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Improved Safety & Security of Gamma-Radiography in Germany

Certified
DIN EN ISO
9001 : 2008

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Radiography device With all safety and security meachnisam

Requested Tests of Gamma-Radiography equipment based on ISO/DIN and ADR

Use restriction based on German law

Higher safety and security levels based on German regulations and licenses to the end-user

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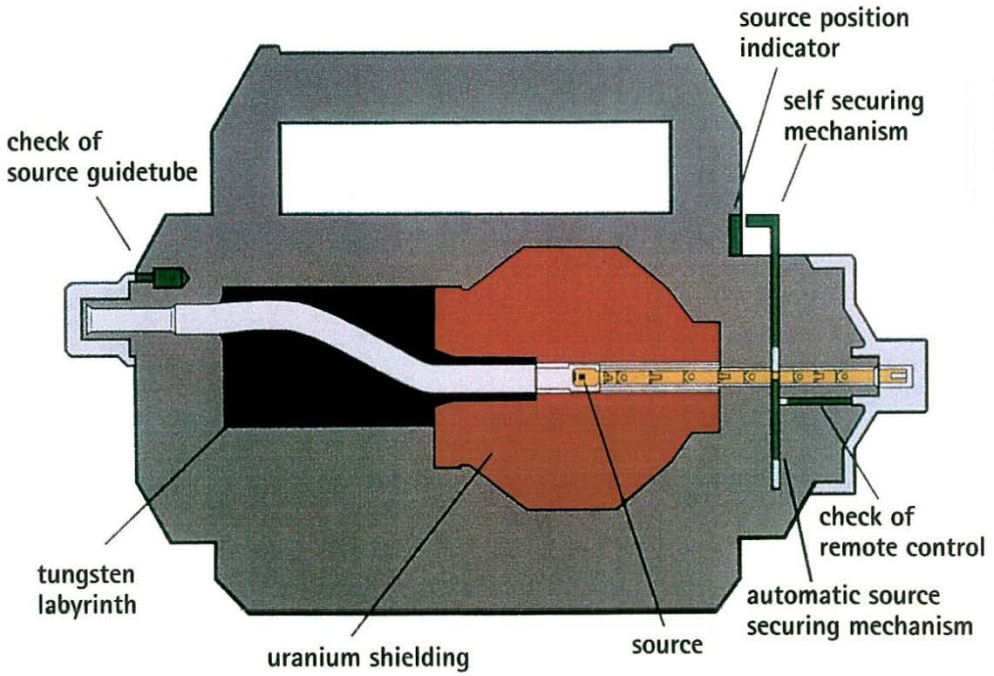

GAMMAMAT® TSI

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If someone wants to work with a Gamma device in Germany it must be designed according to DIN54115 part 4 (almost equivalent to ISO3999/2000). The BAM in Germany has to test the complete equipment and to confirm that it complies with the requested requirements. (Bauartprüfung)

Tests and requirements by DIN54115 part 4 (called Bauartprüfung):

- **Check of dose rates**
- **Vibration tests**
- **Vertical shock tests**
- **Permanent test with 50000 cycles**
- **Shock test under accident condition (e.g. fall test 9 mtr. high)**
- **Fire test (30min, 800°C)**
- **Marking of the complete equipment**
- **all security requirements checked (remote controls, guide tubes, sourceholder etc.)**
- **Handling equipments tested**

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Documentation of complete equipment complies with requirements (e.g. storage and disposal of container, instruction how to use the device, emergency instruction, instruction how to inspect and how to service the equipment etc.)

- Bend, squeeze and tensile strength tests of complete accessories

- Working temperature must be between -10°C and 45°C

- All used materials must be resistant to corrosion

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Requirements of ADR 2015:

- Package must be designed that it could be easily secured during transport
- Device must be designed under national or international specifications (e.g. ISO3999/2000 or DIN54115 part4 in Germany)
- Type A devices have limited activities by ADR
- Type B devices have higher limited activties by the manufacturer
- The requirements of tests for Type A are less than Type B
- A management system must be installed
- Security plan must be installed

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Tests requested by Type B:

- **Water spraying tests**
- **Different fall tests to check the resistance against accidence**
- **Stacking pressure test**
- **Dart drop test**
- **Heat test (30min, 800°C)**
- **Water submergence test**

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Use restriction based on German law

- Licenses are needed for storage and work of Gammaradiography devices
- Time limited (3 years) licenses for the transport of Gammaradiography devices
- Licenses to work in a foreign radioactive area are needed
- Licenses to import or export of Gammaradiography devices are requested
- Special insurances are needed
- Related to the amount of devices enough people must be trained as safety officer (SSB) and they must be yearly instructed to work with Gammaradiography devices. The training must be renewed every 5 years

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- **Safety officer must be reliable**
- **Protective regulations must be state of the scientific and technical knowledge**
- **Gammaradiography devices must have a Bauartprüfung before end-user can get a license to use them**
- **Each company must have a radiation protection directive**
- **The dose of each person which is working with the Gammaradiography devices must be officially registered**
- **Safe keeping workers documentation of all doses for a long time**
- **Storage areas must be fire resistant and the local fire brigade has to know about existing risks**
- **Storage areas must have an alarm system; the alarm system must be tested by an external expert annually**

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Additional constraints in end-user licenses

1. License to handle radioactive material:

- **Limited activities and devices depending on working and storage condition**
- **All 12-18 months wipe tests of all HASS Isotopes**
- **Authorities must be informed immediately about changes of safety officers and main responsible manager**
- **Monthly reporting of all incoming and outgoing Isotopes**
- **Monthly reporting to Euratom and BAFA about ownership changes of depleted Uranium**
- **Directly reporting of all HASS Isotope movements to BfS**
- **Documentation of regular controls of Isotopes and equipments**
- **Requirements to store Isotopes have to be according to DIN25422 („Storage of Radioactive Material“)**

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- **Safety marking of working devices, storage devices, storage areas and control areas must according to DIN25430 („Safety Marking of Radiation Protection“)**
- **Only a safety officer is allowed to use the Isotopes or he has to be present during operation**
- **The exchange of Isotopes can only be done by a safety officer**
- **Tools in case of an emergency must be present or available in a short period of time**
- **Two people (Cat. A) must be present while working with the Isotope**
- **Work with radioactive Isotopes must be documented each time**

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- **Visits of other workers inside of the radioactive area must be documented; Dose rates of those people must be documented too. Visitors can only work in the radioactive area if a safety officer is present**
- **The authorities must be informed about each movable exposer 24/48 hours in advance**
- **Check with dosimeter after expose that the source is inside of the device**

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Additional constraints in end-user licenses

2. Transport license of radioactive material:

- **Each company needs a dangerous good safety advisor**
- **He must be well educated and his training has to be renewed every 5 years**
- **Authorities must be informed about each change of that person immediately**
- **All drivers are registered. A signed list of the drivers is placed in the license. Authorities must be informed about every change of drivers and they have to renew the driver list**
- **Only passengers with radioactive material handling permission are allowed in the car**

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- Radioactive material can be transported in special vehicles only
- The car must have two different safety appliances
- An alarm system against theft has to be installed additionally
- Radioactive material cannot be stored in the car overnight except the car is parked in a closed garage
- Each transport must be documented with complete transport data

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Thanks!

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