VINCI TECHNOLOGIES

RBV 700 / 1000

Rolling Ball Viscometer

Falling-body viscometry for petroleum fluids at reservoir conditions
0.2 to 10,000 cP · up to 15,000 psi · 190°C

Technical & Commercial Proposal

PRODUCT OVERVIEW

What is the RBV 700 / 1000?

The RBV is a **rolling ball viscometer** designed for high-accuracy dynamic viscosity measurement of petroleum fluids at true reservoir pressure and temperature conditions.

Measurement Principle
Falling-body (Stokes' Law)
Piston transit time

Target Fluids
Live oil, dead oil, gas condensate, water, solvents

Wetted Materials
SS316L, FKM, PTFE, Hastelloy

RBV 700 / 1000 At a Glance

Viscosity Range	**0.2 – 10,000 cP**
Pressure (RBV700)	**700 bar / 10,000 psi**
Pressure (RBV1000)	**1,000 bar / 15,000 psi**
Temperature	**Ambient to 190°C**
Sample Volume	**10 – 11 cc**
Cylinder Slopes	**45° and 65°**
Price (RBV1000)	**€ 40,000**

MEASUREMENT PRINCIPLE — STOKES' LAW

1

Gravity-Driven Fall

A calibrated piston (falling body) is released under gravity through the fluid-filled inclined cylindrical tube. Gravitational force and viscous resistance act on the piston simultaneously.

2

Terminal Velocity

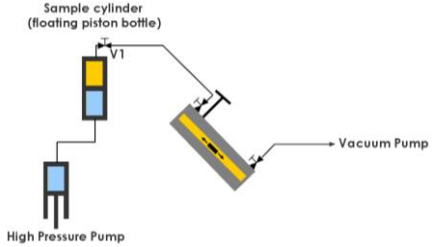
When gravity and fluid resistance balance out, the piston falls at a constant speed. The more viscous the fluid, the slower that speed.

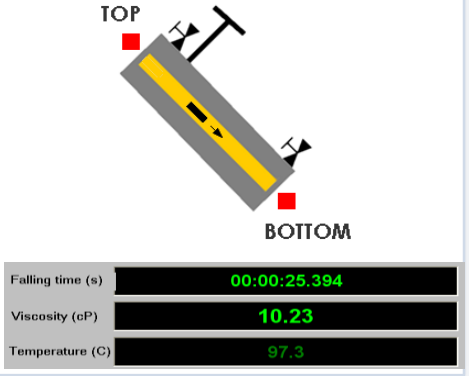
3

Optical Time Detection

Two laser optical detectors at each end measure the piston transit time. The software converts this time into dynamic viscosity (cP) using: $\eta = K(\rho b - \rho)t$

With $\rho b - \rho$ = the density difference between the piston and the fluid.





$\eta = K(\rho b - \rho)t$ | $K = f$(piston diameter, inclination angle) | Results in dynamic viscosity mPa·s (cP)

HOW IT WORKS

01 Load Sample

Fluid is loaded at target pressure and temperature via the inlet valve. Vacuum is applied first to purge the cell before sample injection.

02 Stabilize P & T

The thermostatic bath circulates fluid around the cell jacket, bringing the sample to stable reservoir P&T. Wait minimum 30 min (1 hour recommended).

03 Select Piston & Angle

Choose the correct calibrated piston and inclination angle (45° or 65°) based on expected viscosity range. Software guides the selection.

04 Release & Detect

Latch is opened; piston falls under gravity. The upper laser detects departure, the lower laser detects arrival. Software records transit time and computes viscosity instantly.

SCOPE OF SUPPLY

Calibrated Barrel

SS316L tube with gas cap chamber and piston latch

Temperature Probe

For real-time cell temperature monitoring (±0.1°C)

Upper Laser Detector

Detects piston departure — starts chronometer

Lower Laser Detector

Detects piston arrival — stops chronometer

8 Calibrated Pistons

Different diameters and weights for full viscosity range

Thermostatic Bath

Heating/cooling jacket up to 200°C, 4.5 L capacity

Inlet & Outlet Valves

HP rated, SS316L construction

Control Panel

Electronic interface and acquisition board

Applilab Software

Data acquisition, calibration, and viscosity calculation

Documentation

Operation & maintenance user manual included

TECHNICAL SPECIFICATIONS

Parameter	RBV 700	RBV 1000
Viscosity Range	0.2 – 10,000 cP	0.2 – 10,000 cP
Max Pressure	700 bar (10,000 psi)	1,000 bar (15,000 psi)
Temperature Range	15 to 175°C ±0.1°C	Ambient to 190°C
Sample Volume	10 – 11 cc	10 – 11 cc
Cell Material	SS316L	SS316L
Wetted Parts	FKM, SS, PTFE, Hastelloy	FKM, SS, PTFE, Hastelloy
Cylinder Slopes	45° and 65°	45° and 65°
Sensor	Optical (laser)	Optical (laser)
Power Supply	220 VAC, 2.5 kW	220 VAC, 2.5 kW
Floor Space	2 m × 2 m	2 m × 2 m

VISCOSITY RANGES & PISTON SELECTION

	Piston	Angle	
0.2 – 2 cP	P8	45°	*Condensates, light solvents, gas-saturated fluids*
2 – 30 cP	P7	45°	*Light crude oils, gas condensates above dew point*
10 – 500 cP	P6	45°	*Medium crude oils, reservoir oils below bubble point*
50 – 2,000 cP	P6	45°	*Heavy crude oils at temperature*
1,000 – 10,000 cP	P6	65°	*Extra-heavy oil, viscous crude, near pour point*

CALIBRATION

Factory Calibration

Delivered pre-calibrated with NIST-traceable viscosity standards. Calibration check recommended at minimum every year.

1 Verification

Load certified viscosity standard. If reading differs >3% from reference, re-clean and repeat.

2 Reference Points

Minimum 3 per viscosity range required (6 points recommended). Select standards across the full range.

3 Linear Regression

Plot viscosity vs. falling time. Compute coefficients A and B for equation: $\eta = A \cdot t + B$

4 Enter in Software

Update calibration coefficients A and B in Applilab (Parameters / Edit). Save and exit.

WHY THE RBV / VINCI TECHNOLOGIES

🔭 Full Reservoir Range

0.2 to 10,000 cP in one instrument — from gas condensates to extra-heavy oil — using selectable pistons and angles.

🔬 True Reservoir Conditions

Up to 1,000 bar and 190°C. Live-fluid PVT viscosity at representative P&T, not just surface conditions.

⏱️ Rapid Measurement

Simple 4-step workflow. Only 10 cc of sample needed. Software auto-computes viscosity at the end of each run.

🎯 NIST-Traceable Accuracy

Factory calibrated with certified viscosity standards. Annual re-calibration on site with reference fluids.

🔧 Robust & Maintainable

SS316L + Hastelloy wetted parts. Optical sensors easily adjustable. User-maintainable end-plugs and release valve.

🎓 Complete Turnkey Package

Bath, pistons, spare parts, calibration fluids, commissioning, and 1-day training — all included in the offer.