GB/5133/AF (Rev.0)

**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 URENCO UK Limited (see Section 5)

as: Type AF

by: Road, rail and sea.

Packaging identification: DN30

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 December 2028 (see Section 5).

COMPETENT AUTHORITY IDENTIFICATION MARK: GB/5133/AF

Signature:

 Date of Issue: 28 November 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 package design safety report for the DN30 package, 0023-BSH-2016-001, Rev.10, dated March 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** |
| DN30 | DN30 PSP | 0023-STL-1000-00 | Rev.9 |

* 1. Package Description and Materials of Manufacture
		+ 1. The DN30 packaging consists of the DN30 Protective Structural Packaging (PSP) and the 30B cylinder (defined by standards ISO 7195:2020 and ANSI N14.1-2023), see Appendix 1 for package illustration. The DN30 PSP provides both mechanical and thermal protection for the 30B cylinder and its radioactive content. The main packaging components are:
* 30B cylinder, this is a carbon steel cylindrical tank closed at each end by a domed head. It has two openings. One valve screwed to one of the domed head, for filling and emptying. A plug screwed to the other domed head for emptying. A skirt forms an extension of the cylindrical part at each end, protecting valve and plug during operation activities.
* Bottom half, this has two feet welded to the outer structure for tie-down during transport incorporating four handling attachment points to be used for the loaded package and two fork-lifter pockets for handling the empty and loaded packaging,
* Top half, this has two handling attachment points for handling of the top half,
* Valve protecting device attached to the bottom half by means of hinges,
* Plug protecting device mounted in the bottom half,
* Rotation preventing devices consisting of two pins mounted in the bottom half,
* Closure system consisting of in total six steel blocks welded to the top half and six steel blocks welded to the bottom half forming mortise-and-tenon style joints connected by steel pins,
* Steel blocks welded to the top and bottom half for sealing the package.
	1. Package Dimension and Weights
		+ 1. DN30 Nominal dimensions: Height,1.33 m Width, 1.22 m Length, 2.44 m
			2. DN30 maximum authorised gross weight: 4100 kg
			3. 30B cylinder nominal dimensions: Width, 0.76 m. Length, 2.07 m
			4. 30B cylinder nominal mass: 635 kg
	2. Authorised Contents
		+ 1. The package can include one of the following authorised contents as described in Attachment 1.3 of Safety Report 0023-BSH-2016-001-Rev10 and consist of the following:

Content 1 - commercial grade uranium hexafluoride according to standard ASTM C996-10/15/20 or natural or depleted uranium.

Conditions:

* The content either complies with the definition of Enriched Commercial Grade UF6 of Standard ASTM C996-10/15/20, consists of natural uranium, or is depleted uranium.
* The permissible mass of UF6 in a full 30B cylinder is between 11.3 kg and 2277 kg.
* The U235 enrichment does not exceed 5 %.
* The activity of the content does not exceed 1 A2.
* The minimum purity of the transported UF6 is 99.5 % according to Standard ASTM C996-10/15/20.
* The heat generation rate of the content does not exceed 3 W.

The authorised content of the 30B cylinder for Content 1 is as follows:

|  |  |
| --- | --- |
| **Radionuclide** | **maximum concentration (104 µg/gU)** |
| U232 | 1 x 10-8 |
| U234 | 5.5 x 10-2 |
| U235 | 5 |
| U236 | 2.5 x 10-2 |
| U238 | 100 |
| Tc99 | 1 x 10-6 |

Content 2 - reprocessed uranium hexafluoride non-conforming with a restricted composition.

Conditions:

* Although it contains reprocessed uranium, the content is not compliant with the definition of reprocessed UF6 of Standard ASTM C996-10/15/20; the uranium can also be depleted.
* The permissible mass of UF6 in a full 30B cylinder is between 11.3 kg and 2277 kg.
* The U235 enrichment does not exceed 5 %.
* The activity of the content does not exceed 1 A2.
* The minimum purity of the transported UF6 is 99.5 % according to Standard ASTM C996-10/15/20.
* The heat generation rate of the content does not exceed 3 W.

The authorised content for the 30B cylinder for Content 2 is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Radionuclide** | **Maximum concentration (104 µg/gU)** | **Maximum gamma radiation (MeV.Bq/kg U)** | **Maximum alpha activity (Bq/kg U)** |
| U232 | 6 x 10-8 |  |  |
| U234 | 3 x 10-4 |  |  |
| U235 | 5 |  |  |
| U236 | 2.5 x 10-2 |  |  |
| U238 | 100 |  |  |
| Fission Products\* |  | 4.4 x 105 |  |
| Tc99 | 5 x 10-4 |  |  |
| Neptunium and plutonium |  |  | 3.3 x 103 |
| \* Includes Co60 |

Content 3 - HEELS from commercial grade uranium hexafluoride complying with standard ASTM C996-10/15/20.

Conditions:

* It consists of uranium that complies with the definition of enriched commercial grade UF6 of Standard ASTM C996-10/15/20, of natural uranium, or depleted uranium.
* The permissible mass of UF6 in the heels, as defined in Standard ISO 7195:2020, does not exceed 11.3 kg.
* The U235 enrichment does not exceed 5 %.
* The activity of the content does not exceed 1 A2.
* The minimum purity of the transported UF6 is 99.5 % according to Standard ASTM C996-10/15/20.
* The heat generation rate of the content does not exceed 3 W.

The authorised content for the 30B cylinder for Content 3 is as follows:

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Maximum concentration (104 µg/gU)** | **Maximum activity (Bq)** |
| U232 | 1 x 10-8 |  |
| U234 | 5.5 x 10-2 |  |
| U235 | 5 |  |
| U236 | 2.5 x 10-2 |  |
| U238 | 100 |  |
| Tc99 |  | * 1. x 108
 |

Content 4 - HEELS from reprocessed uranium hexafluoride with a restricted composition.

Conditions:

* It consists of uranium that complies with the definition of Enriched Commercial Grade UF6 of Standard ASTM C996-10/15/20, of natural uranium, or depleted uranium.
* The permissible mass of UF6 in the heels, as defined in Standard ISO 7195:2020, does not exceed 11.3 kg.
* The U235 enrichment does not exceed 5 %.
* The activity of the content does not exceed 1 A2.
* The minimum purity of the transported UF6 is 99.5 % according to Standard ASTM C996-10/15/20.
* The heat generation rate of the content does not exceed 3 W.

The authorised contents for the 30B cylinders for Content 4 is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Radionuclide** | **Maximum concentration (104 µg/gU)** | **Maximum gamma radiation (MeV.Bq)** | **Maximum activity (Bq)**  |
| U232 | 6 x 10-8 |  |  |
| U234 | 3 x 10-4 |  |  |
| U235 | 5 |  |  |
| U236 | 2.5 x 10-2 |  |  |
| U238 | 100 |  |  |
| Fission Products\* |  | 6.78 x 108 |  |
| Tc99 |  |  | 4.87 x 109 |
| Neptunium and plutonium |  |  | 5.08 x 106 (alpha) |

* + - 1. Daughter products of the radionuclides mentioned in authorised content 3 and 4 can also be present in the content of the 30B cylinder.
	1. Restriction on Contents
		+ 1. The radioactive material shall comply with the authorised contents specified in this certificate.
	2. Containment System
		+ 1. The containment system consists of the 30B cylinder.
	3. 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. Content 1 – Commercial Grade Enriched Uranium Hexafluoride

Fissile material:

* + - * 1. Enriched commercial grade UF6, or natural or depleted uranium.
				2. Maximum mass of UF6 2277.0 kg.
				3. U-235 enrichment ≤ 5.0 wt%.
				4. Minimum purity of UF6 is 99.5 %.
		1. Content 2 – Reprocessed Uranium Hexafluoride

Fissile material:

* + - * 1. UF6 with reprocessed uranium, or depleted uranium.
				2. Maximum mass of UF6 is 2277.0 kg.
				3. U-235 enrichment ≤ 5.0 wt%.
				4. Minimum purity of UF6 is 99.5 %.
		1. Content 3 – Commercial Grade Enriched Uranium Hexafluoride Heel

Fissile material:

* + - * 1. Enriched commercial grade UF6 (according to standard ASTM C996-10/15/20), or natural or depleted uranium.
				2. Maximum mass of UF6 11.3 kg.
				3. U-235 enrichment ≤ 5.0 wt%.
				4. Minimum purity of UF6 is 99.5 %.
		1. Content 4 - Reprocessed Uranium Hexafluoride Heel

Fissile material:

* + - * 1. UF6 with reprocessed uranium, or depleted uranium.
				2. Maximum mass of UF6 is 11.3 kg.
				3. U-235 enrichment ≤ 5.0 wt%.
				4. Minimum purity of UF6 is 99.5 %.
			1. Conditions for all four contents:
				1. The enriched uranium complies with standard ASTM C996-10/15/20.
				2. The reprocessed uranium **does not** comply with the definition for reprocessed uranium in standard ASTM C996-10/15/20.
			2. In addition to the limits and conditions on the UF6 the confinement system consists of the 30B cylinder and the DN30 structural package.
			3. For all contents the Criticality Safety Index (CSI) = 0
			4. The criticality safety documentation comprises Chapter 2.2.5 of Safety Report 0023-BSH-2016-001-Rev10.
			5. 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.
			6. Ambient temperature range for package design:
* -40 °C to +38 °C.
	+ - 1. Any fissile materials not specified in paragraph ‎1.12 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 in compliance with handling and testing instructions:
* Handling instruction No.0023-HA-2015-001-Rev 11;
* Test instruction No.0023-PA-2015-015-Rev 6; and
* Test instruction No.0023-PA-2015-017-Rev 5.
	1. 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 and consignee hold a copy of the certificate and instructions on the use of the packaging.
			2. For contents authorised in section ‎1.8 under (i) and (ii), a leakage test of the 30B cylinder is required before transport according to handling instructions 0023-HA-2015-001-Rev11.
	2. Supplementary Operational Controls
		+ 1. Tie down means should be used during transport of the package in any transport mode.
	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.
1. 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, comprise of the following:
* Quality Management Handbook of company Orano NCS GmbH
	+ - 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. 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:

URENCO UK Limited

Capenhurst Works

Capenhurst

Chester

CH1 6ER

|  |  |  |  |
| --- | --- | --- | --- |
| **Issue / Revision Number** | **Date of Issue** | **Date of Expiry** | **Reason for Revision** |
| 0 | 28 November 2024 | 31 December 2028  | First issue of GB specific package design approval for DN30. |

Appendix 1 – package illustration

