

Radiation Safety Act 1999

RADIATION SAFETY STANDARD

NM004:2010

Standard for radiation apparatus used to carry out industrial radiography

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 NM004:2010 *Standard for radiation apparatus used to carry out industrial radiography* 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 industrial 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 industrial radiography.

By ensuring compliance with this radiation safety standard, the standard of radiation apparatus used for industrial radiography 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 NM004:2010 *Standard for radiation apparatus used to carry out industrial radiography*, 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 industrial radiography

Section 1 – General

1.1 Scope

This radiation safety standard sets out the minimum requirements for radiation apparatus that is used to carry out industrial radiography.

1.2 Expiry

This radiation safety standard expires on 1 September 2020.

1.3 Documents

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

1.4 Definitions

In this standard -

"industrial radiography" means the use of the penetrating power of X-rays to obtain information non-destructively on the internal state of objects and materials.

"kVp" means the potential difference applied to an X-ray tube between the anode and the cathode which is expressed by its peak value in kilovolts (kVp).

"open site" means a site at which, due to operational requirements, shielding is not provided, a clearly marked boundary is set up and strict control of access and occupancy is observed.

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

"X-ray crawler" means industrial radiography radiation apparatus designed to travel automatically or by remote control through pipes to radiograph pipeline welds through the pipe wall.

Section 2 - Standard – Industrial radiography radiation apparatus

Test	Compliance Test	Criteria for Passing the Test
Radiation dose rate		
1	Radiation dose rate	The radiation dose rate 1 metre from the housing must not exceed 5000 μ Sv in one hour under conditions of continuous operation at maximum energy and output.
2	Radiation dose rate – fluoroscopy	Radiation apparatus that is used for direct-viewing fluoroscopy must be shielded such that at no time during exposure can the radiation dose rate at any accessible position exceed 25 μ Sv in one hour.
3	kVp and mA indication on control panel	The control panel must be equipped with a device or devices indicating the X-ray beam energy and output in terms of the X-ray tube potential difference (kVp) and current (mA) or electron energy and radiation dose rate, as appropriate. For radiation apparatus that is used at an open site, the values indicated must be clearly legible in bright sunlight.
Warning signs		
4	Control panel indicator light	A red or amber indicator light must: (a) be provided on the control panel; and (b) automatically illuminate when the X-ray tube is energised.
5	Lamp on X-ray tube housing	A red or amber indicator lamp must: (a) be provided on the X-ray tube housing; and (b) automatically illuminate when the X-ray tube is energised; and (c) be visible from a distance of at least 10 metres.
6	Indicator lamps fail-safe	If an indicator lamp on the X-ray tube housing or on the control panel fails: (a) the X-ray tube must not be able to be energised; and (b) replacement of the lamp must not automatically re-energise the X-ray tube.

Test	Compliance Test	Criteria for Passing the Test
Switches		
7	Key switch on control panel	A key switch must be fitted to the X-ray control panel. The key must be removable only when the switch is in the "off" position.
8	Function of key switch clearly marked	The function of the key switch and its on/off positions must be clearly marked on the control panel.
9	X-ray control switch	An X-ray on/off control switch must be physically separate from the key switch.
10	Function of X-ray control switch	The function of the X-ray on/off control switch and its on and off positions must be clearly marked on the control panel.
Termination of X-rays		
11	Termination of X-rays	A device must be provided which will terminate the production of X-rays after a preset interval not exceeding 30 minutes or as otherwise approved for the apparatus by the chief executive, in writing.
Additional requirements for radiation apparatus used at an open site		
12	Control panel fitted with remote flashing light	If the radiation apparatus is used at an open site, the control panel must be fitted with a means of connecting a remote flashing light or a series of remote flashing lights which can be used to define a boundary or provide a visible warning when the equipment is energised.
13	Length of cable	<p>If the radiation apparatus is used at an open site, the length of cable connecting the control panel to the X-ray tube must not be less than:</p> <ul style="list-style-type: none"> • 7 metres for equipment rated at less than 100kVp • 10 metres for equipment rated at less than 200kVp • 15 metres for equipment rated at less than 250kVp • 20 metres for equipment rated at 250kVp or greater.

Test	Compliance Test	Criteria for Passing the Test
<i>Additional requirements for X-ray crawler equipment</i>		
14	Accidental exposure	An X-ray crawler, for which exposures are initiated by remote control or by an automatic device such as a trip wheel, must have a safety device fitted to it which prevents the remote control or the automatic device from initiating an unintentional exposure.
15	Power off if malfunction occurs	An X-ray crawler must incorporate a safety device which disconnects power from the propulsion unit to the radiation apparatus in the event of a malfunction during operation.

Appendix A

Documents

National Health and Medical Research Council. *Code of practice for the safe use of industrial radiography equipment 1989*. NHMRC Publication No. 31, 1989.