

## CERTIFICATE OF CALIBRATION GAMMA STANDARD SOURCE

Radionuclide:	Na-22	Customer:	ECKERT & ZIEGLER ISOTOPE PRODUCTS	
Half-life:	950.8 ± 0.9 days	P.O. No.:	36067	
Catalog No.:	GF-022-M	Reference Date:	1-Jun-08	12:00 PST
Source No.:	1294-80-3	Contained Radioactivity:	0.3990 µCi	14.76 kBq

### Physical Description:

A. Capsule type:	M (25.4 mm OD x 3.18 mm THK)
B. Nature of active deposit:	Evaporated metallic salt
C. Active diameter/volume:	3 mm
D. Backing:	9.23 mg/cm <sup>2</sup> kapton
E. Cover:	0.254 mm aluminized mylar

### Radioimpurities:

None detected

### Method of Calibration:

This source was assayed using gamma ray spectrometry.

Peak energy used for integration:	1275 keV
Branching ratio used:	0.9994 gammas per decay

### Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.6 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.1 %

### Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- This source has a working life of 5 years.

  
Quality Control

  
Date

EZIP Ref. No.: 1294-80

ISO 9001 CERTIFIED

Medical Imaging Laboratory

24937 Avenue Tibbitts Valencia, California 91355

Industrial Gauging Laboratory

1800 North Keystone Street Burbank, California 91504

# CERTIFICATE OF CALIBRATION

## GAMMA STANDARD SOURCE

Radionuclide:	Co-60	Customer:	ECKERT & ZIEGLER ISOTOPE PRODUCTS	
Half-life:	5.272 ± 0.001 years	P.O. No.:	36067	
Catalog No.:	GF-060-M	Reference Date:	1-Jun-08	12:00 PST
Source No.:	1294-80-2	Contained Radioactivity:	0.4257 µCi	15.75 kBq

**Physical Description:**

A. Capsule type:	M (25.4 mm OD x 3.18 mm THK)
B. Nature of active deposit:	Evaporated metallic salt
C. Active diameter/volume:	3 mm
D. Backing:	9.23 mg/cm <sup>2</sup> kapton
E. Cover:	0.254 mm aluminized mylar

**Radioimpurities:**

None detected

**Method of Calibration:**

This source was assayed using gamma ray spectrometry.

Peak energy used for integration:	1173, 1333 keV
Branching ratio used:	0.9986, 0.9998 gammas per decay

**Uncertainty of Measurement:**

A. Type A (random) uncertainty:	± 0.6 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.1 %

**Notes:**

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- This source has a working life of 5 years.

  
Quality Control  
Date

EZIP Ref. No.: 1294-80

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## CERTIFICATE OF CALIBRATION GAMMA STANDARD SOURCE

Radionuclide: Cs-137  
Half-life: 30.17 ± 0.16 years  
Catalog No.: GF-137-M  
Source No.: 1294-80-1

Customer: ECKERT & ZIEGLER ISOTOPE PRODUCTS  
P.O. No.: 36067  
Reference Date: 1-Jun-08 12:00 PST  
Contained Radioactivity: 0.2750  $\mu$ Ci 10.18 kBq

### Physical Description:

A. Capsule type: M (25.4 mm OD x 3.18 mm THK)  
B. Nature of active deposit: Evaporated metallic salt  
C. Active diameter/volume: 3 mm  
D. Backing: 9.23 mg/cm<sup>2</sup> kapton  
E. Cover: 0.254 mm aluminized mylar

### Radioimpurities:

None detected

### Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in  $\mu$ Ci/g was determined using gamma ray spectrometry.

Peak energy used for integration: 661.7 keV  
Branching ratio used: 0.851 gammas per decay

### Uncertainty of Measurement:

A. Type A (random) uncertainty: ± 0.4 %  
B. Type B (systematic) uncertainty: ± 3.0 %  
C. Uncertainty in aliquot weighing: ± 0.4 %  
D. Total uncertainty at the 99% confidence level: ± 3.1 %

### Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- This source has a working life of 5 years.

Daniel James Van Dalsem  
Quality Control

28-Apr-08  
Date

EZIP Ref. No.: 1294-80

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