

Operating Instructions SHLG[®] Source Holder





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NOTES

Table of Contents

Revision Table	3
About this Document	9
Intended Use	
Targeted Group	
Explanation of Symbols	10
For Your Safety	
General Safety	11
Radiation Safety	11
Applications	12
Intended Applications	12
Certifications	12
Standards	13
Safety Information for Ex Areas	13
Manufacturer's Responsibility	13
User's Responsibility	13
Product Description	
Components	15
Source Housing	
Source Material	16
Beam Port	
Shipping Cap	
Beam Direction Label	
Caution-Radioactive Material Label	
Shutter	17

Lifting Eye
Storage and Handling 18
Source Holder
Mounting
General
Unpack the Equipment 19
Location 20
Internal Obstructions 20
External Obstructions 21
Preferred Orientation 21
Continuous Level 21
Point Level
Source Interference
Temperature 23
Ambient Temperature 23
Process Temperature 23
Insulation 23
Mounting Instructions 23
Mounting Checklist 24
Operation
Principle of Operation 25
Commission the Source Holder
Normal Operation 26
Source Holder Installation Requirements

Perform a Leak Test	27
Radiation Survey after Installation	28
Shutter Operation Test	28
Shutter (ON/OFF) Mechanism	29
ON/OFF Indicator	30
Special Conditions	31
Radiation Fields Inside Vessels	31
Maintenance	33
Periodic Maintenance Schedule	33
Diagnostics	34
Troubleshooting	34
Spare Parts	35
Electronics	35
Equipment Repair	35
Repair Information	36
Return the Source Holder for Repair	36
Dismounting	37
De-commission the Source Holder	37
Dismount or Removal Requirements	37
Disposal	39
Source Disposal	39
Supplemental Information	41
Specifications	41
Technical Data	41
SHLG	41
Dimensions	43

Accessories	44
Customer Service	45
Find Help	45
U.S., Canada, and Worldwide	45
Necessary Information	46

1 About this Document

1.1 Intended Use

These **Operating Instructions** provide specific instructions for the safe setup and operation of the source holder. The instructions and procedures in the documentation are designed for users seeking product knowledge, usage, and functionality.



The instructions in this guide are written for qualified and welltrained personnel. Make sure you read and understand all the instructions and safety guidelines in the Operating Instructions before operating this equipment.



Figure 1.1 SHLG

1.2 Targeted Group

The **Operating Instructions** not only provide instructions for the setup and operation of the instrument, but also specifically address topics and procedures required by an intermediate level user such as the following:

- Operator
- Instrumentation Technician
- Field Service
- Internal Support
- Process Engineers
- Field Sales

1.3 Explanation of Symbols



Danger

Identifies an imminently hazardous situation which, if not avoided, will result in death or injury.

Warning

Identifies a potentially hazardous situation which, if not avoided, could result in death or injury.



WARNING

Caution

Identifies a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in equipment damage.



Note

Identifies tips or useful information about the instrument.



Radiation

Introduces information concerning radioactive materials or radiation safety.



Ex Symbol

Provides special instructions for Ex applications.



Bulleted list

Indicates a list of items with no intended or implied sequence



Steps or Sequence

Identifies successive steps in a procedure

2 For Your Safety

2.1 General Safety

Make sure you read and understand all the instructions and safety guidelines in the Installation and Operation Guide before operating the source holder. The instructions in this guide are written for qualified and trained personnel.

Your equipment requires strict observance of standard regulations and guidelines. You must take note of the safety instructions in these operating instructions. In addition, you must adhere to the country-specific installation standards and all prevailing safety regulations and accident prevention rules.

2.2 Radiation Safety

The radiation safety information is included as a service to you and serves as a guide only in the most general terms. Regulatory agencies throughout the world have different requirements, regulations, and restrictions with respect to the use of radiometric instrumentation. You are responsible for familiarizing yourself with your national and local regulations. These regulations are enforced by agencies such as:

- U.S. Nuclear Regulatory Commission (NRC) or the Agreement State
- Atomic Energy Control Board (Canada)
- International Atomic Energy Agency (IAEA)

Your regulatory agency may limit or require certain activities including:

- Installation
- Maintenance
- Relocation
- Testing
- De-commissioning

Field Service Engineers have the proper licenses required to install and commission radiometric sources and can instruct you how to operate the source holder correctly and safely.



Refer to the **Radiation Safety Manual** for more detailed safety information and instructions.



If individuals need to enter the vessel on which the gauge is used, you must follow proper lock-out procedures. See the **Radiation Safety Manual** for the specific lockout procedures and other safety responsibilities.

2.3 Applications

Intended Applications

The SHLG source holder is designed for radiation-based measurement of applications including density and continuous and point level. The most common industries for the SHLG include:

- Chemical
- Petrochemical
- Offshore
- Refining

2.4 Certifications

The SHLG source holder is designed for certification compliance from the following agencies:

- AERB India
- CNSC Canada
- GOST-R Russia
- Northern Territories
- ODH/NRC Ohio Department of Health and Nuclear Regulatory Commission

Standards

The SHLG source holder is regulated by the U.S. Nuclear Regulatory Commission (NRC). Compliance certificates are issued by the State of Ohio under an agreement with the NRC.

Safety Information for Ex Areas

Please note the Ex-specific safety information for the installation and operation of the SHLG in Ex areas.

2.5 Manufacturer's Responsibility

VEGA source holders are designed to International standards for construction and safety.

2.6 User's Responsibility

All users who operate and service the equipment are responsible for ensuring safety requirements are met. This responsibility requires a basic understanding of the nature of radiation and an adherence to all operating procedures.

NOTES

3 Product Description

3.1 Components

The SHLG[®] source holders are used to position and protect a radioactive source near a process vessel orpipe. Radiation from the source is directed through the process by an integral collimator. A radiation detector placed opposite the source holder measures radiation fluctuations caused by process conditionchanges. The detector correlates radiation levels to process conditions.

The radiation beam for the SHLG[®] source holders are controlled manually with a push/pull shutter. In theON position, the source tube assembly is pushed down against the gasket stop with the handle. The source is in the OFF or shielded position when the source tube assembly is in the extended position.

These source holders are one component of a continuous or point level, density, or weight measuring system. The SHLG[®] source holders are gamma radiation devices secured in a fixed position near a vesselor pipe and are responsible for directing radiation through the process material.

The SHLG[®] source holders are constructed from stainless steel or carbon steel with polyester powdercoating and perform the following:

- Houses a radiation-emitting source capsule.
- Protects the radioactive source.
- Provides a means for shielding and locking out the radiation beam.
- Directs radiation safely through the process.
- Shields all areas in which radiation is not intended.

Source holders include some or all of the following components:

- Source Housing
- Source
- Material
- Beam Port
- Shipping Cap
- Beam

- Direction Label
- Caution-Radioactive Material Label
- Shutter
- Lifting
- Eye
- Documentation

Source Housing

A welded, closed stainless steel, lead, or iron container that houses the heli-arc welded stainless steelsource capsule.

Source Material

The source material is either Cesium 137 (Cs-137) or Cobalt 60 (Co-60).

Beam Port

The front face of the source holder is the beam port.

Shipping Cap

The shipping cap covers the beam port during source holder transportation.

Beam Direction Label

An arrow label identifies the direction of the radiation beam.

Caution-Radioactive Material Label

The Caution-Radioactive Material label provides the following:

- Isotope
- Activity
- Model Number
- Serial
- Number

- Date of Assay
- Distributor Name

RADIOACTIVE MATERIAL
SOURCE HOLDER
SERIAL NO.
mCi Bq
C.O.
REMOVAL OF THIS LABEL IS PROHIBITED VEGA AMERICAS, INC., CINCINNATI, OHIO, USA
MADE IN U.S.A. PART NO. 218124

Figure 3.1 Caution-Radioactive Material Label



You must not remove the stainless-steel Caution-Radioactive Material Label.

Shutter

A shutter is the mechanism that opens or closes the radiation beam port.

Lifting Eye

A lifting eye located on top of the housing helps when lifting the source holder into place for installation.

Documentation

The documentation provided with the SHLG source holder includes some or all of the following:

- Operating Instructions Manual
- Quick Reference Guide
- Technical Reference Manual
- Radiation Safety Manual
- SIL
- Safety Manual (if applicable)
- ATEX Safety Manual (if applicable)

3.2 Storage and Handling

You are responsible for familiarizing yourself with all national and local radiation safety guidelines and procedures prior to storing or handling radioactive materials. See the **Radiation Safety Manual** for specific details.

Source Holder

If you must package the source holder, follow these steps:

- 1. Ensure the shutter is in the OFF or CLOSED position and locked, if source holder has a shutter.
- 2. Check the current local regulations (U.S. Nuclear Regulatory Commission, Agreement State, or other)to determine if this area must have access restrictions.

If you must store the source holder, follow these steps:

- 1. Store the source holder in a clean, dry, and secure area.
- 2. Ensure the shutter is in the OFF or CLOSED position and locked, if source holder has a shutter.
- 3. Check the current local regulations (U.S. NRC, Agreement State, or other) to determine if this areamust have access restrictions.Detent Assembly.

4 Mounting

4.1 General

Measurement accuracy is highly influenced by the proper installation of the equipment. This section contains the guidelines for optimizing performance through proper installation. You may also reference theapplication sizing sheet and any installation drawings VEGA provided at the time of order.

4.2 Unpack the Equipment

Make sure you read and understand all the instructions and safety guidelines in the Operating Instructions before you unpack, install, or operate the equipment. The instructions in this manual arewritten for qualified and trained personnel.Conduct visual inspection of source holder.



You must be familiar with radiation safety practices in accordance with your U.S. AgreementState, U.S. Nuclear Regulatory Commission, and other local and international nuclear regulatory agencies before unpacking the source holder.

When you unpack your source holder, make sure you follow the steps below:

- 1. Unpack the unit in a clean, dry area.
- 2. Visually inspect the source holder for damage.
- File a claim against the carrier if there was damage to the unit during shipment. Make certain you report the damage in detail. Any claims against VEGA for shortages or errors in shipment, must occur within 30 days of receipt of the shipment.



If you must return the source holder to VEGA, follow the instructions in the **Instrument Repair** section of the **Maintenance and Diagnostics** chapter.

4. Make sure the ON/OFF mechanism is closed and locked.



If you find the operating handle in the ON position, place the handle in the OFF position immediately and contact your Radiation Safety Officer or VEGA Nuclear Services.

- 5. Compare the shipment against the packing slip to make certain you received your complete order.
- 6. If you are not installing or mounting the source holder immediately, find a storage area that is isolated and secure.



Low level radiation fields are always present around a source holder.

- 7. Allow access to authorized personnel only.
- 8. Maintain records of the shipping and receipt.
- 9. While not required, a survey and leak test provide additional assurance that the source holder is in safe condition.

4.3 Location

At the time you ordered your equipment, VEGA sized the source holder for optimal performancefor the designated application. If the location of the equipment has changed or is different from the original order, notify VEGA before installing the equipment.



Locate the source holder where debris or other material cannot coat it to ensure the continuingproper operation of the source ON/OFF shutter. Many regulatory agencies, such as your U.S.Agreement State, the U.S. Nuclear Regulatory Commission, or other local and international nuclear regulatory agencies, require periodic testing of the ON/OFF mechanism. See the **Radiation Safety Manual** for details about current regulations.

Internal Obstructions

If an internal obstruction such as an agitator or a baffle is directly in the path of the radiation beam, thatobstruction can shield the radiation from the detector. Such an obstruction can diminish performance of the equipment.



If your vessel has a central agitator shaft, the source holder and the detector can mount to the vessel on a chord other than the diameter. Mounting the source holder and the detector in this manner allows the beam of radiation to avoid the agitator shaft.

External Obstructions

Any material in the path of the radiation can affect the measurement. Some materials that are present during the initial adjustment pose no problem because the adjustment accounts for the effect of those materials. Examples of such materials are:

- Tank walls
- Liners
- Insulation

However, when the materials change or you introduce new ones, an erroneous gauge reading is possible. For example, insulation that you add after adjustment attenuates the radiation and causes the gauge to erroneously read upscale.

Preferred Orientation

You can mount the SHLG[®] on a process vessel or a process pipe. Depending upon the specific application, the preferred orientation for the SHLG[®] is as follows:

Continuous Level

Mount the SHLG[®] perpendicular to the process pipe or vessel. Use the same fasteners to temporarily attach the source carrier cover to the source holder.



Figure 4.1 SHLG Continuous Level Orientation

Point Level

Mount the SHLG[®] parallel to the process pipe or vessel.



Figure 4.2 SHLG Point Level Orientation

Source Interference

When multiple adjacent pipes, vessels, or conveyors have nuclear gauges, you must consider the orientation of the source beams so each gauge senses radiation only from its appropriate source. Placethe source holders on the inside, with the radiation beams pointing away from each other.





- 1. Radiation Beam
- 2. Detector
- 3. Source Holders

4.4 Temperature

Your source holder may have components that are sensitive to temperature extremes. Avoid exposure totemperatures beyond the specified limits.

Ambient Temperature

You may use the source holder in continuous ambient temperature conditions from - 40 °C ... + 60 °C (-40 °F ... + 140 °F). Minimize direct exposure to sunlight when ambient temperatures exceed + 40 °C (+ 105 °F).

Process Temperature

Process temperature can affect gauge performance in two ways.

- Large process temperature changes may affect process densities and the radiation absorption rates andmay cause erroneous readings. Consult VEGA if inaccuracies related to process temperature changes occur.
- Extremely hot process temperatures may raise gauge temperatures through radiated or conducted heat transfer. Use additional insulation, thermal heat shields, or ceramic isolation spacers to reduceheat transfer. Use water cooling in extreme situations.

Insulation

Make certain you protect any insulation, between the detector or the source holder and the process material, from liquids. The absorption of a liquid, such as water, attenuates the radiation and causes anerroneously upscale gauge reading.



See the **Supplemental Information** chapter of this manual for more technical data and specifications.

4.5 Mounting Instructions

Anyone with basic radiation safety awareness training can mount the source holder on the process pipe orvessel provided the source is locked in the OFF position and the following instructions are observed.

Canadian licensees must contain specific wording in their license that allows these operations.

Mounting Checklist

Before mounting the source holder, perform the following steps:

- 1. Conduct visual inspection of source holder.
- 2. Ensure that the shutter is closed and locked.
- 3. Make certain that external surfaces are not damaged.
- Check that the mounting position complies with the manufacturer's engineering drawings and specifications. (See certified correct drawings or contact VEGA.)
- 5. Ensure adequate clearance to operate shutter or cable/rod mechanism.
- 6. Consider in advance any high temperature or corrosive environmental conditions. For example, youshould consider the following items:
 - Adequate insulation to protect source holder from high temperature.
 - Special cooling system required to reduce source holder temperature.
 - Additional protection required to prevent corrosive material from settling on source holders.
 - Excessive vibration.
- 7. Have personnel and equipment, cranes, hoists, and supports available to mount unit.

Be prepared to handle the weight of the unit. Remember, source holders are very heavy.

5 Operation

5.1 Principle of Operation

The SHLG[®] source holders position and protect a radioactive source near a process vessel or pipe. Radiation from the source is directed through the process by an integral collimator. A radiation detectorplaced opposite the source holder measures radiation fluctuations caused by process condition changes. The detector correlates radiation levels to process conditions.

SHLG source holders operate by rotating the cylindrical shutter over a 90° range. When the shutter is in the on position, a void slot in the shutter shielding permits the radiation beam to exit the device. When the shutter is in the off position, the void slot is perpendicular to the beam and blocks the beam from exiting the device.

Commission the Source Holder

Before any gauge is setup and adjusted, you must commission the source holder. Depending on the source holder type and the specific license requirements, the process of commissioning the source holdercan include:

- Inspecting the mounting supports.
- Testing the source holder for any source material leakage.
- Conducting open and closed radiation surveys.
- Performing an occupancy evaluation.

See the Radiation Safety Manual for specific details.



Commissioning Call Checklist

In many installations, a VEGA Americas Field Service Engineer commissions the gauge. To reduce service time and costs, use this checklist to ensure the gauge is ready for commissioning before the engineer arrives:

• Allow access to the source holder for testing purposes.

- Have process ready for adjustment.
- To ensure the most accurate measurement, a process adjustment is necessary. This adjustment requires establishing and changing vessel levels. If process material is not available, you may use water in most cases.
- Do not remove the lock on the source holder.
- Notify your Radiation Safety Officer or contact VEGA Americas Field Service at 1-513-272-0131 if there is damage to the source holder.

5.2 Normal Operation

Before putting the source holder into operational use, be aware of the requirements for installing the source holder.

Source Holder Installation Requirements

The following statements are important in defining the requirements for the installation of a source holder:

- Regard each separate placement or relocation as a new installation.
- Installation is the process of preparing the mounted source holder for use and consists of the following:
 - Preliminary radiation survey
 - Leak test
 - Installation radiation survey
 - Shutter or cable/rod mechanism operation test
- Only a specifically licensed individual can perform the installation.
- The specifically licensed person must use a calibrated survey meter and must be present at the site during the entire procedure.
- The licensee may perform future periodic tests by following the instructions in this manual.

Preliminary Survey

- 1. Ensure that the survey meter is calibrated and operational.
- 1. Conduct a radiation survey of the mounted unit by surveying the source holder and detector, omni-directionally, one foot from the surface.
- 1. If the radiation field is normal, less than 50 mSv/hr (5 mrem/hr) at 30 cm (12") for most VEGA Americas source holders, proceed with the leak test.
- 1. If the radiation field is greater than 50 mSv/hr (5 mrem/hr) at 30 cm (12"), complete the following: Post restrictions of the area, if required.
 - Post restrictions of the area, if required
 - Verify with the manufacturer that this condition is normal for the type of source and source holder you are installing.

Perform a Leak Test

- 1. Remove the zip-top bag containing the swab stick.
- 2. Write the source serial number or other identification on the bag.
- 3. Open the zip-top bag and grasp the swab stick by the end opposite of the fiber tip.
- 4. Wipe the external surface of the source holder by using the fiber-tipped end of the swab stick. Wipe the locations where contamination would most likely accumulate in the event the source capsule was leaking.
- 5. Place the swab stick into the zip-top plastic bag and close.
- 6. Put the zip-top bag in an envelope and seal it.



Do not touch the fiber tipped end or allow the tip to touch other objects since this could spread contamination if the source is leaking. If the swab stick contains a significant amount of radioactive material, send an emergency notification, by telephone immediately. Contact the appropriate nuclear regulatory agency and VEGA Americas for assistance. You must make arrangements with VEGA Americas, or another specifically licensed person to take the source out of service.

Radiation Survey after Installation

- 1. Complete the survey sheets with measurements at 30 cm (12") omnidirectionally to record the radiation pattern.
- 2. Survey in the closed (OFF) position and then in the open (ON) position.
- 3. Do an occupancy evaluation to determine the dose personnel might receive. There are two categories, each with a different limit:
 - Members of the general public can receive 20 mSv/hr (2 mrem/hr), not to exceed 1,000 µSv/yr (100 mrem/year). These numbers include only individuals who are in the area infrequently and have no assigned reason for exposure.
 - Occupationally-exposed individuals can receive 50,000 mSv (5,000 mrem) per year with no specified rate limit. This number includes anyone whose assigned duties require his presence in the vicinity of the source holder. Complete the evaluation to determine if the limit of 5,000 mSv (500 mrem) per year, which would require monitoring, is potentially reachable.
- 4. Decide if additional shielding is required to prohibit members of the general public from receiving radiation doses greater than 20 mSv/hr (2 mrem/hr).
- 5. Notify appropriate personnel of the presence of radioactive materials and precautions that they must take to minimize exposure.
- 6. If there are radiation fields above 20 mSv/hr (2 mrem/hr) present on the detector side, notify the RSO (Radiation Safety Officer) of the problem.
- 7. Restrict the area, if required.

Shutter Operation Test

On applicable source holders, the shutter operation test verifies that the shutter is functioning.



If the shutter does not work correctly, see the **Radiation Safety Manual Emergency Guidelines**.

Shutter (ON/OFF) Mechanism

Depending upon whether or not your source holder uses a shutter or cable/rod mechanism, checks arenormally performed at intervals not to exceed six (6) months. Customers who have the ability to cycle shutters or check cables/rods on a more frequent basis without disturbing production requirements are recommended to do so. The application of lubricating oil to the shutter mechanism will assist in maintaining the source holder in good working order.

Perform the following procedure to verify that the shutter mechanism is working correctly.

To test the shutter mechanism, move the actuator back and forth several times between the OFF and ON positions.



The actuator should move easily, but not freely. There will be some resistance to movement due to bearing friction and inertia of the mechanism.

- 1. Use one of the two methods listed below to ensure that the shutter mechanism is operational:
 - Method A Using a calibrated portable radiation survey meter, take a measurement at the back of thedetector housing.
 - Field intensity should be low when the shutter is in the OFF position.
 - Conversely, when the shutter is ON, the field intensity should increase.



Measurement around the source holder may not change.

- Method B If a survey meter is not available, use the gauge electronics and monitor the display whilemoving the shutter to the OFF position.
 - Indication should go to the high process value on the display.
 - Move the shutter to the ON position and the reading should return to normal.

There are no ON/OFF Indicators to verify that the shutter or cable/rod mechanism is working correctly or thatthe source is in the shielded position. When the source shutter or positioning rod or cable is in the retracted position and the shutter is closed, it is assumed that the source is in the shielded position.

Monitoring of the radiation levels by level detectors or other means is necessary to ensure that the sourceis in the shielded position and not in the source well.

Keep the records of these tests, listing the date and name of the person performing the test, for at leastthree years.

At the first indication that a shutter or cable/rod mechanism is not working properly, contact the manufacturer for advice. A sticky shutter or a cable or rod that will not retract is a warning that the properoperation is compromised and you need to address the inoperable mechanism.

If the shutter or cable/rod mechanism becomes inoperable, contact your regulator and manufacturer immediately for advice. DO NOT attempt to free up the shutter or cable/rod by mechanical means with theuse of wrenches, hammers, channel locks, levers, etc., These devices may cause more damage and are prohibited. Such actions have been known to shear shutter handle bolts, damage shutter handles, and bend handle shafts.

If a device has an inoperable shutter or cable/rod, the source holder should not be removed withoutconsulting the manufacturer.

ON/OFF Indicator

On applicable source holders test the ON/OFF indicator every six (6) months. Testing the ON/OFF indicator means that the shutter indicator must indicate ON and OFF properly. You can observe this operation when testing the shutter as described above.

5.3 Special Conditions

Radiation Fields Inside Vessels

You must measure the radiation fields inside a vessel when entering the vessel. Use the following statement when defining those requirements:

- Equipment that is mounted on vessels or has accessible air gaps must have written lockout procedures to ensure that access to the high levels of the primary radiation beam is not possible.
- In North America, many of these types of installation are considered by OSHA (Occupational Safety and Health Administration) as confined spaces and the radiation is classified as "other known energy hazards". These installations require lockout documentation consistent with OSHA rules and regulations.
- You may use this documentation to meet the requirements of the U.S. NRC or other regulatoryagency.

At a minimum, follow the steps listed below, where applicable:

- 1. Verify, by signature, that source holder is locked in the OFF (shutter closed) position.
- 2. Ensure that one person, who controls individuals entering the air gap, holds the key.
- 3. Make certain the radiation field is very low by using the gauge electronics or a survey meter.
- 4. Check that the gauge electronics shows a high reading or maximum density, since no radiation isreaching the detector.
- 5. Make sure the survey meter allows for quantitative measurements. The fields measured should matchvery closely to background readings.
- 6. Ensure that the vessel is vacant and the entrance door is locked, after the work is completed.
- 7. Complete these steps before inserting the source holder and returning it to the ON position.

NOTES

6 Maintenance

To prevent potential problems and comply with radiation regulations, VEGA recommends the following maintenance schedule.

6.1 Periodic Maintenance Schedule

Description	Frequency	Procedure
Location	Annually	Ensure that the source holder is in the correct location. If the source is not in the correct location, contact your regulatory agency immediately.
Mounting brackets and hardware	Annually	Check for loose mounting hardware.
Tags and labels	Annually	Make certain the tags and labels are in place and legible.
General cleanliness	Annually	Make certain there is no buildup of dirt or process material on operating handles or cables.
Corrosion or rusting	Annually	Check the housing and operating handle.
Painting	As needed	Clean and paint as necessary. Do not paint labels.
Source holder shutter check ON/ OFF Mechanism (On applicable source holders)	Every six months unless otherwise required by applicable nuclear regulatory agency	See the Shutter (ON/OFF) Mechanism procedure.
Source wipe/Leak test	Every three years unless otherwise required by applicable nuclear regulatory agency	See the Leak Test procedure.

6.2 Diagnostics

The source holder does not have any diagnostics that alert users to potential problems. However, emergency guidelines as outlined in the **Radiation Safety Manual** provide steps you can take for the following emergency situations:

- Stuck Shutter or Inoperable Cable
- Loss or Theft
- Entering a Tank or Vessel
- Fall, Collision, or Fire

6.3 Troubleshooting

The source holder is extremely reliable, but errors can occur during operation. Some of those potential problems are caused by the following:

Item	Action to Take
Abandoned or discarded source	In the United States, contact the U.S. NRC or an agreement state.
Damaged or failed source	Retract the capsules into the shielded position, if possible and contact VEGA Americas Nuclear Services.
Missing or broken lock	Do not remove the source from the crate or mount the source. If the source is already mounted, contact VEGA Americas Nuclear Services.
Shutter not locked in OFF position	Turn the shutter to the OFF position, if possible and contact VEGA Americas Nuclear Services.
Shutter or Cable/Rod not operating correctly	Contact VEGA Americas Nuclear Services.
Cable not operating correctly	Contact VEGA Americas Nuclear Services.
Source leak	Evacuate the immediate area and control entry to the area. Contact VEGA Americas Nuclear Services.
Improper Handling	Contact VEGA Americas Nuclear Services.
Improper or damaged shielding	Contact VEGA Americas Nuclear Services.

Item	Action to Take
ON/OFF Indicator malfunctioning	Contact VEGA Americas Nuclear Services.
Improper mounting	Contact VEGA Americas Nuclear Services.
Improper installation	Contact VEGA Americas Nuclear Services.
Label damaged or removed	Contact VEGA Americas for a replacement and the procedures for installing the label.
Improper licensing	In the United States, contact the U.S. NRC or an agreement state.

If you are unable to correct the problem, please contact VEGA Americas Nuclear Services at 513-272-0131 or send an email to nuclearservices@vega.com.

6.4 Spare Parts

There are no user-serviceable parts in the source holder. Consult VEGA for any service related needs.

6.5 Electronics

Your source holder does not require any electronics.

6.6 Equipment Repair

To request source holder repair within the United States and Canada, contact a VEGA Americas Field Service Engineer.

Contact Information	Telephone Numbers
Monday through Friday, 8:00 A.M 5:00 P.M. EST (Eastern Standard Time)	1-844-VEGA-NOW (1-844-834- 2669)
For emergencies after hours, call the number listed and follow the voice mail instructions.	1-513-272-0131

Repair Information

When calling VEGA Americas for repair, have the following information available:

- Product model that you are returning for repair.
- Description of the problem.
- VEGA Americas Customer Order (C.O.) Number.
- Purchase Order Number for the repair service.
- Shipping address.
- Billing address.
- Date needed.
- Method of shipment.
- Tax information.

Return the Source Holder for Repair

The steps below outline the process necessary to return your source holder to VEGA for repair.

- 1. Call VEGA Nuclear Products Repair at 1-513-272-0131, Monday through Friday, 8:00 A.M. to 5:00 P.M. EST (Eastern Standard Time).
- 2. VEGA assigns the job (repair) a material return authorization (MRA) number.



You must contact VEGA Americas and receive a material return authorization number (MRA) prior to returning any source holder to VEGA Americas. VEGA Americas reserves the right to refuse any shipment that does not have a MRA number assignment.

- 3. Indicate the MRA on the repair service purchase order.
- 4. Clearly mark the shipping package with the MRA number.
- 5. Send the confirming purchase order and the source holder to:

VEGA Corporation Attention: Repair Department

4241 Allendorf Drive

Cincinnati, Ohio 45209-1599 USA

7 Dismounting

Before you attempt to dismount the source holder, make sure you are aware of any potentially dangerous process conditions such as extreme temperatures, high pressure in the vessel, and toxic or corrosive materials.

7.1 De-commission the Source Holder

In many U.S. installations, a VEGA Americas Field Service Engineer decommissions the source holder. Only persons with a specific license from the U.S. NRC, Agreement State, or other nuclear regulatory agency may remove the source holder lock.



Users outside the United States must comply with the appropriate nuclear regulatory agency's regulations in matters pertaining to licensing and handling of the equipment.



See the **Radiation Safety Manual**, and the appropriate current regulations for details.

Dismount or Removal Requirements

Before you remove the source holder, perform the following steps:

- Conduct a visual inspection of the source holder. Make certain the external surface is smooth and not damaged.
- Check corroded and rusted units, which have been in service under extreme environmental conditions. These units may require special removal, handling, and shipping procedures.
- Ensure that the shutter is closed and locked on applicable source holders.
- Make sure the cable/rod is retracted on applicable source holders.
- Have personnel and equipment, cranes, hoists, and supports available to remove unit.

- Inform all personnel involved in the removal, of the procedures necessary to limit radiation exposure. For example, how to reduce exposure using time, distance, and shielding.
- Be prepared to handle the weight of the source holder. The approximate weight of the source holder is on the certified correct drawing.

Specific requirements for removing the source holder include the following:

- Radiation Survey
- Leak Test, if shipping the unit.
- Only a specifically licensed individual can perform the removal.
- The specifically licensed person performing the removal must use a calibrated survey meter. A radiation safety officer must be present at the site during the entire procedure.



The radiation field should conform to the installation survey or less than 50 mSv/hr (5 mrem/hr) at 30 cm (12") from the surface omnidirectionally.



This information refers to work that should be performed prior to the removal of a source holder in the United States. Canadian licensees must have specific wording in their license that allows installation and removal.

7.2 Disposal

Source Disposal

Contact VEGA Americas Field Service for information regarding the disposal of the source. The contact information for the U.S. and Canada is:

Contact Information	Telephone Number
Monday through Friday, 8:00 A.M 5:00 P.M. EST (Eastern Standard Time)	1-844-VEGA-NOW (1-844- 834-2669)
Emergencies: Follow the voice mail instructions	513-272-0131
Fax	513-272-0133

NOTES

8 Supplemental Information

8.1 Specifications

The following technical data provides a description of the attributes specific to your source holder. In addition, the dimensions provide the detailed length, width, and height of your source holder.

Technical Data

SHLG

Maximum Cs-137 Activity		
- SHLG 1	148 GBq (4 Ci) for 50 uSv@305 mm (5 mR/hr@12")	
- SHLG 2	1.1 TBq (30 Ci) for 50 uSv@305 mm (5 mR/hr@12")	
- SHLG 3	2 TBq (54 Ci) for 50 uSv@305 mm (5 mR/hr@12")	
Maximum C0-60 Activity		
- SHLG 1	925 MBq (25 mCi) for 50 uSv@305 mm (5 mR/hr@12")	
- SHLG 2	3.15 GBq (85 mCi) for 50 uSv@305 mm (5 mR/hr@12")	
- SHLG 3	18.5 GBq (500 mCi) for 50 uSv@305 mm (5 mR/hr@12")	
Fire Resistance	+538 °C (+1000 °F) for 5 minutes	
Shielding Material	Lead	
Handle/Shutter	Push/Pull	
Collimation Angle	0°, 30°, 45°, 60°	
Housing Material	Carbon steel with polyester powder coating 316 Stainless steel (optional)	
Weight		
- SHLG 1	83 kg (182 lbs.)	
- SHLG 2	156 kg (343 lbs.)	
- SHLG 3	297 kg (655 lbs.)	
Environment Conditions		

- Life Expectancy	20 years	
- Temperature	- 40 °C + 60 °C (- 40 °F + 140 °F)	
- Pressure	Atmospheric	
- Vibration	Mild (less than 5 g)	
- Corrosion	Mild	
- Fire and Explosion	Accident Conditions Only	
- Humidity	0% to 100% Relative Humidity	
Licensing	A general license for the use of this source holder must meet the requirements as outlined in OAC 3701:1- 46-05 (10 CFR 31.5 equivalent). Any other use of the source holder requires a specific license.	
Testing		
- Leak Test	At least once every 36 months	
- Shutter Test	At least once every 6 months	
Transfer and Disposal	The transfer of this source holder containing the sealed source is only to a specifically licensed person or as specified in OAC 3701:1-46 (an equivalent to 10 CFR 31 and 32). If you need to transfer the source holder to another location or dispose of the source holder, specific licensees are required.	
Handling, Installation, and Storage	A general licensee may initially mount the device. You may not put the source holder into service until it is inspected by a specific licensee. The manufacturer, or other specifically licensed persons, are the only people that may perform service.	
Storage	Whenever you remove the device from its mounted position, mount the cover plate on the device to shield the beam port and keep foreign material out of the shutter assembly.	
Physical Inspection	Perform physical inspections of the device and its labeling at least once every six months for corrosion prevention and maintenance in accordance with the manufacturer's instructions.	

Dimensions





- 1. Handle
- 2. Lifting Eye
- 3. 3a SHLG 1 16 1/2" [419 mm]
- 4. 3b SHLG 2 20 5/8" [524 mm]
- 5. 3c SHLG 3 24 1/4" [616 mm]
- 6. 4a SHLG 1 8 1/2" [216 mm]
- 7. 4b SHLG 2 11 1/2" [292 mm]
- 8. 4c SHLG 3 14 1/2" [368 mm]
- 9. 5 9/16" [6 mm] Diameter Mounting Holes
- 10.6a SHLG 1 8 3/4" [222 mm]
- 11.6b SHLG 2 8 3/4" [222 mm]
- 12.6c SHLG 3 12 1/4" [311 mm]
- 13.7a SHLG 1 10" [254 mm] 14.7b SHLG 2 10" [254 mm]
- 15.7c SHLG 3 14" [356 mm]
- 16.8 1/4" [6 mm] Padlock Hole9a SHLG 1 3" [76 mm]
- 17.9b SHLG 2 4" [102 mm]
- 18.9c SHLG 3 5" [127 mm]
- 19.10 Collimation Angle11a SHLG 1 8" [203 mm]
- 20.11b SHLG 2 9 3/4" [248 mm]
- 21.11c SHLG 3 12 1/8" [308 mm]

8.2 Accessories

Accessory	Description	Part Number
Leak Test Kit	Leak test kit for one source holder. Includes swab, shipping container, instructions, analysis and report	229555
Signage	"Caution Radioactive Materials" warning sign	238911
Survey Meter	General purpose digital survey meter	245644
Survey Meter	Model 2402 general purpose survey meter with scintillator probe and 1 m cable	240943

9 Customer Service

9.1 Find Help

In addition to the documentation provided with your equipment, you will find more information on the CD shipped with your source holder. If you are unable to find an answer to your specific question, VEGA has service personnel located throughout the world to assist you.

Some of the services available to you include:

- Emergency service telephone support available 24 hours a day
- Radiation survey meter calibration
- · Wipe test and wipe test analysis
- Start up and commissioning
- Service, maintenance, and disposal of source material

9.2 U.S., Canada, and Worldwide

VEGA has Field Service Engineers available for on site service, emergency services or gauge start up.

Contact Information	Telephone Number
Monday through Friday 8:00 A.M 5:00 P.M. EST (Eastern Standard Time)	1-844-VEGA-NOW (1-844-834-2669)
Emergencies: Follow the voice mail instructions	513-272-0131
International (Worldwide)	513-272-0131
Fax	513-272-0133

9.3 Necessary Information

When you call with a question, please have the following necessary information available for the Field Service Engineer or representative:

- VEGA Customer Order (C.O.) Number.
 - Located on the engraved label on the source holder
 - Located on one of the flat sides of the housing just below the conduit entries, where applicable.
- Detector or sensor serial number, if applicable (located on the detector housing inside the external housing).



VEGA Americas, Inc. 4170 Rosslyn Drive Cincinnati, Ohio 45209 USA Phone: 1.513.272.0131 Fax: 1.513.272.0133 E-mail: americas@vega.com www.vega-americas.com

> All statements concerning scope of delivery, application, practical use, and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.

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