



Class: 2nd Stage
Subject: air coditioning and refrigeration lap
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EXP. NO. 1

Representation of air properties on a psychometric chart



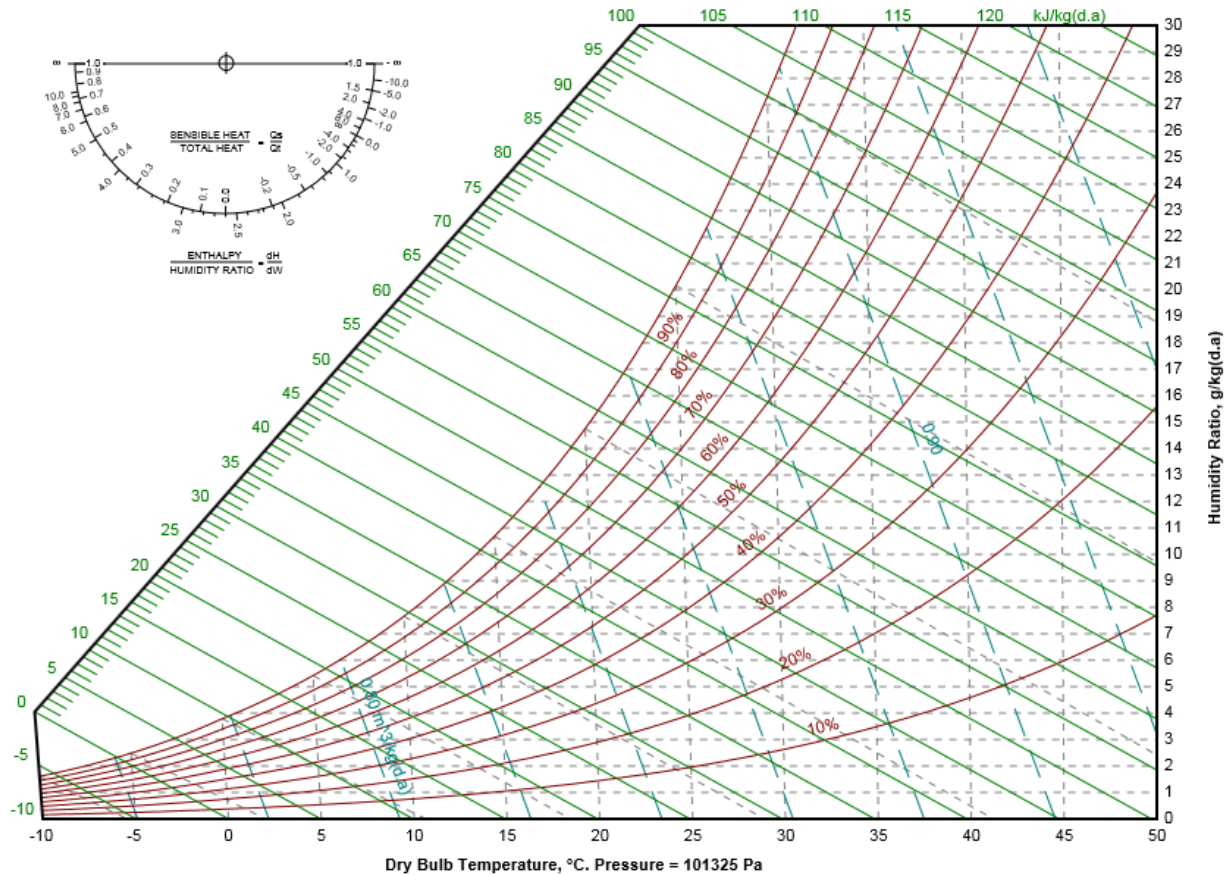
Object:

Identify the components and parts of psychrometric chart and learn the properties of the air through represent them on the psychrometric chart.

Psychrometric Chart:

A psychrometric chart presents physical and thermal properties of moist air in a graphical form. It can be very helpful in troubleshooting and finding solutions to greenhouse or livestock building environmental problems. Understanding psychrometric charts can help you visualize environmental control concepts, such as why heated air can hold more moisture or, .conversely, how allowing moist air to cool will result in condensation

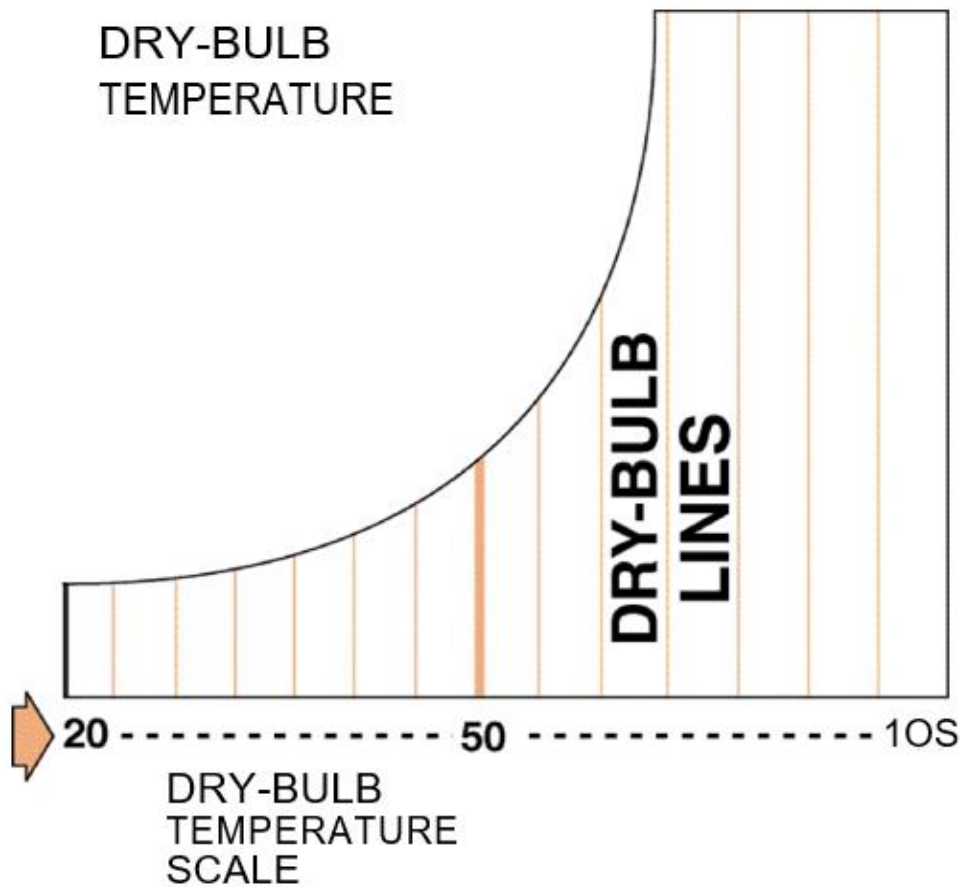
A psychrometric chart packs a lot of information into an odd-shaped graph. If we consider the components piece by piece, the usefulness of the chart will be clearer. Boundaries of the psychrometric chart are a dry-bulb temperature scale on the horizontal axis, a humidity ratio (moisture content) scale on the vertical axis, and an upper curved boundary which represents saturated air or 100-percent moisture holding capacity.



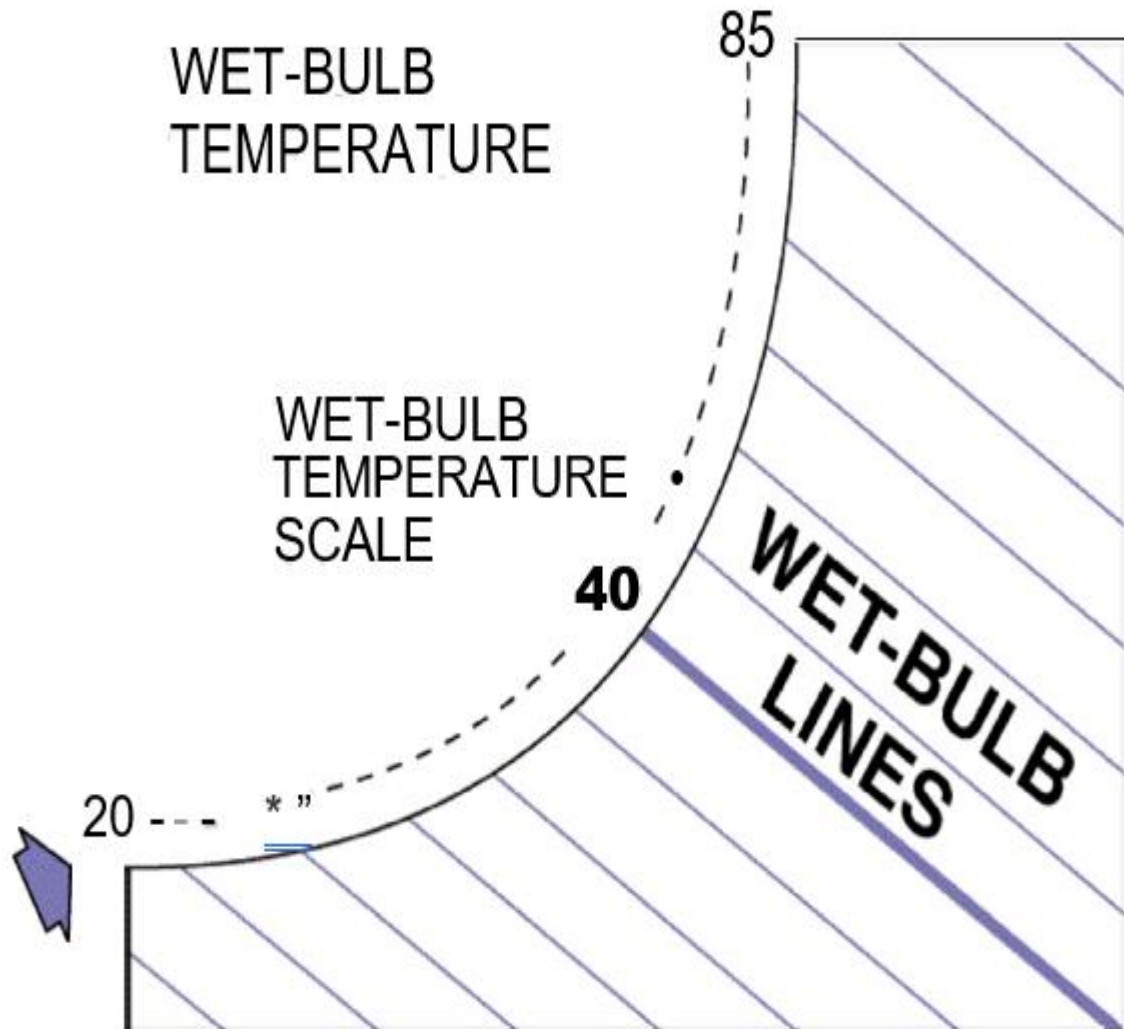
Representation of the properties of air on the psychometric diagram:

Determines on the psychometric diagram several physical properties of a particular air state, namely

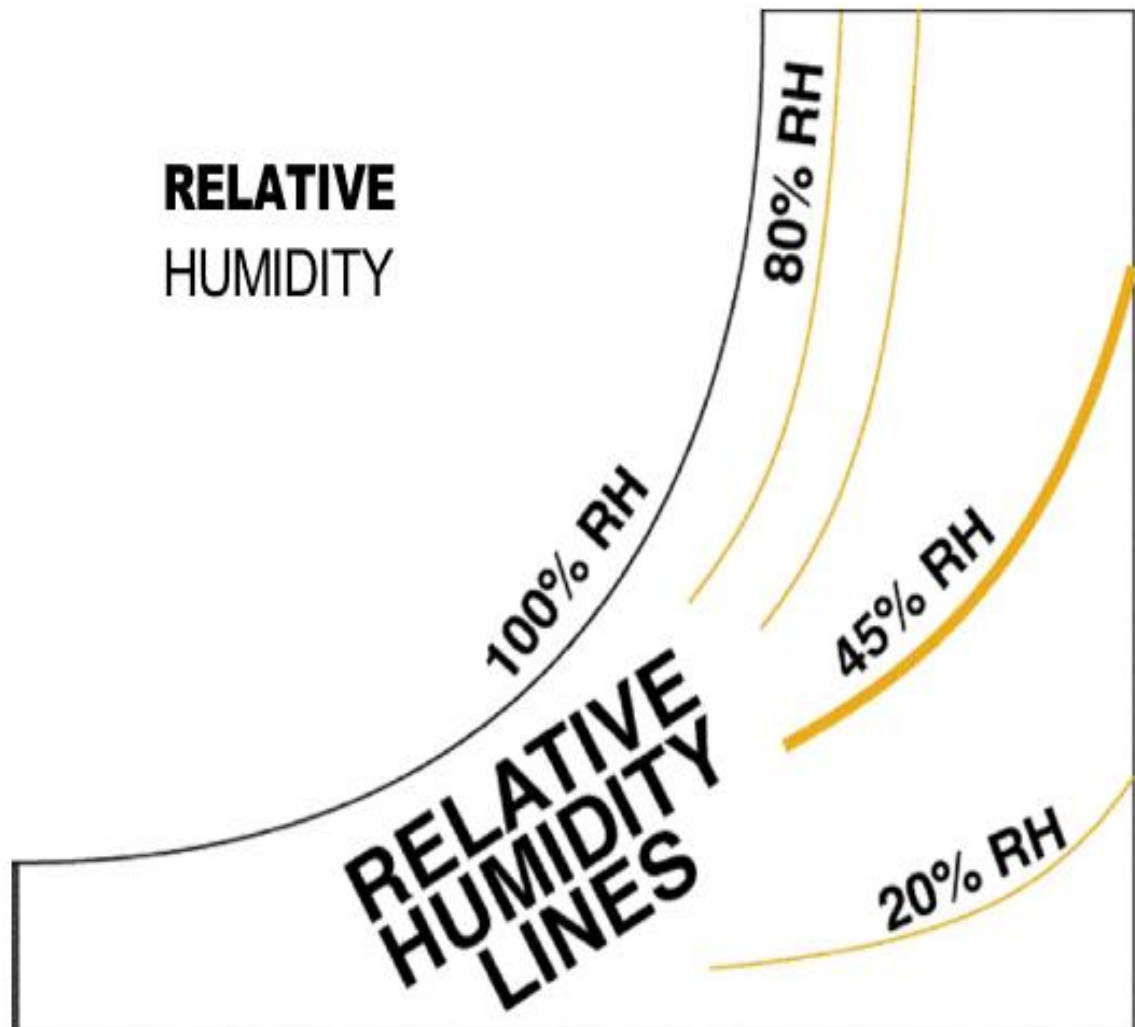
- 1- **Dry bulb temperature (DBT):** It is the temperature recorded by a normal thermometer and is represented by vertical lines that intersect the horizontal axis and is measured in degrees Celsius.



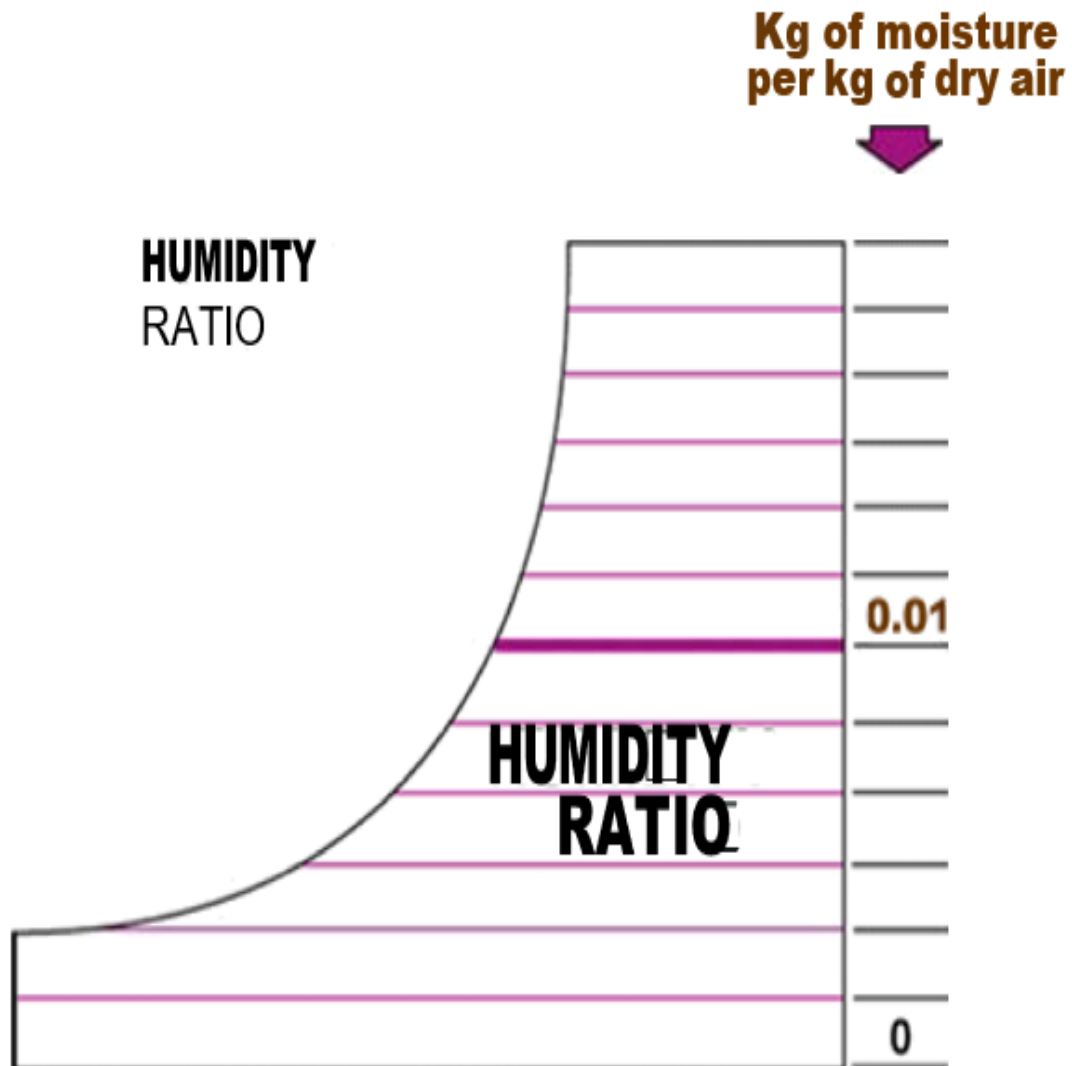
2-wet bulb temperature (WDT): It is the lowest temperature recorded by a thermometer with its bulb covered with a cloth moistened with water and exposed to airflow, and it is lower or equal to the dry temperature and represents the humid temperature of a particular point on the chart by oblique lines approximately parallel to the lines of the enthalpy until they intersect the saturation curve and are measured in degrees one hundred.



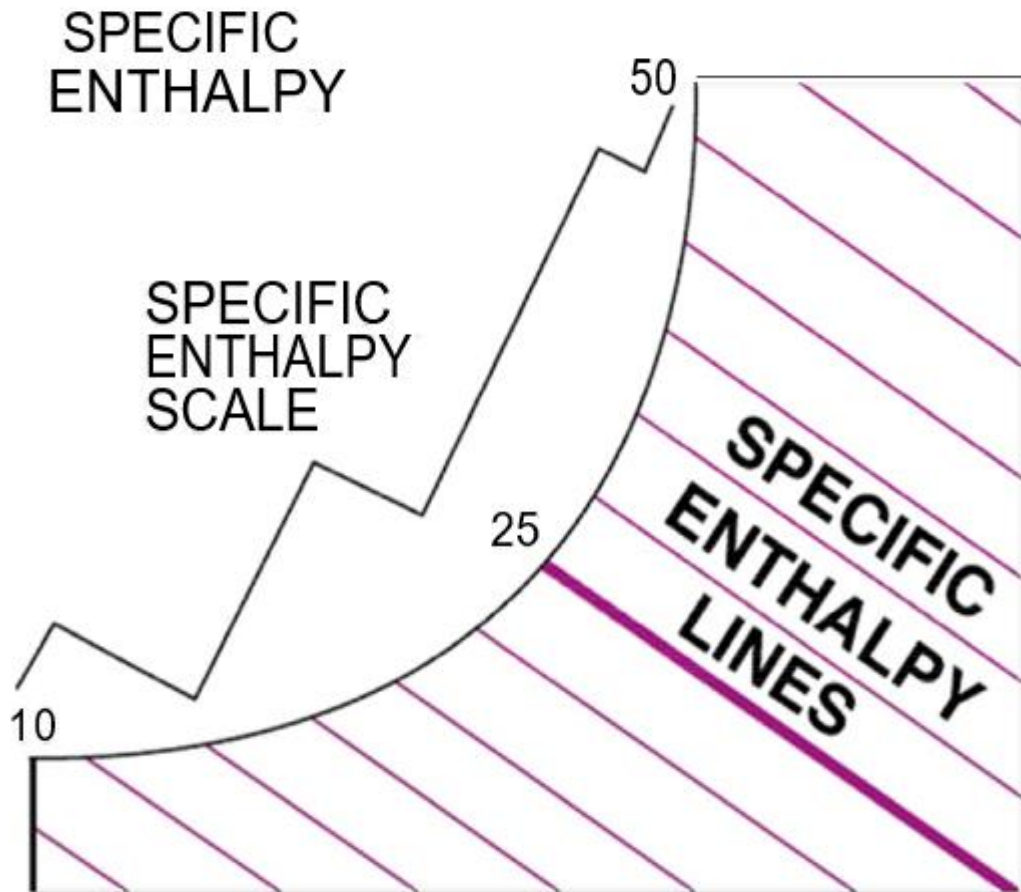
3- relative humidity (RH): It is the ratio between the actual water vapor pressure in the air to the saturated water vapor pressure at the same temperature, Expressed as a percentage.



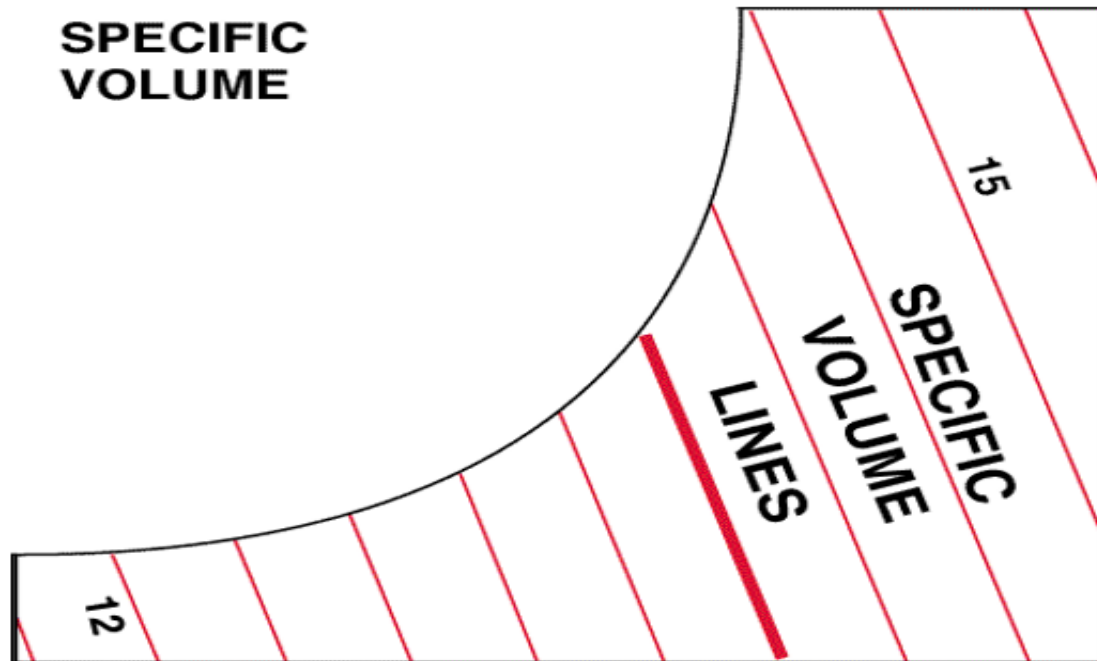
4- **Specific humidity or moisture percentage (ϕ):** is the actual mass of water vapor (moisture) contained in one mass of dry air. The specific humidity is represented on the diagram by horizontal lines with the vertical mauve, and it is sometimes symbolized by (w) , and it is usually expressed as G_w / K_g .



5-Enthalpy (h): It is a heat feature that expresses the amount of heat present in a specific state in the air. In general, the enthalpy value does not matter to us in a specific state of air, but rather the difference of enthalpy between two points, and the enthalpy represents a point on the diagram with diagonal lines called enthalpies and is in units of KJ / kg.



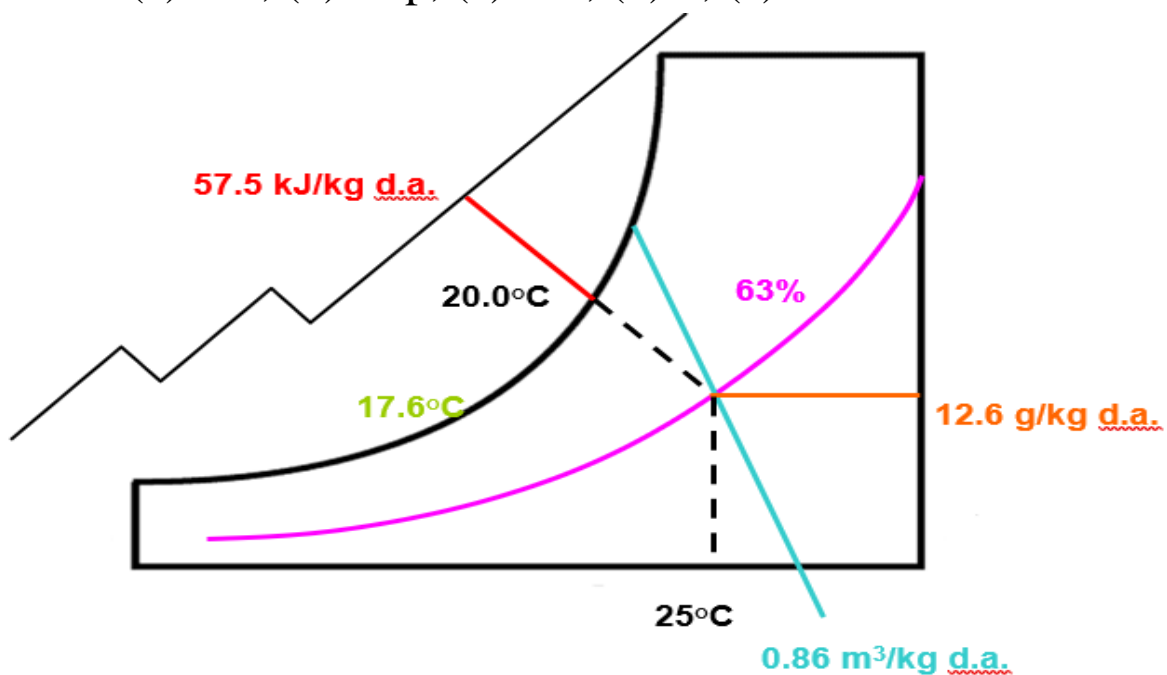
6-The specific volume(V): it is the air volume of one mass and it is represented on the diagram by diagonal lines called the specific volume lines and is by one ft^3 / lb or m^3 / kg .



Psychrometric chart: Example 1

Given: $T = 25^{\circ}\text{C}$ $T_w = 20^{\circ}\text{C}$

Required: (a) RH, (b) T_{dp} , (c) HR, (d) v , (e) h





Reading:

- 1- $R_h = 50\%$, $t_d = 25^\circ\text{C}$
- 2- $T_w = 27^\circ\text{C}$, $R_h = 35\%$
- 3- $T_d = 10^\circ\text{C}$, $T_w = 10^\circ\text{C}$
- 4- $V = 0,83 \text{ m}^3/\text{kg}$, $R_h = 40\%$
- 5- $H = 53 \text{ KJ/kg}$, $t_d = 29^\circ\text{C}$
- 6- $W = 13.5 \text{ g/kg}$, $h = 72 \text{ kJ/kg}$
- 7- $T_w = 22^\circ\text{C}$, $V = 0.87 \text{ m}^3/\text{kg}$

Calculate :

no	t_d	t_w	R_h	w	u	h	t_{dp}
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Discussion :
Discuss the result .