



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(M)F FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0388/B(M)F-96, REVISION 6

REVALIDATION OF JAPANESE COMPETENT AUTHORITY
CERTIFICATE J/108/B(M)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(M)F package as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America².

1. Package Identification - NR-10F.
2. Package Description and Authorized Radioactive Contents - as described in Japanese Certificate of Competent Authority J/108/B(M)F-96, 2 (attached). Contents are restricted to those listed as Content I, II, III and IV on the Japanese certificate.
3. Criticality - The minimum criticality safety index is 0.0. The maximum number of packages per conveyance is determined in accordance with Table X of the IAEA regulations cited in this certificate.
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

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/0388/B(M)F-96, REVISION 6

Materials Safety Administration, U.S. Department of
Transportation, Washington D.C. 20590-0001.

- 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. This certificate provides no relief from the limitations for transportation of plutonium by air in the United States as cited in the regulations of the U.S. Nuclear Regulatory Commission 10 CFR 71.88.
- e. Pursuant to Paragraph 558 of the IAEA Regulations, for each shipment made in accordance with this certificate, the shipper shall notify the competent authorities of each country through or into which the shipment is to be transported. The shipper shall ensure that this notification has been received by the competent authority at least 15 days prior to the commencement of the shipment.
- f. 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. Special Conditions -

- a. This package is approved as a Type B(M)F because an ambient temperature range between -20 degrees C and -40 degrees C has not been considered. Accordingly, it may not be operated in temperatures below -10 degrees C.
- b. Contents are restricted to those listed as Content I, II, III and IV on the Japanese certificate.
- c. This package is not authorized for transport by air.
- d. The impact limiters used on this package must be attached with high strength SCNM material bolts.

6. Marking and Labeling - The package shall bear the marking USA/0388/B(M)F-96 in addition to other required markings and labeling.

CERTIFICATE USA/0388/B(M)F-96, REVISION 6

7. Expiration Date - This certificate expires on December 12, 2022.


This certificate is issued in accordance with paragraph(s) 813 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 March 28, 2018 petition by Edlow International Company, Washington, DC, and in consideration of other information on file in this Office.

Certified By:



May 09, 2018

(DATE)

 William Schoonover
Associate Administrator for Hazardous
Materials Safety

Revision 6 - Issued to revalidate Japanese Certificate of Approval
No. J/108/B(M)F-96, Revision 2.

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

This is to certify, in response to the application by Nippon Nuclear Fuel Development Co., Ltd., that the package design described herein complies with the design requirements for a package containing irradiated fuel elements, specified in the 2012 Edition of the Regulations for the Safe Transport of Radioactive Materials (International Atomic Energy Agency, Safety Standards Series No.SSR-6) and the Japanese rules based on the Act on the 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

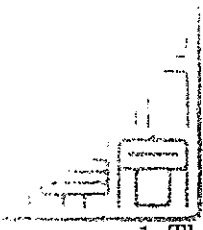
IDENTIFICATION MARK : J/108/B(M)F-96(Rev.2)

January 31, 2018
Date

青木 一 誠
Kazuya Aoki

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/108/B(M)F-96(Rev.2)
2. Name of Package : NR-10F
3. Type of Package : Type B(M) Package containing Fissile Materials
4. Specification of Package
 - (1) Materials of Packaging : See the attached Table-1
 - (2) Total Weight of Packaging : 11.5 tons or less
 - (3) Outer Dimensions of Packaging
 - (i) Outer diameter : Approximately 1.5 m (including Impact limiters)
 - (ii) Height : Approximately 2.0 m (including Impact limiters)
 - (4) Total Weight of Package : 11.5 tons or less
 - (5) Illustration of Package : See the attached Figure-1 (Bird's-eye view)
5. Specification of Radioactive Contents : See the attached Table-2
6. Description of Containment System

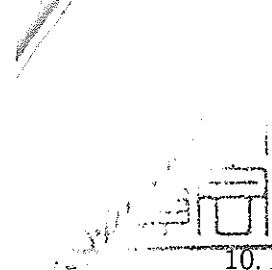
Containment system consists of main body, lid, drain valve, valve mounting flange, valve cover, vent plug, contamination preventive plug for leak test hole, O-ring and lid volt.
7. For Package containing Fissile Materials,
 - (1) Restrictions on Package
 - (i) Restriction Number "N" : No restriction
 - (ii) Array of Package : No restriction
 - (iii) Criticality Safety Index (CSI) : 0
 - (2) Description of Confinement System

Confinement system consists of fuel segment capsule and package.
 - (3) Assumptions of Leakage of Water into Package

It is assumed in criticality analysis that water will leak into void spaces of inner packaging.
 - (4) Special Features in Criticality Assessment

There is no special device.
8. For Type B(M) Packages, a statement regarding prescriptions of Type B(U) Package that do not apply to this Package

Ambient temperature -20°C to -40°C is not considered.
9. Assumed Ambient Conditions
 - (i) Ambient Temperature Range : -20°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 such as forklift or 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) External appearance inspection
- (ii) Operation check and inspection
- (iii) Air tightness and leakage inspection
- (iv) Lifting inspection
- (v) Thermal inspection

(3) Actions prior to Shipment

The following inspections should be performed prior to shipment.

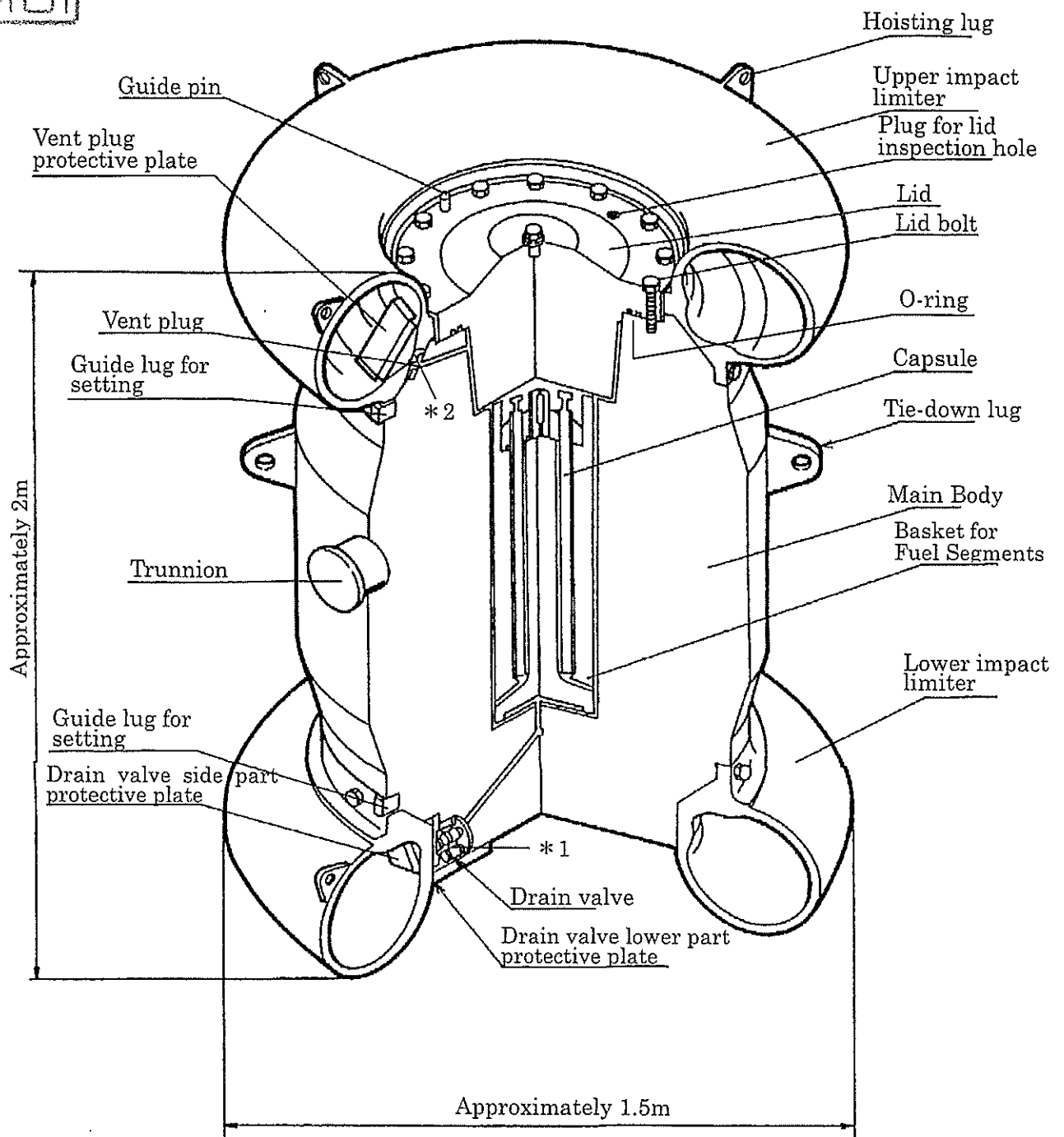
- (i) External appearance inspection
- (ii) Lifting inspection
- (iii) Weight inspection
- (iv) Surface contamination density inspection
- (v) Dose rate inspection
- (vi) Contents inspection
- (vii) Temperature measurement inspection
- (viii) Air tightness and leakage inspection
- (ix) Pressure measurement inspection
- (x) Subcriticality 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 packaging 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 : Dec.13, 2017
- (ii) Expiry Date : Dec.12, 2022



- * 1
 - Valve mounting flange
 - Valve cover
 - Contamination preventive plug for leak test hole
 - O-ring
- * 2
 - Valve cover
 - Contamination preventive plug for leak test hole
 - O-ring

Figure-1 Illustration of Package (Bird's-eye view)

Table-1 Materials of Packaging

Component	Material
a. Main body	Stainless steel (SUS F304)
b. Lid	Stainless steel (SUS F304)
c. Trunnion	Stainless steel (SUS 304)
d. Lid bolt	Alloy steel (SNCM 630)
e. Basket	Stainless steel (SUS F304)
f. Impact limiter	Stainless steel (SUS 304)

Table-2 Specification of Radioactive Contents

Categories of contents	Content I	Content II	Content III	Content IV	Content V
	Fuel segment capsule				MOX fuel segment capsule
Item	Irradiated by power Reactor and test reactor ¹⁾	Irradiated by test reactor only ²⁾		Irradiated by power Reactor ⁸⁾	UO ₂ and MOX fuel segment capsule
		Regular size ³⁾	Small size ⁴⁾		
Kind	Uranium dioxide (irradiated)	Uranium dioxide (irradiated)	Uranium dioxide (irradiated)	Uranium dioxide (irradiated)	Uranium dioxide and Plutonium dioxide (irradiated)
Properties	solid	solid	solid	solid	solid
Weight	Total : ≤ 13.63 kg U : ≤ 2.40 kg	Total : ≤ 16.48 kg U : ≤ 3.20 kg	Total : ≤ 13.88 kg U : ≤ 0.80 kg	Total : ≤ 16.48 kg U : ≤ 3.20 kg	Total : ≤ 12.00 kg U : ≤ 2.69 kg Pu : ≤ 0.40 kg
Radioactivity	≤ 556 TBq	≤ 1.29 PBq	≤ 331 TBq	≤ 137 TBq	≤ 683 TBq
	Major Radionuclides (TBq) ⁹⁵ Nb : 45.3 ¹⁰⁶ Ru : 54.8 ¹⁰⁶ Rh : 54.8 ¹³⁴ Cs : 50.6 ¹⁴⁴ Ce : 58.3 ¹⁴⁴ Pr : 58.3	Major Radionuclides (TBq) ⁹⁵ Nb : 162 ¹⁰⁶ Ru : 118 ¹⁰⁶ Rh : 118 ¹³⁴ Cs : 82.3 ¹⁴⁴ Ce : 155 ¹⁴⁴ Pr : 155	Major Radionuclides (TBq) ⁹⁵ Nb : 41.1 ¹⁰⁶ Ru : 16.4 ¹⁰⁶ Rh : 16.4 ¹³⁴ Cs : 25.5 ¹⁴⁴ Ce : 44.1 ¹⁴⁴ Pr : 44.1	Major Radionuclides (TBq) ⁶⁰ Co : 17.3 ⁹⁰ Sr : 15.1 ⁹⁰ Y : 15.1 ¹³⁷ Cs : 22.9 ^{137m} Ba : 21.4 ²⁴¹ Pu : 13.2	Major Radionuclides (TBq) ¹⁰⁶ Ru : 86.76 ¹⁰⁶ Rh : 86.76 ¹⁴⁴ Ce : 60.83 ¹⁴⁴ Pr : 60.83 ²⁴¹ Pu : 78.74 ²⁴² Cm : 58.59
Enrichment	≤ 4.6 % (initial)	≤ 10.0 % (initial)	≤ 13.5 % (initial)	≤ 4.9 % (initial)	≤ 10.0%
Fissile Plutonium Enrichment	—	—	—	—	≤ 8.2%
Burn-up	≤ 67 GWD/MTU ⁵⁾	≤ 63 GWD/MTU	≤ 103.5 GWD/MTU	≤ 70 GWD/MTU	≤ 110 GWD/MT
Decay heat	≤ 1 kW	≤ 1 kW	≤ 1 kW	≤ 0.03kW	≤ 0.18 kW
Cooling time	After irradiation by a power reactor	After irradiation by a test reactor	≥ 90 days	≥ 90 days	≥ 2,300days
	≥ 180 days ⁶⁾	≥ 90 days ⁷⁾			
Loading quantity	≤ 8 pieces	≤ 8 pieces	≤ 8 pieces	≤ 8 pieces	≤ 8 pieces
Outer dimensions	φ21.7 mm × 800 mm	φ21.7 mm × 800 mm	φ21.7 mm × 800 mm	φ21.7 mm × 800 mm	φ17.9 mm × 692 mm

- 1) The fuel segment additionally irradiated by a test reactor after independent irradiation by a power reactor.
- 2) The fuel segment irradiated by a test reactor only.
- 3) The fuel segment of regular size diameter (φ12.3 mm ~ φ14.3 mm).
- 4) The fuel segment of smaller size diameter (φ6.5 mm).
- 5) Total of burn-up of irradiation by a power reactor and a test reactor.
- 6) Minimum cooling time after irradiation by a power reactor.
- 7) Minimum cooling time after additional irradiation by a test reactor.
- 8) The fuel segment of φ11.0mm ~ φ12.3 mm diameter irradiated by a power reactor.



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CERTIFICATE NUMBER: USA/0388/B (M) F-96

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