

Special Documentation

Source container FQG74

Loading, unloading and replacing radiation sources

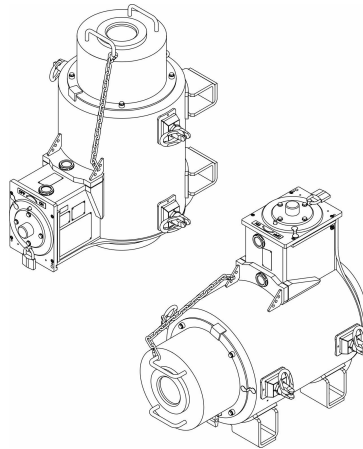


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1 Lieferbedingung

Diese Technische Lieferbedingung beschreibt die Beladung und den Tausch der Strahlungsquellen für den Strahlenschutzbehälter FQG74 und wie dieser an

Endress+Hauser SE+Co. KG

Hauptstrasse 1

79689 Maulburg

, im Folgenden Abnehmer genannt, geliefert wird.

Der Lieferant (das Unternehmen, welches die Tätigkeit durchführt) meldet umgehend, wenn bei der Anlieferung Beschädigungen an der Verpackung des Strahlenschutzbehälters ersichtlich sind. Weitere Schritte sind dann mit dem Abnehmer abzuklären.

Vor dem Durchführen der Tätigkeit wurde das Personal von Endress+Hauser unterwiesen:

- Das Personal des Lieferanten erfüllt die im Kapitel „Anforderungen an das Personal“ beschriebenen Anforderungen.
- Die Unterweisung ist im Dokument „Bestätigung der Sicherheitsschulung FQG74“ dokumentiert.
- Der Mitarbeiter bestätigt durch Nennung des Namens und Unterschrift die Sicherheitsschulung.

Die Gültigkeit beginnt mit dem Tag der Freigabe dieser Technischen Lieferbedingung.

2 About this document

2.1 Document function

This document provides the Technical Terms of Delivery (TTD) for loading and replacing the radiation sources for the source container. 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.

2.2 Symbols

2.2.1 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.

2.2.2 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 ISO 21482.

2.2.3 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

2.2.4 Tool symbols



Phillips head screwdriver



Flat-blade screwdriver



Torx screwdriver



Allen key



Open-ended wrench



Wire cutter

2.3 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

or

Operating Instructions for Source Container FQG74 with up to 20 radiation sources: BA02361F

3 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.

3.1 Requirements for the 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.

Maintenance personnel - Radiation

Maintenance personnel (radiation) carry out any maintenance work affecting the radiation source, including disassembly and replacement. Maintenance personnel (radiation) must comply with the following requirements:

- They must be authorized and monitored in relation to radiation exposure
- They must be trained specialists in radiation protection
- They must be authorized by the plant owner/operator.

Transport personnel

Transport personnel transport the product or parts thereof from the manufacturer or warehouse to the place of installation, for example. Transport personnel must comply with the following requirements:

They must be qualified to transport “Class 7 hazardous goods”.

Disposal personnel

Disposal personnel dispose of the product or parts thereof. Disposal personnel must comply with the following requirements:

- They must be authorized and monitored in relation to radiation exposure
- They must be trained specialists in radiation protection
- They must be authorized by the disposal company.

Radiation safety officer

The radiation safety officer is responsible for ensuring compliance with all applicable legal regulations. The company/operator must appoint a radiation safety officer in accordance with the relevant national law(s). The radiation safety officer is responsible for the following, among other tasks:

- Monitoring the source container at the place of installation
- Training of staff in radiation protection
- Developing and implementing measures in an emergency

. The radiation safety officer can therefore be reached at all times.

The radiation safety officer is:

- Trained for the role
- Someone who is recognized nationally for this role
- A specialist who is authorized by the plant operator.

3.2 Basic instructions on loading and replacing radiation sources

Avoiding unnecessary exposure to radiation

1. Make thorough preparations to ensure that any work with radiation sources is carried out as quickly and efficiently as possible.
2. Make sure you understand the steps in the process before starting work. Consult with the manufacturer if you are unsure.
3. Conduct all work from a protected position.
4. Implement suitable measures (e.g. blocking of access, shielding) to prevent any risk to people.
5. Prepare all the necessary tools and equipment before starting work.

6. Check the radiation source holder for ease of movement, corrosion and damage.
7. Ensure compliance with radiation protection regulations and national requirements on handling radioactive substances.

Freedom from contamination

1. Loading of the radiation source and handling of the source container must be carried out in such a way as to prevent contamination of the source container by radioactive material.
2. Use a wipe test or equivalent method to verify the absence of contamination through measurement.

4 Label set

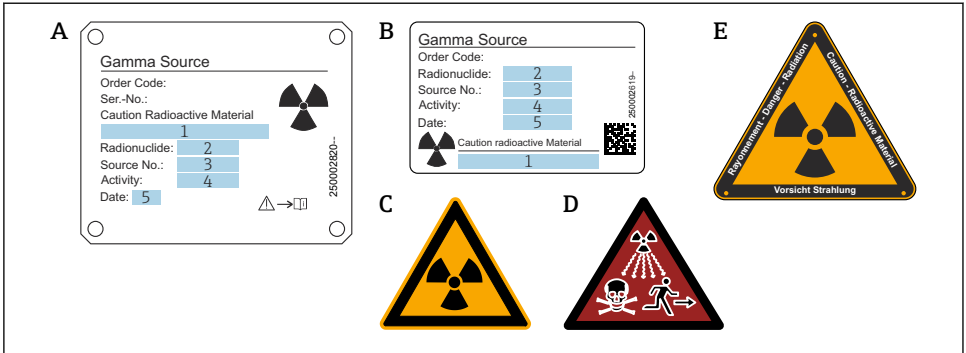
Label set for loading and replacing the radiation source

4.1 Scope of delivery

- 1 "Gamma source" nameplate, 155 x 107 mm (6.10 x 4.21 in)
- One "Gamma source" adhesive nameplate, for each source holder 30 x 48 mm (1.18 x 1.89 in)
- 1x "Radioactive" adhesive labels
- 1x "Highly radioactive" adhesive labels
Only if $^{137}\text{Cs} \geq 100 \text{ GBq}$
- 1 "Caution - Radioactive Material" warning sign
- 4 grooved pins
- Sealing wire and seals

4.2 Labeling and marking

When loading a source container or replacing a radiation source, the nameplates for the radiation sources must be marked as follows with a permanent inscription (e.g. using punch letters):



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1 Signs

- A "Gamma source" nameplate, 155 x 107 mm (6.10 x 4.21 in), stainless steel
- B "Gamma source" adhesive nameplate, 30 x 48 mm (1.18 x 1.89 in)
- C "Radioactive" adhesive labels
- D "Highly radioactive" adhesive labels
- E "Caution - Radioactive Material" warning sign, stainless steel
- 1 Wording "Highly radioactive source" if required
- 2 ¹³⁷Cs
- 3 Serial number of the source capsule (according to supplier certificate)
- 4 Activity including unit (MBq or GBq)
- 5 Date of loading (month/year)

4.2.1 Radiation source nameplate, incl. 4 grooved pins

Dimensions: 155 x 107 mm (6.10 x 4.21 in)

Material: Stainless steel

Gamma Source		Caution Radioactive Material!			
Radionuclide: 1		2		3	
Pos.	Ser. No	Activity	Date	Length	TAG
4	5	6	7	8	9

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2 Nameplate lettering

- 1 Cs^{137}
- 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 Device tag/tag number

4.2.2 "Radioactive" adhesive label

Quantity: 2 pcs



3 "Radioactive" ionizing radiation symbol

4.2.3 "Highly radioactive" adhesive label

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



4 "Highly radioactive" ionizing radiation symbol

4.2.4 Warning sign "Caution - Radioactive Material"

Including rope and distance sleeve

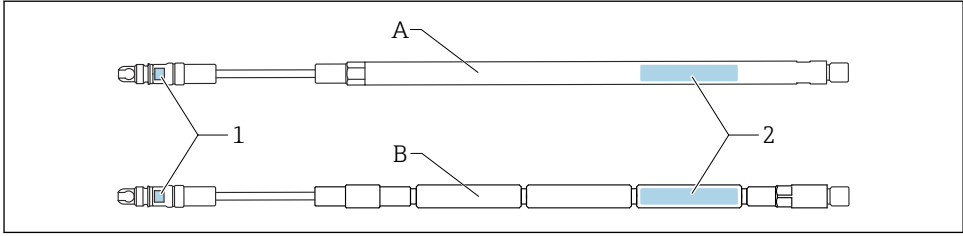


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5 "Caution - Radioactive Material" ionizing radiation symbol

4.2.5 Labeled source holder

Up to 20 pieces, including protection pipe



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6 Source holder inscription

A Rigid source holder

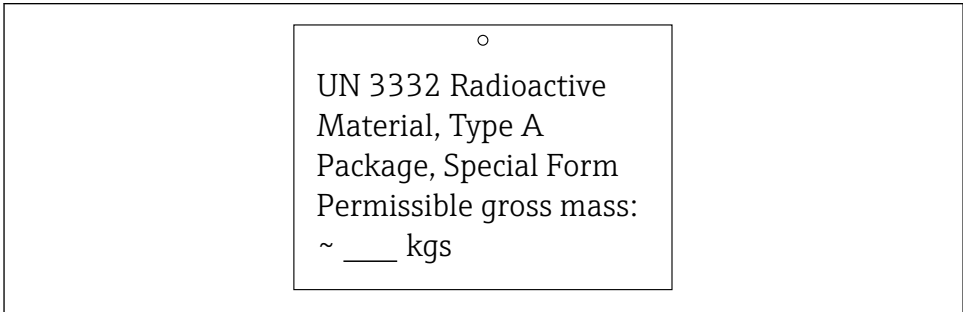
B Flexible source holder

1 Item number of radiation source

2 Serial number of radiation source on the "Gamma source" adhesive nameplate

4.2.6 "UN 3332 Type A" sign

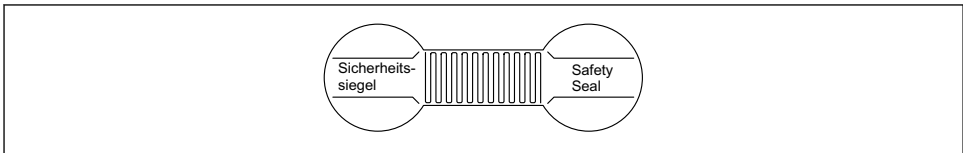
Including rope and distance sleeve



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7 "UN 3332 Type A" sign

4.2.7 Security seal, cover

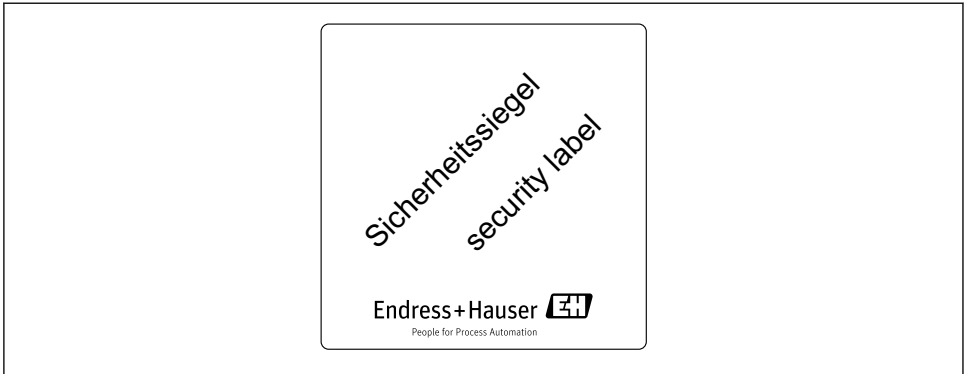


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8 Security seal of the cover

4.2.8 Security seal of overpack

Quantity: 4 pcs



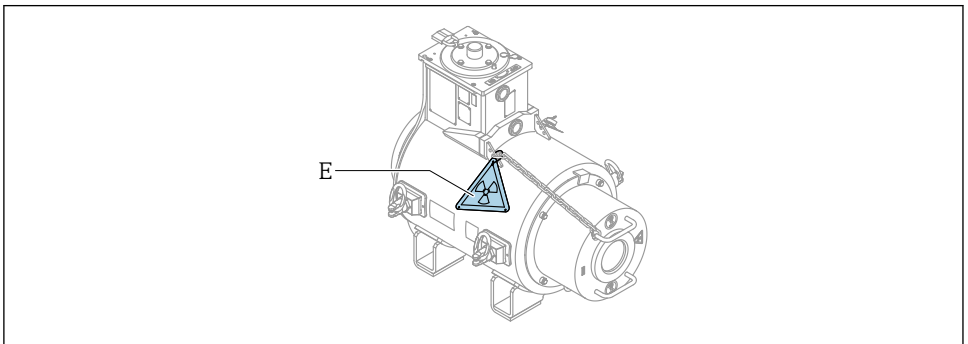
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9 Security seal of the wooden overpack

4.3 Affixing the "Caution - Radioactive Material" warning sign

A "Caution - Radioactive Material" warning sign is supplied with the source container, depending on the version or approval.

The warning sign must be secured to the designated location after the source is loaded.



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10 "Caution - Radioactive Material" warning sign

5 Loading the source container

⚠ WARNING

Radiation damage and risk of injury from ionizing radiation when loading the source container!

- ▶ Please follow the instructions on radiation protection contained in the Operating Instructions.
- ▶ Contact the relevant radiation safety officer for specific instructions.
- ▶ The source container must be secured in the "OFF" position.
- ▶ When working with radiation sources, avoid any unnecessary exposure to radiation.
- ▶ Keep all unavoidable radiation exposure to a minimum.
- ▶ Carry out all work from a protected position only.

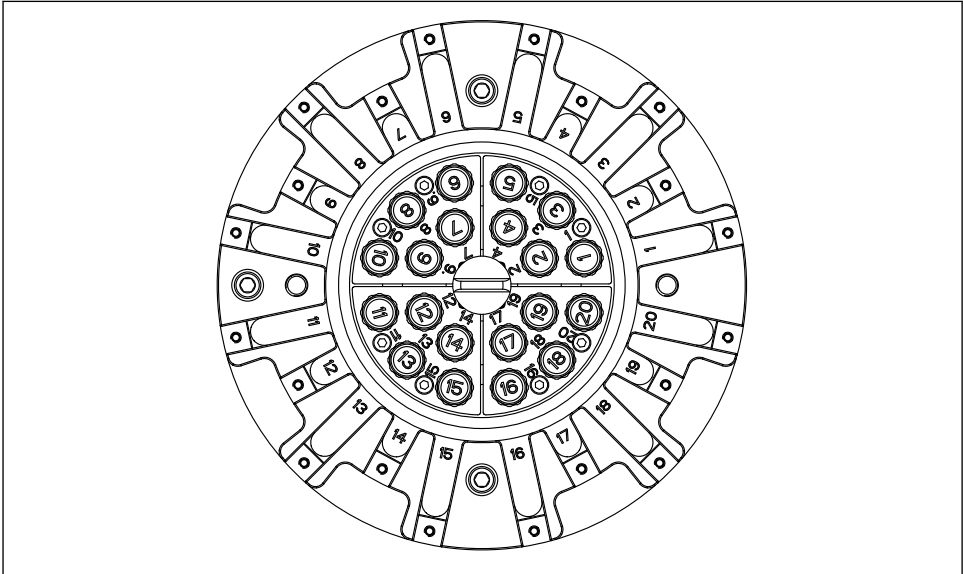
i "Loading source containers" requires the qualification level of 'Maintenance personnel – Radiation'. See the "Requirements for the personnel" section.

5.1 Source magazine versions

i The tables show the positions (P1-P20) of the source magazine (vertical column) where the source holders (horizontal row) are located when the magazine is not completely filled.

i Any position that is not occupied by a source holder must be loaded with a dummy rod.

5.1.1 Source magazine (20-position)



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11 Loading overview, source magazine (20-position)

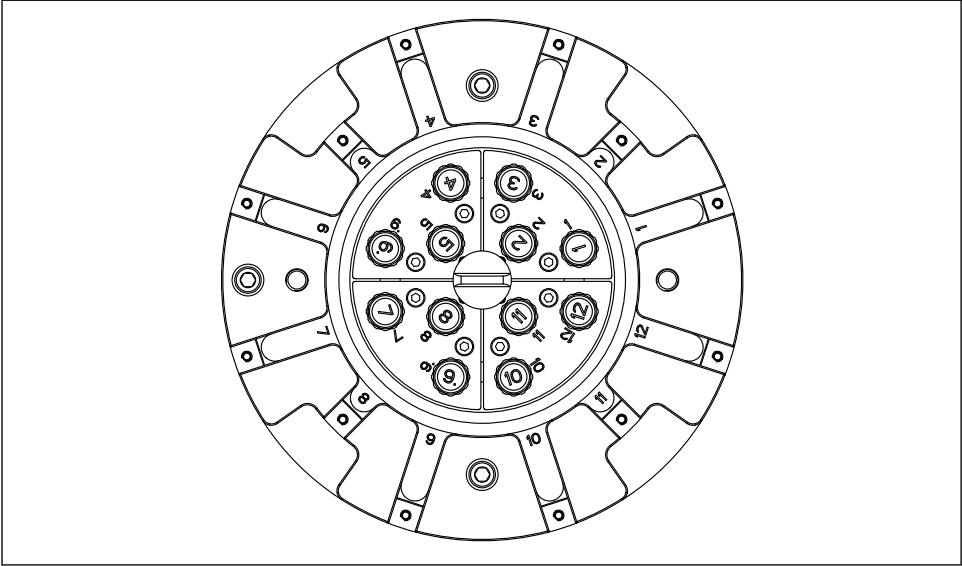
	Number of radiation sources (depending on feature 100)																			
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
P1	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	
P2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	x	
P4	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P5	-	-	-	-	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	
P6	-	-	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	
P7	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	
P9	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P10	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	x	x	x	
P11	-	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	
P12	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	
P14	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P15	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	x	x	x	x	
P16	-	-	-	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	
P17	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	
P19	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	
P20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	x	x	

P1-P20: Positions in source magazine

x: loaded with source holder

-: loaded with dummy rod

5.1.2 Source magazine (12-position)



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12 Loading overview, source magazine (12-position)

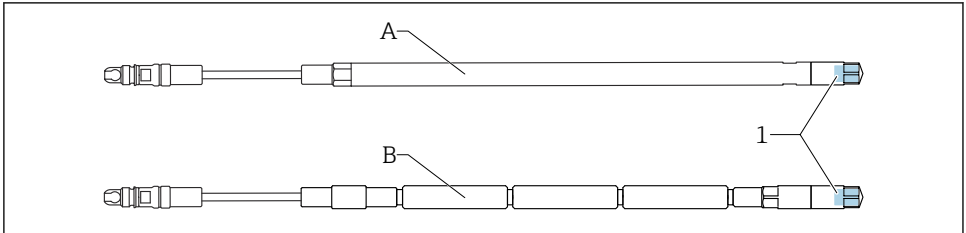
	Number of radiation sources (depending on feature 100)										
	2	3	4	5	6	7	8	9	10	11	12
P1	-	-	-	x	x	x	x	x	x	x	x
P2	x	x	x	x	x	x	x	x	x	x	x
P3	-	-	-	-	-	-	-	x	x	x	x
P4	-	-	-	-	-	x	x	x	x	x	x
P5	-	x	x	x	x	x	x	x	x	x	x
P6	-	-	-	-	-	-	-	-	-	x	x
P7	-	-	-	-	x	x	x	x	x	x	x
P8	x	x	x	x	x	x	x	x	x	x	x
P9	-	-	-	-	-	-	-	-	x	x	x
P10	-	-	-	-	-	-	x	x	x	x	x
P11	-	-	x	x	x	x	x	x	x	x	x
P12	-	-	-	-	-	-	-	-	-	-	x

P1-P12: Positions in source magazine

x: loaded with source holder

-: loaded with dummy rod

5.2 Source holder versions



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13 Versions of the source holder

- A Rigid source holder
- B Flexible source holder
- 1 Radiation source

5.3 Inserting, removing or replacing source capsules

⚠ WARNING

Dropping of crank, cover and ropes due to loosened screws.

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

- ▶ Do not loosen the safety chain from the cover.
- ▶ Wear protective equipment.

⚠ WARNING

Accidental removal of the radiation sources after removing the safety plates!

Ionizing radiation can increase the risk of cancer and genetic defects in offspring.

- ▶ Remove the radiation sources gradually.
- ▶ Only replace or load the radiation source on a firm, level surface.
- ▶ If possible, replace or load the radiation source in the loading chamber.
- ▶ Provide suitable shielding. It must correspond to the intensity of the radiation source and the distance to it.

⚠ WARNING

Radiation sources falling!

Ionizing radiation can increase the risk of cancer and genetic defects in offspring.

- ▶ Only replace or load the radiation source on a firm, level surface.
- ▶ If possible, replace or load the radiation source in the loading chamber.
- ▶ Provide suitable shielding. It must correspond to the intensity of the radiation source and the distance to it.

⚠ WARNING**Source holders falling with radiation sources or radiation sources falling!**

Ionizing radiation can increase the risk of cancer and genetic defects in offspring.

- ▶ Remove the radiation sources from the source holder on a firm, level ground only.
- ▶ Remove the radiation sources from the source holder in the loading chamber or hot cell where possible.
- ▶ Provide suitable shielding. It must correspond to the intensity of the radiation source and the distance to it.

⚠ WARNING**Radiation source is damaged if the sleeve is tightened excessively. Risk of contamination as a result!**

Ionizing radiation can increase the risk of cancer and genetic defects in offspring.

- ▶ Never exceed the specified torque.
- ▶ If there is any suspicion of damage, check that there is no contamination.
- ▶ Do not reuse damaged radiation sources (even if they are free of contamination) and dispose of them safely.
- ▶ Replace damaged sleeves with original spare parts.
- ▶ Replace the source holder if damaged.

NOTICE**Wrong radiation source in wrong source holder!**

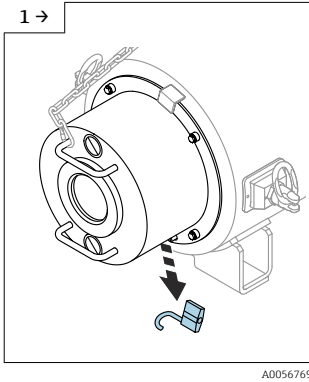
Source assignment is not correct for operation.

- ▶ Pay attention to item numbers and source assignment.

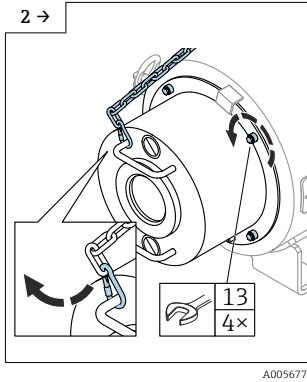
The following principles must be clearly understood before performing work steps:

- Each source holder must always be considered as loaded.
- The protection pipe must be secured before screwing on the source holder.
- The source capsule must be securely fitted in the source bracket of the source holder.
- Measures must be taken to ensure that the source capsule does not fall or get lost.
- Loading, unloading and replacement of the radiation sources are permitted on the transport pallet.
- Loading, unloading and replacement of the radiation sources in the process are only permitted only if all the radiation sources are in the source container and the shutter is closed.
- Radiation sources may only be replaced individually one after another.
- A radiation source can only be replaced once the previously replaced radiation source has been safely placed in the transport drum.
- Ensure that the transport drum is available to receive used radiation sources.

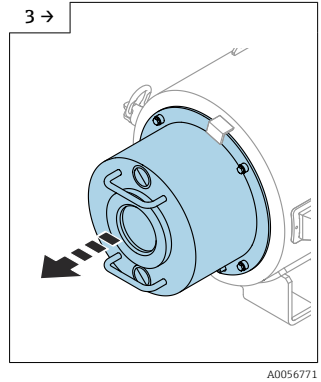
Preparations when inserting, removing or replacing source capsules:



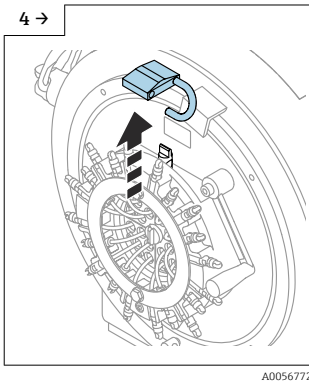
- ▶ **⚠ WARNING: FALLING PARTS!** Observe the safety instructions at the beginning of this section.
- ▶ Remove the lock on the cover and store in a safe place.



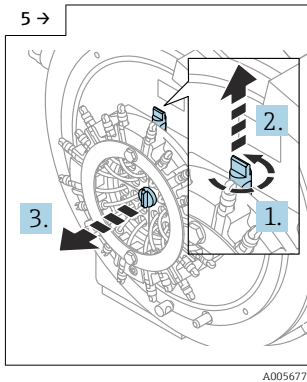
- ▶ Release the snap hook of the link chain from the housing.
- ▶ Release the screws on the cover.



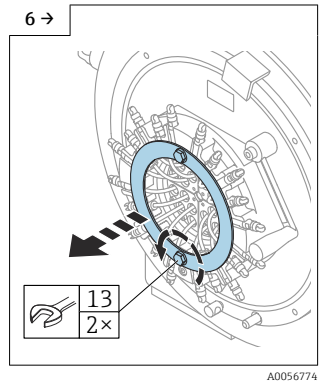
- ▶ Remove the cover of the source container and store it safely.



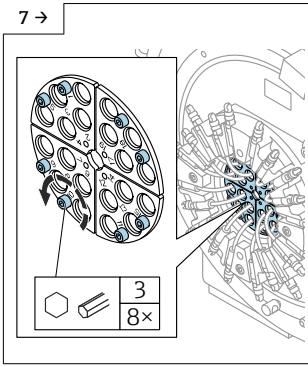
- ▶ **i** All of the source holders and the source magazine must be in the source container. The shutter must be closed.
- ▶ Remove the lock from the source protection rod and store it safely.



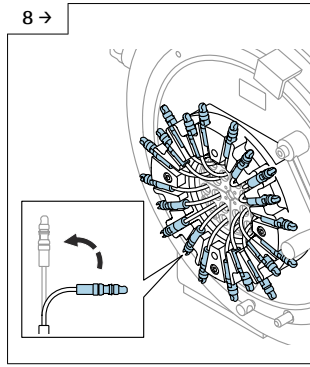
- ▶ Unscrew the source protection rod, remove the safety bolt and store it safely.



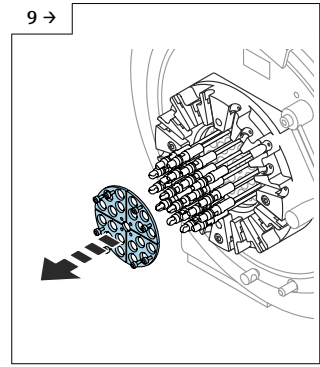
- ▶ Release the screws from the retaining ring.
- ▶ Remove and safely store the screws and the retaining ring.



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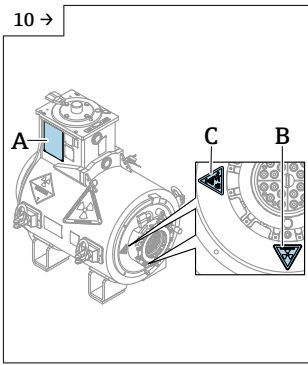


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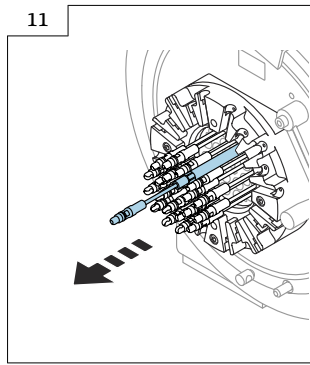


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- ▶ **⚠ WARNING: RADIATION!**
Make sure that the radiation sources cannot be removed accidentally. Observe the safety instructions at the beginning of this section.
- ▶ Release the screws on the safety plates.
- ▶ Release all of the rope separators of the source holders from the locking ring.
- ▶ Remove the safety plates and screws and store them safely.



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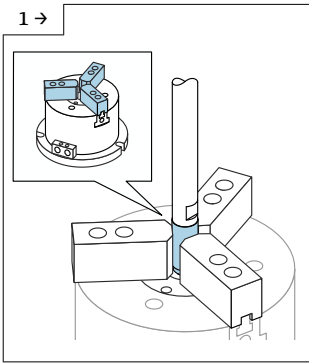


A0056984

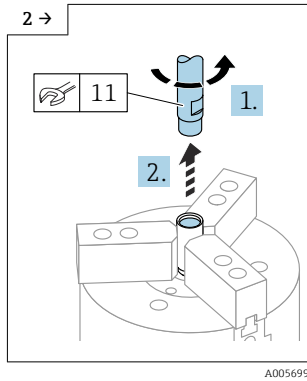
- ▶ A: Affix the nameplate of the radiation sources or label them permanently (e.g. using punch letters).
- ▶ B: Attach "Radioactive" label.
- ▶ C: If necessary, attach "Highly Radioactive" label.
- ▶ **⚠ WARNING: RADIATION!**
Make sure the radiation sources cannot fall. Observe the safety instructions at the beginning of this section.
- ▶ Remove one source holder from the source magazine, paying attention to the numbering.
- ▶ **i** If not fully loaded (number of radiation sources <20 / <12), the positions that are not to be loaded contain dummy rods that must not be removed.

Inserting or replacing the source capsule:

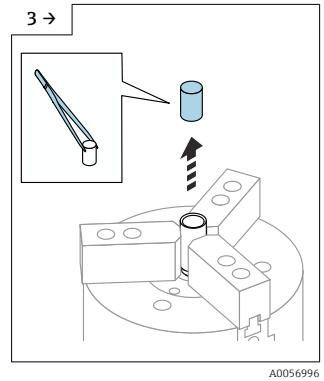
If the source container is already loaded: ⚠ WARNING: RADIATION!



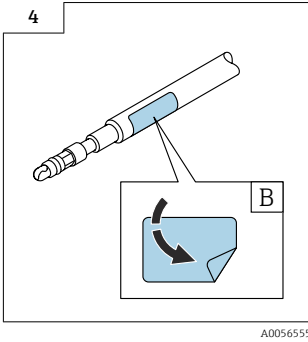
- ▶ ⚠ WARNING: RADIATION!
Prevent damage to the sleeve. Observe the safety instructions at the beginning of this section.
- ▶ ⓘ NOTE: RADIATION! Make sure the correct ionizing radiation source is used in the corresponding source holder. Observe the safety instructions at the beginning of this section.
- ▶ Fit the protective cap securely (in a pneumatic vise with braces, for example).



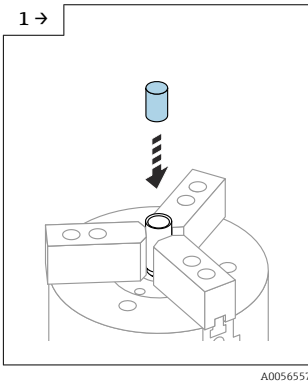
- ▶ ⚠ WARNING: RADIATION!
- ▶ Unscrew the source holder from the protective cap in an upwards direction.



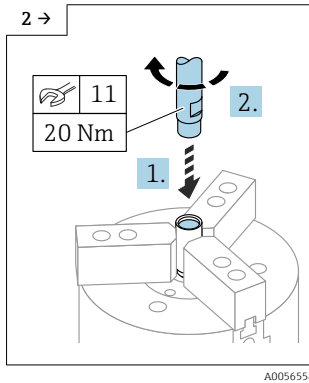
- ▶ ⚠ WARNING: RADIATION!
- ▶ Using long tweezers or a manipulator, remove the radiation source from the protective cap that is open at the top and store it safely in the transport drum, see Special Documentation for the transport drum for information on shipping radiation sources SD01316F.



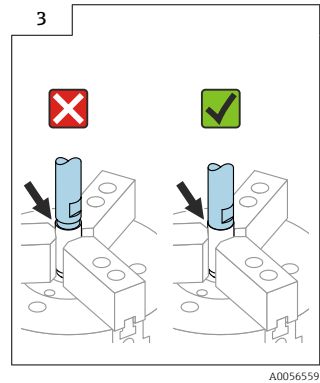
- ▶ Attach the new adhesive “B” gamma source nameplate of the radiation source to the source holder.



- ▶ **⚠ WARNING: RADIATION!**
- ▶ Insert the new radiation source into the protective cap that is open at the top.
- ▶ **i** The serial number of the radiation source must match the serial number on the source holder.

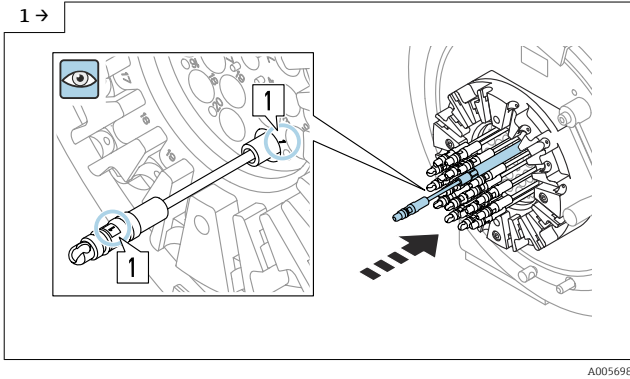


- ▶ Screw the source holder onto the protective cap from above.
- ▶ Tighten the protective cap and the source holder to 20 Nm.

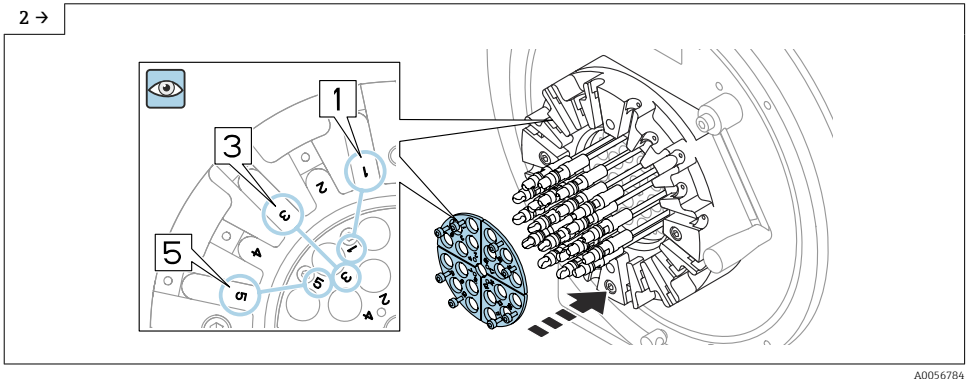


- ▶ Ensure that the protective cap and the source holder are fully screwed on. There can be no visible gap.

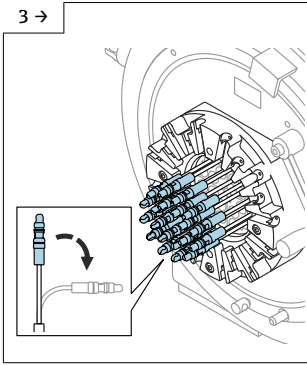
Inserting the source holder into the source magazine:



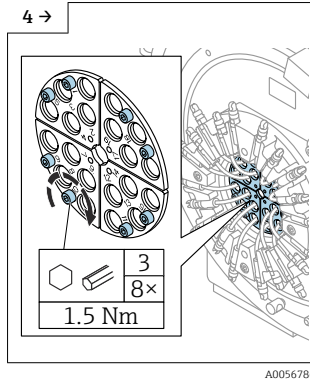
- ▶ Once the source holder and protection pipe have been screwed on, insert the source holder back into the source magazine.
- ▶ **i** The item number of the source holder in question must match the item number of the source holder bracket of the source magazine.
- ▶ Return to step 11 "Removing a source holder from the source magazine".
- ▶ Repeat the steps in sequence with all source holders until all source holders have been processed.



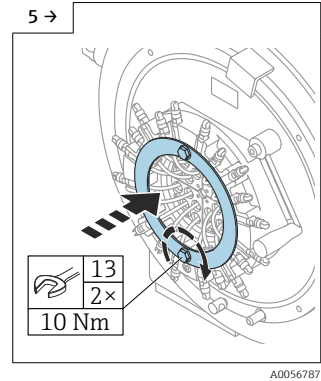
- ▶ Attach the safety plates. Guide the source holder through the safety plates.
- ▶ **i** The item numbers on the safety plates must match the item numbers on the locking ring.



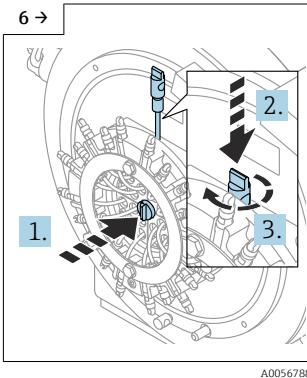
- ▶ Hook the rope separators of the source holder into the locking ring.



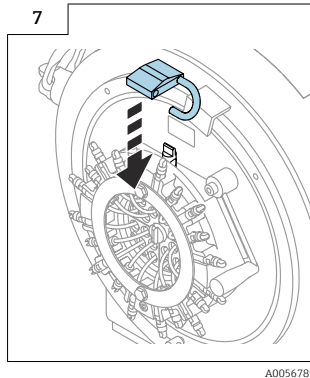
- ▶ Screw the safety plates to the source magazine.



- ▶ Fit the retaining ring and screw it on.



- ▶ Insert the safety bolt and screw in the source protection rod in a clockwise direction.

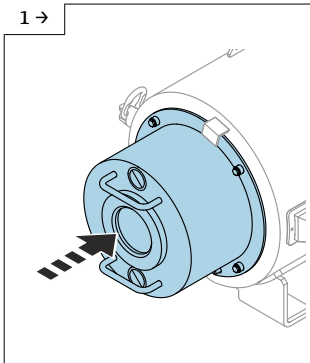


- ▶ Attach the lock to the source protection rod.

5.3.1 Check after loading

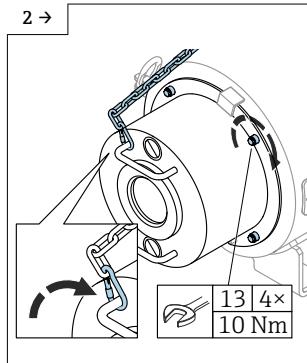
1. Check that the information on the nameplate of the radiation sources corresponds to the specifications of the radiation source certificates.
2. Check that the safety plates are in the correct position. The numbering on the safety plates must correspond to the numbering of the locking ring.
3. Check that the source holder is in the correct source holder bracket of the source magazine. Ensure that the numbering of the source holders matches the numbering of the safety plates.
4. Check that theft protection is correctly mounted and complete. Theft protection comprises the source protection rod, safety bolts and lock.
5. Check that the source holder can easily move in the source magazine.

6. Check that the rope separators of the source holder are properly inserted in the locking ring.
7. Check that the retaining ring is fitted.
8. If correct functioning is impaired or damaged, replace the relevant components.
9. The limit values that apply in your country must be checked and observed.
10. If one or more criteria are not met, the source container may no longer be used. For further information, please contact the ordering party of the loading/unloading process.
11. Mount the cover only following successful inspection of the listed conditions.



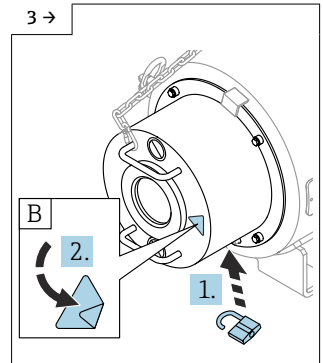
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- ▶ Fit the cover.



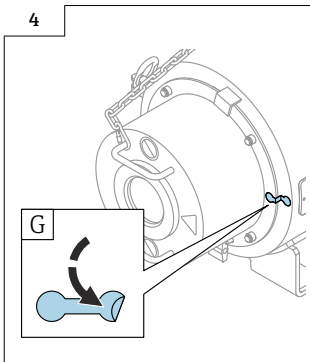
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- ▶ Secure the snap hook of the link chain to the cover.
- ▶ Tighten the screws on the cover.



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- ▶ Fit the lock.
- ▶ If not already in place, affix "Radioactive" label to cover.



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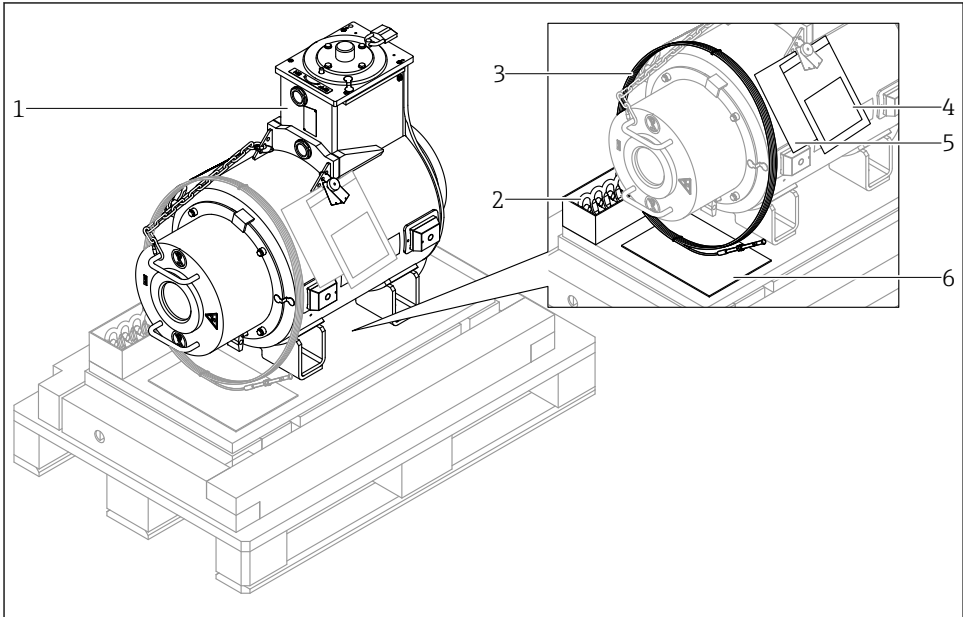
- ▶ Attach the security seal to the cover.

6 Packaging and shipping

- i** Packaging and shipping require the qualification level of transport personnel. Determining the transport index requires the qualification level of "Radiation safety officer", see section "Requirements for the personnel".

The transport index must be determined before packing. To do this:

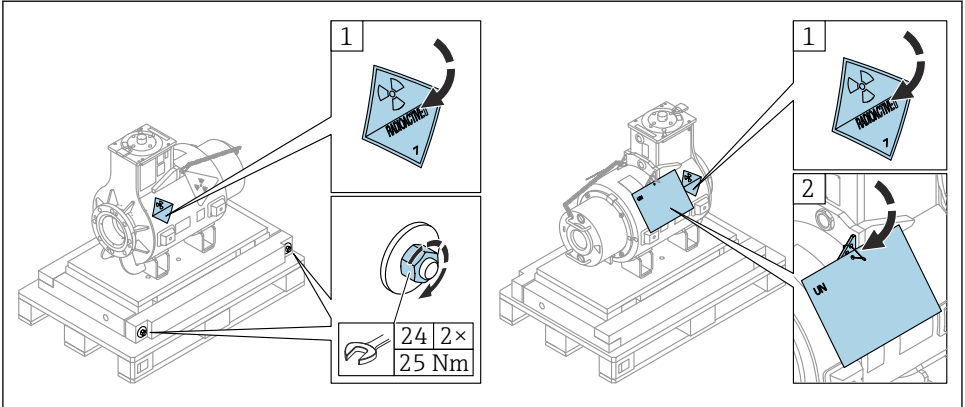
1. The radiation safety officer arranges for the transport index to be determined in accordance with IAEA SSR-6.
2. Label the source container accordingly.



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i 14 Scope of delivery

- 1 Source container
- 2 Lifting points
- 3 Rope extensions
- 4 Document folder (acceptance certificate, final inspection report, optional wipe test report)
- 5 Marking of package with "UN-3332 Radioactive material, Type A package, special form"
- 6 Operating Instructions

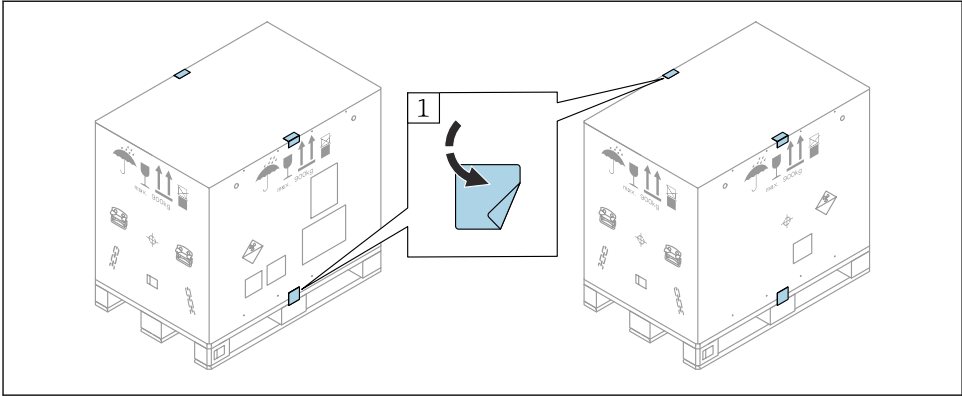


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15 Preparations ahead of shipping

- 1 Stainless steel "Caution - Radioactive Material" warning sign
- 2 "UN-3332 Radioactive material, Type A package, special form" sign

- i** Pack the source container with the original delivery packaging after loading and testing.
- i** Pack the source container with the original delivery packaging after loading and testing.
- i** Observe the national and international regulations for shipping as a type A package (e.g. ADR/RID, IATA/DGR). Affix the necessary markings as type A package, UN-3332 "Radioactive material, Type A package, special form", to the source container and any overpacks.



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▣ 16 4x Safety seal on wooden crate. The labels on the wooden crate are shown here as an example.

1 Security seal

- Affix to the wooden crate any labeling required for shipping as an overpack of a type A package, “UN 3332 Radioactive material, Type A package, special form”.
- Attach the security seal to the wooden crate.

i The required transport documents must be prepared by the dispatcher and handed over to the forwarding agent. The required contents correspond to national and international regulations for shipping as a type A UN-3332 package.

Required shipping documents:

The following documents must be accessible from the outside. This can either be in paper form or via a reference to a download link.

- Certificate of suitability
- Recognition by the German Federal Institute for Materials Research and Testing (BAM)
- Operating Instructions for the source container
- Inspection certificate



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