GB/4123/X (Rev.1)

**CERTIFICATE OF APPROVAL OF SPECIAL ARRANGEMENT
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 shipment of the consignment specified in Section 1 of this certificate, as submitted for approval by Orano TN (see Section 5)

as: Special Arrangement

by: road, rail and sea.

Packaging identification: UX-30 5A/8A

This special arrangement meets 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 compensatory measures, 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 is valid until 30 April 2025 (see Section 5).

COMPETENT AUTHORITY IDENTIFICATION MARK: GB/4123/X

Signature: Date of Issue: 24/06/2024

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. shipment SPECIFICATION
	1. Authorised Shipment(s)
		* 1. This approval is limited to the shipment of UX-30 5A/8A packages that contain 5A and/or 8A uranium hexafluoride (UF6) cylinders with serial numbers (items 1 to 26) as shown in Appendix 2.
	2. Package Design
		* 1. The package design specification shall be in accordance with the package design safety report (PDSR) for “UX-30 5A/8A Industrial Package Design for Fissile Material (Type IF) for Uranium Hexafluoride” Part 1 (identification SARS-22022-100-00 version 1, dated 04/2024) and Part 2 (identification SARS-22022-200-00 version 0, dated 09/2022), and modifications to the package design approved by the authorities named on page 1 of this certificate under the established modifications procedure.
	3. Design Drawings
		* 1. The design is specified in the following drawings.

|  |  |  |  |
| --- | --- | --- | --- |
| **Design No.** | **Title (number of components)** | **Drawing / Drawing List** | **Issue** |
| 1 | UX-30 5A/8A packaging (1) | DWG-22022-INER-02 | 0 |
| 2 | UX-30 outer protective shipping packaging (PSP) (1) | DWG-C-110-B-57922-001 | 4 |
| 3 | 5A/8A inner PSP (1) | DWG-22022-INER-01 | 0 |
| 4 | 5A UF6 cylinder and/or 8A UF6 cylinder (maximum total 4) | ANSI N14.1-1971, Figure 3 ANSI N14.1-1971, Figure 4 | Issued 1971 Issued 1971 |

* 1. Package Description and Materials of Manufacture
		+ 1. The packaging consists of three components (see Appendix 1 for package illustration):
1. the UX-30 outer PSP material is stainless steel;
2. the UX-30 inner PSP material is carbon steel; and
3. the 5A and/or 8A UF6 cylinders material is nickel alloy metal, as specified in ISO 7195.
	1. Package Dimension and Weights
		* 1. Nominal dimensions: 110.5 cm (43.5 in) diameter x 243.8 cm (96 in) length.
			2. Weight of UX-30 inner PSP when loaded: at least 1953 kg (4304 lb) with a maximum of 3003 kg (6620 lb).
			3. Maximum authorised gross weight of package: 3751 kg (8270 lb).
	2. Authorised Contents
		* 1. The authorised contents shall conform to the following:
				1. Solid uranium hexafluoride contained within 5 inch nominal diameter (5A) UF6 cylinders and/or 8 inch nominal diameter (8A) UF6 cylinders.
				2. Uranium hexafluoride material specification for unirradiated uranium and UF6 purity meeting the limits of ASTM C 996-20.
				3. Specific activity of uranium not exceeding 1.0 x 10-7 TBq/g.
				4. Fissile material described in paragraph 1.13 below.
	3. Restriction on Contents
		* 1. None.
	4. Containment System
		* 1. The containment system is the 5A and/or 8A UF6 cylinders including two-cylinder valves.
			2. The UF6 must also be contained to prevent the corrosive hazards from exposure to hydrofluoric acid (HF) that forms when reacting with water or moisture in the environment.
	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
			1. Fissile material:
				1. Uranium hexafluoride with a maximum enrichment of 3.25 wt.% U-235/U.
			2. The confinement system comprises the 5A and/or 8A UF6 cylinders, the tube arrangement of the UX-30 inner PSP and the UX-30 outer PSP.
			3. Criticality Safety Index (CSI) is 6.3.
			4. The criticality safety documentation comprises “PDSR for UX-30 5A/8A Industrial Package Design for Fissile Material (Type IF) for Uranium Hexafluoride” Part 2 (identification SARS-22022-200-00 version 0, dated 09/2022), Section 2.4, Criticality Safety and Appendix 2.4-01, Criticality Evaluation: CALC-INER-0601-00, INER UX-30 Concrete Liner- 8A Criticality Analysis.
			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:
				1. The temperature range for which the package design has been approved is -40°C (-40°F) to +38°C (100°F).
			7. Air transport restrictions:
				1. The package has not been shown to be subcritical under the conditions specified in paragraph 683 of IAEA SSR-6. The package shall not, therefore, be transported by air.
			8. Any fissile materials not specified in paragraph 1.13 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.
4. use of package
	1. Information Provided in Safety Report on Use of Packaging
		* 1. The packaging shall be used and handled in accordance with UX-30 5A/8A Industrial Package Design for Fissile Material (Type IF) for Uranium Hexafluoride” Part 1 (identification SARS-22022-100-00 version 1, dated 04/2024), Section 1.7, Package Operations.
			2. The packaging shall be maintained in accordance with UX-30 5A/8A Industrial Package Design for Fissile Material (Type IF) for Uranium Hexafluoride” Part 1 (identification SARS-22022-100-00 version 1, dated 04/2024), Section 1.8, Maintenance.

**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. Verify condition of cylinders as documented in “UX-30 5A/8A Industrial Package Design for Fissile Material (Type IF) for Uranium Hexafluoride” Part 1 (identification SARS-22022-100-00 version 1, dated 04/2024), Appendix 1.8-01, UF6 Cylinder Inspection Report.
			3. At least seven days before leaving the port of departure in Taiwan, Orano TN shall provide evidence of the following to ONR;
* inspection of the shipping vessel;
* radiation protection plan;
* emergency planning relevant to the radiation risk assessment;
* security plan to the extent allowed; and
* notification of the shipment.
	1. Supplementary Operational Controls
		+ 1. Load 5A and 8A cylinders in inner PSP as shown Appendix 1 figure 1 below.
			2. Load UX-30 5A/8A in closed ISO 20-foot freight container.
	2. Compensatory Measures
		+ 1. The package will be transported within a closed ISO freight container to limit solar heat input during normal transport conditions.
	3. Range of Ambient Conditions for Package Design
		+ 1. The limiting range of ambient conditions for the design is in accordance with paragraph 679 of SSR-6.
	4. Emergency Arrangements
		+ 1. Before any shipment takes place, adequate emergency arrangements must be made, copies of which shall be supplied to the GB Competent Authority.
			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.
	5. Nonconformity with IAEA SSR-6 Paragraphs 639, 655–657 and 660–666
		+ 1. Paragraphs 639, 655–657 and 660–666 are not applicable to this package.
	6. Requirements of IAEA SSR-6 Paragraph 634
		+ 1. The 5A and/or 8A UF6 cylinders referenced in Section 1.1 were designed and fabricated to ANSI N14.1-1971. Cylinders that were manufactured before the first edition of ISO 7195 are acceptable for continued use subject to multilateral approval as prescribed in SSR-6 paragraph 634(a).
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, are as specified in Appendix 1.10 of “UX-30 5A/8A Industrial Package Design for Fissile Material (Type IF) for Uranium Hexafluoride” Part 1 (identification SARS-22022-100-00 version 1, date 04/2024) and comprise the following:
* Orano TN quality assurance applicable to the UX-30 5A/8A package model PRC-QAPD 71-72, TN Americas LLC Quality Assurance Programme Description Manual for 10 CFR Part 71, Subpart H and 10 CFR Part 72, Subpart G
* INER quality assurance applicable to the Model 5A and 8A UF6 cylinders
* INER-QAM-001-10, Quality Manual, Atomic Energy Council, Executive Yuan, Institute of Nuclear Energy Research.
	+ - 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. Related Approvals
		* 1. Not applicable.
	2. 5A and 8A Cylinder Serial Numbers
		* 1. This special arrangement approval applies only to 5A and 8A cylinder serial numbers listed in Appendix 2.
	3. Reasons for Special Arrangement
		* 1. Conformity to the following requirements for transport of UF6 is impractical for all the UF6 cylinders referenced in Appendix 2 due to the following reasons:
2. SSR-6 paragraph 420(c) “…*the internal pressure of cylinders shall not be above atmospheric pressure when presented for transport*”.

Due to concerns over valve re-sealing and lack of facility capability to replace valves, it is not possible to test internal pressure prior to carriage.

1. SSR-6 paragraph 631 “*…packaged and transported in accordance with the provisions of… ISO 7195*”.

Three 8A UF6 cylinders exceed the maximum fill level as defined in ISO 7195:2020, Table 3.

1. CERTIFICATE STATUS
	1. Approval of special arrangement issued to:

Orano TN

7160 Riverwood Drive

Suite 200

Columbia, MD 21046

USA

|  |  |  |  |
| --- | --- | --- | --- |
| **Issue / Revision Number** | **Date of Issue** | **Date of Expiry** | **Reason for Revision** |
| 0 | 31 January 2024 | 30 April 2025 | First approval  |
| 1 | 24 June2024 | 30 April 2025 | Correction of administrative error in the specification of the minimum weight for the 5A/8A internal protective shipping packaging (PSP) |
|  |  |  |  |

Appendix 1 – package illustration



Appendix 2 – UX-30 5A and 8A UF6 cylinder serial numbers

|  |  |  |  |
| --- | --- | --- | --- |
| Item No. | Model No.  | Batch No.  | Serial No.  |
| 1 | 5A  | 5A01  | INER0002  |
| 2 | 5A  | 5A02  | INER0001  |
| 3 | 8A  | 81061  | INER0001  |
| 4 | 8A  | 81062  | INER0002  |
| 5 | 8A  | 81063  | INER0003  |
| 6 | 8A  | 81064  | INER0004  |
| 7 | 8A  | 81065  | INER0005  |
| 8 | 8A  | 81066  | INER0006  |
| 9 | 8A  | 81068  | INER0008  |
| 10 | 8A  | 3EU8A01  | INER001  |
| 11 | 8A  | 3EU8A02  | INER002  |
| 12 | 8A  | 3EU8A03  | INER003  |
| 13 | 8A  | 3EU8A04  | INER004  |
| 14 | 8A | 3EU8A05 | INER005 |
| 15 | 8A  | 3EU8A06  | INER006  |
| 16 | 8A  | 3EU8A07  | INER007  |
| 17 | 8A  | 3EU8A08  | INER008  |
| 18 | 8A  | 3EU8A09  | INER009  |
| 19 | 8A  | 3EU8A10  | INER010  |
| 20 | 8A  | 3EU8A11  | INER011  |
| 21 | 8A  | 3EU8A12  | INER012  |
| 22 | 8A  | 3EU8A13  | INER013  |
| 23 | 8A  | 3EU8A14  | INER014  |
| 24 | 8A  | 3EU8A15  | INER015  |
| 25 | 8A  | 3EU8A16  | INER016  |
| 26 | 8A  | 3EU8A17  | INER017  |