

No. 1-1: Non-Proprietary Version of Japanese JRF-90Y-950K Validation

(English)

1. The Competent Authority Identification Mark : J/2043/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,
    - (b) Outer Lid : Stainless steel,
    - (c) Inner Lid : Stainless steel and
    - (d) Fuel Basket : Stainless steel and
  - (2) Total Weight of Packaging :
  - (3) Outer Dimensions of Packaging
    - (i) Outer Diameter :
    - (ii) Length :
  - (4) Total Weight of Package : 950 kg or less
  - (5) Illustration of Package : See Figure-1  
(Bird's-eye view)
5. Specification of Radioactive Contents : See Table-1 and Table-2
6. Description of Containment System
 

Containment system consists of an inner shell and an inner lid (made of stainless steel). O-ring made of  is used for the contact surface between the inner shell and the 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 the 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 cranes.

(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 more 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 : May 23, 2022
- (ii) Expiry Date : May 22, 2082

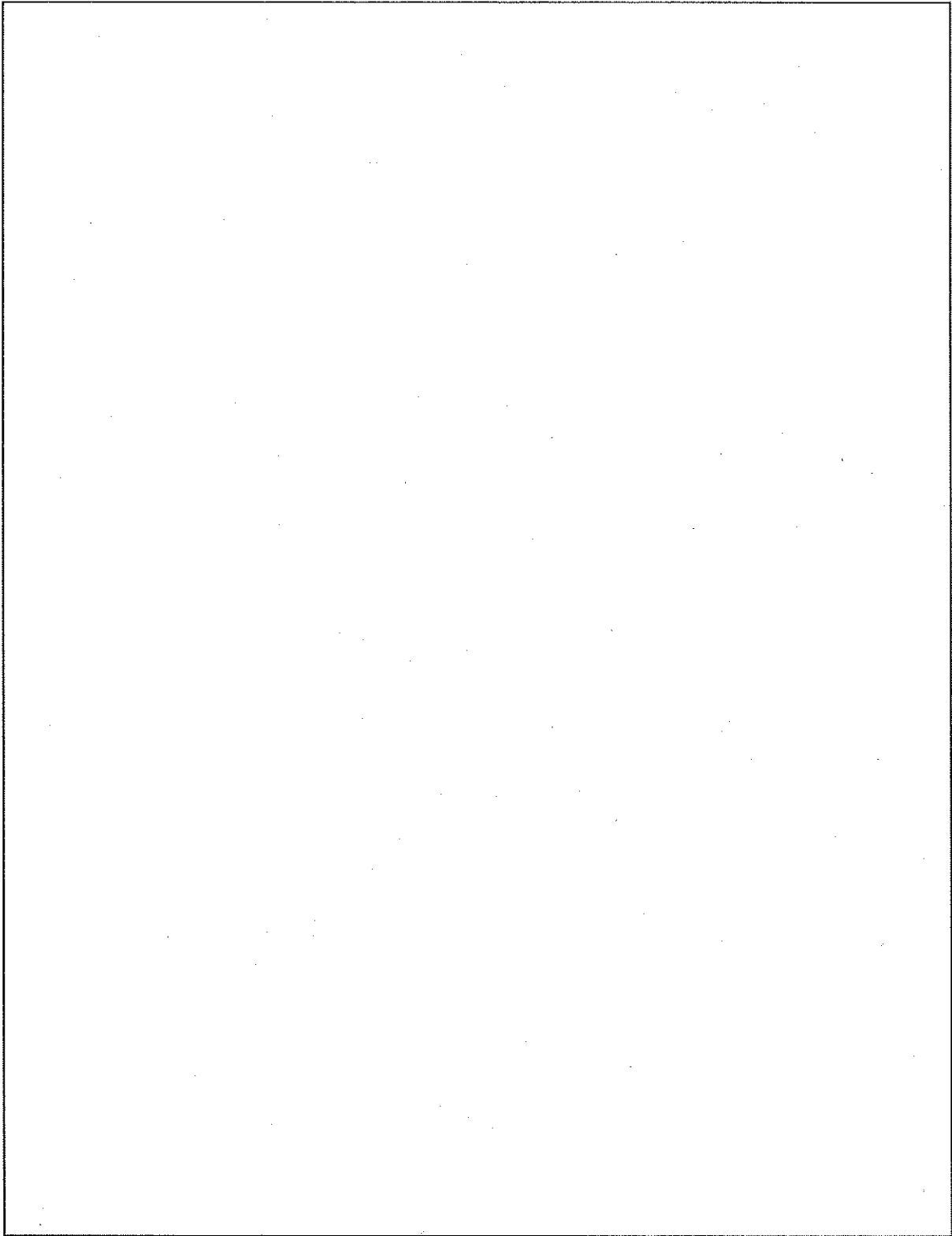


Figure-1 Illustration of JRF-90Y-950K Package (Bird's-eye view)

Table-1 Specification of Contents (Fresh Fuel Element)

| Type   | Reactor                                      | JRR-3                                     | JRR-3          | JMTR          | JMTR          |
|--|--|---|----------------|---------------|---------------|
| Fuel Element                                   |  | JRR-3 Standard                            | JRR-3 Follower | JMTR Standard | JMTR Follower |
| Number of Fuel Elements (element/Package)      |  | 10 or less                                |                |               |               |
| Fuel Type                                      |  | LEU fuel                                  |                |               |               |
| Material of Nuclear Fuel                       |  | Uranium Silicon Aluminum Dispersion Alloy |                |               |               |
| Physical State                                 |  | Solid                                     |                |               |               |
| Weight   | <sup>235</sup> U weight (g or less/package)  |   |                |               |               |
|  | U weight (g or less/package)                 |   |                |               |               |
|  | <sup>235</sup> U weight (g or less/element)  |   |                |               |               |
|  | U weight (g or less/element)                 |   |                |               |               |
| Enrichment(wt% or less)                        |  |   |                |               |               |
| Activity of Contents                           | Total (GBq or less/package)                  |   |                |               |               |
|  | Principal Radionuclide (GBq or less/package) |   |                |               |               |
| Burn-up (% or less)                            |  |   |                |               |               |
| Total Heat Generation Rate (W or less/Package) |  | 0 (Fresh fuel)                            |                |               |               |
| Cooling time (Day)                             |  |   |                |               |               |

·Loading a transport package with different types of fuel element is allowed for each reactor only when all the fuel elements contained are the same material of nuclear fuel 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.

Table-2 Specification of Contents (Low Irradiated Fuel Element)

| Type  | Reactor                                      | Special | Standard   | JMTRC | Special                           | Follower           |
|---|--|---------|------------|-------|-----------------------------------|--------------------|
| Number of Fuel Elements (element/Package)       |  |         | 10 or less |       |                                   |                    |
| Fuel Type                                       | HEU fuel                                     |         |            |       | MEU fuel                          |                    |
| Material of Nuclear Fuel                        | Uranium Aluminum Alloy                       |         |            |       | Uranium Aluminum Dispersion Alloy |                    |
| Physical State                                  |  |         |            |       | Solid                             |                    |
| Weight  | <sup>235</sup> U weight (g or less/package)  |         |            |       |                                   |                    |
|   | U weight (g or less/package)                 |         |            |       |                                   |                    |
|   | <sup>235</sup> U weight (g or less /element) |         |            |       |                                   |                    |
|   | U weight (g or less /element)                |         |            |       |                                   |                    |
| Enrichment(wt% or less)                         |  |         |            |       |                                   |                    |
| Activity of Contents                            | Total (GBq or less/package)                  |         |            |       |                                   |                    |
|   | Principal Radionuclide (GBq or less/package) |         |            |       |                                   |                    |
| Burn-up (% or less)                             |  |         |            |       |                                   |                    |
| Total Heat Generation Rate (W or less /Package) |  |         |            |       | $4.30 \times 10^5$                | $3.29 \times 10^5$ |
| Cooling time                                    |  |         |            |       |                                   |                    |

-Loading a transport package with different types of fuel element is allowed for each reactor only when all the fuel elements contained are the same material of nuclear fuel having the same enrichment level. However, loading with different types of fuel element is allowed even if fuel elements contained are different type or different enrichment level, in case of JMTRC fuel element.

-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.