



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/6788/B(U)-96, REVISION 14**

**REVALIDATION OF UNITED KINGDOM COMPETENT AUTHORITY  
CERTIFICATE GB/2799E/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>. 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 - 2799E Safkeg.
2. Package Description and Authorized Radioactive Contents - as described in United Kingdom Certificate of Competent Authority GB/2799E/B(U)-96, Revision 7, amended by Change Notification CN 070, Issue A (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.

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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.

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- 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 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. Special Conditions -

- a. The Model No. 2799E containment boundary, which is provided by the Model No. 2812 containment can, must be tested to demonstrate that the leak rate does not exceed  $1 \times 10^{-8}$  Pa m<sup>3</sup> s<sup>-1</sup> standardized leak rate (or  $1 \times 10^{-7}$  std cm<sup>3</sup>/s) at the following intervals: (1) within the 12-month period prior to shipment; and (2) upon replacement of the seals.
- b. Prior to each shipment, the seals of the Model No. 2812 containment can must be demonstrated to prevent leakage in excess of  $5 \times 10^{-5}$  Pa m<sup>3</sup> s<sup>-1</sup> standardized leak rate (or  $5 \times 10^{-4}$  ref cm<sup>3</sup>/sec).

5. Marking and Labeling - The package shall bear the marking USA/6788/B(U)-96 in addition to other required markings and labeling.

6. Expiration Date - This certificate expires on July 31, 2022. Previous editions which have not reached their expiration date may continue to be used.

**CERTIFICATE USA/6788/B(U)-96, REVISION 14**


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 June 9, 2021 petition by Croft Associates Limited, Abingdon, Oxfordshire, UK, and in consideration of other information on file in this Office.

Certified By:



June 23, 2021

(DATE)

 William Schoonover  
Associate Administrator for Hazardous  
Materials Safety

Revision 14 - Issued to revalidate, for non-fissile and fissile excepted contents, United Kingdom Certificate of Approval No. GB/2799E/B(U)-96, Rev 7, amended by Change Notification CN 070, Issue A.



## CERTIFICATE OF APPROVAL OF PACKAGE DESIGN FOR THE CARRIAGE OF RADIOACTIVE MATERIAL

This is to certify that for the purposes of the Regulations of the International Atomic Energy Agency

- The Competent Authority of Great Britain in respect of inland surface transport, being the Office for Nuclear Regulation;
- The Competent Authority of the United Kingdom of Great Britain and Northern Ireland in respect of sea transport, being the Secretary of State for Transport;
- The Competent Authority of the United Kingdom of Great Britain and Northern Ireland in respect of air transport, being the Civil Aviation Authority; and
- The Competent Authority of Northern Ireland in respect of road transport, being the Department of Agriculture, Environment and Rural Affairs - Northern Ireland

approve the package design specified in Section 1 of this certificate, as submitted for approval by Croft Associates Ltd. (see Section 5)

as: Type B(U)

by: air, road, rail, sea and inland waterway.

Packaging identification: SAFKEG Package design N<sup>o</sup> 2799E

Packages manufactured to this design meet the requirements of the regulations and codes on page 2, relevant to the mode of transport, subject to the following general condition and to the conditions in the succeeding pages of this certificate.

In the event of any alteration in the composition of the package, the package design, the management system(s) associated with the package or in any of the facts stated in the application for approval, this certificate will cease to have effect unless the Competent Authority is notified of the alteration and the Competent Authority confirms the certificate notwithstanding the alteration.

Expiry Date: This certificate cancels all previous revisions and is valid until the end of July 2022 (see Section 5).

COMPETENT AUTHORITY IDENTIFICATION MARK: GB/2799E/B(U)-96

Signature:

Date of Issue: 10 February 2020

G Smith, Superintending Inspector  
Office for Nuclear Regulation  
Redgrave Court, Merton Road  
Bootle, Merseyside  
L20 7HS

on behalf of the Office for Nuclear Regulation; the Secretary of State for Transport; the Civil Aviation Authority; and the Department of Agriculture, Environment and Rural Affairs - Northern Ireland.

***This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.***

## REGULATIONS GOVERNING THE TRANSPORT OF RADIOACTIVE MATERIALS

### INTERNATIONAL

#### International Atomic Energy Agency (IAEA)

SSR-6 Regulations for the Safe Transport of Radioactive Material 2012 Edition

#### United Nations Economic Commission for Europe (UNECE)

European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) 2019 Edition

#### Intergovernmental Organisation for International Carriage by Rail (OTIF)

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) 2019 Edition

#### International Maritime Organization (IMO)

International Maritime Dangerous Goods (IMDG) Code 2018 Edition incorporating Amendment 39-18

#### International Civil Aviation Organization (ICAO)

Technical Instructions for the Safe Transport of Dangerous Goods by Air 2019-2020 Edition

### UNITED KINGDOM

#### **ROAD**

##### GREAT BRITAIN ONLY:

The Energy Act 2013 (2013 c. 32); The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009 No. 1348); The Energy Act 2013 (Office for Nuclear Regulation) (Consequential Amendments, Transitional Provisions and Savings) Order 2014 (SI 2014 No. 469)

##### NORTHERN IRELAND ONLY:

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland) 2010, (SR 2010 No 160)

#### **RAIL**

##### GREAT BRITAIN ONLY:

The Energy Act 2013 (2013 c. 32); The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009 No. 1348); The Energy Act 2013 (Office for Nuclear Regulation) (Consequential Amendments, Transitional Provisions and Savings) Order 2014 (SI 2014 No. 469)

#### **SEA**

British registered ships and all other ships whilst in United Kingdom territorial waters:

The Merchant Shipping Act 1995 (1995 c. 21); The Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997 (SI 1997 No. 2367); Merchant Shipping Notice MSN 1893 (M) The Carriage of Dangerous Goods and Marine Pollutants in Packaged Form: Amendment 39-18 to the International Maritime Dangerous Goods (IMDG) Code

#### **AIR**

The Air Navigation Order 2016 (SI 2016 No. 765); The Air Navigation (Dangerous Goods) Regulations 2002 (SI 2002 No.2786)

## 1. DESIGN SPECIFICATION

### Package Design

1.1 The package design specification shall be in accordance with Croft Associates Ltd, Design Safety Report for SAFKEG Design N° 2799E, DSR 2799E/B(U)-96 Issue L, dated June 2017; Croft Associates Ltd, Modification to Package Design 2799E for the Addition of a New Lead Pot, CN 048 Issue B, dated June 2018; Croft Associates Ltd, Competent Authority Change Notification: Update to GB/2799E to include a Zirconium Vial (Arrangement3), CN 066 Issue A, dated November 2019; and modifications to the package design approved by the authorities named on page 1 of this certificate under the established modifications procedure.

### Design Drawings

1.2 The design is specified in the following drawings.

Design No.	Title (number of components)	Drawing / Drawing List	Issue
2799E	Packaging Assembly	DL-1C-5407	E
Comprising of			
2799	Outer – Keg (one)	DL-0C-1514	S
2812	Inner – Containment can (one)	DL-1C-1534	Q
	Cork		
<b>And Innermost Packing Arrangement 1</b>			
	Lead Pot	0C-7598	A
	Aluminium Spacers	0C-7598	A
	A Generator Glass Vial	0C-7598	A
<b>Or Innermost Packing Arrangement 2</b>			
--	Comecer Lead Pot	0C-7863	A
--	Aluminium Spacers	0C-7863	A
--	Aluminium Can	0C-7863	A
--	Wheaton 3.0ml Glass Vial	W986277NG	C
<b>Or Innermost Packing Arrangement 3</b>			
	Comecer Lead Pot	0C-8099	A
	Aluminium Spacers (PN 7864 & PN 7865)	0C-8099	A
	Aluminium Can	0C-8099	A
	Zircaloy Canister	N3D020399A356	0

### Package Description and Materials of Manufacture

1.3 The packaging consists of an outer double skin insulated keg, an insulating cork liner, a re-sealable containment can, an inner lead shielding pot and aluminium spacers. See Appendix 1 for package illustrations. The outer keg is made of stainless steel filled with insulating phenolic resin foam and with a flat stainless steel lid attached by 8 stud/nut arrangements. The inner containment can and lid are manufactured from stainless steel, closed by a threaded retaining ring and sealed with a double EPDM O-ring.

1.4 There are three alternative acceptable designs of innermost packaging arrangements. The contents are held centrally within the containment vessel by aluminium spacers and have a lead shielding pot. The innermost packaging parts identified in arrangement 1 are not interchangeable with those

of packing arrangements 2 and 3. The Lead Pot, Aluminium Spacers and Aluminium Can are interchangeable between Innermost Packing Arrangement 2 and 3.

### **Package Dimension and Weights**

- 1.5 Nominal dimensions: 425mm diameter x 540 mm high
- 1.6 Maximum authorised gross weight: 67.5 kg

### **Authorised Contents**

- 1.7 The authorised radioactive contents for Innermost Packing Arrangement 1 are:
  - a) 20 GBq of Actinium 227 as a solid salt,
  - b) Daughter products and
  - c) Trace amounts, < 1%, of other radionuclides due to the production method.
  
- 1.8 The authorised radioactive contents for Innermost Packing Arrangement 2 and 3 are:
  - a) 20 GBq of Actinium 227 and 1 GBq of Actinium 225 as a solid salt
  - b) Daughter products and
  - c) Trace amounts, < 1%, of other radionuclides due to the production method

### **Restriction on Contents**

- 1.9 The total rate of heat generation shall not exceed 10W.

### **Containment System**

- 1.10 The containment system is the inner stainless steel containment can and lid, design number 2812. The seal between the body and lid is made by two EPDM O-rings. The lid is held in position by a threaded retaining ring.

## **2. USE OF PACKAGE**

### **Information Provided in Safety Report on Use of Packaging**

- 2.1 The packaging shall be used and handled in accordance with Croft Associates Ltd. Packing and Handling Instructions CPI 013 Issue U.
- 2.2 The packaging shall be maintained in accordance with Croft Associated Ltd. Serviceability Procedure CSP 006 Issue J.

### **Actions Prior to Shipment**

- 2.3 Administrative controls shall ensure that the contents are in accordance with Section 1 of this certificate, and that the consignor and consignee hold a copy of the certificate and instructions on the use of the packaging.

### **Supplementary Operational Controls**

- 2.4 None required

### **Emergency Arrangements**

- 2.5 Before shipment takes place, suitable emergency plans will have been drawn up, copies of which shall be supplied to the GB Competent Authority on demand.
- 2.6 Within Great Britain, if the consignor's own, or other approved emergency plans, cannot be initiated for any reason, then the police shall be informed immediately.

### **3. MANAGEMENT SYSTEMS**

3.1 The management system(s) assessed as adequate in relation to this design by the authorities named on page 1 of this certificate, at the date of issue, are as specified in Croft Associates Ltd's Safety Report reference DSR 2799E-96 Issue L, referred to in Section 1 above, and comprise the following:

- Croft Associates Ltd Quality Management System.

3.2 No alteration may be made to any management system confirmed as adequate in relation to this design, unless:

- a) the authorities named on page 1 of this certificate have confirmed the amended management system is adequate prior to implementation or use; or
- b) the alteration falls within the agreed change control procedures set out in the management system(s).

3.3 Other management systems for design, testing, manufacture, documentation, use, maintenance, inspection, transport and in-transit storage operations may be used providing they comply with international, national or other standards for management systems agreed as acceptable by the authorities named on page 1 of this certificate.

### **4. ADMINISTRATIVE INFORMATION**

#### **Packaging Serial Numbers**

4.1 For the purpose of compliance with ADR / RID, the owner of the packaging shall be responsible for informing ONR of the serial number of each packaging manufactured to this design.



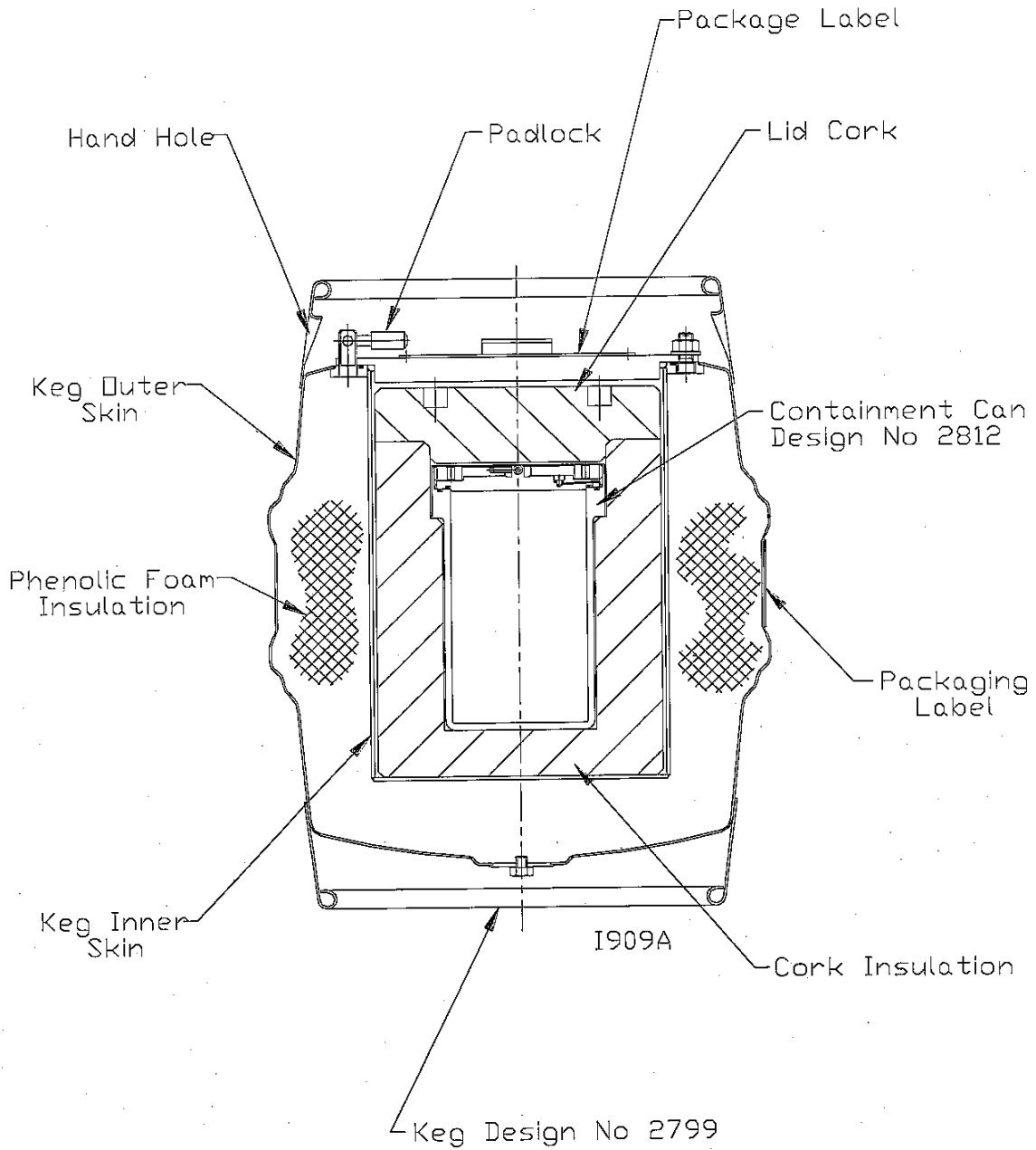
## 5. CERTIFICATE STATUS

### Design approval issued to:

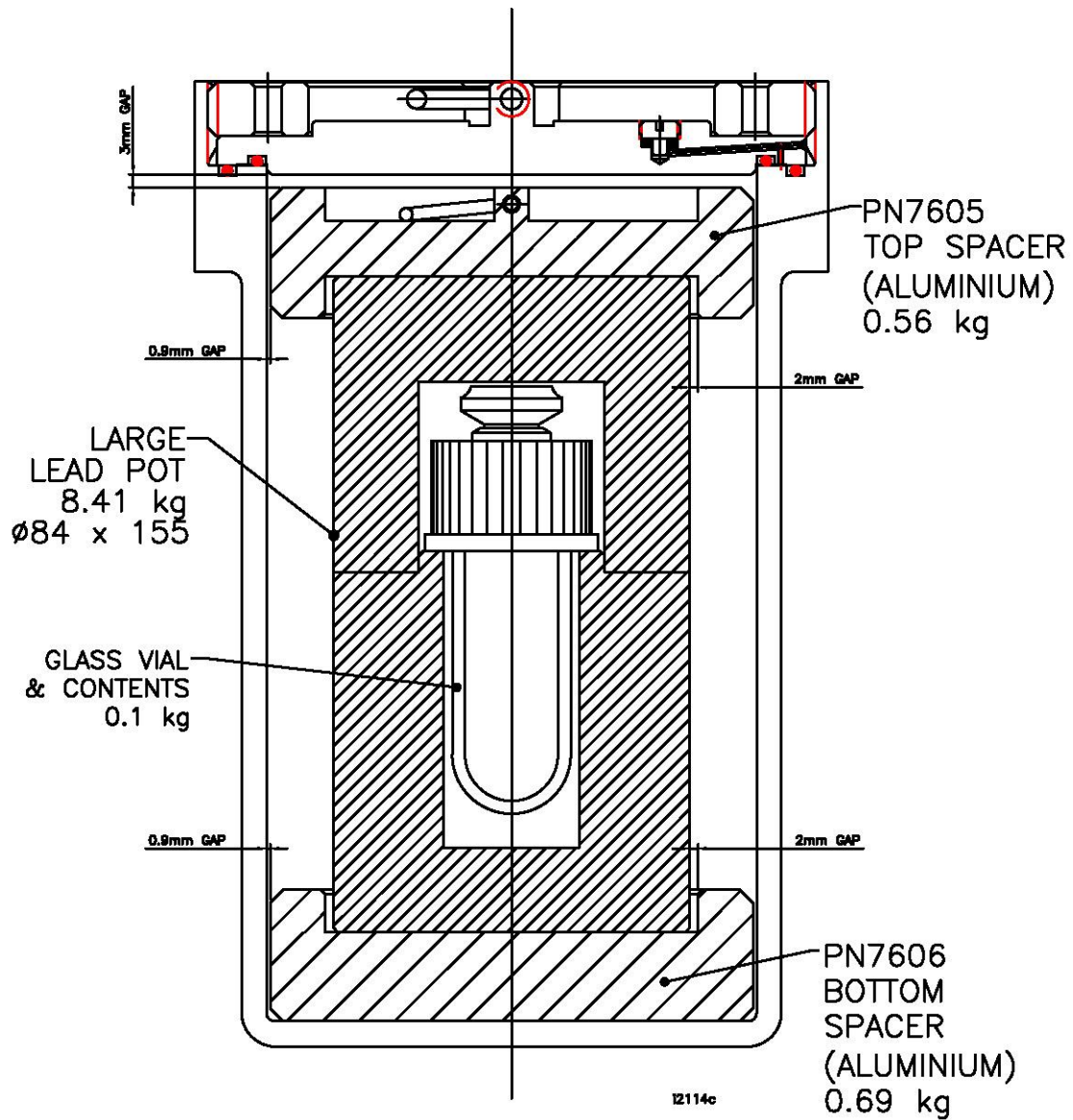
Croft Associates Ltd.,  
F4 Culham Science Centre  
Abingdon  
Oxfordshire  
OX14 3DB  
UK

Issue / Revision Number	Date of Issue	Date of Expiry	Reason for Revision
4	18 June 2001	31 March 2004	Renewal as GB/2799E/B(U)F-85.
1	24 June 2004	30 June 2007	Design approval issued under new regulations. Fissile content removed and minor amendments/clarification.
2	5 March 2008	30 June 2010	Renewal with minor changes (1 year extension issued on 21 June 2010).
3	30 June 2011	30 June 2016	Renewal.
4	29 June 2016	31 Dec 2016	Short Term Certificate with limitations on contents.
5	11 July 2017	31 July 2022	Renewal for Ac-227 only.
6	6 September 2018	31 July 2022	Inclusion of Croft Modification CN048
7	10 February 2020	31 July 2022	Inclusion of Croft Modification CN066

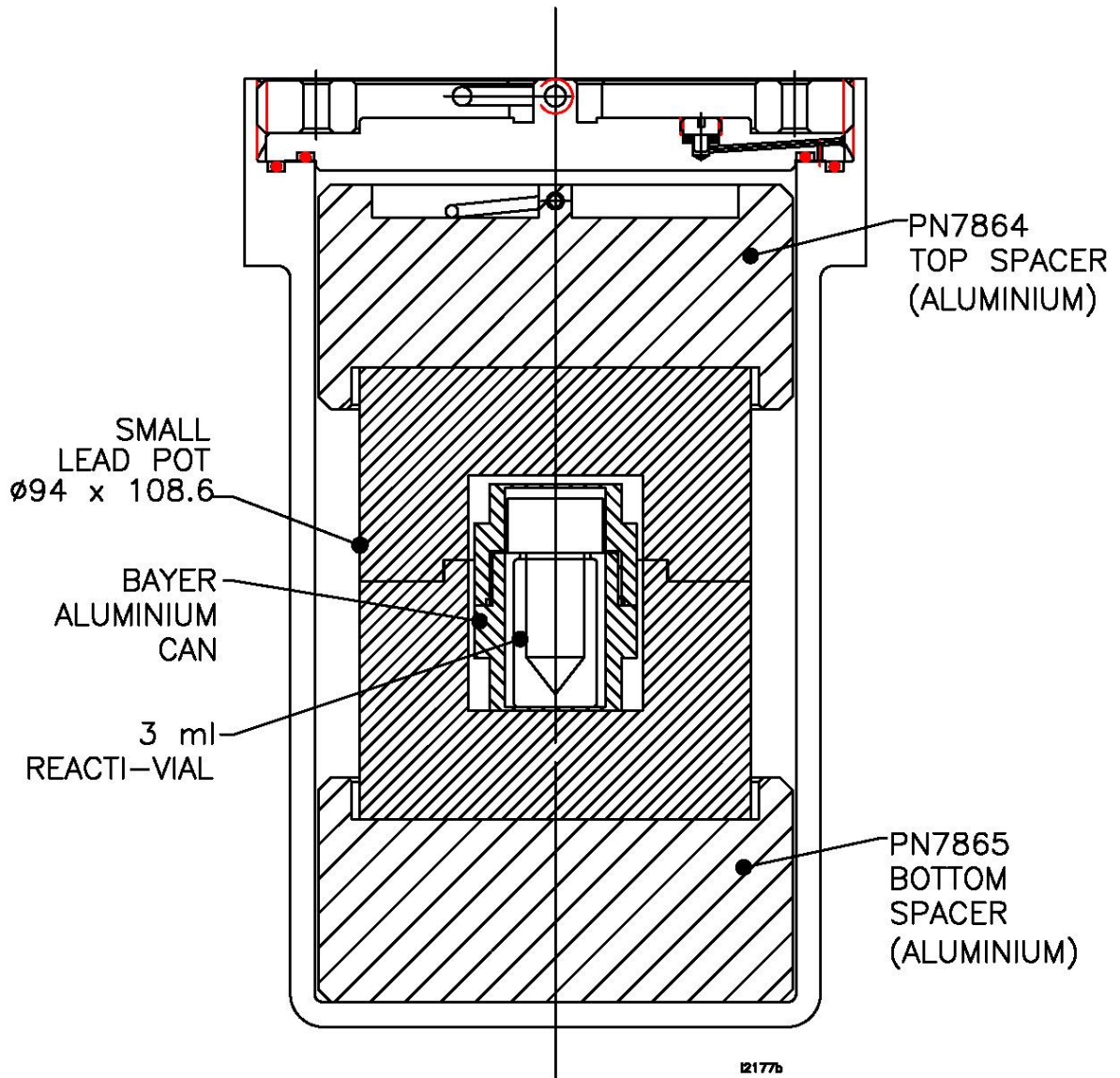
APPENDIX 1 – PACKAGE ILLUSTRATION FIGURE 1 – KEG AND CONTAINMENT VESSEL



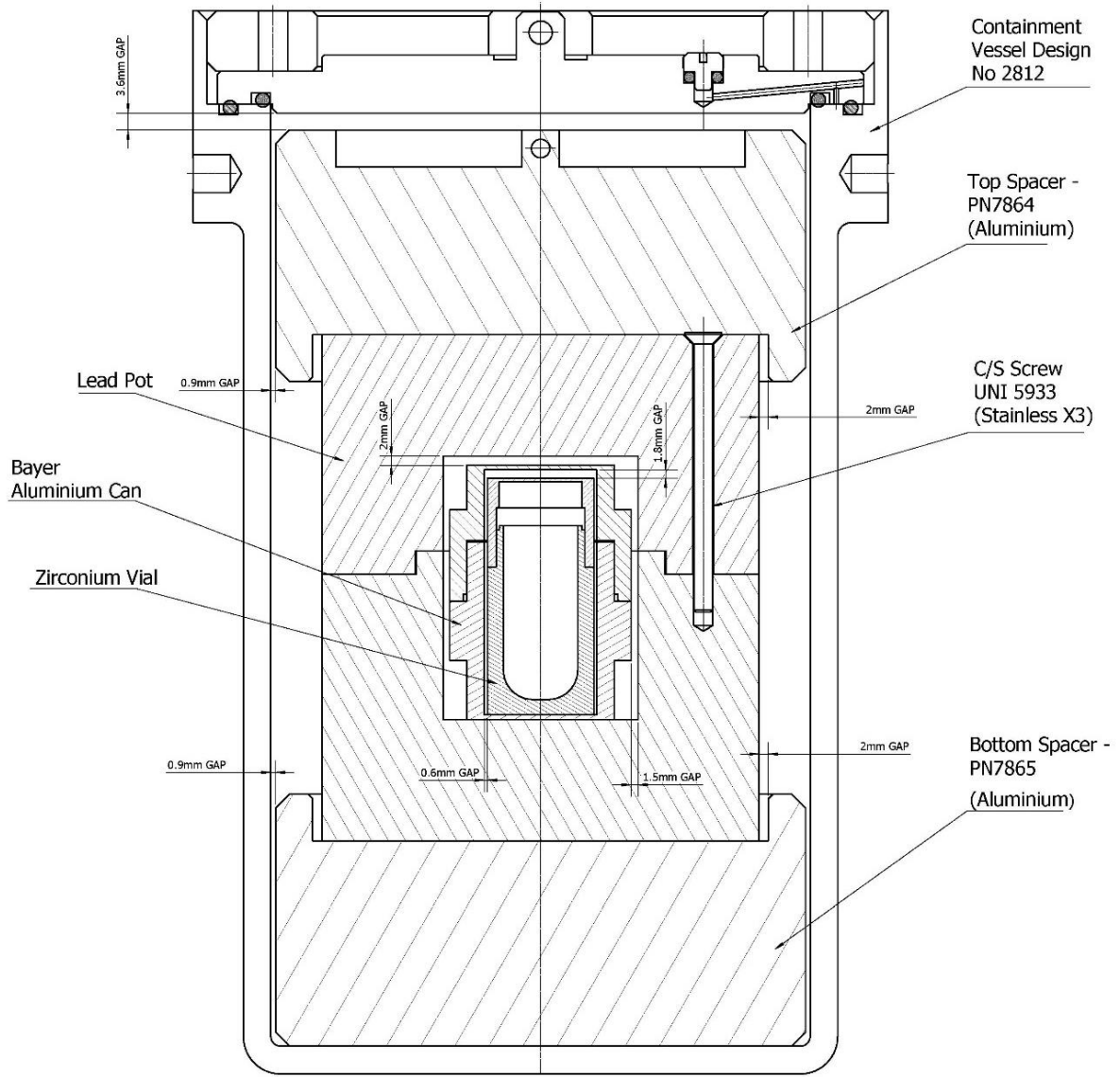
APPENDIX 1 – PACKAGE ILLUSTRATION FIGURE 2 – INNERMOST PACKAGING ARRANGEMENT 1



APPENDIX 1 – PACKAGE ILLUSTRATION FIGURE 3 – INNERMOST PACKAGING ARRANGEMENT 2



APPENDIX 1 – PACKAGE ILLUSTRATION FIGURE 3 – INNERMOST PACKAGING ARRANGEMENT 3



i2261a



Competent Authority Change Notification: Update to  
GB/2799E to include a Revised Zirconium Vial Drawing  
(Arrangement 3)

CN 070  
Issue A  
Page i

Package Design No GB/2799E	Colloquial Name SAFKEG
Certificate No GB/2799E/B(U)-96 Rev.7, expiring end July 2022.	DSR Ref No DSR 2799E/B(U)-96 Issue L

Modification Category: B, No significant impact on safety or design function

Proposed Changes:

To permit the use of an updated version of the Zirconium Vial drawing currently approved under CN 066 Issue A (3D020399A356 Rev 0). The revised drawing corrects imperial to metric dimensional conversion errors which were incorrectly incorporated into the drawing approved under CN 066.

The Zirconium Vial is referred to as Packing Arrangement 3 and uses the small lead pot Ø94 x 108.6mm and the Bayer Aluminium Can that is used with Packaging Arrangement 2.

Supporting Documentation (supplementing those referenced in the Competent Authority Certificate GB/2799E/B(U)-96 Rev.7), these provide the revised component specification for the Zirconium (Zircaloy) vial:

- Oak Ridge National Laboratory, Drawing of Zirconium Vial 'Zircaloy Canister' dated 3rd September 2019, N3D020399A356 Rev B.


20/01/2021 Signature  
Date .....  
\_\_\_\_\_ (Responsible Officer)



Competent Authority Change Notification: Update to GB/2799E to include a Revised Zirconium Vial Drawing (Arrangement 3)	CN 070 Issue A Page ii
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Competent Authority Comments

**Approved**

<p>The proposed change is</p> <p>Approved</p> <p>under the terms of the existing approval(s)</p>	<p>Name: Gavin Smith</p> <p>Signature </p> <p>Date: 08/06/2021</p>	<p>Competent Authority Approval Stamp</p>
<p>Approval received by letter/facsimile/e-mail Email from ONR dated 8th June 2012</p>	<p>Received by A L Ferguson, Croft.</p>	<p>Date 8th June 2021</p>





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East Building, PHH-23  
1200 New Jersey Ave, SE  
Washington, D.C. 20590

**CERTIFICATE NUMBER:** USA/6788/B(U)-96

**ORIGINAL REGISTRANT(S) :**

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