GB/3573A/IF (Rev.1)

**CERTIFICATE OF APPROVAL OF PACKAGE DESIGN   
FOR THE CARRIAGE OF RADIOACTIVE MATERIAL**

This is to certify that for the purposes of the Regulations of the International Atomic Energy Agency

* The Competent Authority of Great Britain in respect of inland surface transport, being the Office for Nuclear Regulation;
* The Competent Authority of the United Kingdom of Great Britain and Northern Ireland in respect of sea transport, being the Secretary of State for Transport;
* The Competent Authority of the United Kingdom of Great Britain and Northern Ireland in respect of air transport, being the Civil Aviation Authority; and
* The Competent Authority of Northern Ireland in respect of road transport, being the Department of Agriculture, Environment and Rural Affairs - Northern Ireland

approve the package design specified in Section 1 of this certificate, as submitted for approval by International Nuclear Services Ltd trading as Nuclear Transport Solutions (see Section 5)

as: Type IF

by: road, rail and sea.

Packaging identification: Uranium Trioxide Industrial Fissile Package

Packages manufactured to this design meet the requirements of the regulations and codes on pages 3 and 4, relevant to the mode of transport, subject to the following general condition and to the conditions in the succeeding pages of this certificate.

In the event of any alteration in the composition of the package, the package design, the management system(s) associated with the package or in any of the facts stated in the application for approval, this certificate will cease to have effect unless the Competent Authority is notified of the alteration and the Competent Authority confirms the certificate notwithstanding the alteration.

Expiry Date: This certificate cancels all previous revisions and is valid until the end of September 2029 (see Section 5).

COMPETENT AUTHORITY IDENTIFICATION MARK: GB/3573A/IF

Signature: Date of Issue: 26 September 2024

Office for Nuclear Regulation

Redgrave Court, Merton Road

Bootle, Merseyside

L20 7HS

on behalf of the Office for Nuclear Regulation; the Secretary of State for Transport; the Civil Aviation Authority; and the Department of Agriculture, Environment and Rural Affairs - Northern Ireland.

***This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.***

**REGULATIONS GOVERNING THE TRANSPORT OF RADIOACTIVE MATERIALS**

**INTERNATIONAL**

International Atomic Energy Agency (IAEA)

SSR-6 Regulations for the Safe Transport of Radioactive Material 2018 Edition

United Nations Economic Commission for Europe (UNECE)

Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) 2023 Edition

Intergovernmental Organisation for International Carriage by Rail (OTIF)

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) 2023 Edition

International Maritime Organization (IMO)

International Maritime Dangerous Goods (IMDG) Code 2022 Edition incorporating Amendment 41-22

International Civil Aviation Organization (ICAO)

Technical Instructions for the Safe Transport of Dangerous Goods by Air 2023-2024 Edition

**UNITED KINGDOM**

***ROAD***

GREAT BRITAIN ONLY:

The Energy Act 2013 (2013 c. 32); The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009 No. 1348); The Energy Act 2013 (Office for Nuclear Regulation) (Consequential Amendments, Transitional Provisions and Savings) Order 2014 (SI 2014 No. 469)

NORTHERN IRELAND ONLY:

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland) 2010 (SR 2010 No. 160)

***RAIL***

GREAT BRITAIN ONLY:

The Energy Act 2013 (2013 c. 32); The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009 No. 1348); The Energy Act 2013 (Office for Nuclear Regulation) (Consequential Amendments, Transitional Provisions and Savings) Order 2014 (SI 2014 No. 469)

***SEA***

British registered ships and all other ships whilst in United Kingdom territorial waters:

The Merchant Shipping Act 1995 (1995 c. 21); The Merchant Shipping (Carriage of Dangerous Goods and Harmful Substances) (Amendment) Regulations 2024 (SI 2024 No. 636)

***AIR***

The Air Navigation Order 2016 (SI 2016 No. 765); The Air Navigation (Dangerous Goods) Regulations 2002 (SI 2002 No. 2786)

1. DESIGN SPECIFICATION
   1. Package Design
      * 1. The package design specification shall be in accordance with TRANSPORT REPORT No. 196 Package Design Safety Report in Support of Application for the: Industrial Fissile Package Design No: 3573 Competent Authority No: GB/3573A/IF-96, Issue 03 dated 30 July 2024, and modifications to the package design approved by the authorities named on page 1 of this certificate under the established modifications procedure.
   2. Design Drawings
      * 1. The design is specified in the following drawings.

|  |  |  |  |
| --- | --- | --- | --- |
| **Design No.** | **Title (number of components)** | **Drawing / Drawing List** | **Issue** |
| 3573 | Outer / ISO Container | INS ENG R 20 911 | Rev 2 |
| 3508 | Inner / IP-2 Drum | 0 PR 1202162 | L |

* 1. Package Description and Materials of Manufacture
     + 1. The 3573 Industrial Fissile package is a full height ISO freight container. It has a single large end opening wrap around door which latches to the side of the container. Stainless steel is used to form the seal contact surfaces for the door closure and HEPA filter seals. It is fabricated from press formed steel sheet and sections and incorporates ISO standard corner fittings and forklift pockets. The internal and external surfaces of the packages are coated with a paint system to provide corrosion resistance for five years of normal use. Internally, two steel rails are fitted to facilitate tie down of up to four steel pallets carrying cylindrical stainless steel UO3 50 litre Product Drums uniquely identified by the design number 3508. Each drum has a removable stainless steel, press formed cap which incorporates an EPDM gasket seal bonded to the inside face. The top and bottom ends of the drum incorporate features to locate the drums with mating location features incorporated into the 3573-pallet assembly. See Appendix 1 for package illustration.
  2. Package Dimension and Weights
     + 1. Nominal dimensions: Width 2438 mm, Length 6058 mm, Height 2591 mm.
       2. Maximum authorised gross weight of a package: 20,000 kg.
       3. Maximum authorised gross weight of an individual steel pallet (comprising of two wooden pallets laden with 3508 drums), a pallet spider spacer and two wooden top boards): 3900 kg.
  3. Authorised Contents
     + 1. The following content is authorised:
          1. Solid uranium trioxide (UO3) of varying isotopic compositions, in powder form, within 3508 drums.
          2. The UO3 powder maximum activity shall not exceed the IAEA SSR-6 LSA-II material limit of 1 x 10-4 A2/g.
  4. Containment System
     + 1. The items of the packaging forming the containment system are as follows:
          1. 3508 drum, cap, and elastomer seal
          2. ISO freight container body
          3. ISO freight container door
          4. Elastomer door seal
          5. HEPA filter
  5. Fissile Material Restrictions
     + 1. Unless the contents of the package and/or consignment meet the provision of paragraphs 417, 674 or 675 of IAEA SSR-6, the packages shall comply with the following fissile material approval.
     1. Fissile material approval A1
        1. UO3 powder with a maximum enrichment of 1.193 wt % U‑235/U.
        2. Conditions:
           1. The maximum permitted mass of U-235 in a single package must not exceed the limit in column C of the table below and is dependent on the greatest enrichment (column A) of UO3 in any single drum within the package.

|  |  |  |
| --- | --- | --- |
| **Greatest Enrichment (wt % U‑235/U) of UO3 in any single drum per package** | **Maximum permitted mass of UO3 (kg) per package** | **Maximum permitted mass of U‑235 (kg) per package** |
| **Column A** | **Column B** | **Column C** |
| ≤ 1.01 | ∞ | ∞ |
| ≤ 1.02 | 337620 | 2866 |
| ≤ 1.03 | 127104 | 1089 |
| ≤ 1.04 | 71496 | 619 |
| ≤ 1.05 | 47187 | 412 |
| ≤ 1.06 | 33365 | 294 |
| ≤ 1.07 | 25421 | 230 |
| ≤ 1.08 | 19741 | 182 |
| ≤ 1.09 | 16444 | 149 |
| ≤ 1.10 | 13703 | 125 |
| ≤ 1.11 | 11598 | 107 |
| ≤ 1.12 | 9994 | 93 |
| ≤ 1.13 | 8699 | 82 |
| ≤ 1.14 | 7642 | 72 |
| ≤ 1.15 | 6792 | 65 |
| ≤ 1.16 | 6077 | 59 |
| ≤ 1.17 | 5481 | 54 |
| ≤ 1.18 | 4957 | 49 |
| ≤ 1.19 | 4512 | 45 |

* + - 1. Drum ID 27790 in the KYUS0302 campaign shall be transported based on an enrichment of ≤ 1.19 wt % U‑235/U.
      2. The confinement system is defined by UO3 mass limits prescribed in this certificate. In determination of the safe fissile mass limits for the UO3 at the different enrichments, no credit is taken for the packaging.
      3. Criticality Safety Index (CSI) = (100 x mass of UO3 in package) / A

where A is the mass (in kilograms) in column B of the table above and is dependent on the greatest enrichment (column A) of UO3 in any single drum within the package.

* + - 1. The criticality safety documentation comprises NTS CAST 3573/JURU UO3/CR01/P3 ‘Additional Design Information Required for Fissile Materials, Transport of UO3 in the IF 3573 Fissile ISO Container’ Issue 02, dated April 2022 and NTS R 23 325 ‘Justification for the use of para 676.2 in GB/3573 Application’ revision 0, dated August 2023.
      2. This package design has been shown to be sub-critical following water ingress as required by paragraphs 680 and 681 of IAEA SSR-6. Special features to exclude water are not therefore required.
      3. Ambient temperature range for package design:
         1. The ambient temperature range for which the package design has been approved is -40ºC to +38ºC
      4. Any fissile materials not specified in paragraph 1.10 are permitted to be present in only trace quantities, that is to say up to either a total of 1 g per package, or a concentration of 0.1 % by mass of the total fissile nuclides present.

1. use of package
   1. Information Provided in Safety Report on Use of Packaging
      * 1. The packaging shall be used and handled in accordance with INS ENG S 20 227 ‘Operation and Maintenance Manual - Industrial Fissile Package Design No. 3573’ revision 4, dated 13 May 2024 and NTS S 22 021 ‘Operating Instruction - Industrial Fissile Package Design No. 3573’ revision 1, dated 13 May 2024.
        2. The packaging shall be maintained in accordance with INS ENG S 20 227 ‘Operation and Maintenance Manual - Industrial Fissile Package Design No. 3573’ revision 4, dated 13 May 2024.
   2. Actions Prior to Shipment
      * 1. Administrative controls shall ensure that the contents are in accordance with Section 1 of this certificate, and that the consignor, carrier and consignee hold a copy of the certificate and instructions on the use of the packaging.
   3. Emergency Arrangements
      * 1. Before shipment takes place, adequate emergency arrangements must be made, copies of which shall be supplied to the GB Competent Authority on demand.
        2. Within Great Britain, if the consignor’s own, or other approved emergency plans, cannot be initiated for any reason, then the police shall be informed immediately.
2. management systems
   * + 1. The management system(s) assessed as adequate in relation to this design by the authorities named on page 1 of this certificate, at the date of issue, are as specified in the document referred to in paragraph 1.1 above, and comprise the following:

* Design Process, SOL-401
* CA Package Licensing Process, SOL-201
  + - 1. No alteration may be made to any management system confirmed as adequate in relation to this design, unless:
         1. the authorities named on page 1 of this certificate have confirmed the amended management system is adequate prior to implementation or use; or
         2. the alteration falls within the agreed change control procedures set out in the management system(s).
      2. Other management systems for design, testing, manufacture, documentation, use, maintenance, inspection, transport and in-transit storage operations may be used providing they comply with international, national or other standards for management systems agreed as acceptable by the authorities named on page 1 of this certificate.

1. ADMINISTRATIVE INFORMATION
   1. Shipment Approval
      * 1. Multilateral shipment approval will be required in accordance with paragraphs 825(c) and 825(d) of SSR-6.
   2. Packaging Serial Numbers
      * 1. For the purpose of compliance with ADR / RID, the owner of the packaging shall be responsible for informing ONR of the serial number of each packaging manufactured to this design.
2. CERTIFICATE STATUS
   1. Design approval issued to:

Nuclear Transport Solutions

Hinton House

Risley

Warrington

WA3 6GRUK

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| --- | --- | --- | --- |
| **Issue / Revision Number** | **Date of Issue** | **Date of Expiry** | **Reason for Revision** |
| Issue 1 | 26 November 2010 | 30 November 2015 | First approval |
| Revision 1 | 26 September 2024 | 30 September 2029 | Changes to regulations, fissile content (and criticality analysis) revised, application of SSG-26 paragraph 676.2, revised operating instruction. |

Appendix 1 – package illustration

