



*Tuning Fork Vibro Viscometer*

# SV-1A

*Series*



**2 ml Sample Measurement**  
*Now Possible!*

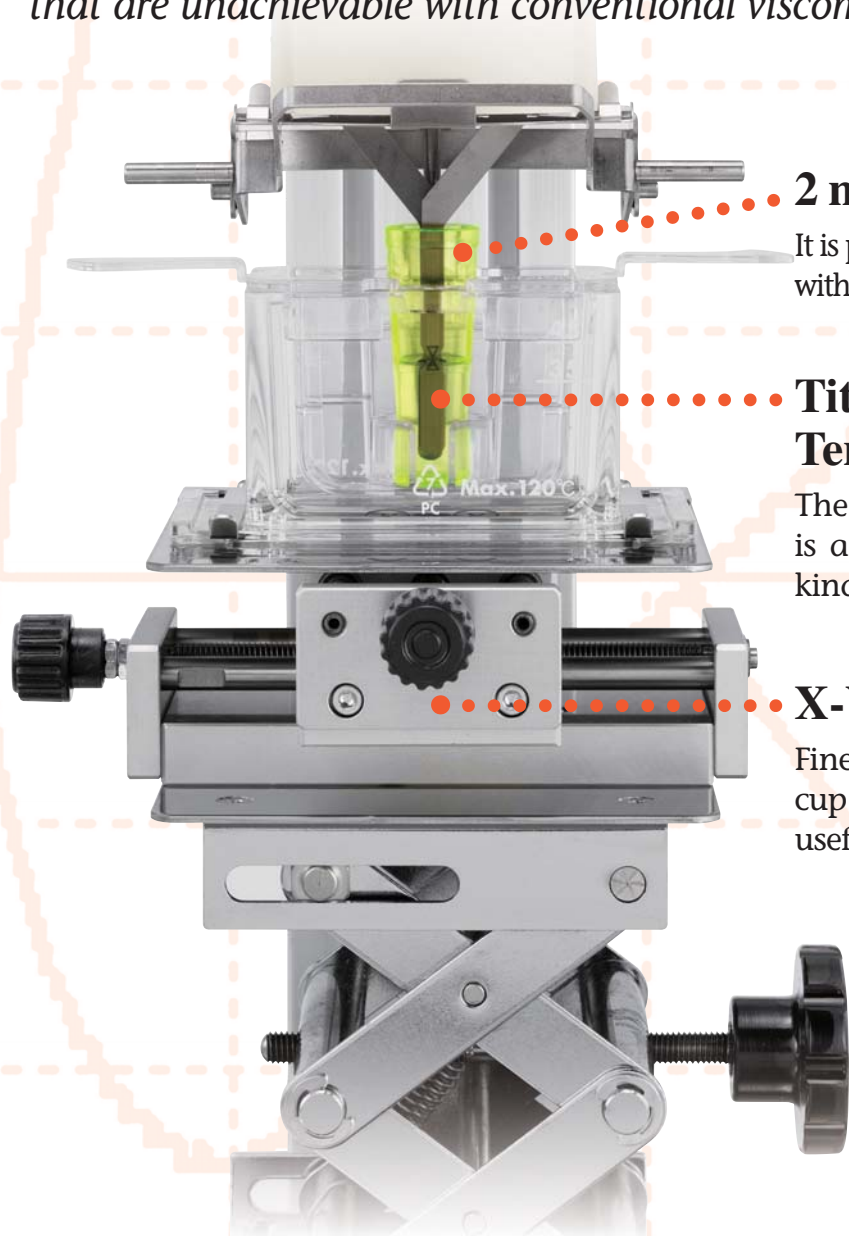


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# How This Unique Method Brings New Possibilities To Your Research

Quick? Precise? Easy to use? A&D's highly sensitive, tuning fork vibro viscometer\*, the SV-A series, not only satisfies these basic requirements to unprecedented levels, but does more by offering you a number of possibilities that are unachievable with conventional viscometers.

\* Patented



## 2 ml Sample Measurement

It is possible to perform viscosity measurements with a sample liquid as small as 2 ml (SV-1A).

## Titanium Sensor Plates and Temperature Sensor

The sensors are made of titanium, which is anti-corrosive and resistant to various kinds of chemical substances.

## X-Y-Z Stage

Fine position adjustment of the sample cup in three directions. This is especially useful when the sample cup is very small.

## Wide-range, Continuous Measurements without Replacing the Sensor Plates

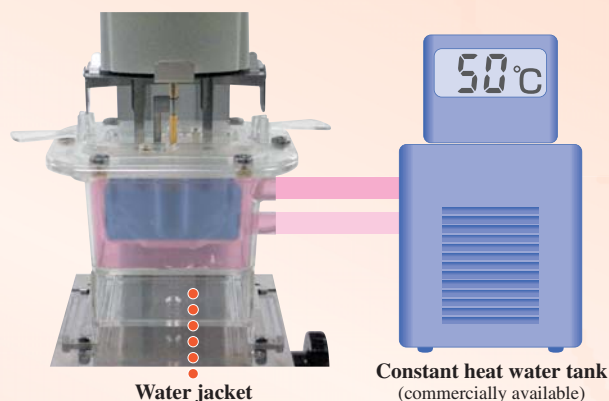
Unlike the rotational viscometer, which requires several different rotors to cover a wide range of measurements, the SV-A series is capable of using the same, fixed sensor plates to perform **continuous measurements** from **very low** to high viscosity [SV-1A: 0.3 to 1000 mPa·s; SV-10A: 0.3 to 10000 mPa·s; SV-100A: 1 to 100 Pa·s].

# Simultaneous Measurements of Temperature and Viscosity

It is widely known that viscosity is very temperature dependent ( $-2\%$  to  $-10\%/^{\circ}\text{C}$ ). The SV-A series has a temperature sensor (0 to  $160^{\circ}\text{C}$  range) right next to the viscosity sensor plates, enabling you to easily monitor the relationship between viscosity and temperature.

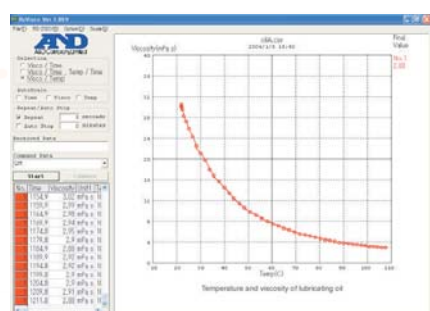
## Sample Temperature Control

A water jacket is provided as standard to be used in conjunction with a commercially available constant heat water tank to heat the circulating system. This ensures that the sample remains at a constant temperature and that the temperature can be changed for viscosity measurement (0 to  $100^{\circ}\text{C}$ ).

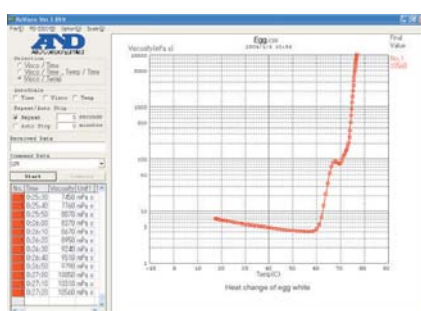


## Windows Communication Tools Software “WinCT-Viscosity”

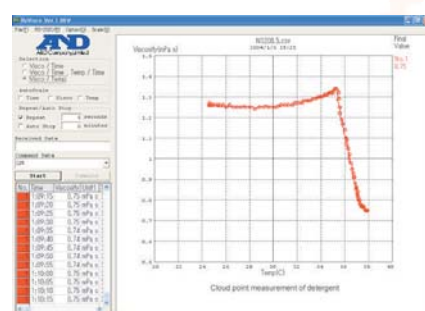
The graphing program RsVisco receives the viscosity and temperature data from the SV-A series and creates a graph on a personal computer **in real time**. As such, changes in viscosity and temperature over time as well as the correlation between viscosity and temperature can be observed visually. The SV-A series includes WinCT-Viscosity as standard along with a serial/USB converter for connection to your computer.



Temperature and viscosity of lubricating oil



Heat change of egg white



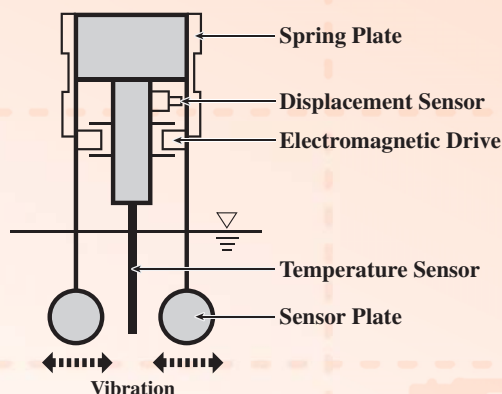
Cloud point measurement of detergent

## Example Applications

- Measure the viscosity necessary for the correction of particle size distribution
- Control the viscosity of resist liquids, inks, coating materials, adhesives, etc.
- Control the viscosity of abrasives for semiconductors, ceramic materials, etc.
- Measure the cure processes of polymers, soldering flux, proteins, and gelation point, etc.
- Detect the cloud points of nonionic surface-active agents
- Measure viscosity variation due to changes in temperature of a lubricant, engine oil, food, etc.
- Quantify the “swallowability” of beverages
- Quantify the physical properties of biological substances, such as blood, etc.

## How the Tuning Fork Vibro Viscometer Works

Two thin sensor plates in a tuning fork arrangement are driven with electromagnetic force to vibrate at their natural (resonant) frequency of 30 Hz within the sample fluid. Viscosity is then calculated based on the proportional relationship between the viscous resistance of the sample fluid and the amount of electric current required to drive and maintain the sensor plates at a constant vibration amplitude.



- The above method is recognized as a Japan industrial standard for viscosity measurement of liquids (JIS Z8803). The tuning fork vibro viscometer is also accredited as a standard device for the Japan Calibration Service System (JCSS) along with capillary and rotational viscometers.
- The sensor plates have very small thermal capacity and cause only minute displacement in the sample liquid, which prevents changes to the temperature and the physical properties of the sample.
- Since the two sensor plates vibrate in reverse phase, it is possible to measure the viscosity of a sample even while flowing or being stirred.

### Very Quick Measurement

The initial viscosity coefficient will be indicated **just 15 seconds** after starting the measurement. The measured values will then be displayed in real time in response to the changes in viscosity.

### Extremely High Precision

The SV-A series achieves an excellent repeatability of 1% of the measured value (by standard deviation) over its full measurement range.

### Low Viscosity Measurement

No other viscometer is capable of measuring viscosity from as low as 0.3 mPa·s with precision (SV-1A/10A).

### Easy Calibration

Both one-point and two-point calibrations are possible using either viscosity standard liquids (optional) or samples of known viscosities. **Simplified Calibration function**, a one-key operation that utilizes purified water is also available for the SV-1A/10A.

### Clearly Visible Display

Easy-to-read VFD for viscosity and temperature. Only 6 keys for simple operation.



## Portable Sensor Unit

The sensor unit can be detached to perform measurements on location at a manufacturing factory, field research, etc. A portable carrying case is also provided as standard.



### Standard Cup Set for SV-1A (AX-SV-55)

Sample cup:

45 ml, Polycarbonate × 5

2 ml, with lid, Polycarbonate × 10

2 ml, Glass × 10

2 ml sample cup holder, Polycarbonate:

Transparent × 3

Black × 2

2 ml sample cup stand × 1

Water jacket × 1



### Standard Cup Set for SV-10A/100A (AX-SV-54)

Sample cup:

45 ml, Polycarbonate × 5

10 ml, with cover, Polycarbonate × 5

13 ml, Glass × 2

Glass sample cup holder, Stainless steel × 1

Water jacket × 1



### Anti-Vibration Table AD-1671A (optional)

Depending on the measurement location, the highly sensitive tuning fork vibro sensor can be influenced by low-frequency vibrations that cannot be detected by humans. AD-1671A effectively isolates such adverse vibrations from the viscometer to guarantee stable and accurate measurements.



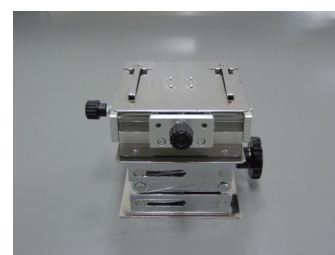
## Specifications

| Specifications              | SV-1A                                                                                                                                                              | SV-10A                | SV-100A            |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------|
| Measurement Method          | Tuning Fork Vibro Method (Natural Frequency at 30Hz)                                                                                                               |                       |                    |
| Viscosity Measurement Unit  | mPa·s, Pa·s, cP, P                                                                                                                                                 |                       | Pa·s, P            |
| Viscosity Measurement Range | 0.3 to 1000 mPa·s                                                                                                                                                  | 0.3 to 10000 mPa·s    | 1 to 100 Pa·s      |
| Repeatability               | 1% of the measured value (Standard deviation, 20 to 30°C, No condensation)                                                                                         |                       |                    |
| Accuracy                    | ±5% (1 to 100 mPa·s)                                                                                                                                               | ±3% (1 to 1000 mPa·s) | ±5% (1 to 10 Pa·s) |
| Minimum Sample Amount       | 2 ml                                                                                                                                                               | 10 ml                 |                    |
| Temperature Measurement     | 0 to 160°C/0.1°C (32 to 320°F/0.1°F)                                                                                                                               |                       |                    |
| Display                     | Vacuum Fluorescent Display (VFD)                                                                                                                                   |                       |                    |
| Power Supply                | AC Adaptor (Approx. 14VA)                                                                                                                                          |                       |                    |
| External Dimensions / Mass  | Main Unit: 112 (W)×132 (D)×291(H) mm / Approx. 0.8 kg<br>Display Unit: 238 (W)×132 (D)×170(H) mm / Approx. 1.3 kg                                                  |                       |                    |
| Standard Accessories        | Stand for Securing the Sensor Unit, X-Y-Z Stage, Cup Set<br>Software Set (including a Serial-USB Converter)<br>AC Adaptor, Connection Cable (1.5 m), Carrying Case |                       |                    |

## Options & Accessories

| Item            | Description                                                                            | SV-1A | SV-10A | SV-100A |
|-----------------|----------------------------------------------------------------------------------------|-------|--------|---------|
| AX-SV-33        | Sample Cup, 45 ml, Polycarbonate × 10                                                  | ○     | ○      | ○       |
| AX-SV-34        | Small Sample Cup, 10 ml, with Cover, Polycarbonate × 10                                | ○     | ○      | ○       |
| AX-SV-35        | Sample Cup, 13 ml, Glass × 1                                                           | ○     | ○      | ○       |
| AX-SV-36        | Positioning Stopper × 1                                                                | ○     | ○      | ○       |
| AX-SV-37        | Water Jacket × 1, Small Sample Cup with Cover × 4                                      | ○     | ○      | ○       |
| AX-SV-38        | Storage Container, 60 ml, Glass × 10                                                   | ○     | ○      | ○       |
| AX-SV-39        | Storage Container, 120 ml, Plastic × 20                                                | ○     | ○      | ○       |
| AX-SV-42        | Analog Voltage Output (0 to 1V)                                                        | ○     | ○      | ○       |
| AX-SV-43        | Extension Cable (5 m) to connect the main unit and the display unit                    | ○     | ○      | ○       |
| AX-SV-51        | Stand Set with X-Y-Z Stage                                                             | ○     | ○      | ○       |
| AX-SV-52        | X-Y-Z Stage × 1                                                                        | ○     | ○      | ○       |
| AX-SV-53-EX     | Software Set (WinCT-Viscosity × 1, 25P-9P RS-232C Cable × 1, Serial-USB Converter × 1) | ○     | ○      | ○       |
| AX-SV-54        | Cup Set for SV-10A/100A                                                                | ○     | ○      | ○       |
| AX-SV-55        | Cup Set for SV-1A                                                                      | ○     |        |         |
| AX-SV-56-1      | 2 ml Sample Cup Holder, Polycarbonate, Transparent × 5                                 | ○     |        |         |
| AX-SV-56-2      | 2 ml Sample Cup Holder, Polycarbonate, Black × 5                                       | ○     |        |         |
| AX-SV-57        | 2 ml Sample Cup Stand × 2                                                              | ○     |        |         |
| AX-SV-58        | Sample Cup, 2 ml with Lid, Polycarbonate × 100                                         | ○     |        |         |
| AX-SV-59        | Sample Cup, 2 ml, Glass × 5, 2 ml Sample Cup Stand × 1                                 | ○     |        |         |
| AX-USB-25P-EX   | Serial-USB Converter                                                                   | ○     | ○      | ○       |
| AD-8121B        | Compact Printer                                                                        | ○     | ○      | ○       |
| AD-1682         | Rechargeable Battery                                                                   | ○     | ○      | ○       |
| AD-1671A        | Anti-Vibration Table for Viscometers/Rheometers                                        | ○     | ○      | ○       |
| AX-SV-31-2.5    | Standard Liquid for Calibration JS2.5 (500 ml)                                         | ○     | ○      |         |
| AX-SV-31-5      | Standard Liquid for Calibration JS5 (500 ml)                                           | ○     | ○      |         |
| AX-SV-31-10     | Standard Liquid for Calibration JS10 (500 ml)                                          | ○     | ○      |         |
| AX-SV-31-20     | Standard Liquid for Calibration JS20 (500 ml)                                          | ○     | ○      |         |
| AX-SV-31-50     | Standard Liquid for Calibration JS50 (500 ml)                                          | ○     | ○      |         |
| AX-SV-31-100    | Standard Liquid for Calibration JS100 (500 ml)                                         | ○     | ○      |         |
| AX-SV-31-200    | Standard Liquid for Calibration JS200 (500 ml)                                         |       | ○      |         |
| AX-SV-31-500    | Standard Liquid for Calibration JS500 (500 ml)                                         |       | ○      |         |
| AX-SV-31-1000   | Standard Liquid for Calibration JS1000 (500 ml)                                        |       | ○      |         |
| AX-SV-31-2000   | Standard Liquid for Calibration JS2000 (500 ml)                                        |       |        | △       |
| AX-SV-31-14000  | Standard Liquid for Calibration JS14000 (500 ml)                                       |       |        | ○       |
| AX-SV-31-160000 | Standard Liquid for Calibration JS160000 (500 ml)                                      |       |        | ○       |

△ Temperature should be kept at or below 25°C when performing calibrations with the SV-100A.



X-Y-Z Stage



2 ml Sample Cup Holder (Transparent)



2 ml Sample Cup Holder (Black)



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