

Online measurement of complex rheology in industrial manufacturing

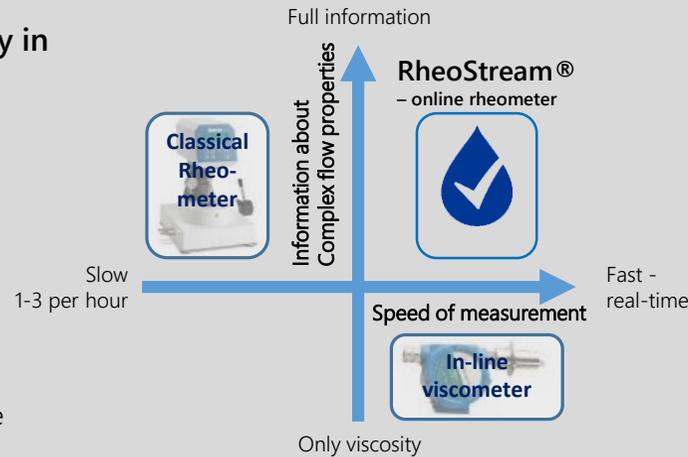
- Shear-thinning, Visco-elasticity, Yield Stress ...

Real time

- Select data, suitable for process control

Enables significant savings:

- Reduced waste or rework
- Reduced batch release time
- Hit optimum in process – higher yield
- Constant quality - higher consumer preference



Industrial Application

RheoStream is a new technology at prototype stage – the potential applications described are based on pilot experience with food/ beverage /chemical samples.

- RheoStream can provide real-time data for monitoring of rheological properties
- The specific design of the instrument is optimized for best differentiation of the flow characteristics that are important in the specific application (see box, right)
- RheoStream works best with
 - Non-Newtonian liquids free of larger particles (<math><50\mu\text{m}</math>)
 - Viscosity range 1 mPa·s (water) - 10000 mPa·s
- RheoStream provides a read-out of a quantitative measure related to viscometry (shear thinning) or visco-elasticity and may be calibrated to read out familiar parameters (such as n , K , $\eta(\dot{\gamma})$, G' , G'').
- The RheoStream instrument can be installed at desired points in production – requires small sample supply.
- The data output is updated 1-2 times per minute, depending on the liquid and the parameter being measured (possibly interrupted by short self-cleaning cycles)

Application areas - examples

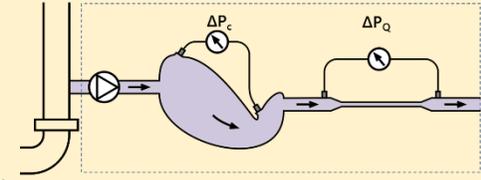
- Controlling process settings, process time and dosing in manufacture of:
 - Food & Beverage - fermented dairy, sauces and dressings, beverage concentrates, ingredients
 - Coatings, paints, enamels
 - Personal Care and Pharmaceuticals
 - Household Care products
 - Printing inks
 - Petrochemical refining and processing
 - Plastics, rubber
- Controlling feed to spray-tower, pumps, separators

How does it work?

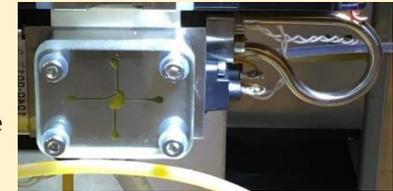


The pressure drop along a **straight** channel is a measure of viscosity.

In a **curved** channel with a complex shape, the pressure along the walls will depend on the complex flow properties of the fluid, such as for example shear thinning or visco-elasticity.



The RheoStream technology is based on this effect: In a channel with a specific shape, optimized to differentiate a desired rheological property, a measurement of the pressure difference gives information about the flow properties of the fluid.



A look inside the current prototype

Next step in development

- The RheoStream measuring principle has been proven in laboratory and prototypes, demonstrating the correlation to lab. rheometer measurements of shear thinning and visco-elastic properties.
- A range of prototypes of a full instrument are being tested in collaboration with end-user companies aiming at proving the technology in industrial processing environments and continuous operation.

Learn more:

RheoStream technology has been developed at DTU Nanotech and DTU Food.

Fluidan ApS is a start-up that is bringing the benefits of on-line rheology control to a range of industrial applications by commercializing the technology



Fridolin Okkels
M: +45 2537 8686
@: fridolin.okkels@fluidan.com
Anders L. Østergård
M: +45 2374 5664
@: anders.ostergard@fluidan.com



Visit
fluidan.com