

(I)-Table D.1 Specification of contents

Classification Item	Basket	Box type				Box type(with Adapters)		MNU type
	Reactor	JRR-3	JRR-3	JRR-4	JRR-4	JRR-3	JRR-3	JRR-3
	Fuel element	Standard aluminide type	Standard silicide type	Low enrichment silicide type	High enrichment Instrumented type (HEU)	Follower aluminide type	Follower silicide type	MNU type
Fuel type		Plate fuel	Plate fuel	Plate fuel	Plate fuel	Plate fuel	Plate fuel	Rod fuel
Number of fuel elements (piece)		40 or less	40 or less	40 or less	40 or less	40 or less	40 or less	160 or less
Initial enrichment (%) ¹⁾		20 or less	20 or less	20 or less	93or less	20 or less	20 or less	0.72
Total mass of ²³⁵ U (g/piece) ¹⁾		306 or less	485 or less	210 or less	168 or less	194 or less	310 or less	61.2 or less
Total mass of U (g/piece) ¹⁾		1,530 or less	2,481 or less	1,075 or less	186 or less	970 or less	1,586 or less	8,500 or less
Burnup (%) ²⁾		50 or less	60 or less	50 or less	15 or less	50 or less	60 or less	23 or less
Cooling time (day)		300 or more ⁴⁾	600 or more	110 or more	10,000 or more	300 or more ⁴⁾	600 or more	2,190 or more
Total activity (Bq/package)		2.04×10 ¹⁶ or less ⁵⁾	2.09×10 ¹⁶ or less	2.02×10 ¹⁶ or less	1.98×10 ¹⁴ or less	9.53×10 ¹⁵ or less ⁵⁾	1.33×10 ¹⁶ or less	9.33×10 ¹⁴ or less
Decay heat (W/package)		2.25×10 ³ or less ⁵⁾	2.24×10 ³ or less	2.15×10 ³ or less	1.69×10 ¹ or less	1.03×10 ³ or less ⁵⁾	1.43×10 ³ or less	7.24×10 ¹ or less
Fuel material	Fuel meat	Uranium aluminum dispersion type alloy	Uranium silicon aluminum dispersion type alloy	Uranium silicon aluminum dispersion type alloy	Uranium aluminum alloy	Uranium aluminum dispersion type alloy	Uranium silicon aluminum dispersion type alloy	Metallic natural uranium
	Clad	Aluminum alloy	Aluminum alloy	Aluminum alloy	Aluminum alloy	Aluminum alloy	Aluminum alloy	Aluminum alloy
	Side plate, etc.	Aluminum alloy	Aluminum alloy	Aluminum alloy	Aluminum alloy	Aluminum alloy	Aluminum alloy	——
Dimension at contained ³⁾ width×height×length (mm)		77.04×77.04×800	77.04×77.04×800	80×80×660	80×80×840	63.6×63.6×880	63.6×63.6×880	φ37×933 and φ37×944
Weight at contained (kg/piece)		8.0 or less	8.0 or less	5.6 or less	6.0 or less	5.2 or less	5.2 or less	10 or less

The fuel elements of JRR-3 and JRR-4 can be contained together (except MNU type fuel elements).

1) The value in the nuclear specification shows an upper value which contains fabrication tolerance.

2) Burn up (%) = ((All depletion weight of ²³⁵U) ÷ (Initial weight of ²³⁵U))×100

3) The dimension of the contained fuels is within the dimension specified in (I)-Fig. D.1 through (I)-Fig. D.8.

4) One operation cycle of JRR-3 with JRR-3 aluminide fuels (standard type and follower type) is 35 days (27 days for reactor operation and 8 days for shutdown). Refueling work is carried out once in an operation cycle, and 4 standard type fuels and 2 follower type fuels are refueled in an operation cycle. Therefore, cooling time of fuels contained in the package are at a minimum of 300 days, and added 35 days in turn for every 4 standard type fuels and 2 follower type fuels. (Standard type fuel: 300 days or more (4 fuels), 335 days or more (4 fuels), ..., 615 days or more (4 fuels). Follower type fuel: 300 days or more (2 fuels), 335 days or more (2 fuels), ..., 965 days or more (2 fuels).)

5) The values in total activity and decay heat are based on the cooling time (day) in 4).

(I)-Table D.2 Quantities of major radionuclides (per package)

Classification	Basket	Box type				Box type (with Adapters)		MNU type
	Reactor	JRR-3	JRR-3	JRR-4	JRR-4	JRR-3	JRR-3	JRR-3
Fuel element Item		Standard aluminide type	Standard silicide type	Low enrichment silicide type	High enrichment instrumented type (HEU)	Follower aluminide type	Follower silicide type	MNU type
		(Bq)	(Bq)	(Bq)	(Bq)	(Bq)	(Bq)	(Bq)
Noble gas, etc.								
H-3		3.10×10^{12}	5.41×10^{12}	1.93×10^{12}	2.06×10^{11}	1.91×10^{12}	3.46×10^{12}	8.67×10^{11}
Kr-85		8.71×10^{13}	1.50×10^{14}	5.37×10^{13}	2.46×10^{12}	5.35×10^{13}	9.55×10^{13}	1.83×10^{13}
I-129		1.82×10^8	3.26×10^8	1.29×10^8	2.74×10^7	1.15×10^8	2.09×10^8	6.44×10^7
I-131		2.14×10^4	1.03×10^{-6}	6.56×10^{11}	-	6.78×10^3	6.54×10^{-7}	6.20×10^{-67}
Xe-131m		2.08×10^6	3.42×10^{-1}	3.10×10^{11}	-	6.58×10^5	2.19×10^{-1}	1.67×10^{-42}
Heavy element								
Pu-238		1.39×10^{12}	4.30×10^{12}	6.79×10^{11}	5.83×10^9	8.76×10^{11}	2.75×10^{12}	1.06×10^{11}
Pu-239		2.72×10^{11}	4.80×10^{11}	1.51×10^{11}	1.67×10^9	1.73×10^{11}	3.07×10^{11}	2.60×10^{12}
Pu-240		3.53×10^{11}	7.40×10^{11}	2.26×10^{11}	4.80×10^8	2.24×10^{11}	4.73×10^{11}	9.31×10^{11}
Pu-241		2.69×10^{13}	6.55×10^{13}	1.49×10^{13}	2.75×10^9	1.67×10^{13}	4.19×10^{13}	1.42×10^{13}
Am-241		5.93×10^{10}	1.99×10^{11}	3.48×10^{10}	2.43×10^8	5.03×10^{10}	1.27×10^{11}	1.63×10^{11}
Cm-242		1.47×10^{11}	4.44×10^{11}	2.83×10^{12}	6.59×10^4	5.68×10^{10}	2.84×10^{11}	1.35×10^8
Cm-244		1.49×10^{10}	8.09×10^{10}	5.24×10^9	1.08×10^4	9.22×10^9	5.17×10^{10}	3.34×10^7
F.P.								
Sr-89		2.00×10^{14}	1.24×10^{13}	1.51×10^{15}	-	6.38×10^{13}	7.90×10^{12}	1.39×10^3
Sr-90		6.00×10^{14}	1.06×10^{15}	4.03×10^{14}	4.81×10^{13}	3.76×10^{14}	6.76×10^{14}	1.53×10^{14}
Y-90		6.00×10^{14}	1.06×10^{15}	4.03×10^{14}	4.81×10^{13}	3.76×10^{14}	6.76×10^{14}	1.53×10^{14}
Y-91		4.09×10^{14}	3.78×10^{13}	2.03×10^{15}	-	1.32×10^{14}	2.42×10^{13}	5.03×10^4
Zr-95		6.41×10^{14}	7.99×10^{13}	2.31×10^{15}	-	2.09×10^{14}	5.11×10^{13}	6.90×10^5
Nb-95		1.36×10^{15}	1.74×10^{14}	3.54×10^{15}	-	4.40×10^{14}	1.11×10^{14}	1.50×10^6
Ru-103		3.37×10^{13}	7.20×10^{11}	7.70×10^{14}	-	1.07×10^{13}	4.60×10^{11}	1.44×10^{-1}
Ru-106		5.86×10^{14}	7.15×10^{14}	2.34×10^{14}	7.98×10^5	2.82×10^{14}	4.57×10^{14}	1.51×10^{13}
Te-129m		6.86×10^{11}	6.70×10^9	3.23×10^{13}	-	2.18×10^{11}	4.29×10^9	1.28×10^{-5}
Cs-134		3.20×10^{14}	6.55×10^{14}	1.68×10^{14}	1.21×10^9	1.75×10^{14}	4.19×10^{14}	3.12×10^{12}
Cs-137		6.14×10^{14}	1.10×10^{15}	4.13×10^{14}	5.02×10^{13}	3.85×10^{14}	6.98×10^{14}	1.79×10^{14}
Ba-140		6.95×10^8	4.38×10^2	4.35×10^{13}	-	2.21×10^8	2.80×10^2	3.16×10^{-36}
Ce-141		1.90×10^{13}	1.39×10^{11}	1.14×10^{15}	-	6.01×10^{12}	8.85×10^{10}	4.55×10^{-5}
Pr-143		1.95×10^9	3.50×10^3	6.13×10^{13}	-	6.17×10^8	2.24×10^3	5.99×10^{-33}
Ce-144		6.12×10^{15}	6.01×10^{15}	2.38×10^{15}	5.63×10^4	2.77×10^{15}	3.84×10^{15}	2.24×10^{13}
Pm-147		1.39×10^{15}	1.84×10^{15}	7.03×10^{14}	2.51×10^{11}	7.81×10^{14}	1.17×10^{15}	1.57×10^{14}
Others		7.39×10^{15}	7.93×10^{15}	3.98×10^{15}	4.91×10^{13}	3.45×10^{15}	5.02×10^{15}	2.13×10^{14}
Total		2.04×10^{16}	2.09×10^{16}	2.02×10^{16}	1.98×10^{14}	9.53×10^{15}	1.33×10^{16}	9.33×10^{14}