# ViscoSystem® AVS 370 makes maximum precision ...

**Well equipped for every viscosity determination**

With the ViscoSystem® AVS 370 we have created a measuring device, which not only measures as precisely and con-sistently as you expect from SCHOTT Instruments, but also offers you maximum flexibility and possibilities for future extensions. Furthermore, it also saves valuable space on the laboratory bench.

**Now possible for the first time ever: "suction" and "pressure" measurement – with one device**

The ViscoSystem® AVS 370 is the first viscosity measuring device, which can be used for both "suction" and "pressure" measurement. This enables simple adjustment of the method of measurement to each sample. This significantly reduces investment costs for measuring stations at which pressure and suction methods are to be used. In most cases, using the ViscoSystem® AVS 370 also achieves noticeable savings in setting up time.

**Easy with a modular concept for future expansion**

The ViscoSystem® AVS 370 has a modular design. The basic version is available with one ViscoPump II module in optical or in TC version. Up to 3 other ViscoPump II modules can be inserted in the compact 19" housing. This means a measuring station can be adapted to increasing requirements at any time. The modular concept also significantly reduces the space required, and measuring instrument set-ups can be more easily and clearly arranged, for example for parallel and comparison measurements.

# … easier and more flexible, with provision for future extension!

**Can be extended from an affordable single measuring station up to an 8-sample station**

The basic version of the ViscoSystem® AVS 370 is an affordable starter model, which can be used to measure high or low viscosity liquids. In the version for TC viscometers, for example, it is ideal for measuring opaque and black fluids. If necessary, each single measuring station can be extended to form a multiple measuring station with PC-controlled-multitasking. The WinVisco 370 software included in the standard equipment enables parallel operation of two fully equipped AVS 370, with a total of eight ViscoPump II modules. Each module can measure a different sample using a different method. All the results can be quickly and easily evaluated and documented independently of each other. It could hardly be more flexible!

**Compatible with existing accessories**

Existing accessories (thermostats, stands, flow through cooler, etc.) can continue to be used with the ViscoSystem® AVS 370. Also, virtually all customary capillary viscometers can be used.


The ViscoSystem® AVS 370 from SCHOTT Instruments. Up to 4 ViscoPump II modules can be integrated in the compact 19" housing. With a PC and the WinVisco 370 software, all kinds of different samples can be measured, evaluated and documented in parallel, independently of each other.

# ViscoSystem® AVS 370 – the right solution for all situations

Anyone working with the ViscoSystem® AVS 370 is perfectly equipped for all tasks involved in determining viscosity using capillary viscometers.

**How to automatically achieve the right results**

PC-controlled, the ViscoSystem® AVS 370 determines the time which the liquid to be examined requires to flow through the measuring distance in the capillary viscometer with quartz precision. The time is displayed with a resolution of 0.01 s (1 digit).

Measurement of the flow time of the liquid's meniscus can be scanned optoelectronically or with TC sensors. (During optoelectronic scanning the meniscus is detected by glass light fibres, with TC sensors the sensor detects the different thermal conductivity of the sample and air.) Therefore the ViscoSystem® AVS 370 offers an extraordinary broad field of uses, which range from viscosity measurement of clear fluids through to black or fully opaque liquids.

**New: Two working principles with the same device.**

For the first time ever, with the ViscoSystem® AVS 370 you can use the same device to work with "pressure" or "suction". This gives you more flexibility and better adjustment to the liquids to be examined.

In the "pressure" method of working an overpressure of up to 0.1 bar is applied to the liquid in the capillary, this is particularly advantageous for fluids with a low boiling point. In the "suction" principle the sample is sucked up into the capillary by a vacuum. A greater reproducibility of results is achieved using the "suction" method for higher viscosity samples. A further advantage of the "suction" principle is that it guarantees formation of the "hanging ball level" in Ubbelohde viscometers, even for the minimum required sample quantities.

**Working with the ViscoSystem® AVS 370 is easy**

The ViscoSystem® AVS 370 is very easy to use. The whole measuring procedure takes place automatically, subjective measuring errors are reliably precluded. The PC starts the measurement. After the set pretempering period has expired the entered number of measurements are carried out and the measured values saved.

The system can be protected against accidental overpumping or oversuction by means of a capacitive sensor. This prevents the sample to be measured from getting into the vessel containing the tempering liquid or inside the device.

**"Suction" or "pressure"? A comparison of preferred applications**

| | | "pressure" | "suction" |
|---|---|---|---|
| Highly viscous samples e.g. oils, polymers | | ■ | ■ |
| Solvent (examples): | highly volatile | ■ | – |
| | Dichlormethane | ■ | – |
| | Chloroform | ■ | – |
| | Sulfuric acid | – | ■ |
| | Dichloroethanoic acid | – | ■ |
| | Toluene | ■ | ■ |
| | Hexafluorisopropanol | – | ■ |
| | m-cresol | – | ■ |
| | Formic acid | – | ■ |
| | Phenol-dichlorobenzene | – | ■ |
| | Phenol-tetrachloroethane | – | ■ |

# Technical data

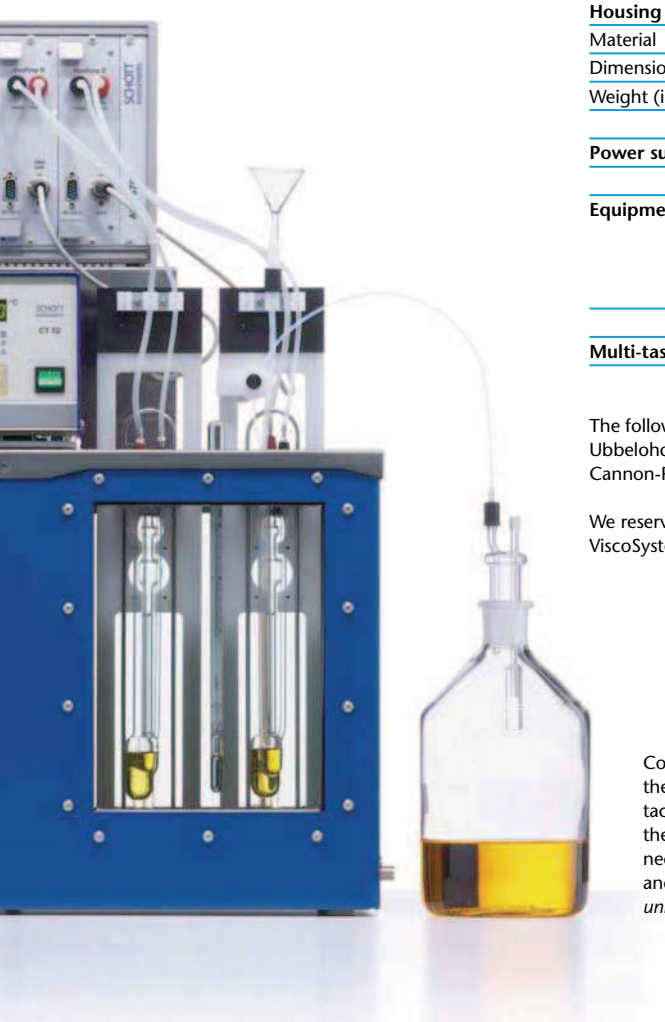
## Unique flexibility

In the PC-controlled multiple measuring station, the ViscoSystem® AVS 370 offers you unique flexibility while working in a very small space: Up to eight modules, which equates to two fully equipped ViscoSystem® AVS 370, can be run parallel with the WinVisco 370 software. Each module can measure the same or different samples using "pressure" or "suction", fully independently of each other. In this way, series of measurements can be prepared extremely quickly and immediately evaluated and documented in the computer. This significantly reduces the time required to carry out viscosity measurements, especially for in process controls and quality assurance.

| | |
|---|---|
| **ViscoSystem® AVS 370** | |
| Measuring range (time) | up to 9,999.99 s; resolution 0.01 s |
| Measuring range (viscosity) | pressure: 0.35 … 1,800 $mm^2/s$ (cSt) |
| | suction: 0.35 … approx. 5,000 $mm^2/s$ (cSt) |
| Measured parameter | flow through time [s] |
| Accuracy of the time measurement | ± 0.01 % |
| Measured value display | via PC |
| Display accuracy | ± 1 digit (0.01 s) |
| Pump pressure | automatically controlled |
| Preselectable tempering period | 0 … 20 min |
| Preselectable number of measurements | up to 10 |
| **Connections** | |
| Pneumatic connections | threaded connections for viscometers |
| Electrical connections | circular connector with bayonet lock for measuring stands |
| | and TC viscometers |
| RS-232-C interface | 9-pin |
| Mains connections | plug in accordance with EN 60320 |
| Pump connection | socket outlet in accordance with EN 60320 |
| **Data Input/Output** | serial to EIA RS-232-C |
| **Ambient conditions** | |
| Ambient temperature | +10 … +40 °C |
| Air humidity | max. 85 % rel. |
| **Housing** | |
| Material | coated aluminum plate |
| Dimensions (for 1 ... 4 modules) | (W x H x D) approx. 255 x 205 x 320 mm |
| Weight (incl. 1 module) | approx. 5.4 kg |
| **Power supply** | 90 … 240 V ~, 50 … 60 Hz |
| **Equipment safety** | EMC-Compatibility according to the Directive 89/336/EEC of the |
| | the Council; |
| | low-voltage directive according to the Directive 73/23/EEC of |
| | the Council, as amended by the Directive 93/68/EEC of the Council |
| **Multi-tasking** | for 1 ... 8 ViscoPump II modules, with WinVisco 370 software |

The following viscometers can be used with the ViscoSystem® AVS 370: Ubbelohde viscometer to DIN, Ubbelohde viscometer to ASTM, micro Ubbelohde viscometer to DIN, micro Ostwald viscometer, Cannon-Fenske routine viscometer, TC-Ubbelohde viscometer, TC-micro Ubbelohde viscometer.

We reserve the right to make technical changes.
ViscoSystem® is a registered trademark.



Compact, space-saving viscosity measuring station with the ViscoSystem® AVS 370. The measuring device is attached to a support table (recommended accessory). All the connections are within view and easily controlled. If necessary the sample can be automatically sucked away and the viscometer flushed e.g. with the TITRONIC® *universal* or the TITRONIC® 110 *plus* burette.

# Real multitasking for up to 8 measurements in parallel mode …

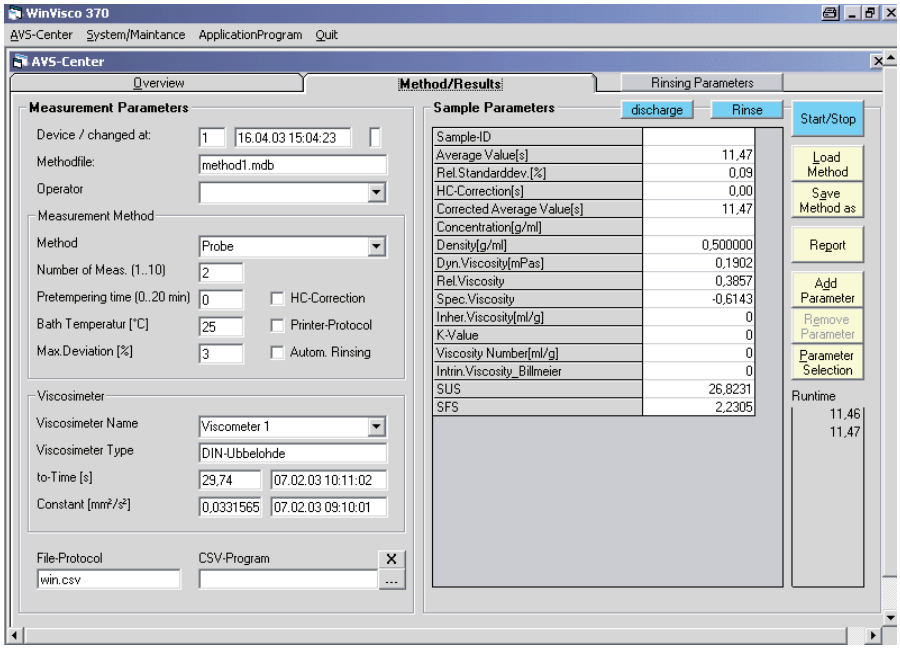
**Easy to understand, proven in practice: The WinVisco 370 software**

WinVisco 370 is the ideal software for the ViscoSystem® AVS 370*). It is supplied as part of the standard equipment. WinVisco 370 is easy to understand and can be quickly learned. Up to eight viscosity measurement modules can be controlled with only a few operating steps. The device parameters are easy to enter: Constants, $t_0$ flow time, number of measurements, pretempering period, type of viscometer, date and sample labeling for each measuring station.

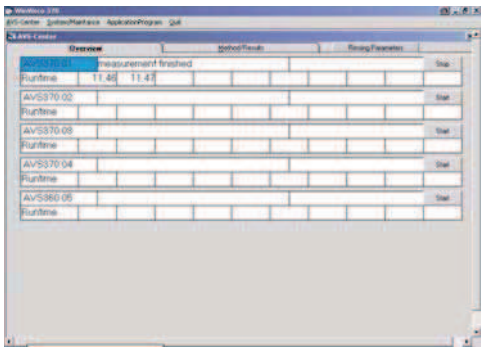
WinVisco 370 works in real multitasking mode. This makes it possible for each measurement to be processed independently from the others. It also means that time-consuming measurements can be carried out from the same PC, without hindering the course of other, faster measurements. During the measurements you can change the monitor displays, start or stop other measurements, print out or save measured values. All data provided by the software can be passed on to an LIMS system.

WinVisco 370 supports three groups of users. For simple use, access is limited to: select viscometer, measure, load and save methods as well as enter parameters. In the highest level, users with administrator status can access all the software's facilities. Each user is given a user ID, an access level and a password.

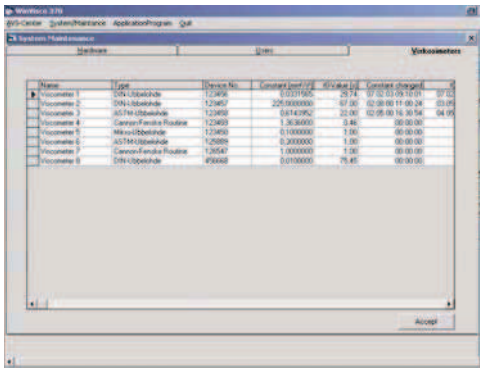
*) The language (English or German) can be chosen after installation over the programme menu.




All the important parameters required for the measurement are displayed on the "Methods/Results" page. If necessary, the parameter editor can be called up using "Add Parameter", in order to enter non-standard or customer specific formulae.

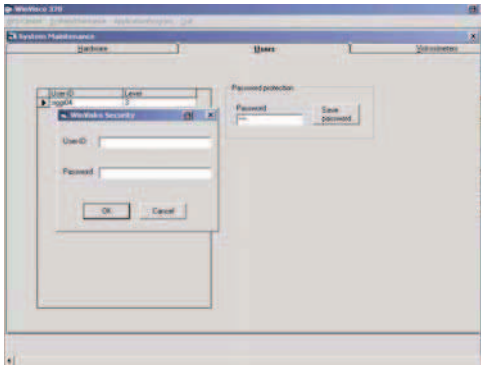


All the measurements currently running can be monitored in parallel in the overview.

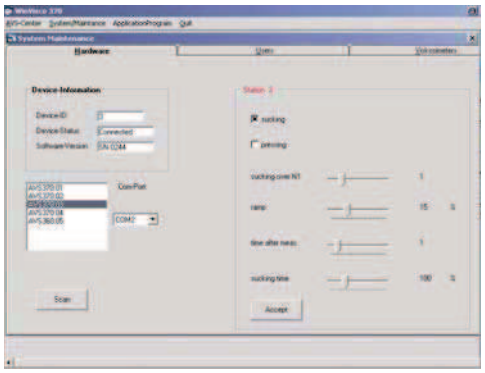


The viscometer data required for the evaluation can be stored in a table. This guarantees perfect allocation of e.g. the $t_0$ runtime, viscometer constants, the series number, etc. for each individual viscometer being used.

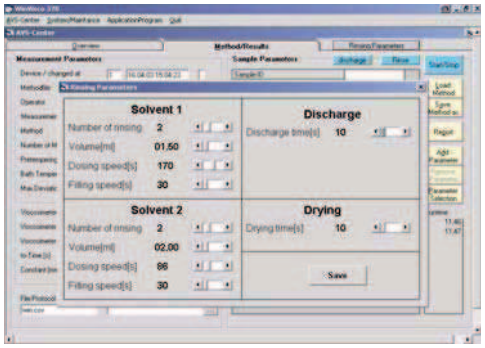
# … with the practically proven WinVisco 370 software



The password protection prevents unwanted or confusing changes to the important measurement parameters.



The parameters can be individually adjusted to the measurement for each measuring position.

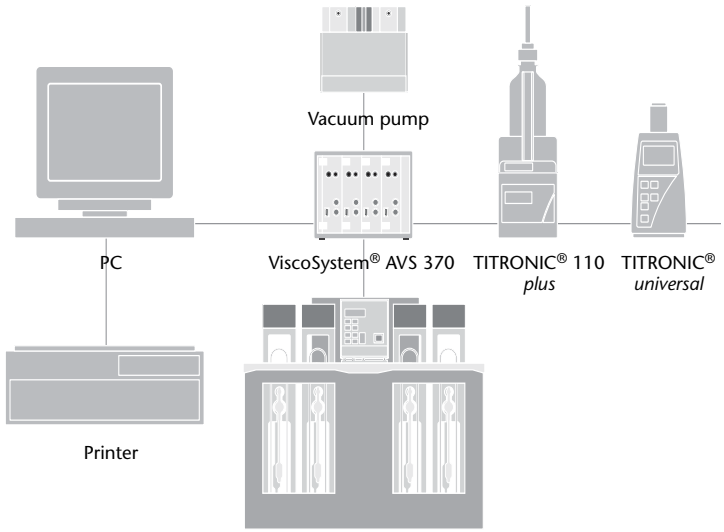



Each rinsing/dry step can be individually preselected. Even the application dependent quantity of solvent and the drying time can be separately determined.

**With the ViscoSystem® AVS 370 and WinVisco 370 you will even quickly find the right connection for rinsing**

With the daisy chain link of the ViscoSystem® AVS 370, further devices can be integrated in the system and controlled using the WinVisco 370 software. For example, when working in suction mode the viscometers can be rinsed using the TITRONIC® *universal* and TITRONIC® 110 *plus* burettes. The TITRONIC® *universal* is preferably used for light solvents, the TITRONIC® 110 *plus* for solvents with a viscosity >3 $mm^2/s$. A special interchangeable unit (TA 50V) is available for highly aggressive solvents.

A vacuum pump (accessory) integrated in the system is used to conveniently suck away samples and solvents.




Transparent thermostat CT 54 with four measuring stands

Two basic concepts are available for the rinsing:

- A ViscoSystem® AVS 370 with four ViscoPump II modules (four measuring positions) and eight burettes, which enable each viscometer to be rinsed with two solvents. Time-consuming removal of the transparent thermostat for external rinsing of the viscometer is no longer necessary.
- Two ViscoSystem® AVS 370 complete with four ViscoPump II modules each (eight measuring positions), which enables semi-automatic rinsing of the viscometer with the next sample or solvent.