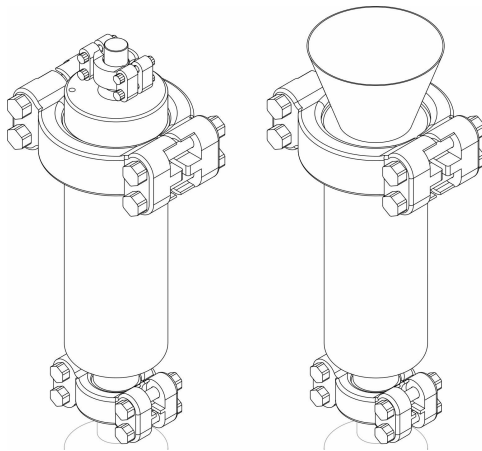


Special Documentation

Process adapter FHG74-C for source container FQG74

Process adapter FHG74-C for source container
FQG74



1 About this document

1.1 Document function

This document describes how to handle and mount the process adapter. It may only be used as additional documentation in conjunction with the Operating Instructions. All of the basic information in the Operating Instructions is also valid for this document without restriction.

1.2 Symbols

1.2.1 Safety symbols

⚠ DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠ WARNING

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠ CAUTION

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.2.2 Radiation warning sign



Warning symbol for radioactive source according to ISO 7010

Warning sign for ionizing radiation

Identification of places and objects in and around which the presence of ionizing radiation is to be expected.



Warning symbol for highly radioactive source according to ISO21482

High radiation warning sign

- Warns of highly radioactive substances or ionizing radiation.
- Highly radioactive sources are marked separately on the source containers with the wording "highly radioactive source" and the supplemental warning symbol according to ISO21482.

1.2.3 Symbols for certain types of information and graphics

Permitted

Procedures, processes or actions that are permitted

Forbidden

Procedures, processes or actions that are forbidden

Tip

Indicates additional information



Reference to documentation



Reference to graphic



Notice or individual step to be observed

1., **2.**, **3.**

Series of steps



Result of a step

1, 2, 3, ...

Item numbers

A, B, C, ...

Views

→ Safety instructions

Observe the safety instructions contained in the associated Operating Instructions

1.2.4 Tool symbols



Phillips head screwdriver



Flat-blade screwdriver



Torx screwdriver



Allen key



Open-ended wrench



Wire cutter

1.3 Documentation



For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

Operating Instructions for source container FQG74 with up to 12 radiation sources, detachable source magazine: BA02365F

2 Basic safety instructions



Noncompliance with national rules and regulations for the handling and storage of radiation sources.

Legal consequences and dangers from errors in the handling of radiation sources.


- ▶ Follow the instructions of radiation safety officers.



Danger from ionizing radiation in case of incorrect handling or a defective source container

Hazard for persons and the environment posed by ionizing radiation and contamination. Ionizing radiation and contamination could increase the risk of cancer and the risk of genetic birth defects. Depending on the dose received, ionizing radiation could lead to immediate physical harm, such as nausea, vomiting, hair loss, changes to blood count, serious tissue damage and even death.

- ▶ **The instructions and warning notes in this manual relating to dangers to health posed by ionizing radiation and contamination must be strictly observed. Disregard for these instructions and warning notes could lead to serious injuries or death and hazards for the environment.**
- ▶ Observe applicable national requirements for radioactive radiation sources. Observe requirements for fire protection measures in particular.
- ▶ Observe the conditions of use of radiation sources with respect to environmental conditions (e.g. vibration or operating temperature).
- ▶ In cases of doubt, contact the responsible radiation safety officer, the responsible national inspectorate or the manufacturer.

Information on potential risks from ionizing radiation is marked with the  warning symbol in these instructions.

 DANGER**Danger from ionizing radiation if radiation sources lost**

If radiation sources are lost, there is a danger to the general public and the environment

- ▶ **The instructions and warning notes in this manual relating to dangers to health posed by ionizing radiation and contamination must be strictly observed. Disregard for these instructions and warning notes could lead to serious hazards for the environment and public safety.**
- ▶ Observe applicable national requirements for anti-theft measures for radioactive radiation sources throughout the entire life cycle (from delivery to disposal).
- ▶ There is a risk of radioactive material being used for criminal or premeditated unauthorized acts, which poses a threat to public safety.

 WARNING**Risk of accident from heavy gross weight**

During assembly: If source containers are assembled incorrectly, there is an impact danger to persons in the event of a dropped load and a risk of serious damage to physical items. During transport: In the event of incorrect or unsecured transport of the source container and overpack (loads), there is a risk that persons could go unnoticed or suffer impact because it is not possible to stop in time. Due to a high center of gravity or uneven weight distribution, there is also the risk of the load tipping, which poses a serious risk of personal injury. For suspended loads: There is the danger of persons being impacted by falling loads or parts thereof, of being impacted by moving suspended loads or of bumping into stationary suspended loads. Parts of the overpack and attachment parts of the source container could weigh over 18 kg.

- ▶ Observe the assembly instructions.
- ▶ Inspect the assembly diligently and check at regular intervals.
- ▶ Observe safety instructions and transport conditions for heavy loads.
- ▶ Wear personal protective equipment.
- ▶ Lift source containers only at the defined lifting points.
- ▶ Use only appropriate lifting accessories for the load.
- ▶ During assembly and transport, only those persons who are directly involved and have knowledge of guidance and requirements may be present in the danger zone.
- ▶ During transport, the center of gravity of the packaging must be taken into consideration and a suitable surface must be ensured.

2.1 Requirements for personnel

 WARNING**Danger from inadequately qualified personnel.**

Physical damage and personal injury. Particularly as a consequence of incorrect handling.

- ▶ The requirements for personnel described below are mandatory for the plant operator.

Operating, installation and servicing personnel

Operating, installation and servicing personnel are responsible for operation, installation, commissioning, maintenance, monitoring and disassembly. Operating, installation and servicing personnel must satisfy the following conditions without exception:

- ▶ qualified specialists having the appropriate qualification for the relevant function and task and meeting the relevant national requirements,
- ▶ accredited and monitored in relation to radiation exposure,
- ▶ specialists qualified in radiation protection,
- ▶ authorized by the plant operator and
- ▶ familiar with national regulations.

Authorized repair personnel

Authorized repair personnel are

- ▶ qualified specialists having the appropriate qualification for the relevant function and task and meeting the relevant national requirements,
- ▶ authorized by the plant operator and
- ▶ familiar with national regulations.

Maintenance personnel – radiation

The maintenance personnel – radiation carry out maintenance work involving the radiation source or are responsible for its removal or replacement. The maintenance personnel – radiation are

- ▶ accredited and monitored in relation to radiation exposure
- ▶ specialists qualified in radiation protection and
- ▶ authorized by the plant operator.

Transport personnel

Transport personnel transport the product or parts thereof from, for example, the manufacturer or storage location to the point of use. Transport personnel

- ▶ are qualified to transport "Class 7 dangerous goods".

Disposal personnel

Disposal personnel dispose of the product or parts thereof. Disposal personnel are

- ▶ accredited and monitored in relation to radiation exposure,
- ▶ specialists qualified in radiation protection and
- ▶ authorized by the disposal company.

Radiation safety officer

The radiation safety officer is responsible for compliance with all applicable laws and regulations. The company/plant operator must nominate a radiation safety officer in accordance with applicable national legislation. The radiation safety officer is, among other things, responsible for

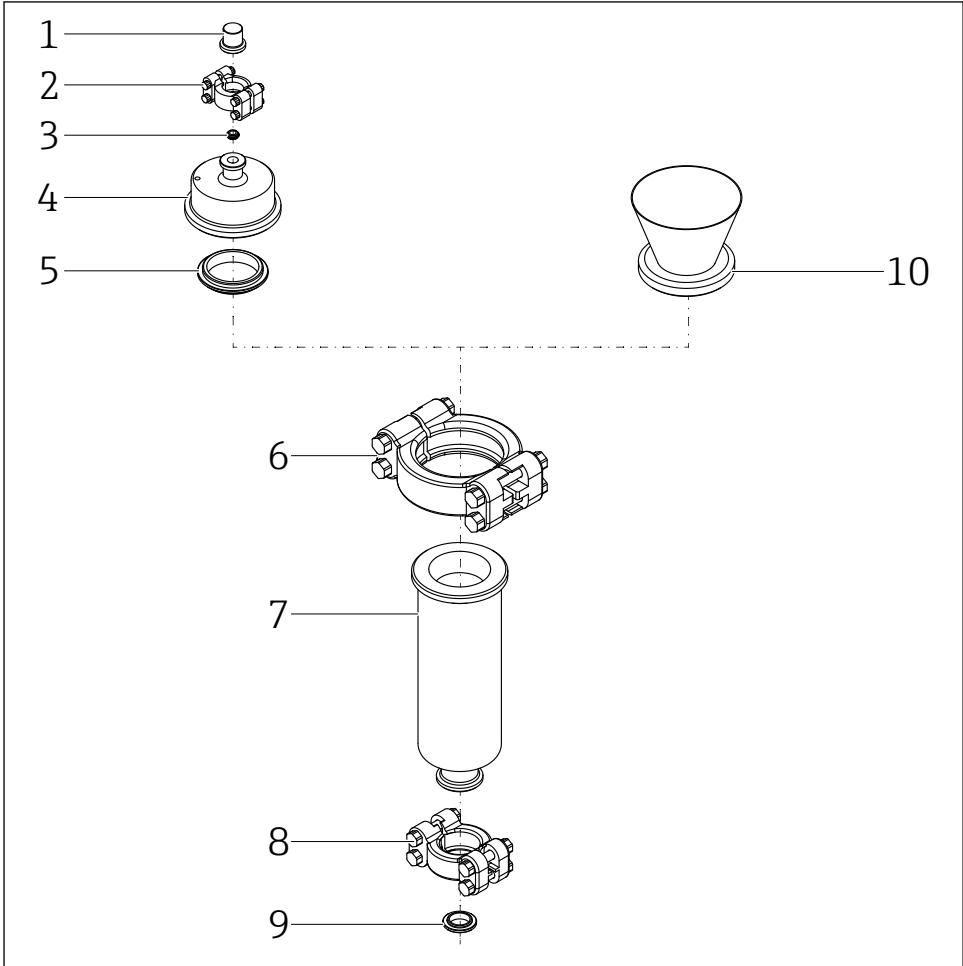
- ▶ monitoring the source container at the respective point of use,
- ▶ the training of employees in the context of radiation protection and
- ▶ developing and implementing measures in an emergency. The radiation safety officer is therefore reachable at all times.

The radiation safety officer is

- ▶ qualified for the task,
- ▶ a nationally recognized person for the task and
- ▶ a specialist authorized by the plant operator.

3 Product description

3.1 Overview of process adapter FHG74-C (scope of delivery)



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1 Position overview of the process adapter (scope of delivery)

- 1 Dummy cover (1GR4)
- 2 Clamp (1GR)
- 3 Seal (size 4)
- 4 Cover (2GR14 on 1GR4)
- 5 Seal (size 40)
- 6 Clamp (5GR)
- 7 Process adapter (5GR40 on 2GR14)

- 8 Clamp (2GR)
- 9 Seal (size 14)
- 10 Funnel

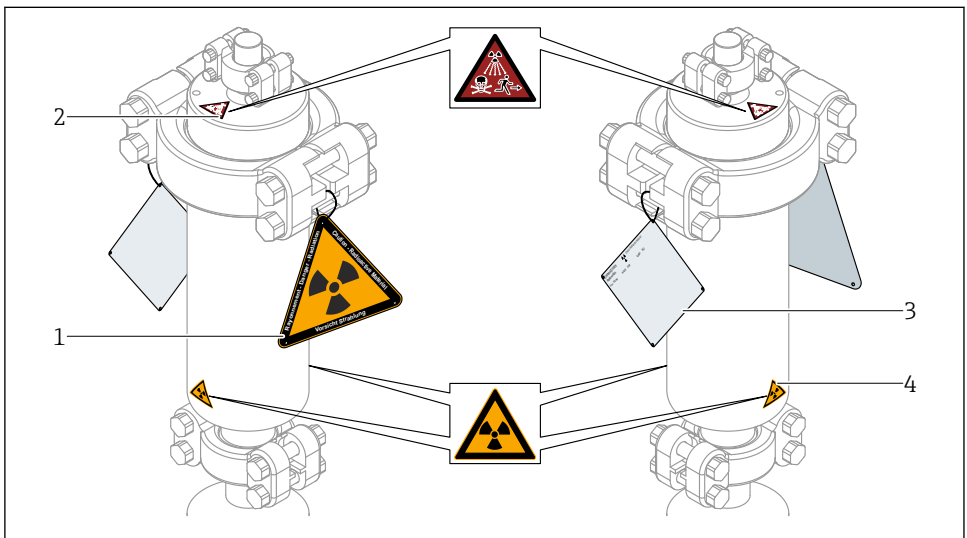
The funnel (item 10) is fitted to the top of the process adapter and fastened with a clamp (5GR). The funnel acts as an insertion aid for the lowerable source holders.

3.2 Radiation warning sign and nameplate of radiation sources



The radiation warning signs are included in the scope of delivery of the FQG74 source container.

- The radiation warning signs warn of ionizing radiation.
- The radiation warning signs and the nameplate of radiation sources must be fitted in the appropriate places.



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2 Position of the radiation warning signs and the nameplate of the radiation sources

- 1 "Caution Radiation" warning sign in stainless steel
- 2 "Highly radioactive" stick-on label, only for highly radioactive radiation sources (1 piece)
- 3 Nameplate of radiation sources. A duplicate of the nameplate for the radiation sources is located on the FQG74 source container.
- 4 "Radioactive" stick-on label (2 pieces)

3.2.1 Radiation warning signs

"Radioactive" stick-on label

Quantity: 2 pcs



3 "Radioactive" ionizing radiation warning symbol

"Highly radioactive" stick-on label

Quantity: 1 pcs

Use of the adhesive label only with a single activity of $^{137}\text{Cs} \geq 100 \text{ GBq}$



4 "Highly radioactive" ionizing radiation warning symbol

"Caution Radiation" warning sign

Including rope and distance sleeve



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5 "Caution Radiation" ionizing radiation warning symbol

3.2.2 Nameplate of radiation sources

i The nameplate of radiation sources is included in the scope of delivery of the FQG74 source container.

This nameplate is a duplicate of the nameplate on the FQG74 source container and must be attached to the FHG74-C process adapter.

The diagram shows a rectangular nameplate for a Gamma Source. At the top left, it says "Gamma Source" and "Radionuclide: 1". To the right is a radiation warning symbol and the text "Caution Radioactive Material!". Further right is a box labeled "3". Below this, there are six columns with headers: "Pos.", "Ser. No", "Activity", "Date", "Length", and "TAG". Each column has a corresponding numbered box: "4" under Pos., "5" under Ser. No, "6" under Activity, "7" under Date, "8" under Length, and "9" under TAG. The entire nameplate is enclosed in a double-line border with small circles at the corners.

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6 Marking of the nameplate for the radiation sources

- 1 Designation of the isotope
- 2 NOTICE: "Highly radioactive source", if required
- 3 2-D matrix code
- 4 Item number of radiation source
- 5 Serial number of radiation source
- 6 Activity of radiation source with unit (MBq or GBq)
- 7 Date of manufacture of radiation source
- 8 LN, nominal length of rope extension
- 9 Measuring point name/tag number

4 Required tools

- Open-ended wrench AF 30
- Open-ended wrench AF 1-1/4"
- Open-ended wrench AF 1-5/8"
- Phillips head screwdriver size 1

5 Mounting the process adapter

DANGER

When the shutter is switched to the ON position, the user will be exposed to unshielded ionizing radiation if the user moves underneath the flange or looks inside.

Ionizing radiation could increase the risk of cancer and the risk of genetic birth defects. Depending on the dose received, ionizing radiation could lead to immediate physical harm, such as nausea, vomiting, hair loss, changes to blood count, serious tissue damage and even death.

- ▶ Always keep away from underneath the flange.
- ▶ Do not look into the exit opening under any circumstances.
- ▶ All precautionary measures for moving the radiation sources have been prepared (process adapter or process connections fitted and open to the top).
- ▶ Persons must be within a protected zone.
- ▶ When the source container is being switched on, personnel must be monitored with respect to their radiation exposure.

DANGER

When the extension ropes are being moved into ON position or OFF position, the user is exposed to ionizing radiation.

Ionizing radiation could increase the risk of cancer and the risk of genetic birth defects.

- ▶ The radiation safety officer must plan the process and minimize the radiation exposure by distance, time and shielding. Instruct the personnel involved in the process.
- ▶ Always keep away from underneath the flange.
- ▶ Do not look into the exit opening under any circumstances.
- ▶ All precautionary measures for moving the radiation sources have been prepared (process adapter or process connections fitted and open to the top).
- ▶ Persons must be within a protected zone.
- ▶ When the source container is being switched on and the radiation sources are moving, personnel must be monitored with respect to their radiation exposure.
- ▶ During lowering, extension ropes must be lowered swiftly and completely.
- ▶ During raising, extension ropes must be pulled swiftly and completely into the source container and the radiation sources must be secured immediately in their parking position.

WARNING

If the process adapter is not secured to the correct torque, it could fall off if the connections rattle loose.

This could result in personal injury or even death as a consequence of impact.

- ▶ Observe the installation instructions.

WARNING

Process adapter not slung on the crane correctly during mounting, leading to possible falling of the process adapter.

This could result in personal injury or even death as a consequence of impact.

- ▶ Observe the installation instructions.

⚠ WARNING

During mounting, a hand could become caught between the flange of the source container and the flange of the process connection.

This could result in serious, possibly irreversible, personal injury in the form of crushed body parts or fractures.

- ▶ Wear protective equipment.
- ▶ Handle heavy loads correctly.

⚠ WARNING

Underestimation of funnel weight, leading to possible falling of the funnel.

This could result in personal injury or even death as a consequence of impact.

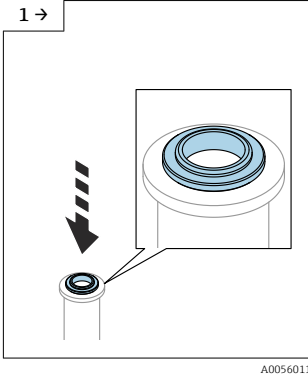
- ▶ Wear protective equipment.
- ▶ The area underneath and around the mounting location must be kept clear during use of the funnel.

⚠ WARNING

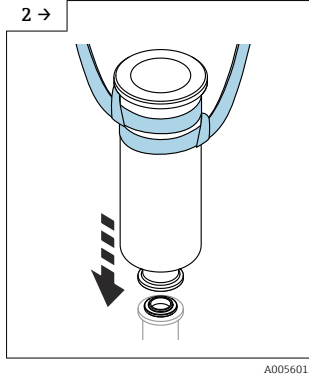
Process adapter secured with incorrect torque during mounting, leading to possible falling of the process adapter from great height with escape of radiation sources from the tank.

Ionizing radiation could increase the risk of cancer and the risk of genetic birth defects.

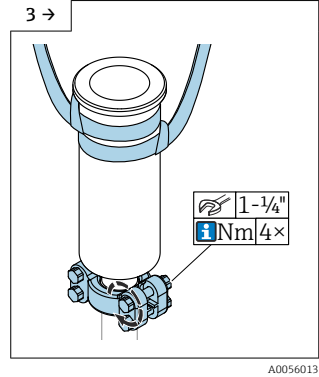
- ▶ During mounting, observe the correct torques of the clamps in accordance with the manufacturer's specifications.
- ▶ Take measures to avoid the possibility of the process adapter falling. Example: provide a chain.



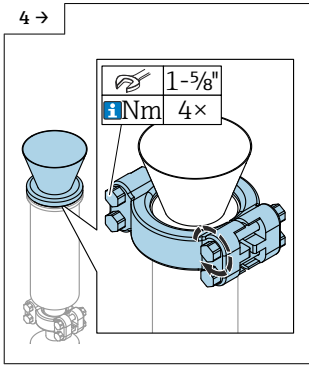
- ▶ Place the seal (size 14) on the customer's process connection.



- ▶ **⚠ WARNING:** Observe the safety instructions at the beginning of this section.
- ▶ Using a crane and two straps, lower the process adapter onto the customer's process connection.

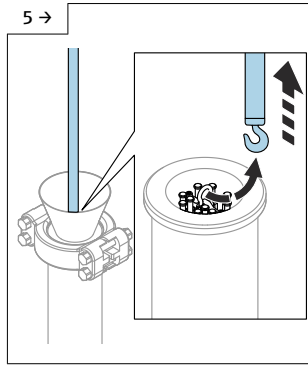


- ▶ **⚠ WARNING:** Observe the safety instructions at the beginning of this section.
- ▶ Secure the process adapter and customer's process connection with the 2GR clamp.
- ▶ **i** Dimension of the clamp screws: 3/4-10 UNC-2.
- ▶ **i** Observe the tightening torque specifications of the clamp manufacturer, Grayloc® Products.



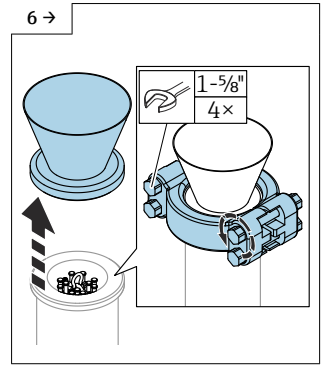
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- ▶ **⚠ WARNING:** Observe the safety instructions at the start of the section.
- ▶ Position the funnel on the process adapter and secure it using the clamp (5GR).
- ▶ **🔧** Tighten the clamp screws finger-tight.



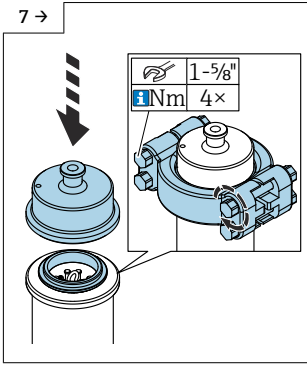
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- ▶ **⚠ DANGER: IONIZING RADIATION. WHEN THE ROPES ARE MOVING, THE USER IS EXPOSED TO IONIZING RADIATION DUE TO UNSHIELDED RADIATION SOURCES!** Observe the safety instructions at the beginning of this section.
- ▶ Lower the complete source magazine into the process adapter.
- ▶ Remove the hook of the transport sling from the shackle of the source magazine.
- ▶ Pull the transport sling up through the source container.

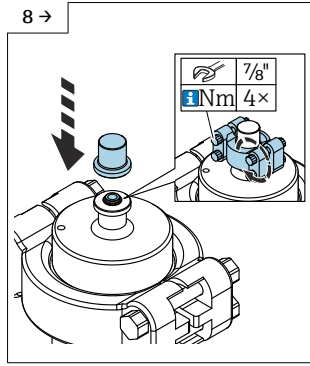


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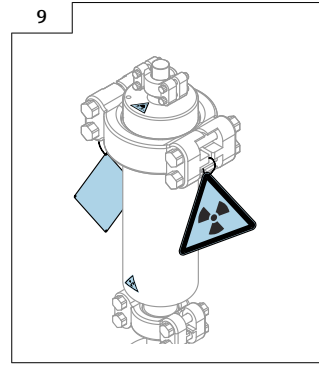
- ▶ **⚠ WARNING: IONIZING RADIATION!** Observe the safety instructions at the beginning of this section.
- ▶ **⚠ WARNING: FALLING PARTS! CONSIDER THE WEIGHT OF THE FUNNEL!** Observe the safety instructions at the beginning of this section.
- ▶ Remove the funnel from the process adapter.



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- ▶ **⚠ WARNING: IONIZING RADIATION!** Observe the safety instructions at the beginning of this section.
 - ▶ Fit the seal (size 40).
 - ▶ Secure the cover of the process adapter (2GR14 on 1GR4) with a clamp (5GR).
 - ▶ **i** Ensure there are no objects inside the process adapter (e.g. transport slings).
 - ▶ **i** Dimension of the clamp screws: 1-8 UNC-2.
 - ▶ **i** Observe the tightening torque specifications of the clamp manufacturer, Grayloc® Products.
- ▶ **⚠ WARNING: IONIZING RADIATION!** Observe the safety instructions at the beginning of this section.
 - ▶ Fit the seal (size 4).
 - ▶ Secure the blind cover (1GR4) with a clamp (1GR).
 - ▶ **i** Dimension of the clamp screws: 1/2-13 UNC-2.
 - ▶ **i** Observe the tightening torque specifications of the clamp manufacturer, Grayloc® Products.
- ▶ **⚠ WARNING: IONIZING RADIATION!** Observe the safety instructions at the beginning of this section.
 - ▶ Affix the radiation warning sign on the process adapter.
 - ▶ Attach the nameplate of the radiation sources to the process adapter.
 - ▶ **i** For a detailed description, see the "Product description" section - > "Radiation warning sign and nameplate of radiation sources".

i Suitable anti-theft measures must be taken by the plant operator.

6 Removing the process adapter

⚠ WARNING

Process adapter not slung on the crane correctly during mounting, leading to possible falling of the process adapter.

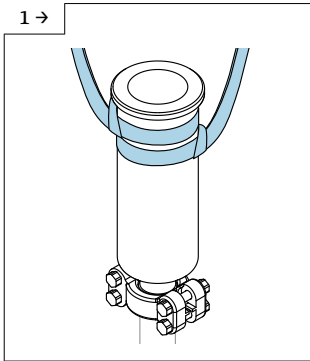
This could result in personal injury or even death as a consequence of impact.

- ▶ Observe the installation instructions.

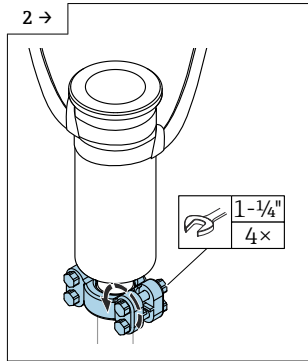
Before removing the process adapter:

If the source magazine is in the process adapter, the source magazine must be pulled into the FQG74 source container.

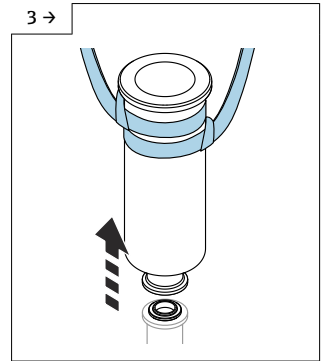
See Operating Instructions BA02365F, "Commissioning" section -> "Switching off the radiation beam for lowerable source magazine"



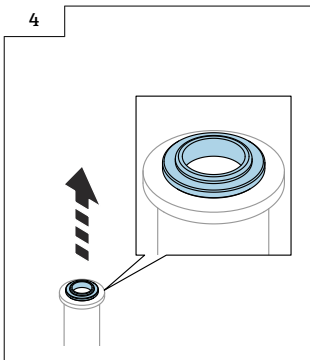
- ▶ **⚠ WARNING:** The source magazine must not be in the process adapter during removal.
- ▶ **⚠ WARNING:** Observe the safety instructions at the beginning of this section.
- ▶ Fit two straps to the process adapter.



- ▶ **⚠ WARNING:** Observe the safety instructions at the beginning of this section.
- ▶ Release the 2GR clamp and remove it.



- ▶ **⚠ WARNING:** Observe the safety instructions at the beginning of this section.
- ▶ Using a crane and two straps, remove the process adapter from the process connection.



- ▶ Remove the seal (size 14) from the process connection.
- ▶ **i** Seal the process connection to prevent penetration by foreign bodies.

NOTICE

Risk of contamination of the protection pipe

The protection pipe, which is now open, can be contaminated by environmental influences.

- ▶ Protect the protection pipe connection from penetration by foreign bodies, liquids or moisture.



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