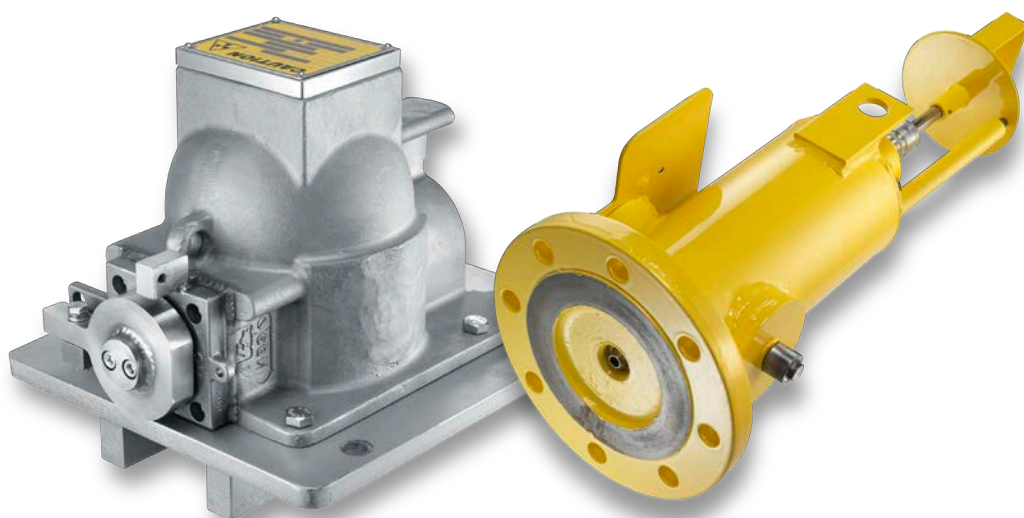


Level, Density, and Weight Measurement

Source Holders for Radiation-based Measurement



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Leadership in Radiation-based Measurement

VEGA is a world leader in radiation-based measurement solutions, with sixty years of experience and success in the industry. Different applications have different requirements, and VEGA recognizes the need to have a complete solution offering. Proper sizing and protection of the source is key to the measurement system's success, so VEGA offers a variety of source holders for level, density, weight, and point level applications.

Why Use Radiation-based Measurement?

Radiation-based measurement is a proven technology with thousands of installed applications. Unlike most other level and density technologies, nuclear detectors avoid contact with process conditions. Processes with extreme temperature, pressure, or corrosive properties have no adverse effects on nuclear instruments. Radiation-based technology installs with no process shutdown and generally requires no modification to existing vessels or piping, reducing total installation cost.

Advanced Design & Development

Gamma source placement and alignment is critical to measurement accuracy. Proper protection and shielding for the source ensures the health and safety of employees. The large selection of source holders allows VEGA Nuclear Application Engineers to specify appropriate and cost-effective solutions for each measurement need.

Licensing

VEGA has full-time staff available to assist customers with their nuclear licensing needs. These specialists provide guidance and information with respect to license applications or amendments, and working with the Nuclear Regulatory Commission, Agreement State agencies, and regulatory bodies around the world. Assistance is also available with additional regulation requirements.

How We Earn Your Business

The Right Instrument for Every Application

VEGA is committed to supplying instruments that work in all applications, not just those with ideal conditions. All new instruments are tested in extreme heat, dust, chemical, moisture, and cold environments before they are released. VEGA's goal is to enable customers to achieve operational efficiency with every measured process.

Performance Guarantee

To demonstrate our commitment to specifying the right instrument for each application, VEGA offers a Performance Guarantee — if our recommended solution does not perform exactly as expected, we'll make it right.

24 Hour Support

The VEGA Field Service team is trained to provide telephone, email, or on-site customer service. Whether starting up, configuring, or troubleshooting the system, VEGA Field Service provides necessary steps to ensure the measuring device and its outputs run efficiently. Through service and training, VEGA supports all users throughout the life of the installed solutions.

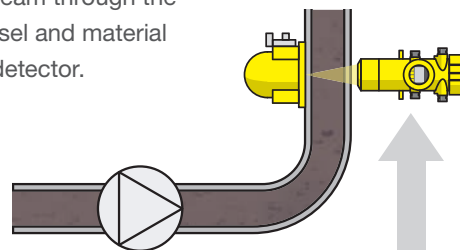
Principle of Operation

Source holders are a component of a radiation-based measurement system, working with one or more detectors to produce a process measurement. A system comprised of a source holder and detector provides a reliable continuous or point level, density, interface, or weight measurement with process values viewable locally or through a control system.

Source holder selection and source activity are dependent on application needs. Radiation-based systems are non-contact and in most cases require no alterations to process vessels or downtime for installation.

Source Output

A source holder and detector are mounted on opposite sides of the process vessel. A cesium-137 or cobalt-60 isotope is used as the source of gamma radiation that is passed as a collimated beam through the process vessel and material toward the detector.



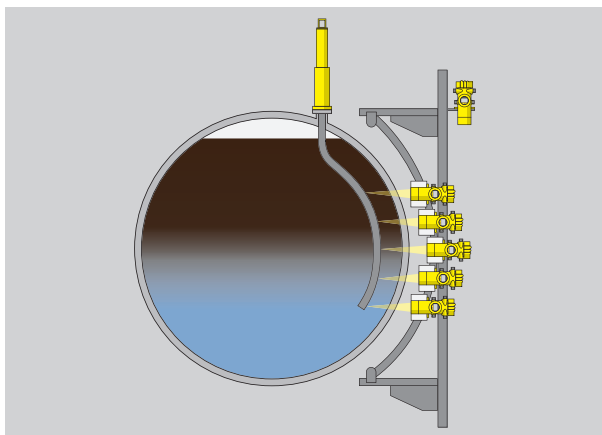
Detector Inference

As process mass increases, it shields the detector from radiation. The more radiation the detector receives, the lower the process mass (i.e. level, density, or weight) and vice versa. The scintillator on the opposite side of the tank infers the process condition based on the radiation received.

SHLM – Internal Source Applications

Source holder for measurement in a dry well

The SHLM source holder is used for critical applications when the vessel construction is too challenging for externally mounted sources. The SHLM utilizes a rod or cable and handle assembly to place the sources inside the vessel in a dry well. Single or multiple source configurations are available.



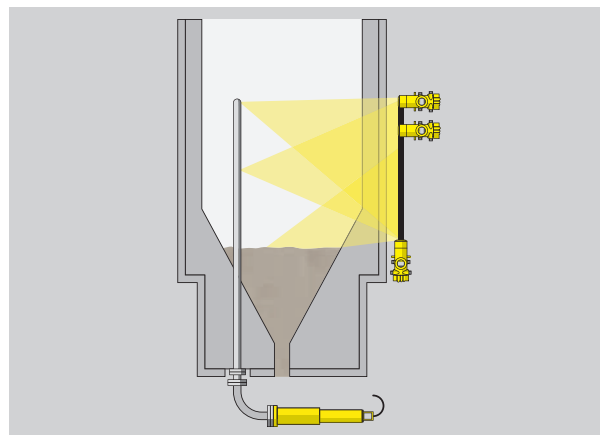
Desalters

The “washing” of crude oil in desalters requires separation of oil and water. Control of the resulting emulsion is vital to plant efficiency. The SHLM source holder inserts multiple sources into a dry well that pairs with a series of MiniTrac density detectors to create the Multi-Point Density Array system.

- System provides multiple points to generate a density profile
- Only one dry well required, reducing installation costs
- Reliable interface control

SHLM

- Maximum Source Activity:
 - Cs-137: 25,000 mCi (925 GBq)
 - Co-60: 500 mCi (18.5 GBq)
- Fire Resistance: 1,000°F (538°C) for 5 minutes
- Collimation Angle: Not applicable



High Pressure Separator Vessels

Several stages in the conversion of hydro-carbons into plastics include the use of a high pressure separator. These vessels have impressive wall thickness, making externally mounted source holders ineffective. In these cases, the insertion of source capsules into a drywell is the only practical solution for level measurement.

- Source capsules positioned in a drywell require that the gamma energy travel through only a single vessel wall, minimizing the required source activity
- The SHLM can be mounted at the vessel bottom and the source capsule pushed up into the drywell vessel, minimizing required source activity.

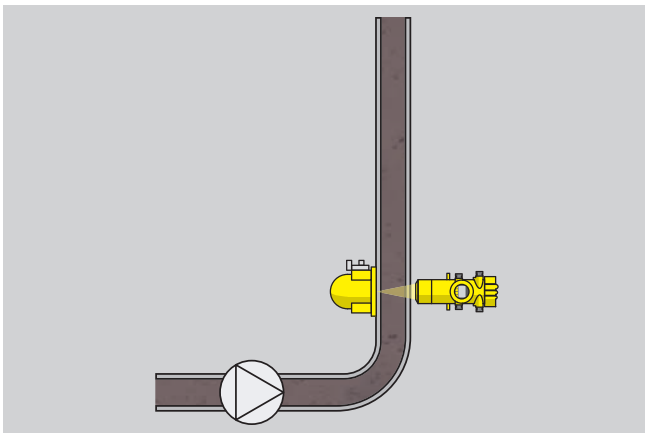
SHLD – Cast Steel Source Holder

Lightweight, cast steel source holder

The SHLD houses a source capsule that provides gamma energy for radiation-based mass flow, point level, level, and density measurements. The compact, lightweight SHLD is comprised of a carbon steel housing material with polyester powder coating, lead shielding material, and rotary shutter. Optional 316 stainless steel housing material available.

SHLD 1

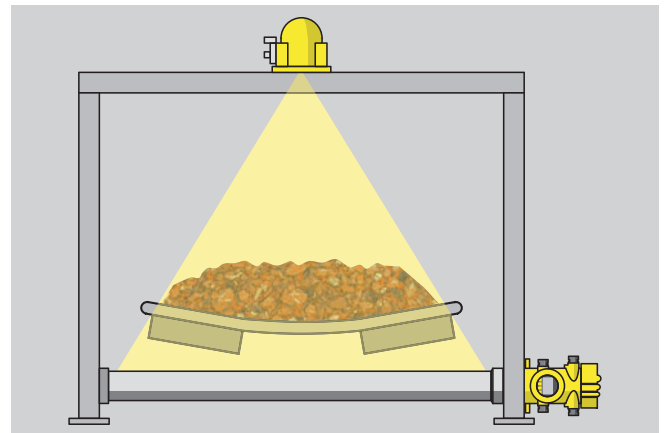
- Maximum Source Activity:
Cs-137: 100 mCi (3.7 GBq)
- Fire Resistance: 1,000°F (538°C) for 5 minutes
- Collimation Angle: 0°, 15°, 30°, 45°, 60°



Slurry Flow

Tracking percent solids in slurry transport pipelines ensures that the process is running at optimum capacity. A MiniTrac density detector bracketed with an SHLD source holder mounts around a vertical section of the pipe to provide the measurement. The amount of radiation from the SHLD that passes through the slurry is detected by the MiniTrac, from which the percent solids measurement is generated.

- Lightweight source holder installs quickly and easily
- Single bracket system mounts around pipe, requiring no special modification



Wood Chip Conveyor

For reliable monitoring during pulp and paper processing, tracking material on screw or belt conveyors is important. An SHLD and WeighTrac radiation-based measurement system measures the amount of material passing on the conveyor. When used in conjunction with a tachometer, the system provides real time mass flow data for controlling speeds of the conveyor.

- Compact, lightweight source holder installs quickly
- Approved for North American market as a General License option in certain applications



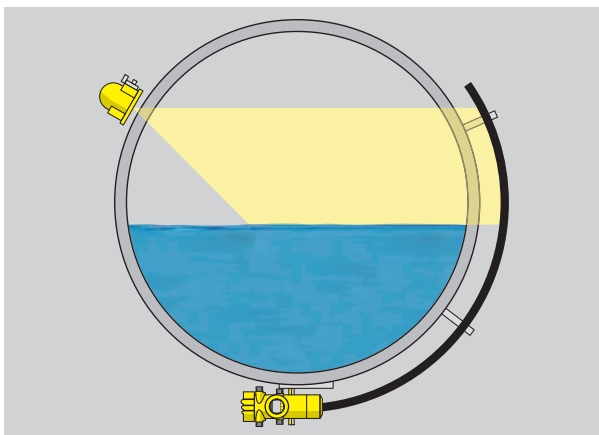
SHLD 2

- Maximum Source Activity:
Cs-137: 5,000 mCi (185 GBq)
- Fire Resistance: 1,000°F (538°C)
for 5 minutes
- Collimation Angle: 0°, 15°, 30°, 45°, 60°



Technology Highlight: Source Holder Selection

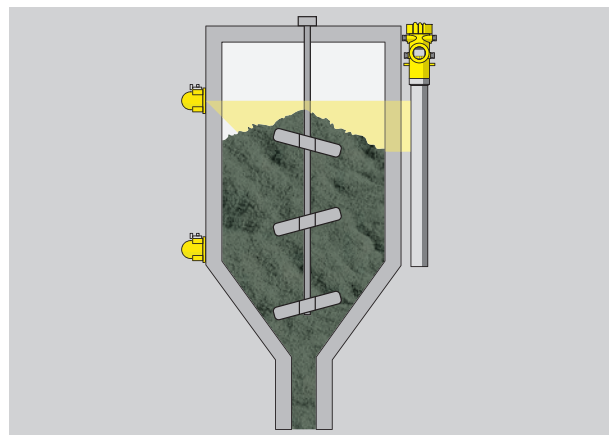
For level, weight, or density measurements, the best source holder is selected for the application. The radiation beam is collimated to avoid stray radiation, and multiple measurements, such as continuous level and density, can be derived from a single source. Source activities are sized as small as possible to produce the measurement, and are safely contained in the source holder.



Curved Vessel

Level measurement in a curved vessel can be difficult due to its shape. A 60° collimated SHLD source holder and a flexible FiberTrac detector mount to the contour of the vessel, allowing a single source holder and detector combination to produce the measurement.

- Single source holder and detector minimizes cost
- Single system measures up to 23 feet of level



Reactor Vessel

In those vessels where chemical reactions are designed to take place efficiently, two or more materials are mixed by an agitator. The mass of the agitator, plus the presence of very thick vessel walls requires a relatively large activity in the source holder. The SHLD 2 can safely shield up to 5 Curies of Cesium 137.

- Non-contact system measures through vessel walls
- Simple mounting procedure reduces installation time and cost

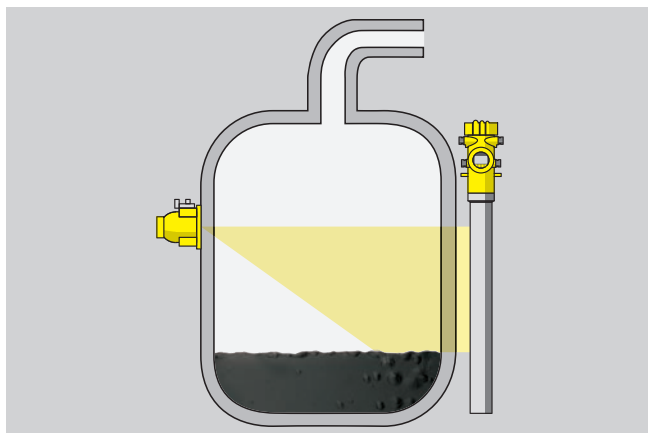
SH-F

Fireproof source holder

The SH-F source holder is well-suited for a wide variety of applications, especially in the chemical manufacturing and oil refining industries where risk of fire is present. This is because the lead-free SH-F features cast iron housing material with polyester powder coating, cast iron and tungsten shielding material, and a lockable rotary shutter. Shutter automation, interlocks, and other accessories available.

SH-F 1B/2B

- Maximum Source Activity:
Cs-137: 1,000 mCi (37 GBq)
- Fire Resistance: 1,472°F (800°C) for 30 minutes
- Collimation Angle: 0°, 30°, 45°, 60°



Refining/Petrochemical Applications

The lead-free SHF source holder provides the most reliable shielding material for applications where risk of fire is present. The lead-free design removes the risk of shielding loss due to elevated temperatures or fires.

- Shielding remains intact even in case of fires
- Rotary shutter with stationary capsule provides the utmost measurement reliability when cycled from on to off.

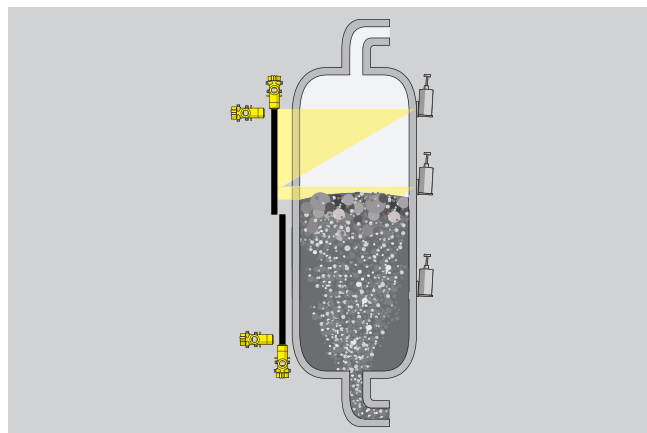
SHLG

Source holder with maximum shielding

The SHLG series source holder features lead shielding material to provide maximum source activity for a variety of applications. Housings constructed of polyester powder coated low carbon steel or stainless steel and lockable push-pull shutter handle add an extra layer of security. Shutter automation, interlocks, and other accessories available.

SHLG 3

- Maximum Source Activity:
Cs-137: 10,000 mCi (370 GBq)
Co-60: 500 mCi (18.5 GBq)
- Fire Resistance: 1,000°F (538°C) for 5 minutes
- Collimation Angle: 0°, 30°, 45°



Coke Drum

Coking units convert residual oil into usable fuels and coke through the application of heat, steam, and pressure. Conditions inside of the coker call for non-intrusive radiation-based measurement. SHLG source holders are paired with FiberTrac detectors for continuous measurement of the coke drum. The SHLG is a plunger-type source holder that shields the high-activity capsules required for the application.

- Multiple collimation angles fit different application requirements
- High capacity shielding

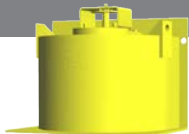
SHRD

Rotary shutter source holder

The large design of the SHRD 2 rotary shutter source holder maximizes shielding and provides a wide range of collimation angles. Corrosion-resistant polyester powder coating make the SHRD 2 appropriate for use in harsh environments. Optional stainless steel housing available.

SHRD 2

- Maximum Source Activity:
Co-60: 5,000 mCi (185 GBq)
- Fire Resistance: 1,000°F (538°C) for
5 minutes
- Collimation Angle: 0°, 15°, 30°, 45°
- Weight: 2,750 lbs (1,247 kg)

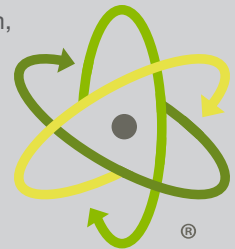


ReSource Program®

As a complete radiation-based measurement solutions provider, VEGA Americas is committed to supporting total management of ownership. To fulfill this commitment to its customers, VEGA is pleased to offer a responsible method of source life cycle management as an alternative to stockpiling and burial. This method, called the ReSource Program®, focuses on the reuse and recycling of radioactive sources used in industrial measurement systems.

Source Reuse and Recycling

Through the ReSource Program, and an exclusive brokerage agreement with QSA Global, VEGA Americas takes ownership of a source from the customer and has it recertified through the manufacturer for reuse. A proprietary, over-encapsulation process plays an important role in this recertification, resulting in a “new” source without requiring the harvest of new materials. Risks associated with stockpiling and burial are eliminated for the customer, and the source is ready for use in a new application.



The ReSource Program is the ideal solution for any customer in need of removing unwanted sources with any of the following requirements:

- Eliminate customer liability associated with stockpiling
- Remove multiple source types from multiple manufacturers
- Benefit from complete source life cycle support
- Contact a single supplier for all instrumentation and radiation program needs
- Reduce the impact of radioactive waste on the environment



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