

R/S-CPS+ Rheometer

User-friendly keypad and display for stand-alone operation

Precision Height Gauge Shows Actual Gap Setting

Quick Connect Coupling for rapid spindle attachment



Quick and easy Cone-Plate or Plate-Plate Gap Setting

Peltier Heater Power Supply



Thermo Barrier is designed to reduce the effects of heat transfer from sample area to the environment.



Choice of several cone spindles and plate spindles accommodates all sample types and viscosity measurement requirements. Plate spindles are used for highly-filled or very viscous samples.



Solvent trap encloses the sample environment with a liquid seal to reduce solvent loss.

What's Included?

Instrument
Base

Optional Accessories

Choice of Spindle Geometries
RHEO3000 Software
Viscosity Standards
Additional Spindles
Water Bath
Solvent Trap
Thermal Barrier*

*two part chamber provides thermal isolation of the measurement zone

Features & Benefits

Cone/plate geometry provides accurate shear rate control for absolute viscosity measurements.

Very small sample size permits rapid test set up and clean up.

Rapid temperature control of plate with Peltier option provides quick profiling of viscosity vs. temperature

Applications

Adhesives	Gels	Pastes
Coatings	Inks	Personal Care
Cosmetics	Paints	Putties
Creams		

Options

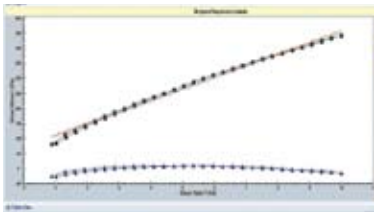
Model	Temperature
Bath	-20° to 250°C
Peltier P1	0° to 135°C
Peltier P2	20° to 180°C
Electronic	50° to 250°C

RHEO3000 Software

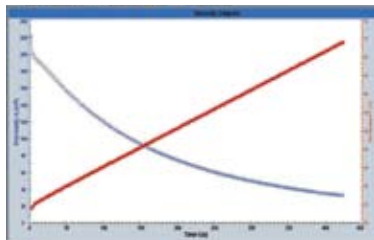
Increased Data Analysis Capabilities with RHEO3000 Software



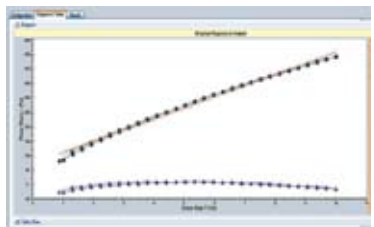
Create test methods for flow behavior characterization, such as shear sensitivity, thixotropy, static yield and creep, with simple program functions. Method sequencing is available to show rebuild/recovery after flow.



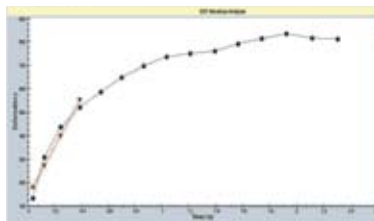
Data Analysis allows for plotting of flow curves, quality control minimum/maximum limits, math models, data averaging and many more analysis functions.



Automatic viscosity/temperature profiling is possible using Peltier, electrical heating or a Brookfield specified temperature bath.



New enhanced encoder provides improved measurement of creep and relaxation data.



The soft solid function allows the user to map the texture of a product by providing static yield stress and modulus results.

Features & Benefits

- Program by controlled stress or rate
- Automated analysis of data collected
- Calculate yield and average viscosity
- Create flow curves and plot yield stress
- Run multiple tests sequentially

Enhance your R/S+ Rheometer through programmed control and data analysis

Your PC can do the detailed data collection and analysis work for you. RHEO3000 allows you to program the R/S Rheometer and control shear stress or shear rate. Use multiple step test programs to create data history and calculate average viscosity, thixotropy and yield stress. In addition, RHEO3000 provides automated analysis of user defined parameter values for Quality Control. Mathematical data processing models included are:

- | | | |
|---------|-------------|------------------|
| Newton | Bingham | Casson |
| Ostwald | Steiger-Ory | Herschel-Bulkley |

Built-In R/S Soft Solids Module

This software allows you to enhance the RHEO3000 to generate data such as yield point, shear modulus, visco-elastic evaluation, creep and relaxation. An understanding of these parameters and their influences enables predictions to be made as to the behavior of your sample in a number of real life stress driven situations such as sedimentation, leveling, sag and slump.



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R/S+ series Rheometers

Our top of the line rheometer with direct yield stress measurement

Dual modes of operation:

- Controlled Stress
- Controlled Rate

Viscosity/temperature profiling

Creep/recovery characterization

Detailed flow curves:

- Viscosity/Shear Stress vs. Shear Rate

Choice of water bath or electronic temperature control



Model R/S-CC+
Coaxial Cylinder Also Available

Model R/S-CPS+ (shown)
(Cone/Plate or Plate/Plate)

Model R/S-SST+
Soft Solids Tester Also Available

Rapid Spindle Attachment

BROOKFIELD VISCOMETERS & RHEOMETERS

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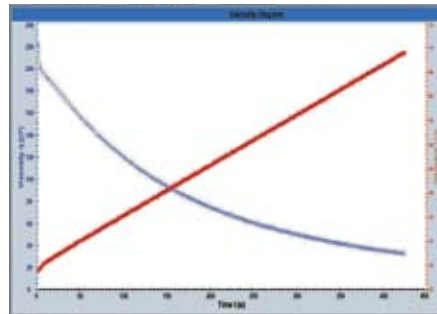
R/S+ series Rheometers

Controlled Stress and Rate — The Perfect Rheometer for QC and R&D

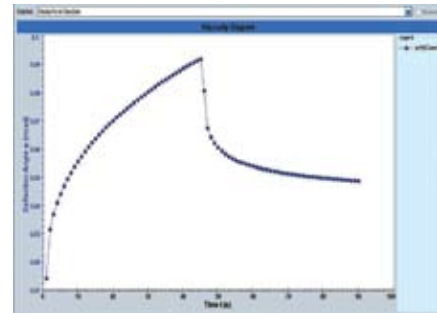
The R/S Plus Rheometer is available in three configurations: Model **R/S Coaxial Cylinder**, Model **R/S-CPS** (cone/plate or plate/plate) and Model **R/S-SST** (soft solids tester/vane) for a variety of sample types.

The rotational motor developed for this rheometer utilizes a high dynamic precision drive system without gearing or mechanical force transducers. The torque is therefore controlled without deflection. A 400,000 line optical encoder carefully measures spindle position during rotation. This combination of motor drive and optical encoder enables the R/S to be controlled via Controlled Shear Stress (CSS) or Controlled Shear Rate (CSR). With its wide torque range capability (0.05 to 50 mN•m), the R/S Plus Rheometer can handle most applications usually limited to the high-end research Rheometers.

Controlled Shear Rate provides important information on flow behavior showing how viscosity changes with spindle speed and time. Data analysis using RHEO3000 software allows for plotting of flow curves, quality control min/max limits, math models, data averaging and many more analysis functions.



Making measurements using Controlled Shear Stress allows the operator to make direct yield stress measurements and determine creep properties and the presence of elastic behavior. Of special note is the enhanced encoder which provides detailed measurement data on relaxation and recovery behavior after the stress is removed.



Dual Operation Modes (CSS and CSR):

The key to meaningful rheological data and the conclusions drawn from it is to select test parameters that reproduce the conditions experienced by the sample in the real world. Capable of operating with either stress or rate as the control parameter, the dual capability of the R/S Rheometer provides the very best of both worlds. Controlled shear stress/shear rate operation makes it easy to study material behavior — from initial yield to flow curve response.

Torque Range and Resolution:

With its broad torque range, the R/S can apply stress/rates to the sample which mimic the operating conditions throughout the whole process. The R/S can simulate high speed mixing, pumping and spraying as well as low shear rate or stress conditions to evaluate sample leveling.

R/S Spindle Ranges

SPINDLE COAXIAL	VISCOSITY RANGE (Pa•s)	SHEAR RATE (sec ⁻¹)	MAXIMUM SHEAR STRESS (Pa)	SAMPLE VOLUME (mL)
DG	0.002-19	4 - 4344	83 Pa	21
CC3-40	0.004-134	2 - 2148	287 Pa	45
CC3-25	0.026-883	1 - 1291	1140 Pa	17
CC3-14	0.151-5035	1 - 1291	6500 Pa	3
CC3-8	0.813-27111	1 - 1291	35000 Pa	0.5
CONE				
RC3-25-1	0.061-2037	6 - 6000	12223 Pa	0.08
RC3-25-2	0.122-4074	3 - 3000	12223 Pa	0.3
RC3-50-1	0.008-255	6 - 6000	1528 Pa	0.7
RC3-50-2	0.015-509	3 - 3000	1528 Pa	1.5
RC3-71-1*	0.002-75	6 - 6000	453 Pa	2.0
RC3-75-2*	0.005-151	3 - 3000	453 Pa	3.9
PLATE				
RP3-25	0.373-12450	1 - 1309	16297 Pa	0.5
RP3-50	0.023-779	3 - 2618	2040 Pa	2
RP3-75*	0.005-153	4 - 3927	600 Pa	4.5

VANE SPINDLE	VANE LENGTH (mm)	VANE DIAMETER (mm)	SHEAR STRESS (Pa)
V80-40	80	40	6 - 200
V60-30	60	30	15 - 505
V40-20	40	20	51 - 1700
V30-15	30	15	120 - 4000
V20-10	20	10	408 - 13600
V10-5	10	5	3276 - 109200

*For use with water bath version only

1 Pa•s = 1,000 cP

Notes:

- 1) Values calculated are based on minimum speed of 1 RPM and maximum speed of 1000 RPM
- 2) 75 mm plates cannot be used with Peltier Plate or electrically heated rheometers

Instrument Specifications

Torque:	0.05-50 mN•m
Torque Resolution:	0.01 mN•m
Angular Resolution:	15.7 urad
Speed:	0.01-1,000 RPM

R/S-CC+ Coaxial Cylinder Rheometer



User-friendly keypad and display for stand-alone operation

Quick Connect Coupling for rapid spindle attachment

Various Sample Chamber options for Temperature Control

What's Included?

Instrument
Base

Optional Accessories

Choice of Spindle Geometries
RHEO3000 Software
Viscosity Standards
Additional Spindles/Chambers, including vanes
Disposable Spindles/Chambers
FTK Water Jacket for Temperature Control
Quick Connect Bayonet Chambers
PT-E Immersion Temperature Sensor PT100
KE Cooling Device*

*required for temperatures under +90° - +180°C

Features & Benefits

Coaxial spindle/chamber geometry provides accurate shear rate control and absolute viscosity measurements for single point QC or full rheological profiling

Small sample size facilitates rapid temperature control during testing

Standalone operation permits use on production floor

Coaxial Cylinder Spindles, Chambers and Water Jacket



Water Jacket

Chambers

Coaxial Cylinder Spindles

Applications

Chemicals	Inks	Paints
Coatings	Juices	Polymer Solutions
Dairy Products	Oils	Slurries

Sample Chamber Options

Chambers	Temperature
Immersion Chambers	-20°C to 180°C
FTK Water Jacket Chambers	-20°C to 180°C
Disposable Chambers	-20°C to 180°C



Optional Disposable spindle system for coaxial cylinder

R/S-SST+ Soft Solids Tester



Smooth Height Adjustment for Easy Non-Intrusive Sample Loading

Vane Spindle Geometry with Quick-Connect Coupling

Rugged base with adjustable sample container clamp

What's Included?

Instrument
Base

Optional Accessories

Choice of one Vane Spindle
RHEO3000 Software with Soft Solids Module
Viscosity Standards
Additional Vane Spindles
Coaxial Cylinders

Features & Benefits

Easy-to-test method using vane spindle geometry for materials with particulates, slurries and stiff pastes

Provides data that relates to viscoelastic characteristics such as yield stress, shear modulus (stiffness of material structure when intact), and creep

Quantifies meaningful properties like wobbliness, sloppiness, consistency and texture

Vane spindle geometry allows spindle insertion without compromising sample structure

Can also be used with coaxial cylinders for complete flow curve analysis

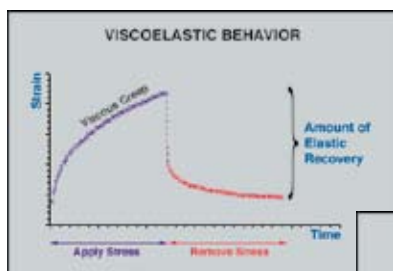
Applications

Adhesives	Gels	Sealants
Cosmetics	Pastes	Viscous Polymers
Foods		

R/S-SST Spindle Ranges

Spindle	Shear Stress Range (Pa)
V80-40	6-200
V60-30	15-505
V40-20	51-1700
V30-15	120-4000
V20-10	408-13600
V10-5	3276-109200

Custom vane spindles available. Call for details.



Software provides visual information and test data on viscoelastic behavior



Quality Control Mode enables tolerance bands to be placed around measurement data for immediate visual pass/fail determination