| 15-Apr | 70 | 55.6 | 57.4 | 39.1 | 32 | 61.6 | 57.5 | 44.5 | 31.4 |
| 22-Apr | 75 | 58.4 | 60.2 | 40.1 | 32 | 63 | 59.2 | 46.4 | 32.5 |
| 29-Apr | 73 | 58 | 60.2 | 41.2 | 34 | 65.1 | 62.5 | 47.2 | 33.4 |
| 6-May | 79 | 59.2 | 62.4 | 42.7 | 34 | 64.4 | 67.5 | 47.9 | 34.3 |
| 13-May | 79 | 60.5 | 63.8 | 42.9 | 35 | 65.8 | 62.7 | 48.4 | 34.8 |
| 20-May | 78 | 59.8 | 65.8 | 45.7 | 39 | 69.3 | 67.7 | 52.8 | 38.4 |
| 27-May | 82 | 62 | 66.4 | 46.8 | 41 | 70 | 64.9 | 54.4 | 40.6 |
| 4-Jun | 82 | 62 | 67.9 | 48.4 | 41 | 80.5 | 63.1 | 57.6 | 42.3 |
| 10-Jun | 86 | 64.3 | 68.3 | 49 | 43 | 70.7 | 65.5 | 58 | 43.1 |
| 17-Jun | 82 | 62 | 68.3 | 49.2 | 43 | 74.9 | 66.9 | 58.3 | 43.6 |
| 24-Jun | 86 | 65.3 | 71.1 | 50.3 | 44 | 79.8 | 65 | 59.7 | 44.8 |
| 1-Jul | 90 | 66.2 | 73.8 | 52.4 | 46 | 85.4 | 71 | 65.1 | 48.8 |
| 8-Jul | 88 | 63.5 | 74.3 | 52.3 | 46 | 80.5 | 67 | 64.2 | 48.7 |
| 15-Jul | 88 | 65.4 | 76.4 | 53.9 | 48 | 80.5 | 73.7 | 67.3 | 51.3 |
| 22-Jul | 93 | 68.3 | 77.6 | 54.8 | 50 | 85.4 | 67.7 | 69.4 | 53.6 |
| 29-Jul | 95 | 69.1 | 79.1 | 54.5 | 48 | 85.4 | 78.2 | 69.7 | 53.6 |
| 5-Aug | 91 | 68 | 79.1 | 53.9 | 48 | 85.4 | 75.7 | 68.5 | 52.4 |
| 12-Aug | 90 | 66.7 | 77.6 | 54.8 | 49 | 88.9 | 76.7 | 70.5 | 53.8 |
| 19-Aug | 91 | 67.9 | 78 | 54.4 | 48 | 85.4 | 70.8 | 70.9 | 54.6 |
| 26-Aug | 86 | 64.4 | 76.1 | 52.3 | 46 | 85.4 | 65.9 | 66.8 | 50.3 |
| 2-Sep | 86 | 64.6 | 75.3 | 52.5 | 46 | 86.1 | 67.9 | 67.9 | 50.3 |
| 9-Sep | 86 | 64.7 | 73.9 | 51 | 45 | 86.8 | 71.3 | 66.1 | 48.8 |
| 16-Sep | 84 | 63.6 | 73.3 | 49.1 | 42 | 82.6 | 68.2 | 64.8 | 45.8 |
| 23-Sep | 82 | 62.4 | 70.2 | 47.8 | 39 | 84.7 | 68.1 | 63 | 44.8 |
| 30-Sep | 79 | 62.5 | 69.5 | 47.1 | 39 | 85.4 | 64.6 | 63.9 | 44.6 |
| 7-Oct | 75 | 59 | 64.8 | 45.2 | 36 | 75.6 | 62.3 | 58.6 | 41.8 |
| 14-Oct | 71 | 58.1 | 61.6 | 44.2 | 35 | 79.8 | 63.2 | 57.2 | 40.5 |
| 21-Oct | 69 | 55.8 | 59.8 | 43.1 | 34 | 79.1 | 62.3 | 56.4 | 40 |
| 28-Oct | 66 | 56.6 | 57.3 | 40.9 | 33 | 67.9 | 58.9 | 52.2 | 36.4 |
| 4-Nov | 61 | 56.3 | 54.9 | 38.8 | 25 | 70 | 60.3 | 48.8 | 33.8 |
| 11-Nov | 62 | 58.8 | 53.6 | 39.4 | 27 | 70.7 | 61.1 | 49.3 | 34.7 |
| 18-Nov | 59 | 56.8 | 51.5 | 38.2 | 25 | 67.2 | 57.4 | 46.3 | 33.1 |
| 25-Nov | 59 | 56.5 | 48.4 | 35.8 | 21 | 65.8 | 57.8 | 42.8 | 30.1 |
| 2-Dec | 55 | 53.2 | 47.5 | 35 | 21 | 63 | 54.7 | 41.2 | 29 |
| 9-Dec | 57 | 54.5 | 45.8 | 33.7 | 17 | 63 | 56.6 | 38.6 | 27.5 |
| 16-Dec | 57 | 54.1 | 46.1 | 34.4 | 21 | 59.5 | 54.9 | 39.8 | 28.2 |
| 23-Dec | 54 | 50.6 | 44.1 | 32.9 | 14 | 54.6 | 52.8 | 37.1 | 26.6 |
| 31-Dec | 54 | 50.4 | 43.8 | 33.5 | 21 | 56 | 52.9 | 37.2 | 27.4 |

# Degree Days, Heating and Cooling
## (Base 65 F) & Cooling (Base 50F)




| Month | Mean Cooling Degree Days (°F) Base 50 | Mean Cooling Degree Days (°F) Base 65 | Mean Heating Degree Days (°F) Base 65 |
|---|---|---|---|
| JAN | 7.9 | 0 | 775 |
| FEB | 12.2 | 0 | 671.9 |
| MAR | 34.5 | 0.6 | 628.4 |
| APR | 82.5 | 5.9 | 489.1 |
| MAY | 199.3 | 26.9 | 335.1 |
| JUN | 310.7 | 53.3 | 201.1 |
| JUL | 479.1 | 127 | 114.4 |
| AUG | 477.1 | 123.3 | 113.2 |
| SEP | 318.7 | 58.6 | 206.7 |
| OCT | 117.5 | 4.7 | 430.1 |
| NOV | 26.1 | 0.1 | 630.6 |
| DEC | 6.1 | 0 | 797.2 |
| ANN | 2071.7 | 400.4 | 5392.8 |

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




| Month | 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 | -22498 | 0 | -1414 |
| FEB | 0 | -19614 | 0 | -1337 |
| MAR | 0 | -18687 | 0 | -782 |
| APR | 13 | -14936 | 0 | -345 |
| MAY | 104 | -10825 | 10 | -107 |
| JUN | 293 | -7058 | 24 | -3 |
| JUL | 862 | -4398 | 58 | -1 |
| AUG | 767 | -4355 | 98 | -3 |
| SEP | 266 | -7140 | 63 | -19 |
| OCT | 6 | -13491 | 9 | -149 |
| NOV | 0 | -18676 | 3 | -715 |
| DEC | 0 | -23074 | 0 | -1426 |
| ANN | 2311 | -164752 | 265 | -6301 |

| Station Information | | Shading Geometry in Dimensionless Units | |
|---|---|---|---|
| City, State, WBAN | OLYMPIA, WA 24227 | Window: | 1.000 |
| Lat, Lon, Elev | 46.97N 122.90W 200ft | Overhang: | 0.735 |
| Press, Stn_Type | 14.6psia Secondary | Vert Gap: | 0.328 |

**AVERAGE INCIDENT SOLAR RADIATION (Btu/sq.ft./day) Percentage Uncertainty = 9**

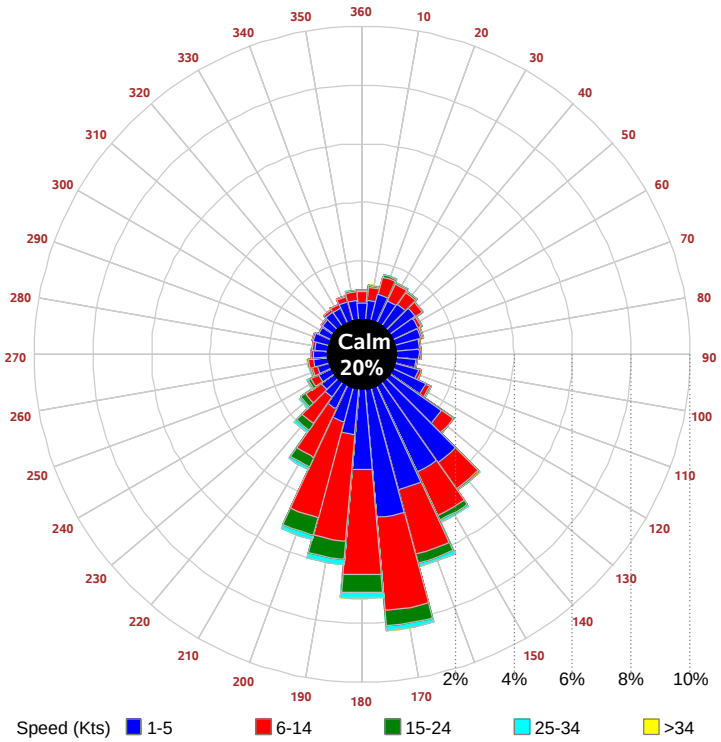
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HORIZ. | Global | 320 | 530 | 880 | 1250 | 1590 | 1770 | 1860 | 1600 | 1200 | 700 | 380 | 270 | 1030 |
| | Std.Dev. | 31 | 65 | 97 | 116 | 143 | 186 | 167 | 150 | 103 | 76 | 38 | 17 | 38 |
| | Minimum | 260 | 390 | 710 | 1020 | 1280 | 1460 | 1540 | 1260 | 960 | 590 | 300 | 240 | 940 |
| | Maximum | 400 | 700 | 1140 | 1460 | 1880 | 2090 | 2180 | 1900 | 1450 | 880 | 480 | 310 | 1100 |
| | Diffuse | 250 | 370 | 530 | 730 | 860 | 900 | 810 | 700 | 550 | 410 | 280 | 210 | 550 |
| Clear Day | Global | 590 | 930 | 1460 | 2040 | 2460 | 2640 | 2540 | 2180 | 1650 | 1080 | 660 | 490 | 1560 |
| NORTH | Global | 130 | 200 | 300 | 420 | 540 | 610 | 590 | 470 | 350 | 240 | 150 | 110 | 340 |
| | Diffuse | 130 | 200 | 300 | 410 | 500 | 540 | 520 | 440 | 340 | 240 | 150 | 110 | 330 |
| Clear Day | Global | 130 | 190 | 290 | 400 | 580 | 700 | 650 | 460 | 320 | 220 | 140 | 110 | 350 |
| EAST | Global | 200 | 320 | 520 | 730 | 880 | 950 | 1000 | 870 | 700 | 400 | 230 | 170 | 580 |
| | Diffuse | 160 | 240 | 360 | 490 | 590 | 620 | 600 | 530 | 420 | 280 | 180 | 130 | 380 |
| Clear Day | Global | 510 | 730 | 1030 | 1330 | 1500 | 1560 | 1520 | 1380 | 1130 | 820 | 550 | 440 | 1040 |
| SOUTH | Global | 450 | 640 | 830 | 890 | 870 | 860 | 950 | 1020 | 1080 | 810 | 490 | 390 | 770 |
| | Diffuse | 230 | 320 | 430 | 540 | 590 | 600 | 590 | 550 | 490 | 370 | 250 | 200 | 430 |
| Clear Day | Global | 1640 | 1840 | 1870 | 1620 | 1340 | 1200 | 1240 | 1470 | 1750 | 1830 | 1670 | 1530 | 1580 |
| WEST | Global | 220 | 360 | 570 | 770 | 970 | 1080 | 1160 | 1040 | 820 | 510 | 260 | 180 | 660 |
| | Diffuse | 160 | 240 | 370 | 500 | 600 | 640 | 630 | 550 | 430 | 300 | 180 | 140 | 400 |
| Clear Day | Global | 510 | 730 | 1030 | 1330 | 1500 | 1560 | 1520 | 1380 | 1130 | 820 | 550 | 440 | 1040 |

| 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 | 210 | 360 | 610 | 890 | 1130 | 1270 | 1340 | 1150 | 850 | 480 | 250 | 170 | 730 |
| NORTH | Unshaded | 93 | 140 | 210 | 290 | 360 | 410 | 390 | 310 | 240 | 170 | 100 | 79 | 230 |
| | Shaded | 71 | 110 | 170 | 230 | 290 | 330 | 320 | 260 | 200 | 130 | 81 | 61 | 190 |
| EAST | Unshaded | 140 | 220 | 370 | 510 | 620 | 670 | 710 | 610 | 490 | 280 | 160 | 120 | 410 |
| | Shaded | 110 | 180 | 290 | 400 | 480 | 520 | 550 | 480 | 390 | 220 | 130 | 95 | 320 |
| SOUTH | Unshaded | 330 | 470 | 590 | 600 | 570 | 550 | 600 | 680 | 750 | 590 | 370 | 290 | 530 |
| | Shaded | 310 | 410 | 440 | 360 | 330 | 340 | 340 | 350 | 490 | 480 | 330 | 270 | 370 |
| WEST | Unshaded | 150 | 250 | 400 | 550 | 690 | 770 | 830 | 750 | 580 | 360 | 180 | 120 | 470 |
| | Shaded | 120 | 200 | 320 | 440 | 540 | 600 | 650 | 590 | 470 | 290 | 140 | 100 | 370 |

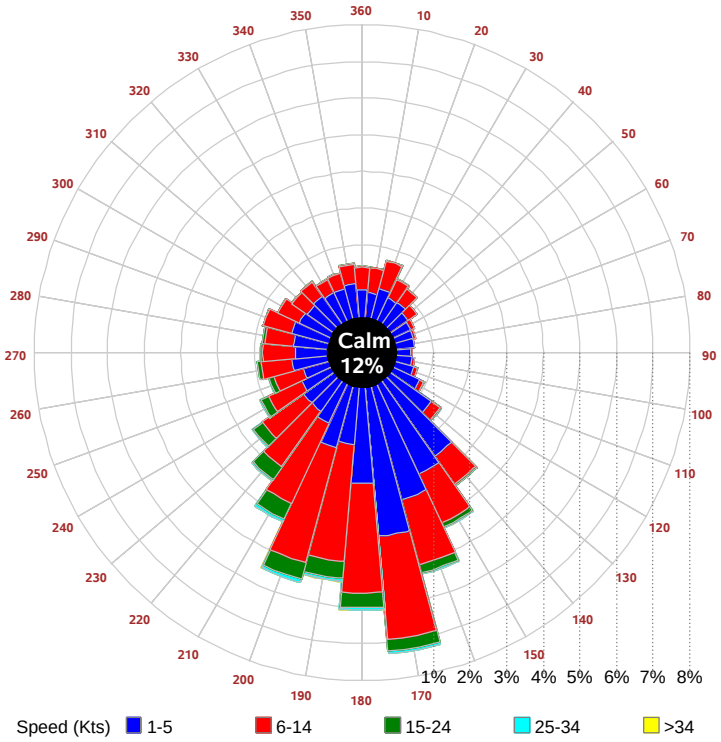
| AVERAGE INCIDENT ILLUMINANCE (klux-hr) FOR MOSTLY CLEAR AND MOSTLY CLOUDY CONDITIONS Percentage Uncertainty = 9 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | March | | | | | June | | |
| | | 9am | 11am | 1pm | 3pm | 5pm | 9am | 11am | 1pm | 3pm | 5pm |
| HORIZ. | M.Clear | 29 | 59 | 69 | 55 | 24 | 46 | 79 | 97 | 93 | 70 |
| | M.Cloudy | 16 | 33 | 38 | 32 | 15 | 26 | 45 | 60 | 59 | 43 |
| NORTH | M.Clear | 8 | 12 | 13 | 12 | 7 | 15 | 15 | 17 | 16 | 15 |
| | M.Cloudy | 7 | 13 | 14 | 12 | 6 | 11 | 16 | 19 | 19 | 15 |
| EAST | M.Clear | 62 | 54 | 13 | 12 | 7 | 78 | 73 | 34 | 16 | 15 |
| | M.Cloudy | 18 | 24 | 14 | 12 | 6 | 27 | 34 | 26 | 19 | 15 |
| SOUTH | M.Clear | 35 | 73 | 86 | 69 | 28 | 11 | 39 | 58 | 54 | 30 |
| | M.Cloudy | 12 | 28 | 35 | 29 | 12 | 11 | 24 | 36 | 34 | 21 |
| WEST | M.Clear | 8 | 12 | 17 | 59 | 59 | 11 | 15 | 17 | 48 | 79 |
| | M.Cloudy | 7 | 13 | 15 | 26 | 20 | 11 | 16 | 19 | 32 | 38 |
| M.Clear | (% hrs) | 15 | 14 | 15 | 17 | 18 | 23 | 23 | 24 | 28 | 31 |

| | | | | Sept | | | | | Dec | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 9am | 11am | 1pm | 3pm | 5pm | 9am | 11am | 1pm | 3pm | 5pm |
| HORIZ. | M.Clear | 23 | 57 | 75 | 71 | 45 | 5 | 25 | 31 | 18 | 0 |
| | M.Cloudy | 12 | 31 | 46 | 45 | 26 | 3 | 14 | 16 | 10 | 0 |
| NORTH | M.Clear | 7 | 13 | 15 | 14 | 11 | 2 | 8 | 8 | 6 | 0 |
| | M.Cloudy | 6 | 12 | 16 | 15 | 10 | 2 | 6 | 7 | 5 | 0 |
| EAST | M.Clear | 59 | 68 | 30 | 14 | 11 | 17 | 31 | 8 | 6 | 0 |
| | M.Cloudy | 15 | 27 | 22 | 15 | 10 | 3 | 10 | 7 | 5 | 0 |
| SOUTH | M.Clear | 19 | 58 | 81 | 75 | 44 | 15 | 62 | 74 | 48 | 0 |
| | M.Cloudy | 8 | 24 | 40 | 40 | 20 | 3 | 14 | 16 | 11 | 0 |
| WEST | M.Clear | 7 | 13 | 15 | 48 | 73 | 2 | 8 | 15 | 34 | 0 |
| | M.Cloudy | 6 | 12 | 16 | 29 | 29 | 2 | 6 | 8 | 9 | 0 |
| M.Clear | (% hrs) | 27 | 31 | 35 | 38 | 43 | 8 | 9 | 10 | 11 | 13 |

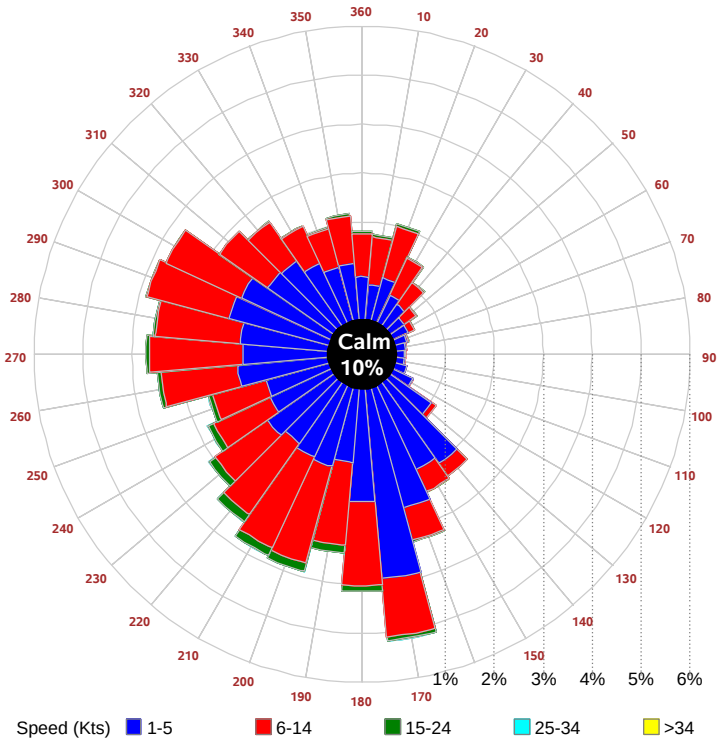
## Wind Summary - December, January, and February




## Wind Summary - March, April, and May



## Wind Summary - June, July, and August




## Wind Summary - September, October, and November