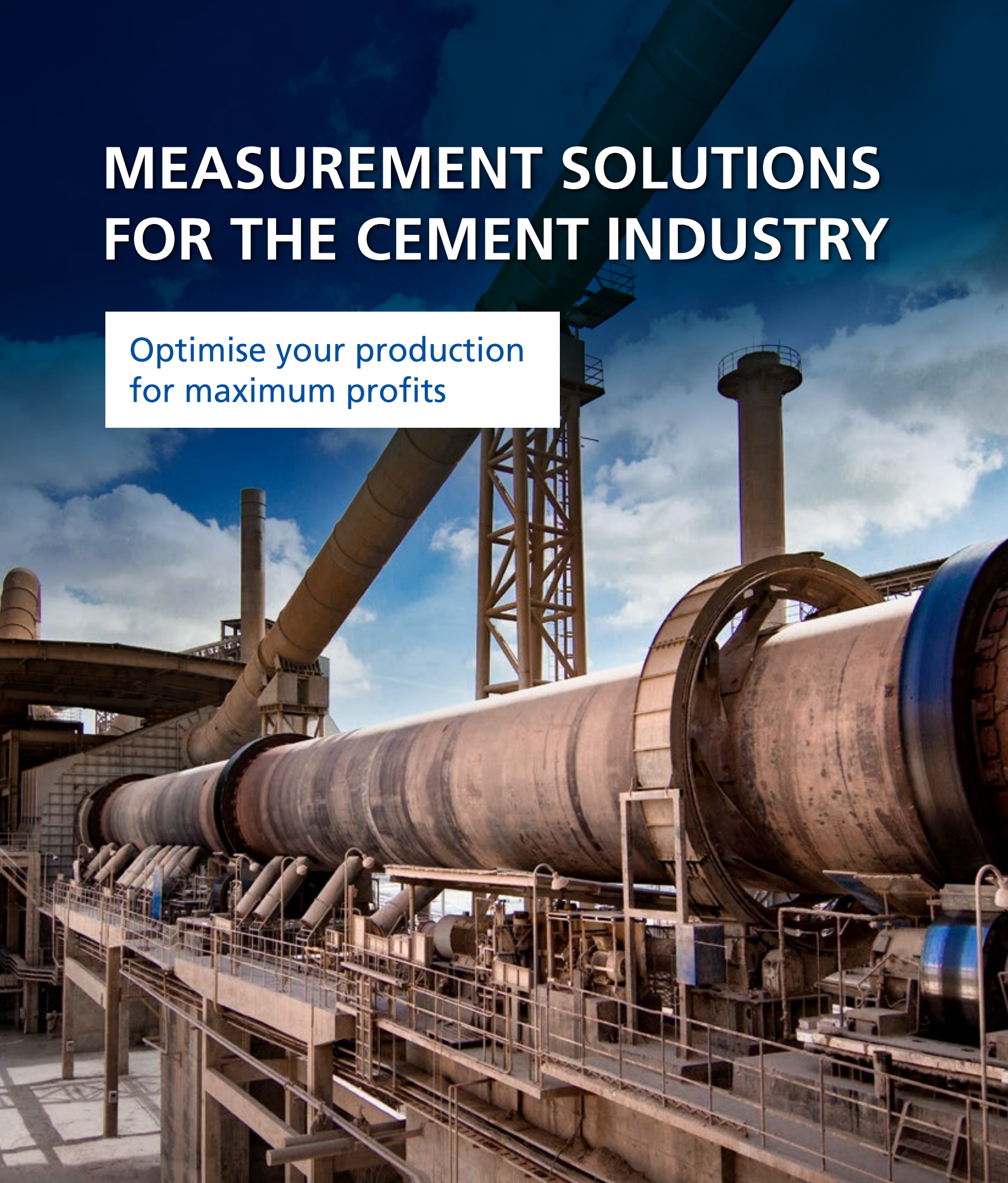


MEASUREMENT SOLUTIONS FOR THE CEMENT INDUSTRY

Optimise your production
for maximum profits



QUALITY
MADE IN
GERMANY

BERTHOLD

CEMENT PROCESSING

In the demanding environment of cement production, conventional process control methods often reach their limits. Radiometric measurement systems offer a reliable, non-contact and non-intrusive process control solution. It enables precise level measurement, early detection of cyclone blockages in the preheater, accurate bulk flow monitoring on conveyor belts, and effective moisture measurement – even under harsh operating conditions.

Contactless – the cost-effective solution

All measurement solutions are completely contactless and non-intrusive. This means they remain unaffected by aggressive process conditions such as acidic, caustic, abrasive, dusty or sticky media – ensuring reliable performance without direct exposure.

- Simple installation on existing equipment
 - No process interruption
 - No structural modifications required
- Wear- and maintenance-free operation

Features

- Online measurement: real-time process information
- Excellent measurement stability: no need for frequent recalibration
- Ruggedness: no moving parts
- High reliability: high accuracy and reproducibility
- Outstanding sensitivity: excellent results even with comparably low source activities

The Applications

- Blockage detection in cyclones
- Bulk flow and/or moisture measurement on conveyors
- Limit level detection at electrostatic precipitators (ESP)
- Moisture measurement of bulk material in bunkers or silos



BULK FLOW MEASUREMENT ON CONVEYORS

In cement production, conveyors are indispensable for material transport. Accurate knowledge of the actual throughput is essential for ensuring high product quality. However, measuring bulk flow on conveyors using non-radiometric methods can be challenging. Due to the wide variety of conveyor types, transported materials, and environmental conditions, mechanical belt scales are often prone to errors – or may not be usable at all. Radiometric bulk flow measurements offer a superior solution, delivering precise and reproducible results. These systems determine the area weight of the conveyed material and, when combined with a speed input (either constant or external), they provide real-time mass flow information. Easily adaptable to all conveyor types, radiometric bulk flow measurement systems are the preferred choice for reliable monitoring. They are ideally suited for applications such as loading and unloading operations, material mixing, and dosing processes.

Application Profile

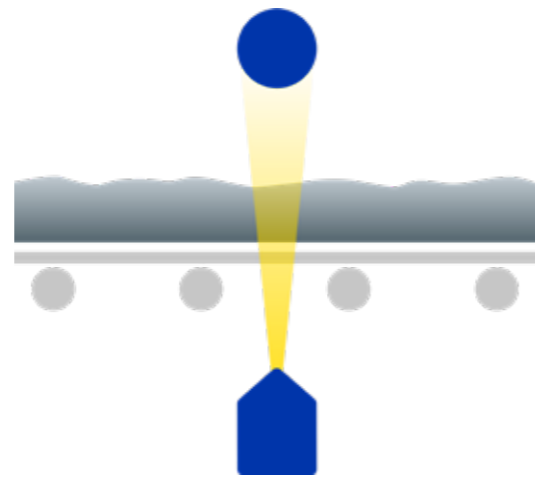
- **Berthold solution for measurement tasks**
Radiometric bulk flow measurement
- **Location**
At all types of conveyor systems

Customer Benefits

- Accurate and reliable measurement of material throughput
- Consistent product quality
- Optimized loading, unloading, mixing, and dosing processes
- No need for frequent recalibration minimizes downtime and maintenance costs
- Suitable for all conveyor types and materials

Special Features

- Not affected by external influences such as wind, varying belt tension or vibrations
- Non-contact, maintenance-free operation
- Easy integration into existing conveyor systems



Typical arrangement of a radiometric bulk flow measurement. Setups adapted to any types of conveyors and transported material.

MOISTURE MEASUREMENT OF BULK MATERIAL

A precise determination of the moisture content in raw materials – such as limestone, clay, sand, or slag – is indispensable in cement production. Variations in moisture levels can significantly impact material dosing, energy consumption in the kiln, and ultimately the quality of the final product. To ensure consistent product quality, the use of online moisture measurement systems is crucial. Microwave-based solutions have proven particularly effective, enabling continuous, non-contact monitoring of moisture content directly on conveyor belts. In contrast, neutron moisture measurements offer a highly effective solution for monitoring raw materials in storage environments like bunkers and silos. Both technologies allow for real-time determination of actual moisture levels, enabling precise adjustments to water addition or material dosing. Integrating such measurement systems helps to reduce material waste, improve energy efficiency, and enhance overall process stability.

Application Profile

- **Berthold solution for measurement tasks**
Microwave moisture measurement system /
Neutron moisture measurement system
- **Location**
At belt conveyors * /
In bunkers and silos **

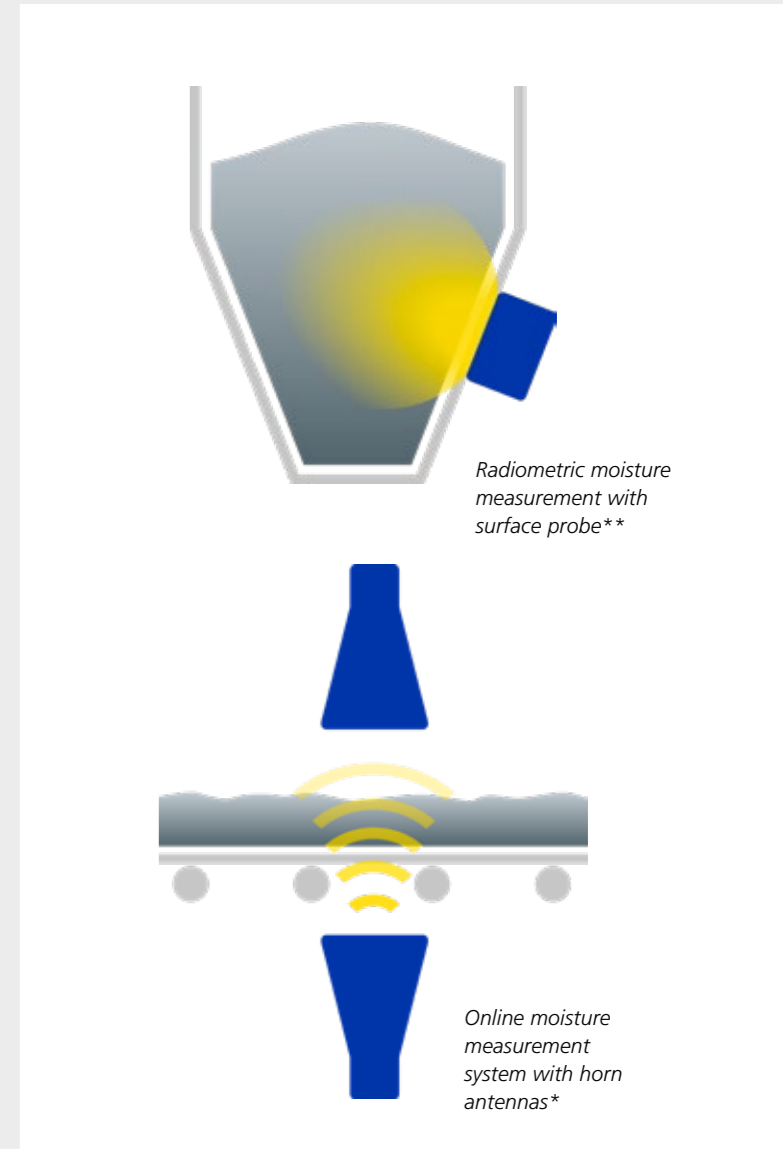
Customer Benefits

- Consistent product quality through real-time moisture monitoring
- Reduced energy consumption in the kiln
- Accurate material dosing
- Enhanced process stability and control
- Known moisture content when offering / loading bulk solid material

Special Features

- Easy to install or retrofit on existing installations
- Not affected by aggressive process media
- Measurement of the entire material cross section *
- Large measuring volume **
- Can be paired with density compensation **

* Specifically for microwave moisture measurement
** Specifically for neutron moisture measurement



Radiometric moisture measurement with surface probe**

Online moisture measurement system with horn antennas*

BLOCKAGE DETECTION IN CYCLONES

In modern cement production, process reliability is key to maintaining high plant efficiency and consistent product quality. The preheater tower – with its multiple cyclones – plays a central role in ensuring optimal heat exchange between raw material and kiln exhaust gases. However, the accumulation of material build-ups in the lower cyclones poses a serious risk: blockages can interrupt the gas and material flow, cause process instability, and even lead to costly plant shutdowns. By implementing radiometric measurement technology, these challenges can be effectively addressed. The solution provides continuous, non-contact monitoring of wall build-ups inside the cyclones. Thanks to its robust and maintenance-free design, it delivers reliable real-time data – even under the extreme conditions of a cement plant. This allows operators to detect wall build-ups early and, thus, prevent blockages, ensuring safe operation, minimizing downtime, and maximizing process uptime and safety.

Application Profile

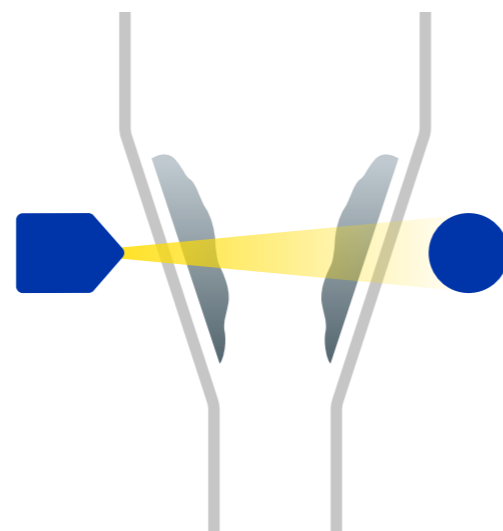
- **Berthold solution for measurement tasks**
Radiometric density measurement
- **Location**
At the critical section of the cyclone

Customer Benefits

- Early detection of wall buildups avoids blockages that could prevent unplanned shut downs
- No disturbance in the flow properties by the measurement

Special Features

- Non-contact and robust
- Maintenance-free operation
- Retrofit installation possible



Cyclone blockage detection with density measurement

LIMIT LEVEL DETECTION AT ELECTROSTATIC PRECIPITATORS

In cement production, filters play a vital role in cleaning process exhaust air. They remove suspended particles that would otherwise be released into the atmosphere, helping plants meet strict environmental regulations. Electrostatic precipitators (ESP) are commonly used for this purpose. The fine dust separated from the exhaust air collects in hoppers beneath the filters. If dust levels in these hoppers becomes too high and contact with the electrostatic precipitator, it can cause a short circuit and lead to process disruptions or shutdowns. To prevent this, reliable and precise limit level detection is essential. Radiometric level switches provide a highly reliable, maintenance-free solution for this challenging application. Unaffected by dust, temperature, or pressure, they enable uninterrupted operation and help plants consistently meet environmental regulations.

Application Profile

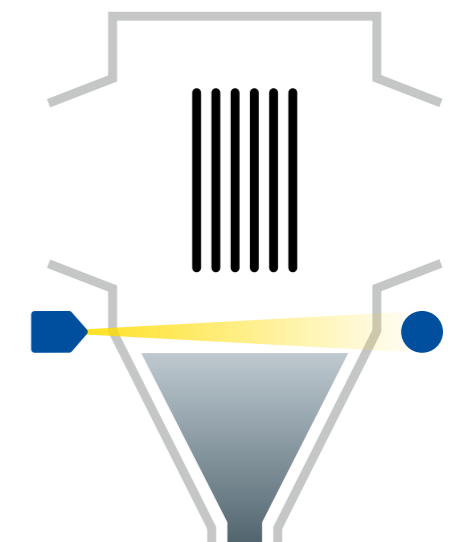
- **Measurement task**
Radiometric level switch measurement
- **Location**
For all types of process filters (ESP, bag filters)

Customer Benefits

- Prevents short circuits in electrostatic precipitators and reduces the risk of shutdowns.
- Maintenance-free technology saves time and costs.
- Early warning of critical hopper levels to prevent plant downtime.
- Simple installation on the outside of the system

Special Features

- Non-contact and robust
- High availability and thus high operational reliability
- One-time calibration, no recalibration required



High-level measurement in electrostatic precipitators



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.

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.

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 when needed. 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.

Berthold Technologies GmbH & Co. KG

Calmbacher Straße 22 · 75323 Bad Wildbad · Germany
+49 7081 1770 · industry@berthold.com · www.berthold.com

