

## Introduction

REVISS transport containers for road, sea and air transportation of sealed radiation sources utilise lead and/or depleted uranium to shield the environment from radiation. They are subject to the highest level of design control, regulated by the International Atomic Energy Authority (IAEA) and the UK Department for Transport (DfT). They are designed, fabricated, operated and maintained in compliance with the REVISS ISO9001:2000 Quality System.

*All REVISS containers used for transporting cobalt-60 are certified B(U) in compliance with IAEA TS-R1-2005*



## IAEA Container Certification Standards

REVISS containers are certified as Type A or Type B in compliance with the IAEA transport regulations TS-R-1-2005. Type A design certification requires the container to be tested, "to withstand inappropriate handling incidents under normal shipping conditions" and defines a nuclide specific, maximum load activity permitted for transportation.

Type B design certification is required for transportation of a specified nuclide in quantities above the maximum load activity permitted for transportation in a Type A container. Type B certification requires the container to be tested, "to withstand transport accident scenarios under extreme environmental conditions".

## Type B transport containers must be resilient to high-speed impact and fire

Part of the REVISS design process for Type B transport containers is to test for resilience to high-speed impact and fire. Containers must withstand a series of drop tests from heights of up to 9 m, onto a hardened concrete target, maintaining source containment, thermal and radiation shielding throughout. The container with accrued damage is then subjected to fire tests to simulate worst-case exposure to thermal shock. The thermal shielding must be found sufficient to continue to preserve containment and radiation shielding throughout.



*The REVISS GB/3962A/B(U) transport container weighs 8.5 tonnes. The radiation and thermal shielding integrity must not be lost after dropping the container onto a reinforced concrete target from a height of 9 m.*

## Restrictions on the transportation of radioactive material by air

Since July 2001 the ICAO<sup>1</sup> has restricted the use of Type B containers for the transportation of radioactive nuclides by air to a maximum permitted load activity of 3,000 x A<sub>1</sub> or 100,000 x A<sub>2</sub> whichever is the lower<sup>2</sup>. This has had an impact on the transportation of cobalt-60 sources for use in industrial radiation processing. The maximum Co-60 load permitted for transportation by air in a Type B container is now 1.2 PBq (33 kCi).

*“The maximum Co-60 load permitted for transportation by air in a Type B container is now 1.2 PBq (33 kCi).”*

In response, REVISS operates a continuous program of investment into the design and fabrication of additional transport containers and now operates a double digit fleet of 5 different designs. This offsets the increase in shipping time by surface routes and enables REVISS to continue to satisfy their growing demand for PURIDEC Co-60 sources worldwide.

- 1 ICAO– International Civil Aviation Organisation
- 2 IAEA Regulations for the Safe Transport of Radioactive Material 1996 Edition (Revised 2003) Section IV pp. 19. For each nuclide there is a type A container maximum load activity quoted for special form (A<sub>1</sub>) and other than special form (A<sub>2</sub>) radioactive materials.

## Flasks Shielded with Depleted Uranium

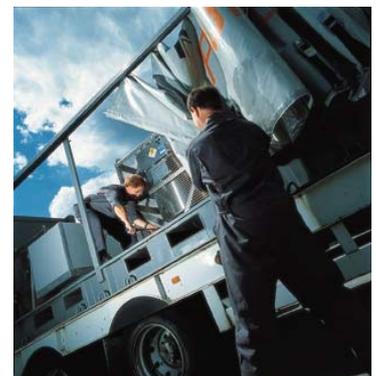
The innovative design of REVISS 3300A and 3750A flasks makes them lighter and more compact than other commonly used flasks, without sacrificing load capacity. They are fully approved as Type B(U) under the IAEA Regulations for the Safe Transport of Radioactive Materials (TS-R-1-2005). They are designed for unloading submerged in the

*The depleted uranium shielding emits a small amount of low energy gamma radiation. Typical values are 3- 4 µSv/h even with an empty container. The maximum dose rate is in the centre of each side of the shipping cage.*

pool of wet-storage plants and are especially well suited to plants with limited access space. Once the sources are removed from the container normal handling procedures apply. They are used typically to transport RSL2089 Co-60 sources, described in detail in Data Sheet QS250i3. They are also licensed for the transportation of Cs-137 in compatible IAEA special form capsules.



*The REVISS GB/3750A/B(U) transport flask is high capacity and compact. It is almost half the weight of other commonly used lead shielded flasks.*



*REVISS runs its own fleet of customised ISO containers (flat racks). These have proprietary fixings to which multiple containers may be bolted, removing the need for unwieldy straps and chains.*

## REVISS invests to confirm and enhance commitment to dry storage irradiation facilities

REVISS has designed and fabricated a new container for dry plant source installation and unload. Although designed for interface with dry plants this new container is fully waterproofed and may be used equally efficiently in wet plants to transport either the large RSL1800 sources or the smaller RSL2089 or equivalent source designs.

The new container is also licensed to carry non-special-form sealed sources, which will facilitate the routine transportation of sources that are outside their recommended working life.

Compliant with the IAEA TS-R1-2005 regulations for the transportation of sealed radiation sources

this new container confirms and enhances REVISS's commitment to serving dry storage irradiation facilities for the long-term.



*The new REVISS transport container GB/7009A/B(U) for dry plant load and unload is also fully waterproofed for use in wet plants.*

## Transportation of Non-Special-Form Sealed Sources

REVISS and its manufacturing partner, Dioxitek, have recently invested in a fleet of new containers licensed to carry non-special-form material internationally. A full-scale model of this 8.5 tonne container was dropped a total of 7 times from heights of 1 m onto a steel punch and 9 m onto a hardened concrete target, witnessed by UK and Argentine regulators, in accordance with IAEA TS-R1-2005 to gain B(U) certification.

For the past 10 years, transportation of non-special-form sources has generally only been possible by obtaining specific approval for the transport operation from the Competent Authorities in the country or countries involved. This is a process that can take up to 6 months to

complete; it requires multilateral approval for international transportation, which is sometimes simply not achievable.

The new GB/3962A/B(U) containers bolster REVISS' commitment to source lifetime management by facilitating the routine transportation of both raw material and sources that are past their recommended working life.

*REVISS has a new fleet of containers licensed to carry non-special-form sealed sources internationally.*



*REVISS's 8.5 Tonne GB/3962A/B(U) survives a drop test from 1 m onto a steel punch.*



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**Proven Solutions for  
Gamma Irradiation**

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REVISS was formed in 1992, as a joint venture company between the UK's Amersham International, and PA MAYAK and Techsnabexport of Russia. REVISS formally combined Amersham's expertise in developing and handling radioactive products with MAYAK's extensive manufacturing capability. This heritage is the backbone from which REVISS has successfully grown its business under the brand identities of PURIDEC Irradiation Technologies™ and REVISS Isotopes™.

REVISS is the administrator, quality controller, design authority and customer service centre for all products supplied under these brand identities. We market our products and services in more than 30 countries and export more than 80% of our total production outside the UK. We have offices in Europe, in the USA and in the Far East.

## **We value your business**

Our approach to business is based on 3 core values

- commitment to customers
- our drive to constantly innovate
- the importance we place on dependability

## **REVISS is working with the World Nuclear Transport Institute to combat denial and delay of Class 7 shipments**

In March 2005 REVISS® Services (UK) Ltd. was granted Associate Membership of The World Nuclear Transport Institute (WNTI). WNTI has objectives to bring together industrial organisations involved in, or having a relationship to, the transportation of radioactive materials and to collaborate with organisations having the same interest.

WNTI has recently launched an initiative to identify the root causes that give rise to many of the difficulties faced by our industry when transporting sealed radiation sources worldwide and to develop appropriate industry responses. This is an area that attracts ever-growing barriers and constraints



and yet is vital to medical device manufacturing and healthcare throughout the world.

Dick Rees, who is REVISS's Harwell Site Manager, will chair the industry Task Force within WNTI to focus on Denial & Delay of Class 7 Shipments by Transporters and Carriers.