Technical Information
Gamma Radiation Source FSG60, ^{137}Cs and FSG61, ^{60}Co

Radiometric Measurement

For level, limit, density and interface measurement

Application

Radioactive isotopes are used as gamma radiation sources for level, density and interface measurement as well as for level limit detection.

The gamma source radiates equally in all directions. For radiometric measurements, however, only radiation passing through the tank or pipe is of interest. All other radiation is superfluous and must be shielded off.
For this reason, the radioactive source is mounted in a special source container which affords the necessary protection while providing a defined, practically unattenuated, narrow beam in one direction only.

Your benefits

- Point source in special source container ensures simple handling and easy installation
- Specially constructed source capsule conforms to strictest safety requirements: Typically class 66646 to ISO 2919
- Choice of isotope (^{137}Cs or ^{60}Co) and activity ensures optimized dosage for your application.

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Gamma sources

Source capsule

The radioactive sources, both ^{137}Cs and ^{60}Co, are sealed in a double-walled, welded stainless steel capsule. The encapsulation corresponds to Performance Class C 66646 as per ISO 2919, providing maximum protection against temperature, external pressure, impact, vibrations and puncture.

Class	Test				
	Temperature	External pressure	Impact	Vibration	Puncture
1	No test	No test	No test	No test	No test
2	▪ -40 °C (104 °F) (20 min) ▪ +80 °C (176 °F) (1h)	25 kPa	50 g (1,764 oz) from 1 m (3.3 ft)	3 x 10 min ▪ 25…500 Hz at 5 g (0.176 oz) peak amplitude	1 g (0.035 oz) from 1 m (3.3 ft)
3	▪ -40 °C (104 °F) (20 min) ▪ +180 °C (356 °F) (1h)	25 kPa_{abs} to 2 MPa_{abs}	200 g (7.054 oz) from 1 m (3.3 ft)	3 x 10 min ▪ 25 … 50 Hz at 5 g (0.176 oz) peak amplitude, ▪ 50 … 90 Hz at 0.635 mm (0.03 in) amplitude peak to peak, ▪ 90 … 500 Hz at 10 g (0.353 oz) peak amplitude	10 g (0.353 oz) from 1 m (3.3 ft)
4	▪ -40 °C (104 °F) (20 min) ▪ +400 °C (752 °F) (1h) and thermal shock 400 °C (752 °F) to 20 °C (68 °F)	25 kP_{abs} to 7 MPa_{abs}	2 kg (4.41 lbs) from 1 m (3.3 ft)	3 x 30 min ▪ 25…80 Hz at 1,5 mm (0.06 in) amplitude peak to peak, ▪ 80…2000 Hz at 20 g (0.705 oz) peak amplitude	50 g (1,764 oz) from 1 m (3.3 ft)
5	▪ -40 °C (104 °F) (20 min) ▪ +600 °C (1112 °F) (1h) and thermal shock 600 °C (1112 °F)to 20 °C (68 °F)	25 kPa_{abs} to 70 MPa_{abs}	5 kg (11.03 lbs) from 1 m (3.3 ft)	-	300 g (10.581 oz) from 1 m (3.3 ft)
6	▪ -40 °C (104 °F) (20 min) ▪ +800 °C (1472 °F) (1h) and thermal shock 800 °C (1472 °F) to 20 °C (68 °F)	25 kPa_{abs} to 170 MPa_{abs}	20 kg (44.10 lbs) from 1 m (3.3 ft)	-	1 kg (2.21 oz) from 1 m (3.3 ft)

Before delivery the manufacturer of the source capsules tests the leak-tightness and decontamination of each capsule. After this testing the capsule can be considered as a sealed radioactive source in accordance with ISO 2919. Each source is accompanied by a leak test certificate.

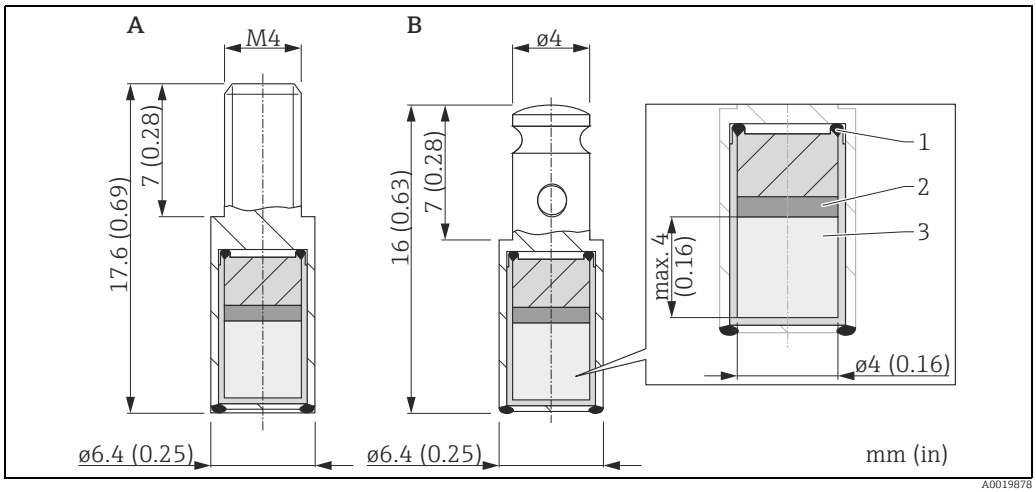
- The material ^{137}Cs enclosed in the capsules as ceramic substrate.
- The material ^{60}Co is enclosed in the capsules in metallic form.

NOTICE

The radiation sources may only be used in environments which do not impair the tightness of the capsule.

Technical data

Standard radiation sources



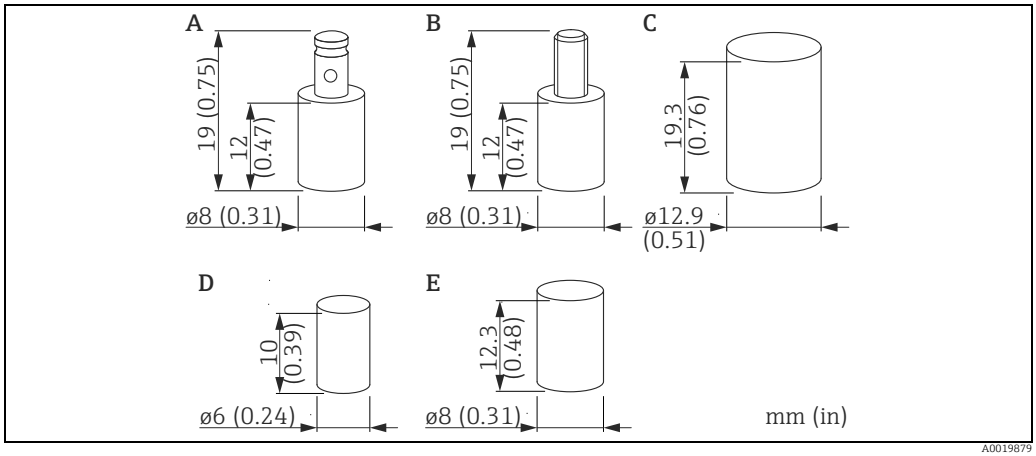
Examples
A VZ1508-001 (CDC.P4), VZ1486-001 (CKC.P4)
B VZ79-001 (CDC.P4), VZ64-001 (CKC.P4)

1 Argon-arc welded
2 Void volume filled with stainless steel spacer
3 ^{60}Co as metal or ^{137}Cs as ceramic

- Weight: approx. 0.005 kg
- Encapsulation: double-walled, welded stainless steel
- Performance class typically C66646 to ISO 2919
- Protection: IP68
- Nominal operating range:
  - VZ64-001, VZ79-001, VZ1508-001, VZ1486-001, VZ357-001, VZ3579-001: -55 to +400 °C[1] (-67 to +752 °F)
  - IGI-Z-3, IGI-Z-4: -60 to +150 °C (-76 to +302 °F)
  - X.9, X.38/4, P04: -40 to +200 °C (-40 to +392 °F)

  Other capsule types by request.
- Radioactive material:
  - ^{60}Co: metallic
  - ^{137}Cs: compound dispersed in ceramic substrate
- Energy of radiation:
  - ^{60}Co: 1.173 MeV and 1.333 MeV
  - ^{137}Cs: 0.662 MeV

Alternative capsule types



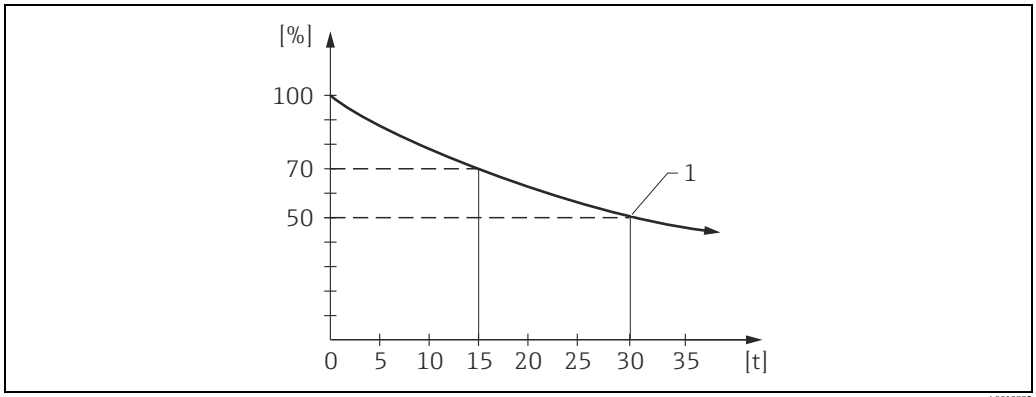
A VZ357-001
B VZ3579-001
C X.38/4
D IGI-Z-3
E X.9 (CDC.93), IGI-Z-4, P04

1) US-Version (NRC License) limited to +200 °C (+392 °F)

Application

^{137}Cs applications

Decay in activity of a ^{137}Cs source as a function of time



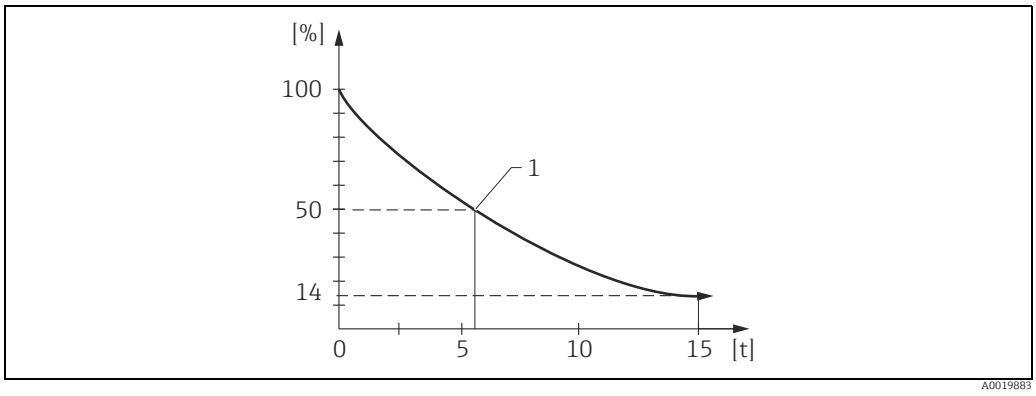
% Activity
t Time in years
1 Half-time 30 years

The ^{137}Cs source (energy 0.662 MeV) is ideal for continuous level, limit detection and density measurement. Its long half life (30 years) ensures a long operation time without the need for cost-intensive source replacement or recalibration. Thanks to the low source energy, the radiation is readily absorbed and the equipment can often be operated with no control zone.

Example:
Remaining activity after 15 years of operation: 70% → no replacement of radiation source required.

^{60}Co applications

Decay in activity of a ^{60}Co source of a function of time

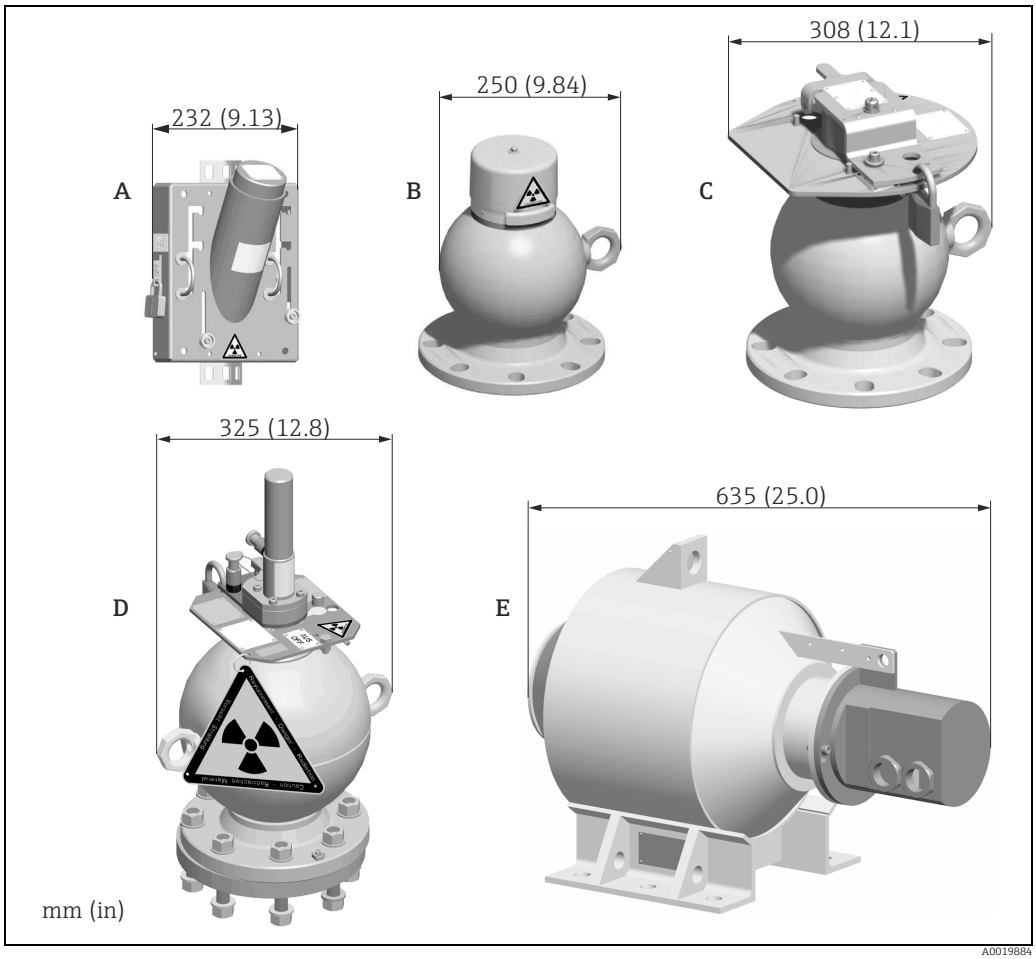


% Activity
t Time in years
1 Half-time 5.3 years

The ^{60}Co source (energy 1.173 and 1.333 MeV; half life 5.3 years) is used mostly for level limit detection when the corresponding ^{137}Cs activity is too high. Its advantages lie in its large depth of penetration, which enables measurement over large distances or through thick tank walls. The ^{60}Co source can also be used for continuous level measurements when the activity of a suitable ^{137}Cs source is considered to be too high.

Example:
Remaining activity after 15 years of operation: 14% → replacement of radiation source required.

Delivery, Transport



A FQG60
B FQG61
C FQG62
D FQG63
E QG2000

Exact dimensions see
- FQG60, TI00445F/00/EN chapter "Mechanical construction"
- FQG61, FQG62, TI00435F/00/EN chapter "Mechanical construction"
- FQG63, TI00446F/00/EN chapter "Mechanical construction"
- QG2000, TI00346F/00/EN chapter "Mechanical construction"

Germany

We can only ship radioactive sources once we have received a copy of the handling permit. We are more than happy to assist in procuring the necessary documents. Please contact our local sales center. For safety reasons and to save costs, we generally supply the source container loaded, i.e. with the radiation source installed. If the user requires the source container be delivered first and if the source must be delivered subsequently, transportation drums are used for shipping.

Other countries

We can only ship radioactive sources once we have received a copy of the import licence. Endress+Hauser is more than happy to assist in procuring the necessary documents. Please contact your local sales centre.
Please contact your local sales centre.
Radioactive sources must be installed in the source container for delivery abroad.

The source container is delivered in the OFF position, secured with a lock.
The transport of loaded source containers is conducted by a company commissioned by Endress+Hauser and officially certified for executing this type of job.
Transportation shall take place in a Type "A" package which complies to the regulations of the European Agreement on the International Transportation of Hazardous Substances on Roads (ADR and DGR/IATA).

Emergency procedure

Objective and overview

This emergency procedure shall be put into effect immediately to secure an area in the interests of protecting personnel where an exposed source is known, or suspected, to exist.
Such an emergency exists when a radioisotope is exposed either by it becoming separated from the source container or a source holder cannot be put into OFF position.
This procedure will safeguard the personnel until the responsible radiation safety officer can attend site and advise on corrective action.
The custodian of the radioactive source (the customer's designated "authorized person") is responsible for observing this procedure.

Emergency procedure

1. Determine the unsafe area by on-site measurement.
2. Cordon off the concerned area by yellow tape or rope and post international radiation warning signs.

The radiation source container can not be switched to the "OFF" position

See chapter "Emergency procedure", in the respective technical information:
- TI00445F/00/EN (FQG60)
- TI00435F/00/EN (FQG61, FQG62)
- TI00446F/00/EN (FQG63)
- TI00346F/00/EN (QG2000)

The radiation source is outside from the source container

In this case, the radiation source must be placed at a safe location or additional shielding must be applied.
The source should only be handled via pliers or tongs and held as far away from the body as possible.
The time needed for the transport should be estimated and minimized by rehearsal without radiation source prior to execution.

Notification to authority

1. Make necessary notifications to local authorities within 24 h.
2. After thorough assessment of the situation, the responsible radiation safety officer, in conjunction with local authorities, shall agree a remedy to the specific problem.

National regulations may require other procedures and reporting obligations.

Procedures after termination of the application

Internal measures

As soon as a radiometric measuring device is no longer required, the radiation source on the source container must be switched off. The source container shall be removed in accordance with all relevant regulations and saved in a lockable room having no through traffic. The responsible authorities shall be informed of these measures. The access to the storage room shall be measured out and signed. The radiation safety officer is responsible for protecting against theft. The radiation source in the source container must not be scrapped with the other parts of the plant. It should be returned as quickly as possible.

⚠ CAUTION

Removal of the source container may only be carried out by supervised personnel, who have been specially trained in radiation procedures according to local regulations or handling approval. Ensure that the contents of the handling approval is valid. Local conditions are to be observed. The disassembly of the source container can only be executed during OFF position. Make sure, the OFF position is secured with a padlock.

Return

Federal Republic of Germany

Contact your Endress+Hauser Sales Center to organise the return of the radiation source for inspection with a view to reuse or recycling by Endress+Hauser.

Other countries

Contact your Endress+Hauser Sales Center or the appropriate authority to find a way of returning the radiation source nationally. If return is not possible domestically, the further procedure must be agreed with the Sales Center concerned. The destination airport for returns is Frankfurt, Germany.

Conditions

The following conditions must be met before returning the material:

- An inspection certificate no more than three months old confirming the leak-tightness of the radiation source must be in the possession of Endress+Hauser (wipe test certificate).
- The serial number of the source capsule, type of radiation source (^{60}Co or ^{137}Cs), activity and model of radiation source must be specified. This data may be found in the documents supplied with the radiation source.
- The container may have no corrosion, especially at the welds.
- The container may have no damages.
- ON / OFF mechanism has to be free of corrosion and function correctly.
- Source container has to be shipped in the OFF position.
- For shipping, the source insert has to be brought into the OFF position and secured with a lock.

NOTICE

The type-A-labeling at the radiation container itself is invalid for a return of the device.

Type A Package

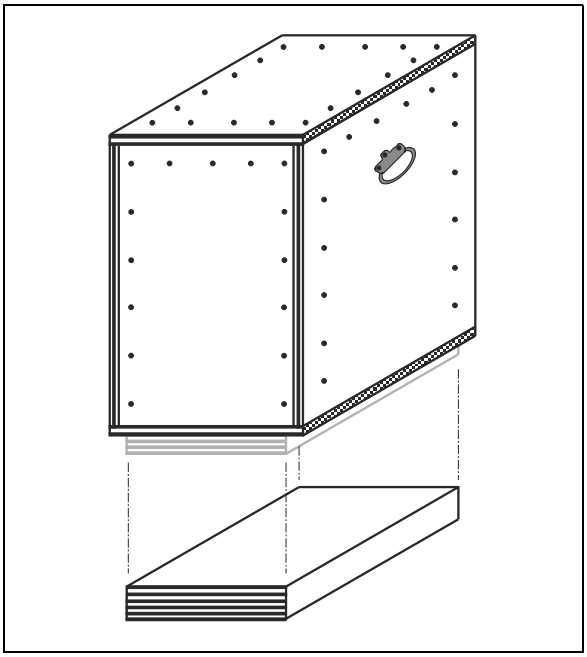
FQG60, FQG61, FQG62, FQG63

Material
- Birch Multiplex

Dimensions
- Standard types and FQG60
  400 x 400 x 650 mm
  (15.7 x 15.7 x 25.6 in)
- Fire proof versions
  530 x 530 x 650 mm
  (20.9 x 20.9 x 25.6 in)
- Base plate
  350 x 350 x 70 mm
  (13.8 x 13.8 x 2.76 in)

Weight: max. 32 kg (70.56 lbs)

Dimensions: L x B x H



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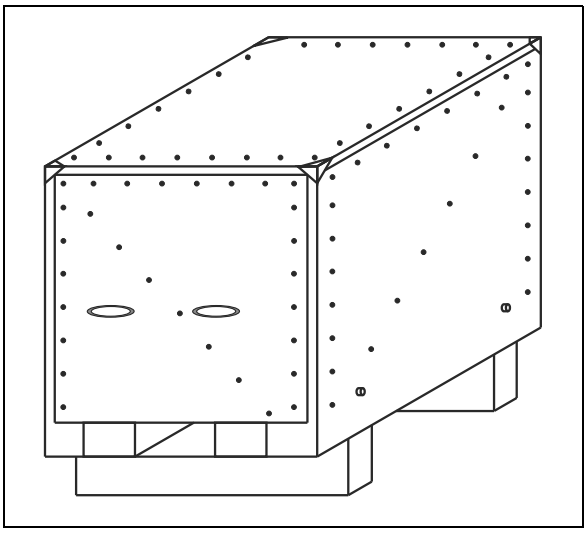
QG2000

Material
- Birch Multiplex

Dimensions
- 900 x 600 x 750 mm
  (35.4 x 23.6 x 29.5 in)

Weight: max. 50 kg (110.25 lbs)

Dimensions: L x B x H



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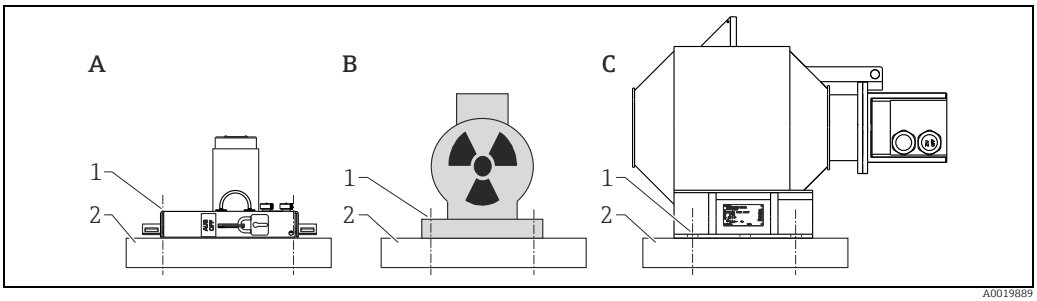
Packaging and Shipment

- Observe the safety instructions in the operation manual of the source container.
- Turn the source insert of the source container in OFF position.
- Secure the OFF position with the lock of the source container.
- Assemble the source container firmly to the base plate of the Type A package by the means of the provided screws and nuts (see figure below).
- Put the cover of the Type A package on the base plate and secure the cover firmly by steel belts.
- The handles shall only be used for lifting and carrying of the package.
- Label the package according to the valid IATA rules and applicable national regulations. If required, conduct check measurement according to applicable national and international regulations.
- In case of doubt, consult your responsible regulator or a competent consultant.



A FQG60
B FQG61, FQG62, FQG63
C QG2000
1 Fastening with screws and nuts per 4 pieces
2 Base plate

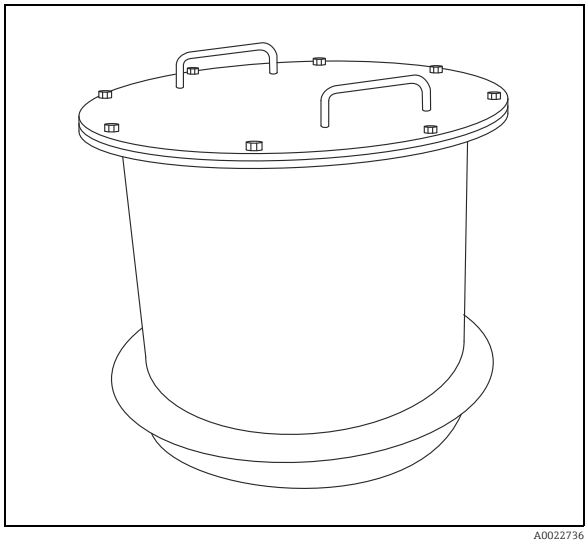
Transportation drum

Material
- 304 (1.4301)
- PUR 2K-texture paint RAL1003

Dimensions:
- Transportation drum "small" ø380 mm (15 in), H = 340 mm (13.4 in)
- Transportation drum "big" ø590 mm (23.2 in), H = 530 mm (20.9 in)

Weight:
- Transportation drum "small" max. 100 kg (220.5 lbs)
- Transportation drum "big" max. 250 kg (551.25 lbs)

For further Information see SD01316F/00/EN.



Examples for Type A package

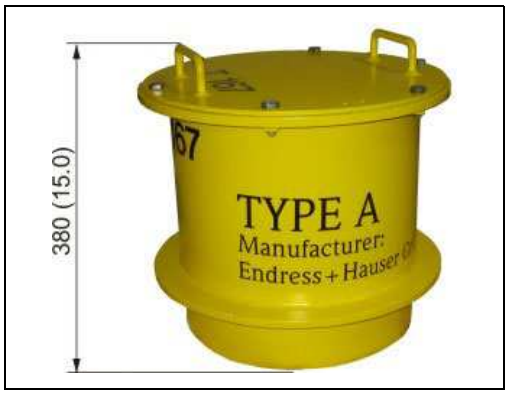
Dimensions in mm (in)

Type A package for:
FQG60[2], FQG61[2], FQG62[2], FQG63[2]

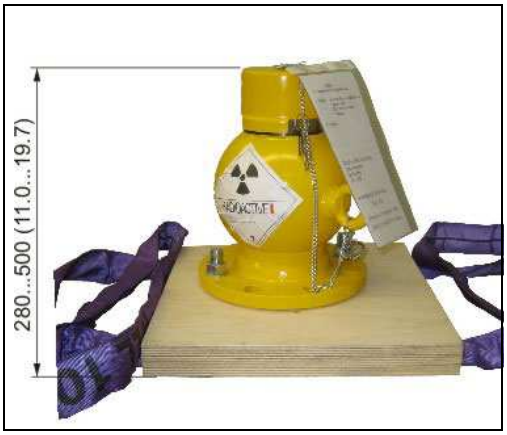
Type A package for:
QG2000, Multiplex 9S, TSP-Source container

Type A transportation drum "big"

Type A transportation drum "small"



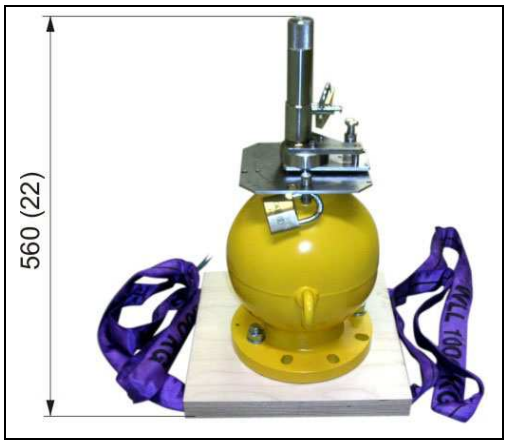
Without overpack for[3), 4)]:
FQG61, FQG62



With overpack for[3), 4)]:
FQG61, FQG62

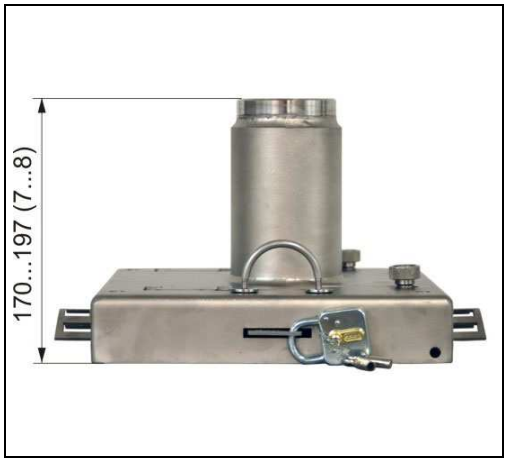
2) For return only
3) The source container has the function of a Type A package
4) Height dimension is depending on the type

Without overpack for[5]:
FQG63



With overpack for[5]:
FQG63

Without overpack for[5]:
FQG60



With overpack for[5]:
FQG60

5) The source container has the function of a Type A package

Ordering information

Ordering information

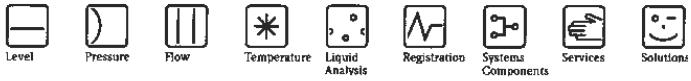
Detailed ordering information is available as follows:
- In the Product Configurator on the Endress+Hauser website: www.endress.com Þ Select country Þ Instruments Þ Select device Þ Product page function: Configure this product
- From your Endress+Hauser sales center: www.endress.com/worldwide

Product Configurator - the tool for individual product configuration
- Configuration data updated on a daily basis
- Depending on the device: Direct input of data specific to measuring point, such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic generation of order code with breakdown in PDF or Excel output format
- Possibility to order directly from the Endress+Hauser online shop

Supplementary documentation

Radiation Source Container FQG60	▪ TI00445F/00/EN Technical Information and Operating Instructions for Radiation Source Container FQG60
Radiation Source Container FQG61/FQG62	▪ TI00435F/00/EN Technical Information and Operating Instructions for Radiation Source Container FQG61/FQG62
Radiation Source Container FQG63	▪ TI00446F/00/EN Technical Information and Operating Instructions for Radiation Source Container FQG63
Radiation Source Container QG2000	▪ TI00346F/00/EN Technical Information for Radiation Source Container QG2000 ▪ BA00223F/00/EN Operating Instructions for Radiation Source Container QG2000 ▪ BA00370F/00/EN Operating Instructions for Radiation Source Container QG2000 - US version
Supplementary Instruction Manuals	▪ SD00142F/00/EN Supplementary Safety Instructions for Radioactive Sources and Source Containers approved for use in Canada. ▪ SD00292F/00/EN Supplementary Instruction Manual for Canada ▪ SD00293F/00/EN, SD00313F/00/EN, SD0335F/00/EN Supplementary Instruction Manual for the USA ▪ SD00297F/00/EN Instructions for loading and replacing the radiation source ▪ SD00276F/00/EN Supplementary Instruction Manual, especially for QG020/100 and QG2000 for the USA

Manufacturer Declaration Reacceptance Source Return



HE-13009a/00

Manufacturer Declaration

Endress+Hauser GmbH+Co. KG, Hauptstraße 1, 79689 Maulburg

CONFIRMATION OF REACCEPTANCE OF DOUBLE ENCAPSULATED RADIOISOTOPES

This is to confirm that Endress + Hauser GmbH+Co. KG will take back radioisotopes for their check of re-use/utilization, based upon the regulation for radiation protection of the F.R.G. (Strahlenschutzverordnung der B.R.D.), valid version, and on the following conditions:

- Endress + Hauser will only accept radioisotopes supplied by Endress + Hauser, which the customer no longer requires. The radioisotopes must be in original conditions and undamaged.
- An inspection certificate not older than 3 month verifying non-leakage of the radioisotope must be submitted to Endress + Hauser (wipe test certificate).
- All source-specific data must be stated (this data is supplied in the documents furnished with the source) i.e. serial number, isotope type (Co60 or Cs137), activity and design type.
- The source has to be returned in an approved gamma ray protective container for the easy manipulation, packed in a Type-A certified transport package (IATA regulations). Transport must be processed according to dangerous goods regulations.

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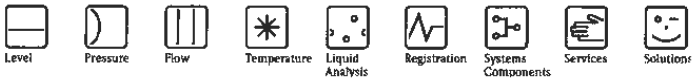

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- The cost for all transportation and the actual cost for the processing are to be borne by the customer (air shipment is obligatory). Quotation on actual prices/cost on request.
- The Airport of Destination for the shipment must be Frankfurt Airport (IATA: FRA), Germany. Notify Endress + Hauser GmbH + Co., D– 79689 Maulburg, Germany.
- The radioisotopes will then become the sole property of Endress + Hauser GmbH+Co. KG.

This declaration of conformity is only valid for the customer and devices listed in the cover letter of the responsible sales centre which refers to this document. This declaration of conformity is only valid for products being in the delivery status and produced after the following date of issue.

Maulburg, 07.02.2013

Endress+Hauser GmbH+Co. KG

i. V. (Ralf Matthaes)
Department Manager Business Development
Service/ Business Development

i. A. (Karl Barton)
Radiation Safety Officer
Quality Management

Endress+Hauser
People for Process Automation

Manufacturer Declaration Type A package

FQG60, FQG61, FQG62, FQG63; 400 x 400 x 650 (15.7 x 15.7 x 25.6 in)

Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

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Herstellererklärung
Manufacturer Declaration

Endress+Hauser GmbH+Co. KG, Hauptstraße 1, 79689 Maulburg

erklärt als Hersteller, dass die Außenverpackung nach Zeichnung 960008522 (Material Fi/Ta Holz 22 mm) und nach Zeichnung 960008520 (Material Birke-Multiplex 24 mm), Abmessung jeweils 400 mm x 400 mm x <650 mm, bei Einsatz mit den Strahlenschutzbehältern Typ QG 020, FQG60 und FQG61 (Gewicht 44 kg = Gesamt Fi/Ta 60 kg; Gesamt Multiplex 73 kg) oder QG 100, FQG62 und FQG63 (Gewicht 87 kg = Gesamt Fi/Ta 103 kg; Gesamt Multiplex 118 kg) den Anforderungen über die internationale Beförderung gefährlicher Güter (ADR/RID, DGR/IATA) an ein Typ „A" Versandstück entspricht. Die Packstücke sind für den Transport von umschlossenen radioaktiven Stoffen und von umschlossenen Stoffen in besonderer Form vorgesehen.

declares as manufacturer, that the external packaging according to drawing 960008522 (*spruce/ fir wood 22 mm) and according to drawing* 960008520 (*birch multiplex - wood 24 mm), dimensions 400 mm x 400 mm x <650 mm each, in use with the source containers Type QG 020, FQG61 and FQG60 (Net Weight 44 kg; Gross Weight spruce/fir 60 kg; multiplex 73 kg) or QG 100, FQG62 and FQG63 (Net Weight 87 kg; Gross Weight spruce/fir 103 kg; multiplex 118 kg) conforms to the requirements on international transportation of hazardous materials (ADR/RID, DGR/IATA) and is designed for the transportation of sealed radioactive materials as well as special kind sealed radioactive materials.*

Durchgeführte Prüfungen nach		*Tests according to „IAEA Safety Standards Series No.ST1"*	
Wassersprühprüfung	1 Stunde mit einer Wassermenge von 600 l/h von allen Seiten besprühen. Dies übertrifft die Niederschlagsmenge von 5 cm pro Stunde.	*Water spray test*	*1 hour sprayed with 600 l/h of water on all sides. This is more than the rain of 5 cm per hour.*
Druckprüfung	Nach der Wassersprühprüfung 24 Stunden mit dem fünffachen Gewicht des Versandstücks belasten.	*Pressure test*	*After carrying out the water spray test, the sample is weighted for 24 hours five times the weight of the package.*
Durchstoßprüfung	Nach der Wassersprühprüfung eine halbkugelförmige Stahlstange mit Ø 3,2 cm und einem Gewicht von 6 kg aus 1 m Höhe auf die schwächste Stelle fallen lassen.	*Penetration test*	*After carrying out the water spray test, a steel rod with a semispherical end diameter of 3.2 cm and weight 6 kg is dropped from a height of 1 m onto the weakest point.*
Freifallprüfung	Nach der Wassersprühprüfung die Verpackung aus einer Fallhöhe von 1,2 m diagonal mit der Deckelecke auf eine Aufprallplatte fallen lassen.	*Free–fall test*	*After carrying out the water spray test, the package is dropped from a height of 1.2 m onto a sensing plate diagonally with the corner of the cover*
Prüfergebnis: **Der Prüfling hat alle Prüfungen bestanden.**		***Test results :*** ***The sample under test has successfully passed all tests.***	
Der in der Typ "A" Verpackung befindliche Stahlenschutzbehälter, mit dem darin befindlichen, doppelt umschlossenen Präparat, hat nach Abschluß der Tests, keinerlei Einwirkung und Beschädigung aufgewiesen. Die Dichtheit und abschirmende Wirkung ist in keiner Weise durch die Test verändert worden.		*The source container with the double-sealed radioactive source contained within the type "A" packaging showed no effects or damage as a result of the test procedures. The tightness and screening remained unaffected by the tests.*	

Maulburg, 30.07.2010

Endress+Hauser GmbH+Co. KG

i. V. (Dr. Arno Götz)
Leitung Zertifizierung/*Manager Certification*

i. V. (Hartmut Damm)
Leitung Projekt/*Project Manager*

Endress+Hauser
People for Process Automation

FQG60, FQG61, FQG62, FQG63; 530 x 530 x 650 (20.9 x 20.9 x 25.6 in)

Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

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Herstellererklärung
Manufacturer Declaration

Endress+Hauser GmbH+Co. KG, Hauptstraße 1, 79689 Maulburg

erklärt als Hersteller, dass die Außenverpackung nach Zeichnung 960009478 (Material Birke-Multiplex 22 mm), Abmessung jeweils 530 mm x 530 mm x <650 mm, bei Einsatz mit den Strahlenschutzbehältern Typ QG 020 und FQG61 (Nettogewicht 48 kg; Bruttogewicht 77 kg) oder QG 100, FQG62 und FQG63 (Nettogewicht 91 kg; Bruttogewicht 123 kg) den Anforderungen über die internationale Beförderung gefährlicher Güter (ADR/RID, DGR/IATA) an ein Typ „A" Versandstück entspricht. Die Packstücke sind für den Transport von umschlossenen radioaktiven Stoffen und von umschlossenen Stoffen in besonderer Form vorgesehen.

declares as manufacturer, that the external packaging according to drawing 960009478 (material birch multiplex - wood 22 mm), dimensions 530 mm x 530 mm x <650 mm each, in use with the source containers Type QG 020 and FQG61 (net weight 48 kg; gross weight 77 kg) or QG 100, FQG62 and FQG63 (net weight 91 kg; gross weight 123 kg) conforms to the requirements on international transportation of hazardous materials (ADR/RID, DGR/IATA) and is intended for the transportation of sealed radioactive materials and special form sealed radioactive materials.

Durchgeführte Prüfungen nach		Tests according to „IAEA Safety Standards Series No.ST1"	
Wassersprühprüfung	1 Stunde mit einer Wassermenge von 600 l/h von allen Seiten besprühen. Dies übertrifft die Niederschlagsmenge von 5 cm pro Stunde.	Water spray test	1 hour sprayed with 600 l/h of water on all sides. This is more than the rain of 5 cm per hour.
Druckprüfung	Nach der Wassersprühprüfung 24 Stunden mit dem fünffachen Gewicht des Versandstücks belasten.	Pressure test	After carrying out the water spray test, the sample is weighted for 24 hours five times the weight of the package.
Durchstoßprüfung	Nach der Wassersprühprüfung eine halbkugelförmige Stahlstange mit Ø 3,2 cm und einem Gewicht von 6 kg aus 1 m Höhe auf die schwächste Stelle fallen lassen.	Penetration test	After carrying out the water spray test, a steel rod with a semispherical end diameter of 3.2 cm and weight 6 kg is dropped from a height of 1 m onto the weakest point.
Freifallprüfung	Nach der Wassersprühprüfung die Verpackung aus einer Fallhöhe von 1,2 m diagonal mit der Deckelecke auf eine Aufprallplatte fallen lassen.	Free–fall test	After carrying out the water spray test, the package is dropped from a height of 1.2 m onto a sensing plate diagonally with the corner of the cover
Prüfergebnis: **Der Prüfling hat alle Prüfungen bestanden.**		**Test results :** **The sample under test has successfully passed all tests.**	
Der in der Typ "A" Verpackung befindliche Stahlenschutzbehälter, mit dem darin befindlichen, doppelt umschlossenen Präparat, hat nach Abschluß der Tests, keinerlei Einwirkung und Beschädigung aufgewiesen. Die Dichtheit und abschirmende Wirkung ist in keiner Weise durch die Test verändert worden.		The source container with the double-sealed radioactive source contained within the type "A" packaging showed no effects or damage as a result of the test procedures. The tightness and screening remained unaffected by the tests.	

Maulburg, 09.08.2010

Endress+Hauser GmbH+Co. KG

i. V. (Dr. Arno Götz)
Leitung Zertifizierung/Manager Certification

i. V. (Hartmut Damm)
Leitung Projekt/Project Manager

Endress+Hauser
People for Process Automation

QG2000; 900 x 600 x 750 (35.4 x 23.6 x 29.5 in)

Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

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Herstellererklärung
Manufacturer Declaration

Endress+Hauser GmbH+Co. KG, Hauptstraße 1, 79689 Maulburg

erklärt als Hersteller, dass die Außenverpackung nach Zeichnung 210011807 (Material Birke-Multiplex 24mm, Abmessung: 900 mm x 600 mm x 750 mm) bei Einsatz mit den Strahlenschutzbehälter Typ QG 2000 (Gewicht ca. 350 kg = Gesamt Multiplex ca. 400 kg) den Anforderungen über die internationale Beförderung gefährlicher Güter (ADR/RID, DGR/IATA) an ein Typ „A" Versandstück entspricht. Die Packstücke sind für den Transport von umschlossenen radioaktiven Stoffen und von umschlossenen Stoffen in besonderer Form vorgesehen.

declares as manufacturer, that the external packaging according to drawing 210011807 (material birch multiplex 24 mm, dimensions: 900 mm x 600 mm x 750 mm) in use with the source containers Type QG 2000 (Net Weight app. 350 kg, Gross Weight multiplex app. 400 kg) conforms to the requirements on international transportation of hazardous materials (ADR/RID, DGR/ IATA) and is designed for the transportation of sealed radioactive materials as well as other special kind sealed radioactive materials.

Durchgeführte Prüfungen nach / *Test according to "IAEA Safety Standards Series No. ST1":*

Wassersprühprüfung	1 Stunde mit einer Wassermenge von 600l/h von allen Seiten besprühen. Dies übertrifft die Niederschlagsmenge von 5 cm pro Stunde.	*Water spray test*	*1 hour sprayed with 600 l/h of water on all sides. This is more than the rain of 5 cm per hour.*
Druckprüfung	Nach der Wassersprühprüfung 24 Stunden mit dem fünffachen Gewicht des Versandstücks belasten.	*Pressure test*	*After carrying out the water spray test, the sample is weighted for 24 hours five times the weight of the package.*
Durchstoßprüfung	Nach der Wassersprühprüfung eine halbkugelförmige Stahlstange mit Ø 3,2 cm und einem Gewicht von 6 kg aus 1 m Höhe auf die schwächste Stelle fallen lassen.	*Penetration test*	*After carrying out the water spray test, a steel rod with a semispherical end diameter of 3.2 cm and weight 6 kg is dropped from a height of 1m onto the weakest point.*
Freifallprüfung	Nach der Wassersprühprüfung die Verpackung aus einer Fallhöhe von 1,2 m diagonal mit der Deckelecke auf eine Aufprallplatte fallen lassen.	*Free drop test*	*After carrying out the water spray test, the package is dropped from a height of 1.2 m onto a sensing plate diagonally with the corner of the cover.*
Prüfergebnis: Der Prüfling hat alle Prüfungen bestanden		***Test result: The sample under test has successfully passed all tests.***	
Der in der Typ "A" Verpackung befindliche Strahlenschutzbehälter, mit dem darin befindlichen, doppelt umschlossenen Präparat, hat nach Abschluss der Tests keinerlei Einwirkung und Beschädigung aufgewiesen. Die Dichtheit und abschirmende Wirkung ist in keiner Weise durch die Test verändert worden.		*The source container with the double-sealed radioactive source contained within the type „A" packaging showed no effects or damage as a result of the test procedures. The tightness and screening remained unaffected by the tests.*	

Maulburg, 01.12.2011

Endress+Hauser GmbH+Co. KG

i.V.

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Abteilungsleiter: Produktsicherheit
head of department: product safety

i.V.

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