



Queensland
Government

Radiation Safety Act 1999

RADIATION SAFETY STANDARD

NM002:2010

Standard for cabinet radiation apparatus used to carry out fluoroscopic or radiographic imaging of inanimate objects

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 NM002:2010 *Standard for cabinet radiation apparatus used to carry out fluoroscopic or radiographic imaging of inanimate objects* 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 cabinet radiation apparatus. 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 cabinet radiation apparatus.

By ensuring compliance with this radiation safety standard, the standard of cabinet radiation apparatus 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 NM002:2010 *Standard for cabinet radiation apparatus used to carry out fluoroscopic or radiographic imaging of inanimate objects*, for the purposes of the Act.

SIGNED

PAUL LUCAS MP
Deputy Premier
Minister for Health

19 / 08 / 2010

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Standard for cabinet radiation apparatus used to carry out fluoroscopic or radiographic imaging of inanimate objects

Section 1 – General

1.1 Scope

This radiation safety standard sets out the minimum requirements for cabinet radiation apparatus that is used to carry out fluoroscopic or radiographic imaging of objects or goods such as baggage, freight and parcels.

1.2 Expiry

This radiation safety standard expires on 1 September 2020.

1.3 Documents

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

1.4 Definitions

In this standard -

"cabinet radiation apparatus" means a radiation apparatus in a shielded enclosure (cabinet) into which articles may be placed for fluoroscopic or radiographic examination.

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

Section 2 - Standard – Cabinet radiation apparatus

| Test | Compliance Test | Criteria for Passing the Test |
|------------------------|---|--|
| Radiation level | | |
| 1 | Radiation level | <p>The radiation level at any accessible point 5 centimetres from the external surface of the cabinet must not exceed $5\mu\text{Gy}$ in one hour.</p> <p>Compliance with this requirement must be made with an object, typical of those examined, in the beam and any flexible or moveable screen displaced as would reasonably occur during the operation of the equipment.</p> |
| 2 | Radiation level through conveyor system | <p>When a conveyor system is provided, the radiation level received by an object 20 centimetres above the conveyor must not exceed $10\mu\text{Gy}$ in a single pass through the beam when the conveyor is moving at the slowest rate at which it can be operated in normal conditions.</p> |
| Warning signs | | |
| 3 | X-ray indicator lights | <p>An indicator light must:</p> <ul style="list-style-type: none"> (a) be provided which automatically illuminates when the X-ray tube is energised; and (b) be labelled “X-rays on”, or words to that effect. |
| 4 | Radiation warning sign | <p>A clearly visible sign bearing a radiation warning sign (trefoil) and the word “caution”, or “warning”, must be fixed to the radiation apparatus adjacent to the controls.</p> <p>The lettering and symbol must be in black on a yellow background.</p> |
| Interlocks | | |
| 5 | Interlocks | <p>Where a door is provided for insertion of items to be examined or tested it must be interlocked so that the power supply is disconnected when the door is opened.</p> |
| 6 | Maintenance panels secured | <p>Panels provided for maintenance purposes which could permit access to the primary beam must be so secured that tools or keys are required to open them.</p> <p>If a key is required, the panel must be interlocked so that when the panel is opened, the power supply is disconnected.</p> |

| Test | Compliance Test | Criteria for Passing the Test |
|---|--|---|
| 7 | Panel accessing X-ray tube | Any panel which allows access to the X-ray tube and is not protected by an interlock must have an appropriate label warning of the presence of the X-ray tube. |
| Switches | | |
| 8 | Key switch on control panel | A key operated control must be connected so that X-rays are not produced when the key is removed. |
| 9 | X-ray control switch | An X-ray on/off control switch must be physically separate from the key switch. If a manual control, each loading must be initiated and maintained by means of a control requiring continuous actuation by the operator. |
| Visibility | | |
| 10 | Visibility of ports and doors | For radiation apparatus designed primarily for the inspection of carry-on baggage, the operator who initiates the X-ray exposure must be in a position where the operator can readily observe all ports and doors during the generation of X-rays. In the case of radiation apparatus in which the X-ray beam is activated by an automatic device, this requirement will be met by the primary viewing position for the X-ray image permitting all ports and doors to be readily observed during generation of X-rays. |
| <i>Additional requirement for radiation apparatus with entry ports</i> | | |
| 11 | Construction of equipment with entry ports | Where entry ports are provided for insertion of items or materials to be examined or tested the equipment must be so constructed so that insertion of any part of the human body into the primary beam must not be readily achieved. |
| <i>Additional requirements for radiation apparatus that allows the admission of humans</i> | | |
| 12 | X-ray control override switch | For radiation apparatus that allows human beings to be admitted to the interior for purposes associated with the operation of the equipment, there must be a control within the cabinet which may be used to terminate or prevent the production of X-rays. This control must not be able to be overridden from the outside of the cabinet. |

| Test | Compliance Test | Criteria for Passing the Test |
|-------------|---|--|
| 13 | Audible/visible signs prior to the production of X-rays | For radiation apparatus that allows human beings to be admitted to the interior for purposes associated with the operation of the equipment, there must be audible and visible signals within the cabinet which activate for at least 10 seconds prior to the production of X-rays. |
| 14 | Visible signal when X-rays produced | For radiation apparatus that allows human beings to be admitted to the interior for purposes associated with the operation of the equipment, there must be a further visible warning signal within the cabinet which must activate when X-rays are produced. If the period of exposure is intended to be less than one second, this warning signal must activate for at least one second for each exposure. |
| 15 | Signs illuminate when control "ON" | For radiation apparatus that allows human beings to be admitted in the interior for purposes associated with the operation of the equipment, there must be clearly visible, legible signs describing the meaning of the warning signals. These signs must adequately illuminate when the main power control is in the "ON" position. |

Appendix A

Documents

National Health and Medical Research Council. *Statement on cabinet X-ray equipment for examination of letters, packages, baggage, freight and other articles for security, quality control and other purposes* (1987). NHMRC Publication No. 21, 1987.