NEW! RST Touch Series Rheometers

Touch Screen Rheometers for Controlled Rate/Stress Measurement

Lab Unlimited
CARL STUART GROUP

Auto spindle recognition
identifies barcode on spindle shaft

Quick Connect Spindle Coupling
for rapid spindle attachment (all models)

RST-CPS Model offers choice of automatic or manual gap setting

RST-CC Model allows for temperature control from -20·C to 180°C with choice of direct immersion in bath or external circulation with optional FTKY3 water jacket

RST-SST Model measures soft solid materials like mayonnaise with special option for joint compound (BU units)

RST Technical Specifications (all models)	
Maximum Torque:	100 mNm
Torque Resolution:	0.15 µNm
Speed:	0.01 to 1300 rpm
Data Output:	USB, RS232
Display Units:	cP, Pa•s, dynes/cm^2, Pa, °C, °F

The **NEW** RST series of touch screen rheometers offers the quickest and most comprehensive rheological testing capabilities for single point viscosity (QC) or complete flow curve analysis (R&D). With automatic data collection and analysis using optional **Rheo3000 software**, RST Rheometers offer greater flexibility and more features than other high-end rheometers in their class — at a fraction of the cost.

RST Rheometers have a durable design with rapid bob (spindle) attachment and easy-to-clean surfaces for years of trouble-free operation. Evaluate material behavior from initial yield stress through viscoelastic modulus to full flow curve response at variable shear rates to relaxation, recovery and creep.

The RST touch screen series is available in three configurations and all models feature:

- Controlled shear stress/rate operation to analyze flow behavior
- User friendly LCD touch screen with graphical display
- 11 memory slots for structured multi-step test programs
- Auto spindle identity recognition
- Quick connect coupling for easy spindle attachment
- Optional Rheo 3000 Software for PC control and data management
- **21 CFR compliance** for controlled user access and data security

A portable RS model without touch screen capability is also available.

Brookfield Viscometers & Rheometers

RST Touch Series Rheometer

Affordable Controlled Stress and Rate — Perfect for QC and R&D Applications

Some popular applications include:

ADHESIVES: RST-CPS tests a variety of silicone-based adhesives at temperatures in excess of >200°C. Advantages include small sample volume (< 2mL), rapid temperature equilibrium with Peltier plate, variable shear rate (to 7,800 sec^{-1}) to duplicate conditions for actual adhesive use, quick test time (< 2 min).

ADHESIVE INGREDIENTS: RST-CPS with Peltier control excels at rapid QC measurements at defined shear rates. Optional Peltier plate changes temperature much more quickly than bath/circulator. Test throughput increases dramatically.

BIOMASS: RST-CC with vane spindle in coax chamber measures biomass fluids used for biofuel production. Easily handles suspended solids and evaluates important flow properties by simulating what happens to the material during pumping in production.

CHOCOLATE: RST-CC is instrument of choice for select manufacturers who run 24/7 operations requiring robust, reliable performance. Choice of optional serrated bob (spindle). Conforms to DIN and ISO test methods which quantify yield stress and consistency using Casson analysis. Affordable alternative to higher priced rheometers.

DAIRY: RST-CC with double-gap geometry measures low viscosity (<0.1 Pa•s) dairy products ranging from skim milk to thicker creams.

GYPSUM: RST-SST is popular choice for measurement of joint compound manufactured by the gypsum industry in accordance with ASTM C474. Small footprint, data display in BU units, and robust design make it ideal for lab and production floor use.

PESTICIDES: RST-CC with double-gap geometry measures various low viscosity formulations (0.001 Pa•s) at shear rates up to 5,600 sec^{-1}. Provides reliable capability in a busy QC lab measuring dozens of samples each day.

PHARMACEUTICAL: RST-CPS with open plate design for easy sample placement accommodates a variety of small sample sizes (< 4mL) and rapid temperature control using the Peltier option. Produces quick profiling of flow behavior, including yield stress and creep, important properties for characterizing ointments.

PIGMENT DISPERSIONS: RST-CPS with Peltier is used by a range of industrial markets, including plastics and paints. Handles broad viscosity range from thin formulations (0.025 Pa•s) to non-flowing pastes. Broad shear rate capability simulates both processing of materials (pumping and mixing) and application of material (brushing and spraying).

SAUCES AND SYRUPS: RST-CPS with Peltier replaces traditional hour-long viscosity tests which measure product from a cooking vessel after it cools to room temperature. Peltier option cools sample to 25°C in less than 1 minute, greatly reducing test time.

SLUDGE/SLURRIES/CONCRETE: RST-SST with vane spindle geometry measures diverse mixtures with particulates ranging in concentration up to 70% solids.

RST Spindles

SPINDLE	VISCOSITY RANGE	SHEAR RATE	MAX. SHEAR STRESS	SAMPLE VOLUME
COAXIAL	Pa•s	sec^{-1}	Pa	mL
CCT-DG	0.00005-4.07K	0.043-5.64K	177	15.7
CCT-40	0.0003-27.6K	0.0215-2.79K	594	68.5
CCT-25	0.002-177K	0.013-1.67K	2.28K	16.8
CCT-14	0.012-1M	0.013-1.68K	13K	3.4
CCT-8	0.065-5.41M	0.013-1.672K	69.6K	1.0
CONE				
RCT-25-1	0.005-407K	0.06-7.8K	24.4K	0.1
RCT-25-2	0.01-814K	0.03-3.9K	24.4K	0.2
RCT-50-1	0.0006-50.9K	0.06-7.8K	3.05K	1.0
RCT-50-2	0.0012-101K	0.03-3.9K	3.05K	2.0
RCT-75-1*	0.0002-15K	0.06-7.8K	905	2.5
RCT-75-2*	0.0004-30K	0.03-3.9K	905	5.0
PLATE				
RPT-25	0.03-2.49M	0.013-1.7K	32.6K	0.5
RPT-50	0.002-155K	0.027-3.4K	4.07K	2.0
RPT-75*	0.0004-30.7K	0.04-5.1K	1.2K	4.5

*75mm cones/plates cannot be used with Peltier sytems. 1 Pa•s = 1,000 cP K = 1 thousand M = 1 million
Note: Values based on minimum speed of 0.01 RPM and maximum speed of 1300 RPM

RST Vane Spindles

SPINDLE	VANE LENGTH	VANE DIAMETER	SHEAR STRESS
	mm	mm	Pa
VT-10-5	10	5	330-210K
VT-20-10	20	10	41-27K
VT-20-20	20	20	9-5.9K
VT-30-15	30	15	12-8K
VT-40-20	40	20	5.2-3.4K
VT-40-40	40	40	1.2-740
VT-50-25	50	25	2.7-1.7K
VT-60-8	60	8	24-15K
VT-60-15	60	15	7-4.3K
VT-60-30	60	30	1.6-1K
VT-80-40	80	40	0.7-420
VT-80-70	80	70	0.2-120

K = 1 thousand

RST Rheometer Oil Fluids (calibrated at 25.0°C)

Cone Spindle	Brookfield Part #	Nominal Viscosity cP (mPa•s)
RCT-25-1	B41000	41,000
RCT-25-2	B73000	73,000
RCT-50-1	B10200	10,200
RCT-50-2	B21000	21,000
RCT-75-1	B4900	4,900
RCT-75-2	B10200	10,200

RST Rheometer Oil Fluids (calibrated at 25.0°C)

Coaxial Spindle	Brookfield Part #	Nominal Viscosity cP (mPa•s)
CCT-DG	B200	200
CCT-40	B2000	2,000
CCT-25	B4900	4,900
CCT-14	B10200	10,200
CCT-8	B41000	41,000

RST-CPS Touch Screen Rheometer

Cone/Plate & Plate/Plate Systems for Small Samples and Wide Shear Rate Ranges

Controlled shear stress/shear rate operation makes it easy to study material behavior from initial yield to flow curve response

User-friendly Touch Screen and graphical display for stand-alone operation

Quick Connect Coupling System for easy spindle attachment

Very Small Sample Size permits rapid test set up and clean up

Auto spindle recognition identifies barcode on spindle

Optional Rheo3000 Software allows for PC control and data acquisition/analysis of multiple test files

Choice of Automatic or Manual Gap Setting

Rapid Temperature Control of plate with Peltier option for quick profiling of viscosity vs. temperature

	VISCOSITY RANGE (Pa•s)		SPEEDS
MODEL	Min.	Max.	RPM
RST-CPS Cone/Plate	0.0006	814K	0.01-1.3K
RST-CPS Plate/Plate	0.002	2.49M	0.01-1.3K

K = 1 thousand M = 1 million 1 Pa•s = 1000 cP (centipoise)

Temperature Control Options†		
MODEL	**Description**	**Temperature**
RST-CPS-FH	Bath	-20° to 200°C
RST-CPS-PA	Peltier Air	20° to 180°C*
RST-CPS-PO	Peltier Oil	0° to 180°C*
RST-CPS-EH	Electric	40° to 250°C

† Higher temperatures available on request. *75mm cones/plates cannot be used with Peltier systems.

What's Included?

Instrument (with choice of water bath, Peltier or electric temperature control for sample plate)

Convenience Package (USB Flash Drive, Stylus, Cleaning Cloth, Screen Protector)

Optional Accessories

Choice of cone or plate spindle geometries
at least one is required

Rheo3000 Software (pg 6)

Viscosity Standards (pg 2)

Water Baths

Solvent Trap

Thermal Barrier

KE Cooling Device

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

Thermal Barrier reduces the effects of heat transfer to the environment. Two part chamber provides thermal isolation of the measurement zone.

The optional KE cooling device is required to cool viscometer bearings when testing with temperatures above 70°C.

RST-CC Touch Screen Rheometer

Coaxial Cylinder DIN Geometries for Single Point QC or Full Rheological Profiling

Auto spindle recognition
identifies barcode on spindle shaft

Controlled shear stress/shear rate
operation makes it easy to study material behavior from initial yield to flow curve response

Optional Rheo3000 Software
allows for PC control and data acquisition/analysis of multiple test files

Quick Connect Coupling
for easy bob (spindle) attachment

Rugged Design
permits use on production floor

Small sample size
facilitates rapid temperature control during testing

Temperature Control from -20°C to 180°C
Choice of
- Direct immersion in bath
- External circulation using the FTKY3 Water Jacket

What's Included?

Instrument with stand and adjustable height control with base

Convenience Package (USB Flash Drive, Stylus, Cleaning Cloth, Screen Protector)

Optional Accessories

Choice of Coaxial Cylinder Bob (spindle) and Chamber
at least one bob and chamber is required

FTKY3 Water Jacket for Temperature Control

Rheo3000 Software (pg 6)

Viscosity Standards (pg 2)

Cone/Plate Accessory

KE Cooling Device
(required for temperatures over 70°C)

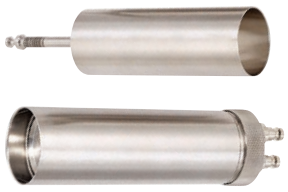
PT-E Immersion Temperature Sensor

Disposable Chambers

Water Jacket

Chambers

Coaxial Cylinder Spindles



Double Gap Coaxial Cylinder for very low viscosity materials

	VISCOSITY RANGE (Pa•s)		SPEEDS
MODEL	Min.	Max.	RPM
RST-CC Coaxial Cylinder	.00005	5.41M	0.01-1.3K

K = 1 thousand M = 1 million 1 Pa•s = 1000 cP (centipoise)

RST-SST Touch Screen Rheometer

Soft Solids Tester for Pastes, Slurries and Materials with Particulates

Auto spindle recognition
identifies barcode on spindle shaft

Measured Values
- Yield Stress
- Shear Modulus
- Recovery
- Creep

Optional Rheo3000 Software
allows for PC control and data acquisition/analysis of multiple test files

Quantifies meaningful properties
like stiffness, wobbliness, sloppiness, consistency and texture

Capable of measurements in BU units for viscous materials such as joint compound

Vane Spindle Geometry
- Quick-Connect coupling
- Rapid spindle insertion without compromising sample structure
- Quick and easy test method

Coaxial Cylinders
can also be used for complete flow curve analysis

	SHEAR STRESS (Pa)	
MODEL	Min.	Max.
RST-SST Soft Solids Tester	0.2	218K

K = 1 thousand Pa = Pascal

What's Included?

Instrument with base plate for sample placement and adjustable height control for rheometer head

Convenience Package (USB Flash Drive, Stylus, Cleaning Cloth, Screen Protector)

Optional Accessories

Choice of Spindle Geometries
at least one is required:
- Vane (spindle)
- Coaxial Cylinder Bob (spindle) & Chamber

Rheo3000 Software (pg 6)
Viscosity Standards (pg 2)
Cone/Plate Accessory
Thermosel System
PT-E Immersion Temperature Sensor

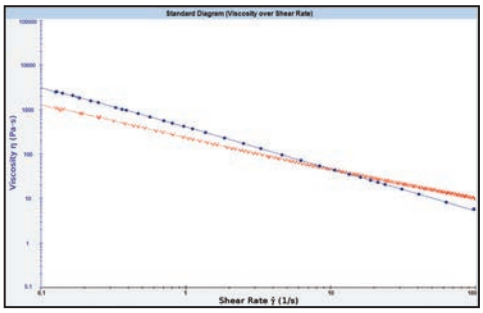
Choice of several vane spindle options

RST-90Y Spindle for BU measurements on joint compound and similar materials

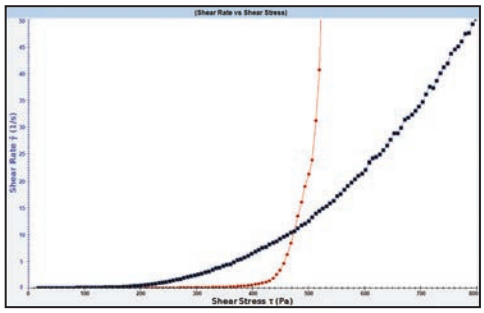
Cone/Plate Accessory
provides extended range capability for shear rate and viscosity

Rheo3000 Software

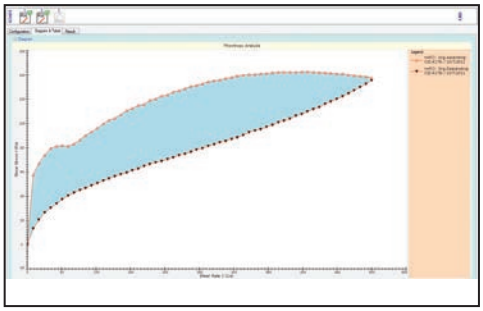
for Quick and Comprehensive Data Analysis Capabilities with RST series Rheometers



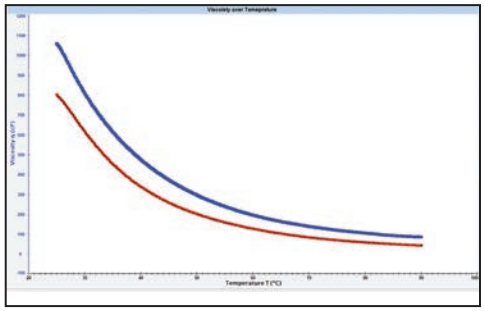
Viscosity Flow Curve: *controlled shear stress ramp produces viscosity vs. shear rate graph for two pseudoplastic materials.*



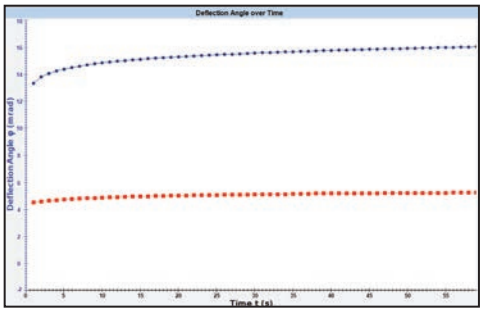
Yield Stress Determination: *shear stress ramp from 0 to 800 Pa over 2 minutes shows yield stress values of 200 and 400 Pa for two materials.*



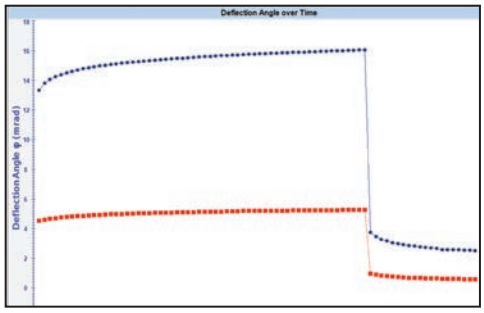
Thixotropy Analysis: *Up/down shear rate ramp produces two shear stress vs. shear rate curves; thixotropy calculation is 20977 Pa/s (the area between the curves).*



Temperature Profile: *Viscosity is measured at constant shear rate of 250 1/s while temperature increases from 25°C to 90°C using RST Cone Plate Rheometer.*



Creep Behavior: *Material flow under constant stress is measured by detecting angular rotation of spindle.*



Recovery: *Elastic property of material is characterized by spindle relaxation (backward rotation) after constant stress is removed.*

Enhance your productivity

VIA PC CONTROL WHEN CHARACTERIZING MATERIAL RHEOLOGY

Your PC can do the detailed data collection and analysis work for you. Rheo3000 allows you to program the RST Rheometer and control shear stress or shear rate. Data is saved in a SQL database for easy access by multiple users on a network. Use multiple step test programs for complete characterization of material flow behavior: viscoelastic modulus, yield stress, viscosity flow curve, creep behavior, recovery.
In addition, Rheo3000 provides automated analysis of fluid behavior against user-defined control limit values, resulting in better quality control.
Mathematical data processing models included are: Newton, Bingham, Casson, Ostwald, Steiger-Ory, and Herschel-Bulkley.
Helpful features include:

- 21 CFR compliance option for controlled user access and data security
- Active clock on screen shows test progress to completion
- Export reports in pdf format; choose parameters of interest, discard others

PC Requirements

1.5 GHz Processor
1 GB System Memory
2.5 GB Hard Drive
VGA Graphics Adapter
1 USB/serial port (2 required for external temperature controller)

BROOKFIELD

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