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Air quality — General aspects — Units of measurement

Qualité de l'air — Aspects généraux — Unités de mesurage

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 4226 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 4, *General aspects*.

This third edition cancels and replaces the second edition (ISO 4226:1993), Table 1 of which has been editorially revised.

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Introduction

The series of International Standards on air quality includes the standardization of methods for the measurement of gases, vapours and particles. In order to enable results to be compared either within or between countries, it is essential to use agreed units of measurement to report the results and other relevant information so that sound conclusions may be drawn. It is also desirable to keep the number of units of measurement to a minimum.

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Air quality — General aspects — Units of measurement

1 Scope

This International Standard lays down the units to be used when reporting results of air quality measurements.

NOTE General guidance on the International System of Units is given in ISO 1000.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 31-0, *Quantities and units — Part 0: General principles*

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

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3 Units

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The units specified in Table 1 shall be used when reporting results of air quality measurements. The units of other quantities used in reporting shall be in accordance with ISO 1000 and with the general principles concerning units specified in ISO 31-0.

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Table 1 — Units

No.	Quantity	Unit	
		Name	Symbol
3.1	**Units for substances**		
3.1.1	**Gases and vapours**		
3.1.1.1	volume or mass fraction of main constituents (for example nitrogen, oxygen, carbon dioxide in air)	percent	%
3.1.1.2	volume fraction of gaseous pollutants[a]	cubic centimetre per cubic metre cubic millimetre per cubic metre	cm^3/m^3 mm^3/m^3
3.1.1.3	molar fraction of gaseous pollutants[a]	millimole per mole micromole per mole nanomole per mole	mmol/mol µmol/mol nmol/mol
3.1.1.4	mass concentration of gaseous pollutants[b]	milligram per cubic metre microgram per cubic metre nanogram per cubic metre picogram per cubic metre	mg/m^3 $µg/m^3$ ng/m^3 pg/m^3
3.1.1.5	diffusion coefficient of gaseous pollutants	centimetre squared per second centimetre squared per minute	cm^2/s cm^2/min
3.1.2	**Particles**		
3.1.2.1	mass concentration of suspended matter[b]	milligram per cubic metre microgram per cubic metre nanogram per cubic metre picogram per cubic metre	mg/m^3 $µg/m^3$ ng/m^3 pg/m^3
3.1.2.2	size of particles	micrometre nanometre	µm nm
3.1.2.3	atmospheric dustfall[c] (deposit gauges)	gram per square metre day milligram per square metre day	$g/(m^2 \cdot d)$ $mg/(m^2 \cdot d)$
3.1.2.4	deposition rate	microgram per square metre second	$µg/(m^2 \cdot s)$
3.1.2.5	deposition velocity	centimetre per second	cm/s
3.1.2.6	number concentration (for example of biological, microbiological and other suspended matter, i.e. pollen, spores, micro-organisms, particles)[b]	reciprocal cubic metre reciprocal cubic decimetre	m^{-3} dm^{-3}
3.2	**Units for specifying the state of gas**		
3.2.1	thermodynamic temperature	kelvin	K
3.2.2	Celsius temperature	degree Celsius	°C
3.2.3	pressure	pascal kilopascal	Pa kPa
3.2.4	relative humidity (ratio of vapour pressure to saturation vapour pressure with respect to water)	percent	%
3.3	**Meteorological quantities**		
3.3.1	wind speed	metre per second	m/s
3.3.2	wind direction[d]	degree	°
3.3.3	precipitation intensity	millimetre per day millimetre per hour	mm/d mm/h

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Table 1 (*continued*)

No.	Quantity	Unit	
		Name	Symbol
3.3.4	irradiance	watt per square metre	W/m^2
3.3.5	atmospheric pressure	hectopascal kilopascal	hPa kPa
3.3.6	absolute humidity (mass of water vapour to total volume)	gram per cubic metre	g/m^3
3.3.7	mixing ratio (mass of water vapour to mass of dry air)	gram per kilogram	g/kg
3.3.8	visibility (visual range)	kilometre	km
3.4	**Time**		
		second minute hour day	s min h d
3.5	**Miscellaneous**		
3.5.1	geographical coordinates [northern (N) or southern (S) latitude] [eastern (E) or western (W) longitude][e]	degree minute second	° ′ ″
3.5.2	universal transverse Mercator (UTM) coordinates[f]	metre	m
3.5.3	altitude	metre	m

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[a] Abbreviated terms such as “ppm” (parts per million) and “ppb” [parts per (US) billion equivalent to parts per thousand million] shall not be used. A volume fraction of e.g. 4,3 cm^3/m^3 is equal to $4{,}3 \times 10^{-6}$. A volume fraction of e.g. 4,3 mm^3/m^3 is equal to $4{,}3 \times 10^{-9}$. A molar fraction of e.g. 3,0 nmol/mol is equal to $3{,}0 \times 10^{-9}$.

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[b] If concentrations are expressed in terms of mass per volume, temperature and pressure as well as humidity have to be specified (e.g. ambient conditions or specific standard conditions).

[c] When deposit gauges are used, no account is taken of the volume of air from which the atmospheric dustfall is deposited; the duration of collection of the atmospheric dustfall should also be reported.

[d] Wind direction is conventionally reported as an angle, in degrees, measured clockwise over 360° for the full circle starting from the true north as 0°.

[e] Northern latitude can also be indicated by “+”, southern latitude by “–” in front of the numbers of the degrees. Longitude can also be indicated with respect to the longitude of Greenwich by, using “+” for western longitude and “–” for eastern longitude.

[f] UTM coordinates are expressed in terms of a zone and easting and northing coordinates within this zone. The coordinates are expressed in metres.

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