

Radiation Safety Act 1999

RADIATION SAFETY STANDARD

NM005:2010

Standard for radiation apparatus used to carry out chemical analysis

Preface

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

This radiation safety standard NM005:2010 *Standard for radiation 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 radiation apparatus used to carry out diagnostic radiography. 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 radiation apparatus used for chemical analysis.

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

I, Paul Lucas, Deputy Premier and Minister for Health, pursuant to section 16(1) of the *Radiation Safety Act 1999*, make the radiation safety standard NM005:2010 *Standard for radiation apparatus used to carry out chemical analysis*, for the purposes of the Act.

SIGNED

PAUL LUCAS MP
Deputy Premier
Minister for Health

19 / 08 / 2010

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Standard for radiation apparatus used to carry out chemical analysis

Section 1 – General

1.1 Scope

This radiation safety standard sets out the minimum requirements for ionising radiation apparatus which is used to carry out chemical analysis.

1.2 Expiry

This radiation safety standard expires on 1 September 2020.

1.3 Documents

Documents which may provide a useful reference are listed in Appendix A.

1.4 Definitions

In this standard -

“enclosed unit” means a radiation apparatus used for chemical analysis which is wholly enclosed by interlocked barriers and/or shields and so designed that it can only be used in ways which involve no possibility of exposure of any person to the primary X-ray beam.

“partly enclosed unit” means a radiation apparatus used for chemical analysis, which is partly enclosed by interlocked barriers and/or shields or partly or wholly enclosed by fixed barriers and/or shielding which require the use of tools for removal and is so designed that, in its normal use there is no possibility of an inadvertent exposure of any person to the primary X-ray beam.

“radiation level” means the air kerma radiation dose during a specified time.

Section 2 - Standard – Chemical X-ray analysers

Test	Compliance Test	Criteria for Passing the Test
<i>Radiation level</i>		
1	Radiation level around tube housing	The radiation level at any accessible point 5 centimetres from the surface of the tube housing, including the closed shutter or enclosure over each aperture in the housing, must not exceed 25 μ Gy in one hour when the X-ray tube is operated at any of the permissible ratings specified by the manufacturer of the radiation apparatus.
2	Radiation level around tube shutter	The radiation level in one hour at any accessible point 5 centimetres from each tube shutter must not exceed 25 μ Gy in one hour when the X-ray tube is operated at any of the permissible ratings specified by the manufacturer of the radiation apparatus.
3	Radiation level behind beam stop	The radiation level behind the beam stop in the line of the primary beam from the aperture during all normal operations must be less than 25 μ Gy in one hour at any accessible point 5 centimetres from the beam stop when the X-ray tube is operated at any of the permissible ratings specified by the manufacturer of the radiation apparatus.
<i>Warning signs/lights</i>		
4	Indicator lights	The radiation apparatus must be fitted with an illuminated sign or combination of a sign and a light which is activated only if the X-ray tube is energised. This light must be either red or orange. The illuminated sign must be legible and readily discernible for at least 2 metres on all accessible sides of the equipment.
5	Shutter sign or light	Each shutter must be linked with an illuminated sign or light which is activated only when that shutter is open and indicates without ambiguity which shutter is open. This light must be either red or orange.
6	Lights fail safe	All warning lights must be fail safe (ie. to de-energize the X-ray tube if a light fails), or adequate warning that a light has failed must be indicated in a clear and unambiguous manner.
7	Type of unit labelled	Radiation apparatus must be clearly labelled to indicate whether it is an enclosed unit or a partly enclosed unit.
8	Warning if barriers or shields incomplete	Partly enclosed units which incorporate fixed shielding and/or barriers must be designed to give a clear and positive warning if the barriers or shields are incomplete.

Test	Compliance Test	Criteria for Passing the Test
Tube housing		
9	X-ray tube enclosed in a tube housing	Each X-ray tube must be enclosed in a tube housing.
10	Each aperture in tube housing covered	Each aperture in the tube housing must be covered by one of the following: (a) a shutter, or (b) a completely shielded enclosure, with all entrances interlocked to prevent the tube being energised.
11	X-ray tube and tube housing interlocked	The X-ray tube and tube housing must be interlocked so that the removal of one from the other or the removal of protective covers from any port or service opening will immediately switch off the X-ray tube.
12	Detachment of enclosure covering the aperture	Each enclosure covering the aperture in the tube housing must comply with one of the following: (a) be attached to the tube housing so that it can only be detached by using tools; or (b) be interlocked with the tube housing so that detachment of the enclosure from the housing de-energises the X-ray tube; or (c) be attached to the tube housing so that detachment of the enclosure immediately closes the relevant aperture shutters.
Shutter		
13	Shutter fitted with a positive closing device	Each tube shutter must be fitted with a positive closing device which, in the absence of an external applied force, keeps the shutter closed.
14	Removal of shutter and operating mechanism	Each tube shutter must be constructed so that tools are required to remove the shutter and its operating mechanism.
15	Shutter and operating mechanism interlocked	Each tube shutter must be constructed so that the shutter and its operating mechanism are interlocked with the tube housing so that their removal switches off the X-ray tube.
Beam stops		
16	Beam stops located close to apertures	One or more beam stops must be placed as close as practicable to each aperture of the X-ray tube housing.

Test	Compliance Test	Criteria for Passing the Test
<i>Additional requirements for an enclosed radiation apparatus</i>		
17	Beam stop interlocked	<p>For an enclosed unit, each beam stop must form a fixed part of the unit, removable only by the use of tools.</p> <p>Each beam stop must be interlocked so that removal of the beam stop:</p> <ul style="list-style-type: none"> (a) de-energises the X-ray tube; or (b) immediately closes the shutter related to that beam stop.
18	Shutter mechanism overlapping the collimator	<p>At each aperture in the tube housing of an enclosed unit which is fitted with a shutter, the shutter mechanism must incorporate permanent shielding in the form of a sleeve overlapping the collimator.</p>

Appendix A

Documents

National Health and Medical Research Council. *Code of practice for protection against ionizing radiation emitted from X-ray analysis equipment (1984)*. NHMRC Publication No. 9, 1984.