

# **Sugar Mills and Refineries**

## **Control, Monitor & Optimise**

**PROCESS  
CONTROL  
SERVICES  
PTY LTD**



**Displays, Controllers & Loggers**

**Interface Level Measurement**

**Environmental Monitoring**

**Suspended Solids & TDS**

**Pressure & Temperature**

**pH, ORP & Conductivity**

**Ultrasonic Flow Meters**

**Brix Measurement**

**Water Quality**

**Turbidity**

**Moisture**

**Dosing**

**Level**

**For:**

**Batch Pans**

**Brix Control**

**Milk of Lime**

**Evaporations**

**Crystallisation**

**Clarifier Overflow**

**Clarifier Underflow**

**Blocked Chute Detection**

**Conveyor Protection & Safety**

**Non-Intrusive Flow Measurement**

**Open Channel Flow Measurement**

**& many more process control improvements.**



## Application Report

### Measurement of dry substance content for regulation of the crystallization process

The most important parameter during the crystallization process in the batch pan is the dry substance content (brix).

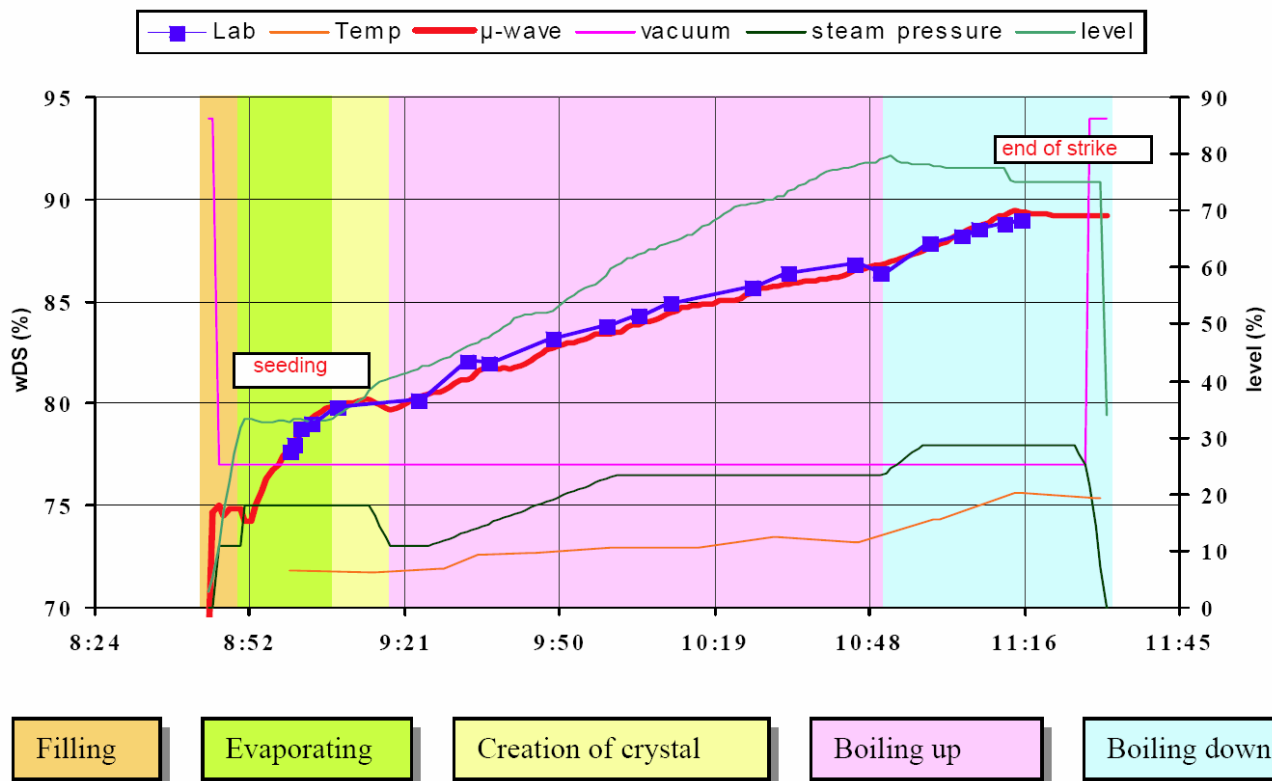
Continuous monitoring of the measurement value in the batch pan is indispensable for the optimal and regular crystal growth.

The proMtec microwave measurement permits precise regulation of the crystallization processes and sets a worldwide standard in this area.

The measurement is carefully calibrated by means of sampling and therefore reaches a very high measurement accuracy up to  $\pm 0,1\%$  dry substance content under operational conditions.



### Crystallisations process with typical increase of the dry substance content

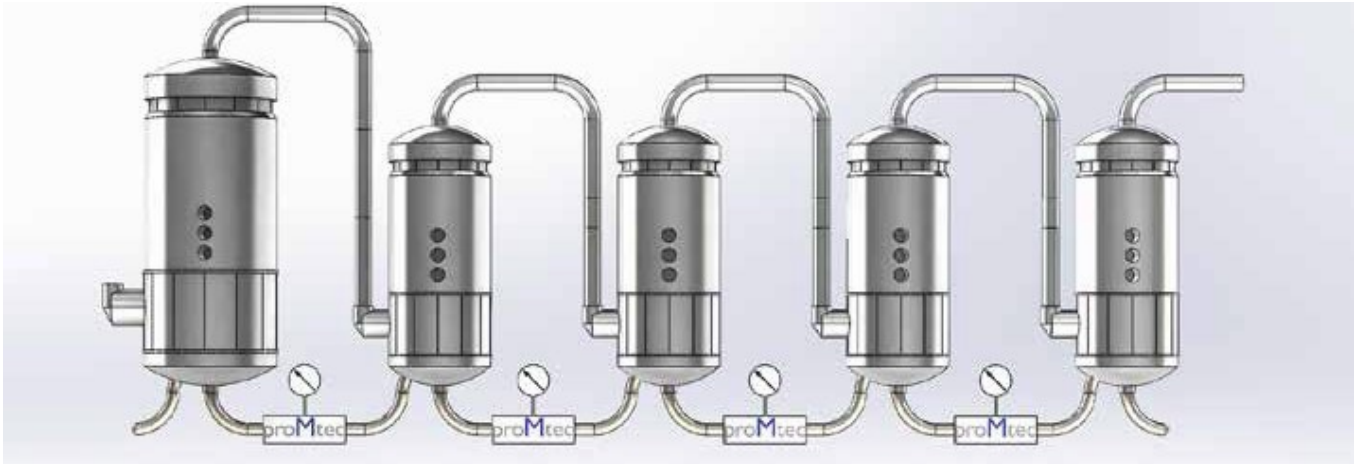


This measurement is thousandfold proven, accepted and used for all common crystallization processes in all types of discontinuous and continuous batch pans worldwide.



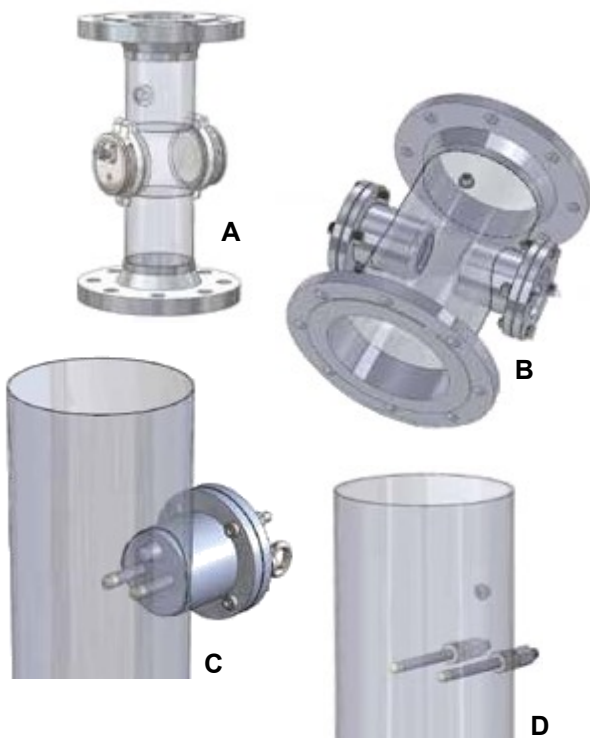
## Application Report

### Measurement of dry substance in the evaporating station



In the multi-stage evaporating station the thin juice is thickened to the required maximum dry substance content. In the stage of evaporation thermal efficiency aiming at energy saving is also of major economic importance for processes in the subsequent crystallization.

The balance between dry substance content of thick juice and the steam requirements is decisive for control and regulation of the plant. With the **proMtec** microwave measuring system the dry substance content is precisely determined and provides the basis for an efficient regulation of the liquid and vapour stream to avoid instabilities of the dry substance content in thick juice.



Due to a longstanding experience in the sugar industry sector a wide range of flexible installation options can be offered by **proMtec**.

Depending on technical requirements and available budget different installation variants can be selected:

A - Pre-assembled Inline measuring sections, provided with individual mounting flanges.

B - Same installation type like A, but also possible for large measuring sections up to DN 400. Optionally only with welding necks and intrusions for fixed pipes

C - Pre-assembled intrusion with mounting neck that can be welded on the measuring section

D - Set of insertion probes with welding sockets



## Application Report

### Measurement of dry substance in milk of lime



The unique advantage of the microwave measurement system is the direct measurement in the process. The method evaluates the concentration of the whole cross section between the sensors, thus, the actual process is measured representative and with high accuracy.

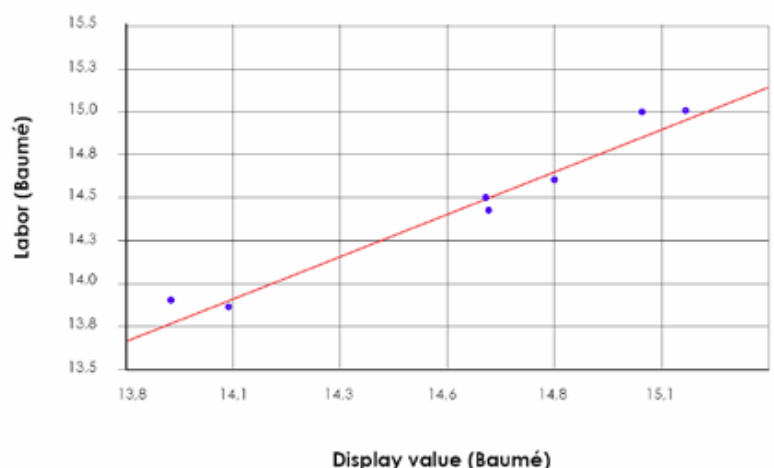
The monitoring is useful for determining the pre-density and density of the milk of lime after maturation. The sensors are installed in the pipeline after the tank or classifier. Alternatively the measurement can be implemented directly in the tank. The probe sensors are used here with weld-in sockets directly on the bottom of the tank.

The measured value is displayed in Baumé or kg / L with a high accuracy, allowing reliable control of the extinguishing water.

The microwave measurement within the process leads to a steady flow. After installation of the microwave sensors and the Pt 100 in the pipe section no additional maintenance of the measuring device is required. In addition, the installation of a bypass has become superfluous and process faults by lockage in a bypass are eliminated.



**Milk of lime in Baumé**



The contactless measurement consists of two flat sensors fitted in a pipe, a temperature sensor to compensate temperature fluctuations and the evaluation unit. The measurement is based on laboratory samples, which are used to calibrate each product, in order to achieve a very high accuracy.

## Microwave Concentration Measurement

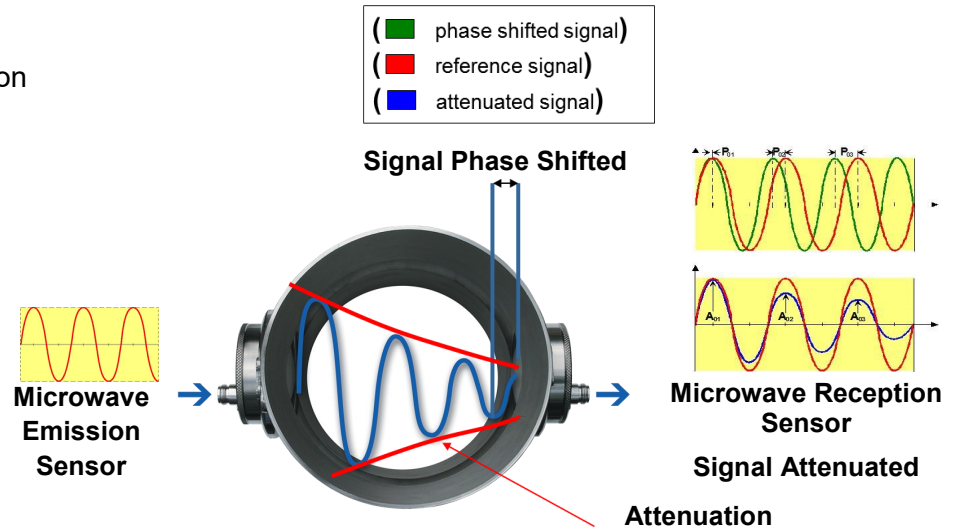
### The Microwave Principle

#### Phase Shift

Decreased speed of propagation after the microwave signal has transmitted the medium.

#### Attenuation

Decreased amplitude after the microwave signal has transmitted the medium



Attenuation & phase shift related to the water content or dry substance

### Non-Nuclear Measurement for:

- Crystallisation
- Evaporations
- Batch Pans
- Brix
- Mild of Lime



### ProMtec (Microwave Technology)

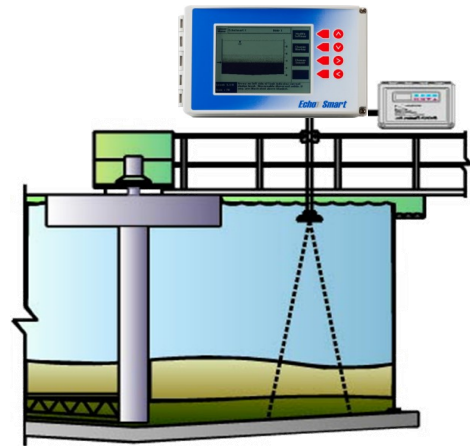
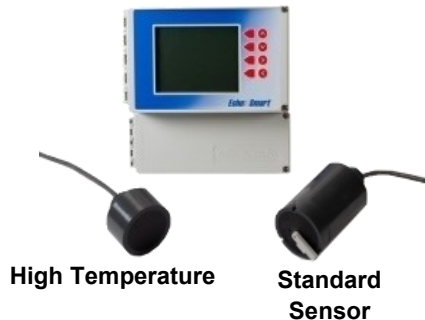
- Microwave measurement
- Connection via coaxial cables (max. 150m)
- Isolated 4-20mA output
- Up to 10 Bar pressure rating



# Interface Level Measurement

## Clarifier Bed Level Detection for in process (high temp.) or effluent treatment plant.

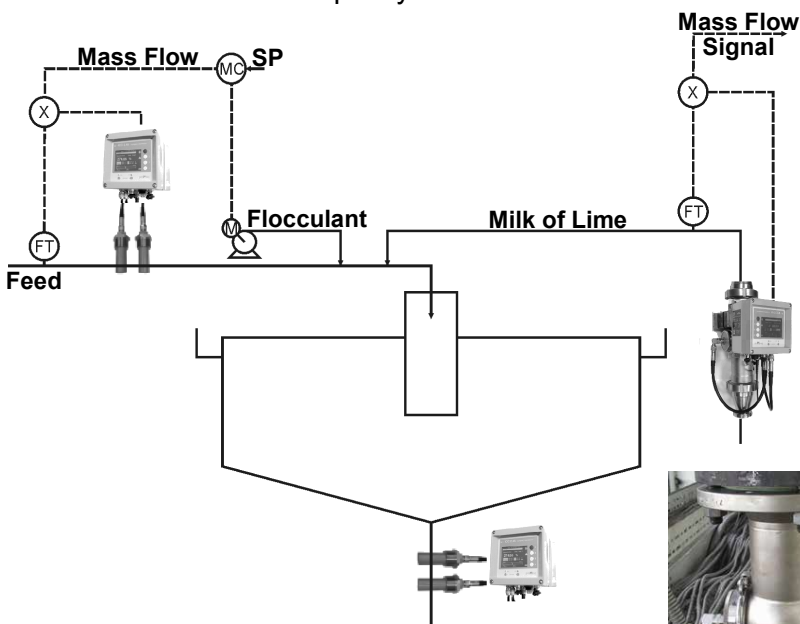
- Installation: Bridge Mounted with wiper sensor
- Use: Monitor & Control
- Typical Range: 2 to 4m
- Benefits: Early warning of process upset
  - Improve management of flocculant dosing
  - Prevent rake stalling
  - More consistent underflow solids concentration



## Slurry Concentration

### Feed to Thickener

- Installation: SS Shielded, Insertion Sensors in Feed Line
- Use: Combine with Flow to provide solids load
- Typical Range: 2-10%
- Benefits: Adjustment of Flocc dosing against solids load
  - To improve Flocc performance & prevent overdosing
  - Improved water circuit quality
  - Increased capacity



### Milk of Lime

- Installation: In-Line with flat sensors or insertion sensor
- Use: Control of Milk of Lime make up/dilution
- Typical Range: 10-15%
- Benefits: Consistent Milk of Lime concentration to enable more precise pH correction
  - Control & optimise lime usage

### Thickener Underflow

- Installation: In-Line, short insertion sensors with Abrasion Resistant coating
- Use: Control of dewatering capacity & loading
- Typical Range: 20-40%
- Benefits:
  - Improved dewatering efficiency & performance,
  - Improved management of thickener,
  - Combine with flow to provide system performance data

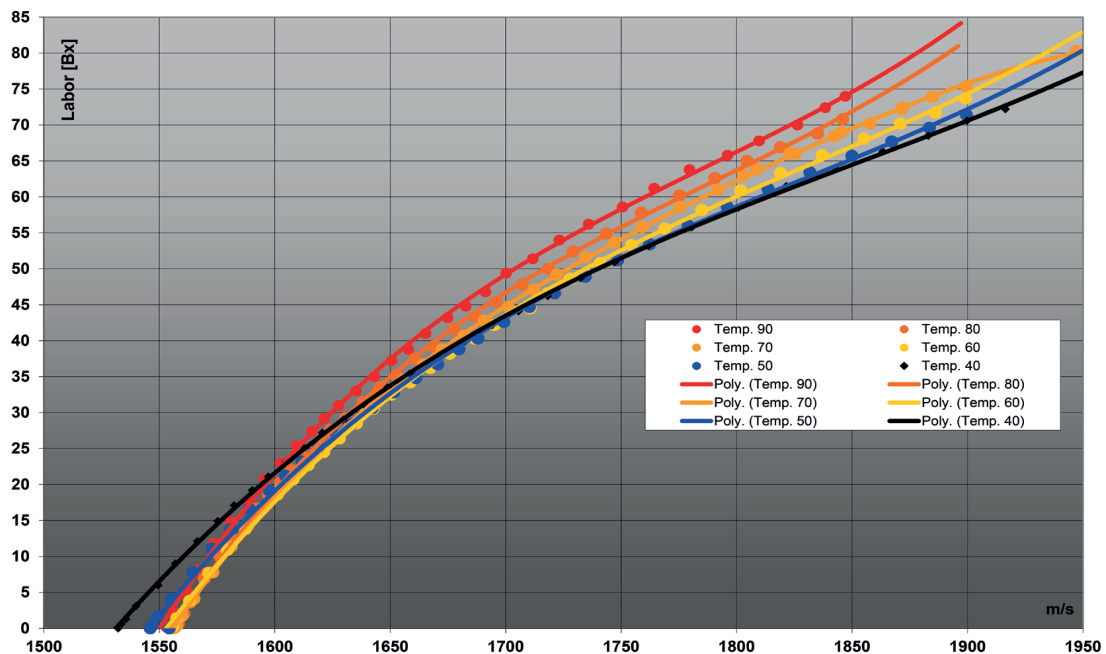
# Slurry Concentration

us-ICC 1500

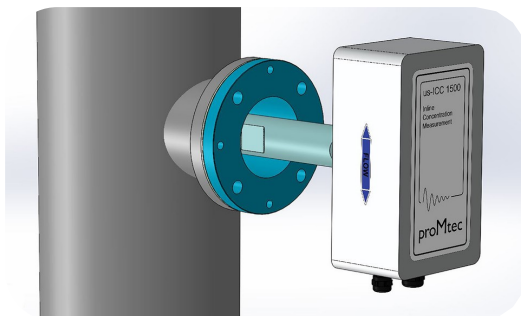
„TOF“



THICK JUICE



Inline Concentration Control  
for measurement of a brix range 0 - 99 %



for any pipe diameter



## FLS / FIP - pH/ORP & Conductivity Controller

- 240 Vac, or 24 Vdc/ac
- 1 x 4-20mA - Recording
- 2 x Relay or OC, Configurable
- Panel or Wall Mount available, IP 67
- Manual or auto temperature compensation Sensor
  - ❖ Alarm, Control On/Off, Pulse Width Modulation or Frequency
  - ❖ Direct reading of raw probe response for diagnostic purpose & probe condition
  - ❖ Auto calibration routine
  - ❖ Simulating Mode



Panel Mount



Wall Mount

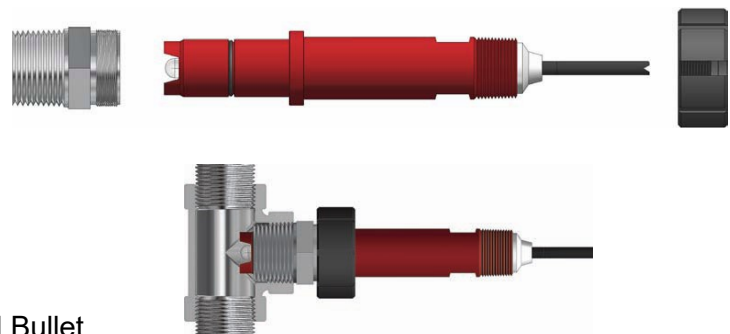


## Tip Types



## Barben Long Life pH & ORP Sensor

- Patented Axial Ion Path™ reference technology increases electrode lifespan in harsh application
- Quick & easy remove & install for checking & calibration
- Proprietary low-noise, high temperature signal cable
- Longer lasting performance
- Minimal maintenance
- Options for Auto Cleaning In-Line
- Immersion or in-line installation
- Flat Tip simplifies cleaning
- With temperature compensation
- Poison resistant
- pH range: 1-13pH
- Temp range: 0-100°C
- Max. pressure: 150psig (10 bar or 1000kpag)
- For ORP; Platinum, Gold or Silver Cyanide Solid Bullet
- Universal compatible with all manufacturer's analysers
- Sensor insertion depth from 2.6 to 12 inches (measured rib to tip of sensor)





## Online Turbidimeter

### Model MicroTOL

Designed for filtered water, raw water, waste water final effluent & industrial applications.

- Nephelometry measurement principal.
- Ranges 0 – 100 NTU & 0-1000 NTU.
- Fast response & easy calibration.
- Accurate, reliable & cost effective.
- With ultrasonic cleaning

Simple Calibration



Ultrasonic Cleaning



## Dissolved Oxygen

- Maintenance free DO measurement
- Using the revolutionary fluorescence principle
- Long term stability now enables reliable control
- Direct insertion into aeration tank.
- No need for floats or other costly mechanisms.
- Not pressure sensitive, can be inserted at any depth



## MicroTPW / TPI – Instruments.

Includes carrying case, one set of calibration standards, indexing rings, 4AAA alkaline batteries operator's manual & measuring cuvettes with light shield caps.

- MicroTPW Portable Turbidimeter (White Light) 0-1,100 NTU
- MicroTPI Portable Turbidimeter (IR) 0-1,100 NTU



## Micro100 – Instruments.

Includes a complete set of calibration standards (0.02, 10 & 1000 NTU), two measuring cuvettes with light shield cap & operator's manual.

- Micro 100 WL Laboratory Turbidimeter, 0-1000 NTU, (White Light).
- Micro 100 IR Laboratory Turbidimeter, 0-1000 NTU, (IR Light).



## DRT – 15CE – Instruments.

Includes: battery charger, sample cuvette w/light shield cap, 0.2 NTU reference standard, recorder output plug & instruction manual.

- DRT - 15CE Portable Turbidimeter 0-1000 NTU (White Light)



## Streaming Current

- Close the automation control loop for coagulation dosing via 4-20mA output
- Draw a post dosed sample
- Monitor the sample charge
- Process the signal in a control device
- Send alarm messages to the operator



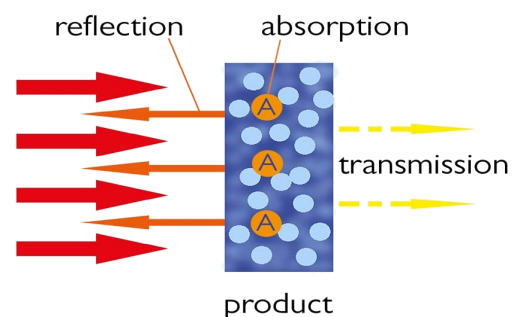
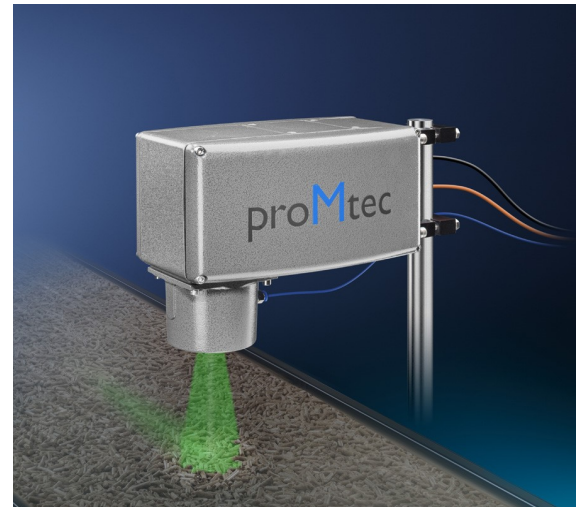
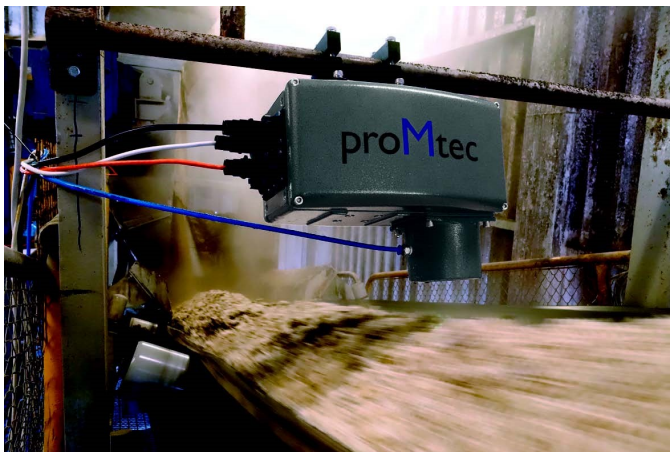
# Moisture

## OMC 2500

The OMC 2500 measures the moisture of your product with highest reliability and precision. The measurement is done contactlessly and directly during the process. This allows an immediate reaction regarding variations of the material moisture.

The reliability of the unit is neither effected by material variations such as particle size, material height and color, nor by ambient light, temperature or humidity.

The measured values can be integrated to the process control via various interfaces.



## Functional principle

To determine the moisture content, the exact water content of the product is measured.

The different materials absorb near-infrared waves at the molecular level, each with specific wavelengths. The amount of reflection at the corresponding wavelengths is inversely proportional to the absorption in the product.

In the device the wavelengths from the NIR spectrum are sent with a very high clock rate into the product. The reflected wave is measured 1000 times per second and analyzed to obtain a real measurement of high stability and precision.

## Conveyor Monitoring



Safety Cable  
Pull Switch



Mis-Alignment  
Switch



Speed  
Monitor





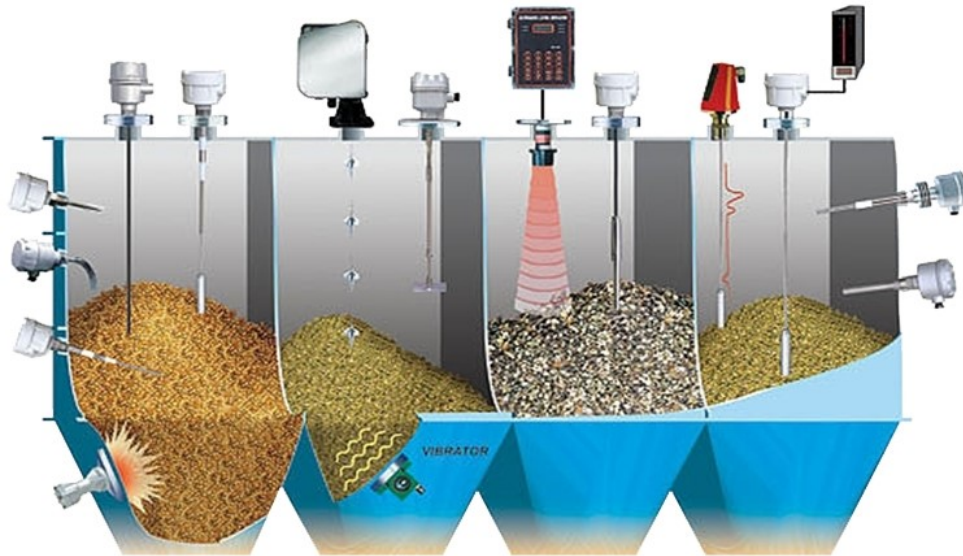
# Level - Solids

## Switches

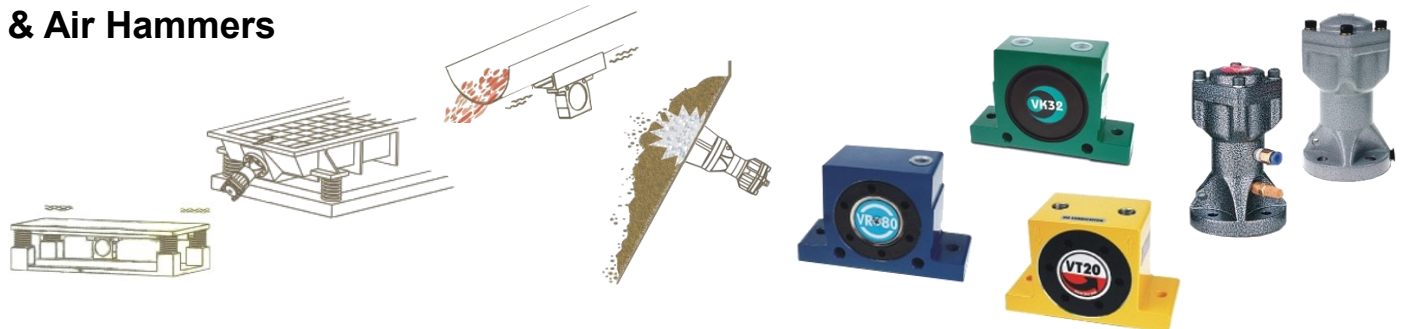
- Rotary Paddle
- Capacitance
- RF Admittance

## Transmitters

- Capacitance
- Radar
- Mechanical



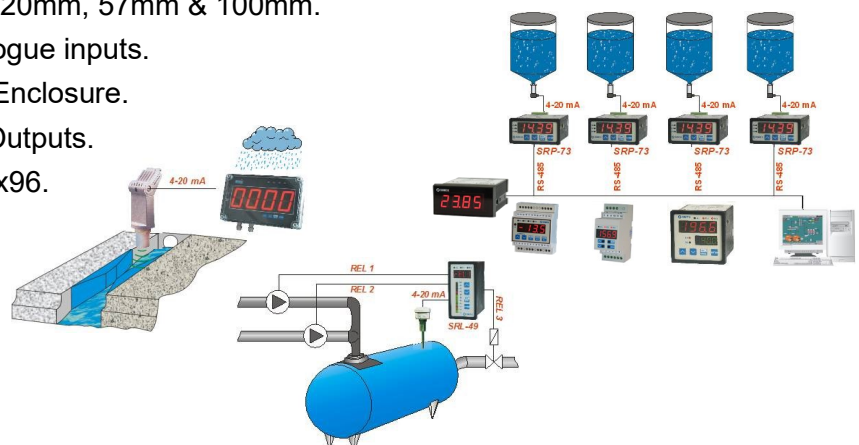
## Pneumatic Vibrators & Air Hammers



# Display, Controllers & Loggers

## Single Channel Displays & Controllers

- Current (0/4-20mA), Pulse, Frequency, Temperature & Weight Inputs.
- Small & Large Displays: 9mm, 13mm, 20mm, 57mm & 100mm.
- Rate, Total or Both from pulse or analogue inputs.
- Panel, DIN Rail & Wall Mount (IP-65) Enclosure.
- Display Only or with Alarm & Control Outputs.
- Panel Sizes: 72x36, 96x48, 72x72, 96x96.
- Modbus (RS-485) Masters & Slaves.
- Batch Controllers & Counters
- Bar Graph Display
- Clocks, Timers & Time Controllers.





## Switch

### Measurement Principles

Thermal Dispersion  
Paddle Wheel  
Sprung Paddle  
Free Paddle  
Variable Area (Rotameter)  
Impeller  
Sprung Float  
Electromagnetic

### Brands

Tecfluid  
FineTek  
FlowLine  
Industrie Technik  
Meister Stromungstechnik  
Intek Rheotherm  
FIP / FLS

## Transmitters

### Measurement Principles

Thermal Dispersion  
Paddle Wheel  
Variable Area  
Impeller  
Sprung Float  
Electromagnetic  
Ultrasonic (T/T & Doppler)  
Turbine  
Rotary Piston (PD)

### Brands

Tecfluid  
FineTek  
FlowLine  
Mainstream  
Industrie Technik  
Meister Stromungstechnik  
Intek Rheotherm  
FIP / FLS

## Indication (Gauges)

### Measurement Principles

Paddle Wheel  
Variable Area  
Impeller  
Sprung Float

### Brands

Tecfluid  
Meister Stromungstechnik  
Kytola  
FIP / FLS





## Switches

### Measurement Principles

Bellows  
Bourdon Tube  
Diaphragm  
Capillary  
Bi-Metal

### Brands

Regulateurs Georgin  
FineTek  
Industrie Technik

## Transmitters

### Measurement Principles

Piezoresistive  
Thermocouple  
RTD (PT100/PT1000)

### Brands

Regulateurs Georgin  
FineTek  
MAC3  
Rhomberg

## Gauges

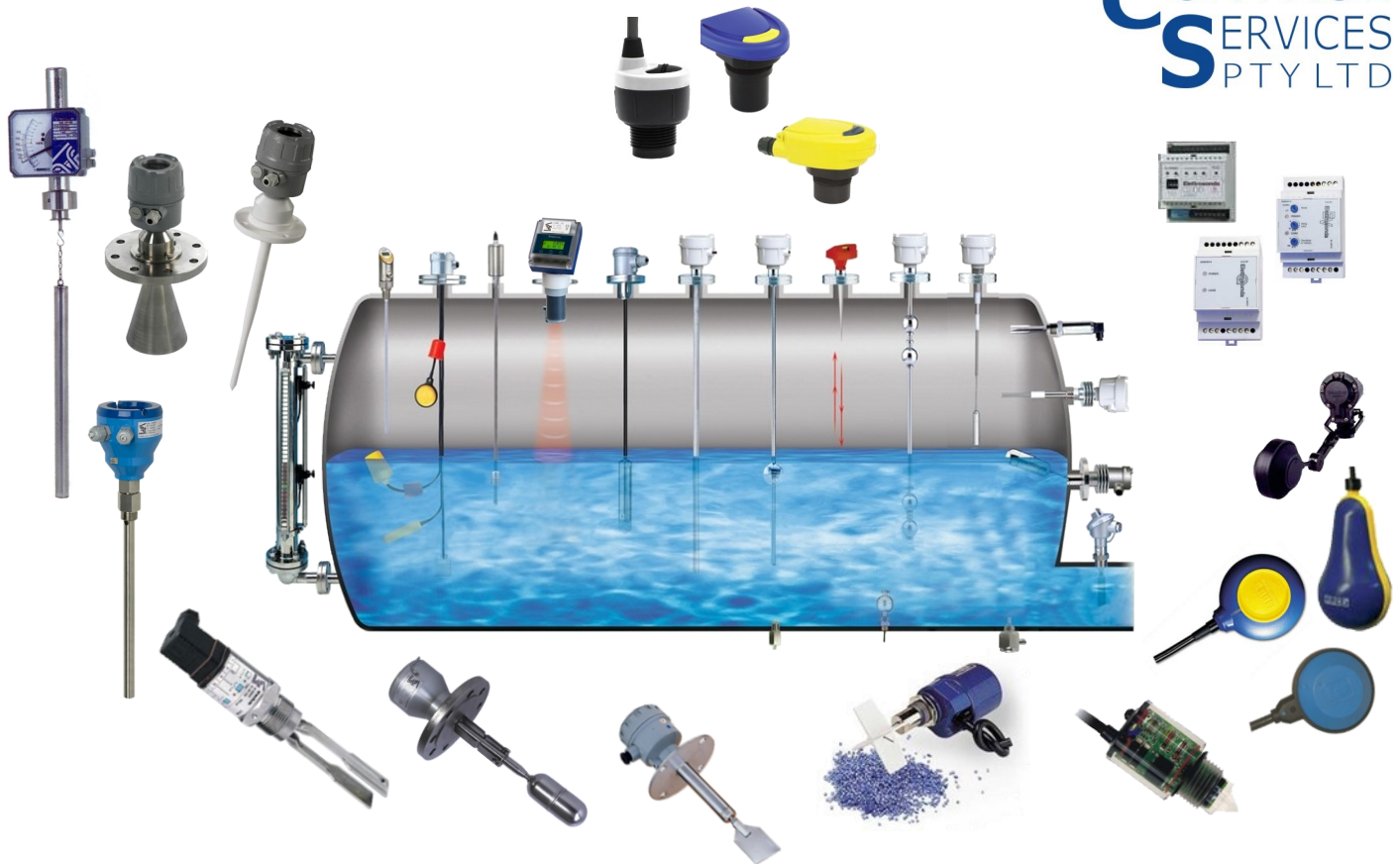
### Measurement Principles

Bellows  
Bourdon Tube  
Diaphragm  
Capillary  
Bi-Metal

### Brands

Regulateurs Georgin  
Rhomberg  
Teltherm

## Level - Liquid



## Switch

## Measurement Principles

### Magnetic Float

## Side Float

## Rotary Paddle

## Buoyancy

## Capacitance

RF Admittance

## Ultrasonic

## Cable Float

## Vibrating Fork

Conductive

## Optical

## Brands

Tecfluid

FineTek

FlowLine

MAC3

## Transmitters

## Measurement Principles

### Magnetic Float

## Guided & Non-Guided Radar

## Magnetostrictive

## Buoyancy

## Capacitance

## Ultrasonic

### Hydrostatic (Pressure)

## Brands

Tecfluid

FineTek

FlowLine

MAC3

## Gauges

## Measurement Principles

## By-Pass Gauges

Sight Glasses (PVC)

## Buoyancy

## Brands

Emteq

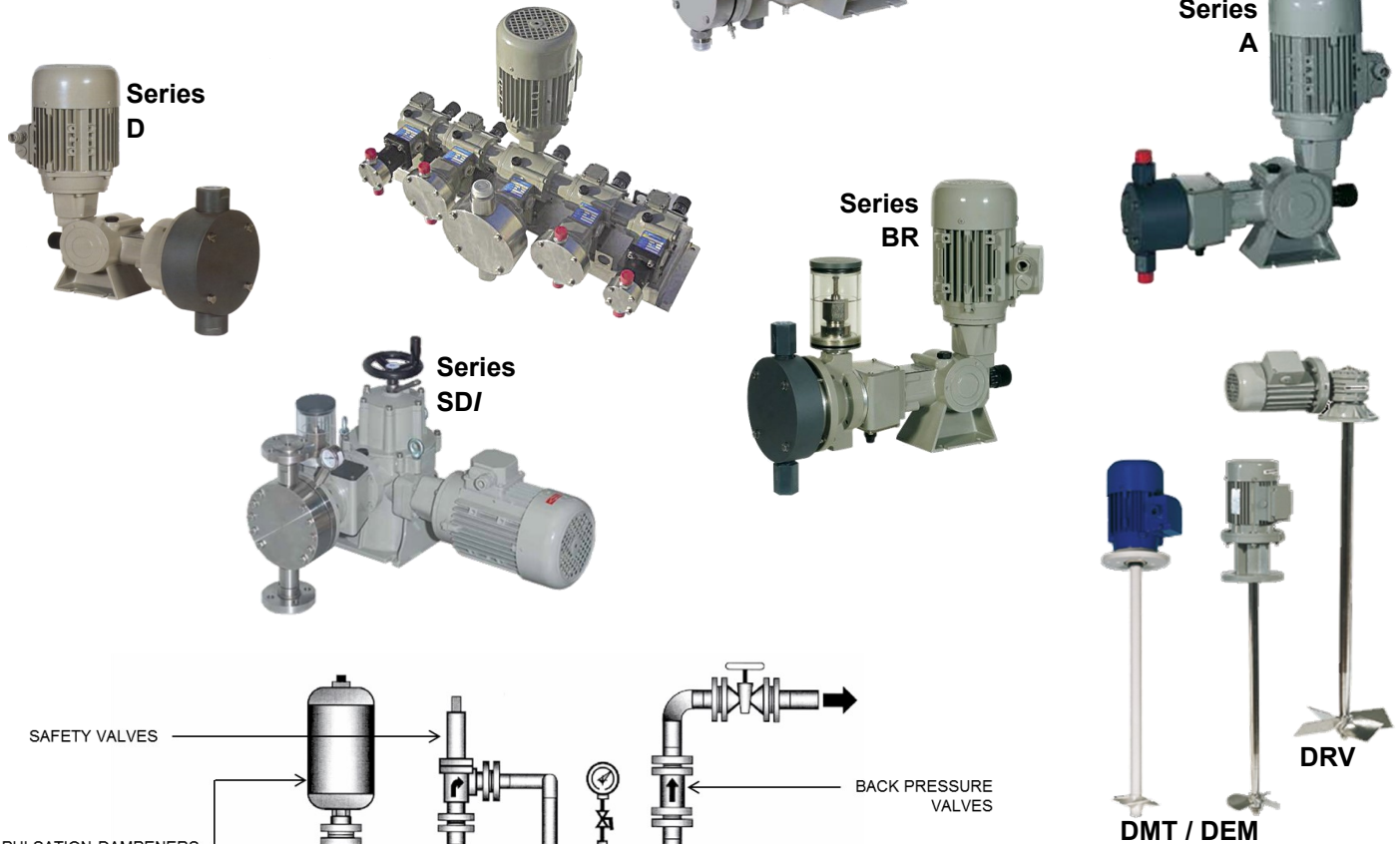
Tecfluid

FineTek

## Piston and Positive Displacement Pumps

### Options & Accessories

- Hydraulic or Mechanical Diaphragm
- Piston
- Polyethylene tanks
- Safety relief valve & back pressure valves
- Injection Valves & Foot Valves
- Hydropneumatic accumulators
- Calibration pot
- Dosing rate: up to 3800 l/hr
- Viscosities up to...3000CP



### Accessories

## About PCS

For more than twenty years Process Control Services (PCS) have provided Measurement & Dosing equipment to an extensive range of industries, varying in size, throughout Australasia.

Continuous growth over the past twenty years driven predominately through word of mouth referrals has led to PCS achieving an outstanding market profile. With offices in Sydney, Brisbane and Melbourne combined with a network of over twenty regional sales outlets PCS is able to deliver top quality international brands at very competitive prices, backed by an outstanding level of customer service throughout Australia and New Zealand.

Process Control Services (PCS) are renowned for their industry expertise together with their extensive choice and range of equipment. Their highly trained engineers are able to offer extraordinary levels of expert service and advice through combining their extensive product knowledge with industry experience that extends in many cases beyond the life of the company.

We supply Flow, Level, Pressure, Temperature and Specialty Measurement Equipment and Chemical Dosing Equipment for monitoring, control & optimisation of industrial processes.

***If you have a problem, call us, we have the solution.....***

<b>Contacts:</b>	<b>E-Mail:</b>
Quotes, Orders & Product Data	<a href="mailto:sales@pcspl.com.au">sales@pcspl.com.au</a>
Service	<a href="mailto:service@pcspl.com.au">service@pcspl.com.au</a>
Accounts	<a href="mailto:accounts@pcspl.com.au">accounts@pcspl.com.au</a>
<b>Technical</b>	
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