Humidity

The presence of moisture (water vapor, an invisible gas) in the atmosphere is measured by the humidity of the air.

Humidity and condensation are closely related as condensation inevitably occurs when the air is saturated with moisture (100% humidity).

Absolute humidity measures the amount of water vapor in air. Grams H_2O/m^3 of air. This water is a gas, water vapor.

Relative humidity measures the amount of water vapor in air relative to the maximum amount of water vapor the air could hold at that temperature.

Relative humidity increases with increasing water vapor or decreasing temperature. Cold air can't "carry" as much water vapor as warm air.

The **dew point** is the temperature to which a given parcel of humid air must be cooled, at constant barometric pressure, for water vapor to condense into liquid water.

A hygrometer is a sensor that senses the amount of evaporated water in air by a mechanical or electronic method. A hygrometer is an instrument used for measuring the moisture content in the atmosphere.

1. **Mechanical Humidity Sensing Absorption Hygrometer**

The operating principle involves the change of linear dimensions of some hydroscopic materials like wood, paper, human hair, animal membrane, etc., when they absorb moisture from atmosphere. This variation in linear dimensions is used to measure the humidity present in the atmosphere.

The schematic arrangement of hair hygrometer is shown below.

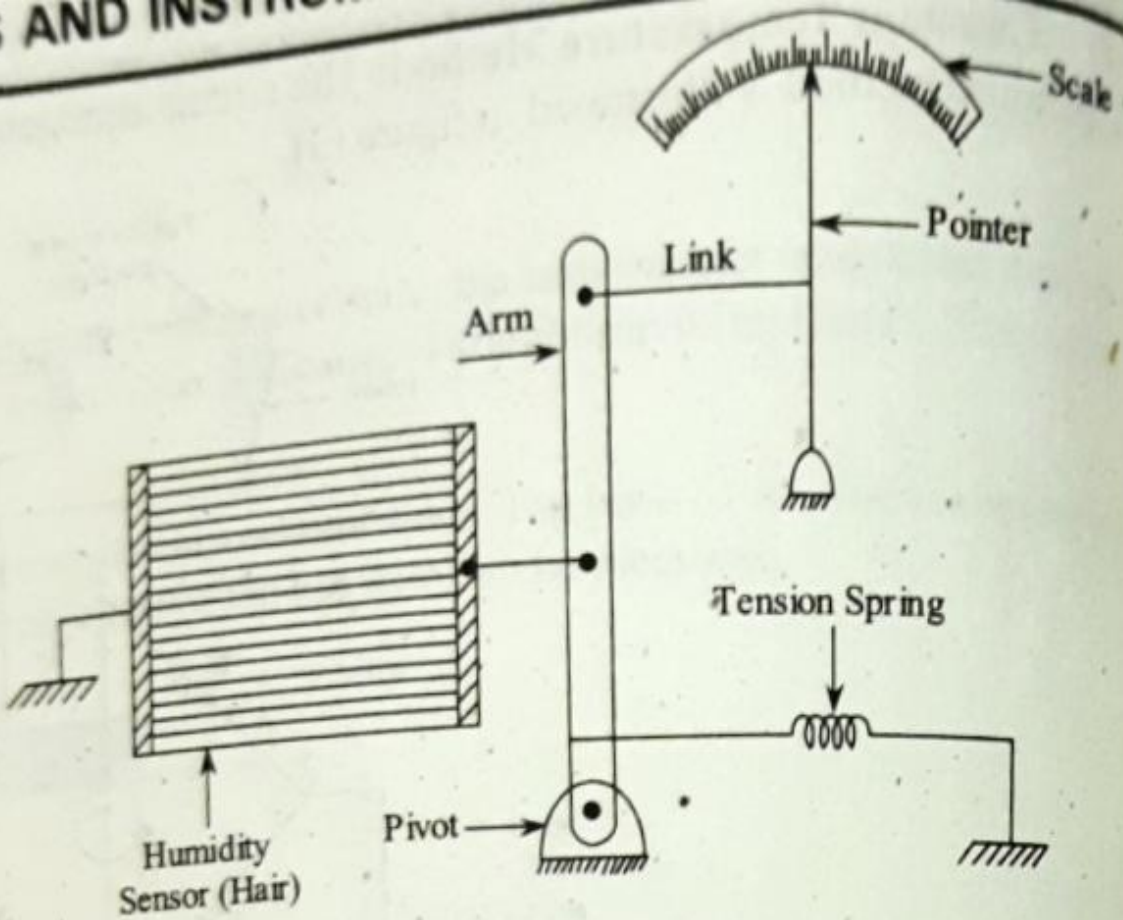

Figure: Hair Hygrometer

In this arrangement an animal hair is used as humidity sensor. The hair is separated from one another and arranged parallely. This hair arrangement is attached to an arm which is pivoted at one end where as the other end is attached to a mechanical link. The link carries a pointer which moves over a scale calibrated interms of humidity.

When the hygrometer is placed in the atmosphere in which the humidity of air is to be known, the hair arrangement absorbs the humidity from its surrounding air. Due to this the length of hair increases or decreases (in a linear direction). This increase or decrease of hair arrangement is transmitted to the arm and link and hence to the pointer. Therefore the pointer moves on the calibrated scale there by indicating the humidity content present in the atmosphere.

If the hygrometer employs membrane as a humidity sensing element then it is known as membrane hygrometer.