A valve for high pressures and all load conditions

Schroeder Valves has developed a new automatic recirculation valve for high and very high pressures. To ensure the highest degree of quality and functionality, the company is currently constructing a test stand for pressures up to 400 bar.

By Anne Dörseln, PR-Atelier

There are three main factors that have led to the technical requirements for automatic minimum flow valves evolving over the past fifteen years or so. One is a result of the general trend towards higher pressures and temperatures in plant engineering for the power industry, as well as increased energy efficiency requirements for the individual components of the plant. Another is a consequence of changes in the way plants are being operated. Because renewable energies constitute an ever growing proportion of the power being generated, modern gas power plants, and even coal-fired power stations, frequently have to operate under heavily fluctuating load conditions and partial loads. They need to reliably compensate for network instabilities caused by the fluctuating levels of power being supplied by wind farms and photovoltaic power installations. The end result is a need to get up to speed quickly after cold or warm starts, combined with rapid fluctuations in load. Last but not least, applications involving high pressures are becoming increasingly common. These include injection pumps used in the offshore oil and gas extraction industries or for the descaling of slabs, billets and sheet metal in steelworks.

Increasing quality demands

There is a fourth aspect too. One of the effects of globalisation is that plant construction, especially for power generation, is subject to extreme time and cost pressures combined with increasing quality requirements. The former leads to valves being handled more "roughly" during installation and commissioning. The latter triggers complaints from plant operators should components exhibit even the slightest (or to use the vernacular: "cosmetic") traces of rust or evidence of operation. A few years ago, visible signs of wear following commissioning or servicing along with continuous operation in high-wear partial load conditions with a contaminated pumping medium were considered quite normal and acceptable. Nowadays, plant engineers and end customers consider such blemishes to be completely unacceptable.

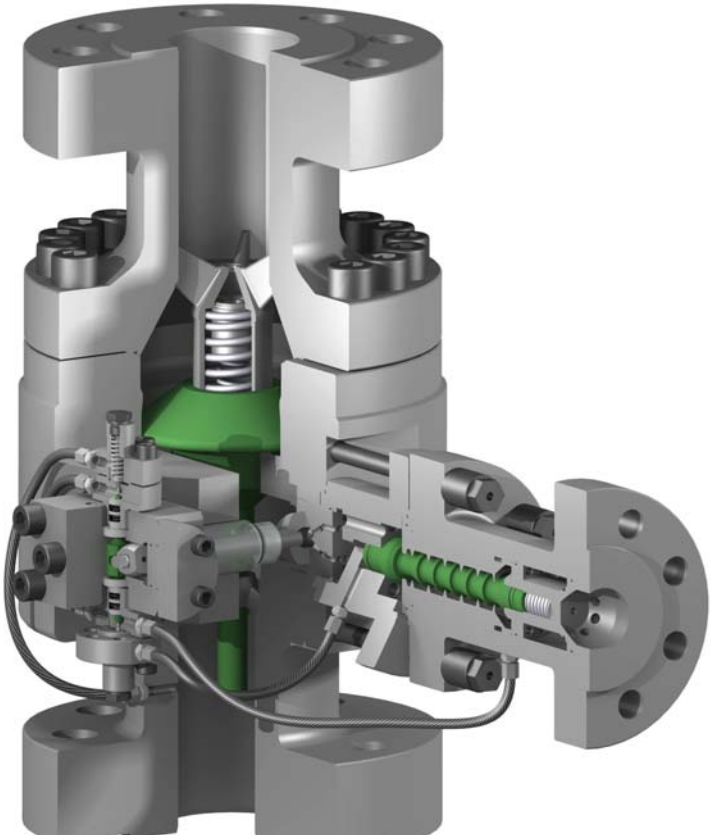
When taken together, the above points show that a modern, marketable minimum flow valve must have the following features:

- Low wear under continuous operation, even in the high and extreme pressure range and under all conceivable load conditions.
- Continuous response to control over the entire load range of the pump or the process.
- Extremely low drop in pressure through the valve in the flow direction together with precise tuning to the minimum flow rate of the pump in order to optimise energy consumption.

Because of the aforementioned cost pressures, all of these demands need to be implemented in a design that costs the same price as conventional valves or not significantly more.

The schroeder high pressure valve (SHP)

Pump protection valve specialist Schroeder Valves has designed just such a product in the form of its new SHP. Valve wear is minimised – even under continuous partial load operation – thanks to multi-



stage pressure release throughout the minimum flow range. The area close to the bypass closing point, which is particularly susceptible to wear, is automatically overridden without restricting the operating range of the system.
The shut-off and pressure reduction bypass functions are physically separate. The bypass shut-off valve has no flow control function. This means that the bypass remains watertight even if the pressure-reducing components are subject to slight wear during the course of operation. This reliably prevents wear damage to the mating surfaces, which could ultimately lead to the total failure of the shut-off function. In addition, the valve seat is located upstream of the flow restrictors and thus in an area of higher static pressure, which is a long way from the pressure ranges where cavitation is likely to occur at the end of the flow-control section.
The controlled flow restrictor in the bypass works with hydraulic pressure-compensation and passive activation, which results in very low pressure loss in the direction of the process and minimises unwanted switching hysteresis. In order to safeguard against the negative impact of contaminated media, the medium used for the hydraulic control is finely filtered and even the smallest amounts of play in the area of moving components avoided to the extent possible.
"The SHP takes the general development of higher pressures and temperatures and the increased energy-efficiency requirements into account," says Axel Mücher, managing partner at Schroeder Valves. "Alongside this, the changing way in which plants work was also taken into consideration in the development of the SHP. Special load sequence power plants, such as modern combined cycle power plants and coal-fired power plants, are operated at partial load for a large proportion of their operating time, on account of the increasing high proportion of regenerative energy generation and highly fluctuating load conditions."

A new test stand for the flow test center

Schroeder Valves has each valve undergo a 100% pressure and functionality testing prior to delivery. To ensure this also with the SHP, the company is currently adding to their flow test center a test stand for pressures up to 400 bar.

The SHP builds on existing Schroeder Valves technology. The company already has years of operational experience with almost all of the effective principles and assemblies used. As such this can be considered 'Proven Equipment'. The individual system components have simply been modified and innovatively combined, as such that they enhance the dependable and low-wear area of application of the existing technology to meet the increased requirements. Thus, the new SHP-series automatic recirculation valve enables and promotes the energy-efficient operation of modern power plant facilities.

About the author

Anne Dörseln is a PR consultant and freelance writer. For several years she has been running the PR department of Schroeder Valves. Prior to starting her own business she worked as a press officer for a major German Management and HR Consultancy. She can be reached at info@pr-atelier.de.