Quick setup guide

VEGASOURCE 35

Source holder

Document ID: 62091

Contents

Information:
This quick setup guide enables quick setup and commissioning of your instrument.

You can find supplementary information in the corresponding, more detailed Operating Instructions Manual as well as the Safety Manual that comes with instruments with SIL qualification. These manuals are available on our homepage.

Operating instructions VEGASOURCE 35: Document-ID 38132
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1 For your safety

1.1 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:

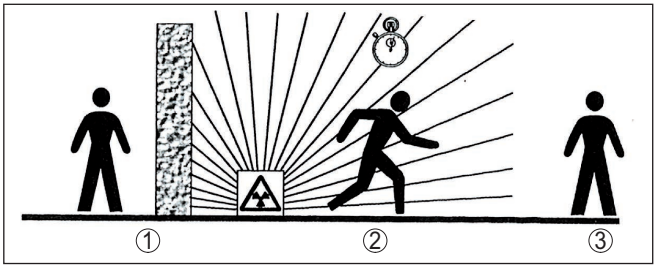

Fig. 1: Measures for protection against radioactive radiation

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.

1.2 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*".

1.3 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.

1.4 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.

1.5 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.

1.6 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.

1.7 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*"

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2 Product description

2.1 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.

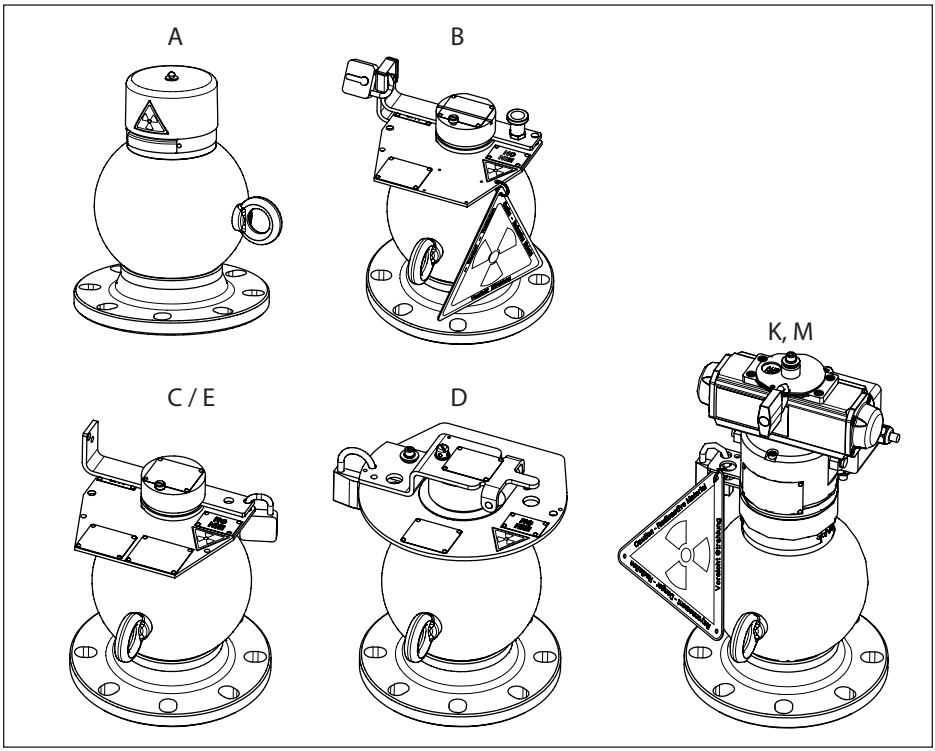

Fig. 2: Versions VEGASOURCE 35 (Overview)

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

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

2.2 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:

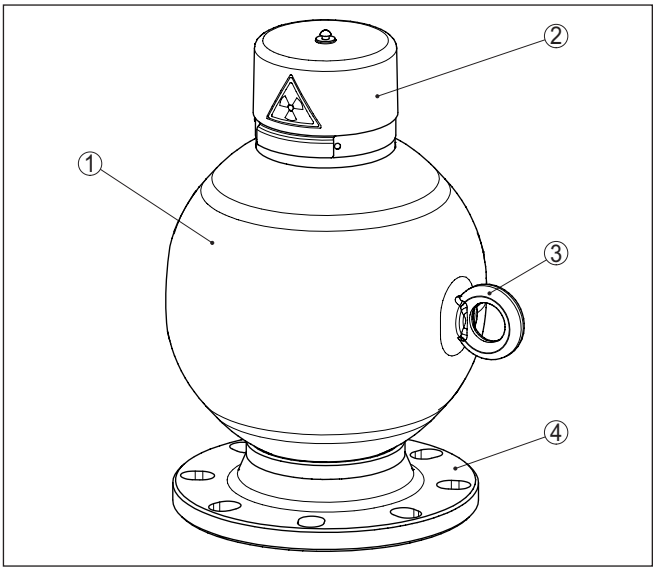

Fig. 3: Source holder VEGASOURCE 35

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 Mounting

3.1 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.

3.2 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.

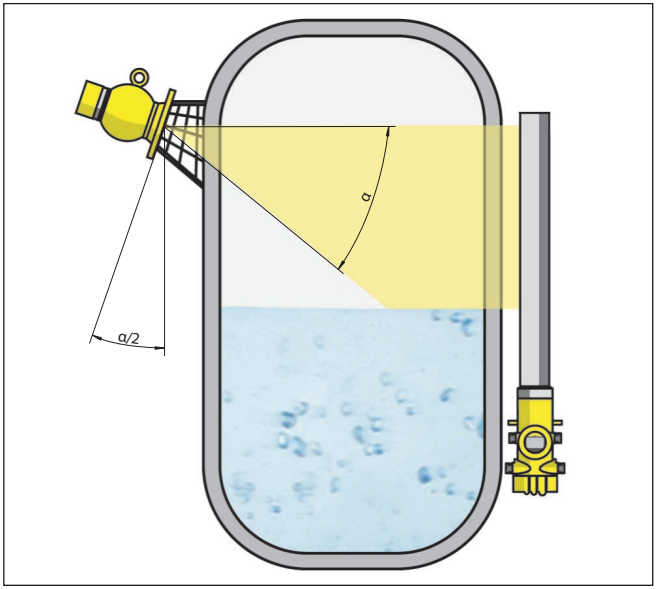

Fig. 4: Orientation - Source holder

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.

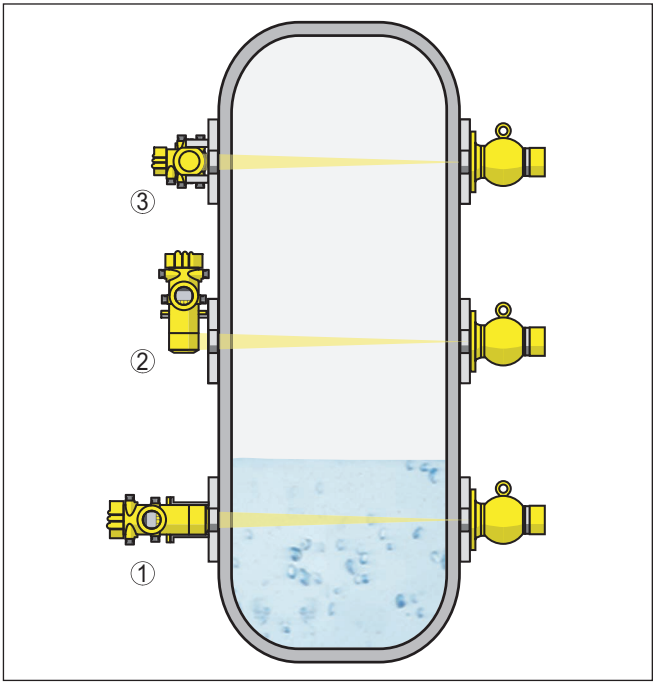

Fig. 5: Installation positions - Point level detection with MINITRAC 31

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°.

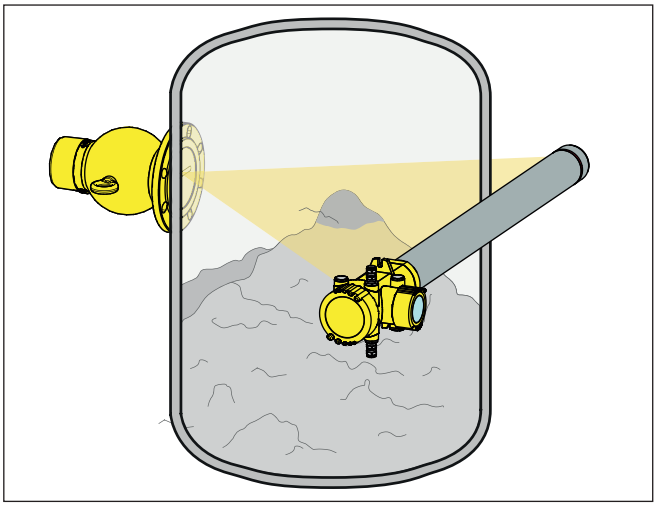

Fig. 6: Point Level detection with SOLITRAC 31

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. 7: 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.

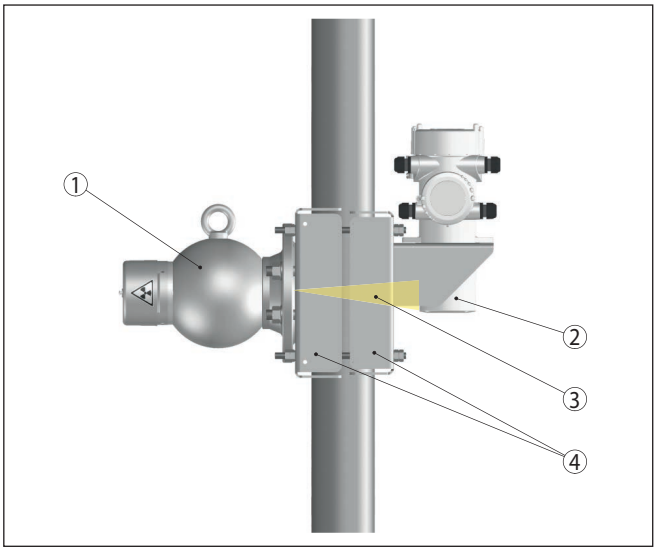

Fig. 8: Measurement setup on a pipeline with a diameter of 50 … 420 mm (1.97 … 16.54 in), detector mounting vertical

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.

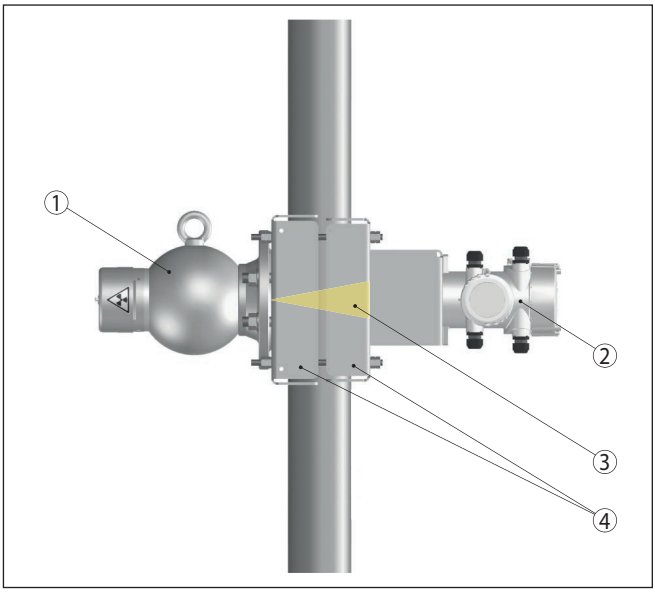

Fig. 9: Measurement setup on a pipeline with a diameter of 50 … 420 mm (1.97 … 16.54 in), detector mounting horizontal

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.

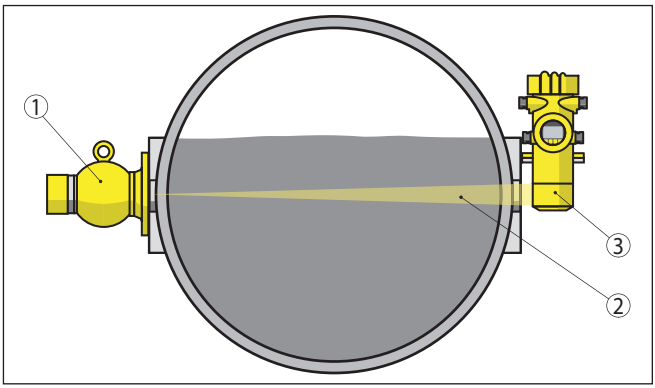

Fig. 10: Measurement setup on a horizontal pipeline

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

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.

4 Setup

4.1 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.

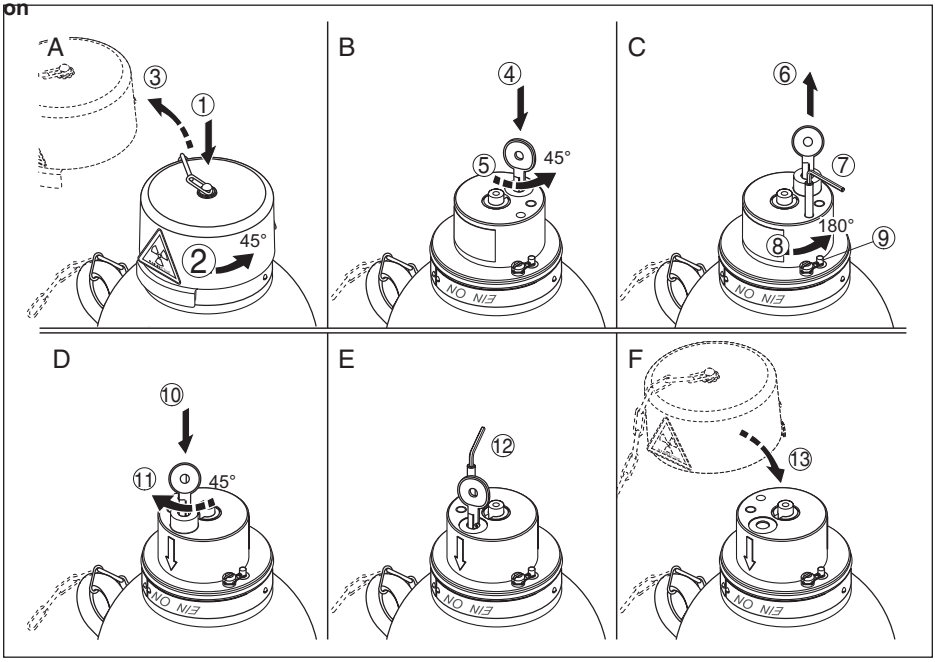

Fig. 11: Switching the radiation on - VEGASOURCE 35 version A

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

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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.

4.2 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.

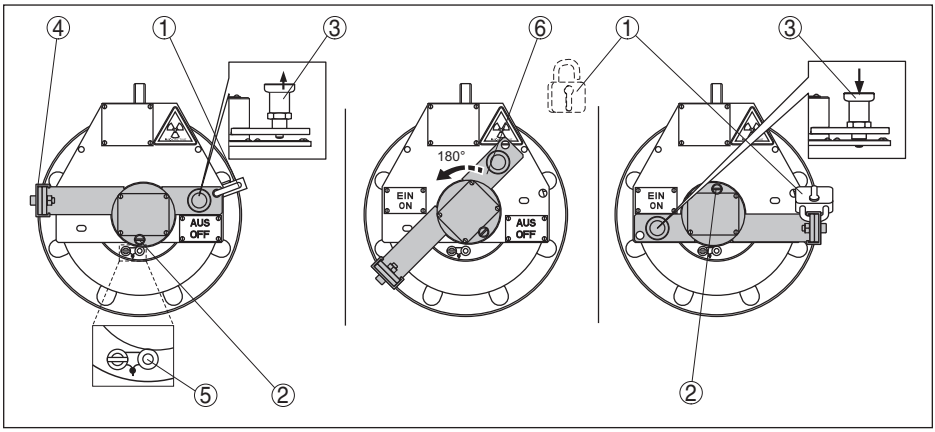

Fig. 12: Switching the radiation on - VEGASOURCE 35 version B

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.

4.3 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.

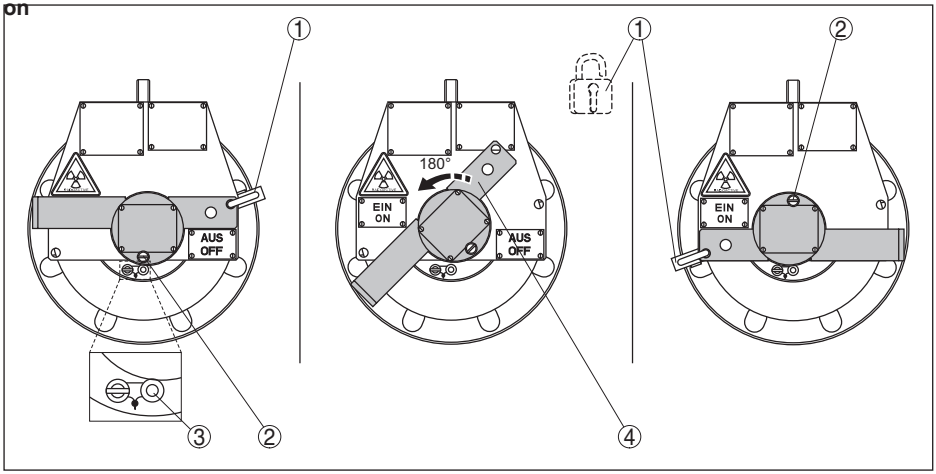

Fig. 13: Switching the radiation on - VEGASOURCE 35 version C, E

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.

4.4 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.

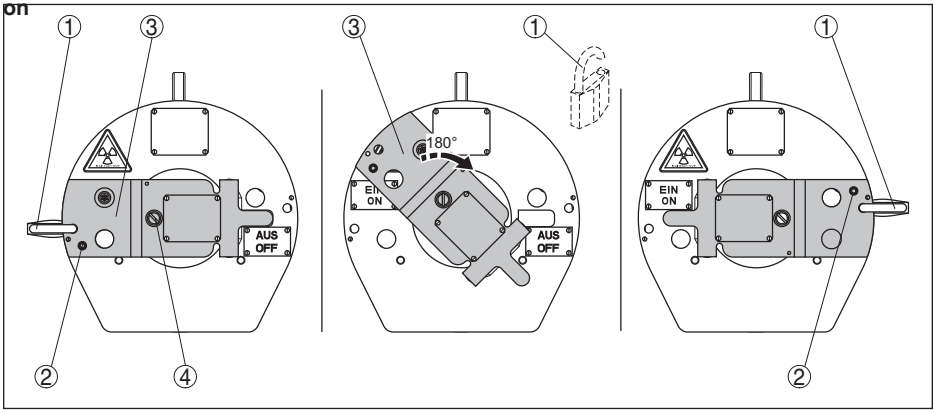

Fig. 14: Switching the radiation on - VEGASOURCE 35 version D

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.

4.5 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.

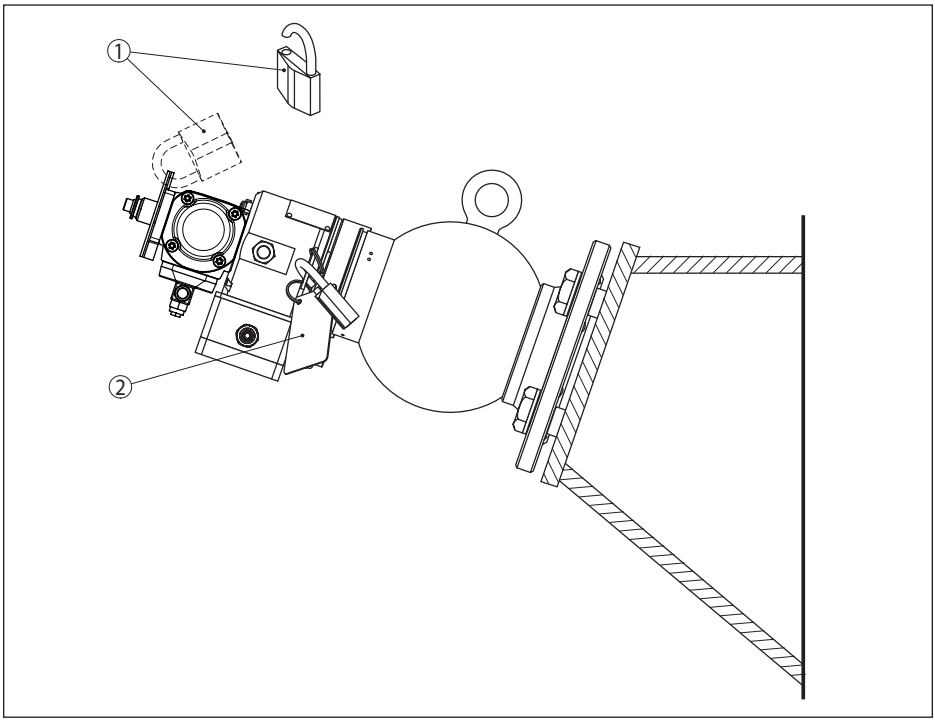

Fig. 15: Switching on the radiation with pneumatic switching facility - VEGASOURCE 35 version K, M

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.

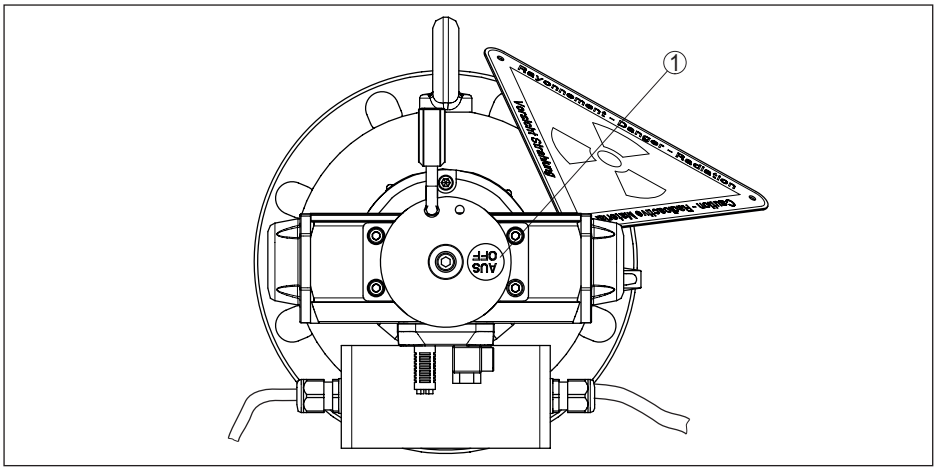

Fig. 16: Indication of the switching status with VEGASOURCE 35 - version K, M

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.

5 Maintenance and fault rectification

5.1 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.

5.2 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.

5.3 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.

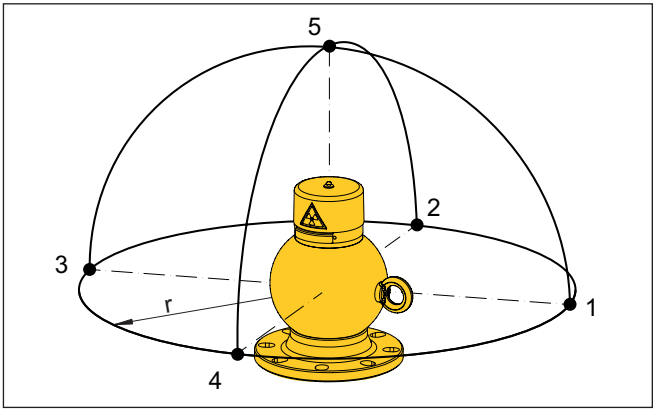

Fig. 17: Measuring points for the measurement of the local dose rate

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. 4: Measurement protocol for the local dose rate

5.4 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:

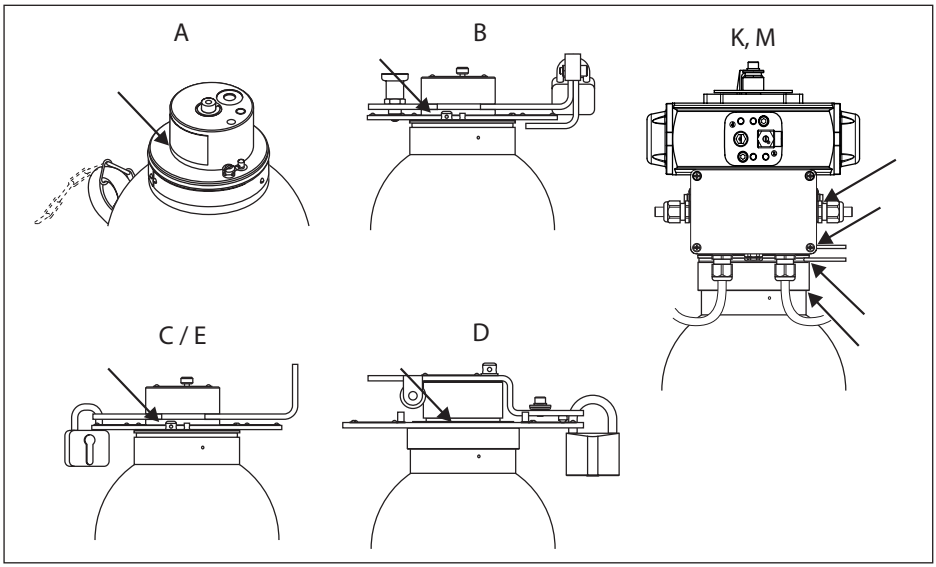

Fig. 18: Wiping surfaces for the tightness test

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).

5.5 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.

5.6 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.

6 Supplement

6.1 Technical data

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)
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

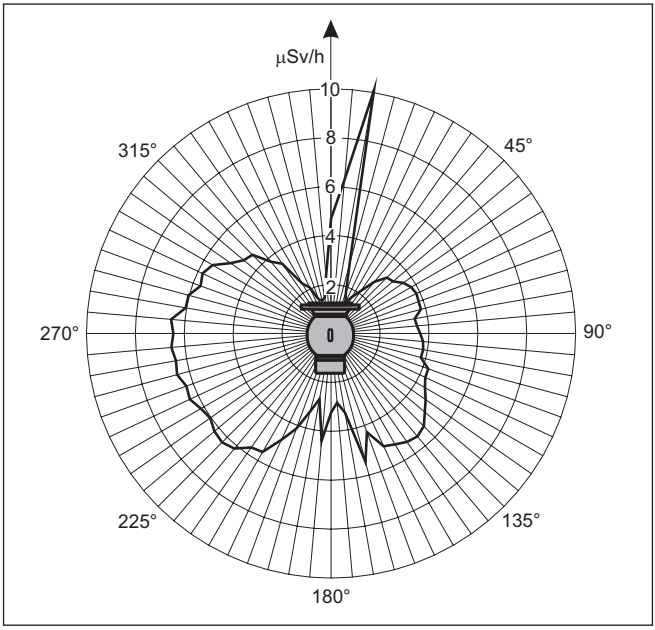

Fig. 19: Dose rate diagram (distance: 1 m) - example: source holder VEGASOURCE 35 with Co-60, 100 mCi (3.7 GBq)

Dose rate diagram for Cs-137

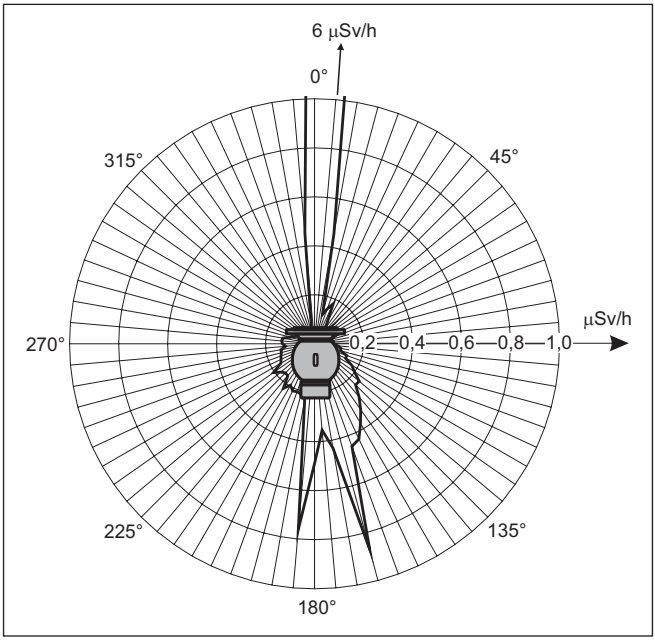

Fig. 20: Dose rate diagram (distance: 1 m) - example: source holder VEGASOURCE 35 with Cs-137, 1000 mCi (37 GBq)

6.2 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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