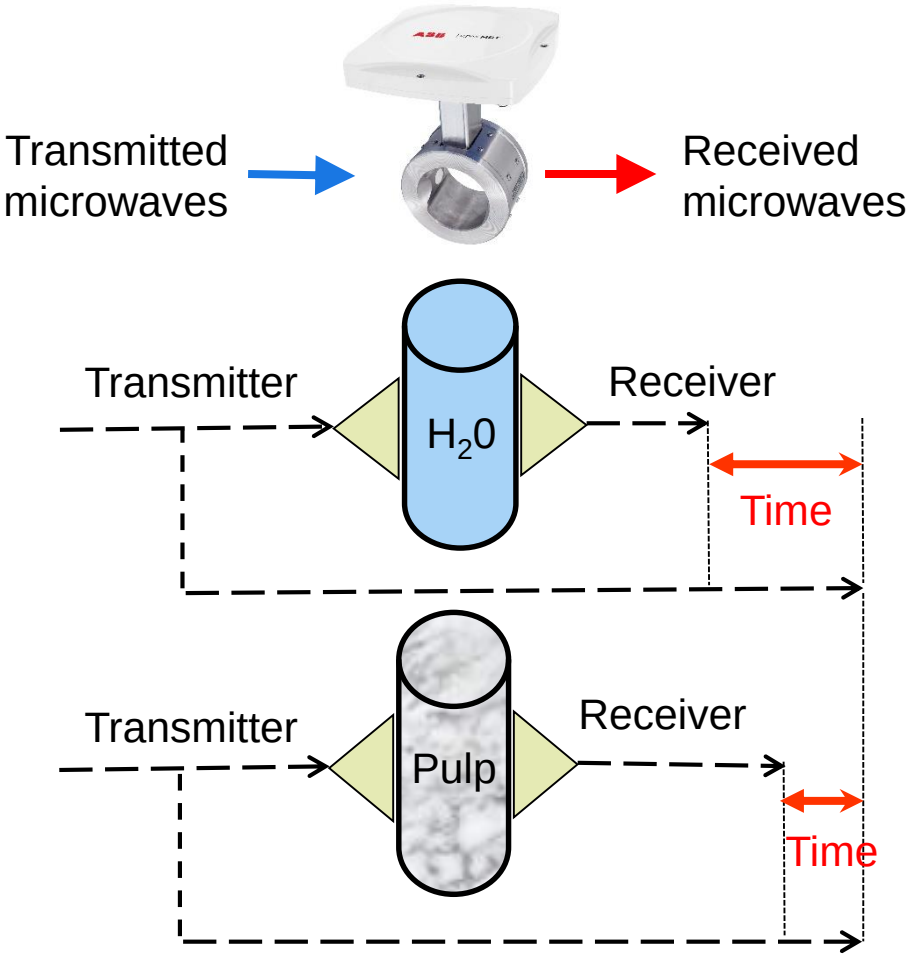
KC/7 Microwave Consistency Transmitter

With the latest microwave technology for total consistency control

What is microwave

- Microwaves are basically high frequency radio waves like radars and mobile phones use
- Microwaves travel with fast speed between antennas
  - Speed in vacuum/air = speed of light
- Speed depends on the medium
- Microwave power intensity 100 mW
  - Not dangerous

KC/7 Microwave measurement



Microwaves travel faster in pulp than in water.

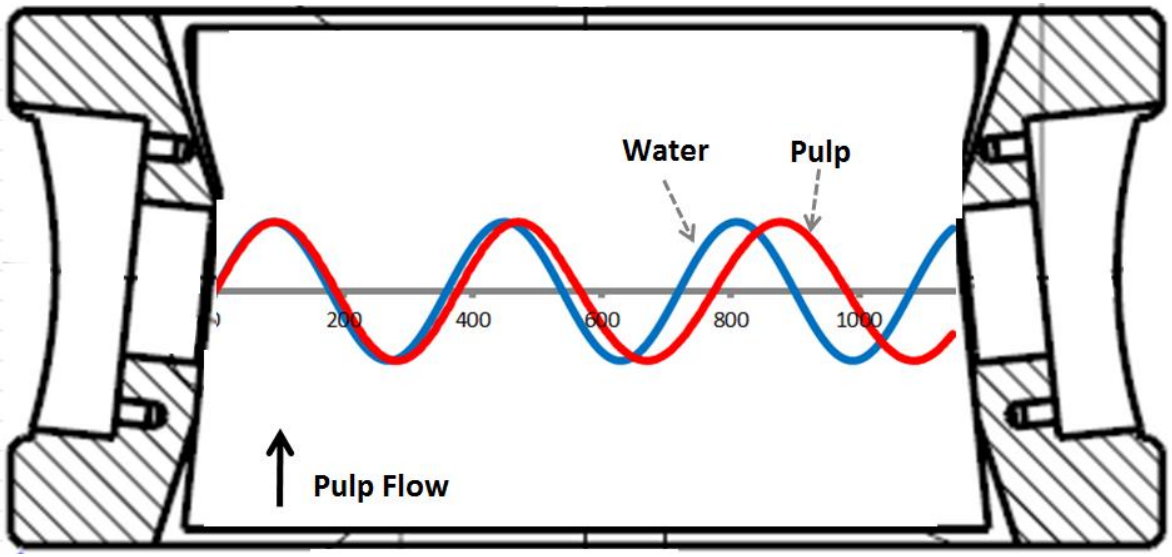
Microwave speed depends on media

Material	Relative speed
Water	0,1
Fiber	0,6
Filler	0,4–0,6
Air	1

Consistency measurement is based on the detection of speed variations in pulp slurry. Speed variation is detected with true-phase measurement.

Measurement principle

- Microwave is transmitted to pulp slurry through ceramic antenna
- Another ceramic antenna works as receiver
- Microwave speed depends on media
- True-phase method enables accurate detection of microwave speed between antennas

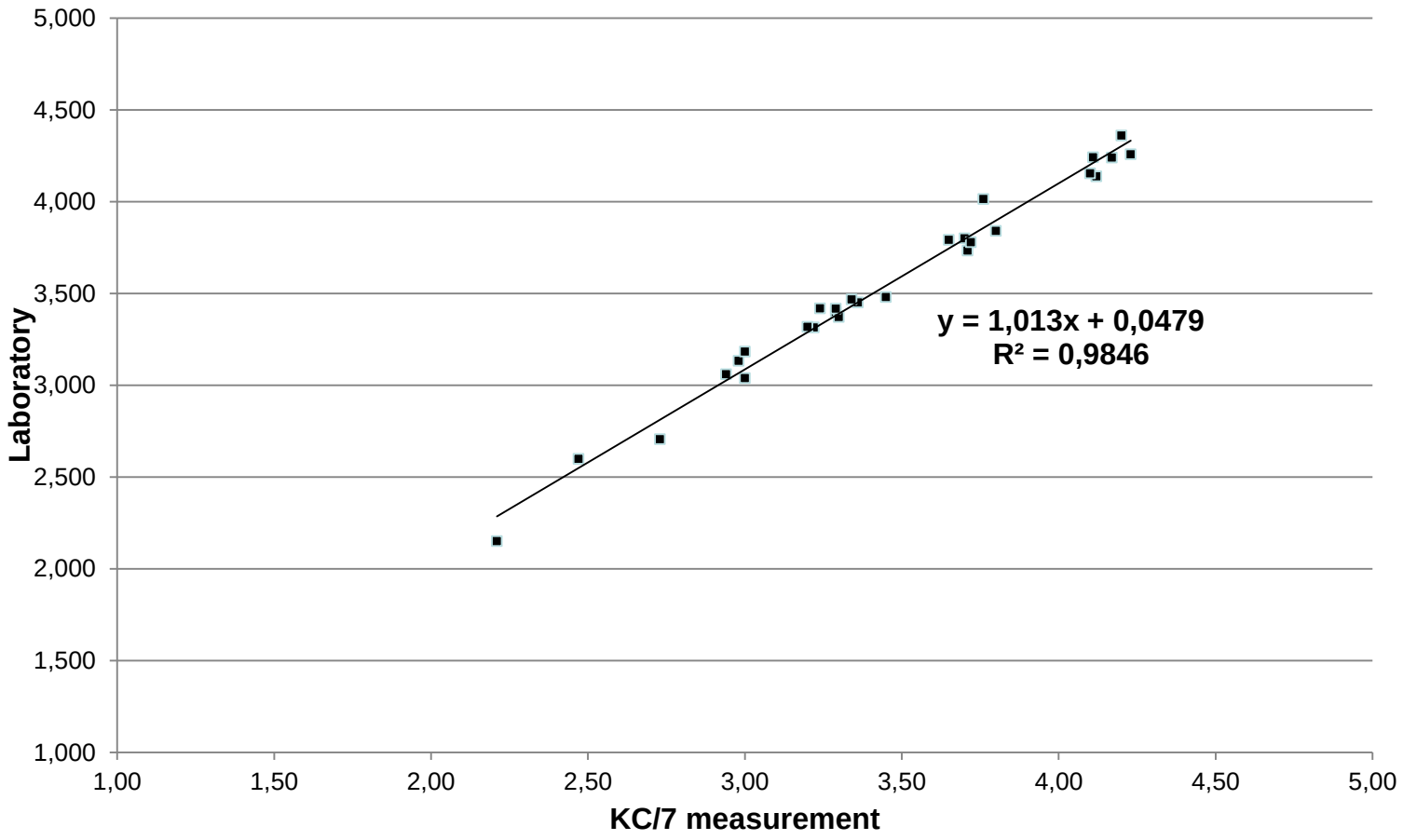


Microwaves travel faster
in pulp than in water.

Microwave technology

- Total consistency measurement
  - Measures fillers (ash) and fibers
- Unaffected of wood species change
  - Varying pulp grade, fiber length, freeness, brightness, colour, shives
- Unaffected of process conditions change
  - Flow rate, pressure, temperature, turbulence
- Easy start-up
  - Factory calibrated with water
  - One point calibration
- No moving parts
  - No regular maintenance needed

KC/7 Calibration follow-up



Microwave consistency transmitter

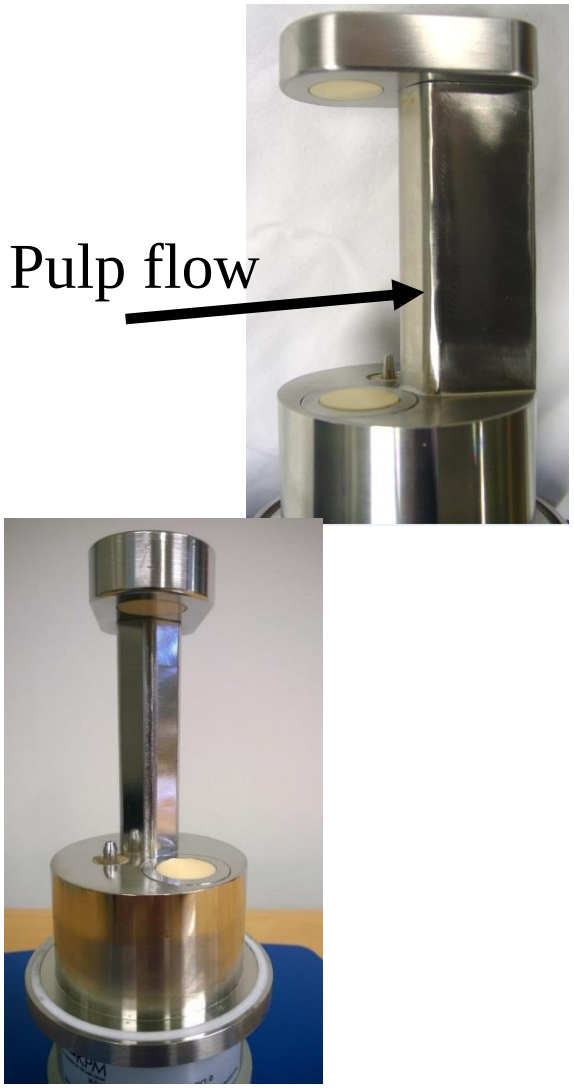
+ Measures total consistency, fibers and fillers
+ Insensitive to fiber length
+ Insensitive to grades
+ Insensitive to freeness
+ Insensitive to flow
+ No moving parts
+ No regular maintenance

Installation

- Flow-through model = FT
  - Sizes 80, 100 ,150, 200, 250 and 300mm available (3” ,4”, 6”,8”,10” and 12”) PN16
  - Flanges are not included
  - DIN, ANSI or JIS flanges can be used
  - Sensor installation length 100 mm (4”)
  - FT50 availabe with adapters
- Insertion type = IT, PN25
  - Sandvik 70 mm saddle same as blade transmitter’s
  - Fits to pipe sizes 150mm (6”) and bigger

Features Insertion type

- Short measurement distance
- Dipole antenna design decreases reflections from the pipe and improves signal quality and accuracy.
- Can be installed to 150 mm (6”) pipe or bigger
- Uses standard Blade sensor process coupling.
- Temperature sensor location



Limitations

- Air content
  - Pulp should not include air (entrained air)
  - To eliminate air effect pressure shall be over 1,5 bar, equal to 15 meter water column (50 ft water column, 22 psi)

- Conductivity
  - High conductivity kills the signal
  - Conductivity limits depends on sensor size (antenna distance)
  - Conductivity should be below the limit

Conductivity max limits

- KC/7 Flow Through models
- FT80 mm (3”) 25 mS/cm
- FT100 mm (4”) 20 mS/cm
- FT150 mm (6”) 20 mS/cm
- FT200 mm (8”) 15 mS/cm
- FT250 mm (10”) 15 mS/cm
- FT300 mm (12”) 15 mS/cm

- KC/7 Insertion Type 25 mS/cm

Conductivity should never exceed these values.
Measure in process temperature.

Microwave applications

- Mixed pulps and fillers
- Broke
- Recycled pulps
- Close to the paper machine,
  - after mixing chest and machine chest
- especially at machines that use fillers
- Accurate pulp production measurement
  - after bleaching, before drying machine

- Waste water treatment plant (Cs > 1,0%)

Features

- Accurate and quick temperature measurement, superior compensation method 0–100 °C
- Accurate measurement with true-phase method
- Robust design, stainless steel body, no moving parts, no regular maintenance
- Ceramic antennas

Features cont.

- Factory calibrated with water
- Latest technology, wideband 1,5–2,5 GHz measurement, true-phase method
- Angled antennas avoid microwave reflections and keep windows clean

Specifications

- Measuring range: 0–16% Cs
- Resolution: 0,001 %
- Repeatability: 0,01%
- Wetted parts
  - Pipe: SS 316L
  - Window: ceramic
- Fluid temperature: 0–100 ºC (32 – 212 ºF)
- Ambient conditions:
  - Sensor: 0–70 ºC (32 – 158 ºF)
    - Protection class: IP 66 Nema 4X
  - Display: 0–60 ºC (32 – 140 ºF)
    - Protection class: IP 65 Nema 4

Summary

- Measurements with the latest technology
  - True-phase method
  - Excellent temperature compensation
  - State-of-art microwave components
- Robust design
  - Stainless steel body
  - No moving parts
  - Ceramic antennas
- Easy start-up
  - Factory calibrated with water
  - One point calibration