IAEA
International Atomic Energy Agency

Which Publication to use and when?

I. Csete, (ex IAEA staff)

Outline

- Type and status of International Standards and other relevant publications
- Relevant international organizations:
  BIPM, CCRI, ICRU, ICRP, IAEA, ISO, IEC, AAPM
- National level standards
- Publications of National Accrediation Bodies
- Requirements for radiation fields for calibration and test
- Requirements for dosimeter performance
- Recommendations for dosimetry calibration methods
- Guidelines for calibration uncertainties and their estimations
- Requirements for QMS
- Conclusion?

References are linked in the pdf version

Type and status of International Standards and other relevant publications to SSDLs

- Standard: *written document including specifications for products, services and systems, to ensure quality, safety and efficiency.*

International: IEC, ISO, IAEA Safety Standard Series, EN CEN-CENELEC. (ASTM INTERNATIONAL nuclear industrial appl.)

National: DIN, BS, ANSI

ISO standards shall be „implemented" in the member countries. IAEA member states are encouraged to implement, shall be in line with in case of IAEA sponsored activity.

- International recommendations: CCRI, ICRU, ICRP publications IAEA Technical Reports and Code of Practices, AAPM report series

Relevant international organizations:

The IEC,International Electrotechnical Commission, founded in 1906,is the world's leading organization for the preparation and publication of International Standards for all electrical, electronic and related technologies.
Committees dealing with ionising radiation:
45 B Radiation Protection Instrumentation
62 C Equipment for radiotherapy, nuclear medicine and radiation dosimetry

In 1946 delegates from 25 countries met in London and decided to create a new international organization 'to facilitate the international coordination and unification of industrial standards.
The International Organization for Standardization is an independent, non-governmental international organization with a membership of 162 national standards bodies.
Members shall „implement" the ISO standards in their countries. TC 85 SC 2 Radiological protection (96 published 46 under publication, 26 members)

Relevant international organizations:

Consultative Committee for Ionizing Radiation (CCRI)

The Consultative Committee for Standards of Ionizing Radiations (Comité consultatif pour les étalons de mesure des rayonnements ionisants, CCEMRI) was set up in 1958. Its name was changed to Consultative Committee for Ionizing Radiation in 1997.

Present activities concern matters related to the definitions of quantities and units, standards for x-ray, γ-ray, charged particle and neutron dosimetry, radioactivity measurement and the international reference system for radionuclides (SIR), and advice to the International Committee for Weights and Measures**,CIPM**, on matters related to ionizing radiation standards. **The CIPM is the highest authority in the field of measurement science.**

The International Bureau of Weights and Measures/*Bureau International des Poids et Mesures* ,**BIPM**, is the intergovernmental organization through which Member States of the Metre Convention (1875) act together on matters related to measurement science and measurement standards.

BIPM is to provide the technical basis for a singe, coherent system of measurements traceable to the International System of Units (SI)

BIPM maintains primary radiation standards, being recognized as the best realisation of the key dosimetry quantites to enable international comparisons and traceability to the SI.

Relevant international organizations:

International Commission on Radiation Units and Measurements
Radiológiai Egységek és Mérések Nemzetközi Bizottsága

The ICRU is a non-profit and non-governmental organization. Its permanent Commission since 1953 developes and promulgates internationally accepted recommendations on radiation-related quantities and units, terminology, measurement procedures, and reference data for the safe and efficient application of ionizing radiation to medical diagnosis and therapy, radiation science and technology, and radiation protection of individuals.

The ICRU Reports are premier international authoritative reference sources for medical radiation procedures and for providing specifications and measuring standards in industrial, environmental and other uses of radiation and in radiation protection.

ICRU recommendations are often adopted by governments, national statutory bodies and relevant international associations and organizations.

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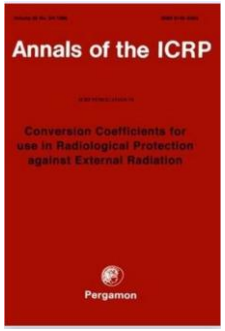
Relevant international organizations:

INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION



INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION ,ICRP, is an independent Registered Charity, established in 1928 to advance for the public benefit the science of radiological protection, in particular by providing recommendations and guidance on all aspects of protection against ionising radiation ellaborated in four committees and 24 Task Groups. Since 1959, ICRP has its own series of publications, since 1977 in the shape of a scientific journal, Annals of the ICRP, (public consultations, basic rad. prot. info)

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Medical Physics
The International Journal of Medical Physics Research and Practice

The American Association of Medical Physicists, AAPM, is an **international organization** with more than 8000 members and provides a variety of programs, membership opportunities, and resources for medical physicists, students, and related medical and scientific professionals **anywhere in the world**.

Some AAPM Task Group reports can be used as dosimetry code of practice.

*Many of the Educational Resources are also available to medical physicists in the Developing Countries. Access requires registration as a **D**eveloping **C**ountry **E**ducational **A**ssociate (DCEA) and obtaining a **Developing Country Educational Associate** USERNAME and PASSWORD*.

International Standards and Recommendations relevant to SSDLs

(photon, neutron, beta , activity)

IAEA

9 topics / 5 applic.	External beam Radiationtherapy	Brachytherapy	Nuclear Medicine	Diagnostic Radiology	Radiation protection
Basic	IAEA SSDL Charter VIM , SI, ICRU 85a (2011), ICRU 90				
Quantities	ICRU 64 (2001)	ICRU 72 (2004)	ICRU 67 (2002)	ICRU Report 74 ICRU Report 87	ICRU 39,47,51,56, ICRP 74 (1996) ICRU 57 (1998) ICRU 66
Instrument performance	IEC 60731 ed.3.1b :2011-2016	IEC 62467-1 :2009 (DIN)	IEC 61303 :1994/Cor 1 2016 IEC TR 61948-4:2019	IEC 61674:2012 IEC 60580:2000 (DIN) (under review)	IEC 60846-1-2 :2009 IEC 61526: 2010 IEC 62387:2012 (BS) IEC 61017:2016 IEC 62327:2017 (RID) IEC 61005:2014 ISO 21909:2015 IEC 60325:2002
Radiation field	DIN 6809-1:2010	ISO 21439:2009		IEC 61267:2005	**ISO 4037-1 :2019** **ISO 29661:2012** ISO 8529-1/Cor 1:2001 conf 2017 ISO 12789-1 ISO 6980-1:2006 (2015 conf.) ISO 8769:2016
	BIPM Rapport 11/04 PTB X-ray beam qualities , NIST beam qualities, IAEA beam qualities				

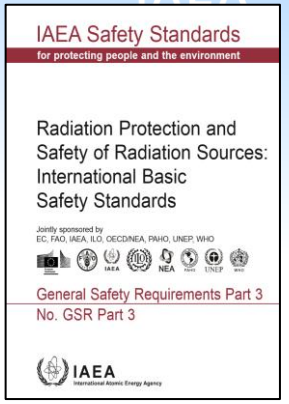
International Standards and recommendations relevant to SSDLs

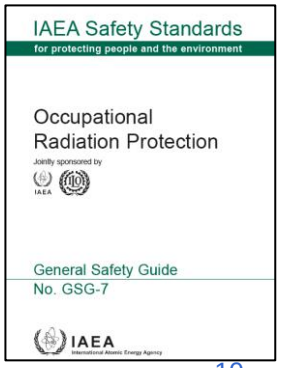
(photon, neutron, beta , activity)

	External beam Radiationtherapy	Brachytherapy	Nuclear Medicine	Diagnostic Radiology	Radiation protection
CALIBRATION METHODS	IAEA TRS 469 IAEA TRS 398 (under review) IAEA-AAPM TRS 483	IAEA TecDoc No.1274	IAEA TRS 454 AAPM TG 181 (2012)	IAEA TRS 457	IAEA SRS 16 (under review)
	AAPM TG 21 (1994). AAPM TG 51(1999) Addendum (2014) AAPM TG 61	ICRU 72 (2004)	NPL Guide No. 93 (2006)		**ISO 4037-2-3-4** ISO 29661:2012 ISO 8529-2-3:2016 conf. ISO 6980-2-3: 2004 (2014 conf.) ISO 7503-1-2-3 2016
Calibration services	CIPM MRA	BIPM International Database of Calibration and Measurement Capabilities of elligible laboratories NAB websites (*if the SSDL is accredited*)			

International Standards and Recommendations relevant to SSDLs

	External beam Radiationtherapy	Brachytherapy	Nuclear Medicine	Diagnostic Radiology	Radiation protection
Safety Radi protrction	**ICRP 103:2007** (free) **IAEA Radiation Protection and Safety of Radiation Sources:** **International Basic Safety Standards GSR Part 3 2014** EU BSS **Euratom 2013/59 Council Diretive** **IAEA General Safety Guide:** **Occupational Radiation Protection GSG-7 2018** (excellent new recource) ISO 2919:2012 Sealed radioactive sources				
Uncertainty	ICRU 24 :1976 u_c (D_w)≤2.5%	ISO 21439:2009	NPL Guide No. 93 (2006)	IAEA TRS 457 u_c (K_{air})≤3.5% ICRU 87 CT	ICRP 60 art. 271 U_c (H_{ref})≤10% U_c (E)≤±.50% IEC TS 62471:2015
	GUM, ILAC Policy for Uncertainty in Calibration:2013 European Co-operation for Accreditation EA 4-02 m:2013, UKAS M3003 :2012 NPL Guide 49, The Assessment of Uncertainty in Radiological Calibration and Testing, 2003 Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results. NIST Technical Note 1297 NIST Uncertainty Machine NUM 2015 NIST Technical Note 1900, Simple Guide for Evaluating and Expressing the Uncertainty of NIST 2015 (advanced level)				
QMS	**ISO/IEC 17025:2017** *Vizsgáló- és kalibrálólaboratóriumok felkészültségének általános követelményei* **IAEA General Safety Guide: Occupational Radiation Protection GSG-7 :2018 (Chapter 8)** **ICRU Report 76**				





Conclusion?

35 international standards and 33 recommendations, some electronic data bases available.

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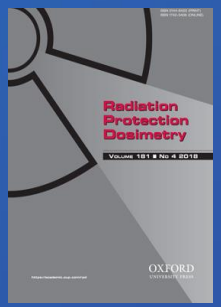
Other scientific publications at the BIPM website and in the Metrologia, Radiation Protection Dosimetry, Physics in Medicine, and Biology, Medical Physics, etc.



EURADOS
European Radiation Dosimetry Group e.V.