



# viscometer rheometer

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# Why measure viscosity?

The ability to gather data on a material's viscosity behavior gives manufacturers an important "product dimension." Knowledge of a material's rheological characteristics is valuable in predicting its pourability, its performance in a dipping or coating operation, or the ease with which it may be handled, processed, or used. The interrelation between rheology and other product dimensions often makes the measurement of viscosity the most sensitive or convenient way of detecting changes in color, density, stability, solids content, and molecular weight.

## Why Choose AMETEK Brookfield?

Ease of use, flexibility, reliable performance and quality of service have made AMETEK Brookfield Viscometers favorites all over the world. All AMETEK Brookfield Viscometers are accurate within  $\pm 1.0\%$  of the range in use and have a reproducibility within  $\pm 0.2\%$ . Test results can be duplicated anywhere in the world when the same model instrument is used.

## Price

### Choices for Instrumentation

This chart shows the AMETEK Brookfield family of Laboratory Viscometers and Rheometers at a glance. This will help to give you a general idea of what is available before making a decision. The horizontal axis indicates performance capability and features while the vertical axis addresses price level.

Need to measure viscosity in-line?  
AMETEK Brookfield also offers a complete line of process viscometers. (p78)



**Dial Reading**  
• Torque



**DVE**  
• Calculates Viscosity  
• Torque



**DV1**  
• Optional Temp Probe  
• Calculates Viscosity  
• Torque



**DV1 Cone/Plate**  
• Small Sample Size  
• Defined Shear Rate



**DV2T Cone/Plate**  
• Small Sample Size  
• Defined Shear Rate



**DV2T**  
• Touch Screen Interface  
• Temp Probe  
• Data / User Security  
• PC Control  
• Calculates Viscosity  
• Torque



**DV3T Cone/Plate**  
• Small Sample Size  
• Defined Shear Rate



**DV3T**  
• Touch Screen Interface  
• Real Time Graphing  
• Temp Probe  
• Data / User Security  
• PC Control  
• Calculates Viscosity  
• Torque  
• Yield Stress



**CAP 2000+ Cone/Plate**  
• Broad Shear Rate Range  
• Peltier Plate Temp Control  
• RS232 (PC control)



**RST Cone/Plate**  
• Peltier Plate



**RST Coaxial Cylinder**  
• Controlled Stress & Rate  
• Yield Stress  
• Stand Alone Programmable  
• Temp Probe  
• USB & RS232  
• Calculates Viscosity  
• Torque



**PVS Rheometer**  
• Pressurized Sample Chamber  
• Controlled Rate  
• Temp Probe  
• RS232/USB  
• Calculates Viscosity  
• Torque

## Performance

### SPECIAL PURPOSE INSTRUMENTS



**KU-3 Viscometer**  
• KREBS Viscosity  
• Required for Paint and Coatings



**CAP 1000+ Cone/Plate**  
• Single Shear Rate  
• Required for Paints and Coatings



**RST Soft Solids Tester**  
• Yield Stress  
• Creep  
• Recovery



**Falling Ball Viscometer**  
• Viscosity  
• Used for QC & Academic Institutions



**BF35 Viscometer**  
• Viscosity  
• Used for Oil Drilling & Fracturing Fluids

AMETEK Brookfield also offers several special purpose instruments which are used to perform a specific type of test or are used to evaluate certain types of materials.



Questions to Consider

- 1. What is the viscosity range of your material: Low, medium, high?
- 2. What rotational speeds or shear rates are important?
- 3. How much sample is available for testing?
- 4. Is temperature measurement/control necessary?
- 5. Do you need to record the viscosity data?

The Selection Method

The Model Selection Table (shown at right) shows detailed information on standard AMETEK Brookfield Viscometers/Rheometers, including the Dial Reading, DVE, DV1, DV2T, and DV3T. The Applications Table (shown at lower right) shows information on typical applications of the standard AMETEK Brookfield viscosity ranges. There may be industry or supplier/vendor specifications that you need to duplicate. Before making a final selection, we suggest that you confer with people in your industry to find out which AMETEK Brookfield Viscometer they are using so that your data can be correlated. More application details may be found throughout this catalog for other AMETEK Brookfield instruments on the following pages:

CAP 1000+/2000+ Viscometers (p22-23) KU-3 Viscometer (p17)  
PVS Rheometer (p30-31) CT3 Texture Analyzer (p54-67)  
RST Touch Series Rheometers (p24-29)

In addition, you may wish to call us and discuss your application or refer to our extensive library of technical papers which covers a complete spectrum of applications. We can also test your materials at AMETEK Brookfield to recommend the instrument most suitable for your application.

Spindles

Standard AMETEK Brookfield Viscometers/Rheometers are supplied with a standard spindle set constructed of stainless steel (#302). Additional spindle options are available in #316 stainless steel or with Teflon coating for increased corrosion resistance. Other spindles and accessories are also available. (p45-48)

Cylindrical Spindles

Cylindrical spindles are particularly valuable when measuring non-Newtonian fluids and are applicable to any AMETEK Brookfield Viscometer model with the use of appropriate range tables. Cylindrical spindles may be substituted for standard spindles upon request.



Need additional assistance? Our website, [www.brookfieldengineering.com](http://www.brookfieldengineering.com), contains additional information on the measurement selection process as well as detailed application notes.

Model Selection Table  
AMETEK Brookfield Standard  
Viscometers/Rheometers

	**MODEL	Min. cP (mPa.s) VISCOSITY RANGE	Max. cP (mPa.s) VISCOSITY RANGE	NUMBER OF SPEEDS	# of Spindles Supplied
LOW VISCOSITY	LVT	1*	2 M	8	4
	DVELV	1*	2 M	18	4
	DV1LV	1*	2 M	18	4
	DV2TLV	1*	6 M	200	4
	DV3TLV	1*	6 M	2600	4
MEDIUM VISCOSITY	RVT	100	8 M	10	6
	DVERV	100	13 M	18	6
	DV1RV	100	13 M	18	6
	DV2TRV	100	40 M	200	6
	DV3TRV	100	40 M	2600	6
HIGH VISCOSITY	HAT	200	16 M	10	6
	DVEHA	200	26 M	18	6
	DV1HA	200	26 M	18	6
	DV2THA	200	80 M	200	6
	DV3THA	200	80 M	2600	6
	HBT	800	64 M	10	6
	DVEHB	800	104 M	18	6
	DV1HB	800	104 M	18	6
	DV2THB	800	320 M	200	6
	DV3THB	800	320 M	2600	6

\*\* Standard torque range values M = 1 millin  
\* Minimum ranges can be extended to as low as 1 cP with the use of accessories

Applications Table

Consider application and viscosity range when selecting model (LV, RV, HA, HB)

LV SERIES – LOW VISCOSITY

Adhesives (solvent base)	Juices	Photo Resist
Biological Fluids	Latex	Polymer Solutions
Chemicals	Milk	Rubber Solutions
Dairy Products	Oils	Solvents
Hot Waxes	Paints and Coatings	
Inks	Pharmaceuticals	

RV SERIES – MEDIUM VISCOSITY

Adhesives (hot melt)	Food Products	Paper Pulp
Asphalt (SHRP)	Gums	Plastisols
Ceramic Slurries	Inks (screen printing)	Starches
Cosmetics	Organisols	Surface Coatings
Creams	Paints	Toothpaste
Dairy Products	Paper Coatings	Varnish

HA/HB SERIES – HIGH VISCOSITY

Asphalt	Pastes
Caulking Compounds	Peanut Butter
Chocolate	Putty
Epoxies	Roofing Compounds
Gels	Sealants
Inks (ballpoint, offset, lithographic)	Sheet Molding Compound
Molasses	Tars

# DV3T™ Rheometer

the all-in-one tool for measuring viscosity and yield stress

## 7-inch Full Color Touch Screen Display

- New User Interface
- Enhanced Controls
- Real Time Graphing
- Supports Multiple Languages

## Displayed Info:

- Viscosity (cP or mPa•s)
- Temperature (°C or °F)
- Shear Rate/Stress
- % Torque
- Speed/Spindle
- Step Program Status
- Math Model Calculations

**Built-in math models** for data analysis in stand-alone mode. E.g. Casson, Bingham, Power Law, Thix Index

## Enhanced Security

- Customizable User Access
- Date and Time Stamp File
- Password Access
- Portable Log-in Settings

## Built-In Options

- Math Modeling
- Temperature Control
- Yield Tests
- Programmable QC Limits/Alarms

**Analyze characteristics** such as yield stress, flow curves (mixing, pumping, spraying), leveling and recovery

**USB PC Interface** provides optional computer control and automatic data collection capability

**Convenient Bubble Level**

**Internal Data Storage: 150 MB**



## Integrated Temperature Control

with connection to AMETEK Brookfield TC series Baths and AP/SD Controllers or AMETEK Brookfield Thermosel System.

## Stand-alone programming

or download custom test programs with PG Flash Software.

## Built-in RTD Temperature Probe

**Accuracy:  $\pm 1.0\%$  of range**

- Displayed with test data

**Repeatability:  $\pm 0.2\%$**

## What's Included?

### Instrument

6 spindles (RV/HA/HB) (p45)  
or 4 spindles (LV) (p45)

PG Flash Software ►

RTD Temperature Probe

Spindle Guard Leg\*

Lab Stand (Model G) (p50)

Convenience Pack

Cleaning Cloth, Screen Protectors

Carrying Case

\*Not applicable to HA or HB torque models

## Optional Accessories

RheocalcT Software ►

Label Printer (p51)

Vane Spindles (p43 & 48)

Ball Bearing Suspension (p50)

Viscosity Standards (p52)

RV/HA/HB-1 Spindle (p45)

EZ-Lock Spindle Coupling System (p50)

Quick Action Lab Stand (p50)

Temperature Bath (p33-35)

Small Sample Adapter (p38)

UL Adapter (p40)

Thermosel (p36)

Helipath Stand with T-bar Spindles (p42)

Spiral Adapter (p44)

DIN Adapter (p44)

Quick Connect/Extension Links (p49)

MODEL	VISCOSITY RANGE cP(mPa•s)		SPEEDS (2600 available)	
	Min.	Max.	RPM	Number of Increments
DV3TLV	1†	6M	.01-250	2.6K
DV3TRV	100††	40M	.01-250	2.6K
DV3THA	200††	80M	.01-250	2.6K
DV3THB	800††	320M	.01-250	2.6K
DV3T5xHB	4K	1.6B	.01-250	2.6K

† 1 cP achieved with UL Adapter accessory, 15 cP on LV with standard spindles.

†† Minimum viscosity is achieved with optional RV/HA/HB-1 spindle.

B = 1 billion M = 1 million K = 1 thousand cP = Centipoise  
mPa•s = Millipascal•seconds

## PG Flash Software Included

PROGRAM GENERATOR SOFTWARE FOR CUSTOMIZING  
TEST CRITERIA FOR ROUTINE PRODUCT QC

This exclusive AMETEK Brookfield software allows you to create repeatable custom tests on your PC! Once the program (up to 25 steps) is created, it can be downloaded to a supplied USB flash drive and then uploaded to any DV3T Viscometer.



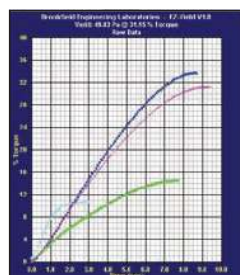
*PG Flash allows users to create repeatable custom tests with all of the built-in options on the DV3T plus the addition of multiple program lines (up to 25 steps). Create the program on the PC and download to a USB Flash Drive. Upload the program from the USB Flash Drive to the DV3T.*

## RheocalcT Software Optional (see p14 for more details)

GET TOTAL CONTROL OF YOUR INSTRUMENT AND TEST PARAMETERS

Automatically control the instrument and collect data with RheocalcT running on a dedicated PC with USB interface. RheocalcT can analyze data, generate multiple plot overlays, print tabular data, run math models and perform other time-saving routines. Up to five comparison data sets can be plotted and saved. Other features include:

- Wizards to guide you through the creation of common tests
- Yield Testing, alone, or in conjunction with other viscosity measurements
- Secure 21CFR features including multiple logins, access levels, digital signatures, and data storage in a password-protected database
- Looping functions for repetitive tasks
- Averaging of collected data by individual step or whole test
- Math models: Bingham, Casson, Power Law, Herschel-Bulkley
- Export data to Excel® file format
- Create data reports in PDF format



TORQUE RANGE	SHEAR STRESS RANGE	
	Pa	dyne/cm <sup>2</sup>
LV	Contact Brookfield	
RV	.5-100	5-1K
HA	1-200	10-2K
HB	4-800	40-8K
5xHB	20-4K	200-40K

*Yield tests can be performed with the use of optional vane spindles.*



## DV3TCP

The DV3T is available in a Wells/Brookfield Cone & Plate Version

Must be ordered when instrument is first purchased. (p20)



## DV3T with Optional Vane Spindles

DV3T Rheometers have a built-in yield stress measurement capability that determines the stress required to initiate flow of slow moving or paste materials. Vane spindles can be immersed into a material without destroying the underlying structures that contribute to yield. The DV3T offers test parameters that create a specific yield test protocol that can be utilized for QC testing or research.

## DV3T Extra

Includes our ball bearing suspension system, EZ-Lock Spindle Coupling System, Quick Action Lab Stand and FREE RheocalcT software.

# DV2T™ Viscometer

our most versatile continuous sensing viscometer

## 5.7-inch Full Color Touch Screen Display

- New User Interface
- Enhanced Controls
- Real Time Trend Indicator
- Supports Multiple Languages

## Displayed Info:

- Viscosity (cP or mPa•s)
- Temperature (°C or °F)
- Shear Rate/Stress
- % Torque
- Speed/Spindle
- Step Program Status

## Enhanced Security

- Customizable User Access
- Date and Time Stamp File
- Password Access
- Portable Log-in Settings

## Built-in Options

- Timed Tests
- Data Averaging
- Programmable QC Limits/Alarms
- Customizable Speed/Spindle Lists
- Test Based User Instructions
- On Screen Data Comparison

## Auto Range Showing

- Maximum viscosity measured with Spindle/Speed combination

**USB PC Interface** provides optional computer control and automatic data gathering capability



## Convenient Bubble Level

**Download custom test programs** with PG Flash Software (included with instrument)

**Accuracy: ±1.0% of range**  
- Displayed with test data

**Repeatability: ±0.2%**

**Built-in RTD Temperature Probe**

**Internal Data Storage: 150 MB**

## What's Included?

### Instrument

6 spindles (RV/HA/HB) (p45)  
or 4 spindles (LV) (p45)

PG Flash Software ►

RTD Temperature Probe

Spindle Guard Leg\*

Lab Stand (Model G) (p50)

Convenience Pack  
Cleaning Cloth, Screen Protectors

Carrying Case

\*Not applicable to HA or HB torque models

## Optional Accessories

RheocalcT Software ►

Label Printer (p51)

Vane Spindles (p43 & 48)

Ball Bearing Suspension (RV/HA/HB) (p50)

Viscosity Standards (p52)

RV/HA/HB-1 Spindle (p45)

EZ-Lock Spindle Coupling System (p50)

Quick Action Lab Stand (p50)

Temperature Bath (p33-35)

Small Sample Adapter (p38)

UL Adapter (p40)

Thermosel (p36)

Helipath Stand with T-bar Spindles (p42)

Spiral Adapter (p44)

DIN Adapter (p44)

Quick Connect/Extension Links (p49)

MODEL	VISCOSITY RANGE cP(mPa•s)		SPEEDS (200 available)	
	Min.	Max.	RPM	Number of Increments
DV2TLV	1†	6M	.1-200	200
DV2TRV	100††	40M	.1-200	200
DV2THA	200††	80M	.1-200	200
DV2THB	800††	320M	.1-200	200

† 1 cP achieved with UL Adapter accessory. 15 cP on LV with standard spindles.  
†† Minimum viscosity is achieved with optional RV/HA/HB-1 spindle.  
M = 1 million cP = Centipoise mPa•s = Millipascal•seconds



## PG Flash Software Included

PROGRAM GENERATOR SOFTWARE FOR CUSTOMIZING  
TEST CRITERIA FOR ROUTINE PRODUCT QC

This exclusive AMETEK Brookfield software allows you to create repeatable custom tests on your PC! Once the program (up to 25 steps) is created, it can be downloaded to a supplied USB flash drive and then uploaded to any DV2T Viscometer.



*PG Flash allows users to create repeatable custom tests with all of the built-in options on the DV2T plus the addition of multiple program lines (up to 25 steps). Create the program on the PC and download to a USB Flash Drive. Upload the program from the USB Flash Drive to the DV2T.*

## RheocalcT Software Optional (see p14 for more details)

GET TOTAL CONTROL OF YOUR INSTRUMENT AND TEST PARAMETERS

Automatically control the instrument and collect data with RheocalcT running on a dedicated PC with USB interface. RheocalcT can analyze data, generate multiple plot overlays, print tabular data, run math models and perform other time-saving routines. Up to five comparison data sets can be plotted and saved. Other features include:

- Wizards to guide you through the creation of common tests
- Secure 21CFR features including multiple logins, access levels, digital signatures, and data storage in a password-protected database
- Looping functions for repetitive tasks
- Averaging of collected data by individual step or whole test
- Math models: Bingham, Casson, Power Law, Herschel-Bulkley
- Export data to Excel® file format
- Create data reports in PDF format



## DV2TCP

The DV2T is available in a Wells/Brookfield Cone & Plate Version  
Must be ordered when instrument is first purchased. (p20)



## DV2T EXTRA™ Viscometer

The “EXTRA” combines all the versatile viscosity testing capabilities of a DV2T with time and money-saving features such as a durable ball bearing suspension system, EZ-Lock Spindle Coupling, Quick Action Lab Stand and FREE Rheocalc T Software.



# DV1™ Viscometer

The only viscometer in its class to offer continuous sensing and data display at such a low price!

## User Configuration Display

- User choice of most important parameter is displayed in larger font size
- Choice of static or scrolling display mode

## Displayed Info:

- Viscosity (cP, P, mPa•s, Pa•s)
  - % Torque
  - Speed/Spindle
  - Temperature (°C or °F)
- if RTD Temperature Probe is purchased

## Choice of Multiple Languages

English, French, German, Portuguese, Russian, Spanish

**USB PC interface** for use with optional Wingather SQ Software

## 18 speeds

provide great range capability

## Optional RTD Temperature Probe DVP-94Y

## Direct access

to time measurement function (time to torque, time to temperature, time to stop)

## Accuracy:

±1.0% of range

## Repeatability: ±0.2%

## Temperature off-set

capability to ±5°C

## Automatic Range Calculation:

- Full Scale Range (FSR) at 100%
- Maximum viscosity measured with Spindle/Speed combination

## Simplified User interface

for more direct access to features

## Printing to Dymo® Printer Capability

## Stylish Model G Base



## What's Included?

### Instrument

6 spindles (RV/HA/HB) (p45)

or 4 spindles (LV) (p45)

Spindle Guard Leg\*

Lab Stand (Model G) (p50)

Carrying Case

\*Not applicable to HA or HB torque models

## Optional Accessories

Wingather SQ Software ►

RTD Temperature Probe

Ball Bearing Suspension (RV/HA/HB) (p50)

EZ-Lock Spindle Coupling System (p50)

Viscosity Standards (p52)

Protective Keypad Covers (p51)

Dymo Printer (p51)

RV/HA/HB-1 Spindle (p45)

Quick Action Lab Stand (p50)

Temperature Bath (p33-35)

Small Sample Adapter (p38)

UL Adapter (p40)

Thermosel (p36)

Helipath Stand with T-bar Spindles (p42)

Spiral Adapter (p44)

DIN Adapter (p44)

Quick Connect/Extension Links (p49)

Vane Spindles (p43 & 48)

MODEL	VISCOSITY RANGE cP(mPa•s)		SPEEDS	
	Min.	Max.	RPM	Number of Increments
DV1MLV	1*	2M	.3-100	18
DV1MRV	100	13M	.3-100	18
DV1MHA	200	26M	.3-100	18
DV1MHB	800	104M	.3-100	18

\* Minimum ranges can be extended to as low as 1 cP with the use of accessories

\*\* Standard torque range values

M = 1 million cP = Centipoise mPa•s = Millipascal•seconds

**Wingather SQ Software** Optional (see p14 for more details)  
DATA COLLECTION SOFTWARE TO COLLECT, ANALYZE AND RECORD TEST DATA

Wingather software provides an easy way to gather data and plot graphs while creating permanent test records.

Important features and benefits enhance operator versatility in performing viscosity tests:

- Multiple test modes to enhance data collection
- Follow up events including analysis through math models which calculate yield stress and plastic index
- Automatic sample numbering
- Data graphing of up to 20 data sets concurrently
- Data export to spread sheet format (Excel®)



The DV1 Viscometer communicates to the PC through USB A port. The interface cable is supplied with Wingather SQ Software. Successful communication is indicated by a green light beside the port designation.

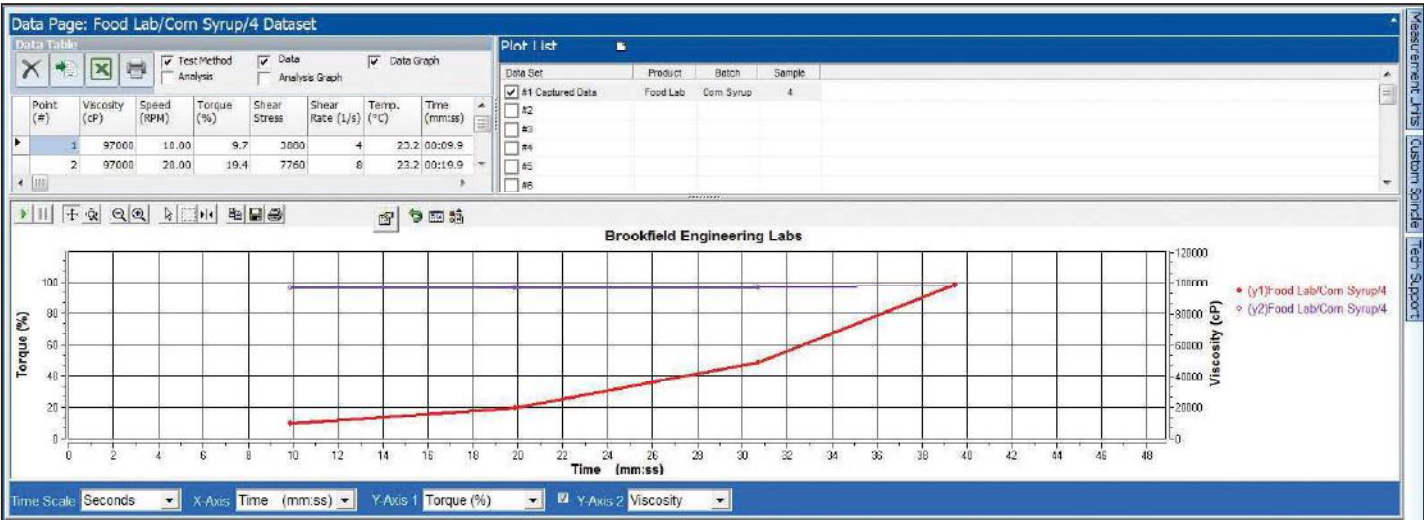


**DV1CP**

The DV1 is available in a Wells/Brookfield Cone & Plate Version  
Must be ordered when instrument is first purchased. (p20)



Dashboard shows current test information.



Data table and graph shows test record at a glance.

# Do You Need Software?

Which instrument/software combination is best for you?

Using software with your AMETEK Brookfield DV1, DV2T and DV3T has many advantages. Software enhances the capabilities of your instrument and allows for a more productive environment as automated tasks reduce test time and operator errors. Which instrument/software combination is best for you? This decision can easily be made by determining which features are the most important to your operation and seeing which instrument has the capabilities that best suits your overall requirements.

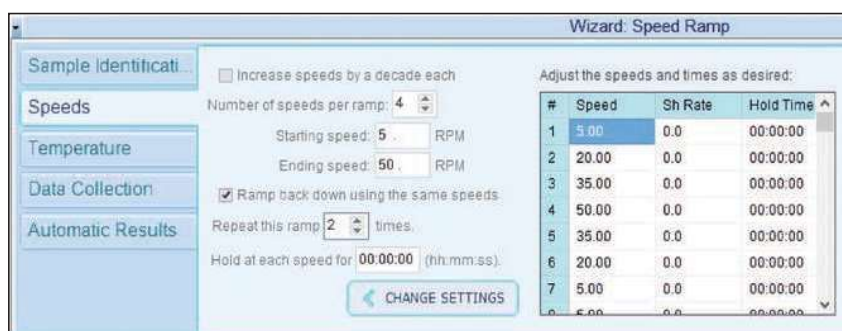
## RheocalcT Test Wizards

Like wizards used in every day office software programs, RheocalcT test wizards are there to reduce the time and effort needed to set up or run a test. RheocalcT test wizards run a thix index test (calculate the ratio of viscosity at low speed vs. viscosity at a higher speed) or control the instrument to automatically reduce speed at preset torque values (curing test). Some other test methods that can easily be created with the RheocalcT test wizard include:

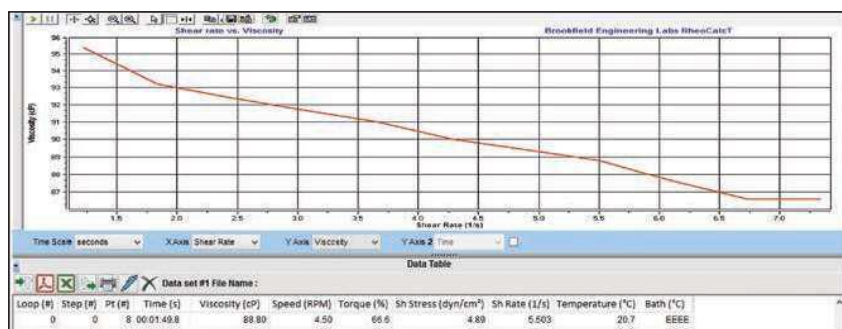
- Time to stop
- Time to torque
- Speed ramp / shear rate ramp
- Temperature profiling
- Yield stress test (DV3T)

	RheocalcT		Wingather SQ
FEATURES & BENEFITS available with software	DV3T	DV2T	DV1
Connect instrument to PC with USB port	•	•	•
Plot live data with graphical view of viscosity during tests	•	•	•
Import legacy templates and test data	•	•	•
Export data to Excel-compatible file format	•	•	•
Create data reports in .pdf file format	•	•	•
Create tests for various conditions using built-in test methods	•	•	•
Run yield stress test with EZ-Yield program	•		
Compare multiple test results on a single graph	•	•	•
Analysis through math models (yield stress and plastic index)	•	•	•
Analysis through math models (Bingham, Casson, Power Law, Herschel-Bulkley)*	•	•	•
Button click to access up to five stored programs			•
Store and easily access up to 10 programs	•	•	
Transfer collected data to a PC through thumb drive	•	•	•
Customized data graphs	•	•	•
Generate multiple plot overlays and print tabular data	•	•	
Test wizard for quick and easy test method creation	•	•	
Security features for user access and data integrity (21CFR P11)	•	•	
Ability to control Brookfield Temperature Bath and ThermoSOL	•	•	
Looping function for repetitive tasks	•	•	
Data collection averaging by individual steps or entire test	•		

\*Math models feature is available in DV3T with or without RheocalcT software.



Test Condition Entry Screen for Speed Test Wizard



Example of RheocalcT Speed Test Results



# DVE™ Viscometer

our most affordable digital viscometer

## New User Interface

- Keypad control
- Sharp viewing screen for close up or distance viewing

## No calculations required

- Direct reading of viscosity

## Displayed Info:

- Viscosity (cP, P, mPa•s or Pa•s)
- % Torque
- Speed/Spindle

## Easy-to-Use

### Range

push for determining full scale range (FSR) viscosity

### 18 Speeds

for complete range capability

### Bubble level

conveniently located for easy adjustment

**Accuracy:  $\pm 1.0\%$  of range**

**Repeatability:  $\pm 0.2\%$**



## What's Included?

Instrument

6 spindles (RV/HA/HB) (p45)

or 4 spindles (LV) (p45)

Spindle Guard Leg\*

Lab Stand (Model A) (p50)

Carrying Case

\*Not applicable to HA or HB torque models

## Optional Accessories

Viscosity Standards (p52)

RV/HA/HB-1 Spindle (p45)

Quick Action Lab Stand (p50)

Temperature Bath (p33-35)

Small Sample Adapter (p38)

UL Adapter (p40)

Thermosel (p36)

DIN Adapter (p44)

Quick Connect/Extension Links (p49)

MODEL	VISCOSITY RANGE cP(mPa•s)		SPEEDS	
	Min.	Max.	RPM	Number of Increments
DVELV	1†	2M	.3-100	18
DVERV	100††	13M	.3-100	18
DVEHA	200††	26M	.3-100	18
DVEHB	800††	104M	.3-100	18

† 1 cP achieved with UL Adapter accessory, 15 cP on LV with standard spindles.

†† Minimum viscosity is achieved with optional RV/HA/HB-1 spindle.

M = 1 million cP = Centipoise mPa•s = Millipascal•seconds

# Dial Reading Viscometer

our original...over 80 years!

**The Worldwide Standard**  
Viscometer

**Easy-to-Select Speeds**

**Electronic Drive**  
means quiet,  
reliable operation

**Analog display**  
- Shows % Torque  
- Use Factor Finder  
to convert reading to centipoise

**Simple-to-use,**  
easy setup

**2-Year Limited Warranty**

**Available in explosion proof**  
U.L. Class 1, Division 1,  
Group D locations  
(w/o Electronic Drive)

**Accuracy:  $\pm 1.0\%$  of range**

**Repeatability:  $\pm 0.2\%$**



## What's Included?

Instrument

6 spindles (RV/HA/HB) (p45)

or 4 spindles (LV) (p45)

Spindle Guard Leg\*

Lab Stand (Model A) (p50)

Carrying Case

\*Not applicable to HA or HB torque models

## Optional Accessories

Viscosity Standards (p52)

RV/HA/HB-1 Spindle (p45)

Quick Action Lab Stand (p50)

Temperature Bath (p33-35)

Small Sample Adapter (p38)

UL Adapter (p40)

Thermosel (p36)

Spiral Adapter (p44)

DIN Adapter (p44)

Quick Connect/Extension Links (p49)

Vane Spindles (p43 & 48)

MODEL	VISCOSITY RANGE cP(mPa•s)		SPEEDS	
	Min.	Max.	RPM	Number of Increments
LVT	1†	2M	.3-60	8
RVT	100††	8M	.5-100	10
HAT	200††	16M	.5-100	10
HBT	800††	64M	.5-100	10

† 1 cP achieved with UL Adapter accessory, 15 cP on LV with standard spindles.  
†† Minimum viscosity is achieved with optional RV/HA/HB-1 spindle.  
M = 1 million cP = Centipoise mPa•s = Millipascal•seconds



*Easy Speed  
Adjustment  
and On/Off  
Control*

# NEW KU-3™ Viscometer

for Paints, Coatings, and Inks

**ASTM D562 Compatible**  
(industry specification)

**New Magnetic Spindle Coupling**

**New User Interface**  
with touch control & auto-start

**New Single Piece Can Adapter**  
for pint and 1/2 pint cans  
*Accommodates quart cans*

**Easy to use**  
no weights, simplifies an  
established test procedure

**LED Display Info:**

- Krebs Units
- Gram Units  
(Weight)
- Centipoise\*

Select Krebs or Grams or Centipoise

**Lock-In Test Results**  
with Hold button

**Accuracy:  $\pm 1.0\%$  of range**

**Repeatability:  $\pm 0.5\%$**

**Standard Krebs Spindle**

**Measurement range:**  
40 to 141 KU, 32 to 1099 gm,  
and 27 to 5274 cP\*



## What's Included?

Instrument  
Krebs-type Spindle (p48)  
Adapter for Quart, Pint and  
Half-Pint Cans

## Optional Accessories

Paste Spindle (p48)

## Applications

Paints  
Coatings  
Adhesives  
Inks  
Pastes

\*Centipoise values based on the conversion from Krebs  
Units as defined in the ASTM D562.



# Falling Ball Viscometer

...Newtonian measurements made simple and easy!

The AMETEK Brookfield Falling Ball Viscometer uses the simple — but precise — H ppler principle to measure the viscosity of Newtonian liquids by measuring the time required for a ball to fall under gravity through a sample-filled tube.

## Complies with DIN 53015

**Set of six balls** to test a wide variety of samples

**Connection to circulating bath** for temperature control of sample

## Temperature Probe

**Pivot bearing** allows for quick and easy tube rotation for repeat test

**Model KF40** (shown) variable angle (50°, 60°, 70° & 80°) for non-Newtonian fluids

**Model KF30** (also available) fixed angle

**Viscosity Range:**  
0.5 to 70,000  
mPa•s (cP)

**Accuracy:**  
0.5% to 2.0%  
(depending on  
ball used)



## SPECIFICATIONS

<b>Viscosity Range:</b>	0.5 mPa•s (cP) to 70,000 mPa•s (cP)
<b>Accuracy:</b>	0.5% - 2.0% depending on choice of ball
<b>Ball set Material of Construction:</b>	
Balls 1 and 2:	Boron Silicate Glass
Balls 3 and 4:	Nickel-iron
Balls 5 and 6:	Steel
<b>Ball Diameter:</b>	11.0 mm to 15.81 mm
<b>Fall Time of Ball in Measurement:</b>	30 to 300 seconds**
<b>Length of Measurement Zone in the Tube:</b>	100 mm
<b>Operating Temperature Range:</b>	-5°C to +150°C
<b>Sample Tube Volume:</b>	40mL
<b>Viscometer Dimensions:</b>	180 x 220 x 330 mm

\*\*Falling times greater than 300 seconds allow measurement of liquids above 70,000 mPa•s (cP)

## What's Included?

Instrument  
Set of six (6) balls  
Temperature Probe  
Carrying Case

## Optional Accessories

Temperature Bath (p33-35)  
Viscosity Standards (p52)  
Special Temperature Probes

## Applications

Beverages  
Coatings  
Cosmetics  
Detergents  
Food  
Paint  
Petroleum Products  
Pharmaceuticals  
Polymers  
Soap



## KF40 with Bath

Use with a AMETEK Brookfield Circulating Bath permits rapid temperature control of sample for more accurate and repeatable results.

# NEW Gel Timer Instrument

for gel coats, resins, potting compounds

## Replacement for Sunshine Gel Timer instrument

### Instrument System

- Choice of Viscometer or Rheometer
- Magnetic Coupling with Glass Rod
- Temperature Probe

### Test Method

- Determine torque value that correlates with gel time
- Select Time-To-Torque Test
- Immerse Rod in Sample
- Start Test:  
Rod rotates at 1 rpm
- Gel time occurs when defined torque value is achieved

### Easy to Use

- Glass rod fits snugly in compression-fit coupling
- Time to torque test method runs automatically
- Quick disconnect for rod at conclusion of test

### Displayed Information

- Gel time
- Continuous temperature readout in °C or °F



## What's Included?

Choice of instrument:

Recommended: DV2TRV Viscometer

Options: DV3T or DV1M

GT-2000

Magnetic Coupling (for 6 mm dia. rod)

Glass Rod (6 mm diameter)

Lab Stand with stop

for controlled immersion depth of rod

Temperature Probe (with DV2T, DV3T)  
(option on DV1M)

## Optional Accessories

Ball Bearing Suspension  
(not available with LV Torque)

EZ-Lock Coupling for instrument head

EZ-Lock Rod Coupling System  
(requires YU-20C)

Hook Couplings (SP1-UC-Y, YDX-1)  
for Rod Coupling System

Rheocalc T Software (DV2T and DV3T)

Wingather SQ Software (DV1M)

GT-1010 - Pack of 10 glass rods

# Wells/Brookfield™ Cone & Plate

*optional small sample configuration for DV3T, DV2T & DV1* Available only when instrument is first purchased



**Determine absolute viscosity**  
of small samples (0.5 – 2.0 mL)

#### Available in these models

- DV3T Rheometer
- DV2T Viscometer
- DV1 Viscometer

**Accuracy:  $\pm 1.0\%$  of range**

**Repeatability:  $\pm 0.2\%$**

#### Electronic Gap Adjustment™

- Simplified setup
- Accurate
- Easy-to-use

**RTD Temperature Sensor**  
in Sample Cup (Optional)  
provides direct measurement of  
sample temperature

**Control Sample Temperature**  
using an AMETEK Brookfield  
circulating water bath (p27)

**Rapid temperature control**  
due to small sample size

#### Recommended

**Temperature Range:**  
5°C to 80°C

#### Precise shear rates

for determining a material's flow  
curve behavior



## What's Included?

Instrument  
Lab Stand (p50)  
Choice of one Cone Spindle (p46)  
Sample Cup (p46)

## Optional Accessories

Embedded Temperature Probe  
in Sample Cup (p46)  
Luer and Purge fittings  
Ball Bearing Suspension (p50)  
Additional Cone Spindles (p46)  
Viscosity Standards (p52)  
Circulating Temperature Bath (p33-35)  
RheocalcT Software ►  
(DV3T & DV2T only)  
Wingather SQ Software ►  
(DV1 only)  
Protective Keypad Covers (p51)

### Viscosity Range\* cP(mPa·s)

MODEL	Cone Spindle: CPA-40Z Sample Volume: .5mL Shear Rate (sec <sup>-1</sup> ): 1.5N	Cone Spindle: CPA-41Z Sample Volume: 2.0mL Shear Rate (sec <sup>-1</sup> ): 2.0N	Cone Spindle: CPA-42Z Sample Volume: 1.0mL Shear Rate (sec <sup>-1</sup> ): 3.84N	Cone Spindle: CPA-51Z Sample Volume: .5mL Shear Rate (sec <sup>-1</sup> ): 3.84N	Cone Spindle: CPA-52Z Sample Volume: .5mL Shear Rate (sec <sup>-1</sup> ): 2.0N	SPEEDS	
						RPM	Number of Increments
DV3TLVCP	.1 - 3K	.5 - 11K	.2 - 6K	2 - 48K	3 - 92K	.01 - 250	2.6K
DV2TLVCP	.2 - 3K	.6 - 11K	.3 - 6K	2 - 48K	4 - 92K	0.1 - 200	200
DV1MLVCP	.3 - 1K	1 - 3K	.6 - 2K	5 - 16K	9 - 30K	0.3 - 100	18
DV3TRVCP	1 - 32K	5 - 122K	2 - 64K	20 - 512K	39 - 983K	.01 - 250	2.6K
DV2TRVCP	1.6 - 32K	6 - 122K	3 - 64K	25 - 512K	49 - 983K	0.1 - 200	200
DV1MRVCP	3 - 10K	12 - 41K	6 - 21K	51 - 170K	98 - 327K	0.3 - 100	18
DV3THACP	2.6 - 65K	10 - 245K	5 - 128K	41 - 1M	78 - 2M	.01 - 250	2.6K
DV2THACP	3 - 65K	12 - 245K	6 - 128K	51 - 1M	98 - 2M	0.1 - 200	200
DV1MHACP	6.6 - 21K	24 - 81K	12 - 42K	102 - 341K	196 - 655K	0.3 - 100	18
DV3THBCP	10.5 - 261K	39 - 982K	20 - 512K	163 - 4M	314 - 7.8M	.01 - 250	2.6K
DV2THBCP	13 - 261K	49 - 982K	25.6 - 512K	204 - 4M	393 - 7.8M	0.1 - 200	200
DV1MHBCP	26 - 87K	98 - 327K	51 - 170K	409 - 1M	786 - 2.6M	0.3 - 100	18

M = 1 million K = 1 thousand cP = Centipoise mPa·s = Millipascal·seconds mL = Milliliter N = RPM e.g. Spindle CPA-40Z 7.50 x 10 (rpm) = 75.0 sec<sup>-1</sup>

\* Dependant upon cone selected.

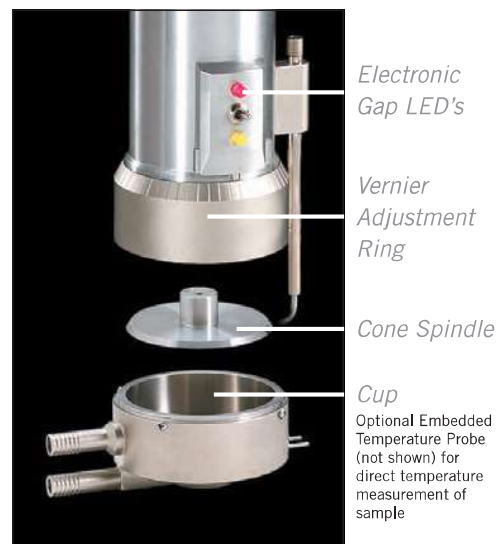


## RheocalcT Software Optional for DV2T and DV3T (see p14 for more details)

GET TOTAL CONTROL OF YOUR INSTRUMENT AND TEST PARAMETERS

Automatically control and collect data with RheocalcT and a dedicated computer. RheocalcT can analyze data, generate multiple plot overlays, print tabular data, run math models and perform other time-saving routines. Up to five comparison data sets can be plotted and saved. Other features include:

- Wizards to guide you through the creation of common tests
- Secure 21CFR features including multiple logins, access levels, digital signatures, and data storage in a password-protected database
- Looping functions for repetitive tasks
- Averaging of collected data by step or whole test
- Math models: Bingham, Casson, Casson NCA/CMA, Power Law, IPC Paste, Herschel-Bulkley, Thix Index



## Optional Sample Cup

The Optional Sample Cup has luer and purge fittings for introducing and removing test sample while cup remains attached to instrument

## Wingather SQ Software Optional for DV1 (see p14 for more details)

DATA COLLECTION SOFTWARE TO COLLECT, ANALYZE AND RECORD TEST DATA

Wingather software provides an easy way to gather data and plot graphs while creating permanent test records. Data can be saved in the program or exported to Excel.

- Automates data collection to save time
- Reduces operator error
- Math modeling for yield stress calculations, plastic index
- Plot up to four data sets for comparisons



# CAP 1000+™ & CAP 2000+™

Cone & Plate Viscometers - appropriate for moderate to high shear tests

**Keypad** for direct input of test parameters

**Cone Spindle** is easily removed for cleaning

**Easy-to-Use Control Handle** for accurate, automatic cone positioning

**Designed to handle repetitive testing** in production environments with easy setup and cleaning

**4-Line Display** allows simultaneous viewing of all test parameters

**Choice of instruments:**  
CAP 1000+ (single speed)  
CAP 2000+ (variable speed)

**Automatic cone/gap positioning**

**Small sample size**  
less than 1 mL

**Built-in Peltier Plate** for temperature control of sample:  
L Series: 5°C — 75°C  
H Series: 50°C — 235°C



## What's Included?

Instrument

Choice of Torque Range:

High Torque (ICI Specification): 181,000 dyne • cm

Low Torque: 7,970 dyne • cm

Choice of One Cone Spindle (p42)

Choice of Temperature Control: L or H

## Optional Accessories

CAP Viscosity Standards (p53)

Additional Cone Spindle (p46)

Capcalc32 Software ►

Protective Keypad Covers (p51)

## CAP 1000+

Single speed 750 or 900 rpm instrument, ideal for QC. Optional choice of alternative speed is available upon request. See examples below at 400 rpm and 100 rpm.

## CAP 2000+

Variable speed 5-1000 rpm instrument ideal for R&D as well as more detailed QC testing. Automated PC control (using optional Capcalc32 software).

MODEL	VISCOSITY RANGE cP(mPa•s)		SPEEDS	
	Min.	Max.	RPM	Number of Increments
<b>CAP 1000+</b>	see next page		900/750	2
<b>CAP 2000+</b>	for each cone		5-1K	995

\* Dependant on cone selected.

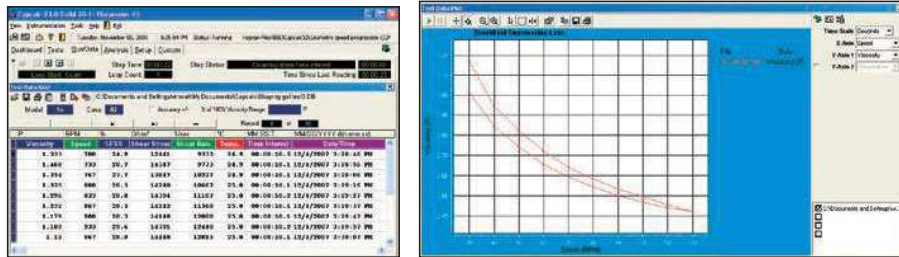
M = 1 million K = 1 thousand cP = Centipoise mPa•s = Millipascal•seconds

## Capcalc32 Software Optional

TURN YOUR CAP 2000+ VISCOMETER INTO A MORE POWERFUL RHEOMETER

Capcalc32 allows control of the CAP 2000+ Viscometer while providing automatic data capture and graphical display. Automate your CAP 2000+ Viscometer and generate flow curves quickly and easily.

- Controls test parameters with powerful scripting capabilities
- Looping functions for repetitive tasks
- Automates data collection to save time
- Reduces operator error
- Math modeling for yield stress calculations, plastic index
- Plot up to four data sets for comparisons



## Applications

### MEDIUM VISCOSITY

Adhesives (hot melt)	Coatings	Resins
Architectural Coatings	Industrial Coatings	Starches
Autocoats (Hi-performance)	Inks (screen printing)	Surface
Creams	Organisols	UV Coatings
Food Products	Paints	Varnish
Gels	Paper Coatings	
Gums	Plastisols	

### HIGH VISCOSITY

Adhesives	Gels	Sealants
Asphalt	Inks (ballpoint, offset, lithographic)	Sheet Molding
Compound		
Chocolate	Molasses	Tars
Composite Polymers	Pastes	Vinyl Esters
Epoxyes	Roofing Compounds	

## Perfect for Paints & Coatings

Meets Industry Standards:  
ASTM D4287, ISO 2884, BS 3900  
High Shear Rate Cone & Plate  
(10,000 sec<sup>-1</sup>)

### CAP Cone Viscosity Ranges (Poise)

MODEL	Shear Rate (sec <sup>-1</sup> ): 13.3N Sample Volume: 67µL Cone Spindle: CAP-01	Shear Rate (sec <sup>-1</sup> ): 13.3N Sample Volume: 36µL Cone Spindle: CAP-02	Shear Rate (sec <sup>-1</sup> ): 13.3N Sample Volume: 24µL Cone Spindle: CAP-03	Shear Rate (sec <sup>-1</sup> ): 13.3N Sample Volume: 13µL Cone Spindle: CAP-04	Shear Rate (sec <sup>-1</sup> ): 3.3N Sample Volume: 67µL Cone Spindle: CAP-05	Shear Rate (sec <sup>-1</sup> ): 3.3N Sample Volume: 30µL Cone Spindle: CAP-06	Shear Rate (sec <sup>-1</sup> ): 2.0N Sample Volume: 170µL Cone Spindle: CAP-07	Shear Rate (sec <sup>-1</sup> ): 2.0N Sample Volume: 40µL Cone Spindle: CAP-08	Shear Rate (sec <sup>-1</sup> ): 2.0N Sample Volume: 100µL Cone Spindle: CAP-09	Shear Rate (sec <sup>-1</sup> ): 5.0N Sample Volume: 170µL Cone Spindle: CAP-10
<b>HIGH TORQUE</b>										
1000+ @750rpm	.25-2.5	.5-5	1-10	2-20	4-40	10-100	N/A	N/A	N/A	N/A
1000+ @900rpm	.2-2	.4-4	.8-8	1-16	3-33	8-83	N/A	N/A	N/A	N/A
1000+ @400rpm	.375-4.6	.75-9.3	1.5-18.7	3-37.5	6-75	15-187	.78-7.81*	3.13-31.3*	12.5-125*	1-10*
2000+ @5-1000rpm	.2-375	.4-750	.8-1.5K	1-3K	3-6K	8-15K	.78-625*	3.13-2.5K*	12.5-10K*	1-1K*
<b>LOW TORQUE</b> (for applications requiring low shear rates for low/medium viscosity fluids, an optional low torque 797-7,970 dyne•cm instrument can be ordered)										
1000+ @100rpm†	.2-.81	.2-1.6	.33-3.3	.65-6.5	1.3-13	3.3-33	.13-1.3	.54-5.4	2.2-22	.22-2.2
2000+ @5-1000rpm	.2-16	.2-32	.2-66	.2-130	.2-260	.2-660	.2-26	.2-108	.2-440	.2-44

µL = microLiter K = 1 thousand P = poise 1 Pa•s = 10 poise N = RPM e.g. Cone CAP-01 13.3 x 10 (rpm) = 133 sec<sup>-1</sup>

\*Maximum speed recommended with this spindle is 400 rpm. Viscosity range indicated is for operation at 400 rpm. †Special speed instrument.

Note: Viscosity ranges shown above are for illustration. The exact range will depend upon instrument configuration.



# RST Touch™ Series Rheometers

Touch Screen Rheometers for Controlled Rate/Stress Measurement

The RST series of touch screen rheometers represents the best that AMETEK Brookfield has to offer — instruments that operate both in controlled shear rate (rpm) and controlled shear stress (torque) modes — for sophisticated rheological analysis. 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. Increased measurement capabilities range from simple single-point viscosity tests to comprehensive rheological profiling. Evaluate material behavior from initial yield stress through 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 stress/rate operation to analyze comprehensive 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 version without touch screen capability (Model RS Portable) is also available.

## RST Technical Specifications (all models)

<b>Maximum Torque:</b>	100 mNm
<b>Torque Resolution:</b>	0.15 µNm
<b>Speed:</b>	0.01 to 1300 rpm
<b>Data Output:</b>	USB, RS232
<b>Display Units:</b>	cP, Pa•s, dynes/cm <sup>2</sup> , Pa, °C, °F

## 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<sup>-1</sup>) 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<sup>-1</sup>. 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-CPS Touch™ 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

**Spindle Barcode** for auto spindle recognition

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

**Automatic or Manual Gap Setting** for quick and easy gap setting

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



## What's Included?

Instrument (with choice of water bath or Peltier temperature control for sample plate)  
Convenience Package (Cleaning Cloth, Screen Protector)

## Optional Accessories

Choice of cone or plate spindle geometries at least one is required (p47)  
Rheo3000 Software  
Viscosity Standards (p53)  
Water Baths (p33-35)  
Solvent Trap  
Choice of Thermal Barrier  
- Teflon (0° - 200°C)  
- Stainless Steel (0° - 200°C+)  
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.*

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

See page 47 for individual spindle (bob) ranges K = 1 thousand M = 1 million 1 Pa•s = 1000 cP (centipoise)

Temperature Control Options†		
MODEL	Description	Temperature
<b>RST-CPS-FH</b>	Bath	-20° to 200°C
<b>RST-CPS-PA</b>	Peltier Air	0° to 180°C*

† Higher temperatures available on request. \* 75mm plates cannot be used with Peltier systems.  
See page 47 for spindle ranges and sample volumes.

# RST-CC Touch™ Rheometer

Coaxial Cylinder DIN Geometries for single point QC or full rheological profiling

## Spindle Barcode

for auto spindle recognition

## 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

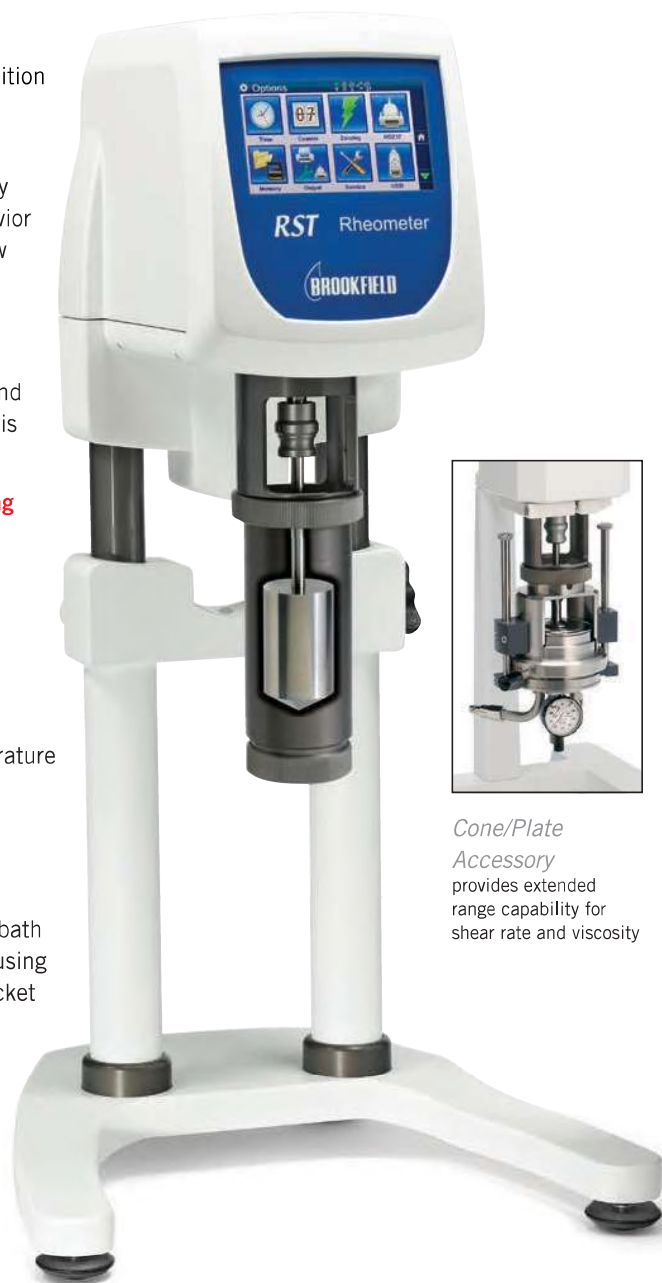
## Small sample size

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



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

## What's Included?

Instrument with stand and adjustable height control with base  
Convenience Package  
(Cleaning Cloth, Screen Protector)

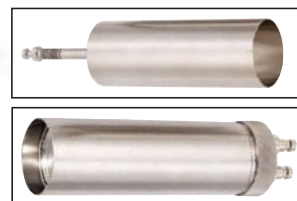
## Optional Accessories

Choice of Coaxial Cylinder Bob (spindle) and Chamber  
at least one bob and chamber is required (p47)  
FTKY3 Water Jacket for Temperature Control  
Rheo3000 Software (p29)  
Viscosity Standards (p53)  
Cone/Plate Accessory (p27)  
KE Cooling Device  
(required for temperatures over 70°C)  
PT-E Immersion Temperature Sensor  
Disposable Chambers

*Water Jacket*



*Coaxial Cylinder Spindles*



*Double Gap Coaxial Cylinder*  
for very low viscosity materials

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

See page 47 for individual bob/spindle ranges K = 1 thousand M = 1 million 1 Pa•s = 1000 cP (centipoise)

# RST-SST Touch™ Rheometer

Soft Solids Tester for pastes, slurries and materials with particulates

## Spindle Barcode

for auto spindle recognition

## 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



## What's Included?

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

Convenience Package  
(Cleaning Cloth, Screen Protector)

## Optional Accessories

Choice of Spindle Geometries  
at least one is required:

- Vane (spindle) or RST-90Y
- Coaxial Cylinder Bob (spindle) & Chamber

Rheo3000 Software (p29)

Viscosity Standards (p53)

Cone/Plate Accessory (p27)

Thermosel System with Din 81 Spindle (p36-37)

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

## SHEAR STRESS (Pa)

MODEL	Min.	Max.
RST-SST Soft Solids Tester	0.2	218K

See pg. 47 for individual bob and vane spindle ranges K = 1 thousand Pa = Pascal



# RST-CC & RST-SST Option Guide

choosing the correct spindles, chambers and other accessories for your application

## Options for the RST-CC

Every Coaxial Cylinder system consists of the instrument, spindle and chamber. In order to assist with configuring an appropriate system, the following questions should be asked.

### WHAT VISCOSITY RANGE DO YOU INTEND TO MEASURE?

Knowing the viscosity range will assist with selecting the most appropriate spindle geometry for your application.

RST Spindles		Refer to chart on page 47				
SPINDLE	VISCOSITY RANGE					
COAXIAL	Pa•s					
CCT-DG	0.00005-4.07K					
CCT-40	0.0003-27.6K					
CCT-25	0.002-177K					
CCT-14	0.012-1M					
CCT-8	0.065-5.41M					

Spindles	VISCOSITY RANGE	SHEAR RATE	MAX. SHEAR STRESS	SAMPLE VOLUME
NDLE	Pa•s	sec <sup>-1</sup>	Pa	mL
NDLE	0.00005-4.07K	0.043-5.64K	177	15.7
NDLE	0.0003-27.6K	0.043-5.64K	177	15.7
NDLE	0.002-177K	0.043-5.64K	177	15.7
NDLE	0.012-1M	0.043-5.64K	177	15.7
NDLE	0.065-5.41M	0.043-5.64K	177	15.7

EXAMPLE: CCT-25

### HOW WILL YOU BE CONTROLLING TEMPERATURE?



MBT-25 & CCT-25

#### Stand-alone Chamber:

For viscosity testing at room temperature or direct immersion in temperature bath. Chamber must match the spindle.

#### CCT-25 Spindle:

For use with the MBT-25 chamber.



FTKY3 & MBT-25F

#### FTKY3 Water Jacket with chamber:

For temperature control of sample using circulating bath. MBT-25F Chamber inserts inside water jacket.

#### Use with CCT-25 Spindle:

Shown above.

### DO YOU NEED THE DISPOSABLE CHAMBER OPTION?

Working with messy or sticky materials can be simplified by using disposable chambers. Contact AMETEK Brookfield for details.

## Options for the RST-SST

Every Soft Solids Tester can be used with coaxial cylinder geometries as well as with vane spindles. If using coaxial geometries, the same questions as in the prior section should be asked. The use of vane geometries does bring up additional considerations.

### WHAT SHEAR STRESS RANGE IS APPROPRIATE FOR YOUR MATERIAL?

RST Vane Spindles		Refer to chart on page 47	
SPINDLE	VANE LENGTH		
	mm	VANE DIAMETER	SHEAR STRESS
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-80-40	80	40	2.7-1.7K
VT-80-70	80	70	24-15K
		15	7-4.3K
		30	1.6-1K
		40	0.7-420
		70	0.2-120

EXAMPLE: VT-40-20 vane length = 40mm / width = 20mm

### WHAT SAMPLE CONTAINER IS TO BE USED?



Container

For stand-alone testing you can use a beaker, your actual product container or any appropriately sized receptacle. Container size will impact shear rate.\*

#### VT-40-20 Spindle:

Standard vane spindles have a long shaft.



\*Our system assumes a container to Vane diameter ratio of 3 to 1 for a shear rate factor of 0.2355 sec<sup>-1</sup>/rpm



MBT-25F or MBT-25

#### MBT-25F or MBT-25 Chamber:

Chamber may be used alone or with a water jacket and circulating bath.

#### VT-40-20MB Spindle:

Vane spindles with "MB" have a shorter shaft length to fit into coaxial chambers.



# Rheo3000 Software

for quick and comprehensive data analysis capabilities with RST series Rheometers

## Enhance your productivity

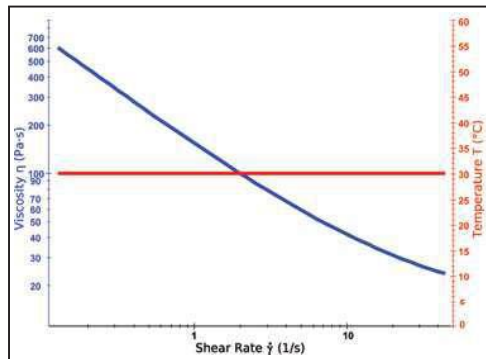
VIA PC CONTROL WHEN  
CHARACTERIZING  
MATERIAL RHEOLOGY

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:

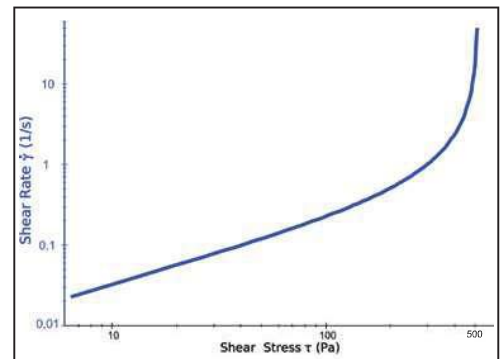
- 21 CFR compliance option for controlled user access and data security
- Active clock on screen shows test progress to completion
- Export reports in pdf format; choose parameters of interest, discard others

## PC Requirements

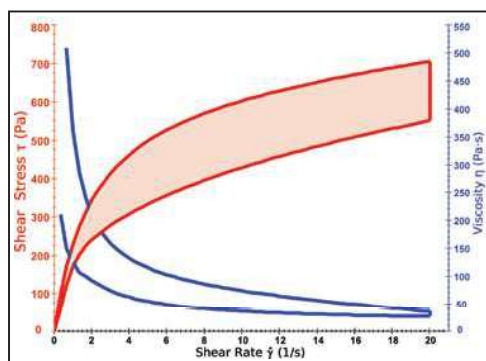
1.5 GHz Processor  
1 GB System Memory  
2.5 GB Hard Drive  
VGA Graphics Adapter  
(800 x 600 resolution)  
1 USB port



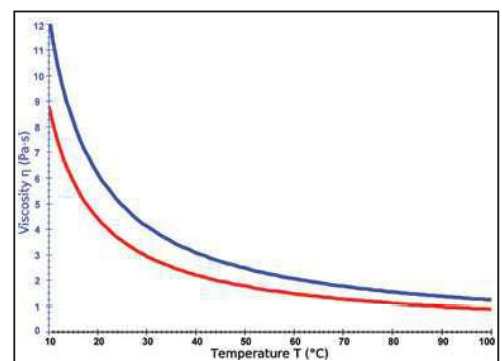
**Viscosity Flow Curve:** viscosity vs. shear rate graph shows pseudoplastic behavior while temperature remains constant at 30°C.



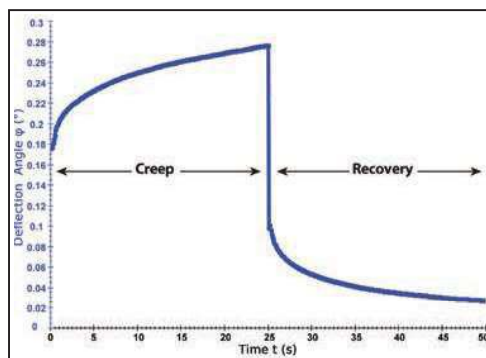
**Yield Stress Determination:** shear stress ramp from 0 to 1,000 Pa over 2 minutes shows yield stress values at 500 Pa.



**Thixotropy Analysis:** up/down shear rate ramp produces curves for shear stress vs. shear rate (red color) and viscosity vs. shear rate (blue color). Thixotropy calculation is the area between the red curves, approximately 2,000 Pa·s.



**Viscosity vs. Temperature:** viscosity is measured at constant shear rate while temperature increases from 10°C to 100°C for two test samples.



**Creep /Recovery Behavior:** material flow under constant stress is measured by detecting angular rotation of spindle; when constant stress is removed, recovery is measured by backward rotation of spindle.

# PVS™ Rheometer

1' x 1' x 2' instrument for portable site-to-site mobility

## Robust Motor

capable of speeds up to 1000 rpm

## Quick and easy setup

in minutes

## Safety Relief Valve

1000 psi (high pressure)

## Avoids sample boil-off

## Couette Geometry

Outside Cylinder Rotates, "bob" inside remains stationary, generating shear rates up to 1700 sec<sup>-1</sup>

## RTD on the inner cylinder

insures accurate sample temperature measurement

## Test to industry standards

## Vacuum to high pressure

measurements up to 1,000 psi

## Hastelloy C cup and bobs

for operation in severe field environments

## Low Shear Rate Viscosity (LSRV)

measurement to .02 sec<sup>-1</sup>

## Fluid Temperature conditions:

from -40°C to +260°C



## What's Included?

Instrument  
Choice of spindle (bob) (p31)  
Sample Cup  
RheoVision software ►  
Carrying Case ►

## Optional Accessories

Viscosity Standards (p52)  
Additional spindle (bobs) (p31)  
Computer  
Temperature Control Bath  
Thermo Bath (p31)  
Available with triple annulus geometry for increased sensitivity when measuring low viscosity fluids

VISCOSITY RANGE cP(mPa•s)			SPEEDS	
MODEL	Min.	Max.	RPM	Number of Increments
PVS	.5	36M	.05-1K	10K

\* Ranges depend on "Bob" spindle selected.  
M = 1 million K = 1 thousand cP = Centipoise mPa•s = Millipascal•seconds

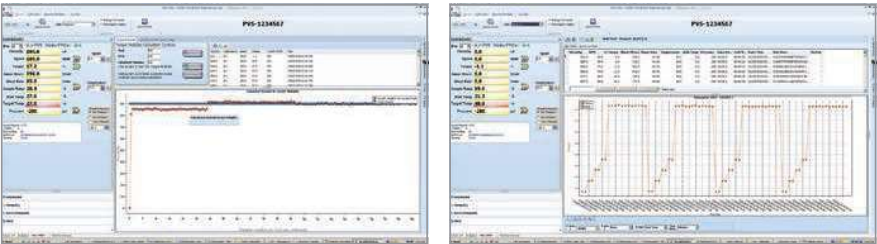


## RheoVision® Software Included

FOR AUTOMATION AND CONTROL OF ALL TEST PARAMETERS

Specifically designed for sophisticated rheological analysis, RheoVision makes viscosity measurement under pressurized and temperature controlled conditions an easy task. Powerful scripting language provides simple to complex data collection programs including automatic calculation of yield stress using Bingham, Herschel-Bulkley, and Power Law equations.

- USB and RS232 connectivity
- Multiple PVS units to PC communication controls.
- Enhanced graphing capabilities
- Easy calibration checks with auto-calculation of the torque multiplier and built-in linearity check
- Use of a powerful Microsoft SQL database allows users to
  - Define product, fluids, customer, location and other specific parameters for samples and later search data on these same fields
  - Search tests by parameters and allow data and test parameters to link for easier full profile viewing
- Instantaneous flow curves
- Built in math modeling
- User-friendly ramp wizard for quick API testing
- Seal history tracking feature



## Applications

Fracturing Fluids	Drilling Muds	Volatile Chemicals
Petroleum Products	Black Liquor	

PVS Spindles, Chambers and Rheometer Ranges			
BOB/STATOR SAMPLE CUP	VISCOSITY RANGE cP(mPa•s)	SHEAR RATE (sec <sup>-1</sup> )	SAMPLE VOLUME (mL)*
PVS-B1-D-HC	2-5M	1.70N	23
PVS-B2-D-HC	20-36M	0.38N	40
PVS-B5-D-HC	5-10M	0.85N	30
PVS-TA5B5-D-HC	.5-1M	0.85N	175
CHAMBER			
PVS-30 (standard)	for use with B1, B2 or B5 spindle		
Triple Annulus	for use with PVS - TA5 B5 - D - HC		

\*±1mL HC = Hastelloy C M = 1 million N = RPM mL = Milliliter



## Thermo Bath option with PID Enhanced Control Capability

For sample heating with small space requirement. Call for details.



## Carrying Case

For portability in the field.





# BF35™ Viscometer

measures viscosity of oil drilling and fracturing fluids at atmospheric pressure in both field and laboratory settings

**Easy speed changes**  
with convenient  
control knob

## What's Included?

Instrument  
Choice of bob Spindle  
Sample Cup

**Shear Stress Values Displayed**  
on easy-to-read lighted magnified dial

**Conventional oilfield rotor,  
bob and torsion spring**  
maintain rheology history  
and reproducibility between  
instruments and laboratories

**Maintains a constant shear rate**  
under varying input power and  
drilling fluid conditions. Provides  
drilling fluid engineers with an  
accurate and versatile tool.

**Sample Cup**

**Adjustable table height**  
to accommodate a variety of  
beaker/containment sizes

## Specifications/Features

<b>Motor Speeds:</b>	8 fixed (3, 6, 30, 60, 100, 200, 300, 600)
<b>Min. Viscosity:</b>	0.5 cP (@600 rpm)
<b>Max. Viscosity:</b>	10,000,000 (@0.01 rpm)
<b>Speed Accuracy:</b>	0.001 (rpm)
<b>Readout:</b>	Direct dial with light
<b>Heat Cup:</b>	Stainless steel, 150 Watt, 190°F (88°C) maximum recommended temperature
<b>Geometry:</b>	True Couette Coaxial Cylinder
<b>Power:</b>	97-250 VAC, 50/60 Hz (12 volt operation requires special cable)
<b>Carrying Case</b>	Included

# Temperature Control with Baths

Temperature Bath Systems combine state-of-the-art controller displays with high performance circulating baths to give accurate viscosity test results

*All controllers are swivel-mounted so that user can adjust position for optimum viewing angle*



## AP Series Controllers

- Color touch-screen interface
- Standalone programmable or PC control with RheocalcT software
- Variable-speed pump
- Max. temperature up to 200°C
- Multiple languages (English, French, German, Spanish, Chinese available)
- Built-in help menu



## SD Series Controllers

- Best value
- Programmable with PC control using RheocalcT software
- Quick scroll to set temperature in standalone mode
- 2-speed pump
- Maximum temperature up to 170°C



## MX Series Controllers

- Economical
- Large character display
- Single-speed pump
- Maximum temperature up to 135°C

## Step 1: Choosing the controller

CHOOSE THE ONE THAT BEST SUITS YOUR APPLICATION

- Choose the controller by considering factors such as the need for PC control using RheocalcT with DV2T or DV3T, ease of use, pump speed, and foreign language choices (AP series controller only).

## Temperature Baths Features

MODEL	Temperature Range Low	Temperature Range High	Controller	Cooling	Temperature Stability†	Digital Type/Resolution (Set / Read)	Reservoir Capacity	Pump Speed	Maximum Flow Rate	Internal Work Area D x W x H (inches)	Overall Dimensions D x W x H (inches)	Weight (Gross)
TC-650AP	-20°C	+200°C	AP	Refrigerated	0.01°C	0.01 / 0.001	7.0 liters	Variable	16 LPM	6.18 x 5.59 x 5.0	21.3 x 8.7 x 24.3	90 lbs
TC-650SD	-20°C	+170°C	SD	Refrigerated	0.04°C	0.1 / 0.1	7.0 liters	2-speed	11 LPM	6.18 x 5.59 x 5.0	21.3 x 8.7 x 24.3	90 lbs
TC-650MX	-20°C	+135°C	MX	Refrigerated	0.07°C	0.1 / 0.1	7.0 liters	1-speed	12 LPM	6.18 x 5.59 x 5.0	21.3 x 8.7 x 25.4	84 lbs
TC-550AP	-20°C	+200°C	AP	Refrigerated	0.01°C	0.01 / 0.001	7.0 liters	Variable	16 LPM	6.18 x 5.59 x 5.0	23.2 x 16.2 x 16.2	90 lbs
TC-550SD	-20°C	+170°C	SD	Refrigerated	0.04°C	0.1 / 0.1	7.0 liters	2-speed	11 LPM	6.18 x 5.59 x 5.0	23.2 x 16.2 x 16.2	90 lbs
TC-550MX	-20°C	+135°C	MX	Refrigerated	0.07°C	0.1 / 0.1	7.0 liters	1-speed	12 LPM	6.18 x 5.59 x 5.0	23.2 x 16.2 x 17.3	84 lbs
TC-250AP*	ambient +10°C†	+150°C	AP	Tap Water	0.01°C	0.01 / 0.001	10.0 liters	Variable	16 LPM	5.0 x 11.0 x 6.0	13.9 x 13.5 x 14.9	45 lbs
TC-250SD*	ambient +10°C†	+150°C	SD	Tap Water	0.04°C	0.1 / 0.1	10.0 liters	2-speed	11 LPM	5.0 x 11.0 x 6.0	13.9 x 13.5 x 14.9	45 lbs
TC-250MX*	ambient +10°C†	+135°C	MX	Tap Water	0.07°C	0.1 / 0.1	10.0 liters	1-speed	12 LPM	5.0 x 11.0 x 6.0	13.9 x 13.5 x 16.0	39 lbs
TC-150AP*	ambient +10°C†	+150°C	AP	Tap Water	0.01°C	0.01 / 0.001	6.0 liters	Variable	16 LPM	4.5 x 4.0 x 6.0	13.4 x 8.1 x 14.9	26 lbs
TC-150SD*	ambient +10°C†	+150°C	SD	Tap Water	0.04°C	0.1 / 0.1	6.0 liters	2-speed	11 LPM	4.5 x 4.0 x 6.0	13.4 x 8.1 x 14.9	26 lbs
TC-150MX*	ambient +10°C†	+135°C	MX	Tap Water	0.07°C	0.1 / 0.1	6.0 liters	1-speed	12 LPM	4.5 x 4.0 x 6.0	13.4 x 8.1 x 16.0	20 lbs
TC-351	-20°C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14.0 x 14.0 x 14.0	72 lbs

\* For use at lower temperatures, use the built-in tap water cooling, or use model TC-351 Cooler for control to -20°C.

† Low temperature limit 10°C above ambient unless external cooling is used.

‡ Temperature stability may vary depending on bath volume, surface area, insulation and type of fluid

N/A - Not Applicable  
FOR OPERATING TEMPERATURES HIGHER THAN 80°C,  
PLEASE CONTACT BROOKFIELD FOR BATH FLUID RECOMMENDATIONS.

## Step 2: Choosing the bath

CHOOSE THE CIRCULATING BATH THAT MEETS YOUR NEEDS

Determine the type of circulating bath needed by considering temperature range, cooling requirements, reservoir capacity, flow speeds and built-in drains (Models TC-550 and TC-650). Consult the chart on page 33 for specifications.

# TC-550

PC control capable  
with RheocalcT software

## Circulating Water Bath Refrigerated

Most popular choice with widest temperature control capability

Easily controls at 25°C for calibration checks

7-liter reservoir capacity

Configured to measure viscosity directly in the bath or circulate to external water-jacketed devices\*\*

Accommodates one 600 mL beaker

Provides stand-alone operation with no tap water required and easy control of set-point

Available with MX, SD or AP Controllers

Automated sample temperature control available with SD and AP Controllers

AP Controller shown



# TC-650

PC control capable  
with RheocalcT software

## Circulating Water Bath Refrigerated

Compact — small “footprint” on your lab bench or can be placed underneath lab bench

Easily controls at 25°C for calibration checks

7-liter reservoir capacity

Specifically designed for circulating to external water-jacketed devices\*\*

Accommodates one 600 mL beaker

Provides stand-alone operation with no tap water required and easy control of set-point

Available with MX, SD or AP Controllers

Automated sample temperature control available with SD and AP Controllers

AP Controller shown



\*Provided tap water temperature is 15°C or lower

\*\*All baths can be used with AMETEK Brookfield water jacketed devices; Wells-Brookfield Cone/Plate Viscometer, R/S-CC and R/S-CPS Rheometers and Small Sample Adapter, Ultra-Low Adapter and DIN Adapter accessories

# TC-150

## Circulating Water Bath Non-Refrigerated

Compact – smallest “footprint” available  
6-liter reservoir capacity

Removable deck lid accommodates  
one 600 mL beaker to measure viscosity  
directly in the bath

Tap water cooling coil for  
temperature control at 25°C\*

Built-in circulator pump for use  
with external water-jacketed devices\*\*

Available with MX, SD or AP Controller

**MX** Controller  
shown



## Water Bath Accessories

Algicide 8 oz.

**TC-Fluid 1A**

Keeps circulator baths clean,  
odor free and resists black algae

50/50 Premix  
Ethylene Glycol 1 gal.

**TC-Fluid 2** -20°C to +100°C

Ethylene glycol 1:1 solution, ready to use

High Temperature Fluid 1 gal.

**TC-Fluid 3** +50°C to +150°C

**TC-Fluid 4** +100°C to +200°C

**PVS-152** +25°C to +200°C

These heat transfer fluids provide superior  
thermal stability

Low Temperature Fluid 1 gal.

**TC-Fluid 5** -50°C to +58°C

Excellent low temperature performance  
Little or no evaporation

Bath Cleaner 8 oz.

**TC-Fluid 6A**

Removes rust and mineral deposits  
Concentrated liquid

18" Lab Stand Rod

**VS-CRA-18S**

Designed for increasing viscometer height  
when measuring in a TC-150, TC-250 or  
TC-550 Bath

# TC-250

PC control capable  
with RheocalcT software

## Circulating Water Bath Non-Refrigerated

Largest work area available  
for conditioning multiple samples  
directly in the bath

10-liter reservoir capacity

Accommodates 600 mL and  
1000 mL beakers (cover is  
removable for large sample  
container requirements)

Built-in tap water cooling coil  
for temperature control at 25°C\*

Built-in circulator pump for use  
with external water-jacket devices\*\*

Available with MX, SD or AP Controller

**SD** Controller shown



# TC-351

Cooler (not shown) for use with TC-150 & TC-250 Circulating Baths

Eliminates tap water requirements on non-refrigerated baths

Increases lower range of most baths to -20°C

## Step 3: Comparing bath features

Once you've familiarized yourself with the AMETEK Brookfield Circulating Water Bath Series  
you can easily compare models to find the bath that best suits your requirements.  
Consult the chart on page 33 for all TC Series Model specifications.



## Accessories

Additional benches for elevating the  
position of beakers, metal lids for  
anchoring beakers, hoses depending on  
temperature range, and deck lid covers are  
available. Contact us for details.



# Thermosel®

for Elevated Temperature Testing



**Compatible** with standard AMETEK Brookfield Viscometers and DV3T Rheometers  
Note: requires optional cable DVP-141

**Provides control** of sample temperature up to +300°C

#### **EZ-Lock Option**

Thermosel is now available with special EZ-Lock spindle coupling for use on standard AMETEK Brookfield Viscometers/ Rheometers already equipped with the EZ-Lock feature

#### **Temperature Ramping**

between set points is possible if used with RheocalcT (DV3T & DV2T) Software  
Note: Requires optional cable HT-106

**Thermo Container**  
(Heating Chamber)



**Computer Controlled** when used with DV2T or DV3T and RheocalcT Software (HT-106 cable required)

**Programmable Temperature Controller** offers single set point or up to 10 programmable set points.

**Direct Temperature Control Possible** with DV2T/DV3T Rheometer (p20)

## What's Included?

Choice of one SC4 Spindle  
Specify when ordering  
Alignment Bracket  
Thermo Container with safety guard and insulating cap  
1 Removable Sample Chamber (p47)  
5 Disposable Sample Chambers (p47)  
Order additional chambers in quantities of 100, HT-2DB-100  
18" Lab Stand Rod (p35)  
Extracting Tools  
Temperature Controller with an RTD probe

## Applications

Hot Melts	Asphalt (ASTM D4402)
Wax	Polymers

The difficulty with viscosity measurements of hot melts and liquids at elevated temperatures has been in maintaining accurate temperature control that is consistent from sample to sample so that meaningful data could be obtained.

The AMETEK Brookfield Thermosel solves this problem by providing a stable, precisely controlled sample environment. This, together with the inherent accuracy of the AMETEK Brookfield Viscometers, is fundamental to the Thermosel System, which produces viscosity measurements that are not only accurate but entirely reproducible.

#### **Several factors contribute to the stable environment:**

- Non-fluctuating temperature control
- Small sample volume and insulated sample chamber which reduces temperature gradients within the sample
- The rotating spindle, which acts as a built-in stirring device
- The test procedure is quite straightforward. Once familiar with the system, unskilled operators can easily produce accurate, reproducible data.

## Thermosel Viscosity Ranges cP(mPa•s)

SPINDLE SAMPLE VOLUME SHEAR RATE (sec <sup>-1</sup> )† MODEL	SC4-18 8mL 1.32N	SC4-31 10mL .34N	SC4-34 9.5mL .28N	SC4-21 8mL .93N	SC4-27* 10.5mL .34N	SC4-28 11.5mL .28N	SC4-29 13mL .25N	HT-DIN-81**
DV3TLV	1.2-30K	12-300K	24-600K	Not applicable for historical reasons. However, it is possible to use the above spindles with any of these instruments.				1.0-10K
DV2TLV	1.5-30K	15-300K	30-600K	Digital Viscometers/Rheometers will automatically calculate viscosity. Please contact Brookfield or an authorized dealer if you require information on viscosity range.				3.4-10K
DV1LV	3-10K	30-100K	60-200K					3.4-10K
DVELV	3-10K	30-100K	60-200K					3.4-10K
LVT	5-10K	50-100K	100-200K					5.7-10K
DV3TRV				20-500K	100-2.5M	200-5M	400-10M	14.6-10K
DV2TRV				25-500K	125-2.5M	250-5M	500-10M	36.5-10K
DV1RV				50-170K	250-830K	500-1.7M	1K-3.3M	36.5-10K
DVERV	Not applicable for historical reasons.			50-170K	250-830K	500-1.7M	1K-3.3M	36.5-10K
RVT	However, it is possible to use the above spindles with any of these instruments.			50-100K	250-500K	500-1M	1K-2M	36.5-10K
DV3THA	Digital Viscometers/Rheometers will automatically calculate viscosity. Please contact Ametek Brookfield or an authorized dealer if you require information on viscosity range.			40-1M	200-5M	400-10M	800-20M	29.2-10K
DV2THA				50-1M	250-5M	500-10M	1K-20M	73.0-10K
DV1HA				100-300K	500-1.7M	1K-3.3M	2K-6.7M	73.0-10K
DVEHA				100-300K	500-1.7M	1K-3.3M	2K-6.7M	73.0-10K
HAT				100-200K	500-1M	1K-2M	2K-4M	73.0-10K
DV3THB				160-4M	800-20M	1.6K-40M	3.2K-80M	116.8-10K
DV2THB				200-4M	1K-20M	2K-40M	4K-80M	292.0-10K
DV1HB				400-1.3M	2K-6.7M	4K-13.3M	8K-26.7M	292.0-10K
DVEHB				400-1.3M	2K-6.7M	4K-13.3M	8K-26.7M	292.0-10K
HBT				400-800K	2K-4M	4K-8M	8K-16M	292.0-10K

M = 1 million K = 1 thousand N = RPM † Spindle SC4-18 1.32 x 10 (rpm) = 13.2 sec<sup>-1</sup> cP = Centipoise mPa•s = milliPascal•seconds

\*Optional disposable SC4-27D spindle is available in quantities of 100, Part No. SC4-27D-100. Requires special chuck/closer, Part No. SC4-DSY, for attachment to viscometer.

\*\*The 81 spindle, Part No. HT-DIN-81, works in an HT-2 or HT-2DB chamber.

## Additional Information



Alignment Bracket ensures concentricity of spindle and sample chamber.



Other components supplied include sample chamber holder, RTD probe, insulating cap, coupling link, coupling nut and choice of SC4 spindle.



Extracting Tool enables the sample chamber to be handled easily and safely.



Option: Disposable Sample Chamber with Optional Disposable Spindle SC4-27D\* is ideal for asphalts or any difficult-to-clean material.

Order disposable SC4-27D spindle in quantities of 100, Part No. SC4-27D-100.

Requires special chuck/closer, Part No. SC4-DSY, for attachment to viscometer.

Order disposable HT-2DB chambers in quantities of 100, Part No. HT-2DB-100.

Option: Solid shaft spindles for high viscosity materials (p47)

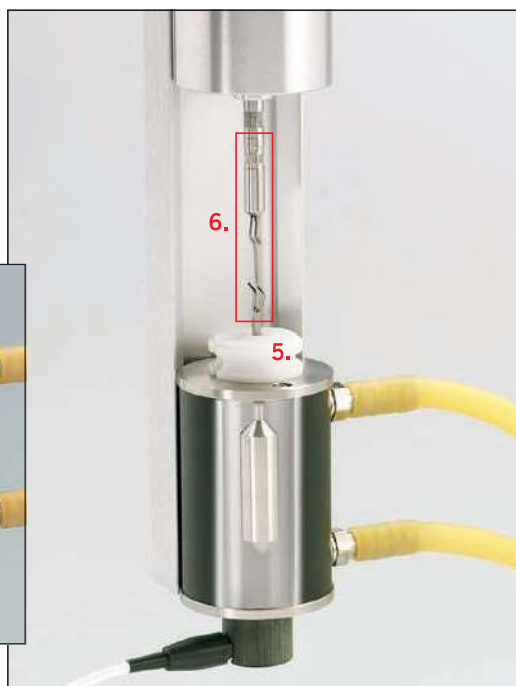
# Small Sample Adapter™

for rheological evaluation where sample volume is limited

Standard Sample Chamber with embedded temperature probe provides direct temperature measurement of sample



Disposable Sample Chamber  
(Requires SSA-DCU Water Jacket)



Complete system shows the DV2T Viscometer and Small Sample Adapter with Circulating Water Bath for temperature control.



## What's Included?

1. Water Jacket
2. Locating Channel Assembly
3. Choice of one SC4 Spindle\*
4. Choice of one SC4 Sample Chamber\*
5. Insulating Cap
6. Extension Link with Coupling Nut
- Storage Case (not shown)

\*Specify when ordering

## Optional Accessories

7. Embedded RTD temperature Probe in Chamber
8. SC4-13RD-100 (100/box)  
Disposable Sample Chambers (p48)  
Requires special water jacket
9. SC4-27D-100 (100/box)  
Disposable Spindles (p48)
10. SSA-DCU  
Special Water Jacket and  
SC4-13RD Disposable Chambers (100/box)
11. SSA27D-13RD-100  
Includes SSA-DCU items (above) plus  
SC4-27D Disposable Spindles (100/box)
12. Temperature Bath (p33-35)
13. EZ-Lock Spindle Coupling (p50)  
For more info on Small Sample Adapter  
Accessory Kits visit our website.

The Small Sample Adapter provides a defined geometry system for accurate viscosity measurements at precise shear rates. Consisting of a cylindrical sample chamber and spindle, the Small Sample Adapter is designed to measure small sample volumes of 2 to 16 mL, and easily attaches to all standard AMETEK Brookfield Viscometers/ Rheometers.

## Small Sample Adapter Viscosity Ranges cP(mPa•s)

MODEL	Spindle: SC4-18 Sample Chamber: *SC4-13R(P) Sample Volume: 6.7mL Shear Rate (sec <sup>-1</sup> ): 132N	Spindle: SC4-31 Sample Chamber: *SC4-13R(P) Sample Volume: 9.0mL Shear Rate (sec <sup>-1</sup> ): 34N	Spindle: SC4-34 Sample Chamber: *SC4-13R(P) Sample Volume: 9.4mL Shear Rate (sec <sup>-1</sup> ): 28N	Spindle: SC4-16 Sample Chamber: *SC4-8R(P) Sample Volume: 4.2mL Shear Rate (sec <sup>-1</sup> ): 28N	Spindle: SC4-25Z (316 S/S only) Sample Chamber: *SC4-13R(P) Sample Volume: 16.1mL Shear Rate (sec <sup>-1</sup> ): 22N	Spindle: SC4-21 Sample Chamber: *SC4-13R(P) Sample Volume: 1.1mL Shear Rate (sec <sup>-1</sup> ): 93N	Spindle: SC4-27(D) Sample Chamber: *SC4-13R(P) Sample Volume: 10.4mL Shear Rate (sec <sup>-1</sup> ): 34N	Spindle: SC4-15 Sample Chamber: *SC4-7R(P) Sample Volume: 3.8mL Shear Rate (sec <sup>-1</sup> ): 48N	Spindle: SC4-28 Sample Chamber: *SC4-13R(P) Sample Volume: 11.0mL Shear Rate (sec <sup>-1</sup> ): 28N	Spindle: SC4-29 Sample Chamber: *SC4-13R(P) Sample Volume: 13.5mL Shear Rate (sec <sup>-1</sup> ): 25N	Spindle: SC4-14 Sample Chamber: *SC4-8R(P) Sample Volume: 2.1mL Shear Rate (sec <sup>-1</sup> ): 40N
DV3TLV	1.2-30K	12-300K	24-600K	48-1.2M	192-4.8M	Not applicable for historical reasons. However, it is possible					
DV2TLV	1.5-30K	15-300K	30-600K	60-1.2M	240-4.8M	to use the above spindles with any of these instruments.					
DV1LV	3-10K	30-100K	60-200K	120-400K	800-1.6M	Digital Viscometers/Rheometers will automatically calculate					
DVELV	3-10K	30-100K	60-200K	120-400K	800-1.6M	viscosity. Please contact Brookfield or an authorized dealer					
LVT	5-10K	50-100K	100-200K	200-400K	800-1.6M	if you require information on viscosity range.					
DV3TRV						20-500K	100-2.5M	200-5M	200-5M	400-10M	500-12.5M
DV2TRV						25-500K	125-2.5M	250-5M	250-5M	500-10M	625-12.5M
DV1RV						50-170K	250-830K	500-1.7M	500-1.7M	1K-3.3M	1.25K-4.2M
DVERV	Not applicable for historical reasons.					50-170K	250-830K	500-1.7M	500-1.7M	1K-3.3M	1.25K-4.2M
RVT	However, it is possible to use the above					50-100K	250-500K	500-1M	500-1M	1K-2M	1.25K-2.5M
DV3THA	spindles with any of these instruments.					40-1M	200-5M	400-10M	400-10M	800-20M	1K-25M
DV2THA	Digital Viscometers/Rheometers will					50-1M	250-5M	500-10M	500-10M	1K-20M	1.25K-25M
DV1HA	automatically calculate viscosity. Please					100-300K	500-1.7M	1K-3.3M	1K-3.3M	2K-6.7M	2.5K-8.3M
DVEHA	contact Ametek Brookfield or an authorized dealer					100-300K	500-1.7M	1K-3.3M	1K-3.3M	2K-6.7M	2.5K-8.3M
HAT	if you require information on viscosity range.					100-200K	500-1M	1K-2M	1K-2M	2K-4M	2.5K-5M
DV3THB						160-4M	800-20M	1.6K-40M	1.6K-40M	3.2K-80M	4K-100M
DV2THB						200-4M	1K-20M	2K-40M	2K-40M	4K-80M	5K-100M
DV1HB						400-1.3M	2K-6.7M	4K-13.3M	4K-13.3M	8K-26.7M	10K-33.3M
DVEHB						400-1.3M	2K-6.7M	4K-13.3M	4K-13.3M	8K-26.7M	10K-33.3M
HBT						400-800K	2K-4M	4K-8M	4K-8M	8K-16M	10K-20M

M = 1 million K = 1 thousand N = RPM e.g. Spindle SC4-18 1.32 x 10 (rpm) = 13.2 sec<sup>-1</sup> cP = Centipoise mPa•s = Millipascal•seconds

N/A = Not applicable for historical reasons. However, it is possible to use any spindle/chamber combination with any torque range. Digital viscometers/rheometers will automatically calculate viscosity.

\* Examples

SC4-13R Sample Chamber

SC4-13RPY Sample Chamber with RTD temperature probe and cable to viscometer/rheometer

SC4-27 Stainless Steel Spindle

† Disposable chamber available in 13R size and requires SC4-45YD water jacket

SC4-13RP Sample Chamber with RTD temperature probe

SC4-13RD-100 Disposable Sample Chamber available in packages of 100

SC4-27D Disposable Spindle

Note: Hastelloy C available for some spindles/chambers - call for details

### Removable Sample Chamber

The design of the Small Sample Adapter allows the sample chamber to be easily changed and cleaned without disturbing the set-up of the viscometer or temperature bath. This means that successive measurements can be made under identical conditions.

### Temperature Control

The sample chamber fits into a water jacket so that precise temperature control can be achieved when the AMETEK Brookfield circulating temperature bath is used. The stirring action of the rotating spindle, plus the small sample volume, reduces waiting time to achieve thermal equilibrium. Direct readout of sample temperature is provided using sample chambers with optional embedded RTD sensor connected to the DV1 and DV2T Viscometers and the DV3T Rheometer. Working temperature range for the Small Sample Adapter is from 1°C to 100°C.

### Cylindrical Geometry

The Small Sample Adapter's coaxial cylinder geometry provides extremely accurate viscosity measurements at defined shear rates. Option: Solid shaft (p48)

### Disposable Sample Chambers and SC4-27D Spindle

Disposable 13R chambers, for hard-to-clean materials, are available in a kit that comes complete with 100 chambers and special-sized water jacket (Part No. SSA-DCU). Additional disposable chambers can be purchased in quantities of 100 (Part No. SC4-13RD-100).

### EZ-Lock Option

Small Sample Adapter is now available with special EZ-Lock spindle coupling for use on standard Viscometers/Rheometers already equipped with the EZ-Lock feature.



Water jacket allows rapid and precise temperature control of sample

Sample chamber easily changed - slides into water jacket and locks in place

Simultaneous sample temperature measurement is possible by ordering embedded temperature probe in sample chamber

Optional disposable chamber also available



# Enhanced UL Adapter™

ideal for low viscosity materials

## Reduces measuring range

to as low as 1 cP, depending on viscometer used

## Simple attachment

to a standard AMETEK Brookfield Viscometer or DV3T Rheometer

## Small sample size:

16 mL

## Cylindrical geometry

provides defined shear rates for detailed product analysis

## Removable cap

of low density polyethylene can be considered disposable for one-time use if required

## Stainless steel parts

are easily cleaned



## What's Included?

Locating Channel Assembly  
Spindle (304 s/s) (p46)  
with universal coupling nut  
Collar assembly with thumbwheel  
Water Jacket  
Chamber Tube  
Tube End Caps (package of 6)

## Optional Accessories

Available with EZ-Lock spindle coupling (p50)



Closed Tube and Spindle  
made from 316 s/s

The AMETEK Brookfield Enhanced UL Adapter is used with any standard AMETEK Brookfield Viscometer and Rheometer to make accurate and reproducible measurements on low viscosity materials. Newtonian and non-Newtonian materials can be measured. It is most commonly used with the LV series instrument (at 60 rpm, these models have a full scale range of 1-10 cP with the UL Adapter). The UL Adapter consists of a precision cylindrical spindle rotating inside an accurately machined tube. Its rheologically correct cylindrical geometry provides extremely accurate viscosity measurements and shear rate determinations.

The tube has a removable end cap which allows the open ended tube to be used in a beaker or tank. With the cap in place, the closed tube can be immersed in a temperature bath or used with the ULA-40Y water jacket for precise temperature control. Working temperature range is from 1°C to 65°C. Use Closed Tubes for higher temperature requirements. The open tube is easier to clean.

## Quick & Easy Design Saves Time



**Quick & easy attachment of spindle:**

Longer coupling nut for better grip and twist action to connect spindle to viscometer.  
Redesigned bracket for attaching ULA assembly to viscometer. Provides more clearance for finger grip on coupling nut.



**Quick & easy removal of chamber:**

Simply loosen thumbwheel, chamber slides down and out.  
Water jacket sleeve remains in place attached to viscometer while chamber and/or spindle only are removed. Saves set up time for the operator.



*Detail of UL Adapter: 1. Locating Channel Assembly 2. Water Jacket 3. Chamber Tube 4. Collar with thumbwheel 5. Tube End Cap 6. Spindle with universal coupling*

### EZ-Lock Option

Enhanced UL Adapter is available with special EZ-Lock spindle coupling for use on standard AMETEK Brookfield Viscometers/Rheometers already equipped with the EZ-Lock feature. (p50)

## Unique ULA Assembly Design Provides Multiple Benefits:

Sturdy collar attaches to locating channel assembly which is connected to viscometer pivot cup.

Sample chamber is held firmly in place by the collar which provides proper alignment for the spindle rotation within the chamber.

Universal coupling nut on spindle ensures firm connection with viscometer and automatic self-centering of spindle in chamber during rotation.

Direct immersion of chamber in temperature bath is quick and easy.

Water jacket grips slide over collar and operator manually aligns the collar/jacket assembly to allow easy insertion of chamber containing sample to be tested.

UL Adapter Ranges cP(mPa•s)						
LVT, DVELV, DV1LV DV2TLV, DV3TLV	RVT, DVERV DV1RV	DV2TRV DV3TRV	HAT, DVEHA DV1HA	DV2THA DV3THA	HBT, DVEHB DV1HB	DV2THB DV3THB
1.0 - 2K	6.4 - 2K	3.0 - 2K	12.8 - 2K	6.0 - 2K	51.2 - 2K	24.0 - 2K

K = 1 thousand

# Helipath Stand™

designed for measurement of non-flowing substances



For viscosity/consistency measurement of gels, pastes, creams, putty, gelatin and other non-flowing substances.

An AMETEK Brookfield Viscometer or Rheometer is mounted on the Helipath drive motor and a T-bar spindle is attached to the viscometer using a special coupling. The drive motor slowly lowers or raises the viscometer so that the T-bar spindle creates a helical path through the test sample thus eliminating the problem of "channeling".

Compatible with standard AMETEK Brookfield Viscometers and DV3T Rheometers

Simple to set up and clean

Provides a solution for hard-to-measure materials

Complete with drive motor, 6 T-bar spindles with coupling, case, lab stand, rod and base



The Helipath Stand is supplied with a set of six T-bar spindles that attach to the instrument with a special coupling.

## EZ-Lock Option

Helipath Stand is now available with special EZ-Lock spindle coupling for use on standard AMETEK Brookfield Viscometers/Rheometers already equipped with the EZ-Lock feature. (p50)

### Helipath Viscosity Ranges cP(mPa•s)

	DIAL, DVE, DV1	DV2T	DV3T
<b>LV Viscosity Range</b>	156 - 3.12M	156 - 9.36M	156 - 9.36M
<b>RV Viscosity Range</b>	2K - 20M	2K - 100M	2K - 100M
<b>HA Viscosity Range</b>	4K - 40M	4K - 200M	4K - 200M
<b>HB Viscosity Range</b>	16K - 160M	16K - 800M	16K - 800M

\*\* Maximum range shown is at 0.1 rpm K = 1 thousand M = 1 million cP = Centipoise mPa•s = millipascal•seconds

# Vane Spindles

for foods, cosmetics, sealants...

...for use with paste-like materials, gels and fluids where suspended solids migrate away from the measurement surface of standard spindles.

Minimal disruption of sample during spindle immersion

Keeps particles in suspension during testing cycle

Viscosity data includes complete flow curve analysis when software is used

Provides information on yield behavior at low rotational speeds

Follows industry recommendations on length/diameter ratios for vane spindles

3-piece spindle set for versatile range capability

Optional V-74 and V-75 spindles for even greater range capability and immersion into small size sample containers

## Vane Spindle Ranges

SPINDLE	TORQUE RANGE	SHEAR STRESS RANGE (Pa)	VISCOSITY RANGE cP(mPa•s)
V-71	NOT RECOMMENDED FOR USE ON LV TORQUE		
V-72	LV	.188-1.88	104.04-1.04K
V-73	LV	.938-9.38	502-5.02K
V-74	LV	9.38-93.8	5.09K-50.9K
V-75	LV	3.75-37.5	1.996K-19.96K
V-71	RV	.5-5	262-2.62K
V-72	RV	2-20	1.11K-11.1K
V-73	RV	10-100	5.35K-53.5K
V-74	RV	100-1K	54.3K-543K
V-75	RV	40-400	21.3K-213K
V-71	HA	1-10	524-5.24K
V-72	HA	4-40	2.22K-22.2K
V-73	HA	20-200	10.7K-107K
V-74	HA	200-2K	108.6K-1.086M
V-75	HA	80-800	42.6K-426K
V-71	HB	4-40	2.096K-20.96K
V-72	HB	16-160	8.88K-88.8K
V-73	HB	80-800	42.8K-428K
V-74	HB	800-8K	434.4K-4.344M
V-75	HB	320-3.2K	170.4K-1.704M
V-71	5xHB	20-200	10.48K-104.8K
V-72	5xHB	80-800	44.4K-444K
V-73	5xHB	400-4000	214K-2.14M
V-74	5xHB	4K-40K	2.172M-21.72M
V-75	5xHB	1.6K-16K	852K-8.52M

Note: 1. 1 Pa = 10 dyne/cm<sup>2</sup> 2. Viscosity Range is given at rotational speed of 10 RPM  
3. 5xHB is the highest torque range available 4. Not for use with DV-E Viscometers

M = 1 million K = 1 thousand Pa = Pascal  
cP = Centipoise mPa•s = Millipascal•seconds



## AMETEK Brookfield Vane Spindle Set

Includes V-71, V-72, and V-73 vane spindles. See the individual specifications in the spindle section. (p44)

Optional V-74 and V-75 spindles are smaller in size than V-73.

## EZ-Lock Option

Vane Spindles are available with special EZ-Lock spindle coupling for use on standard AMETEK Brookfield Viscometers/ Rheometers already equipped with the EZ-Lock feature. (p50)



# DIN Adapter

Complies with DIN 53019 requirements for test geometry. DIN is the German equivalent to the U.S. ASTM Standards.

Designed to provide an alternative for those customers having limited sample volume. Requires 16 mL to 20 mL sample size.

Cylindrical geometry provides defined shear rates.

Comes with three spindles and chambers for measurement range of 1 to 50,000 cP.



DIN Adapter Set

## EZ-Lock Option

DIN Spindles are available with special EZ-Lock spindle coupling for use on standard AMETEK Brookfield Viscometers/Rheometers already equipped with the EZ-Lock feature. (p50)

### DIN Adapter Ranges cP(mPa•s)

LVT	LVDV-E DV1MLV	DV2TLV DV3TLV	RVT, RVDV-E DV1MRV	DV2TRV DV3TRV	HAT, HADV-E DV1MHA	DV2THA DV3THA	HBT, HBDV-E DV1MHB	DV2THB DV3THB
1.9 - 37.9K	1.2 - 37.9K	1.0 - 50K	12.2 - 50K	5.0 - 50K	24.4 - 50K	10.0 - 50K	97.6 - 50K	40.0 - 50K

K = 1 thousand cP = Centipoise mPa•s = Millipascal•seconds

# Spiral Adapter

Designed for measuring the viscosity of heavy paste-like materials such as solder paste, cosmetics, pharmaceuticals, food products and other non-flowing products. Provides variable shear rates for detecting pseudoplastic and thixotropic behavior.

The spiral adapter is mounted onto a AMETEK Brookfield Viscometer; with the chamber immersed in the test sample and the motor turned on, material is “pumped thru” and reaches a steady flow rate. Shear rate is 0.677 sec<sup>-1</sup> per rpm.



Compatible with standard AMETEK Brookfield Viscometers & DV3T Rheometers

Compatible with electronics industry solder paste specifications

Complete with chamber, two spindles, assembly clamp and case

Note: RV/HA/HB torque ranges recommended



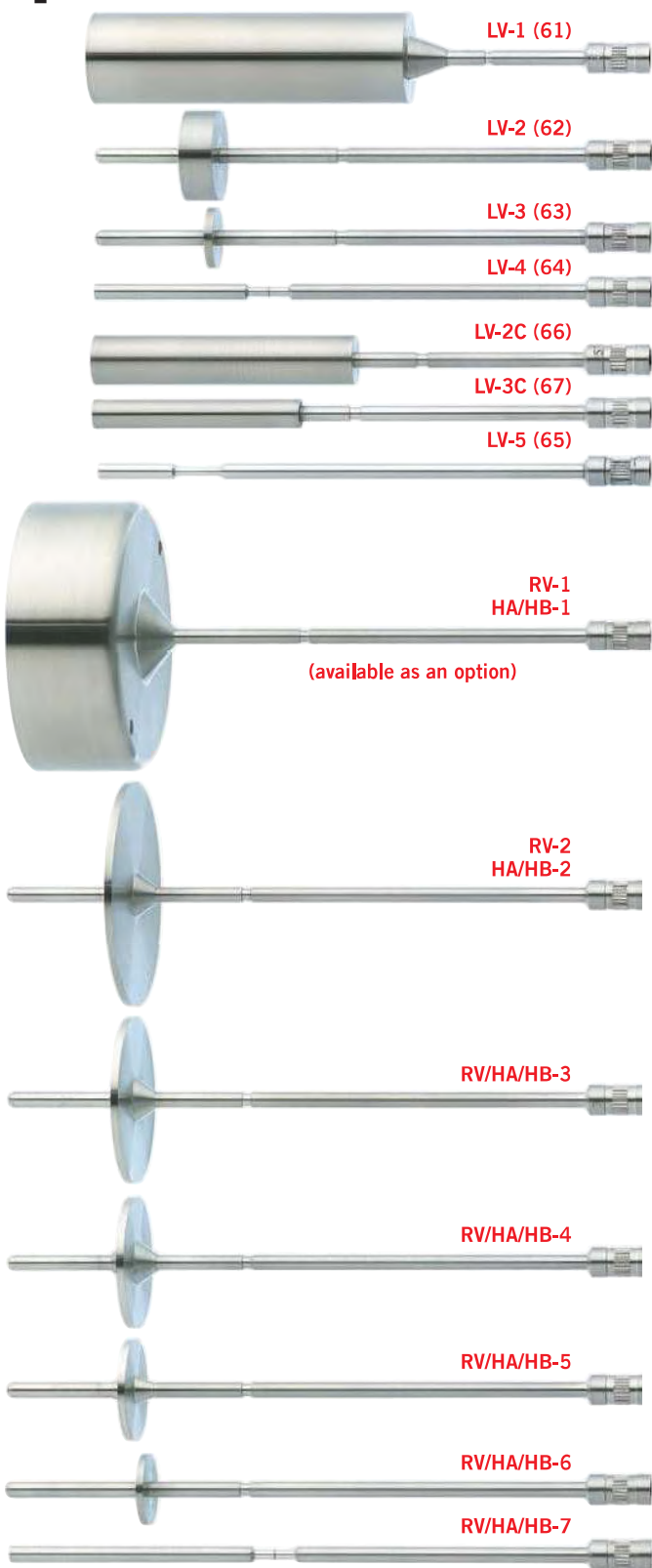
Spiral Adapter Set

### Spiral Adapter Ranges cP(mPa•s)

LV Series	to 100K
RV Series	to 1.1M
HA Series	to 2.2M
HB Series	to 9.0M

K = 1 thousand M = 1 million cP = Centipoise mPa•s = milliPascal•seconds

# Spindles



LV Spindles cP(mPa•s)	
SPINDLE	RANGE*
LV-1 (61)	15 - 20K
LV-2 (62)	50 - 100K
LV-3 (63)	200 - 400K
LV-4 (64)	1K - 2M
LV-5 (65)	2K - 4M
LV-2C	50 - 100K
LV-3C	200 - 400K

\* Based on Standard LV speeds .3 - 60 rpm  
Note: LV-1 through LV-4 are supplied with LV instruments.  
LV-2C & LV-3C are optional "cylindrical spindles" offering geometry for calculating shear rates.  
LV and RV/HA/HB spindles are supplied in 302 stainless steel.  
Optional 316 stainless or teflon coated spindles are available

RV/HA/HB Spindles cP(mPa•s)			
SPINDLE	RANGE* RV SERIES	RANGE* HA SERIES	RANGE* HB SERIES
RV-1 **	100 - 20K	200 - 40K	800 - 160K
HA/HB-1 **	100 - 20K	200 - 40K	800 - 160K
RV-2	100 - 80K	200 - 160K	800 - 640K
HA/HB-2	100 - 80K	200 - 160K	800 - 640K
RV/HA/HB-3	100 - 200K	200 - 400K	800 - 1.6M
RV/HA/HB-4	200 - 400K	400 - 800K	1.6K - 3.2M
RV/HA/HB-5	400 - 800K	800 - 1.6M	3.2K - 6.4M
RV/HA/HB-6	1K - 2M	2K - 4M	8K - 16M
RV/HA/HB-7	4K - 8M	8K - 16M	32K - 64M

\* Based on standard RV/HA/HB speeds .5-100 RPM.  
Note: LV and RV/HA/HB spindles are supplied in 302 stainless steel.  
Optional 316 stainless or teflon coated spindles are available  
\*\* This spindle available as an option

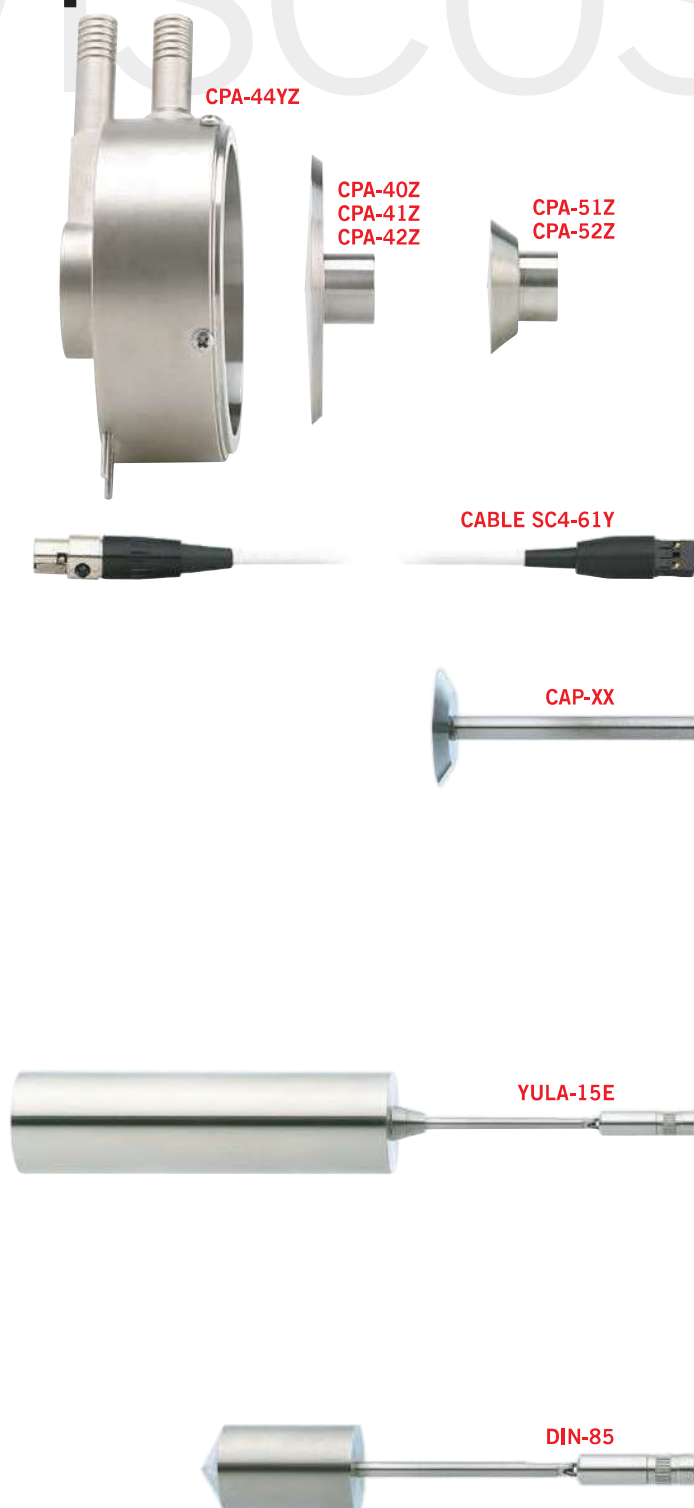


RV/HA/HB Spindle Set includes spindles #2 - #7 and is supplied with standard AMETEK Brookfield Viscometers and Rheometers.  
Spindle #1 is available as an option.

Spindle Rack is also available as an option with both LV and RV/HA/HB spindle sets.

Call or visit our website for more information on spindles with EZ-Lock connectors.

# Spindles



## Wells/Brookfield Spindles & Cups

SPINDLE	SHEAR RATE	SAMPLE VOLUME	CONE ANGLE	CONE RADIUS
CPA-40Z	7.50N sec <sup>-1</sup>	.5mL	.8°	2.4cm
CPA-41Z	2.00N sec <sup>-1</sup>	2.0mL	3°	2.4cm
CPA-42Z	3.84N sec <sup>-1</sup>	1.0mL	1.5°	2.4cm
CPA-51Z	3.84N sec <sup>-1</sup>	.5mL	1.5°	1.2cm
CPA-52Z	2.00N sec <sup>-1</sup>	.5mL	3°	1.2cm
<b>CUP</b>				
CPA-44YZ	Standard cup without temperature probe			
CPA-44PYZ	Standard cup with RTD temperature probe			
PCPA-3YZ	Cup with 1 purge fitting			
PCPA-6YZ	Cup with luer fitting and 1 purge fitting			
PCPA-4YZ	Cup with luer fitting and 2 purge fittings			
PCPA-7YZ	Cup with luer fitting and 4 purge fittings			

Note: 1. Wells-Brookfield cones and cups are calibrated at the factory.  
 Cones ordered after shipment require cups to be returned for calibration to new cone.  
 2. CPA cups and spindles are compatible with CPE cups and spindles  
 3. See page 18 for viscosity ranges

## CAP Spindles

SPINDLE	SHEAR RATE	SAMPLE VOLUME	CONE ANGLE	CONE RADIUS
CAP-01	13.3N sec <sup>-1</sup>	67 µL	0.45°	1.511cm
CAP-02	13.3N sec <sup>-1</sup>	38 µL	0.45°	1.200cm
CAP-03	13.3N sec <sup>-1</sup>	24 µL	0.45°	0.953cm
CAP-04	3.3N sec <sup>-1</sup>	134 µL	1.8°	1.200cm
CAP-05	3.3N sec <sup>-1</sup>	67 µL	1.8°	0.953cm
CAP-06	3.3N sec <sup>-1</sup>	30 µL	1.8°	0.702cm
CAP-07	2.0N sec <sup>-1</sup>	1700 µL	3.0°	2.399cm
CAP-08	2.0N sec <sup>-1</sup>	400 µL	3.0°	1.511cm
CAP-09	2.0N sec <sup>-1</sup>	100 µL	3.0°	0.953cm
CAP-10	5.0N sec <sup>-1</sup>	170 µL	1.2°	1.511cm

Note: 1. Recommend ordering calibration fluids specific to cone for field calibration  
 2. See page 21 for viscosity ranges

## UL Spindles & Chambers

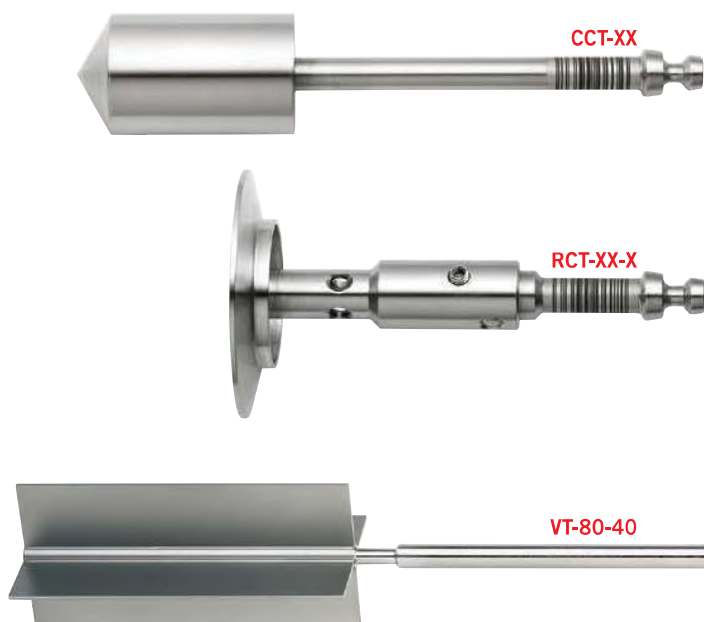
SPINDLE	TYPE	SAMPLE VOLUME	SHEAR RATE
YULA-15(E)	Spindle - 304 stainless steel		1.224N
YULA-15(E)Z	Spindle - 316 stainless steel		1.224N
ULA-31(E)Y	Sample Chamber - 304 stainless steel	16mL	
ULA-31(E)YZ	Sample Chamber - 316 stainless steel	16mL	

Note: 1. See page 41 for viscosity ranges  
 2. (E) represents enhanced UL version (introduced Jan. 2006)

N = rpm

## DIN Spindles

SPINDLE	SHEAR RATE	SAMPLE VOLUME
ULA-DIN-85	1.29N	17.0mL
ULA-DIN-86	1.29N	6.5mL
ULA-DIN-87	1.29N	2.0mL
HT-DIN-81 for Thermoset	1.29N	7.0mL
SC4-DIN-82 for SSA	1.29N	1.5mL
SC4-DIN-83 for SSA	1.29N	1.5mL
<b>CHAMBER</b>		
ULA-DIN-6Y	for use with ULA-DIN-86 and 87	
DAA-1	for use with ULA-DIN-85	



RST Spindles				
SPINDLE	VISCOSITY RANGE	SHEAR RATE	MAX. SHEAR STRESS	SAMPLE VOLUME
COAXIAL	Pa•s	sec <sup>-1</sup>	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

\*For use with water bath version only 1 Pa•s = 1,000 cP K = 1 thousand M = 1 million  
Note: Values based on minimum speed of 1 RPM and maximum speed of 1000 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

Values based on minimum speed of 1 RPM and maximum speed of 1000 RPM K = 1 thousand



CHAMBER RACK HT-54

Thermosel Spindles and Chambers			Link hanging configuration is standard
SPINDLE	SHEAR RATE	SAMPLE VOLUME	
SC4-18	1.32N	8.0mL	
SC4-31	.34N	10.0mL	
SC4-34	.28N	9.5mL	
SC4-21	.93N	8.0mL	
SC4-27**	.34N	10.5mL	
SC4-28	.28N	11.5mL	
SC4-29	.25N	13.0mL	
HT-DIN-81	1.29N	7.0mL	

\*SC4-XXBS = Solid Shaft. Not available for SC4-18 and SC4-21 spindles  
\*\*Also available as SC4-27D-100 = Disposable spindle, 100 units • SC4-DSY Chuck/Closer is required

CHAMBER	TYPE
HT-2	Sample Chamber - Reuseable, stainless steel
HT-2DB-100	Sample Chamber - Disposable, aluminum, 100 units

Note: See page 37 for spindle ranges

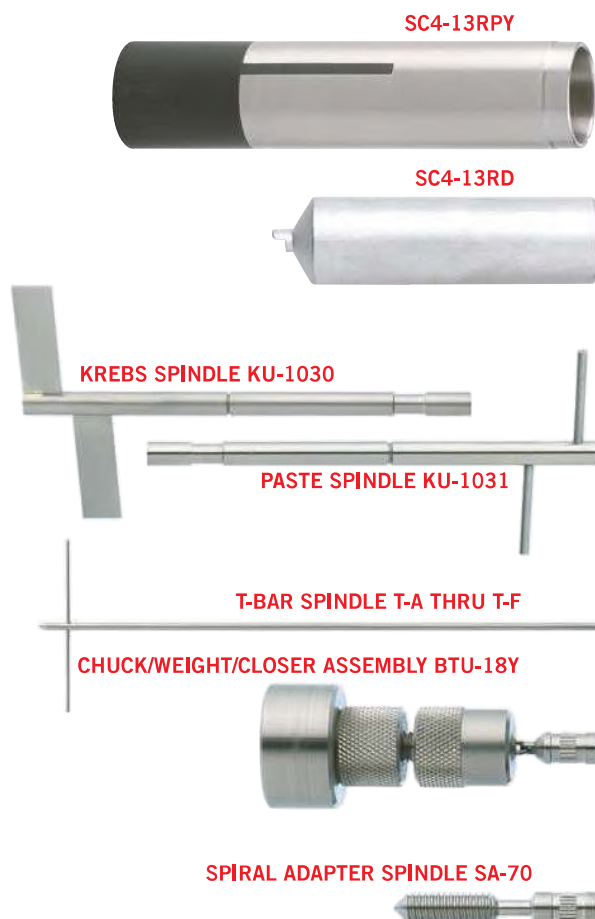
Call or visit our website for more information on spindles with EZ-Lock connectors.



# Spindles



Required for SC4-27D disposable spindles: **SC4-DSY CHUCK/CLOSER**



## Small Sample Spindles and Chambers

SPINDLE	SAMPLE CHAMBER	SHEAR RATE	SAMPLE VOLUME
SC4-18	13R	1.32N	6.7 mL
SC4-31	13R	0.34N	9.0 mL
SC4-34	13R	0.28N	9.4 mL
SC4-16	8R	0.29N	4.2 mL
SC4-25Z (316 s/s only)	13R	0.22N	16.1 mL
SC4-21†	13R	0.93N	7.1 mL
SC4-27*†	13R	0.34N	10.4 mL
SC4-15	7R	0.48N	3.8 mL
SC4-28	13R	0.28N	11.0 mL
SC4-29	13R	0.25N	13.5 mL
SC4-14	6R	0.40N	2.1 mL
SC4-DIN-82	13R	1.29N	1.5 mL
SC4-DIN-83	7R	1.29N	1.5 mL

CHAMBER	TYPE
SC4-13R	Sample Chamber w/o temperature probe
SC4-13RPY	Sample Chamber w/RTD temperature probe & cable
SC4-8R	Sample Chamber w/o temperature probe
SC4-8RPY	Sample Chamber w/RTD temperature probe & cable
SC4-7R	Sample Chamber w/o temperature probe
SC4-7RPY	Sample Chamber w/RTD temperature probe & cable
SC4-6R	Sample Chamber w/o temperature probe
SC4-6RPY	Sample Chamber w/RTD temperature probe & cable
SC4-13RD-100‡	Sample Chamber - Disposable, aluminum, 100 units

Note: See page 39 for spindle/chamber ranges ‡ Requires the use of special water jacket SC4-45YD

\* Also available as SC4-27D-100 = Disposable spindle, 100 units

† Solid shaft option available for spindles SC4-21 (Part No. SC4-21SD) and SC4-27 (Part No. SC4-27SD).

## KU-3 Spindles

SPINDLE	TYPE
KU-1030	Standard Krebs Spindle
KU-1031	Optional Paste Spindle

## T-Bar Spindles cP(mPa•s)

SPINDLE	LV	RV	HA	HB
T-A	156 - 62.5K	2K - 400K	4K - 800K	16K - 3.2M
T-B	312 - 124.8K	4K - 800K	8K - 6M	24K - 6.4M
T-C	780 - 312K	10K - 2M	20K - 4M	80K - 16M
T-D	1.5K - 624K	20K - 4M	40K - 8M	160K - 32M
T-E	3.9K - 1.5M	50K - 10M	100K - 20M	400K - 80M
T-F	7.8K - 3.1M	100K - 20M	200K - 40M	800K - 160M

M = 1 million K = 1 thousand

## Spiral Adapter Spindle

SPINDLE	CHAMBER
SA-70	SA-1Y

Note: See page 44 for ranges

## Vane Spindles

SPINDLE	VANE LENGTH (in)	VANE DIAMETER (in)
V-71	2.708	1.354
V-72	1.706	.853
V-73	.998	.499
V-74	.463	.232
V-75	.632	.316

Note: Container diameter should be twice (2x) the vane diameter when possible. See page 43 for ranges.

# Options & Specialty Items



MV1Y

## MV1Y Flag Impeller Spindle

Use with the Small Sample Adapter to help keep sample materials in suspension



4B2

## 4B2 Spindle

Required for viscosity testing in accordance with ASTM D2983 (Low Temperature Viscosity Measurement of Automotive Fluid Lubricants)



ABZ

## ABZ Spindle

Used for viscosity testing of thick film pastes. Short spindle length is suitable for immersion into shallow depth containers. Sensing length of spindle is less than 1-inch (2.54cm).

### ABZ Spindle

RV	HA	HB
8K-16M	16K-32M	64K-138M

## Custom Spindles

Custom spindles can be developed to meet your particular test requirements. Contact AMETEK Brookfield or an authorized dealer for details.



SP1-UC-Y

YDX-1



SXL-X

SP1-UC-Y

SXR-X

### Type D Extension Link with Hook Coupling

YDX-1	Male coupling nut; attaches to spindle
SP1-UC-Y	Female coupling nut; attaches to viscometer
SXV-XX	Extension link; see below for lengths

### Type S Spindle with one SP1-UC-Y coupling

SPINDLE	
SXL-X	Type S LV spindle (1-4)
SXR-X	Type S RV/HA/HB spindle (1-7)



EXTENSION LINK SXV-XX



SP-7Y QUICK CONNECT COUPLING

SP-4

SP-3

SP-5

Extension		
LINK	LENGTH	USED WITH
SXV-08	1"	UL Adapter
SXV-09	1.12"	Small Sample Adapter
SXV-24	3"	Thermosel
SXV-32	4"	Type D/S Extension
SXV-48	6"	Type D/S Extension
SXV-80	10"	Type D/S Extension
SXV-96	12"	Type D/S Extension

Note: Other lengths available; call for details

### Quick Connect Coupling (SP-7Y)

PART	
SP-3	Coupling to viscometer/rheometer
SP-4	Coupling to spindle
SP-5	Sleeve (to hold together)

Call or visit our website for more information on spindles with EZ-Lock connectors.

# Options & Specialty Items

## Model A Lab Stand: Dial, DV-E

## Model G Lab Stand: DV3T, DV2T, DV1

All standard viscometers are supplied with either a Model A or Model G Laboratory Stand. These traditional stands move the viscometer up and down by turning the knob on the 14 inch rod\* and clamp assembly. The clamp itself has been newly redesigned to allow for an easier, more ergonomic grip.

\*Lab Stands with 18 inch rod assemblies are also available for testing with baths.  
Part Numbers for 18" stands: Model A 18, Model G 18



MODEL A  
LAB STAND



MODEL G  
LAB STAND

## Quick Action Lab Stand:

Optional purchase for Dial, DV-E, DV1, DV2T, DV3T



MODEL QB LAB STAND

Taking measurements has never been so fast or easy! With the push of a button, the instrument moves up and down the lab stand, quicker and easier than ever before. The Quick Action Lab Stand is perfect for busy lab environments, especially those with multiple operators or multiple samples. This stand is available as an option for new Dial, DV-E, and DV1 Viscometers and is also compatible with existing models.

## EZ-Lock Spindle Coupling System



Quickly and more safely change spindles with this spring-loaded spindle coupling attachment. Attach the EZ-Lock Spindle Coupling to a spindle and insert the spindle into the chuck. That's it! Changing spindles has never been quicker or easier... making this the perfect option for busy labs with multiple samples to test. EZ-Lock can be purchased as an option for new DV1 and DV2T Viscometers as well as the DV3T Rheometer. It can also be retrofitted to your existing DV-I and DV-II series Viscometer as well as any of your DV-III series Rheometers.

EZ-Lock is also available for use with your favorite AMETEK Brookfield accessories such as the Thermosel and Helipath Stand as well as the following adapters: Small Sample Adapter, UL Adapter, Enhanced UL Adapter and DIN Adapter.\*

\* Special brackets may be required to accommodate the length of the EZ-Lock system; requirement can be determined at time of ordering.

## Ball Bearing Option

If your viscometer or rheometer is used by multiple operators or in a busy lab environment, a more durable ball bearing suspension system may help keep your instrument in calibration longer with less "down time". This option can be ordered at the time of purchase and a retrofit to existing instruments may be available. Consult AMETEK Brookfield or your local AMETEK Brookfield representative for details.\*\*

\*\* This option is for the torque ranges of RV, HA, and HB only - it is not available for instruments in the LV torque range.

## Protective Keypad Covers



Protect your keypad against dirt, scratches, spillage and dust with these “peel and stick” disposable covers. They are ideal for instruments with multiple users and for busy, high traffic work areas. These flexible protective covers are packaged in quantities of 10 and are available for most DV-I series, DV-II series, CAP series, DV-III series, VTE series and AST-300SY touch screen controller models.

## Complimentary Torque Decals

Now you can quickly identify the torque range of your standard AMETEK Brookfield Viscometer/Rheometer with easy-to-read decals. The decals provide a convenient labeling system for your lab or production personnel. The label sheet comes with pressure-sensitive decals, two large and two small for LV, RV, HA and HB torque ranges. The small decals fit on the instrument faceplate and the large decals on the side, back or top of the instrument. Request Part Number T05-1012.



## Dymo 450 Turbo Label Writer

Easily print — and permanently record — test data with this compact Dymo 450 turbo label writer for DV1M, DV2T Viscometers and DV3T Rheometers. It comes complete with three convenient continuous feed paper rolls:

Paper roll, 2 1/4" wide x 300' (Reorder: GV-1047)

Adhesive label roll, 1 1/8" x 3 1/2", 350 labels

per roll (Reorder: GV-1048)

Adhesive label roll, 2 5/16" x 4", 300 labels per roll (Reorder: GV-1049)



## Touch Screen Protectors

Easy to apply Touch Screen Protectors to shield against dust and dirt are now available for DV2T Viscometers (Part No. GV-1019) and DV3T Rheometers (Part No. GV-1020). Each package includes two touch screen protectors, an application tool for easy alignment, and a cleaning cloth. It's no-water-required application method ensures a no mess, smooth application.



## The AMETEK Brookfield Website

Looking for more information? Then the AMETEK Brookfield website is the place to visit. Here you can download manuals, SDSs, article reprints, brochures and find representatives in your area. Find out when our popular training series will be in your area or watch our, free online videos. The website is updated frequently so there's always something new to discover at [www.brookfieldengineering.com](http://www.brookfieldengineering.com).





# Viscosity Standards

AMETEK Brookfield Viscosity Standards provide a convenient, reliable way to verify the calibration of your AMETEK Brookfield Laboratory Viscometer/Rheometer. AMETEK Brookfield Viscosity

Standards are Newtonian and available as either silicone or oil. Silicone fluids are less temperature sensitive than oil fluids.

Note: AMETEK Brookfield recommends that all fluids be replaced annually

## Silicone Viscosity Standards

These fluids are most commonly used to verify calibration of AMETEK Brookfield Viscometers/Rheometers.

*Accuracy:  $\pm 1\%$  of viscosity value*

*Excellent temperature stability*

*Recommended for use with AMETEK Brookfield and most other rotational viscometers*

*Most economical*

*Special viscosity values and temperature calibrations available upon request*



## VisCal Kit

The VisCal Kit provides all the necessary items to verify calibration of your Viscometer/Rheometer. Includes AMETEK Brookfield 600mL Beaker, 1 pint of Silicone Viscosity Standard, Dispensing Bottle for Cleanup and Trapper Cleaning Agent.\*

\*Trapper Cleaning Agent available only in shipments within the USA



## Plastic VisCal Kit

The AMETEK Brookfield Plastic VisCal Kit provides all the necessary items to verify calibration of your Viscometer/Rheometer in a glass-free environment. Includes AMETEK Brookfield 600mL Plastic Beaker, 1000ml of Silicone Viscosity Standard (5-12,500 cP) in a plastic bottle and a AMETEK Brookfield-designed metal lid for anchoring beaker in the temperature bath.



### General Purpose Silicone Fluids

Brookfield Part #	Nominal Viscosity cP (mPa•s)	Temp °C	Temp °C
5 cps	5	20.0°C	25.0°C
10 cps	10	20.0°C	25.0°C
50 cps	50	20.0°C	25.0°C
100 cps	100	20.0°C	25.0°C
500 cps	500	20.0°C	25.0°C
1000 cps	1,000	20.0°C	25.0°C
5000 cps	5,000	20.0°C	25.0°C
12500 cps	12,500	20.0°C	25.0°C
30000 cps	30,000	20.0°C	25.0°C
60000 cps	60,000	20.0°C	25.0°C
100000cps	100,000	20.0°C	25.0°C

### High Temperature Silicone Fluids

Brookfield Part #	Nominal Viscosity cP (mPa•s)	Temp °C	Temp °F
HT30000	30,000	25.0°C	77°F
	9,000	93.3°C	200°F
	4,500	149.0°C	300°F
HT60000	60,000	25.0°C	77°F
	18,000	93.3°C	200°F
	9,000	149.0°C	300°F
HT100000	100,000	25.0°C	77°F
	30,000	93.3°C	200°F
	15,000	149.0°C	300°F

## Special Order Silicone Fluids

For our customers needing a nonstandard viscosity or temperature range, our silicone fluids can be modified to meet most requirements.

### VISCOSITY BLENDS CALIBRATED AT 25°C (77°F)

- Minimum: 5 cP (mPa•s)
- Maximum: 60,000 cP (mPa•s)
- Blends will be within  $\pm 2\%$  of requested value

### TEMPERATURE CALIBRATIONS

- Minimum: 10°C (50°F)
- Maximum: 80°C (176°F)
- Minimum temperature increment: 2°C

## Oil Viscosity Standards

These fluids are used for specific instruments using cone/plate or Krebs spindle geometry. Also, certain industries may require use of oil standards.

*Accuracy:  $\pm 1\%$  of viscosity value*

*Appropriate for use at shear rates greater than  $500 \text{ sec}^{-1}$*

*Recommended for use with cone/plate Viscometers at viscosities above 5,000 cP*

*Recommended for AMETEK Brookfield CAP series and KU-3 Viscometers and RST Rheometers*

*AMETEK Brookfield oil viscosity standards are hydro-carbon based, either mineral oil or polybutenes*

Note: Other oil fluids are available – call for details

AMETEK Brookfield Viscosity Standards are accurate to  $\pm 1\%$  of the stated viscosity and are certified by methods traceable to the United States National Institute of Standards and Technology (NIST). The selection of one or two fluids will normally provide sufficient measurement points to verify calibration of your instrument. All fluids are supplied in 1/2 liter (1 pint) containers complete with a certificate of calibration. CAP Oil Fluids are supplied in 150 mL (4 oz) containers



### CAP Viscometer Oil Fluids For calibrating CAP Series cones each spindle has its own fluid

Cone Spindle	HIGH TORQUE CAP				LOW TORQUE CAP			
	Low Temp 25°C		High Temp 60°C		Low Temp 25°C		High Temp 60°C	
	Brookfield Part #	Viscosity cP (mPa•s)	Brookfield Part #	Viscosity cP (mPa•s)	Brookfield Part #	Viscosity cP (mPa•s)	Brookfield Part #	Viscosity cP (mPa•s)
1	CAP1L	89	CAP1H	89	CAP0L	57	CAP0H	57
2	CAP2L	177	CAP2H	177	CAP1L	89	CAP1H	89
3	CAP3L	354	CAP3H	354	CAP2L	177	CAP2H	177
4	CAP4L	708	CAP4H	708	CAP3L	354	CAP3H	354
5	CAP5L	1,417	CAP5H	1,417	CAP4L	708	CAP4H	708
6	CAP6L	3,542	CAP6H	3,542	CAP5L	1,417	CAP5H	1,417
7	CAP7L	1,328	CAP7H	1,328	CAP1L	89	CAP1H	89
8	CAP8L	5,313	CAP8H	5,313	CAP3L	354	CAP3H	354
9	CAP9L	21,250	CAP9H	21,250	CAP5L	1,417	CAP5H	1,417
10	CAP10L	236	CAP10H	236	CAP2L	177	CAP2H	177

### HOW TO SELECT A CAP FLUID

- Determine which viscometer is being used: High Torque or Low Torque.
- Determine which temperature model is being used:  
Low Temperature (5°C-75°C) or High Temperature (50°C-235°C)
- Determine which cone is being used.

### Krebs Viscometer Oil Fluids

Brookfield Part #	Nominal Viscosity Krebs Units	Temp °C
KU61	61	25.0°C
KU73	73	25.0°C
KU87	87	25.0°C
KU99	99	25.0°C
KU106	106	25.0°C

### General Purpose Oil Fluids

Brookfield Part #	Nominal Viscosity cP (mPa•s)	Temp °C
B29	29	25.0°C
B200	200	25.0°C
B400	400	25.0°C
B600	600	25.0°C
B1060	1,060	25.0°C
B2000	2,000	25.0°C
B10200	10,200	25.0°C
B21000	21,000	25.0°C
B73000	73,000	25.0°C
B200000	200,000	25.0°C
B360000	360,000	25.0°C

### 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	B10200	10,200
CCT-14	B73000	73,000
CCT-8	B360000	360,000