

## PSYCHOMETRIC WORKSHEET

Psychrometer No. \_\_\_\_\_ Observer's Initials \_\_\_\_\_

Location \_\_\_\_\_

		Before Wetting
Station Thermometer _____ F	Dry Bulb _____ F	
_____ C	_____ C	
	Wet Bulb _____ F	
	_____ C	
	Dry Bulb Correction _____ C	
	Wet Bulb Correction _____ C	

TIME/DATE OF OBSERVATION: \_\_\_\_\_ Z \_\_\_\_\_

DD/MM/YY

Observed Dry Bulb _____ F		
_____ C	Corrected Dry Bulb _____ C	
Observed Wet Bulb _____ F		
_____ C	Corrected Wet Bulb _____ C	
	Wet Bulb Depression _____ C	

### DEW POINT CALCULATION

Local Air Pressure \_\_\_\_\_ inches Hg

Local Air Pressure \_\_\_\_\_ mb

Saturation Vapor Pressure (from wet bulb temperature)  $e'$  \_\_\_\_\_ mb

Difference between actual and saturation vapor pressure  $de_{1000}$  \_\_\_\_\_ mb

Pressure adjusted vapor pressure difference  $dep$  \_\_\_\_\_ mb

Actual Vapor Pressure  $e$  \_\_\_\_\_ mb

Dew Point Temperature  $DP$  \_\_\_\_\_ C  
 \_\_\_\_\_ F

Relative Humidity  $RH$  \_\_\_\_\_ %

## REDUCTION OF PSYCHROMETRIC DATA USING THE SMITHSONIAN TABLES

1. Determine the local air pressure (p).
2. Determine the dry ( $T_{\text{dry}}$ ) and wet bulb ( $T_{\text{wet}}$ ) temperatures using a sling psychrometer.
3. To get vapor pressure:
  - a. Determine the saturation vapor pressure ( $e'$ ) at the observed wet bulb temperature using Table 94 (two-way interpolation is required).
  - b. Determine  $de_{1000}$  (difference between actual vapor pressure and the saturation vapor pressure at an atmosphere pressure of 1000 mb) using Table 98 (two-way interpolation is required).
  - c. Adjust  $de_{1000}$  to the actual air pressure by multiplying by  $(p/1000)$ , p expressed in mb.

$$dep = de_{1000} \left( \frac{p}{1000} \right)$$

- d. Subtract dep from  $e'$  to get the actual vapor pressure (e).
4. To get the dew-point temperature (DP):  
Read off the corresponding dewpoint using Table 94 and the vapor pressure computed above. E.g. if  $e = 60.433$  mb, the DP = 36.3 °C.
5. To get the relative humidity:
  - a. Determine the saturation vapor pressure over water ( $e_{\text{water}}$ ) at the dry-bulb temperature using Table 94.
  - b. Calculate the relative humidity as  $RH = 100 (e/e_{\text{water}})$ .

Reference: Smithsonian Meteorological Tables

### Pressure Conversions:

1 mb = 0.7502 mm Hb = 0.02961 inches Hg  
 1 mm Hg = 0.03947 inches Hg = 1.333 mb  
 1 inch Hg = 33.77 mb = 25.33 mm Hg

### Sky Cover:

Description	ASOS	Human	Day	Night/Day	Meaning
Clear (CLR or SKC)	0 to 5%	0	Sunny	Clear	No Clouds
Few	>5 to ≤25%	0 to 2/8	Mostly Sunny 1/8 – 2/8	Mostly Clear 1/8 – 2/8	Few clouds
Scattered (SCT)	>25 to ≤50%	3/8 to 4/8	Partly Sunny 3/8 – 5/8	Partly Cloudy 3/8 – 5/8	Partly cloudy
Broken (BKN)	>50 to ≤87%	5/8 to 7/8	Mostly cloudy 6/8 – 7/8	Mostly cloudy 6/8 – 7/8	Mostly cloudy
Overcast (OVC)	>87 to 100%	8/8	Cloudy	Cloudy	Sky covered
Sky obscured					Sky hidden by surface phenom.