

Translation

Approval certificate of admission for the structure type "special form radioactive material" № D/0098/S-96 (rev.0)

1. Regulations

This admission has been approved according to the requirements to the special form radioactive material stated in the below rules of transportation by road, railway, sea, river and air:

Safety regulations for transportation of radioactive materials", ed. 2012, International Atomic Energy Agency (IAEA), Special safety requirements SSR-6, Vienna, 2012,

European Agreement on Dangerous Goods by Road (ADR) dated September 30, 1957 (Federal law bulletin of the Federal Republic of Germany, 1969 II, page 1489), last revision by the 24-th amendment, Appendices A and B dated April 17. 2015. (Federal law bulletin of the Federal Republic of Germany, 2015 II, page 504),

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) – Supplement I to Appendix B of the Convention on International Railroad Transport of Goods, dated May 9, 1980 (Federal law bulletin of the Federal Republic of Germany, 1985 II, page 130), as published on May 16, 2008 (Federal law bulletin of the Federal Republic of Germany, 2008 II page 475), last revision by the 19th amendment dated October 31, 2014 (Federal law bulletin of the Federal Republic of Germany, 2014 II 890),

International Maritime Dangerous Goods Code (IMDGC Code), revision 37-14, the last revision as a result of publication of the official correction of the German translation of IMDGC Code dated 2014, introduced on February 01, 2016. (Bulletin of the Federal Ministry of Transport of the Federal Republic of Germany, the service part, issue 4-2016, page 90)

Regulations on National and Transboundary Transportation of Dangerous Goods by Road, Railway and River (GGVSEB) as of March 30, 2015 (Bulletin of the Federal Ministry of Transport of the Federal Republic of Germany I page 366) with revisions introduced by Clause 489 of the Decree dated August 31, 2015 (Bulletin of the Federal Ministry of Transport of the Federal Republic of Germany 2015 I page 1474)

Rules of Admission to Air Transportation dated June 19, 1964 (Bulletin of the Federal Ministry of Transport of the Federal Republic of Germany II page 370) with revisions introduced by Clause 2 of the Decree dated October 29, 2015 (Bulletin of the Federal Ministry of Transport of the Federal Republic of Germany 2015 I 1894) in combination with ICAO ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air, ed. 2015/2016).

2. Applicant and Owner of the approval certificate

RITVERC LLC GmbH
Kurchatova str. 10
194223 St-Petersburg
Russia

3. Manufacturer

RITVERC LLC GmbH
Kurchatova str. 10
194223 St-Petersburg
Russia

4. Relevant documents of the Applicant

- /U1/ The letter of inquiry from RITVERC dated 15.02.2016 with drawings, information on the checklist, operation and testing rules, application rules, quality assurance program
- /U2/ Certificates for dummy sealed radiation sources No. S/16/06 dated 20.05.2016 and S/16/ 07 to 10 dated 22.04.2016

This Certificate of Admission contains 3 pages of text and 3 assembly drawings and may be copied and distributed only in the unabridged version. For partial publication of this Certificate of Admission, references to tests for the purpose of advertisement and revision of Admission contents, each individual case requires a revocable written agreement from BAM.

- /U3/ Letter (e-mail) from RITVERC dated 06.04.2016 and 15.04.2016 with the information on the welding process and minimum scope of tests.
- /U4/ Letter (e-mail) from RITVERC dated 25.07.2015 with revised drawings and checklist.
- /U5/ Letter (e-mail) from RITVERC dated 08.08.16 with the certificate for the radiation source and updated checklist.
- /U6/ Letter (e-mail) from RITVERC dated 24.10.2016 with TU 7017-002-231028-2012, sealed radionuclide sources of photon radiation. Specification dated 15.08.2016.

5. Design designation of structure type, radionuclide, activity

Types: GNa2.12, GNa2.13, GNa2.14, GNa2.15, GNa2.27;
GCo7.12, GCo7.13, GCo7.14, GCo7.15, GCo7.27;
GCo0.12, GCo0.13, CCo0.14, GCo0.15, GCo0.27;
GZn5.12, GZn5.13, GZn5.14, GZn5.15, GZn5.27;
GY8.12, GY8.13, GY8.14, GY8.15, GY8.27;
GBa3.12, GBa3.13, GBa3.14, GBa3.15, GBa3.27;
GCs7.12, GCs7.13, GCs7.14, GCs7.15, GCs7.27;
GEu2.12, GEu2.13, GEu2.14, GEu2.15, GEu2.27.

Nuclides: Na-22, Co-57, Co-60, Zn-65, Y-88, Ba-133, C-137, Eu-152

Activity: 0.1 to max. 11100 MBq (see Instructions on drawings attached).

Used radiation: gamma radiation/

6. Drawings

RITVERC Isotopes Products:

Sealed radionuclide sources of photon radiation with capsule codes 12, 13, 14,
RT.10.K1.000 C, rev. C dated 25.10.2016

Sealed radionuclide sources of photon radiation with capsule codes 15,
RT.10.K4.000 C, rev. C dated 25.10.2016

Sealed radionuclide sources of photon radiation with capsule codes 27,
RT.10.K14.000 C, rev. B dated 25.10.2016

Drawings of the components were submitted to BAM.

7. Design

The radioactive material fixed in the ceramic is placed in a single shell. The shell consists of a cylindrical capsule, sealed by laser welding, made of stainless steel (12X18H10T or AISI 321) and titanium (BT1-0) to 27 capsule code as an alternative. Capsule design differ in diameter and height (code 12: 3 mm x 10 mm, code 13: 4 mm x 10 mm, code 14: 7 mm x 10 mm, code 15: 8 mm x 5 mm, code 27: 3 mm x 5 mm). The capsule wall thickness is 0.25 mm minimum.

Sources are marked by engraving on a lateral surface, specifying a nuclide, serial number and year of manufacture.

8. Quality assurance

The management system of RITVERC and special measures of quality assurance meet the requirements of Section 1 of these Regulations. /U1/

9. Design testing

Certificate BAM No. 160 07782 dated 16.11.2016.

10. Design approval

Sources of structure types specified in Sections 5-7, according to results of structure type tests (Section 9), meet the requirements set to "special form radioactive material", according to the Rules of Section 1.

This Certificate of Admission is valid till 17.11.2016, with a possibility of withdrawal at any time.

11. Incidental provisions

Sources may be transported after being used only if the transportation was preceded by the tightness test with positive results obtained. The time limitation of the tightness test by the transportation beginning shall not exceed 6 months.

As the Recommended Working Life (RWL) specified in the Certificate of the source Manufacturer expires, transportation of the special form radioactive material is not allowed.

The quality assurance documentation shall be stored for at least 15 years from the date of source manufacture. To change the structure type and quality assurance program, the approval of BAM is required.

12. Directions

BAM reserves a right for the re-check at the Applicant's expense to ensure that the manufactured sources meet the structure type approved for the admission.

This Admission does not release the Sender from an obligation to follow the effective Rules applied in the country involved in transportation of the above sources.

If the validity period of this Certificate of Admission shall be prolonged, the relevant application shall be submitted to BAM at least 6 weeks before the expiration date.

13. Legal references

This Admission may be appealed against within a month after notification. The opposition may be filed in the name of the President of the Federal Institute for Materials Research and Testing (BAM) at the address: 12205 Berlin, Unter den Eichen 87, either in written or for recording.

BAM Federal Institute for Materials Research and Testing
Berlin, 17.11.2016

on behalf of

Dr. Eng. F. Wille

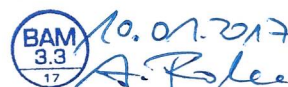
Head of Department 3.3

on behalf of

Dr. Eng. S. Komann
Incharge of the field of activity

Dr. Eng. A. Rolle
Official incharge

The English translation is for informational purposes only. Only the German original text is legally binding.

BAM
3.3
17
10.01.2017
A. Rolle



RT.10.K1.000 C

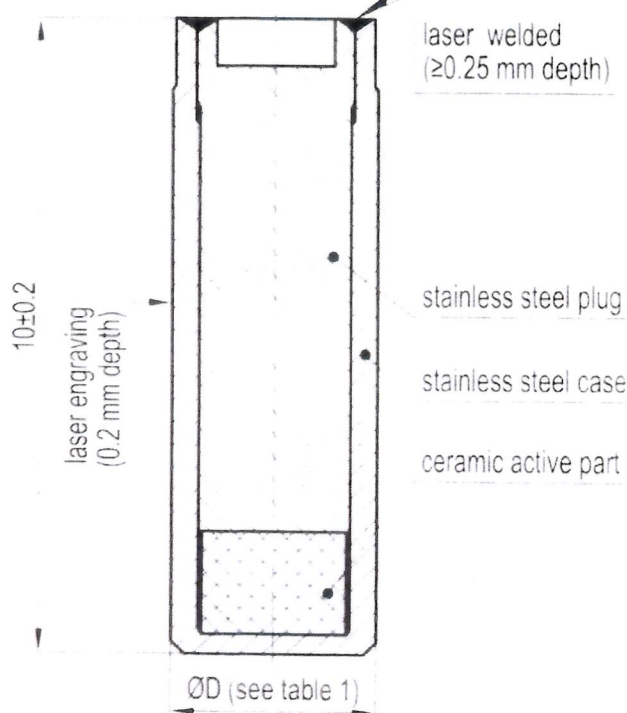


Table 1

| Capsule code | 12 | 13 | 14 |
|--------------|--------------------|--------------------|--------------------|
| Drawing | RT.10.K1.000 C | RT.10.K1.000-01 C | RT.10.K1.000-02 C |
| D, mm | 3 ^{-0.08} | 4 ^{-0.10} | 7 ^{-0.10} |
| Weight, g | 0.5 | 0.87 | 1.16 |

Table 2

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------------------------------|---------|---------|--|---------|---------|-------------------------------|---------|---------|-------------------------------|---------|---------|-------------------------------|--------|--------|---------------------------------|---------|---------|--------------------------------|---------|---------|-------------------------------|---------|---------|
| Code | GNa2.12 | GNa2.13 | GNa2.14 | GCo7.12 | GCo7.13 | GCo7.14 | GCo0.12 | GCo0.13 | GCo0.14 | GZn5.12 | GZn5.13 | GZn5.14 | GY8.12 | GY8.13 | GY8.14 | GBa3.12 | GBa3.13 | GBa3.14 | GCS7.12 | GCS7.13 | GCS7.14 | GEu2.12 | GEu2.13 | GEu2.14 |
| Specifications | TU 7017-002-23102*28-2012 | | | | | | | | | | | | | | | | | | | | | | | |
| Nuclide | ²² Na | | | ⁵⁷ Co | | | ⁶⁰ Co | | | ⁶⁵ Zn | | | ⁸⁸ Y | | | ¹³³ Ba | | | ¹³⁷ Cs | | | ¹⁵² Eu | | |
| Nuclide purity, % | ≥ 99.99 | | | ≥ 99.85 | | | ≥ 99.90 | | | ≥ 99.80 | | | ≥ 99.90 | | | ≥ 99.999 | | | ≥ 99.95 | | | ≥ 99.85 | | |
| Activity, MBq | 0.1...10 0.1...10 0.1...10 | | | 37...11100 37...11100 37...11100 | | | 0.1...5 0.1...5 0.1...5 | | | 0.1...5 0.1...5 0.1...5 | | | 0.1...1 0.1...1 0.1...1 | | | 1...111 37...370 37...370 | | | 0.1...5 0.1...74 0.1...5 | | | 0.1...5 0.1...5 0.1...5 | | |
| Chemical compound of radioactive material | NaCl | | | CoCl ₂ | | | CoCl ₂ | | | ZnCl ₂ | | | YCl ₃ | | | BaCO ₃ | | | CsCl | | | EuCl ₃ | | |
| Physical state | Solid | | | | | | | | | | | | | | | | | | | | | | | |
| Type of radiation used | Gamma | | | | | | | | | | | | | | | | | | | | | | | |

RT.10.K1.000 C

Sealed radionuclide sources
of photon radiation with
capsule codes 12, 13, 14

| Лит. Lit. | Масса Weight | Масштаб Scale |
|---------------|-----------------|------------------|
| | See table 1 | 10:1 |
| Лист Sheet | 1 | Листов Sheets |
| | | 1 |

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RT.10.K4.000 C

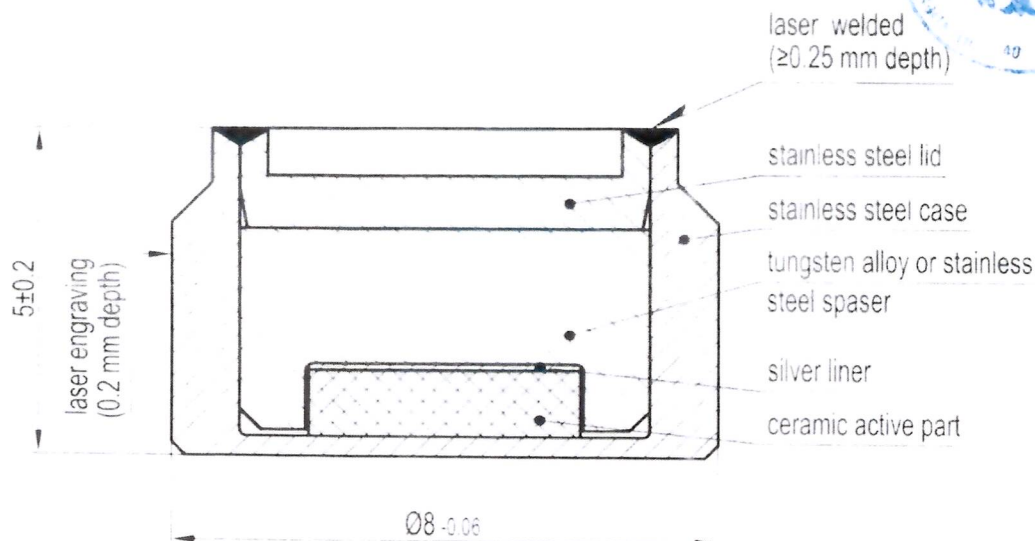


Table 1

| | | |
|-----------------|-------------------------------------|--|
| Spacer material | Tungsten alloy BHM3-2 TU48-19-90-74 | Stainless steel 12X18H10T GOST 5632-72 or AISI 321 ASTM A480 |
| Weight, g | 2.36 | 1.63 |

Table 2

| Code | GNa2.15 | GCo7.15 | GCo0.15 | GZn5.15 | GY8.15 | GBa3.15 | GCs7.15 | GEu2.15 |
|---|---------------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|
| Specifications | TU 7017-002-23102128-2012 | | | | | | | |
| Nuclide | ²² Na | ⁵⁷ Co | ⁶⁰ Co | ⁶⁵ Zn | ⁸³ Y | ¹³³ Ba | ¹³⁷ Cs | ¹⁵² Eu |
| Nuclide purity, % | ≥ 99.99 | ≥ 99.85 | ≥ 99.90 | ≥ 99.80 | ≥ 99.90 | ≥ 99.999 | ≥ 99.95 | ≥ 99.85 |
| Activity, MBq | 0.1...10 | 37...11100 | 0.1...5 | 0.1...5 | 0.1...1 | 1...111 | 0.1...5 | 0.1...5 |
| Chemical compound of radioactive material | NaCl | CoCl ₂ | CoCl ₂ | ZnCl ₂ | YCl ₃ | BaCO ₃ | CsCl | EuCl ₃ |
| Physical state | Solid | | | | | | | |
| Type of radiation used | Gamma | | | | | | | |

| | | | |
|------------|------------|-----------|------------|
| C | RT.K9-2016 | Signature | Date |
| Rev. Sheet | Document | Подп. | Дата |
| Изм. Лист | № докум. | | |
| Разраб. | | | 25.10.2016 |
| Designed | | | 25.10.2016 |
| Н.контр | | | 25.10.2016 |
| Inspector | | | 25.10.2016 |
| Утв. | | | 25.10.2016 |
| Approved | | | 25.10.2016 |

RT.10.K4.000 C

Sealed radionuclide source of photon radiation with capsule code 15

| | | |
|-------|-------------|---------|
| Лит. | Масса | Масштаб |
| Lit. | Weight | Scale |
| | See table 1 | 10:1 |
| Лист | 1 | Листов |
| Sheet | | Sheets |
| | | 1 |

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RT.10.K14.000 C

laser welded
(≥0.4 mm depth)

stainless steel or titanium plug

stainless steel or titanium case

ceramic active part

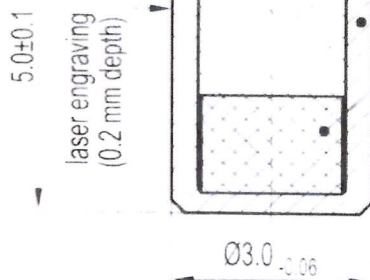


Table 1

| | | |
|------------------|--|------------------------------------|
| Drawing | RT 10.K14.000 C | RT 10.K14.000-01 C |
| Capsule material | Stainless steel 12X18H10T GOST 5632-72 or AISI 321 ASTM A480 | Titanium alloy BT1-0 GOST 19807-74 |
| Weight, g | 0.23 | 0.14 |

Table 2

| | | | | | | | | |
|---|---------------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|
| Code | GNa2.27 | GCo7.27 | GCo0.27 | GZn5.27 | GY8.27 | GBa3.27 | GCs7.27 | GEu2.27 |
| Specifications | TU 7017-002-23102128-2012 | | | | | | | |
| Nuclide | ²² Na | ⁵⁷ Co | ⁶⁰ Co | ⁶⁵ Zn | ⁸⁸ Y | ¹³³ Ba | ¹³⁷ Cs | ¹⁵² Eu |
| Nuclide purity, % | ≥ 99.99 | ≥ 99.85 | ≥ 99.90 | ≥ 99.80 | ≥ 99.90 | ≥ 99.999 | ≥ 99.95 | ≥ 99.85 |
| Activity, MBq | 0.1...10 | 37...11100 | 0.1...5 | 0.1...5 | 0.1...1 | 1...111 | 0.1...5 | 0.1...5 |
| Chemical compound of radioactive material | NaCl | CoCl ₂ | CoCl ₂ | ZnCl ₂ | YCl ₃ | BaCO ₃ | CsCl | EuCl ₃ |
| Physical state | Solid | | | | | | | |
| Type of radiation used | Gamma | | | | | | | |

RT.10.K14.000 C

Sealed radionuclide source
of photon radiation with
capsule code 27

| | | |
|-------|-------------|---------|
| Лит. | Масса | Масштаб |
| Lit. | Weight | Scale |
| | See table 1 | 10:1 |
| Лист | 1 | Листов |
| Sheet | 1 | Sheets |

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