

CONCENTRATION MEASUREMENT

For liquids, suspensions,
and pasty media



QUALITY
MADE IN
GERMANY

BERTHOLD

CONCENTRATION AND DENSITY MEASUREMENT ON LIQUIDS

Concentration, density, or dry matter can be measured in a wide variety of products, continuous processes, pipelines, and vessels using the microwave measuring systems from Berthold Technologies. From the food industry to power plants and the pharmaceutical industry – the fields of application for our microwave systems are manifold and the selection of sensors is correspondingly large. Our special technical features, such as checking the plausibility of measured values or very high measurement and frequency dynamics, set new standards.

The measuring principle

The microwave measuring system uses the dielectric property of water. The measuring system generates microwaves that interact with the water molecules. This interaction causes an attenuation of the microwave energy, which can be detected as phase shift and attenuation. Since the phase shift and attenuation changes are directly proportional to the water content in the product, the concentration or dry content in the medium can be determined with high accuracy.

Berthold's superior multi-frequency technology provides very stable and reliable measurements unaffected by interfering reflections or resonances. The microwave energy is so low (max. 10 mW) that the material to be measured is neither heated nor altered in any way.

Advantages of microwave measurement

- Multi-frequency technology for dynamic plausibility control of the incoming raw signal
- Signal quality self-monitoring for processing measurement data
- Intuitive/user-friendly interface simplifies configuration and calibration
- Patented microwave antennas for signal optimisation and avoidance of signal interference
- Real-time process information from online measurement
- Superior measurement technology „Made in Germany“

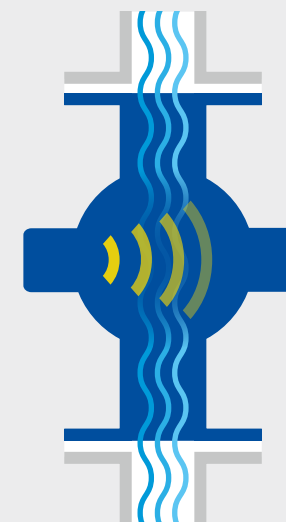
CUSTOMISED ARRANGEMENTS FOR YOUR MEASURING TASK

As an expert in microwave measurements, Berthold offers an extensive portfolio of sensors. These are extremely robust and provide long functional reliability, for years to come.

Successful Applications

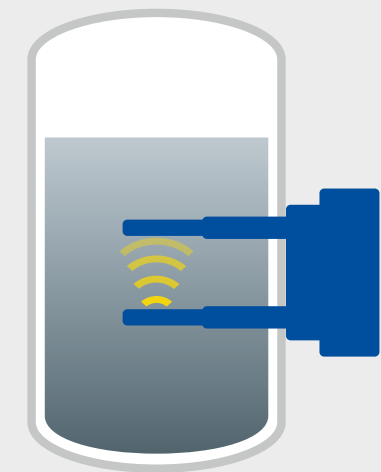
- Sugar
- Dairy products
- Caramel
- Chocolate
- Sewage sludge
- Calcium carbonate
- Milk of lime
- Collagen (protein)
- General acids
- General bases
- Water in oil / oil in water
- Tar
- Sand sludge

Measurement on the pipeline with a FlowCell



- Microwave measurement covers the entire pipe cross-section
- Nominal diameters from DN 50 to DN 150
- For all common connection versions
- Exchangeable antennas
- EHEDG certification
- Suitable for contact with foodstuffs according to Regulation (EC) No. 1935/2004

Measurement on the vessel with container probe



- Pt100 for temperature compensation
- Extremely abrasion-proof polymers
- Integrated reference line
- Various flanges available
- Exchangeable PEEK caps

THE TRANSMITTERS DESIGNED FOR YOUR MEASURING TASK

The heart of the measuring system is the evaluation unit. Many years of experience and extensive know-how have gone into its development and production. We offer this unit in four versions, which differ in frequency range, frequency bandwidth and measurement dynamics. This gives us the possibility to use the ideal technology depending on the application and measurement requirements. Our experienced sales engineers are happy to advise you on the selection of the right system for your application.

Transmitter

MicroPolar Brix LB 565

- Specially developed for the sugar industry
 - For determination of the online °Brix content
 - Pre-calibrated depending on the sugar process
- Applications:** Evaporators, crystallizers, and milk of lime

MicroPolar LB 566

- For the determination of concentration and density
 - Ideal for liquids, suspensions, and pastes
 - Conductivity compensation
- Applications:** Dairies, sewage treatment plants, chemical industry, etc.



Transmitter with amplifier

MicroPolar LB 565++

- Specially developed for the sugar industry
 - With signal amplification
 - For pipelines larger than DN 100
- Applications:** Evaporators, milk of lime.

MicroPolar LB 566++

- For the determination of concentration and density
 - With signal amplification for large nominal diameters
 - For demanding measurement tasks
- Applications:** Primary sludge at DN150, 20% sulphuric acid, glycol



Technical data and facts

Method	Microwave transmission measurement
Transmission power	LB 56x: < 0.1 mW, coaxial output power LB 56x ++: < 10 mW, coaxial output power
Housing	Wall-mounted stainless steel housing LB 56x: H x W x D: 300 x 323 x 140 mm LB 56x ++: H x W x D: 338 x 400 x 170 mm
Protection class	IP 65
Ambient temperature	Operation: -20 ... 60 °C (-4 ... 140 °F) Storage: -20 ... 60 °C (-4 ... 140 °F) Operation and storage without condensation
Achievable accuracy	≤ 0.2 wt.-% (standard deviation), depending on product and sensor
Power supply	100 ... 240 V AC, 50/60 Hz LB 56x: 24 V AC/DC LB 56x ++: 24 V DC
Monitored current output	Inputs and outputs for HF cable (measuring and reference channel), 50 Ω N-socket
Current input	2x current input 0/4 ... 20 mA: Impedance 50 Ω, 1x isolated 1x unit earth, e.g., temperature compensation
Current output	Current output 1: 4 ... 20 mA, max. impedance 800 Ω, isolated, for measured value Current output 2: 0/4 ... 20 mA, max. impedance 800 Ω, isolated, e.g., for temperature, conductivity etc.
Pt100 connection	Measuring range: -50 ... 200 °C (-58 ... 392 °F) for temperature compensation
Digital input	3x digital inputs Functions: Measurement start/stop, measurement hold, product selection, sample recording
Relay outputs	2x relays, SPST, isolated Functions: Collective fault signal, measurement stop, limit value (min. and max.)

THE SENSORS FOR EVERY MEASURING ARRANGEMENT

On the vessel with container probes

The probe can be installed in any container wall so that the transmitting and receiving antenna are surrounded by the product. Microwaves are emitted in a focused manner and thus cover the area between the two antennas, which ensures stable and precise measurement.

Container probe

- Pt100 for temperature compensation
- Extremely abrasion-proof polymers
- Integrated signal reference line
- Various flanges available
- Exchangeable PEEK caps
- Robust and maintenance-free



On the pipeline with the FlowCell

The FlowCell can be integrated to any existing piping system. Since the microwave transmitter and receiver are mounted on opposite sides of the FlowCell, the entire cross-section of the material is covered. A high degree of representativeness is therefore guaranteed.

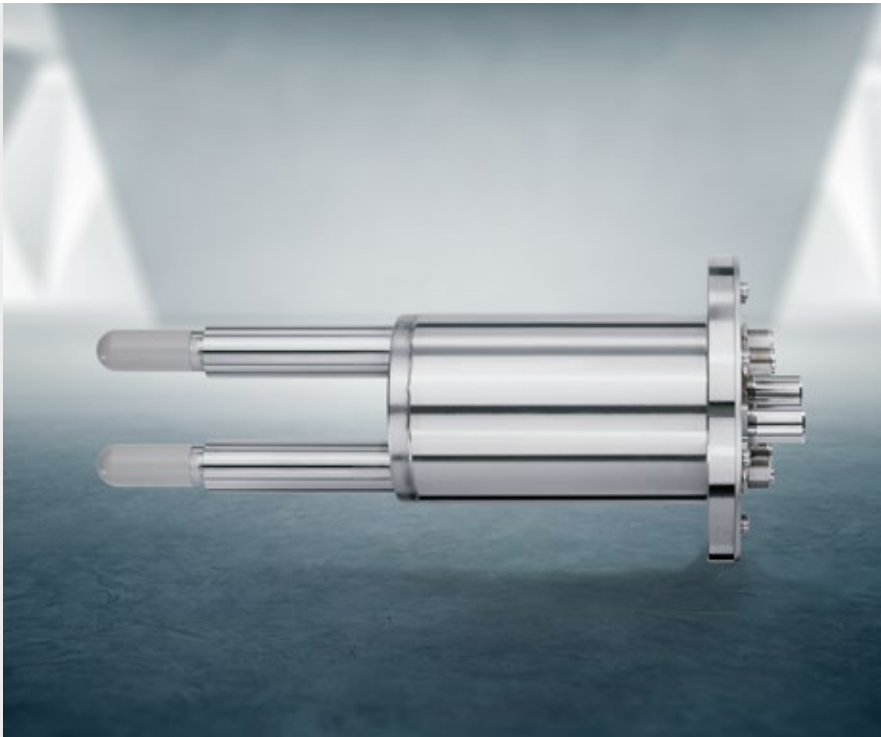
Microwave FlowCell

- Microwave signals measures the entire pipeline cross-section
- Nominal diameters from DN 50 to DN 150
- For many common connection types
- Exchangeable antennas
- EHEDG certification
- Suitable for contact with foodstuffs in accordance with Regulation (EC) No. 1935/2004



Container probe with flushing device

- Integrated water flushing ports prevents caking in the ongoing process
- Abrasion-proof polymers
- Integrated signal reference line
- Various flanges available
- Exchangeable PEEK caps
- Robust and maintenance-free



Container probe			FlowCell	
Material	Stainless steel and PEEK		Stainless steel and PEEK	
Process coupling	Various flanges according to DIN and ASA		Flange according to DIN and ASA, Nominal pipe diameters from 50 ... 150 mm	
Process pressure	Up to 16 bar, depending on version		Up to 20 bar (relative), depending on nominal width and flange type	
Temperature range	Product	10 ... 120 °C (50 ... 248 °F)	10 ... 130 °C (50 ... 266 °F)	
	Environment	-20 ... 60 °C (-4 ... +140 °F)	-20 ... 60 °C (-4 ... +140 °F)	
Connections	4x HF connections, max. cable length: 10 m		2x HF connections, max. cable length: 10 m	
Variants	Pt100 With flushing ports without Pt100		Milk thread, flanged or weldable	



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.

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.

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