



detect and identify

Process Control

Measurement of water content & moisture with microwaves

Micro-Moist LB 456

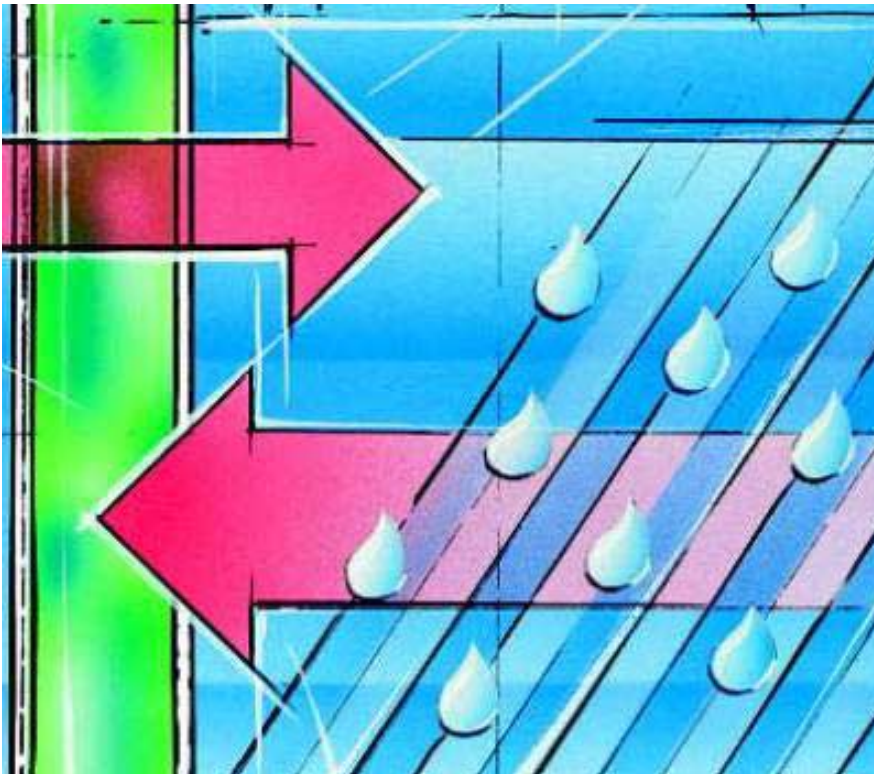
Table of Contents

Micro-Moist LB 456

1. Moisture measurement
2. Microwave measuring system
3. System configuration
4. Microwave sensors
5. Application examples



Measuring moisture accurately and reliably



Berthold Technologies
your experienced
partner

More than 15 years
experience in the
microwave measuring
technology



Brown coal
measurement



Sugar
measurement



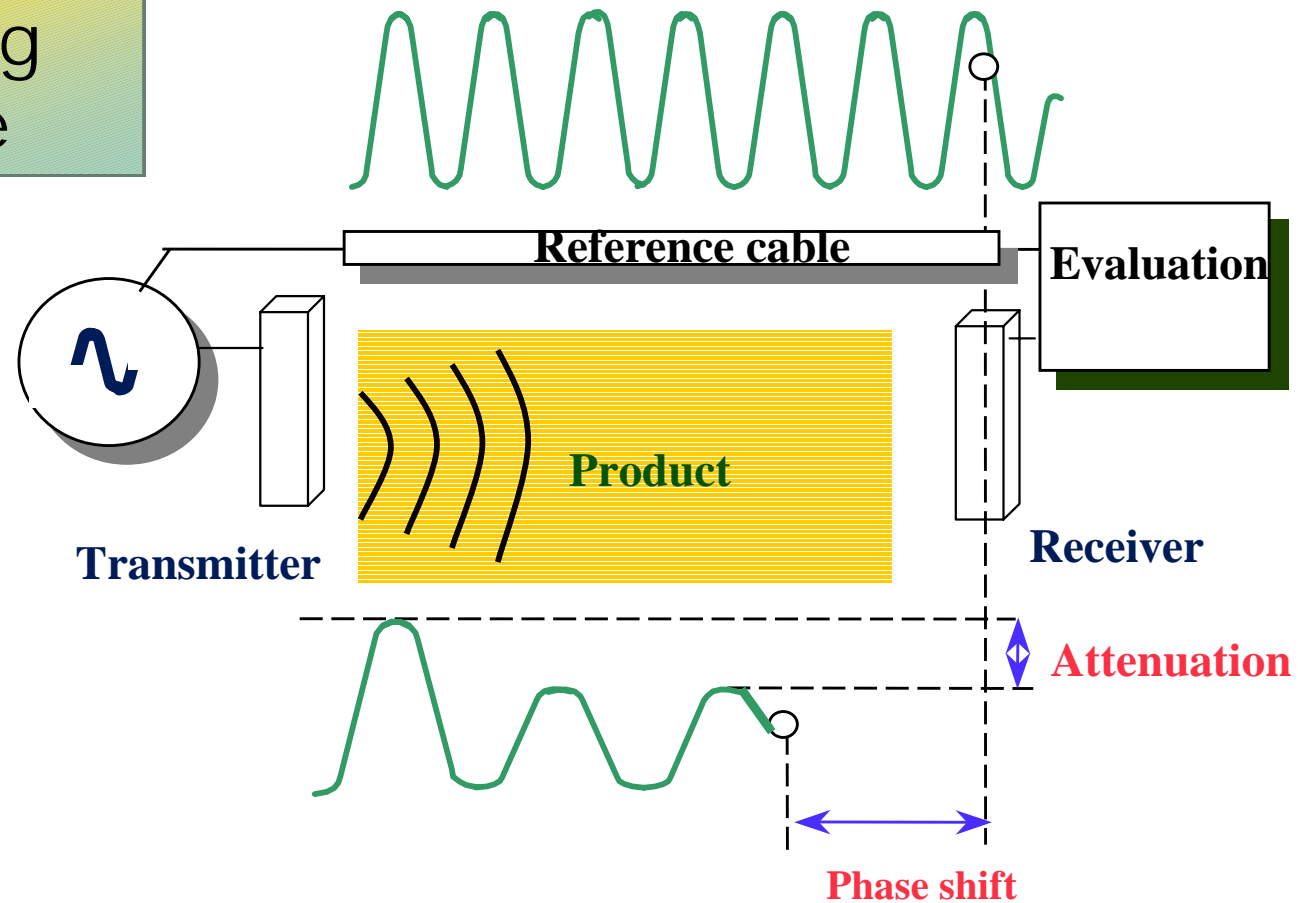
Cream cheese
measurement

Wood chip
measurement



Microwave measuring system

Measuring principle



Microwave measuring system

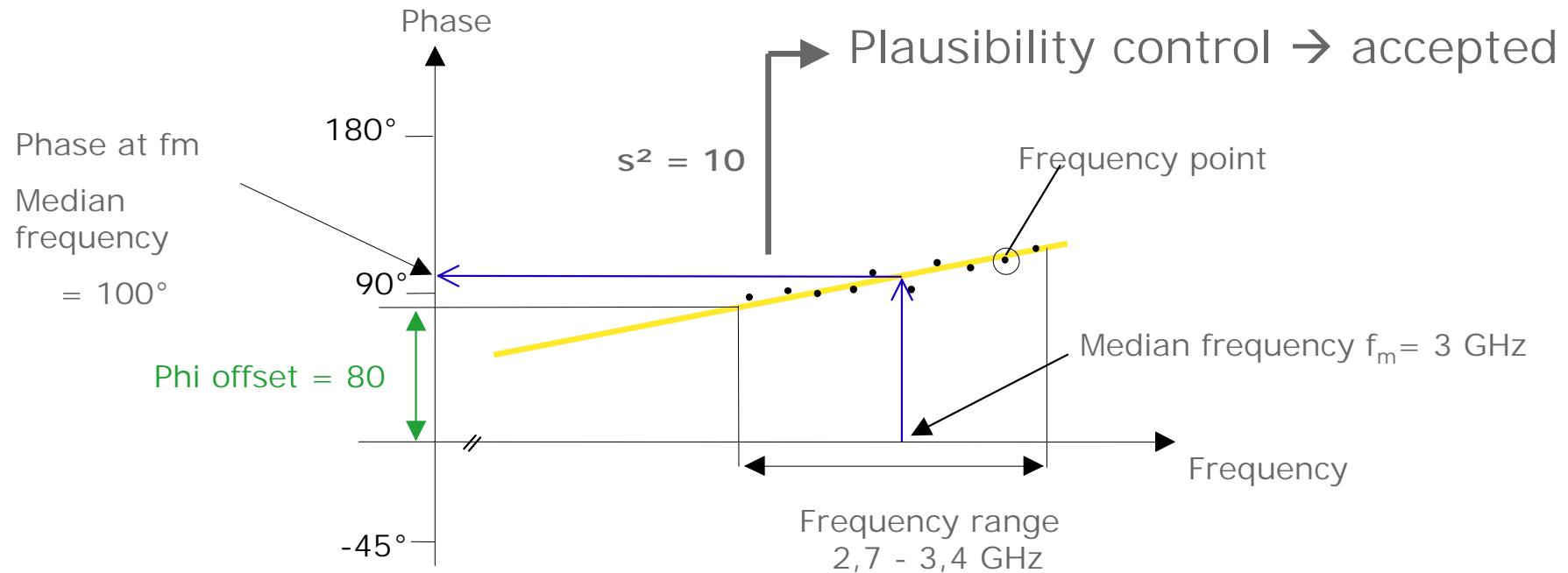
- ▶ Transmission measurement
- ▶ Measurement of 22 single frequencies in a range of 2,7 - 3,4 GHz
- ▶ Evaluation of attenuation and phase shift
- ▶ Regression over 22 frequency points
- ▶ Plausibility control, then clearance for measuring value calculation
- ▶ Concentration value (and/or attenuation) calculated by means of linear regression line



Microwave measuring system

Evaluation

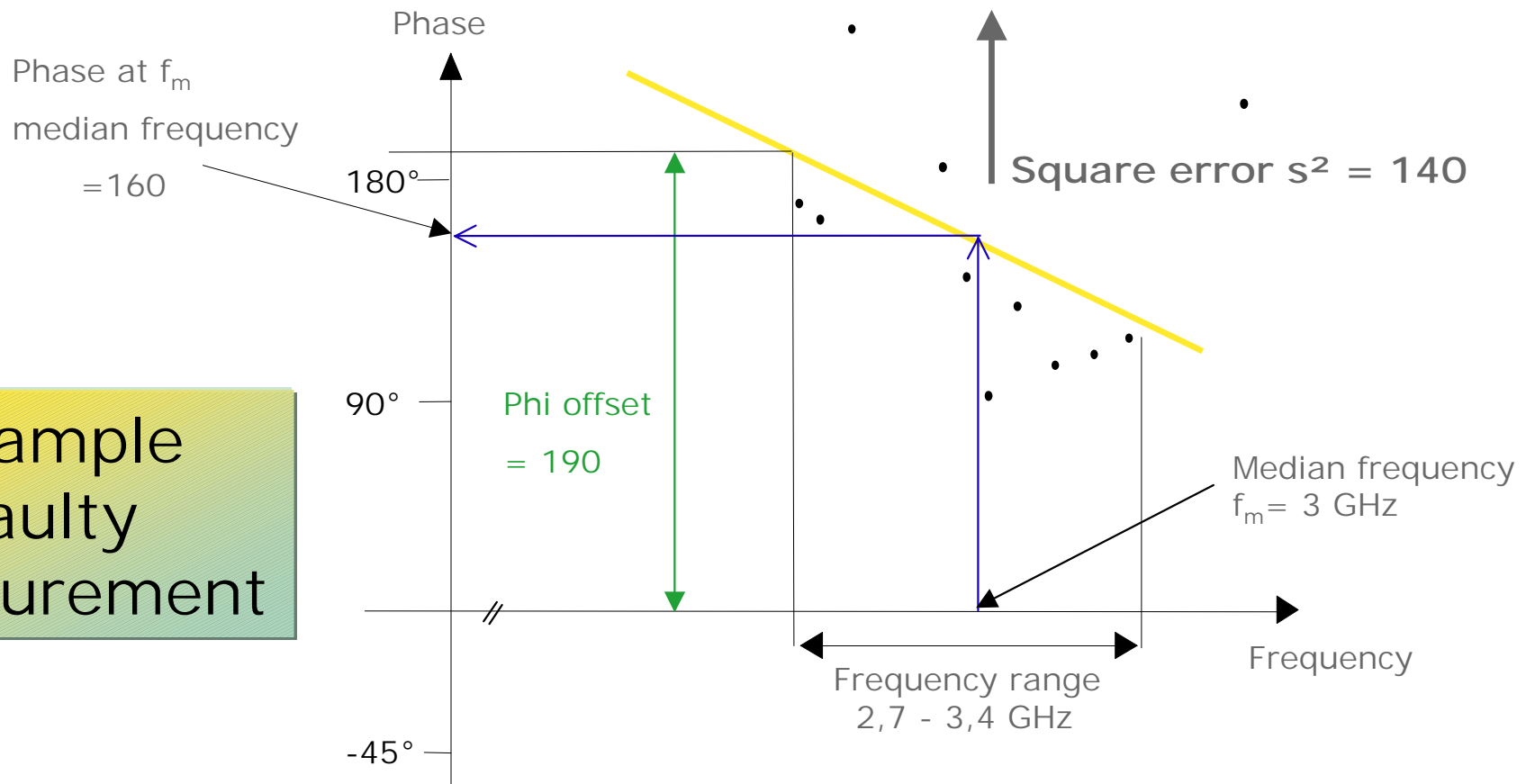
s^2 = square error =
Scattering of each frequency
point around the trend line





Microwave measuring system

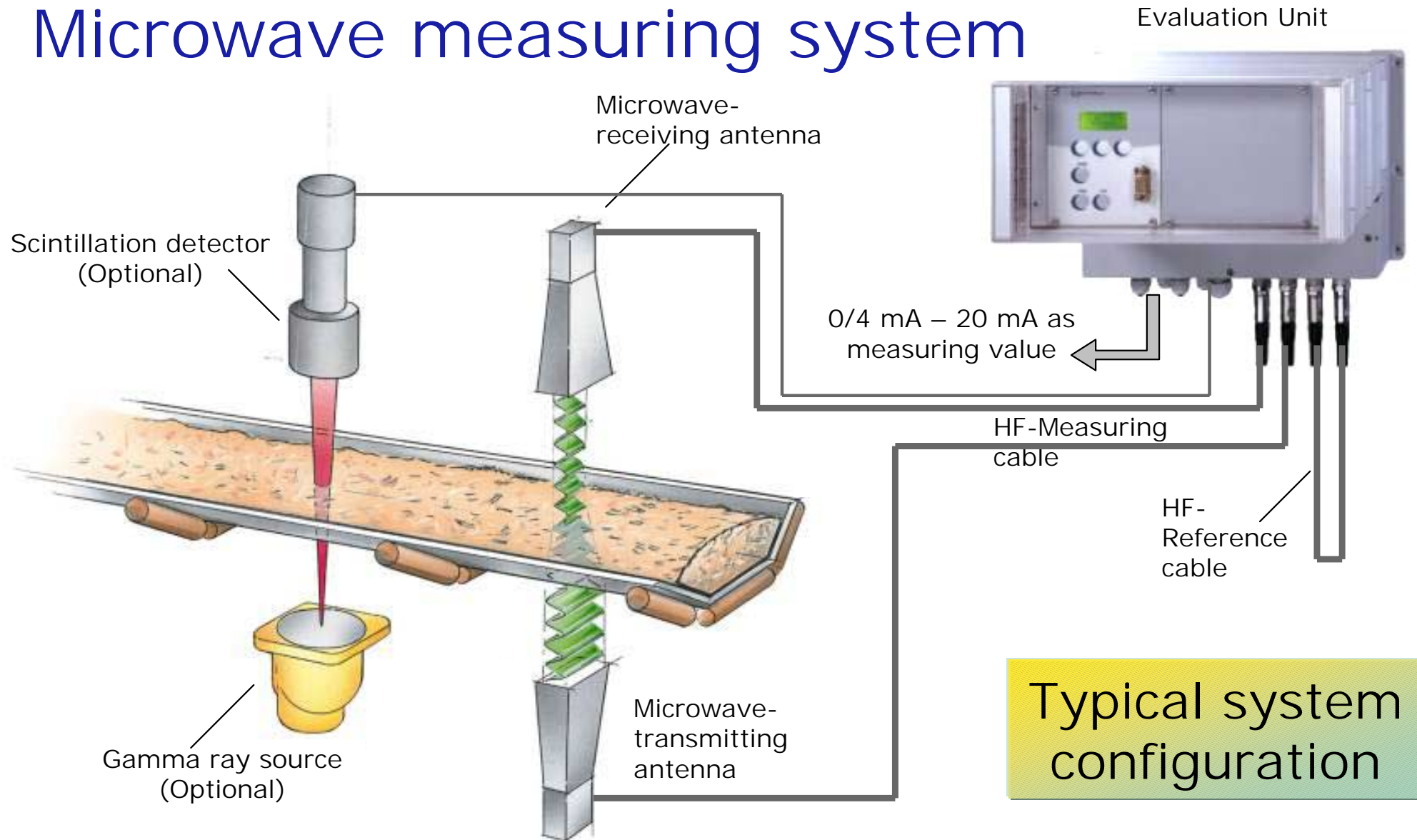
Plausibility control → not accepted



Example
faulty
measurement



Microwave measuring system



Special microwave sensors

for the efficient measurement on

- ▶ Conveyor Belts
- ▶ Chutes
- ▶ Product pipes
- ▶ any other moisture measuring points

Microwave sensors

Different Microwave antenna types



Spiral antenna
for limited
space

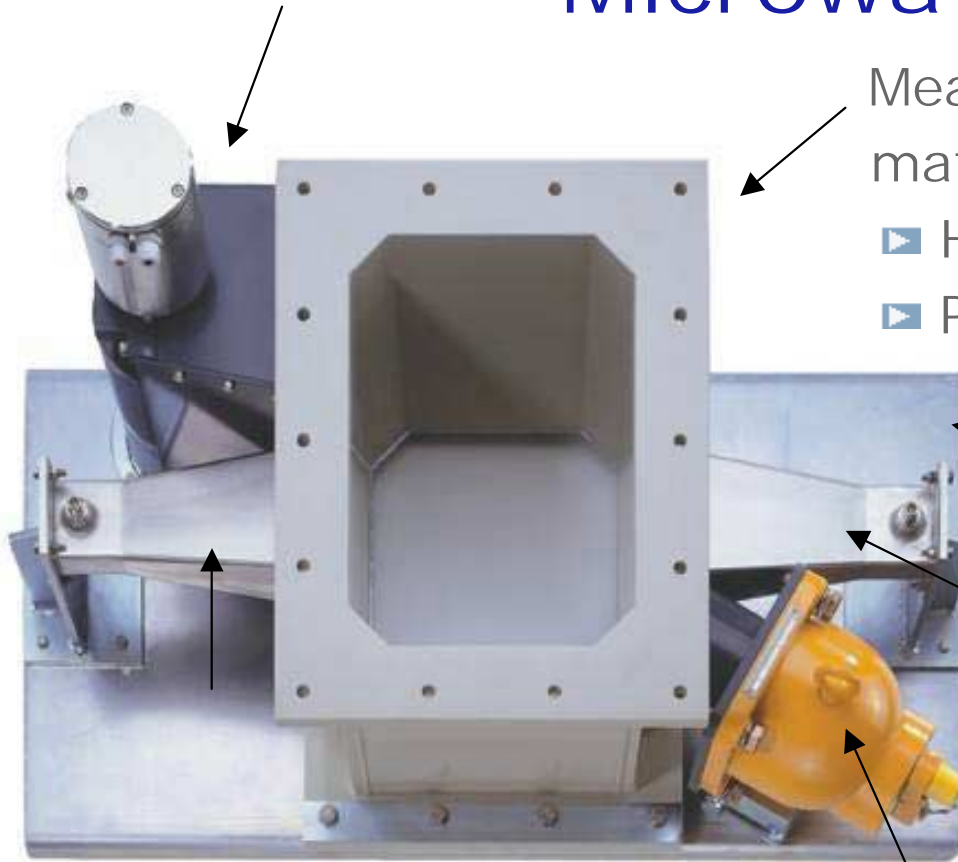


Horn antenna made
of stainless steel
with protective
window





Microwave sensors



Measuring chute made from various materials

- ▶ High corrosion resistance
- ▶ Product temperatures up to 500 °C

Mounting device

- ▶ Quick and easy installation

Transmission and receiving antenna

- ▶ Horn antenna

Radiometric measuring path (optional):
Scintillation detector & radioactive source

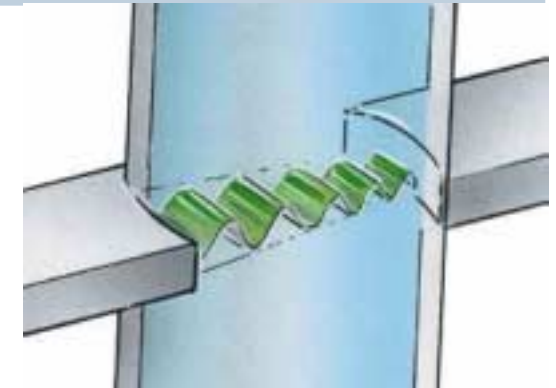
- ▶ Bulk density compensation

Microwave sensors



Measurement
in pipelines

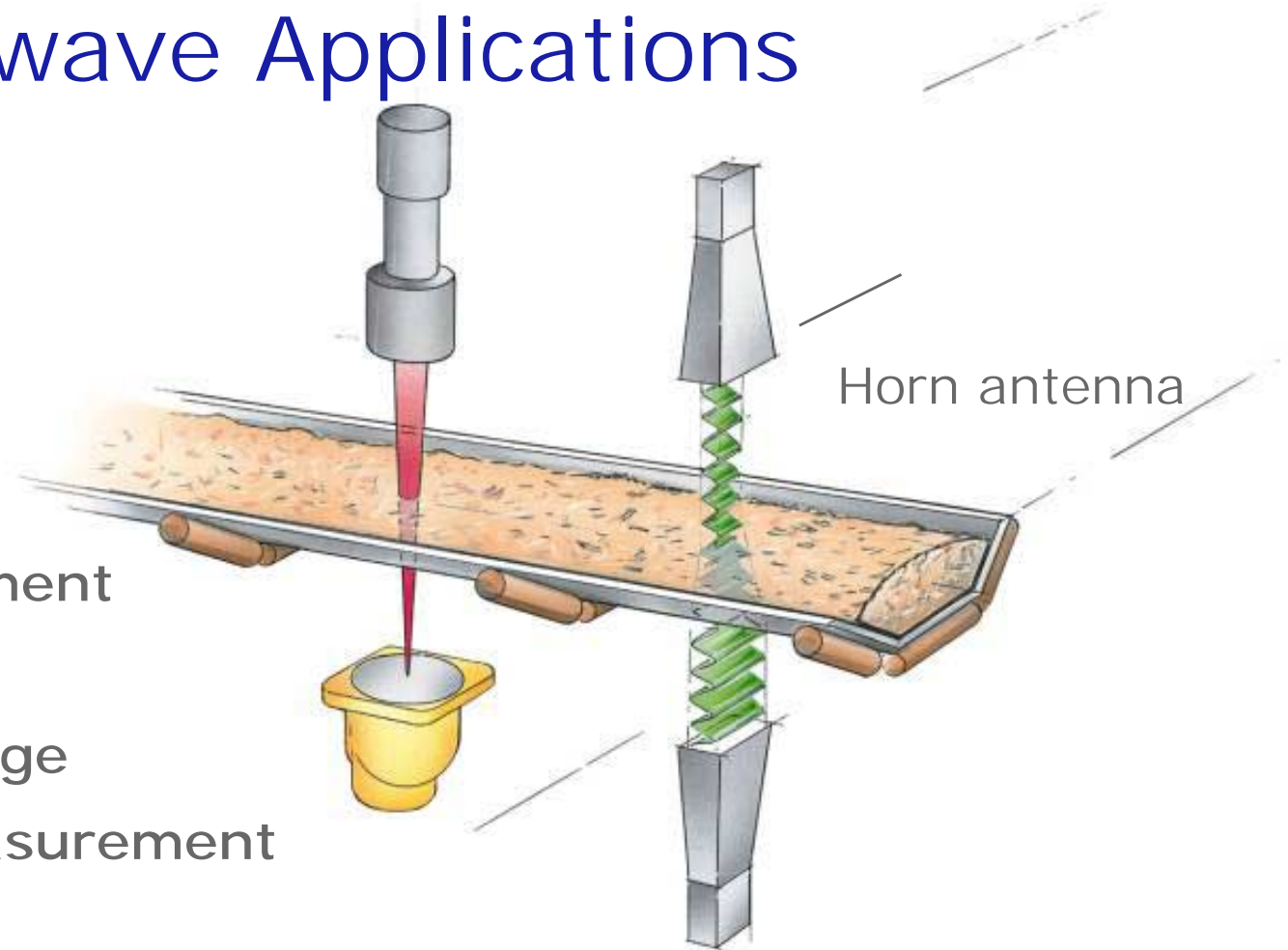
- ▶ Pipe measuring cell
different nominal widths
 - ▶ PTFE lining
 - ▶ Smooth walled inner pipe
 - ▶ No parts contacting the product
 - ▶ High corrosion resistance
- ▶ Applications i. e.
 - ▶ Coffee



Microwave Applications

Measurement on conveyor belt

- ▶ Contactless measurement
 - ▶ No corrosion
- ▶ Large material coverage
 - ▶ Representative measurement



Optional: Area weight compensation with scintillation detector & radioactive source



Microwave Application



Wood Chip
Measurement

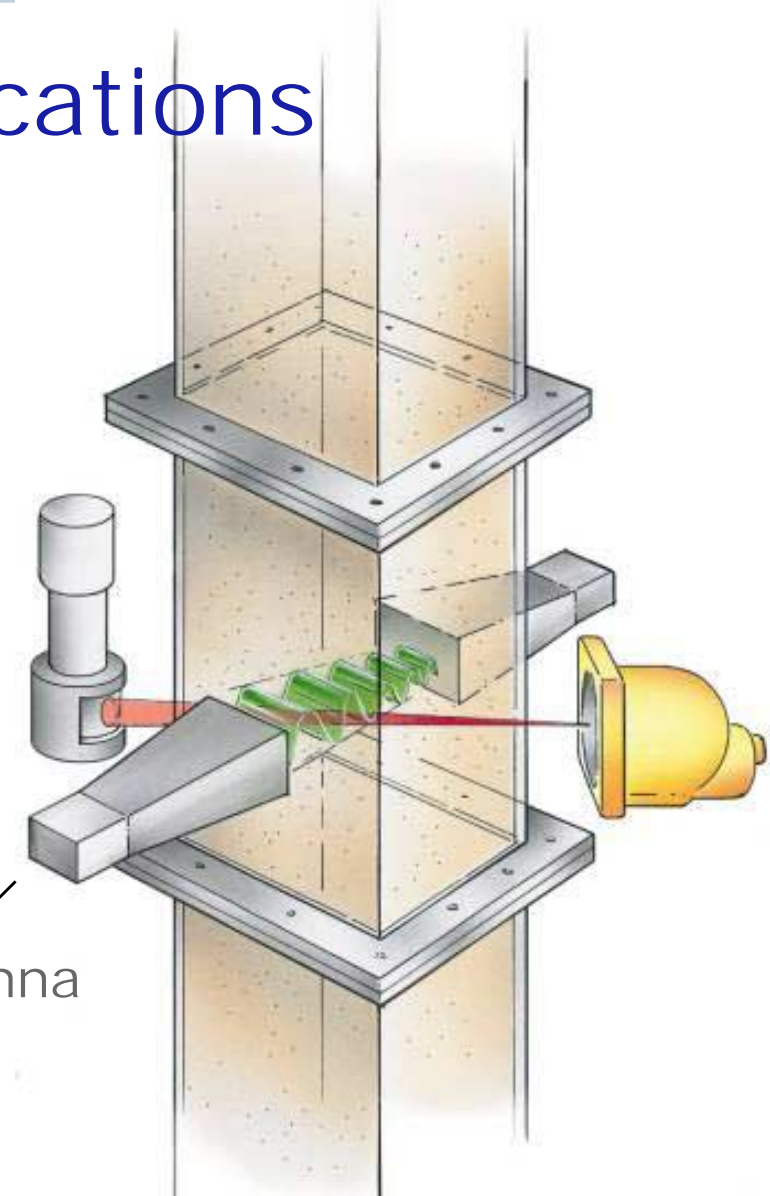
Microwave Applications

Chute measurement

- ▶ Quasi contactless measurement
 - ▶ No installations
- ▶ Large material coverage
 - ▶ Representative measurement

Optional: Bulk density compensation with scintillation detector & radioactive source

Horn antenna





Microwave Application



Brown Coal
Measurement

Successful Moisture Measurements on:

- ▶ Brown coal
- ▶ Coal
- ▶ Fertilizer
- ▶ Fodder
- ▶ Grain
- ▶ Gypsum
- ▶ Chipboard chips
- ▶ Mineral fiber plates
- ▶ Sand
- ▶ Wood chips, -fibers
- ▶ Starch pellets/Starch
- ▶ Clay mass
- ▶ ...

Aims and Advantages

1. Exact & reliable moisture measurement
2. Corrosion resistant microwave probes
3. Easy & quick installation
4. Easy start up procedure
5. Berthold Technologies as experienced partner

