

Safety Note 81

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LEAK TESTING OF SEALED OR ELECTRODEPOSITED SOURCES OF IONISING RADIATION

Summary			
This Safety Note supplements Safety Code of Practice 18, Section 5.6 by describing in more detail the University of Reading's arrangements for radioactive source leak testing.			
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Summary

This Safety Note supplements Safety Code of Practice 18 Section 5.6 by describing in more detail the University of Reading's arrangements for radioactive source leak testing.

Requirements

The Ionising Radiation Regulations 2017 require that employers ensure tests are carried out at suitable intervals to detect leakage from articles containing or embodying radioactive substances. The purpose of the leak test is to demonstrate the continued integrity of the primary source containment and prevent the possibility of uncontrolled spread of contamination due to loss of containment.

The leak test itself is a fairly straightforward procedure and can be carried out by an HSS-appointed external contractor or by the School Radiation Protection Supervisor (RPS). In the latter case, the RPS must be trained to carry out leak testing by a trainer deemed suitably qualified by the University's Radiation Protection Officer (the RPO is typically the Scientific Safety Advisor in HSS).

The UoR expects Schools to ensure their sealed sources are tested for leakage at least every 2 years and retain a record of the test result until the next test, and for at least 2 years after the article is disposed of.

However, if the source is used in equipment which is located in a hostile environment (eg at risk from chemical attack, heat or physical damage) the frequency of testing should be increased to detect any breakdown in the source containment. These details, and any other local requirements or arrangements for leak testing, should be documented in the source risk assessment and Local Rules for the School.

The leak test typically involves a clean swab being wiped around the source capsule or container, packaged up and sent to an external contractor for analysis.

Where the source capsule is not accessible, an indirect wipe test will be regarded as sufficient, provided the area wiped can reasonably be expected to reveal leakage.

If an RPS has any reason to believe a source has been damaged or subjected to a blow or an unexpected harsh environment they may seek an additional leak test in advance of the next test due date. The RPS should also submit an incident on the H&S incident notification system whenever any significant incident or issue occurs relating to a radioactive source

Leak testing

Leak testing will normally be coordinated by HSS.

RPSs should alert the RPO, by email, that leak testing is due and on which date the 2 years period since the previous test will expire, for their sources. Please provide at least three months' notice.

The RPO will agree with the RPS whether the RPS will carry out the physical swabbing or whether the external contractor will be engaged to undertake this task.

The RPO will make necessary arrangements with the external contractor engaged to carry out the analysis of the swab and ensure swabs are supplied in good time.

Where agreed that the RPS will swab, the RPO will provide clean swabs and appropriate packaging to the RPS at least six weeks before the previous test results lapse. The RPS should ensure the leak test is carried out within four weeks from the RPS's receipt of the swabs.

The RPS should carry out the wiping of the swab according to the Radman Associates' Safe Operating Procedure 'Sealed Source Leak Testing'¹ and return bagged and labelled swabs to the RPO.

The RPO will arrange transfer of the packaged swabs to the external contractor responsible for carrying out the analysis. The cost of leak test analysis will be recharged to the School.

Test results

The RPO will take receipt of the leak test results and pass them to the RPSs in the form of leak test certificates, one for each source tested.

Copies of leak test certificates should be held by the School responsible for the source. The School's RPS should ensure a copy of each leak test certificate is retained within the School's radiation records. HSS will also retain a copy of leak test certificates.

Action in event of results indicating a leak

If a leak test result indicates a leaking source (>200 Bq detected ²on the swab) the RPS must initially take action to prevent persons obtaining access to the locality of the source, to prevent potential further spread of contamination. The RPS should take prompt action to halt School or other activities if they judge this necessary to ensure control of the source and the locality. If the RPS needs assistance from senior academics, the Head of School or HSS to establish control and/or lock-out persons who may otherwise access the area they should seek this assistance without delay.

After the RPS has completed initial "make safe" action they should submit an incident on the H&S incident notification system – with the incident being the elevated leak test result.

The RPS should promptly undertake contamination monitoring around the source, equipment and laboratory, but may seek advice from the RPO before commencing this. The RPO may seek advice from the Radiation Protection Advisor (RPA) at this stage.

The RPO will typically seek RPA advice on remediation to avoid further contamination spread and on how to manage the source or equipment.

Leak test training for RPS

RPSs should inform the RPO if they require initial or refresher training on how to undertake leak test swabbing. Please give the RPO plenty of time – ideally 6 months before the next leak test is due for their area.

¹ Available from HSS's radiation webpages or by request.

² Based on advice from the University of Reading's Radiation Protection Advisor, received 7/12/21: The International Standard on Leak Test Methods (ISO 9978 : 2020-07) states If the activity detected on the swab is less than 200 Bq (≈5 nCi), the sealed source is considered to be leak-tight.