R/S Plus Rheometers

Our top of the line rheometer with direct yield stress measurement

NEW, enhanced encoder allows for increased precision when performing sophisticated rheological analysis — all at an affordable price!

Dual modes of operation:
- Controlled Stress
- Controlled Rate

Detailed flow curves:
- Viscosity/Shear Stress vs. Shear Rate

Creep/recovery characterization

Viscoselastic analysis

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

Model R/S-CC
Coaxial Cylinder

Model R/S-SST
(Soft Solids Tester)

BROOKFIELD VISCOMETERS

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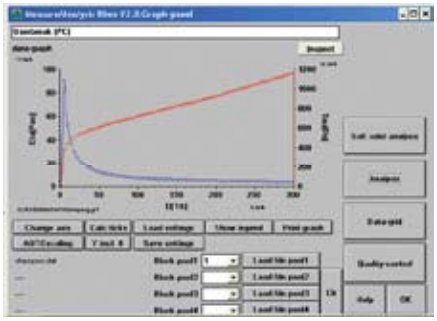
R/S *plus* Rheometer

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

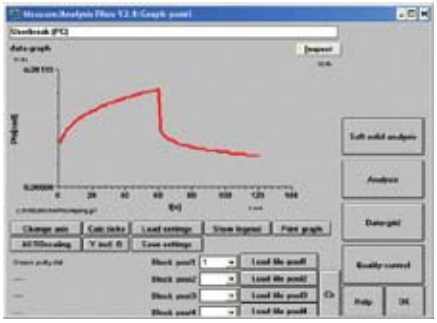
The R/S Plus Rheometer is available in three configurations: Model **R/S Coaxial Cylinder**, Model **R/S-CPS** (cone/plate or plate/plate) and Model **R/S-SST** (soft solids tester/vane) for a variety of sample types.

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 Rheo2000 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 and visco-elastic properties. 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 in either stress or rate as the control parameter: the dual capability of the R/S Rheometer provides the very best of both worlds. Contolled 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.

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 Spindle Ranges

SPINDLE COAXIAL	VISCOSITY RANGE (mPa•s)	SHEAR RATE	SHEAR STRESS	SAMPLE VOLUME
DG	1 - $1x10^3$	0 - 5039 sec^{-1}	0 - 67 Pa	17mL
CC48	5 - $3.2x10^4$	0 - 5143 sec^{-1}	0 - 206 Pa	70mL
CC45	20 - $1.5x10^5$	0 - 1290 sec^{-1}	0 - 195 Pa	100mL
CC25	120 - $8x10^5$	0 - 1290 sec^{-1}	0 - 1141 Pa	17mL
CC14	670 - $5x10^6$	0 - 1290 sec^{-1}	0 - 6502 Pa	3mL
CC8	$3.6x10^3$ - $3x10^7$	0 - 1290 sec^{-1}	0 - 34833 Pa	0.5mL
CONE				
CP25-1	300 - $1.6x10^6$	0 - 6000 sec^{-1}	0 - 12223 Pa	.08mL
CP25-2	500 - $3.2x10^6$	0 - 3000 sec^{-1}	0 - 12223 Pa	.15mL
CP50-1	30 - $2x10^5$	0 - 6000 sec^{-1}	0 - 1527 Pa	.60mL
CP50-2	60 - $4x10^5$	0 - 3000 sec^{-1}	0 - 1527 Pa	1.2mL
CP75-1*	10 - $6x10^4$	0 - 6000 sec^{-1}	0 - 452 Pa	2.0mL
CP75-2*	20 - $1.2x10^5$	0 - 3000 sec^{-1}	0 - 452 Pa	3.9mL
PLATE				
PP25	1500 - $9.9x10^6$	0 - 1309 sec^{-1}	0-16297 Pa	
PP50	90 - $2x10^5$	0 - 2618 sec^{-1}	0-2037 Pa	
PP75*	20 - $1.2x10^5$	0 - 3926 sec^{-1}	0 - 603 Pa	

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

*For use with water bath version only

R/S-CPS *plus* Rheometer

What's Included?

Instrument

Choice of Spindle: cone spindles, plate spindles

Optional Accessories

Rheo2000 Software

Viscosity Standards

Additional Spindles

Water Baths

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
Coatings
Cosmetics
Creams
Gels
Inks
Paints
Pastes
Personal Care
Putties

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.

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

R/S *plus* 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

Choice of Spindle: cone spindles, plate spindles

Optional Accessories

Rheo2000 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

Optional immersion chambers with quick swivel lock feature allows for fast and easy removal of sample from temperature bath. Ideal for a busy QC environment and high volume/multiple tests.

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

Applications

Chemicals
Coatings
Dairy Products
Inks
Juices
Oils
Paints
Polymer Solutions
Slurries

R/S-SST *plus* 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

Choice of one Vane Spindle

Adjustable Sample Container Clamp on Lab Stand

Optional Accessories

Rheo2000 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

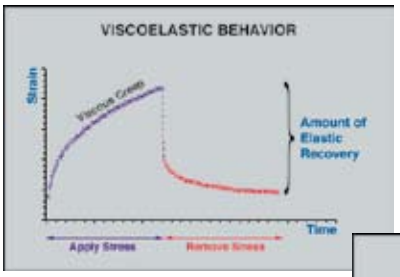
Quantifies meaningful properties like wobbliness, sloppiness, consistency and texture

Vane spindle geometry allows spindle insertion without compromising sample structure

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

Applications

Adhesives
Cosmetics
Foods
Gels
Pastes
Sealants
Viscous Polymers



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

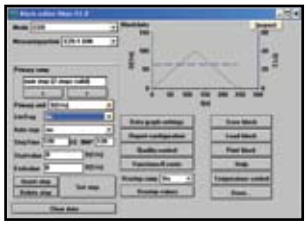
R/S-SST Spindle Ranges

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

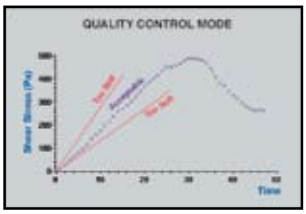
Custom vane spindles available. Call for details.

R/S *plus* Rheometer

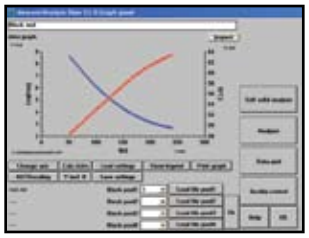
Increased Data Analysis Capabilities with RHEO2000 Software



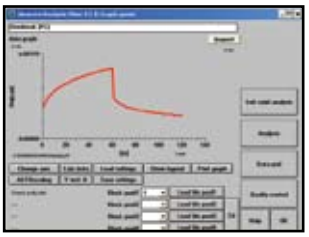
Create test methods for flow behavior characterization, such as shear sensitivity, thixotropy, static yield, creep, are created with simple program functions. Method sequencing is available to show rebuild/recovery after flow.



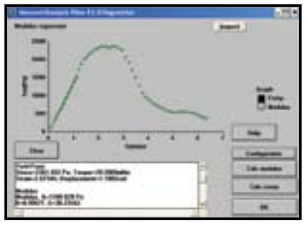
Data Analysis allows for plotting of flow curves, quality control minimum/ maximum limits, math models, data averaging and many more analysis functions.



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

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

Your PC can do the detailed data collection and analysis work for you. Rheo2000 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, Rheo2000 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

Optional R/S Soft Solids Module

This software allows you to enhance the Rheo2000 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 our sample in a number of real life stress driven situations such as sedimentation, leveling, sag and slump.

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