



Test stands demand precision from sliding gate valves

Performance testing of water filters, pumps and pressure tests

An application report by Dr. Kurt Voigt and Dr. Rainer Lange



Components that are used to construct test stands are naturally subject to particularly high requirements. VAF Fluid-Technik relies on the excellent control precision of sliding gate valves in the development and construction of test stands for pumps and for components through which gas and liquids flow. Digital positioning control, the rapid attainment of the set point value and low weight are further properties of sliding gate valves which are also of great benefit in test stands.

VAF Fluid-Technik GmbH, with its headquarters in the Saxony town of Lichtenau, specialises in design, development and manufacture in the field of measuring and control technology. Its main focus is on flow measurement technology for liquids and gases, metering, filling and mixing systems, fill-level measuring methods and overflow prevention techniques, measuring and control software and systems solutions. In addition, the company develops individual test stands for flow-conducting components of all kinds. Manufacturers use these test stands, for example, to determine the specific pressure loss as a function of the flow rate in filters (**Fig. 1**), valves or fittings. For the operators of the test stands, these pressure loss characteristics are indispensable since these data, together with the respective products, are supplied to their customers to provide a sound basis for plant design.

These characteristics are determined on these test stands by combining measurements of the flow (magnetically induced in the case of water) and the differential pressure. Also, the flow has to be controlled extremely accurately in order to be able to set operating points precisely. As a general rule, the test stand specialists at VAF Fluid-Technik use sliding gate valves with electro-pneumatic positioners (**Fig. 2**) for this task.

Excellent control quality, compact construction and light weight are the outstanding advantages offered by sliding gate valves. In particular, the very good response behaviour of valves of this type is crucial in providing the high control quality. The most important parameters for very short reaction times are short actuation paths, small moving masses and low actuation forces. All of these characteristics come together in the sliding gate valve because, in



Figure 1

For many components carrying flows of gas or liquids, in this case a water filter for example, test stands have to be used to determine flow/pressure loss characteristics.

this case, only two slotted discs move against each other across the direction of flow. The typical stroke between open and closed is a mere 6 to 9 mm.

This operating principle makes for very low actuation forces and, thus, small actuators to provide the actuation movements. Furthermore, since it is designed to fit between two flanges, this control valve can be incorporated into compact test stands without taking up a great deal of space. Sliding gate valves are available in

- nominal sizes DN 15 to DN 250
- for pressures up to PN 160 and
- media temperatures of between - 200 °C and + 530 °C.

VAF Fluid-Technik uses sliding gate valves for a very wide range of different test stands, examples of which are:

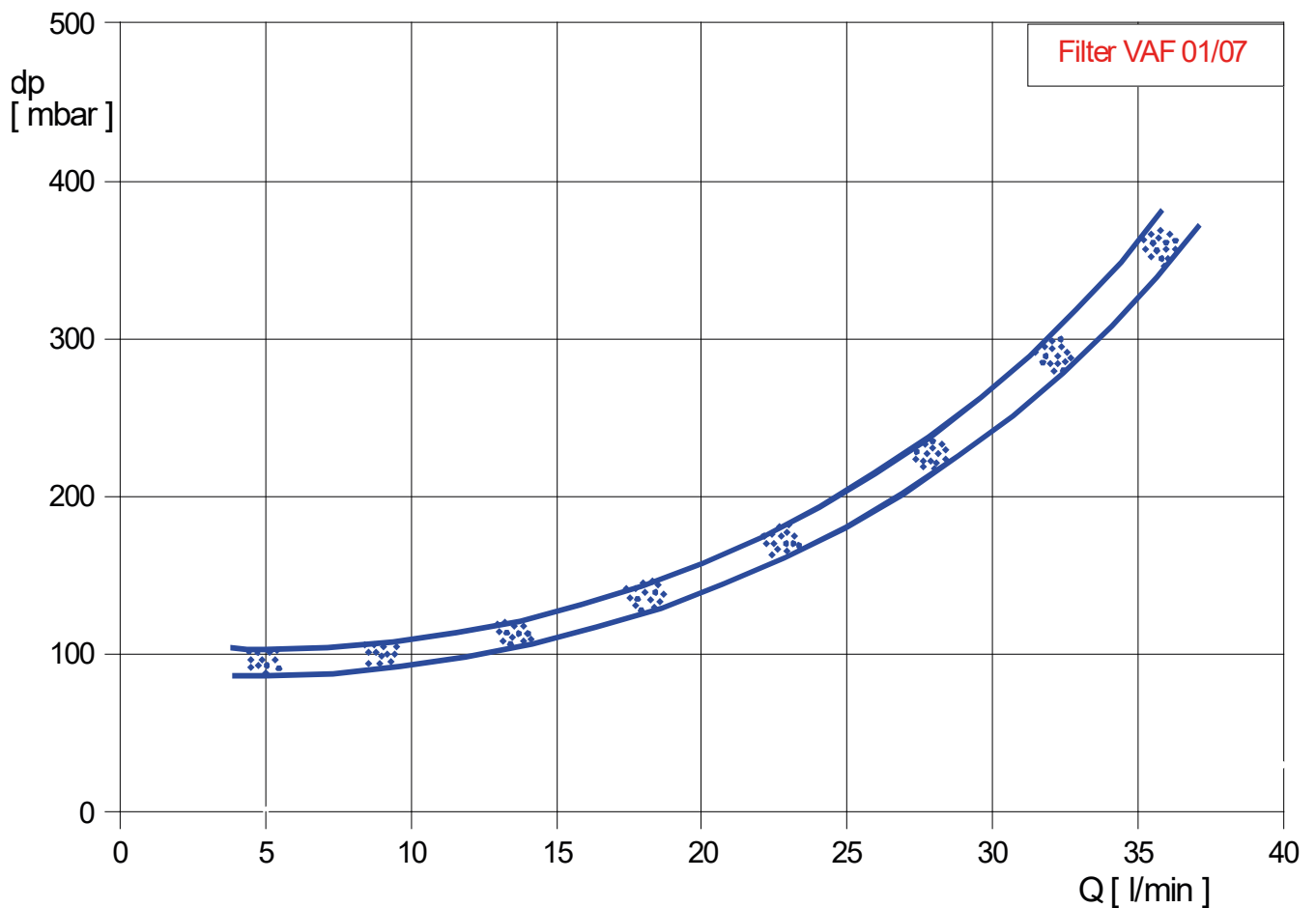


Figure 3
An example of a flow / pressure loss curve for a water filter.

- The determination of pump characteristics (H/Q, head/flow),
- The pressure testing of fittings where the sliding gate valve automatically increases the possible pressure range,
- Pressure cycling testing,
- The triggering of flow switches to determine the switching point,
- System pressure control in flow tests of fittings.

Customised client software is used to manage a given test programme when performing such tests on components through which gas or liquids flow. This allows an open choice of operating points which can be run automatically during the testing. The determination, for instance, of the pressure loss characteristic of a water filter begins with the control valve fully open, that is, when the flow is at its maximum. Then selected measuring points are sent to the pneumatic positioner via an analogue set point signal operating at between 4 and 20 mA and the sliding gate valve closes in the shortest time corresponding to the set point value. After the flow volume has stabilised at the measuring point, the differential pressure corresponding to it is measured. This process therefore provides an automatically derived characteristic of Δp over Q (**Fig. 3**) for the component under test. The test data are then transferred to a test log.



Figure 2
Due to their very high control quality and compact inter-flange design, sliding gate valves are ideally suited for installation in test stands.

Contact:
Schubert & Salzer Control Systems GmbH
Bunsenstr. 38, 85053 Ingolstadt, Germany
Tel: +49 (0) 841 96 54-0 · Fax: +49 (0) 841 96 54-590
info.cs@schubert-salzer.com | www.schubert-salzer.com