



DRAFT TANZANIA STANDARD

Air quality – General considerations

Part 1: Vocabulary

Draft for stakeholders comments only

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0 Foreword

In order to assess, and consequently to protect our environment, standardization of communication, procedures and permissible limits are inevitable. This Tanzania Standard deals with the vocabulary of common terms in English, related to air quality.

The list of terms given in this Tanzania Standard is not exhaustive. Further terms may be added in reviewing the standard as the need arises. In some other standards dealing with specific aspects, terms may also be defined. If there is a difference, the meaning given in a particular standard will hold.

The terms and meanings given in this Tanzania Standard are adopted from:

ISO 4225: 1994, *Air Quality – General aspects – Vocabulary*, published by the International Organization for Standardization (ISO).

1 Scope

This draft Tanzania Standard explains the meanings of a selection of terms commonly used in connection with sampling and measurement of gases, vapours and particles for the determination of air quality.

2 Terms and definitions

2.1 abatement

Reduction or lessening to eliminate type of discharge or pollutant.

2.2 aerosol

Suspension in a gaseous medium of solid particles, liquid particles or solid and liquid particles having a negligible falling velocity.

2.3 air pollutant

Any material emitted into the atmosphere either by human activity or natural processes and adversely affecting man or the environment. The term can also be used in heat, noise, etc.

2.4 air pollution

Usually the presence of substances in the atmosphere resulting either from human activity or natural processes, present in sufficient concentration, for a sufficient time and under circumstances such as to interfere with comfort, health or welfare of persons or the environment.

2.5 aitken nuclei

Small particles less than 0.1 μm in diameter which normally exist in the atmosphere in numbers varying from a few thousand to a few hundred thousand per milliliter. They are

emitted into the atmosphere by anthropogenic and natural processes. They are also formed in the atmosphere by physical and chemical processes.

2.6 ambient air

Outdoor air to which people, plants, animals or material may be exposed.

2.7 ambient air quality

State of the ambient air as indicated by the degree of contamination.

2.8 ambient air quality standard

Specified quality of the ambient air having a legal status, frequently defined statistically by setting limit to the concentration of an air pollutant over a specified averaging time.

2.9 arrester

Equipment designed to remove particles from a gaseous medium.

2.10 ash

Solid residue remaining after combustion of carbonaceous materials. Ash may contain incompletely burned fuel, although, for analytical purposes, complete combustion is often assumed.

2.11 atmosphere (on the earth)

Entire mass of air which surrounds the earth.

2.12 averaging time

Interval of time over which the air quality has been expressed as an average.

2.13 background concentration (of air pollution)

The portion of air quality, which cannot be directly related to the sources under study.

2.14 bag filter

Fabric shaped to remove particles from a gas stream by filtration.

2.15 baghouse

Assembly of filters and a mechanism for discharging particles into containers inside a protecting outer structure (see 2.14, bag filter).

2.16 breathing zone

Immediate portion of the atmosphere from which humans breathe. This consists of a hemisphere, generally accepted to be 3 dm in radius, extending in front of the humans face centred on the midpoint of a line joining the ears. The base of the hemisphere is the plane through this line, the top of the head and the larynx.

2.17 bubbler

Apparatus for passing a gas sample through a liquid absorption medium. The gas inlet tube terminates beneath the surface of the liquid and may be fitted with a distributor to disperse the gas thoroughly in the liquid.

2.18 cascade impactor

Device for simultaneously collecting particles separately in a number of size ranges by impaction, depending on the momentum.

2.19 chimney effect

Phenomenon consisting of upward movement of a localized mass of air or other gases caused by temperature differences.

2.20 cut-of

Size of particles at which the retention efficiency of an instrument device drops below a specified value under defined conditions.

2.21 cyclone

- a) Dust (and grit) or droplet separator utilizing essentially the centrifugal force derived from the motion of the gas.
- b) Large circulatory wind system around a region of low atmospheric pressure (meteorology).

2.22 dispersion parameters, Gaussian

Parameters, in terms of sigma values, which describe the size of an assumed Gaussian plume or puff as a function of travel distance or time. They vary with atmospheric stability.

2.23 droplet

Small liquid particle of such size and density that it will fall under still conditions but may remain suspended under turbulent conditions, mainly in the size range less than 200 μm .

2.24 dry adiabatic lapse rate

The atmospheric condition occurs when lapse rate is the same as that for an adiabatically rising parcel of dry air (about $10^\circ\text{C}/\text{km}$),

2.25 dust

Small solid particles, conventionally taken as those particles below $75 \mu\text{m}$ in diameter, which settle out under their own weight but which may remain suspended for some time (see 2.41, grit).

2.26 effective chimney height

Height used for the purposes of calculating the dispersion of emitted gases for a chimney, and which differs from the real chimney height by an amount which depends on such factors as the exit velocity, buoyancy effects and wind speed; it may be affected by topography.

2.27 electrostatic precipitator

Device for removing particles from a gas stream. The gas is passed between sets of electrodes across which a very high voltage is maintained. The particles are charged, attracted to the highly charged electrodes and deposited on the electrodes.

2.28 elutriation

Method of separating particles using the difference in settling velocity which may exist between the particles when they are suspended in a flowing fluid.

2.29 emission

Discharge of substances into the atmosphere. The point or area from which the discharge takes place is called the "source". The term is used to describe the discharge and the rate of discharge. The term can also be applied to noise, heat, etc.

2.30 emission concentration

Concentration of air pollutant in an emission at its point of discharge.

2.31 emission factor

Expression for the ratio of the rate at which an air pollutant is emitted as a result of some activity. For example: Kilograms of sulphur dioxide emitted per tonne of steel produced.

2.32 emission flux

Emission rate per unit area of the appropriate surface of an emitting source

2.33 emission rate

Mass (or other physical quality) of pollutant transferred into the atmosphere per unit time.

2.34 emission standard

Specified emission rate having a legal status. It is frequently defined statistically by setting a limit to the rate emission or concentration at a defined dilution level or opacity.

2.35 equivalent diameter

Diameter of a spherical particle which will impart geometric, optical, electrical or aerodynamic behaviour identical to that of the particle being examined.

2.36 fly ash

Finely divided particles of ash entrained in flue gases arising from combustion of fuel.

2.37 fog

General term applied to a suspension of droplets in a gas. In meteorology, it refers to a suspension of water droplets resulting in a visibility of less than 1 km.

2.38 fume

Aerosol of solid particles, usually from metallurgical processes, generated by condensation from the gaseous state, generally after volatilization for melted substances and often accompanied by chemical reactions such as oxidation.

2.39 fumes

In popular usage, a term often taken to mean airborne effluent, unpleasant and malodorous, which might arise for chemical processes.

2.40 fumigation

Atmospheric phenomenon in which pollution that has been retained by an inversion layer is brought rapidly to ground level by turbulence when an inversion breaks up.

2.41 grit

Airborne solid particles in the atmosphere of flues (particle size greater than 75 μm) (see 2.25, dust).

2.42 ground level concentration

Amount of solid, liquid or gaseous material per unit volume of air usually measured at a specified height. Normally below turbulent level.

2.43 haze

Suspension in the atmosphere of extremely small particles, individually invisible to the naked eye, but which are numerous enough to give the atmosphere an appearance of opalescence together with reduced visibility. Normally height below the turbulent level.

2.44 immission

Transfer of pollutants from the atmosphere to a "receptor"; for example, pollutants retained by the lungs. It does not have the same meaning as ground level concentration, but is the opposite in meaning to emission

NOTE 1 – In this sense, the term "immission" is not normally used in the English language.

2.45 immission dose

Integral of the immission flow into the receptor over the exposure period.

2.46 immission flux

Immission rate referred to the unit surface area of the receptor.

2.47 immission rate

Mass (or other physical quality) of pollutant transferring per unit time into a receptor

2.48 impinger

Sampling instrument employing impaction and retention for the collection of particles and gases.

2.49 indoor air

Air within enclosed space, e.g. dwelling or public building.

2.50 interferent

Any component of the air sample, excluding the measured constituent that affects the result of the measurement.

2.51 isokinetic sampling

Method of sampling particulate matter suspended in a gas stream, in such a way that the sampling velocity (speed and direction) is the same as that of the gas stream at the sampling point.

2.52 lapse rate

Variation of an atmospheric variable with height, the variable being temperature unless otherwise stated.

This variation is taken as positive when temperature decreases with increasing height. If meteorological conditions are such that the atmospheric lapse rate is the same as that for an adiabatically rising parcel of dry air (about 10°C /km), the atmosphere is said to have a dry adiabatic lapse rate.

2.53 measurement period

Interval of time between the first and last measurements.

2.54 micrometeorology

That portion of the science of meteorology that deals with the observation and explanation of the smallest-scale physical and dynamic occurrences within the atmosphere.

So far, studies in this field are confined to the surface boundary layer of the atmosphere, that is from the earth's surface to an altitude where the effects of the immediate underlying surface upon air motion and composition become negligible.

2.55 mist

Loose term applied to a suspension of droplets in a gas. In meteorology it relates to visibility of less than 2 km but greater than 1 km (see 2.37, fog).

2.56 monitoring

- 1) In the wide sense of the term, repeated measurement to follow changes over a period of time.
- 2) In the restricted sense of the term, regular measurement of pollutant levels in relation to some standard or in order to assess the effectiveness of a system of regulation and control.

2.57 month

For reporting integrated analyses of ambient air on a monthly rate, an average value is calculated, i.e. it is given on the basis of a 30-day month.

2.58 natural background concentration

Concentration of a given species in a pristine air mass in which anthropogenic emissions are negligible.

2.59 odorant

Substance having a distinct and characteristic smell.

2.60 odour

Property of a substance that stimulates the sense of smell.

2.61 odour panel

Group of individuals who compare the odour intensity of a substance to a reference scale, or who identify a substance by means of its odour.

2.62 odour threshold

This may be either an odour detection threshold or an odour recognition threshold.

2.63 odour detection threshold

Minimum concentration at which half of a population can detect the odour. For determination of the odour threshold, odour panels are used as a representative sample of a population

2.64 odour recognition threshold

Minimum concentration at which half of a population can identify the odour. For determination of the odour threshold, odour panels are used as a representative sample of pollution.

2.65 particles

Small discrete mass of solid or liquid matter.

2.66 photochemical reaction

Reaction which can occur when certain substances are exposed to actinic radiation.

2.67 photochemical smog

Result of reactions in atmosphere between nitrogen oxides, organic compounds and oxidants under the influence of sunlight, leading to the formation of oxidizing compounds or possibly causing poor visibility, irritation or damage to material and vegetation if sufficiently concentrated.

2.68 plume

Effluent (often visible) from a specific outlet such as a stack or vent.

2.69 plume rise

Height of the centerline of a plume above the level at which it was emitted to the atmosphere.

2.70 primary pollutant

Air pollutant directly emitted from a source, as compared to a secondary pollutant which is formed in the atmosphere.

2.71 probe

Device, commonly in the form of a tube, used for sampling or measurement inside ducts or stacks.

2.72 rain-out

Mechanism by which small particles in the clouds are removed by the formation of raindrops. (See 2.95), wash-out).

2.73 remote sensing

Determination of substances, or of emissions, or of meteorological parameters in the atmosphere, by means of instruments not in immediate physical contact with the sample being examined.

2.74 retention efficiency

Ratio of the quantity of particles retained by a separator to the quantity entering it (it is generally expressed as a percentage).

2.75 ringelmann number

Value representing the darkness of a plume of smoke assessed by visual comparison with a set of grids numbered from 0 (white) to 5 (black) (Ringelmann smoke chart).

2.76 sampling

2.76.1 continuous sampling

Sampling, without interruptions, throughout an operation or for a predetermined time.

2.76.2 grab sampling

Taking of a sample in a very short time. Also known as spot sampling.

2.77 sampling time

Interval of time over which a single sample is taken.

2.78 scavenging

Removal of pollutants from the atmosphere by natural processes.

2.79 scrubber, wet

Device by which particulate or gaseous contaminants are removed from a gas stream by contact with or impingement on wetted surfaces, or by the use of liquid sprays.

2.80 scrubbing

Process used in gas sampling or gas cleaning in which components in the gas stream are removed by contact with a liquid surface on a wetted packing, on spray drops, droplets, or in a bubbler, etc.

2.81 secondary pollutants

Pollutants which may be produced in the atmosphere by physical or chemical processes from primary pollutants or other substances present as the result of emissions from stationary or mobile sources.

2.82 settling chamber

Chamber designed to reduce the velocity of gases in order to promote the settling of particles out of the gas stream.

2.83 smog (term derived from the terms smoke and fog)

Extensive atmospheric pollution by aerosols, arising partly through natural processes and partly from human activities (see 2.68, photochemical smog).

2.84 smoke

Visible aerosol usually resulting from combustion.

NOTE 1 – This does not include steam.

NOTE 2 – In some literature, smoke is referred to quantitatively in terms of a Ringelmann number, a smoke shade, a darkness of stain or a mass of deposit collected.

2.85 smuts

Agglomerates of soot that become detached from the wall of a chimney and are swept out by the flue gas and then fall on the surrounding area.

2.86 soot

Carbonaceous particles formed in incomplete combustion and deposited before emission.

2.87 source (see 2.29, emission)

2.88 stability (of the atmosphere)

State of hydrostatic equilibrium of the atmosphere in which a parcel of air moved from its initial level undergoes a hydrostatic force which tends to restore it to this level. If the parcel that is moved undergoes no hydrostatic force, the condition is said to be one of neutral stability; if it undergoes a hydrostatic force that tends to remove it farther from its original level, the condition is one of static (or hydrostatic) instability.

2.89 suspended particulate matter

All particulate material which persists in the atmosphere or in a flue gas stream for lengthy periods because the particles are too small in size i.e $\leq 10\mu\text{m}$ to have an appreciable falling velocity.

2.90 trace metal

Metal typically found at low concentrations in the atmosphere.

2.91 transmission (Germanic term)

Combined effects of transport and atmospheric reaction on pollutants.

2.92 vapour

Gaseous phase of matter that can exist simultaneously in a liquid or solid state.

2.93 wash-out

Removal from the atmosphere of gases and sometimes particles by their solution in or attachment to raindrops as they fall; sometimes used to include rain (see 2.73, rain-out).

2.94 workplace air

Atmosphere to which a person is exposed, whether indoor or outdoor, during the hours of work at the person's workplace.

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