

*Radiation Protection Act 2005 – Section 17*

**CERTIFICATE OF COMPLIANCE:**

**STANDARD FOR RADIATION PLACE**

**FOR RADIOACTIVE MATERIAL – UNSEALED SOURCES**

SECTION 1: REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR PLACES WHERE RADIOACTIVE MATERIALS – UNSEALED SOURCES - ARE TO BE USED AND/OR STORED

SECTION 2: COMPLIANCE REQUIREMENTS: PLACE - RADIOACTIVE MATERIAL (UNSEALED SOURCES)

**This information can also be accessed at**  
[http://www.dhhs.tas.gov.au/peh/radiation\\_protection](http://www.dhhs.tas.gov.au/peh/radiation_protection)

## **Section I – REQUIREMENTS FOR CERTIFICATES OF COMPLIANCE FOR PLACES WHERE RADIOACTIVE MATERIALS – UNSEALED SOURCES - ARE TO BE USED AND/OR STORED.**

**This Standard is to be used when assessing a place where radioactive material, in the form of an unsealed source, is to be used and/or stored.**

**A “place” is defined in the *Radiation Protection Act 2005* as including “vacant land, premises and a vehicle”.**

**“premises” is further defined as including**

- (a) a building or structure; and**
- (b) land on which a building or structure is situated; and**
- (c) a part of any such building, structure or land.**

**“vehicle” is defined as meaning anything used for transporting any thing or person by land, water or air.**

**Additional definition:**

**“laboratory” is taken to include, in this document, any place in which radioactive materials are stored or used, including for administration of radioactive materials to patients. For example, camera rooms in nuclear medicine facilities are taken to be “laboratories”.**

**In order for a certificate of compliance to be issued the Place must be shown to fully comply with the mandatory requirements in Section 2, which include the “shall” clauses in the Australian Standards. “Should” clauses in the Australian Standards are for guidance or best practice and are not mandatory but are included for completeness.**

*Note: There are separate standards for a place used for HDR brachytherapy.*

**Requirements in Section 2 are taken from the following:**

- *Radiation Protection Regulations 2006*
- Classification of Laboratories from Australian/New Zealand Standard AS2243.4:1998 "Safety in Laboratories Part 4: Ionizing radiations".
- AS/NZS 2982.1:1997 “Laboratory design and construction”

## Section 2 – COMPLIANCE REQUIREMENTS: PLACE - RADIOACTIVE MATERIALS (UNSEALED SOURCES)

### 1. Protection of people from radiation exposure when the radioactive material is in storage

A place where any radioactive material is usually or primarily stored must –

1. be firmly constructed of durable materials; and
2. be able to resist fire and unauthorised entry; and
3. not be in an area that allows unrestricted access to the public; and
4. be kept locked, except if the radioactive material is being put into storage or removed from storage; and
5. have a clear sign, in accordance with AS 1319:1994, on the outside of the place incorporating the word “caution” or “warning” and a symbol warning of the radiation hazard contained in the place. The sign must clearly identify the purpose for which the place is used and appropriately advise all persons who may enter it, including firefighting personnel. The sign must also contain contact details for the appropriate Radiation Safety Officer; and
6. be so located and designed with sufficient shielding that no member of the public would receive a radiation dose of more than 20 microsieverts in any four-week period due to the storage of the radioactive material in that place. (Occupancy factors (NCRP report 147<sup>1</sup>) may be taken into account when assessing compliance with this criterion.) This includes areas on the same floor level as the room or area or structure in which the radioactive material is stored and on levels above and below this room or area or structure, if applicable;  
and  
be so located and designed with sufficient shielding that the radiation levels at any accessible place outside the place do not result in an ambient dose equivalent rate or directional dose equivalent rate, as appropriate, exceeding 10 microsieverts per hour;  
and  
be so located and designed with sufficient shielding that no occupationally exposed person will receive a radiation dose in excess of the appropriate limit specified in Regulation 9 “Dose limits for occupational exposure of persons” and that the dose to such persons is as low as reasonably achievable; and
7. not be situated near to explosives, combustible or corrosive materials, photographic or X-ray film, areas that are subject to flooding, or other natural or manmade hazards. However, if the place cannot be guaranteed against accidental flooding from such causes as burst water pipes or leaking roofs, provision shall be made for all materials to be stored above floor level and an automatically operated sump and pump system installed with sufficient output capacity to counteract any conceivable flooding; and
8. if the place is likely to hold any volatile radio nuclides in the unsealed sources, an air extraction system must be installed which can be switched on from outside before a person enters the place; and

*Note: The point of discharge for the extraction system should be well away from any*

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<sup>1</sup> NCRP Report No. 147 “Structural shielding design for medical x-ray imaging facilities” 2004, published by the National Council on Radiation Protection and Measurement, Bethesda, Maryland

occupied area and remote from any air conditioning intake. An extraction system that is automatically switched on by the opening of the door should be considered.

9. the inside of the place must be of such materials and so designed as to allow for easy decontamination; and
10. not be used for any purpose other than the storage of radioactive materials.

## 2. Protection of people from radiation exposure when the radioactive material is in use

A place in which unsealed radioactive materials are used:

- must comply with the following design requirements of AS/NZS 2982.1:1997;

ITEM	REQUIREMENTS
<b>General Requirements</b>	
Separation from other facilities	<b>AS/NZS 2982.1:1997 (9.2.5.1)</b>
Storage space for cleaning equipment	<b>AS/NZS 2982.1:1997 (9.2.5.4)</b>
Marking of sealed systems (e.g. ducts and pipes)	<b>AS/NZS 2982.1:1997 (9.2.5.5)</b>
Laboratory Identification Placards	<b>AS/NZS 2982.1:1997 (9.2.5.8)</b>
<b>Minimum Laboratory Criteria</b>	<b>AS/NZS 2982.1:1997 (9.3.1)</b>
General requirements for facilities opening directly from a radioisotope laboratory	<b>AS/NZS 2982.1:1997 (9.3.2)</b>
Floor penetrations	<b>AS/NZS 2982.1:1997 (9.3.3)</b>
<b>Low Level Laboratories</b>	Fittings and finish shall be chosen so that they may be readily cleaned and shall incorporate features as follows:
Bench and flooring joints	<b>AS/NZS 2982.1:1997 (9.3.4) (a)</b>
Surface of walls	<b>AS/NZS 2982.1:1997 (9.3.4) (b)</b>
Bench top surface materials	<b>AS/NZS 2982.1:1997 (9.3.4) (c)</b>

Arrangement of drainage system	AS/NZS 2982.1:1997 (9.3.4) (d)
Sink - flushing	AS/NZS 2982.1:1997 (9.3.4)
Hand washbasin	AS/NZS 2982.1:1997 (9.3.4)
<b>Medium Level Laboratories</b>	AS/NZS 2982.1:1997(9.3.5)
Floor strength and surface	AS/NZS 2982.1:1997 (9.3.5)
Bench strength and shaping	AS/NZS 2982.1:1997 (9.3.5) (b)
Joints on bench surfaces	AS/NZS 2982.1:1997 (9.3.5) (c)
Hand wash basin	AS/NZS 2982.1:1997 (9.3.5) (d)
Continuity and labelling of drainage systems	AS/NZS 2982.1:1997 (9.3.5) (e)
Requirements for exhaust air from fume cupboard	AS/NZS 2982.1:1997 (9.3.5) (f)
Coving of ceilings to walls	Laboratories in the upper part of the medium level classification or above should have ceilings coved to the walls to aid cleaning
Provision of delay tanks	For medium level laboratories in which higher levels of radioactivity are used, consideration should be given to the provision of delay tanks for collection of the effluent before discharge to the sewer. Several tanks may be necessary for holding during decay and dilution of the aqueous liquid effluent before discharge. These tanks should be surrounded with a bund of sufficient size to retain the tank contents in the event of mishap. Holding tanks should be emptied by pumps rather than by gravity discharge. At least one fume cupboard in accordance with AS 2243.8 should be provided.

- must make the following provisions for disposal of liquids, if relevant:

ITEM	REQUIREMENT
<b>Plumbing</b>	Must guarantee that the plumbing leads to a sewer and not to storm water.
	Must ensure that the plumbing is in good condition.
	Must ensure that low point ponding does not occur.
	Must ensure that the radioactive material is released through a slow drip system and well diluted by running water.
<b>Sink</b>	Must make a reasonable effort to prevent splashing.

- must meet the following dose rate requirements:

1. The dose rate outside the place in which unsealed radioactive materials are used must not exceed 10 microsieverts in an hour in any accessible area; and

2. External to the place, the dose rate to any member of the public must not exceed 20 microsieverts in a 4 week period; and
3. Internal to the place, the dose rate must be less than 0.5 microsieverts per hour in all areas, such as corridors, workstations, that are accessible to or occupied by administration staff.

### **3. Protection of people when unsealed sources are used in industry or research:**

- The location of a place in which any container holding an unsealed source is to be used must be one in which access to radiation beams emerging from the source container can be controlled so as to ensure that no person receives radiation exposure in excess of the relevant limits in Regulations 9 and 10 of the *Radiation Protection Regulations 2006*.
- The place in which any container holding an unsealed source is to be used must be selected so that doses received by members of the public and by occupationally exposed persons are as low as reasonably achievable.
- Permanent physical barriers, locks, safety contacts or a combination of these must control access to the source container, which is housing an unsealed source, in order to ensure that the previous two requirements are met.
- The place must have provision for placing a clear sign, in accordance with AS 1319:1994, incorporating the word “caution” or “warning” and a symbol warning of the radiation hazard contained in the place.

### **4. Vehicles**

- Where a (mobile) radiation source that is unsealed radioactive material is to be primarily stored in a road vehicle that is not a trailer, then the radiation source must be securely located in the vehicle, as far as is practicable from the driver and any passenger, to protect it from damage during transport. A radiation source must not be located in the passenger seat of a road vehicle.
- A road vehicle, in which such a radiation source is to be primarily stored, and which is not a trailer must have an alarm and an engine immobiliser.
- A road vehicle, in which such a radiation source is to be primarily stored, and which is a trailer must have an alarm and the unsealed source, when not in use, must be kept securely locked in its container, which in turn must be securely bolted to the vehicle.
- A road vehicle, in which such a radiation source is to be primarily stored, must carry placards if and as required by the Code of Practice for the Safe Transport of Radioactive Material.