



Designation: D1356 – 20a

Standard Terminology Relating to Sampling and Analysis of Atmospheres¹

This standard is issued under the fixed designation D1356; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This terminology is a collective vocabulary relating to sampling and analysis of atmospheres. As a convenience to general interest, it contains most of the standard terms, definitions, and nomenclature under the jurisdiction of Committee D22.

1.2 Many of the entries in this terminology are copied (with attribution) from the standards of origin referenced in Section 2. The standards of origin are noted in bold type at the right margin of the applicable definition.

1.3 Certain terms in the common language that comprise multiple concepts are included herein with the definition specific to standards and practices of Committee D22.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- D1357 Practice for Planning the Sampling of the Ambient Atmosphere
- D3249 Practice for General Ambient Air Analyzer Procedures
- D3614 Guide for Laboratories Engaged in Sampling and Analysis of Atmospheres and Emissions
- D3631 Test Methods for Measuring Surface Atmospheric Pressure
- D3670 Guide for Determination of Precision and Bias of Methods of Committee D22
- D3686 Practice for Sampling Atmospheres to Collect Or-

- ganic Compound Vapors (Activated Charcoal Tube Adsorption Method)
- D3687 Test Method for Analysis of Organic Compound Vapors Collected by the Activated Charcoal Tube Adsorption Method
- D4023 Terminology Relating to Humidity Measurements (Withdrawn 2002)³
- D4096 Test Method for Determination of Total Suspended Particulate Matter in the Atmosphere (High-Volume Sampler Method)
- D4240 Test Method for Airborne Asbestos Concentration in Workplace Atmosphere (Withdrawn 1995)³
- D4298 Guide for Intercomparing Permeation Tubes to Establish Traceability
- D4597 Practice for Sampling Workplace Atmospheres to Collect Gases or Vapors with Solid Sorbent Diffusive Samplers
- D5011 Practices for Calibration of Ozone Monitors Using Transfer Standards
- D5015 Test Method for pH of Atmospheric Wet Deposition Samples by Electrometric Determination
- D5096 Test Method for Determining the Performance of a Cup Anemometer or Propeller Anemometer
- D5111 Guide for Choosing Locations and Sampling Methods to Monitor Atmospheric Deposition at Non-Urban Locations
- D5366 Test Method for Determining the Dynamic Performance of a Wind Vane
- D5438 Practice for Collection of Floor Dust for Chemical Analysis
- D5466 Test Method for Determination of Volatile Organic Compounds in Atmospheres (Canister Sampling Methodology)
- D5527 Practices for Measuring Surface Wind and Temperature by Acoustic Means
- D5755 Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Surface Loading
- D6061 Practice for Evaluating the Performance of Respirable Aerosol Samplers

¹ This terminology is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.01 on Quality Control. Current edition approved Sept. 1, 2020. Published September 2020. Originally approved in 1955. Last previous edition approved in 2020 as D1356 – 20. DOI: 10.1520/D1356-20A.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

- D6177** Practice for Determining Emission Profiles of Volatile Organic Chemicals Emitted from Bedding Sets
- D6196** Practice for Choosing Sorbents, Sampling Parameters and Thermal Desorption Analytical Conditions for Monitoring Volatile Organic Chemicals in Air
- D6246** Practice for Evaluating the Performance of Diffusive Samplers
- D6552** Practice for Controlling and Characterizing Errors in Weighing Collected Aerosols
- D6785** Test Method for Determination of Lead in Workplace Air Using Flame or Graphite Furnace Atomic Absorption Spectrometry
- D7036** Practice for Competence of Air Emission Testing Bodies
- D7144** Practice for Collection of Surface Dust by Microvacuum Sampling for Subsequent Metals Determination
- D7338** Guide for Assessment Of Fungal Growth in Buildings
- D7391** Test Method for Categorization and Quantification of Airborne Fungal Structures in an Inertial Impaction Sample by Optical Microscopy
- D7439** Test Method for Determination of Elements in Airborne Particulate Matter by Inductively Coupled Plasma–Mass Spectrometry
- D7459** Practice for Collection of Integrated Samples for the Speciation of Biomass (Biogenic) and Fossil-Derived Carbon Dioxide Emitted from Stationary Emissions Sources
- D7659** Guide for Strategies for Surface Sampling of Metals and Metalloids for Worker Protection
- D7675** Test Method for Determination of Total Hydrocarbons in Hydrogen by FID-Based Total Hydrocarbon (THC) Analyzer
- E7** Terminology Relating to Metallography
- E104** Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions
- E631** Terminology of Building Constructions
- E833** Terminology of Building Economics
- E1613** Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques
- E1728** Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination

2.2 Other Documents:

- ECC Directive 98/24/EC** Risks Related to Chemical Agents at Work⁴
- EN 1540:2011** Workplace Exposure – Terminology⁵
- EPA 540-R-04-004, 2004** Contract Laboratory Program National Functional Guidelines for Inorganic Data Review⁶

⁴ Available from EUR-Lex, <http://eur-lex.europa.eu>.

⁵ Available from European Committee for Standardization (CEN), Avenue Marnix 17, B-1000 Brussels, Belgium, <http://www.cen.eu>.

⁶ Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, <http://www.epa.gov>.

- ISO 3534-2** Statistics Vocabulary and Symbols – Part 2: Applied Statistics⁷
- ISO 7708** Air Quality – Particle Size Fraction Definitions for Health-Related Sampling⁷
- ISO 13137** Workplace Atmospheres — Pumps for Personal Sampling of Chemical and Biological Agents — Requirements and Test Methods⁷
- ISO 15202-2** Workplace Air — Determination of Metals and Metalloids in Airborne Particulate Matter by Inductively Coupled Plasma Atomic Emission Spectrometry — Part 2: Sample Preparation⁷
- ISO 15202-3** Workplace Air — Determination of Metals and Metalloids in Airborne Particulate Matter by Inductively Coupled Plasma Atomic Emission Spectrometry — Part 3: Analysis⁷

3. Terminology

absolute temperature—see **temperature**.

absolute filter—see **filter**.

absorbance, *n*—the logarithm to the base of 10 of the reciprocal of *transmittance*.

absorbate, *n*—material that has been retained by the process of absorption.

absorbent, *n*—material in which absorption occurs.

absorption, *n*—a process in which one material (the absorbent) takes up and retains another (the absorbate) with the formation of an homogeneous mixture having the attributes of a solution.

DISCUSSION—Chemical reaction may accompany or follow absorption.

acceptance angle ($\pm a$, deg), *n*—the angular distance, centered on the array axis of symmetry, over which the following conditions are met: (a) wind components are unambiguously defined, and (b) flow across the transducers is unobstructed or remains within the angular range for which transducer shadow corrections are defined. **D5527**

accrediting authority, *n*—a body that evaluates the capability of a testing agency or an inspection agency, or both, in certain specific fields of activity. **D3614**

accretion, *n*—a phenomenon consisting of the increase in size of particles by the process of external additions.

accuracy, *n*—the degree of conformity of a value generated by a specific procedure to the assumed or accepted true value and includes both precision and bias. **D3670**

acoustic pathlength (*d*, (m)), *n*—the physical distance between transducer transmitter-receiver pairs. **D5527**

activated charcoal, *n*—activated charcoal refers to properly conditioned coconut-shell charcoal. **D3686**

adsorbate, *n*—material that has been retained by the process of adsorption.

⁷ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.

adsorbent, *n*—solid material on the surface of which adsorption takes place.

adsorption, *n*—a physical process in which molecules of gas, of dissolved substances, or of liquids, adhere in an extremely thin layer to the surfaces of solid bodies with which they are in contact.

aerosol, *n*—a dispersion of solid or liquid particles in a gaseous medium.

agency, *n*—an organization or part of an organization engaged in the activities of testing or inspection, or both. **D3614**

agglomeration, *n*—a process of contact and adhesion whereby the particles of a dispersion form clusters of increasing size.

air at normal conditions (standard air), *n*—air at 50 % relative humidity, 25°C and 101.3 kPa (77°F and 760 mm Hg). See also **atmosphere**.

air change rate, *n*—the volumetric flow rate (volume per unit time) of air entering a space or enclosure divided by the net volume of air in that space or enclosure (1/s, 1/h). **D6177**

DISCUSSION—The entering air may be outdoor air or conditioned air. The space may be an entire building, a room or a chamber used for material emissions and other testing. When using the term *air change rate*, it is important to specify whether the entering air is outdoor or conditioned, as well as the space being considered. The net volume of air in a space or enclosure may be different from the internal volume when the contents (for example, materials being tested for emissions) displace a significant amount of air within the space or enclosure. Requirements for accounting for the net volume of air in determining the air change rate, including clear identification of when the displacement is considered significant, are covered in the individual standards using the definition.

air emission testing body, *n*—a company or other entity that conducts Air Emission Testing. **D7036**

air pollution, *n*—the presence of unwanted material in the air.

DISCUSSION—The term *unwanted material* here refers to material in sufficient concentrations, present for a sufficient time, and under circumstances to interfere significantly with comfort, health, or welfare of persons, or with the full use and enjoyment of property.

aliquot, *n*—a representative portion of the whole that can be expressed as the inverse of an integer.

ambient, *adj*—surrounding on all sides.

analytical recovery, *n*—ratio of the mass of analyte measured to the known mass of analyte in the sample, typically expressed as a percentage. **D7439**

analyzer, *n*—the instrumental equipment necessary to perform automatic analysis of ambient air through the use of physical and chemical properties and giving either cyclic or continuous output signal. **D3249**

analyzer system, *n*—all sampling, analyzing, and readout instrumentation required to perform ambient air quality analysis automatically. **D3249**

full scale, *n*—the maximum measuring limit for a given range of an analyzer. **D3249**

lag time, *n*—the time interval from a step change in the input concentration at the analyzer inlet to the first corresponding change in the analyzer signal readout. **D3249**

linearity, *n*—the maximum deviation between an actual analyzer reading and the reading predicted by a straight line drawn between upper and lower calibration points.

DISCUSSION—This deviation is expressed as a percentage of full scale. **D3249**

minimum detection limit, *n*—the smallest input concentration that can be determined as the concentration approaches zero. **D3249**

noise, *n*—random deviations from a mean output not caused by sample concentration changes. **D3249**

open path analyzer, *n*—an analytical system that measures the average atmospheric or emission compound concentration along one or more monitoring paths open to the atmosphere. See **monitoring path**.

operating humidity range of analyzer, *n*—the range of ambient relative humidity of air surrounding the analyzer, over which the analyzer will meet all performance specifications. **D3249**

operating temperature range of analyzer, *n*—the range of ambient temperatures of air surrounding the analyzer, over which the monitor will meet all performance specifications. **D3249**

operational period, *n*—the period of time over which the analyzer can be expected to operate unattended within specifications. **D3249**

output, *n*—a signal that is related to the measurement, and intended for connection to a readout or data acquisition device.

DISCUSSION—Usually this is an electrical signal expressed as millivolts or milliamperes full scale at a given impedance. **D3249**

range, *n*—the concentration region between the minimum and maximum measurable limits. **D3249**

readout instrumentation, *n*—output meters, recorder, or data acquisition system for monitoring analytical results. **D3249**

response time, *n*—the time interval from a step change in the input concentration at the analyzer inlet to an output reading of 90 % of the ultimate reading. **D3249**

rise time, *n*—response time minus lag time. **D3249**

sample system, *n*—equipment necessary to provide the analyzer with a continuous representative sample. **D3249**

span drift, *n*—the change in analyzer output over a stated time period, usually 24 h of unadjusted continuous operation, when the input concentration is at a constant, stated upscale value.

DISCUSSION—Span drift is usually expressed as a percentage change of full scale over a 24-h operational period. **D3249**

zero drift, *n*—the change in analyzer output over a stated time period of unadjusted continuous operation when the input concentration is zero; usually expressed as a percentage change of full scale over a 24-h operational period.

See also **point analyzer**. **D3249**

analyzer system—see **analyzer**.

area sampler—see **static sampler**.

area sampling—see **static sampling**.

arrester, *n*—a term for an air cleaning device.

aspect ratio, *n*—ratio of the length of a particle to its width.
adapted from D5755

aspirated psychrometer—see **psychrometer**.

aspirator, *n*—any apparatus such as a squeeze bulb, fan, pump, or venturi that produces a movement of a fluid by suction.

atmosphere, *n*—the gaseous envelope which surrounds the earth and includes ambient air, indoor air, and workplace air. See also **air at normal conditions**.

synthetic atmosphere, *n*—a specific gaseous mass containing any number of constituents and in any proportion produced for a special purpose.

backdrafting, *n*—the reversal of the normal (upward) direction of air flow in a vent for a vented combustion appliance (boiler, fireplace, furnace, or water heater), when the vented appliance is operating.

bias, *n*—a systematic (nonrandom) deviation of the method average value or the measured value from an accepted value.
D3670

laboratory bias, *n*—systematic differences between the true value and a value reported by a laboratory due to errors of application such as losses, contamination, miscalibration, and faulty manipulations, for example.
D3670

method bias, *n*—systematic departures of the limiting mean from the true value of the parameter measured caused by physical or chemical phenomena inherent in the methodology.
D3670

biogenic CO₂, *n*—CO₂ recently (in a geological time scale) removed from the atmosphere by plants, then returned to the atmosphere by combustion or biogenic decay.
adapted from D7459

DISCUSSION—Biomass CO₂ emitted from combustion devices is often referred to as “carbon-neutral CO₂” and is distinguished from fossil CO₂.

DISCUSSION—Biomass carbon contains the isotope radiocarbon (carbon-14) in measurable quantities. It decays exponentially with a half-life of about 5700 years and as such is not measurable in fossil materials derived from petroleum, coal, natural gas, or any other source more than about 50 000 years old.

blank substrate, *n*—a collection medium or substrate coming from the same batch as the sampling medium, but not intentionally exposed in the field.
D6552

boroscope, *n*—device for internal inspection of difficult access locations such as wall cavities. Its long narrow tube contains a telescope system with a number of relay lenses. Light is provided via the optical path or fiber bundles.
D7338

breathing zone, *n*—space around the nose and mouth from which breath is taken.
EN 1540:2011

DISCUSSION—Technically the breathing zone corresponds to a hemisphere (generally accepted to be 30 cm in radius) extending in front of the human face, centered on the midpoint of a line joining the ears. The

base of the hemisphere is a plane through this line, the top of the head and the larynx. This technical description is not applicable when respiratory protective equipment is used.

bubbler, *n*—a sampling device consisting of a gas disperser immersed in an absorbing liquid.

fritted bubbler, *n*—a bubbler having a frit as the gas disperser.

building envelope, *n*—the outer elements of a building, both above and below ground, which divide the external from the internal environments.
D7338
E631

DISCUSSION—Commonly included are exterior walls, windows, doors, roofs and subfloors.

calibration curve, *n*—a plot of instrument response versus concentration of standards.
EPA 540-R-04-004, 2004

candidate method, *n*—an analytical method or measurement process being considered for standardization.

DISCUSSION—A method is a *candidate* until completion of all phases of the consensus process specified by ASTM regulations for a proposal, an emergency standard, or a standard.
D3670

capillary action, *n*—(or *capillary migration*), of water, movement of water induced by the force of molecular attraction (surface tension) between the water and the material it contacts.
E631
D7338

cascade impactor—see **impactor**.

carpet-embedded dust—see **dust**.

chemical agent, *n*—any element or compound, on its own or as it occurs in the natural state or as produced, used, or released including release as waste, by any activity, whether or not produced intentionally and whether or not placed on the market.
adapted from ECC Directive 98/24/EC

DISCUSSION—Biological agents are excluded from this definition.

chemisorption, *n*—adsorption, especially when irreversible, by means of chemical forces in contrast with physical forces.

chimney effect, *n*—a phenomenon consisting of a vertical movement of a localized mass of air or other gases due to temperature differences.

circular impaction sample, *n*—a sample of airborne particulate matter collected via a device that draws air through a round aperture at a specified rate, impacting the particles suspended in the air onto an adhesive medium, resulting in a circular area of deposition. A circular impaction sample may be collected by means of a cassette manufactured for that purpose, or by means of a sampling device that requires slides to be pre-coated with impaction medium.
D7391

cloud, *n*—any collection of particulate matter in the atmosphere dense enough to be perceptible to the eye, especially a collection of water drops.

cloud water, *n*—an aggregate of condensed water vapor or ice crystals that are suspended in the atmosphere.

DISCUSSION—Cloud water droplet sizes are typically less than those of precipitation, measuring between 1 and 100 μm in diameter.
D5111

cloud water—see **cloud**.

coalescence, *n*—a process by which the particles of a dispersion combine into one body.

collaborative test, *n*—an interlaboratory study of a test method wherein the participants analyze or make measurements on subsamples of the same test material.

DISCUSSION—If the test method includes the sampling of atmospheres, the participants should sample the same test atmosphere, as possible. **D3670**

collection efficiency—see **efficiency**.

collector, *n*—a device for removing and retaining contaminants from air or other gases.

DISCUSSION—Usually this term is applied to cleaning devices in exhaust systems.

colorimeter, *n*—an instrument used for color measurement based on optical comparison with standard colors.

combustion system downdrafting, *n*—the reversal of the ordinary (upward) direction of air flow in a combustion system when vented combustion appliances are not operating.

DISCUSSION—The term “cold backdrafting” is used synonymously with combustion system downdrafting.

combustion system spillage, *n*—entry of combustion products into a building, caused by backdrafting, vent blockage, or a leaky heat exchanger.

concentration, *n*—the quantity of a substance contained in a total unit quantity of sample.

mass concentration, *n*—concentration expressed in terms of mass of substance per unit volume of gas or liquid.

ppb(v), *n*—a unit of measure of the concentration of gases in air expressed as parts of the gas per billion (10⁹) parts of the air-gas mixture, both by volume.

ppm(v), *n*—a unit of measure of the concentration of gases in air expressed as parts of the gas per million parts of the air-gas mixture, both by volume.

vapor concentration, *n*—concentration expressed in terms of gaseous volume of substance per unit volume of air or other gas usually expressed in percent or parts per million by volume. See also **absolute humidity**.

volume concentration, *n*—concentration expressed in terms of gaseous volume of substance per unit volume of air or other gas usually expressed in percent or parts per million.

condensate, *n*—liquid or solid matter formed by condensation from the vapor phase.

DISCUSSION—In sampling, the term is applied to the components of an atmosphere which have been isolated by simple cooling.

condensation, *n*—the process of converting a material in the gaseous phase to a liquid or solid state by decreasing temperature or by increasing pressure, or both.

DISCUSSION—Usually in air sampling only cooling is used.

condensation sampling—see **sampling**.

condensoid, *n*—the particles of a dispersion formed by condensation.

constant flow high-volume sampler—see **sampler**.

confidence interval, *n*—range of values that has a specified probability of including the true value of the parameter(s) of an underlying distribution. **Ignacio and Bullock, 2006⁸**

contaminant, *n*—a material added by human or natural activities which may, in sufficient concentrations, render the atmosphere unacceptable.

DISCUSSION—Contaminants refer to gases, vapors, mists, aerosols, fumes, particles, or dusts, and so forth, that are airborne. The term does not apply to elements that make up the components of the earth’s atmosphere, such as nitrogen, oxygen, argon, and so forth. **D1357**

continuing calibration blank (CCB), *n*—a solution containing no added analyte, that is used to verify blank response and freedom from carryover. **E1613**

DISCUSSION—The CCB must be analyzed after the CCV. The measured concentration of the CCB should not exceed 10 % of the applicable occupational exposure limit or minimum level of concern.

continuing calibration verification (CCV), *n*—a solution (or set of solutions) of known analyte concentration used to verify freedom from excessive instrumental drift; the concentration is to be near the mid-range of a linear calibration curve. **E1613**

DISCUSSION—The CCV must be matrix matched to the acid content present in sample digestates or extracts. The CCV must be analyzed before and after all samples and at a frequency of not less than every ten samples. The measured value is to fall within ±10 % of the known value.

continuous sampling—see **sampling**.

controlled-pore filter—see **filter**.

conventional respirable concentration, C_R (mg/m³), *n*—the concentration measured by a conventional (that is, ideal) respirable sampler and given in terms of the size distribution dC/dD as follows:

$$C_R = \int_0^{\infty} dD E_R dC/dD$$

DISCUSSION—Note that samples are often taken over an extended time period (for example, 8 h), so that dC/dD above represents a time-averaged, rather than instantaneous, size distribution. **D6061**

count median size, *n*—a measurement of particle size of samples of particulate matter, consisting of that diameter of particle such that one half of the number of particles is larger and half is smaller.

cryogen, *n*—a refrigerant used to obtain very low temperatures. **adapted from D5466**

DISCUSSION—A typical cryogen is liquid argon (bp −185.7°C) or liquid nitrogen (bp −195°C).

cumulative sample—see **sample**.

debris rating, *n*—a distinct value assigned to an impactor sample based on the percentage of the sample area potentially obscured by particulate matter, and ranging from 0 to 5. **D7391**

⁸ Ignacio, J. S., and Bullock, W. H., *A Strategy for Assessing and Managing Occupational Exposures*, Third Edition. American Industrial Hygiene Association, Fairfax, VA, 2006.

delay distance (D), *n*—the distance the air flows past a wind vane during the time it takes the vane to return to 50 % of the initial displacement. **D5366**

density, *n*—the mass per unit volume of substance.

denuder, *n*—a device designed to collect or remove gases from an air stream by diffusion to a collecting surface or secondary air stream while permitting the passage of particles. **D5111**

deposition, *n*—the transfer of an atmospheric constituent to a surface due to gravity or another mechanism, or the material which is transferred.

*dry deposition, *n**—all forms of deposition derived from the net vertical transfer of chemical species to a surface that are not the result of precipitation.

DISCUSSION—Dry deposition includes both turbulent diffusion and gravitational settling. Dew and frost are anomalous forms of dry deposition which rely upon a near-surface condensation process as their principle means of effecting the net vertical transfer. **D5111**

*wet deposition, *n**—the precipitation of water from the atmosphere in the form of hail, rain, sleet, and snow.

DISCUSSION—Deposits of dew, fog, and frost are excluded. See also *meteorological precipitation* under **precipitation**. **D5111**

descriptive statistics, *n*—simple metrics of a sample distribution's characteristics such as central tendency (for example, mean, median) and dispersion (for example, standard deviation, variance, range). **Ignacio and Bullock, 2006⁸**

DISCUSSION—Additional examples are the number of samples and the actual fraction of samples above a decision value or a limit value.

desorption, *n*—the process of freeing from a sorbed state.

dew, *n*—water vapor that has condensed onto a surface near the ground because of radiational cooling of that surface to a temperature that is below the dew point of the air surrounding the surface. **D5111**

dew cell, dew probe, *n*—an instrument that measures the temperature at which a saturated salt solution (usually of lithium chloride) is in equilibrium with the water vapor in moist air. **D4023**

dew-frost-point hygrometer—see **hygrometer**.

dew-point temperature—see **temperature**.

dew probe—see **dew cell**.

diffusion, molecular—see **molecular diffusion**.

diffusive sampler, *n*—device which is capable of taking samples of gases or vapors from the atmosphere at a rate controlled by a physical process such as gaseous diffusion through a static air layer or permeation through a membrane, but which does not involve the active movement of air through the sampler. **D6246**

diffusive sampling rate, *n*—in diffusive sampling, the ratio of mass of a given compound collected by a diffusive sampler per unit time of exposure to the concentration of that compound in the atmosphere being sampled. **adapted from D4597**

DISCUSSION—This is sometimes referred to as the uptake rate, with final units of volume per unit time.

dispersion, *n*—the most general term for a system consisting of particulate matter suspended in a fluid.

dispersoid, *n*—the particles of a dispersion.

distance constant (L, m), *n*—the distance the air flows past a rotating anemometer during the time it takes the cup wheel or propeller to reach $(1 - 1/e)$ or 63 % of the equilibrium speed after a step change in wind speed.

DISCUSSION—The response of a rotating anemometer to a step change in which wind speed increases instantaneously from $U = 0$ to $U = U_f$ is:

$$U_t = U_f(1 - e^{-(t/\Gamma)})$$

where:

U_t = instantaneous indicated wind speed at time t , m/s,
 U_f = final indicated wind speed, or wind tunnel speed, m/s,
 t = elapsed time after the step change occurs, s, and
 Γ = time constant of the instrument.

Distance constant is: $L = U_f\Gamma$

D5096

diurnal, *adj*—recurring daily.

DISCUSSION—Applied to (variations in concentration of air contaminants, diurnal indicates variations that follow a distinctive pattern and which recur from day to day.

DOP, *n*—dioctyl phthalate (di-2-ethylhexyl phthalate).

droplet, *n*—a small liquid particle of such size and density as to fall under still conditions but which may remain suspended under turbulent conditions.

dry-bulb temperature—see **temperature**.

dry deposition—see **deposition**.

dry impingement—see **impingement**.

dust, *n*—a general term, depending upon application, applied to solid particles predominantly larger than colloidal and capable of temporary suspension in air or other gases.

DISCUSSION—Dusts tend to flocculate under electrostatic forces and settle under the influence of gravity. They are typically formed from larger masses through the application of physical forces.

*dust loading, *n**—an engineering term for *dust concentration*, usually applied to the contents of collection ducts and the emissions from stacks.

*carpet-embedded dust, *n**—soil and other particulate matter, approximately 5- μ m equivalent aerodynamic diameter and larger, embedded in carpet pile and normally removable by household vacuum cleaners. **D5438**

*surface dust, *n**—soil and other particulate matter, approximately 5- μ m equivalent aerodynamic diameter and larger, adhering to floor surfaces and normally removable by household vacuum cleaners. **D5438**

dustfall—see *particle fall* under **particle**.

dust loading—see **dust**.

dynamic calibration, *n*—calibration of an analytical system using calibration gas standard concentrations generated by diluting known concentration gas standards with purified inert gas. **adapted from D7675**

efficiency, *n*—a measure of the performance of a collector.

DISCUSSION—Usually it is the ratio of the amount collected to the inlet loading, expressed in percentage.

collection efficiency, n—the percentage of a specified substance retained by a gas cleaning or sampling device.

fractional efficiency, n—the mean collection efficiency for specific size fractions of a contaminant.

DISCUSSION—Commonly this term has been applied to the performance of air cleaning equipment towards particulate matter in various size ranges.

ejector, n—a device that uses a fluid under pressure, such as steam, air, or water, to move another fluid by developing suction through differential pressure.

DISCUSSION—Suction is developed by discharging the fluid under pressure through a venturi.

electrical conductivity, n—the property of a fluid or solid that permits the passage of an electrical current as a result of an impressed emf.

DISCUSSION—It is measured by the quantity of electricity transferred across unit area per unit potential gradient per unit time. (In sampling and analysis, changes in this property are utilized to measure the presence of certain ions and compounds such as sulfur dioxide.)

electric hygrometer—see **hygrometer**.

electrostatic precipitation—see **precipitation**.

electrostatic precipitator—see **precipitator**.

elute, v—to remove sorbed materials from a sorbent by means of a fluid.

emission mixture, n—the total mixture in the outside atmosphere of emissions from all sources.

emissions, n—substances discharged into the air from a stack, vent, or other discrete source.

emission rate, n—the mass emitted per unit of time from a source or, alternatively, per unit of material or energy produced or consumed by a process.

enhancement factor, n—the correction for the departure of the mixture of air and water vapor from ideal gas laws. **D4023**

enzyme activity, n—measure of the quantity of active enzyme present. **D7338**

DISCUSSION—Enzyme activity is essential to metabolism. Specifically, beta-N-acetylhexosaminidase (NAHA) is an enzyme present in all filamentous fungi, the measurement of which has been shown to be directly proportional to the amount of fungal biomass.

event sampling—see **sampling**.

exposure, n—contact with a chemical, biological, physical or other agent over a specified time period.

DISCUSSION—Exposure is expressed as the integral of the concentration (or intensity) of the agent at the boundary of the receptor over the time period of contact, that is: $E \sim \int \{C(t)\} dt$.

exposure (by inhalation), n—situation in which a chemical or biological agent is present in the air that is inhaled by a person. **EN 1540:2011**

filter, n—a porous medium for collecting particulate matter.

absolute filter, n—a filter or filter medium of ultra-high collection efficiency for very small particles (submicrometre size) so that essentially all particles of interest or of concern are collected.

DISCUSSION—Commonly, the efficiency is in the region of 99.95 % or higher for a standard aerosol of 0.3- μ m diameter (see Practice D2986).

D4096

controlled-pore filter, n—a filter of various plastics or metals having a structure of controlled uniform pore size.

DISCUSSION—Sometimes referred to as a membrane or molecular filter.

flocculation, n—synonymous with agglomeration.

flowmeter, n—an instrument for measuring the rate of flow of a fluid (that is, liquid or gas) moving through a system.

DISCUSSION—The instrument is calibrated to give volume or mass rate of flow.

fly ash, n—the finely divided particles of ash entrained in flue gases arising from the combustion of fuel.

DISCUSSION—The particles of ash may contain incompletely burned fuel. The term has been applied predominantly to the gas-born ash from boilers with spreader stoker, underfeed stoker, and pulverized fuel (coal firing).

fog, n—a visible aggregate of condensed water vapor or ice crystals suspended in the atmosphere near the earth's surface.

DISCUSSION—Fog differs from cloud water only that it resides very close to the earth's surface.

D5111

fossil CO₂, n—CO₂ introduced into the atmosphere through the combustion or thermal dissociation of fossil materials.

D7459

DISCUSSION—Fossil-derived CO₂ is distinguished from biogenic CO₂. It is void of carbon-14 and consists entirely of the "stable carbon" isotopes carbon-12 and carbon-13.

fractional efficiency—see **efficiency**.

fractionation, n—the process of separating a mixture into components having different properties (as by distillation, precipitation, or screening).

frit, n—a porous material permeable to gas flow usually made by sintering microbeads of an appropriate material.

fritted bubbler—see **bubbler**.

frost, n—ice crystals resulting from the direct sublimation of water vapor onto a surface that is below freezing.

DISCUSSION—Frost is due to radiational cooling and only occurs when the temperature of the air in contact with the surface falls below the freezing point of water.

D5111

frost-point hygrometer—see **dew-/frost-point hygrometer under hygrometer**.

frost-point temperature—see **temperature**.

full scale—see **analyzer**.

fume, n—properly, the solid particles generated by condensation from the gaseous state, generally after volatilization from melted substances, and often accompanied by a chemical reaction such as oxidation.

DISCUSSION—Fumes flocculate and sometimes coalesce. Popularly, the term is used in reference to any or all types of contaminant, and in many laws or regulations with the added qualification that the contaminant have some unwanted action.

fungal spore, n—general term for a reproductive structure in fungi. **D7338**