ADVANTAGE® RADIOACTIVE SEED LOCALIZATION® (RSL®)

⚠ Instructions for Use – This leaflet contains important product use and safety information. Please read carefully, and retain these instructions for future reference.

PRODUCT NAME:
ADVANTAGE® RADIOACTIVE SEED LOCALIZATION

(I-125 RADIOACTIVE SEED LOCALIZATION NEEDLE)

Description:
The IsoAid ADVANTAGE RSL® I-125 Radioactive Seed Localization Needle [RSLN] is a pre-sterilized 18-gauge stainless steel needle containing a low activity I-125 Iodine Seed (Advantage™ I-125 source). The ADVANTAGE™ I-125 source consists of a laser welded Titanium capsule, containing Iodine-125 chemically affixed (adsorbed), as silver iodide, onto a silver rod which acts as an x-ray detectable marker. The needle tip is occluded with bone wax and the iodine seed is loaded loose or stranded and is provided with or without a trailing spacer. The stainless-steel needles are provided in 5cm, 7cm, and 12cm lengths.

The ADVANTAGE RSL is intended for use by licensed and trained healthcare providers. It is available by prescription only.

Patients may be exposed to the following absorbable materials as part of the RSLN device: PGLA (90% glycolide/10% L-Lactide) polymer (if spacers are used). PLDLA 70L/30DL (if seeds are stranded) and bone wax which is comprised of beeswax, paraffin and isopropyl palmitate. All materials have been tested and comply with biocompatibility standards for implantable materials.

Indications for Use:
The I-125 Radioactive Seed Localization Needle is indicated to aid in the diagnosis of non-palpable tumors, lesions or associated lymph nodes in the breast by defining tumor, lesion or node location with a radioactive seed in preparation for excision. The Advantage RSL (RSLN) is intended to be used on adult individuals with non-palpable tumors/lesions/nodes. The radioactive seed is intended to be excised within thirty (30) days of implant.

Intended Use/Intended Purpose:
The I-125 Radioactive Seed Localization Needle is intended as a temporary implant to aid in localization and excision of a tumor, lesion or associated lymph nodes in the breast. It is intended to be used with or without an absorbable strand and spacer.

Physical Characteristics:
Iodine-125 has a half-life of 59.41 days and decays by electron capture with the emission of characteristic photons and electrons. The principal photon emissions are 27.2 KeV, 27.5 KeV, 31.0 KeV and 35.5 KeV with an average energy of 28.5 KeV. Table 1. shows the decay of I-125 seeds

Calibration:
ADVANTAGE™ I-125 sources are calibrated by direct comparison against a standard source of the same model that has been calibrated by the National Institute of Standards and Technology for Air Kerma Strength. The resulting calibration is reported in Air Kerma Strength (μGy m^2/h) as well as Apparent Activity (mCi).

ADVANTAGE™ I-125 sources are calibrated to the NIST SK99std WAFAC standards for I-125 seeds.

Sterilization/Single Use Only:
The Radioactive Seed and Localization Needle are sterilized with a Sterility Assurance Level of 10^{-6} by Ethylene Oxide gas. The sterile packaging has a one hundred and eighty (180) day shelf-life. If the product's expiration date has been exceeded, the product is considered non-sterile and therefore cannot be used. **Do not re-sterilize the product.**

Table 1. Iodine-125 Decay for RSLN

Day	Decay Factor	Day	Decay Factor	Day	Decay Factor	Day	Decay Factor
0	1.000	31	0.697	62	0.485	93	0.338
1	0.988	32	0.688	63	0.480	94	0.334
2	0.977	33	0.680	64	0.474	95	0.330
3	0.966	34	0.673	65	0.469	96	0.326
4	0.954	35	0.665	66	0.463	97	0.323
5	0.943	36	0.657	67	0.458	98	0.319
6	0.932	37	0.649	68	0.452	99	0.315
7	0.922	38	0.642	69	0.447	100	0.311
8	0.911	39	0.634	70	0.442	101	0.308
9	0.900	40	0.627	71	0.437	102	0.304
10	0.890	41	0.620	72	0.432	103	0.301
11	0.880	42	0.613	73	0.427	104	0.297
12	0.869	43	0.606	74	0.422	105	0.294
13	0.859	44	0.599	75	0.417	106	0.290
14	0.849	45	0.592	76	0.412	107	0.287
15	0.839	46	0.585	77	0.407	108	0.284
16	0.830	47	0.578	78	0.403	109	0.280
17	0.820	48	0.571	79	0.398	110	0.277
18	0.811	49	0.565	80	0.393	111	0.274
19	0.801	50	0.558	81	0.389	112	0.271
20	0.792	51	0.552	82	0.384	113	0.268
21	0.783	52	0.545	83	0.380	114	0.265
22	0.774	53	0.539	84	0.375	115	0.261
23	0.765	54	0.533	85	0.371	116	0.258
24	0.756	55	0.526	86	0.367	117	0.255
25	0.747	56	0.520	87	0.362	118	0.252
26	0.738	57	0.514	88	0.358	119	0.250
27	0.730	58	0.508	89	0.354	120	0.247
28	0.721	59	0.502	90	0.350		
29	0.713	60	0.497	91	0.346		
30	0.705	61	0.491	92	0.342		

In Vivo Characteristics:
During the excision procedure, the seed provides a radioactive localization point and acts as a marker to aid in the location and excision of the lesion. Verify the removal of seed at time of excision of the tumor/lesion/node using a gamma probe or similar instrument intended for isotope detection.

Instructions for Safe Use:
The radioactive seed is introduced via an 18-gauge needle using standard ultrasound or radiography guidance. Once guided to the desired location of the lesion, the seed is deployed through the bone wax with the aid of the needle stylet.

If multiple lesions utilize more than one seed, then each seed shall be a minimum of 2 cm apart. Ultrasound or radiography confirms the appropriate placement of the seed.

The seed is intended to be removed during the excision procedure.

For single use only. Do not reuse. Reusing this medical device bears the risk of cross-patient contamination as medical devices – particularly those with long, and small lumina, joints or crevices between components – are difficult or impossible to clean once body fluids or tissues with potential pyrogenic or microbial contamination have had contact with the medical device for an indeterminable period of time. The residue of biological material can promote the contamination of the device with microorganisms which may lead to infectious complications.

Do not resterilize. After resterilization, the sterility of the product is not guaranteed because of the indeterminable degree of microbiological contamination which may lead to infectious complications. Cleaning, reprocessing and/ or resterilization of the present medical device increases the probability that the device will malfunction due to potential adverse effects on components that are influenced by thermal and/or mechanical changes.

Radiation Protection & Handling:
The 27- 35.5 KeV photons of I-125 are substantially absorbed by any high Z material but exhibit desirable penetration in tissue.

Half Value Layer Lead = 0.025 mm
Half Value Layer Tissue = 20.0 mm

Exposure can be reduced by 99.9% with a thin sheet of lead (0.25 mm or 0.01 inch). The shielding of I-125 results in a reduction of exposure to attending medical personnel and visitors. I-125 sources should be handled only by those individuals trained by an authorizing governmental agency in the safe use & handling of radioisotopes.

- Direct contact with I-125 sources should be avoided. The use of vacuum or reverse action tweezers is recommended. Proper precautions must be taken when handling the sources.
- Personnel monitoring is required. Dosimetry monitors, such as TLD devices, should be used to monitor hand and whole body exposure. During preparation and source implantation procedures, all practical steps should be taken to keep exposure as low as reasonably achievable. Limited exposure time, increasing distance, careful planning of the administration procedure and use of shielded barriers should be considered in meeting this goal.

Accidental Damage:
Do not use the product if there is suspicion that the product is damaged or if the sterile barrier has been breached. It is possible through rough handling (abrasion, incision, etc.), high temperatures or crushing that a seed could rupture and leak. The internal components of the seed are non-toxic, but the area should be closed off immediately and personnel limited to avoid radioactive contamination. The damaged seeds should be placed in a sealed container and the area should be decontaminated. In accordance with radiation regulations, only authorized, specialized staff trained in handling radioactive substances may handle the I-125 seeds.

Accountability & Disposal:
Records of receipt, storage and disposal of Advantage™ I-125 sources should be maintained in accordance with government regulatory policies. I-125 sources should be strictly controlled and stored in a secured area.

When disposal is indicated, the Advantage™ I-125 sources should be transferred to an authorized radioactive waste disposal agency. or returned to IsoAid for disposal. NOTE: IsoAid does not accept I-125 sources for return from European Union. Advantage™ I-125 sources should not be disposed of in normal waste. Any discrepancies must be reported immediately to IsoAid Customer Service.

Licensing:

USA – State/Federal:

⚠ CAUTION: Federal (USA) and State law(s) restrict this device to sale by or on the order of a physician.

The Florida Department of Health (FDOH), Bureau of Radiation Control has approved this sealed source for distribution to persons licensed pursuant to Florida Administrative Code Chapter 64E-5, "Control of Radiation Hazard Regulations," Part VI or under equivalent licenses of the USNRC or issued by an Agreement State. IsoAid requires proof of USNRC radioactive materials license or respective government license as well as agreement state and licensing state information. Orders cannot be processed without license verification. Compliance with the applicable local, state, country, and/or government regulations concerning procurement, possession, use and disposal of radioactive materials is the responsibility of the customer.

Canada - Canadian Nuclear Safety Commission

⚠ CAUTION: Canadian National and Regional/State law(s) restrict this device to sale by or on the order of a physician.

Application of REGDOC-2.12.3, Security of Nuclear Substances: Sealed Sources for typical uses of sealed sources, Brachytherapy - low dose rate is a Category 4 source. Category 4 sources are very unlikely to permanently injure anyone. However, this amount of unshielded radioactive material, if not safely managed or securely protected, could possibly – although it is unlikely – temporarily injure someone who handled it or was otherwise in contact with it, or who was close to it for a period of many weeks. This Code of Conduct on the Safety and Security of Radioactive Sources was approved by the Board of Governors of the International Atomic Energy Agency (IAEA) on 8 September 2003. It replaces the version published (with the symbol IAEA/CODEOC/2001) by the IAEA in March 2001. It reflects the important findings produced by the International Conference on Security of Radioactive Sources held in Vienna in March 2003 (the Hofburg Conference). Member States to be encouraged to join and effectively implement these Conventions. Canada is already a signatory to these conventions, together with codes of conduct on nonproliferation, research reactors and the safety and security of radioactive sealed sources, along with the Comprehensive Nuclear Test-Ban Treaty.

Canadian Nuclear Safety Commission
280 Slater Street P.O. Box 1046
Station B Ottawa, Ontario K1P 5S9 CANADA
Tel.: 613-995-5894 or 1-800-668-5284 (in Canada only)
Facsimile: 613-995-5086 Email: info@cnsc-ccsn.gc.ca
Web site: nuclearsafety.gc.ca

Australia - Australian Radiation Protection and Nuclear Safety Agency

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The establishment of a NRWMF is governed by the National Radioactive Waste Management Act 2012. A NRWMF also needs to adhere to the Environment Protection and Biodiversity Conservation Act 1999, the Nuclear Non-Proliferation (Safeguards) Act 1987 and the Australian Radiation Protection and Nuclear Safety Act 1998.
The proposed National Radioactive Waste Management Facility would be a controlled facility under the Australian Radiation Protection and Nuclear Safety Act 1998 (the Act).
Under the Act, licenses are required to prepare a site for, construct, or operate a controlled facility. The decision to submit a license application is a matter for the applicant.
Before an application is made to the CEO of ARPANSA for a license to prepare a site for the National Radioactive Waste Management Facility, the applicant will have to obtain approval from the Minister for the Environment under the Environment Protection and Biodiversity Conservation Act 1999. Before any radioactive material is allowed to be transported it must be packed, shielded, labelled and marked as set out in the ARPANSA Code: Safe Transport of Radioactive Materials. This code is based on the International Atomic Energy Agency's (IAEA) Regulations for Safe Transport of Radioactive Material. nrwmfsupport@arpansa.gov.au; www.arpansa.gov.au
A radioisotope is considered to be for medical use when it is intended to be:

1. administered to humans or used for any therapeutic procedure or purpose in any planned exposure of humans to ionizing radiation
2. used in any in vitro medical diagnosis or est
3. used in research which is either directly or indirectly related towards medical diagnosis or therapy in humans.

Note: Sealed and unsealed radioactive sources that are used to calibrate instruments in medical practices and pathology laboratories are also included as medical radioisotopes for permit purposes. The applicant/"end user" declares that he/she holds an appropriate license issued by the relevant Commonwealth, State or Territory radiation regulatory authority to deal with the above radioisotopes. The applicant/"end user" also undertakes not to supply any of the above radioisotopes to an unapproved user. The applicant/"end user" should contact the relevant Commonwealth, State or Territory radiation regulatory authority for advice on legislative requirements.
medicalpermits@arpansa.gov.au; www.arpansa.gov.au.

ARPANSA, like other regulatory bodies in Australia and abroad, has been working on developing capability in holistic safety. Charged with the function of protecting the health and safety of people under the Australian Radiation Protection and Nuclear Safety Act 1998 (the Act), ARPANSA proposes to use a holistic approach to assess and monitor the safety of license holders and applicants. These guidelines outline ARPANSA's vision and expectations for holistic safety.

Leak Testing:

ADVANTAGE I-125 Brachytherapy sources are 100% leak tested prior to shipment and have passed a leak test showing less than 185 Bq (5 nCi) of removable I-125 surface contamination as required by ISO 9978 "Radiation protection – Sealed radioactive sources." Advantage I-125 seeds do not require any additional leak testing provided the seeds are used within the use-by-date.

Localization Dosage and Administration:
The most commonly used source activity levels for localization is between 0.1 mCi and 0.3 mCi.

⚠ Adverse Reactions:

- Any adverse reaction associated with tissue radiation damage may be associated with use of I-125 sources. Proper precautions must be taken when handling the sources.

- As with any surgical procedure, complications may occur including: bruising, discomfort, prolonged bleeding or infection near the implant site.
- Although the risk of source migration is minimal, it can be significantly reduced through the use of stranding that links the seed and spacer together prior to implantation.
- Iodine Allergy
- Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the Competent Authority of the Member State in which the user and/or patient is established.

⚠ **Precautions:**

- ⚠ Product should remain in leaded pouch until ready for use. Handle lead pouch and contents with care to prevent damage to product.
- ⚠ Use caution when patients are diagnosed with non-cancerous tumors/lesions. Implant and removal should occur within 24 hours to limit radiation exposure.

⚠ **Contraindications:**

- ⚠ Do not use radioactive seed localization needles in neurological or cardiovascular tissues.
- ⚠ The RSLN is sold sterile. Use of a non-sterile device may compromise patient care. Do not re-sterilize.
- ⚠ Do not use a damaged seed or a seed that may have become damaged when using the device.
- ⚠ Do not come in direct contact with the I-125 source. Use vacuum or reverse action tweezers to handle the I-125 sources.
- ⚠ The needle is not to be used in an MRI environment.

⚠ **Warnings:**

- ⚠ Dispose of radioactive material per nuclear regulatory guidelines (for USA, 10 CFR 35.1000; for EU per EURATOM 1493/93)
- ⚠ Loss of a radioactive seed must be avoided. Protocols must be in place to ensure tracking of the seed throughout the process.
- ⚠ Any attempt to cut or segment stranded product may adversely result in radioactive contamination. Use product as intended.
- ⚠ Do not use if damaged. Discard if damaged during use or after use in accordance with waste disposal procedures.
- ⚠ Do not use when patients are pregnant or breastfeeding. An alternative non-radioactive device should be used to avoid radiation exposure.
- ⚠ Do not use on patients that are less than 18 years old. This product is intended for use in adults.
- ⚠ Do not use if needle is bent or broken.
- ⚠ Excessive Force is not required to expel seed.
- ⚠ Do not store without adequate leaded shielding /packaging
- ⚠ Healthy tissue may be exposed to the RSLN device during implantation and excision.

MR Conditional

The I-125 seed has been evaluated for safety in the MRI environment. The seeds are MR-Conditional as defined in ASTM F2503. The seeds have been tested for heating, migration, and image artifact in the MRI environment. IsoAid seeds are made with a titanium shell with non-magnetic internal materials. Patients with the seeds may safely undergo MRI under the following conditions: 1) Static field of 3 T or less 2) Whole body SAR of 4 W/kg or less and head SAR of 3.2 W/kg or less 3) Normal or first level controlled mode of the MRI system for both RF and gradients 4) Maximum spatial gradient in the static field of 30 T/m (3000 Gauss/cm) 5) Maximum slew rate of the time-varying magnetic gradient for the seed is 200 [T/m/s], which is the high-end gradient slew rate and is worst-case for the seed that does not have any magnetic or transistors in the seed components, no conceivable negative impact.

⚠ The presence of other implants or the health state of the patient may require reduction of the MR limits.

⚠ Temperature rise of tissues surrounding the seed was calculated under a worst-case situation to be less than 50% above the background rise with no implant. Magnetic force and torque during MRI will be less than the values exerted by gravity. Image artifact is expected to extend less than 5 mm beyond the seeds.

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⚠ **Use and Distribution in the EU is governed by EURATOM *2013/59 and 1493/93.***

The RSLN Summary of Safety and Clinical performance is available on the European database on medical devices (EUDAMED), where it is linked to the Basic UDI: M936IRLS. https://ec.europa.eu/tools/eudamed.

The excised RSLN seed is considered biohazardous and must be contained and disposed of in accordance with universal precautions.

The RSLN Product may be configured with or without a Spacer and/or Strand; and may be supplied in a 5cm, 7cm, or 12cm stainless steel needle [where X = length of needle].

Configurations (where "X" = cm in length, e.g. 5 cm, 7 cm, 12 cm)	**Product Code**
Stranded, no spacer	RSLN-X-SS
Stranded with spacer	RSLN-X-SS/S
Loose Load, no spacer	RSLN-X-LL
Loose Load with spacer	RSLN-X-LL/S

LEGEND Caution: Consult Accompanying Documents	
	Do Not Reuse
	Consult Instructions for Use
STERILE EO	Ethylene Oxide Sterilization
	Use by Date
REF	Catalog Number
	Do not Resterilize
	Biohazard
	Radioactive
MR	MR Conditional
	Do not use if package is damaged
	Importer
MD	Medical Device
	Manufacturer
	Keep Dry
EC REP	European Authorized Representative

Clinical Benefit of RSL device for breast cancer patients:

1. Increased surgical accuracy: RSL allows surgeons to precisely locate and remove small, non-palpable breast tumors. This precision helps ensure that all cancerous tissue is removed while preserving as much healthy tissue as possible.

2. Patient comfort: Unlike traditional wire localization, which involves a wire sticking out of the breast for several hours before surgery, RSL uses a tiny radioactive seed that is less uncomfortable for patients. The seed is placed using a needle under local anesthesia and patients can go about their day without the discomfort of a protruding wire.

3. Reduced need for re-operation: By improving the accuracy of tumor removal, RSL reduces the likelihood of needing a second surgery to remove any remaining cancerous tissue.

4. Minimally invasive: The procedure is minimally invasive and can be performed under local anesthesia, making it a safer option with fewer complications.

CE 2797

EU REP
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