



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration

East Building, PHH-23
1200 New Jersey Ave, SE
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION FOR A
TYPE B(U)F FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0835/B(U)F-96, REVISION 0
REVALIDATION OF JAPANESE COMPETENT AUTHORITY
CERTIFICATE J/170/B(U)F-96**

The Competent Authority of the United States certifies that the radioactive material package design described in this certificate satisfies the regulatory requirements for a Type B(U)F package as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America² The package design is approved for use within the United States for import and export shipments made in accordance with applicable international and domestic transport regulations.

1. Package Identification - JRF-90Y-950K.
2. Package Description and Authorized Radioactive Contents - as described in Japanese Certificate of Competent Authority J/170/B(U)F-96, Revision 3 (attached).
3. Criticality - The minimum criticality safety index is 0. There is no restriction on the number of packages per conveyance.
4. General Conditions -
 - a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.
 - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Engineering and Research, (PHH-23), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.

¹ "Regulations for the Safe Transport of Radioactive Material, 2012 Edition, No. SSR-6" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

² Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

CERTIFICATE USA/0835/B(U)F-96, REVISION 0

c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.

d. Records of Management System activities required by Paragraph 306 of the IAEA regulations¹ shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors in the United States exporting shipments under this certificate shall satisfy the applicable requirements of Subpart H of 10 CFR 71.

5. Marking and Labeling - The package shall bear the marking USA/0835/B(U)F-96 in addition to other required markings and labeling.

6. Expiration Date - This certificate expires on April 26, 2025.

This certificate is issued in accordance with paragraph(s) 810 and 816 of the IAEA Regulations and Section 173.472 and 173.473 of Title 49 of the Code of Federal Regulations, in response to the September 22, 2020 petition by Orano NCS GmbH, Hanau, Hesse, GERMANY, and in consideration of other information on file in this Office.

Certified By:

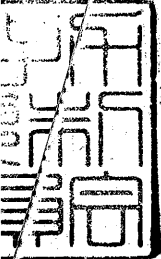


May 03, 2022

(DATE)

William Schoonover
Associate Administrator for Hazardous
Materials Safety

Revision 0 - Issued to revalidate Japanese Certificate of Competent Authority J/170/B(U)F-96 (Rev. 3), dated June 23, 2020.



IDENTIFICATION MARK
J/170/B(U)F-96 (Rev. 3)

COMPETENT AUTHORITY
OF
JAPAN

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

ISSUED BY
NUCLEAR REGULATION AUTHORITY
1-9-9, ROPPOGI 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 low irradiated fuel elements in research reactors, specified in the 2012 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/170/B(U)F-96 (Rev. 3)

Jun. 23. 2020.

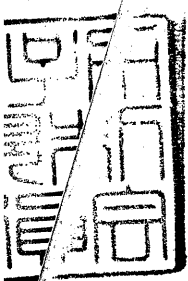
Date

K. Hasegawa

Hasegawa Kiyomitsu

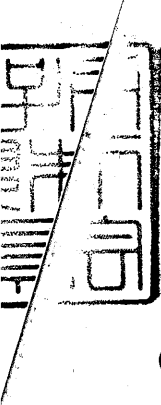
Director, Division of Licensing for
Nuclear Fuel Facilities

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



1. The Competent Authority Identification Mark : J/170/B(U)F-96(Rev. 3)
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, 3 and 4
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

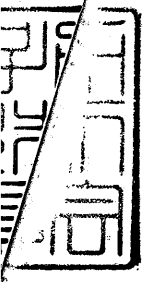
(v) Subcriticality Inspection

(vi) Lifting Inspection

(3) Actions prior to Shipment

The following inspections should be performed prior to shipment.

(i) Visual Appearance Inspection

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- (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 : April 27, 2020
- (ii) Expiry Date : April 26, 2025

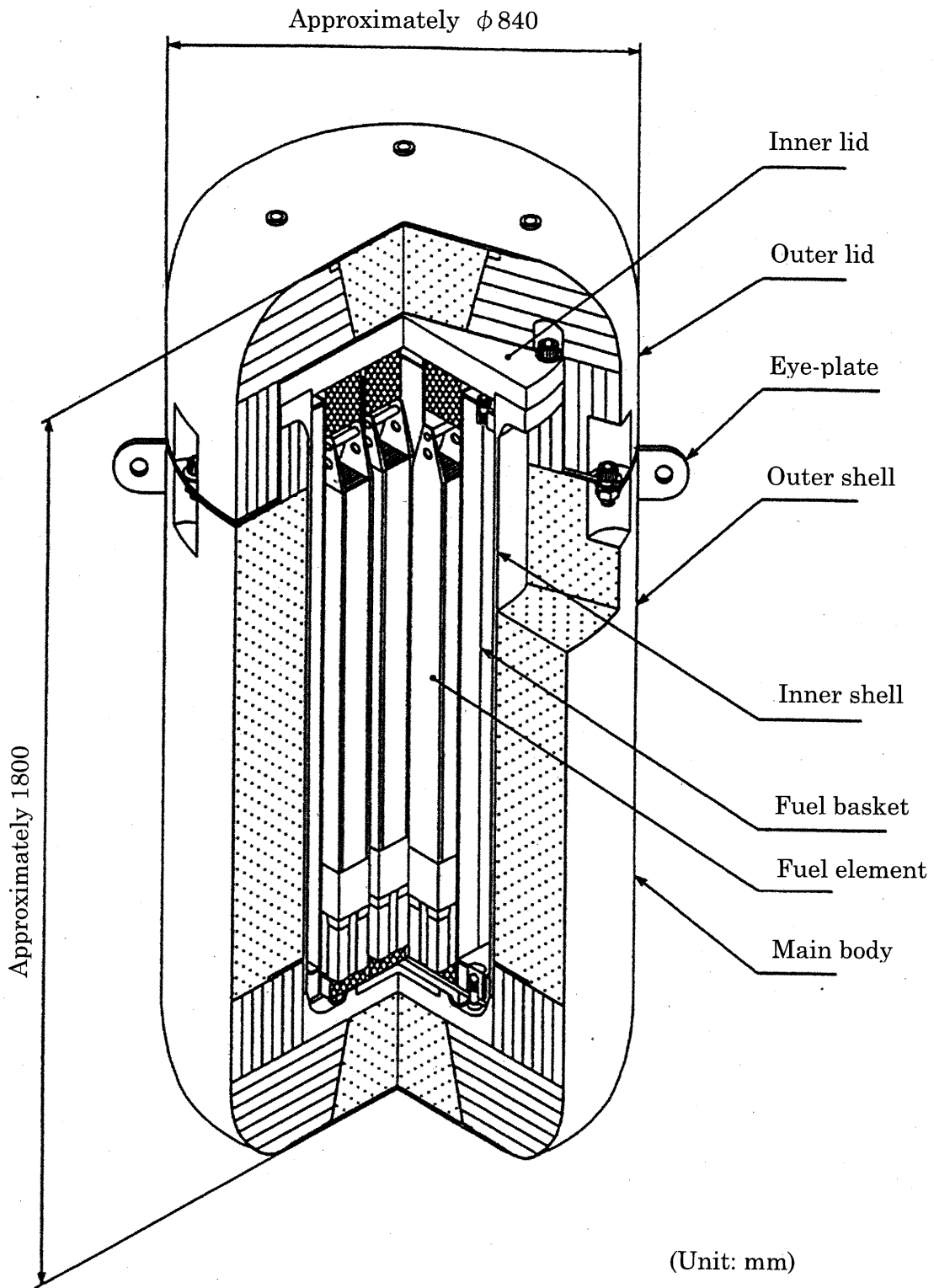


Figure-1 Illustration of JRF-90Y-950K package (Bird's-eye view)

Table-1 Specification of Contents (Fresh Fuel Element)

| Reactor | | KUR (Kyoto University Research reactor) | | |
|--|--|---|--------------------------|-------|
| Fuel Element | KUR | KUR | KUR | KUR |
| | Standard Fuel Element | Special Fuel Element | 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 | ²³⁵ U weight (g or less/package) | 2,180 | 1,090 | 1,090 |
| | U weight (g or less/package) | 11,150 | 5,580 | 5,580 |
| | ²³⁵ 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) | ²³⁴ U | : | 28.6 |
| | | ²³⁵ U | : | 0.38 |
| | | ²³⁶ U | : | 0.59 |
| ²³⁸ 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. For the nuclear fuel material from JMTRC, however, mixed loading of fuel elements of different types and different enrichment levels is allowed.

-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.

Table-2 Specification of Contents (Fresh Fuel Element)

| Reactor | JRR-3 | | JRR-4 | | | JMTR | | |
|--|---|----------------------------------|--------------------------|-----------------------------------|---|-----------------------------------|---------------------|-------|
| | JRR-3 standard fuel element | JRR-3 follower type fuel element | JRR-4B type fuel element | JRR-4L type fuel element | JRR-4 type fuel element | JMTR standard fuel element | JMTR fuel followers | |
| Number of Fuel Elements (element/package) | 10 or less | | | | | | | |
| Fuel Type | LEU fuel | | | | | | | |
| Materials of Nuclear Fuel | Uranium-silicon - aluminum dispersion alloy | | HEU fuel | Uranium-aluminum dispersion alloy | Uranium-silicon - aluminum dispersion alloy | Uranium-aluminum dispersion alloy | LEU fuel | |
| | ²³⁵ U weight (g or less/package) | 3,100 | 1,700 | 2,300 | 2,100 | 3,200 | 2,800 | |
| | U weight (g or less/package) | 15,860 | 1,830 | 11,770 | 10,750 | 7,280 | 14,330 | |
| | ²³⁵ U weight (g or less/element) | 310 | 170 | 230 | 210 | 320 | 280 | |
| U weight (g or less/element) | 1,586 | 183 | 1,177 | 1,075 | 728 | 2,174 | 1,433 | |
| Enrichment (wt% or less) | 19.95 | | 93.3 | 19.95 | | | 46.0 | 19.95 |
| Activity of Contents | Total (GBq or ess/package) | | 29.8 | | | | | |
| | | | ²³⁴ U | : | 28.6 | | | |
| Physical State | | | ²³⁵ U | : | 0.38 | | | |
| | | | ²³⁶ U | : | 0.59 | | | |
| Burn-up (% or less) | | | ²³⁸ U | : | 0.24 | | | |
| | | | Solid | | | | | |
| 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. For the nuclear fuel material from JMTRC, however, mixed loading of fuel elements of different types and different enrichment levels is allowed.

- 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.

Table-3 Specification of Contents (Low Irradiated Fuel Element)

| Reactor | JMTRC | | | | |
|--|---|---------------|-----------------------------------|----------------|----------------|
| | JMTRC Standard | JMTRC Special | JMTRC Follower | JMTRC Standard | JMTRC Follower |
| Fuel Element | | | | | |
| Number of Fuel Elements (element/package) | 10 or less | | | | |
| Fuel Type | HEU fuel | | MEU fuel | | |
| Materials of Nuclear Fuel | Uranium-aluminum alloy | | Uranium-aluminum dispersion alloy | | |
| Weight | ²³⁵ U weight (g or less/package) | 2,850 | 1,990 | 3,170 | 2,860 |
| | U weight (g or less/package) | 3,180 | 2,220 | 7,210 | 6,500 |
| | ²³⁵ U weight (g or less/element) | 285 | 199 | 317 | 286 |
| | U weight (g or less/element) | 318 | 222 | 721 | 650 |
| Enrichment (wt% or less) | 90.0 | | 46.0 | | |
| Total (GBq or ess/package) | 17.3 | | | | |
| Activity of Contents | | | ²³⁴ U | : | 16.2 |
| | | | ²³⁵ U | : | 0.25 |
| Physical State | | | ²³⁶ U | : | 0.29 |
| | | | ²³⁸ U | : | 0.05 |
| | | | | Others | : 0.52 |
| Burn-up (% or less) | 7.23×10 ⁻⁵ | | 1.76×10 ⁻⁵ | | |
| Total Heat Generation Rate (W or less/package) | 4.30×10 ⁻⁵ | | 3.29×10 ⁻⁵ | | |
| Cooling Time (days) | 5,475 or more | | 1,460 or more | | |

-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. For the nuclear fuel material from JMTRC, however, mixed loading of fuel elements of different types and different enrichment levels is allowed.

-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.

Table-4 Specification of Contents (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 | |
| | ²³⁵ U weight (g or less/package) | 4,800 | 4,500 |
| | U weight (g or less/package) | 24,600 | 23,400 |
| | ²³⁵ 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) | ²³⁴ U | : 14.5 |
| | | ²³⁵ U | : 0.38 |
| | | ²³⁶ U | : 0.27 |
| ²³⁸ 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. For the nuclear fuel material from JMTRC, however, mixed loading of fuel elements of different types and different enrichment levels is allowed.

-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.



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1200 New Jersey Ave, SE
Washington, D.C. 20590

CERTIFICATE NUMBER: USA/0835/B(U)F-96

ORIGINAL REGISTRANT(S) :

Orano NCS GmbH
Margarete-von-Wrangell-Straße 7
Hanau, Hesse, 63457
Germany