



POLATOM

Radiochemicals

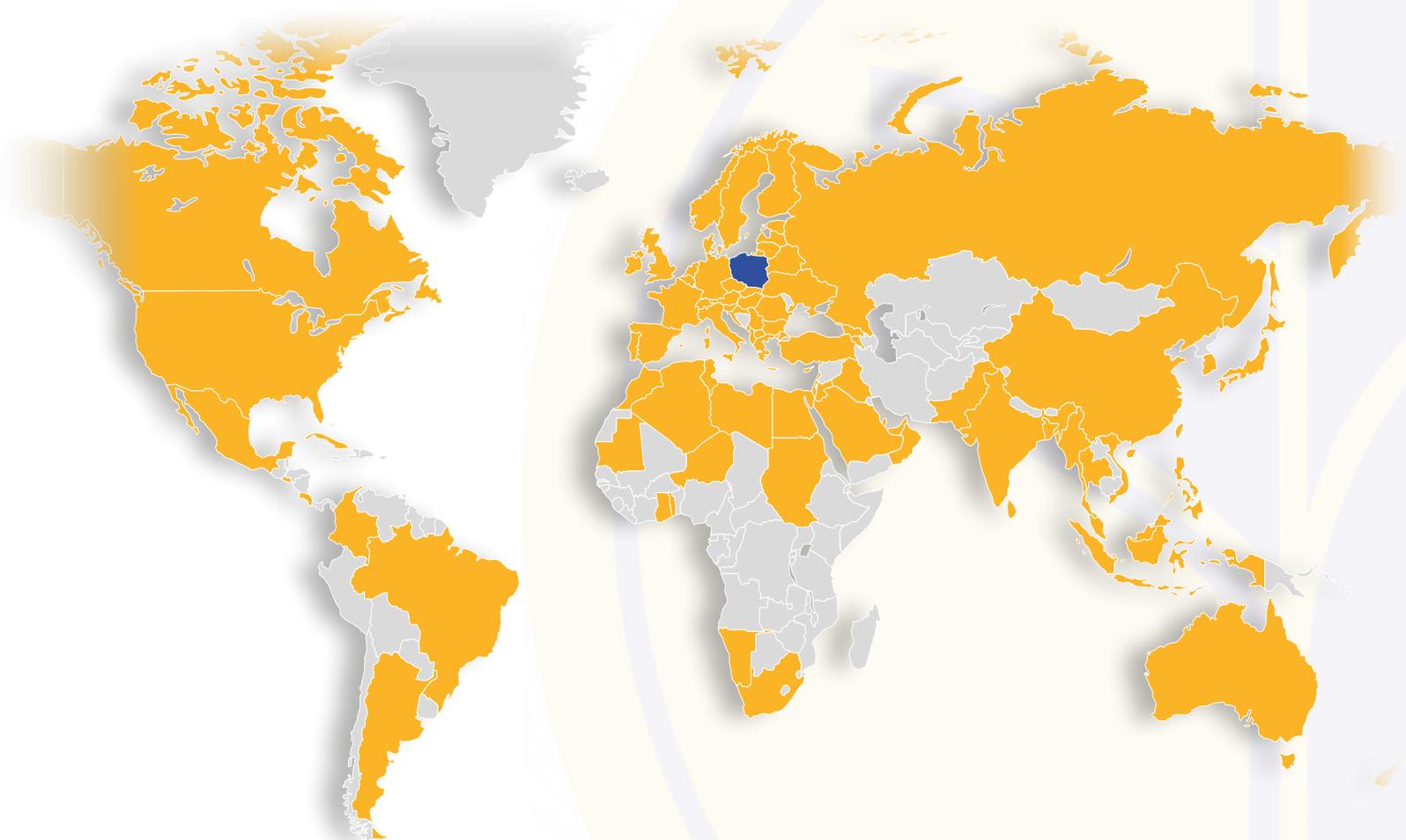
science, quality, precision



National Centre for Nuclear Research
Radioisotope Centre POLATOM



Global reach to over 80 countries worldwide



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Company profile

Radioisotope Centre **POLATOM** is the research and development organization in the structure of the National Centre for Nuclear Research, state owned research institute, located in Otwock near Warsaw and the operator of MARIA Research Reactor, the main irradiation facility in Poland.

POLATOM carries out scientific research and development programs oriented at the application of radioisotopes in nuclear medicine, industry and science. Results of our research programs and innovation activities in the development of radiopharmaceuticals can be directly implemented in the GMP certified production and QC facilities. Sealed radiation sources, standard solutions and reference sources, as well as related services, are also offered.

Quality Assurance System in the area of manufacturing, sales, dispatching and transport of radioactive materials established at **POLATOM** is certified according to the PN-EN ISO 9001: 2015-10 Quality System Certificate and the implemented WSK (Internal Control System) for trade in dual-use goods, as well as a Certificate confirming compliance with the

Good Manufacturing Practice (GMP) and Good Distribution Practice (GDP) requirements.

Moreover, in our Radioactivity Standards Laboratory, a management system compliant with the international standard PN-EN ISO/IEC 17025:2018-02 has been implemented and maintained. The confirmation of RSL's technical competence – as a calibration laboratory – is the accreditation certificate AP 120 granted by the Polish Center for Accreditation.

In recent years **POLATOM** launched manufacture of several innovative products, among them ^{99m}Tc -Tektrotyd radiopharmaceutical kit for diagnostic imaging of tumors expressing somatostatin receptors, useful in oncology, or ItraPol (^{90}Y) solution for radiolabeling) and LutaPol (^{177}Lu) solution for radiolabeling) as radiopharmaceutical precursors for radiolabeling of peptides and other biomolecules for therapy of cancer.

POLATOM is a world famous supplier of high quality radiopharmaceuticals and diagnostic kits for nuclear medicine and important manufacturer of radiochemical products for customers all over the world. Our products are exported to more than 80 countries.



Orders, labelling, packaging

Orders

When ordering please refer to availability and specify at least the following information:

- the specific product code,
- name of the product,
- activity,
- quantity,
- required shipping date.

Label on a packaging contains data referring to the preparation: the nature of the product, activity at a given date, the volume, lot number, expiration, the product code, container type and number and certificate number.

Calibration specifies time (hours, days) after shipping, for which the nominal activity is calculated.

A certificate is attached to every shipment of radioactive material.

The radiochemicals are mainly manufactured from the targets irradiated in MARIA Research Reactor.

Packaging

Determination of the type of packaging is determined by dangerous nature of the transported material: depending on its radiotoxicity, radioactivity and its tendency to spread.

Packing and transportation of radiochemical preparations are performed in accordance with International Atomic Energy Agency (IAEA) requirements and the Regulations for Safe Transport of Radioactive materials (IATA, ADR).

The typical packaging of radioactive material consists of the following elements:

- vial,
- shielding container,
- metal can with styrofoam mould,
- external cardboard box with styrofoam mould.

Radiochemical preparations are packed in vials and shielding containers. The containers are sealed in a metal can lined with a styrofoam mould. The can is then fixed inside cardboard packaging.



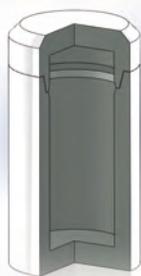
Containers type A certified by POLATOM

Standard shielding containers type A

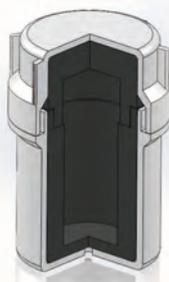
non-returnable packaging, used for radiochemicals:

Container type	Shielding / coverage material	Lead screen [mm]	Internal seating sizes $\varnothing \times h$ [mm]	External sizes $\varnothing \times h$ [mm]	Mass of the container [kg]	Mass of the transport packaging [kg]
P-5	Lead / painted	5	25 × 55	35 × 66	0.44	1.14
P-7Z	Lead / plastic	7	22/20.6 × 43.4	44 × 65	0.45	1.15
P-10	Lead / painted	10	25 × 54	45 × 75	1.00	1.70
P-20	Lead / plastic	20	28 × 54	65 × 95	2.92	3.62
P-30	Lead / plastic	30	28 × 52	87 × 112.5	6.11	6.80
P-40	Lead / painted	40	33 × 70	112 × 155 (190)*	15.70	19.70
P-50	Lead / painted	50	35 × 85	142 × 187	32.00	36.00
P-60	Lead / steel	60	33 × 70	165 × 200 (235)*	44.50	48.40

* with handle



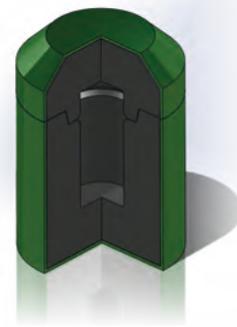
P-5



P-7Z



P-10



P-20



P-30



P-40



P-50



P-60

List of radiochemicals



Antimony ¹²⁴Sb

Code: RSb-4

Name, chemical formula	Antimony(III) chloride, SbCl ₃
Form	5M HCl solution
Radionuclidic purity	> 99.0% (including ¹²² Sb)
Calibration	7 days
Expiration	28 days
Storage	15°C ± 25°C
Specific activity	> 40 MBq/mg Sb
Half life	60.2 days
Availability	~6 weeks advanced order

Arsenic ⁷⁶As

Code: RAs-3

Name, chemical formula	Arsenic(III) chloride, AsCl ₃
Form	1M HCl solution
Radionuclidic purity	> 99.5%
Calibration	24 hours
Expiration	72 hours
Storage	15°C ± 25°C
Specific activity	> 10 MBq/mg As
Half life	1.078 days
Availability	~2 weeks advanced order

Barium ¹³³Ba

Code: RBa-7

Name, chemical formula	Barium chloride, BaCl ₂
Form	1M HCl solution
Radionuclidic purity	> 99.9%
Calibration	7 days
Expiration	28 days
Storage	15°C ± 25°C
Specific activity	> 25 MBq/mg Ba
Half life	10.7 years
Availability	on request

Bromine ⁸²Br

Code: RBr-3

Name, chemical formula	Potassium bromide, KBr
Form	aqueous solution
Radionuclidic purity	> 98.0%
Calibration	48 hours
Expiration	72 hours
Storage	15°C ÷ 25°C
Specific activity	> 40 MBq/mg Br
Half life	1.47 days
Availability	~2 weeks advanced order

Caesium ¹³⁴Cs

Code: RCs-2

Name, chemical formula	Caesium chloride, CsCl
Form	aqueous solution
Radionuclidic purity	> 98.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 400 MBq/mg Cs
Half life	2.065 years
Availability	from stock

Cadmium ¹¹⁵Cd

Code: RCd-3

Name, chemical formula	Cadmium(II) chloride, CdCl ₂
Form	0.1M HCl solution
Radionuclidic purity	> 95.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 2.0 MBq/mg Cd
Half life	44.56 days
Availability	~6 weeks advanced order

Caesium ¹³⁷Cs

Code: RCs-3

Name, chemical formula	Caesium chloride, CsCl
Form	0.1M HCl solution
Radionuclidic purity	> 99.9%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	carrier free
Half life	30.02 years
Availability	from stock



Calcium ⁴⁵Ca

Code: RCa-3

Name, chemical formula	Calcium chloride, CaCl ₂
Form	aqueous solution
pH	5.0 ÷ 8.0
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 40 MBq/mg Ca
Half life	163 days
Availability	on request

Chromium ⁵¹Cr

Code: RCr-2

Name, chemical formula	Chromium(III) chloride, CrCl ₃
Form	0.1 M HCl solution
Radionuclidic purity	> 99.5%
Radiochemical purity	> 95.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 3.5 GBq/mg Cr
Half life	27.7 days
Availability	from stock

Chromium ⁵¹Cr

Code: RCr-3

Name, chemical formula	Sodium chromate(VI), Na ₂ CrO ₄
Form	aqueous solution
Radionuclidic purity	> 99.5%
Radiochemical purity	> 98.0%
pH	6.0 ÷ 8.0
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 3.5 GBq/mg Cr
Half life	27.7 days
Availability	from stock

Chromium ⁵¹Cr EDTA

Code: RCr-9

Name, chemical formula	Chromium ⁵¹ Cr EDTA
Form	isotonic solution
Radionuclidic purity	> 99.5%
Radiochemical purity	> 98%
Calibration	7 days
Expiration	28 days
Storage	5°C ÷ 25°C
Specific activity	> 3,5 GBq/mg Cr
Half life	27.7 days
Availability	from stock



Cobalt ⁵⁸Co

Code: RCo-2

Name, chemical formula	Cobalt(II) chloride, CoCl ₂
Form	1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	carrier free
Half life	70.83 days
Availability	on request

Cobalt ⁶⁰Co

Code: RCo-3

Name, chemical formula	Cobalt(II) chloride, CoCl ₂
Form	0.1M HCl solution
Radionuclidic purity	> 99.5%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 370 MBq/mg Co
Half life	5.271 years
Availability	on request

Copper ⁶⁴Cu

Code: RCu-3

Name, chemical formula	Copper(II) chloride, CuCl ₂
Form	0.1M HCl solution
Radionuclidic purity	> 99.5%
pH	2.0 ÷ 3.0
Calibration	24 hours
Expiration	48 hours
Storage	15°C ÷ 25°C
Specific activity	> 40 MBq/mg Cu
Half life	12.7 hours
Availability	~2 weeks advanced order

Europium ¹⁵²Eu

Code: REu-1

Name, chemical formula	Europium(III) chloride, EuCl ₃
Form	0.1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 200 MBq/mg Eu
Half life	13.52 years
Availability	from stock



Gold ¹⁹⁸Au

Code: RAu-2

Name, chemical formula	Tetrachloroauric(III) acid, H ₂ AuCl ₄
Form	3M HCl solution
Radionuclidic purity	> 90.0%
Calibration	48 hours
Expiration	72 hours
Storage	15°C ÷ 25°C
Specific activity	> 150 MBq/mg Au
Half life	2.69 days
Availability	~2 weeks advanced order

Holmium ¹⁶⁶Ho

Code: RHo-1

Name, chemical formula	Holmium chloride, HoCl ₃
Form	0.1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	24 hours
Expiration	48 hours
Storage	15°C ÷ 25°C
Specific activity	> 400 MBq/mg Ho
Half life	26.8 hours
Availability	~2 weeks advanced order

Iodine ¹³¹I

Code: RI-10

Name, chemical formula	Sodium iodide, NaI
Form	solution in carbonate buffer
Radionuclidic purity	> 99.9%
Radiochemical purity	> 97.0%
pH	> 8.5
Calibration	6 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 400 GBq/mg I, carrier free
Half life	8.02 days
Availability	from stock

Indium ^{114m}In

Code: RIn-2

Name, chemical formula	Indium(III) chloride, InCl ₃
Form	0.1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 10 MBq/mg In
Half life	49.5 days
Availability	~7 weeks advanced order



Iridium ¹⁹²Ir

Code: RIr-2

Name, chemical formula	Ammonium hexachloroiridate(VI), (NH ₄) ₂ IrCl ₆
Form	0.1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 800 MBq/mg Ir
Half life	73.8 days
Availability	on request

Iron ⁵⁹Fe

Code: RFe-4

Name, chemical formula	Iron(III) chloride, FeCl ₃
Form	1M HCl solution
Radionuclidic purity	> 99.5%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 80 MBq/mg Fe
Half life	44.5 days
Availability	from stock

Lutetium ¹⁷⁷Lu

Code: RLu-3

Name, chemical formula	Lutetium chloride, LuCl ₃
Form	0.04M HCl solution
Radionuclidic purity	> 99.97%
Chemical purity	Co, Ni ≤ 0.1 µg/GBq Cu, Pb ≤ 0.5 µg/GBq Fe, Zn ≤ 1.0 µg/GBq
Calibration	2 ÷ 7 days
Expiration	7 days
Storage	15°C ÷ 25°C
Specific activity	≥ 370 GBq/mg Lu
Half life	6.65 days
Availability	according to schedule

Neodymium ¹⁴⁷Nd

Code: RNd-2

Name, chemical formula	Neodymium chloride, NdCl ₃
Form	0.1M HCl solution
Radionuclidic purity	> 90.0%
Calibration	7 days
Expiration	12 days
Storage	15°C ÷ 25°C
Specific activity	> 1 MBq/mg Nd
Half life	10.98 days
Availability	on request



Phosphorus ³²P

Code: RP-10

Name, chemical formula	Phosphoric(V) acid, H_3PO_4
Form	aqueous solution
Radionuclidic purity	> 97.0%
Radiochemical purity	> 98.0%
Chemical purity	> 99.9%
Concentration	< 14.8 GBq /mL
pH	2.0 ÷ 5.0
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 5.0 TBq/mg P
Half life	14.3 days
Availability	on request

Phosphorus ³²P

Code: RP-40

Name, chemical formula	Phosphoric(V) acid, H_3PO_4
Form	aqueous solution
Radionuclidic purity	> 97.0%
Radiochemical purity	> 98.0%
Chemical purity	≥ 99.9%
Concentration	≥ 14.8 GBq/mL
pH	2.0 ÷ 5.0
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 8.0 TBq/mg P
Half life	14.3 days
Availability	on request



Rhenium ¹⁸⁶Re

Code: RRe-2

Name, chemical formula	Potassium perrhenate(VII), $KReO_4$
Form	aqueous solution
Radionuclidic purity	> 99.0%
pH	6.0 ÷ 8.0
Calibration	48 hours
Expiration	7 days
Storage	15°C ÷ 25°C
Specific activity	> 100 MBq/mg Re
Half life	3.72 days
Availability	~4 weeks advanced order

Rubidium ⁸⁶Rb

Code: RRb-2

Name, chemical formula	Rubidium chloride, $RbCl$
Form	aqueous solution
Radionuclidic purity	> 99.0%
pH	6.0 ÷ 8.0
Calibration	7 days
Expiration	14 days
Storage	15°C ÷ 25°C
Specific activity	> 40 MBq/mg Rb
Half life	18.64 days
Availability	~4 weeks advanced order

Samarium ¹⁵³Sm

Code: RSm-2

Name, chemical formula	Samarium(III) chloride, $SmCl_3$
Form	0.1M HCl solution
Radionuclidic purity	99.0%
Calibration	48 hours
Expiration	72 hours
Storage	15°C ÷ 25°C
Specific activity	> 5 GBq/mg Sm
Half life	1.93 days
Availability	~2 weeks advanced order





Scandium ⁴⁶Sc

Code: RSc-2

Name, chemical formula	Scandium chloride, ScCl ₃
Form	1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 200 MBq/mg Sc
Half life	83.8 days
Availability	~4 weeks advanced order

Selenium ⁷⁵Se

Code: RSe-2

Name, chemical formula	Sodium selenite(IV), Na ₂ SeO ₃
Form	aqueous solution
Radionuclidic purity	> 98.0%
pH	7.0 ÷ 9.0
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 400 MBq/mg Se
Half life	119.8 days
Availability	on request

Silver ^{110m}Ag

Code: RAg-2

Name, chemical formula	Silver nitrate(V), AgNO ₃
Form	0.1M HNO ₃ solution
Radionuclidic purity	> 98.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 40 MBq/mg Ag
Half life	249.8 days
Availability	from stock

Sodium ²⁴Na

Code: RNa-2

Name, chemical formula	Sodium chloride, NaCl
Form	aqueous solution
Radionuclidic purity	> 99.5%
Calibration	24 hours
Expiration	48 hours
Storage	15°C ÷ 25°C
Specific activity	> 37 MBq/mg Na
Half life	14.96 hours
Availability	~2 weeks advanced order

Strontium ⁹⁰Sr

Code: RSr-3

Name, chemical formula	Strontium chloride, SrCl ₂
Form	1M HCl solution
Radionuclidic purity	> 99.5%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 1.85 GBq/mg Sr
Half life	28.79 years
Availability	from stock

Strontium ⁸⁵Sr

Code: RSr-2

Name, chemical formula	Strontium chloride, SrCl ₂
Form	0.1M HCl solution
Radionuclidic purity	> 99.5%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 80 MBq/mg Sr
Half life	64.85 days
Availability	from stock

Strontium ⁹⁰Sr

Code: RSr-14

Name, chemical formula	Strontium nitrate(V), Sr(NO ₃) ₂
Form	1M HNO ₃ solution
Radionuclidic purity	> 99.7%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 1.5 GBq/mg Sr
Half life	28.79 years
Availability	on request

Strontium ⁸⁹Sr

Code: RSr-1

Name, chemical formula	Strontium chloride, SrCl ₂
Form	in 0.05M HCl solution
Radionuclidic purity	> 99.4%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 5 MBq/g Sr
Half life	50.57 days
Availability	from stock

Sulphur ³⁵S

Code: RS-3

Name, chemical formula	Sulphuric(VI) acid, H ₂ SO ₄
Form	aqueous solution
Radionuclidic purity	> 99.5%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	carrier free
Half life	87.32 days
Availability	from stock



Terbium ¹⁶⁰Tb

Code: RTb-2

Name, chemical formula	Terbium(III) chloride, TbCl ₃
Form	0.1M HCl solution
Radionuclidic purity	> 90.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 200 MBq/mg Tb
Half life	72.3 days
Availability	~6 weeks advanced order

Thallium ²⁰⁴Tl

Code: RTI-2

Name, chemical formula	Thallium(III) sulphate(VI), Tl ₂ (SO ₄) ₃
Form	2M H ₂ SO ₄
Radionuclidic purity	> 99.5%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 5 MBq/mg Tl
Half life	3.79 years
Availability	on request

Thulium ¹⁷⁰Tm

Code: RTm -2

Name, chemical formula	Thulium(III) chloride, TmCl ₃
Form	0.1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 400 MBq/mg Tm
Half life	127.8 days
Availability	~6 weeks advanced order

Ytterbium ¹⁶⁹Yb

Code: RYb-2

Name, chemical formula	Ytterbium(III) chloride, YbCl ₃
Form	0.1M HCl solution
Radionuclidic purity	> 95.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 4 GBq/mg Yb
Half life	32.02 days
Availability	on request

Yttrium ⁹⁰Y

Code: RY-1

Name, chemical formula	Yttrium chloride, YCl ₃
Form	0.05M HCl solution
Radionuclidic purity	99.0%, 2.5 × 10 ⁻⁴ % ⁹⁰ Sr
Chemical purity	Cu, Zn, Co, Ni, Fe, Pb ≤ 0.1 µg/GBq
Calibration	2 ÷ 7 days
Expiration	7 days
Storage	15°C ÷ 25°C
Specific activity	carrier free
Half life	2.67 days
Availability	according to schedule

Zinc ⁶⁵Zn

Code: RZn-2

Name, chemical formula	Zinc chloride, ZnCl ₂
Form	0.1M HCl solution
Radionuclidic purity	> 99.0%
Calibration	7 days
Expiration	28 days
Storage	15°C ÷ 25°C
Specific activity	> 200 MBq/mg Zn
Half life	244 days
Availability	from stock



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Barium ¹³³ Ba	6	Phosphorus ³² P	12
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Cadmium ^{115m} Cd	7	Rubidium ⁸⁶ Rb	13
Caesium ¹³⁴ Cs	7	Samarium ¹⁵³ Sm	13
Caesium ¹³⁷ Cs	7	Scandium ⁴⁶ Sc	14
Calcium ⁴⁵ Ca	8	Selenium ⁷⁵ Se	14
Chromium(III) ⁵¹ Cr	8	Silver ^{110m} Ag	14
Chromium(VI) ⁵¹ Cr	8	Sodium ²⁴ Na	15
Chromium ⁵¹ Cr EDTA	8	Strontium ⁸⁵ Sr	15
Cobalt ⁵⁸ Co	9	Strontium ⁸⁹ Sr	15
Cobalt ⁶⁰ Co	9	Strontium (chloride) ⁹⁰ Sr	15
Copper ⁶⁴ Cu	9	Strontium (nitrate) ⁹⁰ Sr	15
Europium ¹⁵² Eu	9	Sulphur ³⁵ S	15
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Radioisotope Centre POLATOM reserves the right to modify the availability date of the products contained herein. Please contact us or your local distributor for further information.

The radiochemicals with higher specific activity than presented herein are available, please contact POLATOM to get more details.

Definitions, units, decay tables

Radionuclidic purity: the ratio, expressed as a percentage, of the radioactivity of the radionuclide concerned to the total radioactivity of the radiopharmaceutical preparation.

Radiochemical purity: the ratio, expressed as a percentage, of the radioactivity of the radionuclide concerned which is present in the radiopharmaceutical preparation in the stated chemical form, to the total radioactivity of that radionuclide present in the radiopharmaceutical preparation.

^{99m} Tc decay		¹³¹ I decay	
The half-live (T _{1/2}): 6.01 h		The half-live (T _{1/2}): 8.02 d	
HOURS	Activity	DAYS	Activity
0	1.000	0	1.000
1	0.891	1	0.917
2	0.794	2	0.841
3	0.708	3	0.772
4	0.631	4	0.708
5	0.562	5	0.649
6	0.501	6	0.595
7	0.447	7	0.546
8	0.398	8	0.501
9	0.355	14	0.298
10	0.316	21	0.163
11	0.282	30	0.075
12	0.251	60	0.006
24	0.063	80	0.001
48	0.004	90	0.000

Becquerel in Curie:

1Bq	= 27.027 pCi
1kBq	= 27.027 nCi
1MBq	= 27.027 μCi
1GBq	= 27.027 mCi
1TBq	= 27.027 Ci

Curie in Becquerel:

1nCi	= 37 Bq
1μCi	= 37 kBq
1mCi	= 37 MBq
1Ci	= 37 GBq
10Ci	= 0.37 TBq

Rad in Gray:

1mRad	=10 μGy
1Rad	=10 mGy

Gray in Rad:

1mGy	= 100 mRad
1Gy	= 100 Rad

Rem in Sievert:

1mRem	=10 μSv
1Rem	=10 mSv

Sievert in Rem:

1mSv	=100 mRem
1Sv	=100 Rem





2024



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