

# Test Viscosity of Extreme Conditions

with the

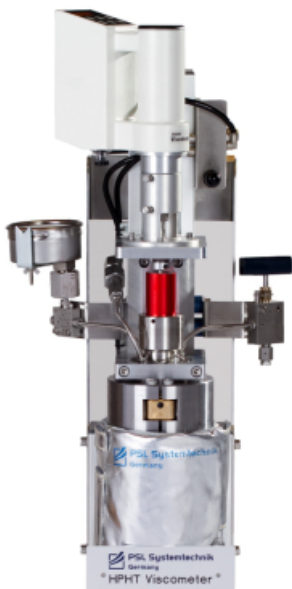
## High Pressure Viscometer HPV

### Characteristics

- Temperature up to +200 °C (392 °F)
- Pressure up to 1,500 bar (27,750 psi)
- Small sample amounts
- For low, medium and high viscosities (5 - 100,000 mPa·s)
- Easy handling with pneumatic lifting platform
- For umbilical line restart tests, yield point and gel strength measurement, stability tests of emulsions

### Extreme conditions can be simulated

The High-Pressure High-Temperature Viscometer (HPV viscometer) is a rotational viscometer. This type of viscometer can measure the viscosity of shear rate independent (Newtonian) fluids as well as the viscosity of shear rate dependent (non-Newtonian) fluids. The HPV covers a wide range of pressures up to 1,500 bar (27,750 psi) and temperatures up to 200 °C (392 °F).



### Deep sea conditions

The HPVs wide pressure and temperature range allows the simulation of extreme conditions prevailing for example with deep sea deposits. Thus, precise and reliable conclusions can be made for all fluids with a shear rate dependent viscosity e.g. crudes or drilling fluids.

### Application range

The rotational method is one of the few methods of viscosity measurement applicable not only to non-Newtonian fluids, but also to Newtonian fluids. Non-Newtonian fluids change their viscosity depending on the shear rate. The viscosity range covers values from approx. 5 mPa·s (cP) up to 100,000 mPa·s, depending on used geometry.

### Pneumatic lift for easy handling

The High-Pressure Viscometer consists of a mounting frame with pressure vessel, pneumatic lifting platform and uses the reliable Haake Viscotester as measuring instrument. With its dimensions of 45 x 50 cm the HPV requires only a small footprint. For temperature control of the pressure vessel a thermostat is provided.

A PC with pre-installed control and data acquisition software RheoWin® can be provided for comfortable experiment configuration and execution.

### Additional measuring sensors

The Haake Viscotester provides fast, easy and reliable measurements of fluids and pastes. The results - viscosity, shear stress and shear rate as well as e.g. yield point and operating temperature - are digitally displayed and can be read-out by software.

The absolute viscosity of a sample can be measured with appropriate geometries.

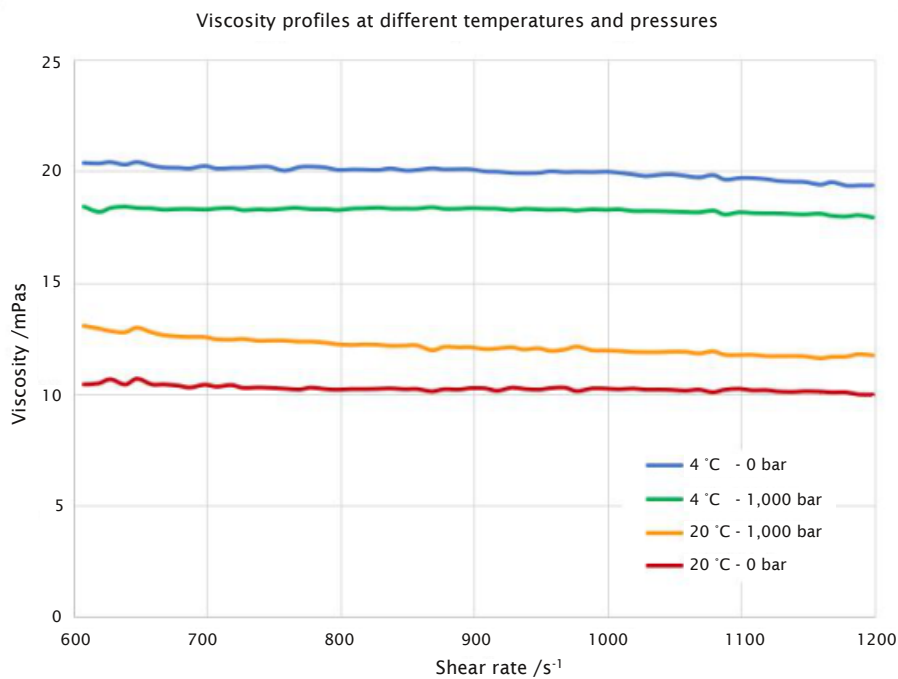
Additional measuring sensors are available. With the vane sensor you can not only execute yield point measurements, but also umbilical line restart tests, gel strength measurements and stability tests of emulsions. Thus the Haake Viscotester can be adapted to various applications.

### Realtime charts with software

More challenging tasks, e.g. the automatic measuring of flow behavior of non-newtonian substances can be directly executed with pre-defined routines. Via PC, experiment runs can be freely programmed, controlled on-line and be evaluated.

### Variable test conditions

For viscosity measuring the Haake® Viscotester provides different factory set or adjustable rotational speed steps. The torque measuring with a non-contact, low displacement sensor increases the measurement precision, signal linearity and measuring range.



Viscosity evaluation with shear rate sweep at different pressures and temperatures

### Specifications:

Application:	High pressure and high temperature viscosity for Newtonian and non-Newtonian fluids
Standard:	DIN 53019 / ISO 3219, DIN 54453 with according geometries
Temperature range:	-20 ... +200 °C (-4 ... +392 °F)
Viscosity range:	5 ... 100,000 mPas (extended range possible)
Accuracy:	0.1 °C / ± 0.1 K
Rotational speed:	0.5 ... 800 rpm
Pressure range:	up to 1,500 bar (27,750 psi)
Power consumption:	1.900 W
Voltage input:	110 .. 240 V~, 50/60 Hz wide range
Weight:	60 kg, without PC and thermostat
Dimensions (WxDxH):	Viscometer: 45 x 45 x 140 cm