Safety Data Sheet
for
Risø ^{60}Co Educational Source

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1. Introduction

This manual applies to the ^{60}Co educational sources produced by Hevesy Laboratory at DTU Nutech (Risø). For safety reasons and to ensure proper application of the Risø educational sources this SDS should be read before the sources are unpacked and put into service.

For additional information on handling and storing radioactive sources, please consult your local authorities.

2. General precautions

2.1 All radioactive sources can pose a hazard if not handled, used, stored or transported properly. It is therefore important that these regulations are followed closely.

2.2 This manual should always accompany the educational sources and be accessible to all persons who use the sources.

2.3 Improper use may cause damage to the sources which may cause potentially hazardous radioactive material to be released.

2.4 The sources contain small amounts of activity, but as they emit ionizing radiation, they are all subject to the rules for handling and storage of radioactive substances.

3. When the package is received

3.1 The package should be examined immediately upon receipt. In the event that the package is severely damaged – to such an extent that there is a danger that the product is damaged – the parcel must not be opened. Instead you should contact local health authorities immediately.

3.2 Check that the accompanying documentation is consistent with the content.

3.3 If the package is not opened immediately upon receipt, it should be placed in a safe place that meets the rules for storage of radioactive material.

4. Uses and safety rules

4.1 Risø ^{60}Co educational sources are manufactured for use in teaching in schools and other educational institutions. The sources are approved for this purpose by the Danish National Board of Health.

4.2 If the sources are used as part of an apparatus, this must be constructed for this specific purpose.

4.3 The sources must not in any way be adapted or modified to fit as part of another apparatus.

4.4 National regulations for students' work with the radioactive sources must be observed. Exercises should always be supervised by the teacher.

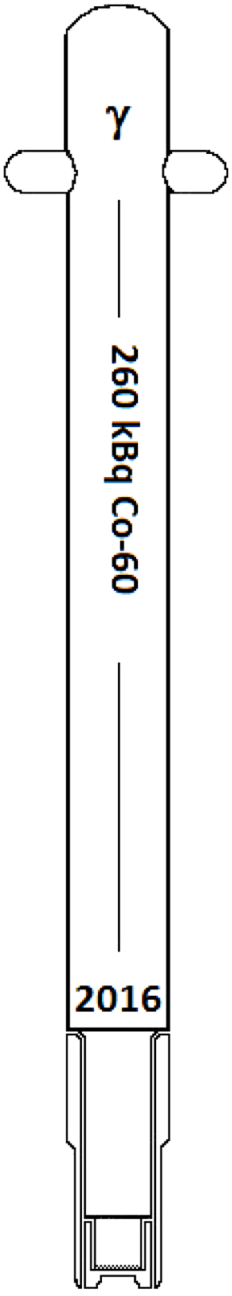
4.5 Teachers should ensure that students are handling the sources properly, and should promptly collect the sources after use.

4.6 The sources must not be exposed to heat or immersed in liquid.

4.7 When handling the sources, only the plastic handle should be touched – if possible only the end that is furthest away from the metal.

5. Design of the source

The source consists of a Perspex source holder (see drawing below).
At the end of this holder the radioactive material is placed, protected by a metal cap. The radioactive material is encased in plastic and cannot under proper use be released into the environment.

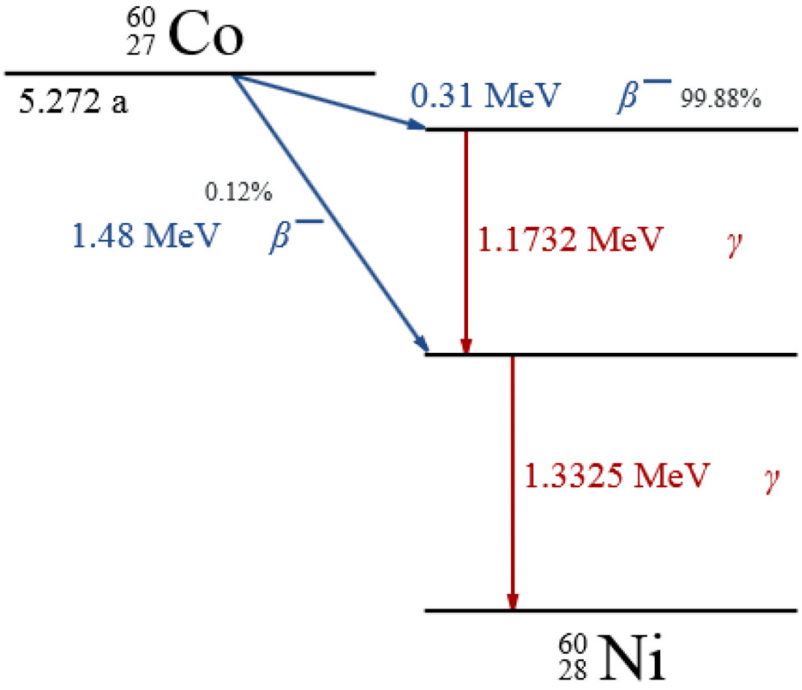


Cross section drawing of the ^{60}Co source

5.1 The ^{60}Co educational source

The ^{60}Co source contains 260 kBq of the radioactive isotope ***Cobalt-60*** (^{60}Co) which decays to Nickel-60 (^{60}Ni) by emission of electrons (β^- decay). The β^- decays go to excited states in ^{60}Ni. When these states decay to the ground state, photons are emitted with energies of 1173 keV and 1333 keV.

Below you find a decay scheme for ^{60}Co



Radionuclide and half life	Type of decay	Particle Energy and intensity		Gamma decays
		Max. energy (MeV)	Intensity (%)	Photon energy (KeV)
Cobalt-60	β^-	0.31	99.88	1173.2 and 1332.5
5.3 years		1.48	0.12	1332.5

6. Certificates and tests

6.1 Before shipment the educational sources undergo the following tests:

- Test for activity
- Surface contamination test
- Leakage test

The sources are accompanied by a certificate stating when each numbered source has undergone the above test. The certificate and the information contained therein meets the requirements described in ISO 2919.

7. Storage

7.1 Radioactive sources must be kept safe from fire, theft and water damage in a locked cupboard.

7.2 The storage cabinet must be shielded so that persons staying close by the cupboard will not receive a dose rate from the sources exceeding 0.3 mSv/year.

7.3 Storage sites must be clearly marked with a warning sign for radioactivity in compliance with national regulations.

8. Disposal

8.1 Disposal of the sources must obey national guidelines for disposal of radioactive material.

8.2 The sources must not be send by mail! Transportation of the sources must meet rules described in Section 9 below.

9. Road transport of Risø educational sources

9.1 Risø educational sources can be transported as excepted packages by approved carriers.

9.2 The sources must be securely packaged so that the packaging keeps the contents under conditions that are common in routine transportation.

9.3 Dose rate on the outside of the package must not exceed 5 µSv/h.

9.4 The package must be marked with UN number 2911. The sender and the recipient of the package must be clearly indicated.

9.5 The package shall bear on an inner surface the marking "Radioactive" – so that by opening the package one is warned that radioactive material is present.

9.6 The package must be followed by a transport document.

9.7 In the car there must be an approved portable fire extinguisher with at least 2 kg powder.