COAGUSENS™ FLEX
Milk coagulation testing instrument

WE PRODUCE PATENTED, RELIABLE, AND EASY-TO-USE INSTRUMENTS DEDICATED TO MEASURING MILK COAGULATION IN THE DAIRY INDUSTRY.

ABOUT RHEOLUTION

Our mission is to empower technologists, engineers, and scientists in their pursuit of innovation, quality, and efficiency through our unique data-driven science platform. Our cutting-edge and highly modular analytical instruments replicate real-world environments to capture the dynamic evolution of living and complex materials. We design user-friendly, customizable, scalable, and data-driven analytical instruments, providing unparalleled testing capabilities to professionals and innovators in the dairy industry.

FULLY MASTER YOUR PRODUCT

We design modular, flexible, and data-driven products and software to easily generate exploitable data. These unique features support the powerful concept of Data-Driven Science that guides our product development philosophy. Our instruments and software are built on this modern concept to accurately capture the evolution of complex materials.

WE CREATE INSTRUMENTS AND SOFTWARE THAT PRODUCE HIGH-VALUE DATA FOR PRODUCT DEVELOPMENT AND PROCESS OPTIMIZATION.

COAGUSENS™ FLEX

CoaguSens™ Flex is a transportable laboratory instrument designed for the dairy industry to measure the firmness of milk gel during coagulation. It is used in cheese and fermented dairy production to develop products and recipes, optimize industrial production processes, control product quality, and dose ingredients.

Instrument 1

COAGUSENS™ FLEX

Apply the temperature of your choice to the sample during the coagulation measurement.

Connect and operate up to 5 instruments in parallel from a single control tablet.

Interact with the CoaguSens Flex from the instrument's touchscreen display.

Perform non-destructive measurements, remove the sample, and study its evolution over extended periods of time without immobilizing the instrument.

Temperature control

Sample height measurement

Data organized in secure databases

Wireless connection between the tablet and the instrument

Connect and operate up to 5 CoaguSens™ Flex units from a single tablet.

The CoaguSens™ Flex utilizes Internet of Things (IoT) principles. Up to 5 instruments can be controlled from a single tablet App using wireless communication. This innovation in the field of analytical instrumentation offers unprecedented modularity to users who need to expand their measurement capacity.

SOFT MATTER ANALYTICS™

This multilingual software allows you to create, customize, and analyze your database to understand the effect of milk protein and fat levels, pH, temperature, and the dosage of coagulant or ferment on the milk coagulation kinetics.
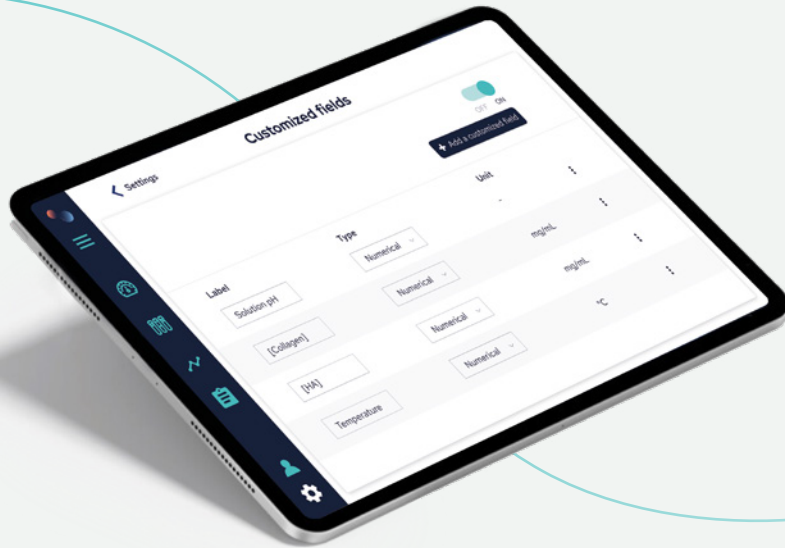
1. Customize your database

Create your own list of parameters to record milk composition, coagulation, and yield parameters.

2. Customize and capture your own descriptive parameters

Create custom buttons in the Soft Matter Analytics application and record real-time coagulation kinetics parameters such as setting time, gel structure development rate, curd firmness, etc.

3. Build your database

Enter properties and record descriptive parameters of each sample you measure using the CoaguSens Flex to correlate coagulation measurements with milk formulation or production parameters.

4. Analyze data and value knowledge

Analyze your database by filtering and correlating recorded properties and descriptive parameters to highlight factors that determine the quality of your product or cheese yield.

5. Generate and leverage reports

Produce customized reports summarizing key data, statistics, and correlations that describe the efficiency of your production.

TECHNOLOGY

CoaguSens™ Flex uses vibrations to non-destructively and contactlessly measure the firmness (viscoelasticity) of milk gels. During each measurement, a micrometer-scale vibration is transmitted to the milk gel within a patented sample holder. The vibrational response of the sample is measured using a laser optical probe. The Soft Matter Analytics software then processes the raw data and displays the gel firmness in real-time during the coagulation kinetics.
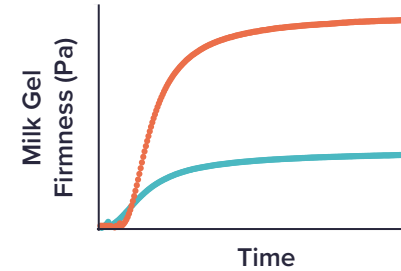
OPERATING PRINCIPLE OF COAGUSENS™ FLEX
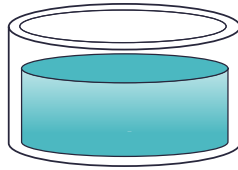
1. Sample introduction

The liquid milk sample is introduced into the sample holder.
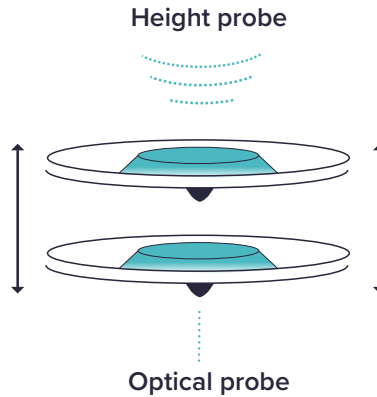
2. Application of vibration

The sample's response to a micrometer-scale vibration is measured using an optical probe.

3. Data analysis and display

The raw data is analyzed, and the elasticity (firmness) of the gel is displayed in real-time.

APPLICATIONS

Optimizing fat retention and cheese yield

The curd firmness at cutting influences cheese yield. The firmness of the milk gel and its rate of organization (coagulation) at the cutting step significantly affect fat retention and cheese moisture content.

CoaguSens™ Flex allows you to correlate curd firmness at cutting with cheese yield. You can now confidently optimize your processing times and yields based on robust data.


Correlation: 79 %
p-value: 0.4 %
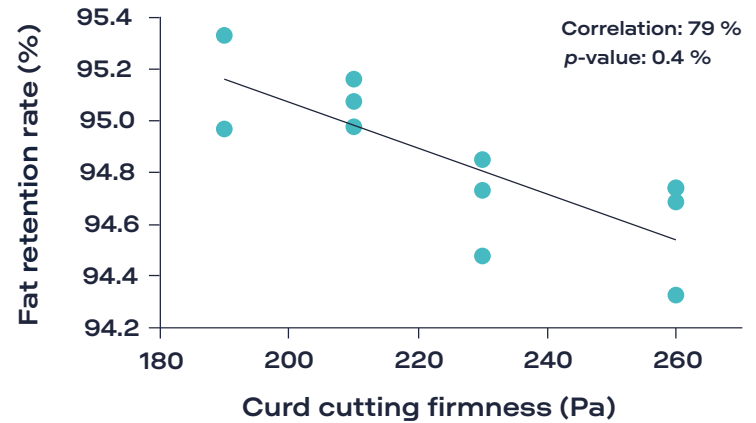
Fat retention rate strongly increases when curd is cut at lower levels of firmness.

Control the effects of milk protein enrichment

The CoaguSens™ Flex measures the effect of milk protein enrichment on coagulation kinetics. Based on quantifiable data, you can confidently adjust processing times (cutting time, cutting speed, etc.) to maximize the benefits of protein enrichment on cheese yield.
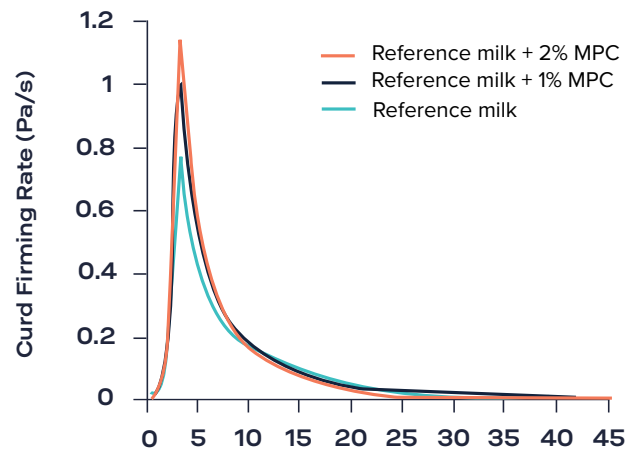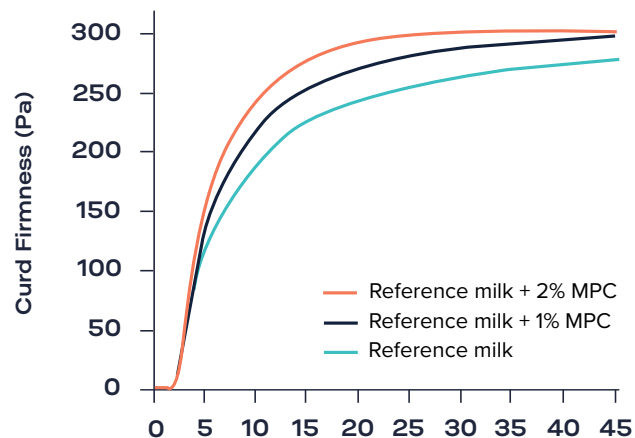

Effect of the MPC (Milk Protein Concentrate) content on the coagulation kinetics of milk. The rate of milk gel formation and the firmness increase with the increase of protein content.

Adjust the coagulant dosage and milk composition

The CoaguSens™ Flex allows for precise quantification and control of the effects on coagulation resulting from adjustments in milk composition, coagulant dosage, and technological parameters. With the CoaguSens™ Flex, the effects of these changes, which are often required and frequent due to market conditions, become predictable.


Curd Firmness (Pa) vs Time (min)

- 0.02% v/v
- 0.04% v/v
- 0.06% v/v
- 0.07% v/v
- 0.08% v/v
- 0.09% v/v
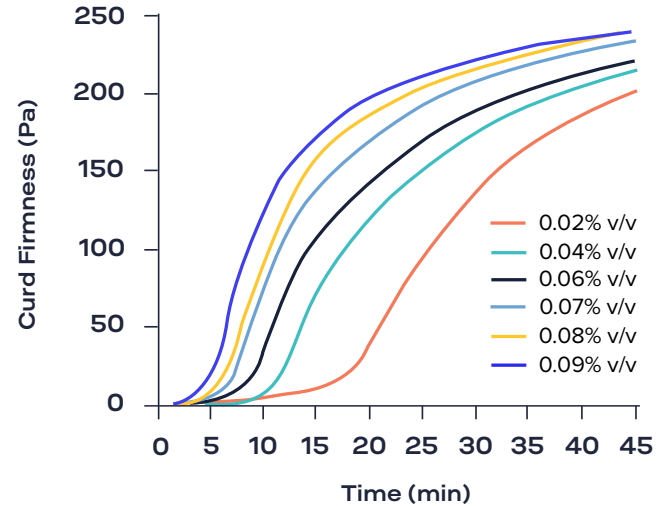
Effect of coagulant dosage on milk coagulation. Increasing the coagulant dosage results in an acceleration of coagulation.

COAGUSENS™ FLEX TECHNICAL SPECS

Shear storage modulus (G') measurement range	1 Pa to 1 MPa (repeatability: ±3 %)
Sample height measurement range	1.0 mm to 20.0 mm (precision: ±0.20 mm)
Sample volume range	7 mL
Temperature range	4.0 °C to 70.0 °C (absolute precision: ±0.1 °C)
Temperature profiles	Programmable temperature profiles with multiple ramps and sequences
Custom time steps between measurements	2 secondes to 60 minutes
Custom total measurement time	10 secondes to 240 hours
Custom sequences	Build and run custom sequences by alternating thermo- and photostimulations
Power Requirements	100-240 VAC (±10%), 50 — 60 Hz, 370 W max
10.5'' Windows tablet with protective cover	245 mm x 175 mm x 8 mm

508 mm
20 in

230 mm
9 in

268 mm
10.5 in
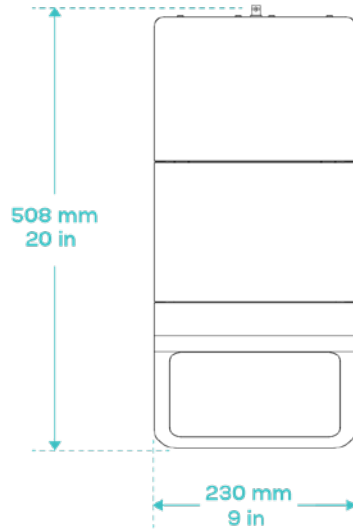
Weight: 16 kg (34 lbs)

Advanced wireless connectivity and Windows Tablet App

Measurement of milk gel firmness during and after coagulation; calculation of gel formation rate (Pa/s); complete test configuration; measurement initiation; real-time data visualization; data archiving; comparison of multiple tests; generation of reports; data and report transfer.

CoaguSens™ Flex Touchscreen Interface

Allows for changing the thermal chamber temperature, displaying the instrument status and main results, and accessing the measurement chamber using a digital button.

Advanced Temperature Control

The temperature control covers a range from room temperature +4 °C to 70 °C (absolute precision: ± 0.1 °C).

SERVICES

Calibration & Qualification
We provide calibration services as well as Installation & Operation qualification services (IQ/OQ)

Installation and training
Instrument installation and training of users on the use of our instruments and software.

Extended warranties
We offer extended warranties on top of the standard 12 months full waranty period.

Lifetime support
We offer our users life time access to our application specialists for support.

Certification & Documentation
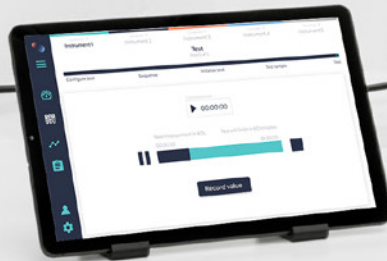We provide certificates and documentation that comply with your industry regulations.

Methods & Protocols
We work with you and your team on the development of custom protocols and methods.

Contact us to start your milk coagulation optimization process.

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