



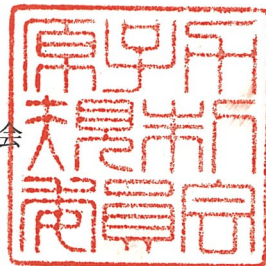
原規規発第 2112201 号

令和 3 年 12 月 20 日

国立大学法人京都大学

学長 湊 長博 殿

原子力規制委員会



核燃料輸送物設計承認英文証明書について

核燃料物質等の工場又は事業所の外における運搬に係る核燃料輸送物設計承認及び容器承認等に関する申請手続ガイド（令和 2 年 2 月 26 日付け原規規発第 2002264 号）2.4. に基づき、令和 3 年 12 月 10 日付け 21 京大施環化第 106 号をもって申請のあった標記の件について、添付のとおり証明します。

IDENTIFICATION MARK

J/2039/B(U)F

COMPETENT AUTHORITY  
OF  
JAPAN

CERTIFICATE FOR APPROVAL OF  
PACKAGE DESIGN  
FOR THE TRANSPORT OF  
RADIOACTIVE MATERIALS

ISSUED BY

NUCLEAR REGULATION AUTHORITY  
1-9-9, ROPPONGI MINATO-KU  
TOKYO, JAPAN

CERTIFICATE FOR APPROVAL OF PACKAGE DESIGN  
FOR THE TRANSPORT OF RADIOACTIVE MATERIALS

This is to certify, in response to the application by KYOTO UNIVERSITY, that the package design described herein complies with the design requirements for a package containing Fresh Fuel Elements and Spectrum Converter, specified in the 2018 Edition of the Regulations for the Safe Transport of Radioactive Material (International Atomic Energy Agency, Safety Standards Series No.SSR-6) and the Japanese rules based on the Act on Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors.

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.

COMPETENT AUTHORITY

IDENTIFICATION MARK: J/2039/B(U)F

Dec. 20. 2021

Date

K. Hasegawa

Hasegawa Kiyomitsu

Director, Division of Licensing for  
Nuclear Fuel Facilities

Secretariat of Nuclear Regulation Authority  
Competent Authority of JAPAN  
for Package Design Approval

1. The Competent Authority Identification Mark : J/2039/B(U)F
2. Name of Package : JRF-90Y-950K
3. Type of Package : Type B(U) package for fissile material
4. Specification of Package
  - (1) Materials of Packaging
    - (a) Main Body : Stainless steel, Balsa wood and Hard polyurethane foam
    - (b) Outer lid : Stainless steel, Balsa wood and Hard polyurethane foam
    - (c) Inner lid : Stainless steel and Silicone rubber
    - (d) Fuel Basket : Stainless steel and Silicone rubber
  - (2) Total weight of Packaging : Approximately 860 kg
  - (3) Outer Dimensions of Packaging
    - (i) Outer Diameter : Approximately 840 mm
    - (ii) Length : Approximately 1,800 mm
  - (4) Total Weight of Package : 950 kg or less
  - (5) Illustration of Package : See the attached Figure-1 (Bird's-eye View)
5. Specification of Radioactive Contents : See the attached Table-1, 2 and 3
6. Description of Containment System  
Containment system consists of the inner shell and the inner lid (made of the stainless steel). O-ring made of silicone rubber is used for the contact surface between inner shell and inner lid.
7. For Package containing Fissile Materials
  - (1) Restrictions on Package
    - (i) Restriction Number "N" : No restriction
    - (ii) Array of Package : No restriction
    - (iii) Criticality Safety Index (CSI) : 0
  - (2) Description of Confinement System

Confinement system consists of the basket which maintains the fuel elements contained in the package.

(3) Assumptions of Leakage of Water into Package

It is assumed in criticality analysis that water will leak into void space of inner shell.

(4) Special Features in Criticality Assessment

Not applicable

8. For Type B (M) Packages, a statement regarding prescriptions of Type B (U) Package that do not apply to this Package

Not applicable (This package is Type B(U))

9. Assumed Ambient Conditions

- |                               |                               |
|-------------------------------|-------------------------------|
| (i) Ambient Temperature Range | : -40°C~38°C                  |
| (ii) Insolation Data          | : Table 12 of IAEA Regulation |

10. Handling, Inspection and Maintenance

(1) Handling Instructions

- (i) Package should be handled carefully in accordance with the schedule and procedures established properly taking all possible safety measures.
- (ii) Package should be handled using appropriate lifting devices and the crane.
- (iii) When packaging is stored outdoors, it should be covered with an appropriate waterproof sheet, avoiding the situation where it is placed directly on the ground.

(2) Inspections and Maintenance of Packaging

The following inspections should be performed not less than once a year (once for every ten times in a case where the packaging is used not less than ten times a year) and defect of packaging should be repaired, if any, in order to maintain the integrity of packaging.

- (i) Visual Appearance Inspection
- (ii) Pressure Durability Inspection
- (iii) Maintenance of O-ring Used for Containment System
- (iv) Leakage Rate Measurement Inspection
- (v) Subcriticality Inspection
- (vi) Lifting Inspection

(3) Actions prior to Shipment

The following inspections should be performed prior to shipment.

- (i) Visual Appearance Inspection

- (ii) Lifting Inspection
- (iii) Weight Measurement Inspection
- (iv) Surface Contamination Measurement Inspection
- (v) Radiation Dose rate Inspection
- (vi) Subcriticality Inspection
- (vii) Contents Specification Check Inspection
- (viii) Leakage Rate Measurement Inspection

(4) Precautions for Loading of Package for Shipment

Package should be securely loaded to the conveyance at the designated tie-down portion of the package so as not to move, roll down or fall down from the loading position during transport.

11. Issue Date and Expiry Date

- (i) Issue Date : December 9, 2021
- (ii) Expiry Date : December 8, 2061

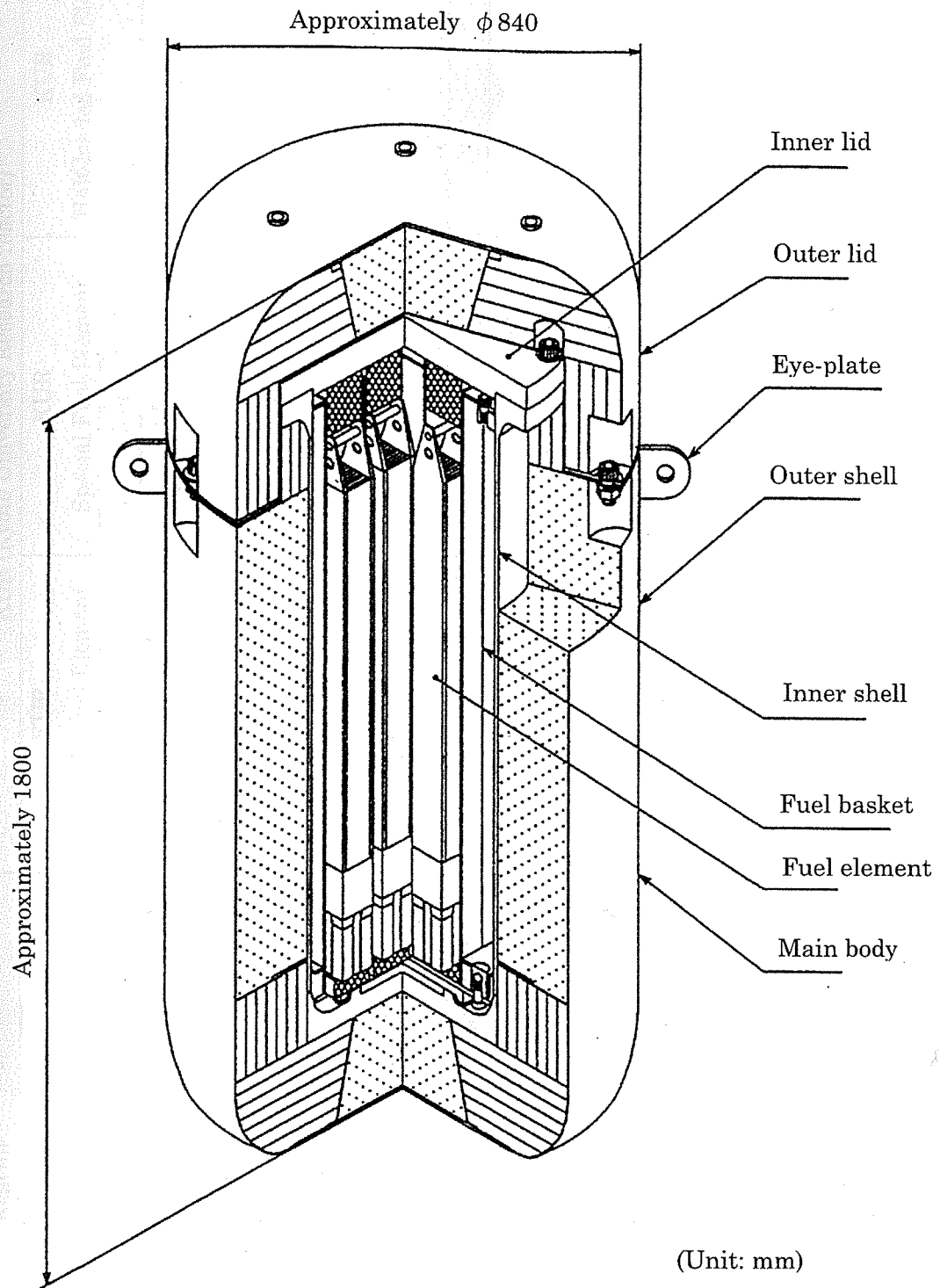


Figure-1 Illustration of JRF-90Y-950K package (Bird's-eye view)

Table-1 Specification of Contents (KUR Fresh Fuel Element)

Reactor		KUR (Kyoto University Research reactor)		
Fuel Element		KUR Standard Fuel Element	KUR Special Fuel Element	KUR Half-loaded Fuel Element
Number of Fuel Elements (element/package)		10 or less		
Fuel Type		LEU fuel		
Materials of Nuclear Fuel		Uranium-silicon -aluminum dispersion alloy		
Weight	<sup>235</sup> U weight (g or less/package)	2,180	1,090	1,090
	U weight (g or less/package)	11,150	5,580	5,580
	<sup>235</sup> U weight (g or less/element)	218	109	109
	U weight (g or less/element)	1,115	558	558
Enrichment (wt% or less)		19.95		
Activity of Contents	Total (GBq or less/package)	29.8		
	Principal Radionuclide (GBq or less/package)	<sup>234</sup> U : 28.6 <sup>235</sup> U : 0.38 <sup>236</sup> U : 0.59 <sup>238</sup> U : 0.24		
Physical State		Solid		
Burn-up (% or less)		0 (Fresh Fuel)		
Total Heat Generation Rate (W or less/package)		0 (Fresh Fuel)		
Cooling Time (days)		0 (Fresh Fuel)		

-Loading a transport package with different types of nuclear fuel material is allowed for each reactor only when all the fuel elements contained are the same type having the same enrichment level.

- The values of weight and heat generation are calculated proportionally from the maximum weight and heat generation for each type of fuel element according to the number of assemblies contained.

- The absorbed dose rate to air at a position 1 m away from the surface of the package is 1 Gy/h or less.



Table-2 Specification of Contents (KUCA Fresh Fuel Element)

Reactor		KUCA (Kyoto University Critical Assembly)	
Fuel Element		Coupon	Flat
Number of Fuel Elements (element/package)		1,200 or less	300 or less
Fuel Type		LEU Fuel	
Materials of Nuclear Fuel		Uranium-molybdenum - aluminum dispersion alloy	Uranium-silicon - aluminum dispersion alloy
Weight	<sup>235</sup> U weight (g or less/package)	4,800	4,500
	U weight (g or less/package)	24,600	23,400
	<sup>235</sup> U weight (g or less/element)	4	15
	U weight (g or less/element)	20.5	78
Enrichment (wt% or less)		19.95	
Activity of Contents	Total (GBq or less/package)	15.5	
	Principal Radionuclide (GBq or less/package)	<sup>234</sup> U : 14.5	
		<sup>235</sup> U : 0.38	
		<sup>236</sup> U : 0.27	
		<sup>238</sup> U : 0.24	
Physical State		Solid	
Burn-up (% or less)		0 (Fresh Fuel)	
Total Heat Generation Rate (W or less/package)		0 (Fresh Fuel)	
Cooling Time (days)		0 (Fresh Fuel)	

-Loading a transport package with different types of nuclear fuel material is allowed for each reactor only when all the fuel elements contained are the same type having the same enrichment level.

- The values of weight and heat generation are calculated proportionally from the maximum weight and heat generation for each type of fuel element according to the number of assemblies contained.

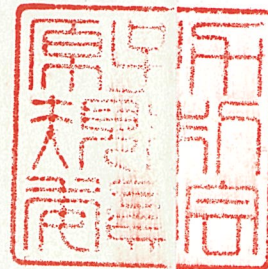
- The absorbed dose rate to air at a position 1 m away from the surface of the package is 1 Gy/h or less.

Table-3 Specification of Contents (Spectrum Converter)

			Specification	
Material of Nuclear Fuel			Uranium dioxide	
Physical State			Solid (metal)	
Form			Plate	
			Spectrum Converter	
Plate size (mm)			310 diam. × 10.7 thick	
Weight of plate (g or less)			2500	
specification per package	Number of plate (plates or less)		1	
	Weight	<sup>235</sup> U (kg or less)	1.002	
	Activity	Total (Bq or less)	3.5 × 10 <sup>8</sup>	
		Principle Radionuclides (Bq or less)	<sup>235</sup> U	8.02×10 <sup>7</sup>
	Uranium Enrichment (wt % or less)		90	
	Heat Generation Rate (W or less)		5.13 × 10 <sup>-6</sup>	
Burn up Rate (%)			7.00 × 10 <sup>-6</sup>	
Cooling Time (days or more) *			12340	

\* As of April 2021

- The absorbed dose rate to air at a position 1 m away from the surface of the package is 1 Gy/h or less.



For the purpose of this report, the data presented herein is based on the information provided by the client.

Page 1 of 1

General Information		15/10/19
Project Name (or code)		15/10/19
Plant ID (or code)		15/10/19
Plant Description (or code)		15/10/19
Customer Name (or code)		15/10/19
Plant Location (or code)		15/10/19
Plant Capacity (or code)		15/10/19
Plant Status (or code)		15/10/19
Plant Type (or code)		15/10/19
Plant Size (or code)		15/10/19
Plant Age (or code)		15/10/19
Plant Owner (or code)		15/10/19
Plant Operator (or code)		15/10/19
Plant Maintenance (or code)		15/10/19
Plant Safety (or code)		15/10/19
Plant Environment (or code)		15/10/19
Plant History (or code)		15/10/19
Plant Future (or code)		15/10/19
Plant Notes (or code)		15/10/19