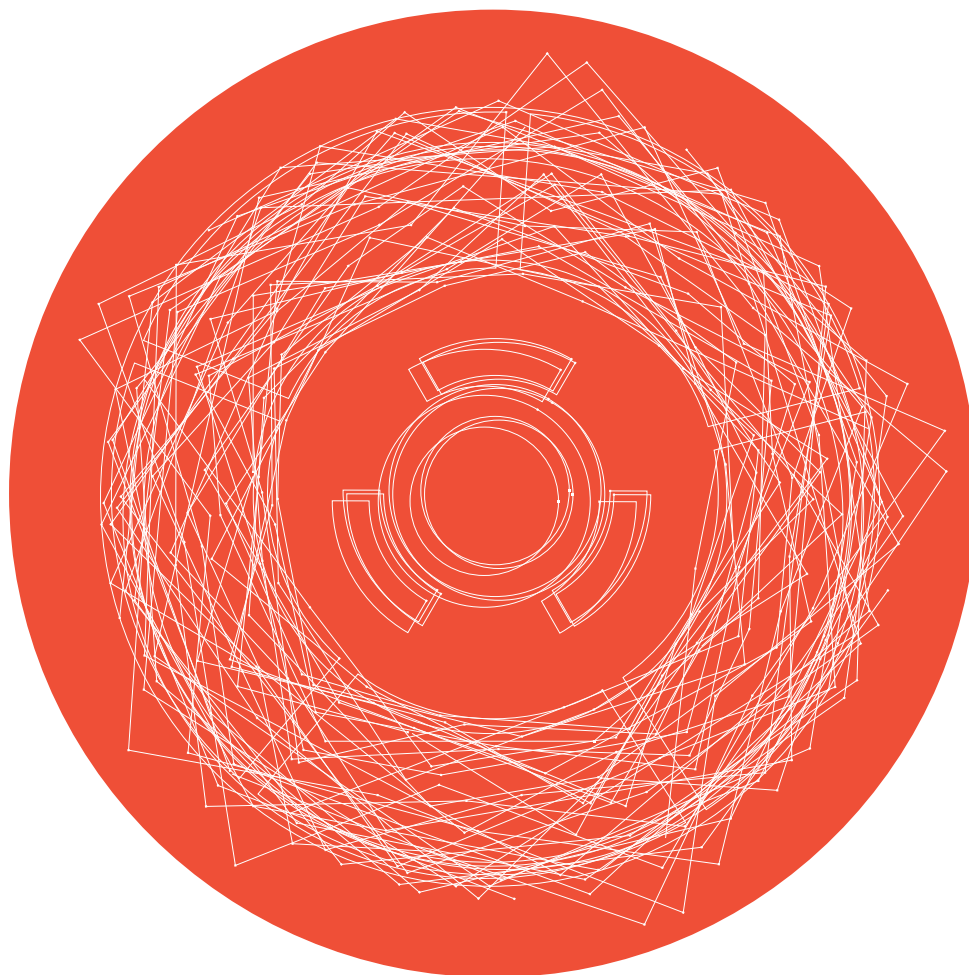
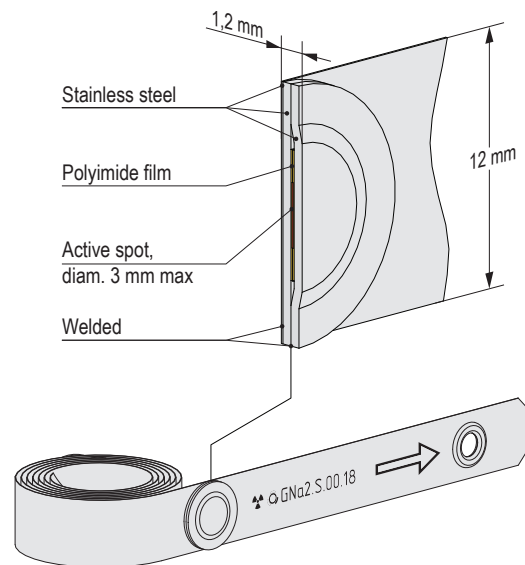




**Radionuclide sources
for quality control systems**

Sealed radioactive sources ^{22}Na , ^{152}Eu

The sources with the radionuclide ^{22}Na , ^{152}Eu are used in density meters for contactless measurement. These units are usually installed on a fluid's process pipeline, gauges of elevator's belt loading uniformity and contactless level meters, which are being manufactured by NTC Ecophyspribor Ltd. (www.ecophyspribor.ru). The sources can be used on the pipelines of any medium and under any pressure.

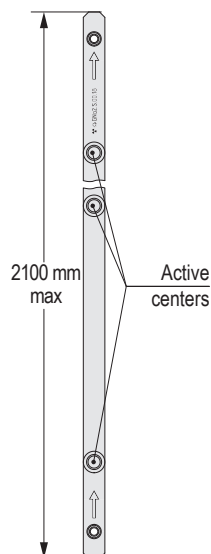


Extended sources of types GNa2.S and GEu2.S

Active parts are allocated on a stripe of stainless steel. The sealing process is performed by laser welding.

D × H	12 mm × 2100 mm* (max)
Total activity	≤ 10 MBq
Active centers	≤ 10 pcs
ISO 2919 classes	C64343
Recommended working life	8 yr

*On request the stripe can be gathered from several parts.



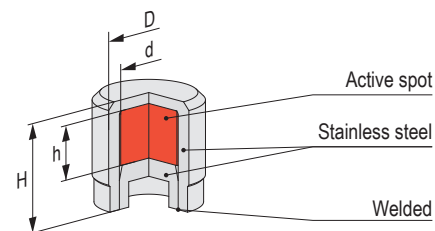
Gamma-radiation sources of type GNa2.11 and GEu2.11

The ceramic active part which contains an embedded radionuclide is placed within a stainless-steel housing and the sealed by laser welding.

D × H	3 × 3 mm
Activity	100–1000 kBq
ISO 2919 classification	C64344
Recommended working life	15 yr

Sources can operate at elevated temperatures up to 250 °C, and have a recommended working life of 5 years at these conditions.

The sources are housed in stainless steel enclosures and have high strength grade with smallest possible dimensions.



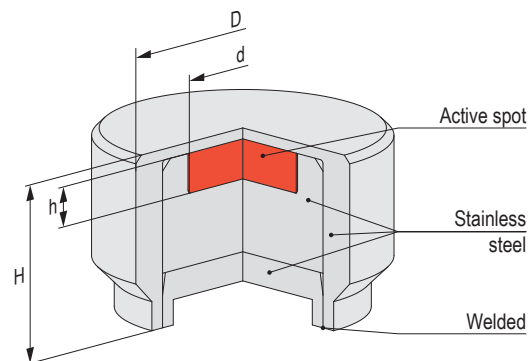
Gamma-radiation sources of type GNa2.15 and GEu2.15

The ceramic active part which contains an embedded radionuclide is placed within a stainless-steel housing and the sealed by laser welding.

D × H	8 × 5 mm
Activity	100–1000 kBq
ISO 2919 classes	C64444
Recommended working life	15 yr

Sources can operate at elevated temperatures up to 250 °C, and have a recommended working life of 5 years at these conditions.

The sources are certified as «Special form radioactive materials» IAEA Special Form Certificate No D/0098/S-96 (Rev.3) and surpass all other types in strength classes.

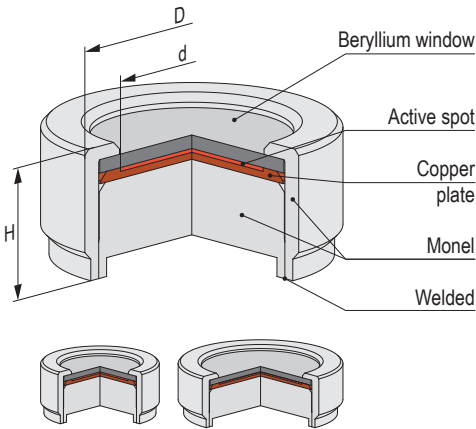


X-ray radiation sources with ⁵⁵Fe

The sources with the radionuclide ⁵⁵Fe are used for determination of composition and number of impurities in coated paper.

The radionuclide ⁵⁵Fe is electroplated on a copper backing. The backing is placed in a capsule of monel metal alloy with a beryllium window; the capsule is sealed by laser welding.

Recommended working life — 15 yr.
The sources are certified as «Special form radioactive materials»
IAEA Special Form Certificate No D/0097/S-96 (Rev.2)



D × H, mm	d, mm	Nominal activity		ISO 2919 classes	Type
		mCi	MBq		
10,8 × 5	7,2	5	185	C64343	XFe5.22
		20	740		
		40	1480		
		80	2960		
		100	3700		
		150	5550		
15 × 5	10,6	5	185	C64343	XFe5.23
		40	1480		
		100	3700		
		150	5550		
		200	7400		
		250	9250		

Radioisotope products and related services

RITVERC offers its own products: sealed radionuclide sources ^{22}Na , ^{152}Eu , ^{55}Fe , ^{147}Pm , as well as products from FSUE PO Mayak with ^{85}Kr , ^{241}Am , $^{90}\text{Sr-90Y}$, ^{137}Cs .

Design

For tasks that cannot be solved with standard products, it is possible to develop new solutions. Design, testing and production of radionuclide sources and auxiliary equipment for transportation, handling and installation in equipment is one of our services.

Installation

Installation of sealed radionuclide sources in customer's holders and equipment is possible in our own licensed premises in Russia and Kazakhstan.

Installation

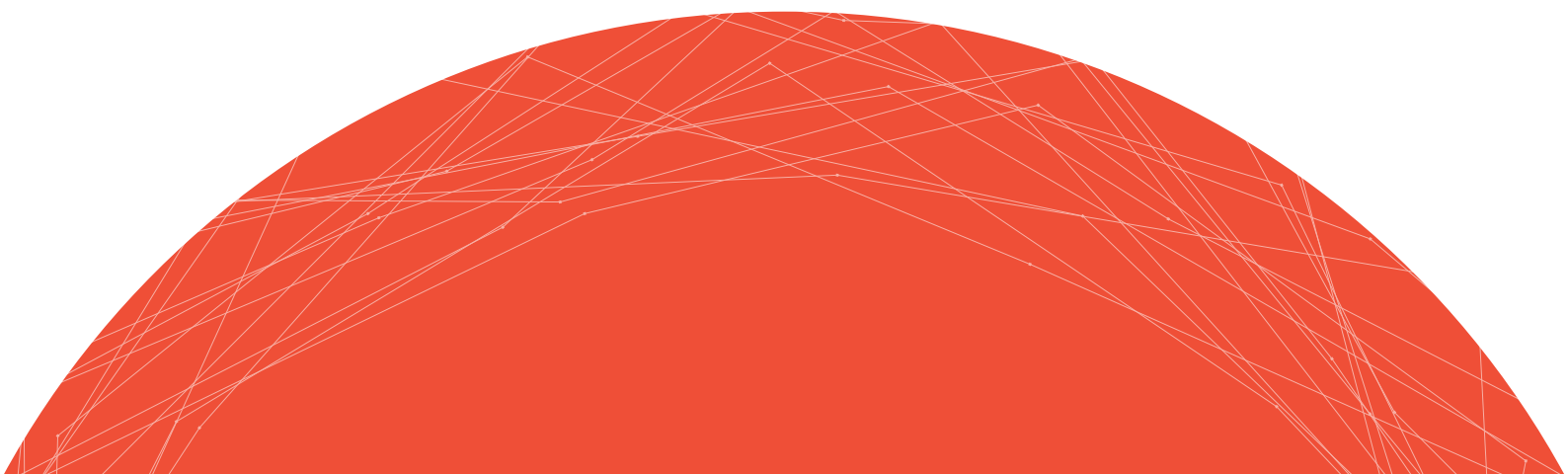
Installation of sealed radionuclide sources in customer's holders and equipment is possible in our own licensed premises in Russia and Kazakhstan.

Transportation

RITVERC provides delivery within Russia and can arrange export and air delivery to international airports around the world. If necessary, our local agents will help with the import.

Acceptance for disposal

The decommissioned sources produced by RITVERC are accepted for disposal.



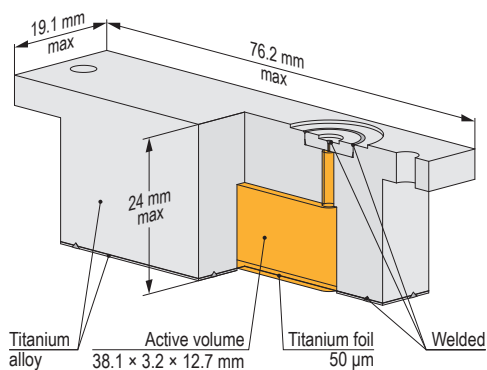
Beta radiation sources with ^{85}Kr

Sources with the radionuclide ^{85}Kr are used for basis weight measurement of sanitary tissue and heavy cardboard. The measurement range is 10–750 g/m².

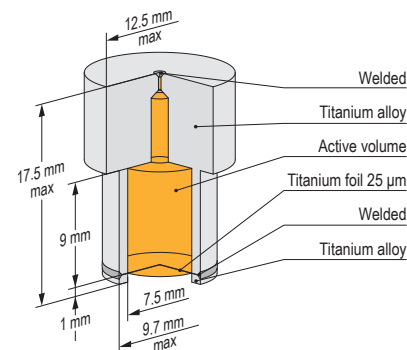
The ^{85}Kr gas is sealed in laser welded titanium capsules with a titanium window 25 - 50 µm thick.

Each source is supplied with a protective brass cap to prevent damage to the working window during transportation and handling. The protective cap also absorbs beta radiation, making handling of the source and its installation in the instrument safer.

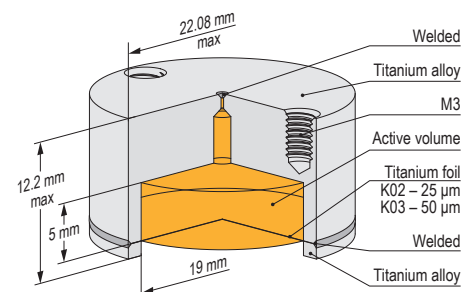
Recommended working life — 10 years.



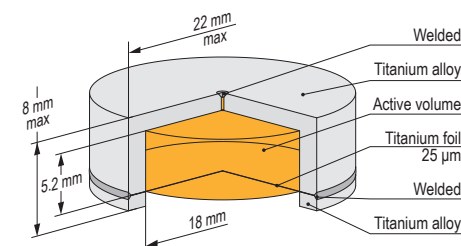
Type M85K05M



Type M85K01M



Type M85K02M, M85K03M



Type M85K04M

Type	Nominal activity		Outer dimensions	Output window
	mCi	GBq	D x H (LxWxH) mm	d (l x w), mm
M85K01M	400	14,80	12.5 x 17.5	7.5
	50	1,85		
	100	3,70		
	200	7,40		
	250	9,25		
M85K02M	50	1,85	22.08 x 12.2	19
	100	3,70		
	200	7,40		
M85K03M	81	3,00	22.08 x 12.2	19
M85K04M	81	3,00	22 x 8	18
	100	3,70		
	200	7,40		
	250	9,25		
M85K05M	400	14,80	72.6 x 19.1 x 24	38.1 x 3.2
	500	18,50		
	1250	46,25		

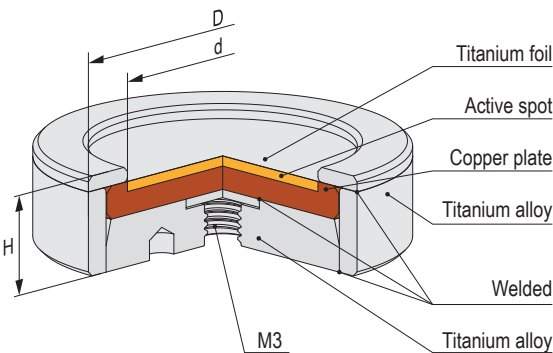
β-radiation source ¹⁴⁷Pm

The sources are used to measure the grammage of tissue products.
The measuring range is 1-15 g/m2.

¹⁴⁷PM is embedded in an enamel backing, placed in a titanium capsule with a titanium window 5 μm thick. The sealing method is laser welding.

Recommended working life – 5 yr.

D × H, mm	d, mm	Nominal activity		ISO 2919 classes	Type
		mCi	GBq		
22 × 6	15,6	100	3,7	C33222	BPm7.72
22 × 6	15,6	200	7,4	C33222	BPm7.72
22 × 6	15,6	500	18,5	C33222	BPm7.72



Applications

Thickness gauging

Beta gauging

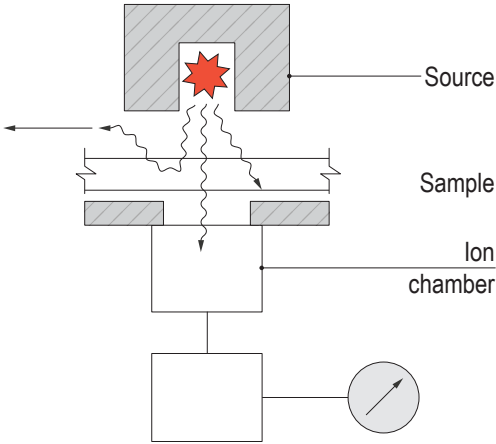
- Thickness gauging of thinner plastics, thin sheet metal, rubbers, textiles and paper, e.g. 1–1000 mg/cm².
- The 'weighing' of cigarettes
- Measurement of dust and pollutant levels on filter paper samples, e.g. 0.1–200 mg/m³ dust.

Measure range

Nuclide	Half thickness (mg/cm ²)	Useful measurement range (mg/cm ²)
¹⁴⁷ Pm	5	1 to 15
⁸⁵ Kr	23	5 to 100
⁹⁰ Sr/ ⁹⁰ Y	90	25 to 500

Activities according to nuclide and application, 1 to 1000 mCi, 37 MBq to 37 GBq.

Geometry



Beta transmission

Level gauging

Gamma switching technique

The transmission of gamma radiation through a container is affected by the level contents. The intensity of the transmitted radiation is measured and used to activate switches when pre-set intensity levels are reached.

Applications

Storage hopper level control. Switch can be used to operate high level and low level alarms or pump switch control.

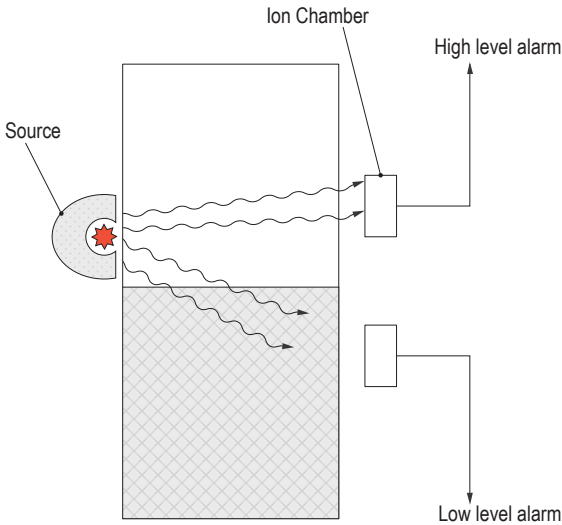
Nuclide	Typical path length
¹³⁷ Cs	7–1000 cm
⁶⁰ Co	7–1000 cm
¹⁵² Eu	7–50 cm
²² Na	7–70 cm

Activity according to dimensions of container and wall thickness.

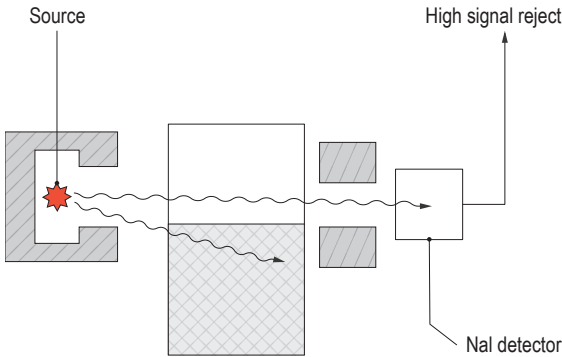
Can/package contents monitoring. Switch can be used to operate reject control for up to 10 cm of low atomic number material.

Nuclide	Activity
²⁴¹ Am	100 mCi 3.7 GBq

Geometry



Storage hopper level control



Can/package contents monitoring



Handwriting practice area consisting of 20 horizontal dotted lines.

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