

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

1 a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE	PAGES
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2. PREAMBLE

- a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."
 - b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.
3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

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| a. ISSUED TO (<i>Name and Address</i>)
Daher Nuclear Technologies GmbH
Margarete-von-Wrangell-Straße 7
D-63457 Hanau – GERMANY | b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION
Safety Analysis Report of the DN30 Package
0023-BSH-2016-002-Rev 1, dated July 12, 2019, as supplemented. |
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4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

- (1) Model No.: DN30
- (2) Description

The DN30 packaging consists of the protective structural packaging (PSP) and the 30B uranium hexafluoride (UF₆) cylinder as specified in ANSI N14.1.

The DN30 PSP is a right circular cylinder constructed of two austenitic stainless steel shells: (i) the bottom half with integrated feet, a valve protecting device, a plug protecting device, two rotation preventing devices, lower part of the closure system (consisting of six devices), and handling attachment points, and (ii) the top half with the upper part of the closure system and integrated handling attachment points for the top half .

For both the bottom and top halves of the PSP, the cavity between the inner and outer shells and the flange is filled with a polyisocyanurate rigid (PIR) foam with a layer of 10 mm thermal insulation between the inner shell and the foam. All the surfaces of the inner shell of both the top and bottom halves are covered with a layer of intumescent material.

The valve protecting device, enclosing the valve of the 30B cylinder, and connected to the bottom half of the DN30 PSP by two hinges, consists of a casing of stainless steel filled with PIR foam and a protective housing with its inner walls covered with an intumescent material.

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5.(a) Packaging (continued)

The two rotation protecting devices, welded at the sides of the inner flange of the bottom half of the PSP, are identical and consist of a pin, withdrawn into the flange during loading, and inserted, during transport, into the two holes in the skirt of the 30B cylinder.

The plug protecting device is welded to the inner shell of the bottom half of the PSP and allows the plug to move in the axial direction without making contact with any part of the PSP.

An elastomeric gasket, installed in the flange of the top half, prevents water inleakage during normal conditions of transport.

The PSP has a nominal length of 2,437 mm, a nominal external diameter of 1,216 mm, and a nominal height of 1,329 mm. The nominal gross weight of the package is 4,012 kg.

The 30B Cylinder, described in ANSI N14.1, is 2,070 mm long with a nominal diameter of 760 mm and a nominal wall thickness of 13 mm.

(3) Drawings

The Model No. DN30 packaging is fabricated in accordance with

Drawing No. 0023-ZFZ-1000-000, Rev. 2 – DN30 PSP
Drawing No. 0023-ZFZ-1000-100, Rev. 0 – Closure Device
Drawing No. 0023-ZFZ-1100-000, Rev. 4 – Bottom Half
Drawing No. 0023-ZFZ-1200-000, Rev. 3 – Top Half
Drawing No. 0023-ZFZ-1120-400, Rev. 0 – Rotation Preventing Device
Drawing No. 0023-ZFZ-1140-000, Rev. 3 – Valve Protecting Device
Part List No. 0023-ZFZ-1000-000, Rev. 5

(b) Contents

(1) Type and form of material

Unirradiated commercial grade uranium, in the form of UF₆, with natural isotopic composition, and a U-235 mass percentage not to exceed 5 weight percent.

(2) Maximum quantity of material per package

2,277 kg UF₆ contained in an ANSI Standard N14.1 30B cylinder.
The maximum H/U atomic ratio for UF₆ is 0.088.

(c) Criticality Safety Index (CSI)

0.0

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6. The ANSI standard 30B, 30-inch diameter UF₆ cylinder, must be fabricated, inspected, tested and maintained in accordance with a) American National Standard N14.1-2012 or an earlier version of ANSI N14.1 in effect at the time of fabrication or b) American National Standard N14.1-2012 or an earlier version of ANSI N14.1 in effect at the time of fabrication and ISO 7195:2005 or an earlier version of ISO 7195 in effect at the time of fabrication. Cylinders must be fabricated in accordance with Section VIII, Division I, of the ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code and be ASME Code stamped.
7. In addition to the requirements of Subpart G of 10 CFR Part 71:
 - (a) The package shall be prepared for shipment and operated in accordance with the Operating Procedures of Chapter 1.7 of the application.
 - (b) Each packaging must meet the Acceptance Tests and Maintenance Program of Chapter 1.8 of the application.
 - (c) Packagings in which stainless steel components show pitting, corrosion, cracking, or pinholes are not authorized for transport.
8. The 30-inch diameter UF₆ cylinder valve and plug threads may be tinned with ASTM B32, alloy 50A or Sn50 solder material, or a mixture of alloy 50A or Sn50 with alloy 40A or Sn40A material, provided the mixture has a minimum tin content of 45 percent.
9. Transport by air is not authorized.
10. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.
11. Revision No. 0 of this certificate may be used until September 30, 2020.
12. Expiration date: July 31, 2024.

**CERTIFICATE OF COMPLIANCE
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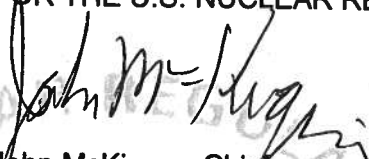
¹ a. CERTIFICATE NUMBER 9362	b. REVISION NUMBER 1	c. DOCKET NUMBER 71-9362	d. PACKAGE IDENTIFICATION NUMBER USA/9362/AF-96	PAGE 4	PAGES OF 4
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REFERENCES

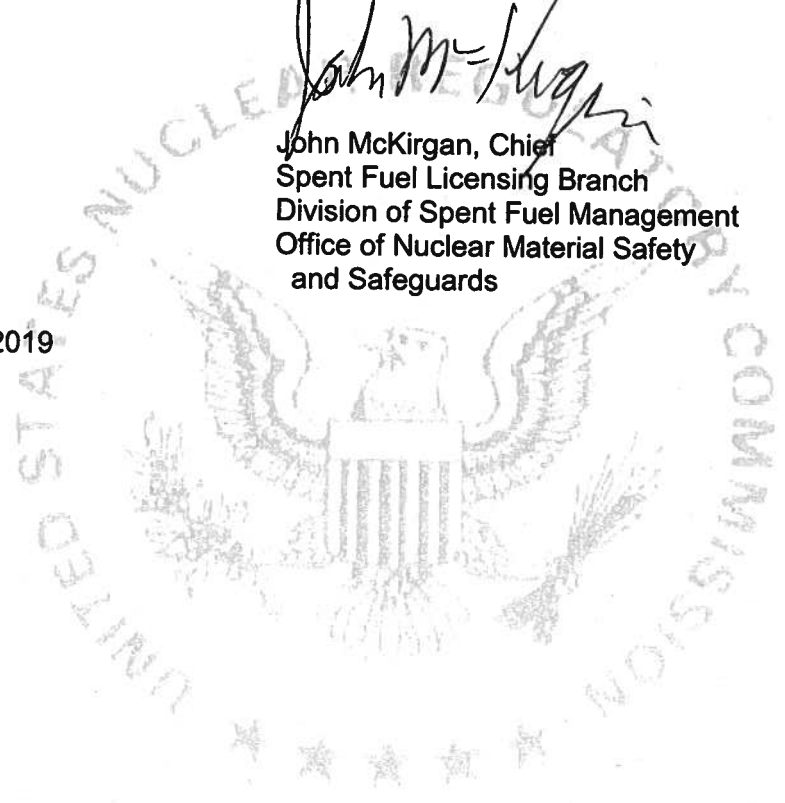
Safety Analysis Report of the DN30 Package, 0023-BSH-2016-002-Rev.1, dated July 12, 2019.

Supplement referenced 0023-SVK-2019-019-Rev. 1, dated September 6, 2019.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


John McKirgan, Chief
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Date: September 26, 2019





UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 25, 2019

Mr. Franz Hilbert
DAHER NUCLEAR
TECHNOLOGIES GmbH
Margarete-von-Wrangell-Straße 7
D-63457 Hanau – GERMANY

SUBJECT: CERTIFICATE OF COMPLIANCE NO. 9362, REVISION NO. 1, FOR THE
MODEL NO. DN30 PACKAGE

Dear Mr. Hilbert:

As requested by your application dated July 25, 2019, supplemented September 6, 2019, enclosed is Certificate of Compliance No. 9362, Revision No. 1, for the Model No. DN30 package. Changes made to the enclosed certificate are indicated by vertical lines in the margin. The U.S. Nuclear Regulatory Commission staff safety evaluation report is also enclosed.

The approval constitutes authority to use the package for shipment of radioactive material and for the package to be shipped in accordance with the provisions of Title 49 of the *Code of Federal Regulations* 173.471.

If you have any questions regarding this certificate, please contact Pierre Saverot of my staff at (301) 415-7505.

Sincerely,

/RA/

John McKirgan, Chief
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9362
EPID - L-2019-LLA-0172

Enclosures:

1. CoC No. 9362, Rev. No. 1
2. Safety Evaluation Report

cc w/encls.: R. Boyle, DOT
J. Shuler, DOE, c/o L. Gelder



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION REPORT

Model No. DN30 Package
Certificate of Compliance No. 9362
Revision No. 1

SUMMARY

By letter dated July 25, 2019, Daher Nuclear Technologies, GmbH, (DNT, or the applicant) submitted an amendment request for Certificate of Compliance (CoC) No. 9362 for the Model No. DN30 package.

DNT requested the possibility to use a microporous insulation material, designated as WDS Multiflex ST 2D50 DS hydrophobic, between the inner shell of the DN30 and the foam, in lieu of the Microtherm Overstitched 1000R HY material that was approved in Revision No. 0 of the CoC. The applicant also requested a small design change concerning the handling of the housing of the valve protecting device.

The staff verified the properties and characteristics of this new material. The staff also verified that the Model No. DN30 package provides adequate protection against the thermal tests specified in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 71 and that the package design meets the thermal performance requirements of 10 CFR Part 71 under normal conditions of transport (NCT) and hypothetical accident conditions (HAC) based on the inclusion of this alternate thermal insulation material.

Based on the statements and representations in the application, and the conditions listed in the Certificate of Compliance, the staff concludes that the package meets the requirements of 10 CFR Part 71.

EVALUATION

The applicant provided a comparison of the material properties of MICROTHERM versus WDS Multiflex for the structural, thermal, shielding (external dose rate), and criticality analyses. The staff finds the provided comparison to be acceptable based on very narrow variations of the physical and material properties between the two thermal insulation materials for all of their functional requirements. The staff also reviewed relevant open literature information and found that the payload radiation level absorbed by the WDS Multiflex insulation material is well below the acceptable threshold required to induce any structural damage or gas generation, and that silicates are used as a microstructural basis. The thermal stability is also similar in both insulation materials. Therefore, the staff accepts the use of the WDS Multiflex for the Model No. DN30 package.

The staff verified the WDS® Multiflex® (ST Grade) material was included on the licensing drawings parts list. The staff also verified that the material properties provided in Table 3-1,

“Material Properties for the Thermal Analysis,” of the supplemented Change Report No. 0023-BAW-2019-001-Rev1 entitled, “Licensing of an Alternative Supplier for the Thermal Insulation Layer of the DN30 PSP,” agreed with the values provided on the Morgan Advanced Material WDS® Multiflex® (ST Grade) data sheet.

The applicant provided NCT and HAC thermal analysis temperature results of the DN30 package with the use of WDS® Multiflex® (ST Grade) insulation material in the supplemented Change Report No. 0023-BAW-2019-001-Rev1. The applicant performed an NCT thermal analysis with the use of the WDS® Multiflex® (ST Grade) insulation material. The applicant showed that with the use of the WDS® Multiflex® (ST Grade) insulation material, in comparison to the previously approved use of MICROTHERM insulation material in the initial issuance of the CoC (Agencywide Documents Access and Management System (ADAMS) No. ML19203A266), the maximum increase in component temperatures was 0.02°C (0.036°F).

The staff verified the applicant provided component temperatures in Table 3-2, “Maximum temperatures calculated for the DN30 package for NCT,” of the supplemented Change Report No. 0023-BAW-2019-001-Rev1 would remain below the maximum allowable NCT temperature limits provided in Table 52, “Admissible component temperatures of the package DN30,” of the DN30 application. Also, based on the applicant’s provided small changes to the NCT component temperatures in Table 3-2 of the supplemented Change Report No. 0023-BAW-2019-001-Rev1, the staff does not expect a change in the maximum normal operating pressure.

The applicant provided HAC temperature results of the DN30 package 30B cylinder valve, 30B cylinder plug, 30B cylinder mantle, and the DN30 inner and outer shells with the use of the WDS® Multiflex® (ST Grade) insulation material in Table 3-3, “Maximum temperatures calculated for the DN30 package for ACT,” of the supplemented Change Report No. 0023-BAW-2019-001-Rev1. The applicant showed that, with the use of the WDS® Multiflex® (ST Grade) insulation material, in comparison to the previously approved use of MICROTHERM insulation material in the initial issuance of the CoC (ADAMS Accession No. ML19203A266), the DN30 package 30B cylinder valve, plug, and mantle temperatures decreased by 0.7°C (1.26°F); the temperature of the DN30 outer shell did not change, and the temperature of the DN30 inner shell increased by 0.2 °C (0.36 °F).

Due to the increase in DN30 inner shell temperature, the staff verified the temperature of the DN30 inner shell remained well below the maximum allowable HAC temperature limit for the DN30 inner shell provided in Table 52, of the DN30 application. Also, based on the applicant provided small changes to the HAC component temperatures in Table 3-3 of the supplemented Change Report No. 0023-BAW-2019-001-Rev1, the staff does not expect a change in the maximum pressure during HAC. Based on review of the statements and representations in the supplemented application, the staff concludes that the thermal design has been adequately described and evaluated, and that the thermal performance of the package meets the thermal standards of 10 CFR Part 71.

The applicant also requested a small design change, concerning the handling of the housing of the valve protecting device, to make the housing completely removable from the valve protecting device and thus allow any type of hook designed for the lifting of the 30B cylinder to fit with the DN30 PSP. DNT revised the licensing drawings accordingly. This change affects only the loading and unloading operations of the 30B cylinder into the DN30 PSP and has no influence on the DN30 package safety evaluation during both NCT and HAC. The revised handling instructions note that operators have to put the housing back after loading and

unloading of the cylinder and a sticker “insert housing before closing” has been added to the valve protecting device.

Based on the statements and representations in the application, as supplemented, the staff concludes that the package meets the requirements of 10 CFR Part 71.

CONDITIONS

The following changes were made to the certificate of compliance:

Item No. 3(b) identifies the application as supplemented.

Condition No. 5(a)(3) has been modified to include revised licensing drawings and a parts list.

Condition No. 11 has been modified to extend the previous revision of the certificate for approximately one year.

The expiration date of the certificate (previously Condition No.11, now renumbered as Condition No. 12) was not modified.

The References section of the certificate was updated to include the supplemental information referenced 0023-SVK-2019-019-Rev1, dated September 6, 2019.

CONCLUSION

Based on the statements and representations in the application, the staff finds that these changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9362, Revision No. 1,
On September 25, 2019.