



## Construction materials industry uses robust control valve in order to minimise operating costs



### Ball sector valve proves itself under abrasive conditions

An application report by Detlev Wandke and Helmut Ambros

For years, a ball sector valve has been used beneath the mixer cone at the Braas production facility in Mainburg. Initially, the rapid delivery times and low investment costs were crucial factors in terms of the conversion. The exceptional robustness of this valve that is almost completely maintenance-free despite abrasive process conditions, minimises downtimes and maintenance periods. Consequently, the ball sector valve makes an important contribution to the reduction of operating costs – even in the construction materials industry.

Roof tiles are a modern, high-tech material. They are extremely resistant and even defy difficult weather conditions such as hail and storms. They also offer great noise protection. As a result of their material and production process, roof tiles are extremely precise in terms of their shape. They are available in various colours and finishes and, in contrast to roof tiles that are usually manufactured using natural minerals, are cement-based. They boast an excellent environmental footprint as, amongst other things, the firing process is not required.

The conveying, accurate dosing, mixing and processing of materials that are usually extremely abrasive such as sand, cement, iron oxide-based colour pigment makes the utilisation of extremely precise yet robust control valves essential. Consequently, it is not only essential that these fittings ensure a clean cut-off and control the abrasive media flow; they must also offer long service lives and be cleaned in a proper and quick manner.

In order to optimise the process sequences at the Mainburg production location, one of the world's leading manufacturers of roof systems, Braas GmbH, has utilised a Schubert & Salzer Control Systems ball control valve for the first time. This valve with a nominal size of DN 250 has now been in operation beneath the mixer cone for several years now.

### The ball sector

The decisive core piece of this control and stop valve is the ball sector (Figures 2 and 3). One part of the ball sector serves as a cut-off and the other part has a drill hole with a diameter that usu-



**Fig. 1** The ball sector valve has convinced Detlev Wandke, Technical Manager at Braas in Mainburg: Even under the toughest of operating conditions and when utilising problematic media, he has been able to rely on the flawless function of the ball sector valve.

ally corresponds to approximately 80% of the valve nominal size. When closing, the shape of the opening cross-section changes from completely round to elliptical. This shape reduces the risk that the ball sector valves get blocked in the event of small valve openings, that suspensions are discharged or that the valve closes under high flow speeds. In doing so, the ball sector also seals the medium under the most difficult of operating conditions via an easily-replaceable seat ring located in the housing.

### Excellent regulation characteristics

The characteristic curve of the ball sector valve is almost of an equal percentage. This characteristic curve shape is ideal for the majority of operating conditions, especially if the differential pressure on the valve disproportionately drops in the event of an increasing degree of opening during operation. Furthermore, this characteristic curve shape is more tolerant in the event of oversizing because, if the  $K_{vs}$  value is only partially utilised, the valve travels a substantial control path as a result of the flatter characteristic curve in the lower opening range. This is in addition to an outstanding rangeability of 300:1 that also significantly supports the aforementioned characteristics in terms of the control behaviour.

### Special structural features

The ball sector is centrally mounted and, as a result, deposits on the ball surface are wiped off by the seat ring. Furthermore, no solid materials can get jammed between the seat ring and the ball sector when closing the valve. As a result of the position of the O-rings upstream of the bearing position, it is not possible for any abrasive materials to enter the bearing. The friction and, as a result, the control accuracy of the valve cannot be impaired. In order to avoid tension in the event of thermal or mechanical loads, the bearings and the shaft seal are stored in pendulum-mounted bearing bushes within the housing.

Reiner Wolf, Head of Construction at Schubert & Salzer Control Systems GmbH adds: "The ball sector valve is designed for utili-

Fig. 2



Fig. 2 Ball sector valves from the 4040 range are available in the nominal sizes of DN 25 to DN 300. Up to a nominal size of DN 250, the valves are constructed in a wafer design (in DN 300 with to PN 40 (ANSI 150 to ANSI 300). Depending on the nominal size,  $K_{vs}$  values between 12.5 and 3,840 are possible. These ball sector valves are manufactured in stainless steel 1.4408 as well as in special materials. The ball sector valves can be used at temperatures up to 220 °C depending on the selected seals.

Fig. 3

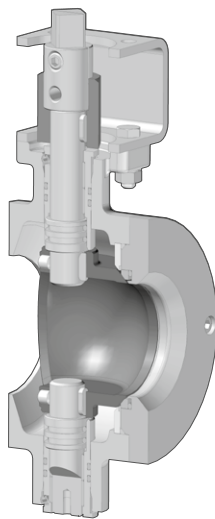


Fig. 3 The ball sector - the core of the ball sector valve.

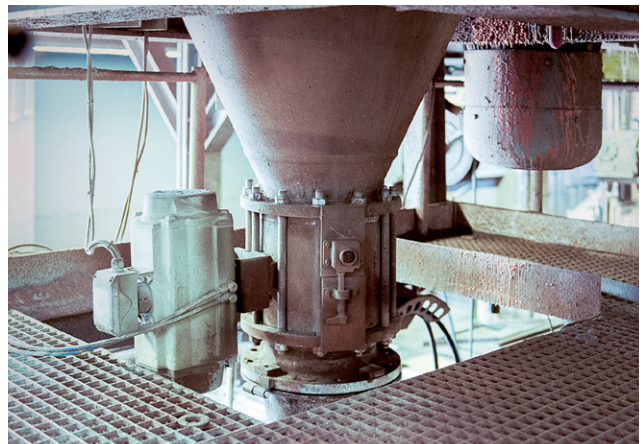


Fig. 4 Ball sector valve on the mixer cone.

sation with particularly abrasive media but, thanks to the selection of the sealing materials, we are able to address the particular requirements of our customers in an extremely individual manner. Consequently, we also equip this ball sector valve with special actuators for instance, with an ultra-high resolution of 8,192 control steps at a 90° valve opening, sets the grammage in paper machines. However, other numerous and extremely challenging applications for the ball sector valve include steam up to a temperature of 220 °C, waste water or abrasive suspensions of iron ore, coal, lime and fly ash."

In order to reliably meet the requirements of the construction materials industry, Schubert & Salzer Control Systems has performed comprehensive tests at its Technology Centre in Ingolstadt. Amongst other things, the ball sector valve must successfully pass 200,000 shift cycles with quartz sand during this test.

### Years of interruption-free continuous operation

Detlev Wandke (Figure 1), Technical Manager at Braas in Mainburg, had the following to say with regard to his decision in favour of the ball sector valve manufactured by Schubert & Salzer Control Systems: "The decision for the conversion at this process-critical location was made easier by the short delivery time of only three weeks and, of course, the 40% lower price compared to the previously-installed valve solution. I have not regretted my decision. Since switching to this ball sector valve, it has not been necessary to replace any seal. This valve was also thoroughly examined during a planned interruption in order to perform an inspection. It was not possible to detect any wear. Everything was fine! This confirms our excellent experience with other valves from Schubert & Salzer Control Systems from the past. We have been also using pinch valves from this manufacturer for the dosage of pantile dyes for many years.

The ball sector valve performs approximately 100 switches per shift and has been put under immense load in a two-shift operation for several years. With its extraordinary robustness, it makes a great contribution towards minimising maintenance and operating costs as well as downtimes.

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