

Enclosure 1 to E-41337

**German Certificate of Approval
Number D/4365/AF-96 (Rev. 2) in English**

Certificate of Approval

D/4365/AF-96 (Rev. 2)

for a transport package sample of Type A for fissionable radioactive materials

Based on the application of Advanced Nuclear Fuels GmbH, Lingen, of July 31, 2014 (File Ref.: 658/14/BfS/DST), the container with manufacturer's designation "shipping container ANF-50" is approved as a Type A transport package sample for fissionable radioactive materials according to the following regulations for transport by road, rail, sea and air:

Regulations for the Safe Transport of Radioactive Material, 2009 Edition, International Atomic Energy Agency (IAEA), No. TS-R-1,

European Convention of September 30, 1957 governing the international conveyance of dangerous goods by road (ADR) (BGBl. 1969 II p. 1489), Annexes A and B in the edition of the notification of June 3, 2013 (BGBl. 2013 II p. 648),

Ordinance for the international conveyance of dangerous goods by rail (RID) – Annex C of the Convention governing international rail transportation of May 9, 1980 (COTIF-Convention) (BGBl. 1985 II, p. 130), in the edition of the notification of May 16, 2008 (BGBl. 2008 II p. 475, 899; 2009 II p. 1188, 1189; 2010 II p. 1273; 2012 II p. 168, 169, 1338), last amended by the 18th RID Amendment Ordinance of May 25, 2013 (BGBl. 2013 II p. 562),

International Maritime Dangerous Goods Code (IMDG-Code), Amendment 36-12,

International Civil Aviation Organization – Technical Instructions for the Safe Transport of Dangerous Goods by Air, Edition 2013/2014,

Ordinance governing the domestic and cross-border conveyance of dangerous goods by road, rail and inland waterways (Dangerous Goods Ordinance, Road, Rail and Inland Waterways – GGVSEB) in the edition of the notification of January 22, 2013 (BGBl. 2013 I p. 110),

Ordinance governing the conveyance of dangerous goods by seagoing vessels (Dangerous Goods Ordinance, Maritime – GGVSee), in the edition of the notification of March 26, 2014 (BGBl. 2014 I p. 301),

Air Transport Approval Ordinance of June 19, 1964 (BGBl. I p. 370), amended by article 1 of the Ordinance of December 17, 2014 (BGBl. I p. 2237),

in conjunction with the Directive for the design approval procedure of the transport package sample for fissionable radioactive materials, of radioactive material in particular form and slightly dispersible radioactive materials (R003) in the edition of the notification of November 17, 2004 (VkB1 2004, p. 594) and the BAM Dangerous Goods Regulation concerning quality assurance measures of package designs requiring approval for transport packages for radioactive materials) (BAM-GGR 011) Rev. 0 of June 25, 2010 (Official Gazette of BAM 2011, p. 323), brought into force by notification of July 1, 2010 (VkB1. 2010 p. 282).

It is hereby confirmed that the Bundesamt für Strahlenschutz (BfS), Salzgitter, is the authority authorized 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. Application by Advanced Nuclear Fuels GmbH (ANF), Lingen, of July 31, 2014 (File Ref.: 658/14/BfS/DST), and letter from ANF dated December 8, 2014 (File Ref.: 682/14/BfS/DST)
2. Safety report of ANF, no. ANFG-11.105 (05), Rev. 11, of November 28, 2014
3. Test certificate by the Federal Institute for Material Research and Testing (BAM), Berlin, of August 28, 2006 (File Ref.: III.3/21139) and BAM letters of 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) and January 21, 2015 (File Ref.: III.3/21570)

With respect to the verification of criticality safety, we refer specifically to the "Criticality Safety Analysis for the approval of the ANF-50 shipping container for public traffic" no. ANFG-5.060 (11), Rev. 6 and criticality safety analysis "Approval of the ANF-50 shipping container for transport by air" no. ANFG 5.060 (34), Rev. 1.

Manufacturer's designation: **ANF-50 shipping container**

Identification mark of the package: **D/4365/AF-96**

Period of validity of the certificate: **Up to and including January 31, 2020**

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 content in the total uranium max. [%]	Activity per gram of uranium max. [Bq]	Gamma output per gram of uranium max. [MeV * Bq]
U-232	2.00E-08 ¹⁾	1.65E+02	
U-234	5.50E-02	1.27E+05	
U-235	5.00	4.00E+03	
U-236	1.00E-01	2.39E+03	
U-238	100	1.18E+04	
Fission nuclides			30
Transuranic elements		20	

¹⁾ 1.00E-08 means 1.00 · 10⁻⁸

Package design:

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 Federal Office for Radiation Protection (BfS), the design for the shipping container Type ANF-50 conforms to the requirements laid down for a Type A transport package for fissionable radioactive materials (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 package:

The basic components 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 lid for pellet box
- carrying rack with clamping device and pellet trays.

The shipping frame consists of a welded structure 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 reinforced by a diagonal tube and closed in the form of a grid by longitudinal flat bars. The bottom is reinforced 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 plate. Between the cover plates, there is a welded structure 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 structure of the case for pellet box. 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 pellet box with eight bolts.

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

The pellet holding structure consists of 15 pellet trays, the carrying rack for holding the pellet trays, two barrier plates for positioning the pellet trays in the carrying rack as well as the clamping device for bracing the layered pellet trays which can be locked in place in the carrying rack 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 container 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 unladen 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 and height approx. 756 mm.

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

The packagings 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 no. 7).

Supplementary conditions and notes:

1. All quality assurance measures relating to planning, monitoring inspections and operation must be performed in accordance with the stipulations of the Dangerous Goods Regulation of the BAM "Measures Governing Quality Assurance of Packages Requiring Approval Used to Transport Radioactive Substances" (BAM-GGR 011, Rev. 0).
2. The remanufacture of packing materials 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 (Federal Institute for Material Research and Testing) and BfS (Federal Office for Radiation Protection) 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 in the inspection log book of the series-production sample.
4. It must be ensured that each user of the package registers with the BfS before first-time use and confirms that he has received and complies with the inspection log book, which mainly contains the Certificate of Approval, the instructions for handling and maintenance and the instructions for in-service inspections. These are in particular:
 - Container instruction "Handling and maintenance of ANF-50 shipping containers" ANFG-11.101 (30), Rev. 3, dated April, 2014
 - Container instruction "In-service inspections of ANF-50 shipping container" ANFG-11.101 (25), Rev. 5, dated February, 2013

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 authorization of the BfS.

5. Each series-production sample shall be subjected to in-service inspections in due time. For series-production samples that are to be used solely outside the Federal Republic of Germany, the in-service inspections can be performed and certificated by testing personnel authorized by the responsible authority in the relevant country. The certificates for the in-service inspections conducted shall be forwarded unasked to the Federal Institute for Material Research and Testing (BAM) and to the Federal Office for Radiation Protection (BfS).
6. Each series-production sample must be provided permanently with the identification mark detailed above and with the date (month/year) of the next in-service 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 BfS 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 the government of any country through which or in which the transport package is conveyed.
9. The Certificate of Approval D/4365/AF-96 (Rev. 1) still remains valid until June 30, 2015.

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) in the version of the notification of July 7, 2009 (BGBl. I p. 1774, 3975), amended by Article 2 paragraph 148 of the law dated August 7, 2013 (BGBl. I p. 3154), in connection with Section 1 paragraph 2 of the Order Governing Costs for Measures with Conveying Dangerous Goods (GGKostV) of March 7, 2013 (BGBl. 2013 I p. 466). The fees result from Section 2 in connection with Appendix 2 of the Order Governing Costs for Measures with Conveying Dangerous Goods (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. I p. 821), in the edition of December 5, 2012 (BGBl. I p. 2415) valid until August 14, 2013.
3. The costs shall be determined by a separate decision.

Information about legal remedies available:

Objections may be lodged within one month of notification of this decision. Objections must be either lodged in writing or recorded at the Bundesamt für Strahlenschutz (Federal Office for Radiation Protection), Willy-Brandt-Strasse 5, 38226 Salzgitter, Germany.

Salzgitter, February 4, 2015

By order

Dr. Ruprecht

Appendices

Annex

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

Appendix 2: Type list

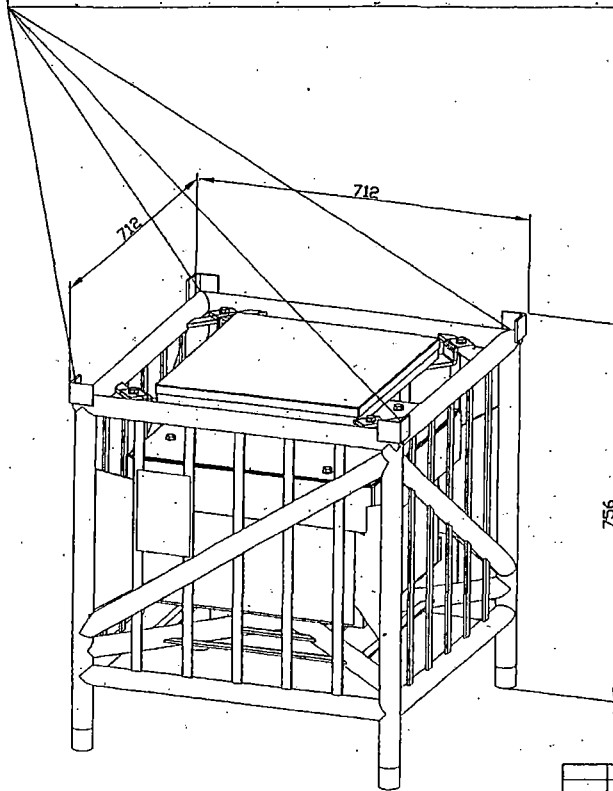
- Annex to the Certificate of Approval D/4365/AF-96 (Rev. 2) -

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

Handling the ANF-50 shipping container by crane and 4 round slings which are attached to the four upper corners of the shipping rack is permissible as an alternative to handling it with a forklift truck.

ANFG - 11.101 (24)
 Rev. 0
 Anlage 1
 Seite 1 von 1

ORIGINAL



Gewicht	
ca. Tara	ca. Brutto
190 kg	248 kg

Rev. 1		Tara und Bruttogewicht		Oelgemittler		Apr 03	
Rev:		Anderung		Name		Datum Kurzz.	
Fertigung nach Zeichnung		Beurteilt	Datum	Name	Unterschrift	Maßstab	
Stücklisten-Nr.:		Geprüft	19.07.2002	Paulinyi	<i>[Signature]</i>	%	
Advanced Nuclear Fuels GmbH		Data sheet for ANF-50 shipping container attachment means				Zeichnungsnummer	
Ersatz für:		Ersatz durch:				ANF-3-127-3763-03	
						Rev. 1	

**Type list
for the ANF-50 shipping container**

Type ANF-50 shipping containers, which shall be or have been manufactured in accordance with the following ANF GmbH design documents, conform to the model 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 mentioned therein	BAM expert opinion of May 19, 2010 (File Ref.: III.3/21349)
Index of drawings no. 5-3 27-4004-04, Rev. 2 with the drawings mentioned therein	BAM expert opinion of January 21, 2015 (File Ref.: III.3/21139)

Salzgitter, February 4, 2015

By order

Dr. Ruprecht