# Declaration of waste and classification for transport

Radioactive waste and scintillation counting fluid must be declared through <https://www.avfallsdeklarering.no/>.

There may be one declaration for several packages if these have the same waste product number and they will be sent to the same recipient.

The waste declarations must be labelled with the number/code on the corresponding package

All waste that has specific activity above the limit values in the Regulations on radioactive pollution and waste must be declared in one of the following three groups. If waste contains more than one radionuclide, the summation rule specified in Annex I (a) of the Regulations must be used.

## Scintillation counting fluid

When disposing of scintillation counting fluid, fill in the following:

* **Description of the waste**
	+ Waste product number 7152
	+ EAL code (European List of Waste, LoW code) 180106
	+ Under "further description", write: Scintillation counting fluid, number of Bq, number of Bq/g, type of radionuclide and quantity.
* **Transport classification**
	+ Choose “Not subject to classification”.

Print the declaration and attach it to the container. If there is more than one container, one declaration form is enough (volume in litres, activity in Bq, Bq/g, and the number of containers must be added up before they are written into the declaration).

All packages must be labelled with the declaration number, waste product number and EAL code (European List of Waste, LoW).

NB! If the level of activity is 10^6 Bq/g or more for H-3 and 10^4 Bq/g or more for C-14, the waste must be sent to a disposal facility. See [waste that must be sent to a disposal facility](https://innsida.ntnu.no/wiki/-/wiki/Norsk/Str%C3%A5levern%2B-%2Bradioaktivt%2Bavfall#section-Str%C3%A5levern+-+radioaktivt+avfall-Deponeringspliktig+radioaktivt+avfall). If the waste contains more than one radionuclide they must be assessed together using the summation rule in the Regulations on radioactive pollution and waste, [Annex I (b)](http://www.lovdata.no/for/sf/md/td-20101101-1394-001.html).

## Radioactive waste

Radioactive waste that does not need to be sent to a disposal facility must be categorized as:

* Waste product number: **3831-2**
* EAL (European List of Waste, LoW) code: Must not be filled in

If radioactive waste that does not need to be sent to a disposal facility contains **scintillation fluid**, it must be categorized as:

* Waste product number: **7152**
* EAL (European List of Waste, LoW) code:
	+ Medical research: **180106**
	+ Veterinary research: **180206**
	+ Other research: see the list of waste materials
* Under “Nærmere beskrivelse” (“Detailed description”), write:
	+ “Scintillation fluid”
	+ Radionuclide and activity (Bq)

Radioactive waste that does not need to be sent to a disposal facility must not be transported as dangerous goods.

Table 1. Limit values for waste and transport

|  |  |  |
| --- | --- | --- |
| **Radionuclide**  | **Waste** | **Transportation**  |
| **Radioactive waste** | **Radioactive waste that must be sent to a disposal facility** | **Excepted Package 1)**  |
| **Open sources** | **Sealed sources** |
| **H-3** | 100 Bq/g | 1,000,000 Bq/g  | 40 GBq | 40 GBq |
| **C-11 2)** | - | - | 0.6 GBq | 1 GBq |
| **C-14** | 10 Bq/g  | 10,000 Bq/g |  3 GBq | 40 GBq |
| **F-18** | 10 Bq/g | 10 Bq/g | 0.6 GBq | 1 GBq |
| **P-32** | 1,000 Bq/g | 1,000 Bq/g | 0.5 GBq | 0.5 GBq |
| **P-33** | 1,000 Bq/g | 100,000 Bq/g | 1 GBq | 40 GBq |
| **S-35** | 100 Bq/g | 100,000 Bq/g | 3 GBq | 40 GBq |
| **Cr-51** | 100 Bq/g | 1,000 Bq/g | 3 GBq | 3 GBq |
| **Cu-64** | 100 Bq/g | 100 Bq/g | 1 GBq | 6 GBq |
| **Cd-109** | 10 Bq/g | 10,000 Bq/g | 2 GBq | 30 GBq |
| **I-125** | 100 Bq/g | 1,000 Bq/g | 3 GBq | 20 GBq |
| **I-129** | 0.1 Bq/g | 100 Bq/g | Unlimited |
| **Cs-137** | 1 Bq/g | 10 Bq/g | 0.6 GBq | 2 GBq |
| **U-238** | 1 Bq/g | 10 Bq/g | Unlimited |
| **U-nat**  | 1 Bq/g | 1 Bq/g  | Unlimited |

* The limit value for sources in instruments and objects is 10 times higher per instrument/object than in the table
* Limit values for waste are not specified in the Regulations, but the same limit value as for F-18 can be used

## Radioactive waste that must be sent to a disposal facility

Radioactive waste that must be sent to a disposal facility must be classified as:

* Waste product number: **3831-1**
* EAL (European List of Waste, LoW) code: Must not be filled in

Radioactive waste that must be sent to a disposal facility must be transported as hazardous waste:

* **Class 7 Radioactive material**
* UN number and product number (depending on the type of source; see Chapter 6):
	+ Excepted Package (see below): “**UN 2910 – Radioactive material, excepted package, limited quantity of material”**
	+ Type A Package (encapsulated source which is not an excepted package)
		- Open radioactive sources: **“UN 2915 - Radioactive material, Type A Package”**
		- Radioactive source in a sealed capsule: **“UN 3332 - Radioactive material, Type A package, special form”**

It should normally be possible to transport radioactive waste containing open radioactive sources that must be sent to a disposal facility as an excepted package with simplified requirements (see the limit values in Table 1)

Sealed radioactive sources above the limit for an excepted package must be transported as a “Type A Package”

# Physical properties and half-life of relevant radionuclides

Table 2. Physical properties and half-life of relevant radionuclides

|  |  |  |
| --- | --- | --- |
| **Radionuclide**  | **Physical qualities**  | **Shielding** b: 100 % reduction g: 99.9 % reduction  |
| **Type of radiation / Energy**  | **Half-life** |
| a | b | g |
| **H-3** |  | 19 keV |  | 12 years  | 0.1 mm plastic/glass  |
| **C-11 2)** |  | 961 keV | 511 keV | 20 minutes | 6 cm lead  |
| **C-14** |  | 165 keV |  | 5,730 years | 0.3 mm plastic/glass |
| **F-18** |  | 634 keV | 511 keV | 1.8 hours | 6 cm lead |
| **P-32** |  | 1,710 keV |  | 14 days  | 6 mm plastic/glass |
| **P-33** |  | 250 keV |  | 26 days | 0.5 mm plastic/glass |
| **S-35** |  | 167 keV |  | 87 days | 0.3 mm plastic/glass |
| **Cr-51** |  |  | 320 keV | 28 days | 2 cm lead  |
| **Cu-64** |  | 653 keV | 511 keV | 13 hours | 6 cm lead |
| **Cd-109** |  | 84 keV | 25 keV | 1.3 years | 0.2 mm lead  |
| **I-125** |  |  | 36 keV | 60 days | 0.4 mm lead |
| **I-129** |  | 151 keV | 40 keV | 15 x 106 years  | 0.7 mm lead |
| **Cs-137** |  |  | 661 keV | 30 years | 8 cm lead  |
| **U-238 / U-Nat**  | 4,150 keV |  |  | 4.5 x 109 years | Not necessary |

# Shipment of radioactive waste

* Sort the waste according to where it will be shipped.
* Waste that has been stored until the activity is below the limit value for radioactive waste must NOT be sent as radioactive waste
* Pack the waste in suitable containers with a leakproof lid (for example, waste containers or drums in plastic or steel).
	+ Different waste product numbers must be placed in different containers.
	+ Different radionuclides must be placed in different containers if possible.
	+ For transport of liquids, there must be outer packaging with absorbent material.

Further procedures for shipment depend on the type of waste (waste product number).

## Shipment of radioactive waste that does not need to be sent to a disposal facility (3831-2)

The person disposing of radioactive waste is responsible for ensuring that the waste is sent to a recipient authorized to receive and handle (incinerate, deposit) hazardous waste or radioactive waste (see sections 16-5 and 16-6 of the waste regulations).

Norsk Gjenvinning can transport radioactive waste, but cannot provide intermediate storage for this type of waste. The person disposing of the waste must contact the recipient before the waste is sent, to ensure that Norsk Gjenvinning can deliver the waste.

* Contact the recipient to arrange delivery, e.g. Senja avfall.
	+ - Contact:
		Mads Løvås, Department Head, incineration
		mads@senja-avfall.no,
		Tel.: 98 09 70 24
* Contact Norsk Gjenvinning (waste management and recycling company) for transport
	+ - The waste must NOT be transported as dangerous goods
		- Agree on the shipping price and pick-up, and ask your local orderer to place an order for collection and shipment of the waste in the ordering system.
* All transport packages must be labelled with a specific number or code
	+ Remove all visible hazard markings from the transport packages.
* Print the waste declaration (Chapter 3). The waste declaration must accompany the transport.

## Radioactive waste that must be sent to a disposal facility

Sealed radioactive sources must usually be returned to the supplier.

Other waste that must be sent to a disposal facility, as well as sealed sources where the supplier is unknown, must be sent to the Institute for Energy Technology (IFE).

Norsk Gjenvinning (waste management and recycling company) can transport radioactive waste, but cannot provide intermediate storage for this type of waste. The person disposing of the waste must contact the recipient before the waste is sent, to ensure that Norsk Gjenvinning can deliver the waste.

* Contact the recipient to arrange delivery - request a waste requisition document
* Supplier of radioactive source
* IFE ([www.ife.no](http://www.ife.no/))
	+ - Contact:
		Knut Bjørnar Larsen, Department Head, radioactive waste
		knut.bjornar.larsen@ife.no
		Tel.: 63 80 60 00
		Mobile: 90 73 09 71
* Fill in the declaration form and waste requisition document – in dialogue with waste recipient
* Send the completed waste requisition document to the recipient
	+ Wait for approval from the recipient
* Contact Norsk Gjenvinning (waste management and recycling company) for transport
	+ The necessary documentation (for example, the consignment note and transport accident card) must be completed in cooperation with the carrier
	+ Packaging/waste containers are available in several sizes; ask the recipient to send us suitable packaging/containers if we do not have any in stock
	+ The waste must be sent as dangerous goods Class 7 (see Chapter 6)
	+ Agree on the shipping price and pick-up, and ask your local orderer to place an order for collection and shipment of the waste in the ordering system.
* The waste must be marked as dangerous goods Class 7 (see Chapter 6)
* Print the waste declaration (Chapter 3) and fill in the transport documentation as specified in Chapter 6

# Marking and transport documentation for Dangerous Goods Class 7

Radioactive waste that must be sent to a disposal facility must be transported as hazardous waste: **Class 7 Radioactive material**

## Excepted Package

If radioactive waste that must be sent to a disposal facility is below the limit values in Table 1 (Chapter 3), it can be transported as an excepted package if the maximum dose rate on the packaging surface does not exceed 5 µSv/h.

There is no requirement for the driver to be trained in the transport of dangerous goods, but there is a requirement for a fire extinguisher (minimum 2 kg) in the vehicle.

The outer surface of an excepted package must only be marked with:

* + UN number: “**UN 2910**”
	+ Name and address of recipient and/or sender
	+ Gross weight if over 50 kg
	+ Specific number/code for the individual package

The inner surface of the package, which is visible when the package is opened, must be marked with the word “**Radioactive**”. If this is not possible, this marking may also be on the outside of the package.

The only requirement for transport documentation for an excepted package is the waste declaration (see Chapter 3).

## Type A Package

Radioactive waste that must be sent to a disposal facility and cannot be transported as an excepted package must be transported as a “Type A Package”.

### Category and labelling

All type A packages must be categorized and marked as: “I-White”, “II-Yellow” or “III-Yellow” according to the maximum dose rate on the surface of the package and the maximum dose rate 1 m from the package. If one of the dose rate limits is exceeded, a higher category must be assigned.

|  |  |  |
| --- | --- | --- |
| **Category**  | **I-White**  | **II-Yellow**  |
| **Maximum surface dose rate**  | < 5 µSv/h | 5-500 µSv/t  |
| **Maximum dose rate at 1 m from the package**  | < 0.5 µSv/h  | 0.6-10 µSv/h |
| **Hazard label** **(10 x 10 cm)** | adr_7I | Klasse7 |
| **Type of package marking**  |  |  |

The package must be marked on two sides with

* UN number and product number:
	+ Open radioactive sources: **“UN 2915 - Radioactive material, Type A Package”**
	+ Radioactive source in a sealed capsule: **“UN 3332 - Radioactive material, Type A package, special form”**
* Hazard label with information on
	+ Radionuclide
	+ Total activity (Bq, kBq, MBq, GBq)
	+ Transport index (not for I-White)
* Type of package marking

### Transport index

To calculate the transport index (TI), you start with the maximum dose rate at 1 metre from the surface of the package, divide it by 10 and round it up to one decimal place.

Example: Maximum dose rate at 1 m distance: 2.1 µSv/h

 Transport index: 2.1/10 = 0.21 resulting in TI = 0.3

### Transport documentation

Each package of type A must be accompanied by

* Waste declaration
* Traffic accident card
* Consignment note with attachments, fill in
	+ Section 1-3: Your name and the Department’s address.
	+ Section 4-6: Recipient’s name and address (often pre-filled), for example:
		- Institute for Energy Technology
		Dept. Radavfall
		Instituttv. 18
		2007 Kjeller
	+ Section 15: Sender’s customer number at the carrier (for example, Norsk Gjenvinning AS)
	+ Section 23: Sender’s customer number at the carrier (for example, Norsk Gjenvinning AS)
	+ Section 25: Recipient’s reference (for example, Knut Bjørnar Larsen at IFE)
	+ Section 34: Number of packages
	+ Section 35: For example, Steel drums – radioactive waste (see annex).
	+ Section 36: Gross weight under point 36.
	+ Section 37: Volume (largest container/drum)