Operating Instructions

VEGASOURCE 35

Source holder

Document ID: 38132

Contents

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Editing status: 2020-01-14

1 About this document

1.1 Function

This instruction provides all the information you need for mounting, connection and setup as well as important instructions for maintenance, fault rectification, the exchange of parts and the safety of the user. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

1.2 Target group

This operating instructions manual is directed to trained personnel. The contents of this manual must be made available to the qualified personnel and implemented.

1.3 Symbols used

Document ID
This symbol on the front page of this instruction refers to the Document ID. By entering the Document ID on www.vega.com you will reach the document download.

Information, note, tip: This symbol indicates helpful additional information and tips for successful work.

Note: This symbol indicates notes to prevent failures, malfunctions, damage to devices or plants.

Caution: Non-observance of the information marked with this symbol may result in personal injury.

Warning: Non-observance of the information marked with this symbol may result in serious or fatal personal injury.

Danger: Non-observance of the information marked with this symbol results in serious or fatal personal injury.

Ex applications
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

1. **Sequence of actions**
   Numbers set in front indicate successive steps in a procedure.

Battery disposal
This symbol indicates special information about the disposal of batteries and accumulators.

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2 For your safety

2.1 Authorised personnel

All operations described in this documentation must be carried out only by trained, qualified personnel authorised by the plant operator.

During work on and with the device, the required personal protective equipment must always be worn.

The handling of radioactive substances is regulated by law. The radiation protection rules of the country in which the system is operated apply first and foremost.

In Germany the current radiation protection ordinance (StrlSchV) based on the Atomic Energy Law (AtG) is applicable.

The following points are important for measurement with radiometric methods:

Handling permit

A handling permit is required for operation of a system using gamma rays. This permit is issued by the respective state government or the responsible authority (offices for environmental protection, trade supervisory boards, etc.)

We would be pleased to assist you in applying for the permit.

General instructions for radiation protection

When handling radioactive sources, unnecessary radiation exposure must be avoided. An unavoidable radiation exposure must be kept as low as possible. Take note of the following three important measures:

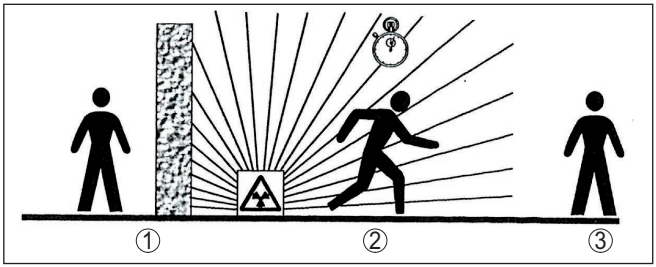

Fig. 1: Measures for protection against radioactive radiation

1 Shielding
2 Time
3 Distance

Shielding: Provide good shielding between the source and yourself as well as all other persons. Special source containers as well as all materials with high density (e.g. lead, iron, concrete, etc.) provide effective shielding.

Time: Stay as short a time as possible in radiation exposed areas.

Distance: Your distance to the source should be as large as possible. The local dose rate of the radiation decreases in proportion to the square of the distance to the radiation source.

Radiation safety officer

The plant operator must appoint a radiation safety officer with the necessary expert knowledge. He is responsible for ensuring that the radiation protection ordinance is complied with and for implementing all radiation protection measures.

We offer appropriate training that imparts the necessary qualification in this field.

You can also find certified course providers on the homepage of the Federal Office for Radiation Protection: **www.bfs.de**.

Control area

Control areas are areas in which the local dose rate exceeds a certain value. Only persons who undergo official dose monitoring are allowed into these control areas. You can find the respectively valid limit values for control areas in the radiation protection ordinance.

We are at your disposal for further information concerning radiation protection and regulations in other countries.

2.2 Appropriate use

When in operating mode, the source container VEGASOURCE 35 described in this document contains a radiactive source for radiometric level, interface, switching and density measurement. The source container shields the radiation off from the surroundings and only allows it to exit, practically unhindered, in the direction of measurement.

To ensure the shielding effect and exclude damage to the radioactive source, all instructions in this operating instructions manual and the legal radiation protection regulations must be observed during installation and operation.

Operational reliability is ensured only if the instrument is used properly. We are not liable for damages caused by improper use.

You can find detailed information about the area of application in chapter "*Product description*".

2.3 Warning about incorrect use

Inappropriate or incorrect use of this instrument can give rise to hazards, e.g. risk to persons through exposure to gamma radiation. Damage to property and persons or environmental contamination can result. Also, the protective characteristics of the instrument can be impaired.

Take note of the respective safety instructions.

2.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and directives. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for the trouble-free operation of the instrument. When measuring aggressive or corrosive media that can cause a dangerous situation if the instrument malfunctions, the operator has to implement suitable measures to make sure the instrument is functioning properly.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the

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current valid rules and regulations and also take note of new regulations.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed by the user.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden. For safety reasons, only the accessory specified by the manufacturer must be used.

To avoid any danger, the safety approval markings and safety tips on the device must also be observed.

2.5 Application reference

- Take note of the applicable regulations and national/international standards.
- Take note of the radiation protection ordinance when using, storing and working with the radiometric measuring system.
- Take note of the warning instructions and safety zones.
- Install and operate the instrument according to the documentation and the respective official regulations.
- The instrument must not be operated and stored outside the specified parameters.
- Protect the instrument against extreme influences (e.g. chemical products, weather, mechanical shock, vibration, etc.) during operation and storage. Especially when loaded with a source, the instrument may not be destroyed for any reason (e.g. for scrapping).
- Always secure the switch position OFF with a lock.
- Before switching on the radiation, make sure that no persons are in the radiation area (also not outside the vessel). The radiation must only be switched on by trained personnel.
- Do not use a corroded or damaged instrument. Inform the responsible radiation safety officer as soon as damage or corrosion appears and follow his instructions.
- Carry out the necessary tightness test according to the applicable rules and instructions.
- If there are doubts about the proper condition of the measuring system, check if there is radiation in the environment of the instrument and inform the responsible radiation safety officer.

2.6 Installation and operation in the USA and Canada

This information is only valid for USA and Canada. Hence the following text is only available in the English language.

Installations in the US shall comply with the relevant requirements of the National Electrical Code (ANSI/NFPA 70).

Installations in Canada shall comply with the relevant requirements of the Canadian Electrical Code.

2.7 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfil this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

3 Product description

3.1 Configuration

Type label

The type label contains the most important data for identification and use of the instrument:

- Order code
- Serial number
- Source holder
- Source contained
- Activity
- Local dose rate
- Article number - Documentation
- Note: "Highly radioactive source" (if necessary)

The serial number allows you to access the delivery data of the instrument via "www.vega.com", "*Instrument search (serial number)*".

Note:
The local dose rate stated on the type label at a defined distance is safety-oriented and includes production-related fluctuations of the emitters as well as tolerances of the measuring instruments. There can thus be deviations in the local dose rate calculated with the specified attenuation factors. See also "*Principle of operation/Source*".

Note:
With sources exceeding a certain level of activity, the warning "Highly radioactive source" must be stated on the type label.

This is the case for Co-60 with an activity ≥ 4 GBq (108 mCi) or for Cs-137 with an activity ≥ 20 GBq (540 mCi).

Versions

There are several versions available with different options for opening or blocking the beam exit. Apart from the manual versions, there are also versions with pneumatic switchover.

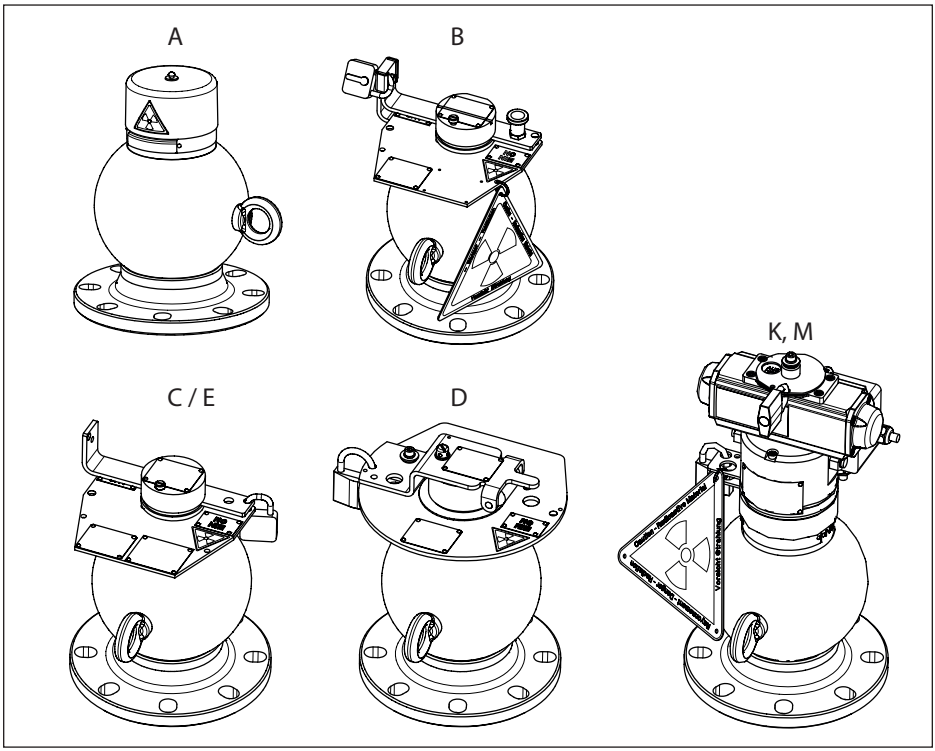

Fig. 2: Versions VEGASOURCE 35 (Overview)

Version A: Standard version
Version B: With fixing pin and padlock for OFF position
Version C: With padlock for ON and OFF position
Version D: With increased protection against dust and moisture and padlock for ON and OFF position
Version E: with padlock for ON and OFF position - additionally with electric position transmitters
Version K, M: version with pneumatic switching mechanism

Features of the versions

	A	B	C	D	E	K	M
Manual switching	●	●	●	●	●	–	–
Swivel bracket	–	●	●	●	●	–	–
Protective cover	●	–	–	–	–	–	–
Fixing pin	–	●	–	–	–	–	–
Key lock - ON/OFF	●	–	–	–	–	–	–
Padlock - ON	–	–	●	●	●	–	–
Padlock - OFF	–	●	●	●	●	●	●
Protection against dust and moisture	–	–	–	●	–	–	●
Pneumatic switching	–	–	–	–	–	●	●

Tab. 1: Features of the instrument versions

Version A

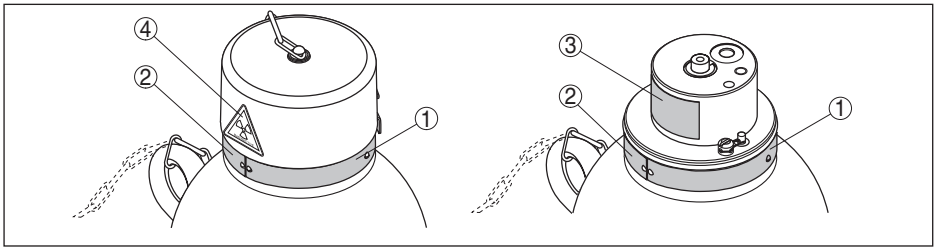

Fig. 3: Position of the type labels - Version A

1 Type label - Source holder
2 Type label - Source
3 Adhesive label - Source
4 Adhesive label - Radioactive

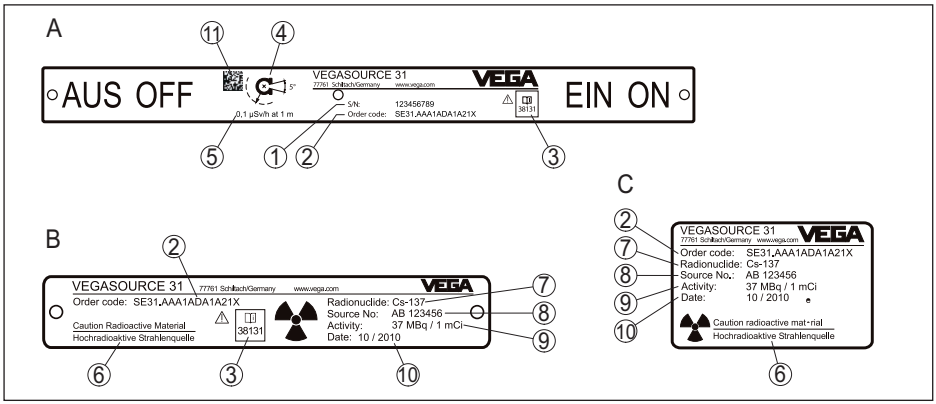

Fig. 4: Type label - Version A

A Type label - Source holder
B Type label - Source
C Adhesive label - Source
1 Serial number - Source holder
2 Order code - Source container
3 Number of the corresponding operating instructions
4 Beam exit angle
5 Local dose rate at a defined distance from the surface (opposite the exit opening)
6 Note: "Highly radioactive source" (if necessary)
7 Source: Cs-137 or Co-60
8 Serial number of the source capsule (for traceability of the source)
9 Activity of the sources in MBq and mCi or GBq and mCi
10 Production date of the sources (MM/YYYY)
11 DataMatrix code

Version B, C, D, E

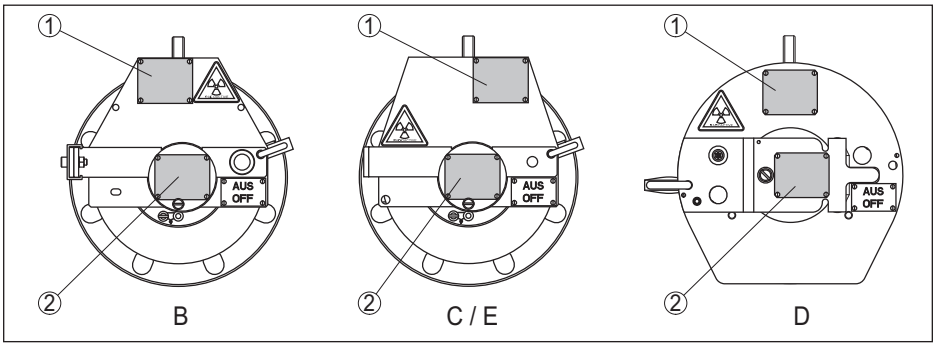

Fig. 5: Position of the type labels - Version B, C, D, E

1 Type label - Source holder
2 Type label - Source

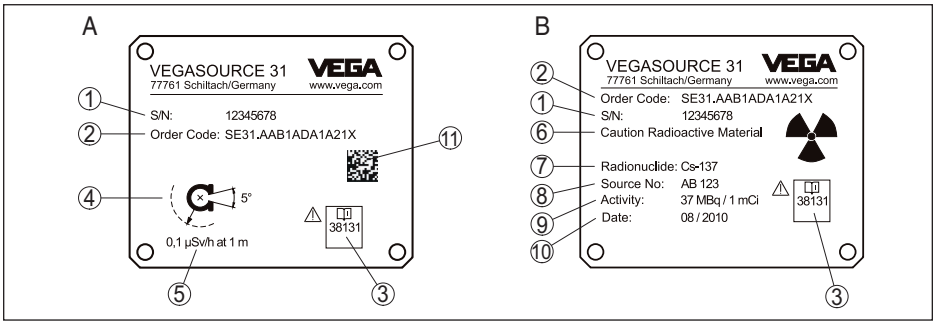

Fig. 6: Type label - Version B, C, D, E

A Type label - Source holder
B Type label - Source
1 Serial number - Source holder
2 Order code - Source container
3 Number of the corresponding operating instructions
4 Beam exit angle
5 Local dose rate at a defined distance from the surface (opposite the exit opening)
6 Note: "Highly radioactive source" (if necessary)
7 Source: Cs-137 or Co-60
8 Serial number of the source capsule (for traceability of the source)
9 Activity of the sources in MBq and mCi or GBq and mCi
10 Date (mm/yyyy)
11 DataMatrix code

Version K, M

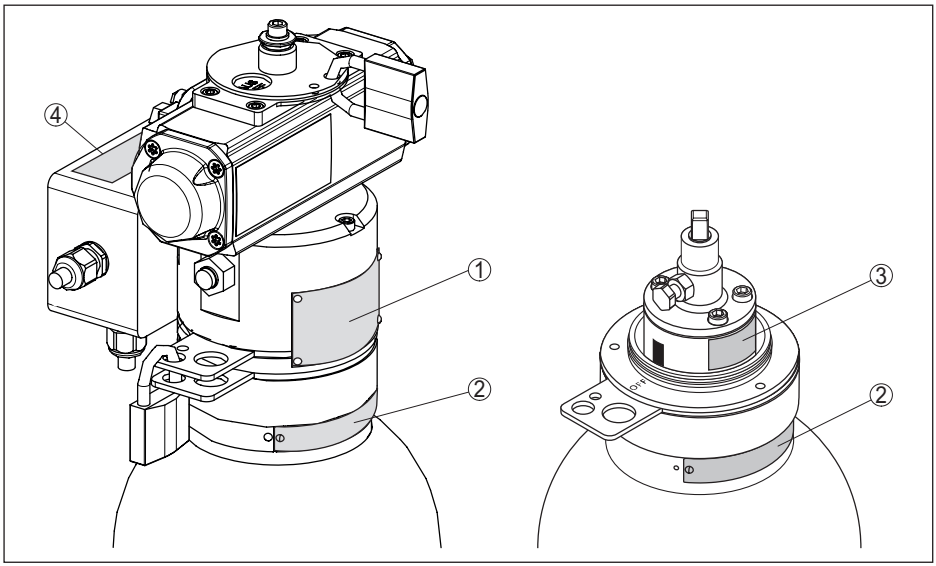

Fig. 7: Position of the type labels - Version K, M

1 Type label - Source holder
2 Type label - Source
3 Additional type label - Source
4 Additional type label - Pneumatic switching facility

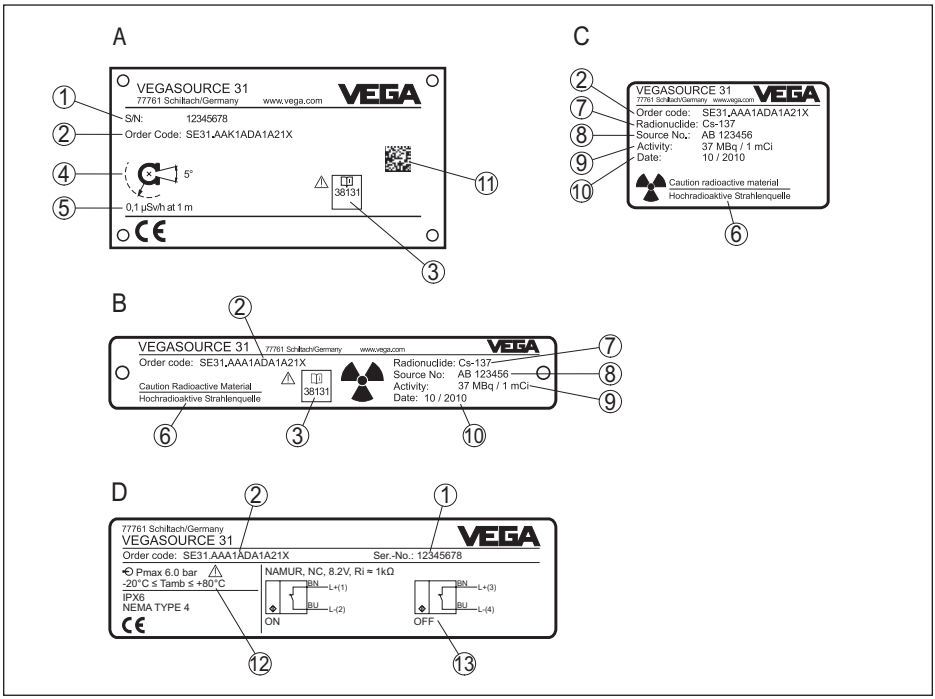

Fig. 8: Type label - Version K, M

A Type label - Source holder
B Type label - Source
C Adhesive label - Source
D Additional type label - Pneumatic switching facility
1 Serial number - Source holder
2 Order code - Source container
3 Number of the corresponding operating instructions
4 Beam exit angle
5 Local dose rate at a defined distance from the surface (opposite the exit opening)
6 Note: "Highly radioactive source" (if necessary)
7 Source: Cs-137 or Co-60
8 Serial number of the source capsule (for traceability of the source)
9 Activity of the sources in MBq and mCi or GBq and mCi
10 Date (mm/yyyy)
11 DataMatrix code
12 Operating conditions - Pneumatic switching facility
13 Electrical connection - Position indicator

Serial number - Instrument search

The type label contains the serial number of the instrument. With it you can find the following instrument data on our homepage:

- Product code (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions and quick setup guide at the time of shipment (PDF)

- Order-specific sensor data for an electronics exchange (XML)
- Test certificate (PDF) - optional

Move to "www.vega.com" and enter in the search field the serial number of your instrument.

Alternatively, you can access the data via your smartphone:

- Download the VEGA Tools app from the "*Apple App Store*" or the "*Google Play Store*"
- Scan the DataMatrix code on the type label of the instrument or
- Enter the serial number manually in the app

Scope of delivery

The scope of delivery typically consists of the following components.

- Source holder
- Documentation
  - This operating instructions manual
  - Certificate of the source (source capsule)
  - If necessary, further certificates

3.2 Principle of operation

Application area

The VEGASOURCE 35 is a source holder for shielding radioactive sources such as Cs-137 or Co-60.

The radioactive source in the source container emits gamma rays. The VEGASOURCE 35 is mounted on the vessel or the pipeline directly opposite the sensor.

The source container shields the environment against gamma radiation and protects the radioactive source against mechanical damage or chemical influences. In case of large measuring ranges (e.g. with high vessels) two or more source holders are used.

The VEGASOURCE 35 consists of the components:

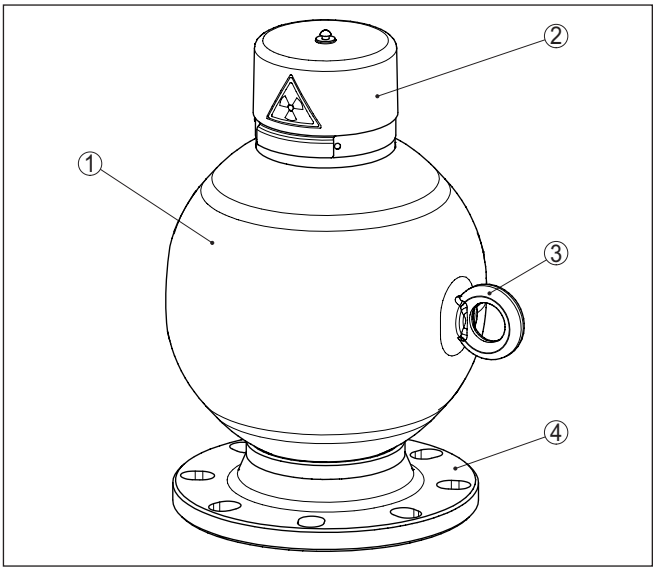

Fig. 9: Source holder VEGASOURCE 35

1 Source holder
2 Switchover/locking mechanism
3 Transport lug
4 Connection flange

Functional principle

The rays emitted by the gamma source are damped when penetrating the medium. The sensor detecting the attenuated radiation on the opposite side of the vessel calculates the measured value from the intensity of the radiation.

Source

Max. activity of the sources

The following table states the max. activity of the source. Production-related fluctuations of the source activity and tolerances of the measuring instruments are not taken into account.

	Co-60	Cs-137
Max. activity	max. 3.7 GBq (100 mCi)	max. 111 GBq (3000 mCi)

Tab. 2: Max. activity of the source

Caution:
The max. permissible activity of the source can be further limited by a country-specific approval.

Attenuation factor and half-value layers

	Co-60	Cs-137
Attenuation factor	181	3100
Number of the half-value layers	7.5	11.6

Tab. 3: Attenuation factor and half-value layers

3.3 Packaging, transport and storage

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The device packaging consists of environment-friendly, recyclable cardboard. PE foam or PE foil is also used for packing the instrument. Dispose of the packaging material via specialised recycling companies.

For transport, the source holder is fixed on a transport board of wood and protected by foam packaging.

Information:
The foam packaging can be disposed of in the standard household waste.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

A seal is located on the outside of the transport packaging indicating that the packaging was not opened. Check the condition of this seal and record the intactness.

Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

According to the IATA regulations, the source container serves adequately as type A packaging for the sources. For transport, the source holder is fixed on a transport board and protected by foam packaging.

Dimensions of the transport packaging in mm (in):

- Without pneumatic switching facility: 380 x 380 x 450 mm (15 x 15 x 18 in)
- With pneumatic switching facility: 380 x 380 x 600 mm (15 x 15 x 24 in)

Warning:
Check the hoisting equipment for sufficient lifting capacity, approx. 110 kg (244 lbs)

Persons must never stand beneath the loads.

For transport, please proceed according to the following illustrations. Use the heavy duty handles (5) only for unloading by hand. The heavy duty handles are not suitable for attaching to a crane hook. We recommend for transport to the application location the use of a lift truck or forklift.

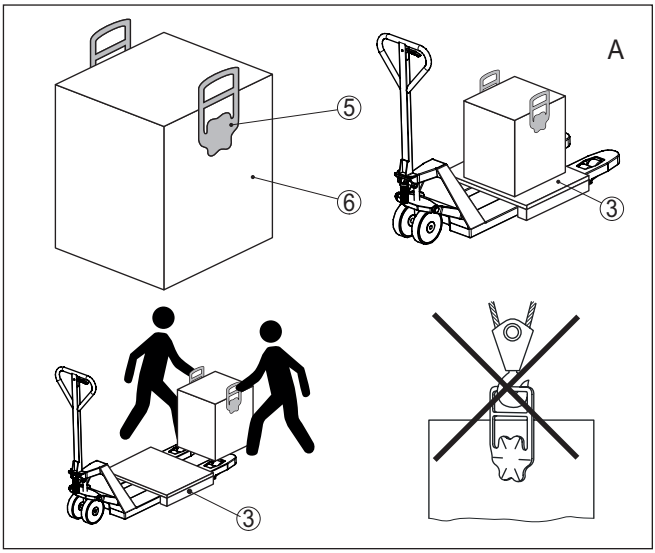

Fig. 10: Transport of the type A packaging

A Source holder in outer packaging (on pallet)
3 Pallet
5 Heavy duty handles
6 Outer packaging of the type A packaging (source holder)

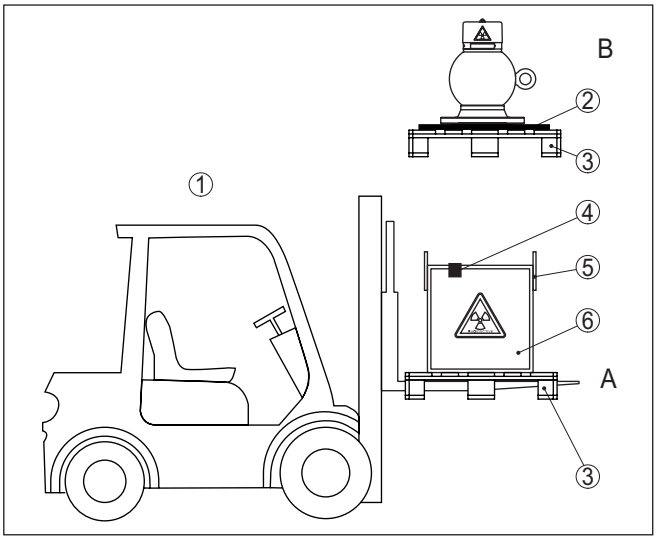

Fig. 11: Pallet transport of the type A packaging

A Source holder in outer packaging (on pallet)
B Source holder without outer packaging (on pallet)
1 Fork truck or other lifting vehicle
2 Transport board
3 Pallet
4 Seal
5 Heavy duty handles
6 Outer packaging of the type A packaging (source holder)

On site you have to lift the transport board out of the outer packaging. Proceed according to the following illustration. When using transport lugs, prevent rotating or tilting of the source holder by an additional transport lug on the upper part of the source holder.

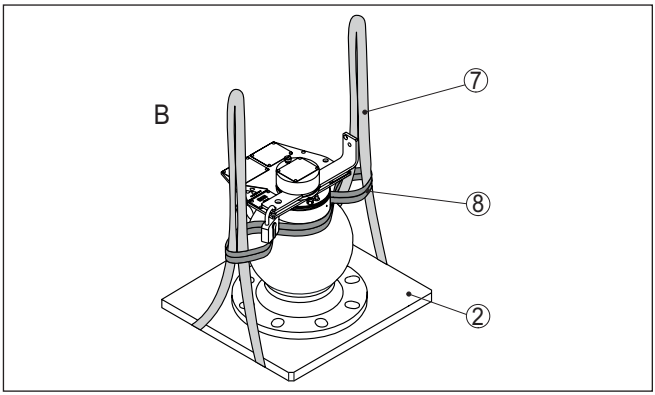

Fig. 12: Additional lug to prevent the source holder from tilting

B Source holder without outer packaging
7 Transport lug
8 Lug
9 Transport board

- Open outer packaging and pull the two transport lugs upward out of the outer packaging.
- When using transport lugs, prevent rotating or tilting of the source holder with the help of an additional transport lug on the upper part of the source holder.
- Lift the source holder carefully out of the outer packaging by using the transport lugs.
- Lower the source holder slightly for safety reasons and transport it carefully, without sudden movements, to the place of installation.
- Loosen source holder from the transport board

Crane transport

Use the lug of the source holder for transport on a crane hook.

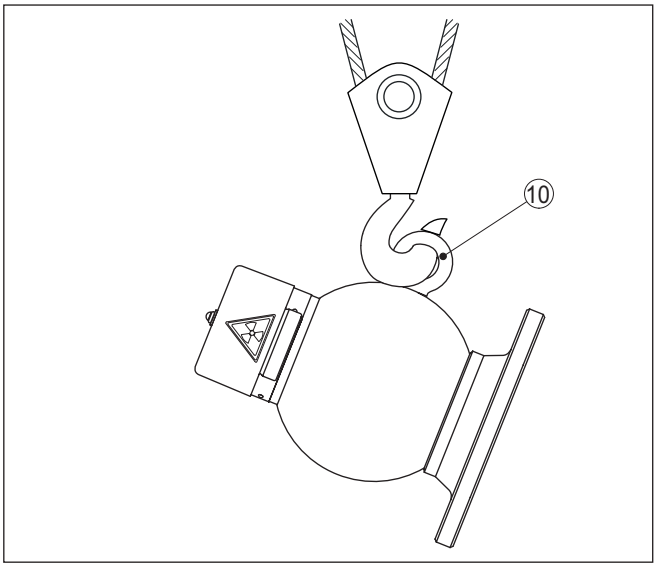

Fig. 13: Crane transport of the source holder
10 Lug

Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Storage and transport temperature

- Ambient temperature for storage and transport see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

Lifting and carrying

With instrument weights of more than 18 kg (39.68 lbs) suitable and approved equipment must be used for lifting and carrying.

3.4 Shipment

Transport regulations

Radioactive sources are subject to strict regulations. Therefore, when shipping the sources, we are bound to the respective regulations of the country where they will be used.

Germany
We are only allowed to ship radioactive sources when we have a copy of the handling permit in hand. We can assist you with the procure-

ment of the necessary documents. If you need help, contact our responsible sales organisation.

For safety reasons and to save costs, we always ship the source holder with the source installed. If the operator needs the source holder in advance, the source has to be shipped separately at a later time. In such cases, the source is shipped in a transport drum.

Other countries

We are only allowed to ship radioactive sources when we have a copy of the import license in hand. We can assist you with the procurement of the necessary documents. If you need help, contact our responsible sales organisation.

We can only ship to foreign countries when the radioactive source is mounted in the source holder.

During shipment, the source holder is in switch position OFF. This position is secured by a lock.

Transport of the loaded source holder is carried out by a company authorized by us, with official approval for such transports.

The transport is carried out in a type A packaging (source holder VEGASOURCE 35 with outer packaging of sheet steel) in compliance with the European and international convention on the transport of dangerous goods (ADR and DGR/IATA regulations).

3.5 Accessories

Mounting accessories

Brackets and special mounting accessories are available for mounting the VEGASOURCE 35.

For mounting on pipelines, there are corresponding clamp brackets. Contact our sales staff.

Gamma modulator

In order to exclude external interference radiation, you can mount a gamma modulator in front of the source holder. This allows reliable measurement even when interference radiation occurs.

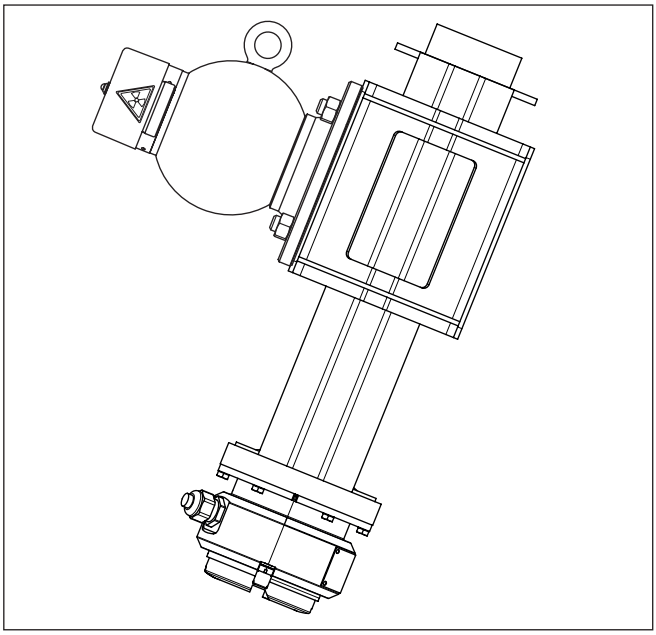

Fig. 14: Gamma modulator (optional) for uninterrupted measurement even with interference radiation

1 Gamma modulator (mounted on the source holder)

For ambient temperatures up to 120 °C (248 °C) the gamma modulator is optionally available with water cooling.

Any number of devices can be synchronized. To synchronize several gamma modulators, you need a controller.

Set of labels

There is a special label set for the source holder which can be ordered as a spare part.

4 Mounting

4.1 General instructions

General information

- For mounting of VEGASOURCE 35 you need a special handling permit.
- Mounting may only be carried out by authorized, qualified personnel who are monitored for radiation exposure according to local laws or the handling permit. Take note of the specifications in the handling permit. Also take the local conditions into account.
- Carry out all work within the shortest possible time and at the largest possible distance. Provide suitable shielding
- Avoid risk to other persons by taking suitable measures (e.g. safety fence, etc.)
- All mounting and dismounting work must only carried out with the switch in position OFF, secured with a lock.
- Keep the weight of the source holder in mind when mounting (up to 100 kg or 220 lbs)
- Depending on the version, the centre of gravity of VEGASOURCE 35 can vary. Keep this in mind during crane transport on the lug

Mounting with a crane

Warning:
Check the hoisting equipment for sufficient lifting capacity, approx. 110 kg (244 lbs).

Persons must never stand beneath the loads.

The source holder is screwed onto a transport board. Loosen the screws and lift the source holder from the transport board. For this purpose you have to use the lug of the source holder.

Use a suitable lifting tackle (shackle, snap hook, etc.) to fasten the source holder to the crane hook. Keep in mind that the source holder will tilt sidewards while lifting.

Moisture

Versions with manual switchover
Protect the source holder against moisture and hence against corrosion. If the source holder is exposed directly to the elements, you should cover it with a roof or a suitable protective bonnet.

To maintain the housing protection, make sure that the housing lid is closed during operation and locked, if necessary.

Make sure that the degree of contamination specified in chapter "*Technical data*" meets the existing ambient conditions.

Version with position switches
Use the recommended cables (see chapter "*Connecting to power supply*") and tighten the cable gland.

You can give your instrument additional protection against moisture penetration by leading the connection cable downward in front of the cable gland. Rain and condensation water can thus drain off. This applies mainly to outdoor mounting as well as installation in areas where high humidity is expected (e.g. through cleaning processes) or on cooled or heated vessels.

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Version with pneumatic switching mechanism
The pneumatic actuator must not be used under ambient conditions that can cause corrosion in and on the pneumatic actuator.

4.2 Mounting instructions

Orientation - Level measurement

For continuous level measurement the source holder must be mounted slightly above or at the height of the max. level. The radiation must be directed exactly towards the detector mounted on the opposite side.

The angle of orientation of the source holder corresponds to half of the exit angle.

The source holder VEGASOURCE should be mounted as close as possible to the vessel.

However, with large measuring ranges and small vessel diameters, a gap can often not be avoided.

If there are gaps or empty spaces around the installation, provide protective fences or grids to keep hands away from the dangerous area. Such areas must be marked accordingly.

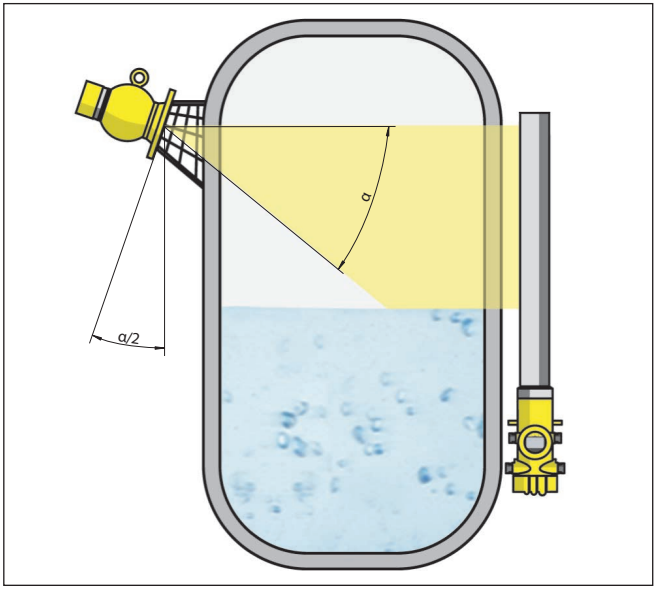

Fig. 15: Orientation - Source holder

a Angle of aperture

Orientation - Limit level measurement

For level detection, the version of the source container with an exit angle of **a** = 5° is suitable. The radiation must be directed exactly towards the detector mounted on the opposite side.

If you want to use larger exit angles (20° or 40°), you have to make sure the beam is horizontal. To do this you have to mount the source holder so that the eye-bolt is in a horizontal position.

The source holder VEGASOURCE should be mounted as close as possible to the vessel.

However, with large measuring ranges and small vessel diameters, a gap can often not be avoided.

If there are gaps or empty spaces around the installation, provide protective fences or grids to keep hands away from the dangerous area. Such areas must be marked accordingly.

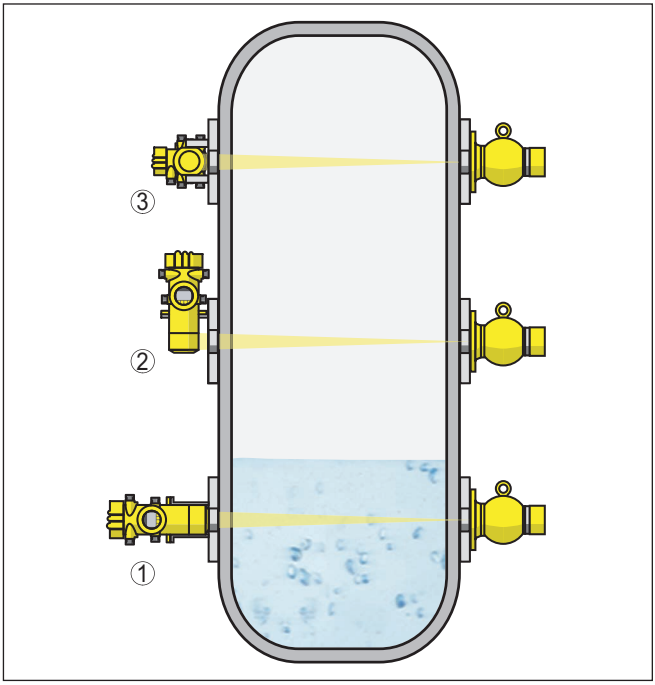

Fig. 16: Installation positions - Point level detection with MINITRAC 31

1 Horizontal mounting
2 Vertical mounting
3 Mounting horizontally, at right angles to container

For reliable point level detection over the entire vessel diameter, a correspondingly long level sensor can also be used. In the case of bulk solids, the reaching of a limit level on a large container cross-section can be reliably detected.

To do this, select the largest possible beam exit angle and mount the source holder rotated by 90°.

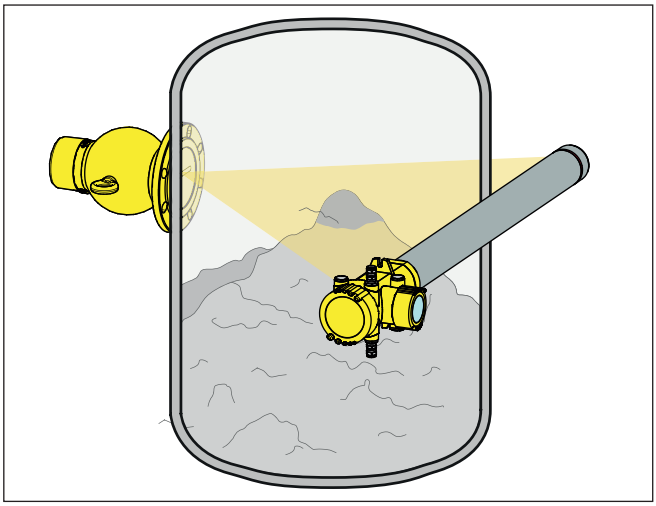

Fig. 17: Point Level detection with SOLITRAC 31

Orientation - Density measurement

The optimum and most constant conditions for density measurement in pipes can be achieved if you mount the measuring equipment on vertical pipelines or conveyors. The radiation must be oriented directly towards the detector mounted on the opposite side.

To extend the distance the beam travels through the medium and thus achieve a better measuring effect, the tube can be radiated diagonally or a measuring track can be used.

You can find the required mounting accessories in chapter "*Technical data*".

The source holder VEGASOURCE should be mounted as close as possible to the vessel.

However, with large measuring ranges and small vessel diameters, a gap can often not be avoided.

If there are gaps or empty spaces around the installation, provide protective fences or grids to keep hands away from the dangerous area. Such areas must be marked accordingly.

The ideal measurement setup for density measurement is installation on a vertical pipeline. The pipe diameter can be 50 … 100 mm (1.97 … 3.94 in). Flow direction should be from bottom to top.

Mounting brackets, angled attachments as well as mounting clamps are available for mounting.

Vertical pipeline, 30° inclined, diameter 50 … 100 mm (1.97 … 3.94 in)

For pipeline diameters 50 … 100 mm (1.97 … 3.94 in), a diagonal radiation path is recommended. The distance of the beam through the medium is thus longer and an improved measuring effect is achieved. For this, the optional lead shielding for the detector is recommended in order to avoid influence from secondary radiation sources.

Fig. 18: 30° measurement setup on a pipeline with diameter 50 … 100 mm (1.97 … 3.94 in)

Vertical pipeline, diameter 50 … 420 mm (1.97 … 16.54 in)
For pipeline diameters 50 … 420 mm (1.97 … 16.54 in), a straight radiation path is possible. The radiometric sensor can be mounted either horizontally or vertically.

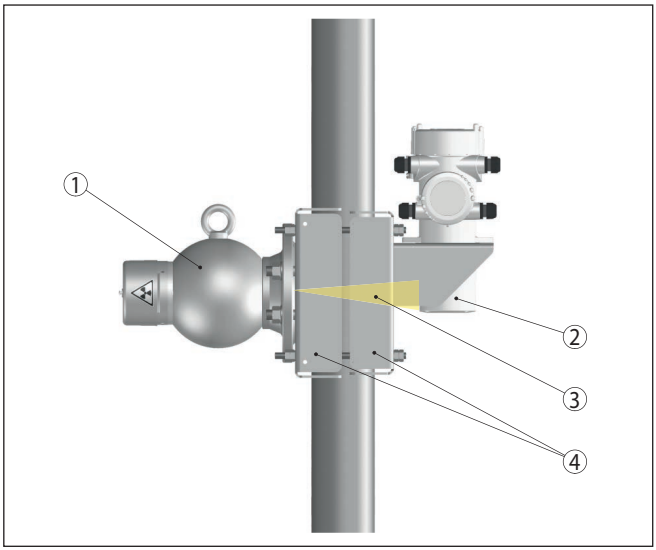

Fig. 19: Measurement setup on a pipeline with a diameter of 50 … 420 mm (1.97 … 16.54 in), detector mounting vertical

1 Source holder (VEGASOURCE)
2 Radiometric sensor (MINITRAC)
3 Radiated area
4 Mounting bracket

Avoiding stray radiation - Vertical pipeline, diameter 50 … 420 mm (1.97 … 16.54 in)

When mounting the radiometric sensor horizontally, the optional lead shielding is recommended in order to avoid influence from secondary radiation sources.

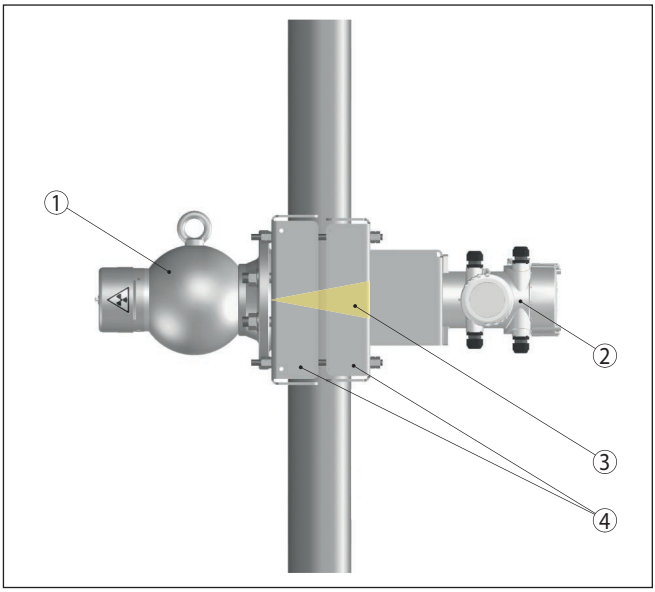

Fig. 20: Measurement setup on a pipeline with a diameter of 50 … 420 mm (1.97 … 16.54 in), detector mounting horizontal

1 Source holder (VEGASOURCE)
2 Radiometric sensor (MINITRAC)
3 Radiated area
4 Mounting bracket

Horizontal pipeline

On a horizontal pipeline, the radiation should be directed horizontally to avoid interference from air pockets.

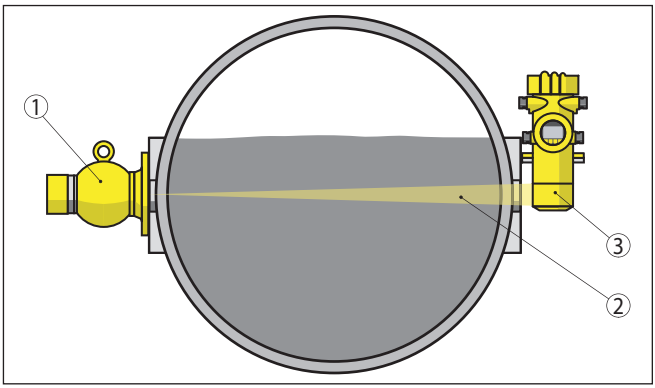

Fig. 21: Measurement setup on a horizontal pipeline

1 Source holder (VEGASOURCE)
2 Radiated area
3 Detector (MINITRAC)

Fire-proof version

Recommended orientation

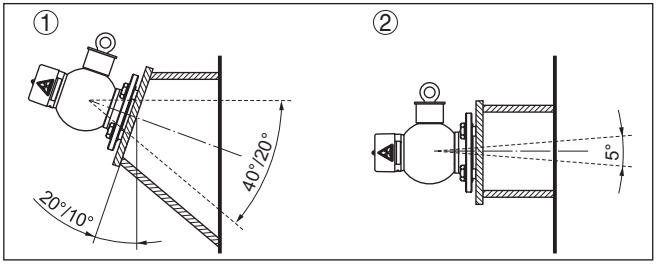

Fig. 22: Correct mounting of the fire-proof version

1 Mounting for level measurement
2 Mounting for point level detection

The source holder is also available as a fire-proof version (821 °C for 30 min./1510 °F for 30 min.). This version has an expansion tank.

Mount the source holder in such a way that the expansion tank is on top, i.e. in the highest position.

In case of fire, the molten lead can expand into the expansion tank, only closing off the beam exit channel.

Note:
After a fire, the shielding in the upper area of the protective container is slightly reduced. Contact our consultants about exchanging the source holder.

Orientation in tight spaces

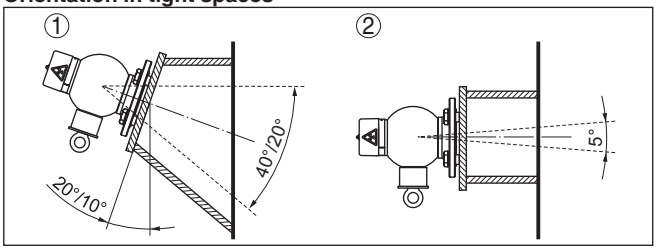

Fig. 23: Installation of the fire-proof version when space above the source holder is limited

1 Mounting for level measurement
2 Mounting for point level detection

If there is a lack of space above the source holder, the source holder can also be mounted in such away that the expansion tank is at the bottom or side.

In case of fire, the molten lead can expand into the expansion tank, thus filling the exit channel and the expansion tank.

Warning:
After a fire, the shielding in the upper area of the source holder is considerably reduced. The unit may no longer be operated. The source holder must be exchanged immediately.

Screw locking device

The source holder must be integrated in the potential equalization of the system.

To ensure a good electrical contact between the source holder and the mounting bracket, the supplied lock washers must be used according to the following illustration.

Use the prescribed torque for the mounting screws. Make sure that the screws have electrical contact to the potential equalization.

Material	Strength class	Torque	Friction coefficient
Stainless steel	70	50 … 140 Nm	1.4
Steel	8.8	50 … 140 Nm	1.4

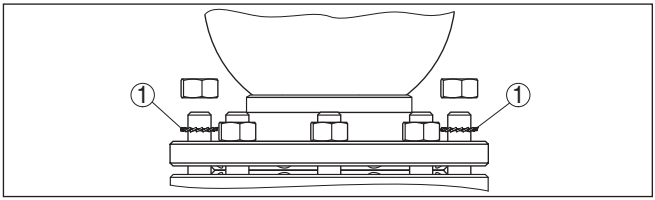

Fig. 24: Lock washers as screw locking device and conductive connection to potential equalization

1 Lock washers (2 pieces)

Mounting facilities

The source container can also be mounted, for example, on a mounting plate provided by the customer or on an L-profile.

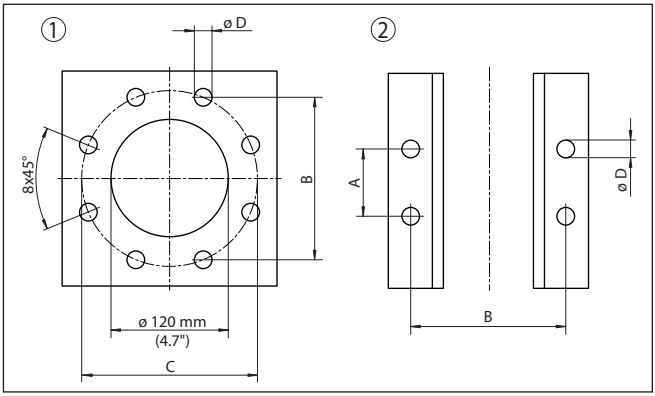

Fig. 25: Mounting facility supplied by the customer

1 Mounting plate
2 L-profiles

	EN	ASME
A	68.9 mm (2.71 in)	72.9 mm (2.87 in)
B	166.3 mm (6.55 in)	176.0 mm (6.93 in)
C	180.0 mm (7.09 in)	190.5 mm (7.50 in)

	EN	ASME
D	18.0 mm (0.71 in)	19.1 mm (0.75 in)

The mounting flange of VEGASOURCE 35 is compatible with:

- DN 100 PN 16
- ASME 4" 150 lbs

Installation control

Measurement of the local dose rate

After mounting, i.e. as soon as the radioactive emitter is mounted in the source holder, the local dose rate in the area of the source holder and the detector must be measured in µSv/h.

Caution:
Depending on the respective installation, radiation can also leak out of the beam exit channel due to scattering. Such stray radiation must be shielded off with additional lead or steel sheets. All control and off-limit areas must be rendered inaccessible and provided with warning signs.

Behaviour with empty vessel

Caution:
After technically correct mounting, the control area around an empty vessel must be measured for radioactivity and if there is any, the area must be cordoned off and marked. Possible ways of access to the inside of the vessel must be reliably closed off and marked with a warning sign "Radioactive".

The responsible radiation safety officer can allow access after having checked the safety measures with switched-off source holder.

If work must be carried out in and on the vessel, it is absolutely necessary to switch off the radiation on the source holder.

5 Installation - Special equipment

5.1 Version K, M: connection of the pneumatic switching facility

5.1.1 Connection of the proximity switches

These instructions apply to source holders VEGASOURCE 35 version K, M with pneumatic switching facility.

The proximity switches signal die switching position of the source holder. We recommend connecting the proximity switches. They are used for reliable feedback if the switching facility is really reacting on the pneumatic switching impulse.

Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed

Potential equalisation

The proximity switches are already mounting and connected in the terminal housing to the terminals.

Connect the proximity switches according to the following diagrams. Take note of the general installation regulations. As a rule, connect VEGASOURCE 35 to vessel ground (PA), or in case of plastic vessels, to the next ground potential. On the upper side of the instrument protective cover there is a ground terminal. This connection serves to drain off electrostatic charges.

The data for power supply are specified in chapter "*Technical data*".

Connection cable

The instrument is connected with standard two-wire cable without screen.

Use cable with round cross-section. A cable outer diameter of 5 … 10 mm (0.2 … 0.39 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

Electrical connection

Integrated proximity switch: Pepperl+Fuchs 181094-NCB2-12GM35-NO-10M

Caution:
Take note of the operating instructions of the proximity switch for electrical connection and setup.

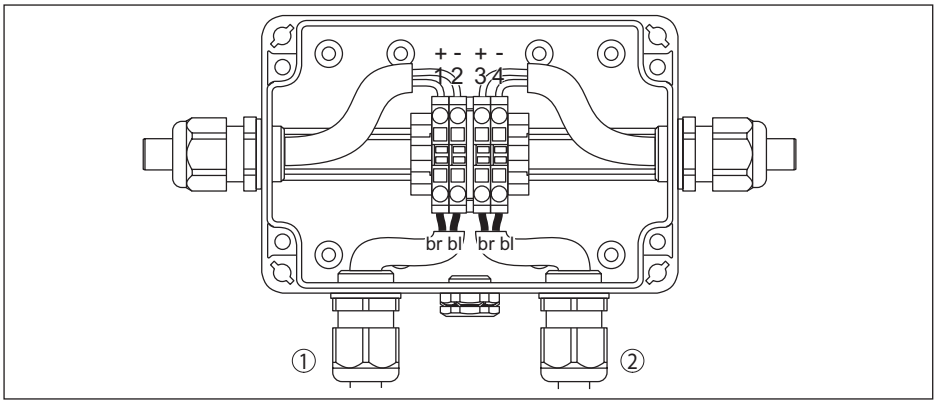

Fig. 26: Connection terminal housing of the proximity switches

1 Proximity switch for switch position EIN - ON (terminals 1 and 2)
2 Proximity switch for switch position AUS - OFF (terminals 3 and 4)

Switching amplifier

For signal processing you need a NAMUR switching amplifier. We recommend the double channel switching amplifier VEGATOR 112.

5.1.2 Compressed air connection

These instructions apply to source holders VEGASOURCE 35 version K, M with pneumatic switching facility.

Note:
The pneumatic switching mechanism may only be put into operation after the source holder is mounted.

Connection of the pneumatic lines

The pneumatic line is connected to the check valve with choke.

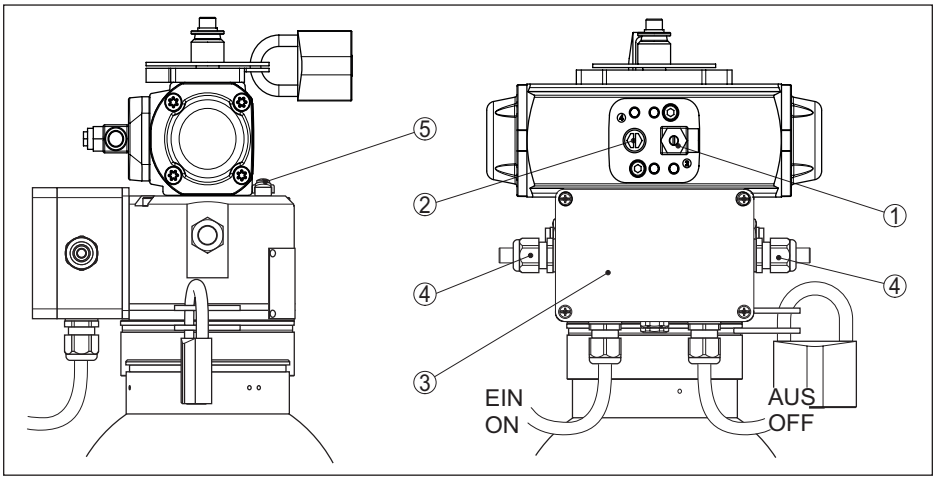

Fig. 27: Connection of the pneumatic lines on VEGASOURCE 35 - version K, M

1 *Check valve with choke for connection of the compressed air*
2 *Ventilation filter/Sound absorber*
3 *Terminal housing for connection of the proximity switches*
4 *Cable glands*
5 *Ground terminal for the potential equalization*

Caution:
The check valve with choke is preset and secured with thread locker. The adjustment of the check valve with choke must not be modified.

Use an electrical switching valve in the pneumatic line (e.g. Festo CPE). With this, you can switch off the air supply.

Optionally you can install an additional hand-operated switching valve (e.g. Festo VHEM) in the pneumatic line. In emergencies you can then interrupt the pneumatic air supply on site and switch off the source holder. Mount this hand-operated switching valve in a safe position outside the radiated area.

5.2 Version E: Connection of the electrical position indicators

These instructions apply to source holder VEGASOURCE 35 version E with electrical position indicators.

The position indicators signal the switching position of the source holder. We recommend connecting the position indicators. They provide reliable feedback on the condition of the source holder.

Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed
- Only for use in non-hazardous areas

Potential equalisation

The position indicators are already mounting and connected in the terminal housing to the terminals.

Connect the position indicators according to the following diagrams. Take note of the general installation regulations. As a rule, connect VEGASOURCE 35 to vessel ground (PA), or in case of plastic vessels, to the next ground potential. Use the ground terminal. This connection serves to drain off electrostatic charges. In Ex applications, the installation regulations for hazardous areas must be given priority.

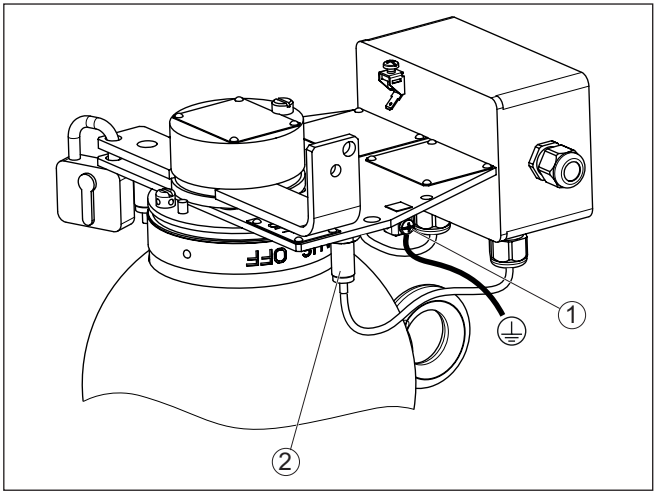

Fig. 28: Connection of the earth conductor terminal

1 Earth conductor terminal
1 Position indicator

The data for power supply are specified in chapter "*Technical data*".

Connection cable

The instrument is connected with standard two-wire cable without screen.

Use cable with round cross-section. A cable outer diameter of 5 … 10 mm (0.2 … 0.39 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

Electrical connection

Built-in position indicator: Pepperl+Fuchs NCN4-12GM35-NO-10M

Caution:
Take note of the operating instructions of the position indicator for electrical connection and setup.

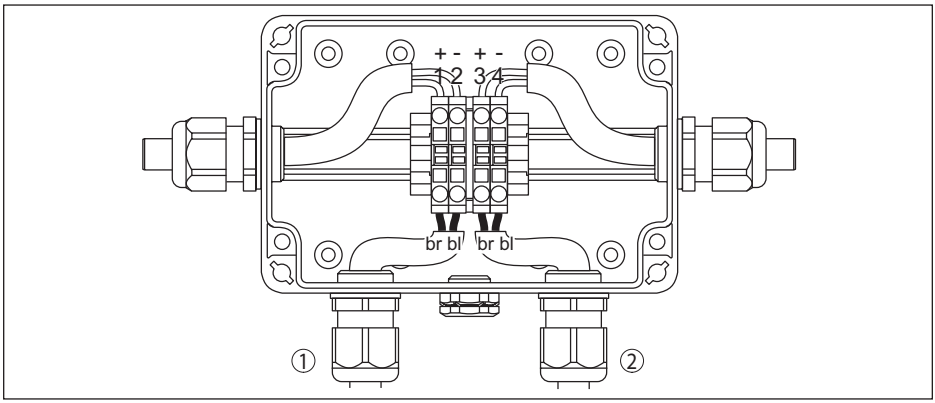

Fig. 29: Connection terminal housing of the position indicators

1 Position indicator for switch position EIN - ON (terminals 1 and 2)
2 Position indicator for switch position AUS - OFF (terminals 3 and 4)

Switching amplifier

For signal processing you need a NAMUR switching amplifier. We recommend the double channel switching amplifier VEGATOR 112.

6 Setup

6.1 Operation - version A

Warning:
Before switching on the radiation, make sure that no persons are inside the radiated areas (also not inside the vessel).

Radiation must only be switched on by trained personnel.

Switching the radiation on

The figures in brackets refer to the following illustration.

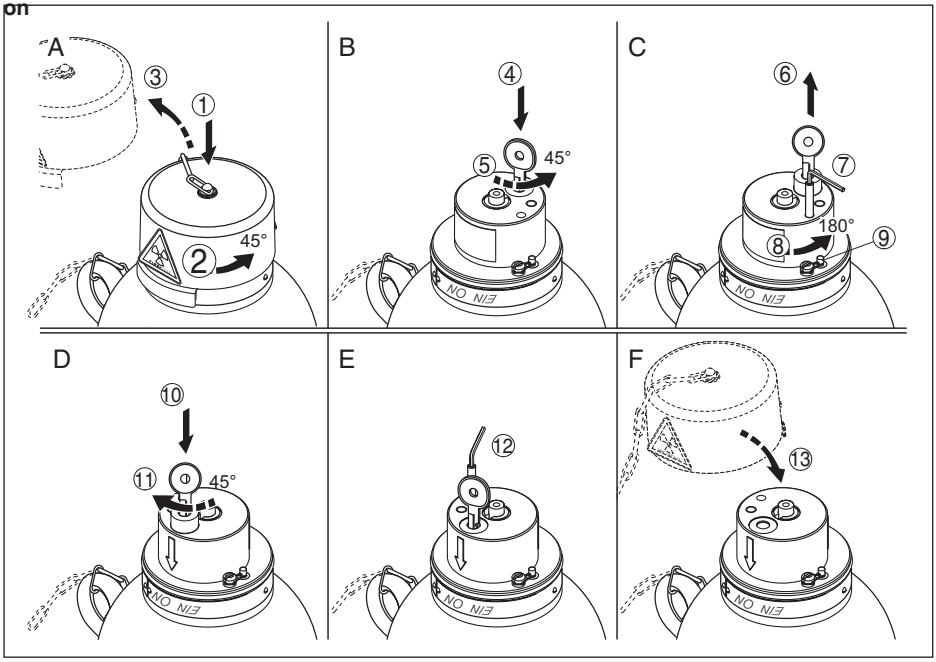

Fig. 30: Switching the radiation on - VEGASOURCE 35 version A

Initial situation: Source holder is in position OFF

1. Press the protective cover firmly against the source container and …
2. Turn the protective cover by 45° clockwise up to the stop
3. Pull the protective cover upward
4. Put the key into the keyhole
5. Turn the key 45° anticlockwise
6. Pull out the key lock up to the stop
7. If threaded pin is present: Loosen the threaded pin with a hexagon key wrench - size 5 (only on instruments with additional function "Density measurement with fixation")
8. Turn the complete insert 180° anticlockwise

The respective switch position is shown by a marking arrow (ON or OFF)

9. Do not loosen the seal.

Warning:
Do not push the sealed pin (9). Turning the insert over the pin leads to the removal position of the source insert.

10. Insert key lock with key
11. Turn key lock with key approx. 45° clockwise
12. If threaded pin is present: screw in the pin with a hexagon key wrench size 5)
13. Place the protective cover back on

    The source holder may not be operated without protective cover.

Indication of the switching status

Radiation ON
The label EIN - ON is visible. The marking arrow points to EIN - ON.

Radiation OFF
The label AUS - OFF is visible. The marking arrow points to AUS - OFF.

Switching the radiation off

Switching off the radiation is analogous to this procedure. To switch off the radiation, turn the source insert 180° clockwise.

6.2 Operation - version B

Warning:
Before switching on the radiation, make sure that no persons are inside the radiated areas (also not inside the vessel).

Radiation must only be switched on by trained personnel.

Switching the radiation on

The figures in brackets refer to the following illustration.

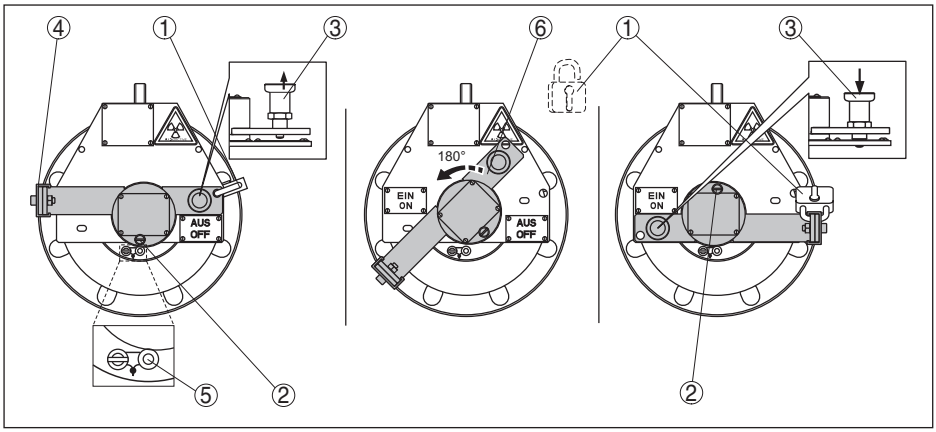

Fig. 31: Switching the radiation on - VEGASOURCE 35 version B

1 Padlock
2 Locking screw
3 Fixing pin
4 Securing strap
5 Retaining pin
6 Swivel bracket

Initial situation: Source holder is in position OFF

- Remove padlock (1)
- Loosen locking screw (2)
- Pull out fixing pin (3)

Warning:
Do not remove the safety catch (4). Do not remove the seal. Do not push the sealed pin (5). Turning the insert above the pin (5) leads to the removal position of the source insert.

- Turn stirrup (6) 180° anticlockwise

Note:
The actual switch position is shown by the visible label (ON or OFF). The other label is always covered by the stirrup (6).

- Let the fixing pin (3) snap in in position ON. Check if it snaps in correctly
- Fasten the padlock (1) in the specified position on the securing bar (4) until it is required again
- Tighten locking screw (2)

Indication of the switching status

Radiation ON
The label EIN - ON is visible. The marking arrow points to EIN - ON.

Radiation OFF
The label AUS - OFF is visible. The marking arrow points to AUS - OFF.

Switching the radiation off

Switching off the radiation is analogous to this procedure. To switch off the radiation, turn the stirrup (6) 180° clockwise.

6.3 Operation - version C, E

Warning:
Before switching on the radiation, make sure that no persons are inside the radiated areas (also not inside the vessel).

Radiation must only be switched on by trained personnel.

Switching the radiation on

The figures in brackets refer to the following illustration.

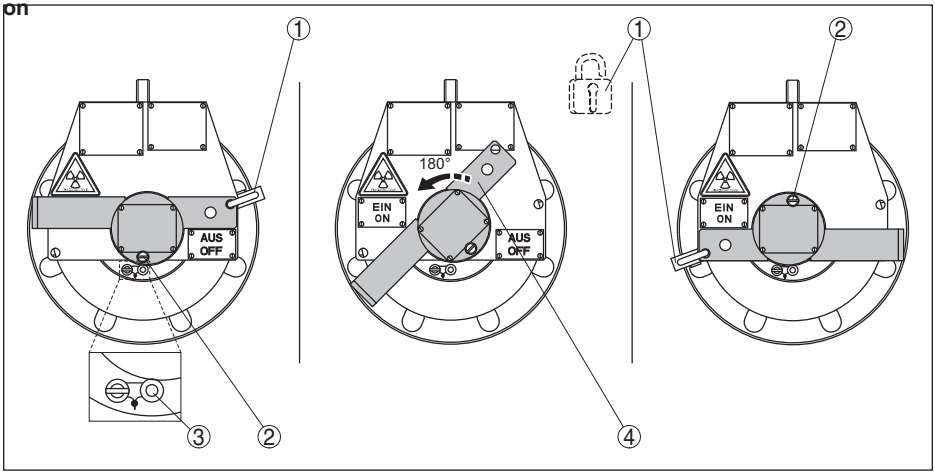

Fig. 32: Switching the radiation on - VEGASOURCE 35 version C, E

1 Padlock
2 Locking screw
3 Retaining pin
4 Swivel bracket

Initial situation: Source holder is in position OFF

- Remove padlock (1)
- Loosen locking screw (2)

Warning:
Do not remove the seal. Do not push the sealed pin (3). Turning the insert over the pin (3) leads to the removal position of the source insert.

- Turn stirrup (4) 180° anticlockwise

Note:
The actual switch position is shown by the visible label (ON or OFF). The other label is always covered by the stirrup.

- Secure the switch position ON with the padlock (1) in the specified position
- Tighten locking screw (2)

Indication of the switching status

Radiation ON
The label EIN - ON is visible. The marking arrow points to EIN - ON.

Radiation OFF
The label AUS - OFF is visible. The marking arrow points to AUS - OFF.

Switching the radiation off

Switching off the radiation is analogous to this procedure. To switch off the radiation, turn the stirrup (4) 180° clockwise.

6.4 Operation - version D

Warning:
Before switching on the radiation, make sure that no persons are inside the radiated areas (also not inside the vessel).

Radiation must only be switched on by trained personnel.

Switching the radiation on

The figures in brackets refer to the following illustration.

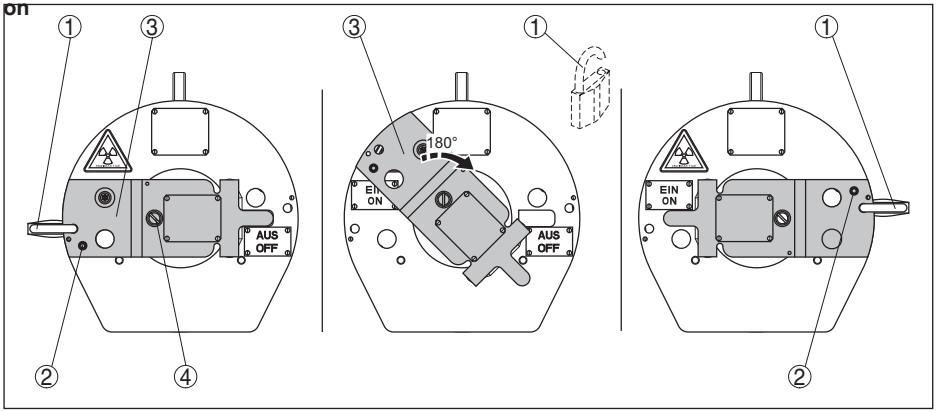

Fig. 33: Switching the radiation on - VEGASOURCE 35 version D

1 *Padlock*
2 *Locking screw*
3 *Swivel bracket*
4 *Safety screw*

Initial situation: Source holder is in position OFF

- Remove padlock (1)
- Loosen locking screw (2)

Warning:
Do not loosen the safety bolt (4) and do not fold up the stirrup (3). Folding up the stirrup (3) leads to the removal position of the source insert.

- Turn stirrup (3) 180° anticlockwise

Note:
The actual switch position is shown by the visible label (ON or OFF). The other label is always covered by the stirrup.

- Secure the switch position ON with the padlock (1) in the specified position
- Tighten locking screw (2)

Indication of the switching status

Radiation ON
The label EIN - ON is visible. The marking arrow points to EIN - ON.

Radiation OFF
The label AUS - OFF is visible. The marking arrow points to AUS - OFF.

Switching the radiation off

Switching off the radiation is analogous to this procedure. To switch off the radiation, turn the stirrup (3) 180° clockwise.

6.5 Operation - version K, M (pneumatic switching facility)

Warning:
Before switching on the radiation, make sure that no persons are inside the radiated areas (also not inside the vessel).

Radiation must only be switched on by trained personnel.

Note:
The pneumatic actuator must not be used under ambient conditions that can cause corrosion in and on the pneumatic actuator.

Switching the radiation on

The figures in brackets refer to the following illustration.

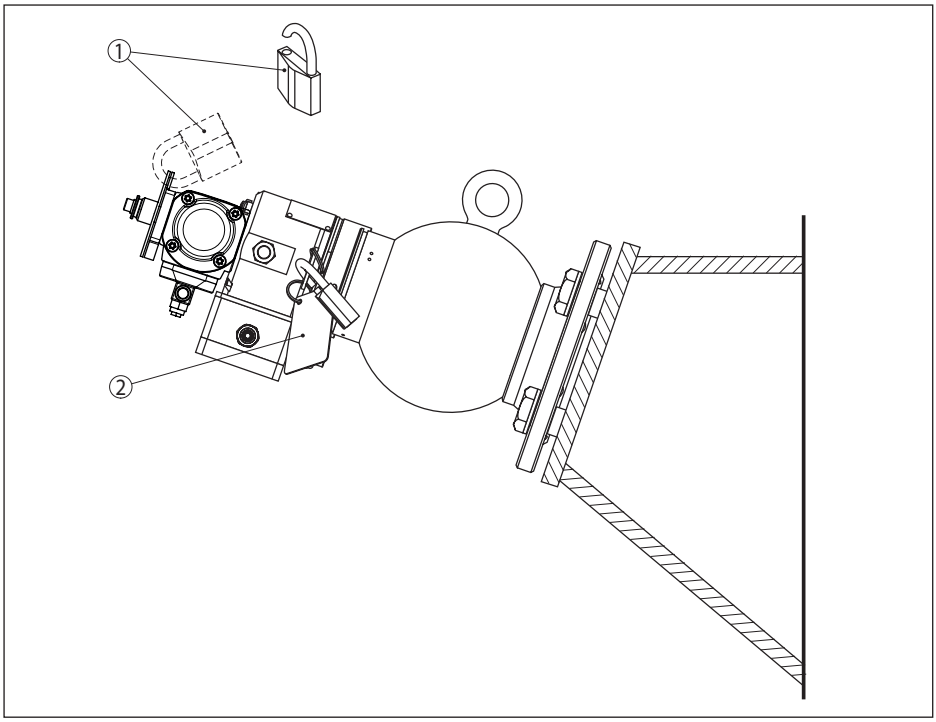

Fig. 34: Switching on the radiation with pneumatic switching facility - VEGASOURCE 35 version K, M

1 Padlock for securing the switching status - must be removed to operate the pneumatic switching facility
2 Padlock for securing the source insert - may not be removed during normal operation

Initial situation: Pneumatic switching device is connected correctly. Source holder is in AUS-OFF position.

- Remove upper padlock (1)

Note:
The upper padlock must first be applied again for revision purposes (OFF position) and should be attached to the second padlock until then or kept outside the plant.

Warning:
The lower padlock (2) secures the access to the source insert and may not be removed during normal operation.

- The pneumatic switching facility can now be operated

Note:
The actual switch condition is visible in the indicating window (ON or OFF). The other lable is respectively covered.

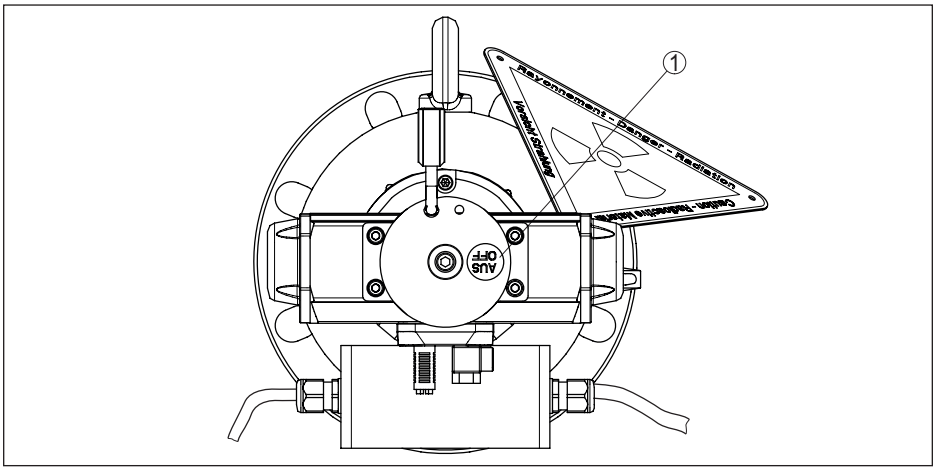

Fig. 35: Indication of the switching status with VEGASOURCE 35 - version K, M

1 Display window

Warning:
Do not touch the display window when the drive is pressurized.

Indication of the switching status

Radiation ON
The label EIN - ON is visible in the display window

Radiation OFF
The label AUS - OFF is visible in the display window

Switching the radiation off

Analogue to this procedure, the radiation is switched off via the compressed air controls.

When the pneumatic switching facility is unpressurized, the VEGASOURCE 35 switches back automatically to switch position OFF.

7 Maintenance and fault rectification

7.1 Cleaning

Clean the instrument in regular intervals. Note the following points:

- Clean the instrument of substances that can impair the safety function
- Remove deposits of medium or other substances that could impair or prevent the source holder from switching over
- Take care that the lettering remains legible
- Clean the adhesive labels and the connection box (version with pneumatic switching mechanism) only with water (e.g. with slightly damp rag)
- Avoid creating electrostatic charges on the instrument. Never rub with dry cloth when cleaning

Warning:
Take note of all safety instructions in this operating instructions manual when cleaning.

7.2 Maintenance

If the device is used properly, no special maintenance is required in normal operation.

Inspection

Along with the regular inspections of the system, we recommend the following checks:

- Visual check for corrosion on the housing, the weld joints, the outer parts of the source insert, the lock/locks, the lock washers
- Visual check of the reference O-ring (only version D, M, N) - see following instruction
- Test of the mobility of the source insert (switching on and off function)
- Assessment of the legibility of all labels and warning signs
- Stability and firm attachment of the source holder

Tip:
If you are operating a version with increased protection against dust and moisture (version D, M, N), the source is protected with two additional seals. The condition of the seal can be judged more easily using the following methods without opening the source holder.

An identical seal (reference O-ring) is mounted to one of the outer threaded fittings so that it is subjected to the ambient conditions. From the condition of this seal you can draw conclusions about the condition of the installed seal.

If the seal on the outside has become porous or defective, the seals inside the source holder probably have to be exchanged.

You can find the position of the seal (reference O-ring) in the dimensional drawings in chapter "*Supplement*" (version D, M, N).

Caution:
If you are not sure of the proper functioning or condition of the instrument, contact immediately the responsible radiation safety officer for further instructions.

Caution:
Repairs or maintenance work beyond the scope of the usual inspection may only be carried out by the manufacturer, the supplier or specially authorized persons.

Measures in case of corrosion

If there are clear traces of corrosion on the source container, the local dose rate (µSv/h) must be measured in the surroundings. If the rate is clearly above the values during normal operation, then the area must be cordoned off and the responsible radiation safety officer informed.

Corroded instruments and lock washers must be exchanged as soon as possible.

Warning:
Source containers with corroded locking device or source insert must be replaced immediately.

7.3 Test of the switching mechanism

Test the function of the switching mechanism on the source holder at regular intervals.

Function test

Source holder with manual switching mechanism

1. Loosen the fixing pin (version B) or remove the lock (if present) as described in chapter "*Setup*".
2. Move the source insert as described in chapter "*Setup*" several times from the ON to the OFF position and vice versa. The source insert should be easily movable and must have no traces of corrosion in the visible area.

   If the source insert cannot be moved from ON to OFF position, follow the instructions in paragraph "*What to do in case of emergency*".

   If it is hard to move the source insert or if there are other signs of a malfunction, the source insert must be locked in position OFF and the responsible radiation safety officer informed.

   In case of corrosion: Follow the instructions in chapter "*Maintenance/Measures in case of corrosion*".

Source holder with pneumatic switching mechanism

1. Remove the padlock (see chapter "*Setup*")
2. Switch the source insert by means of compressed air from the position OFF to position ON. The source insert should move without interruption to position "ON".

Caution:
Do not grasp into the display window of the indication plate while the pneumatic actuator is switching over.

3. Reduce the pressure to below 2.5 bar (36 psi). The source insert must move back to position OFF.

   If the source insert does not move smoothly or shows signs of a possible malfunction, the source insert must be locked in position OFF and the responsible radiation safety officer informed.

   If the source insert cannot be moved from ON to OFF position, follow the instructions in paragraph "*What to do in case of emergency*".

   In case of corrosion: Follow the instructions in chapter "*Maintenance/Measures in case of corrosion*".

Measure the local dose rate

Measure the local dose rate of the source holder at regular intervals and document the measurement results.

The measurement data allow conclusions to be drawn about leaks and possible changes in radiation power.

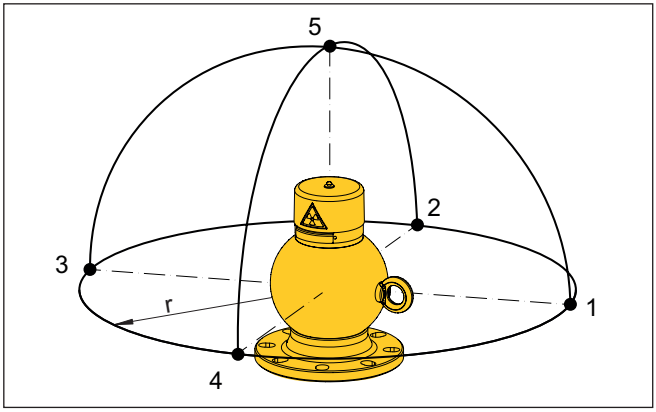

Fig. 36: Measuring points for the measurement of the local dose rate

r Distance to the source holder
1-5 Measuring points

Always use the same distance (r) from the source holder to the measuring points.

Document the measurement results.

Date of the measurement **Time of the measurement**	**dd/mm/yyyy** **hh:mm**	
Measuring distance r		
Value of the last measurement (µS)	**Measuring point**	**Measured value (µS)**
	1	
	2	
	3	
	4	
	5	

Tab. 6: Measurement protocol for the local dose rate

7.4 Tightness test

The tightness of the source capsule must be checked at regular intervals. The frequency of the tightness test (wipe test) must correspond to the specifications of the authorities or the handling permit.

Note:
A tightness test is not only required as a regular test but must be carried out after each incident that could impair the shielding of the source. In such case, the tightness test must be prescribed by the responsible radiation safety officer under consideration of the applicable regulations and comprise, apart from the source holder itself, all other affected parts of the process vessel.

The tightness test must be carried out immediately after an incident.

The tightness test described below is specified:

- For regular testing during operation
- For when the source holder is stored for longer periods
- For when the source container is put into operation after a longer storage period

Sequence of the tightness test

The tightness test (also wipe test) must be carried out by an authorized person or organisation with a wipe test kit provided by an authorised organisation. Wipe test kits must be used according to the instructions of the manufacturer. Reports on the test results must be kept.

If no other instructions are specified, carry out the tightness test as follows:

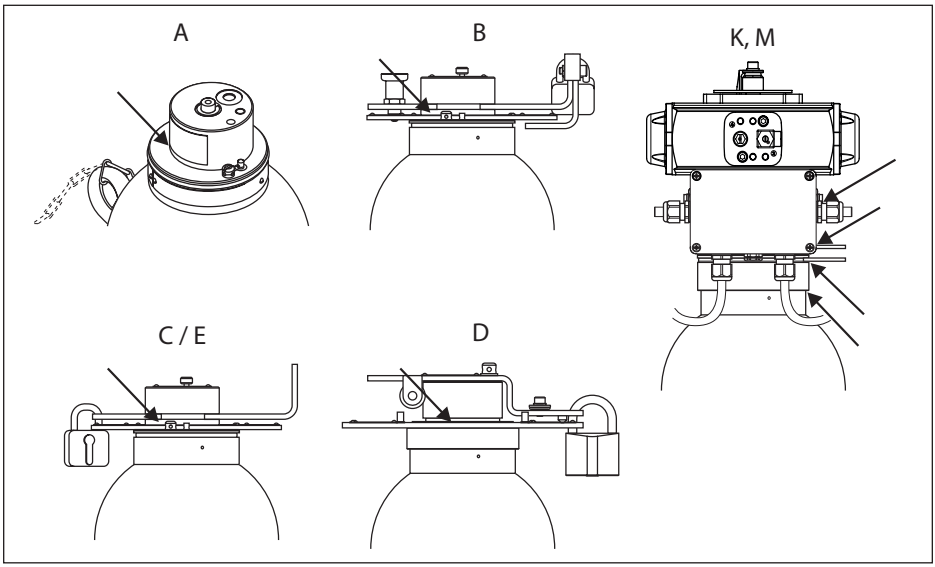

Fig. 37: Wiping surfaces for the tightness test

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1. Take wipe samples from at least the following locations:

   Version A, B, C, D, E: along the groove between source insert and housing

   Version K, M: along the thread of the proximity switch and the three circular grooves on the cylinder housing

   With manually operated source holders, the tightness test can be carried out when the source holder is in position "ON" or "OFF".

   With source holders with pneumatic switching facility, the switch must be fixed with the lock in position OFF before starting the tightness test.
2. Have the samples analyzed by an authorized organisation. A radiation source is judged to be leaky if more than 185 Bq (5 nCi) are detected in the sample of the tightness test.

Note:
The specified value is valid for the USA. National regulations of other countries may prescribe other limit values.

If the source is possibly leaky, carry out the following steps:

- Inform the radiation safety officer
- Take suitable measures to avoid contamination of the environment by the source. Secure the source.
- Inform the responsible authority that a leaky source was detected.

Tip:
If you are operating a version with increased protection against dust and moisture (version D, M, N), the source is protected with two additional seals. The condition of the seal can be judged more easily using the following methods without opening the source holder.

An identical seal (reference O-ring) is mounted to one of the outer threaded fittings so that it is subjected to the ambient conditions. From the condition of this seal you can draw conclusions about the condition of the installed seal.

If the seal on the outside has become porous or defective, the seals inside the source holder probably have to be exchanged.

You can find the position of the seal (reference O-ring) in the dimensional drawings in chapter "*Supplement*" (version D, M, N).

7.5 Rectify faults

Reaction when malfunction occurs

The operator of the system is responsible for taking suitable measures to rectify faults.

The radiation safety officer is responsible for all matters having to do with radiation protection, especially ensuring that the radiation protection ordinance is observed, and can prescribe appropriate measures if problems or malfunctions occur.

24 hour service hotline

For help with urgent technical problems, call the VEGA service hotline number **+49 1805 858550**.

The hotline is manned 7 days a week round-the-clock. Since we offer this service worldwide, the support is only available in the English language. The service is free, only standard call charges are incurred.

Telephone hotline USA
A special telephone hotline is available for the USA:

1-800-367-5383

Outside normal working hours, please leave a message on the answering machine.

The engineer on duty will call you back.

7.6 What to do in case of emergency

Immediate measures

The emergency procedure described here must be applied immediately in the interest of the safety of the staff, in order to secure an area in which an unshielded radiation source exists or is assumed to exist.

An emergency situation exists if a radioactive source is no longer inside the source holder, if the source holder cannot be switched to "OFF" position or if an increased local dose rate has been detected in the proximity of the source holder.

The emergency procedure protects the affected persons until the responsible radiation safety officer arrives and prescribes further measures.

The person charged with the supervision of the radiation source (i.e. the person stipulated and authorized by the plant operator) is responsible for implementing this procedure.

- Determine the dangerous area on site by measuring the local dose rate in µSv/h
- Generously cordon off the affected area with yellow marking tape or rope and mark the area with the international radiation warning symbol

The source holder cannot be brought into position "OFF"

In this case, the source holder must be dismounted. The radiation safety officer has to prescribe dismounting.

Direct the exit channel towards a thick wall (e.g. of steel or lead) or mount a blind flange in front of the exit channel.

Persons may only stand behind the source holder. Never stay in front of the radiation exit channel (flange or mounting surface of VEGASOURCE 35).

The transport lug on the housing facilitates safe handling.

The source is no longer in the source holder

In this case, the source must be kept secure in another place or an additional shielding must be provided.

The source may only be transported with pliers or a gripper and the distance to the body must be kept as large as possible.

The time required for transport should be estimated and optimized in advance through tests and training.

Informing the responsible authority

- Pass all necessary information immediately on to the responsible local and national authorities

- After a thorough investigation of the situation on site, the responsible radiation safety officer must agree, together with the local authorities, on appropriate corrective measures for the existing problem

Note:
National regulations can prescribe deviating procedures and notification requirements.

8 Dismount

8.1 Dismounting steps

As soon as a radiometric measuring system is no longer required, the radiation must be switched off on the source holder (position "OFF").

The source holder must be dismounted under consideration of all relevant regulations and stored in a lockable room without through traffic.

Inform the responsible authorities of this measure.

The access area for this storage room must be measured (µSv/h) and marked. The radiation safety officer is responsible for implementing anti-theft measures.

Care must be taken that the source in the source holder is not scrapped together with the rest of the system.

Arrange for a return shipment as soon as possible.

Caution:
Dismounting may only be carried out by authorized, qualified personnel who are monitored for radiation exposure according to local laws or the handling permit. Take note of the specifications in the existing handling permit.

All local conditions must be taken into account.

All work must be carried out in the shortest possible time and at the largest possible distance (shielding). Also, the endangering of other persons must be avoided through suitable measures (e.g. safety fence, etc.).

The source holder may only be dismounted when the radiation is switched off. Make sure that the switch position OFF is secured by a lock.

Note chapters "*Mounting*" and "*Setup*" for dismounting and carry out the described steps in reverse order.

8.2 Return

Federal Republic of Germany
Contact the responsible sales engineer to arrange for a return, to check on the possibility of reuse or disposal.

Other countries
Contact the responsible sales partner to arrange for a return, to check on the possibility of reuse or disposal.

Also inform the relevant authority.

If a return in your country is not possible, contact the respective sales partner to decide on further action.

The destination airport for a possible return shipment is Frankfurt a. M., Germany.

Conditions for a return shipment
The following conditions must be fulfilled before a return shipment:

- An inspection certificate not older than three months confirming the tightness of the source (wipe test certificate) must be available for a return.
- Keep specifications on the serial number of the source capsule, the type of source (Co-60 or Cs-137) and the activity or type of source ready. These data are available in the documents supplied along with the source. Enclose a copy of the manufacturer's certificate of the source.
- No significant traces of corrosion on the source holder which could endanger the function or safe storage of the source.
- No serious damage due to fire or mechanical influences (deformations, dents, etc.)
- The switching mechanism of the source holder functions perfectly. Set the source holder to "OFF" and secure this position with a lock.
- The return shipment must be made in a type-tested type A packaging in accordance with IATA rules. The source holder VEGASOURCE 35 is suitable for return shipment. In case of doubt, your sales partner will provide you with suitable transport packaging.
- Label the package in accordance with the applicable IATA regulations and probable deviating national regulations. If necessary, carry out further control measurements in accordance with national and international regulations.

In case of doubt, talk to your relevant authority or an appropriately competent institution.

9 Supplement

9.1 Technical data

General data

Material 316L corresponds to 1.4404 or 1.4435

Instrument weight

- With manual switching mechanism — approx. 86 kg (190 lbs)
- With pneumatic switching mechanism — approx. 90 kg (198 lbs)

Process fitting

- Flanges — Compatible with DIN DN 100, PN 16 and ASME from 4", 150 lbs

Torque - Mounting screws

Material	Strength class	Torque	Friction coefficient
Stainless steel	7.0	50 … 140 Nm	1.4
Steel	8.8	50 … 140 Nm	1.4

Beam exit channel

- Position — 9.5 mm (0.37 in) displaced from the centre of the mounting flange
  It has the same direction as the transport lug.
  The position of the exit channel is marked in black on the cover plate of the mounting flange.
- Exit angle — 5 °, 20 °, 40 °
- Width — 6 °
- Attenuation of the useful beam — approx. 0.3 half value layers (F_S = 1.2)

Materials

- Process fitting - flange — 316L
- Outer housing — 316L, with PUR textured paint RAL 1003 or steel C22.8 (1.0460) with PUR textured paint RAL 1003
- Tightness of the source insert — Silicone
- Shielding material — Lead
- Source holder — 316L
- Manual switching mechanism — 316L
- Pneumatic switching mechanism — 316L

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Materials - Instrument version A

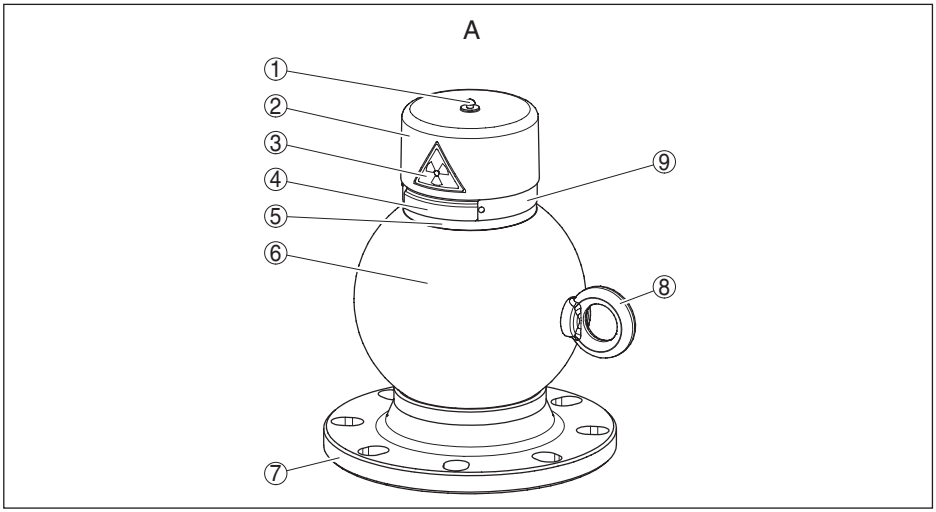

Fig. 38: Materials VEGASOURCE 35 - Version A

Position	Component	Material
1	Screw/Grooved pin	A2
2	Cover hood	St/StSt
	O-ring	FKM
3	Warning label	Acrylate foil
4	Type label - Source	304
5	Housing ring	316L / 304
6	Housing	316L / S235JR
7	Flange	316L / S235JR
8	Lug	C15, A2
9	Type label	StSt

Materials - Instrument version B

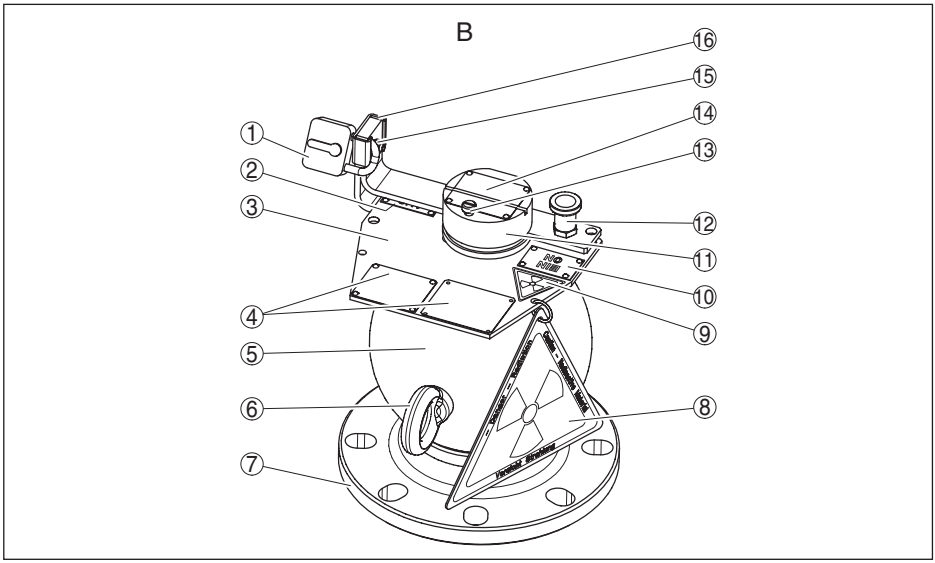

Fig. 39: Materials VEGASOURCE 35 - Version B

Position	Component	Material
1	Padlock	-
2	Label "AUS/OFF"	304
3	Indicator plate	304 / 316L
4	Optional label	304
	Type label	304
5	Housing	316L / S235JR
6	Lug	C15, A2
7	Flange	316L / S235JR
8	Label "Attention radiation"	304
9	Warning label	Acrylate foil
10	Label "EIN/ON"	304
11	Rotor	304 / 316L
12	Rotating pin	304
13	Screw	StSt
14	Type label "Source"	304
15	Screw	A4
	Nut	A4
16	Strap	StSt

Materials - Instrument version C

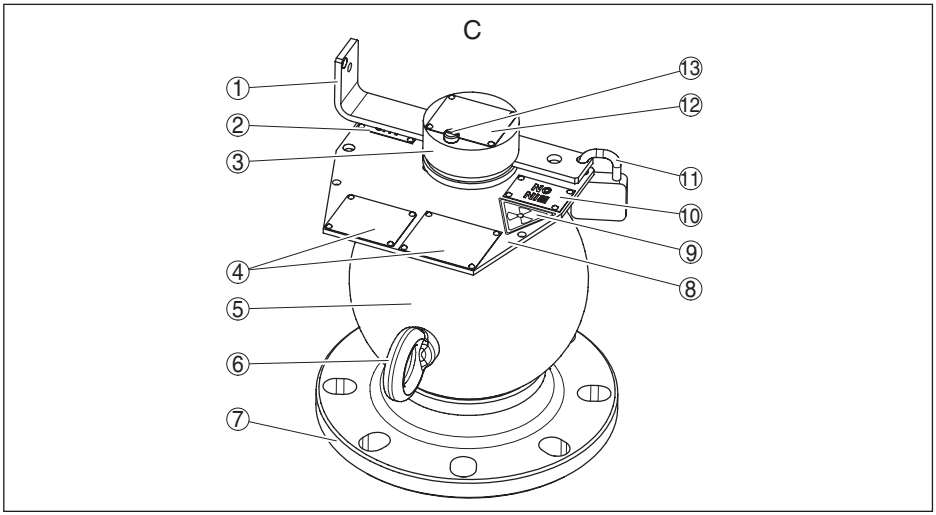

Fig. 40: Materials VEGASOURCE 35 - Version C

Position	Component	Material
1	Swivel bracket	304
2	Label "AUS/OFF"	304
3	Rotor	304 / 316L
4	Type label	304
	Optional label	304
5	Housing	316L / S235JR
6	Lug	C15, A2
7	Flange	316L / S235JR
8	Indicator plate	304 / 316L
9	Warning label	Acrylate foil
10	Label "EIN/ON"	304
11	Padlock	-
12	Type label "Source"	304
13	Screw	StSt

Materials - Instrument version D

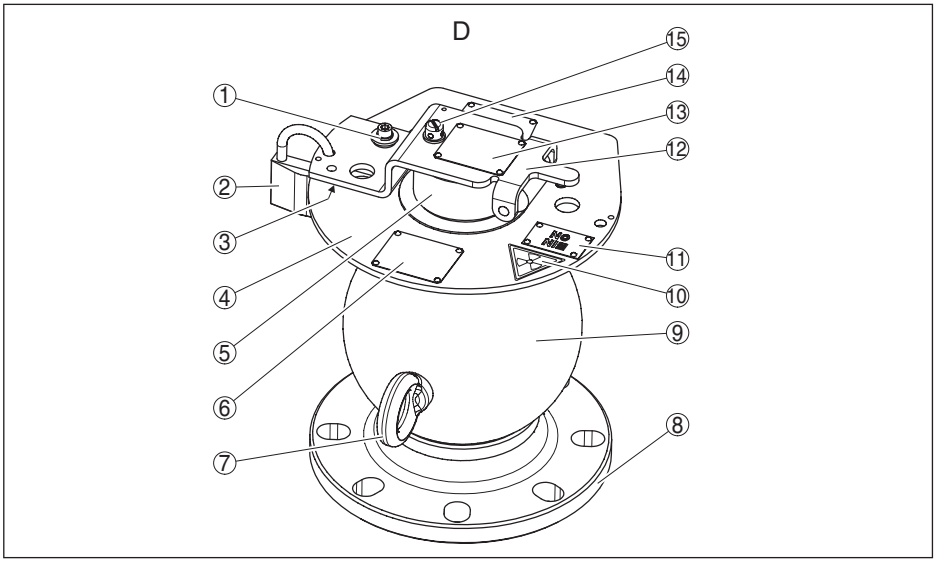

Fig. 41: Materials VEGASOURCE 35 - Version D

Position	Component	Material
1	Screw	A4-70
	Spring ring	A2
	Protective screen	304
	O-ring	FKM
2	Padlock	-
3	Label "EIN/ON"	304
4	Indicator plate	304, 316L
5	Rotor	304, 316L
6	Type label	304
7	Lug	C15, A2
8	Flange	316L, S235JR
9	Housing	316L, S235JR
10	Warning label	Acrylate foil
11	Label "AUS/OFF"	304
12	Swivel bracket	316L
13	Type label "Source"	304
14	Optional label	304
15	Fastening	A2-70

Materials - Instrument version E

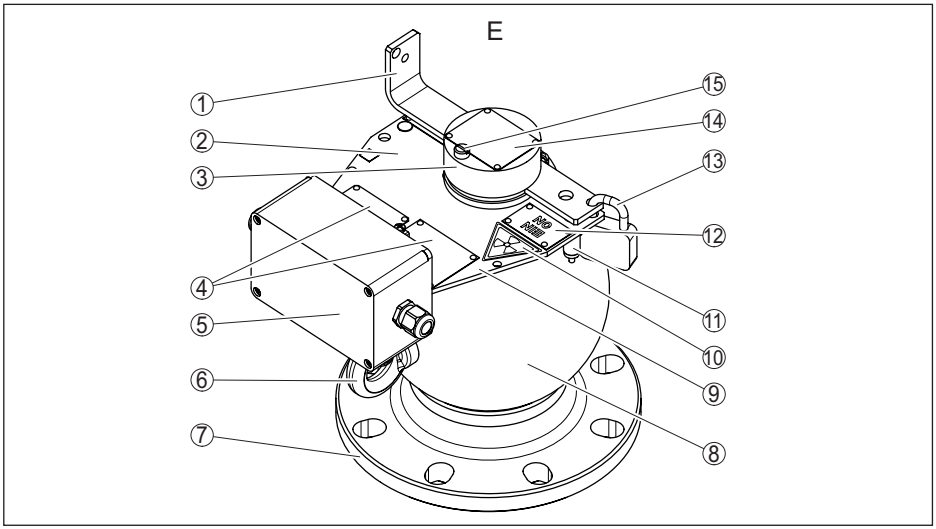

Fig. 42: Materials VEGASOURCE 35 - Version E

Position	Component	Material
1	Swivel bracket	304
2	Label "AUS/OFF"	304
3	Rotor	304, 316L
4	Type label	304
	Optional label	304
5	Connection terminal housing	Plastic
6	Lug	C15, A2
7	Flange	316L, S235JR
8	Housing	316L, S235JR
9	Indicator plate	304, 316L
10	Warning label	Acrylate foil
11	Position indicator	Plastic
12	Label "EIN/ON"	304
13	Padlock	-
14	Type label "Source"	304
15	Screw	StSt

Materials - Instrument version K, M

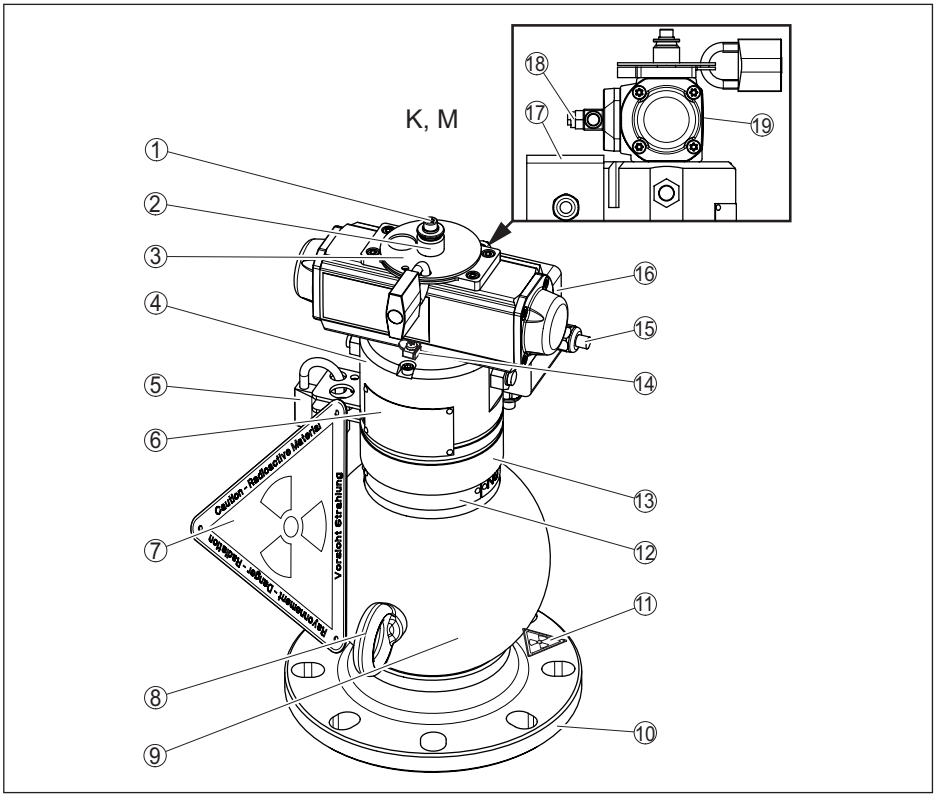

Fig. 43: Materials VEGASOURCE 35 - Version K, M

Position	Component	Material
1	Screw	A2-70
	Spring ring	301
	Protective screen	304, 316L
	O-ring	FKM
2	Sleeve	316L
3	Washer	316L
4	Cover	316L
5	Padlock	-
6	Type label	304
7	Label "Attention radiation"	304
8	Lug	C15, A2
9	Housing	316L,S235JR
10	Flange	316L,S235JR

Position	Component	Material
11	Warning label	Acrylate foil
12	Type label "Source"	304
13	Adapter disc	316L
14	Ground terminal	Screw: A4
		Spring ring: A4
		Clamping bracket 316L
		Connection block: 316L
15	Fastening plate	316L
16	Terminal housing	PC
17	Sound absorber G1/8	PVC
18	Reflux valve G1/8	Brass

Pneumatic switching mechanism (optional)

Pivoting range	180 °
Compressed air connection	G⅛
Switching pressure	3.5 … 6 bar (51 … 87 psi)
Reset of the switching facility	by spring force
Compressed air conditioning	Class 3 acc. to ISO 8573-1, pressure dew point 10 K below operating temperature, particle size 40 µm Notes for Europe: For compressed air (gas of group 2), the pneumatic actuator is excluded from the requirements of the Regulation on Pressure Equipment (PED) 97/23/EC based on Article 1, Clause 3.6 of the directive.
Connection data	
– Operating voltage	8 V
– Current consumption - Measuring plate not included	≥ 3 mA
– Current consumption - Measuring plate included	≤ 1 mA

Source and vessel characteristics

Attenuation factor F_S of the source holder	
– Co-60	181
– Cs-137	3100
Number of half value layers of the source holder	
– Co-60	7.5
– Cs-137	11.6
Max. activity of the source	
– Co-60	max. 3.7 GBq (100 mCi)
– Cs-137	max. 185 GBq (5000 mCi)

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Dose rate diagram

In the dose rate diagram, the locase dose rate is specified in a certain distance to the surface of the source holder. In the following you will find examples of some dose rate diagrams for source container VEGASOURCE 35. They apply for a distance of 1 m as well as exemplary activities of Co-60 or Cs-137 emitter.

All listed iso-distance curves refer to switch position OFF.

Dose rate diagram for Co-60

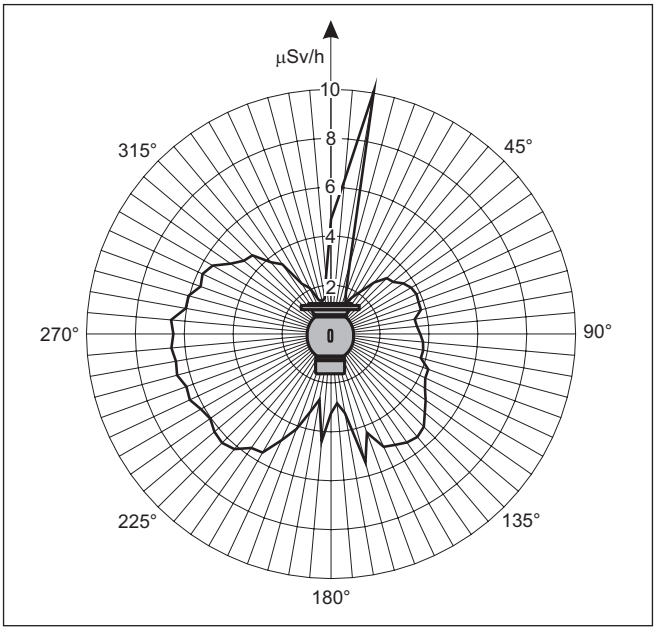

Fig. 44: Dose rate diagram (distance: 1 m) - example: source holder VEGASOURCE 35 with Co-60, 100 mCi (3.7 GBq)

Dose rate diagram for Cs-137

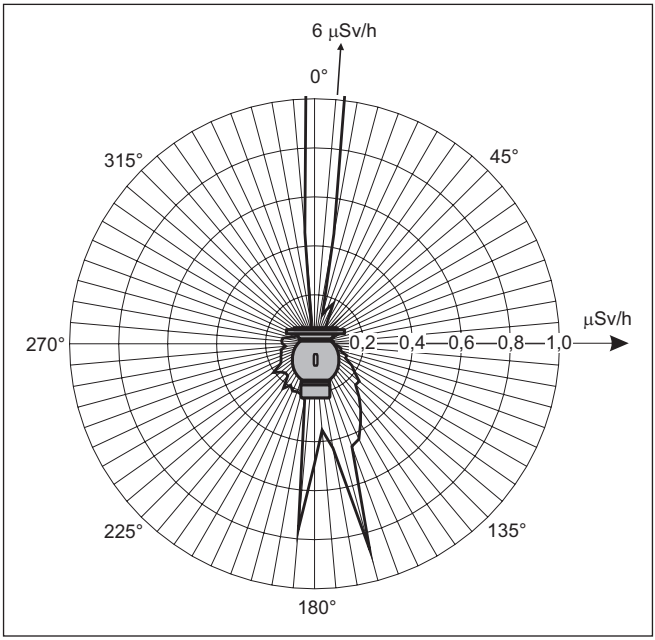

Fig. 45: Dose rate diagram (distance: 1 m) - example: source holder VEGASOURCE 35 with Cs-137, 1000 mCi (37 GBq)

Ambient conditions	
Ambient pressure	Atmospheric pressure
Ambient temperature (flange temperature)	
– VEGASOURCE 35 with manual switching mechanism	-40 … +200 °C (-40 … +392 °F)
– VEGASOURCE 35 with pneumatic switching mechanism	-20 … +80 °C (-4 … +176 °F)
Vibration resistance	DIN EN 60068-2-64 test Fh; 10 … 2000 Hz; 1 g^2/Hz
Flame resistance	
– VEGASOURCE 35 all versions	538 °C (1000 °F) for 5 min.
– VEGASOURCE 35 fire-proof version	821 °C (1510 °F) for 30 min.

Protective measures	
Protection rating	IPx6 (NEMA Type 4)

9.2 Dimensions

VEGASOURCE 35, version A

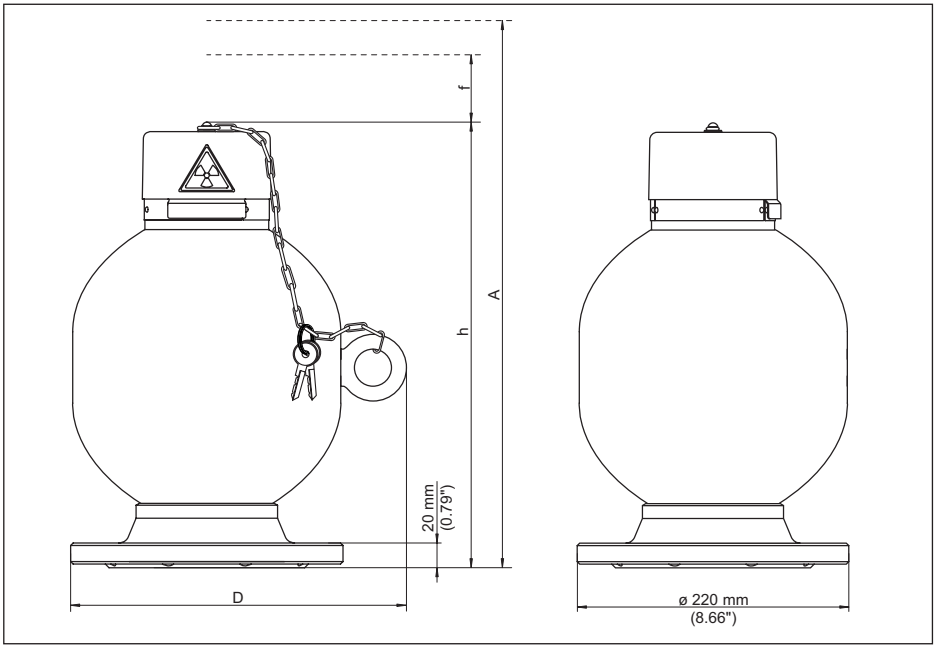

Fig. 46: Source holder VEGASOURCE 35, version A (source insert for manual ON/OFF switching, key lock for securing the switch position ON or OFF, protective cover)

D Max. width = 272 mm (10.71 in)
h Instrument height = 360 mm (14.17 in)
f Free space to remove the cover = 75 mm (2.95 in)
A Free height for exchanging the source = 560 mm (22.05 in)

The mounting flange is compatible with DIN DN 100 PN 16, ø 180 mm (7.09 in) and ASME from 4", 150 lbs, ø 190 mm (7.48 in)

Features

- Source insert for manual switching ON/OFF
- Key lock for securing the switch position ON or OFF
- Cover hood

VEGASOURCE 35, version B

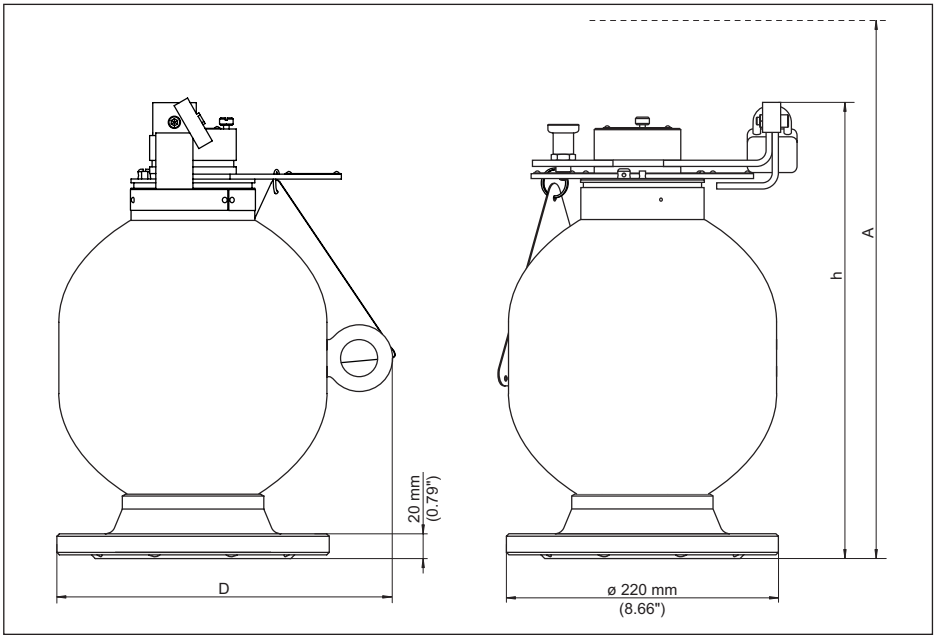

Fig. 47: Source holder VEGASOURCE 35, version B (stirrup for manual ON/OFF switching, fixing pin for securing the switch position ON, padlock for securing the switch position OFF)

D Max. width = 272 mm (10.71 in)
h Instrument height = 368 mm (14.49 in)
A Free height for exchanging the source = 580 mm (22.84 in)

The mounting flange is compatible with DIN DN 100 PN 16, ø 180 mm (7.09 in) and ASME from 4", 150 lbs, ø 190 mm (7.48 in)

Features

- Stirrup for manual switching on/off
- Fixing pin for securing the switch position ON
- Padlock for securing the switch position OFF

VEGASOURCE 35, version C

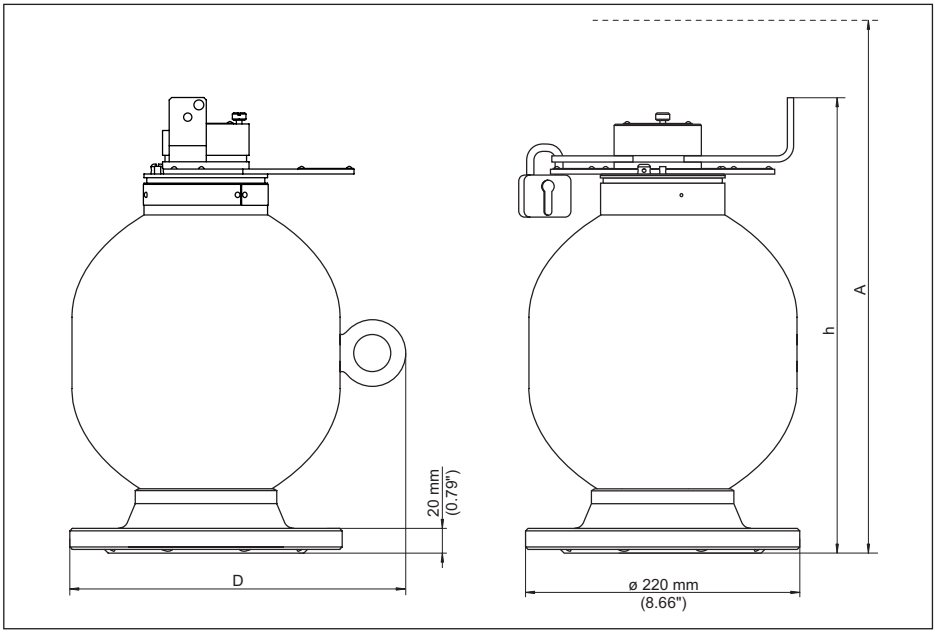

Fig. 48: Source holder VEGASOURCE 35, version C (stirrup for manual ON/OFF switching, padlock to secure the switch position ON or OFF)

D Max. width = 272 mm (10.71 in)
h Instrument height = 368 mm (14.49 in)
A Free height for exchanging the source = 570 mm (22.44 in)

The mounting flange is compatible with DIN DN 100 PN 16, ø 180 mm (7.09 in) and ASME from 4", 150 lbs, ø 190 mm (7.48 in)

Features

- Stirrup for manual switching on/off
- Padlock for securing the switch position ON or OFF

VEGASOURCE 35, version D

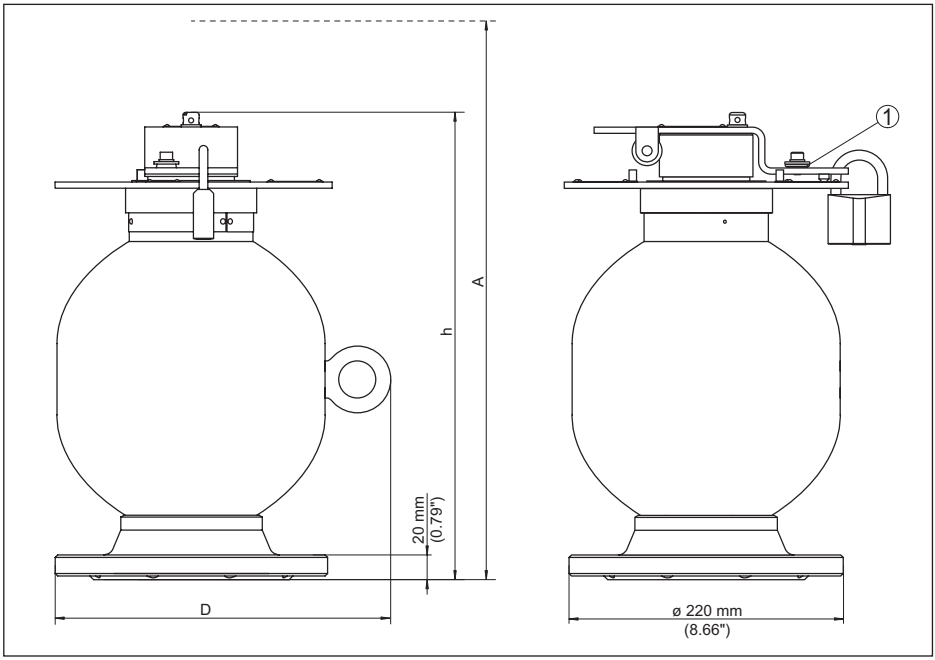

Fig. 49: Source holder VEGASOURCE 35, version D

D Max. width = 272 mm (10.71 in)
h Instrument height = 378 mm (14.88 in)
A Free height for exchanging the source = 578 mm (22.76 in)
1 Reference O-ring

The mounting flange is compatible with DIN DN 100 PN 16, ø 180 mm (7.09 in) and ASME from 4", 150 lbs, ø 190 mm (7.48 in)

Features

- Greater protection against dust and moisture
- Stirrup for manual switching on/off
- Padlock for securing the switch position ON or OFF

VEGASOURCE 35, version E

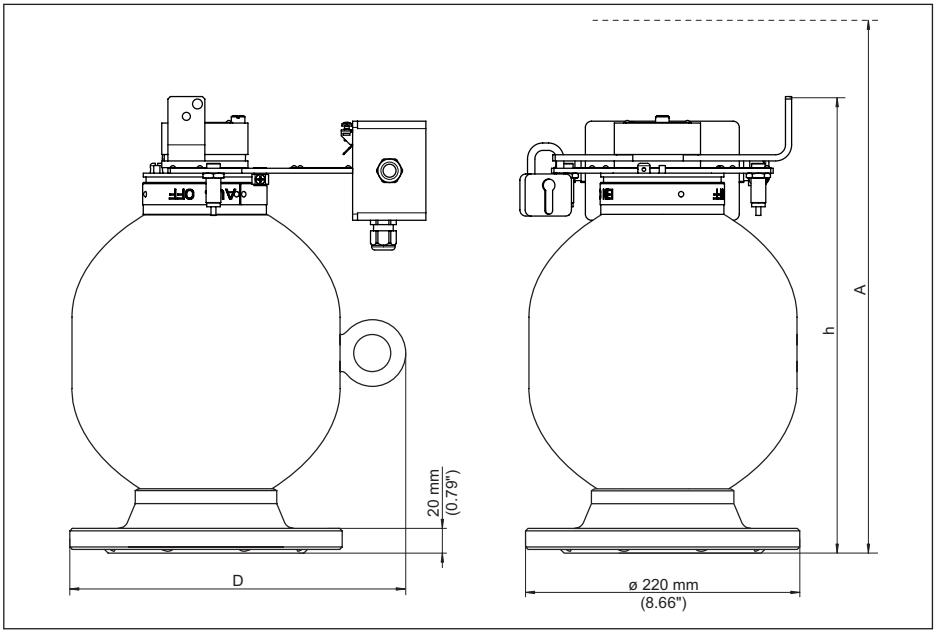

Fig. 50: Source holder VEGASOURCE 35, version E (stirrup for manual ON/OFF switching, padlock for securing the switch position ON or OFF), in addition with electrical position indicators

D Max. width = 272 mm (10.71 in)
h Instrument height = 368 mm (14.49 in)
A Free height for exchanging the source = 570 mm (22.44 in)

The mounting flange is compatible with DIN DN 100 PN 16, ø 180 mm (7.09 in) and ASME from 4", 150 lbs, ø 190 mm (7.48 in)

Features

- Stirrup for manual switching on/off
- Padlock for securing the switch position ON or OFF
- Electrical position indicators for feedback of the switching status

VEGASOURCE 35, version K, L

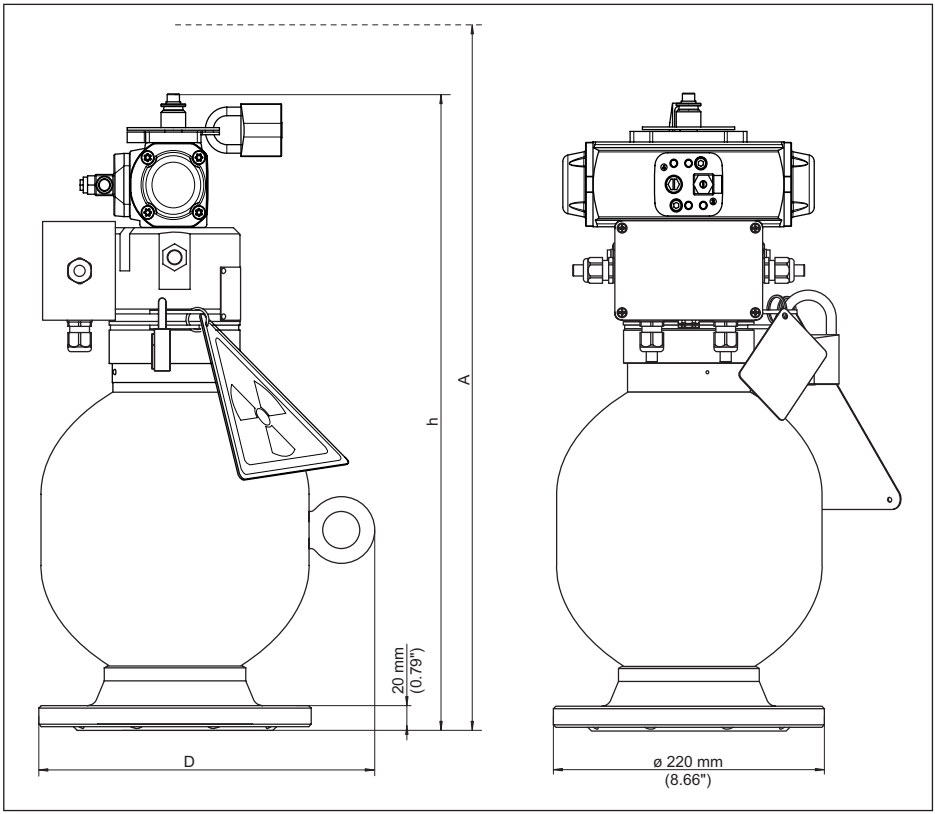

Fig. 51: Source holder VEGASOURCE 35, version K, L

D Max. width = 272 mm (10.71 in)
h Instrument height = 500 mm (19.69 in)
A Free height for exchanging the source = 602 mm (23.7 in)

The mounting flange is compatible with DIN DN 100 PN 16, ø 180 mm (7.09 in) and ASME from 4", 150 lbs, ø 190 mm (7.48 in)

Features

- Pneumatic switching on/off
- Padlock for securing the switch position OFF

VEGASOURCE 35, version M, N

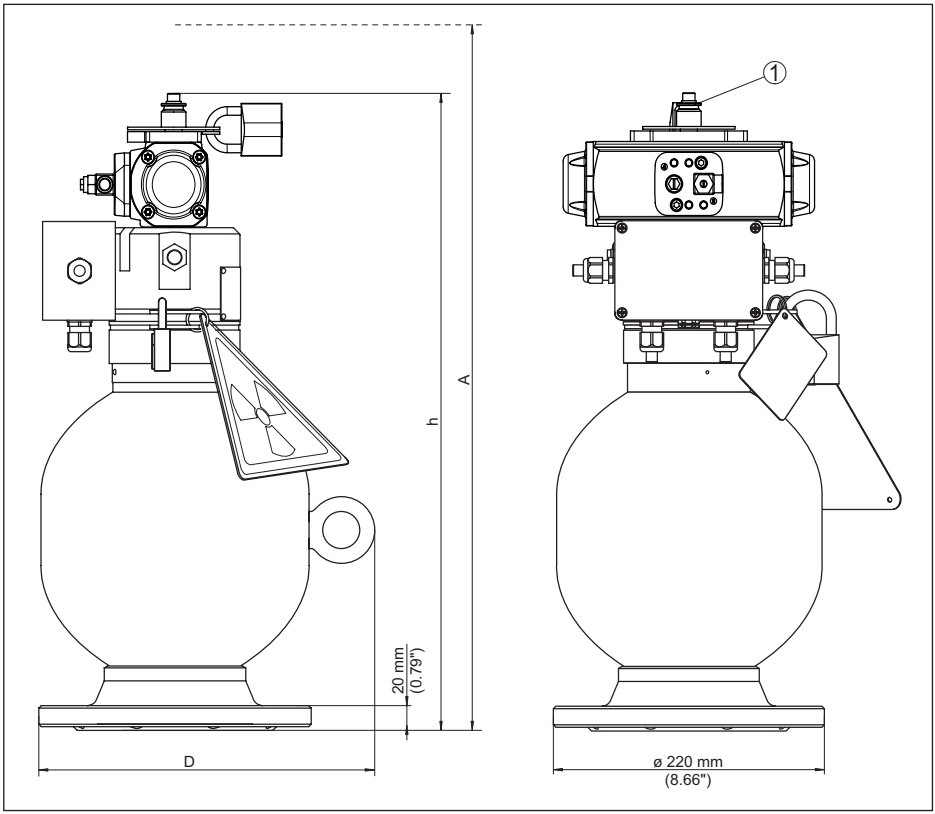

Fig. 52: Source holder VEGASOURCE 35, version M, N

D Max. width = 272 mm (10.71 in)
h Instrument height = 500 mm (19.69 in)
A Free height for exchanging the source = 602 mm (23.7 in)
1 Reference O-ring

The mounting flange is compatible with DIN DN 100 PN 16, ø 180 mm (7.09 in) and ASME from 4", 150 lbs, ø 190 mm (7.48 in)

Features

- Greater protection against dust and moisture
- Pneumatic switching on/off
- Padlock for securing the switch position OFF

VEGASOURCE 35, beam exit channel

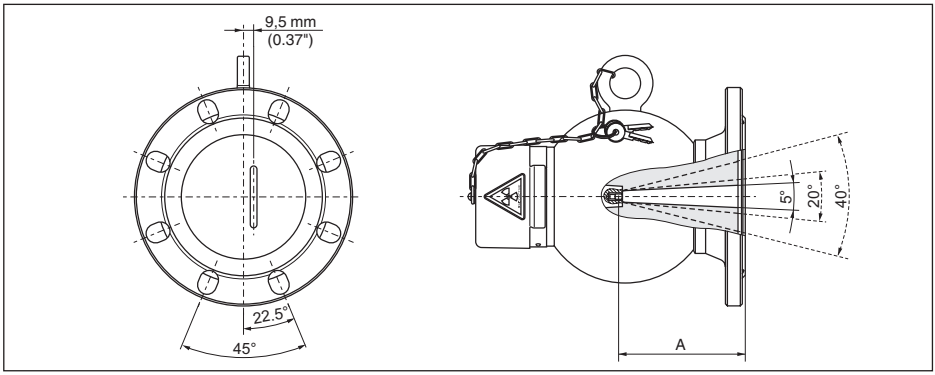

Fig. 53: Beam exit channel (e.g. version A)

A 166 mm (6.54 in)

VEGASOURCE 35, fire-proof version (optional)

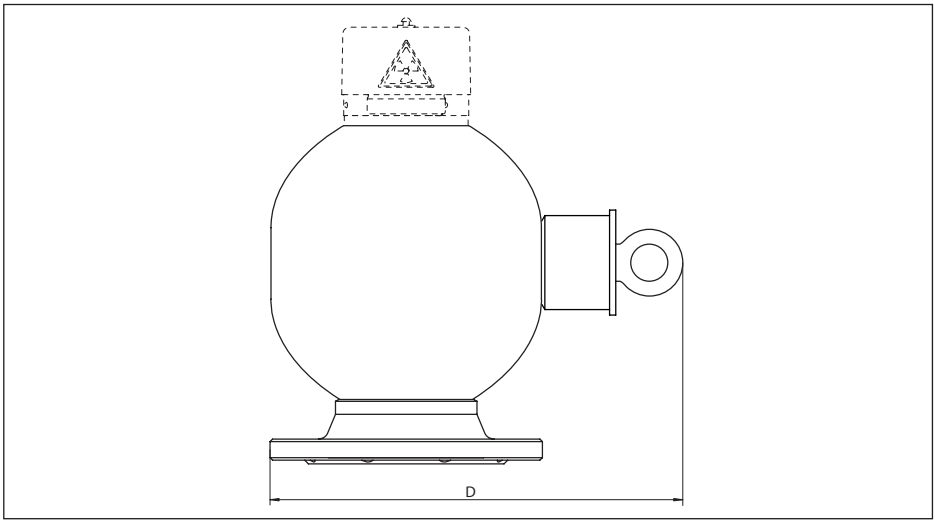

Fig. 54: Source holder VEGASOURCE 35, fire-proof version (optional)

D Max. width = 362 mm (14.25 in)

Gamma modulator (optional)

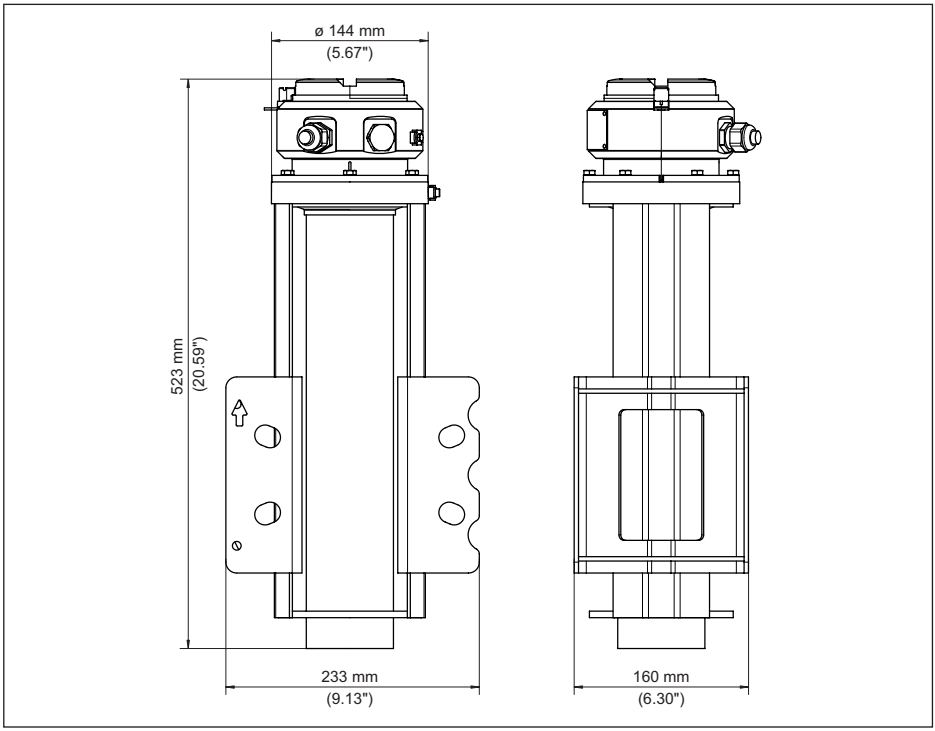

Fig. 55: Gamma modulator for uninterrupted measurement even with X-ray radiation

Mounting brackets KV 31, for pipes from 50 … 220 mm (1.97 … 8.66 in) for 30° diagonal irradiation

Fig. 56: Mounting brackets for diagonal mounting on pipes from 50 … 220 mm (1.97 … 8.66 in)

Mounting brackets KV 31, for pipes from 50 … 220 mm (1.97 … 8.66 in)

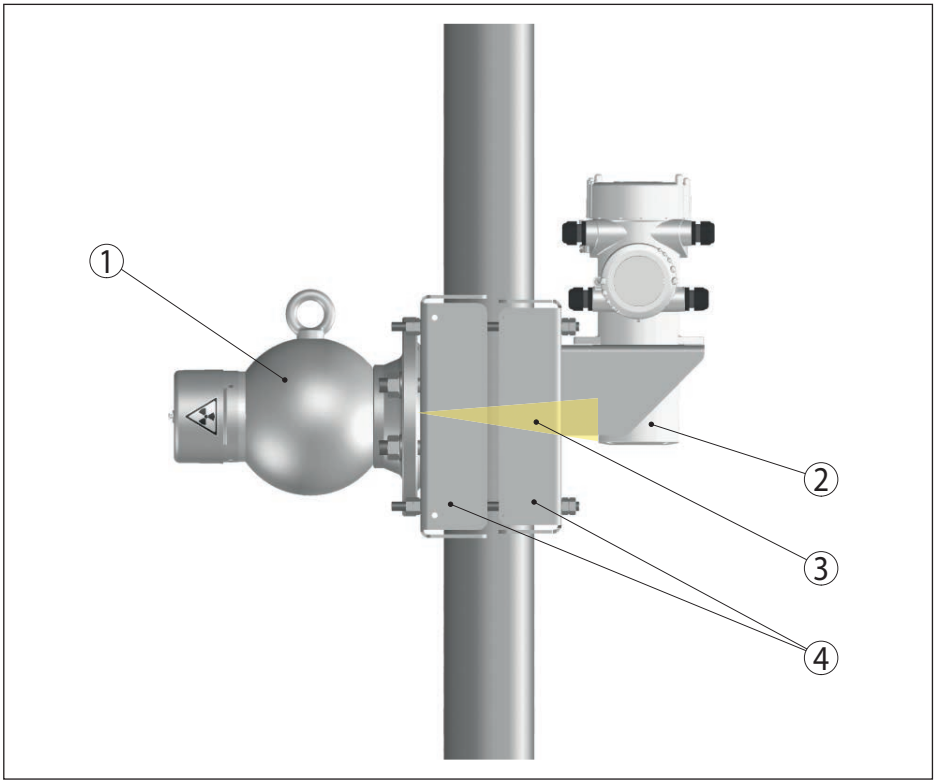

Fig. 57: Mounting brackets for mounting on pipes from 50 … 220 mm (1.97 … 8.66 in) for 30° diagonal irradiation

1 *Source holder (VEGASOURCE)*
2 *Radiometric sensor (MINITRAC)*
3 *Radiated area*
4 *Mounting bracket*

Mounting brackets KV 31, for pipes from 50 … 220 mm (1.97 … 8.66 in)

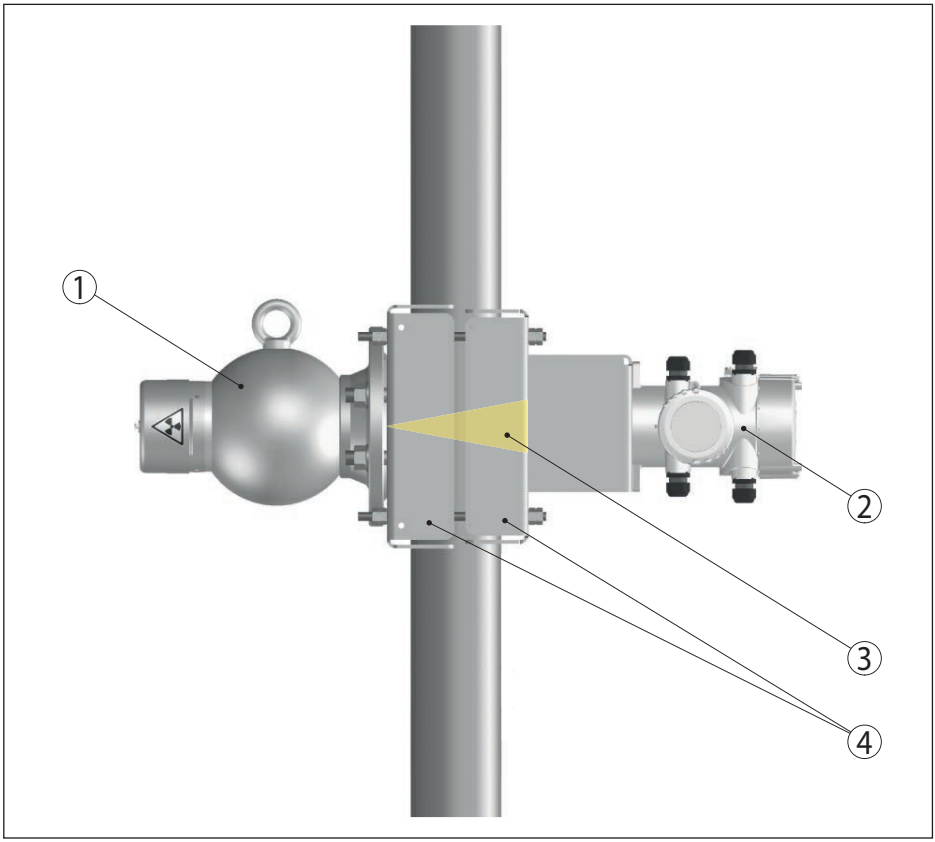

Fig. 58: Mounting brackets for mounting on pipes from 50 … 220 mm (1.97 … 8.66 in)

1 *Source holder (VEGASOURCE)*
2 *Radiometric sensor (MINITRAC)*
3 *Radiated area*
4 *Mounting bracket*

9.3 Manufacturer declaration

Herstellererklärung

Manufacturer Declaration
Declaración del fabricante

VEGA Grieshaber KG, Am Hohenstein 113, 77761 Schiltach

erklärt, dass der Strahlenschutzbehälter
declares, that the source containers
declara, que los contenedores de las fuentes

VEGASOURCE 31, VEGASOURCE 35

den Anforderungen über die internationale Beförderung gefährlicher Güter (ADR/RID, DGR/IATA) an ein TYP A Versandstück entspricht. Die Strahlenschutzbehälter sind für den Transport von umschlossenen radioaktiven Stoffen und von umschlossenen Stoffen in besonderer Form vorgesehen.

conforms to the requirements on international transportation of hazardous materials (ADR/RID, DGR/IATA) for TYPE A packaging and is designed for the transportation of sealed radioactive materials as well as special kind sealed radioactive materials.

están conformes a los requerimientos del transporte internacional de materiales peligrosos (ADR/RID, DGR/IATA) para el embalaje TIPO A y está diseñado para el transporte de materiales radiactivos sellados así como los materiales radiactivos sellados de clase especial

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29. March 2011

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R&D Director

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38132-EN-200224

Printing date:

38132-EN-200224

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