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AIRGLOSS: Air Infiltration Glossary (English Edition)

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Annex V Air Infiltration Centre

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Canada, Denmark, Italy, Netherlands, Sweden, Switzerland, United Kingdom and United States of America.

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Preface

International Energy Agency

In order to strengthen cooperation in the vital area of energy policy, an Agreement on an International Energy Program was formulated among a number of industrialised countries in November 1974. The International Energy Agency (IEA) was established as an autonomous body within the Organisation for Economic Cooperation and Development (OECD) to administer that agreement. Twenty-one countries are currently members of the IEA, with the Commission of the European Communities participating under a special arrangement.

As one element of the International Energy Program, the Participants undertake cooperative activities in energy research, development, and demonstration. A number of new and improved energy technologies which have the potential of making significant contributions to our energy needs were identified for collaborative efforts. The IEA Committee on Energy Research and Development (CRD), assisted by a small Secretariat staff, coordinates the energy research, development, and demonstration programme.

Energy Conservation in Buildings and Community Systems

The International Energy Agency sponsors research and development in a number of areas related to energy. In one of these areas, energy conservation in buildings, the IEA is sponsoring various exercises to predict more accurately the energy use of buildings, including comparison of existing computer programmes, building monitoring, comparison of calculation methods, etc. The difference and similarities among these comparisons have told us much about the state of the art in building analysis and have led to further IEA sponsored research.

Annex V Air Infiltration Centre

The IEA Executive Committee (Buildings and Community Systems) has highlighted areas where the level of knowledge is unsatisfactory and there was unanimous agreement that infiltration was the area about which least was known. An infiltration group was formed drawing experts from most progressive countries, their long term aim to encourage joint international research and to increase the world pool of knowledge on infiltration and ventilation. Much valuable but sporadic and uncoordinated research was already taking place and after some initial ground-work the experts group recommended to their executive the formation of an Air Infiltration Centre. This recommendation was accepted and proposals for its establishment were invited internationally.

The aims of the Centre are the standardisation of techniques, the validation of models, the catalogue and transfer of information, and the encouragement of research. It is intended to be a review body for current world research, to ensure full dissemination of this research and based on a knowledge of work already done to give direction and a firm basis for future research, in the Participating Countries.

The Participants in this task are Canada, Denmark, Italy, Netherlands, Sweden, Switzerland, United Kingdom and the United States.

Introduction

The preparation of a glossary of terms related to air infiltration was one of the initial tasks assigned to the AIC. This document is intended to promote a more uniform usage of terms by workers in the subject of air infiltration. It will also aid translations between the languages of the member countries.

Terms have been assembled concerning air infiltration, its description, detection, measurement, modelling and prevention. Also included are terms associated with the environment and relevant physical processes.

Topics covered include:

- experimental techniques
- instrumentation
- climate
- terrain
- building descriptions and components
- construction techniques (where relevant to the construction or retrofitting of buildings to reduce air infiltration
- ventilation requirements, air quality (appearing frequently in papers on air infiltration)

The terms have been compiled from a wide variety of sources (see References). The definitions should not be regarded as official standards.

There is an appendix containing fundamental units and conversion tables for derived units between SI and other systems. There are also appendices for common abbreviations and tracer gases.

Translations of the terms in the glossary from English into the languages of the participating countries will appear in due course.

Translations into the following languages are currently in preparation:

- French (Canada, Switzerland)
- Swedish
- German (Switzerland)
- Dutch
- Danish
- Italian

User's Guide

The glossary consists of main terms and subsidiary terms of which the main terms are in alphabetical order.

The basic entry has the following format:

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mechanical diffusion
     (see eddy diffusion)
     Eddy diffusion due to mechanically generated turbulence. The
     frequency and eddy size spectra are usually very different to those of
     natural turbulence.
       eddy, turbulent flow
```

consisting of: The main term
(a cross reference to another defined term)
The definition of the main term
cross references

If the bracketed term has 'also' instead of 'see', e.g.

e.g.

equilibrium concentration method
(also constant emission method)
A method of measuring ventilation rate whereby tracer gas is emitted continuously at a uniform rate. The equilibrium concentration of tracer gas in air is measured.
tracer gas, ventilation rate, air infiltration.

this is an alternate word for the same definition and will not be defined elsewhere. It may, however, appear in the list in the form:

constant emission method
(see equilibrium concentration method)

Where more than one interpretation attaches to a term, the alternatives are given and numbered, e.g.

e.g.

furring
(also firring)
(1) Lathing fixed to common grounds and plastered, leaving an air space between brick and plaster.
(2) (USA) A cavity within an outside wall to keep out damp and for insulation. It may be formed with lath and plaster or with hollow blocks or bricks.
(3) Timber strips laid, for example, on uneven joists to pack them out and make a plane surface for floor boards or for the close boarding of a roof or wall.

Subsidiary terms appear after the main term with which they are associated.

e.g.

blower (USA)
(see fan)
(1) A machine for driving a blast of air.
(2) A metal plate on the upper part of a fireplace to increase the draught.
_blower door (USA)
A vaneaxial fan driven by a variable speed motor attached to a large sheet of plywood which is adjusted to fit a doorway in the building to be pressurised.
pressurisation.

Glossary

absolute humidity
(also: density of water vapour)
The mass of water vapour per unit volume.
Also in H&V as humidity mixing ratio: mass of water vapour per unit mass of dry air.
relative humidity, humidity mixing ratio, specific humidity.

absolute pressure
The pressure above the absolute zero value of pressure that theoretically obtains in empty space or at the absolute zero of temperature as distinguished from gauge pressure (gage pressure (USA)). (McGraw-Hill)

absolute ventilation efficiency
A quantity which expresses the ability of a ventilation system to reduce a pollution concentration relative to the feasible theoretical maximum performance.

$$a.v.e.= \frac{C(initial)-C(j)}{C(initial)-C(supply)}$$

C = concentration of pollutant.
j is the measurement point.
(Sandberg)

absorption
If a solid takes up a liquid or a gas, or a liquid takes up a gas and the latter permeates the former throughout its entire substance, absorption is said to take place. (ASSE)
adsorption

acceptable air quality
Ambient air in which there are no known contaminants at harmful concentrations and with which a substantial majority (usually 80%) of the people exposed do not express dissatisfaction. (ASHRAE 62- 73)
contaminant, air pollution

acetone
(see tracer gas appendix)

acoustic analyser
Instrument for measuring gas concentrations by determining the speed of sound in the mixture.
tracer gas

acoustic insulation
A substance (or air gap) used to reduce the transmission of sound through walls, windows, etc.

acoustic technique
A method of detecting cracks in a building where leakage may occur by placing a steady source of high pitched sound within the building and using a microphone outside as a detector. Leaks correspond to an increase in volume of the sound transmitted. This is a qualitative

technique only.

a-c pressurisation
(also infrasonic method: alternating pressure method)
A method of testing for air leakage of a building using a large piston assembly to vary the effective volume of the structure and measuring the pressure response due to this variation.
leakage, effective volume

adiabatic lapse rate
Temperature/density gradient with height such that a volume changing state along it does not exchange heat with its environment.

adsorption
The adhesion in an extremely thin layer of molecules as of gases, solutes or liquids, to the surface of solid bodies or liquids with which they are in contact. (ASSE)
absorption

advection
The transport of a property by a fluid by embedding it in the main flow.

adventitious openings
Openings in the building envelope which are not purpose provided.
component leakage, background leakage, purpose provided openings

adventitious ventilation
Natural ventilation other than through purpose provided openings.

aerated concrete
(also cellular concrete)
A structural material with good insulation properties.

aerofoil (U.S.: airfoil)
A body shaped so as to produce an aerodynamic reaction (lift) normal to its direction of motion for a small resistance (drag) in that plane.

aerosol
A colloidal system in which the dispersal medium is a gas, and the disperse phase is finely divided solid or liquid particles with sizes from a few nm. to approx. 100 micron. The larger particles (giant aerosol/ giant nuclei) are lost rapidly by gravitational settling, the smaller particles, those less than .03 micron, are lost by coagulation.
particulates, dust, air pollution

aging (alt. ageing)
The change in the state of the fabric of a building with time. (especially leakage).

air
The gaseous mixture (chiefly nitrogen and oxygen) of which the atmosphere is composed.

air brick
A perforated block built into a wall to ventilate a room or the underside of a wooden floor.

air change
A quantity of fresh air equal to the volume of the room (building) being ventilated.

air change rate
The air change rate of a room is the ratio of the volumetric rate at which air enters (or leaves) a room divided by the volume of the room. Usually this is expressed in air changes per hour (ach).
air infiltration, ventilation, natural ventilation, minimum air change rate

air circulation
The gross movement of air between spaces in a building etc. (Particularly with respect to mechanical ventilation systems.)

air conditioning
The artificial process of treating air to adjust its temperature, humidity, cleanliness and distribution, and ventilation to meet the requirements of the conditioned spaces.

air current
Any moving stream of air.

air curtain
(also air door)
A stream of air that creates a barrier between two spaces which are at different conditions. (BS 5643)
Used for fume cupboards, biological safety cabinets, department store doors.

air distribution
The delivery of fresh or conditioned air to various spaces in a building, usually by mechanical means.

air door
(see air curtain)
A sheet jet of air across an entrance, separating the air inside a building from the air outside. (Used to reduce the ingress of cold outdoor air where there is heavy traffic through the entrance.)

air duct
An air passage, usually formed in sheet metal, plastics, etc. which may be of square, rectangular or circular cross section, used for guiding ventilation air to and from various parts of a building.

air flow pattern
The pattern of air currents within a building.

air flow rate
(1) The volume rate of transport of air either within or through the walls of an enclosure.
(2) The mass rate of transport of air either within or through the walls

of an enclosure.

air flow switch
A switch that incorporates a mechanism capable of detecting a flow of air. The mechanism operates the switch automatically at a preset airflow rate. (BS 5643)
mechanical ventilation

air flue
A small duct, built to withdraw bad air from a room.

air gap (air drain)
(see cavity, air space)

air grate (/grid, foundation ventilator, air inlet)
Grating set into a wall to allow the free passage of air for ventilation, especially to the underside of floors
air brick

air infiltration
The uncontrolled inward air leakage through cracks and interstices in any building element and around windows and doors of a building, caused by the pressure effects of the wind and/or the effect of differences in the indoor and outdoor air density, measured as an air change rate. (CIB Report "Units and Definitions", Publication 53, 1978)
leakage, natural ventilation, tracer gas, air change rate

air inlet
Opening in an outside wall for the provision of fresh air.
(1) for ventilation
(2) for heating appliances, for combustion

air leakage
The uncontrolled flow of air through a component of the building envelope, or the building envelope itself, when a pressure difference is applied across the component.
air infiltration

air lighting troffer
An air inlet or extract device combined with a luminaire. (BS 5643)

air lock
(1) An anciliary chamber giving access to an enclosure without changing the conditions in it and restricting leakage of air from or into the enclosure.
(2) Weatherstripping. (U.S.A)

air outflow
Air flowing out of a building through cracks and openings.

air outlet
(1) An opening in a wall or shaft through which bad air is expelled to the outside.
(2) (see air inlet) An opening through which fresh or conditioned air enters a room.

air penetration
(1) (see air permeability)
(2) The passage of air through a component crack etc.

air permeability
The property of a building component to let air pass when it is subjected to a differential pressure.
component leakage

air pollution
The contamination of air by noxious gases or dust particles.
aerosol, dust, particulate, contaminant

air pressure
The pressure exerted by the air. This may refer to static (atmospheric) pressure , or dynamic components of pressure arising from air flow, or both acting together.

air purity
(see air quality)

air quality
Usually refers to the concentration in air of one or more pollutants, for more than one pollutant, air quality is expressed as a concentration over a certain period of time. e.g. $\mu g / m^3$ over 24 hours.

air seal
(see vapour barrier)

air shaft
(also lightwell)
An open space surrounded by the walls of a building, or buildings, to provide ventilation for windows.
(McGraw-Hill)

air space
(1) The gap between two panes in double glazed windows.
(2) The gap between two panels (or brick leaves) in hollow (cavity) wall construction.
cavity wall

air stratification
The settling of air into layers of different density (temperature).
stratification

air stream
An air current, usually with well defined boundaries.

airtight/airproof/hermetic
(1) Impervious to air.
(2) Resistant to penetration by air.

airtightness
A general descriptive term for the leakage characteristics of a building. (see building tightness for specific term.)
building tightness, loose, tight.

air-to-air heat transmission coefficient
(see "U"- value)

air-to-air thermal resistance.
Reciprocal of the "U"- value.

air velocity
Parameter describing the rate of movement of air.
Important when considering cooling effects and comfort criteria.

air vent
A purpose provided inlet.

ambient pollution
(see outdoor pollution)

ambient temperature
Temperature of the air, (1)- outside the building, or (2)- within a room.

ammonia
(see tracer gas appendix)

anemometer
A device used for measuring air or gas velocities. (BS 5643)
flow meter
_cup anemometer
A device for measuring wind speed comprising a number of cups attached around a spindle to which an indicator is fitted. Widely used in meteorological studies.
_drag anemometer
An instrument for measuring windspeed by exposing a simple body to the airstream and measuring the drag force on it.
_heated thermometer anemometer
(also thermometer anemometer)
A device for measuring airspeed by supplying power at a steady rate to a coil wrapped round the bulb of a mercury-in-glass thermometer and measuring the temperature rise above ambient.
Instruments of this type may also employ an electric resistance thermometer without loss of sensitivity. (H+W)
_hot film anemometer
As for a hot wire anemometer but with the sensing element consisting of a thin quartz rod coated with a film of platinum. The sensing area is typically 1mm. long by 50 micron in diameter.The element is used to measure mean and turbulent flow and can be used as a droplet detector. It is considerably more robust than a hot wire instrument of similar sensitivity.
_hot grid anemometer
A device for measuring air flow rate.
A variant form of hot wire anemometer in which the heating and sensing elements are separated, the heater being in the centre of the array. The downstream sensor will register a rise in air temperature, the temperature difference between the heater and the sensor being proportional to the air speed.
Directionally sensitive.

hot wire anemometer

A device for measuring air speed (thermal anemometer) by passing a current through a fine platinum or nichrome wire which may or may not be shielded by a silica tube. The resistance of the wire is proportional to the temperature which, in turn, is proportional to the flow rate. It may operate in either constant current or constant temperature mode. Constant current mode is limited to the case of low intensity turbulence.

hot wire microphone

This operates on the principle that the sensitivity to oscillation varies with net flow. Operating in a constant sound field gives the amplitude of the a.c. portion of the signal as a function of the net. air velocity. v greater than 0.06 m/s. (H+W)

ionisation anemometer

A device for measuring air flow rate.
An alpha-particle source raised to 120V is placed at the centre of an earthed grid. Measuring the current between the source and the grid gives the airspeed.
Range: v greater than 0.04 m/s. at least.
Angular tolerance: within +/- 30 deg. of the horizontal plane and all directions in that plane .
Some beta and gamma emission from most sources dictates careful use.
(H+W)

laser anemometer

(also laser doppler anemometer: laser doppler flow meter)
A device for measuring air flow rate.
(a) The difference in frequency between the incident beam and that reflected or scattered from particles moving with the flow is determined. This frequency difference is proportional to the wind speed and the angles of scattering and of wind direction with respect to the axis of the instrument.
(b) Using an IR laser (e.g.CO_2 laser) the intensity of the transmitted beam is measured, being proportional to the windspeed. Scattering by air in the beam increases at low windspeeds due to heating of the air in the beam.

optical anemometer (interferometry)

A form of laser doppler anemometer in which two mutually perpendicular beams are used and the corresponding radial velocity components found from the small frequency shifts, visualised as interference fringes.

laser doppler anemometer

propeller anemometer

A device for measuring airflow usually having about 8 flat blades inclined slightly after the manner of an airscrew, mounted on a horizontal axis. Responds to off axis flow directions according to a cosine law. A capacitance pickup is used.
Range: v greater than 0.15 m/s. approx.

pulsed hot wire anemometer

A device for measuring air flow rate.
As with the hot grid anemometer, the heater and sensor elements are separated. The arrival time of the pulse of hot air at the downstream sensor gives the wind speed. A number of sensors placed around the heater element gives directional sensitivity. The response is faster than for a hot grid as it is measuring time differences rather than temperature differences.

rotating anemometer

A device for measuring airflow by measuring the rotation of an array of vanes mounted on a spindle. The axis may be horizontal or vertical.

_sinusoidally heated hot wire anemometer.
A device for measuring air flow rates.
A heater element is fed a sinusoidally varying power input. This produces a spacially varying air temperature pattern downstream, the wavelength of which is proportional to the air speed.
highly directonal, Range: v greater than 0.37 m/s., limited to slowly changing conditions.

_sonic anemometer
A device for measuring airflow rate by measuring the difference in transmission time for two sonic signals travelling in opposite directions. The airspeed found is an average over the path length. Range: v greater than 0.18 m/s.: accuracy approx. 4% over +/-5 m/s. (H+W)

_thermal anemometer
A device for measuring air speed by measuring the rate of loss of heat from the instrument.
katathermometer, hot wire anemometer

_thermistor anemometer
A device for measuring air flow rate. As hot wire anemometer but using a thermistor instead of resistance wire. Range: v greater than 0.06 m/s.

_vane anemometer
(see propeller anemometer)

apartment (U.S.A)
(1) A separate room in a house occupied by a particular person or party.
(2) A suite or set of such rooms. (USA, + architecture)

apartment building (block of flats)
A residential building divided up into suites of rooms, each comprising a single dwelling, usually multi storey.

apron wall
(see spandrel panels)

arcade
(1) A walk, arched over.
(2) A covered passage lined with shops.

Archimedes No.
The ratio of buoyancy forces to wind forces affecting flow through openings in buildings. (analogous to the gradient form of the Richardson number used for the atmospheric boundary layer).
It can be expressed as

$$Ar = \left| \frac{T_i - T_o}{\underline{T}} \; \frac{gh}{\overline{U}^2} \right|$$

Where T_i is the internal temperature (K)

T_o is the external temperature (K)

$\underline{T}$ is the mean (or internal) temperature (K)

U is the wind speed and
h is the vertical displacement between openings.

Also Ar = $Gr/(Re^2)$ where:
Gr = Grashof No. and Re = Reynolds No.

argon
(see tracer gas appendix)

arris
A sharp edge of a brick, of plaster or of other building elements.

asbestos
Fibrous heat resistant minerals. Including:-
(1) A fine fibrous amphibole. Forms include tremolite ($Ca_2.Mg_5.Si_8.O_{22}.(OH)_2$) and riebeckite (variety crocidolite) also known as blue asbestos ($Na_2.(Fe,Mg)_5.Si_8.O_{22}.(OH)_2$). This has fallen into disfavour due to the health hazard arising from the dust. It is known to be the most carcinogenic of the asbestos minerals.
(2) A fibrous serpentine (chrysotile) which is more common. ($Mg_3.Si_2.O_5.(OH)_4$)

ashler (ashlar)
(1) A square hewn stone
(2) Stone walls or facings finely dressed to given dimensions, laid in courses with thin joints (1/8")
(3) (USA) inc. walling of burnt clay blocks larger than brick size (U.K. terra cotta) + sometimes brickwork.
(4) A stud in ashlering, a vertical timber which joins ceiling joists to rafters.(PDB)

atmosphere
The gaseous envelope which is held to the earth by gravitational attraction and which in large measure rotates with it.

atmospheric pressure
(1) Pressure at ground level exerted by the column of atmospere immediately above.
(2) As (1) but referred to sea level.

atmospheric stability
The state of the atmosphere with respect to its response to small perturbations of temperature (or displacements) of a volume of air.

_static stability
This occurs when the temperature gradient in the atmosphere is less than the adiabatic lapse rate. Upward displaced volumes will tend to return to their original level.

_static instability
This occurs when the temperature gradient in the atmosphere is greater than the adiabatic temperature gradient. An upward displaced volume will always be less dense than its surroundings and will continue to rise.

_neutral stability
This occurs when the temperature gradient in the atmosphere is equal to the adiabatic temperature gradient. A displaced volume will remain

where it is placed, neither rising nor falling.
conditional instability
This occurs when the temperature gradient in the atmosphere lies between the saturated adiabatic lapse rate and the dry adiabatic lapse rate.
dynamic stability
The kinetic energy of the fluctuations in turbulent motion will increase or decrease according as the rate of supply of energy extracted from the mean motion by Reynolds stresses exceeds or falls below the work that has to be done in the gravitational field in moving masses of fluid in the vertical.
The former is dynamic instability, the latter, dynamic stability.

atrium
An open space in the middle of a building, usually covered.

atrium house (/building)
Building built round a covered courtyard. (May refer to multi-storey buildings)

attached space
Space adjacent to the sampling (living) space with which significant exchange of air may take place, thus increasing the effective volume of the space.
(Sherman et.al)

attic
A low storey or structure above the cornice of the main part of an elevation. Usually occupied.
roofspace, loft

background leakage
Leakage of air through a building envelope which is not accounted for by obvious measurable gaps. i.e. component leakage, purpose provided openings.
adventitious openings, component leakage, purpose provided openings.

background leakage area
The open area which remains when all of the component cracks and purpose provided openings are sealed

back to back
A form of construction found in older high density housing developments where the rear walls of successive rows of dwelling units are contiguous.
terrace

bad air
(also foul air)
Air of unacceptable quality, containing excessive amounts of contaminant material.

bag sampling method
(1) (also long term average technique)
A method of measuring air infiltration using tracer gas and a two channel pump. One channel dispenses tracer gas from a bag of known volume, the other draws room air into a sample bag. The final concentration of tracer in the room air and the amount of tracer gas used allow one to calculate the average inverse infiltration. (Sherman et.al.)
(2) A method of measuring air infiltration by which tracer is discharged into the sample volume and mixed. Sample bags are inflated with room air at intervals and the concentration of tracer measured.

balanced ventilation
(also mechanical exhaust-supply ventilation system)

balcony
(1) Balcony belonging to an individual dwelling unit, not used for common access.
(2) (also deck) Access balcony for deck access flats.

balcony access block
(see deck access block)

barge board (gable board, verge board)
(also verge board, gable board)
A sloping board (built in pairs) along a gable, covering the ends of roof timbers, and protecting the barge course (brick coping along the top of the wall) from rain.

barometer
A device that measures atmospheric pressure. (BS 5643)

baseboard (U.S.A.)
(also base, skirting board (U.K.)
General: A board situated at or forming the base of something.
Specific: (1) A protecting or finishing moulding of board or other material covering the joint of a wall and the adjoining floor.
(2)The cladding on the outside of a house covering the joint between the walls and the bottom plate (U.S.A.), floor bed (U.K.) on which they rest.
soleplate, leakage

basement (cellar)
(USA) A storey whose floor line is below grade at any entrance or exit, the ceiling of which is not more than 5ft above ground level whose primary function is as living space. (ASSE)
U.K.: As above but the room may be entirely below ground level.
cellar, subbasement

batten
(1) A piece of square sawn, softwood timber used for building frames etc.
(2) Thin horizontal strips of timber, used as fixings for wood lathing or slates or tiles.

bay window
A window formed in a projection of the wall beyond its general line. It is carried on the foundations. (PDB)
oriel window, bow window, sash window, casement window,

Beaufort scale
Wind force estimated on a scale from 0 (calm) to 12 (hurricane) (MG)
_calm
Force 0 on the Beaufort scale. (MG)
Smoke rises vertically.
Wind stagnation pressure: 0 Pa
10 m. wind speed: mean:0 m/s. range 0 m/s. - 0.2 m/s.
_light air (see Beaufort scale)
Force 1 on the Beaufort scale.
Direction of wind shown by smoke drift, but not by wind vanes. (MG)
Wind stagnation pressure 1.0 Pa.
10 m. wind speed: mean: 0.8m/s. range: 0.3 - 1.5 m/s.
_light breeze
Force 2 on the Beaufort scale.
Wind felt on face, leaves rustle, ordinary vane moved by wind. (MG)
Wind stagnation pressure 4.0 Pa.
10 m. wind speed: mean: 2.4 m/s. range: 1.6 - 3.3 m/s.
_gentle breeze
Force 3 on the Beaufort scale.
Leaves and small twigs in constant motion, wind extends light flag. (MG)
Wind stagnation pressure 13 Pa.
10 m. wind speed: mean: 4.3m/s. range: 3.4 - 5.4 m/s.
_moderate breeze
Force 4 on the Beaufort scale.
Raises dust and loose paper, small branches moved.
Wind stagnation pressure 32 Pa.

10 m. wind speed: mean: 6.7m/s. range: 5.5-7.9 m/s.
_fresh breeze
Force 5 on the Beaufort scale.
Small trees in leaf begin to sway, crested wavelets form on inland waters.
Wind stagnation pressure 62 Pa.
10 m. wind speed: mean: 9.3 m/s. range: 8.0 - 10.7 m/s.
_strong breeze
Force 6 on the Beaufort scale.
Large branches in motion, whistling heard in telegraph wires, umbrellas used with difficulty.
Wind stagnation pressure 110 Pa.
10 m. wind speed: mean: 12.3 m/s. range: 10.8 - 13.8 m/s.
_near gale
Force 7 on the Beaufort scale.
Whole trees in motion, inconvenience felt when walking against the wind.
Wind stagnation pressure 170 Pa.
10 m. wind speed: mean: 15.5 m/s. range: 13.9-17.1 m/s.
_gale
Force 8 on the Beaufort scale.
Breaks twigs off trees, generally impedes progress. (MG)
Wind stagnation pressure 260 Pa.
10 m. wind speed: mean: 18.9m/s. range: 17.2 - 20.7m/s.
_strong gale
Force 9 on the Beaufort scale.
Slight structural damage occurs, (chimney pots and slates removed)
Wind stagnation pressure 370 Pa.
10 m. wind speed: mean: 22.6 m/s. range: 20.8 - 24.4 m/s.
_storm
Force 10 on the Beaufort scale.
Seldom experienced inland, trees uprooted, considerable structural damage.
Wind stagnation pressure 500 Pa.
10 m. wind speed: mean:26.4 m/s. range: 24.5 - 28.4 m/s.
_violent storm
Force 11 on the Beaufort scale.
Very rarely experienced, accompanied by widespread damage.
Wind stagnation pressure 670 Pa.
10 m. wind speed: mean: 30.5 m/s. range: 28.5 - 32.6 m/s.
_hurricane
Force 12 on the Beaufort scale.
Wind of extreme violence. As mean wind usually encountered only at sea or on islands and coastal regions, usually confined to the sub tropics. Velocities of this magnitude are frequently encountered in gusts. Wind stagnation pressure 770 Pa.
10 m. wind speed: range: greater than 32.7 m/s.

berm
A ledge or bank of earth or rubble used to provide shielding from sound or wind.
shelter belt, wind break

Bernoulli effect
Pressure differential arising from the variation of wind velocity with height.
wind pressure, stack effect, air infiltration, natural ventilation.

blind wall
(see dead wall)

blower (USA)
(see fan)
(1) A machine for driving a blast of air.
(2) A metal plate on the upper part of a fireplace to increase the draught.
_blower door (USA)
A vaneaxial fan driven by a variable speed motor attached to a large sheet of plywood which is adjusted to fit a doorway in the building to be pressurised.
pressurisation.

boarding
(also close boarding)
Boards closely laid over rafters or studs to act as a surface for fixing insulation, cladding, tiles, slates, etc
close boarding, secondary space boarding, weather boarding.

borrowed light
A window in an internal wall or partition. (BS 565, PDB)

bottom joists
(see ground plate)

bottom rail (boom, beam, chord)
The horizontal bottom member of a door, casement or lower sash. (BS 565, PDB)

bottom separation (USA)
The lowest horizontal surface partitioning a tall building.
top separation, separation

boundary layer (atmospheric)
The layer of air, approximately 100m. deep, in which the motion is predominantly controlled by the presence of the earths surface. Effects of the surface remain significant up to 600m (in the "friction layer").

bow window
A bay window which is curved in plan. (PDB)
bay window, oriel window, sash window, casement window.

breach
(see penetration)
A hole in a wall.

break
(also crown, nick)
A line on a roof where there is a change of slope of the roof, e.g. at the crown, or shoulder in the case of a mansard roof.

building component (1)/- unit (2)/- element (3)
(1) (built in situ)
(2) (prefabricated)
(3) doors, windows, walls etc. (general term)

building board
(also fibre building board, fibre board, insulating board)
Stiff board built up of felted wood or vegetable fibre (fireproof fibre board uses mineral wool or asbestos) used in building for non load bearing partitions. (Safety restrictions have reduced the use of asbestos in recent construction work.)
(BS 1142)

building tightness
General: Volume flow rate or airchange rate for a building at specified elevated pressures, used to characterise its leakiness.
Specific: The volumetric flow rate or air change rate for a building at 50 Pa pressurisation with all purpose provided openings sealed.
(Sweden)

bungalow
A single storey dwelling which may be detached or semi-detached.

buoyancy
The force, positive or negative, experienced by a body immersed in a fluid arising from the difference in density between body and fluid and the action of gravity.
hydrostatic pressure, convection

cant bay (window)
A bay window with three straight sides. (PDB)

capacitance pressure transducer
(also variable capacitance gauge)
A variable capacitance pressure sensor. The sensing element, a metal diaphragm, acts as one plate of a capacitor. When pressure is applied it moves with respect to a fixed plate, changing the thickness of the dielectric between. The resulting signal is monitored using a bridge circuit.

carbon dioxide
(see tracer gas appendix)

carbon monoxide
(see tracer gas appendix)

casement window
A window in which one or more lights are hinged to open. Usually the hinges are vertical, like door hinges. (BS 565, PDB)

caulking
To make a joint airtight by driving in a flexible sealing material.
airtight, tight, retrofit, weatherstrip.

cavity barrier
(see vapour barrier)
A form of vapour barrier where a moisture impervious layer is introduced inside the "cavity" of a cavity wall, usually polythene sheeting.

cavity wall
A wall built of two leaves of brickwork, separated, usually, by a continuous gap. The two leaves are connected by tie-bricks at intervals.
"U"-value = 0.34 approx.
The inner layer may be double for floor bearing.

ceiling
(1) The inner roof of a room. (Chambers)
(2) An upper limit. (Chambers)
_caisson ceiling
A ceiling construction with deeply recessed panels, resembling an array of boxes.
_suspended ceiling, (also false ceiling)
A ceiling surface suspended below the true ceiling of a room allowing space for wiring, air conditioning ducts etc. (see plenum)
_panelled ceiling
A ceiling construction of panels in a frame which may or may not be directly in contact with the true ceiling of the room.

ceiling plate
(see floor plate)

ceiling void
The space between a ceiling and a false ceiling, usually used for ventilation ducts etc.
plenum

cellar
A room or rooms, of which more than half is below ground, usually reserved for storage, central heating boiler etc.

cellar ventilator
(airhole of a cellar)
Opening to the outside from a cellar permitting ventilation air to enter.
basement

cellular concrete (also air entrained concrete, foam concrete, gas concrete)
(see aerated concrete)

central heating
A system for the space heating of a building from a single source of heat or energy using a permanent installation operating as an entity. (BS 5643)
HVAC

chalet
(see dormer house)

chemical method (for tracer gas analysis)
A method of measuring tracer gas concentrations for air infiltration measurements. Any method employing chemical techniques. Usually involves the absorption of a sample of gas into solution and subsequent tests for pH, colorimetric assay, etc., also gas chromatography.

chimney
Any structure or part of the structure of a building other than a flue pipe that forms part of a flue. (BS 5643)

chimney effect
(see stack effect)
Often used interchangeably with "stack effect", strictly should refer to the pressure differences generated by a temperature difference across the walls of a chimney.

chloroform
(see tracer gas appendix)

chlorothene
(see tracer gas appendix)

cill plate
(see sole plate)

circulation time
The time taken for tracer gas concentration to rise to a steady value, a measure of mixing.

clapboard (=clinker)
Weather boarding which is not rebated.
shiplap, weather board

clean room
A room in which a high level of freedom from contamination is maintained. (BS 5643)

clerestory
(see skylight, lantern light)

climate
The synthesis of the day to day values of the meteorological elements that affect the locality. (MG)

cloakroom
(1) Room with W.C. with bath or shower.
(2) Room for storing coats.

close boarding
(also close sheeted)
Said of a roof (or wall) that is covered with boards touching each other at the edges, below the slates or tiles. (PDB)
secondary spaced boarding (2)

closet (US) (locker, built in cupboard)
(see cupboard)

cluster flats
A group of flats or bedsitters on the same floor with shared central facilities i.e. kitchen, bathroom etc.

column walls (from Swe.)
Walls resting on intermediate joists, themselves supporting the roof truss and purlins.

combustion air
The air required to provide adequate oxygen for fossil fuel burning appliances in the building.

comfort
A state of being free from annoyance.

comfort zone
The range of indoor conditions considered acceptable by a large proportion (e.g. more than 70%) of people working or living in the space.

commercial building
Functional classification term for buildings. A general term for buildings whose primary purpose is to provide space for commercial activity rather than domestic.

This includes office, storage, plant, farm, public and some factory classifications.
residential building

common duct
(rarely: "joint duct")
TNC58

common grounds
(also grounds, rough grounds)
A strip of wood nailed, plugged, or otherwise solidly fixed to a wall or sub frame as a base for plaster, joinery, building board, etc. (PDB)
first fixings, framed grounds

communal
Functional classification term for buildings.
Buildings acting as accommodation for large numbers of people where some of the activities are performed in common.

compass window
A bay window or oriel window circular in plan. (PDB)
bay window, oriel window

component leakage
The leakage of air through the building envelope which is directly attributable to flow through cracks around doors, windows, etc.
purpose provided openings, air permeability, adventitious openings, background leakage.

condensate
Liquid water deposited from the vapour.

condensation
The precipitation of liquid from its vapour resulting from the lowering of temperature at constant pressure: especially the deposition of water from warm, moist air onto a relatively cold surface. (BS 5643)

conservatory
(see greenhouse)
A greenhouse of which one or more walls are shared with a house. Used for raising delicate plants and recently as a passive solar heat trap for domestic heating (= glass verandah).

constant concentration method
A method of measuring ventilation rate whereby an automated system injects tracer gas at the rate required to maintain the concentration of tracer gas at a fixed, predetermined level. The ventilation rate is proportional to the rate at which the tracer gas must be injected. (Kumar)
tracer gas, air infiltration, ventilation rate.

constant emission method
(see equilibrium concentration method)

constant feed method
(see equilibrium concentration method)

contaminant
An unwanted airborne constituent that may reduce acceptability of the air. (ASHRAE 62-73)
air pollution, acceptable air quality

continuous development
As opposed to "detached" or "open" style of development. Each dwelling shares title to the land with several others. TNC58

continuous vent (USA)
(see vent stack)

controlled flow method
(see constant concentration method)

convection
The transfer of heat from one point to another by the mixing of one portion of the fluid with another. (BS 5643)
also: as above but for the case of the motion being driven by buoyancy forces.
buoyancy, advection

corbel
Brick, masonry or concrete projecting from a wall face, usually as a support for a beam or roof truss, oriel window etc. (also corbelling iron) (PDB)

corrected effective temperature
An empirical index of comfort that takes accout of dry bulb and wet bulb temperatures, of radiant heat (as measured by a globe thermometer) and of air movement.
air flow, natural ventilation

courtyard house
(also patio house, hacienda style house (USA), see atrium house)
A detached house built round a courtyard.

crackage
Gaps around doors and windows through which ventilating air passes.

crack length
The total length of gaps around doors and windows etc. through which ventilating air passes.
effective crack area, component leakage

crawlspace
A shallow space in a building which workers can enter for access to pipes, wires and other equipment.

cross ventilation
Ventilation provided by circulation of air from one side of a room to the other.
(BS 5643)
Also used for flow between rooms.

cupboard
(also closet)
An enclosure, usually of timber or plastic, with one or more doors used for storage.
_built in cupboard:- A cupboard of which one or more of the sides is formed by the walls of the room.

curtain walling
Modern wall cladding often framed in light alloy and consisting of two or more layers of opaque glass or other lightweight fire resistant sheet material.
(PDB)

curtain walls
(1) (USA) A non-loadbearing wall between columns and piers not carried on the floors which it passes.
(2) A wall which acts as a screen merely to hide something.
(3) An enclosing wall round a property.
(PDB)

damp
n: vapour, mist, moist air.
adj: moist, foggy (Chambers)
Damp (walls, etc.) after the erection of a building.
condensation, sweating

damper
A blade or set of blades that can be moved within or slid into, a duct in order to control fluid flow. (BS 5643)

damp proof course (dpc)
(also damp course)
A horizontal layer of impervious material laid in a wall to exclude water, above ground level, as well as above the junctions of parapet walls with a roof and above door or window openings.
Vertical damp courses (tanking) of asphaltic material are also provided to keep basements dry.

dead light
A window or part of a window which does not open. (Includes fixed sash, fast sheet, stand sheet)
(PDB)

dead space
The space within or adjoining a room with which air is not readily exchanged.
(also stagnant zone)

dead time (USA)
(1) (also response time) The time interval between a change in input to a control system or measuring instrument, and the response of the system.
(2) (also insensitive time). The time after a system/instrument responds to a signal before it is able to respond again.

dead wall
A wall unbroken by windows or other openings.

dead zone
The band within which a change of value of an input signal (e.g. control condition) to an element or system may take place without causing any perceptible change in output signals. (BS 5643)

decay method
Time delay between the injection of tracer gas and the rise in concentration of tracer gas in the sampled air. (Sherman)

deck access block
(also balcony access block (less common))
A block of flats, usually low or medium rise, in which the entrances to the individual dwelling units on each floor open onto a common walkway which is usually not covered.

degree day(s) (ventilation)
The number of degrees of temperature difference on any one day between a given base temperature and the mean day outside temperature. (BS 5643)

den (USA)
A (small) workroom in a private dwelling.

depressurisation (U.S.A. depressurization)
A method of testing for air leakage of a building or component by installing a powerful fan across the envelope and creating a static pressure deficit within the building.
The flow rate through the fan and across the envelope are measured and air leakage assessed.
leakage, flow rate, pressurisation.

detached (house)
A form of construction where each house is totally separate from all others.

dew point (temperature)
The lowest temperature to which a sample of moist air may be cooled at constant pressure (in the presence of a nucleating surface) without causing condensation.
condensation, saturation vapour pressure, supersaturation.

dew point depression
The difference in temperature between the ambient temperature and the dew point.

diffusion
Mixture through each other of gases or liquids in contact. (Chambers)
turbulence, mixing length
_molecular diffusion
Transport of particles or molecules by bombardment with the molecules of the ambient fluid.
_eddy diffusion
Transport of particles or molecules by inclusion in turbulent eddies.

discharge coefficient
A dimensionless coefficient relating the mean flow rate through an opening to an area and the corresponding pressure difference across the opening.

dispersion
In the context of air pollution (similarly tracer gas injection), the way in which a pollutant/ tracer gas spreads from its point of emission and becomes diluted in the atmosphere.

doorbuck (USA)
A door subframe of wood or pressed metal to which the door case is fixed.

door head (lintel)
The horizontal wood member forming the top of a door frame.

door jamb
A door post. (also door stile)

door sill
Horizontal timber at the foot of the frame of an outside door, connected to the doorposts, designed to keep out rain - often a site of substantial air leakage.

door stile
(also door cheeks or door posts)
The vertical members of a door frame.

dormer (window)
A vertical opening formed in a roof slope. Used for light and ventilation for occupied roof spaces. (IDPT)
internal dormer

dormer house
(also chalet house)
A house in which a substantial part of the useful space is within the roof. (includes bungalows and 1½ storey houses) (C+E+E)
bungalow

double glazing (+double glazed window)
A single window frame with two panes of glass separated by an air gap. Used for thermal insulation and, if the gap is greater than 25mm, acoustic insulation also.
storm window

downdraught
An airstream with a significant downward directed vertical component of velocity.
Usually occurs in the lee of buildings, adjacent to cold surfaces etc. when natural. It may be generated artificially in air curtains, air doors etc.

drain ventilation stack
(see vent stack, soil pipe)

draught
(1) Excessive air movement in an occupied enclosure causing discomfort.
(2) A difference in pressure between a furnace and the atmosphere that causes air for combustion to flow into the furnace and/or the products of combustion to leave the furnace.
(BS 5643)
airflow, air movement

dry bulb temperature
The temperature indicated by a dry temperature sensing element (such as the bulb of a mercury-in-glass thermometer) shielded from the effects of radiation. (BS 5643)

dry lining
Gypsum plaster board, used for lining rooms.

dry resultant temperature
The temperature registered by a thermometer at the center of an externally blackened sphere 150mm in diameter, being a function of air and mean radiant temperature and air velocity. (BS 5643)

duct
(1) An enclosure of any cross sectional shape, but generally circular or rectangular, through which air can flow.
(2) A passage through which services such as water pipes, electric cables or air ducts can be led through a building.
(BS 5643)

duplex apartment (U.S.A.)
A maisonette.

duplex dwelling
A two family dwelling in which the living units are one above the other.

duplex outlet
A point of penetration through an inside wall for two way cable: a telephone socket or power point, often a site of air leakage.

dust
An air suspension (aerosol) of particles of any solid material, usually with particle size less than 100 microns. (ASHRAE 62-73)
aerosol

dwelling (building, house)
A living unit, in single family residential or multi family residential buildings, mobile homes etc.

dynamic pressure
(see stagnation pressure, velocity pressure)
total pressure, static pressure

eaves
The lowest overhanging part of a sloping roof. (PDB)

eaves fascia
A board on edge nailed along the feet of the rafters. It often carries the the eaves gutter and may also act as a tilting fillet (=ornamental band). (PDB)

eddy
A fluctuation of the motion of a fluid, usually superimposed on the mean flow of the fluid. (NSCA)
turbulent flow, turbulence scale

eddy wind
A wind characterised by large vortices which may have horizontal or vertical axes. The former is characterised by the wind in the lee of a long (low) hill (also known as a roller) or in the lee of a building of similar shape.
The latter include corner vortices in the lee of buildings, to tornados in the most extreme case.

effective crack area
(also effective orifice area, open area)
The area derived from the homogeneous crack flow equations which describes the pressure/flow characteristics of the opening or set of openings under consideration. The area is nominally independent of flow rate.
(Etheridge, A+E+G)
crackage, crack length

effective flow
In tracer gas experiments, the flow rate that would account for the observed concentration of tracer gas if the gas were instantaneously mixed.
mixing function, injected flow

effective leakage area
Effective leakage area = open area x discharge coefficient.
(varies with the flow rate)

effective orifice area
The area derived by assuming the value of the discharge coefficient associated with a sharp-edged orifice, generally speaking the area varies with flow rate.
(Etheridge, A+E+G)

effective temperature
An empirical index of comfort that takes account of dry bulb and wet bulb temperatures and air movement. (BS 5643)
natural ventilation, draught

effective volume
The volume of the interior of a building (or room) in which mixing occurs.
mixing

efflux
That which flows out, specifically gas flowing out of a chimney outlet. (BS 5643)

efflux velocity
Velocity of gases issuing from a chimney outlet.

elbow board
(see window board)

electron capture detector
This instrument uses a weak beta source, (usually Ni63, half-life 92y) to generate electrons in an ionisation chamber, which is subjected to a pulsed voltage, thus generating a current. Electron capturing material (e.c.m.) in the sample reduces the number of electrons in the chamber and thus the current. E.c.m.'s are normally halogenated hydrocarbons such as SF_6, trichloroethylene, CCl_4, chloroform and refrigerant gases. (see Appendix on tracer gases).

Molecular oxygen is also an e.c.m. therefore a gas chromatograph must be used upstream of the detector. The molecular oxygen peak is close to that for SF_6 and can be used for calibration.

This device is particularly suited to tracer gas measurement at very low concentrations.
katharometer, infra-red absorption method

elevation
(1) Height of the land above mean sea level.
(2) (of plan) An architectural (scale) drawing showing the front rear or side aspect of a building.

energy signature (USA)
A graphical means of describing the energy efficiency of a building. Plot the heat consumption (fuel energy content x efficiency) against the average outside temperature. (Harrje)

entrance floor
(see ground floor (UK), first floor (USA))

entrance infiltration
Infiltration arising from the passage of persons or other traffic through the exterior doors of a building. (ASHRAE)

entrance zone
The region in the immediate environs of the entrance of a building. (trans. from TNC58)

entresol
(see mezzanine)

envelope
The exterior surface of a building including all external additions e.g. chimneys, bay windows, etc.

environmental pollution
(see outdoor pollution)

environmental temperature
The temperature of a hypothetical uniform environment (with surroundings and air at equal temperature) that would have the same rate of heat transfer through a building element as occurs under prevailing conditions. (BS 5643)

equilibrium concentration
The amount expressed as a mass or volume of a particular constituent in equilibrium in a given enclosure. (BS 5643)

equilibrium concentration method
(also constant emission method)
A method of measuring ventilation rate whereby tracer gas is emitted continuously at a uniform rate. The equilibrium concentration of tracer gas in air is measured.
tracer gas, ventilation rate, air infiltration.

equivalent temperature
An empirical index of comfort that takes account of dry bulb temperature and of radiant heat (as measured by a globe thermometer) and of air movement. (BS 5643)

ethane
(see tracer gas appendix)

eupatheoscope
A black, electrically heated cylinder used for the estimation of equivalent temperature. (PDB)
This device is also used to simulate people in air movement studies.

evacuation technique
(see depressurisation)

excess air
(1) Air supplied to a combustion process additional to that theoretically required by the chemical reaction. (BS 5643)
(2) Air supplied to a space (room/building) in excess of ventilation requirements.

exfiltration
The uncontrolled leakage of air out of a building.

exposure
The position of a building, or a room within a building relative to its environment as it affects the properties of the building such as thermal conductivity, air infiltration, noise levels, solar gain etc. (BS 5643)
normal exposure, severe exposure, sheltered exposure, building integrity.

exterior pollution
(see outdoor pollution)

exterior pressure coefficient
(see pressure coefficient)

exterior zone
(also: perimeter zone = walls only)
A zone of a building that is predominantly affected by external changes (such as temperature, solar effect and wind) acting through the walls and roof rather than by changes within the building. (BS 5643)
interior zone

external leakage
Leakage taking place between spaces inside a building and the outside of the building.

external pollution
(see outdoor pollution)

external wall
A wall of which at least one face is exposed to the weather or to the earth.
(PDB)

extract air
Exhaust air that is discharged to atmosphere.

extract duct
(see air duct, air flue)
Duct through which bad air is rejected to the outside of the building. This term is usually confined to cases involving forced extraction, e.g. kitchens, workplaces, laboratories, fume cupboards etc.

extractor
(=extract fan)
A fan withdrawing air from a conditioned space which may be partially or wholly exhausted to atmosphere.

extract ventilation
Mechanical ventilation removing air from an enclosed space, directly or through ducting. (BS 5643)

facade
The exterior front or face of a building. (Chambers)
i.e.front facade, rear facade etc

fan
(see blower (USA))
A device for moving air from one location to another.
vaneaxial fan
A fan in which the airflow is driven by an airscrew mounted on an axis pointed along the desired direction of flow.
centrifugal fan
A fan in which the air leaves the impeller in a direction substantially tangential to the periphery of the impeller. (BS 5643)

farm building
Functional classification term for buildings. Buildings used for agricultural, horticultural and livestock purposes.
e.g. Greenhouses, milking parlours, livestock sheds, barns etc.

fascia board
(1) A wide board set vertically on edge fixed to the rafter ends or wall plate or wall. It carries the gutter round the eaves.
(2) The wide board over a shop front.

fetch
In flow over a rough surface, the distance upstream of the measurement point for which the condition of the airstream or the underlying surface is fairly uniform.

fibreboard (building board)
(also fibre building board, building board, insulating board)
Stiff board built up of felted wood or vegetable fibre (fireproof fibre board uses mineral wool or asbestos) used in building for non load bearing partitions. (Safety restrictions have reduced the use of asbestos in recent construction work.)
(BS 1142)

fire ventilation
The expulsion of smoke and combustion gases to the outside, esp. from escape routes. (trans. from TNC58)

firring
(see furring)

first fixings
(1) Structural timber, joists, rafters, floors etc.
(2) Grounds, plugs, etc. which carry the joinery.
(PDB)
grounds, common grounds, frame grounds.

first floor
(1) (UK) The floor which is next above the floor at ground level and is therefore about 3m. above ground level. Also for USA, in houses with neither basement nor cellar.
(2) (USA) In buildings with a basement or cellar, the first floor is the first above ground level. (= UK ground floor)

(PDB) first floor

fixed glazing
(also fixed window)
A non-openable window in which the glazing frame is fixed directly to the building fabric.

fixed window
(see fixed glazing)

flashing (lead (metal))
A term used to mean watertight e.g. on or in a roof, with two by five strips of sheet metal, e.g. copper or galvanised iron, bent to fit in the interior angle between two intersecting roof surfaces in order to make a watertight joint. (ASSE)
Similarly for pipes and stacks penetrating walls and floors to make an airtight joint, where the seal may also be of neoprene or polythene.
shroud

floor plate
(also cover plate, fish plate)
Polished metal plate to fit in and hide sleeves. (IDPT)
sleeve

flow coefficient
The term K in the commonly used flow equation:

$$V = K.(\Delta P)^n$$

V is the volumetric flow rate of air.
ΔP is the pressure difference across the door or building envelope.
n is the flow exponent.
K usually takes the value of the flow rate for P = 1 Pa.
Some users quote flow per unit area in which case the equation becomes

$$V = K.A.(\Delta P)^n$$

flow exponent, pressurisation

flow exponent
The term n in the commonly used equation:

$$V = K.(\Delta P)^n$$

V is the volumetric flow rate of air. K is the flow coefficient:
ΔP is the pressure difference across the door or building envelope.
n varies from 0.5 (turbulent flow) to 1.0 (laminar flow)
flow coefficient, pressurisation

flow meter
A device for measuring rate of flow of fluid in a pipeline or channel in either volumetric or gravimetric units. (BS 5643)

flow reversal
(also back flow)
When the direction of flow of part, or all, of the fluid is opposite to the prevailing direction of flow or that implied by the prevailing external pressure gradient, flow reversal is said to take place.

flue
(also seduct system)
A passage for smoke and fumes from a boiler/fire etc. in a chimney.
(also bad air)
balanced flue
A flue in which air for combustion is supplied from outside a building at a point near to the outlet, the appliance being sealed from the room in which it is installed. Used with space heating and water heating appliances, now compulsory for bathroom water heaters in the U.K.

flue gas (smoke, stack gas)
The mixture of gases resulting from combustion and other reactions in a furnace, passing through the smoke flue.

flue pipe
Channel for flue gases in a chimney.

fluid permeability coefficient
For a fluid leaking through a surface of area A :-

$$Bo = \frac{Q_v}{A} \frac{n}{\text{grad } p}$$

Bo = fluid permeability coefficient (m^2)
Qv = volume flow rate across A (m^3/s)
A = cross sectional area (m^2)
n = dynamic viscosity (Ns/m^2)
p = the total pressure (Pa) across the surface.
This may be used for air passing through brickwork etc.

foot plate
(1) A horizontal timber laid over and crossing the wall plate. It joins the foot of an ashler piece (see ashler (4)), formerly known as a hammer beam (or dragon piece ?).
(2) Soleplate.

formaldehyde
HCHO
Common indoor pollutant deriving from construction materials containing binding resin. TLV = 2ppm, Recommended levels less than 0.1 ppm. Irritant.

foul air
(also bad air)
Usually refers to air of unacceptable quality where the contaminants are malodorous.

foul air flue
A ventilating duct which draws air out of a room.

foundation plate (also footing, foundation wall)
Foundation wall on which rests the wall plate.
wall plate

foundation ventilator
(see air grate)

frame construction
A form of house construction commonly encountered in the USA, and more recently in Europe. The form lends itself readily to prefabrication and is suitable for tight buildings.
Wood house building. (PDB)
balloon framing
Frame construction in which the studs run to the roof plate past the floor joists which are nailed to them.
braced frames
Frame construction of widely spaced heavy corner posts into which binders or girders are framed. The studs carry no load. The corner posts are framed into each floor as they pass it. This term is also used for constructions intermediate in type between the above and balloon frames.
platform frames (Western frames)
A frame construction in which the wall, floor and roof frames are built independently. The floor platforms are carried over the full thickness of the wall frames which are built in separate storeys. Floors, external walls and roof are braced with diagonal boarding.

framed grounds
Grounds (see common grounds) framed like a door frame round openings with the head tenoned to the posts, used as a fixing for joinery. (PDB)
first fixings

frame house
(USA)
The American sawn timber house of frame construction, sheathed usually with weather boards or shingles outside. (PDB)

frame-wall leakage
Leakage passing between the frame of a wood double hung window and the wall. (ASHRAE) (Similarly for other types of window and doors)

free wind velocity head
(see velocity head)

French window(s)
A door-like window.

freon
Chlorinated hydrocarbon used as refrigerants and aerosol propellants. Common indoor pollutants. Non-toxic.
Freon 12 = dichlorodifluoromethane. ($C.Cl_2.F_2$)
electron capture detector

fresh air
Air from free atmosphere that is generally assumed to be sufficiently uncontaminated to be used for ventilation.

fresh air change rate
(see ventilation rate)

fumes
Airborne gases or particles, less than a micron in size, arising from condensation of vapours or from chemical reaction.
air pollution, condensation, particulates, aerosol.

furring
(also firring)
(1) Lathing fixed to common grounds and plastered, leaving an air space between brick and plaster.
(2) (USA) A cavity within an outside wall to keep out damp and for insulation. It may be formed with lath and plaster or with hollow blocks or bricks.
(3) Timber strips laid, for example, on uneven joists to pack them out and make a plane surface for floor boards or for the close boarding of a roof or wall.
(4) (see common grounds, framed grounds) Timbers carrying a false ceiling.

gable
(also gable end)
The triangular part of the end wall of a building with a sloping roof. It is that part between the barge boards or rafters which sometimes rises above the roof. A gable may be of any material, weatherboards, brick, stone, hung tiles, etc.. (PDB)

gable wall
A wall crowned by a gable. (PDB)

garage
(1) Building used for parking vehicles.
(2) Carport.
(3) (see multi-storey car park)

gauge pressure (gage pressure USA)
Pressure above atmospheric.

gemel window
A window in the roof with twin lights.

grade (U.S A)
Ground level.

gradient height
General: The height above ground level at which the ground has no effect on the wind profile.
Specific: The height of the gradient wind.
gradient wind

gradient wind (velocity)
General: The velocity of the wind (at the gradient height) at which it is not affected by the presence of the ground.
Specific: That equilibrium horizontal wind (V), blowing parallel to curved isobars of radius of curvature (r) whose centripetal acceleration (V^2/r) represents the net inward force acting per unit mass of air. The only forces considered to act are the horizontal component of the pressure gradient and the coriolis force. (MG)
gradient height

greenhouse
(also glasshouse)
A glasshouse for plants, especially one with little or no artificial heating.
(Chambers)
conservatory

gross volume
The total volume of a building (room), found by calculating the room dimensions, taking no account of the fixtures and fittings or the contents.

ground floor (UK)
(UK) The floor which is nearest the ground level. It is generally about 30cm above ground level. (PDB)
first floor

ground level
(also grade (USA))

ground plate
The lowest horizontal timber of a building frame often called the sole plate.
sole plate, sill plate

grounds (carp.)
(1) (see common grounds)
(2) (see frame ground)
first fixings

grounds (plan., arch)
Surrounding land belonging to a building. (trans. from TNC58)

gust
A brief episode of high wind speed (compared with the mean wind speed).

habitable room
(1) Generally refers to bedrooms + living room.
(2) Any room in a home regularly used by the inhabitants.

hacienda style house (U.S.A)
(see courtyard house, atrium house)

hall door
A door in a passageway or hall designed to reduce draughts.

heat balance
A statement of the heat input to, and heat loss from, an appliance, plant or structure, intended to account for all sources of heat and equivalent energy. (BS 5643)
energy signature

heat exchanger
A device designed to transfer heat between two physically separated fluids. (BS 5643)

heating season
Period of the year during which space heating is normally necessary in a building to achieve comfort conditions. (BS 5643)
energy signature

height allowance
(1) An allowance for vertical temperature gradient added to heat loss calculations based on a uniform temperature in a heated space.
(2) An additive factor in heat loss calculations to compensate for greater heat loss in the upper storeys of multi-storey buildings. (BS 5643)

helium
(see tracer gas appendix)

high pressure leakage
Leakage in which the dominant mode of flow through cracks is turbulent. Flow exponent $n = \frac{1}{2}$ approximately.

high rise building
Buildings exceeding approximately eight storeys in height.
severe exposure

hollow wall
(see cavity wall)

hopper inlet
A form of inlet built into a wall for supplying air for natural ventilation, whereby a tilting drawer, hinged at the bottom, is opened to provide the air flow path. (IDPT)
wall ventilator

humid air
(see moist air)

humidistat
A sensing device associated with regulating heating and/or ventilating plant according to the relative humidity in the building.
thermostat, hygrometer

humidity
Atmospheric water vapour content. (M-H)
relative humidity, specific humidity, humidity mixing ratio

humidity mixing ratio
(also mixing ratio: absolute humidity)
The mass of water vapour mixed with one unit mass of dry air, usually expressed in g/kg.
relative humidity, specific humidity, condensation, humidity.

hydrogen
(see tracer gas appendix)

hydrostatic pressure
(1) The pressure at a point in a fluid at rest due to the weight of fluid above it. (also gravitational pressure)
(2) The negative of the stress normal to a surface in a fluid.

hygrometer
An instrument for measuring water vapour content of the air.
hair hygrometer
An instrument for measuring the humidity of the air using the property of expansion/contraction of certain materials (e.g. hair) with relative humidity. (MG)

impermeable
(also impervious)
Not permitting water or other fluid to pass through.
vapour barrier

indoor climate
The synthesis of day to day values of physical variables in a building. (e.g. temperature, humidity, air movement, air quality, electric and radiation environment etc.) which affect the health and/or comfort of the occupants.

indoor pollution
(see internal pollution.)
Pollution occurring indoors from any source i.e. from outside as well as inside the building.

induced leakage
Leakage additional to the natural leakage of a building, generated when pressurising a building due to windows and doors being pushed away from their seals.
pressurisation, flexure

induced sealing
Leakage defecit on the natural leakage of a building generated when pressurising a building due to windows etc. being pushed further into their seals, improving tightness.
induced leakage

industrial building
A functional classification term for buildings of which the main purpose is to provide space for manufacturing and assembly processes. These are characterised by high levels of activity, both mechanical and human, and, unless otherwise indicated, by high levels of internal pollution.

infiltration
(see air infiltration)

infiltration heat losses
Heat losses from a building which are directly attributable to the effects of cooler outside air leaking into a building and of warm air leaking out.

infiltration rate
The rate at which outside air infiltrates into a room or building. Equivalent to the fresh air change rate, usually expressed in ach or litres/s.
air change rate

influx
(also inlet air)
That which flows in: specifically fresh air entering through a ventilation inlet. (Chambers)

infra- red absorption method
A method of measuring tracer gas concentrations by determining the transmission of infra-red radiation at an absorption frequency through a fixed path length- usually compared with a reference gas. (High sensitivity, large range of sensitivity). Susceptible to contamination by water vapour. (H+W)
tracer gas, carbon dioxide, carbon monoxide.

infrasonic method
(see a-c pressurisation)

injected flow
Actual flow rate of tracer gas introduced during infiltration measurement experiments.

inside air
Air inside a room.
outside air, supply air

insolation
The radiation received from the sun. (BS 5643)

instability (atmospheric)
(see atmospheric stability)

institutional building
A functional classification term for buildings. Buildings with mixed occupational and other activities where there may be special requirements arising from those activities .
e.g. hospitals, prisons etc.

insulation
(1) Protection of a room or building from undesireable gains or losses of sound or heat.
(2) Insulating materials to break up the flow paths for heat or sound.

integrating flow meter
A flow meter that indicates the cumulative value of the quantity of fluid with respect to an arbitrary zero. (BS 5643)

interior wall
(see internal wall)
The term "interior wall" usually refers to the inner leaf of a cavity wall, but the term is often used interchangeably with "internal wall"

interior zone
A zone of a building that is substantially unaffected by changes of conditions outside the building. (BS 5643)

intermediate joists
Joists between, and supported by, wallplates at the eaves, themselves bearing the roof assembly.

intermittent (occupation)
adj. Functional classification term for buildings.
Buildings subjected to only limited periods of relatively short term occupation.
e.g. holiday homes, chalets, research field stations, mountain shelters etc.

internal dormer
A vertical door or window in a sloping roof, within the general line of the roof. (PDB)
dormer

internal leakage
Leakage taking place between spaces within a building and adjacent spaces, e.g. through ceilings and floors into loft/cellar spaces for which wind pressure variations are unimportant.

internal pressure
The pressure inside a building envelope.

internal shielding coefficient (USA)
(also internal pressure coefficient)
A dimensionless coefficient relating the internal pressure shift to the stagnation pressure. (wind speed at ceiling height.)
shielding coefficient.

internal temperature
The temperature in an enclosure or occupied space. (BS 5643)

internal wall
A wall of which no surface is exposed to the weather or earth.
Generally used for partitions and walls between rooms. (see interior wall)

isokinetic sampling
Implies sampling at such a rate that the motion of the gas entering the sampling nozzle is the same as that of the gas being sampled. Where there is a significant density difference between the tracer/pollutant and air this is necessary. (e.g. for detection of particulates or liquid drops.) Otherwise the sampling process sensitivity will be particle size dependent, which is highly undesirable. It may also lead to an abnormally high (or low) count due to the volume being drawn into the instrument being much larger (or smaller) than the cross section of the aperture would imply.
_anisokinetic flow.
The condition of isokinetic sampling is not observed.
This variable flow condition also occurs in the vicinity of pressurisation fans.
blower door, pressurisation, isokinetic sampling

isolated roughness flow
(Ref. Turbulence Phenomena, J.T.Davies 1972)
This regime is observed for rough plates with rectangular elements perpendicular to the flow where the ratio of the spacing between the elements is greater than 10. It is characterised by the wake eddies generated by each element and the approach eddies of subsequent elements

being completely separate.
This flow regime is observed in wind tunnels and in the atmosphere for terrain classes I and II
terrain class

isotherm image
Thermal image with isotherms. i.e. A display with lines or areas corresponding to the same infrared radiation density. (SWE)

jet
A fluid stream issuing from a slot, orifice or nozzle. (BS 5643)
(These include cracks, open windows, etc.)
_jet envelope
The boundary between the jet and the surrounding air.
_jet range
(also jet throw). The distance for which the jet is distinguishable from the ambient air.
_jet spread
The divergence of a jet from the point of origin. Usually given as an angle at the orifice, or the ratio between the cross sectional area of the jet at at a given distance from the origin and the jet area at the origin.
_jet velocity
(1) The core velocity of a jet (of air).
(2) The mean velocity of a jet (of air).

jointing fibre
A sealing strip formed from a strip of mineral wool coated with plastic film, used between walls and frames. (C+E+E)
retrofit, tight

joist
(1) (UK and USA) A wood or steel beam directly supporting a floor. Usually a common joist. Steel joists are often called RSJ's (= rolled steel joists).
(PDB)
(2) (USA) Rectangular lumber from 5 cm.(2") up to (but not including) 12.5 cm. (5") thick and 10 cm.(4") or more wide, graded for its bending strength loaded on edge. (When graded for its bending strength loaded on face it is a plank.)
(PDB)

katathermometer

An instrument used to assess the cooling effect of an air current. (BS 5643) A large bulb alcohol thermometer is warmed above air temperature. From the known temperature drop and the air temperature, the airspeed can be derived.
Range: v greater than 0.06 m/s.
nondirectional (H+W)

katharometer

A device for measuring tracer gas concentrations. A katharometer measures changes in the thermal conductivity of the air/tracer mixture using a bridge circuit.
Used for hydrogen, helium, coal gas, ethane, carbon dioxide. i.e.any gas of which the thermal conductivity is very different from that of air.
N.B. This instrument measures only relative concentrations, not absolute.
The device may be active or passive. Active devices draw in samples with a pump.
tracer gas, dead time, air infiltration.

krypton

(see tracer gas appendix)

k-value

(=total heat transfer coefficient = coefficient of thermal transmittence)
UK: The thermal conductivity of a material. (Preferred symbol now lambda)
Europe: Air to air transmittance. (Preferred symbol now "U"-value)
(Chartered Institute of Building Services recommendations)
"U"-value, lambda value.

lambda value
(also k-value)
The coefficient of thermal conductivity of a material. S.I. (ISO recommendation)

laminar flow
(also viscous flow: streamline flow)
A fluid flow in which the particles move smoothly without turbulence. (Chambers)
Flow in which cross stream momentum transfer takes place by viscous action alone.
Flow in which mixing between flow strata (laminae) does not occur. (BS 5643)
Reynolds No., quasi-smooth flow, wake interference flow, isolated roughness flow.

lantern light
A widely used method of producing natural light and ventilation to rooms in buildings, particularly flat roof design, consisting of a raised assembly of pitched glass panels resembling a roof or an old fashioned lantern hood. (IDPT)

larder (also pantry)
Room where food is stored.

latent heat
Heat added or removed during a change of state, the temperature remaining constant. (BS 5643)
condensation, adiabatic lapse rate (saturated) .

leakage
(see air leakage)

leakage function
The leakage of a building or part of a building as a function of applied pressure difference (m^3/hr-Pa).
a-c pressurisation, leakage function

leakage path
A route by which air enters or leaves the building.
simple leakage path or direct leakage path
A direct crack through the fabric.
complex or indirect leakage path
A path where the entry and exit points for the air are not easily determined. e.g. a crack in the brickwork to a light fitting.

leakage profile
A means of representing the leakage characteristics of windows etc. -locating the paths of greatest leakage.
component leakage.

leakage site
A point on the outer or inner surfaces of a building envelope or an internal wall where a leakage path emerges.
thermography, smoke.

leakiness
(see airtightness)

leeward
(downwind)
(1) Sheltered
(2) On or towards the sheltered side,
(3) The quarter toward which the wind blows.

light (window)
One glazed or unglazed window, (usually of several panes) whether fixed or opening. (PDB)

lining
(see cladding)

linked house
A dwelling in a row of similar dwellings linked to its neighbours by a garage or other unoccupied space, otherwise detached.
terrace, detached house, semi-detached house

lintel
(see window head, door head)

lobby
(also vestibule (UK north & midlands))
(1) A small hall or waiting room.
(2) A passage serving as a common entrance to several apartments.
(3) The public area on the ground floor of a hotel or public building.

local air velocity
A velocity at a specific point in a fluid stream.
(BS5643)

lodge
(1) A small building, usually in remote areas, intermittently inhabited, used as a base for sporting activities, etc.
(2) A gatehouse for :-
a) a large country estate, or
b) a complex of buildings e.g. a university.

loft
A storage space under a roof. (U.K.)
As above, also the entire upper floor of a commercial building.
roof space

long term average technique
(see bag sampling method (1))

loose
adj. applied to a building with high leakage.

low pressure leakage
Leakage in which the dominant mode of flow through cracks is laminar.
(flow exponent n = 1 approx.)

low rise
A term applied to buildings not exceeding approximately three storeys in height.
sheltered exposure, medium rise, high rise.

lucarne
(see dormer window)
A dormer window (especially in a church spire).

lug sill
A sill with its ends built into the jambs (stiles/uprights) often of stone, concrete or brick, below the window sill. Also window sill of the above design.
slip sill

luminaire
A light fitting. (BS 5643)

luting
(see mastic)
From 'lute', clay, cement or other material used to form a protective covering, an airtight stopping etc.

magnahelic gauge
A compact dial gauge of limited accuracy for measuring differential pressures.
The active element is a twisted bourdon tube with a flat magnetic armature attached which rotates when pressure is applied, thus changing the air gap between it and the sensing circuit, changing the inductance. The resultant signal is used to modulate a carrier voltage.

maisonette
(also USA, duplex apartment)
A self contained flat (apartment) on two levels having its own internal stairs. (PDB)

manometer
A device for measuring pressure employing the principle of displacement of liquid levels in a liquid filled "U"-tube. The limbs of the "U" may be vertical, inclined or curved. (BS 5643)
micromanometer
A device for measuring small pressure changes by detecting small displacements of a diaphragm electronically.
ring balance manometer
(ringwaage . Ger.)
A measuring device for static pressure differences, consisting of an axially pivoted hollow ring partially filled with liquid, with a septum dividing the air space on either side of which are the air inlets. Increased air pressure on one side displaces liquid towards the other causing a mass imbalance, making the ring rotate. The degree of rotation can be limited by a counterweight attached to the outside of the ring.

manometric pressure
The pressure measured by a manometer. (BS 5643)

massive walls
(see solid walls)
n.b. This term is usually confined to walls of unusual thickness, e.g. of a castle or lighthouse.

mastic
(also luting)
(1) A pale yellow gum resin from the lentisk and other trees used for varnish , cement etc.
(2) A bituminous or oily cement, (which does not dry out), used for sealing gaps subject to changes in size. (Chambers)

mechanical diffusion
(see eddy diffusion)
Eddy diffusion due to mechanically generated turbulence. The frequency and eddy size spectra are usually very different to those of natural turbulence.
eddy, turbulent flow

mechanical turbulence
(1) The erratic movement of air caused by local obstructions such as buildings. (NSCA)
(2) Turbulence generated by mechanical means e.g. fans, opening doors

etc.

mechanical ventilation
Ventilation by means of one or more fans. (BS 5643)
ventilation, natural ventilation

medium rise (building)
A term applied to buildings between approximately four and eight storeys in height.
normal exposure, low rise, high rise.

meteorological wind speed (UK)
The wind speed measured in open country at a height of 10m above ground.

methane
(see tracer gas appendix)

mezzanine
(1) (also entresol): A full or partial storey in a building, the floor level of which is between the ground floor and first floor levels. (PDB)
(2) A room below the stage. (theatre)
(3) A small low window. (PDB)

mezzanine room
(see mezzanine (2), and occasionally, mezzanine (1))

microclimate
The wind, solar radiation, temperature and moisture conditions which are in force at a particular location. e.g. in the immediate environs of a building.

minimum air change rate
(also minimum air quantity)
(1) The air change rate for a room (or building), which may include both fresh and recirculated air, required to maintain acceptable air quality. (based on ASHRAE 62-73)
(2) The air change rate which is specified for a tight house under pressure as a standard of building tightness. approx. 3 air changes per hour at 50Pa. (Swedish standard)
minimum ventilation requirements, air change rate, building tightness.

minimum ventilation requirements
The minimum quantity of fresh air, per hour, entering a room (or building) required to maintain acceptable air quality. (based on ASHRAE 62-73)
minimum air change rate, natural ventilation, acceptable air quality

mixing
The degree of uniformity of distribution of (fresh) air or foreign material in a room (or building).
transfer index, ventilation rate.
_perfect mixing: homogeneous mixing
_inhomogeneous mixing
The substance is unevenly distributed.

mixing ratio
(see humidity mixing ratio)

mixing time
The time during which air infiltration appears to rise after injection of tracer gas is reduced or ceases.

mobile home
Moveable single storey dwelling, usually permanently connected to site facilities. (U.K.)

moist air
(also humid air)
A mixture of clean dry air and water vapour for which the vapour pressure (density) is less than the saturated vapour pressure (density) at the same temperature.
dry air, saturation vapour pressure

moisture content
(1) The amount of moisture in a substance expressed as the mass of moisture per unit mass of the dry substance.
(2) The amount of moisture in a substance per unit mass of the moist substance.
(3) For moist air, the mass of water vapour per unit mass of dry air.
The preferred term is humidity mixing ratio. (BS 5643)
humidity mixing ratio, specific humidity, absolute humidity, relative humidity

movable window
An openable window in which the glazing frame is :
(1) mounted on hinges (=movable hinged window), or
(2) a sash window (=movable sash window).

moving indicator
A method of visualising air flow by introducing visible particulates. e.g. smokes of ammonium chloride, titanium tetrachloride, evaporated parafin oil mixture, tobacco. also metaldehyde, soap bubbles, gas filled balloons etc.

mullion
(also monial (rare))
An upright division between the lights of windows. (Chambers)

multi-cell model
A computer model in which the building is considered as a collection of interconnected cells between which the flow rates are calculated.

multi-chamber infiltration measurements
Air infiltration measurements where flow between rooms and common spaces is estimated as well as that to the outside.
reciprocity

multi-family (dwelling) (multiple unit dewelling)
A functional classification term for buildings. A building serving the needs of two or more families whose requirements and activities overlap due to the nature of the building. e.g. blocks of flats (apartments),

maisonettes (duplex apartments)

multi-storey building
Strictly, a building with two or more floors, but in common usage the term is confined to medium and high rise buildings. high rise, medium rise.

natural circulation
Circulation that depends on states or conditions such as thermal currents or differences in level. (BS 5643)
natural ventilation, stack effect, wind pressure.

natural ventilation
Ventilation using only natural motive force such as wind pressure or differences in air density. (BS 5643)
wind pressure, stack effect, Bernoulli's effect, mechanical ventilation,
ventilation, air infiltration.

negative pressure
A pressure below atmospheric. (BS 5643)

neutral zone
An area where no (mean) pressure difference exists between inside and outside a building. (ASHRAE Handbook)
stack effect, wind pressure, effective chimney height .

night vent
(also vent light, vent sash, ventilator)
A small opening light with horizontal hinges at the top of a casement window. (PDB)

nitric oxide
NO: Common indoor pollutant, usually resulting from combustion in gas appliances.

nitrogen dioxide
NO_2: Common indoor pollutant, usually resulting from combustion in gas appliances. Recommended air quality standard 0.10 to 0.17 ppm/hr. (Sax)

nitrous oxide
(see tracer gas appendix)

nogging piece
(also nogging, nog)
(1) Horizontal short timbers which stiffen the studs of a framed partition.
(2) (also bricknogging) Brickwork infilling between the studs of a wooden framed partition or building frame.
(PDB)

normal exposure
Degree of exposure of a building corresponding to most suburban and country premises, and between the fourth and eighth floors in city centres. (BS 5643)
exposure, severe exposure, sheltered exposure

noxious
Harmful.

occupancy
(1)The time during which one occupies a building.
(2) (also see occupancy pattern)

occupancy pattern
The pattern of activity of occupants of a building, including number of occupants, where they are within the building and for what length of time.

occupancy type
A term for classifying buildings according to the occupancy pattern.

occupied zone
An enclosure in which human activity occurs. (BS 5643)

odour
Smells arising from chemical contaminants in the living space which are either obtrusive or unpleasant or both.
minimum air change rate, acceptable air quality, air pollution

odour concentration
The number of unit volumes which a unit volume of sample will occupy when diluted to the odour threshold.

odour intensity
A measure of the strength of an odour in subjective terms as assessed by a panel of sniffers.
When a stream of undiluted odorous air is presented to a subject the intensity is assessed either:
(1) on a verbal scale, (e.g. from "no odour" to "very strong odour").
(2) in direct comparison to standardised odours e.g. pyridine, hydrogen sulphide.

odour threshold
The ratio of odorous to odour free air for which the odour is just perceptible. (usually to half a panel of sniffers)
odour intensity, organoleptic

office (building)
A functional classification term for buildings intended for use by office staff, characterised by high density of occupation and a relatively sedentary level of activity.
e.g. office blocks

opening(s)
Gaps in the building envelope, sometimes referring to purpose provided openings such as windows and doors.

organoleptic
Affecting a sensory organ (of pollutants, odours, etc.).
air quality

oriel window
An upper storey overhanging window carried on corbels. (PDB)
bay window, corbel

orientation
The direction with respect to points of the compass, in which building axes lie or external walls face. (BS 5643)

orifice plate
(orifice meter)
A device for measuring gas flow by measuring the pressure drop across an orifice in the flow line.
venturi meter

outdoor air
(also ambient air, environmental air)
Air outside the building (or enclosure).

outdoor pollution
(also external pollution, exterior pollution, environmental pollution, ambient pollution)
Pollution generated outside, including that from vehicles, industrial activity, combustion products etc., degassing from waste etc., also natural decay products, sea salt etc.

overpressure
Pressure differential above a reference pressure, usually ambient atmospheric pressure.

oxygen
(see tracer gas appendix)

palisaded (house)
Terrace house with a small front garden bounded by a wall or fence.
terrace.

parapet
(also parapet wall)
A low wall guarding the edge of a roof, bridge, balcony, etc.. That part of a house wall which passes above the roof.

parge
(1) Ornamental plasterwork.
(2) A form of coarse plaster made with cowdung, used for lining flues.

parging
(also pargetting, pargeting)
(1) (also coring, fluelining) Rendering the inside of a brick flue with parge.
(2) Decorative plastering to the outside walls of Elizabethan style houses with parge.
(3) (USA) Rendering the inner face of an outer leaf of cavity brickwork, sometimes called back mortaring.
(PDB)

particulate
A state of matter in which similar or dissimilar solid or liquid substances exist in the form of aggregated molecules or particles. Airborne particulate matter is typically in the size range 0.01 to 100 micrometres. (micron) (ASHRAE 62-73)
aerosol

particulate tracer
Solid particles or aerosol used as a tracer for measuring air infiltration/air movement. dia: 2 to 3 micron.
Detection: fluorescent, light scattering and photomultiplier (P-M), phosphorescence and P-M detector.
tracer gas, air flow

partition
A (vertical) interior wall separating a storey into one or more chambers (rooms,corridors)

party wall
(also parting wall, common wall (USA))
A wall separating two properties and shared by them.
similarly, party fence.

patio house
(see courtyard house, atrium house) atrium

penetration
(also throughfare)
A locus on a wall, ceiling or floor where a fitting or component passes completely through the wall etc., e.g. window, light fitting, etc.

permeable area
The sum of the areas of the exposed walls, the ground floor, provided that this is not solid, and the area of the ceiling between the topmost floor and the roofspace.
(Kronvall)

permeability to water vapour

$$=q.d/A(v_1-v_2)$$

v_1 and v_2 are the water vapour concentrations on either side of the test section. d is the thickness and A the area of the test section. q is the permeability coefficient for water vapour. (as for conductivity for heat etc.)
(TNC58)

_resistance to water vapour migration

$$z= A\ (v_1-v_2)/q$$

For definitions of symbols see "permeability to water vapour"
(TNC58)

permeability characteristic (or coefficient)
(1) A description of the permeable areas of a building and their distribution.
(2) (see building tightness)

perviousness factor
(see building tightness also permeability characteristic)

physical volume
The true volume of the interior of a building (or room) found by subtracting the volume of the contents from the gross volume and making allowances for fixtures and fittings.
attached space, dead space, gross volume

piezometer ring
(also piezostatic tube)
In a device for measuring static pressure, usually a set of four pressure tappings at 90 degree intervals round a pipe or throat joined by a circular tube which is connected to the sensing element.
piezometer tube

piezometer tube
In a pressure measuring device, the tube one end of which is set into the wall of the pipe or throat, terminating flush with the surface, and the other connected to the sensing element.
piezometer ring, venturi meter, orifice plate.

piezostatic tube
(see piezometer ring)
piezometer tube

pipe chase
A recess or channel in a wall for the purpose of recessing pipes and/or other conduits. (ASSE)

pitot tube
A detector for transmitting the static and dynamic pressure of a moving fluid stream. The difference in the measured pressures is used to determine the velocity of the fluid.
(BS 5643)
pressurisation, dynamic pressure, wind pressure, total pressure.

platform roof
A flat roof. (PDB)

plenum chamber
A chamber under higher than surrounding pressure for receiving air before delivery to a conditioned space or a combustion system. (BS 5643)

plenum system
A supply system of ventilation that provides air at a positive pressure. (BS 5643)

plume
A readily distinguishable jet (flow) of effluent from an outlet before turbulence and diffusion have effectively dispersed it. Applied to smoke from chimneys, warm air from central heating units and tracer gas injection. etc.

porosity
General: The quality or state of being porous.
Specific: The ratio of the volume of pores to the total volume.

pressure attenuation technique
A method of estimating the leakage of a building by releasing compressed air inside the building causing instant pressurisation, the pressure returning to normal as the air leaks out. The rate of reduction of pressure is proportional to the leakage.
leakage, induced leakage, pressurisation

pressure coefficient
(also exterior pressure coefficient, external shielding coefficient)
A dimensionless coefficient relating the pressure on the outer surface of a building to a reference pressure and air speed. (S/G/C/S)
_internal pressure coefficient
As above, relating the internal pressure to the reference pressure and airspeed.

pressure ventilation
Ventilation achieved by overpressurising the building with exfiltration/ natural exhaust. (used for very large buildings)

pressurisation (U.S.A.: pressurization)
A method of testing for air leakage of a building or component by installing a powerful fan in the building envelope, e.g. through a door or window, and creating a static pressure excess inside the building. The flow rate through the fan and pressure difference across the envelope are measured and air leakage assessed. (Kronvall)
leakage, flow rate

prevailing wind direction
The wind most frequently observed during a given period. (day, month, season, year)

primary air
(1) Air for combustion purposes admitted directly to or with the fuel.
(2) Air introduced into a ventilation or air conditioning system from outside.
(3) In an induction system, air supplied to the terminal units from a central plant.
(BS 5643)
mechanical ventilation, fresh air

process building
Factory building in which manufacturing activities are taking place.
industrial building

psychrometer
A wet and dry bulb hygrometer.
_Assmann psychrometer
An aspirated hygrometer in which a fan draws a current of air over the wet and dry bulbs of thermometers.
(BS 5643)
_sling psychrometer
A hygrometer that is whirled through the air.
(BS 5643)

public (building)
A functional classification term for buildings in public use, characterised by a very high density of occupation and may have a high level of physical activity and high levels of pollution.
e.g. clubs, restaurants, large railway stations, museums, exhibition centres, public houses, etc.
high traffic area

pulley stile
(see window stile)

pulsed tracer method
A method of measuring the transient behaviour of a ventilation system in a room.
A small quantity of tracer gas is admitted to the supply duct. The growth and decay of the tracer gas concentration at different points in the room is monitored.
(Sandberg)
This is a variant of the transfer index method.

purge pump
A pump in a tracer gas analysis apparatus which draws in sufficient room air to completely displace (purge) the previous sample from the sample line and the apparatus.

purlin
A horizontal beam in a roof, at right angles to the principal rafters or trusses, and carried on them. It carries the common rafters, if there are any, or the substrate on which the roof covering is mounted. (PDB)

purpose provided openings
Openings in the building envelope for the specific purpose of supplying ventilation air. i.e. air bricks, vents, extractor fans, intake and exhaust for HVAC systems, chimneys, etc.
air leakage, background leakage, component leakage, natural ventilation.

quasi-smooth flow

This regime is observed for rough plates with rectangular elements perpendicular to the flow where the ratio of the spacing between the elements to the height of the elements is less than, or of the order of 3.3 .

It is characterised by isolated eddies between the elements with the main flow passing over the top of the element array relatively undisturbed.

("Turbulence Phenomena" J.T.Davies, 1972)

This flow regime is observed in wind tunnels and in the atmosphere for terrain classes IV and V.

terrain class

racetrack effect (USA)
A blob of tracer gas is advected by an air current without mixing substantially with the surrounding air before returning to the injection area, giving rise to an highly uneven distribution of gas concentration of an essentially toroidal shape.
inhomogeneous mixing, effective volume

radioactive tracer method
A method of measuring air infiltration by using a radioactive tracer gas, measuring tthe concentration by the radioactive emissions. Isotopes of the noble gases are preferred. 41Ar, 85Kr, 133Xe are beta emitters. Radon (Rn or 222Em) is an alpha emitter.
Detector: Geiger-Muller tube, scintillation counter.
transfer index method, tracer gas,

radon
(Rn or 222Em) noble gas formed in the decay chains of isotopes of uranium and thorium. Decays by alpha and gamma emission to 218Po with a half life of 3.823 days. Daughter products unstable.
Commonly occurring indoor pollutant deriving from trace quantities of heavy elements in concrete, building stone and the water supply. It can also occur in natural gas.
Considered for use as a tracer gas measuring air infiltration.
indoor pollution, tracer gas, Tracer gas appendix

rafter
A sloping timber extending from the eave to the ridge of a roof. It may be a common rafter or a principal rafter.

principal rafters
(also principals)
The main rafters, those in the roof truss carrying the purlins on which the common rafters are laid.

common rafters
(also rafter spar, intermediate rafter)
A sloping timber, 10 cm.(4") x 5 cm.(2") fixed either to a wall plate at the foot and a ridge at the top of a single roof, or to the purlins which are, in turn, carried by the principal rafters.

rate of decay method
A method of measuring ventilation rate whereby a quantity of tracer gas is released and the decrease in concentration measured as a function of time.
(also known as the decay method and the tracer dilution method.)
tracer gas, air infiltration

rebated weatherboard
(see shiplap)

reciprocity method
A method of measuring leakage whereby each room in a multi chamber building is pressurised in turn. The sum of the leakages measured indicates the true air leakage through the outer shell of the building.
true air leakage

recirculated air
Old room air - removed by natural air flow or mechanical systems, reintroduced into the rooms via H&V, cupboards, floor spaces, etc.
One of the major possible sources of error in air infiltration measurements.

reference conditions
Specified conditions of pressure, temperature and relative humidity for air.
(BS 5643)

register
A combined grille and damper assembly. (BS 5643)
purpose provided openings

regression
A latent curve or functional relation between variables, applied to fit a statistical population of sets of these variables.
regression coefficient

regression coefficient
In a regression, the values of the coefficients by which each variable or function of each variable is multiplied in the various terms in the regression equation.
regression

regression equation
An empirical equation approximating a functional relation between variables.
(see regression)

relative humidity (R.H.)
The ratio of the vapour pressure of water in the air to the saturation vapour pressure at the same pressure and temperature (dry bulb).
humidity mixing ratio, absolute humidity, specific humidity

relative water vapour concentration
The ratio of the water vapour concentration in the air (kg/m^3) to the concentration at saturation. (Also the ratio of the absolute humidities or specific humidities.)
This term is not commonly used in the U.K., the preferred quantity is the "relative humidity". The two terms have almost the same numerical value.
(The exact relationship may be found in M.G. under "relative humidity")

relative leakage
The ratio of the leakages (at a specified pressurisation) of two buildings.

relative ventilation efficiency
A quantity describing how the ventilation ability of a system varies between different parts of a room.
For a steady source :-

$$r.v\ e.(j) = \frac{C(exhaust) - C(supply)}{C(j) - C(supply)}$$

C = concentration of pollutant.
For a transient source :-

$$r.v.e. = \frac{\int_0^\infty C(t,exhaust).dt}{\int_0^\infty C(t,j)\ dt}$$

C = concentration of pollutant.
j = point of measurement. When j represents the whole room, the quantity is known as the overall relative ventilation efficiency.

residence time
The time during which a substance introduced into the air (or other medium) remains in place before it is lost or transformed into something else.

residential building
A functional classification term for buildings.
General term for buildings whose primary purpose is to provide living space for the occupants. Activities within them are limited to those of a domestic nature.
This includes single-family, multi-family, communal, institutional and intermittent use building classifications.
commercial building

resistance
(see fluidic resistance)

retrofit
The process of reducing energy loss in a building by physical means, e.g. reducing excess air infiltration by obstructing flow through cracks and openings.
minimum air change rates, air infiltration, weatherstrip, caulking.

Reynolds No.
Dimensionless ratio which gives an estimate of the relative importance of viscous and non-viscous forces.
Re = velocity x characteristic length/kinematic viscosity.
for crack flow: length = 4A/wetted perimeter, where A is the area of the crack.
This quantity is analogous to the hydraulic radius of pipes and channels.

Richardson No.

$$Ri = \frac{g}{T}\frac{(\partial T/\partial z) + G}{(\partial \underline{u}/\partial z)^2} = \frac{g}{}\frac{(\partial \theta/\partial z)}{(\partial \underline{u}/\partial z)^2}$$

This equation compares buoyancy and momentum energy transfers.
T = temperature K.
u = mean velocity.
$\overline{G}$ = adiabatic lapse rate.
θ = potential temperature. = $T+Gz$ approx.
z = height above ground
Archimedes No., adiabatic lapse rate, atmospheric stability.

ring balance meter.
A device for measuring velocity or flowrate by measuring the dynamic pressure using a ring balance manometer.
ring balance manometer.

riser
A vertical pipe or duct. (BS 5643)
stack effect, purpose provided openings.

roof light
(see lantern light, skylight)

roof penetrations
(see roof terminals)

roof pitch
The angle between the maximum slope of a roof surface and the horizontal plane. (also angle of dip)

roof space
Space between the roof and the ceiling of the highest storey.

roof terminals
(also roof penetrations)
The position on a roof where a chimney, flue or other service penetrates the roof surface. Roof penetrations = UK preferred term.
weathering slate

roof truss
A wood or metal frame which carries a roof. (PDB)

roof ventilator
A weatherproof air outlet on a roof using only natural forces to generate flow. Including natural draught ventilators, gravity ventilators, and may be: stationary, pivoting, oscillating or rotating.
Bernoulli effect, stack effect.

room air conditioner
Packaged equipment for air conditioning the enclosure in which it is located.
(BS 5643)

room height
The height of a room between the floor and ceiling surfaces.
storey height

rough grounds
(see common grounds)
first fixings (2)

roughness
absolute roughness
The linear distance from peak to trough of a surface irregularity. (BS5643)
isolated roughness flow, quasi-smooth flow, wake interference flow.

row house (USA)
(see terrace house)

sarking felt
Thick inodorous waterproof felt used as an underlay between sheet metal roof covering and the prepared under surface of the roof. A sound and heat insulator.
(also under the tiles in modern roof construction)

sash run
(see window stile)

sash window
(also balanced sash, or (USA) vertical sash)
A window in which the opening lights slide up and down in a cased frame, balanced by sash cords passing over a sash pulley to counterweights. (PDB)

saturation vapour density (/concentration)
The vapour density at which a dynamic equilibrium exists for exchange of molecules between the gas and an open liquid surface.
supersaturation, dry air, humid air, saturation defecit.

saturation vapour pressure
The vapour pressure at which a dynamic equilibrium exists for exchange of molecules between the gas and an open liquid surface.
The pressure exerted by a vapour when saturated at a given temperature. (BS 5643)
supersaturation, dry air, humid air, saturation defecit.

scantling
A narrow piece of timber.

sealing fibre
A sealing strip formed from mineral wool strips in plastic film. Used between the ground plate and the foundation and between construction elements. (C+E+E)

secondary air
(1) (also entrained air)
(2) Room air entrained and set in motion by a jet of air entering through the HVAC system, purpose provided opening or crack.
(3) Air for combustion externally supplied to the flame at the point of combustion. (see primary air)
mixing, jet

secondary sash double glazing
(also secondary glazing, second glazing)
A form of double window where the inner and outer leaves are independently mounted horizontally moveable sashes.

secondary spaced boarding
(1) (see common grounds)
(2) Inner boarding in a roof construction supporting the vapour barrier, mineral wool, roof covering on the outer surface and the internal cladding on the inner surface. Preferred term in UK = close boarding.
first fixing, close boarding, boarding

second fixings
Joinery which is fixed after the plastering. e.g. skirting boards, linings, picture rails, cupboards, etc.. The term may also be used to cover plumbing and electrical wiring. (PDB)

selective sealing method
(also differencing technique)
A method of determining the leakage of specific building components by pressurising the building and recording the leakage changes as components are sealed successively. When all the major outlets and component cracks are sealed, the remainder is the background leakage.
leakage, component leakage, background leakage

semi detached (house)
A form of construction in which two houses form a single unit sharing one party wall, the party wall being between occupied areas.

sensitivity
(1) A measure of the minimum change in a variable which significantly affects the final outcome (of a calculation).
(2) The minimum quantity of a material or property which can be detected by an instrument.

separation
Horizontal surface partitioning a tall building.
top separation, bottom separation, partition

severe exposure
Degree of exposure of a building corresponding to buildings on coast and hill sites. (BS 5643)
exposure, normal exposure, sheltered exposure

shape coefficient
A coefficient by which the mean kinetic energy associated with the wind is transformed to wind pressure at the surface of a building.

$P(\text{wind}) = C_s \times 0.5 \times d \times v^2$.

shelter belt
A natural or planned barrier of trees or shrubs used to reduce wind velocity, giving shelter to a building or open area.

sheltered exposure
Degree of exposure of a building corresponding to buildings up to the third floor in city centres. (BS 5643)
exposure, normal exposure, severe exposure

shielding
The degree of protection from wind offered to a building by upstream obstacles. (These may be windbreaks, shelter belt, or another building) It may be negative where eddy reinforcement takes place between large buildings.

shielding class
Classification for the degree of shielding by local obstacles.
_no shielding
Class I shielding: No obstructions or local shielding whatsoever. (generalised shielding coefficient = 0.34) (Sherman II)
_light local shielding
Shielding class II: light local shielding with few obstructions. (generalised shielding coefficient = 0.30) (Sherman II)
_moderate local shielding
Shielding class III: Moderate local shielding, some obstructions within two house heights. (generalised shielding coefficient = 0.25)
_heavy shielding
Shielding class IV: Heavy shielding, obstructions around most of perimeter. (generalised shielding coefficient = 0.19) (Sherman II)
_very heavy shielding
Shielding class V: Very heavy shielding, large obstructions surrounding perimeter within two house heights. (Sherman II) (generalised shielding coefficient = 0.11)

shielding coefficient
(see pressure coefficient)
Specifically the ratio of the average exterior wind pressure to the stagnation pressure at the ceiling height. (Sherman)

shingle(s)
A thin rectangular piece of timber about 16"x5"x¼" used like a tile for covering walls or roofs. (U.K.) In U.S.A. shingle may also be of metal.

shiplap
(also shiplap boarding: shiplap siding)
Weather boarding of rectangular cross section with a rebate cut on each edge, fitting into corresponding rebates on the neighbouring boards.

short circuiting
(1) Transport of tracer gas between chambers by means other than infiltration. e.g. air currents, leaks from gas dispensing apparatus, altering the true destination of the gas.
(2) Direct flow between inlet and outlet.

shroud
A skirt of material sealed to a pipe and to the floor or ceiling providing a a watertight or airtight joint . It may be of neoprene, polythene, metal, etc..
_flashing

siding
(1) A piece of wood sawn to exclude the heart centre.
(2) Weather boarding.
(3) (USA) Any wall cladding except masonry or brick, e.g. asbestos cement, metal or other sheet material.
_weather boarding

single cell model
A model in which the building is regarded as a single cell for calculating air flows.

single chamber infiltration measurements
Whole house infiltration measurements in which the house is regarded as a single sample volume.
Also measurements made for an individual room.

single course brickwork
(see single wall)

single family dwelling
A functional classification term for buildings. A building serving the needs of a single family unit, whose requirements and activities are essentially separate from adjoining units. e.g. houses.

single sided ventilation
Natural ventilation of spaces with openings on one side only. (e.g. back to back housing).

single storey building
(see one-storey building)

single wall
(also single course brickwork)
A wall consisting of a single course of bricks,- without a cavity.
cavity wall

skirting board
(see base board)

skylight
Glazed opening formed in the roof to give lighting, ventilation (if of opening type) and also access to the roof. (IDPT)

slab block (/linear block)
Free standing building with two or more storeys above ground level and with at least two staircases. (trans. from TNC58)
tower block

slant gauge
An inclined manometer for measuring differential pressures.

sleeve
A piece of tube, usually of wrought iron or mild steel placed in walls and floors, and sited to allow passage of some service pipe through them. A clearance of 1/4" is allowed for expansion etc. (IDPT)
penetration

slip sill
A sill which fits (or slips) between the jambs of an opening and is not built into the walls like a lug sill.

slip sill
A sill which fits (or slips) between the jambs of an opening and is not built into the walls like a lug sill.

slope (of roof)
(see dip)

smoke
Visible cloud of airborne particles derived from combustion or from chemical reaction. (BS 5643)
particulates, aerosol, air pollution.

smoke flue (gas flue)
(see flue)

smoke stick method
A method of detecting leaks in the building fabric by pressurising the building and using smoke to trace the paths followed by the leaking air.

soffit
(also soffite)
(1) The under surface of a cornice, stair, beam, arch, vault, or rib, or the uppermost part of the inside of a drain or culvert (also crown). Generally any under surface except a ceiling.
(2) The lining at the head of an opening, (e.g. a window opening).

soffit board
(also planceer piece): A horizontal board nailed to the underside of rafters forming the soffit under an overhanging eave.

sol-air temperature
(external environmental temperature)
The outside air temperature, which, in the absence of solar radiation, would give the same temperature distribution and rate of heat transfer through the walls or roof of a building as exists with the actual outdoor temperature and the incident solar radiation. (BS 5643)

soleplate
(also cill plate, sill plate, ground plate)
The bottom member of a timber frame panel (or wall). (U.S A.)
Preferred term for a panel is sill plate, and for the outside wall, ground plate.
lug sill

solid walls
(used for massive walls)
Exterior wall of masonry, brick or timber which does not contain any major air spaces.

sorbent
(n) A substance which absorbs or adsorbs or both.
(adj.) The quality of absorbancy and/or adsorbancy possessed by a material.

sorption
The interaction of a gas or vapour with a solid or liquid substrate. Usually either adsorption or absorption.

sound transmission coefficient
The ratio that sound energy transmitted through and beyond a surface partition or device bears to that incident upon it. (BS 5643)
acoustic technique

source
Point of emission of a substance. (pollution) (NSCA)
_point source. A specific location emitting material. e.g. factory.
_area source. (generalised source) a collection of several small sources of uncertain location.
_line source. e.g. road.
_stationary source (point source)
_mobile source. e.g. cars.
N.B. Not to be confused with leakage path.

spandrel panels
(or apron wall (USA))
The rectangular infilling in a multi storey building between a window sill and the window head below.

specific humidity
The mass of water vapour present in one unit mass of moist air.
relative humidity, humidity mixing ratio, condensation

specific leakage

=leakage area (cm^2) / floor area (m^2)

split level house
(see hillside house)

stack
A single chimney/flue or a cluster of chimneys or flues.

stack effect
(also stack pressure, see chimney effect)
Pressure differential across a building caused by differences in the density of the air due to an indoor-outdoor temperature difference. (IHVE)
natural ventilation, air infiltration

stack infiltration
Infiltration driven by stack pressures arising from temperature differences across the building envelope.

stack regime
The range of weather conditions for which the stack effect is dominant in air infiltration.

stack vent
(1) The opening (which may be controlled) through which gases passing up a flue/stack/chimney are discharged to the atmosphere.
(2) The vent for a heating system in the form of a vertical flue or stack.
(preferred term: flue or stack)

stagnant zone
(see dead space)

stagnation pressure

= (0.5 x density of air x (wind speed)^2) + (absolute pressure if there were no wind).

using the wind speed at ceiling height for the structure which would be measured if the structure were not present.

standing eddy
(see vortex)

starter strip (Can.)
(see flashing, wind stop, weather strip)
Polythene sheeting laid under the roof tiles to ensure tightness.

static head
Difference between the total fluid pressure and the dynamic pressure if any.
(BS 5643)
wind pressure, static pressure, dynamic pressure, total pressure

static pressure
The difference, in consistent units, between absolute pressure at a point and the absolute pressure of the ambient atmosphere. (BS 5643)

steady state
The final state of a system after any disturbance. (BS 5643)
constant concentration method.

step (door)
A block of stone/paving slab raised above normal ground level outside the door sill to render access easier.

storage
A functional classification term for buildings. This classification includes those buildings for which the internal conditions are determined by the contents (passive) rather than by human occupants. e.g. cold store, furniture repository.
plant

storey (USA story)
The space between a floor and the floor above. (PDB)

storey height
(also pitch (2))
Height between successive floor surfaces.
room height

storm window
(also double window)
A double window, each of the pair of windows having a separate frame and having a large air gap. Used for thermal and acoustic insulation (PDB)

strain gauge
A device used to measure loads, - used in flat plate pressure transducers.
They are based on the fact that the resistance of a wire varies, with its length, under load. Unbonded s.g.'s have a balanced set of four wires, bonded s.g.'s have a single wire embedded in a paper or plastic matrix.

stratification
The formation of layers at different temperatures in a heated or cooled fluid that is not well mixed. (BS 5643)
atmospheric stability

streamline flow
(see laminar flow)

streamlined zone
(1) A zone in which viscous flow occurs.
(2) Passages, ducts or geometric forms designed to avoid discontinutities and thus, flow separation, thereby reducing turbulence. (BS 5643)

strike
On a sloping surface, the direction of strike is the line along the surface which lies in the horizontal plane. (by anal. with geological term)
dip, roof pitch, slope

stud
An upright scantling (narrow piece of timber) as in a timber framework or partition.

study (room)
(also office (room), den (USA))

sub-basement
Storey below the basement.

subvolume
Volumes within a larger building which are not, in normal use, connected to each other. e.g. flats (apartments)
multi family

sulphur dioxide
A common gaseous (acid) pollutant arising mainly from the combustion of fossil fuels.

sulphur hexafluoride
(see tracer gas appendix)

surface inversion
(also ground inversion)
A temperature inversion based at the earths surface, i.e. an increase of air temperature with height beginning at the ground level. Primarily produced by radiative loss of heat from the ground or the drift of air over a surface colder than itself. (NSCA,MG)

surface pressure
(1) The local value of pressure experienced at a surface. (see total pressure)
(2) The local value of sea-level atmospheric pressure.

suspended particle
A very small particle maintained in the air by bombardment with air molecules.
aerosol, smoke, particulates

sweating
Exhudation of moisture, especially by new building materials. Often used (incorrectly) for condensation and leakage of water through the fabric.

temperature differential within occupied zone
The difference in temperature between two specified points within an enclosure. (BS 5643)

terrace (house)
A form of construction in which dwellings are erected in a row with side walls contiguous (or party walls). Front and rear faces of the building are open to the weather.
back to back, palisaded terrace house, semi detached house, linked house,party wall.

_mid terrace
A house in a terrace construction where both side walls are party walls.

_end terrace
A house in a terrace construction where only one side wall is a party wall, the other forming the end wall of the row.

terrain
Ground regarded as having some sort of unity or prevailing character. (Chambers)

terrain classes
Classification for terrain to allow conversion between windspeeds measured at different locations using the standard windspeed v. (Sherman II)

$v = v_0 \times a \times (H/10)^g$

v_0 = windspeed at 10 metres in terrain class II (flat)
H = reference height of structure.
a,g are parameters associated with the local terrain class.

_ocean (terrain)
Terrain class I. Ocean or other body of water with at least 5km. of unrestricted expanse. a = 1.30: g = 0.10

_flat (terrain)
Terrain class II: Flat terrain with some isolated obstacles. (e.g. buildings or trees well separated from each other)
a=1.00: g=0.15

_rural (terrain)
Terrain class III: Rural areas with low buildings, trees etc. a = 0.85: g = 0.20

_urban (terrain)
Terrain class IV: Urban, industrial or forest areas. a = 0.67: g = 0.25

_city centre (terrain)
Terrain class V: Centre of large city eg. Manhattan, Chicago. dominated by high rise buildings. a = 0.47: g = 0.35 .

terrain effects
The effect of the landscape surrounding a building on the windspeed and direction, and thus on the surface pressure distribution on the building envelope.

thermal conductivity (coefficient of)
(see k-value (UK), lambda value)

thermal draft coefficient (thermal draught coefficient)
The pressure difference across an actual building wall divided by the stack pressure. (chimney pressure) (ASHRAE 1977)

thermal image
Image which is given by an infrared radiation sensing system and represents the temperature distribution over a surface. (SWE)
thermogram, thermography

thermal inertia
The property of a material or structure to delay the effect of a change of thermal gradient. (BS 5643)

thermograph
(1) A device that measures and records air temperature. (BS 5643)
(2) A self registering thermometer. (Chambers)

thermography
(1) Obtaining an image on a picture tube or I.R. photographic film using an infra-red camera. (Chambers)
(2) A method of indicating and representing the temperature distribution over a part of the envelope of a building. (Petterson)
(3) The process of converting the heat emitted from an object into a visible picture.
(4) Determination and representation of surface temperature distribution by measuring the infra-red radiation density from a surface, including interpretation of thermograms. (SWE)

thermogram
(1) A visual representation of a detailed thermal image (of a building or part of a building) obtained from an infra-red camera.
(2) The trace produced by a thermograph.
thermography, thermal image

thermohygrograph
A device that measures and records simultaneously air temperature and relative humidity. (BS 5643)

thermometer
An instrument that measures temperature
globe thermometer
A thermometer with the sensing element enclosed in a 150mm diameter globe, externally matt black, which enables mean radiant temperature to be measured. (BS 5643)

thermostat
(also thermorelay)
An instrument which measures changes in temperature and directly or indirectly controls sources of heating and cooling to maintain a desired temperature.
(McGraw-Hill)

threshold limit value
A limit of an environmental condition to which persons may be exposed repeatedly without adverse effect. (TLV)

threshold value
Limit below which a stimulus ceases to be perceptible.
(BS 5643)

throughfare
(see penetration)

through ventilation
(1) Air currents passing through a room without mixing thoroughly with its contents, (jet flow)
(2) Ventilation driven by the pressure differential between the windward and leeward sides of a building.

tier building (U.S.A)
(see multistorey building)

tight (adj.)
Applied to a building with low leakage.
loose

tightness
(see building tightness)

topography
The layout of an area in terms of height,- the natural features and/or the buildings, etc.. (NSCA)

top plate
A horizontal solid slab of material across the top of a wall (or stud). The top member of a timber frame/wall.

top separation
The highest horizontal surface partitioning a tall building.
separation, bottom separation

total pressure
The algebraic sum of the static pressure and the velocity pressure at any particular point. (BS 5643)

total thermal resistance
Reciprocal of the "U"- value.

tracer gas
A gas used with a detection device, to determine the rate of air interchange with a space.
rate of decay, constant emission, equilibrium concentration, transfer index, constant concentration methods, (see Tracer gas appendix)

tracer gas dilution method
(see rate of decay method, transfer index method)
A measure of the movement of air between two points (regions). (H+W)
airchange factor

transfer index method
A method of measuring air infiltration by determining the transfer index between two points. (also index of exposure to contamination).
The time integral of tracer gas is determined at one point following the liberation of a fixed volume of tracer at another. Several sample points are usually employed. The reciprocal of the transfer index has dimensions of ventilation rate. (H+W)

transition flow
The unstable region of flow that occurs when there is a change from a laminar to a turbulent flow regime. (BS 5643)
laminar flow, turbulent flow.

trench
An opening formed in the ground or below the floor of a building in which to run pipes or cables. (BS 5643)

triaxial probe
A form of multiple hot-wire anemometer in which three hot wires, or pairs of hot wires, are set up in a mutually orthogonal arrangement, shielded such that each component of velocity is effectively isolated. The directon of the wind as well as its magnitude can be found from the three components.
anemometer

trunk duct
The principal duct supplying air to a building or enclosure.
(BS 5643)

turbulence scale
A length representing the average size of the eddies or length scale of the fluctuations without implying any definite model of an eddy. (Sutton)
mixing length, turbulent flow.

turbulent flow
Flow in which cross-stream momentum transfer is dominated by bulk motion of the fluid in the form of random eddies.
This occurs for Reynolds numbers in excess of approx. 10^5.
mixing length, quasi-smooth flow, Reynolds No., Isolated roughness flow, wake interference flow.

turbulent intensity
Analogous to temperature in molecular motion in a gas.
The kinetic energy content of the flow attributable to eddies. Usually presented as a spectrum of energy against length scale or frequency.
(Sutton)
turbulent flow, wave number.

"U"-value
(thermal transmittance)
The thermal transmission through unit area of a given structure divided by the difference between the effective ambient temperature on either side of the structure in steady state conditions. ($W/(m^2.K)$) (BS 5643)

ultra-violet absorption
Detection method for tracer gases measuring the absorption of u.v.radiation by the gas mixture over a fixed path length.
especially, organic vapours. acetone, ethyl aceto-acetate, etc.

vapour barrier
A moisture impervious layer applied to the surfaces enclosing a space, or to the external surface of thermal insulation to limit moisture migration.
(BS 5643)
(also damp proof felt)

vapour pan
A moisture proof cavity in a wall for an electrical or other outlet, lined with vapour barrier material which is sealed to the vapour barrier of the wall.

vapour pressure
The pressure exerted by a vapour either by itself or in a mixture of gases.
(BS 5643)

variable aperture flow meter
(variable area meter, area meter)
A device for measuring air flow rate whereby the magnitude of the cross sectional area of the flow is a measure of the rate of flow, the differential pressure remaining constant.
drag anemometer

variable capacitance gauge
(see capacitance pressure transducer)

velocity head
The kinetic energy per unit mass of the fluid resulting from its velocity. (also known as the free wind velocity head). (BS 5643)

velocity pressure
The pressure equivalent of fluid velocity at any particular point. (BS 5643)
wind pressure

velocity profile (atmospheric boundary layer)
A curve showing the relationship between the height above the ground and the local mean velocity component at that point.

velometer
A device for measuring airflow consisting of a pivoted, spring controlled aluminium vane mounted in a chamber of a shape such that, as the vane pivots, the gap between the vane and the side of the chamber changes. The space on one side of the vane is open to the atmosphere and the other side is connected to a tube facing the airflow. The shape of the chamber is designed so that the vane deflection is linearly related to airspeed.
Normal instrument range: v greater than 0.15 m/s. With eddy current damping and reduced friction pivots, v greater than 0.03 m/s. Angular tolerance +/- 30 deg. from true direction.

vent (hole)
A device permitting fluid flow in order to maintain the balance of pressure between the atmosphere and the system. (BS 5643)
_exhaust vent

A vent through which bad air (or flue gases) is discharged to the atmosphere. (ASSE)

ventilated volume
(see effective volume)

ventilating brick
(see air brick)

ventilation
The process of supplying and removing air by natural or mechanical means to and from any space. (ASHRAE 62-73)
The provision of air to an enclosed space sufficient for the needs of the occupants or process. (BS 5643)
mechanical ventilation, natural ventilation ventilation efficiency
A quantity describing the ability of a mechanical (or natural) ventilation system to remove pollution originating in a room, either of a steady state or transient nature. (Sandberg)
relative ventilation efficiency, absolute ventilation efficiency

ventilation heat gain/loss
Heat gain/loss in the form of warm and/or humid air flowing or leaking into the space. (BS 5643)
leakage, air infiltration.

ventilation pipe
(see vent stack)

ventilation potential
The maximum possible air leakage through a component under natural conditions, contributing to the ventilation rate. (A+E+G)

ventilation rate
Number of room air changes per unit time of fresh air (usually air changes per hour), or the volume flow rate of fresh air into a room or building per unit volume (usually $m^3/s.m^3$ or $l/s.m^3$).
= volume of fresh air per unit time/volume of room.
Using the effective volume of the room and assuming perfect mixing.
air change rate.

ventilation unit
(see roof ventilator and wall ventilator)

ventilator
Any means of ventilating a room. (PDB)
wall ventilator, roof ventilator

vent light
(see ventilator, night vent)

vent pipe (1)
Hot water supply: (also expansion pipe)
A pipe to allow the release of air from the system when cold water is introduced and gas evolved when it is heated.

(IDPT)

vent pipe (2)
Drainage: (see vent stack)
(IDPT)

vent sash
(see night vent)

vent stack
(also drain ventilation stack, vent pipe (drainage))
A vertical stack or duct used to provide efficient ventilation of the drainage system to prevent the accumulation of foul air. (IDPT)

venturi meter
A device from which fluid velocity may be determined by comparison of pressures on the wall of a pipeline and a smooth shaped throat in the same pipeline.
It may also be applied to liquids in open channels. (BS 5643)
orifice plate

verandah
A roofed gallery, terrace or open portico along the front or side of a building.

verge (roof)
(similarly "eaves overhang")
The edge of a sloping roof which overhangs a gable, sometimes including the bricks which cope the gable wall. (PDB)

vestibule
(see lobby)

viscous flow
(see laminar flow)

vitiated air
Spoiled, impure or polluted air.
bad air, foul air

volumetric flow rate (=volume flow rate)
(see air flow rate)

vortex
(also whirlwind)
Airflow with rotary rather than translatory motion. Occurs in wakes of buildings etc., also in the presence of strong updraughts, the extreme natural form of this being a tornado.
A standing eddy or stationary vortex may be formed in the lee of a building arising from the air flow round it.

wainscot
(1) Woodwork, especially panelled on an interior wall, also for materials other than wood. (dado)
(2) Boarding, sarking boards.
(3) The lower part of an interior wall when lined with material different from the upper part.

wake interference flow
This regime is observed for rough plates with rectangular elements perpendicular to the flow where the ratio of the spacing between the elements to the height of the elements lies in the range 6.7 to 5.0. The wake generated by each element interferes with the approach vortex of the next. (Davies. "Turbulence Phenomena")
This flow regime is observed in wind tunnels and in the atmosphere for terrain class III.
terrain class

wall plate
(1) (see floor plate) (IDPT)
(2) A horizontal timber along the top of a wall at eaves level carrying the rafters or joists. (PDB)

wall ventilator
A weatherproof air outlet in the outside wall of a building using only natural forces to produce flow.

water gas
(see tracer gas appendix)

water vapour
(see tracer gas appendix)
A common constituent of indoor air.
Insufficient quantities (r.h.less than 40% approx) may give rise to discomfort for the occupants and damage to some building materials. If too much is present (r.h.greater than 70% approx.) it may give rise to condensation, mould growth, rot etc.
condensation

weather boarding
(also weather boards, (USA)- siding)
Horizontal boards nailed on edge over the outside of light buildings. The boards generally overlap each other, either with or without a rebate at the lower edge of the upper board, which helps to keep out rain and wind. (PDB)
shiplap, clapboard.

weather factor
A fractional number based on the number of degree days at a particular locality used in estimating the probable fuel consumption of a heating system. (BS 5643).

weathering slate
A 'slate' formed from soft or hard metal to ensure a watertight joint where ventilation pipes pass through a roof. (IDPT)

weatherised (USA)
(also weatherisation)
(see retrofit)

weather strip
(1) A strip of flexible material used to seal cracks around doors and windows. The strip is attached to one edge and excludes air by pressing tightly against the other. or (2) (also wind stop, air lock) A piece of metal, wood, rubber or other material which stops the draught passing the joints of a closed door or window. (PDB) starter strip (Can.)

wet bulb temperature
Air temperature indicated by a sensing element kept wet (usually by a wick), the indicated temperature thus being related to the rate of evaporation from the wetted bulb.

_wet bulb temperature (screen)
Temperature indicated by a wet bulb thermometer in stationary air.

_wet bulb temperature (sling)
The temperature indicated by a wet bulb thermometer mounted in a sling or whirling psychrometer.

_thermodynamic wet bulb temperature
The equilibrium temperature that would be attained by moist air in intimate contact with a water surface assuming no heat interchange with an external source other than the enthalpy of the added moisture, the temperature of the water being deemed to be constant and equal to the air temperature finally attained.

wetted perimeter
The length of the perimeter of a pipe, channel or crack with which the fluid flowing through it is in direct contact.
This is the whole circumference in the case of an air filled crack.
(Ethridge)

wind
Air in motion relative to the surface of the earth. In meteorology referring to the horizontal component of the flow almost exclusively.

wind barrier
A diffusive sheet or paper material with low air permeability. (C+E+E)
Includes building paper etc.

windbreak
A barrier designed to obstruct wind flow and intended for protection against excessive wind pressure. (usually artificial)
shelter belt, wind pressure

wind climate
The distribution in time of wind speed and direction at a site.
sheltered wind climate = sheltered exposure
moderate wind climate = moderate exposure
severe wind climate = severe exposure
exposure, shielding, terrain

wind infiltration
Infiltration driven purely by wind induced pressure differences across a building envelope.

window
A glazed opening in a wall to let in light and usually also air. (PDB)

window board
(also elbow board, and stool (USA))
A horizontal board fixed like a shelf at sill level inside a window. Traditionally wood but may be pressed steel. (PDB)

window frame
A frame of timber or metal to which the glass of a window is secured, and which is inside the lining of the window opening.

window head
The upper horizontal member of a window frame.

window sill
The lowest horizontal member of a window frame, usually of wood.
lug sill, slip sill

window stile
(also pulley stile, sash run)
The vertical board at each side of the cased frame of a sashed window. The pulleys over which the sash cords pass are fixed in them.

window stool (USA)
(see window board.)

window wall
(see spandrel panels, apron wall)

wind pressure
Pressure on the exterior of a building generated by reducing the normal component of the local wind velocity to zero.
natural ventilation, stack effect, air infiltration.

wind regime
The range of weather conditions for which the wind effect is dominant in air infiltration.
stack regime

wind rose
A diagram showing the frequency and strength of winds of various directions over a period for a given locality.

wind stop
Weatherstrip.

wind tunnel (environmental)
(also boundary layer wind tunnel)
A device for simulating the wind speed and turbulence profiles in the lower atmospheric boundary layer for modelling pressure forces on buildings and the patterns of flow around them.

W

windward
Towards or on the side from which the wind blows. Upwind.

X

xenon
(see Tracer gas appendix)

Y

Z

APPENDIX 1

References

References

A+E+G
"Experimental techniques for ventilation research."
Alexander D.K., Etheridge D.W., and Gale R.
Presented at the First AIC Conference on Instrumentation and Measuring Techniques, Windsor, England, 6th-8th Oct., 1980. ASHRAE 62-73
ASHRAE Standard ,"Natural and Mechanical Ventilation."

ASHRAE
ASHRAE Handbook and Product Directory: 1977 Fundamentals.

ASSE
American Society of Sanitary Engineering. Plumbing Dictionary. 3rd. ed. 1979

BS 565
BSI "Glossary of terms relating to timber and woodwork." 80pp 1972

BS 1142
"Specification for Fibre Building Boards." 1961, 1967,(Part 3 1972)

BS 5643
BSI Glossary of refrigeration, heating, ventilating and air conditioning terms. 1979

C+E+E
"Airtightness and thermal insulation - building design solutions."
Carlsson B., Elmroth A., Engvall P-Å

Chambers
Chambers Twentieth Century Dictionary. Revised 1977.

Etheridge
"Crack flow equations and scale effect." Building and Environment. Vol.12 p181-189, 1977.

Grimsrud et al.
Grimsrud D.T., Sherman M.H., Diamond R.C., Condon P.E., Rosenfeld A.H.
"Infiltration/Pressurisation Correlations. Detailed measurements on a Californian house."
ASHRAE Trans. 1979, Vol.85, pt.1, p851-865

H+W
Hitchen E.R. and Wilson C.B. "A review of experimental techniques for the investigation of natural ventilation in buildings."
Building Science, Vol.2, p59-82, 1967

IDPT
"An illustrated dictionary of plumbing terms" by Evan Berry.
(London) Technical Press, (1960)

IEA Proposal
Air infiltration in buildings. IEA Draft Program Plan. Oct.1979.
U.S.Dept.of Energy. DOE/CS-0099-D

References

IHVE
IHVE Guide "Air Infiltration". Building Services Manual A4, 1976

Jardinier
Jardinier P. "Ventilation and permeability of dwellings" AIC Translation No.5 from the French, "Ventilation et transparance a l'air des habitations" Cahiers Techniques du batiment No 27. Feb/Mar. 1980

Kumar
Kumar R., Ireson A.D., Orr H.W. "An automated air infiltration measuring system using SF_6 tracer gas in constant concentration and decay methods." ASHRAE meeting June 24-28, 1979, p385-395

McGraw-Hill
Dictionary of Scientific and Technical Terms, ed.in chief D.N.Lapedes, (1976)

MG
Meteorological Glossary . 5th Ed., Met.O.842., A.P.897, Compiled by D.H McIntosh, HMSO 1972

NSCA
National Society For Clean Air. Reference book. 1st.ed. 1978 (136,North St., Brighton, England, BN1,1RG.)

Pasquill
Pasquill F. "Atmospheric Diffusion." (1962)

PDB
"A dictionary of building." John S. Scott. Penguin (1964)

Sandberg
"What is ventilation efficiency." M.Sandberg
Building and Environment Vol.16 No.2 pp123-135 (1981)

Sax
Recommendations from "Dangerous Properties of Industrial Materials." 4th ed. Sax N.I. (1975)

Sherman et al
Sherman M.H., Grimsrud D.T., Condon P.E. and Smith B.V
"Air infiltration measurement techniques." Presented at the AIC Conference on Infiltration and Measuring Techniques, Windsor, England 6-8 Oct. 1980

Sherman II
"Measurement of infiltration using fan pressurisation and weather data." Sherman M.H. and Grimsrud D.T.
Presented at First AIC Conference on Instrumentation and Measurement Techniques. Windsor, England, 6th-8th Oct. 1980

S.I.
S.I. The International system of units.
Approved translation of "Le Système International d'Unites."
ed. Page, C.H. and Vigoureux,P., National Physical Laboratory HMSO

(1977)

Sutton
Sutton O.G. "Micrometeorology.". McGraw-Hill (1963)

SWE
"Thermal insulation - Infra-red method for qualitative detection of thermal irregularities in building envelopes." ISO Draft proposal. ISO/DP 6781 E, Page 2. (1978) (Eventually for inclusion in Swedish handbook on tight buildings, scheduled for 1981.)

TNC58
Plan och byggtermer.(in Swedish). (Glossary of Planning and Building Terms.)
ed. Einar Selander, (1975)
Pub. Tekniska nomenklaturcentralen No.58. (Swedish Centre of Technical Terminology)

APPENDIX 2

Tracer Gases

acetone
$(CH_3)_2.C=O$: Common indoor pollutant. Used as a solvent for acetylene gas so often found where welding is done.

Detectable and measurable by absorbing air containing it into a solution of hydroxylamine hydrochloride and measuring the pH: or by ultraviolet absorption. Unsuited to tracer gas studies in occupied areas by reason of its odour and variable background concentration.
tracer gas

ammonia
NH_3: Common indoor pollutant arising from metabolic activity of occupants and from cleaning products. It has been used as a tracer gas in measurements of air change rates in large buildings.
Measured by absorbing in dilute sulphuric acid, adding Nesslers Reagent and performing a colorimetric assay.
Advantages: Low concentrations, easy to produce.
Disadvantages: Smell, high background in the domestic environment.
tracer gas, indoor pollution, contaminant.

argon
One of the noble (or inert) gases: Atomic No. 18 The radioactive isotope 41Ar has been used as a tracer gas.
41Ar via (B- , gamma) to 41K (half- life = 1.83 hours.)
Radioactive argon is produced by neutron bombardment of stable 40Ar.
Detector: Geiger counter w- ratemeter or acoustic analyser.
Care must be taken during injection so that safe levels of radiation exposure are not exceeded. The short half- life is a disadvantage.

carbon dioxide
(CO_2): Common indoor pollutant and minor constituent of the atmosphere.

Detector: Non-dispersive infrared analyser, also acoustic analyser.

Advantages: Non-toxic at levels used in tests. Detectable in low ppm. concentrations.
TLV = 2% by volume.
Disadvantages. High background concentration, spurious sources, (400-600 ppm) probable sinks (soluble in water).
tracer gas, air infiltration, acoustic analyser

carbon monoxide
(CO)
Detector: Nondispersive infra-red analyser, also acoustic analyser.
Advantages: Similar molecular weight to air. Disadvantages: Toxic, flammable, low background concentrations allowed. TLV = 400 ppm approx.
tracer gas, air infiltration, acoustic analyser.

chloroform
$(CHCl_3)$

Anaesthetic gas which has been used as a tracer gas for air infiltration measurements. TLV = 25 ppm for occupied spaces.
Detector: Acoustic analyser
acoustic analyser, tracer gas

chlorothene
($CH_3.C.Cl_3$): 1, 1, 1-trichloroethane, M.W. 133
also known as methyl chloroform or alpha-trichloroethane. TLV = 350ppm
Detector: Halide meter.

ethane
(C_2H_6)
Detector: Total hydrocarbon analyser: Flame ionisation detectors with or without gas chromatograph.: Katharometer.
Advantages: Easily detectable, inexpensive monitoring equipment.
Disadvantages: Possible background concentrations, flammable, explosive.

helium
He: The lightest of the noble gases. Atomic No.2, M.W. 4.0026 (monatomic)
Detector: Katharometer or acoustic analyser.
Advantages: Non-toxic, stable, detectable at less than 0.5%in air.
Disadvantages: Low M.W. low density. tendency for small molecules to be absorbed into porous materials. It may be mobile enough to diffuse through thin partitions where air molecules could not pass.

hydrogen
H_2 :
Detector: Katharometer.
Advantages: Detectable at 0.5% in air, non-toxic.
Disadvantages. Combustible, a tendency to be absorbed into porous material, diffusion through the fabric of thin partitions, explosive mixtures at concentrations greater than 4% in air.
tracer gas, katharometer, helium, air infiltration

krypton
Kr: One of the noble gases. Monatomic, Atomic No.36
The radioactive isotope 85Kr is produced as a by product of slow neutron fission of uranium in nuclear reactors. (approx. 1% of fission products) It decays by beta and gamma emission to 85Rb (stable) with a half life of 10.3 years.
Detector: Geiger counter w/ratemeter.
Care must be taken during injection so that safe levels of radiation exposure are not exceeded.

methane
CH_4
Detectors: Total hydrocarbon analyser: flame ionisation detector with or without gas chromatograph.
Advantages: Easily detectable, inexpensive monitoring equipment. (20-400 ppm)
Disadvantages: Background concentrations, flammable, explosive.
tracer gas, air infiltration

nitrous oxide
N_2O :

Detector: Infra-red absorption spectroscope.

Advantages: Detectable in 100 ppm concentrations. Well suited to automatic monitoring systems.
Disadvantages: Anesthetic, may be a related health hazard, background concentrations.
N_2O is a product of rotting vegetable matter and is evolved by nitrogenous fertilisers.

tracer gas, infra-red absorption method, constant concentration method

oxygen
O_2: Major constituent of the earth's atmosphere.

Method: Inject nitrogen into the room and measure the rate at which the oxygen concentration returns to normal.
Detector: Paramagnetic analyser.
Advantages: Non-toxic.
Disadvantages: Large background concentration compared with the changes in concentration to be measured. Consumed by occupants. Consumed by combustion.

sulphur hexafluoride
(SF_6)

Detectors: Gas chromatographic separator with electron capture detector.

Advantages: SF_6 is inert, non-toxic, non flammable, detectable in ppb so low gas volumes required.

Disadvantages: Detection equipment requires frequent calibration and will respond to other halogenated compounds.

water gas
A mixture of carbon monoxide and hydrogen.
Detector: Infra-red analyser.
TLV 0.08% by volume. toxic, explosive, flammable.

water vapour
Gaseous phase of water.
Detector: Infra-red absorption.
Advantages: Safe, easy to detect. Disadvantages: High background concentration.
condensation, saturation vapour pressure, tracer gas.

xenon
Noble gas, A.W. 54
Unstable isotope 133Xe used.
Produced in nuclear reactors as a by product of slow neutron fission of uranium. Decays by beta and gamma emission to 133Cs (stable) with a half life of 5.27 days. The metastable form has a half life of 2.26 days but usually forms only a small fraction of the isotope as supplied.
Detector: Geiger counter w/ratemeter.
Advantages: Chemically inert.
Disadvantages: Radiation hazard at the point of dispensation. Also one

needs to know the radon concentration as its daughter products emit beta and gamma rays in the same energy range.

APPENDIX 3

Abbreviations

Abbreviations

ADP: Automatic Data Processing

AQS (=air quality standard.): The minimum statutary requirements for air quality with respect to contaminants. (e.g. oxygen/ carbon dioxide balance, formaldehyde, radon etc.)
(NSCA)

HVAC : Abbrev. for heating, ventilation and air-conditioning.

MAC (USA), (MAK- Ger.): (Preferred term: Threshold Limit Value.)
= Maximum allowable concentration.
The maximum quantity (/unit volume) of radioactive or toxic (pollutant) material in air, water or food that is not considered an undue risk to human health. (calculated for an exposure of 8 hours per day, used in the working environment. This term is largely obsolete. (NSCA)

GIMA :
An odour intensity measuring instrument using human sensory assay. (Huber)
organoleptic

ppb: Parts per billion. $1{:}10^{12}$ (UK), $1{:}10^{9}$ (USA), the latter is the preferred interpretation.

pphm: Parts per hundred million. $1{:}10^{8}$

ppm: Parts per million. $1{:}10^{6}$

quad (UK): Abbreviation for "quadrangle", a rectangular paved or grassy space entirely surrounded by buildings.

TLV : threshold limit value.

APPENDIX 4

Units

S.I. Base Units

metre (m)
The length equal to 1650763.73 wavelengths in vacuum of the radiation corresponding to the transition between the levels 2p10 and 5d5 of the krypton 86 atom.

kilogram (kg)
The unit of mass. It is equal to the mass of the international prototype of the kilogram.

second (s)
The unit of time, equal to the duration of 9192631770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom.

ampere (A)
The constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross section and placed 1 metre apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre of length.

kelvin (K)
The unit of thermodynamic temperature, is the fraction 1/273.16 of the thermodynamic temperature of the triple point of water.

candela (cd)
The unit of luminous intensity, in the perpendicular direction of a surface of 1/600000 square metre of a black body at the temperature of freezing platinum under a pressure of 101325 newtons per square metre.

mole (mol)
This is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon 12. When the mole is used, the elementary entities must be specified, and may be atoms, molecules, ions, electrons, other particles, or specified groups of such particles.

S.I. Supplementary Units.

radian (rad)
The plane angle between two radii of a circle which cut off on the circumference an arc equal in length to the radius.

steradian (sr)
Unit of solid angle. The solid angle which, having its vertex in the centre of a sphere, cuts off an area of the surface of the sphere equal to that of a square with sides of length equal to the radius of the sphere.

bequerel (Bq)
Unit of radioactivity, equal to one disintegration per second.

S.I. Prefixes

Prefix	Symbol	Multiplying Factor
exa	E	10^{18}
peta	P	10^{15}
tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
hecto	h	10^{2}
deca	da	$10^{1} = 10$
deci	d	$10^{-1} = 0.1$
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}
atto	a	10^{-18}

Units

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
length				
angstrom	Å	0.1	nm	10
micron		1	μm	...
thou (mil)	...	0.254	mm	3.9370
inch	in	2.54	cm	0.3937
foot	ft	30.48	cm	0.0328
yard	yd	0.9144	m	1.0936
statute mile (UK)	mi	1.6093	km	0.6214
area				
square inch	in^2	6.4516	cm^2	0.1550
square foot	ft^2	9.290	dm^2	0.1076
square yard	yd^2	0.8361	m^2	1.196
are	a	100	m^2	0.01
acre	...	0.4047	ha_2	2.471
hectare	ha	1	hm^2	...
square statute mile	...	2.590	km^2	0.3861
volume				
cubic inch	in^3	16.387	cm^3	0.06102
pint (US)	...	0.4732	l	2.1133
pint (UK)	pt	0.5683	l	1.7598
litre	l	1	dm^3	1
gallon (US)=231 in^3	...	3.785	l	0.2642
gallon (UK)	gal	4.5461	l	0.2200
cubic foot	ft^3	28.317	l	0.03532
barrel (US)=42gal(US)	bbl	0.1590	m^3	6.290
cubic yard	yd^3	0.7646	m^3	1.3080
stere	st	1	m^3	1
concentration				
grain per cubic foot	gr ft^{-3}	2.288	g m^{-3}	0.4371
plane angle				
radian	c	1	rad	1
right angle = π/2rad	...	1.5708	rad	0.6366
degree=1/90 right angle	^{o}	π/180	rad	57.296
minute=(1/60)^o	'	π/10800	rad	3437.8
second=(1/60)'	"	π/648	mrad	206.27

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
grade=0.01 right angle	...	$\pi/200$	rad	63.662
gon	gon	$\pi/200$	rad	63.662
revolution	r	2π	rad	$1/2\pi$
mass				
tonne	t	1	Mg	...
pound (avdp)	lb	0.4536	kg	2.205
grain	gr	0.0648	g	15.432
ounce (avdp)	oz	28.35	g	0.03527
ounce (troy)	...	31.10	g	0.03215
ton=2240 lb	...	1.016	Mg	0.9842
short ton	...	0.9072	Mg	1.103
hundredweight	cwt	50.80	kg	0.1969
slug	...	14.59	kg	0.06852
mass per unit area				
pound per square foot	lb ft^{-2}	4.882	kg m^{-2}	0.2048
density				
pound per cubic foot	lb ft^{-3}	16.02	kg m^{-3}	0.06243
pound per cubic inch	lb in^{-3}	27.68	Mg m^{-3}	0.03613
pound per gallon(UK)	lb gal^{-1}	99.78	kg m^{-3}	0.01002
slug per cubic foot	slug ft^{-3}	0.5154	Mg m^{-3}	1.940
momentum				
pound foot per second	lb ft s^{-1}	0.1383	kg m s^{-1}	7.231
moment of inertia				
pound square inch	lb in^2	2.926	kg cm^2	0.3417
slug square foot	slug ft^2	1.3558	kg m^2	0.7376
moment of momentum				
pound square foot per second	lb $ft^2 s^{-1}$	0.04214	kg m^2 s^{-1}	23.73
moment of section				
quartic inch	in^4	41.62	cm^4	0.02403
quartic foot	ft^4	0.008631	m^4	115.9

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
time				
minute	min	60	s	...
hour=60min	h	3600	s	...
day	d	86400	s	...
volume flow rate				
cubic inch per minute	$in^3\ min^{-1}$	0.2732	$cm^3\ s^{-1}$	3.660
litre per hour	$l\ h^{-1}$	0.2778	$cm^3\ s^{-1}$	3.600
US gallon per hour	$gal\ h^{-1}$	1.052	$cm^3\ s^{-1}$	0.9506
UK gallon per hour	$gal\ h^{-1}$	1.263	$cm^3\ s^{-1}$	0.7918
cubic foot per hour	$ft^3\ h^{-1}$	7.866	$cm^3\ s^{-1}$	0.1271
cubic inch per second	$in^3\ s^{-1}$	16.39	$cm^3\ s^{-1}$	0.06101
litre per minute	$l\ min^{-1}$	0.01667	$dm^3\ s^{-1}$	60
US gallon per minute	$gal\ min^{-1}$	63.09	$cm^3\ s^{-1}$	0.01585
		0.06309	$dm^3\ s^{-1}$	15.85
UK gallon per minute	$gal\ min^{-1}$	75.77	$cm^3\ s^{-1}$	0.0132
		0.07577	$dm^3\ s^{-1}$	13.20
cubic metre per hour	$m^3\ h^{-1}$	0.2778	$dm^3\ s^{-1}$	3.6
cubic foot per minute	$ft^3\ min^{-1}$	0.4719	$dm^3\ s^{-1}$	2.1191
cubic metre per minute	$m^3\ min^{-1}$	16.67	$dm^3\ s^{-1}$	0.06
cubic foot per second	$ft^3\ s^{-1}$	0.02832	$m^3\ s^{-1}$	35.31
mass flow rate				
pound per hour	$lb\ h^{-1}$	0.1260	$g\ s^{-1}$	7.937
kilogram per hour	$kg\ h^{-1}$	0.2778	$g\ s^{-1}$	3.6
pound per minute	$lb\ min^{-1}$	0.007560	$kg\ s^{-1}$	132.3
kilogram per minute	$kg\ min^{-1}$	0.01667	$kg\ s^{-1}$	60
velocity				
foot per minute	$ft\ min^{-1}$	0.00508	$m\ s^{-1}$	196.9
kilometre per hour	$km\ h^{-1}$	0.2778	$m\ s^{-1}$	3.6
foot per second	$ft\ s^{-1}$	0.3048	$m\ s^{-1}$	3.281
		1.097	$km\ h^{-1}$	0.9113
mile per hour	m.p.h. $mile\ h^{-1}$	1.609	$km\ h^{-1}$	0.6214
knot (international)	...	1.852	$km\ h^{-1}$	0.5400
angular velocity				
radian per sec	$rad\ s^{-1}$	...	...	...
revolution per minute	rpm	0.1047	$rad\ s^{-1}$	9.551
revolution per second	rps	6.283	$rad\ s^{-1}$	0.1592

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
acceleration				
gal	Gal	1	$cm\ s^{-2}$	...
foot per square second	$ft\ s^{-2}$	0.3048	$m\ s^{-2}$	3.2808
frequency				
hertz	Hz	1	s^{-1}	
force				
newton	N	1	$m\ kg\ s^{-2}$	...
dyne	dyn	10	μN	0.1
poundal	pdl	0.1383	N	7.230
pound-force	lbf	4.448	N	0.2248
ton-force	tonf	9.964	kN	0.1004
kilogram-force	kgf	9.807	N	0.1020
also kilopond	kp	...	...	...
force per unit length				
	$lbf\ in^{-1}$	0.1751	$kN\ m^{-1}$	5.710
	$tonf\ ft^{-1}$	32.69	$kN\ m^{-1}$	0.03059
torque				
pound-force foot	lbf ft	1.356	N m	0.7376
pressure, stress				
pascal	Pa	1	$N\ m^{-2}$	
bar	bar	0.1	MPa	10
psi	$lbf\ in^{-2}$	6.895	kPa	0.1450
psf	$lbf\ ft^{-2}$	47.88	Pa	0.02088
tpsi	$tonf\ in^{-2}$	15.44	MPa	0.06475
ton force per square foot	$tonf\ ft^{-2}$	107.3	kPa	0.009320
standard atmosphere	atm	0.1013	MPa	9.869
technical atmosphere	at	98.07	kPa	0.0102
metre of water	mH_2O	9.807	kPa	0.1020
torr,mmHg	torr	0.1333	kPa	7.501
in Hg	...	3.386	kPa	0.2953
millimetre of water	mmH_2O	9.807	Pa	0.10197
inch of water	inH_2O	249.1	Pa	0.004014
foot of water	ftH_2O	2.989	kPa	0.33456
kilogram force per square centimetre	$kgf\ cm^{-2}$	98.07	kPa	0.010197

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
pressure drop per unit length				
inch of water per hundred feet	...	8.176	Pa m^{-1}	0.1228
foot of water per hundred feet	...	98.10	Pa m^{-1}	0.01019
work, energy, heat				
joule	J	1	N m	...
erg	erg	0.1	μJ	10
electronvolt	eV	0.1602	aJ	6.241
calorie (IT)	cal	4.187	J	0.2388
thermie	th	4.1855	MJ	0.2389
frigorie (withdrawn heat)	...	4.1855	kJ	0.2389
British thermal unit	Btu	1.055	kJ	0.9478
therm=105 Btu	...	0.1055	GJ	9.478
foot poundal	ft pdl	0.04214	J	23.73
foot pound-force	ft lbf	1.356	J	0.7376
kilocalorie	kcal	4.187	kJ	0.2388
metre kilogram force	m kgf	9.807	J	0.1020
horsepower hour	hp h	2.685	MJ	0.3724
kilowatt hour	kW h	3.6	MJ	0.2778
intensity of heat flow rate				
kilocalorie per hour square metre	kcal $.h^{-1}m^{-2}$	1.163	W m^{-2}	0.8598
British thermal unit per hour square foot	Btu h^{-1} $.ft^{-2}$	3.155	W m^{-2}	0.3170
watt per square foot	W ft^{-2}	10.76	W m^{-2}	0.09294
heat emission				
Btu per hour cubic foot	Btu h^{-1} $.ft^{-3}$	10.35	W m^{-3}	0.09662
heat capacity, entropy				
Btu per ^{o}F	Btu $^{o}F^{-1}$	1.899	kJ K^{-1}	0.5266
kilocalorie per ^{o}C	kcal $^{o}C^{-1}$	4.187	kJ K^{-1}	0.2388
Btu per degree Rankine	Btu $^{o}R^{-1}$	1.899	kJ K^{-1}	0.5266
kilocalorie per kelvin	kcal K^{-1}	4.187	kJ K^{-1}	0.2388

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
latent heat				
foot pound force per pound	ft lbf .lb^{-1}	2.989	J kg^{-1}	0.3346
Btu per pound	Btu lb^{-1}	2.326	kJ kg^{-1}	0.4299
kilocalorie per kilogram	kcal kg^{-1}	4.187	kJ kg^{-1}	0.2388
specific heat capacity, specific entropy				
Btu per pound ^{o}F	Btu lb^{-1} .^{o}F^{-1}	4.187	kJ kg^{-1} .K^{-1}	0.2388
kilocalorie per kilogram ^{o}C	kcal kg^{-1} .^{o}C^{-1}	4.187	kJ kg^{-1} .K^{-1}	0.2388
Btu per pound degree Rankine	Btu lb^{-1} .^{o}R^{-1}	4.187	kJ kg^{-1} .K^{-1}	0.2388
kilocalorie per kilogram kelvin	kcal kg^{-1} .K^{-1}	4.187	kJ kg^{-1} .K^{-1}	0.2388
volumetric calorific value				
kilocalorie per cubic metre	kcal m^{-3}	4.187	kJ m^{-3}	0.2388
Btu per cubic foot	Btu ft^{-3}	37.26	kJ m^{-3}	0.02684
specific heat (volume basis)				
kilocalorie per cubic metre degree Celsius	kcal m^{-3} .^{o}C^{-1}	4.187	kJ m^{-3}K^{-1}	0.2388
Btu per cubic foot degree Farenheit	Btu ft^{-3} .^{o}F^{-1}	67.07	kJ m^{-3}K^{-1}	0.01491
thermal conductivity				
Btu inch per hour square foot degree F	Btu in .h^{-1}ft^{-2}^{o}F^{-1}	0.1442	W m^{-1}K^{-1}	6.9348
kilocalorie per hour metre degree Celsius	kcal h^{-1} .m^{-1}^{o}C^{-1}	1.163	W m^{-1}K^{-1}	0.8598
Btu per hour foot degree Farenheit	Btu h^{-1} .ft^{-1}^{o}F^{-1}	1.731	W m^{-1}K^{-1}	0.5777
calorie per second centimetre per deg. C.	cal s^{-1} .cm^{-1}^{o}C^{-1}	418.7	W m^{-1}K^{-1}	0.002388

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
thermal conductance				
kilocalorie per hour square metre degree C	$kcal\ h^{-1}.m^{-2}{}^{o}C^{-1}$	1.163	$W\ m^{-2}K^{-1}$	0.1761
Btu per hour square foot degree F	$Btu\ ft^{-2}.{}^{o}F^{-1}$	5.678	$W\ m^{-2}K^{-1}$	0.1761
calorie per second square cm. deg. C	$cal\ s^{-1}.cm^{-2}{}^{o}C^{-1}$	41.87	$kW\ m^{-2}.K^{-1}$	0.02388
thermal resistivity				
centimetre second ^{o}C per calorie	$cm\ s\ {}^{o}C.cal^{-1}$	0.002388	$m\ K\ W^{-1}$	418.76
foot hour ^{o}F per Btu	$ft\ h\ {}^{o}F.Btu^{-1}$	0.5778	$m\ K\ W^{-1}$	1.7277
metre hour ^{o}C per kilocalorie	$m\ h\ {}^{o}C.kcal^{-1}$	0.8598	$m\ K\ W^{-1}$	1.1631
square foot hour ^{o}F per Btu inch	$ft^2\ h\ {}^{o}F.Btu^{-1}in^{-1}$	6.933	$m\ K\ W^{-1}$	0.14424
thermal resistance				
square centimetre second ^{o}C per calorie	$cm^2\ s\ {}^{o}C.cal^{-1}$	0.2388	$cm^2\ K\ W^{-1}$	4.1876
square foot hour ^{o}F per Btu	$ft^2\ h\ {}^{o}F.Btu^{-1}$	0.1761	$m^2\ K\ W^{-1}$	5.6786
square metre hour ^{o}C per kilocalorie	$m^2\ h\ {}^{o}C.kcal^{-1}$	0.8598	$m^2\ K\ W^{-1}$	1.1631
thermal diffusivity				
square inch per hour	$in^2\ h^{-1}$	0.1792	$mm^2\ s^{-1}$	5.5804
square foot per hour	$ft^2\ h^{-1}$	0.2581	$cm^2\ s^{-1}$	3.8745
square metre per hour	$m^2\ h^{-1}$	2.778	$cm^2\ s^{-1}$	0.3600
power, radiant flux				
watt	W	1	$J\ s^{-1}$	...
horse-power=550ftlbfs^{-1}	hp	0.7457	kW	1.341
cheval-vapeur=75mkgfs^{-1} (metric horsepower)	(ch,cv (pk,PS	0.7355	kW	1.360
Btu per hour	$Btu\ h^{-1}$	0.2931	W	3.4118
kilocalorie per hour	$kcal\ h^{-1}$	1.163	W	0.8598
foot pound force per second	$ft\ lbf.s^{-1}$	1.356	W	0.7375
calorie per second	$cal\ s^{-1}$	4.187	W	0.2388

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
ton of refrigeration	...	3.517	kW	0.28433
Lloyds ton of refrigeration	...	3.884	kW	0.2575
heat flux density, irradiance				
calorie per cm^2 second	$cal_{th}.cm^{-2}.s^{-1}$	41.868	$kW\ m^{-2}$	0.02388
vapour permeability				
grain inch per hour square foot inch of mercury (perminch)	...	1.45	$(ng\ m\ N^{-1}s^{-1}$ $(ng\ s^{-1}Pa^{-1}\ m^{-1}$	0.6897
pound foot per hour pound force	$lb\ ft.h^{-1}.lbf^{-1}$	8.620 ...	$mg\ m\ N^{-1}s^{-1}$ $mg\ s^{-1}Pa^{-1}m^{-1}$	0.1160
vapour permeance				
grain per square foot hour inHg (perm)	...	57.2	$ng\ N^{-1}s^{-1}$	0.01748
grain per square foot hour millibar	...	1.940	$\mu g\ N^{-1}s^{-1}$	0.5155
pound square inch per square foot hour pound force	...	0.1965	$mg\ N^{-1}s^{-1}$	5.089
pound per hour pound force	$lb.h^{-1}.lbf^{-1}$	28.34	$mg\ N^{-1}s^{-1}$	0.03528
moisture content				
grain per pound	$gr\ lb^{-1}$	0.1428	$g\ kg^{-1}$	7.003
pound per pound	$lb\ lb^{-1}$	1	$kg\ kg^{-1}$	...
moisture flow rate				
pound per square foot hour	$lb\ ft^{-2}.h^{-1}$	1.357	$g\ m^{-2}s^{-2}$	0.7369
grain per square foot hour	$gr\ ft^{-2}.h^{-1}$	0.194	$mg\ m^{-2}s^{-1}$	5.155
mass transfer coefficient				
foot per hour	$ft\ h^{-1}$	0.0847	$mm\ s^{-1}$	11.806

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
temperature				
degree Celsius	^{o}C	1	K	...
t ^{o}C	...	273.15+t	K	...
degree Farenheit	^{o}F	5/9	K	1.8
t ^{o}F	...	5(t-32)/9	^{o}C	...
degree Rankine	^{o}R	5/9	K	1.8
heat transmission				
	Btu h^{-1}	0.2931	W	3.4121
viscosity, (dynamic)				
pascal-second	Pa s	...	...	...
poise	P	0.1	Pa s	10
lb $ft^{-1}s^{-1}$=pdl s ft^{-2}	...	1.4882	Pa s	0.6720
slug $ft^{-1}s^{-1}$=lbf s ft^{-2}	...	47.88	Pa s	0.02089
pound per hour foot	lb h^{-1} .ft^{-1}	0.4134	mPa s	2.318
centipoise	cP	0.001	mPa	1000
pound force hour per square foot	lbf h .ft^{-2}	172.4	kPa s	0.0058
viscosity (kinematic)				
stokes	St	1	cm^2s^{-1}	...
square foot per second	ft^2 s^{-1}	9.290	dm^2s^{-1}	0.1076
centistokes	cS	0.01	cm^2 s^{-1}	100
metre squared per hour	m^2 h^{-1}	2.778	cm^2 s^{-1}	0.3600
inch squared per second	in^2 s^{-1}	6.452	cm^2 s^{-1}	0.1550
foot squared per minute	ft^2 min^{-1}	0.001548	m^2 s^{-1}	645.99
electricity (quantity of)				
coulomb	C	1	A s	...
potential difference, electromotive force				
volt	V	1	W A^{-1}	...
electrical resistance				
ohm	Ω	1	V A^{-1}	...

Unit name	Symbol	S.I.equiv.	Symbol	Reciprocal
electrical conductance				
siemens	S	1	Ω^{-1}	...
mho	mho	1	S	...
capacitance				
farad	F	1	C V^{-1}	...
inductance				
henry	H	1	Ωs	...
light				
lumen	lm	1	cd sr_2	...
lux	lx	1	lm m^{-2}	...
stilb	sb	10	kcd m^{-2}	0.1
phot	ph	10	klx	0.1
foot lambert	...	3.426	cd m^{-2}	0.2919
candela per square inch	cd in^{-2}	1550	cd m^{-2}	0.0006452
candle	...	10.76	lx	0.09294
lumen per square foot	...	10.76	lx	0.09294
radioactivity				
becquerel	Bq	1	s^{-1}	1
curie	Ci	37	GBq or ns^{-1}	0.0270
röntgen	R	0.258	mC kg^{-1}	3.876
rad	rad	10	mJ kg^{-1}	0.1
rem	rem	0.01	J kg^{-1}	100

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