

BSI and International Standards

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Standards in Radiation Protection

Organisations

BSI British Standards Institution

First standard 1901

IEC International Electrotechnical Committee

Founded in London in 1906

ISO International Standards Organisation

Founded in 1946

CENELEC European Committee for Electrotechnical Standardization

BSI

Has seven standards divisions

The Nuclear Energy committees:

- NCE 2** **Radiation Protection and Measurement**
- NCE 8 Reactor Instrumentation
- NCE 9 Nuclear Fuel Cycle Technology
- NCE 9/01 Reactor Technology

are, with four hundred other committees, in the Engineering Division.

The Radiation Protection and Measurement committee is one of the busiest BSI committees. It shadows the work of ISO TC85 SC2 Radiation Protection, IEC TC45 Nuclear Instrumentation, IEC TC45 SC45B Radiation Protection Instrumentation and CENELEC CLC TC45B Radiation Protection Instrumentation.

BSI and BSI adopted standards published

- BS 3385 Specific for direct reading pocket type electroscopes exposure meters
- BS 3455 Glossary of terms used in nuclear science and technology
- BS 3510 Specification for a basic symbol to denote the actual or potential presence ionising radiation
- BS 3664 Specification for film badges for personnel radiation monitoring
- BS 3775 Specification for counting trays (planchets) for radioactive assay
- BS 3890 General recommendations for the testing, calibration and processing of radiation monitoring films
- BS 4094-1 Recommendation for data on shielding from ionizing radiation. Shielding from gamma radiation
- BS 4094-2 Recommendation for data on shielding from ionizing radiation. Shielding from X-radiation
- BS 4247-1 Surface materials for use in radioactive areas. Methods of measuring and evaluating the decontamination factor
- BS 4247-2 Surface materials for use in radioactive areas. Guide to the selection of materials
- BS 4513 Specification for lead bricks for radiation shielding
- BS 5243 General principles for sampling airborne radioactive materials
- BS 5288 Specification. Sealed radioactive sources
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- BS EN 60325 Alpha, beta and alpha/beta (beta energy 60keV) contamination meters and monitors
- BS EN 60405 Constructional requirements and classification of radiometric gauges
- BS EN 60761-1 Equipment for continuous monitoring of radioactivity in gaseous effluents (General requirements)
- BS EN 60761-2 Equipment for continuous monitoring of radioactivity in gaseous effluents (Specific requirements for radioactive aerosol monitoring including transuranic aerosols)
- BS EN 60761-3 Equipment for continuous monitoring of radioactivity in gaseous effluents (Specific requirements for radioactive iodine monitors)
- BS EN 60761-4 Equipment for continuous monitoring of radioactivity in gaseous e
(Specific requirements for tritium monitors)
- BS EN 60761-5 Equipment for continuous monitoring of radioactivity in gaseous effluents (Specific requirements for radioactive noble gas monitors)
- BS EN 60846 Ambient and/or directional dose equivalent (rate) meters and/or monitors for beta, X and gamma radiation
- BS EN 60861 Equipment for monitoring of radionuclides in liquid effluents and surface waters
- BS EN 61005 Neutron ambient dose equivalent (rate) meters
- BS EN 61098 Installed personnel surface contamination monitoring assemblies
- BS EN 61526 Measurement of personal dose equivalent Hp(10) and Hp(0.07) for X, gamma, neutron and beta radiations. Direct reading personal dose equivalent meters and monitors
- BS EN 61582 In vivo counters. Classification, general requirements and test procedures for portable, transportable and installed equipment
- BS EN 62022 Installed monitors for the control and detection of gamma radiations contained in in recyclable and non-recyclable materials transported by vehicle

BSI and BSI adopted standards published (cont.)

- BS IEC 60532 Installed dose ratemeters, warning assemblies and monitors ,x and gamma radiation between 50keV and 7 MeV
- BS IEC 60692 Density gauges utilizing ionizing radiation. Definitions and test methods
- BS IEC 61336 Thickness measurement system utilizing ionizing radiation. Definitions and test methods
- BS IEC 61559-1 Radiation protection instrumentation in nuclear facilities. Centralized systems for continuous monitoring of radiation and/or levels of radioactivity. General requirements
- BS IEC 61577-1 Radon and radon decay product measuring instruments. General requirements
- BS IEC 61577-2 Radon and radon decay product measuring instruments. Specific requirements for radon measuring instruments
- BS IEC 61577-3 Radon and radon decay product measuring instruments. Specific requirements for radon decay product measuring instruments
- BS IEC 61577-4 Radon and radon decay product measuring instruments. Equipment for the production of reference atmospheres containing radon isotopes and their decay products (STAR)
- BS IEC 61584 Installed, portable or transportable assemblies. Measurement of air kerma direction and air kerma rate
- BS IEC 62244 Installed radiation monitors for the detection and radioactive and special nuclear materials at national borders
- BS IEC 62363 Portable photon contamination meters and monitors
- BS IEC 62401 Alarming personal devices (PRD) for detection of illicit trafficking of radioactive material
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- BS ISO 4037-1 X-ray and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy. Radiation characteristics and production methods
- BS ISO 4037-2 X-ray and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy. Dosiimetry for radiation protection over the energy ranges 9 keV to 1.3 MeV. and 4 Mev to 9 MeV
- BS ISO 4037-3 X-ray and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy. Calibration of area and personal dosimeters and the measurement of their response as a function of energy and angle of incidence
- BS ISO 4037-4 X-ray and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy. Calibration of area and personal dosimeters in low energy X reference radiation fields
- BS ISO 6980-1 Reference beta-particle radiation. Methods of production
- BS ISO 6980-2 Reference beta-particle radiation. Calibration fundamentals related to basic quantities characterizing the radiation field
- BS ISO 6980-3 Reference beta-particle radiation. Calibration of area and personal dosimeters and the determination of their response as a function of beta radiation energy and ancle of incidence
- BS ISO 8529-1 Reference neutron radiations. Characteristics and methods of production
- BS ISO 8529-2 Reference neutron radiations. Calibration fundamentals of radiation protection devices related to the basic quantities characterizing the radiation field
- BS ISO 8529-3 Reference nuclear radiations. Calibration of area and personal dosimeters and personal dosimeters and determination of their response as a function of neutron energy and angle of incidence

BSI and BSI adopted standards published (cont.)

- BS ISO 11929-1 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and application to counting measurements without the influence of sample treatment
- BS ISO 11929-2 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and application to counting measurements without the influence of sample treatment
- BS ISO 11929-3 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and application to measurement by high resolution gamma spectrometry without the influence of sample treatment
- BS ISO 11929-4 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and application by use of linear scale analogue ratemeters without the influence of sample treatment
- BS ISO 11929-5 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and application to counting measurements on filters during accumulation of radioactive material
- BS ISO 11929-6 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and application to counting measurements by use of transient mode
- BS ISO 11929-7 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and general applications
- BS ISO 11929-8 Determination of the detection limit and detection threshold for ionizing radiation measurement. Fundamentals and application to unfolding of spectrometric measurements without the influence of sample treatment
- BS ISO 11933-3 Components for containment enclosures. Transfer systems such as plain doors, airlock chambers, double door transfer systems leak tight connections for waste drums
- BS ISO 12789-1 Reference radiation fields. Simulated workplace neutron fields. Characteristics and methods of production
- BS ISO 12789-2 Reference radiation fields. Simulated workplace neutron fields. Calibration fundamentals related to the basic quantities
- BS ISO 12794 Individual thermoluminescence dosimeters for extremities and eyes
- BS ISO 14152 Neutron radiation protection shielding. Design principles and considerations for the choice of appropriate materials
- BS ISO 18589-1 Measurement of radioactivity in the environment. Soil. General guidelines and definitions
- BS ISO 18589-2 Measurement of radioactivity in the environment. Soil. Guidance for the selection of the sampling strategy, sampling and pre-treatment of samples
- BS ISO 18589-3 Measurement of radioactivity in the environment. Soil. Measurement of gamma-emitting radionuclides
- BS ISO 18589-4 Measurement of radioactivity in the environment. Soil. Measurement of plutonium isotopes (Plutonium 238 and Plutonium 239 + 240) by alpha spectrometry
- BS ISO 18589-5 Measurement of radioactivity in the environment. Soil. Measurement of strontium 90
- BS ISO 18589-1 Measurement of radioactivity in the environment. Soil. Measurement of gross alpha and gross beta activities
- BS ISO 19238 Performance criteria for service laboratories performing biological dosimetry by cytogenetics
- BS ISO 21243 Performance criteria for laboratories performing cytogenetic triage for assessment of mass casualties in radiological or nuclear emergencies. General principles and application to dicentric assay
- BS ISO 21439 Clinical dosimetry. Beta radiation sources for brachytherapy
- BS ISO 21482 Ionising-radiation warning. Supplementary symbol

Work in hand is related to CENELEC, IEC and ISO standards,
in the latter two cases adoption as BS is likely

Who is represented on NCE2

The following are entitled to send representatives

- Atomic Weapons Establishment
- British Nuclear Group Sellafield Ltd
- Energy Industries Council
- Health and Safety Executive
- Health Protection Agency
- National Nuclear Laboratory
- National Physical Laboratory
- Nuvia Limited
- The Institute of Physics

Other organisations I am sure can be represented.

In fact a number of our active members have been co-opted because of their particular expertise. If you think you can contribute please let me know.

All NCE 2 meetings take place at the BSI headquarters in Chiswick

We have about four meetings a year generally scheduled for day.

However most of our work is done by correspondence. All our work now relates to International Standards. Because of the enormous amount of work detailed discussion at meetings on every document is no longer possible. Discussion relates to specific problems, progress of the documents, representation at International meetings and who is to collate the comments of members for submission as the UK national comments. Most of the active members NCE 2 are also the UK experts on the working groups of the international standard organisations.

IEC TC45 Nuclear Instrumentation

This Committee deals only with electrical apparatus. It has two sub-committees

SC45A Reactor Instrumentation

SC45B Radiation Protection Instrumentation

Two working groups

WG1 Terminology

WG9 Detectors

and a project group dealing with industrial instrumentation

SC45B has at present seven working groups

WG 5 Measurement of environmental radiation

WG 8 Active electronic dose equivalent and dose equivalent rate meters and monitors

WG 9 Installed equipment for radiation and activity monitoring in nuclear facilities

WG 10 Radon and radon decay products measuring instruments

WG 13 Measurements of airborne radioactivity

WG 14 Passive integrating dosimetry systems for monitoring of external radiation

WG 15 Border control instrumentation using spectrometry, personnel electronic dosimeter and portable dose rate instrumentation

Standards Published but not adopted by CENELEC or BSI

- IEC 60860 Warning assembly for criticality accidents
- IEC 61017-1 Portable, transportable or installed X or gamma radiation ratemeters for environmental monitors-Part 1 Ratemeters
- IEC 61017-2 Portable, transportable or installed X or gamma radiation ratemeters for environmental monitors-Part 2 Integrating assemblies
- IEC 61018 High range beta and photon dose and dose rate portable for emergency radiation protection purposes
- IEC 61066 Thermoluminescence dosimetry systems for personal and environmental monitoring
- IEC 61171 Monitoring equipment – atmospheric radioactive iodines in the environment**
- IEC 61172 Monitoring equipment- Radioactive aerosols in the environment**
- IEC 61256 Installed monitors for the detection of radioactive contamination of laundry
- IEC 61275 Measurement of discrete radionuclides in the environment – In situ photon spectrometry system using a germanium detector
- IEC 61322 Installed dose equivalent rate meters, warning assemblies and monitors for neutron radiation of energy from thermal to 15 MeV
- IEC 61344 Monitoring equipment – Personal warning devices for X and gamma radiations
- IEC 61560 Apparatus for non-destructive radiation tests of fur and other cloth samples
- IEC 61562 Portable equipment for measuring specific activity of beta emitting radionuclides in foodstuffs
- IEC 61563 Equipment for measuring specific activity of gamma emitting radionuclides in foodstuffs
- IEC 62302 Equipment for noble gas monitoring in the workplace and in the environment**
- IEC 62303 Equipment for sampling and monitoring airborne tritium in the workplace, effluents and the environment**
- IEC 62327 Hand-held instruments for the detection and identification of radionuclides and additionally for the indication of ambient dose equivalent rate from photon radiation
- IEC 62387-1 Passive integrating dosimetry systems for environmental and personal monitoring for external photon and beta radiation using electronic devices for the data evaluation Part 1 General characteristics and performance requirements on dosimetry systems
- IEC 62438 Mobile instrumentation for measurement of gamma and neutron radiation in the environment
- IEC 62461 Determination of uncertainty in measurement

Work in progress

- IEC 60532 Installed dose rate meters ,warning assemblies and monitors X and gamma radiation of energy between 50 keV and 7 MeV (Revision)
- IEC 61526 Measurement of personal dose equivalents Hp(10) and Hp(0.07) for X, gamma, neutron and beta radiations – Direct reading personal dose equivalent meters and monitors (Revision)
- IEC 61578 Effectiveness of radon compensation for radioactive aerosol monitors including transuranic aerosols (Revision)**
- IEC 61275 Measurement of discrete radionuclides in the environment – In situ photon spectrometry system using a germanium detector (Revision)
- IEC 62438 Mobile instrumentation for measurement of gamma and neutron radiation in the environment
- IEC 62463 X-ray systems for the screening of persons for security and the carrying of illicit items
- IEC 62484 Spectroscopy-based portal monitors used for the detection and identification of illicit trafficking of radioactive materials
- IEC 62523 Cargo/vehicle radiographic inspection systems
- IEC 62533 Highly sensitive hand-held instruments for photon detection of radioactive material
- IEC 62534 Highly sensitive hand-held instruments for neutron detection of radioactive material

TC 45 meets with its subcommittees and most of the working groups about every fifteen months. Working groups often have at least one interim meeting. The venue of the committee meeting is by invitation of one of the national committees. The last meeting in September was in Yokohama, Japan and the next in about a year's time will be in Seattle, USA. The interim working group meetings are normally in the country of the convener.

Standards are initiated by a request from a national committee. If twenty five percent of the national voting members agree this becomes a new work item and the committee decides which of the existing working groups is applicable to do the work or forms an additional working group. National committees are invited to propose experts in the particular field to join the working group and a project leader is proposed usually from the nation making the original proposal or the convener (leader) of the working group. The working group prepares a draft (CD committee draft) for circulation to national committees for comments. Further CDs can be prepared if necessary otherwise the amended document goes forward as draft for voting. If two thirds of the votes approve it goes forward as Final Draft International Standard for minor editorial correction before being published as an International Standard. It takes at least three years

UK delegates to committee and working group meetings can, if they do not work directly or indirectly for a government department, claim for assisted travel. This is a fixed amount for a particular city and is intended to cover air fares but any over can be used for hotel bills. Only one fare for any working group or committee is paid for, unless the applicant is convener, chairman or secretary.

ISO TC85
NUCLEAR ENERGY

This committee deals with all aspects except electrical apparatus and has three subcommittees

SC2 Radiation Protection

SC5 Nuclear Fuel Technology

SC6 Reactor Technology

and two working groups one terminology and the other on dosimetry standards in radiation processing

SC2 has twelve working groups

WG 2 Reference radiation fields

WG 4 Apparatus for gamma radiography and irradiators

WG 5 Materials and devices for protection against alpha, beta, X, gamma, beta and neutron radiations, and equipment for remote manipulation of radioactive materials

WG 11 Sealed Sources

WG 13 Monitoring and dosimetry for internal exposure

WG 14 Air control and monitoring

WG 17 Radioactivity measurements

WG 18 Biological Dosimetry

WG 19 Individual monitoring of external radiation

WG 20 Illicit trafficking in radioactive material

WG 21 Dosimetry for exposures to cosmic radiation in civilian aircraft

WG22 Dosimetry and related protocols in medical applications of ionizing radiation

Standards not adopted by BSI

ISO1727 Personal photo graphic dosimeters

ISO 2889 General principles for sampling airborne radioactive materials

ISO 2919 Sealed radioactive sources- general requirements and classification

ISO 3975 Unsealed radioactive substances – Identification and certification

ISO 7205 Radionuclide gauges – Gauges designed for permanent installation

ISO 7212 Enclosures for protection against ionizing radiation –Lead shielding used for 50 mm and 100mm thick walls

ISO 7503-1 Evaluation of surface contamination – Part 1 Beta-emitters (maximum beta energy greater than 0.15 MeV) and alpha-emitters

ISO 7503-2 Evaluation of surface contamination – Part 2 Tritium surface contamination

ISO 7503-3 Evaluation of surface contamination – Part 3 Isomeric transition and electron capture emitters

ISO 8194 Clothing for protection against radioactive contamination – Design, selection, testing and use

ISO 8690 Decontamination of radioactively contaminated surfaces – Method for testing and assessing the ease of decontamination

ISO 8769 Reference sources for the calibration of surface contamination monitors – Beta-emitters(maximum beta energy greater than 0.15 MeV) and alpha emitters

ISO 8769-2 Reference sources for the calibration of surface contamination monitors – Part 2 Electrons of energy less than 0.15 MeV and photons of energy less than 1.5 MeV

Standards not adopted by BSI (cont.)

- ISO 9271 Decontamination of radioactively contaminated surfaces –Testing of decontamination agents for textiles
- ISO 9404 Enclosures for protection against ionizing radiation - lead shielding units for 150mm, 200mm and 250 mm thick walls – Part 1 – Chevron units of 150mm and 200mm thickness
- ISO9978 Sealed radioactive sources – Leakage test methods
- ISO 10648-1 Containment enclosures – Part 1 Design principles
- ISO 10648-2 Containment enclosures – Part 1 Classification according to leak tightness and associated checking methods
- ISO 11933-1 Components for containment enclosures Part 1: Glove/bag ports, bungs for glove/bag ports, enclosure rings and interchangeable units
- ISO 11933-2 Components for containment enclosures Part 2 : Gloves, welded bags, gaiters for remote handling tongs and for manipulators
- ISO 11933-4 Components for containment enclosures Part 4: ventilation and gas-cleaning systems, such as filters, trap, safety and regulation valves, control and protection devices
- ISO 11933-4 Components for containment enclosures Part 5: Penetrations for electrical and fluid circuits
- ISO 12790 Performance criteria for radiobioassay – Part 1 General principles
- ISO 14146 Criteria and performance limits for the periodic evaluation of processors of personal dosimeters for X and gamma radiation
- ISO 15080 Ventilation penetration for shielded enclosures
- ISO 15382 Procedure for radiation protection monitoring in nuclear installations for external exposure to weakly penetrating radiation, especially to beta radiation
- ISO 17873 Criteria for the design and operation of ventilation systems for nuclear installations other than nuclear reactors
- ISO 17874-1 Remote handling devices for radioactive materials–Part 1 General requirements
- ISO 17874-2 Remote handling devices for radioactive materials–Part 2 Mechanical master-slave manipulators
- ISO 17874-4 Remote handling devices for radioactive materials–Part 4 Power manipulators
- ISO 17874-5 Remote handling devices for radioactive materials–Part 5 Remote handling tongs

Standards under development

ISO 2889 Sampling airborne radioactive materials from the stacks and ducts of nuclear facilities

ISO 8769 Reference sources- calibration of surface contamination monitors – alpha, beta- and photon emitters

ISO 11665-1 Measurement of radioactivity in the environment-air-Part1 Radon-222 and its short-lived decay products in the atmospheric environment: their origins and measuring methods

ISO 11665-2 Measurement of radioactivity in the environment-air-Part2 Radon-222 Integrated measuring methods of the potential alpha energy concentration of short lived radon decay products in the atmospheric environment

ISO 11665-3 Measurement of radioactivity in the environment-air-Part 3 Radon-222 Short-term measuring methods of the potential alpha energy concentration of short-lived radon decay products in the atmospheric environment

ISO 11665-4 Measurement of radioactivity in the environment-air-Part 4 Integrated measuring methods of the average radon activity concentration in the atmospheric environment using passive sampling and delayed analysis

ISO 11665-5 Measurement of radioactivity in the environment-air-Part5 Radon-222 Continuous measuring methods of radioactivity concentration in the atmospheric environment

ISO 11665-6 Measurement of radioactivity in the environment-air- Part6 Radon-222 Methods of estimating the exhalation surface rate by accumulation in the environment

ISO 11665-7 Measurement of radioactivity in the environment-air-Part 7 Radon-222 Short-term measuring methods of radon activity concentration in the atmospheric environment

ISO 11665-8 Measurement of radioactivity in the environment-air-Part 8 Radon-222 in buildings: Methodologies for screening and additional investigations

Standards under development (cont.)

- ISO 11929 Determination of the characteristic limits (decision threshold, detection limit and limits of confidence interval) for measurements of ionizing radiation
- ISO 17874-3 Remote handling devices for radioactive materials Part 3 Electrical master-slave manipulators
- ISO 20785-2 Dosimetry for exposures to cosmic radiation in civilian aircraft–Part 2 Characterization of instrument response
- ISO 27048 Dose assessment for the monitoring of workers for internal radiation exposure
- ISO 26802-2 Criteria for the design and the operation and ventilation systems for nuclear reactors
- ISO 28218 Performance criteria for radiobioassay
- ISO 29661 Reference radiation fields for radiation protection- Definitions and fundamental concepts

ISO TC 85 works almost identically as IEC TC 45 except that TC 85 meets with its sub-committees and most of the working groups every two and half years. The sub-committees meet independently with their working groups between and the working groups meet often between these meetings. In all other ways treatment is identical

CENELEC TC45B

This committee adopts standards of the IEC SC45B by agreement of the national bodies, often with modifications. Meetings are held two or three times a year in France, Germany and the UK the only participating nations There are no working groups at this time.

The voting for adoption is weighted according to countries population as with any other decisions of European Union

Work in Progress

IEC 62327 Hand-held instruments for the detection and identification of radionuclides and for the indication of ambient dose equivalent rate from photon radiation

IEC 62244 Installed radiation monitors for the radioactive and special nuclear materials at national borders

IEC 62387-1 Passive integrating dosimetry systems for environmental and personal monitoring – Part 1 : General characteristics and performance requirements

IEC 62363 Portable photon contamination meters and monitors