



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(U)  
RADIOACTIVE MATERIALS PACKAGE DESIGN  
CERTIFICATE USA/0830/B(U)-96, REVISION 0**

**REVALIDATION OF FRENCH COMPETENT AUTHORITY  
CERTIFICATE F/357/B(U)-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(U) package as prescribed in the regulations of the International Atomic Energy Agency<sup>1</sup> and the United States of America<sup>2</sup>.

1. Package Identification - TN-MTR.
2. Package Description and Authorized Radioactive Contents - as described in French Certificate of Competent Authority F/357/B(U)-96, Revision Eah (attached).
3. 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 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.

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<sup>1</sup> "Regulations for the Safe Transport of Radioactive Material, 2012 Edition, No. SSR-6" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

<sup>2</sup> Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

**CERTIFICATE USA/0830/B(U)-96, REVISION 0**

- d. Records of Management System activities required by Paragraph 306 of the IAEA regulations<sup>1</sup> 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.
4. Marking and Labeling - The package shall bear the marking USA/0830/B(U)-96 in addition to other required markings and labeling.
5. Expiration Date - This certificate expires on February 28, 2021.

This certificate is issued in accordance with paragraph(s) 810 of the IAEA Regulations and Section 173.473 of Title 49 of the Code of Federal Regulations, in response to the February 27, 2019 petition by TN Americas LLC, Columbia, MD, and in consideration of other information on file in this Office.

Certified By:



William Schoonover  
Associate Administrator for Hazardous  
Materials Safety

October 17, 2019  
(DATE)

Revision 0 - Issued to revalidate French Certificate of Approval No. F/357/B(U)-96 (Eah) for non-fissile contents consisting of strontium titanate (SrTiO<sub>3</sub>), in the form of sintered pellets within an isotopic generator of "Gisete 4", "Gisete 5" or "Gisete 8" type.



TRANSPORT AND RESOURCES DEPARTMENT

This document is a translation of:  
 Certificat d'agrément d'un modèle de colis, F/357/B(U)-96 (Eah),  
 numéro d'enregistrement CODEP-DTS-2018-060678

In case of deviation between the French and English versions, the  
 French version governs.

**PACKAGE MODEL  
 APPROVAL CERTIFICATE**

**F / 357 / B(U)-96 (Eah)  
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The French Governing Authority.

With respect to the request submitted by **TN International** by letter COR-18-004458-067 dated 2 August 2018;

With respect to the TN International Package Design Safety Report DOS-18-006566 Rev. 2.0 of 2 August 2018,

hereby certifies that the package model comprising packaging **TN-MTR** described in appendix 0 index ah and:

- loaded with an isotopic generator of "Gisete 4", "Gisete 5" or "Gisete 8" type, placed in a special-purpose internal fitting, as described in appendix 16 index ah, is conform as a B (U) type package model,
- emptied, contaminated or not, with or without internal fittings, is conform as a B(U) type package model or dispensed standard package depending on the level of contamination of the internal surfaces of the packaging and the surfaces of the internal fittings and the intensity of radiation on the external surface of the package,

with the instructions in the regulations and agreements listed below:

- International Atomic Energy Agency (IAEA) regulations for the safe transport of radioactive material, IAEA Safety Standards series, No. SSR-6, 2012 edition;
- European Agreement on the International Carriage of Dangerous Goods by Road (ADR);
- Regulations governing International Rail Transportation of Dangerous Goods (RID);
- International maritime code for dangerous goods (IMDG code of the IMO);
- Decision of 29 May 2009 modified concerning the carriage of dangerous goods by land routes (TMD decision);
- Order of 23 November 1987 (modified), on the Safety of Shipping, and particularly division 411 of the attached regulations (RSN Order).

This certificate does not exempt the shipper from the need to comply with the requirements established by the authorities of countries across which or to which the package will be transported.

The validity of this certificate expires on **28 February, 2021**.

Registration number: **CODEP-DTS-2018-060678**

Signed in Montrouge, 26 December 2018

**On behalf of the President of the ASN and by  
 delegation, the Director for Transportation and Sources.**

**Fabien FÉRON**



## APPENDIX 0

### TN-MTR PACKAGING

#### 1. DESCRIPTION OF THE PACKAGING

The packaging was designed, manufactured, inspected, tested, maintained and used in compliance with the TN International Package Design Safety Report DOS-18-006566 Rev. 2.0 of 2 August 2018.

The packaging, of a cylindrical form, is shown in Figure 0.1.

References of the packaging plans:

- " TN-MTR packaging - safety drawing (general view) : PLA-15-00166811-000 Rev. 0";
- "packaging TN-MTR - detailed drawing (detail) : PLA-15-00166811-001 Rev. 0."

The overall external dimensions of the packaging are:

- length: 2,008 mm;
- diameter: 2,080 mm.

The cavity is a cylinder with a height of 1,080 mm and a diameter of 960 mm.

The empty weight (without basket or fuel elements) is 20,600 kg.

The maximum permissible weight for the package in the transport configuration is 23,400 kg.

The packaging comprises the main sub-assemblies described below.

##### 1.1 Body

The body is composed of lead radiation protection fitted radially and axially (on the bottom side of the packaging) surrounded by resin thermal protection, housed in two stainless steel enclosures.

##### 1.2 Packaging closure system

The packaging is closed using a "STANDARD" lid comprising lead radiation protection surrounded by a stainless steel housing. It is equipped with two orifices with closure plates.

##### 1.3 Shock absorption system

Shocks triggered by falls are absorbed by a cover comprising a stainless steel structure filled with wood.

##### 1.4 Handling and securing components

Two trunnions can be used to handle the packaging.

The packaging is tied down to the means of transport using four lugs.

##### 1.5 Safety functions

**Containment** is provided by the packaging enclosure, which comprises:

- the packaging cavity;
- the lid and orifice closure plates;
- internal lid seals and lid orifice closure plates.

**Radiation protection** is provided by the layers of steel and lead in the packaging body and the closure system.

**Internal power is dissipated** by packaging body components, particularly the fins welded to the external surface of the packaging.

**Impact protection** is ensured by the cover.

**Fire protection** is mainly ensured by the resin and the cover.

## **2. ACTIONS TO BE TAKEN BY THE SHIPPER PRIOR TO DISPATCHING THE PACKAGE**

The packaging must be used in accordance with the applicable procedures listed in Chapter 6A of the TN International Package Design Safety Report DOS-18-006566-006 Rev. 2.0.

## **3. MAINTENANCE PROGRAMME**

The packaging must be maintained in accordance with the maintenance programme described in Chapter 7A of the TN International Package Design Safety Report DOS-06-00032593-700 Rev. 3.

## **4. NOTIFICATION AND RECORDING OF SERIAL NUMBERS**

The relevant authorities must be kept informed of any packaging that is taken out of service or transferred to another owner. Accordingly, an owner transferring packaging must provide the name of the new owner.

## **5. MANAGEMENT SYSTEM**

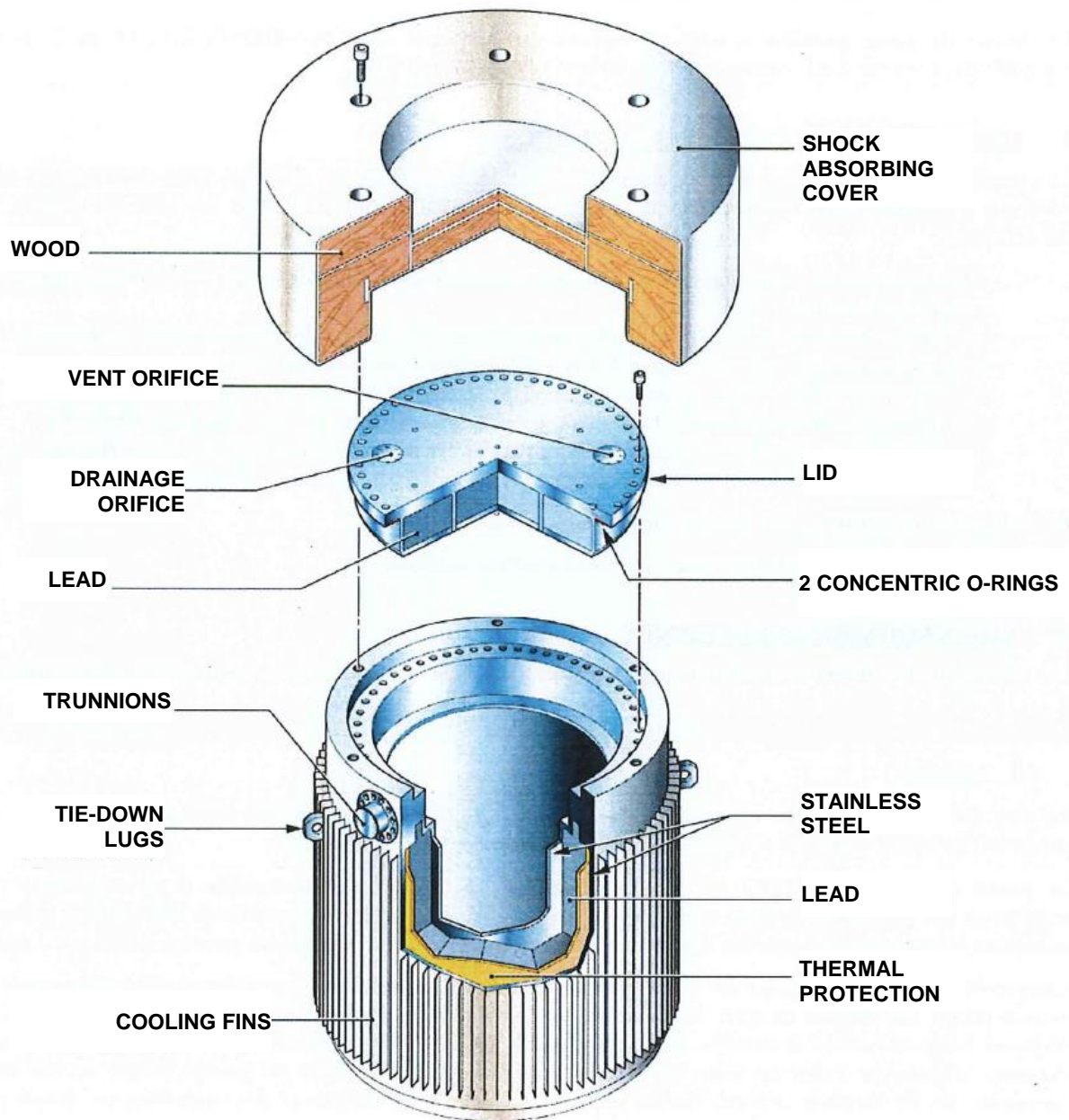
The management system principles applied during the design, manufacturing, inspection, testing, maintenance and use of the package must comply with those described in Chapter 8A of the TN International Package Design Safety Report Ref. DOS-06-00032593-800 Rev. 0.

## **6. ADDITIONAL REQUIREMENTS FOR CONTAINED TRANSPORT**

Contained transport methods are not permitted unless authorised by the governing authority.

If packages are transported inside a closed transport unit (covered vehicle, transport container, canopies, etc.) the dissipation of heat may be modified. The thermal power must be such that the peak temperature of the resin, the internal fittings and the elastomer seals in the packaging fails to exceed the temperature limits defined in the Package Design Safety Report, taking into account the regulatory atmospheric conditions after thermal equilibrium is reached.

FIGURE 0.1  
PACKAGE DIAGRAM



## APPENDIX 16

### ISOTOPIC GENERATOR OF “GISETE 4”, “GISETE 5” OR “GISETE 8” TYPE

TN International Package Design Safety Report DOS-18-006566 Rev. 2.0 of 2 August 2018 justifies the authorised content.

#### 1. DEFINITION OF AUTHORISED CONTENT

The authorised radioactive content is described in Chapter 0A-14 of the Package Design Safety Report, ref. DOS-18-006566-015 Rev. 1.0.

##### Characteristic of the radioactive material

The radioactive material is contained in an isotopic generator of “Gisete 4”, “Gisete 5” or “Gisete 8” type. This isotopic generator is placed in a special-purpose internal fitting. The radioactive material consists of strontium 90 titanium (SrTiO<sub>3</sub>), in the form of sintered pellets.

At the time of transport, the radioactivity of the material contained in the isotopic generator respects the following limit:

Radionuclide *	Max. activities (TBq)
<sup>90</sup> Sr	897
*Presence of any other radionuclide that those listed in this table is authorised only if the radionuclide activity stays below the activity limit corresponding to an exempted consignment	

##### Characteristic of isotopic generator

The radioactive material can be contained in one of these 3 types of isotopic generators: “Gisete 4”, “Gisete 5” or “Gisete 8”. These isotopic generators are shown in the figure 16.1.

The isotopic generators are constituted of:

- a metal capsule locking the radioactive material, which forms the source block;
- a primary shield in which is inserted the source block;
- a thermal insulator;
- a secondary shield, except in the case of “Gisete 8” type of isotopic generator;
- an outer plate, except in the case of “Gisete 4” type of isotopic generator;
- a closure system.

##### Maximum thermal power

The thermal power of the material present in the isotopic generator is lower or equal to 160 W.

##### Maximum mass

The maximum mass of authorised content depends on type of isotopic generator. This mass is given in the following table:

Type of isotopic generator	Maximum mass (kg)
Gisete 4	2,270
Gisete 5	1,670
Gisete 8	212



## **2. INTERNAL FITTINGS**

The authorised content is placed in an internal fitting providing its radial and axial wedge inside of the package TN MTR cavity.

There are 3 types of internal fittings, shown in figure 16.2, each is dedicated to a type of isotopic generator:

- the "Gisete" 4 type of internal fitting dedicated to the "Gisete 4" type of isotopic generator;
- the "Gisete 5" type of internal fitting dedicated to the "Gisete 5" type of isotopic generator;
- the "Gisete 8" type of internal fitting dedicated to the "Gisete 8" type of isotopic generator.

The internal fittings are designed, manufactured, inspected and tested in compliance with:

- The chapter 0A-14 of the Package Design Safety Report, ref. DOS-18-006566-015 Rev. 1.0
- The plans ref. :
  - Orano TN PLA-17-00204480-010 Rev. 1.0, that corresponds to the "Gisete 4" type of internal fitting;
  - Orano TN PLA-17-00204480-011 Rev. 1.0, that corresponds to the "Gisete 5" type of internal fitting;
  - Orano TN PLA-17-00204480-012 Rev. 1.0, that corresponds to the "Gisete 8" type of internal fitting;

The internal fittings have of two parts:

- a radial wedge that can be fitted with a bottom
- an axial wedge.

The shell of axial wedge of internal fittings dedicated to isotopic generators of « Gisete 4 » and "Gisete 5" types can be constituted of several welded elements. The welds are so of type "full penetration".

## **3. LOADING CONDITIONS**

The internal fittings, loaded of them authorised content, are transported only in the package using a "STANDARD" lid.

FIGURE 16.1 (1/3)

DIAGRAM OF "GISETE 4" TYPE OF ISOTOPIC GENERATOR

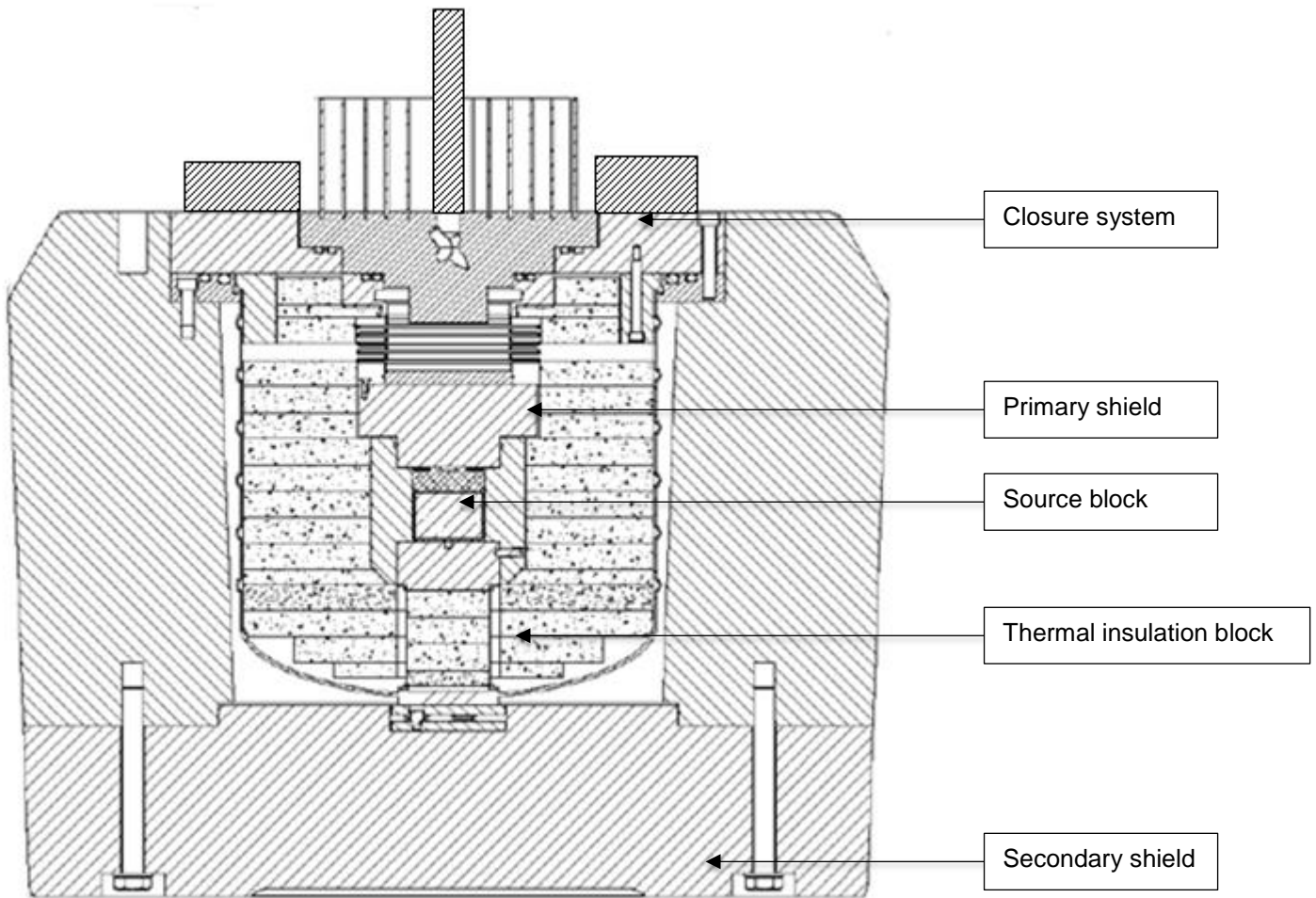


FIGURE 16.1 (2/3)

DIAGRAM OF "GISETE 5" TYPE OF ISOTOPIC GENERATOR

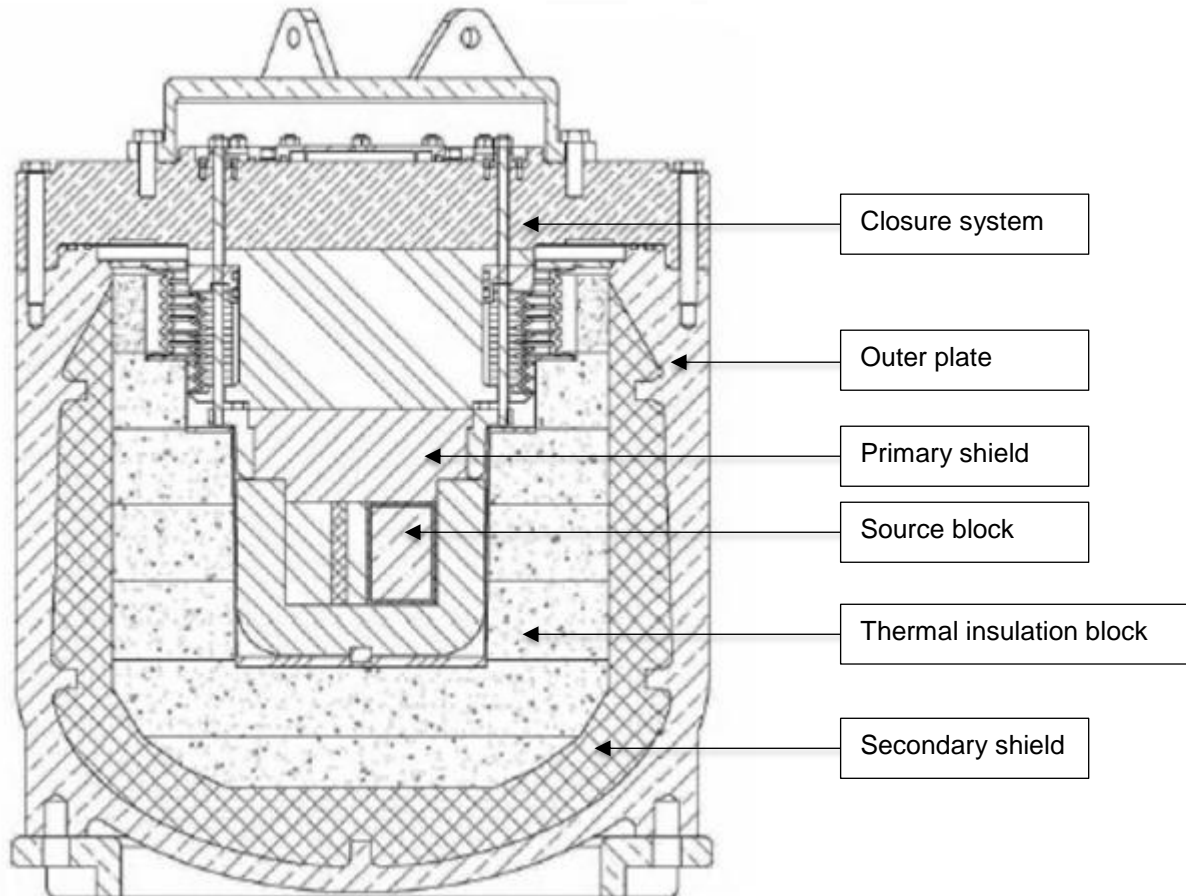


FIGURE 16.1 (3/3)

DIAGRAM OF "GISETE 8" TYPE OF ISOTOPIC GENERATOR

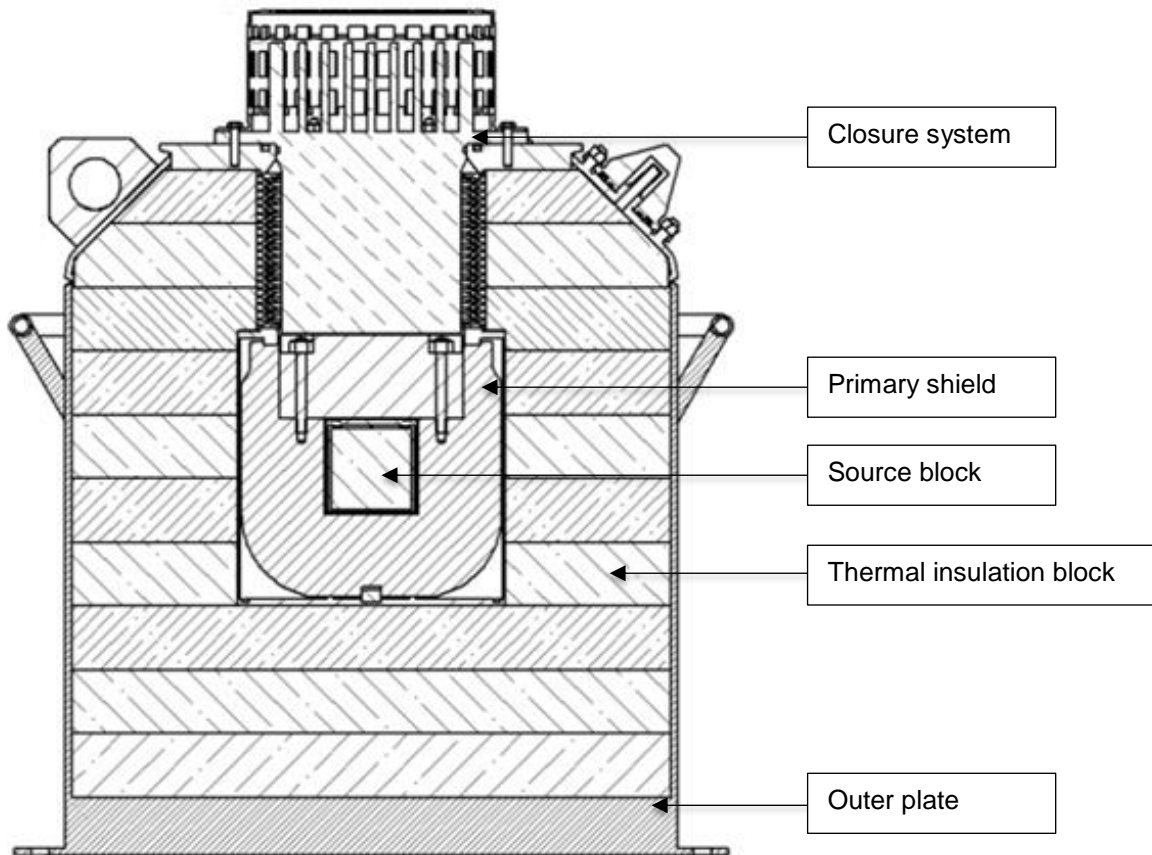


FIGURE 16.2 (1/3)

DIAGRAM OF INTERNAL FITTING DEDICATED TO "GISETE 4" TYPE OF GENERATOR

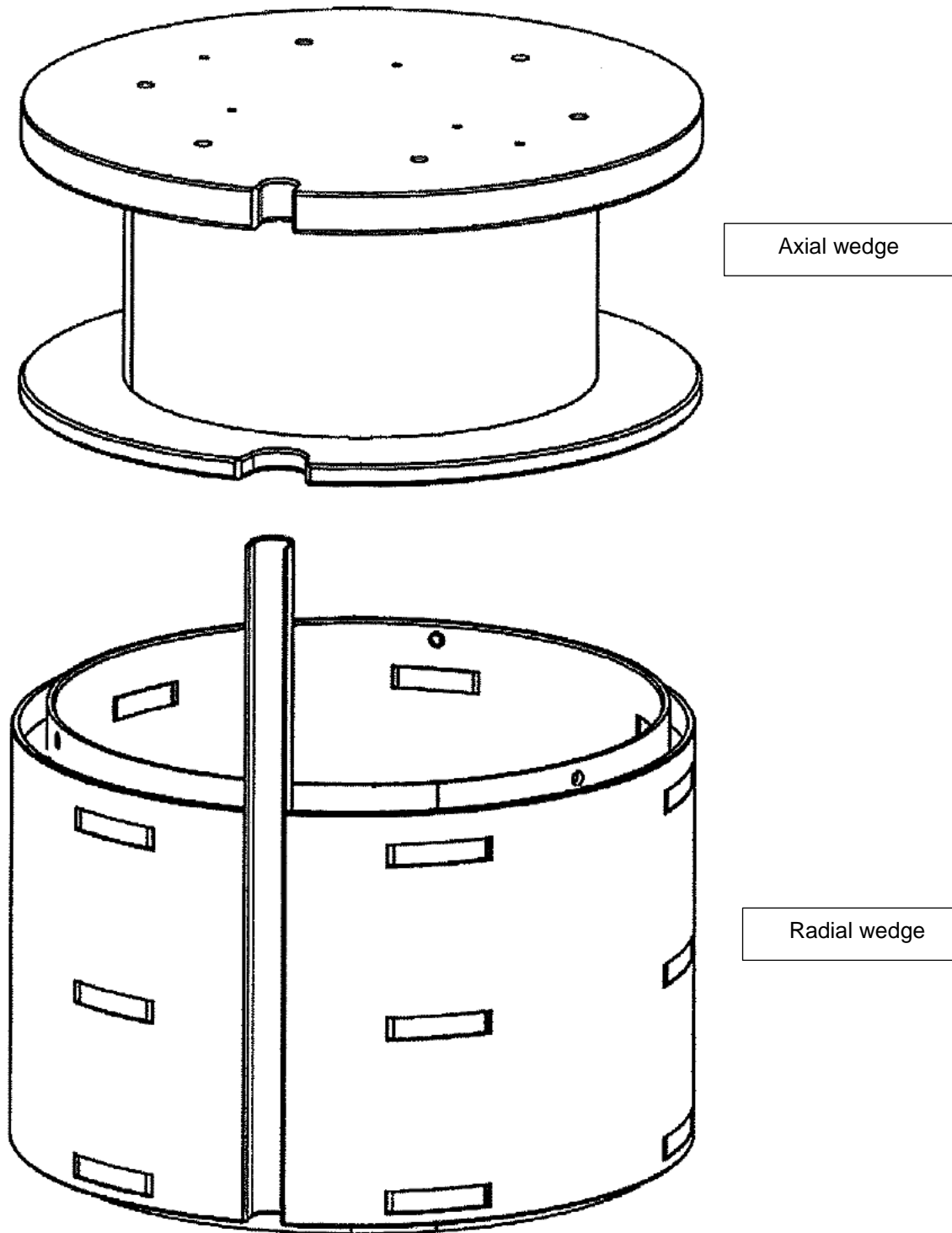


FIGURE 16.2 (2/3)

DIAGRAM OF INTERNAL FITTING DEDICATED TO "GISETE 5" TYPE OF GENERATOR

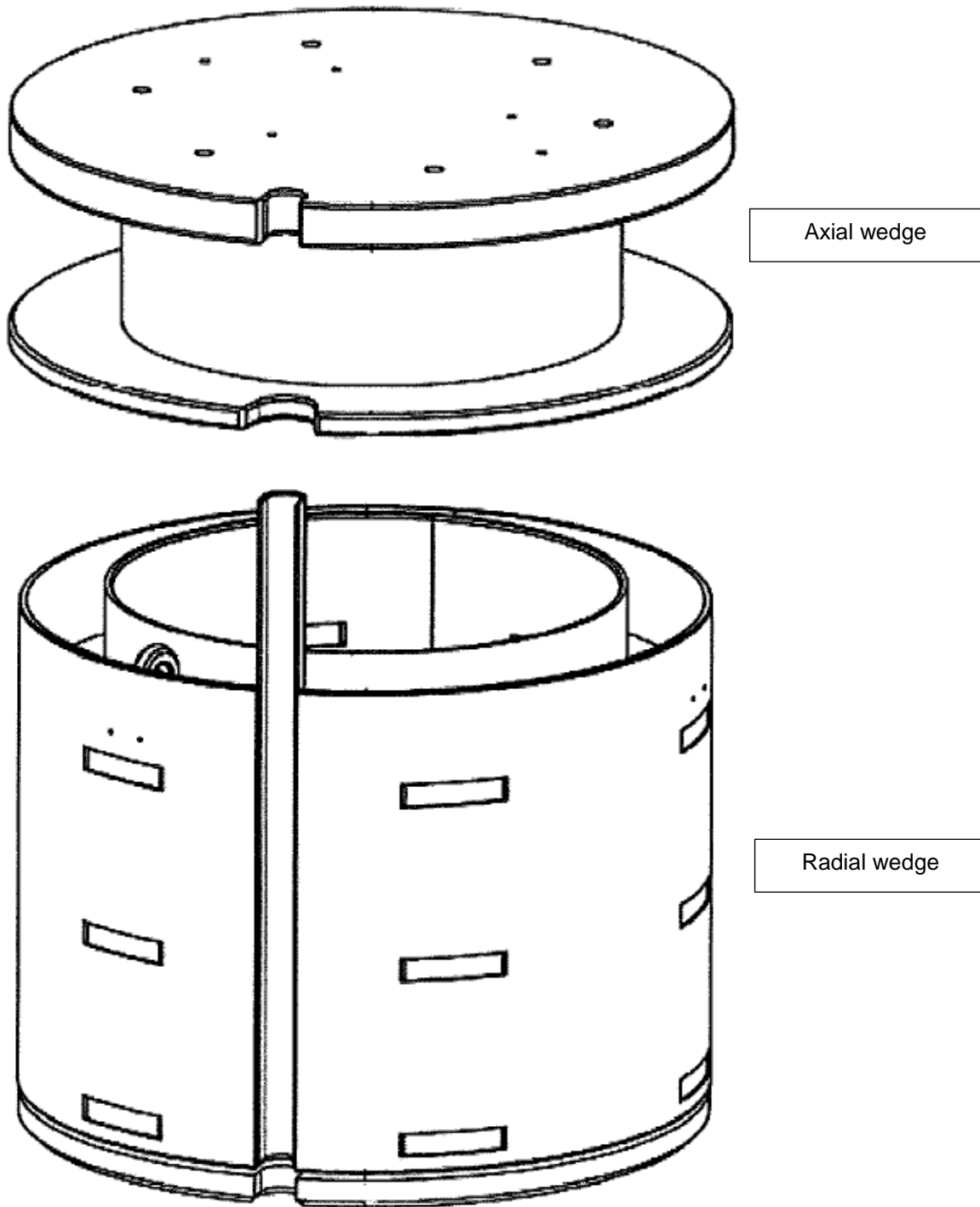
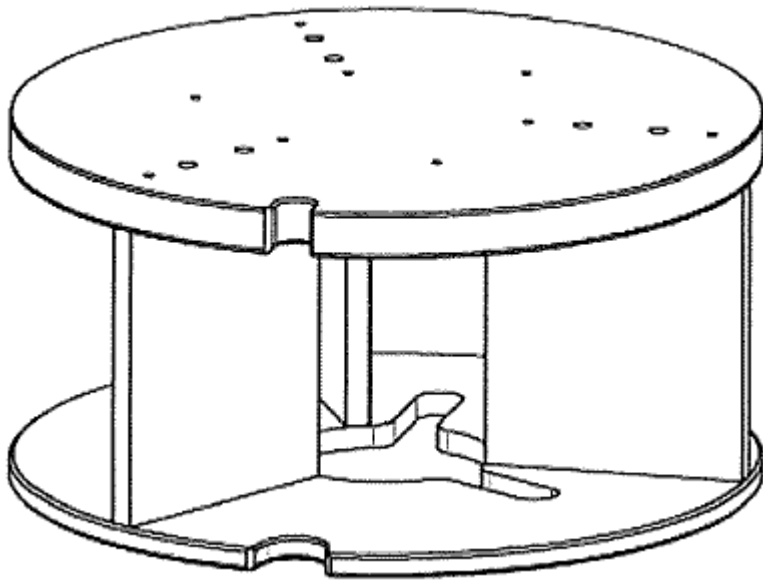
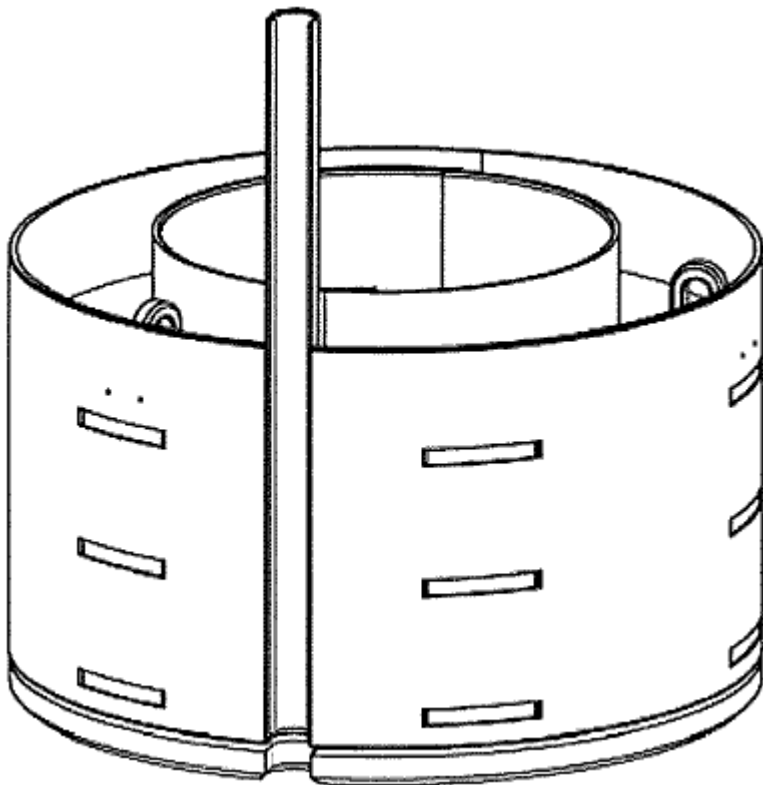


FIGURE 16.2 (3/3)

DIAGRAM OF INTERNAL FITTING DEDICATED TO "GISETE 8" TYPE OF GENERATOR



Axial wedge



Radial wedge



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**CERTIFICATE NUMBER:** USA/0830/B(U)-96

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