Manual Relative Humidity

(Last rev. 14/07/2023)

Manual Relative Humidity is manually measured at Fortuna using two different systems: sling psychrometer and a dial hygrometer.

Manual Relative Humidity is recorded, usually between 12:00 and 1:00pm.

Data are collected as wet and dry bulb temperatures using a Bacharach Sling Psychrometer (see Bacharach_Sling_Psychrometer.pdf and Figure 1). The wet bulb of the Psychrometer is wetted with distilled water. The Psychrometer is then vigorously rotated for 60-90 seconds following which wet and dry-bulb temperatures are recorded.

A Robert White Instruments dial precision hygrometer, located inside a standard Stephenson's screen instrument shelter, is also used to measure relative humidity (see Figure 2).

Figure 1

Bacharach Sling Psychrometer

Figure 1

Robert White Instruments dial precision hygrometer

Appendix A

Calculation of Relative Humidity from Wet/Dry bulb temperatures

Wet/dry bulb temperatures are converted to relative humidity using the following equation:

$P = 101.325 * e^{(-.0001184 * Elevation)}$

$A = .00066 * (1 + .00115 * Tw)$

$ESwb = e^{((16.78 * Tw - 116.9)/(Tw + 237.3))}$

$Ed = ESwb - P * A * (Td - Tw)$

$ESdb = e^{((16.78 * Td - 116.9)/(Td + 237.3))}$

Relative Humidity = 100 * Ed / ESdb

Where: Tw = Wet-bulb temperature (in degrees Celsius)
Td = Wet-bulb temperature (in degrees Celsius)