

|                                 |           |                                    |
|---------------------------------|-----------|------------------------------------|
| <b>RAMSTEIN USAFB</b>           | <b>DL</b> |                                    |
| Latitude = 49.43 N              |           | WMO No. 106140                     |
| Longitude = 7.60 E              |           | Elevation = 781 feet               |
| Period of Record = 1973 to 1996 |           | Average Pressure = 29.16 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) |
| <b>Dry Bulb Temperature (T)</b>                  | <b>(°F)</b>       |                                  |                         |                        |                             |
| Median of Extreme Highs                          | 91                | 69                               | 71                      | 6.8                    | VARIABLE                    |
| 0.4% Occurrence                                  | 86                | 67                               | 72                      | 5.8                    | VARIABLE                    |
| 1.0% Occurrence                                  | 82                | 66                               | 70                      | 6.2                    | VARIABLE                    |
| 2.0% Occurrence                                  | 81                | 65                               | 69                      | 5.9                    | W                           |
| Mean Daily Range                                 | 16                | -                                | -                       | -                      | -                           |
| 97.5% Occurrence                                 | 23                | 21                               | 14                      | 2.7                    | ENE                         |
| 99.0% Occurrence                                 | 18                | 16                               | 11                      | 1.8                    | ENE                         |
| 99.6% Occurrence                                 | 12                | 11                               | 8                       | 2.6                    | ENE                         |
| Median of Extreme Lows                           | 7                 | 6                                | 6                       | 1.4                    | E                           |
|                                                  | Design Value      | Mean Coincident (Average) Values |                         |                        |                             |
|                                                  |                   | Dry Bulb Temperature (°F)        | Humidity Ratio (gr/lb)  | Wind Speed (mph)       | Prevailing Direction (NSEW) |
| <b>Wet Bulb Temperature (T<sub>wb</sub>)</b>     | <b>(°F)</b>       |                                  |                         |                        |                             |
| Median of Extreme Highs                          | 73                | 87                               | 102                     | 4.9                    | SW                          |
| 0.4% Occurrence                                  | 70                | 83                               | 91                      | 4.9                    | WSW                         |
| 1.0% Occurrence                                  | 67                | 79                               | 82                      | 4.8                    | W                           |
| 2.0% Occurrence                                  | 66                | 78                               | 79                      | 5.0                    | WSW                         |
|                                                  | Design Value      | Mean Coincident (Average) Values |                         |                        |                             |
|                                                  |                   | Dry Bulb Temperature (°F)        | Vapor Pressure (in. Hg) | Wind Speed (mph)       | Prevailing Direction (NSEW) |
| <b>Humidity Ratio (HR)</b>                       | <b>(gr/lb)</b>    |                                  |                         |                        |                             |
| Median of Extreme Highs                          | 106               | 78                               | 0.69                    | 2.8                    | W                           |
| 0.4% Occurrence                                  | 93                | 74                               | 0.61                    | 3.6                    | WSW                         |
| 1.0% Occurrence                                  | 88                | 72                               | 0.57                    | 3.7                    | WSW                         |
| 2.0% Occurrence                                  | 82                | 71                               | 0.54                    | 3.7                    | W                           |
| <b>Air Conditioning/<br/>Humid Area Criteria</b> | <b># of Hours</b> | T ≥ 93°F                         | T ≥ 80°F                | T <sub>wb</sub> ≥ 73°F | T <sub>wb</sub> ≥ 67°F      |
|                                                  |                   | 7                                | 179                     | 5                      | 130                         |

### Other Site Data

| Weather Region                                      | Rain Rate<br>100 Year Recurrence<br>(in./hr) | Basic Wind Speed<br>3 sec gust @ 33 ft<br>50 Year Recurrence (mph) | Ventilation Cooling Load Index<br>(Ton-hr/cfm/yr) Base 75°F-RH 60%<br>Latent + Sensible |
|-----------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 6                                                   | N/A                                          | N/A                                                                | 0.1 + 0.2                                                                               |
| Ground Water<br>Temperature (°F)<br>50 Foot Depth * | Frost Depth<br>50 Year Recurrence<br>(in.)   | Ground Snow Load<br>50 Year Recurrence<br>(lb/ft <sup>2</sup> )    | Average Annual<br>Freeze-Thaw Cycles<br>(#)                                             |
| 51.5                                                | N/A                                          | N/A                                                                | 55                                                                                      |

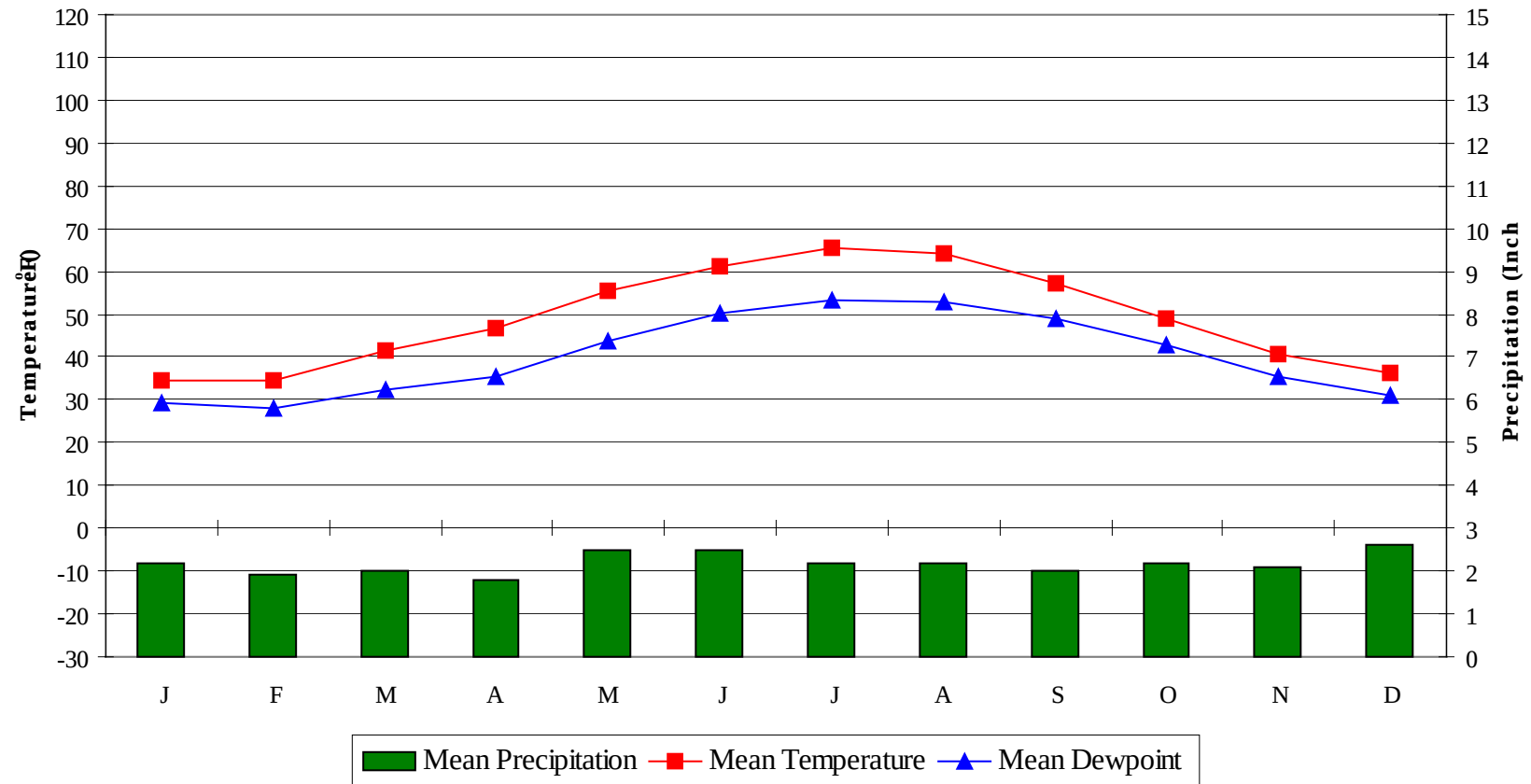
\*Note: Temperatures at greater depths can be estimated by adding 1.5°F per 100 feet additional depth.

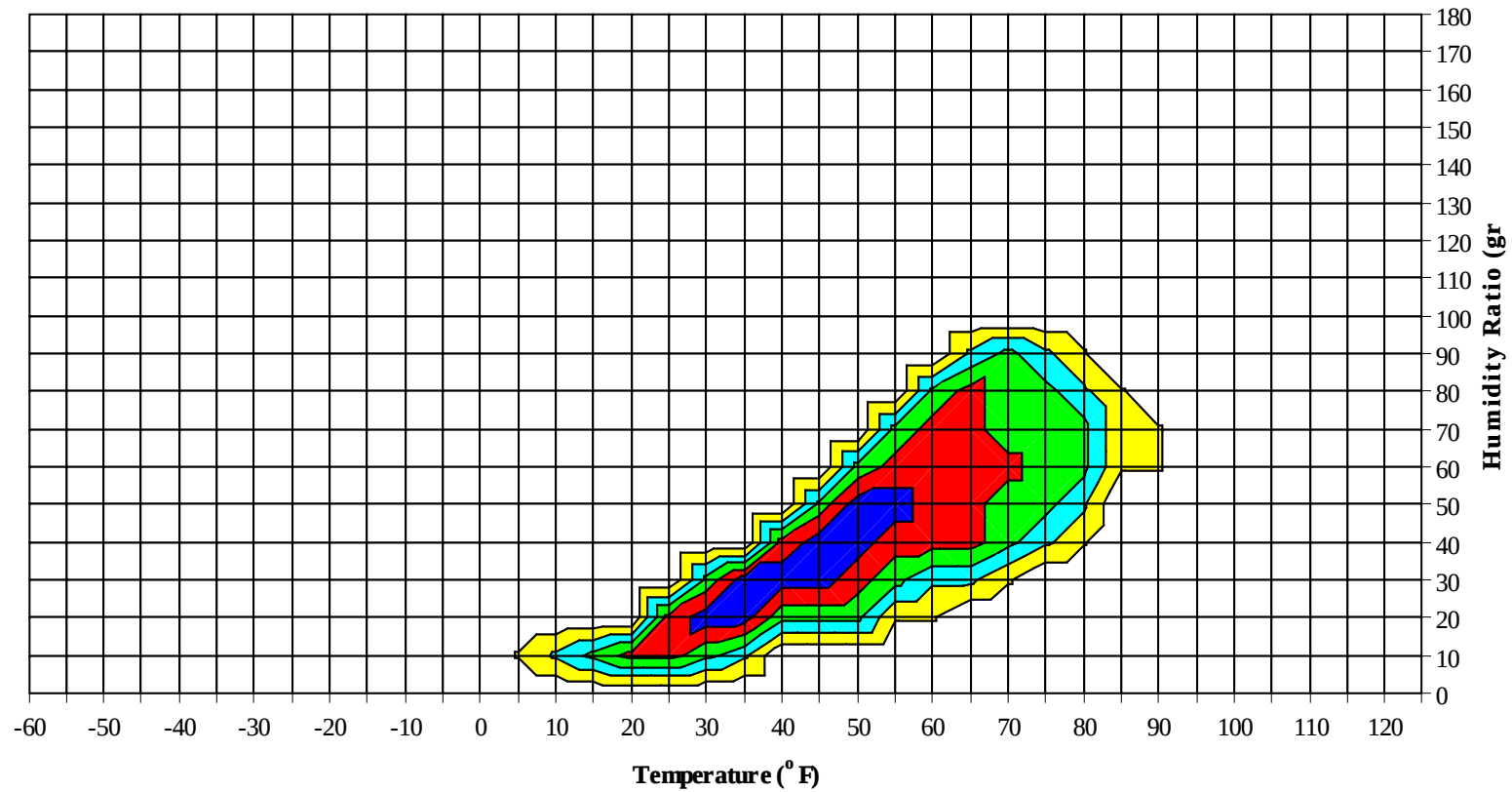
RAMSTEIN USAFB

DL

WMO No. 106140

### Average Annual Climate



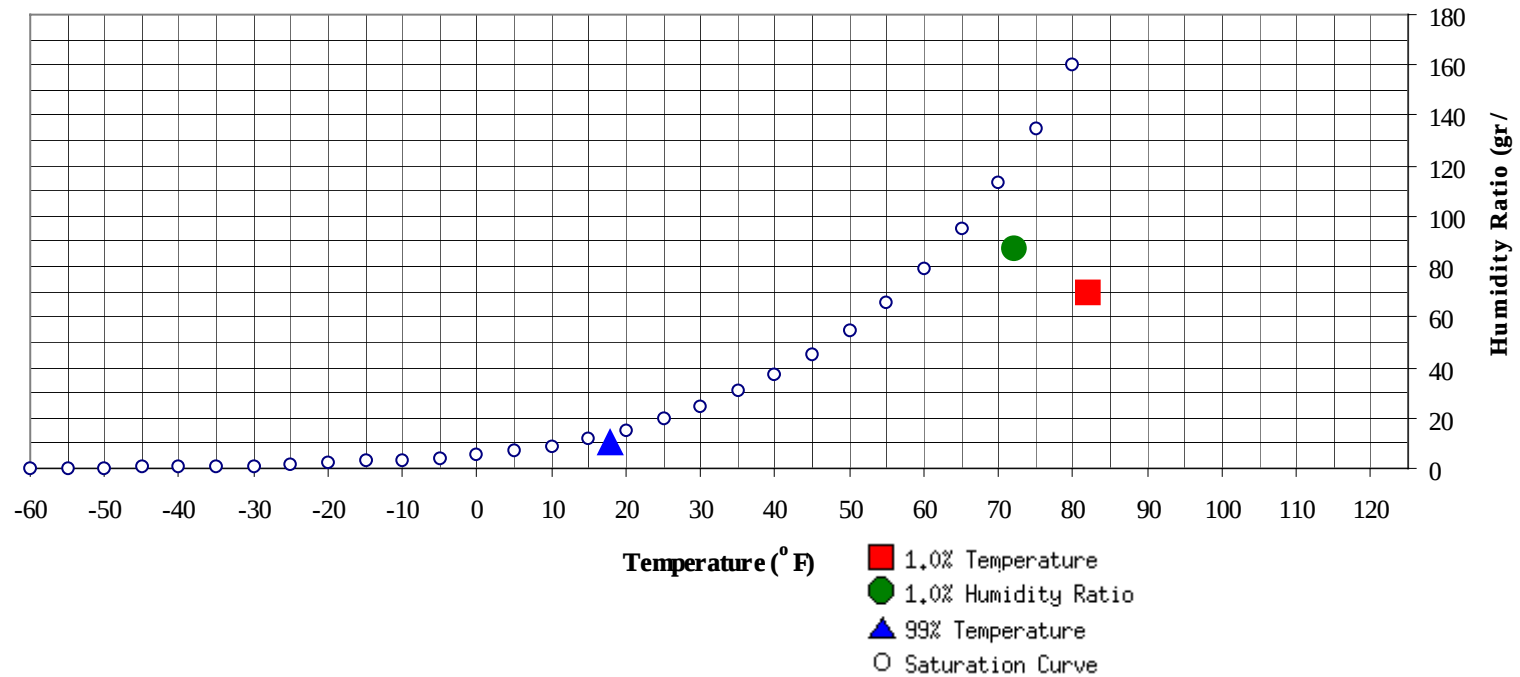
**Long Term Psychrometric Summary**

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

RAMSTEIN USAFB

DL

WMO No. 106140

**Psychrometric Summary of Peak Design Values**

| 99% Dry Bulb | (°F) | MCHR<br>(gr/lb) | Enthalpy<br>(btu/lb) | 1.0% Humidity<br>Ratio | (gr/lb) | MCDB<br>(°F) | MCWB<br>(°F) | MC Dewpt<br>(°F) | Enthalpy<br>(btu/lb) |
|--------------|------|-----------------|----------------------|------------------------|---------|--------------|--------------|------------------|----------------------|
|              | 18   | 10.6            | 5.9                  |                        | 87.5    | 72           | 65.9         | 62.6             | 30.9                 |

| 1.0% Dry Bulb | (°F) | MCHR<br>(gr/lb) | MCWB<br>(°F) | Enthalpy<br>(btu/lb) |
|---------------|------|-----------------|--------------|----------------------|
|               | 82   | 70.1            | 65.6         | 30.7                 |

RAMSTEIN USAFB DL

WMO No. 106140

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

Period of Record = 1973 to 1996

| Temperature<br>Range<br>(°F) | January             |                |                |              |                          | February            |                |                |              |                          | March               |                |                |              |                          |
|------------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|
|                              | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) |
|                              | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          |
| 95 / 99                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 90 / 94                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 85 / 89                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 80 / 84                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 75 / 79                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 70 / 74                      |                     |                |                |              |                          |                     |                |                |              |                          |                     | 1              | 0              | 1            | 55.5                     |
| 65 / 69                      |                     |                |                |              |                          |                     |                |                |              |                          | 2                   | 1              | 3              | 54.8         |                          |
| 60 / 64                      |                     |                |                |              |                          |                     | 1              | 0              | 1            | 52.6                     | 0                   | 9              | 4              | 13           | 51.9                     |
| 55 / 59                      |                     | 1              | 0              | 1            | 48.7                     | 0                   | 3              | 1              | 5            | 49.4                     | 2                   | 20             | 11             | 33           | 49.1                     |
| 50 / 54                      | 5                   | 11             | 8              | 25           | 47.7                     | 2                   | 13             | 7              | 22           | 46.2                     | 13                  | 40             | 31             | 84           | 46.4                     |
| 45 / 49                      | 27                  | 37             | 30             | 94           | 43.3                     | 18                  | 34             | 23             | 76           | 42.4                     | 36                  | 69             | 60             | 166          | 41.9                     |
| 40 / 44                      | 26                  | 33             | 28             | 87           | 39.2                     | 18                  | 30             | 28             | 75           | 39.0                     | 36                  | 40             | 45             | 122          | 38.4                     |
| 35 / 39                      | 56                  | 67             | 65             | 189          | 34.9                     | 45                  | 59             | 60             | 164          | 34.6                     | 57                  | 47             | 55             | 159          | 34.5                     |
| 30 / 34                      | 63                  | 52             | 61             | 175          | 30.4                     | 54                  | 48             | 56             | 158          | 29.8                     | 56                  | 15             | 30             | 102          | 29.8                     |
| 25 / 29                      | 34                  | 24             | 29             | 88           | 25.3                     | 42                  | 24             | 34             | 101          | 25.0                     | 35                  | 4              | 10             | 48           | 24.9                     |
| 20 / 24                      | 10                  | 9              | 9              | 27           | 20.6                     | 17                  | 5              | 7              | 29           | 20.4                     | 8                   | 0              | 1              | 9            | 20.5                     |
| 15 / 19                      | 13                  | 8              | 9              | 30           | 16.4                     | 16                  | 4              | 5              | 25           | 16.3                     | 3                   | 0              | 0              | 3            | 16.7                     |
| 10 / 14                      | 8                   | 5              | 7              | 20           | 11.2                     | 6                   | 2              | 3              | 10           | 11.1                     | 1                   | 0              |                | 1            | 10.6                     |
| 5 / 9                        | 4                   | 1              | 1              | 6            | 6.4                      | 3                   | 1              | 0              | 4            | 6.3                      |                     |                |                |              |                          |
| 0 / 4                        | 1                   | 0              | 0              | 2            | 0.9                      | 1                   | 0              | 0              | 1            | 0.7                      |                     |                |                |              |                          |
| -5 / -1                      |                     |                |                |              |                          | 0                   |                |                | 0            | -4.1                     |                     |                |                |              |                          |
| -10 / -6                     |                     |                |                |              |                          | 0                   |                |                | 0            | -6.0                     |                     |                |                |              |                          |

**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.

RAMSTEIN USAFB DL

WMO No. 106140

**Dry-Bulb Temperature Hours For An Average Year (Sheet 2 of 5)****Period of Record = 1973 to 1996**

| Temperature<br>Range<br>(°F) | April               |                |                |              |                          | May                 |                |                |              |                          | June                |                |                |              |                          |
|------------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|
|                              | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) |
|                              | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          |
| 95 / 99                      |                     |                |                |              |                          |                     |                |                |              |                          |                     | 0              | 0              | 1            | 67.1                     |
| 90 / 94                      |                     |                |                |              |                          |                     | 0              |                | 0            | 68.0                     |                     | 2              | 1              | 2            | 67.0                     |
| 85 / 89                      |                     |                |                |              |                          |                     | 1              | 0              | 1            | 64.5                     |                     | 2              | 1              | 3            | 67.7                     |
| 80 / 84                      |                     | 0              | 0              | 1            | 59.3                     |                     | 4              | 2              | 6            | 63.3                     | 0                   | 17             | 8              | 26           | 65.5                     |
| 75 / 79                      |                     | 2              | 1              | 3            | 57.5                     |                     | 16             | 8              | 24           | 60.4                     | 0                   | 30             | 16             | 46           | 63.2                     |
| 70 / 74                      |                     | 10             | 4              | 14           | 54.9                     | 0                   | 33             | 18             | 51           | 58.1                     | 2                   | 42             | 27             | 71           | 60.8                     |
| 65 / 69                      |                     | 11             | 5              | 16           | 52.9                     | 0                   | 26             | 15             | 41           | 56.0                     | 7                   | 31             | 25             | 63           | 59.0                     |
| 60 / 64                      | 1                   | 27             | 16             | 44           | 51.2                     | 9                   | 54             | 41             | 104          | 53.7                     | 36                  | 61             | 60             | 156          | 56.5                     |
| 55 / 59                      | 5                   | 39             | 27             | 71           | 48.3                     | 37                  | 54             | 56             | 147          | 51.2                     | 74                  | 39             | 59             | 172          | 53.0                     |
| 50 / 54                      | 21                  | 51             | 46             | 118          | 46.0                     | 68                  | 38             | 57             | 163          | 48.1                     | 68                  | 16             | 33             | 117          | 49.2                     |
| 45 / 49                      | 46                  | 55             | 59             | 160          | 42.0                     | 71                  | 18             | 36             | 125          | 43.6                     | 39                  | 1              | 9              | 49           | 44.8                     |
| 40 / 44                      | 39                  | 26             | 34             | 98           | 38.7                     | 28                  | 4              | 9              | 41           | 39.7                     | 10                  |                | 1              | 10           | 40.5                     |
| 35 / 39                      | 68                  | 18             | 36             | 121          | 35.0                     | 25                  | 1              | 6              | 31           | 35.8                     | 3                   |                | 0              | 3            | 36.4                     |
| 30 / 34                      | 44                  | 2              | 11             | 57           | 30.2                     | 9                   |                | 1              | 10           | 31.0                     |                     |                |                |              |                          |
| 25 / 29                      | 15                  | 0              | 1              | 16           | 25.7                     | 0                   |                |                | 0            | 27.2                     |                     |                |                |              |                          |
| 20 / 24                      | 1                   |                |                | 1            | 21.6                     |                     |                |                |              |                          |                     |                |                |              |                          |
| 15 / 19                      | 0                   |                |                | 0            | 18.0                     |                     |                |                |              |                          |                     |                |                |              |                          |
| 10 / 14                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 5 / 9                        |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 0 / 4                        |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| -5 / -1                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| -10 / -6                     |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |

**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.

RAMSTEIN USAFB DL

WMO No. 106140

**Dry-Bulb Temperature Hours For An Average Year (Sheet 3 of 5)****Period of Record = 1973 to 1996**

| Temperature<br>Range<br>(°F) | July                |                |                |              |                          | August              |                |                |              |                          | September           |                |                |              |                          |
|------------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|
|                              | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) |
|                              | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          |
| 95 / 99                      |                     | 2              | 1              | 2            | 69.5                     |                     | 1              | 0              | 1            | 70.5                     |                     |                |                |              |                          |
| 90 / 94                      |                     | 7              | 3              | 10           | 69.3                     |                     | 3              | 1              | 5            | 68.4                     |                     |                |                |              |                          |
| 85 / 89                      |                     | 9              | 6              | 15           | 68.0                     |                     | 7              | 3              | 10           | 67.4                     |                     | 0              | 0              | 0            | 65.6                     |
| 80 / 84                      | 0                   | 31             | 18             | 49           | 66.3                     | 0                   | 29             | 13             | 42           | 65.6                     |                     | 5              | 1              | 7            | 65.4                     |
| 75 / 79                      | 1                   | 41             | 25             | 67           | 63.9                     | 1                   | 41             | 22             | 64           | 63.4                     |                     | 15             | 5              | 19           | 63.6                     |
| 70 / 74                      | 9                   | 51             | 42             | 103          | 61.5                     | 3                   | 57             | 39             | 100          | 61.4                     | 0                   | 34             | 15             | 50           | 60.9                     |
| 65 / 69                      | 16                  | 35             | 33             | 84           | 59.8                     | 10                  | 38             | 34             | 82           | 59.7                     | 3                   | 30             | 17             | 50           | 59.0                     |
| 60 / 64                      | 65                  | 49             | 64             | 178          | 57.6                     | 62                  | 51             | 70             | 184          | 57.7                     | 19                  | 69             | 56             | 144          | 56.5                     |
| 55 / 59                      | 83                  | 20             | 42             | 145          | 53.7                     | 84                  | 20             | 44             | 148          | 53.9                     | 57                  | 55             | 66             | 178          | 53.1                     |
| 50 / 54                      | 53                  | 2              | 13             | 68           | 49.8                     | 55                  | 2              | 16             | 74           | 50.0                     | 73                  | 25             | 51             | 149          | 49.6                     |
| 45 / 49                      | 19                  |                | 1              | 20           | 45.1                     | 25                  | 0              | 3              | 28           | 45.0                     | 51                  | 5              | 24             | 80           | 45.0                     |
| 40 / 44                      | 2                   |                |                | 2            | 40.5                     | 5                   |                | 0              | 5            | 40.6                     | 20                  | 1              | 4              | 25           | 40.7                     |
| 35 / 39                      | 0                   |                |                | 0            | 36.9                     | 2                   |                | 0              | 2            | 36.6                     | 15                  | 0              | 1              | 16           | 36.5                     |
| 30 / 34                      |                     |                |                |              |                          |                     |                |                |              |                          | 2                   |                | 0              | 2            | 32.5                     |
| 25 / 29                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 20 / 24                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 15 / 19                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 10 / 14                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 5 / 9                        |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 0 / 4                        |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| -5 / -1                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| -10 / -6                     |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |

**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.

RAMSTEIN USAFB DL

WMO No. 106140

**Dry-Bulb Temperature Hours For An Average Year (Sheet 4 of 5)****Period of Record = 1973 to 1996**

| Temperature<br>Range<br>(°F) | October             |                |                |              |                          | November            |                |                |              |                          | December            |                |                |              |                          |
|------------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|---------------------|----------------|----------------|--------------|--------------------------|
|                              | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) |
|                              | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          |
| 95 / 99                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 90 / 94                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 85 / 89                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| 80 / 84                      |                     | 0              |                | 0            | 63.5                     |                     |                |                |              |                          |                     |                |                |              |                          |
| 75 / 79                      |                     | 2              | 0              | 2            | 62.6                     |                     |                |                |              |                          |                     |                |                |              |                          |
| 70 / 74                      |                     | 6              | 1              | 7            | 60.7                     |                     |                |                |              |                          |                     |                |                |              |                          |
| 65 / 69                      | 0                   | 10             | 3              | 13           | 58.7                     |                     |                |                |              |                          |                     |                |                |              |                          |
| 60 / 64                      | 4                   | 31             | 13             | 49           | 56.1                     |                     | 2              | 0              | 2            | 54.3                     | 0                   | 0              | 0              | 1            | 52.8                     |
| 55 / 59                      | 24                  | 55             | 44             | 124          | 52.7                     | 5                   | 12             | 8              | 25           | 52.0                     | 1                   | 3              | 2              | 6            | 51.4                     |
| 50 / 54                      | 55                  | 64             | 63             | 182          | 48.9                     | 19                  | 36             | 24             | 79           | 48.4                     | 14                  | 14             | 13             | 42           | 48.3                     |
| 45 / 49                      | 61                  | 49             | 62             | 172          | 44.0                     | 43                  | 61             | 53             | 158          | 43.7                     | 29                  | 41             | 33             | 102          | 43.7                     |
| 40 / 44                      | 36                  | 18             | 29             | 83           | 40.0                     | 37                  | 39             | 40             | 116          | 39.7                     | 25                  | 30             | 26             | 81           | 39.6                     |
| 35 / 39                      | 39                  | 10             | 23             | 73           | 36.3                     | 55                  | 54             | 60             | 168          | 35.5                     | 62                  | 68             | 68             | 198          | 35.2                     |
| 30 / 34                      | 21                  | 2              | 8              | 32           | 31.1                     | 46                  | 24             | 36             | 106          | 30.4                     | 57                  | 58             | 60             | 176          | 30.5                     |
| 25 / 29                      | 7                   | 0              | 1              | 8            | 26.7                     | 25                  | 10             | 17             | 52           | 25.5                     | 29                  | 20             | 27             | 77           | 25.4                     |
| 20 / 24                      | 0                   |                |                | 0            | 22.8                     | 7                   | 1              | 2              | 10           | 21.2                     | 13                  | 6              | 8              | 27           | 20.8                     |
| 15 / 19                      |                     |                |                |              |                          | 4                   | 1              | 1              | 5            | 17.1                     | 10                  | 4              | 8              | 22           | 16.8                     |
| 10 / 14                      |                     |                |                |              |                          | 0                   | 0              | 0              | 0            | 12.7                     | 6                   | 2              | 2              | 10           | 12.1                     |
| 5 / 9                        |                     |                |                |              |                          |                     |                |                |              |                          | 2                   | 1              | 0              | 3            | 7.2                      |
| 0 / 4                        |                     |                |                |              |                          |                     |                |                |              |                          | 0                   | 0              | 0              | 0            | 0.5                      |
| -5 / -1                      |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |
| -10 / -6                     |                     |                |                |              |                          |                     |                |                |              |                          |                     |                |                |              |                          |

**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.



**RAMSTEIN USAFB DL**

WMO No. 106140

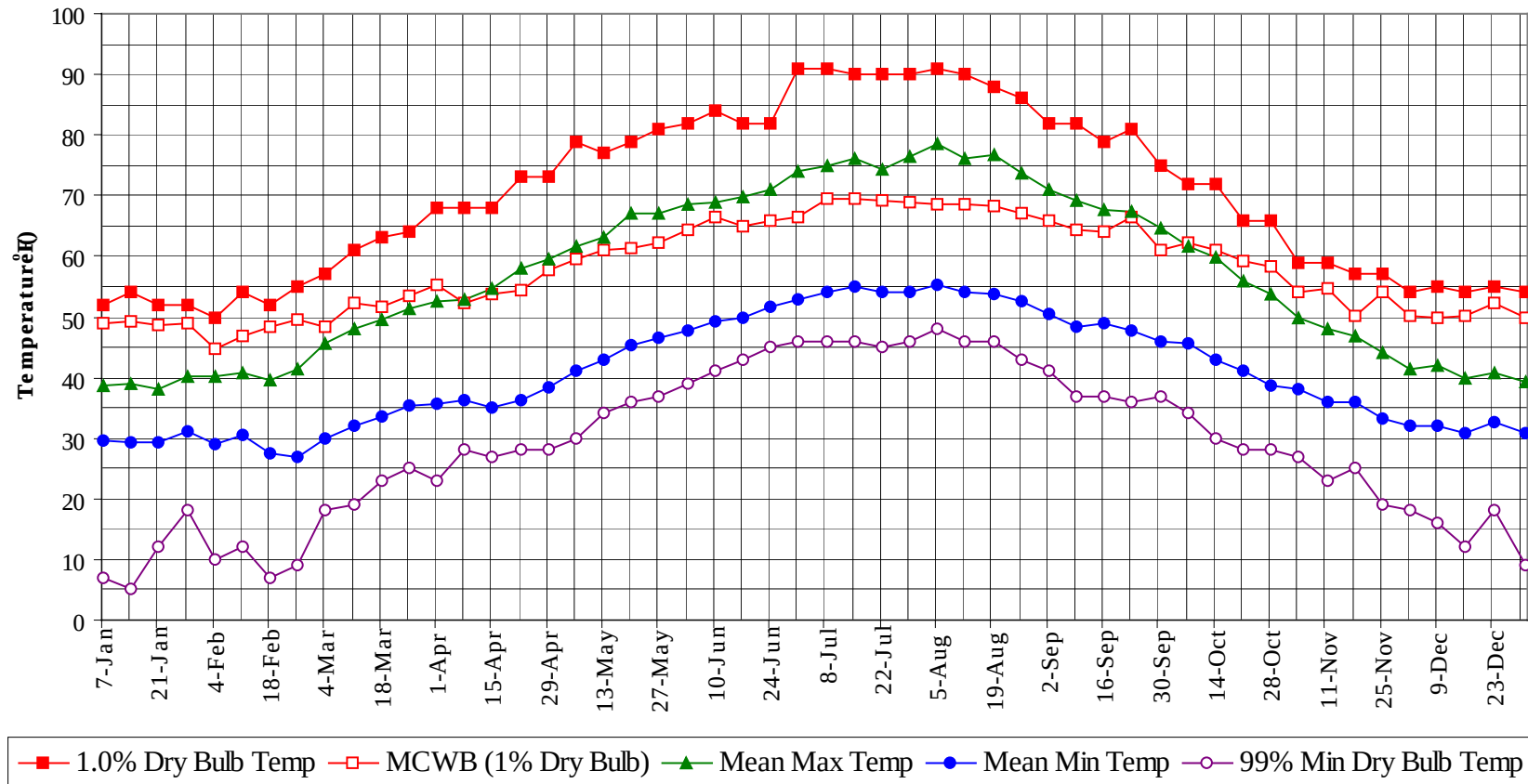
**Dry-Bulb Temperature Hours For An Average Year (Sheet 5 of 5)**

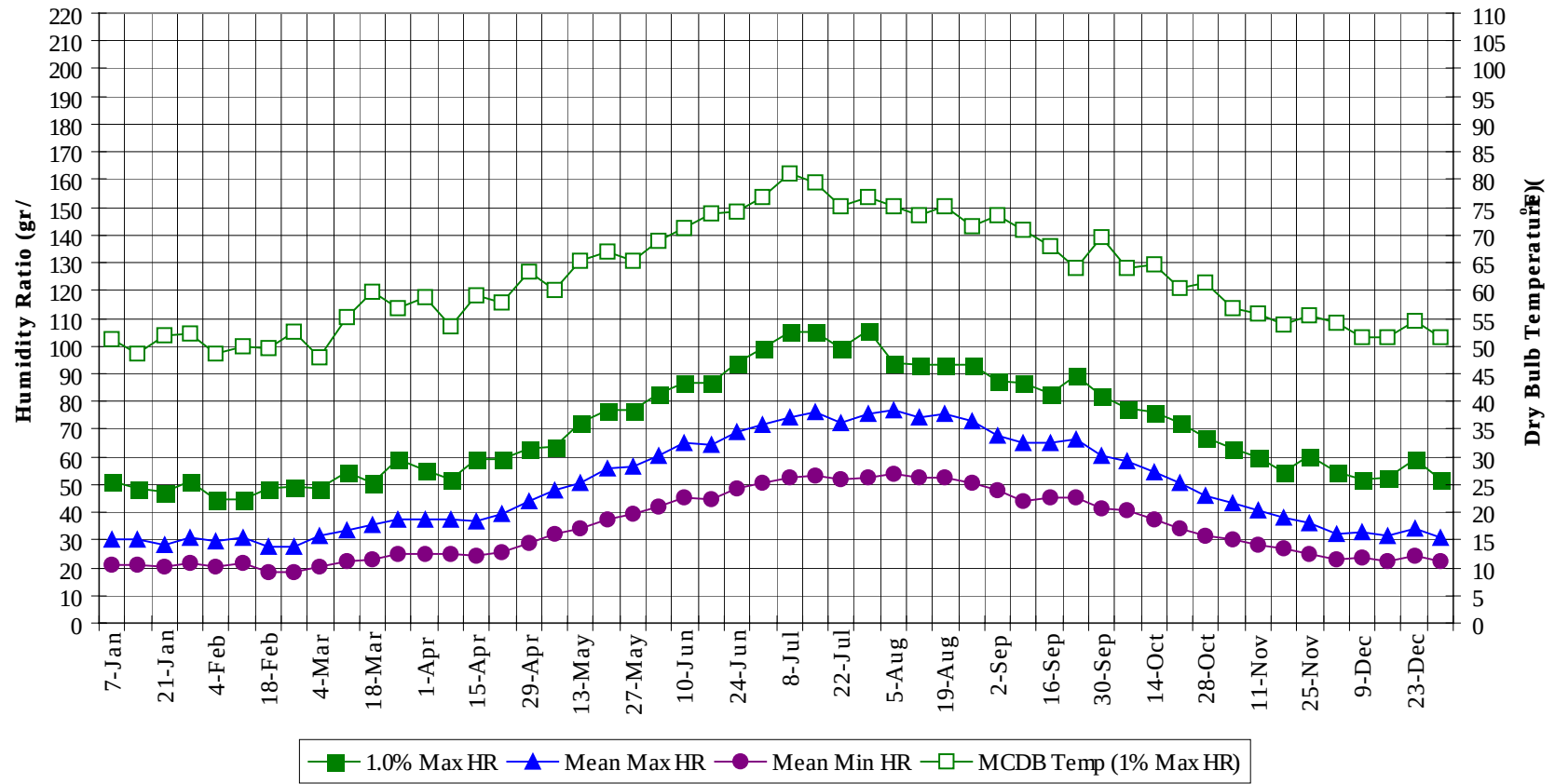
**Period of Record = 1973 to 1996**

| Annual Totals                |                     |                |                |              |                          |  |
|------------------------------|---------------------|----------------|----------------|--------------|--------------------------|--|
| Temperature<br>Range<br>(°F) | Hour<br>Group (LST) |                |                | Total<br>Obs | M<br>C<br>W<br>B<br>(°F) |  |
|                              | 01<br>To<br>08      | 09<br>To<br>16 | 17<br>To<br>00 |              |                          |  |
| 95 / 99                      |                     | 3              | 1              | 4            | 69.5                     |  |
| 90 / 94                      |                     | 12             | 5              | 17           | 68.7                     |  |
| 85 / 89                      |                     | 19             | 10             | 29           | 67.6                     |  |
| 80 / 84                      | 0                   | 87             | 43             | 130          | 65.7                     |  |
| 75 / 79                      | 2                   | 146            | 77             | 224          | 63.1                     |  |
| 70 / 74                      | 15                  | 233            | 147            | 395          | 60.6                     |  |
| 65 / 69                      | 37                  | 181            | 133            | 351          | 58.7                     |  |
| 60 / 64                      | 196                 | 355            | 325            | 875          | 56.3                     |  |
| 55 / 59                      | 371                 | 321            | 361            | 1053         | 52.5                     |  |
| 50 / 54                      | 446                 | 314            | 363            | 1122         | 48.4                     |  |
| 45 / 49                      | 467                 | 372            | 392            | 1230         | 43.4                     |  |
| 40 / 44                      | 281                 | 221            | 243            | 745          | 39.3                     |  |
| 35 / 39                      | 429                 | 323            | 375            | 1126         | 35.1                     |  |
| 30 / 34                      | 353                 | 202            | 263            | 819          | 30.3                     |  |
| 25 / 29                      | 189                 | 83             | 119            | 391          | 25.3                     |  |
| 20 / 24                      | 55                  | 21             | 27             | 103          | 20.6                     |  |
| 15 / 19                      | 46                  | 17             | 23             | 86           | 16.6                     |  |
| 10 / 14                      | 21                  | 9              | 12             | 42           | 11.4                     |  |
| 5 / 9                        | 8                   | 2              | 2              | 13           | 6.5                      |  |
| 0 / 4                        | 3                   | 0              | 1              | 4            | 0.8                      |  |
| -5 / -1                      | 0                   |                |                | 0            | -4.1                     |  |
| -10 / -6                     | 0                   |                |                | 0            | -6.0                     |  |

**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.

## Annual Summary of Temperatures



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

**RAMSTEIN USAFB**

**DL**

**WMO No. 106140**

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

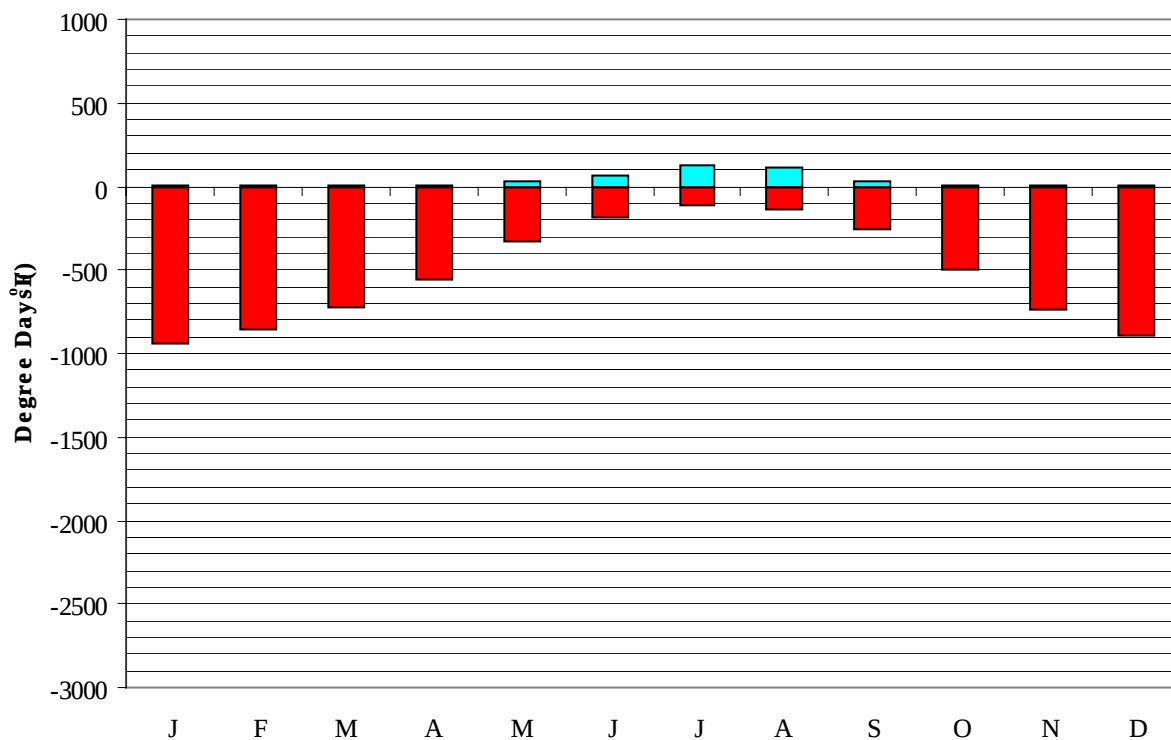
| Week<br>Ending | 1.0%<br>Temp (°F) | MCWB @<br>1% Temp (°F) | Mean Max<br>Temp (°F) | Mean Min<br>Temp (°F) | 99%<br>Temp (°F) | 1.0%<br>HR (gr/lb) | MCDB @<br>1% HR (°F) | Mean Max<br>HR (gr/lb) | Mean Min<br>HR (gr/lb) |
|----------------|-------------------|------------------------|-----------------------|-----------------------|------------------|--------------------|----------------------|------------------------|------------------------|
| 7-Jan          | 52.0              | 49.0                   | 38.6                  | 29.6                  | 7.0              | 51.1               | 51.3                 | 30.0                   | 21.1                   |
| 14-Jan         | 54.0              | 49.1                   | 38.9                  | 29.4                  | 5.0              | 48.3               | 48.7                 | 30.2                   | 20.9                   |
| 21-Jan         | 52.0              | 48.6                   | 38.0                  | 29.4                  | 12.0             | 47.6               | 52.0                 | 28.2                   | 20.2                   |
| 28-Jan         | 52.0              | 48.9                   | 40.3                  | 31.2                  | 18.0             | 51.1               | 52.2                 | 30.9                   | 21.8                   |
| 4-Feb          | 50.0              | 44.8                   | 40.3                  | 29.0                  | 10.0             | 44.8               | 48.7                 | 29.3                   | 20.2                   |
| 11-Feb         | 54.0              | 46.9                   | 40.8                  | 30.5                  | 12.0             | 44.8               | 49.8                 | 30.8                   | 21.4                   |
| 18-Feb         | 52.0              | 48.4                   | 39.5                  | 27.5                  | 7.0              | 48.3               | 49.7                 | 27.7                   | 18.5                   |
| 25-Feb         | 55.0              | 49.6                   | 41.3                  | 27.0                  | 9.0              | 49.0               | 52.4                 | 27.7                   | 18.1                   |
| 4-Mar          | 57.0              | 48.4                   | 45.5                  | 29.9                  | 18.0             | 48.3               | 48.1                 | 31.4                   | 20.3                   |
| 11-Mar         | 61.0              | 52.3                   | 48.0                  | 31.9                  | 19.0             | 54.6               | 55.3                 | 33.5                   | 22.0                   |
| 18-Mar         | 63.0              | 51.6                   | 49.5                  | 33.7                  | 23.0             | 50.4               | 59.7                 | 35.2                   | 23.2                   |
| 25-Mar         | 64.0              | 53.6                   | 51.4                  | 35.3                  | 25.0             | 58.8               | 56.8                 | 37.4                   | 25.0                   |
| 1-Apr          | 68.0              | 55.4                   | 52.6                  | 35.7                  | 23.0             | 55.3               | 58.8                 | 37.7                   | 25.1                   |
| 8-Apr          | 68.0              | 52.3                   | 53.0                  | 36.1                  | 28.0             | 51.8               | 53.5                 | 37.1                   | 25.2                   |
| 15-Apr         | 68.0              | 53.9                   | 54.8                  | 35.0                  | 27.0             | 58.8               | 59.2                 | 36.8                   | 24.3                   |
| 22-Apr         | 73.0              | 54.5                   | 58.0                  | 36.2                  | 28.0             | 58.8               | 57.7                 | 39.4                   | 25.9                   |
| 29-Apr         | 73.0              | 57.7                   | 59.5                  | 38.3                  | 28.0             | 63.0               | 63.4                 | 43.8                   | 28.6                   |
| 6-May          | 79.0              | 59.6                   | 61.5                  | 41.0                  | 30.0             | 63.7               | 60.2                 | 48.2                   | 32.1                   |
| 13-May         | 77.0              | 60.9                   | 63.1                  | 42.9                  | 34.0             | 72.1               | 65.4                 | 50.4                   | 34.1                   |
| 20-May         | 79.0              | 61.3                   | 67.2                  | 45.3                  | 36.0             | 77.0               | 67.0                 | 56.1                   | 37.3                   |
| 27-May         | 81.0              | 62.3                   | 67.1                  | 46.6                  | 37.0             | 77.0               | 65.5                 | 56.5                   | 39.2                   |
| 3-Jun          | 82.0              | 64.3                   | 68.6                  | 47.6                  | 39.0             | 82.6               | 69.1                 | 60.6                   | 41.9                   |
| 10-Jun         | 84.0              | 66.6                   | 69.0                  | 49.3                  | 41.0             | 86.8               | 71.4                 | 64.9                   | 45.4                   |
| 17-Jun         | 82.0              | 65.0                   | 69.8                  | 50.0                  | 43.0             | 86.8               | 73.9                 | 64.6                   | 44.7                   |
| 24-Jun         | 82.0              | 66.0                   | 71.0                  | 51.8                  | 45.0             | 93.8               | 74.2                 | 68.8                   | 48.5                   |
| 1-Jul          | 91.0              | 66.4                   | 73.9                  | 53.0                  | 46.0             | 99.4               | 76.8                 | 71.7                   | 50.3                   |
| 8-Jul          | 91.0              | 69.4                   | 75.0                  | 54.0                  | 46.0             | 105.0              | 81.1                 | 74.2                   | 52.4                   |
| 15-Jul         | 90.0              | 69.4                   | 76.1                  | 55.0                  | 46.0             | 105.0              | 79.5                 | 76.5                   | 53.4                   |
| 22-Jul         | 90.0              | 69.3                   | 74.4                  | 54.2                  | 45.0             | 99.4               | 75.3                 | 72.1                   | 51.9                   |
| 29-Jul         | 90.0              | 68.9                   | 76.4                  | 54.1                  | 46.0             | 105.7              | 76.9                 | 75.5                   | 52.6                   |
| 5-Aug          | 91.0              | 68.5                   | 78.7                  | 55.1                  | 48.0             | 93.8               | 75.4                 | 76.8                   | 53.8                   |
| 12-Aug         | 90.0              | 68.5                   | 76.1                  | 54.2                  | 46.0             | 93.1               | 73.7                 | 74.0                   | 52.6                   |
| 19-Aug         | 88.0              | 68.4                   | 76.6                  | 53.7                  | 46.0             | 93.1               | 75.2                 | 75.6                   | 52.8                   |
| 26-Aug         | 86.0              | 67.0                   | 73.9                  | 52.4                  | 43.0             | 93.1               | 71.7                 | 72.7                   | 50.8                   |
| 2-Sep          | 82.0              | 65.7                   | 70.9                  | 50.4                  | 41.0             | 87.5               | 73.6                 | 68.0                   | 47.6                   |
| 9-Sep          | 82.0              | 64.4                   | 69.3                  | 48.2                  | 37.0             | 86.8               | 71.1                 | 65.0                   | 44.1                   |
| 16-Sep         | 79.0              | 64.0                   | 67.8                  | 49.0                  | 37.0             | 82.6               | 68.1                 | 64.9                   | 45.2                   |
| 23-Sep         | 81.0              | 66.6                   | 67.3                  | 47.8                  | 36.0             | 89.6               | 64.0                 | 66.5                   | 45.0                   |
| 30-Sep         | 75.0              | 61.1                   | 64.5                  | 45.8                  | 37.0             | 81.9               | 69.7                 | 60.4                   | 41.4                   |
| 7-Oct          | 72.0              | 62.3                   | 61.6                  | 45.6                  | 34.0             | 77.7               | 63.9                 | 58.4                   | 40.6                   |
| 14-Oct         | 72.0              | 60.9                   | 59.8                  | 43.0                  | 30.0             | 76.3               | 64.6                 | 54.3                   | 37.5                   |
| 21-Oct         | 66.0              | 59.2                   | 56.0                  | 41.1                  | 28.0             | 72.1               | 60.5                 | 50.5                   | 34.3                   |
| 28-Oct         | 66.0              | 58.3                   | 53.9                  | 38.7                  | 28.0             | 67.2               | 61.5                 | 45.7                   | 31.3                   |
| 4-Nov          | 59.0              | 54.2                   | 50.0                  | 37.9                  | 27.0             | 63.0               | 56.8                 | 43.5                   | 30.3                   |
| 11-Nov         | 59.0              | 54.6                   | 48.1                  | 36.1                  | 23.0             | 59.5               | 55.9                 | 40.7                   | 28.2                   |
| 18-Nov         | 57.0              | 50.3                   | 46.7                  | 36.0                  | 25.0             | 54.6               | 54.0                 | 38.0                   | 27.1                   |
| 25-Nov         | 57.0              | 54.2                   | 44.2                  | 33.4                  | 19.0             | 60.2               | 55.4                 | 36.0                   | 25.0                   |
| 2-Dec          | 54.0              | 50.3                   | 41.4                  | 32.0                  | 18.0             | 54.6               | 54.2                 | 32.1                   | 23.1                   |
| 9-Dec          | 55.0              | 50.0                   | 41.9                  | 32.1                  | 16.0             | 51.8               | 51.7                 | 33.1                   | 23.4                   |
| 16-Dec         | 54.0              | 50.1                   | 40.0                  | 30.7                  | 12.0             | 52.5               | 51.7                 | 31.8                   | 22.1                   |
| 23-Dec         | 55.0              | 52.4                   | 40.8                  | 32.7                  | 18.0             | 58.8               | 54.4                 | 33.9                   | 24.1                   |
| 31-Dec         | 54.0              | 49.9                   | 39.3                  | 30.9                  | 9.0              | 51.8               | 51.5                 | 31.0                   | 22.6                   |

RAMSTEIN USAFB

DL

WMO No. 106140

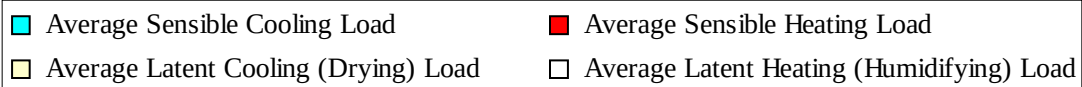
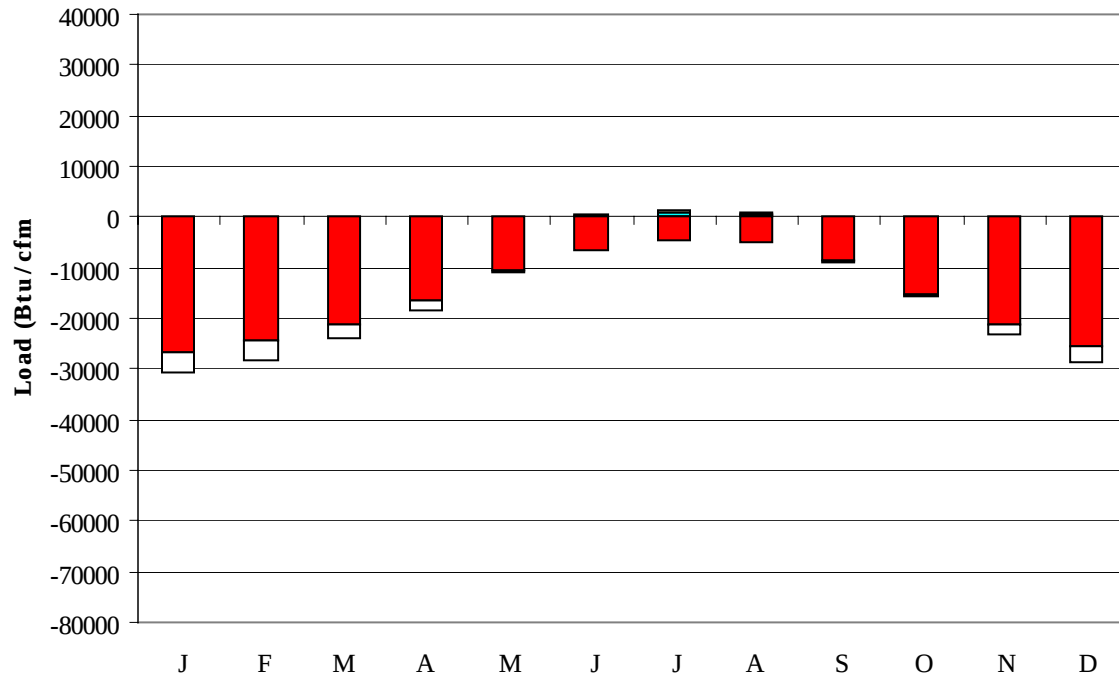
# **Degree Days, Heating and Cooling** (Base 65°F)



■ Mean Cooling Degree Days ■ Mean Heating Degree Days

|     | Mean Cooling<br>Degree Days (°F) | Mean Heating<br>Degree Days (°F) |
|-----|----------------------------------|----------------------------------|
| JAN | 0                                | 940                              |
| FEB | 0                                | 857                              |
| MAR | 1                                | 728                              |
| APR | 6                                | 555                              |
| MAY | 33                               | 333                              |
| JUN | 71                               | 187                              |
| JUL | 129                              | 117                              |
| AUG | 110                              | 134                              |
| SEP | 31                               | 260                              |
| OCT | 4                                | 498                              |
| NOV | 0                                | 734                              |
| DEC | 0                                | 897                              |
| ANN | 384                              | 6240                             |

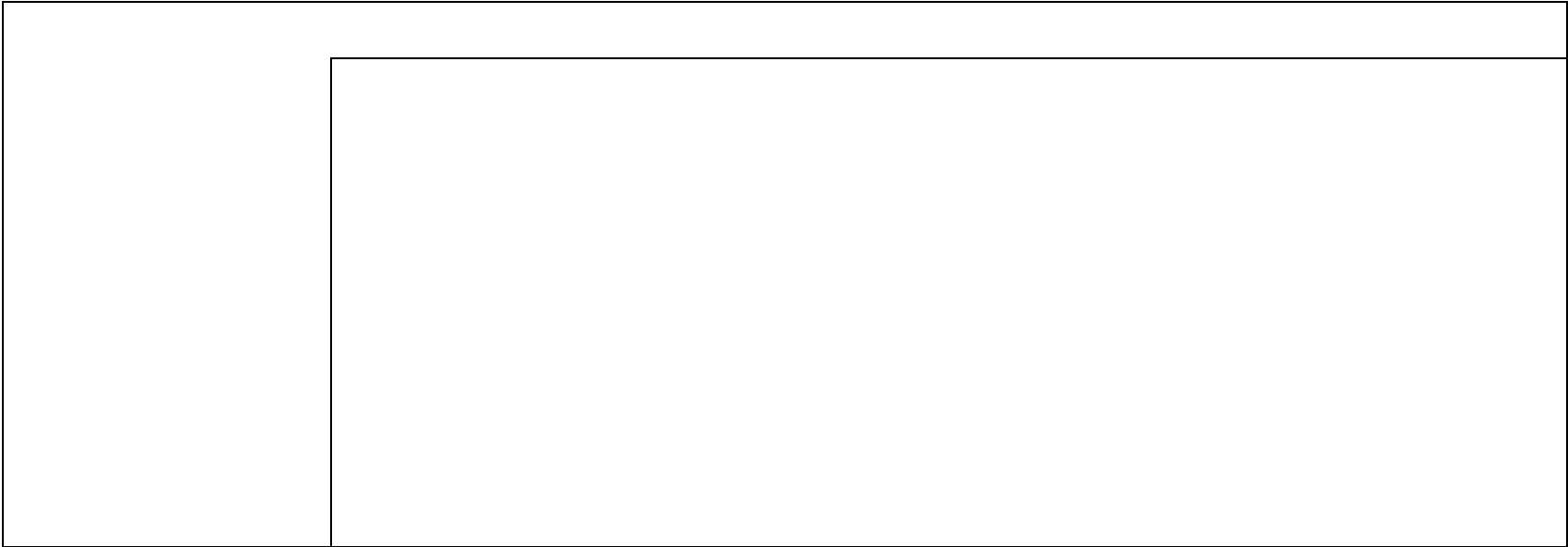
**Average Ventilation and Infiltration Loads**  
**(Outside Air vs. 75°F, 60% RH summer; 68°F, 30% RH winter)**



|     | 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                                       | -26781                                  | 0                                     | -3830                                 |
| FEB | 0                                       | -24416                                  | 0                                     | -3963                                 |
| MAR | 0                                       | -21261                                  | 0                                     | -2711                                 |
| APR | 8                                       | -16629                                  | 1                                     | -1725                                 |
| MAY | 92                                      | -10702                                  | 7                                     | -318                                  |
| JUN | 372                                     | -6584                                   | 200                                   | -38                                   |
| JUL | 903                                     | -4472                                   | 523                                   | -2                                    |
| AUG | 672                                     | -4990                                   | 262                                   | -8                                    |
| SEP | 88                                      | -8729                                   | 63                                    | -35                                   |
| OCT | 3                                       | -15271                                  | 3                                     | -440                                  |
| NOV | 0                                       | -21360                                  | 0                                     | -1857                                 |
| DEC | 0                                       | -25648                                  | 0                                     | -3165                                 |
| ANN | 2138                                    | -186843                                 | 1059                                  | -18092                                |

**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)

|  |  |
|--|--|
|  |  |
|  |  |

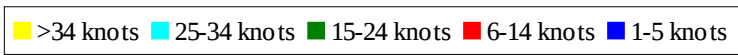
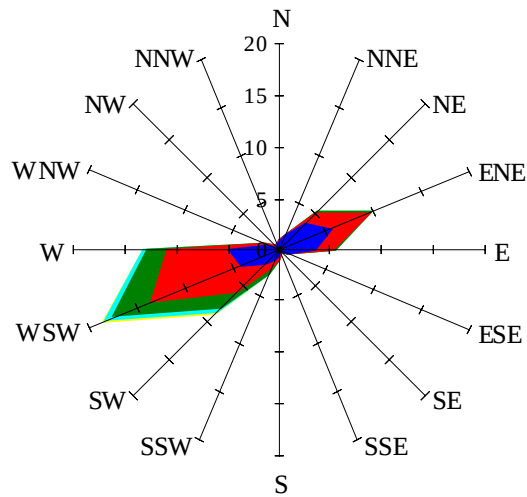
|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |

|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |



### Wind Summary - December, January, and February

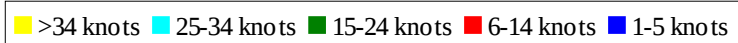
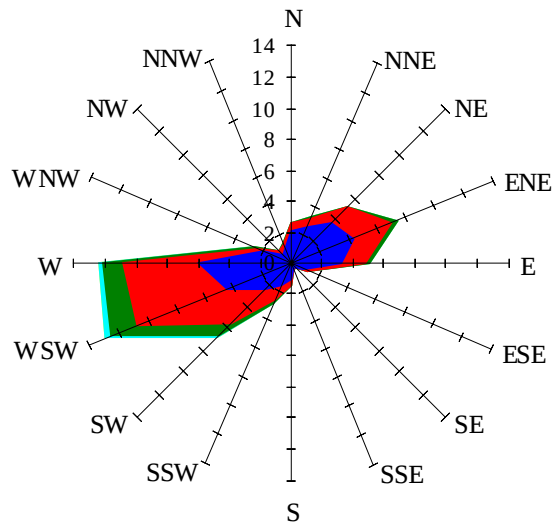
Labels of Percent Frequency on North Axis



Percent Calm = 28.74

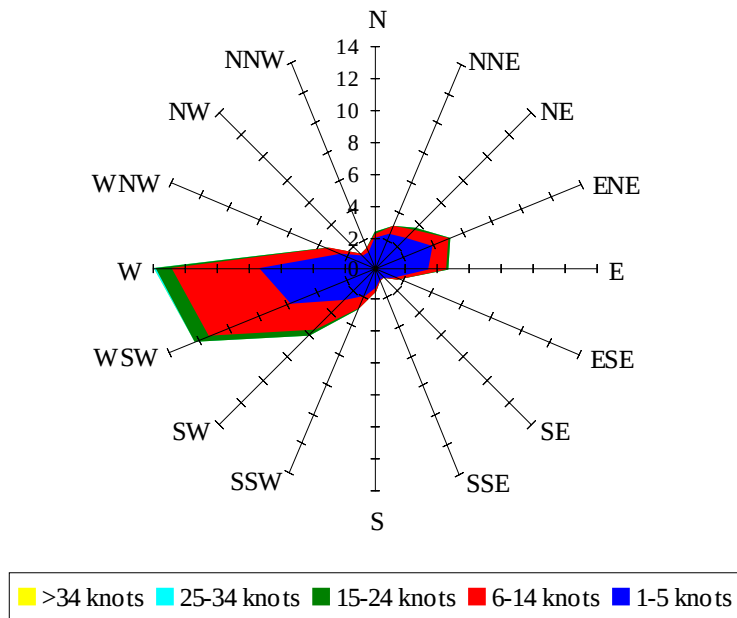
### Wind Summary - March, April, and May

Labels of Percent Frequency on North Axis



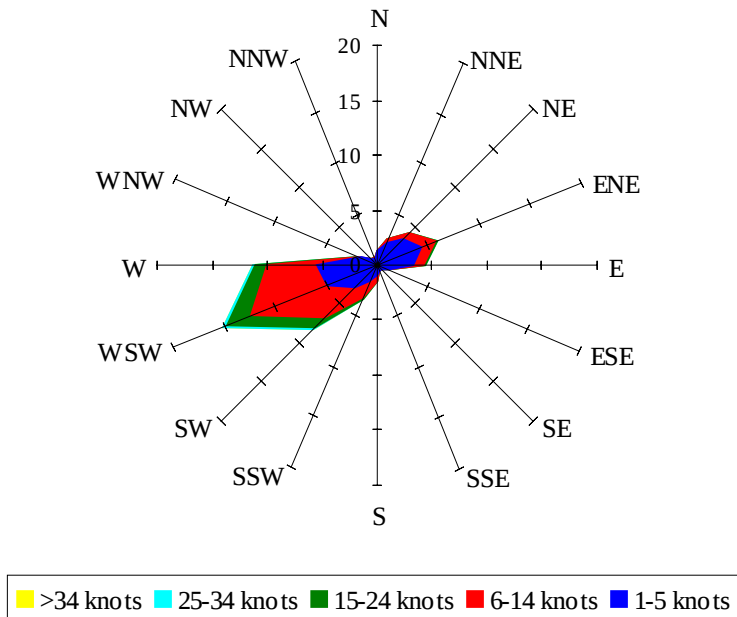
Percent Calm = 33.25

# **Wind Summary - June, July, and August** **Labels of Percent Frequency on North Axis**



Percent Calm = 36.63

# **Wind Summary - September, October, and November** **Labels of Percent Frequency on North Axis**



Percent Calm = 36.57