

Radiation Protection Act 2005 – Section 17

**CERTIFICATE OF COMPLIANCE:
STANDARD FOR RADIATION APPARATUS -
X-RAY INDUSTRY
(BAGGAGE)**

SECTION 1: REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR CLASSES OF RADIATION SOURCES

SECTION 2: PARTS OF STANDARDS AND CODES OF PRACTICE ADOPTED BY THIS STANDARD

This information can also be accessed at
http://www.dhhs.tas.gov.au/peh/radiation_protection

Section 1 – REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR CLASSES OF RADIATION SOURCES

This Standard is to be used when assessing Radiation Apparatus, classified by Radiation Protection Act 2005 licences as “X-ray baggage”, for the purpose of issuing a certificate of compliance.

In order for a certificate of compliance to be issued the Radiation Apparatus must be shown to fully comply with the requirements in Section 2.

The requirements in Section 2 are taken from the following:

NHMRC Statement

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)”

Section 2 – PARTS OF STANDARDS AND CODES OF PRACTICE ADOPTED BY THIS STANDARD.

ITEM	Requirements
Labels and markings:	A clearly visible sign bearing an ionizing radiation warning symbol (trefoil) and the word 'CAUTION' OR 'WARNING' must be fixed to the equipment adjacent to the controls. In addition, the following words should be included on the sign: "X-RAY APPARATUS This unit produces radiation when energised" The lettering and symbol must be in black on a yellow background. NHMRC Statement 9
Indicators:	
Energised X-ray tube	The production of X-rays must be indicated by two independently operated lights that are clearly discernible from each point at which production of X-rays may be initiated. One of these lights must be so connected that it indicates when voltage is applied to the primary windings of the X-ray tube high-tension transformer. Failure of any single component must not result in the failure of both indicator lights to operate. These indicator lights must be labelled "X-RAYS ON". NHMRC Statement 8
Minimum time for exposure indicator	If the period of exposure is intended to be less than one second, all X-ray indicator lights must be activated for at least one second for each exposure. NHMRC Statement 8
Exposure switch:	Controls referred to in this section are those that initiate and terminate the generation of X-rays other than by functioning of a safety interlock or mains power control. NHMRC Statement 6
Keyed exposure switch	There must be a key operated control so connected that X-rays cannot be produced when the key is removed. NHMRC Statement 6
Manual Type - Separate dead man switch	There must be a separate switch for the control of the X-ray beam. This may provide for manual control, in which case the switch must be of the "dead man" type NHMRC Statement 6
Automatic activation	Alternatively, the X-ray beam 'on' and 'off' may be activated by automatic devices (e.g. where the items to be examined may trigger the production of X-rays when the items are transported on a conveyor belt). NHMRC Statement 6
Unintentional exposure	An accidental earthing of an electrical conductor must not result in the production of X-rays. NHMRC Statement 7
Safety interlocks	In this statement a safety interlock means a device intended to prevent exposure of any part of the human body to the primary X-ray beam by preventing production of X-rays while any door or access panel leading to the interior of the cabinet is open. Failure of any component of the equipment must not cause the failure of more than one safety interlock. NHMRC Statement 4
Access via a door	Where a door is provided for insertion of items to be examined or tested it must have a minimum of two safety interlocks, one but not both of which must be arranged to disconnect the supply of the high voltage transformer when the door is opened. NHMRC Statement 5.1

Access via entry port	<p>Where entry ports are provided for insertion of items or materials to be examined or tested the equipment must be so constructed that:</p> <p>(a) insertion of any part of the human body into the primary beam is not possible; or</p> <p>(b) in the case of a conveyor system used to convey the items to be examined into the primary beam, insertion of any part of the human body into the primary beam must not be readily achieved, and the dose rate must be so limited that, 20 centimetres above the conveyor, an object must not receive a dose in excess of 10 micro gray 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. When the conveyor is stationary the equipment must not produce X-rays except by manual control as provided for in section 6.</p> <p>NHMRC Statement 5.2</p>
Access for maintenance	<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. Where access is by means of a key the panel must be provided with at least one safety interlock. Where tools are required for access these must not be common hand tools, and each panel should be provided with at least one interlock. Any panel that allows access to the X-ray tube and is not protected by an interlock must be provided with a label warning of the presence of the X-ray tube within.</p> <p>NHMRC Statement 5.3</p>
Radiation protection:	
Radiation leakage of X-ray tube assemblies	<p>3. External radiation</p> <p>The radiation level at any accessible point 5 centimetres from the external surface** of the cabinet must not exceed 5 micro gray in one hour when averaged over an area of 100 square centimetres.</p> <p>Measurements for compliance with this section must be made with an object in the beam typical of those to be examined and any flexible or moveable screen displaced as would reasonably occur during the operation of the equipment.</p> <p>Where pulsed X-ray systems are used, compliance with the above requirement must be determined with the X-ray tube operated at its maximum rating at the maximum kilovoltage to which it can be set by the control for that tube in the housing in which it is installed.</p> <p>NHMRC Statement 3</p> <p>**The “external surface” means the outside surface of the cabinet X-ray system, including the high voltage generator, doors, access panels, handles, control knobs and other permanently mounted hardware and including the plane across any aperture or port.</p>

Protection by shields

2. Radiation shields

Except within ports* where flexible shields may be used, radiation shields installed to achieve compliance with the external radiation limits in section 3 must be fixed and must be made of lead affixed to material having greater resistance to distortion than lead (e.g. steel or plywood), or of dense materials not readily distorted, such as steel, brass or lead filled rigid plastic or glass.

Reduction of radiation emitted through a port to the level permitted in this statement may be achieved by the use of baffles, multiple curtains of durable flexible shielding material, tunnels providing distance protection or other equivalent methods. Where curtains of flexible shielding material are used the presence of an item to be examined displacing any such curtain must not permit the emission limit to be exceeded.

* A 'port' means any opening in the outside surface of the cabinet that is designed to remain open during generation of X-rays for the purposes of conveying materials to be irradiated into and out of the cabinet.

NHMRC Statement 2