Technologies, Solutions, and Applications

Source Holders for Radiation-based Measurement

Looking Forward VEGA

Contents

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.

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.

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 gauges avoid contact with process conditions. Processes with extreme temperature, pressure, or corrosive properties have no adverse effects on nuclear gauges. Radiation-based technology installs with no process shutdown and generally requires no modification to existing vessels or piping, reducing total installation cost.

Licensing

VEGA has full-time staff available to assist customers, both experienced users and those new to the use of nuclear instrumentation, with their nuclear licensing needs. Guidance and information for customers is readily provided with respect to license applications or amendments, working together with the Nuclear Regulatory Commission, Agreement State agencies, and regulatory bodies around the world. Assistance is also available with additional regulation requirements.

Source Reuse and Recycling

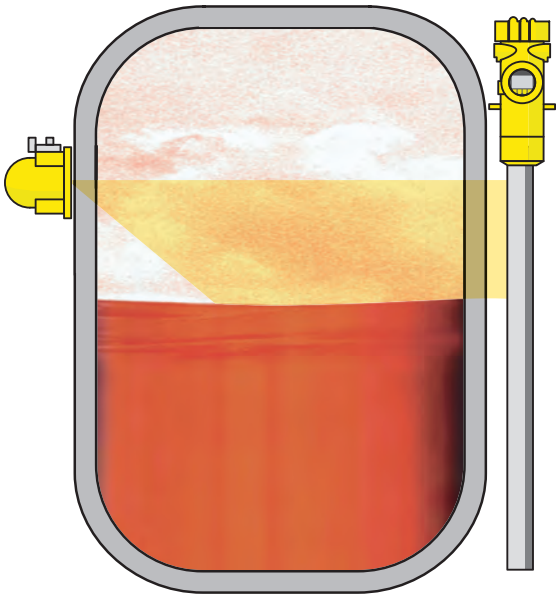
As a complete radiation-based measurement solutions provider, VEGA is committed to supporting total management of ownership. To fullfill this commitment to its customers, VEGA is pleased to offer the ReSource Program, a responsible method of source life cycle management as an alternative to stockpilling and burial.

Through the ReSource Program, VEGA takes ownership of a source from the customer and has it recertified through the manufacturer for reuse. A proprietary, over-encapsulation process results 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.

VEGA Nuclear and Field Services provide full support for the life of the radiation-based solutions. Top quality start-up service ensures proper function with all safety and compliance issues fully addressed. Fully certified service personnel inspect the source holder mounting, perform leak tests and shutter checks, and document the radiation levels around the equipment. The detector is also checked for functionality and is calibrated to the customer's process.

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. When paired with different detector types, a source holder and its system provide a reliable continuous or point level, density, interface, or weight measurement with process values viewable on site or through a control system.



All radiation-based measurement systems operate using the same principle. A source holder and detector are mounted on opposite sides of the process vessel. A cesium-137 or cobalt-60 isotope is the gamma radiation source, which is passed as a collimated beam through the process vessel and material toward the detector. As the process level rises, it shields the detector from the radiation. The more radiation the detector receives, the lower the process level. The less radiation detected, the higher the process level. Process level is provided in the form of a current output.

Radiation-based measurement is non-contact and is not affected by process pressure, temperature, or corrosive properties. In turn, the radiation passed through the process vessel does not affect the measured material. All systems can be mounted external to the vessel and do not require process downtime for installation.

Models & Versions

SH-F

Fireproof source holder

- Cast iron housing material with polyester powder coating
- Cast iron and tungsten shielding material
- Rotary shutter

Maximum Source Activity:	Cs-137: 2,000 mCi (74 GBq)
	Co-60: 25 mCi (0.92 GBq)
Fire Resistance:	1,472°F (800°C) for 30 minutes
Collimation Angle:	0°, 30°, 45°, 60°

SHGL

Low activity source holder

- Stainless steel housing material
- Stainless steel shielding material
- General license available

Maximum Source Activity:	Cs-137: 2 mCi (74 MBq)
	Co-60: 0.5 mCi (18.5 MBq)
Fire Resistance:	1,472°F (800°C) for 30 minutes
Collimation Angle:	0°, 10°, 30°

Models & Versions

SHLD

Lightweight, cast steel source holder

- Carbon steel housing material with polyester powder coating, 316 stainless steel (optional)
- Lead shielding material
- Rotary shutter

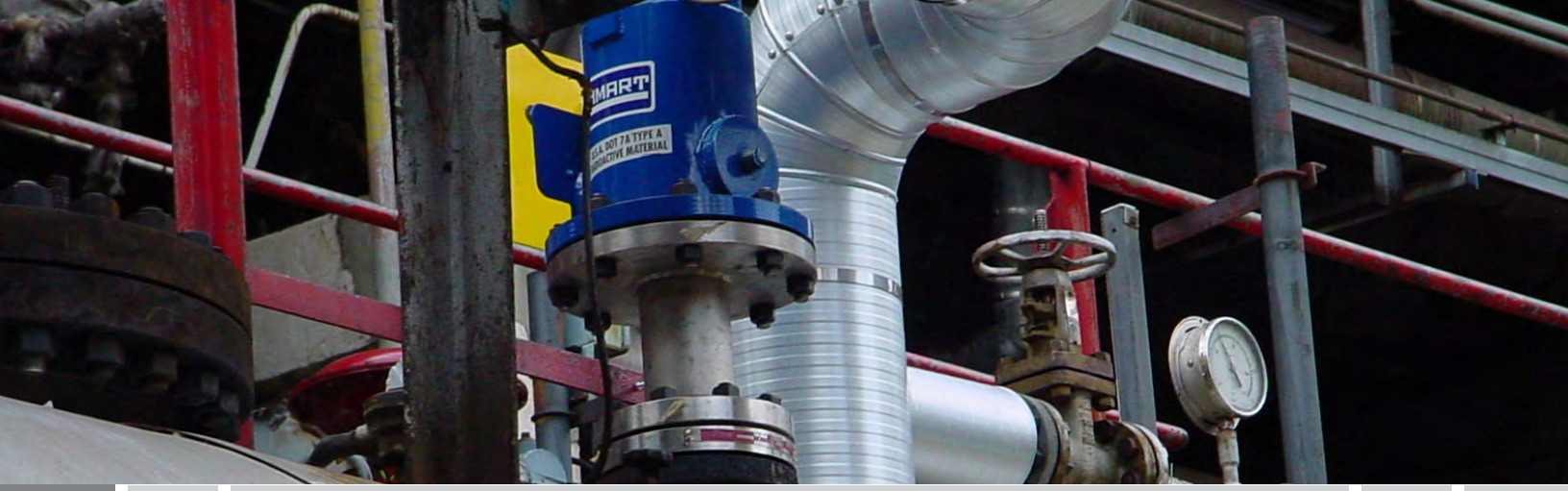
Maximum Source Activity:	Cs-137: 5,000 mCi (185 GBq)
	Co-60: 80 mCi (2.96 GBq)
Fire Resistance:	1,000°F (538°C) for 5 minutes
Collimation Angle:	0°, 15°, 30°, 45°, 60°

SHLG

Source holder with maximum shielding

- Low carbon steel housing material with polyester powder coating or stainless steel
- Lead shielding material
- Push/pull handle

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°



SHLM

Source holder for measurement in a dry well

- Carbon steel housing material with polyester powder coating
- Lead shielding material
- Cable with handle or rod

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:	Not applicable

SR

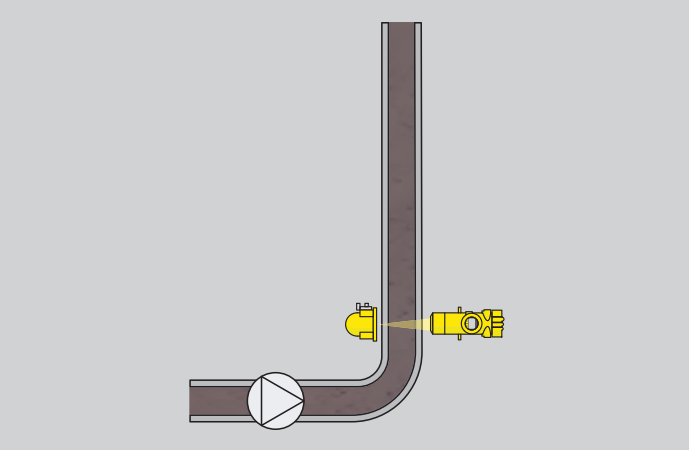
Source holder ideal for point level and density measurements

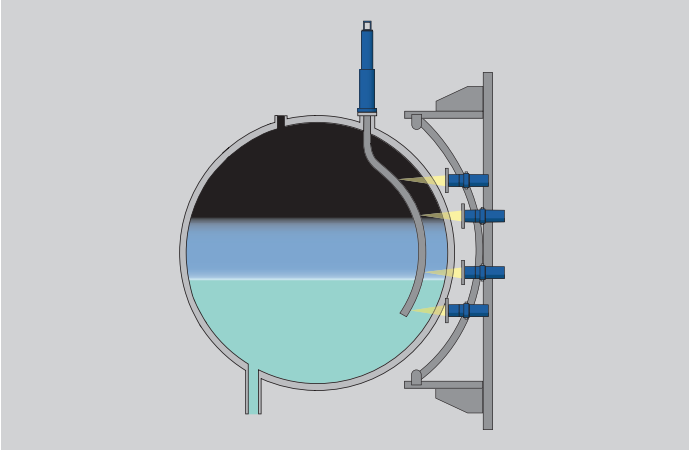
- Low carbon steel housing material with epoxy powder coating or 316 stainless steel (optional)
- Lead shielding material
- Rotary shutter

Maximum Source Activity:	Cs-137: 5,000 mCi (185 GBq)
	Co-60: 30 mCi (11.1 GBq)
Fire Resistance:	1,000°F (538°C) for 5 minutes
Collimation Angle:	0°

Application Areas

Several source holders provide reliable source management for density and point level applications. Selection of the source holder and source activity are dependent on the specific application's needs. The systems are non-contact and in most cases require no alterations to the process vessels or downtime for installation.





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.

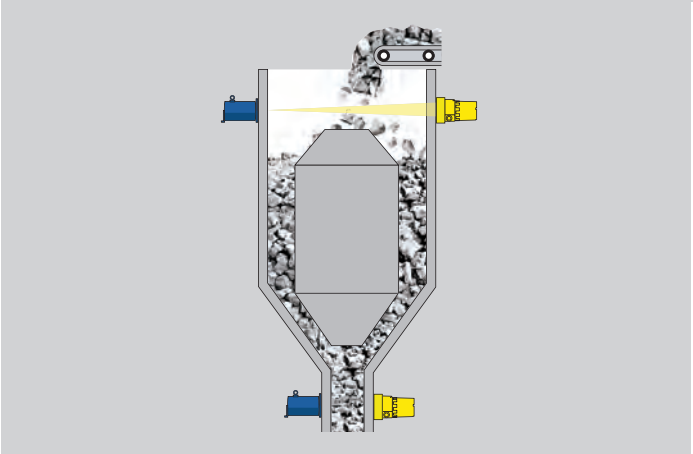
- Lightweight source holder installs quickly and easily
- Single bracket system mounts around pipe, requiring no special modification

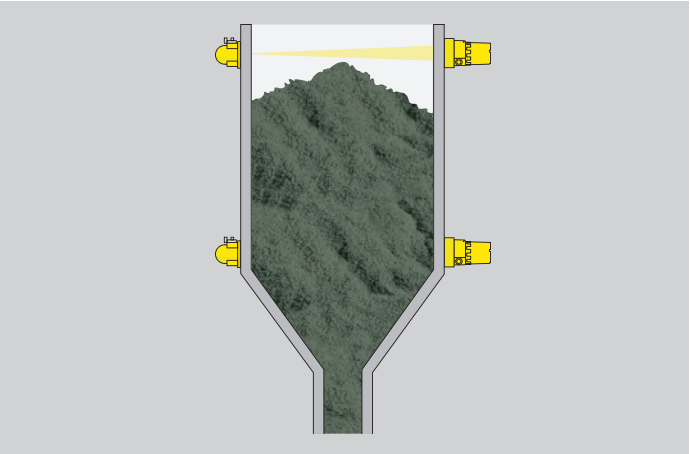
Desalters

Separation units in oil & gas and chemical industries take raw process materials and use the variance in specific gravities to create layers. This critical process must be tracked to control output, making proper source holder selection imperative. The SHLM source holder inserts multiple sources into a dry well that pairs with a series of DSG density detectors to create the Multi-Point Density Array system.

- Complete system provides multiple points to generate a density profile
- Internal components require only one dry well, reducing installation costs
- Reliable interface control applies to many separation unit types

"VEGA has been helping customers manage their source holders for over 60 years. From specification and licensing to decommissioning and disposal, our support team simplifies ownership and gives customers piece of mind."





Plugged Chute Detection

A VEGA nuclear switching system is a reliable solution for plugged chute detection. Comprised of an SR source holder and GM-17 detector, the system mounts external to the vessel and measures through the vessel walls to detect plugging.

- Non-contact system does not interfere with process
- Easy on/off shutter for safe operation
- Level detection system can also be used as a high level alarm

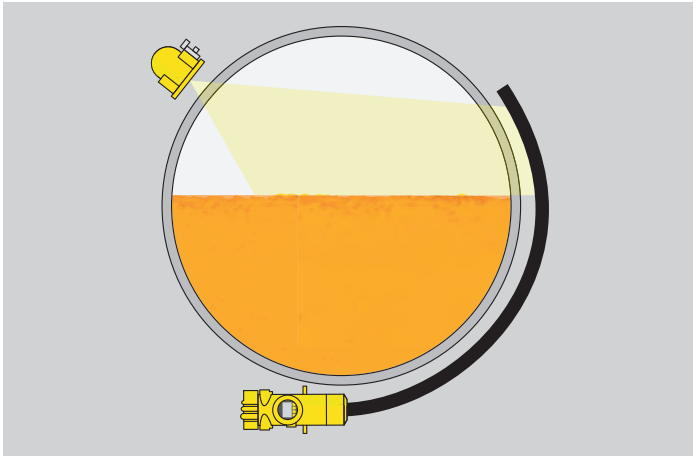
Fly Ash Hopper

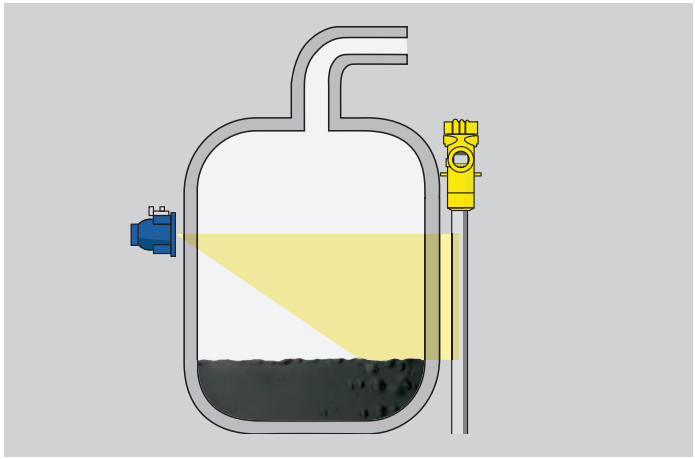
Hoppers in the power industry collect fly ash from the precipitator process and are monitored to avoid overfill. An SHLD with a GM-17 point switch are an ideal radiation-based high level alarm. The measurement system protects the precipitator process from backup, and is not affected by process conditions.

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

Application Areas

For level, weight, or combination system 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. An 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. The SHLD is lightweight for ease of installation.

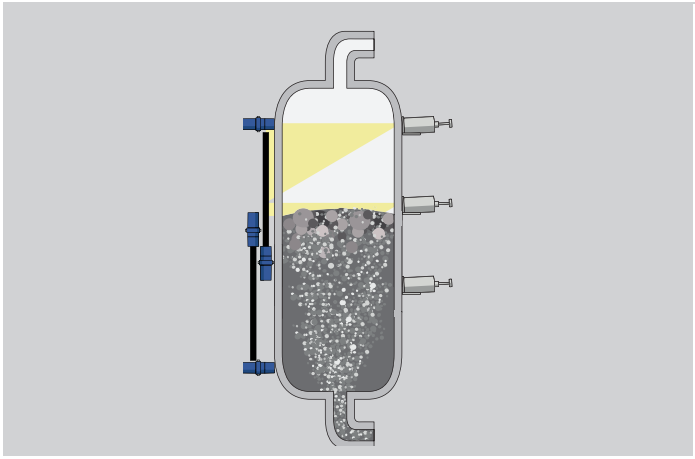
- Single source holder and detector minimizes cost
- Single system measures up to 23 feet of level

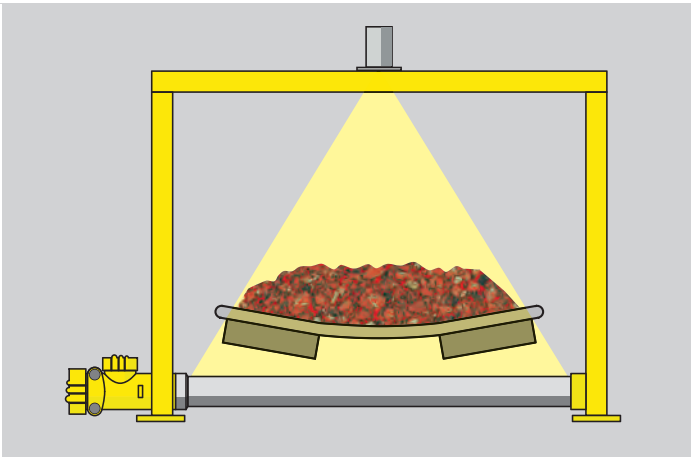
Reactors

In applications where a short measurement span is required, level measurement with a SoliTrac and SH-F measurement system is ideal. The system measures a critical span in reaction applications, or where thick walls and other variables may be present between the source and detector.

- Iron and Tungsten shielding provides high fire resistance
- Highly sensitive system offers increased accuracy

"At VEGA, we are strongly committed to radiation safety and responsibility. Our radiation safety training classes, source recycling program, and extensive field service capability demonstrate our commitment."





Coke Drum

Coking units require extreme heat during operation, making radiation-based measurement the ideal solution for tracking level. SHLG source holders are paired with FiberFlex detectors for continuous measurement of the coke drum. The SHLG is a plunger-type source holder, safely retracting the potentially large source into the container when not in use.

- Multiple collimation angles fit different application requirements
- Use with density detectors for complete coke drum control

Wood Chip Conveyor

For reliable monitoring during pulp and paper processing, tracking material on screw or belt conveyors is important. An SHGL 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.

- SHGL offers low source activities
- Approved for North American market as a General License option

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VEGA Americas, Inc.
4170 Rosslyn Drive
Cincinnati, OH 45209
USA

Toll Free +1 800 367 5383
Phone +1 513 272 0131
Fax +1 513 272 0133
E-mail americas@vega.com
Web www.vega-americas.com

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