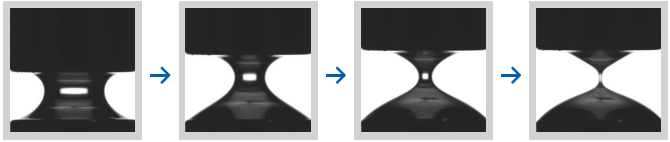
Extensional Visocometer

FV-30 Extensinal Viscometer

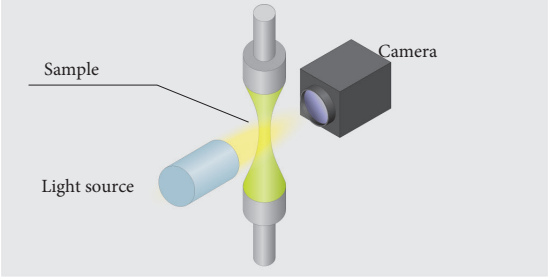
Introduction

In various processes, materials undergo both shear and exten sional deformation. For instance, during roll coating and pri nting, extensional deformation occurs as ink leaves the prin ting plate. If stringiness occurs at this time, misting can result when filaments break, leading to uneven coating and poor print quality. Similarly, when filling containers with shampo o or other liquids, stringiness after nozzle discharge can con taminate subsequent containers. Therefore, it is crucial to prevent stringiness during container filling. Conventional rotational viscometers and rheometers apply shear flow to samples, making it impossible to evaluate the exten sional behavior of materials. The Extensional Viscometer FV-30, on the other hand, applies extensional flow, allowing for direct evaluation of stringiness.

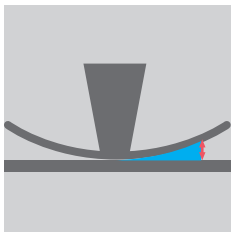


Feature

A small amount of sample (<1mL) is placed between two circular plates. The upper plate moves upward at a set speed, increasing the gap between the plates. This applies extensional deformation to the sample, causing the central portion to gradually thin.
This process is captured as images by a side-mounted camera. The thickness of the thinnest part (filament) is measured through image analysis. Additionally, a Force sensor integrated into the lower probe allows for evalu-ation of the sample's cohesive and tacky properties during extensional deformation

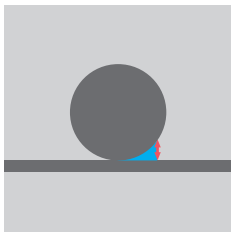


Application



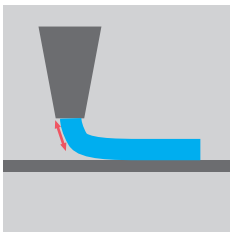
Screen Printing

Stringing, Printing error



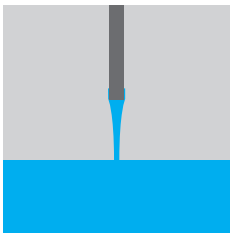
Roll coting

Forming mist



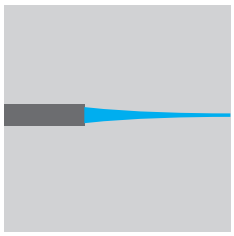
Die Coting

Thickness error



Bottling, Dipping

Liquid shortage,Stringing

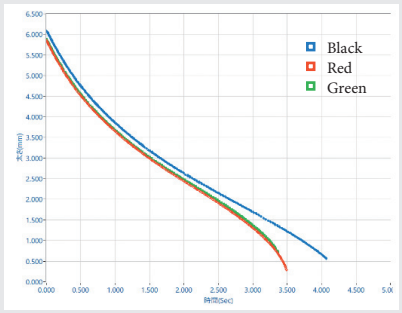


Springing

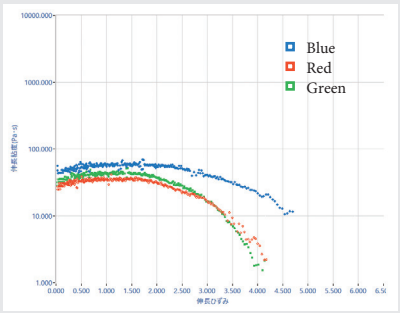
Breakage

Test Data

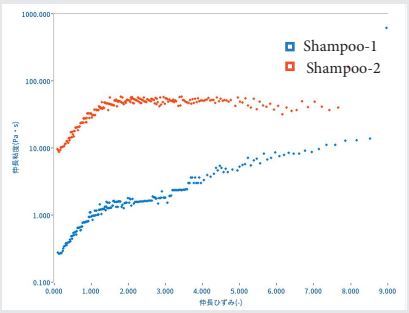
We measured three types of paint to evaluate forming mist issues. The results indicated that blue paint has a higher potential to cause forming mist problems, and this was attributed to its suppressed decrease in extensional viscosity up to higher extensional strain regions. Additionally, measurement results from shampoos suggest that shampoo-1 show a strong tendency for increased extensional viscosity, suggesting data pointing to a potential for stringing issues



Time-Filament Diameter(mm)



Ex.Strain- Ex.Viscometer(Pas)



Ex.Strain-Ex.Viscosity

Specification

Viscosity Range	>200mPa･s (Depend on sample)
Probe	ϕ4 mm , ϕ6 mm
Probe speed	0.1-30 mm/sec
Move distance	50 mm
Field of view	Vertical 10 mm
Size range	>0.05 mm
Size resolution	0.016 mm
Load resolution	0.001 g
Data aquisition speed	500 data/sec
Parameter	Ex.Visocmeter, Ex.Strain, Ex.Stress, Time, Filamet Diameter
Dimension	W 300 x D 250 x H 1620 mm
Weight	23 kg

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