LEVEL MEASUREMENT ON DISTILLATION BOTTOMS

Precise measurement with extreme process conditions

BERTHOLD

MEASURING THE LEVEL
OF TOWER BOTTOMS

The level measurement in the bottom of any distillation column is a critical measurement task in refineries. Tower internals damage due to the failure of level control technologies for residual bottoms is one of the most common issues in refineries. However, this is not the only way that reliable bottoms level measurements can save costs and increase efficiency in the refining process.

In the atmospheric distillation process as well as in vacuum distillation, crude oil is separated into fractions by temperature. The least volatile components descend to the bottom of the column, where it is important to measure the liquid level in order to avoid excessive height or falling too low. If the level is too high, this could lead to tray damage and decrease the quality of the products with large impacts downstream in other units. If the level is too low, this could potentially damage pump seals or even the pumps themselves. With the radiometric level systems from Berthold the bottoms can be reliably measured in a non-invasive and non-intrusive manner, regardless of process conditions changes or environmental changes.

Berthold has the best solution

Often, the level measurement on tower bottoms is carried out using differential pressure probes. Such devices require calibrations and often face issues with the plugging of pressure ports. Berthold offers a radiometric measurement solution, which does not have these issues and can easily be installed on existing columns without any process downtime. Typically an arrangement with a point source and a rod detector is applied here. In case of measurement ranges over 2 meters, our TowerSENS solution can be used to cover the entire span with just one set of wiring.

Measuring principle

In simple terms, a radiometric measurement is a system consisting of a source that emits radiation and a detector that can detect that radiation. Gamma radiation is attenuated as 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 product to be measured. This results in a high level of reliability combined with freedom from maintenance, even under harsh operating and environmental conditions. As the source and detector are non-intrusive and non-invasive, they do not make contact with tarry tower bottoms, and are therefore not negatively impacted by the process buildups.

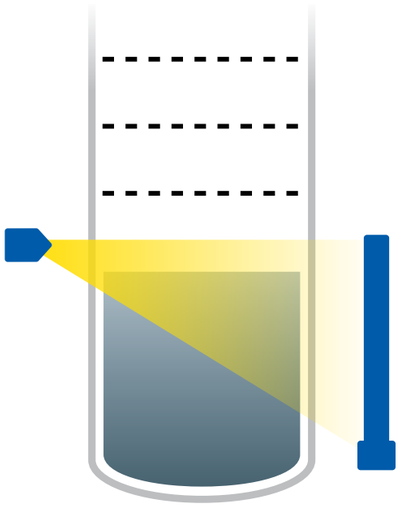
[SIL 2] [SIL 3]

Customer Benefits

- Reliable prevention of pump cavitation
- Increased efficiency of distillation process
- Safe prevention of foam or liquid entering the upper fractions
- Unaffected by foaming, plugging, build-ups or changes in temperature or pressure
- Easy to install on existing columns without process downtime

Technical Features

- Continuous level measurement, typically 2 ... 4 m measuring range
- Installed on the cylindrical bottom of the column, mounted below all trays and packing
- Redundancy can easily be provided
- Typical arrangement: Cs-137 point sources and rod detectors
- On small diameter columns Co-60 rod sources achieve best measurement results
- As the source and detector are non-intrusive and non-invasive, they do not make contact with tarry tower bottoms, and are therefore not negatively impacted by the process buildups
- SIL2 / SIL3 certified detectors available



Measuring the level of residuals in the bottom of the column

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. We know our business!
Using our varied product portfolio, our enormous specialized knowledge and extensive experience, we develop suitable solutions together with our customers for new, individual measurement tasks in a wide variety of industries and applications. Berthold Technologies is specialised in radiometric process measurements for more than 75 years. This is our core competence with state-of-the-art and cutting edge products and solutions covering a vast range of industries and applications.

We are here for you – worldwide!
The engineers and service technicians from Berthold Technologies are wherever you need them. Our global network assures you fast and above all competent and skilled assistance in case of need. 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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