

Glossary of terms used in nuclear science and technology

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Foreword

This Glossary is basically a revision of BS 3455:1962 “*Glossary of terms used in nuclear science*” but, as will be seen, the title has been slightly amended.

In carrying out this revision an attempt has been made to restrict the terms defined to those used chiefly or exclusively in nuclear technology, together with those terms used in nuclear science (and sometimes in other branches of science) which are of great importance in nuclear technology or are used in that context with slightly different meanings from their usual ones.

This has involved cutting out some of the more academic terms previously included. In addition, terms of limited interest such as those concerned only with the separation of isotopes, together with terms concerned with controlled fusion reactions, have also been omitted.

As a result, the Glossary has been reduced in size but not, it is hoped, in usefulness, since it is intended mainly for those (including students and teachers) interested in the practical aspects of nuclear technology and in the underlying theory. It is not intended, for example, for nuclear physicists or solid-state physicists as such. Attention has, therefore, been concentrated on such topics as reactor physics and design, reactor materials, health and safety, and similar aspects of nuclear technology.

Since BS 3455:1962 was published, the work on nuclear terminology carried out by the International Organization for Standardization has made significant progress and has been taken into account¹⁾. Advice has also been obtained from The British Committee on Radiation Units and Measurements on the radiological and radiobiological terms incorporated.

The terms in this Glossary are arranged alphabetically in a single series. Where a term is a group of words, for convenience the term may also be listed alphabetically by other than its first word and there defined.

Important terms appearing in the definitions are italicized when they are defined elsewhere in the Glossary. The basic terms, e.g. *electron*, *neutron*, *particle*, *photon*, *radiation* and *reactor* are, generally, exceptions to this rule. Usually a term is italicized only the first time it appears in a definition. A term is not only italicized when it appears in the form as entered in the Glossary, but also when it undergoes grammatical inflection: thus because *absorption* occurs in the glossary, the words *absorbed* and *absorbing*, for example, are also italicized.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 42, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ ISO Standard 921:1972, “*Nuclear energy glossary*”.

Term	Definition
absorbed dose	See <i>dose, absorbed</i> .
absorber	A material with which radiation interacts significantly, resulting in the transfer of energy to the material. For certain specified particles, in particular neutrons, the interaction results in their disappearance as free particles. NOTE The term may also denote a specific object used deliberately to act as an absorber.
absorption	1. A phenomenon in which radiation transfers some or all of its energy to the matter which it traverses. NOTE The <i>Compton effect</i> is considered to be a part of this process. 2. For a specified particle: an atomic or nuclear interaction in which the incident particle disappears as a free particle, even when one or more of the same or different particles are subsequently emitted. NOTE <i>Scattering</i> is not considered to be part of this process.
absorption, neutron	A nuclear interaction in which the incident neutron disappears as a free particle even when one or more neutrons are subsequently emitted accompanied by other particles, e.g. in <i>fission</i> . NOTE <i>Scattering</i> is not considered to be part of this process.
absorption coefficient	Of a substance, for a parallel beam of specified radiation: the quantity μ_{abs} in the expression $\mu_{\text{abs}} \Delta x$ for the fraction <i>absorbed</i> in passing through a thin layer of thickness Δx of that substance. It is a function of the energy of the radiation. According as Δx is expressed in terms of length, mass per unit area, moles per unit area, or atoms per unit area μ_{abs} is called the linear, mass, molar, or atomic absorption coefficient. NOTE It is that part of the <i>attenuation coefficient</i> resulting from absorption processes only.
absorption control	See <i>control, absorption</i> .
absorption curve	A graph, as a function of distance in an <i>absorber</i> , of a radiation quantity which is dependent upon <i>absorption</i> , e.g. <i>energy flux density</i> .
absorption edge	For a given element: one of a series of wavelengths at which the X- or gamma-ray <i>absorption coefficient</i> of the element, plotted against increasing wavelength, shows an abrupt decrease.
abundance, isotopic	In a mixture of the <i>isotopes</i> of an element: the relative number of atoms of a particular isotope expressed as a fraction of all the atoms of the element.
abundance, natural	Of a specified <i>isotope</i> of an element: the <i>isotopic abundance</i> in the element as found in nature.
abundance ratio	In a given sample: the ratio of the number of atoms of one <i>isotope</i> to the number of atoms of another isotope of the same element.
accelerator	A device for imparting kinetic energy to charged particles.
accumulated dose	See <i>dose, accumulated</i> .
actinides	The group of elements with atomic numbers 90 to 103 inclusive.
activation	The process of inducing <i>radioactivity</i> by <i>irradiation</i> .

Term	Definition
activation analysis	A method of chemical analysis based on the identification and measurement of characteristic radiations of <i>nuclides</i> formed by <i>irradiation</i> .
activation cross section	See <i>cross section, activation</i> .
active radioactive	Possessing or pertaining to <i>radioactivity</i> .
active area	An area or region in a laboratory or installation where <i>radioactivity</i> may exist above predetermined levels owing to radiation or contamination. The term is sometimes loosely used to mean <i>controlled area</i> .
activity	In a given quantity of material: the number of spontaneous <i>nuclear disintegrations</i> occurring per unit time. See also <i>curie</i> .
activity, specific	Of a given material or <i>nuclide</i> : the <i>activity</i> per unit mass.
activity concentration	Of a given material: the <i>activity</i> per unit volume.
advanced gas cooled reactor	See <i>reactor, advanced gas cooled</i> .
after-heat	For a <i>shutdown</i> reactor or for <i>fuel</i> or reactor components after removal from the reactor: the heat resulting principally from <i>fission product</i> decay, and from other residual radioactive processes. See <i>decay heat</i> and <i>shutdown power</i> .
after-power	For a <i>shutdown</i> reactor: the power corresponding to the <i>after-heat</i> .
age	In <i>Fermi age theory</i> : one sixth of the mean square displacement of a neutron as it slows down in an infinite homogeneous medium through a specified energy range. See also <i>slowing-down area</i> .
age equation	In <i>Fermi age theory</i> : the equation which describes the spatial distribution of the <i>slowing-down density</i> at any <i>age</i> .
aggregate recoil	The ejection, from the surface of a <i>radioactive</i> sample, of atoms additional to those which recoil on disintegrating. It is chiefly observed with strong preparations of α -active materials, as a migration of a small fraction of the radioactivity on to clean surfaces nearby.
AGR	See <i>reactor, advanced gas cooled</i> .
air-scatter	Radiation arriving at a specified place after being <i>scattered</i> by the atmosphere.
air-wall ionization chamber	An ionization chamber whose walls have substantially the same <i>absorption</i> and <i>scattering</i> characteristics as air.
albedo	In neutron diffusion: the probability that a neutron entering into a region through a surface will return through that surface.
albedo dosimeter	A <i>dosimeter</i> which makes use of backscatter of radiation, particularly of neutrons, from the body. See <i>albedo</i> .
allobars	Forms of an element having different <i>isotopic</i> compositions and therefore different <i>atomic weights</i> .
alpha decay	<i>Radioactive decay</i> in which an <i>alpha particle</i> is emitted. This lowers the <i>atomic number</i> of the nucleus concerned by two and its mass number by four.
alpha particle	A helium-4 nucleus emitted during a nuclear <i>transformation</i> ; by extension, any helium-4 nucleus.

Term	Definition
alpha ratio	As applied to <i>fissionable</i> nuclei: the ratio of the radiative capture <i>cross section</i> to the fission cross section.
amu	See <i>atomic mass unit, unified</i> .
annihilation	An interaction between a positive and a negative electron in which they both disappear, their energy, including rest energy, being converted into electromagnetic radiation (called annihilation radiation).
annihilation radiation	See <i>annihilation</i> .
asymptotic flux density	See <i>flux density, asymptotic</i> .
atom	A unit of matter consisting of a single <i>nucleus</i> surrounded by a number of electrons equal to the number of protons in the nucleus.
atomic energy	A term sometimes used to denote <i>nuclear energy</i> .
atomic mass	The mass of an <i>atom</i> , expressed in <i>unified atomic mass units</i> .
atomic mass unit	See <i>atomic mass unit, unified</i> .
atomic mass unit, unified	Defined as 1/12 of a mass of the ^{12}C <i>nuclide</i> . It replaces the atomic mass unit <i>amu</i> which is related to the ^{16}O <i>nuclide</i> , and the atomic weight unit <i>awu</i> which is related to the naturally-occurring mixture of oxygen <i>isotopes</i> . It is greater than the <i>amu</i> by a factor of 1.000 318 and than the <i>awu</i> by a factor of 1.000 043.
atomic number	The number of <i>protons</i> in an atomic <i>nucleus</i> . It determines the chemical nature of the <i>atom</i> and its nuclear charge.
proton number	
atomic power	A term sometimes used to denote <i>nuclear power</i> .
atomic weight	Of an element: the average mass of its <i>atoms</i> , expressed in <i>unified atomic mass units</i> .
atomic weight unit	See <i>atomic mass unit, unified</i> .
attenuation	The reduction of a radiation quantity upon passage of radiation through matter, resulting from all types of interaction with that matter. But see <i>attenuation, geometric</i> .
attenuation, geometric	The reduction of a radiation quantity due to the effect of the distance between the point of interest and the source (e.g. the inverse-square law for a point source), and excluding the effect of any matter present.
attenuation coefficient	Of a substance, for a parallel beam of specified radiation: the quantity μ in the expression $\mu\Delta x$ for the fraction removed by <i>attenuation</i> in passing through a thin layer of thickness Δx of that substance. It is a function of the energy of the radiation. According as Δx is expressed in terms of length, mass per unit area, moles per unit area or atoms per unit area μ is called the linear, mass, molar or atomic attenuation coefficient.
attenuation factor	For a given <i>attenuating</i> body in a given configuration: the factor by which a radiation quantity at some point of interest is reduced owing to the interposition of the body between the <i>source</i> of radiation and the point of interest.
Auger effect	The emission of an electron (rather than an <i>X-ray</i> photon) from an <i>atom</i> due to the filling of a vacancy in an inner electron shell.
augmentation distance	The <i>linear extrapolation distance</i> and, less often, the <i>extrapolation distance</i> .

Term	Definition
autoradiograph	A photographic record of the radiation from <i>radioactive material</i> in an object, made by placing the object close to a photographic emulsion.
average energy expended in a gas per ion pair formed	The ratio of the initial energy of a charged particle to the average number of ion pairs formed along its track in a gas when that particle is completely stopped by the gas.
average life	See <i>mean life</i> .
average logarithmic energy decrement	See <i>logarithmic energy decrement, average</i> .
awu	See <i>atomic mass unit, unified</i> .
backscatter factor	1. In dosimetry: the ratio of the dose rate at a point on the surface of an externally <i>irradiated</i> body to the dose rate at the same point in the absence of the body. 2. In counting: the factor by which the counting rate is increased by the additional radiation which is scattered back by the source material and its support.
bare	Describes a <i>critical</i> or <i>subcritical assembly</i> having no <i>reflector</i> .
barn	A unit of area used in expressing nuclear <i>cross sections</i> . Symbol: b. 1 barn = 10^{-28} m ² .
BCD	See <i>burst can detector</i> .
beam hole	A hole through the <i>biological shield</i> into the interior of a reactor. It is used for the passage of a beam of radiation for experiments outside the reactor.
beam trap	A system for <i>absorbing</i> a beam of radiation so that the <i>scattered</i> radiation is reduced to an acceptable level. It usually consists of a suitable cavity in a concrete wall or block.
beta decay	<i>Radioactive decay</i> in which a <i>beta particle</i> is emitted or in which orbital <i>electron capture</i> occurs. This changes the atomic number of the <i>nucleus</i> concerned by plus or minus one but does not change its <i>mass number</i> .
beta particle	An electron of either sign which has been emitted by an atomic <i>nucleus</i> or neutron in the process of a <i>transformation</i> .
beta rays	Radiation composed of <i>beta particles</i> .
beta transformation	The transformation of a <i>nucleus</i> into its neighbouring <i>isobar</i> , with the emission of a positive or negative electron, or with the <i>capture</i> of an orbital electron. See also <i>nuclear disintegration</i> .
betatron	An <i>accelerator</i> in which electrons are accelerated by means of magnetic induction.
binding energy	1. For a particle in a system: the net energy required to remove it from the system. Sometimes called separation energy. 2. For a system: the net energy required to decompose it into its constituent particles.
biological half-life	See <i>half-life, biological</i> .
biological shield	See <i>shield, biological</i> .
BISO	Of <i>coated particle fuel</i> : a graded pyrocarbon coating containing no silicon carbide layer.

Term	Definition
black	In reactor technology: effectively <i>absorbing</i> all the incident neutrons of some specified energy.
blanket	A region of <i>fertile</i> material placed around or within a <i>reactor core</i> for the purpose of <i>conversion</i> . By extension, the term <i>blanket</i> may be used when the purpose is <i>transformation</i> of non-fertile material.
body burden	The total amount (which may be expressed as <i>activity</i>) of a specified <i>radionuclide</i> in a human or animal body.
Bohr radius	The radius of the smallest electron orbit in Bohr's model of the hydrogen atom.
boiling water reactor	See <i>reactor, boiling water</i> .
bond	1. The intimate contact between <i>fuel</i> and <i>can</i> or <i>cladding</i> . 2. A material effecting the intimate contact between <i>fuel</i> and <i>can</i> or <i>cladding</i> .
bone-seeking element	Any element which in vivo is incorporated in bone in preference to other tissues.
booster element	A <i>fuel element</i> temporarily inserted in a <i>reactor core</i> , e.g. to provide <i>xenon override</i> .
boron counter	A radiation counter utilizing a nuclear reaction with ^{10}B for the detection of <i>slow neutrons</i> .
branching decay	Of a <i>nuclide</i> : <i>radioactive decay</i> which can proceed in two or more alternative ways.
branching fraction	In <i>branching decay</i> : the fraction of <i>nuclei</i> which disintegrate in a specified way. It is usually expressed as a percentage.
branching ratio	The ratio of the <i>branching fractions</i> for two specified modes of disintegration.
breeder reactor	See <i>reactor, breeder</i> .
breeding	<i>Conversion</i> when the <i>conversion ratio</i> is greater than unity.
breeding gain	<i>Breeding ratio</i> minus one.
breeding ratio	The <i>conversion ratio</i> when it is greater than unity.
Breit-Wigner formula	An expression for the neutron <i>absorption cross section</i> of a <i>nucleus</i> near a resonance, as a function of the neutron energy.
bremsstrahlung	The electromagnetic radiation arising from the deceleration, or acceleration, of charged particles.
broad beam	In beam <i>attenuation</i> measurements: a beam in which the unscattered and much of the <i>scattered</i> radiation reaches the detector. See <i>narrow beam</i> .
buckling	Short for <i>material buckling</i> or <i>geometric buckling</i> .
buckling, geometric	A parameter, B_g^2 , depending on the shape and the external dimensions of an assembly, e.g. a <i>reactor core</i> . For a <i>bare</i> reactor B_g^2 is the first eigenvalue of the equation. $\nabla^2 \phi(r) + B^2 \phi(r) = 0$

Term	Definition
	with the condition that the neutron <i>flux density</i> $\phi(r)$ is zero at the <i>extrapolated boundary</i> of the assembly, and where r is the radius vector.
buckling, material	A parameter, B_m^2 , providing a measure of the <i>multiplying</i> properties of a medium as a function of its materials and their disposition. In <i>age-diffusion theory</i> B_m^2 is the value of B^2 satisfying the equation $k_{\infty}e^{-B^2\tau} = 1 + L^2B^2$ where k_{∞} is the infinite <i>multiplication factor</i> , τ the <i>age</i> and L the <i>diffusion length</i> of the neutrons.
build-up factor	In the passage of radiation through a medium: the ratio of the total value of a specified radiation quantity at any point to the contribution to that value from radiation reaching the point without having undergone a collision.
built-in reactivity	See <i>reactivity, built-in</i> .
bulk rod bulk control rod	One of the group of <i>control rods</i> used for the control of the reactor as a whole. See also <i>zone rod</i> and <i>trim rod</i> .
burnable poison	<i>Nuclear poison</i> purposely introduced into a <i>reactor</i> to help control long term <i>reactivity</i> changes by its progressive <i>burn-up</i> .
burn-out, fuel	Of a <i>fuel element</i> in a liquid cooled reactor: severe local damage due to failure of the <i>coolant</i> to dissipate all the heat produced in the element. See <i>melt-out, fuel</i> .
burn-out heat flux	The local heat flux density at which <i>fuel burn-out</i> takes place.
burn-out point	For a liquid cooled reactor: any combination of values of heat-transfer parameters which results in <i>fuel burn-out</i> .
burn-up	The significant reduction in the quantity of one or more <i>nuclides</i> in a reactor, arising from <i>neutron absorption</i> . The term may be applied to <i>fuel</i> or other materials. See also <i>burn-up, fuel</i> and <i>burn-up fraction</i> .
burn-up, fuel	The total energy released per unit mass of <i>nuclear fuel</i> . (Also called fuel irradiation level.) It is commonly expressed in megawatt days per tonne.
burn-up fraction	The fraction of initial <i>nuclides</i> of a given type which have undergone <i>burn-up</i> . It is usually expressed as a percentage.
burst	A defect in a <i>fuel element can</i> which allows <i>fission products</i> to escape. See <i>failed fuel</i> .
burst can detector	An instrument for the early detection of a <i>burst</i> . Abbreviation: BCD.
BWR	See <i>reactor, boiling water</i> .
cadmium cutoff, effective	In a given experimental configuration: the neutron energy above which cadmium is effectively transparent to neutrons, and below which it is effectively opaque.
cadmium ratio	The ratio of the response of a neutron <i>detector</i> to its response under the same conditions when covered with cadmium of a specified thickness.
calandria	A closed <i>reactor vessel</i> with internal tubes or channels arranged, for example, to keep the liquid <i>moderator</i> separate from the <i>coolant</i> .

Term	Definition
can	A sealed container for <i>nuclear fuel</i> or other material. It provides protection from a chemically reactive environment, and containment of <i>radioactive</i> products produced during <i>irradiation</i> . It may also provide structural support. See also <i>cladding</i> .
canal	A water-filled channel into which <i>radioactive</i> objects, including <i>fuel elements</i> may be discharged from a reactor. It may also lead to a fuel cooling installation.
canning	The process of providing a material with a <i>can</i> .
capture	A process by which an atomic or nuclear system acquires an additional particle.
capture, parasitic	<i>Neutron capture</i> not leading to <i>fission</i> or any other desired process.
capture, radiative	<i>Capture</i> of a particle by a nucleus followed by emission of <i>gamma radiation</i> .
capture gamma radiation	The <i>gamma radiation</i> emitted in <i>radiative capture</i> .
carrier	A substance in an appreciable amount which, when assembled with a trace of another substance, will carry that trace with it through a chemical or physical process.
carrier-free	A preparation in which substantially all the <i>atoms</i> of the activated element present are <i>radioactive</i> . Material of high <i>specific activity</i> is often loosely referred to as “carrier-free”.
cask	See <i>flask</i> .
castle	1. A small <i>shielded</i> container in which the <i>radioactivity</i> of material can be measured without a significant background of extraneous radiation. 2. A small <i>shielded</i> container for the temporary storage of <i>radioactive material</i> .
cave	Another term for <i>hot cell</i> .
cell	In a heterogeneous reactor: one of the set of elementary regions each of which has the same materials in the same geometrical form.
cell, hot	A heavily <i>shielded</i> enclosure for highly <i>radioactive materials</i> . It may be used for their handling or processing by remote means, or for their storage. Also known as <i>cave</i> .
cell, shielded	
cell correction factor	In the calculation of reactor parameters: a factor introduced to correct for the effect of using a simplified shape for the reactor <i>cells</i> .
cent	A unit of <i>reactivity</i> equal to one hundredth part of a <i>dollar</i> .
ceramic fuel	<i>Nuclear fuel</i> consisting of refractory compounds, e.g. oxides and carbides.
Cerenkov counter	A counter in which the <i>Cerenkov radiation</i> produced in a transparent medium is converted to electrical pulses by a photomultiplier.
Cerenkov radiation	Bluish light emitted when a charged particle moves in a transparent medium with a speed greater than that of light in the same medium.
cermet fuel	<i>Nuclear fuel</i> consisting of an intimate mixture of metallic materials and refractory compounds. Either phase or both can contain <i>fissile</i> elements.
chain fission yield	See <i>fission yield</i> , <i>chain</i> .

Term	Definition
chain reaction, neutron chain reaction, fission	A nuclear chain reaction in which the necessary agent is a neutron which has been produced in the <i>fission</i> process. According as the resulting neutron population decreases, remains constant, or increases with time, the reaction is considered to be convergent (<i>subcritical</i>), self-sustained (<i>critical</i>), or divergent (<i>supercritical</i>).
chain reaction, nuclear	A series of nuclear reactions in which one of the agents necessary to the series is itself produced by the reactions so as to cause similar reactions.
chamber	See <i>ionization chamber</i> .
channelling effect	Another term for <i>streaming</i> .
charge	1. The <i>fuel</i> placed in a reactor. 2. To place the <i>fuel</i> in a reactor.
charge pan	In certain reactors: a structure on top of the <i>core</i> , often of metallic material, used as a guide to the <i>fuel channel</i> when <i>charging</i> .
charged particle equilibrium	The condition existing at a point within a medium under <i>irradiation</i> in which the average number, composition and energy distribution of charged particles per unit volume remain constant.
chemical shim	See <i>shimming, chemical</i> .
chemical shim control	See <i>shimming, chemical</i> .
chemonuclear	Refers to chemical processes induced by nuclear radiation.
Ci	See <i>curie</i> .
cladding	An external layer of material applied directly to <i>nuclear fuel</i> or other material. It provides protection from a chemically reactive environment, containment of <i>radioactive</i> products produced during <i>irradiation</i> , or structural support. See also <i>can</i> .
clean	Of a reactor: having no induced <i>radioactivity</i> and no <i>fission products</i> . In some countries “clean” also implies the absence of <i>control members</i> .
cluster, control rod	A group of <i>control rods</i> moveable together for <i>reactor control</i> purposes.
cluster control	See <i>control, cluster</i> .
coated particle	See <i>fuel particle</i> .
coffin	An obsolete term for <i>flask</i> .
cold clean reactor	A <i>clean reactor</i> at room temperature.
cold neutrons	Neutrons whose most probable energy corresponds to a temperature considerably lower than room temperature.
collapsible cladding	A <i>fuel element cladding</i> which is designed to achieve direct contact with the <i>fuel</i> under pressure of the <i>coolant</i> .
compound nucleus	A highly excited <i>nucleus</i> , of short lifetime, formed as an intermediate stage in a nuclear reaction.
Compton effect	The <i>elastic scattering</i> of a photon by an electron when the electron can be considered to be free and stationary. Part of the energy and momentum of the incident photon is transferred to the electron (Compton electron) and the remaining part is carried away by the scattered photon (Compton scatter).
configuration control	See <i>control, configuration</i> .

Term	Definition
containment	The prevention of release, even under the conditions of a reactor accident, of unacceptable quantities of <i>radioactive material</i> beyond a controlled zone. Also, commonly, the containing system itself.
contamination area	A <i>controlled area</i> in which the control is imposed in respect of contamination.
control, absorption	<i>Reactor control</i> by adjustment of the properties, position, or quantity of <i>neutron-absorbing material</i> , other than <i>fuel</i> , <i>moderator</i> , and <i>reflector material</i> .
control, chemical shimming	See <i>shimming, chemical</i> .
control, cluster	<i>Reactor control</i> by adjustment of the position of a <i>fuel</i> cluster or a <i>control rod</i> cluster.
control, configuration	<i>Reactor control</i> by adjustment of the configuration of the <i>fuel</i> , <i>reflector</i> , <i>coolant</i> , or <i>moderator</i> .
control, fluid poison	<i>Reactor control</i> by adjustment of the position or quantity of a fluid <i>nuclear poison</i> . The fluid poison may include soluble chemicals or particles in suspension.
control, fuel	<i>Reactor control</i> by adjustment of the properties, position, or quantity of <i>fuel</i> .
control, moderator	<i>Reactor control</i> by adjustment of the properties, position, or quantity of the <i>moderator</i> .
control, reactor	In a reactor: the intentional variation of the <i>reactivity</i> to maintain a desired state of operation.
control, reflector	<i>Reactor control</i> by adjustment of the properties, position or quantity of the <i>reflector</i> .
control, spectral shift	A type of <i>moderator control</i> in which the neutron spectrum is intentionally changed.
control arm	A <i>control member</i> in the form of a signal arm.
control drive	In <i>reactor control</i> : a device used for moving a <i>control member</i> .
control member	An adjustable part of a reactor used for <i>reactor control</i> .
control element	
control rod	A <i>control member</i> in the form of a rod.
control rod cluster	See <i>cluster, control rod</i> .
control rod worth	The <i>reactivity</i> change resulting from the complete insertion of a fully withdrawn <i>control rod</i> into a <i>critical reactor</i> under specified conditions.
controlled area	An area in which individual <i>exposure</i> of personnel to ionizing radiation or radioactive contamination is controlled. It is under the supervision of a person who has knowledge of the appropriate <i>radiation-protection</i> regulations and responsibility for applying them.
conventional flux density	Another term for <i>flux density</i> , 2 200 m/s.
convergent reaction	See <i>chain reaction, neutron</i> .
conversion	In reactor technology: nuclear <i>transformation</i> of a <i>fertile</i> substance into a <i>fissile</i> substance. See <i>breeding</i> .
conversion coefficient	See <i>internal conversion</i> .
conversion electron	See <i>internal conversion</i> .

Term	Definition
conversion ratio conversion factor	The ratio of the number of <i>fissile nuclei</i> produced by <i>conversion</i> to the number of fissile nuclei destroyed. The term can refer to an instant of time or to a period of time.
conversion ratio, relative	The instantaneous <i>conversion ratio</i> in a reactor relative to the instantaneous conversion ratio in <i>fuel</i> of the same composition in some specified (usually thermal) neutron spectrum.
converter, neutron	A device placed in a <i>flux</i> of <i>slow neutrons</i> to produce <i>fission neutrons</i> and so increase the number and proportion of <i>fast neutrons</i> .
converter reactor	See <i>reactor, converter</i> .
coolant coolant, primary	A coolant used to remove heat from a primary source such as a <i>reactor core</i> or a <i>breeding blanket</i> .
coolant, secondary	A coolant used to remove heat from the <i>primary coolant</i> .
cooling	A term commonly used to describe the <i>radioactive decay</i> of <i>nuclear fuel</i> after <i>irradiation</i> in a reactor.
cooling pond	A large container, filled with water, in which <i>irradiated nuclear fuel</i> is set aside until its <i>activity</i> has decreased to a desired level.
core, reactor	That region of a reactor which contains the <i>fuel elements</i> and in which a <i>chain reaction</i> can take place. It is normally bounded by the <i>reflector</i> or <i>blanket</i> .
counter	See <i>detector, particle</i> .
counter, fission	A <i>counter</i> lined with <i>fissile</i> material or filled with a fissile gas which detects neutrons by the <i>ionization</i> produced by <i>fission fragments</i> .
counter, proportional	A gas-filled chamber, usually having a hollow cylindrical cathode with a fine wire anode along its axis, which is operated in the <i>proportional region</i> . Each incident ionizing particle produces one output electric pulse, whose size is proportional to the number of primary ions produced by the incident particle in the active volume of the counter.
counter, scintillation	A <i>counter</i> in which the light flashes produced in a scintillator by ionizing radiation are converted into electric pulses by a photomultiplier.
counter, semiconductor	See <i>detector, semiconductor</i> .
critical	Of a <i>neutron-chain-reacting</i> medium: having an <i>effective multiplication factor</i> equal to unity. See also <i>delayed critical</i> ; <i>prompt critical</i> .
critical assembly	An assembly of materials for use in a <i>critical</i> experiment.
critical equation	Any equation relating parameters of an assembly which must be satisfied for the assembly to be <i>critical</i> .
critical experiment	A test or series of tests performed with an assembly of reactor materials which can be gradually brought to the <i>critical</i> state for the purpose of determining the nuclear characteristics of a reactor. The experiment is usually performed at very low power.
critical heat flux	For a given phenomenon: that value of the heat flux in a specific system which will produce the phenomenon.
critical mass	The mass of <i>fissile</i> material in a specified <i>critical</i> system.

Term	Definition
critical organ	That body tissue or organ in which damage from a given <i>radionuclide</i> resident in the body, or from external irradiation, results in the greatest impairment to health. The critical organ for any given radionuclide may depend on the route of entry of the radionuclide into the body or on its chemical form.
critical size	The physical dimensions of a specified <i>critical</i> system.
criticality	The condition of being <i>critical</i> .
criticality factor	The <i>effective multiplication factor</i> .
criticality pack	A <i>dosemeter</i> designed for measuring radiation which might result from accidental <i>criticality</i> .
cross section	A measure of the probability of a specified interaction between an incident radiation and a target particle or system of particles. It is the reaction rate per target particle for a specified process divided by the <i>flux density</i> of the incident radiation (<i>cross section, microscopic</i>). In reactor physics the term is sometimes applied to a specified group of target particles, e.g. those per unit volume (<i>cross section, macroscopic</i>), or per unit mass, or those in a specified body. A cross section can be qualified by the process to which it relates, e.g. - capture cross section - coherent scattering cross section - elastic scattering cross section - fission cross section - incoherent scattering cross section - inelastic scattering cross section - neutron absorption cross section - radiative capture cross section - radiative inelastic scattering cross section - scattering cross section - thermal inelastic scattering cross section NOTE Unless otherwise qualified the term cross section means microscopic cross section. See also the definitions below.
cross section, activation	The <i>cross section</i> for the formation of a <i>radionuclide</i> by a specified interaction.
cross section, differential	The <i>cross section</i> for an interaction involving one or more outgoing particles with specified direction or energy per unit interval of solid angle or energy.
cross section, Doppler-averaged	A <i>cross section</i> averaged over energy, employing appropriate weighting factors, to take into account the effect of thermal motion of the target particles. The product of the average cross section so obtained and the <i>flux density</i> in the laboratory system then gives the correct reaction rate.
cross section, effective thermal	That <i>cross section</i> for a specified interaction which, when multiplied by the <i>conventional flux density</i>, gives the correct reaction rate. (Also called cross section, Westcott.) NOTE The use of the term is usually restricted to <i>capture</i> and <i>fission</i> in <i>well-moderated</i> systems.