Flow Dividers for Control Valves

St I · St III

Application

These valve components serve to reduce noise emission. They are designed for installation in globe and angle valves used to control vapors or gases.

The noise emission of control valves controlling gases or vapors as well as the connected pipeline is determined by the free jet leaving the restriction and by the downstream turbulent mixing zone. A particularly effective and low-cost solution to reduce noise is achieved by using flow dividers which shorten the free jet of gas or vapor and accelerate the exchange of energy in the mixing zone.

Special features

- Effective, reliable and cost-effective components for noise reduction
- Noticeable deviation from the characteristic only in the travel range beyond 80%
- The valve's K_{vs} value is reduced to the K_{vsI} and K_{vsIII} values specified in the Data Sheets
- Installation in Types 3241, 3251 and 3254 Globe Valves, Type 3256 Angle Valves as well as globe valves as part of self-operated regulators
- In Series 280 Steam-converting Valves, the St III Flow Divider is also used to split up and vaporize cooling water (see Information Sheet T 8250 EN).

Versions

St I Flow Divider (Figs. 1 and 4) made of perforated sheet steel with perforation diameters of 2.5 mm; suitable for gases and vapors.

St III Flow Divider (Fig. 2) made of stainless wire mesh; suitable for gases and vapors containing small-sized suspended matter. It additionally has an internal and external perforated sheet steel (Fig. 3) and is designed for Series 250 and 280 Valves.

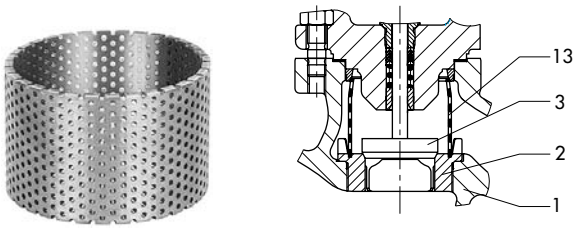

Fig. 1 · St I Flow Divider, installed in Type 3241 Valve

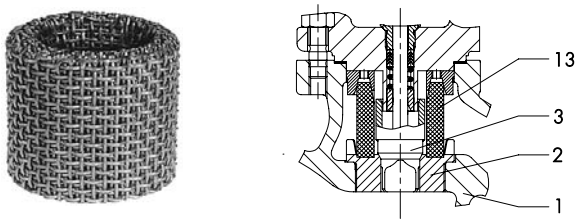

Fig. 2 · St III Flow Divider, installed in Type 3241 Valve

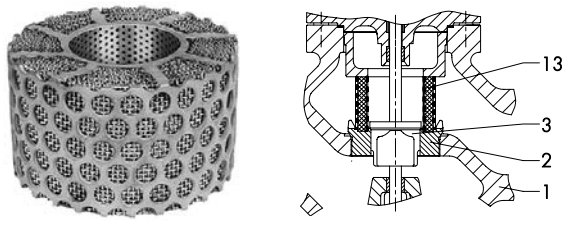

Fig. 3 · St III Flow Divider, installed in Type 3254 Valve

1	Valve body	3	Plug
2	Seat	13	Flow divider

Principle of operation (Fig. 4)

After having passed the cross-sectional area of the restriction located between the valve seat (2) and the plug (3), the process medium reaches its maximum velocity. Before a noisy turbulent mixing zone can be created, the medium hits the inner wall of the flow divider (13) which splits up the jet into numerous smaller jets, thus ensuring low-noise energy transfer to the surrounding medium.

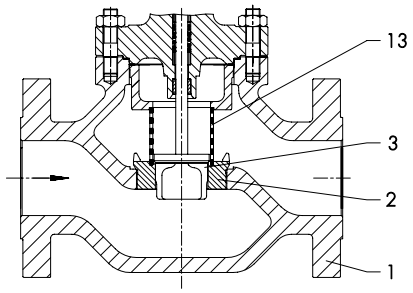

Fig. 4 · Type 3251 Valve with St I Flow Divider

Calculation of noise emission

Gases and vapors

The noise emitted by gases in single- and multi-stage control valves is determined according to DIN EN 60 534, Part 8-3. This calculation method, however, does not apply to control valves containing noise-reducing elements, such as St I and St III Flow Dividers. In this case, calculation is performed according to VDMA 24 422, Edition 89.

The calculation is based on the jet power reached during expansion. An acoustical conversion ratio η_G is used to determine the noise emission. Diagram 1 illustrates the difference between the conversion ratios depending on the differential pressure ratio. This difference immediately shows the level difference of the internal sound power. The difference between the sound pressure levels to be expected at one meter distance from the pipe is also sufficiently accurate.

Assuming a differential pressure ratio of x = 0.5, the difference in sound pressure level amounts to –10 dB between a valve without a flow divider and a valve with a St I Flow Divider and –20 dB with a St III Flow Divider.

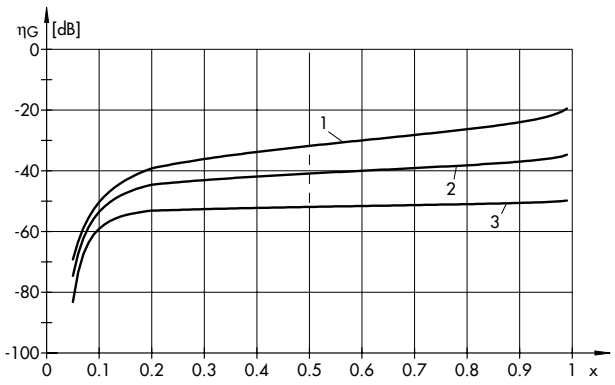

Diagram 1

1 Without flow divider
2 With St I Flow Divider
3 With St III Flow Divider

Specifications subject to change without notice.

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