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 (p82)

FAST-102

Compliant to 3A sanitary standards (p82)

TT-100

For in-line system applications requiring pipeline mounting (p82)

PV-100

In-tank, Probe Viscometer for pressurized systems (p83)

Viscosel

For systems open to the atmosphere (p83)

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)

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.

TEL 800-628-8139 or 508-946-6200 **FAX** 508-946-6262 **www.brookfieldengineering.com**

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.

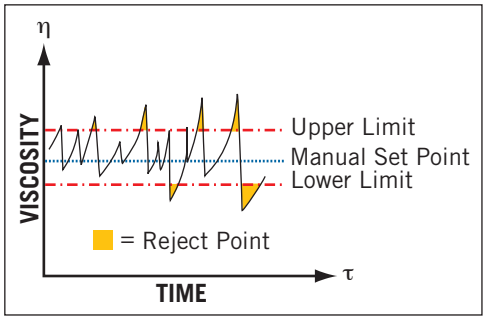
WHAT ARE THE TOP THREE FACTORS TO CONSIDER WITH CHANGING YOUR MEASUREMENT PROCESS?

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.

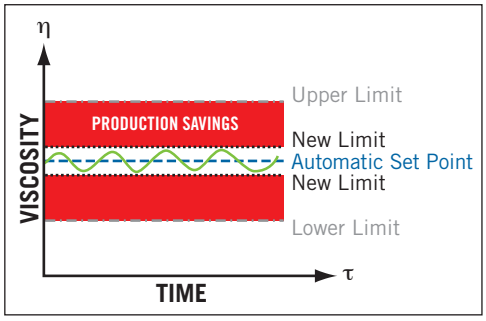
HOW DOES MONITORING THE VISCOSITY AFFECT PRODUCT QUALITY?

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



For more information, call or visit our website to request your copy of our Process Viscometers Catalog

FAST-101™ Viscosity Controller

Advanced Sensor Technology for simple, direct in-line viscosity measurement

FAST-101

FMXTS

Single Station Controller

Multi-Station Controller

What's Available?

Vibrating Element Viscosity Sensor in Nema 4, Nema 7, ATEX, Sanitary, or Ink System Configurations

FAST-102

Compliant to 3A sanitary standards

Flange Mount

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

Probe Style

Allows for insertion into the tank from above

Optional Accessories

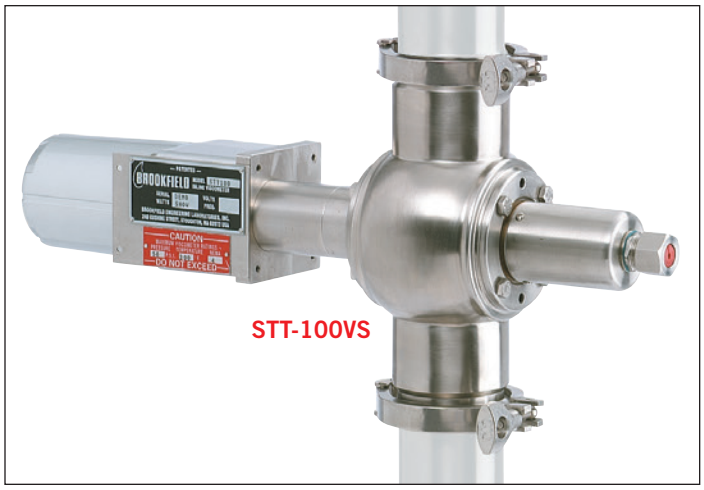
Single Station Controller
Mounting Brackets
Viscosity Standards (p52)

Multi-Station Controller
Solenoid Control Valve

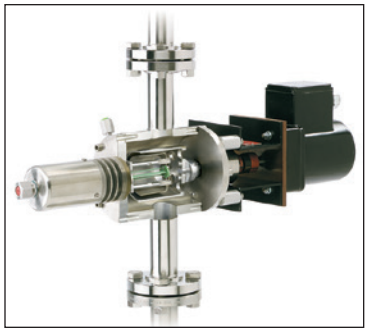
TEL 800-628-8139 or 508-946-6200 **FAX** 508-946-6262 **www.brookfieldengineering.com**

TT-100™ Viscometer

for in-line system applications



STT-100VS



TT-100

TT-100VS

What's Available?

Rotational, Couette Flow Viscometer in Nema 4, Nema 7 (explosion proof Class I, Division 1 & 2, Group D design), ATEX or Sanitary Configurations

Optional Accessories

Optional 12V or 24V DC operation
Readout Indicator
Variable Speed Motor

Viscosel™ Series

for systems open to the atmosphere

VTE-250™

What's Available?

VTE-250 In-Line Rotational Viscometer

Optional Accessories

- Sample chambers
- Solenoid Control Valve
- Solvent Bottle
- Test Stand
- Mounting Brackets
- Additional Spindles
- Viscosity Standards (p52)

PV-100™ Viscometer

for in-line system applications

PV-100

What's Available?

PV-100 Rotational Viscometer in NEMA 4 or NEMA 7 (explosion proof Class 1, Division 1 & 2, Group D design)

Optional Configurations

- PT temperature sensor
- Readout indicator/controller

For more information, call or visit our website to request your copy of our Process Viscometers Catalog