

## Core of knowledge for a licence to use radioactive materials for the purpose of installation and servicing (industrial gauges)

This core of knowledge summarises the basic level of radiation safety knowledge an applicant must demonstrate to be granted a licence under the Radiation Protection Act 1965 to use Radioactive Materials for the purpose of Installation and Servicing, restricted to industrial gauges.

Applicants can demonstrate that they have the required knowledge by:

1. completing an NRL-recognised training course (including an end-of-course assessment), or
2. providing documented evidence of other training addressing the core of knowledge.

Please contact the National Radiation Laboratory for further information regarding recognised training courses.

### Required knowledge

Applicants must display knowledge in all of the modules set out below.

The depth of knowledge required for each topic is indicated using the following scale:

- (1) **Introductory.** Overview and familiarity only.
- (2) **Working.** Knowledge gained should be able to be used in problem solving and practical situations.

## Core of knowledge

### Modules

<b>Module</b> Standard 1	<b>Nature and sources of ionising radiation</b> <ul style="list-style-type: none"> <li>• Radiation, radioactivity and half-life (1).</li> <li>• Types and characteristics of radiation (to include alpha, beta and gamma) and its interaction with matter (1).</li> <li>• Quantities and units (activity, absorbed dose and effective dose) (2).</li> <li>• Sources of ionising radiation (natural and artificial) (1).</li> </ul>
<b>Module</b> Standard 2	<b>Biological effects of ionising radiation and radiation risks</b> <ul style="list-style-type: none"> <li>• Damage mechanisms (1).</li> <li>• Whole body and extremity exposures (1).</li> <li>• Deterministic effects; skin erythema, cataracts, LD<sub>50</sub> etc (1).</li> <li>• Stochastic effects; cancer and hereditary effects (1).</li> <li>• International Commission on Radiological Protection's risk factors and radiation risks in perspective (1).</li> <li>• Public perception and communication of radiation risk (2).</li> </ul>
<b>Module</b> Standard 3	<b>International Commission on Radiological Protection's principles of radiation protection</b> <ul style="list-style-type: none"> <li>• Justification (2).</li> <li>• Optimisation ('as low as reasonably achievable') (2).</li> <li>• Individual dose limits (occupational and public dose limits, extremity dose limits and pregnant workers) (2).</li> </ul>

- Module**  
Standard 4      **Legal framework and regulatory authority**
- The *Radiation Protection Act 1965* and amendments and the *Radiation Protection Regulations 1982* (2).  
Particular emphasis should be placed on owner and licensee obligations.
  - Role of the National Radiation Laboratory (NRL) and compliance monitoring (2).
  - The reporting of incidents to NRL (2).
- Module**  
Standard 5      **Transport of radioactive material**
- International Atomic Energy Agency's *Regulations for the safe transport of radioactive material 1996* (2).  
Particular emphasis should be placed on packaging, labelling and documentation requirements for consigning and receiving industrial gauge sources (Type A packages).
- Module**  
Standard 7      **Sealed sources**
- Sealed source manufacture (to include how radionuclides are produced and encapsulated) (1).
  - The meaning and use of Special Form Certificates (1).
- Module**  
Standard 9      **Practical issues associated with the security and disposal of sealed sources**
- Sealed source receipt and storage (2).
  - Options for disposal of sealed sources (2).
- Module**  
Specific 1      **Incidents (focussing on industrial gauges)**
- Review of incidents reported worldwide (1).
  - Discussion of lessons learned (2).
  - Recognition of a radiation incident, immediate actions, and how it should be investigated and reported (2).
- Module**  
Specific 2      **Practical radiation protection**
- *Code of Safe Practice for the Use of Industrial Gauges Containing Sealed Radioactive Sources, NRL C19* and associated *Guidance Notes: Safe Practice for the Use of Industrial Gauges Containing Sealed Radioactive Sources* (2).
  - Model radiation safety plan (2).
  - Critical safety assessment (2).
  - Radiation measurement instrumentation likely to be encountered (2).
  - Performance of radiation measurements (2).
  - Practical application of the 'as low as reasonably achievable' principle with a particular emphasis on minimising personnel doses (time, distance, shielding) (2).
  - The need for and the benefits of personal monitoring. To include: advantages and uses of different types (electronic and passive) of personal monitors and the meaning of doses reported in relation to dose limits and dose action levels (2).
- Module**  
Specific 3      **Industrial gauges**
- Types, principles and known hazards of operation (2).
  - Characteristics and types of radionuclides used (to include Am-241, Cs-137, Pm-147, Tl-204, Kr-85, Cm-244, Co-60, Cf-252, Fe-55 and Sr-90) (2).