



**BROOKFIELD  
AMETEK®**

PROCESS CONTROL  
VISCOMETERS

# Why measure viscosity in-line?

## Why Measure Viscosity In-Line?

Practical application of viscosity measurement data often leads to the need for in-process control of viscosity. The installation of viscosity control equipment on a process can provide a level of control achievable by no other means. Variations in viscosity are detected and corrected instantly before they can negatively affect product quality. Real time viscosity control can reduce downtime and material waste by ensuring that the process is operating within its specified viscosity parameters. In many cases, the savings from increased efficiency can pay back the cost of the viscometer in only a few months.

## Why Choose AMETEK Brookfield?

AMETEK Brookfield builds its Process Control Viscometers to the same high standards of performance and value as its Laboratory Viscometers. Particular attention has been devoted to making these instruments rugged and easy to maintain for long service in demanding industrial environments.



**FAST-101**

Advanced sensor technology for direct in-line viscosity measurement (p4 )



**FAST-102**

Compliant to 3-A sanitary standards (p5)



**Flange Mount**

Designs are available to allow direct mounting onto a process tank through a sidewall flange. (p6)



**TT-100**

For in-line system applications requiring pipeline mounting (p8)



**VTE-250**

For systems open to the atmosphere (p12)

## Questions to Consider

1. What is the viscosity range of your material?
2. Is your material Newtonian, Dilatant, Non-Newtonian, Thixotropic or Plastic?
3. What is the minimum, maximum and average pressure requirement of your application?
4. What is the minimum, maximum and average temperature of your application?
5. What is the minimum, maximum and average flow rate of your application?
6. Where in production would you like the viscometer:  
in-line, on the top of the tank or on the side of the tank?
7. What electrical code requirements do you have:  
NEMA 1 (general purpose—indoor)  
NEMA 4 (watertight/dust tight for indoor/outdoor use)  
NEMA 7 (explosion proof—Class 1, Div. 1&2, Group D)  
ATEX (explosion proof—Code: EE x d 11B T6)  
IECEx (code II 2 G Ex db 11B)

The above parameters may eliminate some of the instrument models because, for example, the viscosity is higher than the range of the instrument or outside of the pressure rating of the instrument. In many cases, more than one instrument may be applicable.

Please allow us to assist you in choosing the best viscosity control system for your application.

# In-Line Viscometers Provide Automatic Control of Process Fluid Viscosity

There are many ways that viscosity can be measured, such as capillary, vibration and rotational. These methods have different benefits and may work well for process monitoring or control but will likely not give the same values as laboratory or analytical methods. In general, laboratories require a more scientifically accurate measurement, while process control requires a stable, repeatable signal. Process measurements are made both in-line and off-line. A bench-top viscometer has often been used for off-line measurements wherein a sample of the process fluid is drawn and tested under controlled conditions (temperature, shear history, shear rate, etc.). In-line viscometers are immersed in the process stream. They measure and control continuously under process conditions helping to maintain a consistent quality product. The demands of these two environments are different, and it is unlikely the same equipment can be used for both or that the exact same results will be generated. However, if done properly, the results will follow the same trend and can be correlated to the bench top, making in-line measurement useful for ensuring consistent production quality.

## WHAT ARE THE BENEFITS TO BRINGING YOUR MEASUREMENT IN-LINE?

In-line measurements give real-time, continuous readings of the fluid's viscosity during processing and consequently provide a means to automate the modification and viscosity control of the process fluid. While it is difficult to control all the factors present in the process that affect the fluids' viscosity (such as temperature, air bubbles, shear history, turbulence, pressure variations, etc.), if these factors are kept relatively constant, then good control can be achieved.

## WHAT EFFICIENCIES ARE GAINED BY MEASURING IN-LINE?

Automatic control of the process fluid viscosity insures consistent product all the time and reduces or eliminates human errors and expensive sample testing. Also, it provides for a complete record of how the process varied over a span of time, instead of at just one point in time.

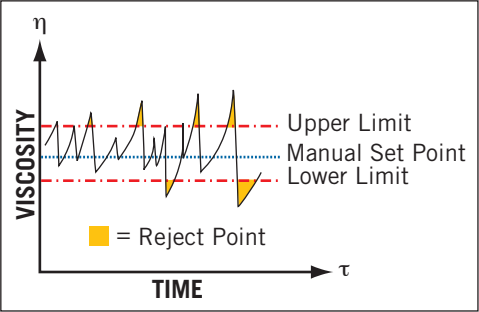
## WHAT ARE THE TOP THREE FACTORS TO CONSIDER WITH CHANGING YOUR MEASUREMENT PROCESS?

For process measurements, the critical factors are stability, repeatability, and sensitivity to changes in viscosity. In the laboratory or for analysis environment controls (e.g. temperature, flow, sedimentation, air, etc.) and scientific measurements (controlled shear, geometry measurements and sample preparation) must also be included.

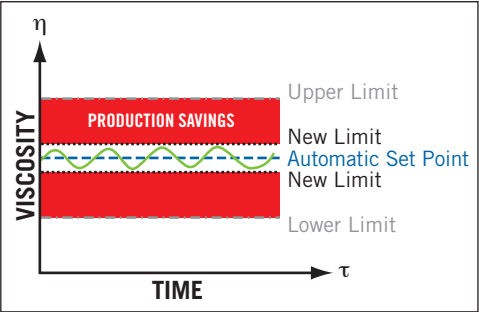
## HOW DOES MONITORING THE VISCOSITY AFFECT PRODUCT QUALITY?

Most products are formulated to flow or spread in a controlled manner. Monitoring viscosity at critical shear points ensures that the product will act the same way every time the customer uses it. This is the most tangible indicator of quality.

# Manual Viscosity Control



# In-Line Viscosity Control



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# FAST-101™ Viscosity Controller

the compact FAST-101 is the world's most innovative means of viscosity control

**No moving parts** to wear, bind or contact process materials and no narrow gaps to trap product

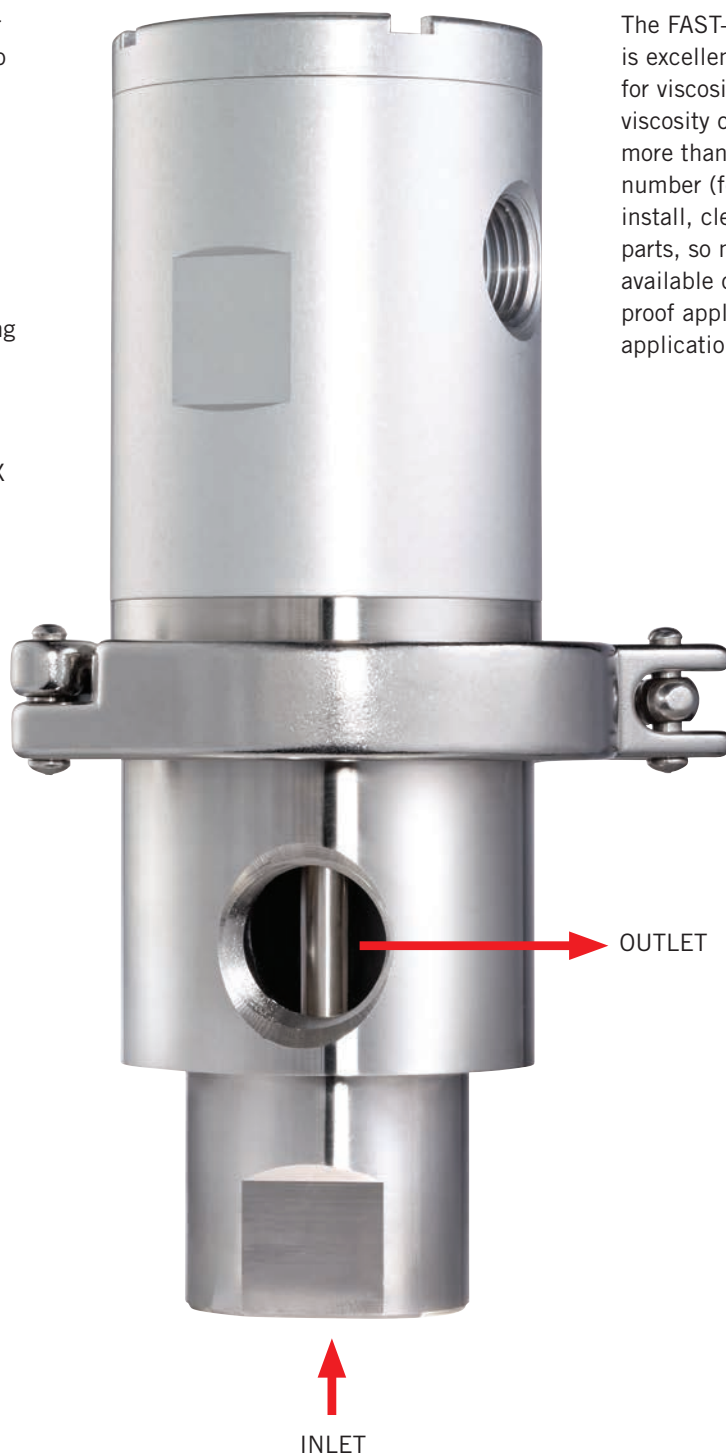
**Simple, clean-in-place design**  
rugged 316 stainless steel construction

**Continuous, reliable output**  
4-20 mA, RS232 or RS485

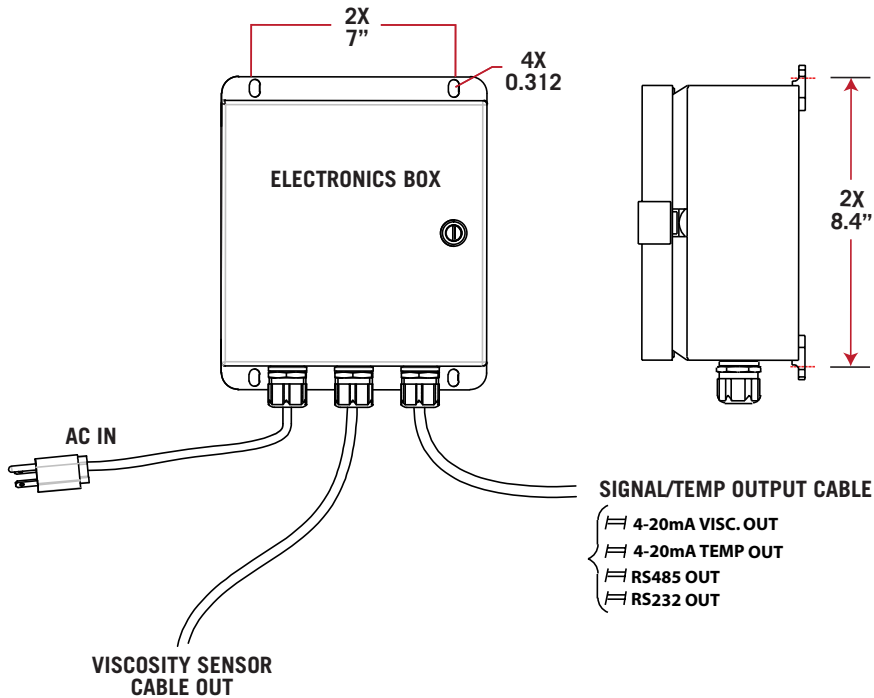
**Saves you money** while increasing your production

**Optional configurations**  
food grade and explosion-proof designs (Nema 4, Nema 7, ATEX or Sanitary Configurations)

The FAST-101 is a versatile instrument that is excellent for customers who are looking for viscosity control (i.e. maintaining the viscosity of the product) in their process more than the measurement of an exact number (for example, 23.5 cP). It is easy to install, cleans-in-place, and has no moving parts, so maintenance is minimal. With available options it is suitable for explosion-proof applications or 3-A food-grade applications as well.



## Typical Installation: FAST-102 (115 or 230V)



### NOTE:

1. POWER IN CORD MAY BE REMOVED AND POWER MAY BE BROUGHT DIRECTLY INTO THE TERMINAL BOARD LOCATED INSIDE OF THE CONTROLLER ENCLOSURE.

## FAST-102 Sanitary Unit



### Standard Sensor

Option is an economically priced, sensor transmitter design for simple equipment integration



### FMXTS

The FAST-101/MXTS is a simple solution to viscosity control when special features or elaborate operator interfaces are not required.

The FAST-101/MXTS Viscosity Sensor coupled with a PLC allows an operator to make better and faster decisions without depending on unreliable or inconsistent measurement techniques.

The FAST-101/MXTS is also ideal for low cost, seamless integration of viscosity measurements with factory-floor, automated control systems (PC, PLC, DCS, etc.). Our new FAST-101/MXTS includes a powerful digital communication feature that allows up to 12 viscometers to be networked into a single reliable multi-stationed viscosity measurement system.

# FAST™ Optional Configurations



## Flange Mount

Designs are available to allow direct mounting onto a process tank through a sidewall flange.



## Immersion Probe

Allows for insertion into the tank from above

## Ranges & Specifications

**Measurement Type:** Torsionally oscillating probe

**Viscosity Range:** 1-3,300 cSt using an NIST traceable, Newtonian fluid measured at 25°C  
1-12,000 option

**Temperature (fluid):** -20° to +120°C (-4° to 248°F)

**Pressure Range:** Vacuum to 200 psig maximum,

**Repeatability and Stability:** ±1% of the Reading

**Power Requirements:** 115 or 230VAC (auto set),  
50 or 60Hz

**Connections:** - FAST-101TSY: 3/4" female NPT standard  
1" male or 1" female NPT  
1" BSP male  
- FAST-102FTSY: 2½" tri-clamp 3-A  
design inlet, 2" tri-clamp outlet

**Wetted Surfaces:** 316L stainless steel

**Sensor O-Ring:** Isolast for probe, Viton for chamber  
housing (EDPM or Kalrez®, optional  
on FAST-102TSY)

**Optional Specifications:**

- Sanitary 3-A design
- Explosion-proof design Class 1, Division 1 Groups C&D FM and ATEX Approved
- pH control
- Probe or flange mounting
- 24V DC power
- >200 psi pressure design
- 200°C optional on NEMA 4 design



# FAST-101™ Controllers



*Single Station Controller*

## AST-330SY Single or Dual Station Process Viscosity Controllers

The AST-330SY is designed for use with the AMETEK Brookfield AST-330SY system to control viscosity and temperature, interlock with other process devices, and accurately control fluid viscosity in a variety of industrial applications.

The AST-330SY is a precise, programmable controller with timed dosing intervals. Its intuitive screen layout allows for quick selection of setup and menu items. At a glance, set point and alarm status are displayed as are viscosity in cP, mPa•s, cSt or cup-seconds, current pH value and temperature in °C or °F.

### ADDITIONAL FEATURES INCLUDE:

- Touch Screen Convenience
- Viscosity and pH data trending
- pH and pump interlock
- Multi-level password protection
- Viscosity high/low alarms
- Control of viscosity set point
- Ethernet output



*Multi-Station Controller*

## AST-420SY Multi-Station Process Viscosity Controller

The AST-420SY is designed for use with the AMETEK Brookfield FAST-101TSY system to monitor viscosity, display temperature, interlock with other process devices, and accurately control fluid viscosity in a variety of industrial applications.

The AST-420SY is a precise, 6-station programmable controller with individual station timed dosing intervals. Its intuitive main screen layout allows for quick individual station selection of setup and menu items. At a glance, set point and alarm status are displayed as are viscosity in cP, mPa•s, cSt or cup-seconds, current pH value, and temperature in °C or °F for all stations.

### ADDITIONAL FEATURES INCLUDE:

- Touch Screen Convenience
- Viscosity and pH data trending
- pH and pump interlock
- Multi-level password protection
- Viscosity high/low alarms
- Main screen job run display
- Standby All/Auto toggle button
- Job Recipe/Auto/Load/Save selection button
- Unit-to-unit toggle button to access specific unit detail screen
- Ethernet output

# TT-100™ Viscometer

for in-line systems applications

**Continuous linear output signal**  
(4-20 mA)

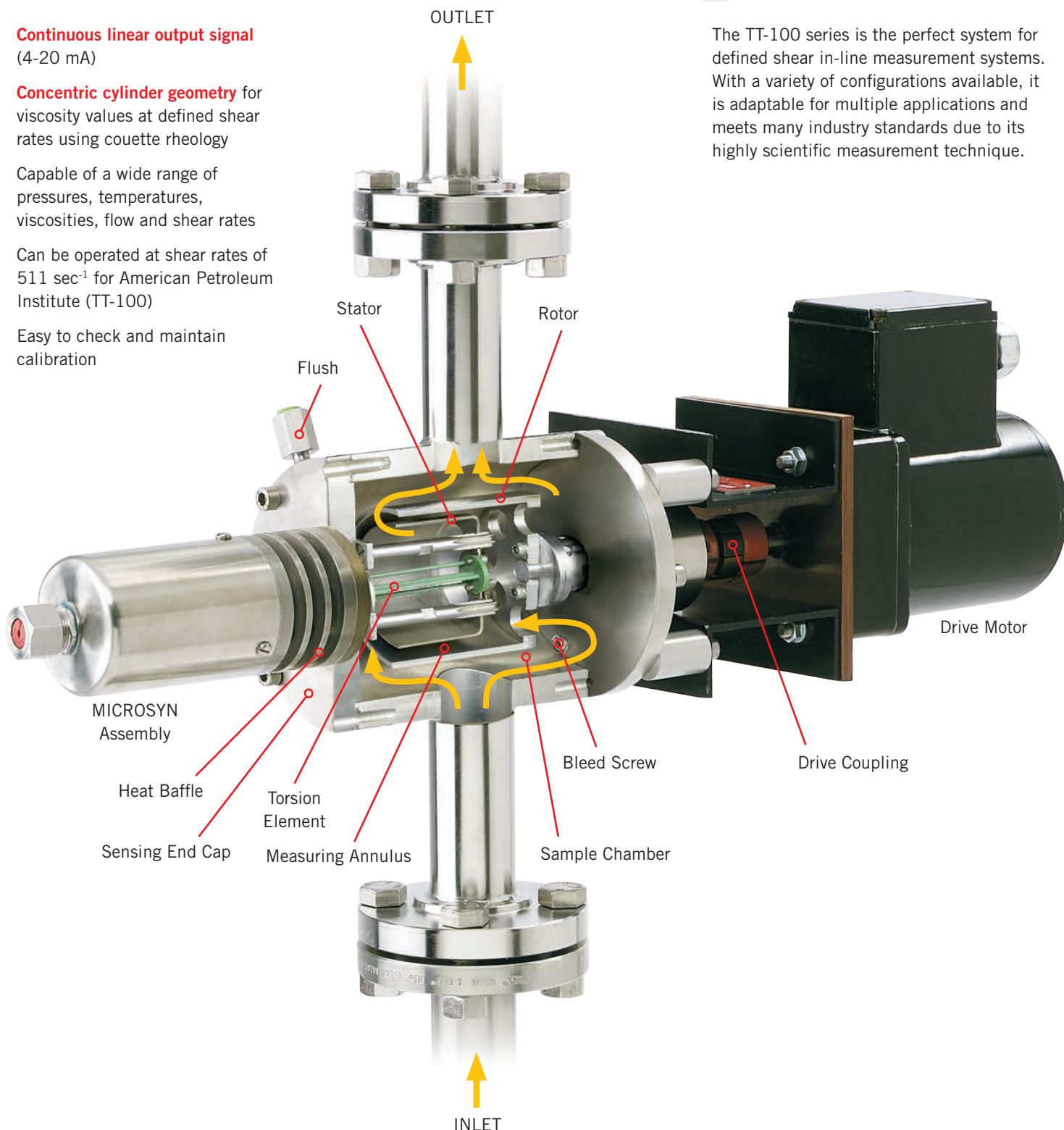
**Concentric cylinder geometry** for  
viscosity values at defined shear  
rates using couette rheology

Capable of a wide range of  
pressures, temperatures,  
viscosities, flow and shear rates

Can be operated at shear rates of  
511  $\text{sec}^{-1}$  for American Petroleum  
Institute (TT-100)

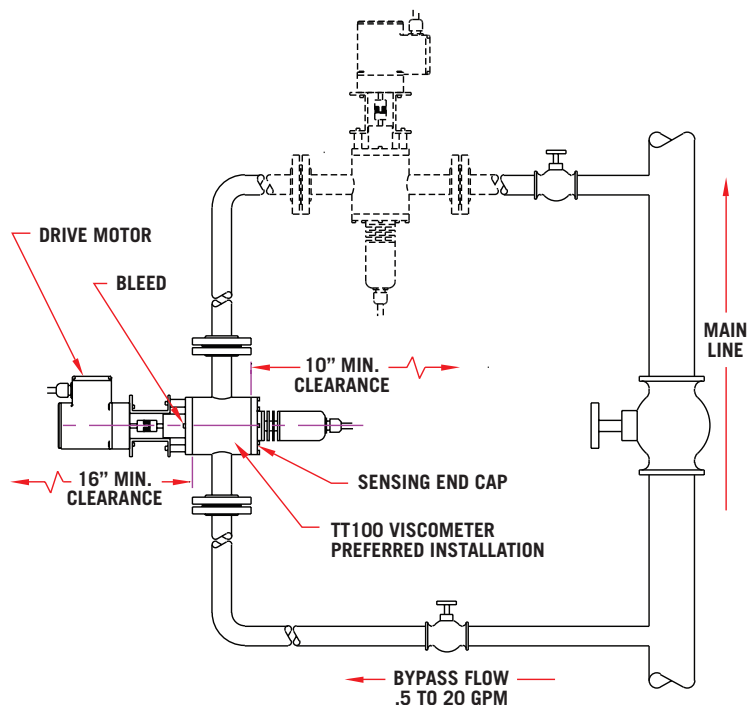
Easy to check and maintain  
calibration

The TT-100 series is the perfect system for  
defined shear in-line measurement systems.  
With a variety of configurations available, it  
is adaptable for multiple applications and  
meets many industry standards due to its  
highly scientific measurement technique.





## Typical Installation



### Notes:

1. Install viscometer in clean, vibration free, readily accessible area. To avoid air or gas entrapment, preferred installation is vertical bypass line. Allow specified clearance for removal of viscometer endcaps
2. Provide a minimum of 4-feet of straight pipe to viscometer inlet to minimize turbulent flow caused by elbow.

## Ranges & Specifications

**Measurement Type:** Concentric Cylinder

**Viscosity Range:** TT-100: 10 to 500,000 cP  
STT-100: 350 to 250,000 cP

**Shear Rates:** TT-100: 10 to 1,000  $\text{sec}^{-1}$   
STT-100: 7.5 to 225  $\text{sec}^{-1}$

**Temperature (fluid):** TT-100:  $-40^{\circ}$  to  $+300^{\circ}\text{F}$  (options to  $500^{\circ}\text{F}$ )

**Pressure Range:** 200 psig (maximum) (options to 1000 psig)

**Repeatability:**  $\pm 0.5\%$  of span,  $\pm 1^{\circ}$  Full Scale

**Power Requirements:** 115/230VAC, 50 or 60Hz, 100W

**Maximum Flow Rate:** TT-100: 20 gpm (maximum)

**Wetted Surfaces:** 316L stainless steel

**Output Signal:** 4-20 mA

**Process Connections:** TT-100: 1", 1-1/2" or 2" threaded or ANSI flanged  
STT-100: 3" or 4" Tri-Clamp

**Electrical Code:** NEMA 4, NEMA 7, ATEX or IEC option

## Optional Configurations

Optional configurations include 500 psi,  $500^{\circ}\text{F}$  construction, IECEx, NEMA 7 explosion-proof (FM approved), 1", 1-1/2", 2" threaded or flanged inlet and outlet fittings, special viscosity ranges or shear rates, 24V DC operations, readout indicator and variable speed motor



### TT-100IECEX™

Optional variable speed instrument for multiple shear rates



### STT-100VS™

Sanitary Viscometer

Conforms to 3-A sanitary conditions and has clean-in-place (CIP) technology (STT-100)  
3" or 4" tri-clamp connections  
Other options available

# PVS™ Rheometers

allows quick and easy viscosity measurements under pressure where sample boil-off is a problem

## 1'x1'x2' footprint

for site to site mobility

## Includes RheoVision Software

for sophisticated rheological analysis

## Hastelloy C cup and bobs

for operation in severe field environments

**Robust Drive** Capable of  
Speeds Up to 1000 RPM

**High Pressure**  
(1000 psi) Safety  
Release Valve

**Outside Cylinder Rotates**  
While Inside "Bob"  
Remains Stationary.  
Shear Rates to 1700 sec<sup>-1</sup>

**RTD on the Inner Cylinder**  
Ensures Accurate Sample  
Temperature Measurement

Sample  
Cup

## PVS Rheometer Ranges

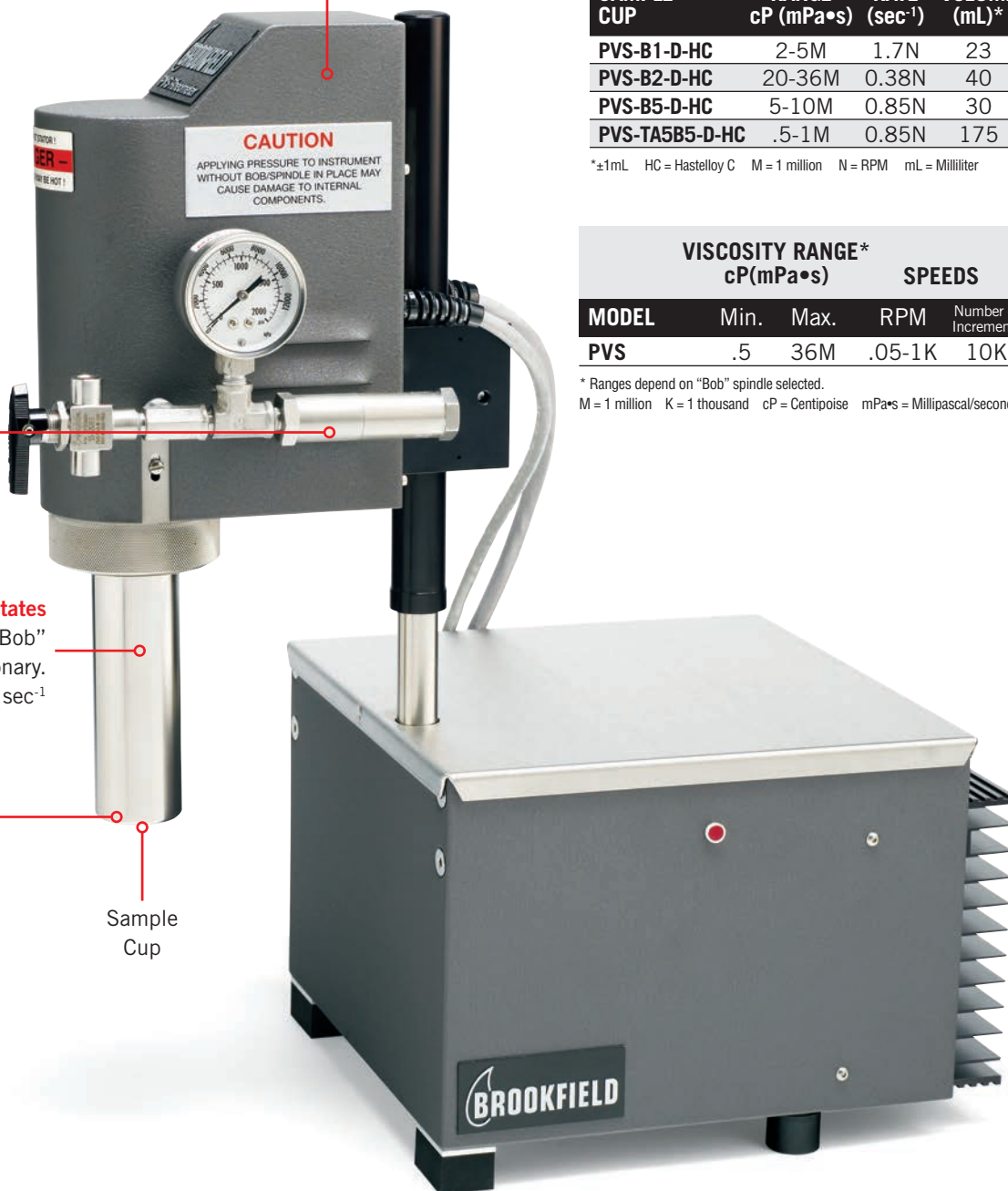
BOB/STATOR SAMPLE CUP	VISCOSITY RANGE cP (mPa•s)	SHEAR RATE (sec <sup>-1</sup> )	SAMPLE VOLUME (mL)*
PVS-B1-D-HC	2-5M	1.7N	23
PVS-B2-D-HC	20-36M	0.38N	40
PVS-B5-D-HC	5-10M	0.85N	30
PVS-TA5B5-D-HC	.5-1M	0.85N	175

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

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

\* Ranges depend on "Bob" spindle selected.

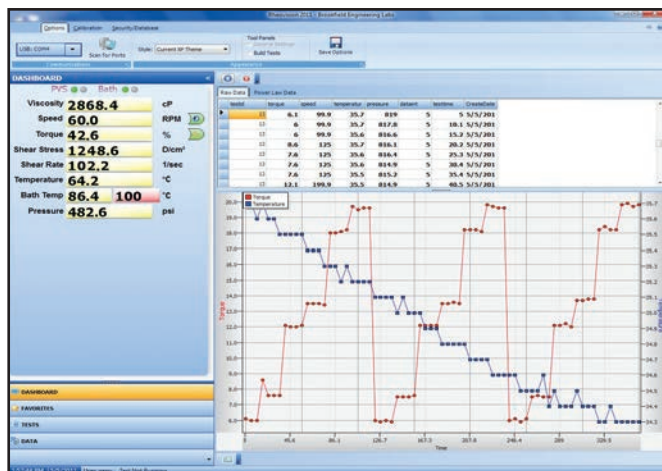
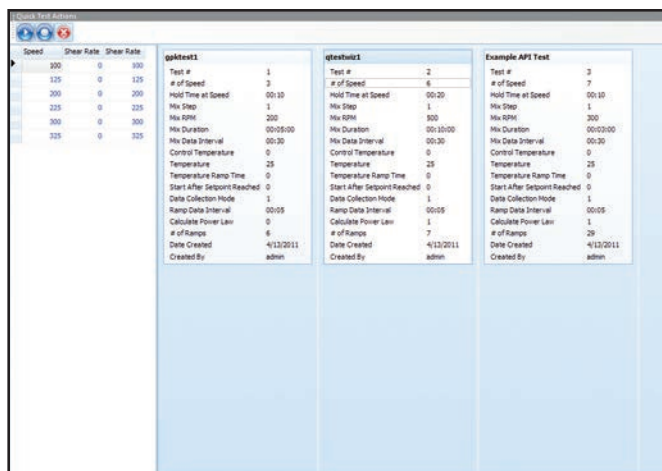
M = 1 million K = 1 thousand cP = Centipoise mPa•s = Millipascal/seconds



## 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.



## Optional Configurations

Optional configurations include additional spindles and bobs, computer, temperature control bath, thermo bath, triple annulus geometry for increased sensitivity when measuring low viscosity fluids



## Thermo Bath Option

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



## Carrying Case

For in-the-field portability

# VTE-250™ Viscometer

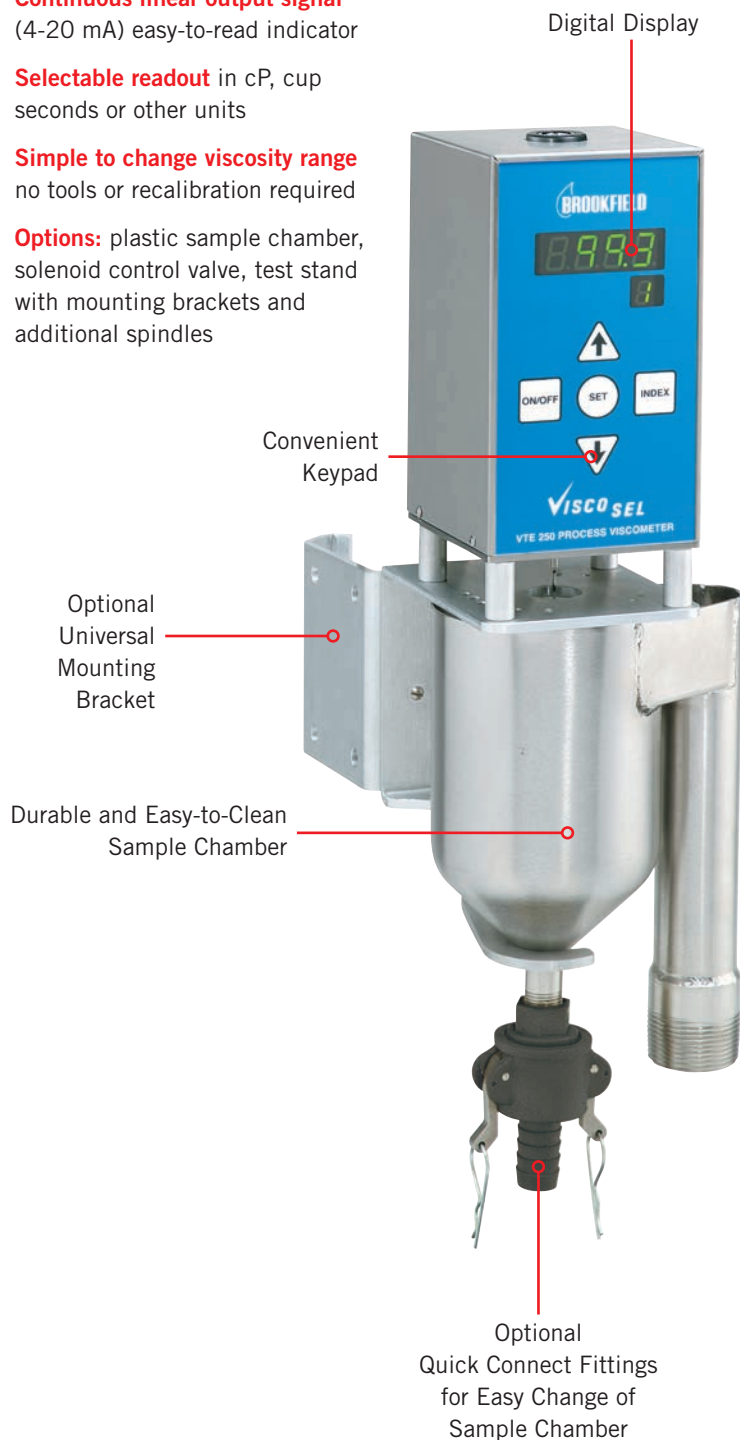
an in-line viscometer for automatic viscosity control of systems open to the atmosphere

**Continuous linear output signal**  
(4-20 mA) easy-to-read indicator

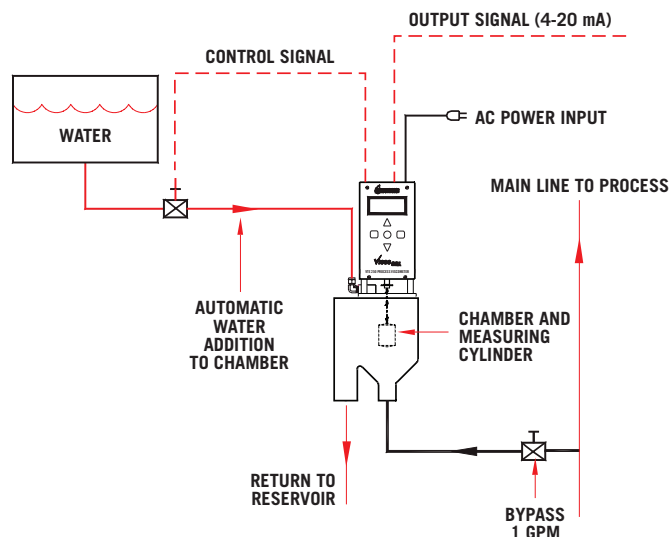
**Selectable readout** in cP, cup seconds or other units

**Simple to change viscosity range**  
no tools or recalibration required

**Options:** plastic sample chamber, solenoid control valve, test stand with mounting brackets and additional spindles



## Typical Installation



## Ranges & Specifications

**Measurement Type:** Rotational

**Viscosity Range:** 10 to 4,000 cP, other ranges optional

**Display:** Digital display of viscosity units

**Repeatability:**  $\pm 0.2\%$  of span,  $\pm 1^\circ$  Full Scale

**Power Requirements:** 115/230VAC, 50 or 60Hz, 100W

**Output Signal:** 4-20 mA

**Control Signal:** Up to 3 amp solenoid relay control

**Electrical Code:** NEMA 1

**Installation:** In-tank or flow-through, 1 gpm maximum

# 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

## Shear Stress Values Displayed

on easy-to-read lighted magnified dial

## Maintains a constant shear rate

under varying input power and  
drilling fluid conditions. Provides  
drilling fluid engineers with an  
accurate and versatile tool.

## Conventional oil field rotor, bob and torsion spring

maintain rheology history  
and reproducibility between  
instruments and laboratories

## Adjustable table height

to accommodate a variety of  
beaker/containment sizes

## Sample Cup

## Specifications/Features

<b>Motor Speeds:</b>	8 fixed (3, 6, 30, 60, 100, 200, 300, 600)
<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



# Typical In-Line Applications



VTE-250  
Process Viscometer (p12)

## Dip coating thickness control: capsules/batter/paint

The thickness or consistency of a fluid is controlled to provide a dependable and uniformly coated substrate when dipped, then removed, from the coating tank. In this application, the thickness or consistency of a fluid is controlled so that when something is dipped in it and pulled out, it is uniformly and consistently coated. Dipping applications are designed in automated systems whereby the substrate is brought over a tank or pan, dipped into the bath, removed and allowed to drip dry before proceeding through the process. The main problem with the open tank is with evaporation of fluids to the environment. Viscosity control is used for addition of water, solvents, or other modifiers as needed to control viscosity to a set point. In capsules, if the fluid is too thin, the capsule will break during filling or dissolve too soon when swallowed. If it is too thick, then there is raw material waste on millions of capsules, and it may not dissolve properly when swallowed. For batter applications, too thin a batter will mean improper coating and product quality. Too thick a batter will mean bad product quality, longer cook/dry times, and raw material waste. The VTE 250 is commonly used for capsule/tray coating control, with the FAST-101 used extensively for batter or tank coating controls.



FAST-101  
Process Viscometer (p4)

## Roll coating thickness control: Book binding, can coating, printing

**BOOK BINDING** – Animal glue is an adhesive used in the binding industry due to its flexible properties and general ease of handling. Solid glue bars are put into a pot, and heated to form liquid glue which is pumped to a roller pan, where the substrate picks up the adhesive in an automated process. The viscosity is held to a set point, as it is crucial to optimum coverage and quality of the final product. The typical instrument for this is the FAST-101.

**PRINTING** – In print applications, constant maintenance of proper ink viscosity ensures the quality of the printing, which reduces rejects and waste, while also keeping ink costs to a minimum. To assure the uniform application of water-based inks on a variety of substrates, it is necessary to control viscosity and pH.

Continuous monitoring and control of the ink reservoir viscosity using the AMETEK Brookfield FAST-101 can provide simultaneous viscosity and pH measurement and control at multi-stations and save money by using less ink.

- Optimizes printing quality and consistency
- Assures that ink quality is maintained
- Ensures continuity of color value
- Provides cleanliness of image with no haloing
- Maximizes press operating speeds
- Prevents ink curdling due to wrong pH
- Assures product consistency
- Minimizes waste
- Provides a permanent record for QC, when used with data recorder

### SENSITIVE CONTROL IS THE KEY

Control of the slightest change in viscosity makes all the difference to successfully applying material - particularly in the low viscosity region of the thin inks currently in use. The AMETEK Brookfield FAST-101 has a simple, rugged design that allows it to maintain accurate control at low viscosities. With an economical price, no moving parts, and no calibration required, other viscosity control systems can't match it.



## Spraying through nozzles: Fuel oil/ paint

In this application, the viscosity of a fluid is controlled so that when it is pumped through a spray nozzle, proper atomization of the material occurs.

### FUEL OIL

Proper atomization ensures the best combustion efficiency which requires continuous and accurate viscosity measurement and control. To burn fuel oil at the high volume flow rates demanded of modern boiler units, the oil must be atomized (i.e. dispersed into the furnace as a fine mist). This assures high speed vaporization and ignition. Most burners atomize oil by shearing the oil into small droplets. Burner manufacturers recommend that the oil be supplied to the burners at a specific viscosity to maintain consistent atomization. Failure to maintain proper atomization results in:

- Dirty fuel burning due to carbon and soot buildup
- Higher fuel consumption and costs
- Increased stack emissions and possible fines from government agencies
- Increases costly downtime in manufacturing and office operations

The AMETEK Brookfield FAST-101 in-line process viscometer monitors and controls viscosity and temperature in pressurized oil delivery systems. Repeatable viscosity measurements are necessary to maximize the efficient atomization and delivery of a variety of paraffin-based oils, asphaltic-based oils, as well as #5 and #6 heating fuels, and waste oils. The FAST-101 process viscometer also ensures that no fluctuations in viscosity occur. The FAST-101 solution includes the following design considerations:

- Bypass loop for viscometer installation to for fail-safe operation
- Use of viscosity feedback to control the heat rate to the oil feed line heat exchanger
- Output from the viscometer goes to a single loop controller which instantly responds to in-line viscosity changes
- System design can accommodate the large thermal capacitance of the oil heat exchangers and the varying oil flow rates through the heat exchanger

### PAINT

It's a matter of maintaining optimum coverage. Paints that are too thin have a lower viscosity and may require multiple coats. Paints that are too thick will provide optimal coverage in less coats but costs more to produce. To the unaided eye, borderline differences may be difficult to see without sophisticated viscosity control.

AMETEK Brookfield's FAST-101 Automatic Viscosity Control maintains paint thickness at correct levels throughout the run. This is an automatic control system that continuously senses viscosity, transmitting a signal when additional solvent is required, thus preventing wasteful material buildup.

## Quality control: Shampoo/Yogurt

Production of many products requires that viscosity be constantly measured and controlled in order to ensure consistent product quality. In-line measurement ensures consistent quality control in real-time. It saves on lab testing times, and hold up of product waiting for evaluation.



FAST  
Flange Mount (p6)



FAST  
Probe Style  
Process Viscometer (p6)



FAST-102  
Process Viscometer (p5)

# viscosity



TT-100  
Process Viscometer (p8)



PVS Rheometer (p10)

## End Point of Reaction

The viscosity of the product is continuously monitored in-tank and the process is either stopped, or the next steps taken once a specific viscosity limit is reached. This approach is used with chemical reactions, as well as the blending of multiple ingredients in batch process. (ex. synthetic fiber manufacturing)

### FIBER MANUFACTURE

Latex, spandex, and other synthetic materials are used to manufacture fibers, which are stretchable, rugged and used in many applications such as clothing. The manufacturing process is held in a reactor, where both temperature compensation and tight viscosity control are required over the steps and additions made in the process. The leading instrument for this service is the TT-100.

## Carrying properties: Drill mud, fracturing fluids

In many oil production applications, viscosity is monitored and controlled to make sure that the fluids have the proper rheological properties to carry solids. For example, in stimulation operations the fracturing fluid has to have the proper viscosity under various shear conditions to carry the proppant downhole, and deposit it at the required location. For drilling fluids, the viscosity must be correct to carry the cuttings away from the drill bit and out of the hole.

Field engineers in oil and gas drilling operations can make a mistake if the viscosity specifications of fluids pumped down-hole are incorrect. This complicates testing procedures, increases the risk of costly errors and wastes time. Consequently, it's necessary to ensure fast, accurate viscosity measurement, data collection and analysis of small fluid samples (tested under pressure and elevated temperatures) before they are pumped down-hole.

The in-line TT-100 and the portable, bench top PVS Rheometer give field engineers reliable viscosity measurement on-site at the well, simplify complicated test procedures, minimize human error and ensure quality control without delay. The AMETEK Brookfield PVS bench-top Rheometer:

- Permits easy relocation to the most remote job site due to its small size and light weight
- Allows quick and easy viscosity measurements under pressure and elevated temperature
- Provides complete automation of standard test procedures and conditions
- Utilizes coaxial cylinder geometry identical to existing standards
- Allows easy cleaning and disassembly due to simple, straightforward design
- Isolates torque transducer, bearings and other mechanisms from sample/test environment

The TT-100 is a field proven, in-line Couette measurement system that provides continuous measurement capabilities. The TT-100 output allows for constant monitoring and reporting of Frac Fluid viscosity or for use in ECD (Equivalent Circulating Density) calculations by Rig Engineers.

# Accessories & Service



## AMETEK Brookfield Dip Viscosity Cup (Zahn Type)

**Robust and inexpensive**

**Complies with  
ASTM methods**  
(D816, D1084, D4212)

**Wide viscosity range  
with 5 cups:**  
1 – 1840 cSt

**Highly compact  
and portable**  
requiring no electricity

Cup No.	Viscosity Range (cSt)	Application (material)
1	60 max	very thin liquids
2	20 – 230	thin oils, mixed paints, lacquers
3	150 – 850	medium oils, mixed paints, enamels
4	220 – 1100	viscous liquids and materials
5	460 – 1840	extremely viscous liquids and materials



## Service

AMETEK Brookfield has **AMETEK Brookfield Process Instrument Service Centers** located in Middleboro, MA, Guangzhou, China, and Dresden, Germany.

**On site Service** is also available through our main office in Middleboro, MA as well our Dresden and Guangzhou Offices.

We also have a world wide network of Dealers & Representatives factory trained to assist you with your AMETEK Brookfield Process Viscometer.

For service outside the United States, contact our authorized representatives. Go to our website **[www.brookfieldengineering.com](http://www.brookfieldengineering.com)** for a comprehensive list.

**Contact our Process Sales & Service for complete details:**  
800.628.8139 or 508.946.6200.

## DATA SHEET

for process instruments

**To help us determine which Process Viscometer would be best suited for your application, please complete the information requested below:**

Type of Fluid: ☐ Food ☐ Polymer ☐ Coating ☐ Slurry ☐ Liquid ☐ Pulp ☐ Other

Viscosity (specify units): Average: \_\_\_\_\_ Min.: \_\_\_\_\_ Max.: \_\_\_\_\_

Reference Temperature (at above viscosity): °C \_\_\_\_\_ °F \_\_\_\_\_

How was the viscosity measured? If known, provide shear rate or instrument description and operating speed.

(NOTE: If fluid is non-Newtonian, measurements at several shear rates and speeds will be required.):

If actual viscosity is centipoise is unknown, indicate approximate viscosity by comparison with common fluids:

For which viscosity value or range should the measuring system be designed? \_\_\_\_\_

### DESCRIPTION OF MATERIAL TO BE MEASURED

Product: \_\_\_\_\_

Rheological Characteristics: ☐ Newtonian ☐ Non-Newtonian ☐ Thixotropic  
☐ Dilatant ☐ Plastic ☐ Other: \_\_\_\_\_

Physical Composition:

Does it contain fibers?: \_\_\_\_\_ Size?: \_\_\_\_\_ Concentration?: \_\_\_\_\_

Does it contain particles?: \_\_\_\_\_ Size?: \_\_\_\_\_ Concentration?: \_\_\_\_\_

Are the fibers or particles abrasive?: ☐ Yes ☐ No

### OPERATING CONDITIONS (Specify Units)

Pressure: Average: \_\_\_\_\_ Min.: \_\_\_\_\_ Max.: \_\_\_\_\_

Temperature: Average: \_\_\_\_\_ Min.: \_\_\_\_\_ Max.: \_\_\_\_\_

Flow Rate: Average: \_\_\_\_\_ Min.: \_\_\_\_\_ Max.: \_\_\_\_\_

Where exactly in production would you like the viscometer to be installed? (If necessary, please provide a sketch on a separate sheet.) \_\_\_\_\_

Strong external influences (e.g., vibration, dust, humidity, ambient temperatures, corrosive vapors and cleaning procedures)? \_\_\_\_\_

Does the substance cure, set or harden? For what reasons (e.g., air, temperature, time)? \_\_\_\_\_

Is the substance hazardous or toxic? Corrosive properties (process or cleaning): \_\_\_\_\_

Material of Construction: ☐ 316 stainless ☐ Other: \_\_\_\_\_

## DESCRIPTION OF INSTALLATION

Planned installation in:

☐ Pipeline: Pipe Size: \_\_\_\_\_ Flow Rate: \_\_\_\_\_

Mounting connections: ☐ 3/4" Female NPT ☐ 1" Male NPT ☐ 1" Female NPT ☐ 1" Female BSP  
(Model FAST100 Series only)

☐ Pipeline: Pipe Size: \_\_\_\_\_ Throughput: \_\_\_\_\_

Mounting connections: ☐ 1" FPT ☐ 1" 150# flange ☐ 1 1/2" 150# flange ☐ 2" 150# flange  
(Model TT100 only) ☐ 1" MPT ☐ 1" 300# flange ☐ 1 1/2" 300# flange ☐ 2" 300# flange  
☐ 1 1/2" MPT ☐ 1" 600# flange ☐ 1 1/2" 600# flange ☐ 2" 600# flange  
☐ 2" MPT ☐ Other: \_\_\_\_\_

Can the instrument be installed in a bypass (maximum flow rate for TT100 is 20 gpm)?: ☐ Yes ☐ No

☐ Pressurized Vessel or Open Reservoir: Method of agitation: \_\_\_\_\_  
or ☐ none

Mounting: ☐ No flange ☐ 3" 150# flange ☐ 4" 150# flange ☐ 4" tri-clamp flange  
☐ 3" 300# flange ☐ 4" 300# flange ☐ 6" tri-clamp flange  
☐ DN80 PN16 flange ☐ DN100 PN16 flange ☐ DN150 PN16 flange  
☐ DN80 PN40 flange ☐ DN100 PN40 flange ☐ DN150 PN40 flange  
☐ DN80 PN100 flange ☐ DN100 PN100 flange ☐ DN150 PN100 flange

Insertion Length: \_\_\_\_\_ inches

## TYPE OF READOUT AND CONTROL EQUIPMENT PREFERRED

Indicator: ☐ Analog ☐ Digital ☐ Indicator with control contacts  
☐ Other: \_\_\_\_\_

## ELECTRICAL CODE

☐ NEMA 1 (general purpose - indoor) ☐ NEMA 7 (explosion proof - Class 1, Div. 1&2, Group C&D)  
☐ NEMA 4 (watertight/dusttight for indoor/outdoor use) ☐ IECEx (explosion proof - II 26Ex d IIB)  
☐ ATEX

Line Voltage/frequency: ☐ 115V 50Hz/1 ☐ 115V 60Hz/1 ☐ 230V 50Hz/1 ☐ 230V 60Hz/1  
☐ 24 Volts DC

## ADDITIONAL EXPLANATIONS

Please provide information on a separate sheet, if applicable: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## CUSTOMER INFORMATION

COMPANY: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_  
NAME: \_\_\_\_\_ TEL: \_\_\_\_\_  
TITLE: \_\_\_\_\_ EMAIL: \_\_\_\_\_



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