

Viscometers within quality assurance systems

Recommendations for companies that have introduced a quality assurance system in accordance with the DIN/ISO 9000 ff resp. EN 29 000 ff standards. In this quality assurance system, an inspection of the measuring equipment is planned. The intervals and required accuracy can be defined by each company according to its own requirements. The standard DIN/ISO 10 012, Part 1 serves as a guideline in this matter. We recommend regular inspection of the viscometers in defined intervals.

Inspection of the viscometer constants:

1. Calibration using comparative measurements with reference measuring standards

Comparative measurements must be performed with a viscometer (reference measuring standard) which was tested at the PTB (Federal German Physical-Technical Institute) and provided with a constant. During this comparative measurement, the viscometer to be inspected and the PTB - tested viscometer were placed simultaneously in the same thermostat bath. The test liquid tested, the viscosity of which must not be known exactly, is filled into both viscometers, tempered and the flow-through time then measured. The constants of the viscometers to be inspected are then calculated according to the following equation:

$$K = \frac{K_{Uref} \cdot t_{Uref}}{t}$$

K = constant of the tested viscometer

K_{Uref} = constant of the standard reference viscometer

t = flow time (HC) of the tested viscometer
(corrected by Hagenbach-Couette)

t_{Uref} = flow time (HC) of the standard reference viscometer
(corrected by Hagenbach-Couette)

Within the quality assurance system in accordance with DIN EN ISO 9000 ff, traceability of the measuring equipment to national measuring standards is demanded. This traceability can be achieved by inspecting the comparative viscometers (reference measuring standards) at regular intervals at the PTB. The time intervals are defined according to the specifications made in the quality assurance system of the user.

2. Calibration of the capillary viscometer with normal oils of the PTB

During this calibration, a normal oil from the PTB with known viscosity is used as a reference measuring standard. The measurement is performed by means of flow-through measurement of the PTB normal oil in the viscometer to be inspected in a temperature bath, the temperature of which must correspond precisely to the test temperature of the PTB. In this case, it is extremely important to make sure that the temperature is absolutely correct. In case of temperature variation, this will always result in a constant for the viscometer that deviates from the constant applied. A temperature variation of 0.01 K, for instance, will result in a measuring error of up to 0.01 %. The calibration of the deviating temperature into the viscometer constant is not permitted.

3. Inspection by SCHOTT-GERÄTE with quality certificates in accordance with DIN 55 350-18-4.2.2

The inspection at SCHOTT-GERÄTE is carried out by means of comparative measurements using viscometers as reference measuring standards that were tested at the PTB (corresponds to Item 1).

Information on the stability of viscometer constants

Each inspection (even with a certificate) can guarantee the technical measuring direction only for a limited period of time. The constants of viscometers made of the borosilicate glass DURAN®, however, can remain unchanged for long periods of time if the viscometers are kept away from altered influences. Especially extreme changes can be expected, for instance, during the use of liquids that attack glass or during glass-blowing repairs (even for apparently insignificant repairs).

Liquids whose components adhere to the glass wall also cause errors. In such cases, regular cleaning is required whereby the corrosive action cleaning agent on the glass must be eliminated.

For this reason, we recommend that the user should write up a special processing instructions for all important measurements and include them in his quality assurance manual in accordance with DIN EN ISO 9000 ff. In all cases the user is responsible for the correctness of his measuring and testing equipment and is not released from his responsibility for quality (cp. DIN 55 350, Part 18).

® registered trademark for SCHOTT GLAS, Mainz

Version 000514 E



Hersteller:
SCHOTT-GERÄTE GmbH
Postfach 11 30
65701 Hofheim a. Ts.
Im Langgewann 5
65719 Hofheim a. Ts

SCHOTT GLAS
Postfach 24 80
55014 Mainz
Hattenbergstraße 10
55122 Mainz

Geschäftsbereich Industrieglas
Laborgeschäft
Telefon (0 61 31) 66 49 07
Telefax (0 61 31) 66 40 51