GEORG FISCHER
PIPING SYSTEMS

Media Release

Global Communication

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Mastering the challenge – The new generation of check valves from GF Piping Systems guarantees long-term process stability in chemicals processing

A new and intelligent valve solution to prevent media backflow in piping systems offers numerous maintenance-friendly, reliable and efficiency-enhancing opportunities for industrial applications.

Preventing failure-free backflow of media presents a major challenge for check valves in the chemical process industry. Due to the mechanical and chemical stress, the valves are subjected to considerable wear and tear. The new generation of check valves from GF Piping Systems is the perfect example of how an innovative valve concept can eliminate this problem, as proven in use in the chemical treatment industry.
GF Piping Systems, one of the three corporate groups of the Georg Fischer Corporation headquartered in Schaffhausen/Switzerland, is a leading supplier of plastic and metal piping systems with a global market presence. Customers benefit from a complete range of system products, which comprises pipes, fittings and valves, suitable jointing technologies and optimal measurement and control instrumentation as well as comprehensive support and services.

The company serves diverse applications and industries, such as building technology, chemical process industry, food and beverage, microelectronics, shipbuilding, water and gas supply as well as water treatment. In the chemical process industry, the focus lies on chemicals manufacturing, chemicals trade and surface treatment. Water treatment is another key focal point of GF Piping Systems.

Practical field tests during development

In the development of the new check valves, two main issues were defined: How can a well established product type be improved and made even more reliable? How can we reduce wear and tear of the moving parts and minimize the amount of maintenance required? The solution resulted in a totally new design of the valve interior.

Every new development must of course fulfill the requirements in practice. For this reason, it was considered a major milestone of the development project to test the valves under conditions which were as close as possible to actual use. Besides the customary laboratory tests, the valves were put into field tests at diverse customers, in intensive cooperation between user and manufacturer, in order to obtain realistic test results during the development process.

Already two years prior to series production, GF Piping Systems made the new check valves in a variety of versions available to a customer in the chemical process industry for field testing in the effluent neutralization process.

Key process: Effluent treatment

Effluent treatment is an important process in maintaining the water quality. Before waste water can be conducted into the sewage system, it must comply with strict regulations. State-of-the-art technology is a legal requirement in today’s treatment plants.

Waste is created in every industry. It either takes the form of a solid, metal, acid, base or organic substance. In the case of effluents, the classification is based on a treatment process that must be monitored with instruments. The process begins

when the water enters the treatment system and ends when it has been treated and leaves the system. The system neutralizes chemically contaminated effluents with acids or bases. The desired pH range is given by the system control and monitored and recorded in the final check in the sewage pipeline.
For this process the effluents are pumped from large tanks into the system. The purpose of the check valves is to protect the pumps. This is where the new generation of check valves stands out, especially because of the variety of available materials and the corresponding chemical resistance. The cast-iron check valves, previously used by the customer, were exposed to very strong wear. The valves failed regularly in intervals of a few months and the process had to be interrupted for maintenance work.

Customer requirements incorporated in the new development

The process owner approached Georg Fischer because he wanted a solution which would reduce the amount of wear and tear on the check valves. This would not only extend the lifetime of the system, but also decrease maintenance. Georg Fischer saw this as the perfect opportunity to allow the user's experiences to flow into the development process.
Check valves, in particular, are subject to many wear factors: mechanical stress because of high flow velocities, water hammer in the pipeline and chemical attack on the valve components, such as elastomer seals. This can have serious consequences on process control – beginning with a small leak, caused by swelling of the elastomer seal to valve components becoming jammed and finally total breakdown of the valve.

New design of valve cone

Precisely these experiences were incorporated in the development of the valve. The valve cone was hydrodynamically optimized. This allowed us to minimize pressure loss and at the same time increase flow by 25 percent compared to the previous generation. And that's not all: It is practically impossible for the valve cone to jam anymore since the cone is double guided. Process stability is ensured.
Another positive effect of the new cone contour is that the valve can optionally be equipped with a return spring and thus implemented in completely new applications.

Equipped with a return spring, the check valve can be installed in nearly any position, horizontal or vertical. To ensure a long service life of the spring-loaded valves, the spring is also available in three different materials: stainless steel (V2A/304), Nimonic90® and with Halar (ECTFE)-coated stainless steel.
A second key factor for a check valve's high reliability are the elastomer seals. Here GF Piping Systems relies on a further development of the proven profile seal of the preceding generation. The first-rate chemical resistance of the elastomers (EPDM and FPM) has proven successful in the new valves. We also optimized the seal profile. Together with the patented cone design, one hundred percent leak-tightness is guaranteed. The profile of the cone surface that comes into contact with the sealing ring is spherical. What this means is that the valve is completely leakproof if there is a slight deflection of the cone, ultimately protecting the pump from backflow of the process medium.

New valve proves successful in field test

Many of these valve features were verified and improved in the course of the field test. The result – the new generation of check valves from GF Piping Systems – today safely and reliably protects the pumps in the customer‘s water treatment process, even under extreme conditions.
The valve was tested in this application for over 25,000 hours. More than 11,000 successfully completed test hours after the final design adjustment confirm the safety, efficiency and profitability of the new valve. Parallel to the development work, a patent for the new design was applied for and finally granted in spring 2011.

Key characteristics at a glance

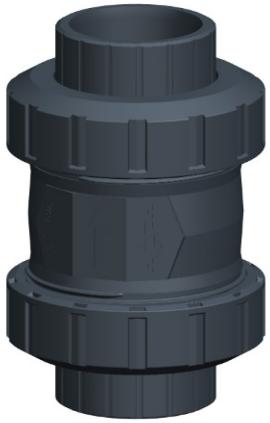
Dimension range:	DN10 – 100
Materials:	PVC-U, PVC-C, ABS, PP, PVDF
Pressure rating:	PN16/PN10, depending on material
Seal material:	EPDM, FPM, others on request
Connection type:	Socket, spigot, flange, threaded socket
Standards:	ISO, ANSI, BS, JIS

New check valves from GF Piping Systems

Standard cone check valve type 561
- seals with medium pressure

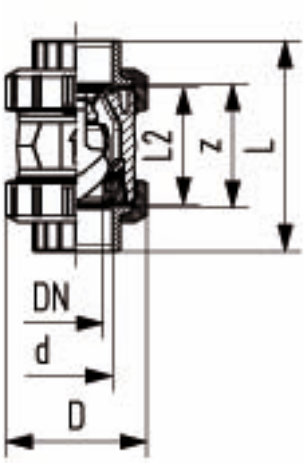
Cone check valve type 562, spring loaded
- closes automatically and can be installed in any position

Return spring materials: stainless steel (V2A/304), Nimonic90®, ECTFE-coated V2A (304)



Check valve with solvent cement socket
(Photo: Georg Fischer Piping Systems, 2011)

Transparent check valve with solvent cement socket
(Photo: Georg Fischer Piping Systems, 2011)



Technical drawing of the cone design

(Photo: Georg Fischer Piping Systems, 2011)

Georg Fischer – Adding Quality to People's Lives
GF Piping Systems is one of three companies within the Georg Fischer group and a leading supplier of plastic and metal pipe systems with a global market presence.
Our portfolio offers connection technology, fittings, fixtures, sensors and pipes for the treatment and distribution of water as well as the safe transport of industrial fluids and gases. GF Piping Systems supplies leading innovative technical solutions for domestic engineering applications, the chemical process industry, food & beverage, life sciences, the microelectronics, shipbuilding, energy, water and gas supply industries as well as potable water treatment. Our distributors in more than 25 countries and representatives in a further 80 countries guarantee customer service around the clock. Production facilities in Europe, Asia and the US are customer focussed and comply with all local requirements. Georg Fischer's registered offices have been located in Schaffhausen, Switzerland, since the company was founded in 1802.

Key figures - GF Piping Systems 2011
More than 5'040 employees worldwide (as of 1 March 2012)
1174 million CHF turnover
137 million CHF EBIT (earnings before interest and taxes)

Further information is available from www.piping.georgfischer.com