

NOMINAL SOURCE CERTIFICATE

Customer: Eckert & Ziegler Isotope Products GmbH
Purchase Order No.: PO-067835
Model No.: Cf2.N02
Catalog No.: CF23036/20020U
Capsule Type: A3036-2
Active Diameter: 0.125" (3.18 mm)
Cover: Stainless Steel
Backing: Stainless Steel

Certificate Date: 2024-08-09
Quantity: 1
SS&DR No.: CA0406S193S
ISO/ANSI Classification: ANSI 77C66545
Special Form No.: USA/0793/S-96 Rev 1
Nuclide Half Life: 2.645 ± 0.008 years
Recommended Working Life: 15 years

Nuclide	Source No.	Activity	Radiation Output	Reference Date
Cf-252	X3-832	740 kBq (20 µCi)	Not Applicable	2024-08-15

Impurities: See Technical Data Sheet

Leak Test Information is on Reverse Side:

Remarks:

- This document uses the numerical convention where 1.000 = 1 and 1,000 = 10³.
- This document uses the date convention YYYY-MM-DD in accordance with ISO 8601.
- Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- ANSI classification is equivalent to ISO2919.

Matthew Dey

Name


Signature

2024-08-09

Date

Notebook Page: 2460-21

THE LEAK TEST(S) INDICATED BY THE CHECKED BOX(ES) WAS(WERE) APPLIED TO DETERMINE THE INTEGRITY OF THE SOURCE DESCRIBED ON THE FRONT SIDE. THE LEAK TESTS INDICATED BELOW WERE EITHER TAKEN DIRECTLY FROM ISO 9978:2020 OR DERIVED FROM THE LEAK TEST METHODS LISTED IN ISO 9978:2020. THE REGULATORY LIMIT FOR LEAK TEST RESULTS IS <5 nCi (185 Bq) FOR BOTH ALPHA AND BETA-GAMMA ACTIVITY. LEAK TEST RESULTS MARKED BELOW CONTAINED <5 nCi (185 Bq) OF REMOVABLE ACTIVITY UNLESS OTHERWISE STATED ON THIS CERTIFICATE.

Standard Wipe Test

The source was wiped over its entire surface with a moistened filter paper disk. After drying, the disk was checked for activity using a scintillation detector.

Special Wipe Test

The source was wiped over its entire surface with moistened polystyrene. The polystyrene was then dissolved in a liquid scintillation cocktail and counted in a liquid scintillation counter.

Distilled Water Soak Test

The source was immersed in distilled water and maintained at $(50 \pm 5)^{\circ}\text{C}$ for a minimum of four hours or room temperature $(20 \pm 5)^{\circ}\text{C}$ for 24 hours. After removal of the source, the liquid was a) checked for activity using a liquid scintillation counter, or b) evaporated in a planchet and the residue checked for activity using a windowless proportional counter or end-window G.M. tube.

Liquid Scintillation Soak Test

The source was immersed for a minimum of 3 hours at room temperature $(20 \pm 5)^{\circ}\text{C}$ in a liquid scintillation cocktail, which does not attack the source's outer surface material. The source was stored away from light to avoid photoluminescence. The sealed source was then removed and the activity of the liquid scintillation cocktail was measured.

Gas Source Test

The source was placed in a vacuum desiccator and maintained at a pressure of <10 mm Hg for not less than 12 hours. The activity was checked by introducing air into the desiccator and monitoring the air with an end-window G.M. tube.

Ampoule Leak Test

The ampoule was kept in an inverted position on a filter paper disk or polystyrene wipe for a minimum of 16 hours. The wipe was then checked for activity using a scintillation detector or liquid scintillation counter.

Bubble Leak Test

The container was pressurized to its fill pressure; then soapy water was applied over its valve and neck or, the valve and neck of the vessel were immersed in water. If no growing bubbles were observed, the container was considered leak free.

Wipe Test for Industrial Ni-63 Sources

The sources were wipe tested by an approved sampling plan, which called for either 100% of the batch to be individually wipe tested, or, a subset thereof. The wipe test(s) used to test for removable contamination and the results of those tests are recorded on the front of this form.

Pressure Test for Triotech Kr-85 Sources

Prior to filling the vessel with Kr-85 gas, the vessel was evacuated to <5 mm Hg, the gas manifold system shut off and the system allowed to stand for a minimum of 30 minutes. A vacuum difference not greater than the known vacuum loss of the manifold system itself signified the vessel did not leak.

Leak Test Not Applicable

The active area of the source is uncovered or is protected by a very thin coating. Although the deposit is adherent, it is not designed or certified to pass a standard leak test. The inactive portions of the source have been checked using the standard wipe test or special wipe test depending on the nuclide.

Other Leak Test



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Cf-252 Technical Data

The Cf-252 used for source number X3-832 was taken from Eckert & Ziegler Isotope Products Laboratories Lot #6050725. It had the following composition as of 2023-08-22.

<u>Nuclide</u>	<u>Mass %</u>	<u>Activity %</u>
Cf-249	22.601	0.3583
Cf-250	23.496	9.9062
Cf-251	10.676	0.0656
Cf-252	43.226	89.6699

The Cm-248 decay product was last separated on 2018-04-19.

Isotopic composition provided by Oak Ridge National Laboratory.

If you have any questions, please contact Eckert & Ziegler Isotope Products Technical Service: 661-309-1010

Res Niño Lazatin, Chemist
name, title


signature

2024-8-9
date