CONTINUOUS LEVEL MEASUREMENT

Reliable measurement even under extreme conditions

QUALITY
MADE IN
GERMANY

BERTHOLD

RADIOMETRIC LEVEL MEASUREMENTS

From the chemical to the cement industry, radiometric level measurements from Berthold are used in a wide range of industries. Measurement ranges from a few millimeters up to several meters can be realized.
Successful applications are mainly located where extreme process environments and thus demanding measuring conditions prevail. Radiometric measurements are not affected by extreme temperatures, high pressures or dusty environments. Even strong foaming or corrosive or abrasive media are no problem for these level measurement systems.

Measurement technology

In simple terms, a radiometric measurement system consists of a radioactive source that emits gamma radiation and a detector that measures this radiation. The gamma radiation is attenuated when it passes through the vessel and its contents. The amount of attenuation depends on the fill level: the higher the fill level, the less radiation reaches the detector.
The measurement is not influenced by pressure, temperature, viscosity, colour or chemical properties of the material to be measured. Even under difficult operating and environmental conditions, this results in a high degree of reliability and freedom from maintenance.

Advantages of radiometric technology

- High reliability under extreme process conditions
- Easy mounting, even on existing vessels
- No contact with the measured product
- No wear and maintenance

CUSTOMIZED ARRANGEMENTS FOR YOUR MEASUREMENT TASK

Customized solutions that ideally comply with the given requirements are achieved by using various detectors and sources. These can be combined in different ways and can also be used in dip pipes. Which one of these options is chosen depends on measurement geometry, accuracy requirements and economic aspects.

Possible applications

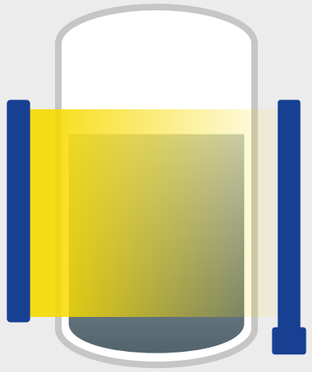
- (Hot) storage tanks
- Vessels with agitators
- Cyclones
- High-pressure reactors
- Autoclaves

Rod source / Point detector

Best technical solution

- Best accuracy and linear sensitivity over entire measuring range
- Not affected by interfering radiation
- Optimal adaptation to measurement geometry
- Unique rod source technology

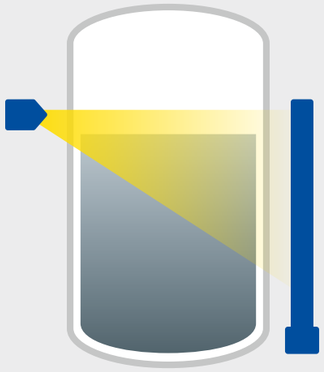
Rod source / Rod detector



Special applications

- High accuracy and linear sensitivity
- Ideal for gas pressure fluctuations with dip tube application
- Highest sensitivity with minimum source activity
- Unique rod source technology

Point source / Rod detector



Standard arrangement

- Very cost efficient
- Large measuring ranges are easy to enable
- Easy installation

DETECTOR SERIES
FOR DIFFERENT TECHNICAL REQUIREMENTS

As an expert for radiometric level measurements, Berthold offers a comprehensive range of system families. These differ both in their performance spectrum, such as interfaces or user interfaces, and approval types.
Within each detector series it can be chosen between several detector types of different scintillator size and material.

DuoSeries LB 4700

Used where maintenance and control technology is implemented

- Proven 2-wire system
- Separate transmitter (LB 470)
- All contemporary Ex-approvals
- Implemented high- /low-level alarm
- Easy, intuitive operation via touch-screen
- Important maintenance-oriented diagnostic functions and self-monitoring

LoopSeries LB 430

Compact field device with revolutionary new technology

- 2-wire field device, Loop Powered
- Process controlvia HART
- All contemporary Ex-approvals
- Daily functional check and 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, for high- and low- level alarm and continuous level measurement
- High interference immunity (SIL standard)
- Quick Start menu for effective and fast start-up
- Daily functional check and continuous self-monitoring

DETECTOR TYPES
TAILORED FOR YOUR MEASUREMENT TASK

Scintillators are a crucial component of our detectors. In the scintillator, incoming gamma radiation is converted into flashes of light, which are then transformed 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 achieves a 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 because using smallest source activities is sufficient. By using SuperSENS, an imminent source replacement can be delayed by several years.

UniSENS

Rod detector with a sensitive length of 0.5 to 2 m. Multiple UniSENS detectors can be cascaded in order to cover larger measuring ranges.

TowerSENS

Rod detector specifically designed to monitor up to 8 m long measuring ranges with only one electronics. The TowerSENS is significantly more economical than cascaded systems comprising several short detectors.

SOURCES AND SHIELDS
TAILORED FOR YOUR SPECIFICATIONS

Berthold is the only radiometry provider in the world to have its own source production facility, thus offering maximum flexibility. The best measurement results and cost-optimized solutions can be achieved with a wide range of products: Point and rod sources, various isotopes (e.g., Co-60 or Cs-137), shields with different collimation angles and materials (e.g., lead, tungsten, stainless steel).
Maximum safety is guaranteed using Safety Source Capsules (SSC) with double or triple encapsulation. The SSC are tested in accordance with ISO 2919, exceed the highest classification C66646, and are extremely robust and temperature-resistant up to 1200 °C. The unique rod source technology enables high and constant responsiveness to changes in flow in spite of challenging measuring geometry. Our project engineers strictly follow the ALARA principle (as low as reasonably achievable) to determine and calculate the required source activity for each measurement. Measurement systems are therefore designed to minimize dose rates in the surrounding area.

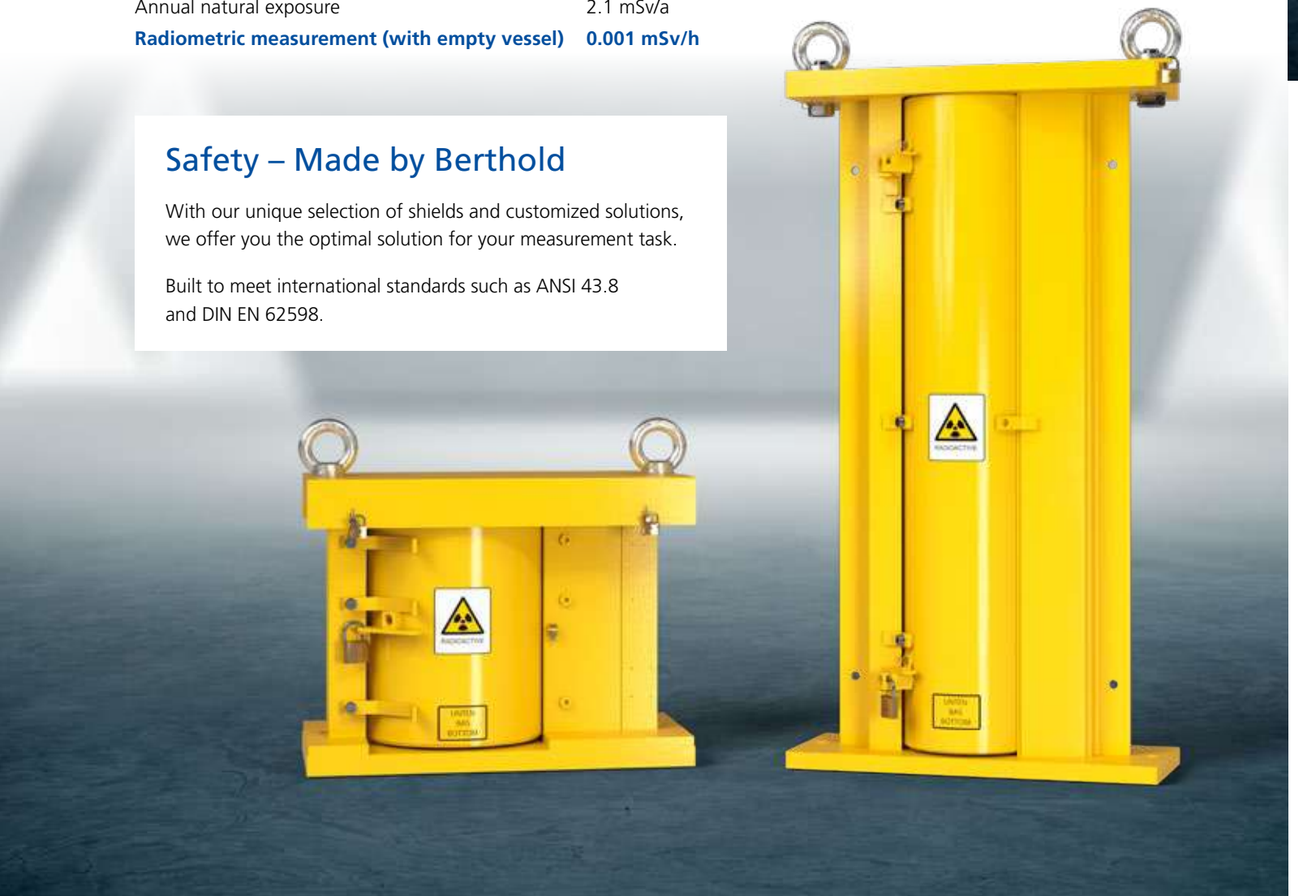
Typical radiation exposures in comparison:

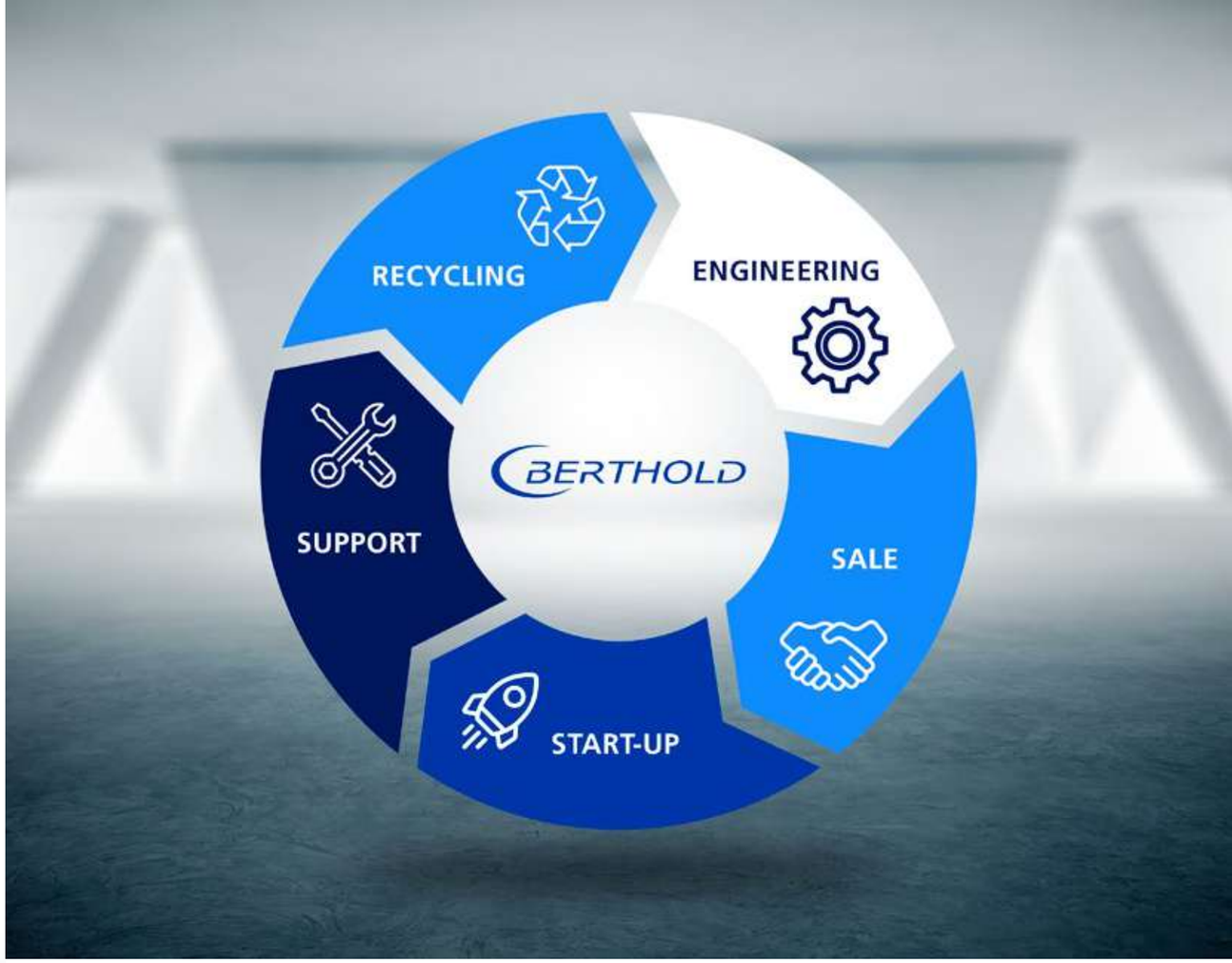
Full body CT scan	10–20 mSv
Transatlantic flight	Up to 0.1 mSv
Annual natural exposure	2.1 mSv/a
Radiometric measurement (with empty vessel)	**0.001 mSv/h**

Safety – Made by Berthold

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

Built to meet 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

CONTINUOUS LEVEL MEASUREMENT SYSTEMS

	DuoSeries LB 4700	SENSseries LB 480	LoopSeries LB 430
Process connection			
4–20mA	•	•	•
HART		•	•
Certificates			
ATEX / IECEx	•	•	•
Intrinsically safe signal output	•	•	•
Intrinsically safe power supply	•		•
US / Canada (FM / CSA)	•	•	(•)
SIL 2/3		•	
Versions			
CrystalSENS	•	•	•
SuperSENS	•	•	
UniSENS	•	•	
TowerSENS	•	•	
Features			
Monitored current output	•	•	•
X-Ray Interference Protection (XIP)	•	•	•
Radiation Interference Discrimination (RID)	•		
Gas property compensation (GPC)	•	•	
Compensation of natural product radioactivity (PRC)		•	
Product Buildup Compensation (PBC)	•	•	
Speedstar (50 ms response time)		•	
Loop Powered			•
Optional display module			•
Operation and parameter settings			
Separate transmitter	•		
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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