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ERS
Epsilon Radioactive Sources

TECNICAS RADIOFISICAS SINGAPORE PTE. LTD.
10 Anson Road #26-04
International Plaza
Singapore 079903
SINGAPORE
Tel: +65 9163 3528 / +65 8206 3551
+60 193 550 175
Fax: +65 672 58 438
info@trf.es

TECNICAS RADIOFISICAS S.L.
Gil de Jasa 18, pral.
50006 Zaragoza
SPAIN
Tel: +34 976 212545
Fax: +34 976 213011
info@trf.es

NUCLEAR MEDICINE REFERENCE & CALIBRATION SOURCES

EPSILON RADIOACTIVE SOURCES

NUCLEAR MEDICINE REFERENCE & CALIBRATION SOURCES

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ABOUT US

Epsilon Electronics was established in 1993 to provide sales, marketing and technical service activities in the healthcare sector. The company has initiated its product research and development activities in 2008 and started to produce high quality Ge-68 reference and calibration sources for Siemens PET and PET-CT systems. As a result of increasing demand and local growth, in 2012, Epsilon Electronic's production facility has been moved to a new location with high production capacity in order to serve both local and international markets.

In 2013, ERS (Epsilon Radioactive Sources) brand name was established and Epsilon Electronics started producing nuclear medicine reference and calibration sources under ERS brand name.

The company has enriched its product range by adding Ge-68 reference and calibration sources for General Electric PET and PET-CT systems in 2013, and Na-22 reference and calibration sources for Philips PET and PET-CT systems, Co-57 flood sources, dose calibrator reference sources, spot markers, rod sources in 2014 respectively.

ERS serves high quality radioactive source products including PET and PET-CT sources, dose calibrator sources, flood sources, spot markers and rod sources for the nuclear medicine market in Europe, Middle East, South Africa and Far East countries through its specialized distributor network.

Epsilon Electronics continues to invest in research and development activities of ERS in order to develop new and customized sources and sustain international growth.

PET & PET-CT SOURCES

ERS manufactures high quality PET and PET-CT sources that are compatible with the leading imaging system manufacturers including Siemens Healthcare, General Electric Healthcare and Philips Healthcare to provide high level customer satisfaction. For the calibration of PET and PET-CT systems, Ge-68 and Na-22 sources are used in different forms and activities depending on the system model. Customized PET and PET-CT sources in different forms and activities can be offered upon request by ERS. Please contact your local distributor or ERS headquarters for product availability and additional information.


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Epsilon Radioactive Sources
NOT FOR DRUG USE
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NOT FOR DRUG USE

SIEMENS PET & PET CT

SOURCES

LINE SOURCES

Ge-68 line sources are double layered tubes and made of high quality stainless steel. Each line source is sealed on its ends by the process of precise argon welding. Thanks to the argon welding process, the possibility of activity leakage is eliminated, ensuring safe use of line sources.

Source related information including product code, isotope type, activity, serial number and production date is permanently marked with laser for traceability.

Uniformity

Each line source is tested with 5 mm steps of scannings throughout its length for uniformity.

The uniformity of the line sources is within +/- 5% limits.

GE-68 CYLINDIRICAL PHANTOM

Ge-68 Cylindirical phantoms are used for 2D and 3D normalization and in test images of PET and PET-CT systems. Radioactive element is uniformly filled in the cylindrical cast. Each cylindrical phantom manufactured is checked with a PET-CT scanner to ensure high quality.

The results of quality control image files are available upon request.

SIEMENS HEALTHCARE SYSTEM MODEL	PRODUCT CODE	PRODUCT TYPE	ISOTOPE	ACTIVITY		QUANTITY	REPLACEMENT PERIOD*
				SI	NON SI		
ECAT EXACT 47							
Initial Set-up	FNT1010	Phantom	Ge-68	44 MBq	1.19 mCi	1	1 Year
	FNT1011	Phantom	Ge-68	120 MBq	3.24 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	37 MBq	1 mCi	1	1 Year
	CBK1021	Line Source	Ge-68	111 MBq	3 mCi	3	1 Year
	TST1030	Test Tube	Ge-68	5.5 kBq	0.15 uCi	1	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT EXACT 47							
Annual Replacement	FNT1011	Phantom	Ge-68	120 MBq	3.24 mCi	1	1 Year
	CBK1021	Line Source	Ge-68	111 MBq	3 mCi	3	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT EXACT ART							
Annual Replacement	FNT1010	Phantom	Ge-68	44 MBq	1.19 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	37 MBq	1 mCi	1	1 Year
	TST1030	Test Tube	Ge-68	5.5kBq	0.15 uCi	1	1 Year
ECAT EXACT HR+							
Initial Set-up	FNT1010	Phantom	Ge-68	44 MBq	1.19 mCi	1	1 Year
	FNT1011	Phantom	Ge-68	120 MBq	3.24 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	37 MBq	1 mCi	1	1 Year
	CBK1022	Line Source	Ge-68	148 MBq	4 mCi	3	1 Year
	TST1030	Test Tube	Ge-68	5.5kBq	0.15 uCi	1	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT EXACT HR+							
Annual Replacement	FNT1011	Phantom	Ge-68	120 MBq	3.24 mCi	1	1 Year
	CBK1022	Line Source	Ge-68	148 MBq	4 mCi	3	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT ACCEL & ECAT HR							
Initial Set-up	FNT1010	Phantom	Ge-68	44 MBq	1.19 mCi	1	1 Year
	FNT1011	Phantom	Ge-68	120 MBq	3.24 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	37 MBq	1 mCi	1	1 Year
	CBK1023	Line Source	Ge-68	185 MBq	5 mCi	3	1 Year
	TST1030	Test Tube	Ge-68	5.5kBq	0.15 uCi	1	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT ACCEL & ECAT HR							
Annual Replacement	FNT1011	Phantom	Ge-68	120 MBq	3.24 mCi	1	1 Year
	CBK1023	Line Source	Ge-68	185 MBq	5 mCi	3	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT BIOGRAPH							
Initial Set-up & Annual Replacement	FNT1010	Phantom	Ge-68	44 MBq	1.19 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	37 MBq	1 mCi	2	1 Year
	TST1030	Test Tube	Ge-68	5.5 kBq	0.15 uCi	1	1 Year
ECAT BIOGRAPH PICO							
Initial Set-up & Annual Replacement	FNT1014	Phantom	Ge-68	74 MBq	2 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	37 MBq	1 mCi	2	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT BIOGRAPH TRUE V & BIOGRAPH MCT							
Initial Set-up & Annual Replacement	FNT1012	Long Phantom	Ge-68	74 MBq	2 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	37 MBq	1 mCi	2	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year
ECAT BIOGRAPH TRUE V & BIOGRAPH MCT							
Initial Set-up & Annual Replacement	FNT1013	Long Phantom	Ge-68	92.5 MBq	2.50 mCi	1	1 Year
	CBK1020	Line Source	Ge-68	44.4 MBq	1.2 mCi	2	1 Year
	TST1031	Test Tube	Ge-68	15 kBq	0.41 uCi	1	1 Year

* Recommended

GENERAL ELECTRIC PET & PET-CT
SOURCES

LINE SOURCES

Ge-68 line sources are triple layered tubes and made of high quality stainless steel. Each line source is sealed on its ends by the process of precise argon welding. Thanks to the argon welding process, the possibility of activity leakage is eliminated, ensuring safe use of line sources.

Source related information including product code, isotope type, activity, serial number and production date is permanently marked with laser for source traceability.

Uniformity

Each line source is tested with 5 mm steps of scannings throughout its length for uniformity.

The uniformity of the line sources is within +/- 5% limits.

VQC PHANTOM

Each VQC phantom manufactured is scanned by a PET scanner to perform uniformity quality control test.

GE HEALTHCARE SYSTEM MODEL	PRODUCT CODE	PRODUCT TYPE	ISOTOPE	ACTIVITY		QUANTITY	REPLACEMENT PERIOD*
				SI	NON SI		
DISCOVERY ST							
	CBK2020	Line Source	Ge-68	55 MBq	1.49 mCi	1	1 Year
DISCOVERY 600							
	FNT2090	VQC Phantom	Ge-68	3.5 MBq	0.095 mCi	1	1 Year
	CBK2022	Line Source	Ge-68	10 MBq	0.27 mCi	1	1 Year
DISCOVERY 690 & 690 ELITE							
	FNT2090	VQC Phantom	Ge-68	3.5 MBq	0.095 mCi	1	1 Year
	CBK2021	Line Source	Ge-68	18.5 MBq	0.5 mCi	1	1 Year
DISCOVERY 710 & 710 ELITE							
	FNT2090	VQC Phantom	Ge-68	3.5 MBq	0.095 mCi	1	1 Year
	CBK2021	Line Source	Ge-68	18.5 MBq	0.5 mCi	1	1 Year
DISCOVERY LS							
	CBK2023	Line Source	Ge-68	60 MBq	1.62 mCi	1	2 Years
	CBK2024	Line Source	Ge-68	400 MBq	10.81 mCi	2	6-9 Months

* Recommended

PHILIPS PET & PET-CT

SOURCES

LINE SOURCES

Na-22 line sources are double layered tubes and made of high quality stainless steel. Each line source is sealed on its ends by the process of precise argon welding. Thanks to the argon welding process, the possibility of activity leakage is eliminated, ensuring safe use of line sources.

Uniformity

Each line source is tested with 5 mm steps of scannings throughout its length for uniformity.

The uniformity of the line sources is within +/- 5% limits.

POINT SOURCES

Na-22 point sources are in two different forms; glass filled teflon capsule and acrylic disc. Epoxy marked active area is located in the center of the point source with the dimension of 1 mm x 1mm (0.39” x 0.39”) Overall dimensions for glass filled teflon capsule and acrylic disc type point sources are 25.4 mm x 6.35 mm (1” x 0.25”) and 25.4 mm x 5 mm (1”x 0.20”) respectively.

PHILIPS HEALTHCARE SYSTEM MODEL	PRODUCT CODE	PRODUCT TYPE	ISOTOPE	ACTIVITY		QUANTITY	REPLACEMENT PERIOD*
				SI	NON SI		
GEMINI GXL							
	SPT3181	Spot Marker	Na-22	3.7 MBq	0.1 mCi	1	2 Years
	SPT3180	Spot Marker	Na-22	0.37 MBq	0.01 mCi	6	2 Years
GEMINI TF							
	CBK3120	Line Source	Na-22	3.7 MBq	0.1 mCi	1	2 Years
	SPT3180	Spot Marker	Na-22	0.37 MBq	0.01 mCi	6	2 Years
CPET & ALLEGRO							
	SPT3181	Spot Marker	Na-22	3.7 MBq	0.1 mCi	1	2 Years

* Recommended

FLOOD SOURCES

FLOOD
SOURCES

Co-57 flood sources are used for quality control of gamma camera systems.

ERS flood sources are available in rectangular and circular geometry. The replacement period of Co-57 flood sources is typically 2 (two) years depending on the source activity.

Co-57 is mixed uniformly in resin component in the production of Co-57 flood sources. Ultrasonic welding process is performed after placing the resin component in an ABS case. Before the product delivery, a permeability test is performed on each flood source to ensure impermeability and check defects.

Uniformity

Quality control tests of Co-57 flood sources are performed with a gamma camera system by taking count measurements. Each gamma camera scan contains differential and integral non-uniformity parameters according to IEEE/ANSI N 42.27 standard.

LEAD SHIELDING AND CARRYING CASE

ERS offers lead shielding and carrying case accessories to provide high-level radiation protection during Co-57 flood source transportation.

Unless otherwise indicated, flood source orders come with the lead shielding as a standard accessory.

An optional aluminum carrying case is supplied upon customer request.

PRODUCT CODE	PRODUCT TYPE	ISOTOPE	ACTIVITY	
			SI	NON SI
DZM6270-5M	Circular	Co-57	185 MBq	5 mCi
DZM6270-10M	Circular	Co-57	370 MBq	10 mCi
DZM6260-5M	Rectangular	Co-57	185 MBq	5 mCi
DZM6260-10M	Rectangular	Co-57	370 MBq	10 mCi
DZM6260-20M	Rectangular	Co-57	740 MBq	20 mCi

PRODUCT CODE	OVERALL DIMENSIONS		ACTIVE AREA DIMENSIONS	
	cm	inches	cm	inches
DZM6270-5M	65 diameter	25.59" diameter	60 diameter	23.62" diameter
DZM6270-10M	65 diameter	25.59" diameter	60 diameter	23.62" diameter
DZM6260-5M	66x46	25.98"x 18.11"	61.7 x 42.3	24.29" x 16.65"
DZM6260-10M	66x46	25.98"x 18.11"	61.7 x 42.3	24.29" x 16.65"
DZM6260-20M	66x46	25.98"x 18.11"	61.7 x 42.3	24.29" x 16.65"

DOSE CALIBRATOR SOURCES SPOT MARKERS

DOSE CALIBRATOR

SOURCES

ERS dose calibrator reference sources are calibrated by direct comparison of standardized solutions traceable to the National Institute of Standards and Technology (NIST), in an identical geometry, using a pressurized ion chamber with ±%5 accuracy. Dose Calibrator sources are manufactured by adding 20 ml activity of epoxy composition in 30 ml volumed of polyethelen vial. Each dose calibrator source has its own colored-coded epoxy.

Cobalt-57, Cobalt-60, Cesium-137, Barium-133 dose calibrator reference sources can be supplied in set or individually in accordance with customer request.

PRODUCT CODE	PRODUCT TYPE	ISOTOPE	ACTIVITY	
			SI	NON SI
RKK8200-5M	Reference Source	Co-57	185 MBq	5 mCi
RKK8200-10M	Reference Source	Co-57	370 MBq	10 mCİ
RKK8400-250u	Reference Source	Cs-137	9.25 MBq	0.25 mCİ
RKK8400-200u	Reference Source	Cs-137	7.4 MBq	0.20 mCi
RKK8300	Reference Source	Ba-133	9.25 MBq	0.25 mCi
RKK8500	Reference Source	Co-60	1.85 MBq	0.05 mCi
RKKSET1				
	Reference Source	Co-57	185 MBq	5 mCi
	Reference Source	Cs-137	7.4 MBq	0.20 mCi
	Reference Source	Ba-133	9.25 MBq	0.25 mCi
RKKSET2				
	Reference Source	Co-57	185 MBq	5 mCi
	Reference Source	Co-60	1.85 MBq	0.05 mCi
	Reference Source	Cs-137	7.4 MBq	0.20 mCi
RKKSET3				
	Reference Source	Co-57	185 MBq	5 mCi
	Reference Source	Co-60	1.85 MBq	0.05 mCi
	Reference Source	Cs-137	7.4 MBq	0.20 mCi
	Reference Source	Ba-133	9.25 MBq	0.25 mCi

SPOT
MARKERS

ERS spot markers are used for the purpose of patient orientation during a camera study.

Epoxy marked active area is located in the center of the spot marker with a spherical diameter of 1.8 mm (0.71”).

Overall dimensions of ERS spot markers are 25.4 mm x 6.35 mm (1” x 0.25”).

PRODUCT CODE	PRODUCT TYPE	ISOTOPE	ACTIVITY	
			SI	NON SI
SPT8280-25u	Spot Marker	Co-57	0.925 MBq	0.025 mCi
SPT8280-50u	Spot Marker	Co-57	1.85 MBq	0.05 mCi
SPT8280-100u	Spot Marker	Co-57	3.7 MBq	0.1 mCi
SPT8280-200u	Spot Marker	Co-57	7.4 MBq	0.2 mCi
SPT8280-1M	Spot Marker	Co-57	37 MBq	1 mCi
SPT8280-2M	Spot Marker	Co-57	74 MBq	2 mCi
SPT8480-5u	Spot Marker	Cs-137	0.185 MBq	0.005 mCi
SPT8480-10u	Spot Marker	Cs-137	0.37 MBq	0.01 mCi
SPT8080-100u	Spot Marker	Ge-68	3.7 MBq	0.1 mCi
SPT8080-500u	Spot Marker	Ge-68	18.5MBq	0.5 mCi
SPT8180-100u	Spot Marker	Na-22	3.7 MBq	0.1 mCi
SPT8180-500u	Spot Marker	Na-22	18.5MBq	0.5 mCi

ROD SOURCES

ROD SOURCES

ROD
SOURCES

ERS rod sources are calibrated by direct comparison of standardized solutions traceable to the National Institute of Standards and Technology (NIST), in an identical geometry, using a pressurized ion chamber with ±%5 accuracy.

Source dimensions are 12.7 mm x 127 mm (0.5" x 5") / 12.7 mm x 74.9mm (0.5"x 2.95").

ERS rod sources can be supplied in set or individually in accordance with customer request.

ERS offers a wide range of rod sources that are used for calibrating well counters and thyroid uptake systems. Rod sources are constructed of acrylic material and have a flat base which allows easy positioning in the vertical position required for consistent accuracy of the calibration process.

PRODUCT CODE	PRODUCT TYPE	ISOTOPE	ACTIVITY		DIMENSIONS (Diameter x Length)	
			SI	NON SI	mm	inches
KSR8230-0,1u	Rod Source	Co-57	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8230-1u	Rod Source	Co-57	37 kBq	1 uCİ	12.7mm x 127 mm	0.5" x 5"
KSR8430-0,1u	Rod Source	Cs-137	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8430-0,5u	Rod Source	Cs-137	18.5 kBq	0.5 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8430-1u	Rod Source	Cs-137	37 kBq	1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8330-0,1u	Rod Source	Ba-133	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8330-1u	Rod Source	Ba-133	37 kBq	1 uCİ	12.7mm x 127 mm	0.5" x 5"
KSR8530-0,1u	Rod Source	Co-60	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8530-1u	Rod Source	Co-60	37 kBq	1 uCİ	12.7mm x 127 mm	0.5" x 5"
KSR8630-0,1u	Rod Source	Mn-54	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8630-1u	Rod Source	Mn-54	37 kBq	1 uCİ	12.7mm x 127 mm	0.5" x 5"
KSR8130-0,1u	Rod Source	Na-22	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8130-1u	Rod Source	Na-22	37 kBq	1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8730-0,1u	Rod Source	Cd-109	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8730-1u	Rod Source	Cd-109	37 kBq	1 uCİ	12.7mm x 127 mm	0.5" x 5"
KSR8830-0,1u	Rod Source	Eu-152	3.7 kBq	0.1 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8830-0,5u	Rod Source	Eu-152	18.5 kBq	0.5 uCi	12.7mm x 127 mm	0.5" x 5"
KSR8830-1u	Rod Source	Eu-152	37 kBq	1 uCİ	12.7mm x 127 mm	0.5" x 5"
KSR8240-0,1u	Rod Source	Co-57	3.7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8240-1u	Rod Source	Co-57	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8440-0,1u	Rod Source	Cs-137	3.7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8440-1u	Rod Source	Cs-137	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8340-0,1u	Rod Source	Ba-133	3.7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8340-1u	Rod Source	Ba-133	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8540-0,1u	Rod Source	Co-60	3.7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8540-1u	Rod Source	Co-60	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8640-0,1u	Rod Source	Mn-54	3.7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8640-1u	Rod Source	Mn-54	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8140-0,1u	Rod Source	Na-22	3,7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8140-1u	Rod Source	Na-22	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8740-0,1u	Rod Source	Cd-109	3.7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8740-1u	Rod Source	Cd-109	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8840-0,1u	Rod Source	Eu-152	3.7 kBq	0.1 uCi	12.7mm x 74.9 mm	0.5" x 2.95"
KSR8840-1u	Rod Source	Eu-152	37 kBq	1 uCİ	12.7mm x 74.9 mm	0.5" x 2.95"

GENERAL
INFORMATION

SOURCE DISPOSAL

ERS will accept return of depleted radioactive sources after the end of their useful life on the condition that equivalent replacement source is purchased directly from ERS or ERS distribution channels.

The customer will be responsible for all shipping costs incurred including import fees and duties for the return of the source. The shipment must be sent with the term Delivery Duty Paid (DDP) in case of an overseas shipment. ERS must be informed about the return before product shipment to be able to make proper shipping arrangements.

ERS can provide all necessary shipping documents for return of depleted sources. Customers will be charged for any unauthorized returns.

CERTIFICATES

ERS is certified with ISO 13485:2003 and ISO 9001:2008

DOCUMENTATION

All manufactured sources are accompanied by Calibration Certificate and Quality Certificate.

The sources can only be delivered to certified companies which are allowed to import radioactive sources with the terms of European Atomic Energy Community Regulations or related Local Atomic Energy Agencies.

PRODUCT AVAILABILITY

Customized sources in different forms and activities can be supplied upon request by ERS. Please contact your local distributor or ERS headquarters for product availability and additional information.

PRODUCT SHIPMENT

The regulations of the US Department of Transportation (DOT) per 49 CFR and the International Air Transportation Association (IATA) apply to packaging and delivery of radioactive materials of ERS product range.

Excepted Packaging and Type A packaging are used for ERS product shipments.

Excepted Packaging "Limited Quantity" is used when the activity limits do not exceed defined in IATA regulations and the radiation level at any point on the package does not exceed allowed limits.

Type A packaging is used to carry normal form radioactive material as defined by 49 CFR and IATA.

ANSI N43.6 : 2007 and ISO 2919 : 2012 sealed radioactive sources radiological protection tests are performed on Type A and Excepted packages.

ISO 9978 : 1992 sealed radioactive sources leakage tests are applied on ERS sealed sources.

ERS
Epsilon Radioactive Sources

EPSILON ELECTRONICS

MONGERI BINASI 19 MAYIS MAHALLESI
DR. SEVKET BEY SOKAK NO:5 34360 SISLI ISTANBUL

TEL : +90 212 219 56 57
FAX : +90 212 219 42 88
WEB : www.epsilonsources.com
E- MAIL : info@epsilonsources.com

TRF
TECNICAS RADIOFISICAS
www.trf.es

TECNICAS RADIOFISICAS SINGAPORE PTE. LTD.

10 Anson Road #26-04
International Plaza
Singapore 079903
SINGAPORE
Tel: +65 9163 3528 / +65 8206 3551
+60 193 550 175
Fax: +65 672 58 438
info@trf.es

TECNICAS RADIOFISICAS S.L.

Gil de Jasa 18, pral
50006 Zaragoza
SPAIN
Tel: +34 976 212545
Fax: +34 976 213011
info@trf.es