

Absolute Humidity

Ratio of the mass of water vapour in the air to the total volume of the air (g/m³).

Absolute Zero

Complete absence of energy and atomic movement defined as 0.00K, -273.15°C, or -459.67°F.

Absorption

The process of transferring matter or energy into another body.

Acclimatisation

The ability of a body to adapt to its thermal environment.

Accuracy

The numerical difference between an instrument reading and the true value of the quantity being measured. Often expressed as limits that will not be exceeded when the instrument is used within its stated operational conditions, i.e. ±5°C.

Actual Pressure

The atmospheric pressure at the level of measurement.

Advection

The horizontal transport of heat or cold, in the atmosphere, or the oceans. When a warm air mass passes over a cold land or sea surface it causes the air to cool and the water vapour held within it to condense.

Air Temperature

Typically expressed in °C, it is the temperature of the ambient air.

Air Velocity

The magnitude and direction of air flow, typically expressed in metres per second.

Ambient

The surrounding environment atmosphere.

Ambient Monitoring

The monitoring of air quality outside buildings, being representative of the air that the general (or identified) population is breathing.

Ambient Noise

Encompassing sound, at a given location, usually made up from the sounds from many sources, both distant and close-by.

Ambient Pressure

The pressure of the ambient air sometimes referred to as barometric pressure.

Ambient Temperature – ta

The average temperature of the air surrounding an instrument/sensor or experienced by the operative during the work activity. This parameter forms one of the fundamental input values for the calculation of various derived values related to heat stress.

Analogue-To-Digital Converter

A device or circuit which outputs a digital number corresponding to an analogue signal input at that level.

Anemometer

An instrument for measuring the speed of wind or air.

Aneroid Capsule

A thin semi-evacuated metal capsule, which when used in a barometer deforms with changes in pressure. One end being fixed and the other moves a pen on a chart or a hand on a dial. Aneroid means without air.

Area, Effective Radiating (A_e)

The surface area of a body, that exchanges

radiant energy with a radiant source, measured in m².

Area, Wetted (A_w)

The area of skin covered in sweat, expressed in m².

Atmometer

The generic name for instruments used to measure the rate of evaporation of water into the atmosphere.

Audible Sound

Sound of such character as to excite the sensation of hearing.

Beaufort Wind Scale

A system of estimating and reporting wind speed with reference to the behaviour of objects such as trees, smoke, and the surface of the sea.

Bel

A unit of level of a power quantity proportional to the base-ten logarithm of the ratio of two values of the quantity, where one value is usually a reference power. In acoustics, sound power is proportional to the square of sound pressure and the bel is also used to express the ratio of two pressures. The reference sound pressure is 20 micropascals.

Black Globe Temperature

The temperature within a matt black, hollow sphere. It monitors the radiant temperature of the ambient air.

Boiling Point

The temperature when a liquid transforms to a gas. For example water boils at 100°C at sea level.

Brownfield Site

An area of land which has previously been used (e.g. industrial buildings) and may therefore be derelict and/or contaminated.

Campbell Stokes Sunshine Recorder

Recognised as the primary standard instrument for sunshine hours recording.

Carbon Dioxide

A colourless, odourless, un-reactive gas commonly produced by combustion and decay. It is also an asphyxiant.

Carbon Monoxide

Formed when carbon is burned in a limited supply of oxygen, resulting in incomplete combustion. It is tasteless, odourless, colourless and extremely toxic.

CE

A mark to identify conformity to European Standards.

Celsius

Temperature scale where the ice point of water is 0°C and the boiling point of water is 100°C at sea level.

Cloud

Formed as air cools to its dew point and relative humidity reaches 100%. The air is cooled by advection or convection, resulting in different cloud types (see Precipitation).

Clouds will only exist as long as the rate of condensation is equal or greater than the rate of evaporation of water droplets on the clouds' edges, to the surrounding air.

Clouds can be classified in three ways:

- By shape and structure
- By height of the cloud base
- By amount

Cloud Base

For a given cloud layer, the lowest level in the atmosphere that contains a visible quantity of water droplets.

Communication Port (Comms Port)

A serial or parallel connection used to input/output information from a computer or a piece of hardware.

Convection

The process of heat flow and transfer that involves the movement of the medium itself. For example if a liquid is heated from below, the lower part gets warmer and as a result expands. The warmer liquid is now less dense and therefore rises, to be replaced by the cooler liquid from above. This is in turn heated and the cycle continues.

Convective Heat Transfer (C)

The net heat exchange between a body and its environment.

Convective Heat Transfer Coefficient (H_c)

The rate of heat transfer between a body and the ambient air per m² of skin exposed, expressed as kcal, Btu, or W.

Dew

The formation of moisture droplets on or near the ground. Occurs when an object's temperature has fallen below the dew point temperature of the surrounding air.

Dew Point

The temperature at which the water vapour in the air first starts to condense, typically expressed in °C.

DSE

See *Display Screen Equipment*

EMC

Electro Magnetic Compatibility – European Standards.

EN

European standard prefix.

EPA

Environmental Protection Agency (USA)

Eutrophication

Occurs when phosphates and nitrates collect in reservoirs/rivers and cause accelerated plant growth, especially surface algae. In turn this prevents light from reaching other plant life, which in time die. The algae's rapid growth and the decomposition of the dead plant matter uses up the available oxygen in the water resulting in widespread bacteria which do not rely upon oxygen. The bacteria produce hydrogen sulphide, a toxic gas, which kills most animal life in the water.

Evaporation

The loss of liquid as it changes from the liquid to gaseous phase:

- Evaporation gauge – See *Atmometer*
- Hook gauge – Used to measure the change in water level in an evaporation pan. Normally placed in a still well, the hook is adjusted till the point just breaks the surface of the water. The change in water level is read off the attached micrometer
- Evaporation pan – A means of observing the change in level of a free water surface for example the Casella CEL class 'A' pan
- Evaporation rate – The volume of liquid

water evaporated per unit area in unit time. Usually measured as the depth of liquid lost per unit time for the whole area

- **Evaporative power/capacity** – A measurement of the degree to which the weather or climate of a region is favourable to evaporation. Normally recognised as the rate of evaporation, under the current conditions, from a surface, which is chemically pure and has the same temperature as the lowest layer in the atmosphere
- **Piche evaporimeter** – An instrument that uses a filter paper disc as an evaporating element. The amount of water evaporated is read on a graduated tube

Fahrenheit

Temperature scale where the ice point of water is 32°F and the boiling point of water is 212°F at sea level.

Freezing Point

The temperature at which a substance turns from its liquid phase to its solid phase.

Hail

Irregular lumps of ice with diameters normally ranging from 5 to 50mm.

Hydrometeor

A term for atmospheric water in any of its states, i.e. clouds, rain, mists, hail.

Hyperpyrexia

A body core temperature exceeding 40°C (104°F).

Hysteresis

The maximum difference in output for any given input (within the specified range) when the value is approached first with increasing and then with decreasing input signals.

Isobar

An imaginary line connecting points of equal pressure.

Isotherm

An imaginary line connecting points of equal temperature.

Knot

Nautical unit of speed. One nautical mile per hour equals 1.1508 statute miles per hour.

Leachate

The liquid arising from landfill sites, derived directly and indirectly from waste materials. It can be highly polluting.

LUX

The luminescence per square metre, of surface area.

Mains Voltage and Frequency

- UK – 230V -10% +5% @ 50Hz
- Europe – 220V +10% -5% @ 50Hz
- USA – 110V @ 60Hz

Maximum Thermometer

Used to record the maximum temperature over a period of time by having a constriction in the bore just above the bulb as shown below.



The thermometer is mounted at about 5° from the horizontal, with the bulb downwards. To set the thermometer it is grasped firmly about half way along the stem and given a shake by a quick rotation of the wrist as shown above.

Mean Radiant Temperature – tr

Value associated with the radiation temperature in °C experienced by the operative from radiating surfaces. These surfaces act as heat sources that will add to the heat load of the operative and consequently cause the core temperature to rise.

Meniscus

The upper curved surface on a column of liquid due to surface tension.

Micron

1 millionth of a metre, 1 x 10⁻⁶m.

Minimum Thermometer

Used to record the minimum temperature over a period of time. When the temperature falls, the surface tension of the column top is high enough to draw the index down the bore. When the temperature rises again the index remains in its lowest position. The minimum temperature is indicated by the end of the index furthest from the bulb. To reset, raise the bulb end so that the index runs along the bore to touch the column end, see below



Mist

Liquid droplets suspended in the atmosphere. Mist reduces visibility to a lesser extent than fog.

Modem - Modulator/Demodulator

A device that allows computers or electrical equipment to communicate using telephone lines.

MSL

Mean Sea Level

Natural Wet-Bulb Temperature

A temperature sensor covered with a wet wick that measures the cooling effect due to evaporation in ambient air conditions.

Parameter

A measured or calculated value.

Particulate

- **Aerosol** – Liquid or solid particles suspended in air
- **Mist or Fog** – Liquid aerosol, fog is made up of larger particles than mist
- **Dust** – Solid particles in the air, produced by an abrasive or mechanical action
- **Fumes** – Solid particles formed by condensation after volatilisation of welding or flame cutting
- **Smokes** – Similar size to fumes, produced during combustion

Period Data

A measured sound level data set generated over an interval of observation which is shorter than a run-time interval and which may be repeated many times during the run-time.

PM₁₀

Particulate matter having a mean aerodynamic diameter of 10 microns, usually relates to ambient particulate monitoring.

PPB

Parts Per Billion

PPM

Parts Per Million

Precipitation

Occurs when moisture droplets form in clouds and the up current is no longer able to support them. Rising air causes the water in it to condense.

Pressure (P), hPa, mb.

Barometric pressure is concerned with measuring the weight of air above the measuring device. Typically, high pressure is associated with good weather and low pressure is associated with poor weather.

Measurement is generally related to a common datum point i.e. mean sea level = QNH, runway elevation = QFE.

Pressure, Atmospheric (p_a)

Pressure exerted by the weight of the air, it is 760mmHg at sea level and decreases with altitude and increases with depth

Pressure Drop (Back Pressure)

The differential pressure across a restriction, such as a filter; normally measured in cm of H₂O.

Psychrometer

An aspirated instrument used to measure the water vapour content of the air. Uses a wet bulb and dry bulb thermometer.

Radiant Heat Exchange (R)

Heat exchange by two radiant surfaces at different temperatures.

Radiant Heat Transfer Coefficient (h_r)

The rate of heat transfer between two black surfaces, per unit temperature difference.

Radiation – Solar

- **Net Radiation** – The difference between incoming and outgoing total radiation
- **Net Solar Radiation** – The difference between solar radiation directed downward and upward
- **Solar Radiation** – Total electromagnetic radiation emitted by the sun
- **Global Radiation** – The total of direct solar radiation and diffuse sky radiation received by a unit's horizontal surface

- Diffuse Solar Radiation – Downward scattered and reflected solar radiation, coming from the whole hemisphere with the exception of the solid angle of the suns disc on a surface perpendicular to the axis of this cone
- Direct Solar Radiation – Radiation coming from the solid angle of the suns disk, opposed to radiation from any other source
- Reflected Solar Radiation – Upward directed solar radiation, reflected by the earth's surface and the atmosphere
- Scattered Radiation – Solar radiation that is scattered by particles in the atmosphere
- Spectral Solar Radiation – Solar radiation of selected wavelengths
- Total Radiation – The sum of Solar and Terrestrial radiation
- Terrestrial Radiation – Total infra-red radiation emitted from the Earth's surface

Rain

Precipitation at least 0.5mm in diameter, may reach 5mm by coalescence, at this point they can no longer be held within the cloud and fall.

Rain Gauges

An instrument to measure the total depth of rain fall over a specified time period.

Real-Time

The monitoring of changes to parameters as they occur.

Relative Humidity (%RH or U)

This term is the ratio between the partial pressure of water vapour and the water vapour saturation pressure. This value is often expressed as a percentage.

Repeatability

The ability of an instrument to record the same consecutive output value, from the same input values operating under the same conditions.

Resolution

Smallest incremental change which can be measured by an instrument.

Response Time

The time it takes an instrument to register a designated percentage (usually 90%) of a step change in the variable being measured.

Run-Time

The measurement time elapsing from start to finish.

Sensor

A device that responds to a change in condition.

Stevenson Screen

Slatted box design to shield meteorological instruments from direct radiation and precipitation.

Still Well

A cylinder placed in a body of water or evaporation pan, to hold a float or hook gauge. It allows water in and out thus providing an accurate representation of the water level, whilst proving a calm level surface to take a measurement from.

Telemetry

The transmission of data over a distance.

Temperature (T)°C

The degree or intensity of heat of a body in relation to others.

Temperature, Core (t_c)

Temperature of the tissues and organs of the body, sometimes called Deep Body Temperature.

Temperature, Radiant (t_r)

See Black Globe Temperature

Thermohygrograph

Device for recording temperature and humidity onto a chart.

Charts available:

- Daily
- Weekly
- Monthly

Transducer

A device which converts one form of energy to another, for example wind energy to electrical energy in an anemometer.

Turbulence Intensity

Expressed as a percentage and is calculated from the ratio of the standard deviation to the average measured air flow.

Vapour

Liquid or moisture diffused or suspended in air.

Vaporisation

Process by which a liquid or solid is converted into a vapour by heat/energy. Unlike boiling, which occurs at a fixed temperature, vaporisation can occur at any temperature. Its rate increases with rising temperatures.

Wet Bulb Depression

The difference between the wet and the dry bulb temperatures of a hygrometer.

Wind

- Anabatic wind – An up-slope wind due to local surface heating, opposite of katabatic wind
- Backing – A change in wind direction in a counter clockwise movement, opposite of veering
- Cross wind– Wind speed perpendicular to a given reference heading, for example a runway heading
- Downdraft – A relatively small scale downward moving current of air.
- Downwind – The direction to which the wind is blowing
- Foehn – A warm, dry wind on the lee side of a mountain range, caused by adiabatic compression on descent
- Gravity wind – A wind directed down a slope caused by a greater air density near the slope than at the same level some distance horizontally from the slope. Sometimes called a Katabatic wind
- Gust – Sudden brief increase in the speed of the wind, followed by a lull
- Head wind – Wind blowing in the opposite direction to the heading of a moving object
- Katabatic wind – Any wind blowing down an incline, if warm it is foehn, if cold it is a gravity wind
- Leeward – Side facing away from the wind
- Local level wind sheer – A local variation

in the wind direction or speed, i.e. changes from a head wind to a tail wind

- Lull – A momentary decrease in the speed of the wind
- Monsoon – Seasonal wind with a persistent direction, pronounced change in direction between seasons
- Tail wind – A wind blowing in the same direction as a moving object
- Upwind – In the direction from which the wind is blowing
- Veering – A change in wind direction in a clockwise movement, the opposite of backing
- Wind sheer – Local variation of any kind of wind vector
- Windward – Side facing the wind

Wind Velocity

A vector which includes both the wind speed and direction.