# Measuring Solutions

## Automatic S-flow® Viscometry Systems


### High Speed & Accuracy

- *Extreme ease of use*
- *Automated flow time measurement*
- *Fully automated drying and cleaning*
- *Single or dual solvent injection system*
- *Ultra-precise meniscus detection*
- *Optional pc software for control and DDE*
- *Optional external printer*

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- *Quick bath and sample warm-up*
- *Very low sample quantities (0.3-0.4 ml)*
- *Highly reliable and repeatable results*
- *Short measuring cycle times*
- *Easily removable viscometers*
- *Integrated system design eliminates the need for a seperate thermostatic bath*
- *Savings up to 90% on cleaning&drying agents*

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- *Exceptional bath temperature stability*
- *All connections, rings and valves are chemically resistant*
- *Viscometers can be independently cleaned*
- *Compliant with or exceeding requirements in ASTM D445, D446 and related specifications for kinematic viscosity testing*

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# Product info

## COMPANY BACKGROUND

When we started out more than 20 years ago our focus was entirely on manufacturing highly specialized scientific glassware for laboratories and research departments in the petrochemical industry. Since then, many things have changed. Our ever increasing expertise in the field of analysis techniques, material testing and automation has led to a gradual shift toward the development and production of highly advanced and fully automated measuring equipment for mineral oils and plastics. What has remained constant throughout the years however, is our constant strive for innovation, quality and customer satisfaction.

## PRODUCT ORIGINS

The S-flow® viscometer type was designed as a high-speed, low volume alternative for commonly used viscometer types such as the Ubbelohde and Cannon Fenske. Although reliable, these viscometer types present the user with a number of disadvantages:

- Large quantities of both sample and cleaning & drying agents are required
- Because of their large volume it's difficult to clean or dry the viscometer completely
- Measuring cycles are generally long

The above can cause problems where quick results are necessary in a continuous feedback process to the production line and where a large number of viscosity tests is performed on a daily basis.

The S-flow® eliminates all these disadvantages. Because of the small volume of the viscometer much smaller quantities of both sample and drying & cleaning agents are required, which saves considerably on measurement costs, guarantees complete cleaning and drying and allows for quick sample warm-up. Up to 90% savings on cleaning/ drying agents are feasible compared to conventional viscometers.

## UNIQUE VISCOMETER DESIGN

The shape and dimensions of the S-flow® viscometers have been designed in such a way that disturbance of the laminary flow area by turbulence is virtually non-existent. Measuring kinematic viscosity of both transparant and opaque fluids (Newtonic) with this type of viscometer meets or exceeds the requirements in relevant international standards, such as ASTM, IP, ISO, NEN, DIN etc.

The S-flow® viscometer was designed for flow times of 30 seconds and higher and viscosity ranges of 1-5,000 $mm^2/s$. S-flow® types for higher viscosity ranges can be supplied as well.

## INTEGRATED AUTOMATION

Two automated systems are available :

### *S-flow®- 850*

The S-flow®-850 is fully microprocessor controlled, offering the user complete automation of the measurement cycle, and semi-automated cleaning and drying. State-of-the-art technology allows for ultra-precise meniscus detection, which is essential in obtaining reliable and repeatable test results.

The instrument can be configured using the control panel that utilizes a clear LCD-display. Viscosity measurements as well as viscometer calibrations can be performed with the push of a single button. The results will be given on the display upon completion of the measurement. The user can set the number of measurements he wants to perform and the instrument will calculate the average results after these measurements as

well. Additional parameters can be set to configure draining time, minimal and maximal flow times, viscometer constants and more.

Four simultaneous measurements can be performed, meeting even the needs of those facilities faced with a high number of daily viscosity tests. After a measurement, the viscometers can be cleaned and dried individually by manually injecting a suitable agent into the viscometers and starting the integrated pump. Dependent on the sample and agent used, the user can set the drain time for each tube individually.

All seals, connections and valves are chemically resistant in order to allow for the most commonly used cleaning agents.

For measurements that have to take place at or below room temperature, an additional cooling spiral has been provided inside the thermostatic bath, to which an external oil or water cooler can be attached.

*S-flow®- 1200*

On top of the advanced functionality of the 850 model, the 1200 model also offers completely automated solvent injection. The user is offered complete control over the various parameters of the cleaning process, guaranteeing a completely dry and clean tube at every cycle.

Depending on the characteristics of the tube and sample, different cleaning parameters can be set for each tube individually. Upon completion of a measurement the tubes are automatically flushed with solvent and subsequently dried with air.

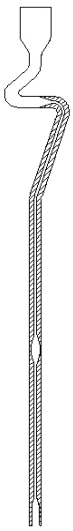
The standard 1200 model uses a single solvent cleaning system, but can be upgraded to include dual solvent cleaning / drying as well.

Although it is possible to control both the 850 and 1200 systems with pc software, they are entirely autonomous and can fully function in a stand-alone setup.

Both systems can optionally be connected to an external printer.

Measuring ranges chart (indicative)

| Nominal constant $mm^2/s^2$ | Measuring range $mm^2/s$ | Nominal constant $mm^2/s^2$ | Measuring range $mm^2/s$ |
|---|---|---|---|
| 0.01 | 0.6-1.0 | 0.30 | 18-30 |
| 0.02 | 1.2-2.0 | 0.40 | 24-40 |
| 0.03 | 1.8-3.0 | 0.50 | 30-50 |
| 0.04 | 2.4-4.0 | 0.70 | 42-70 |
| 0.05 | 3.0-5.0 | 1.00 | 60-100 |
| 0.07 | 4.2-7.0 | 2.00 | 120-200 |
| 0.10 | 6.0-10 | 3.00 | 180-300 |
| 0.15 | 9.0-15 | 5.00 | 300-500 |
| 0.20 | 12-20 | 10.00 | 600-1000 |



Above chart is based on flow times of 60-100 seconds, which can be regarded as normal flow times for the S-flow viscometer tubes. Should you with to observe measurement times of 200 seconds as prescribed by ASTM D445, change the constant accordingly.

## SPECIFICATIONS*

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|---|---|
| Standard Methods : | ASTM D445, D446, IP 71, BS 188, ISO 3104 and more. |
| Measuring range : | 0.6 – 5,000 cSt |
| Measuring units : | $mm^2/s$ (cSt) |
| Timer accuracy : | ± 0.0025 sec |
| Meniscus detection : | Optical |
| Solvent injection : | |
| *S-flow-850 :* | Manual |
| *S-flow-1200 :* | Automatic, optional dual solvent |
| Sample injection : | Manual |
| Display : | Clear LCD |
| Temperature range : | 20 – 110ºC |
| Temperature stability : | 20-100º ± 0.01ºC, > 100 º ± 0.03ºC |
| Bath volume : | 7.5 liter |
| Cooling spiral : | integrated, for connection to external cooling bath |
| Viscometers : | 4 S-flow® measuring tubes with optional calibration certificate |
| External printer : | optional |
| pc software : | optional, not required for full system functionality |
| Dimensions : | 435 x 475 x 620 mm. |
| Weight : | 32 kg. |
| *External Requirements* | |
| Compressed air: | 5-6 Bar @ 50 l. / min. |

**CE** compliant

* Due to our constant efforts for improvement, these specifications are subject to modification without prior notice