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Radioactive sources used in ionizing radiation metrology

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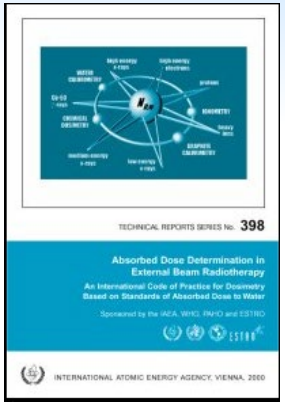
Areas supported by dosimetry labs

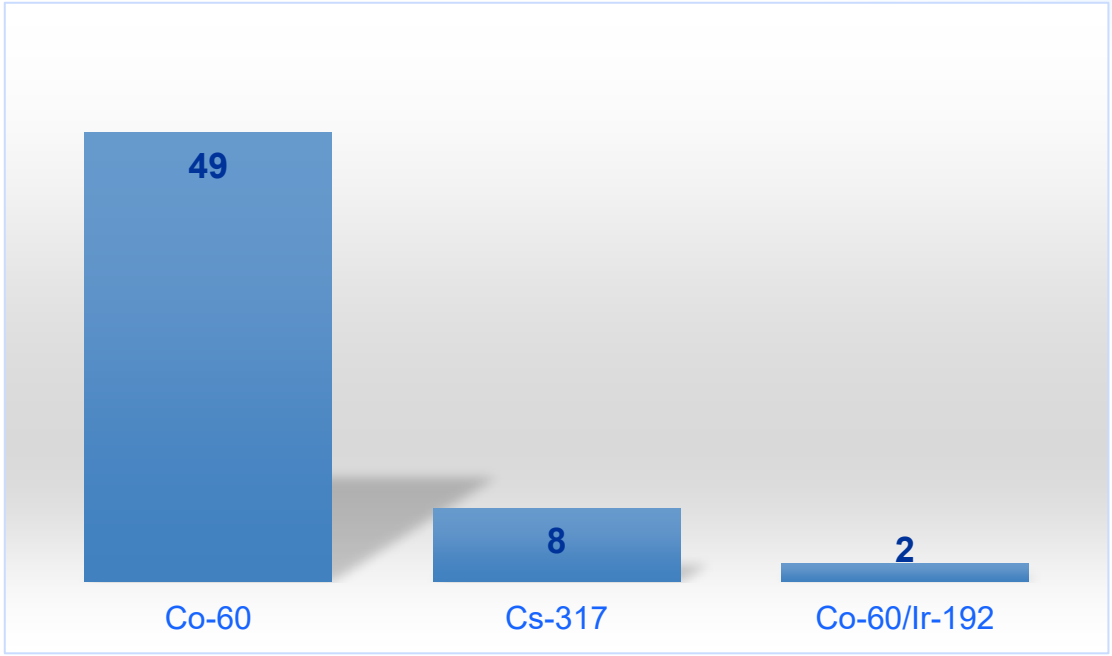
- Radiation therapy
- Diagnostic radiology
- Nuclear medicine
- Radiation processing
- Research
- Radiation protection

Radiation therapy calibration

- Ionisation chambers used to measure absorbed dose to water in clinical beams
- Well type chambers used to measure reference air kerma rate/ air kerma strength in brachytherapy



SSDL Radiation therapy capabilities

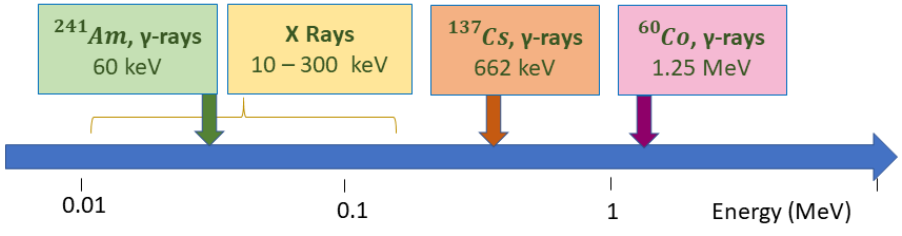


Radiation protection calibration

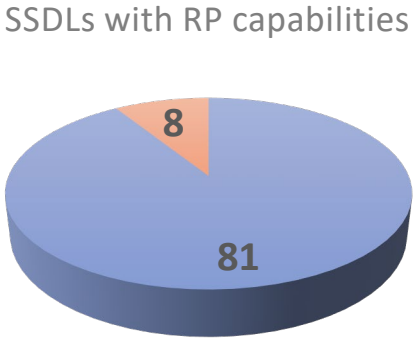
- Ionisation chambers
- Dose rate meters
- Surface contamination monitors
- Continuous air monitoring systems
- Reference irradiations for personnel dosimetry services

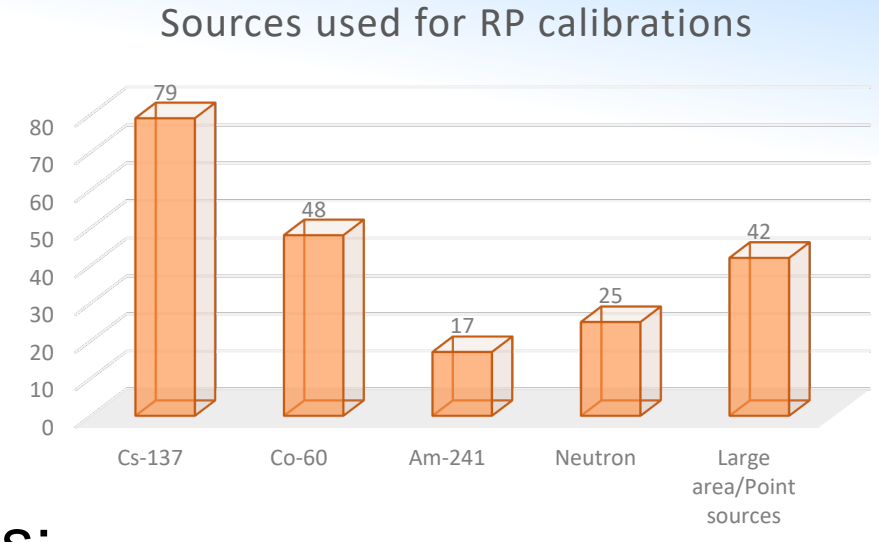
Radiation protection

- Hospitals
- Mining industry and mineral processing
- Scrap metal
- Oil and gas industry
- Non-Destructive Testing
- Nuclear power plants
- Food industry
- Research facilities etc.



Radiation protection capabilities





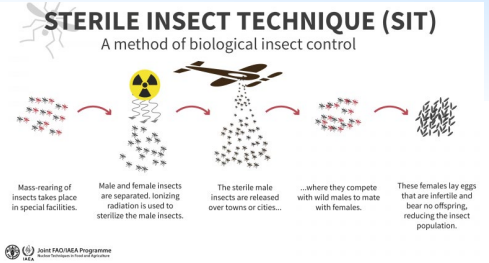
- Large area/Point sources:
  - Am-241, Pu-238, C-14, Tc-99, Cl-36, Co-57, Cs-137, Co-60, Sr-90/Y-90
- Neutron sources
  - Cf-252, Pu239-Be-9, Am/Be(majority)

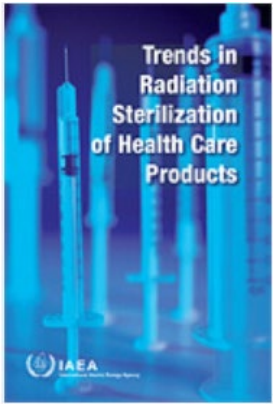
Regulations for radiation protection

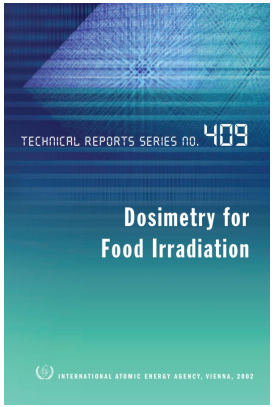
- Laboratories follow various international standards in setting up and performing these calibration services.
- The services provided assist users in ensuring compliance with regulatory requirements.
- The regulations are based on international standards like ISO, IEC, ICRP, ICRU, ANSI, NCRP, etc.
- Most regulations require the radiation protection instruments to be calibrated using a Cs-137 source.

Radiation processing

- Dosimetry for radiation processing is also crucial whether it is for food irradiation, sterilisation of medical supplies, sterile insect technique or other industrial applications
- For food irradiations traceability is provided using Co-60 and Cs-137 sources as well as
low and high energy electrons, in the absorbed dose range 40–105 Gy.







Comparison of standards

Comparison	Quantity	Energy
BIPM.RI(I)-K1	Air kerma	Co-60
BIPM.RI(I)-K2	Air kerma	10-50 keV
BIPM.RI(I)-K3	Air kerma	50-250 keV
BIPM.RI(I)-K4	Absorbed dose to water	Co-60
BIPM.RI(I)-K5	Air kerma	Cs-137
BIPM.RI(I)-K6	Absorbed dose to water	4-25 MV (LINAC)
BIPM.RI(I)-K7	Air kerma	Mammo
BIPM.RI(I)-K8	Air kerma strength	Ir-192
BIPM.RI(I)-K9	Absorbed dose to water	50-250 keV

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Thank you!