



Eckert & Ziegler

Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010

Fax 661•257•8303

BRANDEIS CERTIFICATE

NOMINAL SOURCE CERTIFICATE

Customer: Brandeis University

Purchase Order No.: VISA / Hermann Wellenstein

Model No.: N-252

Catalog No.: CF230140010U

Capsule Type: A3014

Active Diameter/Mass: 0.062" (1.57 mm)

Cover: Stainless Steel

Backing: Stainless Steel

Certificate Date: 17-May-12

Quantity: 1

SS&DR No.: CA0406S102S

ISO/ANSI Classification: ANSI 77C66535

Special Form No.: USA/0351/S-96 Rev 8

Nuclide Half Life: 2.645 +/- 0.008 years

Recommended Working Life: 15 years

Nuclide	Source No.	Activity	Radiation Output	Reference Date
Cf-252	J2-991	10 μ Ci (370 kBq)	Not Applicable	1-Jun-12

CF230140010U - double encapsulated
stainless steel point source

Nominal Activity @
mCi MBq
0.01 0.37

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 = 10^3 .
 - Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
 - ANSI classification is equivalent to ISO2919.

Matthew Dey

Name

Signature

Date

Notebook Page: 1575-60

ISO 9001 CERTIFIED

Medical Imaging Laboratory

24937 Avenue Tibbitts Valencia, California 91355

Industrial Gauging Laboratory

1800 North Keystone Street Burbank, California 91504



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Cf-252 Technical data

The Cf-252 used to prepare your order was taken from
Eckert & Ziegler Isotope Products Laboratories Lot #5731301
and it had the following composition as of 10 Apr 12.

<u>Nuclide</u>	<u>Mass %</u>	<u>Activity %</u>
Cf-249	12.162	0.1312
Cf-250	14.838	4.256
Cf-251	5.349	0.0223
Cf-252	67.651	95.591
Cf-254	0.00000005	0.000001

The Cm-248 decay product was last separated on 26 Sep 11

Isotopic composition provided by Oak Ridge National Laboratory

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

ISO 9001 CERTIFIED

Medical Imaging Laboratory

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Industrial Gauging Laboratory

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Activity Tolerance

± 15% from nominal

Recommended Working Life

See Technical Information section.

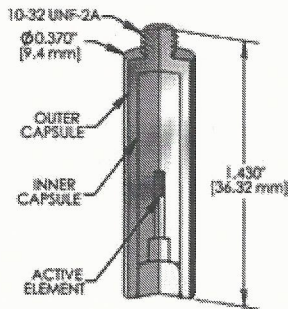
Only typical sources are listed; inquiries are invited for alternative capsule designs and activities.

Spontaneous fission neutron sources for research, moisture gauging and materials analysis applications requiring low activities. Activity is contained in a stable homogeneous element.



3014 capsule

Double-encapsulated stainless steel point source. ISO rating: C66535

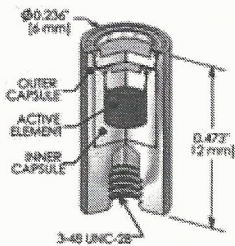


Nominal Activity		Part Numbers	Regulatory
mCi	MBq	3014	SS&DR / SFC
0.0001	0.0037	CF230140100N	Yes / No
0.005	0.185	CF230140005U	Yes / No
0.01	0.37	CF230140010U	Yes / No
0.5	18.5	CF230140500U	Yes / No
1	37	CF230140001M	Yes / No
Availability: 4 weeks			

Intermediate activities are available upon request.

3023 capsule

Double-encapsulated stainless steel source. ISO rating: C63333



Nominal Activity		Part Numbers	Regulatory
mCi	MBq	3023	SS&DR / SFC
0.0001	0.0037	CF230230100N	Yes / Yes
0.005	0.185	CF230230005U	Yes / Yes
0.01	0.37	CF230230010U	Yes / Yes
0.5	18.5	CF230230500U	Yes / Yes
1	37	CF230230001M	Yes / Yes
Availability: 4 weeks			

Activity on date of purchase

Cf-252: 0.009559

Cf-250: 0.000425

Total: 0.01 mCi

10 April 2012

error due to neglect of other isotopes,
0.2% of activity at start.

Cf-252 neutron decay percentage:
3.09%

Cf-250 neutron decay percentage:
0.077%

mCi x neutron factor:

$$\begin{aligned}\text{Cf-252} &= 2.097 \times 10^{-3} \times 0.0309 \\ &= 6.48 \times 10^{-5} \text{ mCi} \times \frac{\text{neutron}}{\text{event}}\end{aligned}$$

$$\begin{aligned}\text{Cf-250} &= 3.13 \times 10^{-4} \times 0.00077 \\ &= 2.41 \times 10^{-7} \text{ mCi} \times \frac{\text{neutron}}{\text{event}}\end{aligned}$$

$$\text{total } \frac{\text{neutron}}{\text{event}} \cdot \text{mCi} \cong 6.50 \times 10^{-5} \times \underset{\substack{\uparrow \\ \text{mCi}}}{3.7 \times 10^7} = 2.405 \times 10^2 \frac{\text{neutrons}}{\text{second}}$$

Activity on experiment start

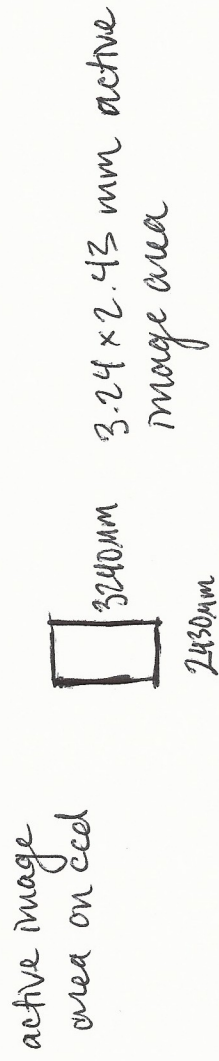
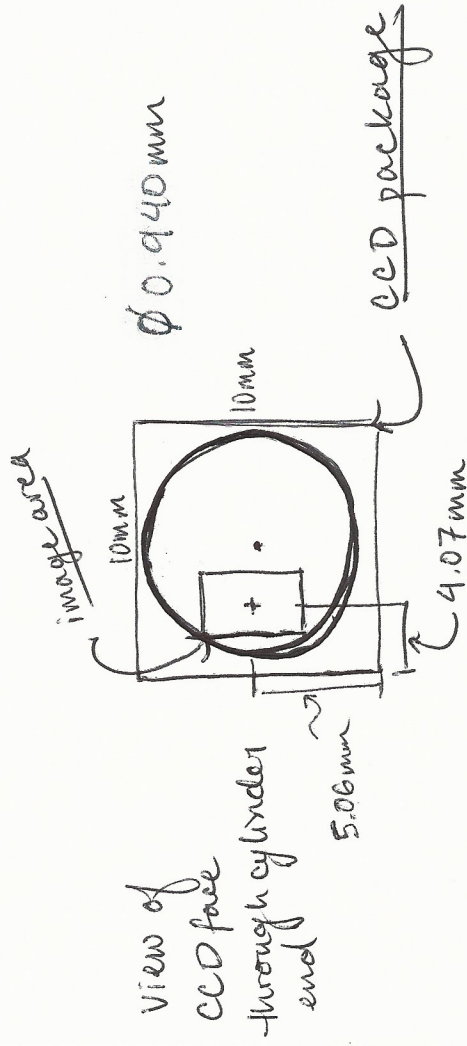
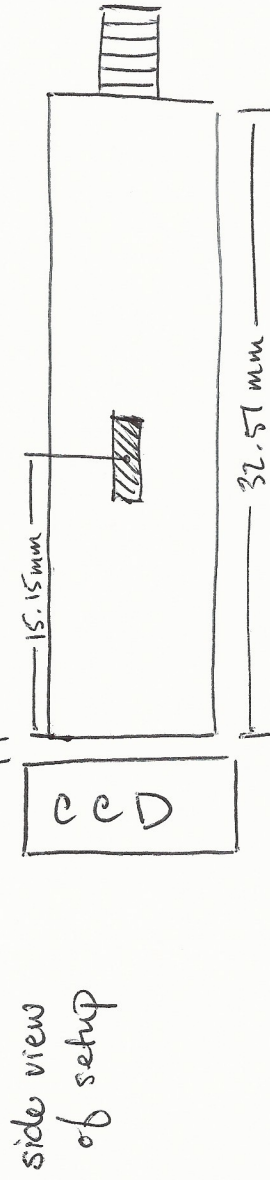
Cf-252: 0.002097

Cf-250: 0.000313

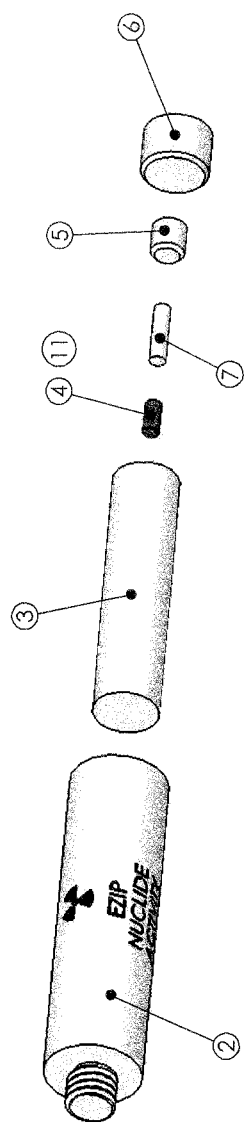
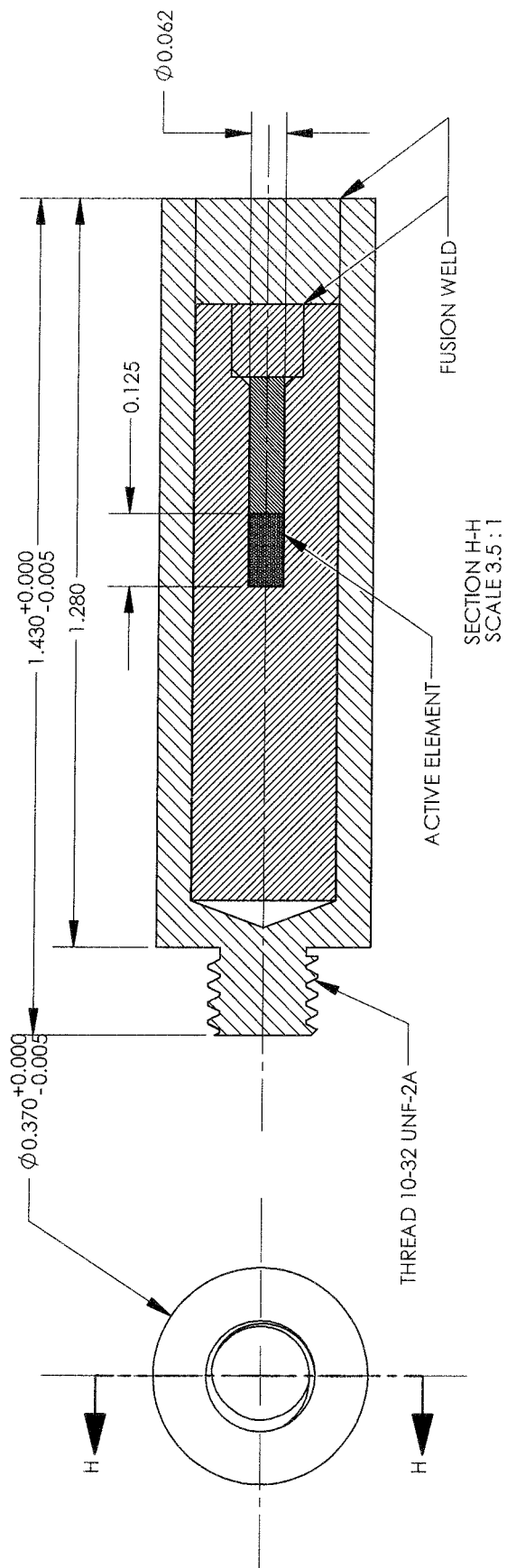
Total: 0.002410 mCi

22 January 2018

Helpful Drawings of Setup



diameter of active element: 1.575mm
length of active element: 3.175mm



2. PACKAGE AND IDENTIFY PART NUMBER THEREON.
1. ASSEMBLE PER ENGINEERING DRAWING.
NOTES: UNLESS OTHERWISE SPECIFIED

P/N A3014-01 NEUTRON SOURCE ASSEMBLY (CERAMIC ACTIVE ELEMENT)
P/N A3014-02 NEUTRON SOURCE ASSEMBLY (SINGLE Cf-252 WIRE ACTIVE ELEMENT)

Eckert & Ziegler Isotope Products VALENCIA, CALIFORNIA 91355			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCH-SIZES. METRIC UNITS (mm) ARE IN MILLIMETERS. TOLERANCES (UNLESS OTHERWISE SPECIFIED) X.XXX ± .002 INCH ANGULAR TOLERANCE OF 0°±30° X.XX ± .005 INCH FRACTIONAL DIMENSIONS ± 1/32" X.X ± .03 INCH REFERENCE DIMENSIONS (I) N/A X. ± .1 INCH SURFACE ROUGHNESS μINCH MAX ALL DIMENSIONS ARE FINISHED DIMENSIONS			DRAWN		TITLE				
						KP		NEUTRON SOURCE				
						ME/CHECKER		SERIES TITLE				
						EZ		HIGH INTENSITY GAMMA AND NEUTRON SOURCES (HEG SERIES CAPSULES 193, 225 & N-252)				
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			EZ		32993		3014		K		3 OF 11	
			SCALE		SIZE							
THIRD ANGLE PROJECTION			NONE		A							