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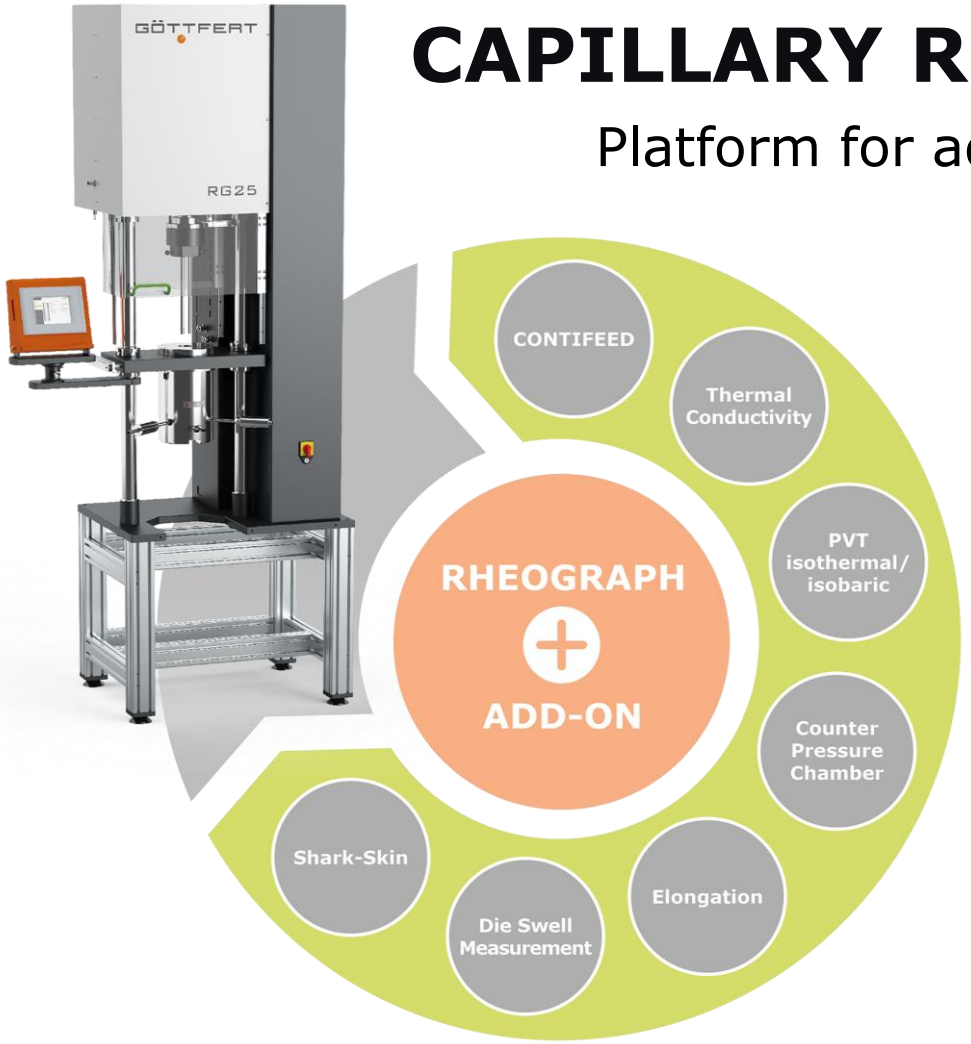
CAPILLARY RHEOMETER

Platform for advanced material characterization



CAPILLARY RHEOMETER

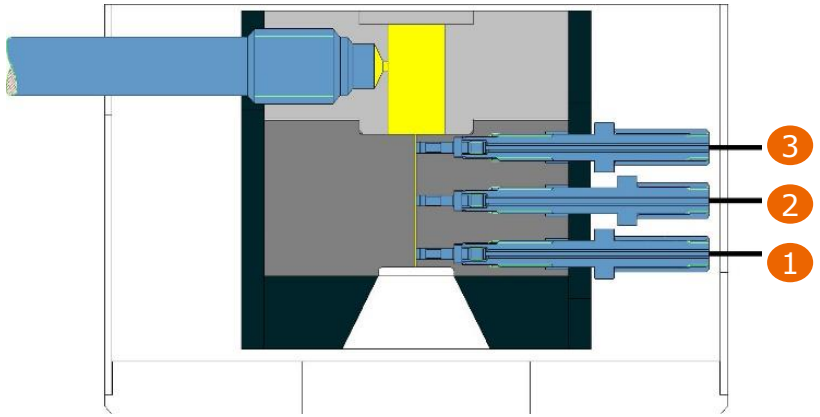
Different basic units

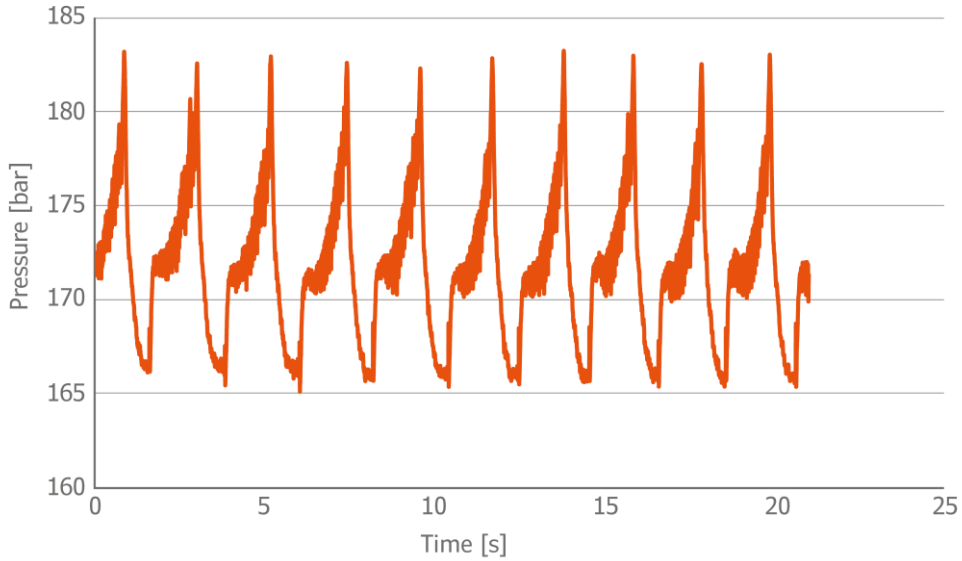
- High test piston force of 25, 50, 75, 120 KN
- Single-, twin- or triple barrel system
- Ø 9.55, 12, 15, 20, 25, 30 mm design
- Speed range 0.00004 – 40 mm/s
- High dynamic test piston acceleration
- 0 – 40 mm/s in 0.6 sec
- High resolution encoder 0.0000016 mm
- Automatic pressure transducer identification

FLOW INSTABILITIES

Add-on for Capillary Rheometer

- Measuring cell for detection of melt flow instabilities e.g. Shark-Skin,
- Determination of the frequency spectrum and the statistical evaluation of the pressure signal.
- Used for optimization in Extrusion, film and coating process





FLOW INSTABILITIES

Add-on for Capillary Rheometer

How to determine different flow instabilities:

Defect	cause	How to recognize	Frequency
Shark Skin	Material detachment at the die exit	Highest oszillation of the pressure transducer at the die exit	Above app. 15Hz
Slip Stick	Wall slip, elastic effects at the die entrance	High pressure oscillations entrance>exit	<5 Hz
Helicoidal defects	Elastic effects in the die entrance	pressure oscillations in the middle range entrance>exit	App.3-15Hz
Melt fracture	Elastic effects	High pressure oscillations	Complete range

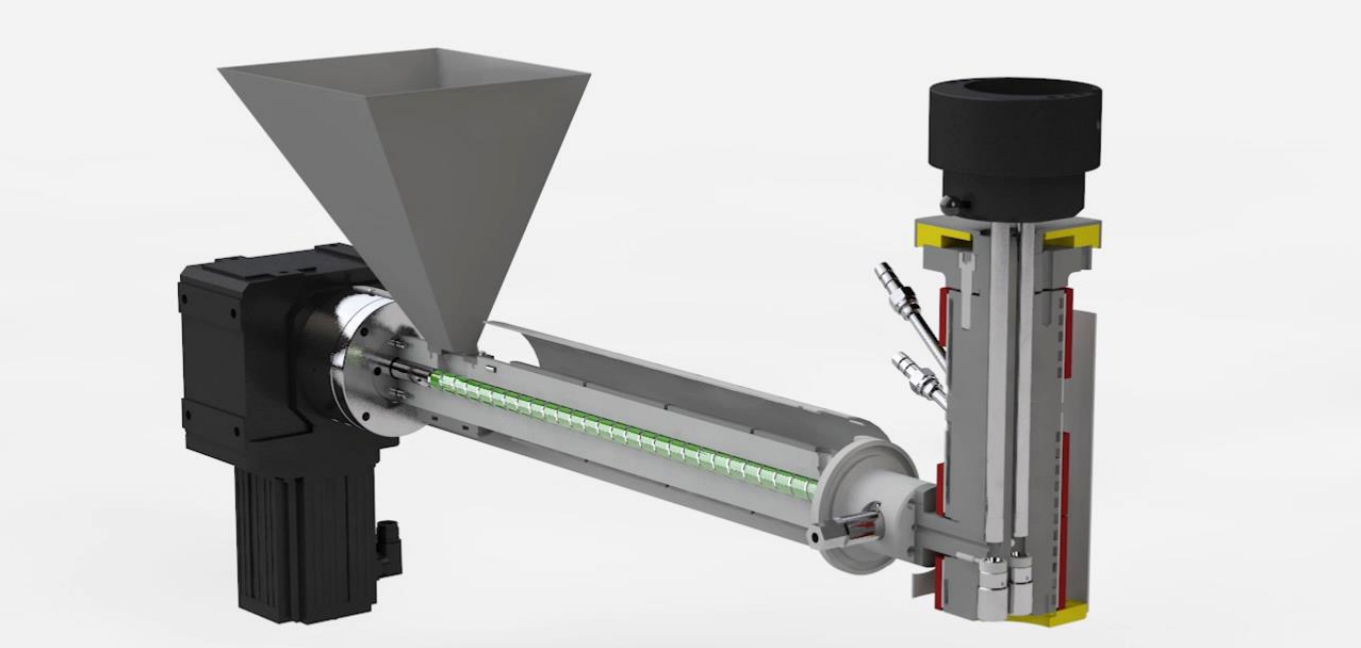
FLOW INSTABILITIES

Add-on for Capillary Rheometer

- Compact set-up allows to run high shear rates even with low sample amounts (with 12mm barrel 100400 1/s)
- Correlation of surface defects with analyzed pressure oscillation frequency
- Possibility of analysing fluctuations at three different die positions simulaneously
- Correlation between pressure oscillation and molecular structure
- Application in compounding
- Effective tool for the prediction of surface defect
- Thus the use of a fast acquisition transducer is absolute necessary

CONTIFEED

Add-on for Capillary Rheometer



WATCH on YouTube

- Fully automatic Melt Feeding Unit
- Measuring of non flowing samples (e.g. PVC)
- Suitable for thermally less stable polymers and elastomers
- Air bubble free filling
- Shorter heating time, reduced material residence time

CONTIFEED

Add-on for Capillary Rheometer

- Plastification by CONTIFEED reduces:
  - Shear viscosity up to 34%
  - Extension viscosity up to 54%
  - Residence time up to 50%
  - The contribution of plug flow

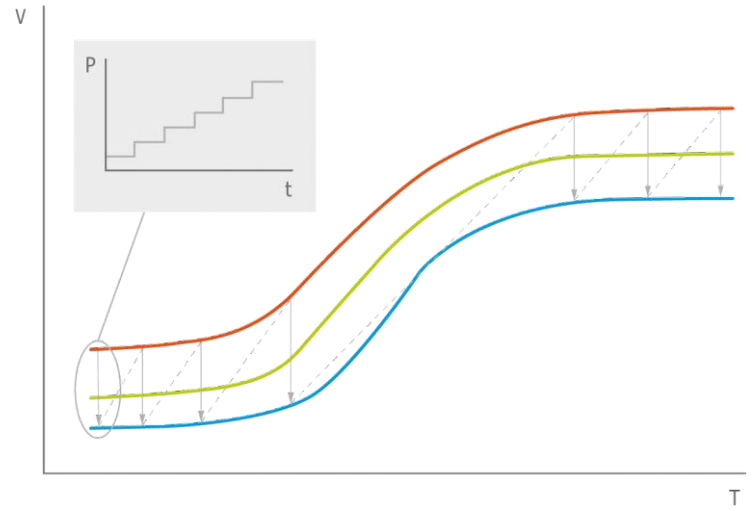
- Plug flow is eliminated in most cases by plastification with CONTIFEED
- Without plastification all testet compounds show plug flow

→ Pre-plastification like in CONTIFEED is essential for the determination of process relevant data

PVT

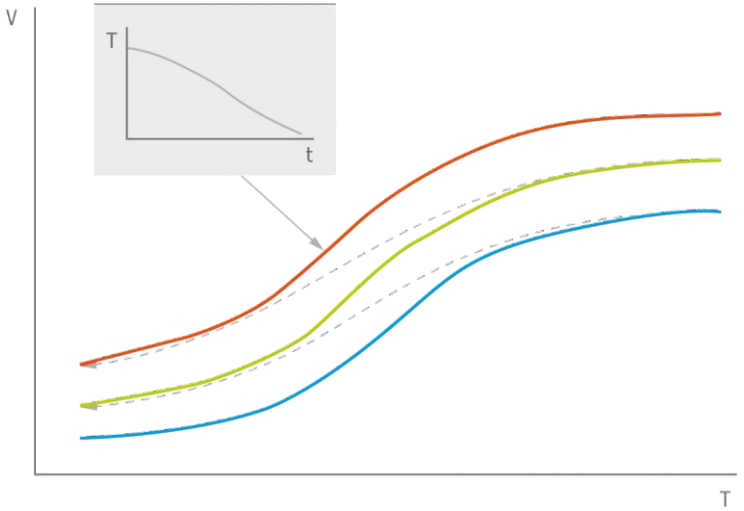
Add-on for Capillary Rheometer

Isothermal



- Temperature: up to 450°C
- Cooling rates: 25K/min

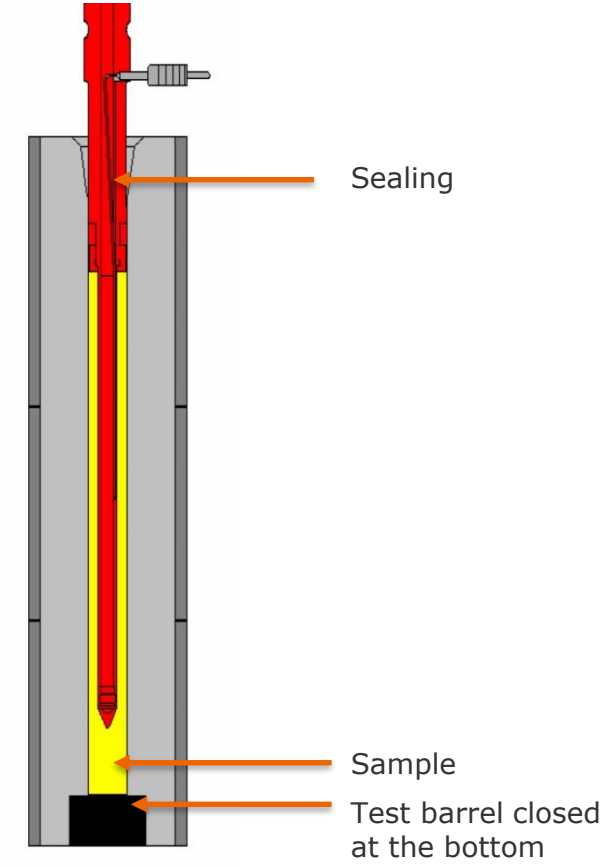
Isobaric



- According to ISO 17744
- Temperature: up to 380°C
- Cooling rates: 25K/min

THERMAL CONDUCTIVITY

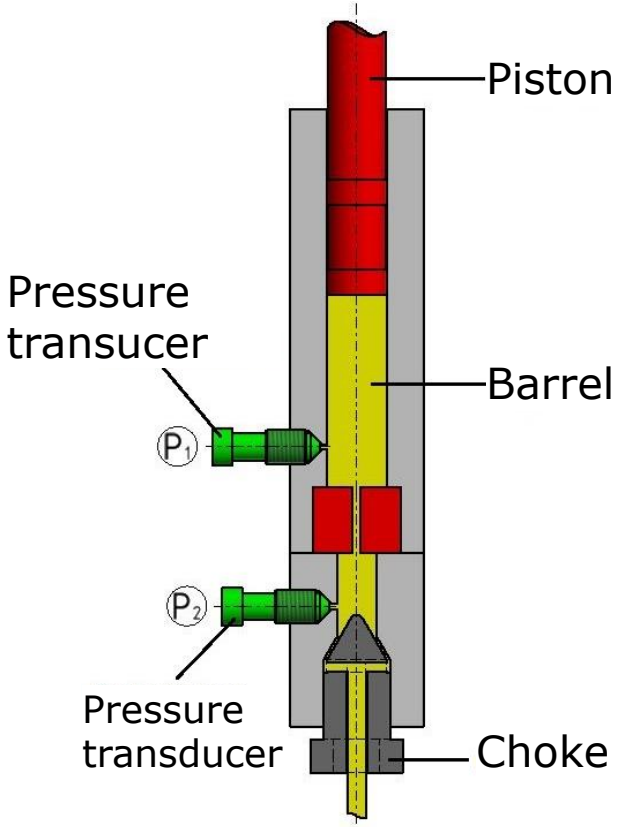
Add-on for Capillary Rheometer



- Based on a test according ASTM D5930
- Evaluation by the software from a single test
- Thermal Conductivity under industrial processing conditions
- 15 mm bore minimum
- Temperature up to 450°C
- Pressure up to 1.000 bar
- SAM – Script Automated measurement
- Script Generator for automatically test procedure

COUNTER PRESSURE CHAMPER

Add-on for Capillary Rheometer



- Pressure dependency of viscosity
- Wall slip behavior
- Process simulation
- Maximum Pressure 1200 bar
- Temperature range up to 400°C

ELONGATION RHEOMETER

Add-on for Capillary Rheometer

Rheotens

- Elongation viscosity modelling

- Speed: 0-114m/min
- Force Range 2N
- Resolution 1mN
- Feeding by Rheograph or Extruder

Haul-Off

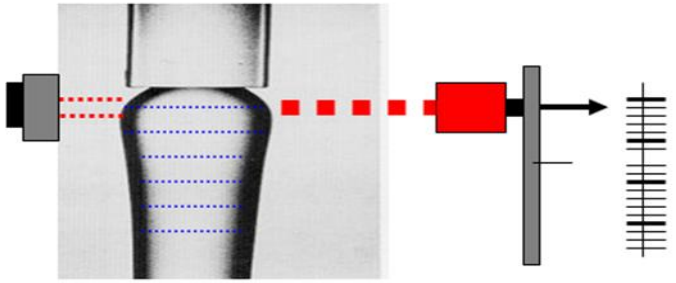
- Standard Haul-Off
- Fibre Spinning

- Speed: 0-2000m/min
- Force Range 1N
- Resolution 0,05mN
- Feeding by Rheograph or Extruder

DIE SWELL MEASUREMENT

Add-on for Capillary Rheometer

- Calculates die swell value from diameter or surface ratio between die and strand
- Laser Measurement head
- Manual cutting of the strand
- Automatic cutting
- Evaluation of a die swell profile
- Laser Measurement head - adjustable in height
- maximum of swelling depends on material relaxation



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