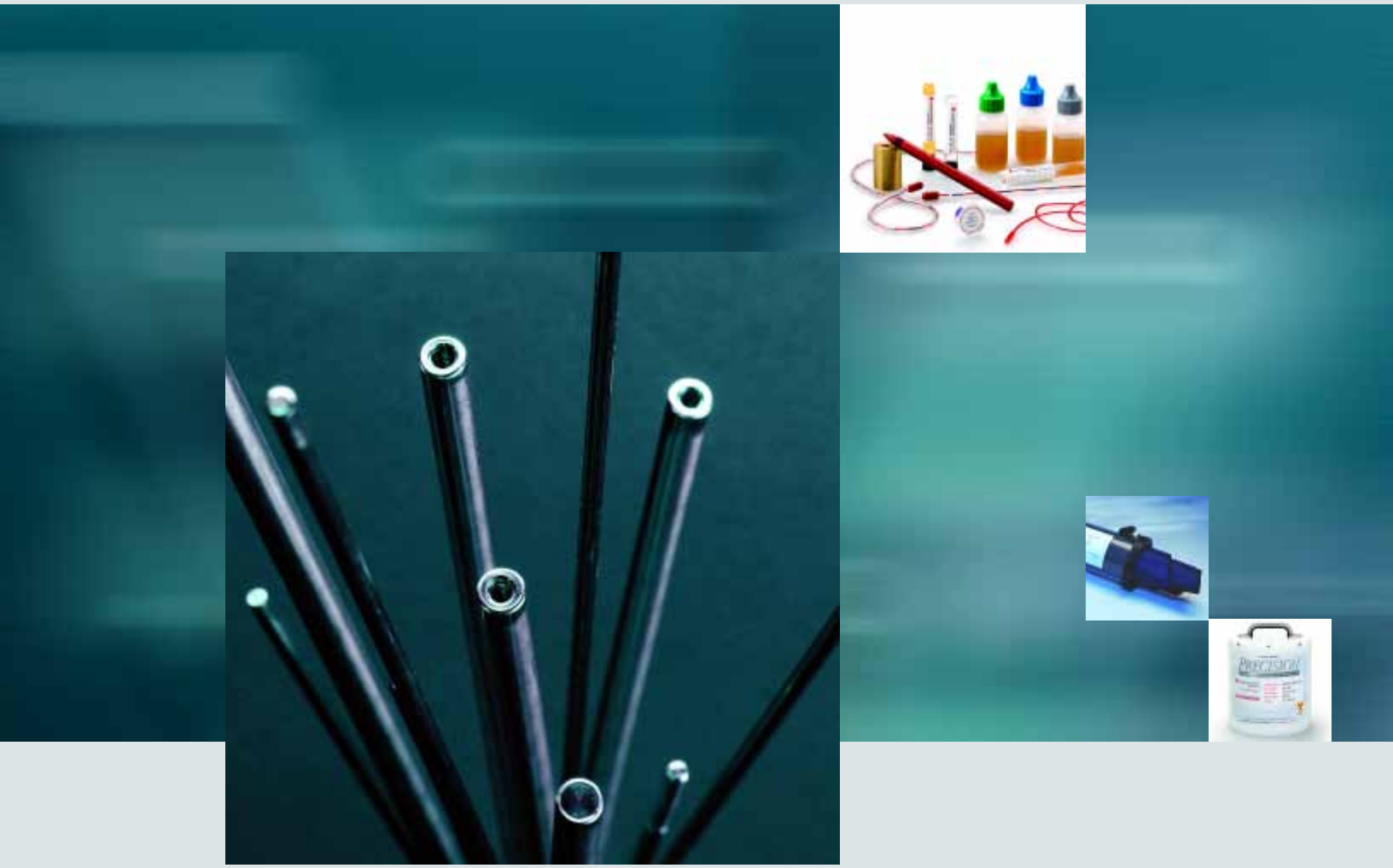
Sources for Medical Imaging



Isotope Products Laboratories

An Eckert & Ziegler Company

Isotope Products Laboratories is committed to providing our medical imaging partners with the highest quality products, ensuring product safety, prompt delivery, and the highest levels of customer support and technical service.

Co-57 Flood Sources

The Isotope Products Laboratories' Co-57 Flood Source provides a uniform field of radiation for evaluation of Nuclear Medicine gamma camera performance, allowing detection and correction of any camera malfunction prior to diagnostic use. The useful life of the Co-57 flood source is approximately 2 years. The Co-57 flood sources are available in a variety of circular and rectangular dimensions, with activities to meet the standards established by the manufacturers of the gamma cameras.

Announcing Perflexion,™ the world's only flexible flood source.

Call for details.

Construction

Isotope Products Laboratories' Co-57 flood sources consist of Co-57 as cobalt chloride uniformly dispersed in high impact casting resin which is cured and placed in an ABS encapsulation consisting of two formed halves that interlock upon assembly and are ultrasonically welded so that disassembly without destruction of the encapsulation is not possible.

Quality

IPL's Manufacturing Process ensures that Nuclear Medicine customers will receive the highest quality flood source available to perform quality control on gamma cameras.

Flood sources are scanned using a gamma camera. The camera images each flood source for parameters including differential and integral non-uniformity in accordance with ANSI N42.2.25.

Visual checks are performed to detect any distortions of the active element and the outside capsule.

A Leak Test is performed on all sources prior to shipment.

Uniformity

IPL's flood sources are manufactured according to the following specifications:

CV ≤ **1.0%**
INU ≤ **3.6%**

FLOOD SOURCES ARE AVAILABLE WITH OPTIONAL CASE. IF A CASE IS NOT REQUESTED, THE FLOOD SOURCE WILL BE SUPPLIED WITH A LEAD LINED CARDBOARD CONTAINER

Model Number	Configuration	Active Dimensions	Overall Dimensions	Activity (mCi)	Activity(MBq)
NES 297	CIRCULAR	14" (35.6cm)	19.3"(49cm)	5	185
NES 298	CIRCULAR	14" (35.6cm)	19.3"(49cm)	10	370
NES 391	CIRCULAR	18.5" (47cm)	19.3"(49cm)	5	185
NES 392	CIRCULAR	18.5" (47cm)	19.3"(49cm)	10	370
NES 394	CIRCULAR	18.5" (47cm)	19.3"(49cm)	11-20	407-740
NES 8009	CIRCULAR	23.5" (59.7cm)	25.4"(64.5cm)	5	185
NES 8012	CIRCULAR	23.5" (59.7cm)	25.4"(64.5cm)	10	370
NES 8150	CIRCULAR	23.5" (59.7cm)	25.4"(64.5cm)	11-20	407-740
NES 8300	RECTANGULAR	23.9" x 16.4" (60.7cm x 41.7cm)	25.4" x 17.9" (64.5cm x 45.5cm)	5	185
NES 8400	RECTANGULAR	23.9" x 16.4" (60.7cm x 41.7cm)	25.4" x 17.9" (64.5cm x 45.5cm)	10	370
NES 8430	RECTANGULAR	23.9" x 16.4" (60.7cm x 41.7cm)	25.4" x 17.9" (64.5cm x 45.5cm)	15	555
NES 8450	RECTANGULAR	23.9" x 16.4" (60.7cm x 41.7cm)	25.4" x 17.9" (64.5cm x 45.5cm)	20	740
NES 8470	RECTANGULAR	18" x 14" (45.7cm x 35.6cm)	19.3" x 15.3" (49cm x 38.9cm)	5	185
NES 8480	RECTANGULAR	18" x 14" (45.7cm x 35.6cm)	19.3" x 15.3" (49cm x 38.9cm)	10	370
NES 8490	RECTANGULAR	18"x 14" (45.7cm x 35.6cm)	19.3" x 15.3" (49cm x 38.9cm)	11-20	407-740
NES 8496	RECTANGULAR	14.25"x 8.23" (36.2cm x 20.9cm)	16.2" x 9.7" (41.1cm x 24.6cm)	5-20	185-740

Perflexion™

The world's most innovative flood source

Smallest. Lightest. Most convenient.

Isotope Products Laboratories Perflexion flood source eliminates bulk and weight with its unique flexible design and tungsten composite WolfGuard™ shield. Together with superior source uniformity, low impurities, and excellent durability, Perflexion makes every other source seem, well . . . obsolete.

Only Perflexion gives you:

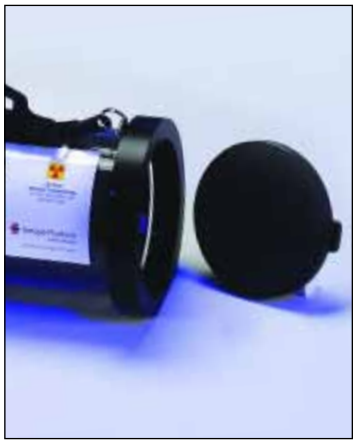
- Lightest weight—weighs less than 29 lbs including the tungsten shield and hard case
- Smallest form factor—source rolls to fit in a 6" x 6" x 22" tube for convenient storage
- Best shielding—5-10x better than lead cases

Perflexion™ and WolfGuard™ Shield in Transport Case

Perflexion™ Frequently Asked Questions

Q: What is unique about the Perflexion flood source?
A: Perflexion is the world's only flexible flood source. The unique, patent-pending design was developed in response to customer feedback—IPL asked what you wanted in a "perfect" flood source, and overwhelmingly, the response was that our customers hated the lead-lined cases. The only way to reduce the case weight without compromising shielding safety is to change the geometry. We developed the Perflexion flood source to lie flat for calibration use, but to roll into a compact cylinder for storage, to provide the most convenient, ergonomic flood source and case with optimum shielding protection.

Q: Will the source crack, crease, flake, curl, or tear over time?
A: No. The Perflexion active element material was custom-formulated for IPL, to meet the demands of years of use and abuse. You can fold, bend, crush, and pull this material without deforming or damaging the source, and it will not crease, crack, flake, or tear over time. In addition, the polymer "memory" ensures that the source will return to flatness even after being stored in a rolled configuration. IPL has performed extensive fatigue testing on the polymer, and Perflexion shows excellent integrity and uniformity even after several working lives' worth of fatigue.



Tungsten Composite Shielding

Q: What about radiation dose from handling Perflexion?
A: Dose rate monitoring during beta testing indicates that a technician rolling and unrolling the Perflexion source once a day will receive approximately 30-35 mR per year extremity dose. Perflexion can be removed from its WolfGuard shield and positioned on the camera using the attached handles, and so the actual handling time may be equal or less than for a rigid source with a lead-lined hard case. In addition, the convenient "carryon-luggage" style wheels and telescoping handle of the hard case allow Perflexion to transport easily in its shield, so technicians will no longer need to risk excess exposure by carrying a bare source from the hot lab in order to avoid the hassle of a large, unwieldy lead-lined case.

Q: What do I do if I need to lift the source off the collimator for imaging, for example by propping it on paper cups?
A: On request, IPL can provide a rigid polycarbonate plate with the dimensions of the Perflexion source, for use in applications where the source needs a rigid support.

Model Number	Configuration	Active Dimensions	Overall Dimensions	Activity (mCi)	Activity(MBq)
PF24R-057	RECTANGULAR	23.9" x 16.4" (60.7cm x 41.7cm)	25.25" x 17.75" (64.1cm x 45cm)	5-20	185-740
PF16R-057	RECTANGULAR	16"x 10.5" (40.6cm x 26.7cm)	17.4" x 11.9" (44.2cm x 30.2cm)	5-20	185-740
PF09R-057	RECTANGULAR	9"x 9" (22.9cm x 22.9cm)	10.5" x 10.5" (26.7cm x 26.7cm)	10	370

Application Guide

Co-57 Flood Sources

Camera Manufacturer	SPECT or Planar	Source Type	Head Size	Recommended Nominal Activity	Perflexion™ Model	IPL Source Model
Digirad						
2020tc	SPECT	Rectangular	8" x 8"	10 mCi	PF09R-057-10M	FL09R-057-10M
Cardius 2	SPECT	Rectangular	8" x 8"	10 mCi	PF09R-057-10M	FL09R-057-10M
Elscint						
SP4	SPECT	Circular	15.75"	10 mCi Max	N/A	NES392
SP6	SPECT	Rectangular	21.25" x 15.75"	10 mCi Max	PF24R-057-10M	NES8400
Helix	SPECT	Rectangular	21.25" x 15.75"	10 mCi Max	PF24R-057-10M	NES8400
Cardial	SPECT	Rectangular	15.75" x 10"	10 mCi Max	PF16R-057-10M	NES8480
Varicam	SPECT	Rectangular	21.25" x 15.75"	10 mCi Max	PF24R-057-10M	NES8400
General Electric Medical Systems						
300 AM	Planar	Circular	10"	3 mCi	N/A	NES297
Maxi 2	Planar	Circular	15"	5 mCi	N/A	NES391
Maxi 37	Planar	Circular	15"	5 mCi	N/A	NES391
5000 Series	SPECT	Circular	24"	10 mCi	N/A	NES8012
Maxxus	SPECT	Rectangular	21"x 16"	10 mCi	PF24R-057-10M	NES8400
Starcam XRT	SPECT	Rectangular	21"x 16"	10 mCi	PF24R-057-10M	NES8400
Starcam XCT	SPECT	Circular	15.4"	10 mCi	N/A	NES392
Starcam ACT	SPECT	Circular	15.4"	10 mCi	N/A	NES392
Optima	SPECT	Rectangular	14" x 9"	7.5 mCi	PF16R-057-10M	NES8480
Millenium MPS	SPECT	Square	14" x 14"	10 mCi	N/A	NES8480
Millenium MPR, VG	SPECT	Rectangular	15.75" x 21.75"	10 mCi	PF24R-057-10M	NES8400
Millenium MG	SPECT	Rectangular	14" x 20"	10 mCi	PF24R-057-10M	NES8400
Neurocam	SPECT	Rectangular	7.9" x 6.7"	10 mCi	PF09R-057-10M	FL09R-057-10M
Myosight	SPECT	Rectangular	20" x 14"	10 mCi	PF24R-057-10M	NES8400
Infinia	SPECT	Rectangular	21.25" x 15.75"	10 mCi	PF24R-057-10M	NES8400
DSTi/Dsi	SPECT	Rectangular	12.99" x 14"	10 mCi	N/A	NES8480
Hitachi						
1024C	SPECT	Circular	13.5"	5 mCi	N/A	NES297
1024 RDT	SPECT	Rectangular	19.7" x 14.2"	10 mCi	PF24R-057-10M	NES8400
1024 R	SPECT	Rectangular	19.7" x 14.2"	10 mCi	PF24R-057-10M	NES8400
Neuro Spect	SPECT	Rectangular	8.7" x 6.7"	10 mCi	PF09R-057-10M	FL09R-057-10M
150-250DSP	SPECT	Rectangular	20" x 15"	10 mCi	PF24R-057-10M	NES8400
260 DSP	SPECT	Rectangular	22" x 16"	10 mCi	PF24R-057-10M	NES8400
Mediso Medical Imaging Systems						
CardioSpect SC	SPECT	Rectangular	20.8" x 15.3"	10 mCi	PF24R-057-10M	NES8400
CardioSpect SR	SPECT	Rectangular	20.8" x 15.3"	10 mCi	PF24R-057-10M	NES8400
CardioSpect D90	SPECT	Rectangular	14.5" x 9"	10 mCi	PF16R-057-10M	NES8480
CardioSpect VMAX	SPECT	Rectangular	20.8" x 15.3"	10 mCi	PF24R-057-10M	NES8400
NeuroSpect Quad	SPECT	Rectangular	9" x 8"	10 mCi	PF09R-057-10M	FL09R-057-10M
Nuclear Chicago Searle						
Phogamma	Planar	Circular	12"	5 mCi	N/A	NES297
LEM	Planar	Circular	9.75"	3 mCi	N/A	NES297
LFOV	Planar	Circular	15"	5 mCi	N/A	NES391
Park Medical						
Isocam I & II	SPECT	Rectangular	22.3" x 16.5"	10 mCi	PF24R-057-10M	NES8400
Philips (formerly Marconi/Picker)						
Dynamo	Planar	Circular	10"	3 mCi	N/A	NES297
411	Planar	Circular	11"	5 mCi	N/A	NES297
412	Planar	Circular	12"	5 mCi	N/A	NES297
415	Planar	Circular	15"	5 mCi	N/A	NES391
Prism 1000	SPECT	Rectangular	20" x 15"	10 mCi	PF24R-057-10M	NES8400
Prism 2000	SPECT	Rectangular	20" x 15"	10 mCi	PF24R-057-10M	NES8400
Prism 3000	SPECT	Rectangular	15.7" x 9.4"	10 mCi	PF16R-057-10M	NES8480
SX300	SPECT	Square	14" x 14"	10 mCi	N/A	NES8480
Axis /Irix	SPECT	Rectangular	21" x 15.5"	10 mCi	PF24R-057-10M	NES8400

Camera Manufacturer	SPECT or Planar	Source Type	Head Size	Recommended Nominal Activity	Perflexion™ Model	IPL Source Model
Philips (formerly ADAC)						
Cardio MD	SPECT	Rectangular	9.2" x 15.4"	10 mCi Max	PF16R-057-10M	NES8496
Cardio 60	SPECT	Rectangular	20" x 15"	10 mCi Max	PF24R-057-10M	NES8400
Skylight	SPECT	Rectangular	20" x 14"	10 mCi	PF24R-057-10M	NES8400
Merida	SPECT	Rectangular	20.47" x 14.57"	10 mCi	PF24R-057-10M	NES8400
ARC 3000	Planar	Circular	15"	10 mCi	N/A	NES392
Genesys	SPECT	Rectangular	20" x 15"	10 mCi Max	PF24R-057-10M	NES8400
Argus	SPECT	Rectangular	20" x 15"	10 mCi Max	PF24R-057-10M	NES8400
Solus, Cardial, or Vertex	SPECT	Rectangular	20" x 15"	10 mCi Max	PF24R-057-10M	NES8400
Forte	SPECT	Rectangular	20" x 15"	10 mCi Max	PF24R-057-10M	NES8400
Cirrus	SPECT	Circular	15"	10 mCi	N/A	NES392
Raytheon						
	Planar	Circular	16"	5 mCi	N/A	NES391
Siemens Medical Systems						
Multispect 2	SPECT	Rectangular	21.25" x 15"	10 mCi	PF24R-057-10M	NES8400
Multispect 3	SPECT	Rectangular	16" x 12"	10 mCi	N/A	NES8480
3700, 7500 Orbiter Series	SPECT	Circular	15.25"	10 mCi	N/A	NES392
Body Scan	SPECT	Rectangular	23.5" x 13.5"	10 mCi	PF24R-057-10M	NES8400
Diacam	SPECT	Rectangular	21.25" x 15"	10 mCi	PF24R-057-10M	NES8400
3700, 7500 Orbiter Series	SPECT	Rectangular	21.25" x 15"	10 mCi	PF24R-057-10M	NES8400
c.cam	SPECT	Rectangular	14" x 8.4"	10 mCi	PF16R-057-10M	NES8496
e.cam	SPECT	Rectangular	21.25" x 15"	10 mCi	PF24R-057-10M	NES8400
SMV (Sopha Medical)						
DST	SPECT	Rectangular	11.7"x 15.8"	10 mCi	N/A	NES8480
DSX	SPECT	Rectangular	21.3" x 15.75"	10 mCi	PF24R-057-10M	NES8400
DS7	SPECT	Circular	15.75"	10 mCi	N/A	NES392
Bodytrac	SPECT	Rectangular	21.3" x 15.75"	10 mCi	PF24R-057-10M	NES8400
DSTXL	SPECT	Rectangular	21.3" x 15.75"	10 mCi	PF24R-057-10M	NES8400
Vision FX Series	SPECT	Rectangular	20" x 15"	10 mCi	PF24R-057-10M	NES8400
Technicare (G.E)						
Mobile 420	Planar	Circular	10"	3 mCi	N/A	NES297
Mobile 420	Planar	Circular	12"	5 mCi	N/A	NES297
Mobile 420	Planar	Circular	15"	5 mCi	N/A	NES391
Omega 500	SPECT	Rectangular	20" x 14.5"	10 mCi	PF24R-057-10M	NES8400
Gemini 700	SPECT	Rectangular	20" x 14.5"	10 mCi	PF24R-057-10M	NES8400
Gemini 600	SPECT	Circular	15"	10 mCi	N/A	NES392
Toshiba America						
GCA7100A, 7200	SPECT	Rectangular	21.5" x 19"	10 mCi	PF24R-057-10M	NES8400
GCA9300	SPECT	Rectangular	16.1" x 8.3"	10 mCi	PF16R-057-10M	NES8480
GCA901, 901A	SPECT	Rectangular	20.1" x 14.5"	10 mCi	PF24R-057-10M	NES8400
GCA901WB	SPECT	Rectangular	20.1" x 14.6"	10 mCi	PF24R-057-10M	NES8400
GCA602, 602A	SPECT	Circular	13.75"	5 mCi	N/A	NES297
GCA601A	SPECT	Circular	13.75"	5 mCi	N/A	NES297
t.cam	SPECT	Rectangular	21.25" x 15"	10 mCi	PF24R-057-10M	NES8400
Trionix Res. Lab.						
Monad	SPECT	Rectangular	24" x 14.5"	10 mCi	PF24R-057-10M	NES8400
Biad 24/XLT24	SPECT	Rectangular	24" x 14.5"	10 mCi	PF24R-057-10M	NES8400
Biad 20/XLT20	SPECT	Rectangular	20" x 14.5"	10 mCi	PF24R-057-10M	NES8400
Triad XLT/88	SPECT	Rectangular	15.75" x 8.7"	10 mCi	PF16R-057-10M	NES8480
Triad XLT 20	SPECT	Rectangular	20" x 14.5"	10 mCi	PF24R-057-10M	NES8400
Union Carbide						
Union Carbide	Planar	Circular	16"	5 mCi	N/A	NES391

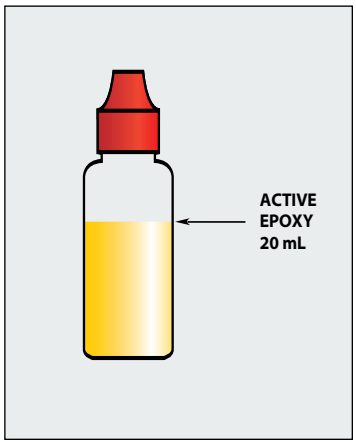
Accessories

Dose Calibrator Reference Standards (RV or E Vial)

Dose Calibrator Reference Sources provide a safe and convenient method of calibrating instruments for measuring the accuracy of imaging solutions most commonly utilized by medical technicians. The Dose Calibrator is manufactured by uniformly distributing the active element in 20mL of epoxy, comprising a density of approximately 1.0 g/cm^3. Each standard is supplied in a 27mL polyethylene vial. Calibration is in terms of activity contained in an aqueous solution. NIST traceable within ±5% at the 99% confidence level.

Model Number	Nuclide	Activity (mCi)	Activity(MBq)
RV-057-5M	Co-57	5	185
RV-057-10M	Co-57	10	370
RV-137-200U	Cs-137	.200	7.4
RV-137-250U	Cs-137	.250	9.25
RV-133-250U	Ba-133	.250	9.25
RV-SET	Co-57, Cs-137, Ba-133	5, .200, .250	185, 7.4, 9.25
RV-SET-1	Co-57, Co-60, Cs-137, Ba-133	5, .050, .200, .250	185, 1.85, 7.4, 9.25
RV-SET-2	Co-57, Co-60, Cs-137	5, .050, .200	185, 1.85, 7.4
RV-060-50U	Co-60	0.050	1.85

Other nuclides, activities and geometries are available upon request.



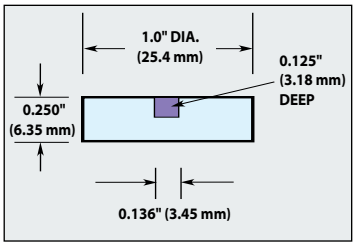
Dose Calibrator Vial

Spot Markers (SM-057)

The IPL Spot Markers are used for patient orientation during the performance of a camera study. A 0.136" (3.45 mm) diameter active area is marked with purple epoxy and centered in a 1" x 0.250" (25.4 mm x 6.35 mm) clear acrylic disk. Contained activity is supplied as a nominal value ±15%.

Model Number	Nuclide	Activity (µCi)	Activity(MBq)
SM-057-25U	Co-57	25	0.925
SM-057-50U	Co-57	50	1.85
SM-057-100U	Co-57	100	3.7
SM-057-200U	Co-57	200	7.4

Other activities and nuclides are available upon request.



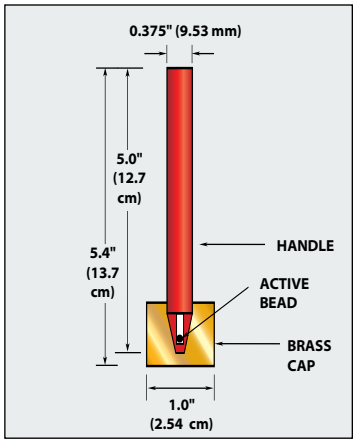
Spot Marker

Pen Point Markers (PP-057)

The IPL Pen Point marker is used to mark a point of interest during a camera study. The Pen Point Marker contains Co-57 in a ceramic matrix at the end of a 5.0" (12.7 cm) anodized aluminum rod. The pen-shaped rod screws into a brass cap which shields the active point. The Pen Point Marker is used in tracing the outlines of anatomical features on a patient. The trace appears almost instantly on the camera display. Contained activity is supplied as a nominal value +/-15%.

Model Number	Nuclide	Activity (µCi)	Activity(MBq)
PP-057-100U	Co-57	100	3.7
PP-057-200U	Co-57	200	7.4

Other activities are available upon request.

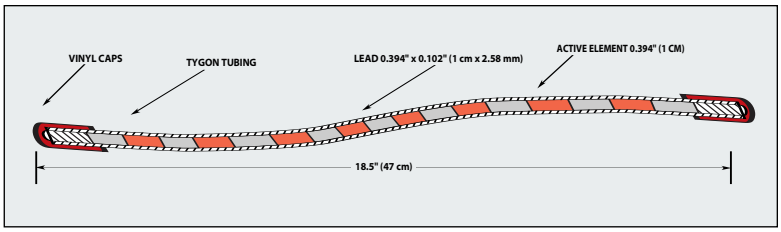


Pen Point Marker

Accessories

Flexible Rulers (FR-057)

Radioactive rulers and markers are used to define anatomical locations and/or organ size during a camera study. The Flexible Ruler is a plastic tube 0.19″ (4.8 mm) in diameter containing 47 alternating 0.394″ (10 mm) sections of Co-57 and inactive lead. The overall length of the ruler is 18.5″ (47 cm) with an active length of 17.7″ (45 cm). Contained activity is supplied as a nominal value ± 15%.



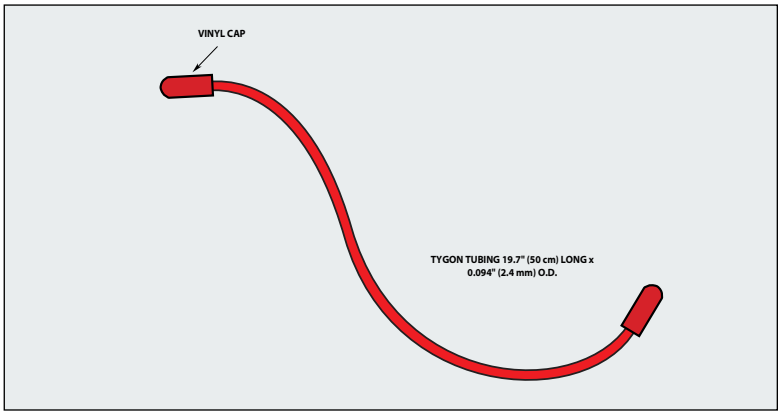
Flexible Ruler

Model Number	Nuclide	Activity (µCi)	Activity (MBq)
FR-057-460U	Co-57	460	17.02

Other activities are available upon request.

Flexible Markers (FM-057)

Co-57 uniformly dispersed in an epoxy matrix is injected into a 0.094″ (2.4 mm) outer diameter flexible plastic tube having an inner diameter of 0.02″ (0.508mm). The overall length and the active length of the ruler is 19.7″ (50 cm). Contained activity is supplied as a nominal value ±15%.



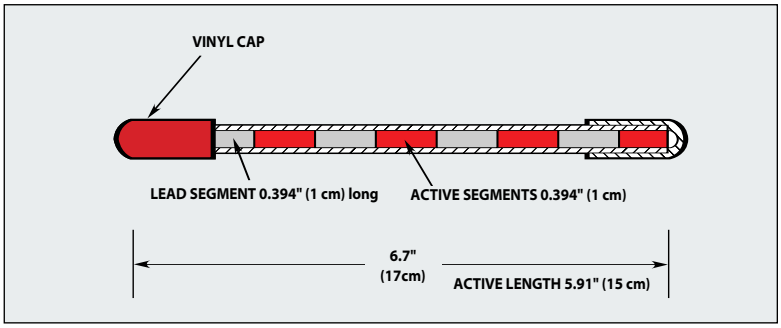
Flexible Marker

Model Number	Nuclide	Activity (µCi)	Activity (MBq)
FM-057-150U	Co-57	150	5.55

Other activities are available upon request.

Rigid Rulers (RR-057)

The Rigid Ruler is a plastic tube 0.197" (5 mm) in diameter containing 17 alternating 0.394" (10mm) sections of Co-57 and inactive lead. The overall length of the ruler is 6.7" (17 cm) with an active length of 5.91" (15 cm). Contained activity is supplied as a nominal value ±15%.



Rigid

Model Number	Nuclide	Activity (µCi)	Activity (MBq)
RR-057-160U	Co-57	160	5.92

Other activities are available upon request.

Gamma Tube Standards

Each source consists of a polypropylene test tube containing 0.75 mL of active epoxy with the balance of the test tube filled with cold epoxy. Each set contains Ba-133, Cs-137, Co-57, Co-60, Cd-109, Mn-54, and Na-22.

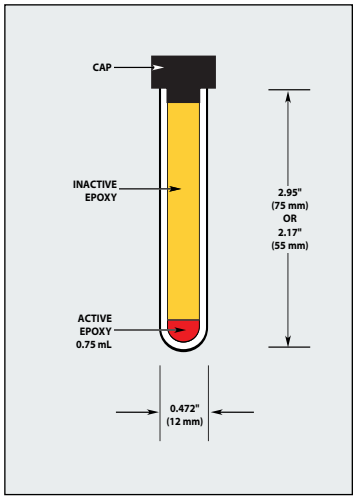
Test tube sizes available: 2.95" x 0.472" (75 mm x 12 mm), 2.17" x 0.472" (55 mm x 12 mm)

A variety of other nuclides and tube sizes are available upon request. Customer-supplied tubes can be utilized upon request. Tube sources are calibrated as NIST traceable with an accuracy of ±5% at the 99% confidence level.

Model Number	Activity (µCi)	Activity (kBq)
GF-290T-100N	0.1	3.7
GF-290T-1U	1.0	37

Other activities are available upon request.

Test tube standards may also be purchased individually.



Gamma Tube Standards

Well Counter (Rod) Standards

Each source consists of a lucite rod measuring 5" x 0.5" (127 mm x 12.7 mm) or 2.95" x 0.5" (74.9 mm x 12.7 mm). The activity is located in a 0.187" x 0.187" (4.75 mm x 4.75 mm) well, positioned approximately 0.250" (6.35 mm) from the top of the rod. Set includes Ba-133, Cs-137, Co-57, Co-60, Cd-109, Mn-54, and Na-22.

Rod sources are calibrated and NIST traceable with an accuracy of ±5% at the 99% confidence level.

		Length			
Model Number	Nuclide	Inches	mm	Activity (µCi)	Activity (kBq)
GF-0012	Co-57	2.95	74.9	0.1	3.7
GF-0208	Co-57	2.95	74.9	1	37
GF-0014	Cs-137	2.95	74.9	0.1	3.7
GF-0209	Cs-137	2.95	74.9	1	37
GF-0206	Cs-137	5	127	0.1	3.7
GF-0210	Co-57	5	127	1	37
GF-0207	Co-57	5	127	0.1	3.7
GF-0211	Cs-137	5	127	1	37
GF-290R-100N	SET	5	127	0.1	3.7
GF-290R-1U	SET	5	127	1	37
GF-0235	Ba-133	2.95	74.9	0.1	3.7
GF-0239	Ba-133	5	127	0.1	3.7

Other nuclides, activities and geometries are available upon request.

Well Counter Standards

Sources for Dedicated PET

Isotope Products Laboratories is the leader in source manufacturing for Positron Emission Tomography (PET) studies. IPL manufactures Ge-68 Transmission Sources and quality assurance sources for major dedicated PET camera makers such as GE Medical Systems, Siemens Medical Systems, Positron Corporation and others. In addition, IPL manufactures Cs-137 and Na-22 sources for dedicated PET cameras for Philips Medical Systems and Siemens/CTIMI Medical Systems.

Custom Sources: IPL can manufacture PET sources for custom needs. Please contact an IPL Medical Imaging Customer Service Representative for additional information.

SIEMENS MEDICAL SYSTEMS ECAT EXACT/HR/ART/951R/951/31/931/08™
Phantom for Quality Assurance

Product Code	Nuclide	Activity
EG-0068	Ge-68	2.5-4.0 mCi (92.5 - 148 MBq) without groove
EG-0310	Ge-68	1.2-4.0 mCi (44.4 - 148 MBq) with groove
EG-0317	Ge-68	1.2-4.0 mCi (44.4 - 148 MBq) with groove

IPL DRAWING NUMBER	A1911
ENCAPSULATION	High density polyethylene right circular cylinder
DIMENSIONS	8.37″ diameter x 8.87″ high (21.3cm x 22.5cm)
ACTIVE VOLUME	6 Liters
SOURCE MATRIX	Epoxy
DENSITY	1.0 g/cm3 ±7%
NUCLIDE PURITY	>99%
UNIFORMITY	±5% coefficient of variation measured with a resolution of 1 cm3 source volume
CALIBRATION	Calibrated and NIST traceable with an absolute activity accuracy ±5% of measured value

Ge-68 Phantom

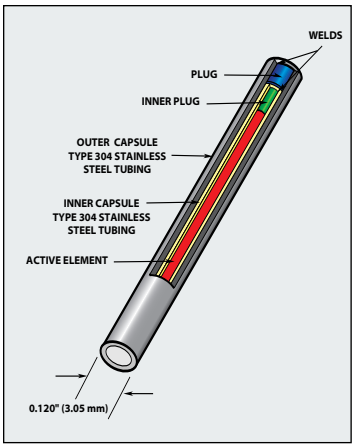
ADAC MEDICAL C-PET ™
Quality Assurance Point Source

Product Code	Nuclide	Activity
GF-0227	Na-22	100 uCi (3.7 MBq)

IPL DRAWING NUMBER	1001 (Type D)
OVERALL DIMENSION	1″ diameter x 0.250″ high (25.4mm x 6.35mm)
ACTIVE DIMENSION	.040″ (1mm)
NUCLIDE PURITY	>99%

Point Source

The Ge-68 line source is utilized to calibrate Positron Emission Tomography scanner systems. It is used as a transmission standard or a source of annihilation photons to provide a tissue density correction to permit more accurate diagnostic scanning of patients. The source is mounted on a movable holder which revolves around the patient's head or body. The source emits photons which attenuate in the patient to varying degrees, depending on the particular location of the source with respect to the patient. The counter-opposed detectors on the PET system detect the radiation at any given point and the system software computes and stores this information. The instrumentation "corrects" the annihilation radiation intensity emitted from the administered radiopharmaceutical, automatically adjusting for the effect of the density and thickness of the tissue through which the photons travel at all the reference locations. This provides a "background corrected" scan of the patient to optimize resolution and define more precisely the distribution of the radiopharmaceutical.



Doubly Encapsulated Point Source

GE MEDICAL SYSTEMS PET ADVANCE™
Transmission and Quality Assurance Pin

Product Code	Nuclide	Activity
HEGL-0019	Ge-68	10.8 mCi x2 (400 MBq) x2
HEGL-0020	Ge-68	1.62 mCi (60 MBq)

CE 0123

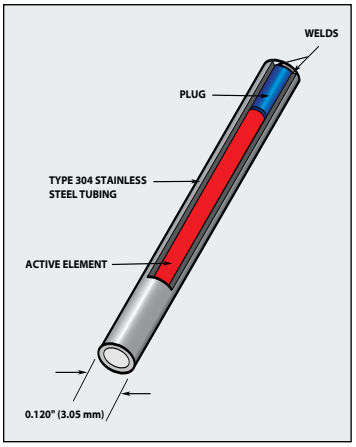
IPL DRAWING NUMBER	A3407
ENCAPSULATION	Triply encapsulated 304 stainless steel
OVERALL LENGTH	8.88″ (225.6 mm)
ACTIVE LENGTH	6.108″ (155 mm)
OVERALL DIAMETER	0.156″ (3.96 mm) (handle is 0.75″ 19.05 mm)
ACTIVE DIAMETER	0.060″ (1.52 mm)
NUCLIDE PURITY	>99%
UNIFORMITY	≤5% integral non-uniformity measured in centimeter long segments

GE MEDICAL SYSTEMS DISCOVERY ST™
Normalization Pin

Product Code	Nuclide	Activity
HEGL-0132	Ge-68	1.49 mCi (55 MBq)

CE 0123

IPL DRAWING NUMBER	A3429
ENCAPSULATION	Singly encapsulated 304 stainless steel
OVERALL LENGTH	11.54″ (293.1 mm)
ACTIVE LENGTH	6.30″ (160 mm)
OVERALL DIAMETER	0.156″ (3.96 mm) (with handle 0.75″ 19 mm)
ACTIVE DIAMETER	0.055″ (1.40 mm)
NUCLIDE PURITY	>99%
UNIFORMITY	≤5% integral non-uniformity measured in centimeter long segments



Singly Encapsulated Point Source

SIEMENS MEDICAL SYSTEMS ECAT EXACT/HR™
Transmission Pin

Product Code	Nuclide	Activity
HEGL-0080	Ge-68	2.5-4.0 mCi x3 (92.5-148 MBq) x3

CE 0123

IPL DRAWING NUMBER	A3418-2
ENCAPSULATION	Singly encapsulated 304 stainless steel
OVERALL LENGTH	7.56″ (192 mm)
ACTIVE LENGTH	7.21″ (183 mm)
OVERALL DIAMETER	0.125″ (3.18 mm)
ACTIVE DIAMETER	0.093″ (2.36 mm)
NUCLIDE PURITY	>99%
UNIFORMITY	≤5% integral non-uniformity measured in centimeter long segments

Sources for SPECT

Isotope Products Laboratories manufactures a wide range of Attenuation Correction line sources for Single Photon Emission Computed Tomography (SPECT) studies.

A SPECT image is developed by measuring a collimated radiation beam emitted from a patient's body. The radiation beam is produced by injecting a known radiopharmaceutical into the patient. SPECT image quality can suffer from unquantified attenuation effects caused as the beam passes through tissue of varying density and thickness. A line source is utilized to produce a "control beam" that is measured concurrently with the "radiopharmaceutical beam." The two beams are integrated and patient specific attenuation is calculated. The resulting image is of higher quality than an image produced without attenuation correction.

The typical Attenuation Sources for SPECT studies are Gd-153, Co-57 and Ba-133. Isotope Products Laboratories also manufactures Molecular Coincidence Detection (MCD) sources for PET applications. Typically the MCD sources for PET studies are Gd-153, Cs-137 and Ba-133.

Sources for both applications are configured in both line and point geometries. The nuclides, activities and dimensions are manufactured in accordance to OEM Camera manufacturer specifications. Line sources are singly or doubly encapsulated with welded joints.

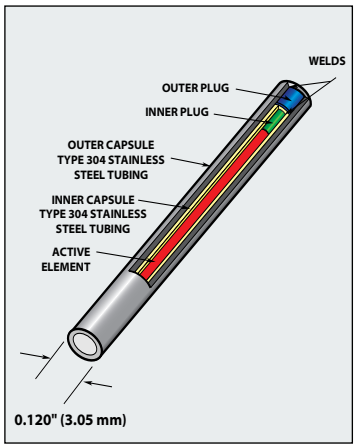
Custom Sources: As part of IPL's commitment to Nuclear Medicine, custom Line Sources for standard and non-standard gamma cameras can be manufactured. Please contact an IPL Medical Imaging Customer Service Representative for additional information.

ADAC MEDICAL SYSTEMS VANTAGE™
Transmission Pin

CE 0123

Product Code	Nuclide	Activity
NES 8412	Gd-153	250 mCi x2 (9.25 GBq) x2

IPL DRAWING NUMBER	A3402
ENCAPSULATION	Doubly encapsulated in 304 stainless steel
OVERALL LENGTH	20.5" (520.7mm)
ACTIVE LENGTH	20.0" (508mm)
OVERALL DIAMETER	0.12" (3.05mm)
ACTIVE DIAMETER	0.060" (1.52mm)
NUCLIDE PURITY	<0.005% High Energy Impurities
UNIFORMITY	≤5% integral non-uniformity measured in centimeter long segments



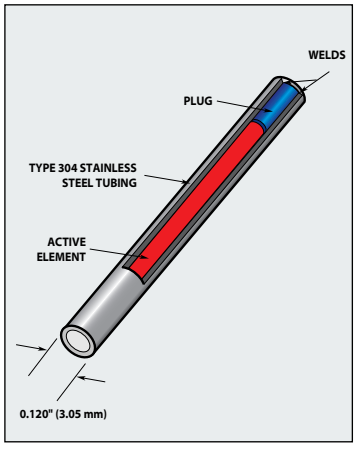
Doubly Encapsulated Line Source

ADAC MEDICAL SYSTEMS MCD™
Quality Assurance Pin

CE 0123

Product Code	Nuclide	Activity
HEGL-0109	Ge-68	500 uCi (18.5 MBq)

IPL DRAWING NUMBER	A3402
ENCAPSULATION	Doubly encapsulated in 304 Stainless Steel
OVERALL LENGTH	5.7" (144.8mm)
ACTIVE LENGTH	5.2" (132.1mm)
ACTIVE DIAMETER	0.060" (1.52mm)
OVERALL DIAMETER	0.12" (3.05mm)
NUCLIDE PURITY	>99%
UNIFORMITY	≤5% integral non-uniformity measured in centimeter long segments



Singly Encapsulated Line Source

Sources for SPECT

SMV MEDICAL SYSTEMS DST ™
Transmission Pin

CE 0123

Product Code	Nuclide	Activity
NES 8424	Gd-153	323 mCi x2 (12GBq) x2

IPL DRAWING NUMBER	A3421
ENCAPSULATION	Doubly encapsulated in 304 stainless steel
OVERALL LENGTH	9.06″ (230 mm)
ACTIVE LENGTH	8.66″ (220 mm)
OVERALL DIAMETER	0.120″ (3.05 mm) (Ring OD 0.177″, 4.5 mm)
ACTIVE DIAMETER	0.060″ (1.52 mm)
NUCLIDE PURITY	<0.005% High energy Gamma impurities
UNIFORMITY	≤5% integral non-uniformity measured in centimeter long segments

SIEMENS MEDICAL SYSTEMS
ECAM PROFILE ATTENUATION™
Transmission Pin

CE 0123

Product Code	Nuclide	Activity
NES 8426 (Set of 4)	Gd-153	20 mCi x4 (740MBq) x 4

IPL DRAWING NUMBER	A3410
ENCAPSULATION	Singly encapsulated in 304 stainless steel
OVERALL LENGTH	8.11″ (206 mm)
ACTIVE LENGTH	7.86″ (200 mm)
OVERALL DIAMETER	0.120″ (3.05 mm)
ACTIVE DIAMETER	0.090″ (2.29 mm)
NUCLIDE PURITY	<0.005% High Energy Impurities
UNIFORMITY	≤10% integral non-uniformity measured in centimeter long segments

GE MEDICAL SYSTEMS MILLENIUM/ACuscan™
Transmission Pin

CE 0123

Product Code	Nuclide	Activity
NES 8429	Gd-153	450 mCi (16.6GB) x 2

IPL DRAWING NUMBER	A3431
ENCAPSULATION	Singly encapsulated in 304 stainless steel
OVERALL LENGTH	20.5″ (520.7 mm)
ACTIVE LENGTH	20.0″ (508 mm)
OVERALL DIAMETER	0.120″ (3.05 mm)
ACTIVE DIAMETER	0.060″ (15.24 mm)
NUCLIDE PURITY	>99%
UNIFORMITY	≤10% integral non-uniformity measured in centimeter long segments

Multimodal Sources

Increase your coregistration accuracy with IPL.

Multimodal Spot Markers and Fiducial Markers

Available in Co-57 for CT-SPECT and Ge-68 or Na-22 for CT-PET fusion imaging, these markers help increase the accuracy of your image registration. Activities up to 100µCi nominal available.

Model MMS01 Specifications

Capsule: 1″ x 0.25″ (D x H)
white Delrin
Active dimensions:
1mm x 1mm cylinder
Suggested usage:
high-resolution PET point source or fiducial marker.

Model MMS02 Specifications

Capsule: 1″ x 0.25″ (D x H)
clear cast acrylic
Active dimensions:
1.5mm x 1.5mm cylinder
CT target: 1/4″ OD
bone-equivalent ring
(surrounds active element)
Suggested usage:
multimodal fiducial marker for image coregistration.

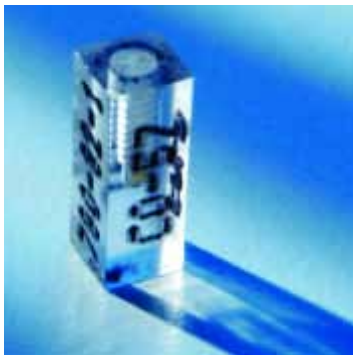
Model MMS03 Specifications

Capsule: 1″ x 0.25″ (D x H)
clear cast acrylic with etched crosshairs for laser alignment
Active dimensions:
1mm diameter sphere
CT target: 2mm OD
bone-equivalent ring
(surrounds active element)
Suggested usage:
multimodal fiducial marker for image coregistration.

Multimodal Spot Markers

Model MMS04 Specifications

Capsule: 3 x 3 x 8mm
clear acrylic with Delrin plug
Active dimensions:
1 x 0.5mm (D x H) cylinder
CT target: active element is CT-visible
Suggested usage:
multimodal fiducial marker for image coregistration, recommended for small animal studies or other situations where a small source capsule is needed.



MMS04

Model MMS06 Specifications

Capsule: 1″ x 0.25″ (D x H)
clear cast acrylic
Active dimensions:
0.25mm diameter sphere
Suggested usage:
high-resolution point source or spot marker for use with scanners with resolution better than 3mm.

Packaging and Shipping Containers

Packaging and shipment of radioactive materials at Isotope Products Laboratories adhere to the regulations of the U.S. Department of Transportation regulations, 49CFR and the International Air Transportation Association (IATA).

Isotope Products Laboratories uses two types of packaging to ship radioactive materials: excepted packaging and type A packaging.

Type A packaging is used to carry normal form radioactive material as defined by the A_2 values of 49 CFR 173.435 (1998) and IATA 10.4.2.3 (2001) and encapsulated radioactive material that has been issued an IAEA certificate of Competent Authority Special Form Radioactive Material Encapsulation Certificate by the U.S. Department of Transportation.

In the Standard Type A configuration, sources are sealed in an inner container and centered in a fiberboard box. Sources requiring heavy shielding are shipped in a lead shield centered in a fiberboard box.

Excepted Packaging (Limited Quantity) is used when the activity limits do not exceed those defined in 49 CFR 173.425 (1998) and IATA regulations table 10.5.A (2001) and the radiation level at any point on the package does not exceed 0.5 millirem per hour. All boxes shipped from Isotope Products as "excepted packages" meet the requirements of 49 CFR 173.421(1998) and IATA regulation 10.5.9.4(2001).

Radiation levels on the external surfaces of all packages and at a distance of one meter from all external surfaces (Transport Index), will not exceed the limits set in 49 CFR 173.441(1998) or IATA 10.5.16 (2001). All measurements are made with an Eberline RO2 or equivalent survey instrument.

Unless special arrangements are made with the customer in advance, radiation levels at the surface of any shielded inner containers will not exceed 200 millirem per hour as measured with an Eberline RO2 or equivalent survey instrument.

ANSI/ISO Classifications

The development of these standards began in 1962 and they were published in 1968. The standards were written so that both the regulatory agencies and the users would have specifications which would characterize radioactive sources and establish performance standards.

The table is from ISO 2919; 1999, Classification of sealed source performance

Current copies of these standards are available from:

American National Standards Institute
1430 Broadway
New York, NY 10018
(212) 642-4900

Global Engineering
15 Inverness Way East
Englewood CO 80112
(800) 854-7179

International Organization for Standardization
1, Rue De Varendel
Case Postale 56
CH-1211 Geneva 20
Switzerland
41-22-734-0150

The concept of both ANSI.N542 and ISO.2919 is that design standards are not mandated but a series of tests are specified for which prototypes of new designs are subjected. In this manner innovation is encouraged without sacrificing safety standards. Minimum performance must be met to demonstrate suitability for certain applications.

ANSI/ISO Classifications

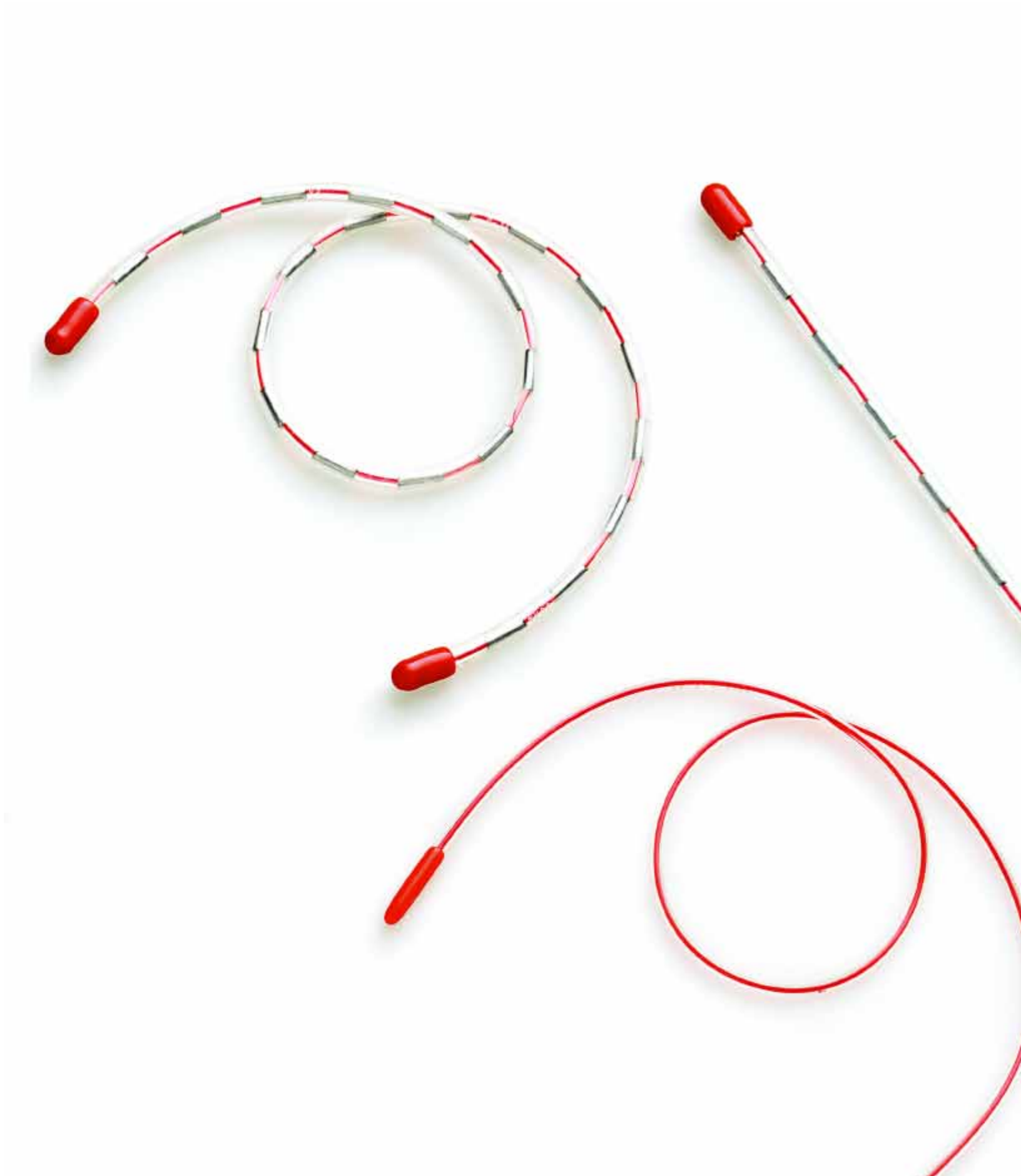
TEST	CLASS						
	1	2	3	4	5	6	X
TEMPERATURE	No Test	-40˚C (20 min) +80˚C (1 h)	-40˚C (20 min) +180˚C (1 h)	-40˚C (20 min) +400˚C (1 h) and thermal shock to 20°C	-40˚C (20 min) +600˚C (1 h) and thermal shock to 20°C	-40˚C (20 min) +800˚C (1 h) and thermal shock to 20°C	Special Test
EXTERNAL PRESSURE	No Test	25 kPa absolute to atmospheric	25 kPa absolute to 2 MPa absolute	25 kPa absolute to 7 MPa absolute	25 kPa absolute to 70 MPa absolute	25 kPa absolute to 170 MPa absolute	Special Test
IMPACT	No Test	50 g from 1 m or equivalent imparted energy	200 g from 1 m or equivalent imparted energy	2 kg from 1 m or equivalent imparted energy	5 kg from 1 m or equivalent imparted energy	20 kg from 1 m or equivalent imparted energy	Special Test
VIBRATION	No Test	3 times 10 min 25 to 500 Hz at 49 m/s2 (5 gn) 1)	3 times 10 min 25 to 50 Hz at 49 m/s2 (5 gn) 1) and 50 to 90 Hz at 0.635 mm amplitude peak to peak and 90 to 500 Hz at 98 m/s2 (10 gn) 1)	3 times 30 min 25 to 80 Hz at 1.5 mm amplitude peak to peak and 80 to 2000 Hz at 196 m/s2 (20 gn) 1)	Not Used	Not Used	Special Test
PUNCTURE	No Test	1 g from 1 m or equivalent imparted energy	10 g from 1 m or equivalent imparted energy	50 g from 1 m or equivalent imparted energy	300 g from 1 m or equivalent imparted energy	1 kg from 1 m or equivalent imparted energy	Special Test

1) Acceleration maximum amplitude

The tests are performed on two sources. Different specimens of the same source design are allowed for each test in the above table. To pass a test the sealed source must retain its activity after each test and pass the prescribed leak tests. Source performance is generally described as C12345, a letter and five digits. The letter will be either C or E. C indicates the activity does not exceed limits established by nuclide dependent upon its toxicity and the solubility of its physical form. E indicates the activity exceeds those limits. The five digits indicate, respectively, the highest test passed for temperature, pressure, impact, vibration, and puncture.

SEALED SOURCE USAGE		SEALED SOURCE TEST AND CLASS				
		TEMPERATURE	PRESSURE	IMPACT	VIBRATION	PUNCTURE
Radiography - Industrial	Unprotected source	4	3	5	1	5
	Source in device	4	3	3	1	3
Medical	Radiography	3	2	3	1	2
	Gamma Teletherapy	5	3	5	2	4
Gamma gauges	Unprotected source	4	3	3	3	3
(medium and high energy)	Source in device	4	3	2	3	2
Beta gauges and sources for low energy gamma gauges or X-ray fluorescence analysis (excluding gas filled sources)		3	3	2	2	2
Oil well logging		5	6	5	2	2
Portable moisture and density gauge (including hand held or dolly transported)		4	3	3	3	3
General neutron source application (excluding reactor start-up)		4	3	3	2	3
Calibration sources - Activity greater than 30 µCi		2	2	2	1	2
Gamma Irradiators[1]	Categories II, III, IV	4	3	4	2	4
	Category I	4	3	3	2	3
Ion Generators[2]	Chromatography	3	2	2	1	1
	Static eliminators	2	2	2	2	2
	Smoke detectors	3	2	2	2	2

[1]For the purposes of this Standard, gamma irradiators have been divided into four distinct categories.
[2]Source-device combination may be tested.
Category I–Self-Contained-Dry Source Storage Category II–Panoramic-Dry Source Storage
Category III–Self-Contained-Wet Source Storage Category IV–Panoramic-Wet Source Storage



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