



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 FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0745/AF-96, REVISION 5**

**REVALIDATION OF GERMAN COMPETENT AUTHORITY
CERTIFICATE D/4365/AF-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 AF 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 - ANF-50.
2. Package Description and Authorized Radioactive Contents - as described in German Certificate of Competent Authority D/4365/AF-96, Revision 3 (attached).
3. Criticality - The minimum criticality safety index is 0.4. The maximum number of packages per conveyance is determined in accordance with Table 11 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.

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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. 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 - Hydrogenous plastic material is not allowed within the package during air transport.
6. Marking and Labeling - The package shall bear the marking USA/0745/AF-96 in addition to other required markings and labeling.
7. Expiration Date - This certificate expires on March 31, 2025.

This certificate is issued in accordance with paragraph(s) 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 June 15, 2020 petition by Framatome, Richland, WA, and in consideration of other information on file in this Office.

Certified By:



William Schoonover
Associate Administrator for Hazardous
Materials Safety

August 14, 2020
(DATE)

Revision 5 - Issued to revalidate German Certificate of Approval No.
D/4365/AF-96, Revision 3.

Bundesamt für die Sicherheit der nuklearen Entsorgung



Certificate of Approval

D/4365/AF-96 (Rev. 3)

for a transport package sample of Type A for fissile radioactive material

Based on the application of Advanced Nuclear Fuels GmbH, Lingen, of October 29, 2018 (File Ref.: 760/18/BfE/DST), the container with the manufacturer's designation "ANF-50 shipping container" is approved as a type A transport package sample for fissile radioactive material in accordance with the following regulations governing transportation by road, rail, sea and air:

Regulations for the Safe Transport of Radioactive Material, 2012 Edition, International Atomic Energy Agency (IAEA), No. SSR-6,

European Convention of September 30, 1957 governing the International Transport of Dangerous Goods by Road (ADR) (BGBl. 1969 II p. 1489), Appendices A and B in the edition of the notification of July 2019 (BGBl. 2019 II p. 756),

Regulation concerning the International Carriage of Dangerous Goods by Rail (RID) – Appendix C of the Convention concerning International Carriage by Rail (COTIF) dated May 9, 1980 (BGBl. 1985 II p. 130) as published on May 16, 2008 (BGBl. 2008 II p. 475, 899; 2009 II p. 1188, 1189; 2010 II p. 1273; 2012 II p. 168, 169, 1338; 2013 II p. 562; 2014 II p. 890; 2015 II p. 1143, 1144; 2016 II 1258; 2018 II p. 216, 217), last amended by the 21st RID Amendment Ordinance of November 5, 2018 (BGBl. 2018 II p. 494),

International Maritime Dangerous Goods Code (IMDG-Code), Amendment 39-18, published in the official German translation on November 13, 2018 (VkBli. 2018 p. 847),

International Civil Aviation Organization - Technical Instructions for the Safe Transport of Dangerous Goods by Air, Edition 2019/2020,

Ordinance governing the domestic and cross-border transport of dangerous goods by road, rail and inland waterways (Dangerous Goods Ordinance, Road, Rail and Inland Waterways – GGVSEB) as published on March 11, 2019 (BGBl. 2019 I p. 258), last amended by Article 14 of the Ordinance of December 12 2019 (BGBl. 2019 I p. 2510),

Ordinance governing the transport of dangerous goods by seagoing vessels (Dangerous Goods Ordinance, Maritime – GGVSee) as published on October 21, 2019 (BGBl. 2019 I p. 1475), last amended by Article 16 of the Ordinance of December 12 2019 (BGBl. 2019 I p. 2510),

Air Transport Approval Ordinance of June, 19, 1964 as published on July 10, 2008 (BGBl. 2008 I p. 1229; 2009 I p. 2424, 3535; 2010 I p. 11; 2012 I p. 1032; 2013 I p. 293, 2749; 2015 I p. 1474, 1894; 2016 I p. 1548), last amended by Article 6 of the Ordinance dated December 12, 2019 (BGBl. 2019 I p. 2510), in conjunction with the ICAO dangerous goods regulations (ICAO Technical Instructions),

in conjunction with the guidelines for the procedure for the construction type approval of transport packages for the transport of radioactive materials, of radioactive materials in a special configuration, of low dispersible radioactive materials and of exempted fissile materials (R003) as published on September 17, 2019 (VkBli. 2019 p. 618) and the BAM Dangerous Goods Regulation on quality assurance measures of packaging of design types requiring approval for transport packages for the transport of radioactive materials (BAM-GGR 011, Rev. 1) of October 1, 2018 (official information sheet of BAM 2018 p. 109).

It is hereby confirmed that the Federal Office for the Safety of Nuclear Waste Management (BASE), is the authority authorised by the Federal Ministry of Transport and Digital Infrastructure pursuant to Section 7.9 of the IMDG Code.

Certificate holder: Advanced Nuclear Fuels GmbH
Am Seitenkanal 1
49811 Lingen, Germany

Documents:

1. Letter from Advanced Nuclear Fuels GmbH dated October 29, 2018 (File Ref.: 760/18/BfE/DST) and dated November 11, 2019 (File Ref.: 816/19/BfE/DST)
2. Safety report by Advanced Nuclear Fuels GmbH Nr. ANFG-11.105 (05), Rev. 13, dated November 08, 2019 and letter from Advanced Nuclear Fuels GmbH dated February 18, 2020 (File Ref.: 832/20/BASE/TL)
3. Test certificate by the Federal Institute for Material Research and Testing (BAM), Berlin, dated August 28, 2006 (File Ref.: III.3/21139) and letter from BAM dated September 27, 2006 (File Ref.: III.3/21139), August 14, 2007 (File Ref.: III.3/21139), September 28, 2007 (File Ref.: III.3/21139), May 19, 2010 (File Ref.: III.3/21349), January 21, 2015 (File Ref.: III.3/21570), October 29, 2019 (File Ref.: 3.3/18047170/2019/Ku/02) and December 10, 2019 (File Ref.: 3.3/18047170/2019/Ku/06)

With respect to the verification of criticality safety, we refer specifically to the "Criticality Safety Analysis for the Transport Approval of ANF 50 Shipping Containers" no. ANFG-5.060 (11), Rev. 9 in conjunction with the letter dated February 19, 2020 (File Ref.: 832/20/BASE/TL) and to the Criticality Safety Analysis "Permit for Air Transportation of the ANF-50 Shipping Container" no. ANFG 5.060 (34), Rev. 1.

Manufacturer's designation: ANF-50 shipping container

Identification code of the package: D/4365/AF-96

Validity of approval: Up to and including March 31, 2025

Criticality Safety Index (CSI): 0.4

Permissible contents:

Content no. 1: Max. 51.29 kg uranium oxide, containing a maximum of 45.27 kg uranium with an enrichment (U-235 mass content in the uranium) of max. 5%, in the form of sintered pellets with a diameter of between 7.6 mm and 10 mm.

Content no. 2: Max. 14.5 kg uranium oxide, containing a maximum of 12.8 kg uranium with an enrichment (U-235 mass content in the uranium) of max. 5%, in the form of pellets, pellet fragments, abraded pellet material or uranium oxide powder.

The parameters detailed in Table 1 regarding the composition of the contents must be complied with. Both contents may also include gadolinium oxide.

Table 1: Composition of contents

Nuclide	Mass fraction of uranium nuclides, max. [%]	Activity per gram of uranium, max. [Bq]	Gamma output per gram of uranium, max. [MeV * Bq]
U-232	2.00×10^{-8}	1.65×10^2	
U-234	5.50×10^{-2}	1.27×10^5	
U-235	5.00	4.00×10^3	
U-236	1.00×10^{-1}	2.39×10^3	
U-238 ¹⁾	> 94.84	> 1.18×10^4	
Fission nuclides			30
Transuranic elements		20	

¹⁾ The maximum fraction depends on the actual composition of the uranium and can be up to 100%.

Design type of packaging:

In terms of its mechanical and thermal properties in accordance with the test certificate and the letters of the BAM, Berlin, as detailed above and with regard to the criticality safety and the radiation shielding, according to testing by the BASE, the design for the shipping container Type ANF-50 conforms to the requirements laid down for a Type A transport package for fissile radioactive material (IAEA Regulations §§ 633 and 671).

In the criticality safety analysis, the penetration of water into all cavities/hollow spaces of the package was assumed.

Description of the packaging:

The major subassemblies of the ANF-50 shipping container are the following:

- Shipping frame with protective lid and case for pellet box with lid for case
- pellet box with box cover
- carrying rack with clamping device and pellet trays.

The shipping frame consists of a welded construction of austenitic tubes and flat-bar profiles. Four vertically arranged tubes are connected at the top and bottom to four horizontally arranged tubes. The four sides are each stiffened by a diagonal tube and closed in the form of a grid by longitudinal flat bars. The bottom is stiffened by two diagonal tubes and likewise closed in the form of a grid by longitudinal flat bars.

The protective cover consists of a frame of rectangular sections, the top of which is faced with a cover plate. The protective cover is screwed to the frame at the four angled brackets at the corners.

The case for pellet box consists of a sandwich structure with an external and internal austenitic cover plates. Between the cover plates, there is a welded construction made of austenitic tubes and rectangular tubes and of austenitic round-, angular- and flat-bar profiles, in addition to a filling of inorganic insulation material. The cover plates are welded to the case for pellet box structure. The case for the pellet box is welded to the vertically arranged tubes of the shipping frame at the four side edges by means of sheet-metal keys.

The cover of the case for the pellet box is also designed as a sandwich-type structure with external and internal austenitic cover plates, and with inorganic insulation material between these cover plates. The case cover is fastened to the case for the pellet box with eight bolts.

The pellet box and the lid for pellet box are made of austenitic plates. The pellet box lid is fastened to the pellet box with 10 bolts.

The pellet holding structure consists of 15 pellet trays, the supporting frame for holding the pellet trays, two barrier plates for positioning the pellet trays in the supporting frame as well as the clamping device for bracing the layered pellet trays which can be locked in place in the supporting frame at different heights.

If the container is used for transporting Content no. 1, the pellets are enclosed in layers between the pellet trays. The pellet box with supporting structure, clamping device and pellet trays is also used for transporting Content no. 2. Content no. 2 is transported unsorted in an additional metal box (ANF-50 scrap/powder box) in the empty space between the clamping device and the unloaded pellet trays.

A schematic diagram of the package (drawing no. ANF-3-127-3763-03 Rev. 1) is attached as Appendix 1.

The containment system is formed by the pellet box with the lid for pellet box.

The confinement system is formed by the pellet box with the lid for pellet box, the carrying rack with the clamping device and either (for Content no. 1) the pellets between the pellet trays, or (for Content no. 2) the pellets, scrap, abraded pellet material and/or uranium oxide powder in an ANF-50 scrap/powder box inserted in the cavity of the pellet box when the pellet trays are not loaded.

The main dimensions of the transport package are: Length approx. 712 mm, width approx. 712 mm, height approx. 756 mm.

The mass of the shipping container is: Tare approx. 190 kg, gross approx. 248 kg.

The packaging specified by the relevant revisions of the design documents (list of drawings) in Appendix 2 (Type list) are at present in conformity with this Certificate of Approval (also see Supplementary Condition 7 and list of drawings).

Supplementary conditions and notes:

1. All quality assurance measures relating to planning, monitoring inspections and operation must be performed in accordance with the BAM dangerous goods regulation "Quality Assurance Measures of Packagings for Competent Authority Approved Package Designs for the Transport of Radioactive Material" (BAM-GGR 011, Rev. 1).
2. The remanufacture of packaging is only permissible in accordance with the design documents with the highest revision index in Appendix 2 including the amendments in accordance with Supplementary Condition No. 7.
3. This approval applies only in conjunction with the certificate of acceptance issued for the relevant series-production sample; this certificate shall be sent to the BAM and BASE unasked. Any deviations tolerated by the BAM in accordance with BAM-GGR 011 and any changes as per Supplementary Condition No. 7 shall be documented in this certificate of acceptance. In the case of series-production samples already manufactured, the deviations tolerated by the BAM and the changes as per supplementary condition no. 7 shall be documented for the series-production sample in the log book.
4. It must be ensured that each user of the packaging registers with the BASE before first-time use and confirms that he has received and complies with the log book, which mainly contains the Certificate of Approval, the instructions for handling and maintenance and the instructions for periodic inspections. These are in particular:
 - Container instruction "Handling and maintenance of shipping containers ANF 50" ANFG 11.101 (30), Rev. 3,
 - Container instruction "Periodic inspections on ANF-50 shipping containers" ANFG 11.101 (25), Rev. 5.

Within the framework of this Approval, the use of documents with a higher revision index is only permissible after prior release by the BAM and with authorisation of the BASE.

5. Each series-production sample shall be subjected to periodic inspections in due time. For series-production samples that are to be used solely outside the Federal Republic of Germany, the periodic inspections can be performed and certificated by testing personnel authorised by the responsible authorities in the relevant country. The certificates for the recurring tests shall be forwarded to BAM without request from the organisation.
6. Each series-production sample must be provided permanently with the identification mark detailed above and with the date (month/year) of the next periodic inspection.
7. Any changes relating to the design documents listed in Appendix 2, upon which the approval is based, require, after release through the BAM, the BASE approval of the Revision Certificate or an extended type list (in accordance with Appendix 2). They then become part of the present approval.
8. This approval does not relieve the sender from the obligation to comply with all statutory regulations of any country through which or in which the transport package is conveyed.

Costs:

1. Costs, charges and expenses shall be levied for this Decision in accordance with Section 12 Paragraph 1 and 2

of the Act Governing the Conveyance of Dangerous Goods (GGBefG) dated August 6, 1975, last amended by Article 13 of the Ordinance of December 12, 2019 (BGBl. 2019 I p. 2510), in conjunction with Section 1 Paragraph 2 of the Ordinance Governing Costs for Safety Measures When Conveying Dangerous Goods (GGKostV) dated March 11, 2019 (BGBl. 2019 I p. 308), last amended by Article 15 of the Ordinance of December 12, 2019 (BGBl. 2019 I S. 2510). Fees arise from §2 in connection with attachment 2 of GGKostV.

2. The costs shall be borne by Advanced Nuclear Fuels GmbH, in accordance with Section 12 Paragraph 1 of the GGBefG in conjunction with Section 13 Paragraph 1 no. 1 of the Administrative Costs Act (VwKostG) of June 23, 1970 (BGBl. 1970 I p. 821), in the version valid up to August 14, 2013 of December 5, 2012 (BGBl. 2012 I p. 2415).
3. The costs shall be determined by a separate decision.

Information about legal remedies available:

Objections may be lodged to the Federal Office for the Safety of Nuclear Waste Management in Berlin within one month of notification of this decision.

Berlin, dated April 01 2020

By order



Dr. Holländer



Appendices

Annex

Appendix 1: Data sheet for ANF-50 shipping container, drawing number ANF-3-127-3763-03, Rev. 1

Appendix 2: Type list

- Appendix to Certificate of Approval D/4365/AF – 96 (Rev. 3)

Rev. no.	Date of issue	Validity	Reason for revision
0	2006-10-18	2009-10-31	Initial issue
1	2010-06-02	2015-06-30	Modification of sections "Regulations", "Documents", "Permissible content", modification of type list
2	2015-02-04	2020-01-31	Modification of sections "Regulations", "Documents", "Permissible content", "Supplementary conditions and remarks", modification of type list, extension of validity
3	2020-04-01	2025-03-31	Modification of sections "Regulations", "Documents", "Supplementary conditions and remarks", modification of type list

Type list
for the ANF-50 shipping container

Containers of type ANF-50 shipping containers, which shall be or have been manufactured in accordance with the following Advanced Nuclear Fuels GmbH design documents, conform to the design type specified in this Certificate of Approval (see also Supplementary Conditions 2,3 and 7).

Revision status of the design documents	Release by the BAM
Index of drawings no. 5-3 27-4004-04 Rev. 1 with the drawings indicated therein	BAM expert opinion dated May 19, 2010 (File Ref.: III.3/21349)
Index of drawings no. 5-3 27-4004-04 Rev. 2 with the drawings indicated therein	BAM expert opinion dated January 21, 2010 (File Ref.: III 1.3/21139)
Index of drawings no. 5-3 27-4004-04 Rev. 3 with the drawings indicated therein	BAM expert opinion dated September 02, 2010 (File Ref.: 3.3/18047170/2019/Ku/02)

Berlin, dated April 01 2020

By order



Dr. Holländer





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CERTIFICATE NUMBER: USA/0745/AF-96

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