



**Queensland  
Government**

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Radiation Safety Act 1999

**RADIATION SAFETY STANDARD**

NM008:2020

***Standard for sealed radioactive substances incorporated in sealed source apparatus  
used to carry out chemical analysis***

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## Preface

Under section 17 of the *Radiation Safety Act 1999*, a possession licensee who, under a licence, possesses a sealed source apparatus to carry out a radiation practice, must ensure that the apparatus is not used for this purpose, unless the sealed source apparatus complies with the relevant standard.

This radiation safety standard NM008:2020 *Standard for sealed radioactive substances incorporated in sealed source apparatus used to carry out chemical analysis* is made under section 16 of the *Radiation Safety Act 1999*.

This standard sets the minimum safety criteria for sealed source apparatus used to carry out chemical analysis. Compliance with this standard will assist in ensuring that public and occupational exposure to radiation is minimised.

Queensland Health has prepared this standard based on information derived from reputable sources such as the National Health and Medical Research Council.

The standard will be reviewed periodically to re-evaluate its currency and its appropriateness as the standard for sealed source apparatus used for chemical analysis.

By ensuring compliance with this radiation safety standard, the standard of sealed source apparatus used for chemical analysis in Queensland will be significantly enhanced.

I, Steven Miles, Deputy Premier and Minister for Health and Minister for Ambulance Services, pursuant to section 16(1) of the *Radiation Safety Act 1999*, make the radiation safety standard NM008:2020 *Standard for sealed radioactive substances incorporated in sealed source apparatus used to carry out chemical analysis*, for the purposes of the Act, and repeal the previous standard NM008:2010 *Standard for sealed radioactive substances incorporated in sealed source apparatus used to carry out chemical analysis*.

**STEVEN MILES MP**  
**Deputy Premier and**  
**Minister for Health and**  
**Minister for Ambulance Services**

25 May 2020

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# Standard for sealed radioactive substances incorporated in sealed source apparatus used to carry out chemical analysis

## Section 1 –General

### 1.1 Scope

This radiation safety standard sets out the minimum requirements for sealed radioactive substances incorporated in sealed source apparatus which are used to carry out chemical analysis.

### 1.2 Expiry

This radiation safety standard expires on 1 September 2021.

### 1.3 Reference documents

Documents which may provide some useful information are listed in Appendix A.

### 1.4 Definitions

In this standard –

“**ISO**” means the International Organization for Standardization.

“**radiation dose rate**” means the amount of energy from radiation absorbed by the person or thing exposed to the radiation during a particular time.

## Section 2 - Standard - Chemical analysers

Test	Compliance Test	Criteria for Passing the Test
<b>Radioactive substance details</b>		
1	Radioactive substance certification	The sealing of the radioactive substance must have a minimum sealed source classification system of ISO/C33222, as specified in ISO2919-1980(E) <i>Sealed Radioactive Sources – Classification</i> <sup>1</sup> , or equivalent.
<b>Radiation dose rate</b>		
2	Radiation dose rate	When the sealed source apparatus is locked in the “beam off” position, the radiation dose rates must not exceed:  (a) 10µSv in one hour at any point 5 centimetres from the external surface of the sealed source apparatus; and  (b) 1µSv in one hour at any point 1 metre from the external surface of the sealed source apparatus.
3	Interception of primary radiation beam	Primary radiation emitted by the radioactive substance must be stopped by an effective shutter assembly (or equivalent) at all times except during a measurement.
<b>Warning signs</b>		
4	Shutter operation indicators	Visible and/or audible indicators must signal the imminent or actual opening of the shutter.
5	Labels relating to the sealed source apparatus	A label must be affixed to an external surface of the sealed source apparatus which contains the type, manufacturer, model number and serial number details of the apparatus.  The label must be durable, clearly visible to the operator and of a size such that the wording is legible. The lettering must be black (or dark).
6	Radiation warning sign	A label must be present for each radioactive substance installed in the apparatus. This label must incorporate the following:  <ul style="list-style-type: none"> <li>• a radiation warning sign (trefoil)</li> <li>• words “caution – radioactive material”</li> </ul> <p>The word “warning” is also acceptable.</p> <p>The symbol and lettering must be black on a yellow background.</p>

<sup>1</sup> The standard is available from Standards Australia, 232 St Pauls Terrace, Fortitude Valley, Brisbane.

Test	Compliance Test	Criteria for Passing the Test
7	Labels relating to the radioactive substance	<p>A label must be present for each radioactive substance installed in the apparatus. This label must incorporate the following:</p> <ul style="list-style-type: none"> <li>• the manufacturer of the radioactive substance</li> <li>• the model and serial number of the radioactive substance</li> <li>• the type of radioactive substance</li> <li>• the date of manufacture of the sealed source apparatus</li> <li>• the activity of the radioactive substance</li> <li>• the date the activity was measured</li> <li>• the maximum activity permitted in the sealed source apparatus for each radioactive substance</li> </ul> <p>Lettering must be black (or dark).</p> <p>The label(s) must be durable, clearly visible to the operator and of a size such that the wording is legible. The label(s) must be affixed to a visible external surface, as close as possible to the source location.</p>
<b>Shutter mechanism</b>		
8	Radiation source holder securely enclosed	The radiation source holder must be securely enclosed within a shielded housing under operational, transport and storage conditions.
9	Radiation source shielding mechanism/shutter assembly	The sealed source apparatus must be provided with a radiation source shielding mechanism and a shutter assembly.
10	Shutter assembly interlock	The shutter assembly must be interlocked such that the aperture will not be in the open position when the sample or sample holder is not placed in the correct or appropriate position.
<b>Additional requirement for sealed source apparatus with external probes</b>		
11	Shutter assembly operation	<p>For sealed source apparatus with external probes containing sealed radioactive substances, and where the sample is external to the device:</p> <p>(a) the shutter assembly actuator must be designed to avoid inadvertent opening of the shutter by accident. In the event of power failure to the device, a fail-safe shutter mechanism must prevent the shutter from remaining open; or</p> <p>(b) a fail-safe, automatically activated shutter mechanism must be installed which opens the shutter only when placed against the sample.</p>

## Appendix A

### Documents

Australian Radiation Protection and Nuclear Safety Agency. *Code of practice for the safe use of elemental analysis and measurement equipment containing sealed radioactive sources* (draft). ARPANSA.