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THIS IS RHEOLOGY

# CAPILLARY RHEOMETER

## Capillary Rheometer Serie

Rheograph 20 | 25 | 50 | 75 | 120

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# CAPILLARY RHEOMETER

## Capillary Rheometer Serie



20 KN



20 KN  
25 KN  
50 KN  
75 KN  
120 KN

# CAPILLARY RHEOMETER

## Basic device RG 20



- High test piston force of 20 KN
- Single-, twin- or triple barrel system
- Ø 9.55, 12, 15, 20 mm design
- Speed range 0.0001 – 40 mm/s
- High dynamic test piston acceleration
- 0 – 40 mm/s in 0.6 sec
- High resolution encoder 0.000053 mm
- Automatic pressure transducer identification

# CAPILLARY RHEOMETER

RG 25 | RG 50 | RG 75 | RG 120



- 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

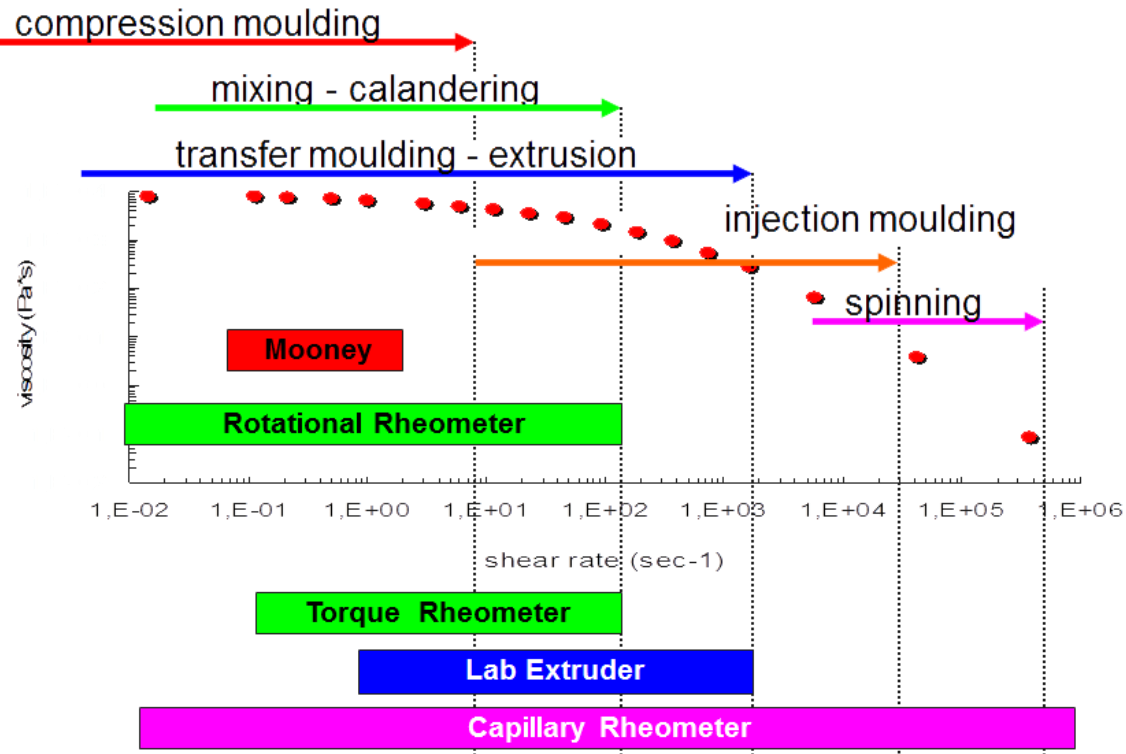
# CAPILLARY RHEOMETER

RG 25 | RG 50 | RG 75 | RG 120

- Test barrel and optional equipment up to 5 pressure transducers and up to 3 force transducers
- Temperature range up to 400°C (500°C optional) via temperature control algorithm
- 5 calibration data sets for any temperature inside of the range (including respective controlling parameter sets)
- Drive torque monitoring and display
- Infinitely variable manual controlling of the test piston
- Integrated timer for temperature set values
- Intelligent Service Monitoring

# CAPILLARY RHEOMETER

## Process and measuring window



# CAPILLARY RHEOMETER

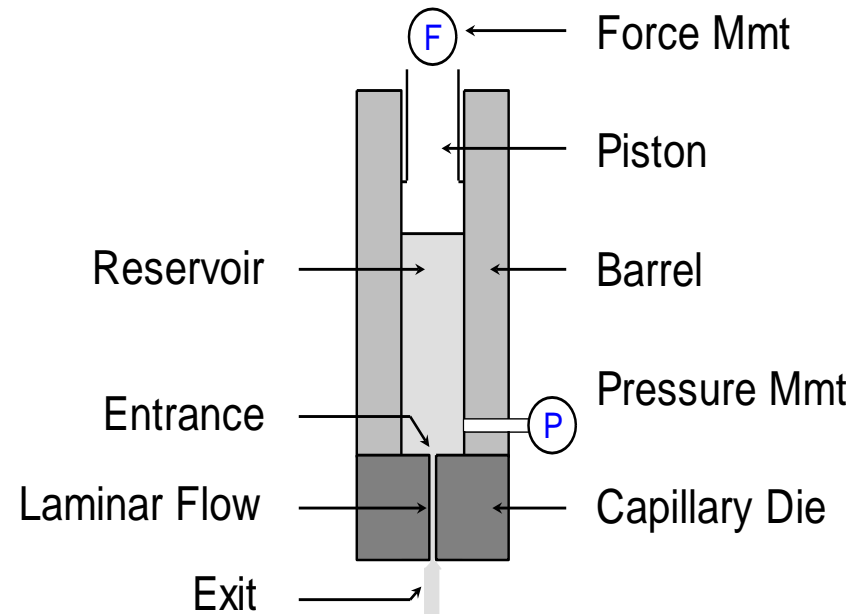
## Shear rate spectrum

	Test piston diameter [mm]				
Capillary [L/D]	12	15	20	25	30
<b>30/0.5</b>	0.36 - 368640	0.576 - 576000	1.02 - 1024000	1.6 - 1600000	2.30 - 2304000
<b>30/1</b>	0.046 - 46080	0.072 - 72000	0.12 - 128000	0.020 - 200000	0.28 - 288000
<b>30/2</b>	0.005 - 5760	0.009 - 9000	0.016 - 16000	0.025 - 25000	0.036 - 36000



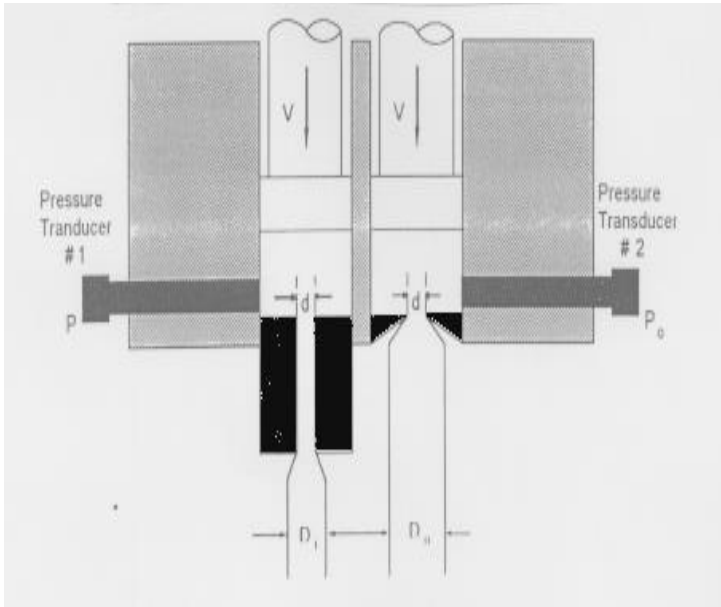
# CAPILLARY RHEOMETER

Single barrel system



# CAPILLARY RHEOMETER

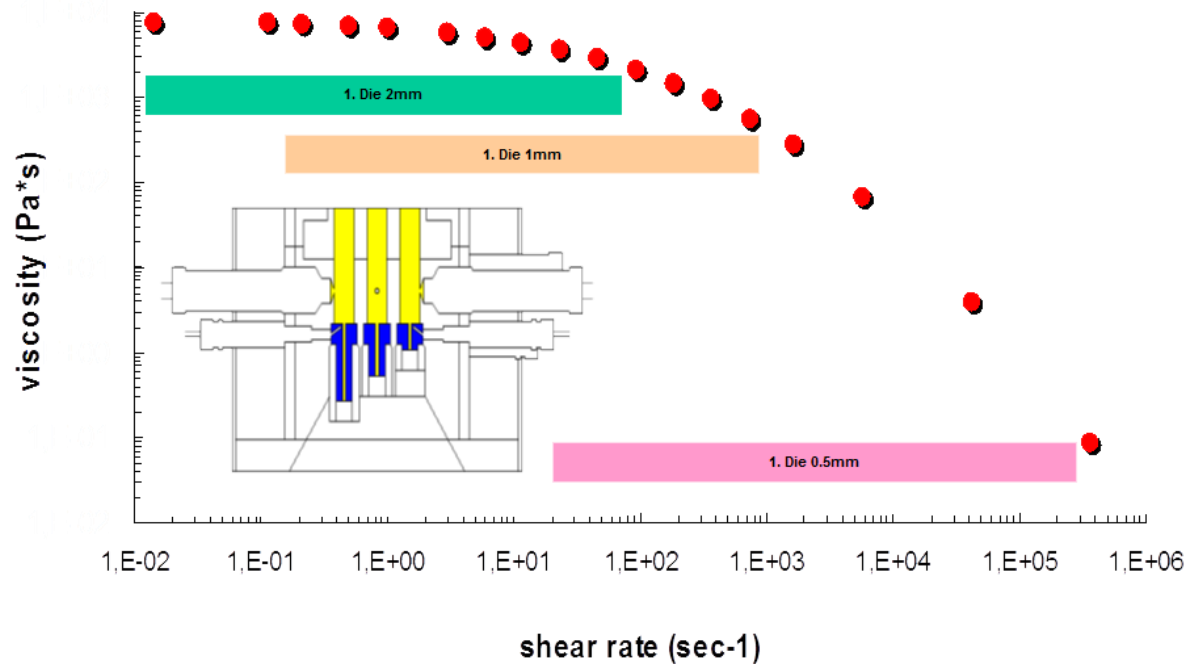
## Twin barrel system



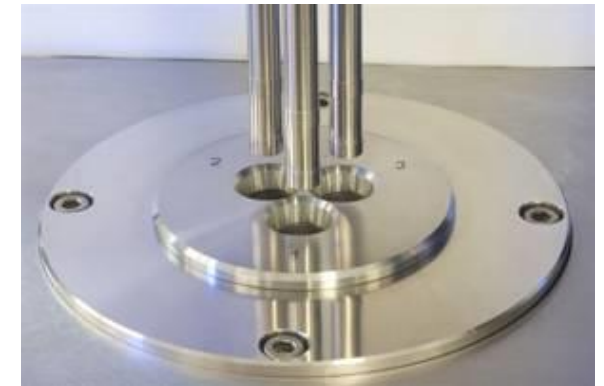
- Interchange any capillaries at any barrel by dual or triple bore system
- Different correction possibilities
- e.g. Bagley & Mooney correction
- Pressure transducer
- Optional melt temperature measurement

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## Triple barrel system



- different dies to cover different shear rates with one measurement
- e.g.: 2mm, 1mm, 0.5mm



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## Piston / barrel design

Steelgrade	Hardness	Abrasion resistance	Acid resistance	Temperature range / test material
Steelgrade 2	★★	★★	★★★★★★	Up to 500°C, e.g. PVDF, PTFE
Steelgrade 3	★★★	★★★	★★★★	Up to 500°C, e.g. PVDF (up to 250°C), PVC, PLA, Bio polymers
Steelgrade 4	★★★★★	★★★★★	★★★	Up to 500°C, e.g. PEEK, as well as >30% glass fiber filled PA6, PPT and PP
Steelgrade 5 (standard)	★★★★★	★★★	★★	Up to 500°C suitable for all thermosets and elastomers without abrasive and aggressive behaviour
Steelgrade 6	★★★★★★	★★★★★★	★★	Up to 500°C

★ less suitable  
★★★★★ very good suitable

# CAPILLARY RHEOMETER

## Twin and triple die application

L/D - Ratio		Mooney-Correction	Broad Shear Rate Range
Bagley-Correction	0/1 (5/1)	20/1 (10/1)	20/1
		40/2 (20/2)	20/0.5
		(40/4)	(20/2)

Die dimensions in brackets recommended for non-linear correction

- Recommended die for apparent viscosity 30/1 mm
- Suggestion for the capillaries needed to do different tests
- Mooney: Correction of wall slip behaviour
- Bagley: Correction of entrance pressure loss

# CAPILLARY RHEOMETER

Modular platform for advanced material characterization



*For more detailed information about different Add-ons, please have a look on our presentation RG ADD-on*

# CAPILLARY RHEOMETER

## Die Swell Unit

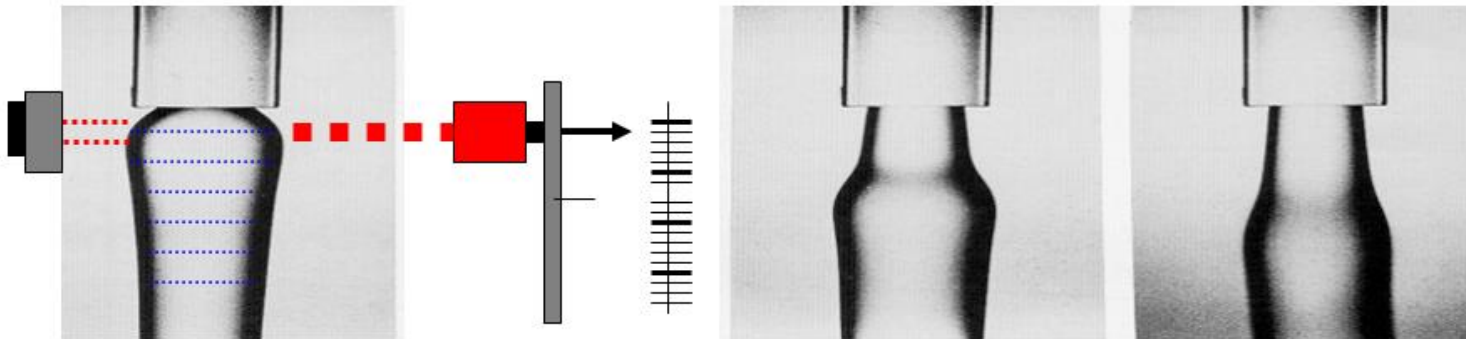


- Calculates die swell value from diameter or surface ratio between die and strand
- Laser Measurement head
- High resolution 0,1 $\mu$ m
- Low resolution 0,44 $\mu$ m
- Manual cutting of the strand
- Automatic cutting
- Controlled by software via script file
- Evaluation of a die swell profile

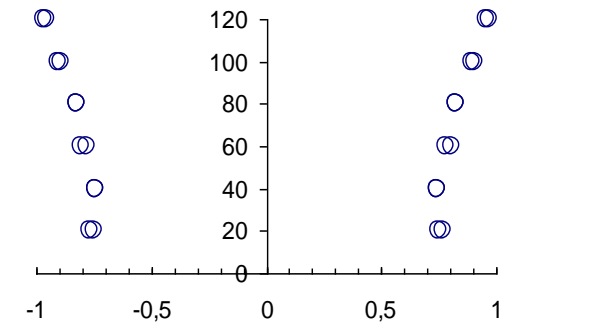
# CAPILLARY RHEOMETER

## Die Swell Unit

- Laser Measurement head - adjustable in height
- Maximum of swelling depends on material relaxation



Photographs from H. Giesekus, Rheologica Acta, 8,1968



Extrudate profile LDPE 2420 K at 230 sec<sup>-1</sup>



# CAPILLARY RHEOMETER

## Elongation Rheometer

### Rheotens

- Elongation viscosity modelling



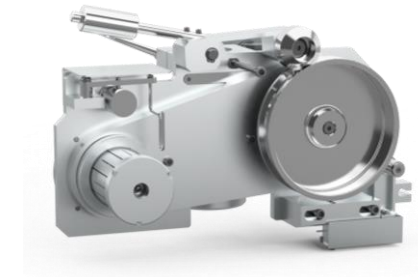
- Speed: 0-114m/min
- Force Range 2N
- Resolution 1mN
- Feeding by Rheograph or Extruder

### Haul-Off

- Standard Haul-Off
- Fibre Spinning

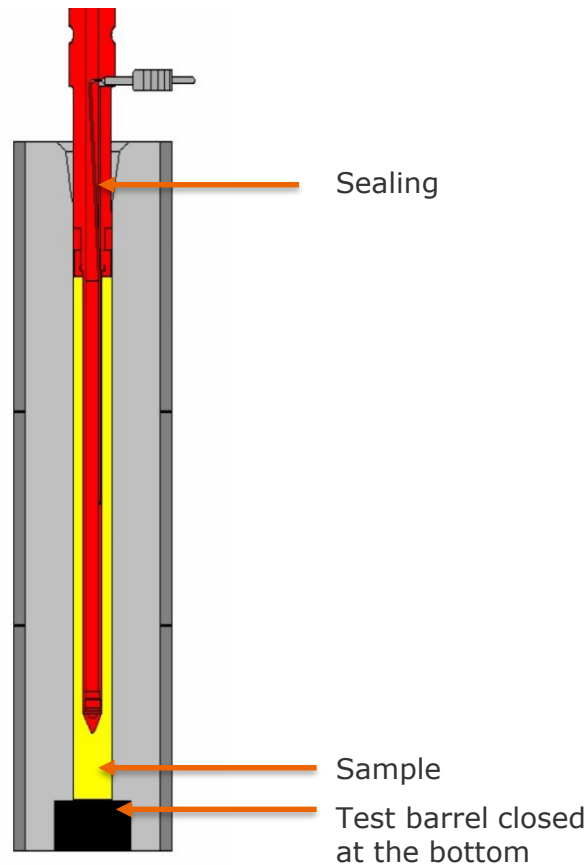


- Speed: 0-2000m/min
- Force Range 1N
- Resolution 0,05mN
- Feeding by Rheograph or Extruder



# CAPILLARY RHEOMETER

## Thermal conductivity

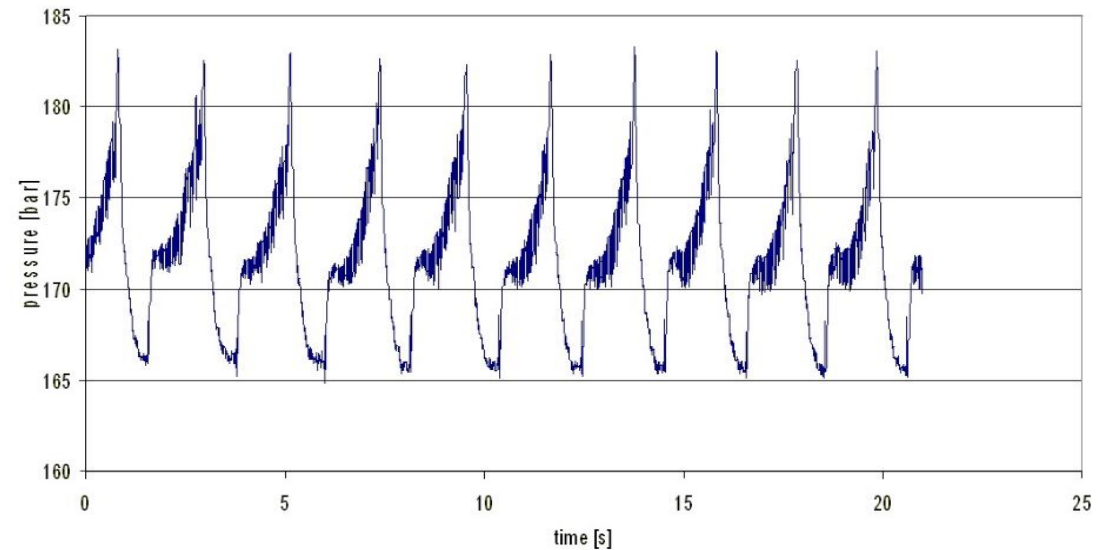
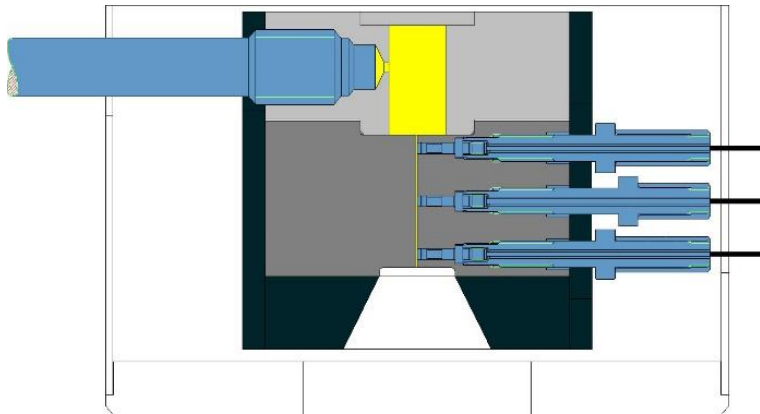


- Based on a test according ASTM D5930
- Evaluation by the software from a single test
- 15 mm bore minimum
- Temperature up to 450°C
- Pressure up to 1000 bar
- Script Generator for automatically test procedure

# SHARK SKIN

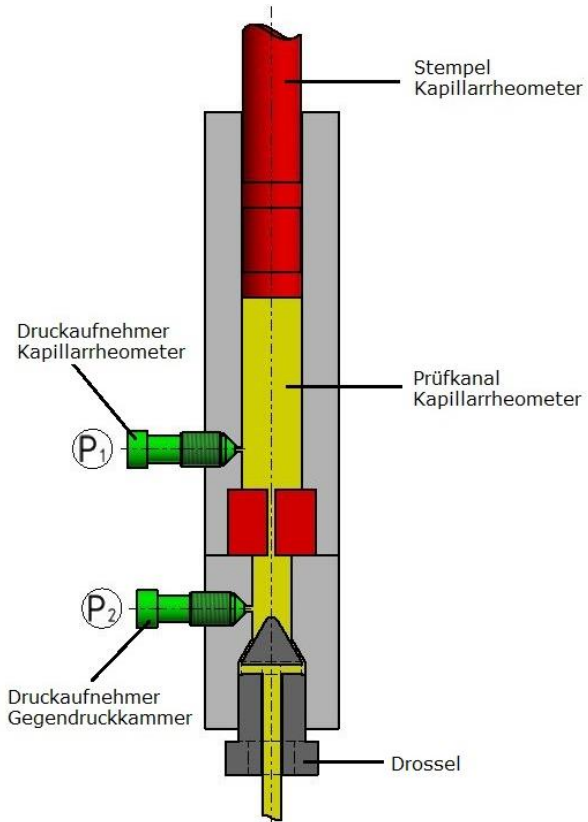
## Add-on for Capillary Rheometer

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



# CAPILLARY RHEOMETER

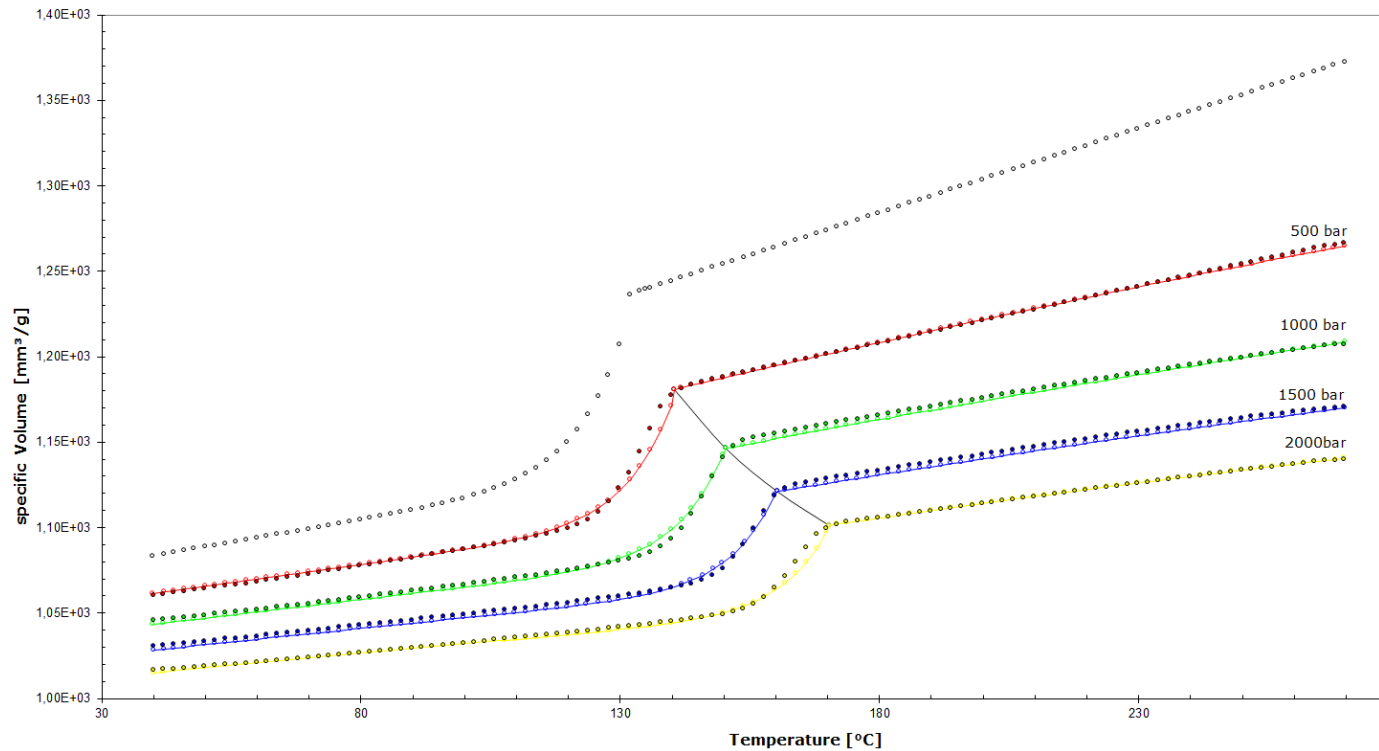
## Counter Pressure Chamber



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

# CAPILLARY RHEOMETER

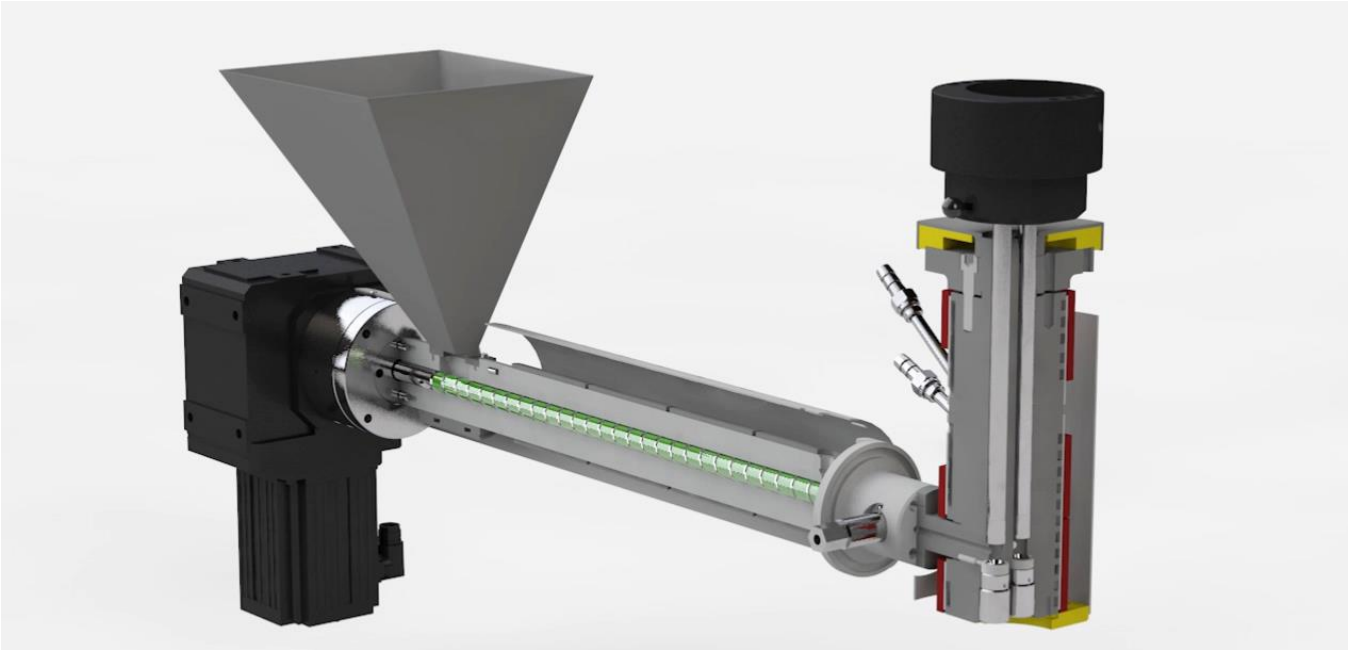
pVT isobaric and isothermal



- According to ISO 17744
- Isothermal (up to 450°C)
- Isobaric (up to 380°C)
- Up to 25K/min

# CONTIFEED

## Add-on for Capillary Rheometer



- 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

WATCH on YouTube

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