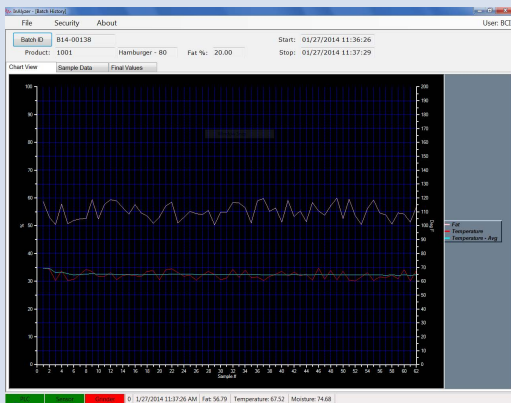


# PDMS • In-line multi constituent analysis

## Proven technology for in-line measurement of fat/lean in ground meat



PDMS chamber with sender and receiver antenna. Also shown is the Temp. probe that makes temperature compensation possible. To the right the adapter is shown as an extension of the end nut.



User Interface Panel (UIP) allows the operator to monitor the fat content vs. target fat as the blender is being filled with product. The system calculates constantly how much fat/lean the operator has to add into the blender as the weight signal from the blender is fed back to the UIP. Once the target fat has been reached, the operator stop's the batch and the batch data is automatically stored in the database.

The PDMS is a fast, non-contact method for monitoring multiple components in liquid, solid or multiphase materials that pass through a pipe.

The system is used to analyze products such as ground meat and dough where other technologies such as NIR may not provide a suitable solution. The chamber and control module are easily integrated into your process. Unlike other analyzers, its simple design contains no moving parts or optical components that require routine maintenance, resulting in extremely low long-term cost of ownership.

The chamber is easily installed with a variety of end connections and sizes to accommodate most process lines. Multiple outputs, alarm status indicator light and

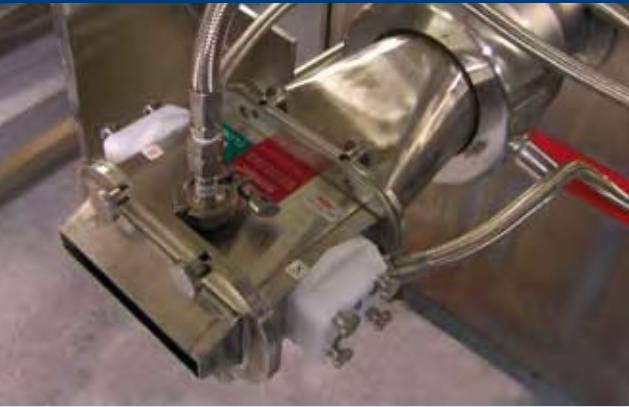
a UIP communicates real-time results. The PDMS provides you with crucial product information resulting in improved quality and process efficiency.

### Advantages

- Analyzes multiphase products such as slurries, dough, liquids and larger particle size products.
- Analyzes multiple components.
- Measurement is truly representative of the total product. PDMS is not a surface measurement.
- Intergrates seamlessly into your process with no flow obstruction.
- Results are not affected by the sample colour.
- Excellent repeatability, accuracy precision and stability.



# In-line fat analysis in ground meat



The ground meat flows through a waveguide and low power-multiple frequency microwaves are transmitted through it. The resulting changes in dielectric constant and conductivity allow fat and other constituents to be measured.

The PDMS graphs the real-time readings on a graphic display showing both instant and average values (see. fig1), this together with the weight fed back from a mixer's load cells, gives the operator the opportunity to adjust the product in order to reach the target fat value for the batch with an accuracy of +/- 1%. Like all other in-line systems the results depends on a good lab reference.



Fig. 1

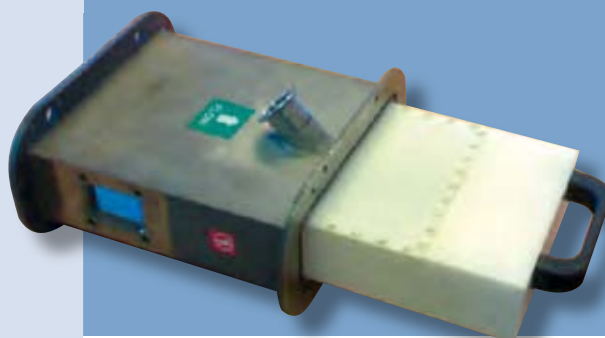
The test block is a quality control piece slid into the chamber, which will ensure the consistency of the readings from one day to the next. The measured values are stored and trend enable the operator to action should the readings deviate from the target value.

PDMS, is a system that combines microwave spectral technology with a proprietary waveguide design to provide precise and reproducible compositional analysis of fat, water and protein in ground meat. The system consists of an electronic control box, interconnecting microwave cables a sensor body that acts as a "waveguide" and a user interface panel.



## The system has a number of benefits:

- Totally independent, fits all known brands of grinders
- Can be fitted to both new and used grinders
- Very compact, measures 65cm from end of grinder
- System comes pre-calibrated
- Calibration is done only once, no need for re-calibration
- Particle size from 3mm – whole trimmings
- Temp. range from -1 to +30 degr. Celsius
- Unaffected by colour
- Same calibration in fat range from 5-80% fat
- Measures through the whole sample and not only on the surface
- Robust parts, very easy to clean
- Accuracy of +/- 1%.



# PDMS Applications



## Meat applications:

- Standardizing batches, single or multiple
- Sausage applications, handling recipes
- Standardizing trimmings for further sales
- QC instrument for finished emulsified products



## Other PDMS applications

- Moisture in:
  - Raw ingredients such as corn, rice, soybeans
  - Processed materials such as tomato paste, corn masa
  - Chemicals and plastics
- Fat in:
  - Peanut butter
  - Milk and other dairy products
- Salt in:
  - Mashed potatoes
  - Most vegetable products
- Solvents in a mixture or chemical
- Alcohol in beverages
- Reaction progress

## Other options

- Brix, pH, viscosity and acid in:
  - Orange juice
  - Soft drinks
  - Mayonnaise
  - Tomato products

## What is PDMS?

PDMS stands for Guided Microwave Spectrometer. The PDMS uses very low-powered microwave energy (only 0.005 W compared to 1200 W for a typical microwave oven) at hundreds of specific frequencies to analyze the physical and chemical properties of a sample. GMS is best at determining multiple constituent concentrations of a process with varying particle sizes.

Microwave energy is sensitive to the concentration of polar, semi-polar and non-polar molecules such as water, protein, fat, oil and ion/salt concentration in a process or sample. The PDMS applies a pulsed microwave signal to the material that passes through the sample in the chamber providing a representative measurement of the bulk product. In the presence of microwave energy, the polar molecules in the sample such as water rotate and align with the electromagnetic field, similar to aligning the poles on a magnet. The movement of the molecules causes the microwave signal to be altered and the velocity of the wave decreases as it passes through the sample. The resulting PDMS spectrum has two characteristic features, the cut-off frequency and the passband region.

The cut-off region is the characteristic high slope "rise" in the spectrum. It is determined by the dielectric constant of the sample. This cut-off region is the result of the sample altering and reducing the velocity of the energy, which changes its wavelength. The pass band region is generally fairly horizontal. It shifts primarily in the vertical direction with small changes in the slope. The amplitude (intensity) of the pass band region is determined by the conductivity of the sample and how much energy is lost in the transmission from the transmitter to the receiver antennae of the chamber. The cutoff region is generally sensitive to moisture and the passband region to other constituents. Using a well-defined calibration, the changes in the passband and cut off regions are correlated to the amount of change in the concentration of the component of interest in the mixture.

# PDMS • specifications

## Technical Specifications

Sample Types	Liquids Granular solids Pastes Multiphase (solids, liquids and slurries)
Microwave Power	0.04 mW to 63mW adjustable
Microwave Bandwidth	975 to 3,750 MHz adjustable
Temperature Compensation	Resistor Temperature Device (RTD) Signal output for temperature via 4-20 mA output or Modbus
Calibration	Software for calibration development, diagnostics and uploading variables
Alarm Indicators	UIP
Process Connections	ANSI Flange 150# ANSI Flange 300#  Tri- Clamp <sup>3</sup> Threaded Sanitary I-line (Interlock)
Communications	USB or Modbus
UIP (User Interface Panel)	Std PC platform, Windows 7, SQL 4xCom, 3xUSB, VGA, Touch screen
Physical Specifications	
Chamber Dimensions	5.08 cm (4 in) 7.62 cm (9 in) 10.16 cm (12 in) Special sizes, determined by application, available by special order
Chamber Material	316 SST
Process Temperature Limits	0°C to +150°C (+32°F to +302°F); up to 2000 kpa pressure
Control Module Dimensions	960x800x400 mm
Control Module Enclosure	IP65 (separate from chamber)
Electronics Module Connection	4.20 m SST cables (pharmaseutical grade) Longer lengths available by special order
Operating Temperature Range	Control module: 0°C to +40°C (+32°F to +104°F)
Operating Relative Humidity	Control module: 0-95% non-condensing
Vibration Limits	Control module: Up to 1 m/s <sup>2</sup> from 5-200 Hz Stable, non-vibrating stand or surface
Weight	58 kg average
Power Requirements	90-260 VAC (47-63 Hz)



9505 N CONGRESS  
KANSAS CITY, MO 64153  
1-800-427-6498  
WWW.SCANAMCORP.COM