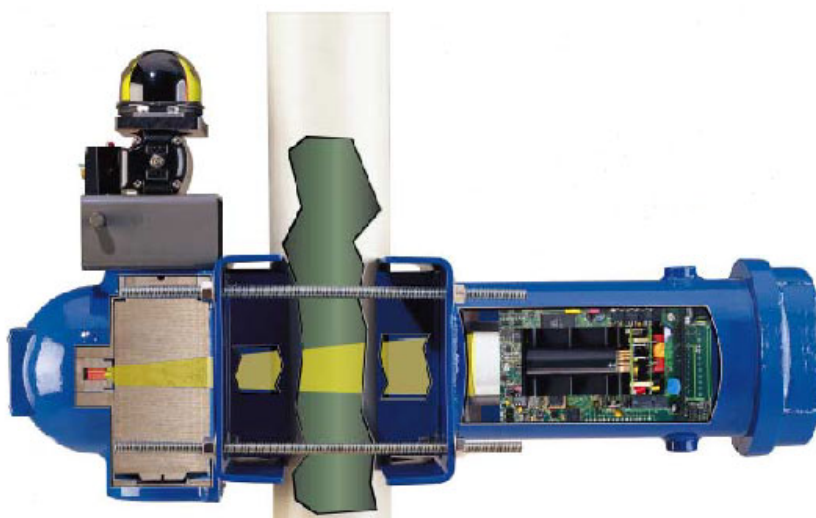




# INDUSTRIAL COMPLIANCE TESTING

## PROGRAM REQUIREMENTS

2023



### Radiological Council

**Mail**

The Secretary  
Radiological Council  
Locked Bag 2006 P O  
NEDLANDS W A 6009

**Phone**

+61 8 9222 0888

**Email**

[radiation.health@health.wa.gov.au](mailto:radiation.health@health.wa.gov.au)

**Web**

[www.radiologicalcouncil.wa.gov.au](http://www.radiologicalcouncil.wa.gov.au)

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# 1. PROGRAM OVERVIEW

## 1.1 INTRODUCTION

Radiation producing equipment used in some industrial applications can be a significant source of unnecessary radiation exposure to workers if the equipment is not operated and maintained to required standards. To address this concern, quality assurance programs for industrial radiation equipment have been in place in Western Australia and elsewhere for a number of years. These programs are now mandatory in a number of jurisdictions.

The Radiological Council, the statutory authority under the Radiation Safety Act of Western Australia, instituted the program for the compulsory compliance testing of industrial fixed radiation gauges on 1 July 2000. The Council is empowered under Regulation 23 of the Radiation Safety (General) Regulations to implement such a program although the specific requirements of the program are imposed under section 36 of the Act as a condition on registrations.

The Council is mindful of the cost-benefit aspects of such a program and will keep its critical parameters under review. The required tests are essentially concerned with the radiation safety of radioactive sources and x-ray equipment, formalising the tests that are already required to be performed under the legislation and relevant Australian Codes of Practice.

## 1.2 EQUIPMENT SUBJECT TO TESTING

The program will, when fully implemented, apply to all ionising radiation producing equipment used in industry – that is, fixed and portable radiation gauges, well logging equipment, industrial radiography equipment, x-ray analysis equipment, portable mineral analysers, special purpose x-ray and cabinet x-ray equipment.

## 1.3 FREQUENCY OF TESTING

The frequencies for testing of fixed radiation gauges will be triennially for gauges that are both in use or in storage.

Compliance testing is also required upon installation of a new gauge or upon reinstallation of a gauge that has been in storage, prior to use or operation.

The Radiological Council will keep this frequency under review and may adjust it as appropriate.

## 1.4 RESPONSIBILITY FOR TESTING

Compliance testing is the responsibility of the registrant.

It is an offence to operate or use a gauge unless a current<sup>1</sup> compliance certificate is held for the gauge.

The Registrant must retain a copy of each signed and dated test report.

The responsibilities of the registrant under the compliance testing program are given in the conditions of registration. See [Appendix 1](#) for an example of the conditions of registration for Gauges – Industrial.

The compliance tester is required to provide a copy of the test report forthwith to the registrant and to the Radiological Council (in accordance with the conditions imposed on the compliance tester's licence under Section 36 of the Radiation Safety Act).

## 1.5 TEST PROTOCOLS

The required tests will assess compliance with the regulations under the Radiation Safety Act and with other requirements approved by the Radiological Council.

A workbook that describes the tests to be undertaken and the approved test methods is available to compliance testing licence holders from the Council. Variations of the recommended test methods may be used provided they are approved by the Council. Documentation on the alternative test method would need to be provided with each test report.

A summary of the tests is provided in Section [5](#) and full details are given in the relevant Workbook.

## 1.6 TESTING PERSONNEL

Compliance testing is only to be undertaken by a person who holds a licence for that purpose, or by a person who is acting under the direction and immediate personal supervision<sup>2</sup> of a licensee.

Requirements for a licence for compliance testing are given in Section [4](#).

Special note should also be taken of Section [2.4](#) concerning compliance tests undertaken by persons during service of radiation equipment.

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<sup>1</sup> "Current" means that the certificate was issued within the previous 36 months following a compliance test by a licensed compliance tester.

<sup>2</sup> "Immediate personal supervision" means maintaining direct visual supervision of the person concerned. It requires the licensee to be present.

## 2. DOCUMENTATION, CERTIFICATION AND AUDITING OF COMPLIANCE TESTS

### 2.1 TEST REPORTS

All compliance tests must be performed by a licensed compliance tester or by persons under the direction and immediate personal supervision of a licensee.

The compliance tester must carry out all the tests and report the additional specified information required by the Council, using the methods described in the relevant workbook or as otherwise approved by the Radiological Council (see Section 1.5).

All test results must be recorded and submitted with the test report. All equipment faults **must** be reported even if such faults are corrected before the completion of testing.

Compliance tests that cannot be completed because of equipment faults must also be reported (see also Section 0).

There is no required format for test reports. However, test sheets that facilitate standardised reporting of the required compliance test data are provided in the workbook. Use of the test sheets is recommended to assist reporting and auditing of the compliance tests.

Copies of the compliance test report must be forwarded to the Radiological Council. Electronic submissions by email are preferred, or the sheets can be mailed:

Email: [radiation.health@health.wa.gov.au](mailto:radiation.health@health.wa.gov.au)

Copies of these documents should be retained by the registrant and the compliance tester.

The compliance tester may submit the reports on the registrant's behalf. However, it is the registrant's responsibility to ensure compliance test reports are submitted to the Radiological Council.

## 2.2 AUDITING AND CERTIFICATION

The compliance test report is used by Council Officers as the basis for issuing, or not issuing, as may be the case, a compliance certificate for the equipment tested.

**Note:** *A compliance test report indicates that the compliance test has been conducted by approved test methods. It does not necessarily indicate that the equipment itself complies with the Radiological Council's requirements. That is, a compliance test report does not cause the automatic issuing of a compliance certificate for the equipment tested.*

Radiological Council officers will also use the data from reporting to monitor the program. These officers may also decide to re-test equipment, either randomly or as indicated by the test data.

## 2.3 COMPLIANCE RECORDS

The registrant must maintain records of gauges that have been tested and certified to comply must be tagged by the registrant using a durable label or tag.

## 2.4 COMPLIANCE TESTING FOR EQUIPMENT REQUIRING MAINTENANCE

For compliance tests performed for equipment which requires service or maintenance, the compliance test sheet must show the performance of the equipment *before and after* any service is undertaken (unless a particular fault renders subsequent tests invalid). That is, compliance testing must also precede normal service and maintenance procedures.

Any faults found during testing must be detailed on the test sheet, even if such faults are corrected before the completion of testing. These faults may be common to the particular type or model of gauge and failure to report them may put other users at risk. An appropriate test must be undertaken and recorded following correction of any fault.



## 2.5 NON-COMPLYING EQUIPMENT

Equipment registered prior to the current version of the relevant Australian Code of Practice may not pass all compliance tests. Should this arise, the results of the tests in question will be reviewed by Council officers and, where practicable, modification of the gauge considered, particularly where the failure may have a significant bearing on radiation dose to operators and workers in the vicinity.

Failure to comply with any particular test will not necessarily prevent continued use of the gauge by the present owner. However, gauges which by virtue of their design and manufacturer's specifications are capable of complying but fail to do so will be required to undergo repair and/or adjustment to rectify the areas of non-compliance. If the gauge in question is a new model and/or cannot be brought into compliance, registration of the gauge for use or operation may be refused.

## 2.6 CALIBRATION OF RADIATION MEASURING INSTRUMENTS

Any component of a compliance test involving the use of a radiation measuring instrument is valid only if that instrument is capable of measuring the relevant radiations and was last calibrated no more than one year before the compliance test.

Where neutron monitoring is required and a neutron survey meter is not available, the neutron levels may be estimated from gamma measurements using a gamma-neutron ratio provided by the supplier of the equipment containing the source.



### 3. REQUIREMENTS FOR NEW EQUIPMENT

#### 3.1 SUPPLY OF NEW EQUIPMENT

Radioactive substances must not be sold or supplied in Western Australia unless the purchaser provides evidence of a licence under the Radiation Safety Act for the use of the substance.

#### 3.2 GAUGE MODEL APPROVALS

Fixed radiation gauges must comply with the requirements of the Radiation Safety Act 1975 and the Radiation Safety (General) Regulations 1983. The Regulations require that gauges and any incorporated sealed sources conform with the requirements set out in the *Australian Code of practice and safety guide for the safe use of fixed gauges (2007)*, published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

The supplier of a gauge must provide evidence to the Radiological Council that demonstrates that the gauge model meets the requirements of the Code of practice. In particular, Schedules C and D of the Code outline the requirements for containers and tests that are to be performed on a prototype container. The supplier must comply with the responsibilities of Section 2.1 of the Code and provide the information outlined in Section 2.1.7 in order for the Council to be able to assess the gauge. Schedule B of the Code also specifies the requirements for the radiation source.

The submission to the Council should include any approvals of other Australian or international radiation jurisdictions, including any conditions that have been placed on the approval.

Where reasoned argument or calculations have been provided in accordance with Clause 2.1.7c of the Code in place of the physical testing of samples or prototypes outlined in Schedule D, the Radiological Council requires that the calculations and reasoned argument be endorsed by a qualified mechanical engineer who is a practising member with the Australian Institute of Engineers. The Radiological Council may also consider any request for an exemption from specific testing criteria if full details, appropriate justification and explanation are provided in the submission.

Additional testing requirements for gauges which are designed to meet requirements as a transport package are stipulated in Sections VI and VII of the International Regulations contained within the *Australian Code of Practice for the Safe Transport of Radioactive Material (2019)*, Radiation Protection Series No. C-2, published by ARPANSA.



## 4. REQUIREMENTS FOR COMPLIANCE TESTERS

### 4.1 FUNCTIONS

Persons carrying out compliance tests required by regulations under the Act or as otherwise required by the Radiological Council must be licensed for this purpose or be acting under the direction and immediate personal supervision<sup>3</sup> of a licensee. All test reports must be submitted to the Radiological Council for assessment.

Persons carrying out compliance testing must –

- have a working knowledge of the gauge to be tested
- conduct the tests according to the workbook or using a method approved by the Radiological Council
- submit the test report to the Radiological Council and a copy to the registrant.

### 4.2 QUALIFICATIONS

Applicants must be able to meet the criteria for gaining approval as a Radiation Safety Officer for the device or category of equipment being assessed and have relevant experience in its use.

### 4.3 LICENSING

Persons who satisfy the qualification criteria are eligible to apply for a compliance testing licence. The conditions attached to this licence are given in [Appendix](#) .

Refer also to Section [2](#) on the requirements for a valid compliance test.

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<sup>3</sup> "Immediate personal supervision" requires the licensee to be present and directly observing the person concerned.



## 5. REQUIRED COMPLIANCE TESTS

All gauges that are in use and capable of producing ionising radiation will be required to undergo compliance testing under the Western Australian Radiation Safety Act. The recommended test methods are provided in the Council's workbook which includes a template test sheet.

A summary of the required information is below. Variations of the recommended test methods may be used provided the Radiological Council gives prior approval. Documentation on any alternative test methods must be provided with the test report.

### 5.1 FIXED GAUGES

Registration Details	<ul style="list-style-type: none"><li>▪ Currency of registration information</li><li>▪ Radiation Safety Officer</li><li>▪ gauge details tally against registration certificate and any subsequent amendment notifications</li></ul>
Record Keeping	<ul style="list-style-type: none"><li>▪ inventory of gauges</li><li>▪ wipe tests</li><li>▪ compliance test results</li><li>▪ annual audit and testing</li></ul>
Storage Area	<ul style="list-style-type: none"><li>▪ warning signs</li><li>▪ dose rates</li><li>▪ gauges locked off</li><li>▪ log book</li><li>▪ security</li><li>▪ Radiation Safety Officer name and phone number</li></ul>
Gauges	<ul style="list-style-type: none"><li>▪ warning signs</li><li>▪ labels</li><li>▪ function</li><li>▪ condition</li><li>▪ signs of corrosion</li><li>▪ mounting points safe</li><li>▪ radiation measurement results</li><li>▪ photographic evidence</li></ul>
Radioactive Sources	<ul style="list-style-type: none"><li>▪ serial numbers</li><li>▪ type, activity and date</li><li>▪ working life</li></ul>
Radiation Management Plan	<ul style="list-style-type: none"><li>▪ incorporate required content from Codes of Practice</li><li>▪ staff training</li><li>▪ plan available to staff</li><li>▪ clear in defining which type of emergency</li></ul>
Radiation Monitoring	<ul style="list-style-type: none"><li>▪ calibrated radiation survey meter available</li></ul>





## RELATED PUBLICATIONS

1. Radiation Safety Act 1975  
Radiation Safety (General) Regulations 1983  
Radiation Safety (Transport of Radioactive Substances) Regulations 2002
2. *Australian Code of Practice and Safety Guide for the Safe Use of Fixed Radiation Gauges (2007)*, Radiation Protection Series No. 13. Australian Radiation Protection and Nuclear Safety Agency.
3. 2007 Recommendations of the International Commission on Radiological Protection, ICRP Publication 103. International Commission on Radiological Protection, 2007.
4. Recommendations for limiting exposure to ionising radiation (1995). National Health and Medical Research Council. Australian Government Printing Service, Canberra.
5. *Australian Code of Practice for the Safe Transport of Radioactive Material (2019)*, Radiation Protection Series No. C-2. Australian Radiation Protection and Nuclear Safety Agency.
6. *Australian Code for Radiation Protection in Planned Exposure Situations (2020)*, Radiation Protection Series C-1. Australian Radiation Protection and Nuclear Safety Agency.



## **APPENDIX 1 REGISTRATION CONDITIONS**



**RADIATION SAFETY ACT****CONDITIONS, RESTRICTIONS AND LIMITATIONS (SECTION 36)****GAUGES – INDUSTRIAL**

1. This registration provides for the possession and use of fixed radiation gauges.
2. The registrant is directed to ensure that –
  - 2.1 radiation gauges are used under the “general supervision”<sup>a</sup> of a person holding a licence for the use of fixed radiation gauges;
  - 2.2 a licence holder, or a person who fulfils the training requirements that are required to obtain a licence, must be readily available to arrive on site within one hour;
  - 2.3 except for Section 2.1, radiation gauges, all of their component parts, and all associated equipment comply with the provisions of the Code of Practice and Safety Guide for the Safe Use of Fixed Radiation Gauges (2007), issued by the Australian Radiation Protection and Nuclear Safety Agency;
  - 2.4 no radiation gauge is installed, operated or used unless it has –
    - (a) a current<sup>b</sup> Certificate of Compliance<sup>c</sup>; or
    - (b) a current Certificate of Conditional Compliance<sup>d</sup>; or
    - (c) an exemption from compliance granted by the Council.

*A radiation gauge that has been tested but which requires service or modification before a Certificate of Compliance can be issued, can continue to be used for a period of 3 months after expiry of the current certificate provided –*

    - *the Council is satisfied that the fault(s) do not pose a significant radiation risk; and*
    - *the Council has issued a written order (Notice of Non-Compliance) to the registrant for correction of the fault(s).*
  - 2.5 any person who will be working with or near the radiation gauges is informed of and directed to comply with Section 2.4 of the Code of Practice;
  - 2.6 no person is permitted in an area where it may be possible to enter the useful (primary) radiation beam emitted from a gauge unless that area has been surveyed with a calibrated radiation survey meter and the radiation exposure rate at that point confirmed as being less than 25  $\mu\text{Sv hr}^{-1}$ ;
  - 2.7 the storage of radiation gauges not permanently fixed to a component at the registered site is in compliance with Regulation 30 of the Radiation Safety (General) Regulations 1983 and Schedule G of the Code of Practice;
  - 2.8 wipe tests of the source assembly are performed at 12 monthly intervals in a manner approved by the Council and analysed by a recognised facility.
  - 2.9 gauges containing sealed solid sources which have reached the source manufacturer's recommended working life are not used, operated or installed unless –
    - 2.9.1 the source capsule has been removed by an appropriately licensed person, examined and its integrity confirmed through the relevant tests specified in ISO 9978 Radiation protection. Sealed radioactive sources – Leakage test methods.
    - 2.9.2 a report has been issued by a recognised<sup>e</sup> person specifying the source meets the relevant test requirements of ISO 9978.

2.9.3 the source container is examined and serviced, if necessary, to confirm it meets the requirements of the Code of Practice.

#### NOTES

- a* “**general supervision**” means the exercise of control over radiation safety without the person exercising such control necessarily being present at the registered premises.
- b* “**current**” means that the certificate was issued within the past 36 months following a compliance test by a licensed compliance tester
- c* “**compliance**” means compliance with the Radiation Safety (General) Regulations 1983, with any subsequent amendments to those regulations, and with any additional requirements of the Council applicable to that class of radioactive gauge
- d* “**conditional compliance**” may be granted to non-complying gauges if it is subject to an existing registration and was manufactured before the particular regulations or standards applying to the non-compliance came into effect, and if the non-compliance, as assessed by Council officers –
- cannot reasonably be rectified; and
  - is unlikely to lead to a situation where any person may receive an unacceptable radiation dose.
- e* “**recognised**” means recognised in writing by the Council to perform the test

*The attention of the registrant is drawn to Section 38 of the Act which requires **prior notice in writing to be given to the Council** if “the information furnished to the Council in relation to any radioactive substance, irradiating apparatus, electronic product, or premises will cease to be correct or will be misleading or incomplete in a material particular”.*

Amendments approved by the Radiological Council at their 196th meeting held on Thursday 23 February 2012.

**CONDITION NO: 9**

**CERTIFICATE NO: RS**

**EXPIRES ON:**

## **APPENDIX 2**

### **COMPLIANCE TESTING LICENCE CONDITIONS**





**RADIATION SAFETY ACT****CONDITIONS, LIMITATIONS AND RESTRICTIONS (SECTION 36)****COMPLIANCE TESTING OF RADIOACTIVE GAUGES**

- 1 This licence permits the holder, and persons acting under the direction and immediate personal supervision<sup>a</sup> of the licensee, to deal with radiation gauges for the purpose of compliance testing<sup>b</sup>.
- 2 The licensee is directed to –
  - 2.1 ensure that no person is exposed to the useful radiation beam for any purpose during test procedures;
  - 2.2 take appropriate precautions to minimise the potential for their exposure to radiation and shall at all times during testing have at hand a functional and calibrated survey meter;

***Note:** Personal monitoring by film badge, TLD or related device should not be necessary as, with appropriate work practices, no significant exposure is likely to be received during these routine test procedures. However, licensees should consider the use of an electronic integrating dosimeter to check their radiation exposure at any given time.*
- 3 Where compliance testing has been imposed as a statutory requirement by the Radiological Council, the licensee is directed to –
  - 3.1 test the equipment according to the protocols in the workbook approved by the Council using appropriately calibrated instruments;
  - 3.2 ensure that any faults found, or found and corrected, during testing are detailed in the test report;
  - 3.3 forthwith provide a copy of the test report to the registrant and to the Radiological Council.

**NOTES:**

- a **'Immediate personal supervision'** means maintaining direct visual supervision of the person concerned.
- b **'Compliance testing'** means testing radioactive gauges for compliance with the regulations under the Act and with other standards that may have been adopted by the Radiological Council for that class of equipment.

**CONDITION NO: 139****CERTIFICATE NO: LS****EXPIRES ON:**