LEVEL SWITCH MEASUREMENT

Reliable measurement of level switches even under extreme conditions

QUALITY
MADE IN
GERMANY

BERTHOLD

RADIOMETRIC LEVEL SWITCH MEASUREMENT

Radiometric level switches are used across a wide range of industries to monitor minimum and maximum levels of liquids or bulk solids. The level switch detection is contactless. All components of the measuring system are mounted on the outside of the vessel, so that there is no contact with the product being measured. The level switch measurement can be installed on a wide variety of vessels or bunkers, for example on storage tanks, hot material bunkers, vessels with agitators, high-pressure reactors, cyclones or feeder chutes. Due to the contactless measurement method, radiometric level switch measurement is used in particular where process conditions are demanding and extreme.

Measurement technology

A radiometric measurement system consists of a radioactive source that emits gamma radiation and a detector that measures this radiation. The vessel is irradiated at the predefined height. When the level reaches this point, the gamma radiation is significantly attenuated or completely absorbed by the product. This strong and sudden weakening of the radiation is detected by the detector on the opposite side of the container and an alarm is triggered.
The measurement is not influenced by pressure, temperature, viscosity, colour or chemical properties of the product inside the vessel. Even under difficult operating and environmental conditions, this results in a high degree of reliability while remaining maintenance-free.

Advantages of radiometric technology

- High reliability under extreme process conditions and thus high operational safety
- Easy mounting, even on existing vessels and bunkers
- No contact with the measured product
- No wear and maintenance
- Reliable measurement without frequent recalibration
- Interference detection

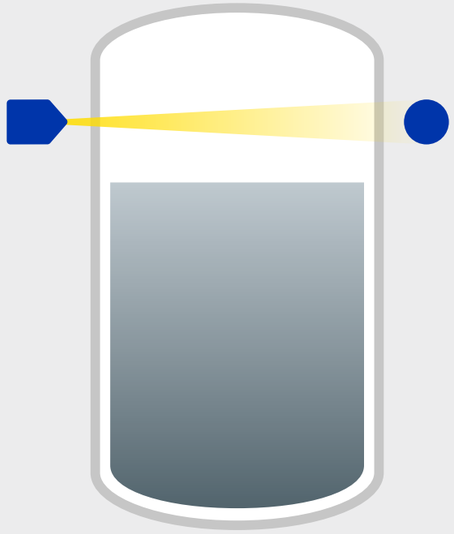
CUSTOMIZED ARRANGEMENTS FOR YOUR MEASUREMENT TASK

Customized solutions that perfectly meet the given requirements are achieved through the use and combination of different detectors and radiation sources. The configuration selected depends on the measurement geometry and accuracy requirements.

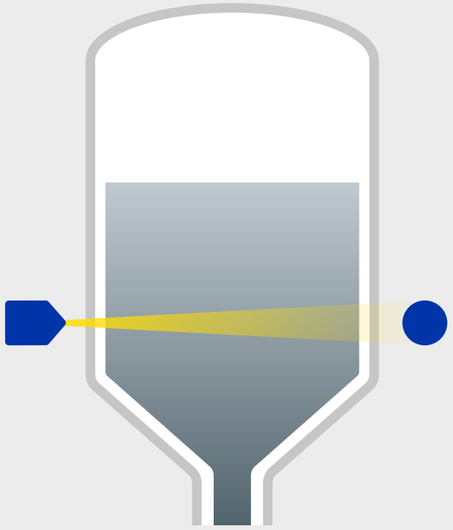
Possible applications

- Storage tanks
- Hot material bunkers
- Vessels with agitators
- Cyclones
- High-pressure reactors
- Transfer chutes

Level switch measurement
High level alarm



Level switch measurement
Low level alarm



DETECTOR SERIES

FOR DIFFERENT TECHNICAL REQUIREMENTS

As an expert for radiometric level measurements, Berthold offers a comprehensive range of detector series. The models differ both in terms of their range of functions – for example, in terms of I/O options, housing materials and user interfaces – and in terms of the approvals available.
Within each detector series, it is possible to choose from several detector types featuring different scintillator sizes and materials.

DuoSeries LB 4700

Proven 2-wire technology

- All contemporary Ex-approvals
- Operated by separate transmitter unit (LB 471 or LB 473)
  - Easy, intuitive operation via touchscreen (only with LB 473)
  - Important maintenance-oriented diagnostic functions and self-monitoring (only with LB 473)
- Alarm via relay (with LB 471 and LB 473) and current output (only with LB 473)

LoopSeries LB 430

Compact field device with revolutionary technology

- 2-wire field device, Loop Powered
- Process control via HART
- All contemporary Ex-approvals
- Continuous self-monitoring
- Commissioning wizard
- Display module optionally available

SENSseries LB 480

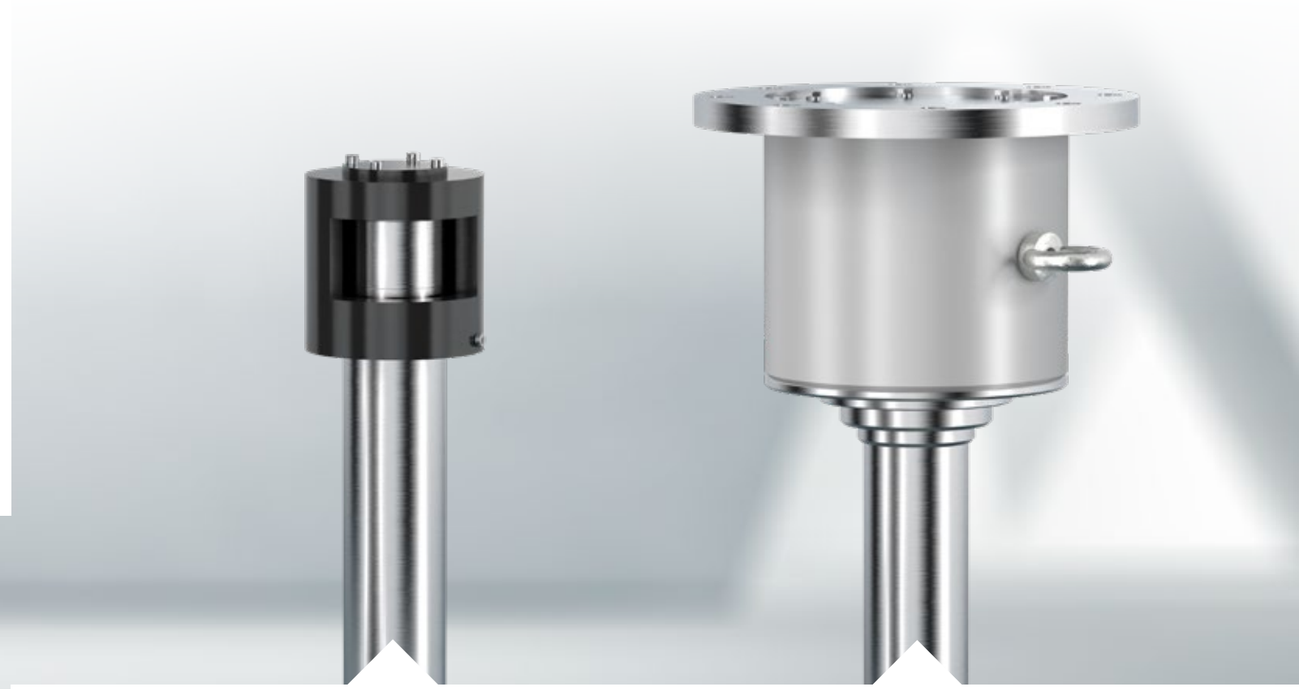
Robust and compact field device

- Process connection via HART
- All contemporary Ex-approvals
- SIL 2, with homogeneous redundancy SIL 3
- Quick Start menu for effective and fast start-up
- Continuous self-monitoring
- Alarm via open collector and current output

DETECTOR TYPES

TAILORED FOR YOUR MEASUREMENT TASK

Scintillators are a crucial component of our detectors. In the scintillator, the incident gamma radiation generates flashes of light, which are then converted into a measurable current by a photomultiplier. The scintillator is critical for measurement sensitivity. Berthold detectors use high-quality materials for their scintillators, ensuring optimal results for your measurement tasks.



CrystalSENS

Point detector with high-quality scintillation crystal made of e.g., sodium iodide which offers particularly high sensitivity despite its small volume. Due to its compact design, CrystalSENS is ideally suited for applications with limited space requirements.

SuperSENS

Point detector with an extreme large scintillation volume, which results in extraordinarily high sensitivity and accuracy. It is perfect for thick-walled or big vessels, as low-activity radiation sources are sufficient. By using SuperSENS, an imminent source replacement can be delayed by several years.

SOURCES AND SHIELDS
SUITABLE FOR YOUR SPECIFICATIONS

Berthold is the only global manufacturer of radiometric measurement systems that operates its own source production, providing customers the highest level of flexibility. Best measurement results and cost-optimal solutions can be achieved by a broad spectrum: point sources, different isotopes (e.g. Co-60, Cs-137, Am-241) and shields of specialized materials (e.g. lead, tungsten, stainless steel).

Maximum safety is ensured by the use of so-called SSC source capsules with up to threefold encapsulation. These are tested according to ISO 2919, exceed the highest classification C66646, are robust and temperature resistant up to 1200 °C.

Strictly following the ALARA principle (as low as reasonably achievable), our project engineers calculate the required activity of the radiation source individually for each measurement. Accordingly, radiation sources are designed in such a way that only as much activity as absolutely necessary is used. The table below shows some typical radiation exposures compared to a radiometric measurement.

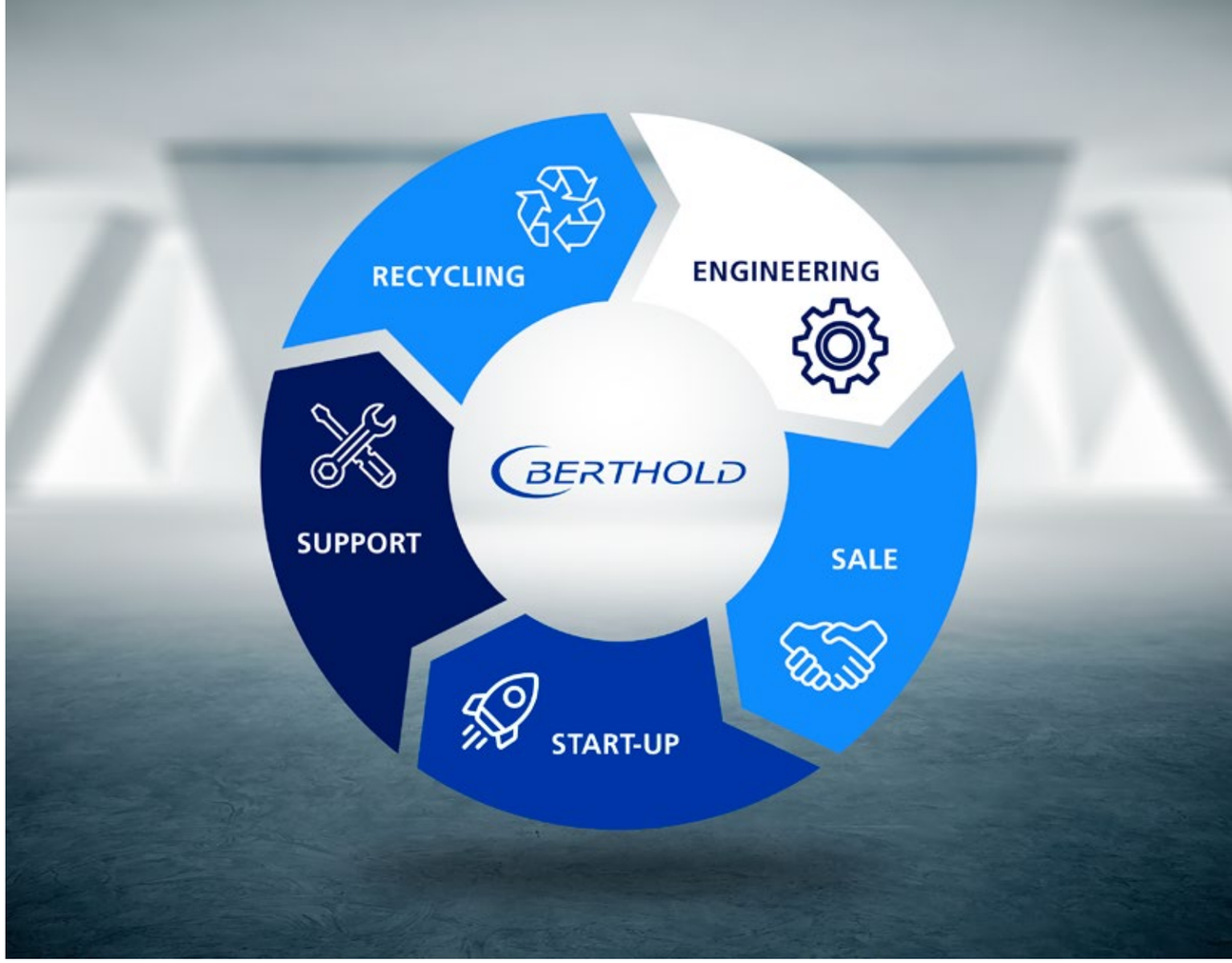
Typical radiation exposures

Whole body computer tomography	10–20 mSv
Transatlantic flight	Up to 0.1 mSv
Annual natural exposure	2.1 mSv/a
Radiometric measurement (with empty vessel)	**0.001 mSv/h**

Safety – Made by Berthold

With our unique selection of shields and customized solutions, we offer you the optimal solution for your measurement task.

International standards such as ANSI 43.8 and DIN EN 62598.



BERTHOLD – YOUR PARTNER
SUPPORT OVER THE COMPLETE LIFE CYCLE

Berthold acts responsibly throughout the life cycle of a radiometric measurement. We take care of your radiometric measurement from design to final disposal. This includes shipping import, commissioning and support. Berthold is committed to take back all delivered radiation sources - without further ado and at any time.

Our global network of experts is always available to provide you with fast and competent support and to find the ideal solution for you.

TECHNICAL DATA & FACTS

LEVEL SWITCH MEASUREMENT SYSTEMS

	DuoSeries LB 4700 / Transmitter LB 473	DuoSeries LB 4700 / Transmitter LB 471	SENSseries LB 480	LoopSeries LB 430
Process connection				
4–20mA	•		•	•
HART			•	•
Digital output (relay)	•	•		
Digital output (open collector)			•	
Certificates				
ATEX / IECEx	•	•	•	•
Intrinsically safe signal output	•		•	•
Intrinsically safe power supply	•			•
US / Canada (OrdLoc / HazLoc)	•	•	•	(•)
SIL 2/3			•	
Versions				
CrystalSENS	•	•	•	•
SuperSENS	•	•	•	
Features				
Monitored current output	•		•	•
X-Ray Interference Protection (XIP)	•	•	•	•
Speedstar (50 ms response time)			•	
Loop Powered				•
Optional display module				•
Operation and parameter settings				
Separate transmitter including display	•	•		
HART communicator			•	•
AMS / PDM / FDT / DTM			•	•
Ethernet	•			
USB	•			

THE EXPERTS

IN MEASUREMENT TECHNOLOGY

Berthold Technologies stands for excellent know-how, high quality and reliability. The customer is always the focus of our solution.
No matter where you are, our highly qualified experts and specialists are ready and waiting and will be with you in no time at all with the ideal solution for even the most difficult measurement task.

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