

Press Information

Ingolstadt, September 2019

Innovative valve design for conditioning in steam networks

Desuperheater with Segmented Disc Valve Controls Nozzle by Nozzle

Steam is not only a supplier of energy, but is also an important source of energy for a wide variety of processes for all operators of thermal systems such as producers of sugar or paper. Using desuperheaters, it is easy to control the pressure and temperature of the steam and condition overheated steam for the particular consumer in the process.

Desuperheaters have proven effective for injecting cooling water or condensate into overheated steam. Producing slightly overheated steam that is 3-20 K above the saturated steam temperature to subsequently provide consumers with steam with an optimal heat transfer coefficient is a specialized art. Schubert & Salzer has developed a completely new kind of desuperheater by integrating a segmented disc valve with four injection nozzles on the lance. This enables the outstanding advantages of this valve technology to be used for the finely tuned regulation of steam networks.

The main flow control element for the injected water - the segment discs which slide over each other and mutually seal each other - are positioned perpendicular to the direction of flow in the valve body of the segmented disc valve. On a non-rotating segment disc with four segment openings, a movable disc with same number of segments rotates so that the four segment openings open precisely and continuously in sequence. Each segment opening is connected to an injection nozzle by a lance so that the four injection nozzles - depending on the control requirements – increase their flow rate. The 4 serial nozzles in the system offer a wide control range and ensure that the water pressure in the nozzles remains almost constant. This enables a much finer atomization of the water, and therefore optimal control of the steam. At the same time, the risk of accumulations of water in the steam system is minimized.

With this special design, segmented disc valves are one of the few industrial valves that combine precise control under extreme operating conditions with high seal tightness, lower noise emissions, and low wear.

Another advantage of the Schubert & Salzer desuperheater is that the control unit consisting of segmented disc valves with proven 8049 digital positioners is located outside of the flow of steam. This means the amount of water injected is controlled outside of the hot steam pipe. Thermal distortion due to the temperature difference is thus eliminated, and leaks are minimized. The temperature of the injection medium can be up to +220°C. The immersion depth of the spraying nozzle lance is between 150 and 900 mm and can therefore be adapted exactly to the requirements of the system.

The segmented disc valve offers a rangeability Kvs/Kv_{min} of 60:1 with a modified linear characteristic. The leakage rate is < 0.001% of the Kvs value. The nominal size of the injection valve on the input is DN 25 or DN 50. The nominal size of the cooling water connection is DN 100. The nominal pressure is PN 40 or ANSI 300. The entire desuperheater is manufactured from stainless steel. The sealing towards the control actuator is done by using a preloaded PTFE packing set. An attachment of positioners according to the NAMUR recommendation is also possible as an option.

Summary: With the Type 5090 desuperheater, Schubert & Salzer has made it possible to utilize the inherent advantages of segmented disc valves when conditioning steam. Operators of thermal systems benefit from the especially high tightness of the seals, minimized wear and optimal steam control.



Fig. 1: The Type 5090 desuperheater from Schubert & Salzer makes it possible to utilize the inherent advantages of segmented disc valves when conditioning steam.



Fig. 2: Detailed view of the valve disc of the segmented disc valve in the desuperheater

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