

# Interface and Multiphase Level Measurement

Non-contacting measurement



# Radiometric measurements from Berthold

The radiometric measurement systems from Berthold are used to localize the interface layer between two phases. These systems are even used in more complex processes to measure the density profile and thereby picturing the heights of the different product layers inside the vessel. In this way the characteristic of the emulsion layer can be monitored as well.

## Advantages of radiometric technology

- easy mounting outside of the vessel, easily accessible
- not contacting the measured material
- reliable technology for extreme conditions
- no wear and tear, no maintenance
- insensitive to scaling
- easy commissioning and calibration
- no re-calibration required

The measurements are primarily applied in chemical plants and in the oil & gas industry e.g. on separator vessels. Whenever other measurement technologies fail to do their job due to temperature, pressure or geometrical issues, radiometric measurements can be counted on. Even caustic or acid fluids can be measured reliably with the Berthold systems. The measurement in extreme environments is the major benefit of the radiometric systems.

## Measuring Principle

Gamma radiation is attenuated when transmitting a vessel. The attenuation by the heavy phase is much stronger due to its higher density. The light phase hardly attenuates and the gamma radiation arrives virtually without weakening at the detector side. Based on the measured intensity of the gamma radiation the height of the heavy phase and finally the location of the interface can be determined very precisely. The measurement is not affected by pressure, temperature, viscosity, colour and chemical properties of the measured material. Consequently this results in the high reliability and low maintenance of the radiometric measurement systems, even under harsh operating and environmental conditions.



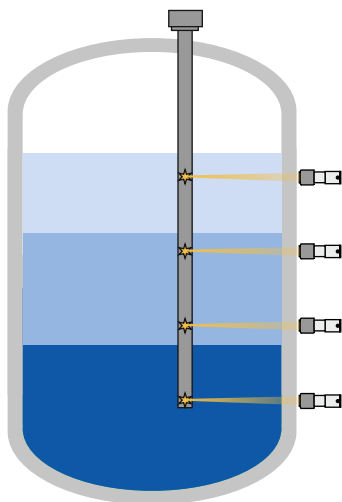
# Tailored solutions – suiting each application

## Multiphase Level Measurement (MPLM)

If an emulsion layer or the height of multiple phases has to be monitored we can choose between the measurement arrangements below. Several density measurements are installed on different heights to monitor very precisely e.g. the process in a separator vessel. The result: residence time and the addition of demulsifying agent can be optimized.

### Aligned Arrangement

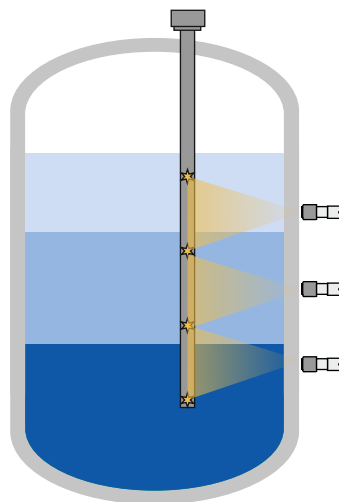
Several density measurements at different elevations. The detectors and sources are opposed to each other.



- density value averaged over a narrow range
- very precise „point information“
- long transmission path and therefore very representative
- number and distribution of measurement points can be individually determined
- distance between measurement points freely selectable

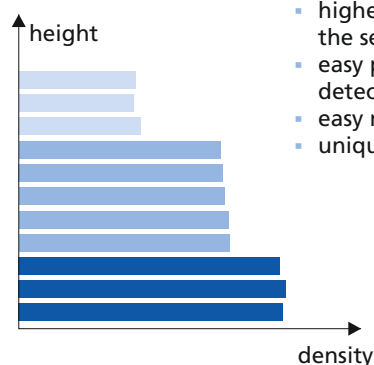
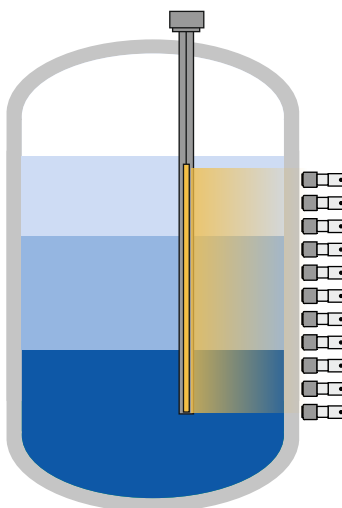
### Staggered Arrangement

Density measurements of small sections. Detectors and sources are arranged in a staggered position.



- continuous measurement, covering the whole measurement range
- average density value of the yellow triangle
- the position of the interface between two detectors can be extrapolated

### Multiphase Level Measurement using rod source

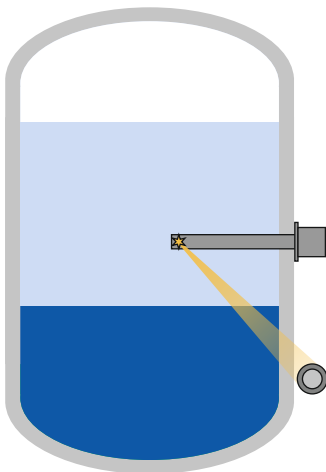


- optimum granularity (highest number of measurement points)
- highest resolution to picture the separation process
- easy positioning of source and detectors
- easy mounting / handling
- unique rod source technology

## 2 Phase interface measurement

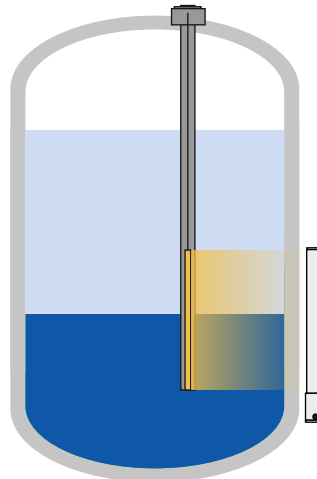
There are different ways in measuring a clear interface between two phases. The vessel geometry, accuracy requirements and economic aspects are crucial when deciding on which of the arrangements is selected to solve the measurement task. Our experienced application experts are pleased to give advice and support.

### Point source / point detector



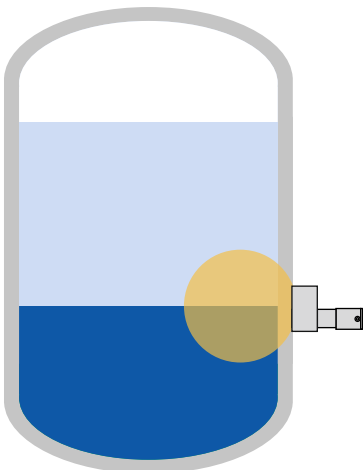
- point source inserted in a dip pipe
- highly accurate in case of small density variances
- especially for small measurement ranges
- very cost-efficient
- perfect for horizontal cylindrical vessels

### Rod source / rod detector



- rod source inserted in a dip pipe
- best accuracy along the whole measurement range
- for measurement ranges of any length
- highest sensitivity and minimum source activity
- unique rod source technology

### Backscatter measurement



- all components are located outside
- very small density differences between the phases can be detected
- ideal for small measurement ranges
- limited by wall thickness

### Special feature

Varying product densities can be compensated to ensure best measurement performance. Talk to us!



## Using variety and experience to achieve custom-made solutions

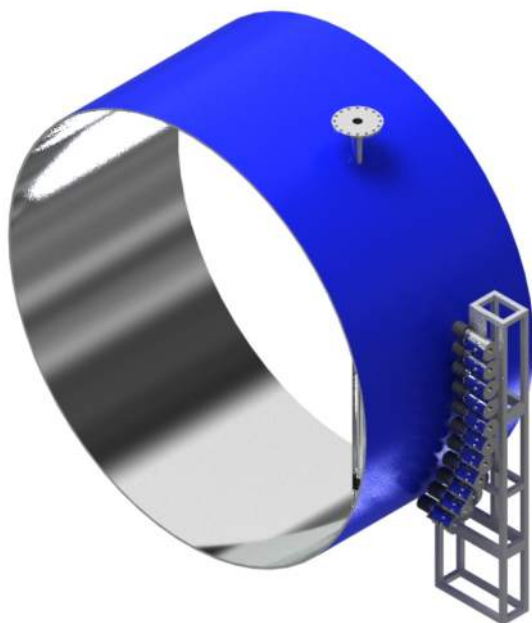


The CrystalSENS LB 480 is just one example of our great variety of sources and detectors.

Berthold is the specialist for radiometric measurement solutions offering a unique and comprehensive variety of sources and detectors. This range of modular systems allows us to tailor-make our solutions according to your application and measurement conditions, ensuring the highest level of reliability and operational safety.

A special feature of our measuring systems is the outstanding long-term stability. Several patented technologies take care of temperature and aging effects and reliably compensate for them. The systems are not subject to drifts and verifiably work even after many years of operation with unchanged accuracy and repeatability. Recalibrations are not required at all.

The great variety of communication standards and certificates or the availability of 2-wire systems with separate evaluation units and compact probes complete the Berthold offer of modular systems. Out of the wide range of variants our project engineers will be pleased to select the perfect system configuration for your application.



Engineering example of a Multiphase Level Measurement on an oil separator with the phases: water, emulsion, oil and gas.

For detailed information about the particular detectors and technical data, please see our brochures "Level" or "Density, Concentration and Solids Content".



### We are there for you! Worldwide.

For more than 60 years we have successfully provided nucleonic measuring systems to prestigious companies throughout a broad range of industries. We use our extensive specialist expertise and our vast experience to develop, together with our customers, the perfect solutions for innovative and individual measurements. An excellent understanding of technology, highest quality levels and reliability are the standards for which we are known.

Benefit from our technology, our support and our engineering spirit – from the concept stage of a project through commissioning and installation phase.

With a worldwide network of subsidiaries and partners, we guarantee for best service and quick and competent support. Our qualified sales engineers and service technicians will be at your site whenever they are needed. No matter where your production is located – we will be there in no time at all!

You can take our word for it.

