MechChem AFRICA
JULY-AUGUST 2020
CROWN PUBLICATIONS

ZWICK TRI-SHARK
Bares its teeth

Valve & Automation
Total Valve & Control Solutions®

This month:

- Conveyor technology for large world copper mine
- Significant release in simulation-driven development
- Decarbonising the energy trade
- Bearing types and applications, an overview

TRI-SHARK from Zwick – exceptional performance with simplicity everything one needs in a control valve

Valve & Automation South Africa presents the features and advantages of the TRI-SHARK Throttling Trim Cartridge valve from Zwick, a valve that combines the advantages of leak-free triple-offset valves (TOVs) with high-performance control valves into a single valve solution.

When choosing zero leakage valves for open/close functionality, triple eccentric valves, also known as triple-offset valves (TOVs), are becoming increasingly popular. This valve type provides many advantages, including zero leakage, compact design, frictionless functionality and maintenance-free operation – and all these reasons contribute to their popularity increase.

LWKLFHQGLOLPLWVZDVFDQLQVREHXVHG for control and/or throttling applications. 7KH[WHQVLWKHUDQDQWRWUDQVIRUPWKHVH valves into efficient, high-performance control valves, however, Zwick has further developed the triple-offset TRI-SHARK valve range.

The TRI-SHARK Throttling Trim Cartridge valve

The combination of Zwick's Throttling Trim Cartridge and its TOV TRI-CON series to create TRI-SHARK has resulted in a very high-performance, zero leakage shut-off and triple-offset control valve. The latest design offers control performance equal to that of globe or rotary plug valves, but incorporates much better shut-off capabilities while having a much lighter weight.

This valve combination provides numerous advantages. On one hand, it includes all the advantages of triple offset valves, while on the other, it features all the special qualities of an H[FHOOHQWFRQWUROYDOYH,WHQDEOHVRQHVLQJOH style of valve to be used for both on/off and control applications.

The Throttling Trim Cartridge is designed WREHHGLQWRWKHYDOYHERGZKLOHWKHYDOYH GLVFVSLYRWVHQDEOLQJWKHRZEHWZHHQWKH disc and cartridge to be as low as possible. Furthermore, the cartridge is manufactured with multiple, optimised slots, which divide WKHRZDQGFOHDUDQFHDFWXDOFURVVVHFWLRQ section while opening or closing the valve.

Equal percentage flow characteristics

With the TRI-SHARK Throttling Trim Cartridge, the valve's characteristic is FKDQJHGWRHTXDOSHUFHQWDJHRZZKLFKLV the preferred characteristic for the majority RIFRQWURODSSOLFDWLRQV7KLVHTXDOSHUFHQWDJHRZFKDU-acteristic makes sure that the valve is able to provide an effective control range from 5 to 30° of opening, which is the control area ZKHUHWUDGLWLRQDOKLJKSHUIRUPDQFHEXWWHU valves seem to reach their limits. Typical TOVs and ordinary high performance butterfly valves have good control limits between DQRIWUDYHO7, 6+$5.YDOYHVH[WHQG this range as a result of the characteristics of the Throttling Trim Cartridge. With respect to streamed flow, the cartridge and valve GHVLJQDUHHQJLQHHUHGIRULGHDORZLQWKLV control area.

TRI-SHARK control valves have an effective control range that extends from 1% at 5° of travel to 100% at 90° degrees of WUDYHOZKLFKDOORZVLQVWDOODWLRQVWRPHHWWKHFRQWUROUDQJH requirements.

Low to high flow capability

The TRI-SHARK Throttling Trim Cartridge eliminates the low angle instability inherent in most quarter-turn control valves. For instance, ordinary high performance butWHUYDOYHVH[KLELWSRRUFRQWURODWDQJOHVRI opening that are less than 30°. TRI-SHARK WHFKQRORJ\EUHDWKHVQHZOLIHLQWRWKHFRQWUROUDQJH of quarter-turn valves to as low as 3° of valve opening, while also providing noise attenuaWLRQDQGDQWLFDYLWDWLRQEHQHILWV

As the TRI-SHARK disc turns within the Throttling Trim Cartridge, the flow is first controlled via the clearance between the disc edge and the solid, tapered portion of the cartridge; then through the multiple, optimised VORWVDQGQDOOWKURXJKWKHDGGLWLRQDORSHQ area of the valve.

Anti-cavitation properties: Further advantages of TRI-SHARK valves include anti-cavitation properties. TRI-SHARK's WKUHHEDUULHUDQWLFDYLWDWLRQGHVLJQDOORZV for higher pressure drops than ordinary high SHUIRUPDQFHEXWWHUYDOYHVZKLOHH[KLELWLQJ much less noise, cavitation and damage. Even if cavitation does occur in higher pressure drop situations, the shorter vapour jets produced by the slots will avoid 'super cavitation' damage that would normally be caused by larger vapour jets.

The flow is divided through the slots, which reduces cavitation because the stream bubbles occurring in the cartridge slot area DUHVPDOOHUEHFDXVHRIWKHORZHUZDWHU within each channel. Therefore, less energy is released when the stream bubbles implode. Furthermore, especially at small opening angles, TRI-SHARK valves are able to keep water jets concentric to the pipeline's centreline, thereby reducing their kinetic energy to a lower level prior to contacting the pipe wall.

The cartridge is IRUPHGZLWK PXOWLSOHRSWLPLVHG VORWVZKLFKGLYLGHWKH RZDQGFKDQJHWKH calculated cross section ZKLOHRSHQLQJRUFORVLQJ WKHYDOYH

Flow laboratory tests have verified that individual water jets impinge upon HDFKRWKHUDWDSSUR[imately one pipe diameter downstream from the TRI-SHARK control element, thereby transferring kinetic energy WRWKHYDSRUDQGFDYLWDWLRQLQWKHSLSH ZDOOZKLFKVLJQLILFDQWO\UHGXFHVWKHSLSH wall damage that can occur.

,QDGGLWLRQVLQFHWKHMHWPDVVRZLVGLYLGHG into smaller streams through TRI-SHARK's throttling slots, the sound frequency rises, with the result that sound can be absorbed more easily through the pipeline, and at a frequency in the range where the human ear notices it less – and optional resistance plates can be added for even more sound attenuation.

More control with less torque: Another important aspect of the throttling trim cartridge is that the dynamic torque is reduced by the changed pressure VXUHHGLWKUHJDUGWR the necessary dynamic torque, this means that at critical opening angles and flow conditions, a smaller actuator requiring less power can be used.

TRI-SHARK's dynamic torque requirements are 60% less than ordinary high-performance butterfly valves, even at high end CVs. 7KLVSURYLGHVH[ceptional stability throughout the valve's control range.

TRI-SHARK's dynamic torque requirements are 60% less than ordinary high-performance EXWWHUIO\YDOYHVZKLFK means a smaller actuator UHTXLUHVWREHFDQ be used.

The valve's triple-offset metal-to-metal valve seat requires lower breakaway torques than either high-performance butWHURUURWDU\SOXJFRQWUROYDOYHVDQLWV H[WHQGHGWRUTXHUHVHUYHVDOSRLQWVDOORZVLW HDQHUJDQGHERIFRQWURO

ZWICK TRI-CON Triple 2IIVHWYDOYH

Standard types and applications

TRI-SHARK valves can be supplied in standard body styles including wafer, lug and GRXEOHDQJHYHUVLRQVLQVL]HV up to DN900 (36").

By combining Zwick's Throttling Trim Cartridge and TOV technologies, a single valve style can accommodate on/off and control applications. This solution is the smart choice for today's control systems' engineers delivering on applications for chemical and synthetic fuels, oil and gas production, power generation, pulp and paper, water treatment, mining and metals, and shipbuilding.

In comparison with other control valves, TRI-SHARK offers realisable benHVWZLWKUHVSHFWWR acquisition costs; weight and geometrical dimensions; and leak tightness and control characteristics, especially in larger diameter piping systems.

Ultimately, this valve makes it possible for plant operators to reduce their total costs of ownership (TCO) and improve sustainability and SURWPDUJLQV‰

Valve & Automation

Valve & Automation supplies total valve and FRQWUROVROXWLRQVWRWKHFKHPLFDOUHILQHU\ mining and minerals; pulp and paper; sugar; steel; power generation and other key process industries throughout Southern Africa.

The company's specialist skills help customers meet their core business objectives by sizing and selecting optimum valve and control solutions for their processing plants.

This, together with after sales technical support and reconditioning facilities, reduces the total cost of ownership (TCO) thereby helping customers to increase production, reduce costs and reduce emissions.

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