© Office for Nuclear Regulation
UNCONTROLLED WHEN PRINTED
If you wish to reuse this information visit
www.onr.org.uk/copyright for details.

GB/3516C/AF (Rev.2)

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 Springfields Fuels Limited (see Section 5)

as: Type AF

by: road, rail and sea.

Packaging identification: Uranic Materials Container Type 3516

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 is effective from 01 June 2025 and is valid until 31 May 2030 (see Section 5).

COMPETENT AUTHORITY IDENTIFICATION MARK: GB/3516C/AF

Signature:  Date of Issue: 29 May 2025

Ian Barlow, Head of Transport Competent Authority

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 (until 30 June 2025) or Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) 2025 Edition

Intergovernmental Organisation for International Carriage by Rail (OTIF)
Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) 2023 Edition (until 30 June 2025) or Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) 2025 Edition

International Maritime Organization (IMO)
International Maritime Dangerous Goods (IMDG) Code 2022 Edition incorporating Amendment 41-22 (until 31 December 2025) or International Maritime Dangerous Goods (IMDG) Code 2024 Edition incorporating Amendment 42-24

International Civil Aviation Organization (ICAO)
Technical Instructions for the Safe Transport of Dangerous Goods by Air 2025-2026 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

Package Design

1.1 The package design specification shall be in accordance with Design Safety Report in Support of Competent Authority Approval for Fuel Transport Container Package Design No. 3516A & 3516C Type AF & Type IF, Transport Report No. 186 Issue 8 dated 15 May 2025, and modifications to the package design approved by the authorities named on page 1 of this certificate under the established modifications procedure.

Design Drawings

1.2 The design is specified in the following drawings.

Design No.	Title (number of components)	Drawing / Drawing List	Issue
3516	General Arrangement Fuel Transport Container Type 3516 (1)	PK330525	H
3544	Pail Assembly Fuel Transport Container Type 3544 (9)	PK324038	H
GB/3516	Drawing List for Package Type GB/3516	DRG/3516	15

Package Description and Materials of Manufacture

1.3 The package is cuboidal in shape. It has an outer container made of stainless steel, with a removable lid at the top secured by twelve bolts. Inside there is a 100 mm thick layer of thermal insulation on the base, sides and underside of lid which serves the dual purpose of providing thermal protection and holding a stainless steel inner liner centrally in place within the outer container. The inner liner is provided with a removable lid secured by sixteen bolts. Neutron absorbing boronated resin is cast inside the inner liner to a depth of 450 mm, with nine cylindrical positions provided in the resin interspersed with expanded polystyrene plugs. The nine positions house the stainless steel pails with each having a removable lid, secured by a clamp band. The radioactive material is contained within the pails. See Appendix 1 for package illustration.

Package Dimension and Weights

1.4 Nominal dimensions: 1062 mm square plan x 908 mm high

1.5 Maximum authorised gross weight: 693 kg

Authorised Contents

1.6 The authorised radioactive content is:

a) Solid uranium compounds in the form of uranium oxide powder.
b) The maximum payload mass of uranium oxide per pail / package will depend on enrichment as described in paragraph 1.10 below

Restriction on Contents

1.7 The restrictions on content are:

a) The total activity of the contents shall not exceed one A2.
b) The mass of the contents shall be such that the gross mass of the package is greater than 500 kg.

Containment System

1.8 The containment system comprises three parts:

a) The primary containment is the pail assembly, which is designed to hold the package contents within polyethylene bags.
b) The inner liner is designed to retain the pails.
c) The outer body of the 3516 container is designed to retain the inner liner.

Fissile Material Restrictions

1.9 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.

Fissile material approval C1

1.10 Uranium oxide powder with an enrichment of no greater than 5.0 wt% U-235/U(total). The maximum payload mass per pail / package is limited according to enrichment:

Enrichment Band (wt% U-235/U(total))	Maximum Payload Mass (kg)	
	per pail	per package
up to 5.0	24.0	216.0
up to 4.9	25.0	225.0
up to 4.8	26.0	234.0
up to 4.7	27.0	243.0

1.11 Conditions:

a) The mixing of enrichment bands within the package shall not occur.
b) Substances with a hydrogen density greater than water shall not be carried; however, up to 256 g of polyethylene may be used for wrapping or packing within each pail.
c) The mass of moisture associated with the uranium oxide powder is included in the maximum mass loadings stated above and shall not exceed 0.4 wt%.
d) The bulk density of the uranium oxide powder shall not exceed 3.1 g/cm^3
e) Uranium carbides, hydrides, nitrides and metallic uranium shall not be carried.
f) Beryllium, graphite, carbon granules and substances enriched in deuterium shall not be carried.

1.12 The confinement system comprises the following:

a) The nine stainless steel pails.
b) The inner liner comprising NS-4-FR neutron shielding material with a density of at least 1.58 g/cm^3, a boron carbide (B_4C) content of at least 1.444 wt% and a hydrogen content of at least 4.93 wt%.
c) The outer shell with calcium silicate insulation insert.

1.13 Criticality Safety Index (CSI) = 1.66

1.14 The criticality safety documentation comprises NTS CAST 3516C/CR01/R01 Issue 2 'Transport Criticality Safety Report for Uranium Oxide in the 3516C Transport Package' dated October 2023.

1.15 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.

1.16 The fissile material is unirradiated (this does not preclude the use of reprocessed material).

1.17 Ambient temperature range for package design:

a) -40°C to +38°C

1.18 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.

2. USE OF PACKAGE

Information Provided in Safety Report on Use of Packaging

2.1 The packaging shall be used and handled in accordance with PMD 0038 Issue B 'Packing and Handling Instructions for Package Design No. GB/3516'.

2.2 The packaging shall be maintained in accordance with FEMCS 2105 Issue G ‘Maintenance of Type 3516 Fuel Transport Containers’.

Actions Prior to Shipment

2.3 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.

Emergency Arrangements

2.4 Before shipment takes place, adequate emergency arrangements must be made, copies of which shall be supplied to the GB Competent Authority on demand.

2.5 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.

3. MANAGEMENT SYSTEMS

3.1 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 Design Safety Report in Support of Competent Authority Approval for Fuel Transport Container Package Design No. 3516A & 3516C Type AF & Type IF referred to in Section 1 above, and comprise the following:

- SSI 624 Revision 6 Transport Packages for Radioactive Materials & Carriage of Dangerous Goods
- PDGPK03 Issue 11 Package Design Procedures

3.2 No alteration may be made to any management system confirmed as adequate in relation to this design, unless:

a) the authorities named on page 1 of this certificate have confirmed the amended management system is adequate prior to implementation or use; or
b) the alteration falls within the agreed change control procedures set out in the management system(s).

3.3 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.

4. ADMINISTRATIVE INFORMATION

Packaging Serial Numbers

4.1 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.

5. CERTIFICATE STATUS

Design approval issued to:

Springfields Fuels Limited
Salwick
Preston
PR4 0XJ

Issue / Revision Number	Date of Issue	Date of Expiry	Reason for Revision
0	17 May 2019	31 May 2024	First approval
1	14 May 2024	31 May 2025	12-month extension
2	29 May 2025	31 May 2030	5-year renewal

APPENDIX 1 – PACKAGE ILLUSTRATION