

HSE information sheet

Control of radioactive substances

Ionising Radiation Protection Series No 8 (rev1 2026)

Introduction

This information sheet is aimed at users of radioactive substances who:

- are subject to the Ionising Radiations Regulations 2017 (IRR17),¹ and/or the Ionising Radiations Regulations (Northern Ireland) 2017²
- also hold a permit, authorisation or registration under the Environmental Permitting Regulations 2016 (EPR16),³ Environmental Authorisation (Scotland) Regulations 2018 (EASR18)⁴ or Radioactive Substances Act 1993 (Amendment) Regulations (Northern Ireland) 2011 (RSA93)⁵

Any reference to IRR17 can also be taken to include the Ionising Radiations Regulations (Northern Ireland).

The information sheet outlines areas of similarity between IRR17, EPR16, EASR18 and RSA93 and details the standards which will satisfy the relevant set of regulations for your geographic location.

It does not aim to give the full requirements of IRR17 or the relevant environmental regulations, as these can be obtained in the Approved Code of Practice and associated guidance supporting the Regulations.⁶ It is also not intended to give advice to those holding a licence under the Nuclear Installations Act 1965. It is, however, relevant to employers (other than the licensee) working on a site run by an organisation holding a licence under the Nuclear Installations Act 1965.

Legislation

IRR17 is enforced by the Health and Safety Executive (HSE), Health and Safety Executive Northern Ireland, the Office for Nuclear Regulation (civil transport only) or in some cases by local authorities.

The Regulations aim to protect workers and others from the effects of exposure to ionising radiation in the workplace and set out the minimum requirements that employers working with ionising radiation must meet. In most cases, before you

start work with radioactive substances for the first time, you will need to apply for and obtain either a registration or consent from HSE.

The Environmental Permitting (England and Wales) Regulations 2016 (EPR16) are enforced by the Environment Agency (EA) in England and Natural Resources Wales (NRW) in Wales.

The Environmental Authorisations (Scotland) Regulations 2018 (EASR18) are enforced by the Scottish Environment Protection Agency (SEPA).

The Radioactive Substances Act 1993 (Amendment) Regulations (Northern Ireland 2011(RSA93) are enforced by the Northern Ireland Environment Agency (NIEA).

The environmental regulations aim to control radioactive substances, particularly radioactive waste. Before obtaining the radioactive substances, you must have applied for and been granted a permit, certificates of registration and/or authorisation from the relevant enforcing agency. Please note that anyone using radioactive substances in more than one of England and Wales, Scotland or Northern Ireland will need to apply to each agency, though a permit is not required if the radioactive material is only 'in-transit' through a particular country.

Some radioactive sources can be kept, used and disposed of without requiring a permit, registration or authorisation, providing you can prove that they are being held in accordance with the conditions laid out in the relevant exemption.^{7,8,9} For more information, please contact the appropriate environmental regulator.

Management responsibilities

Both IRR17 and the environmental regulations place management responsibilities on employers to ensure compliance and minimise the impact from sources of ionising radiation. Arrangements made under the Management of Health and Safety at Work Regulations 1999 (and the Management of Health and Safety at Work Regulations (Northern Ireland) 2000) will assist employers in the planning, organisation, control, monitoring and review of control measures.

Under IRR17, those working with ionising radiation will need to consult and appoint a suitable radiation protection adviser (RPA). Their advice will help you decide what must be done to meet the requirements of the regulations. This will likely include:

- drafting a suitable and sufficient radiation risk assessment
- preparing local rules for any controlled (and possibly supervised) areas
- summarising the arrangements for controlling the work

The advice will also cover the need for contingency plans, dose assessment and, where appropriate, medical surveillance.

Where local rules apply, a radiation protection supervisor (RPS) who is trained in the use of ionising radiation must be trained and appointed to ensure the arrangements set out in the local rules are followed. It is also a requirement of your environmental

permit/authorisation to ensure there is adequate supervision by a suitably qualified and experienced person(s) to make sure the conditions of your permit/authorisation are being fulfilled. The same person(s) could act as RPS and provide the adequate supervision required. However, the overall responsibility for regulatory compliance rests with you as the employer.

Organisations that have a permit or authorisation to manage radioactive waste under the relevant legislation must appoint a radioactive waste adviser (RWA). This can sometimes be the same person as your RPA but you need to make sure they hold a certificate of competence from a recognised body and are suitable for your specific needs. As with RPAs, the RWA must also be appointed in writing.

Keeping and accounting for radioactive substances

You must have appropriate accounting procedures to ensure the quantity and location of each radioactive substance are always known. This will enable the employer to quickly identify the loss or theft of significant quantities of radioactive substances. In order to satisfy both IRR17 and the conditions of your environmental permit/registration/authorisation, the following information should be recorded:

- a means of identification, which for sealed sources must be unique
- the date of receipt
- the activity at a specified date
- the whereabouts of the substance, updated at appropriate intervals
- the date and manner of proper disposal or to whom it was sent

There may also be additional requirements specified in your environmental permit/registration/authorisation if a source is mobile or a high activity sealed source (HASS).

It is advisable to carry out an annual audit of the arrangements to ensure the accounting record is a true one, supported by records of ordering, receipt, stock and disposal of radioactive material.

Routine checks on source location

The frequency of checking the location of the source should be determined, taking into account the likely movement of the source, the potential for displacement and its susceptibility to damage. For sources securely attached to machines or other fixed equipment, checks may be carried out once a month, providing additional checks are carried out following any maintenance or repair which could affect the source.

If the source is portable, for example industrial radiography containers or well logging equipment, daily checks and records (on each working day) are recommended. In small-scale laboratories using open sources, it will be sufficient to know the radioactivity present and the radionuclides involved in each room, supported by records of ordering, receipt, stock and disposal of radioactive material.

The term ‘cradle to grave’ is commonly referred to regarding the management of all radioactive materials.

Leak tests

Unless it is inappropriate to do so (the RPA will be able to advise you on this), you will need to ensure any sealed radioactive source, or article containing or embodying a radioactive substance, is tested for leakage. The interval between leak tests should not normally exceed 2 years. However, it is advisable to increase the frequency if a sealed source is used beyond the recommended working life given to the source capsule by the supplier or manufacturer. The supplier or manufacturer will normally advise about periodic leak testing and the methods to adopt to give the required level of assurance that radioactive material will not be allowed to disperse. In the absence of such advice, test methods set out in British Standard BS EN ISO 9978:2022 may be appropriate.

Keeping, moving and transporting radioactive substances

Radioactive sources, including any radioactive waste which is in storage, must be kept in a suitable container inside a suitable store to protect against accidental damage, loss or theft and to protect employees and the general public.

The container for the radioactive source(s) is likely to be suitable if it provides:

- radiation shielding – it is advisable that the surface dose rate never exceeds 2 mSv per hour and usually it should be much less
- the ability to withstand damage from normal use and foreseeable misuse or accident
- fire resistance
- prevention of unauthorised access, exposure or dispersal

This value is consistent with the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009¹⁰ and Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland) 2010¹¹ for the maximum surface dose rate at any external surface of a package under routine carriage. Package dose rates up to 10 mSv/h may be permitted when carried under exclusive use conditions.

The store is likely to be suitable if it:

- offers protection from the weather
- has sufficient resistance to fire
- provides shielding to achieve the lowest dose rate that is reasonably practicable outside the store. Where non-classified people may approach the outside of the store, it is advisable that the dose rate does not normally exceed 2.5 micro-sieverts an hour. It may need to be lower in special cases if the employer wishes to avoid designating the area as a supervised one

- provides adequate ventilation to prevent the build-up of gases, vapours (whether radioactive or not) or any accidentally dispersed radioactive substance
- offers proper physical security
- has a prominently displayed radiation warning sign which complies with the Health and Safety (Safety Signs and Signals) Regulations 1996¹²

Any store allocated to radioactive materials must be reserved solely for the radioactive substances, their containers and ancillary items such as handling tools and shielding material and must never contain explosive, corrosive or highly flammable substances in the same store. A radioactive store should not be built in close proximity to a flammable substances one. The RPA should be consulted on storage of radioactive substances.

If radioactive substances are to be moved on site, you should ensure the substance is kept in a suitable receptacle and suitably labelled. The labelling must provide sufficient information to ensure the person moving the receptacle is aware of the hazards. This information should include the nature and activity of the substances being moved. The extent of the information will depend on circumstances, but should include information on appropriate action to take in the event of accidental spillage or dispersal.

You need to consider the following factors when judging the suitability of a receptacle for site movement:

- the adequacy of the shielding to protect the person moving the substances
- the distance to be moved
- the likely hazards and the consequences of an incident, for example from spillage or dispersal
- the physical and chemical form of the substances being moved

Before transporting radioactive substances through public places, you need to appoint an appropriately qualified dangerous goods safety adviser (DGSA) who:

- holds the road/rail all classes DGSA qualification from the Department of Transport, Scottish Qualifications Authority or Health and Safety Executive Northern Ireland (HSENI), and
- is suitably qualified and experienced to advise on the transport of UN Class 7 dangerous goods (radioactive material)

Further information on the requirements for DGSA training can be found in guidance provided by the Office for Nuclear Regulation (ONR).¹³

If you intend to transport radioactive material by common carrier, you must follow the standards for packaging and labelling during transport and ensure the correct documentation is in place as required by the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009, or Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland) 2010, as appropriate to the mode of transport.

These are regulated by ONR in England, Wales and Scotland or Northern Ireland Environment Agency (NIEA) in Northern Ireland.

In some cases, there may also be a requirement to notify ONR of a shipment containing certain amounts of material contained in certain packages but your DGSA can advise you on this before making the shipment.

Where possible, radioactive substances should be stored in a proper store. If it is necessary for sources to be kept in a vehicle overnight, the vehicle must be locked and kept in a secure place, such as a locked compound, that is well-lit and away from the general public. The ONR website has guidance on security of sources during transport (www.onr.org.uk).

Shipment of radioactive substances to/from countries in the European Union

Shipments of radioactive material between the UK and Europe must comply with the Shipment of Radioactive Substances (EU Exit) Regulations 2019.¹⁴ For imports of radioactive substances from Europe, a prior written declaration must be submitted to the relevant environmental agency. This form for 'shipping radioactive sources between the UK and EU' can be found on the GOV.UK website.¹⁵

The purpose of this declaration is to confirm that the consignee has complied with the UK requirements for safe storage, use and disposal of radioactive substances. For those wishing to export sealed sources, you are no longer required to submit a written declaration. However, if you wish to export unsealed radioactive waste, you must apply for an authorisation from the appropriate environmental regulator, and the destination country must consent to the shipment.

All shipments must comply with international standards for packaging, labelling, and vehicle placarding, and staff involved need appropriate training. You are advised to consult a DGSA to ensure you are fully compliant with all regulations.

Incidents

Permit, authorisation or registration holders will need to inform the relevant environmental regulator, and the police, immediately if a radioactive source is lost or stolen. HSE or HSENI must also be informed if the quantity of radioactive substance concerned exceeds the levels given in column 6 of Part 1 of Schedule 7 to IRR17. If the incident or theft occurred during transport (including loading, in-transit storage or unloading) you will also need to notify ONR.

Any damage, accidental spillage or release of radioactive material will also require notification to the relevant environmental regulator and additionally to HSE or HSENI if levels exceed those in column 5 of Part 1 of Schedule 7 to IRR17.

Those operating under an exemption order may only need to inform the relevant environmental regulator if the quantity lost, stolen, damaged or released exceed the values stated in that order.

Incidents where equipment malfunction causes a radioactive source to fail to return to a safe (shielded) position at the end of the intended exposure period may also need to be notified to HSE under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR).

One outcome of the radiation risk assessment is to identify what contingency plans may be necessary to address reasonably foreseeable accidents. If a circumstance arises where it is necessary for you to implement your contingency plan, you will be expected to carry out your own investigation into the cause of the incident.

This is to identify what measures need to be taken to prevent reoccurrence. You will be expected to produce a report which must be kept on file for a minimum of 2 years from the date on which it was made. Any exposure which is received as a result of such an occurrence must be recorded on any relevant dose record.

To ensure the contingency plans are appropriate and employees have received suitable and sufficient instruction in implementing such procedures, the plans must be rehearsed at suitable intervals.

References

- 1 Ionising Radiations Regulations 2017 (IRR17):
www.legislation.gov.uk/ukxi/2017/1075/contents
- 2 Ionising Radiations Regulations (Northern Ireland) 2017:
www.legislation.gov.uk/nisr/2017/229/made
- 3 Environmental Permitting (England and Wales) Regulations 2016 (EPR16):
www.legislation.gov.uk/ukxi/2016/1154/contents
- 4 Environmental Authorisations (Scotland) Regulations 2018 (EASR18):
www.legislation.gov.uk/sdsi/2018/9780111039014/contents
- 5 Radioactive Substances Act 1993 (Amendment) Regulations (Northern Ireland) 2011: www.legislation.gov.uk/nisr/2011/290/made
- 6 Ionising Radiations Regulations 2017. Approved Code of Practice and guidance: www.hse.gov.uk/pubns/books/l121.htm
- 7 Scope and Exemption from the Radioactive Substances Legislation in England, Wales and Northern Ireland:
www.gov.uk/government/publications/guidance-on-the-scope-of-and-exemptions-from-the-radioactive-substances-legislation-in-the-uk/scope-of-and-exemptions-from-the-radioactive-substances-legislation-in-england-wales-and-northern-ireland
- 8 Radioactive Material and Radioactive Waste which is 'Out of Scope' of the Environmental Authorisations (Scotland) Regulations 2018:
www.gov.scot/publications/scope-radioactive-substances-legislation-scotland-guidance-document/pages/2/
- 9 The Radioactive Substances Exemption (Northern Ireland) Order 2011:
www.legislation.gov.uk/nisr/2011/289/pdfs/nisr_20110289_en.pdf
- 10 The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG09):
www.legislation.gov.uk/ukxi/2009/1348/contents
- 11 The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland) 2010:
www.legislation.gov.uk/nisr/2010/160/contents/made
- 12 The Health and Safety (Safety Signs and Signals) Regulations 1996:
www.hse.gov.uk/pubns/books/l64.htm
- 13 Dangerous Goods Safety Advisers Annual Report. Available from the Office for Nuclear Regulation: www.onr.org.uk
- 14 The Shipments of Radioactive Substances (EU Exit) Regulations 2019:
www.legislation.gov.uk/ukxi/2019/571/contents/made

- 15 Shipping radioactive sources between the UK and EU (on GOV.UK):
www.gov.uk/guidance/shipping-radioactive-sources-between-the-uk-and-eu#importing-to-the-uk-from-the-eu

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

This information sheet is available at www.hse.gov.uk/radiation/links.htm.

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First published 05/26.