

# Why use a microfluidic rheometer? - Fluidicam Technical Note -

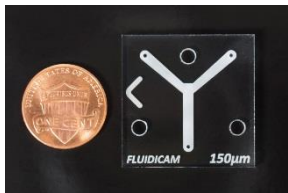


## Introduction

Multiple techniques have been developed over the years to assess rheological behaviour of complex fluids from water-like solutions to more pasty and thicker materials. The most commonly used instruments are based on a measure of the resistance to rotation of a spindle in contact with the sample. These instruments present multiple limitations, especially for liquid solutions: high sample volume is required, high shear rates are difficult to achieve and often hydrodynamic instabilities or interfacial artifacts affect the quality of the measurement.

## KEY BENEFITS

- ACCURATE
- FAST & SIMPLE
- HIGH SHEAR RATE



In recent years, the use of microfluidics has increased to overcome these limitations. Microfluidic is the science dedicated to studying the flow behaviour in systems with at least one dimension on the micron scale. Our technology uses a Y shaped flow comparator to measure viscosity

## Reminder on the technique

FLUIDICAM is based on a co-flow microfluidic principle to measure viscosity. Sample and viscosity standard are pushed together simultaneously into the microfluidic channel (typically 2.2mm X 150µm) under controlled flow rates. This results in a laminar flow, interface position between sample and reference relates the viscosity ratio between the two to the flow rates.

Images acquired during the measurement allow to calculate the position of the interface and plot directly an interactive flow curve.

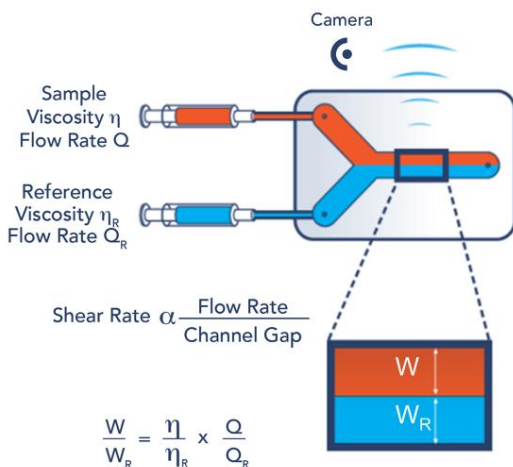
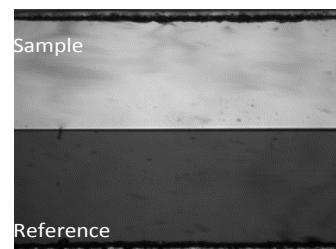


Fig. 1: Fluidicam measuring principle

## Interface centering

The instrument calculates the viscosity based on the interface position. At equal flow rates, the interface position will shift from the center, the more viscous fluid takes up more volume in the channel. However, the accuracy is the highest at the center of the channel, as the wall effect is minimized and the flow quality is optimized. Thus, the software uses smart algorithms to automatically adjust the flow rates to maintain demanded shear rate and the interface in a measurement area in the center of the channel.