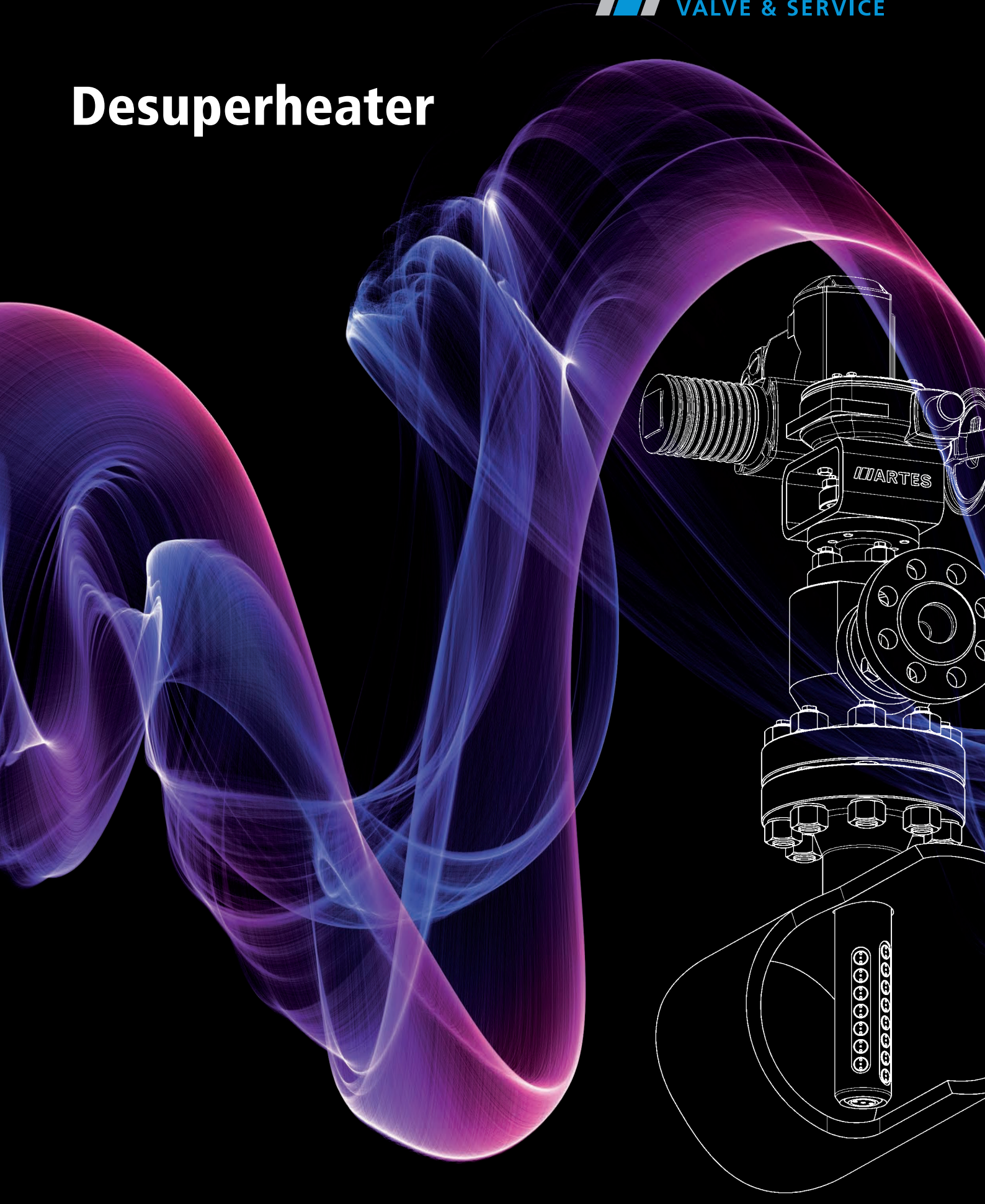
ARTES
VALVE & SERVICE

# Desuperheater



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# Purpose & Advantages

The ARTES desuperheater is a regulating valve with which the temperature of vapour can be regulated by injecting cooling water. The ARTES desuperheater is frequently used in steam generators of power plants and other industrial systems. Special applications using other media have also been realised.

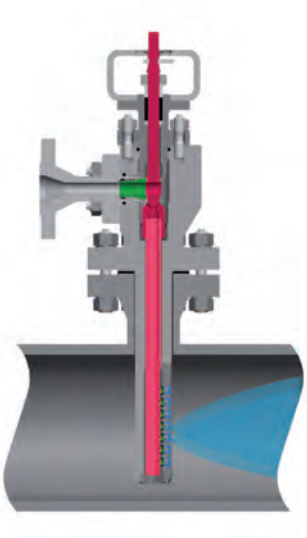
**By nature of its design and use of rotary movement, the ARTES desuperheater offers many crucial advantages:**

- The cooling water is always injected into the centre of the pipe, regardless of the quantity.
- The perfect combination of rotary movement, nozzle design and nozzle controlling ensures reliable and precise cooling in all load cases.
- The use of high-grade materials helps to prevent vibration fractures in the functional components and ensures reliable operation without interruptions.
- With its large rangeability, ARTES desuperheaters offer outstanding quality of control. The control performance is continuous across the entire controlling range.
- The valve is permanently leak-tight to the outside.

The ARTES desuperheater can be actuated by means of electric, pneumatic or hydraulic drives.

Thermal power plant Tiefstack, Hamburg

# Function



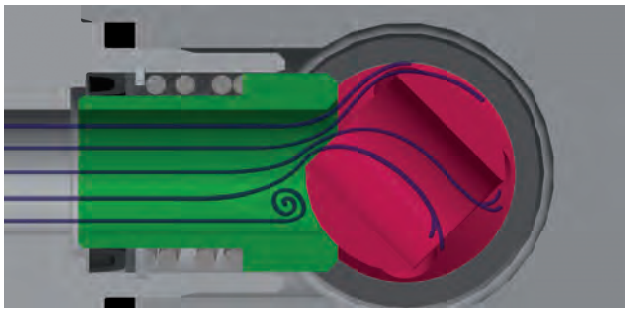
In contrast to other valves that operate according to the lift principle, the ARTES desuperheater utilises rotary movement. The quantity of water to be injected is controlled by the rotation of the valve stem. An additional regulating valve, as is necessary when using unregulated nozzles, is not required here.

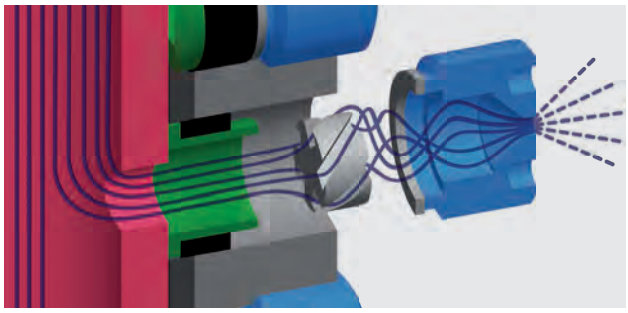
As the valve stem rotates, the contour located directly behind the water connection opens and the flow to the desuperheater lance is enabled. Water subsequently flows through the nozzle stem. Water reaches the various nozzles through openings in the nozzle stem. The openings of the nozzle stem are designed in such a way that there are no ‚steps' in the characteristic curve of the valve.

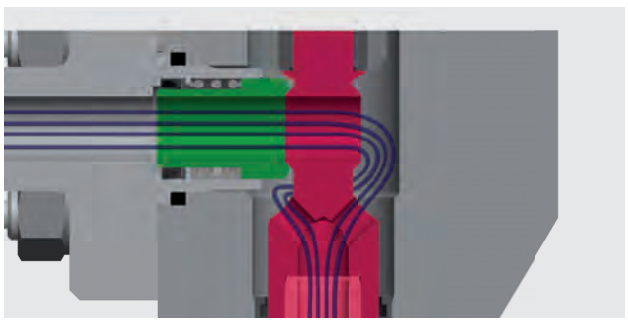
Swirl inserts in the nozzles cause the water to begin to rotate. As a result of the water rotation and nozzle geometry, the injection cone is uniform, with very fine atomisation of the cooling water.

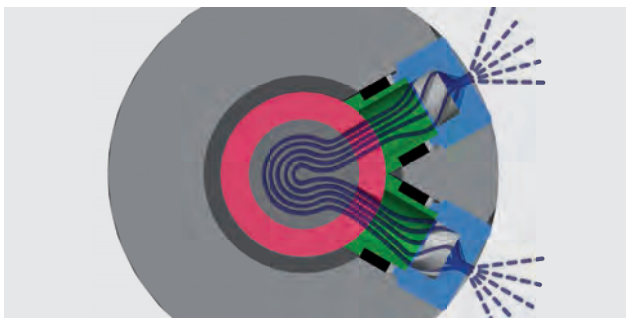
By using nozzles with different bore diameters, any characteristic curve is possible – fine-tuned to the respective application.

The perfect combination of rotary movement, nozzle design and nozzle controlling ensures reliable and precise cooling in all load cases. To achieve a very wide and fine water distribution, the maximum number of nozzles is always used. Here, the number of nozzles is directly dependent on the inner diameter of the steam pipe.









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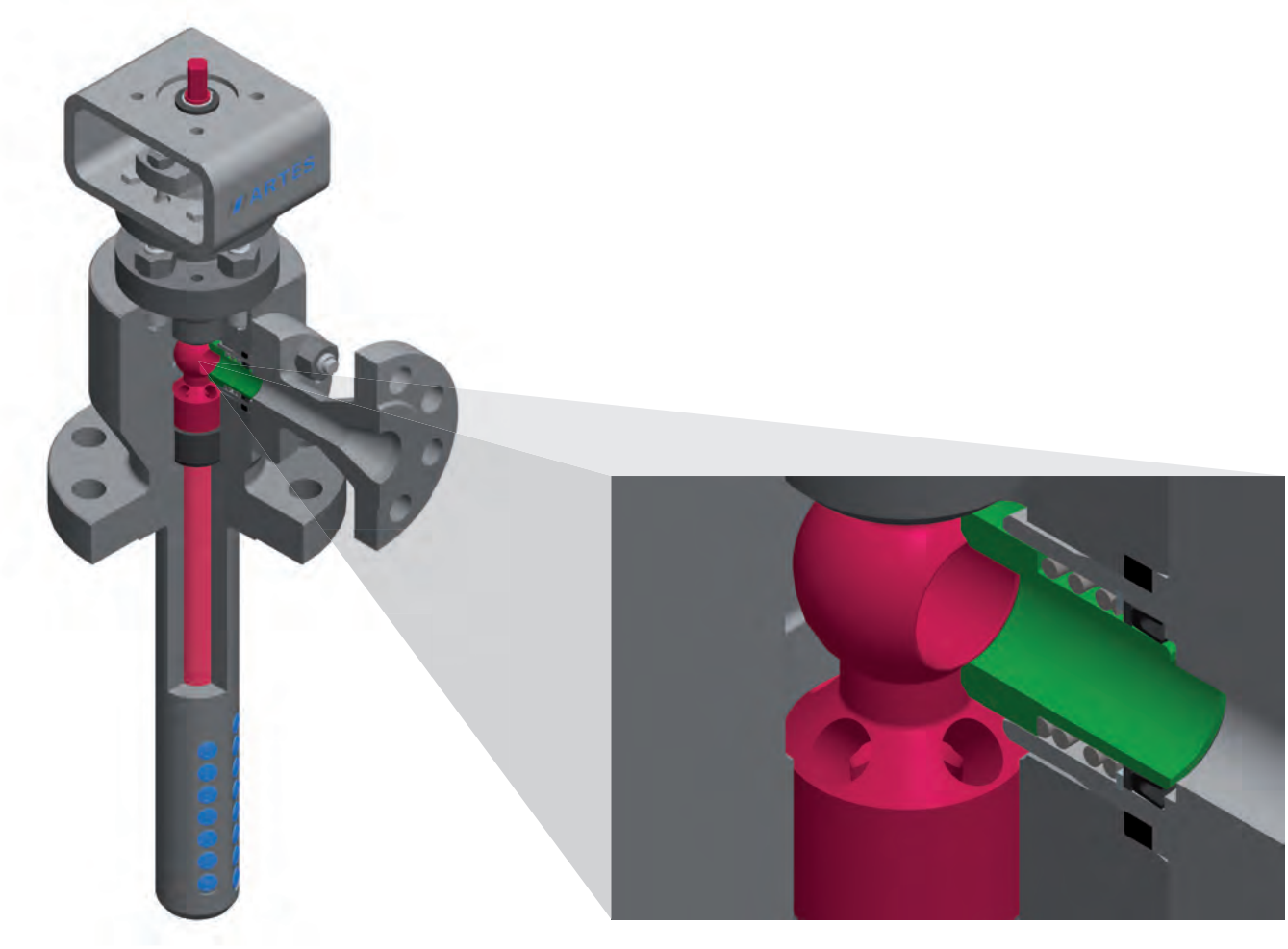
# Design

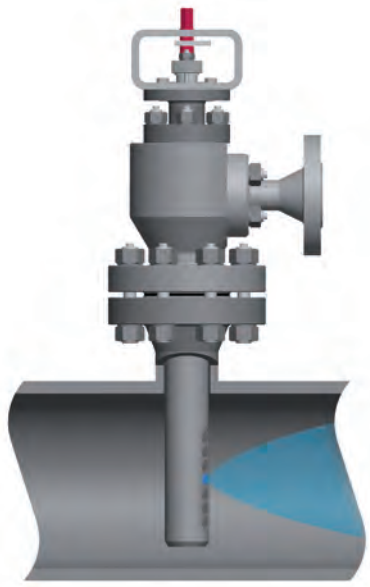


The ARTES desuperheater can be equipped with a single-stage or two-stage pressure reduction. The version with single-stage pressure reduction is used in cases where the differential pressure between the cooling water and the steam is in a range of 5 to 30 bar. If the differential pressure between the cooling water and steam is less than 10 bar, the entire differential pressure is applied at the nozzle systems, due to the very low pressure loss within the desuperheater. This guarantees very fine atomisation of the water. The ball/seat ring system is used exclusively for shutting off the water.

If the pressure differences between the cooling water and steam are very high, the desuperheater reduces the pressure in 2 stages. In this version, the ball and seat ring additionally have a controlling and throttling function (control contour in the ball passage).

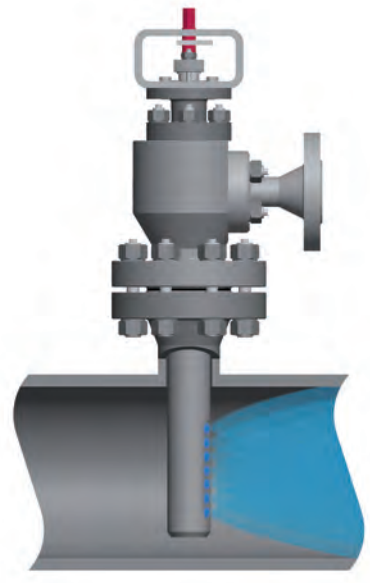
The ball/seat ring system is a pure metal seal and works similar to a conventional ball valve.

# Design

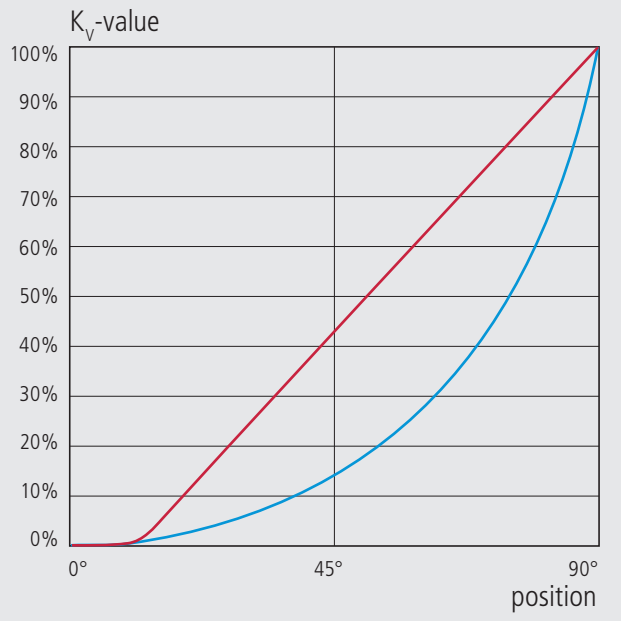


Optimal injection location:
The nozzle that opens first is located in the middle of the steam line.

Various models available, for optimised usage



The order in which the nozzles open is determined by the design of the nozzle stem. The nozzles located in the middle of the desuperheater are always the first to inject cooling water.




Examples for achievable control characteristics
characteristics ■ linear ■ equal percentage

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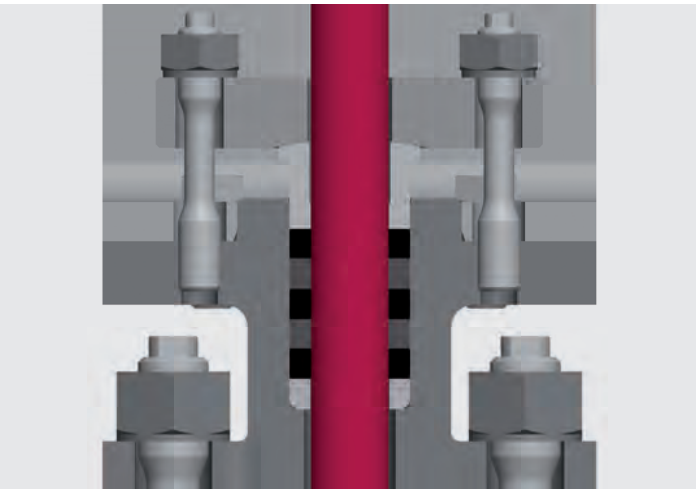
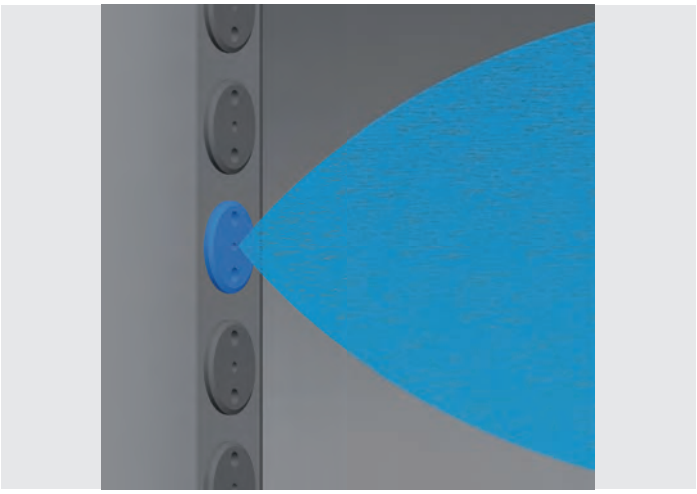
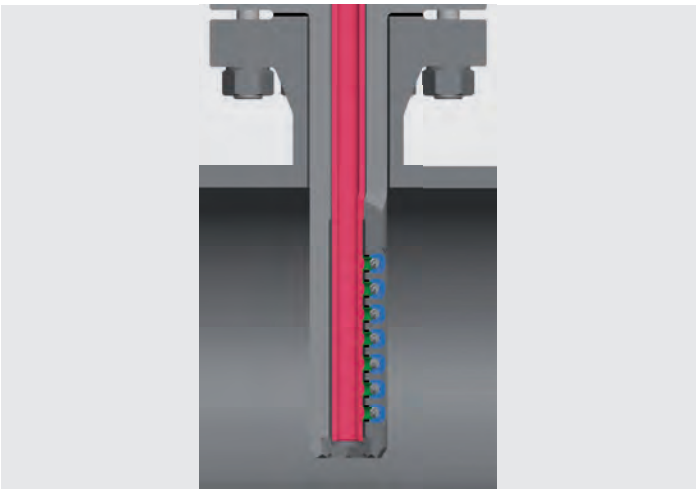


Permanently sealed to the outside: The rotary movement prevents dirt from being pulled into the packing.



No cross-flow: The leak-tightness between the nozzles is safeguarded by metallic sealing elements. The control over the individual nozzles is adapted depending on the operating conditions. This allows precise control over the injection water quantity in accordance with the specified characteristics curve.



No vibration fractures: Contrary to lift valves, no forces or torques act on the stem after it has been positioned. The flow through the inside of the nozzle stem provides additional protection.
One-piece desuperheater lance: The nozzles are integrated into the forged housing. There is no separate nozzle head as is the case in valves that use the lift principle.

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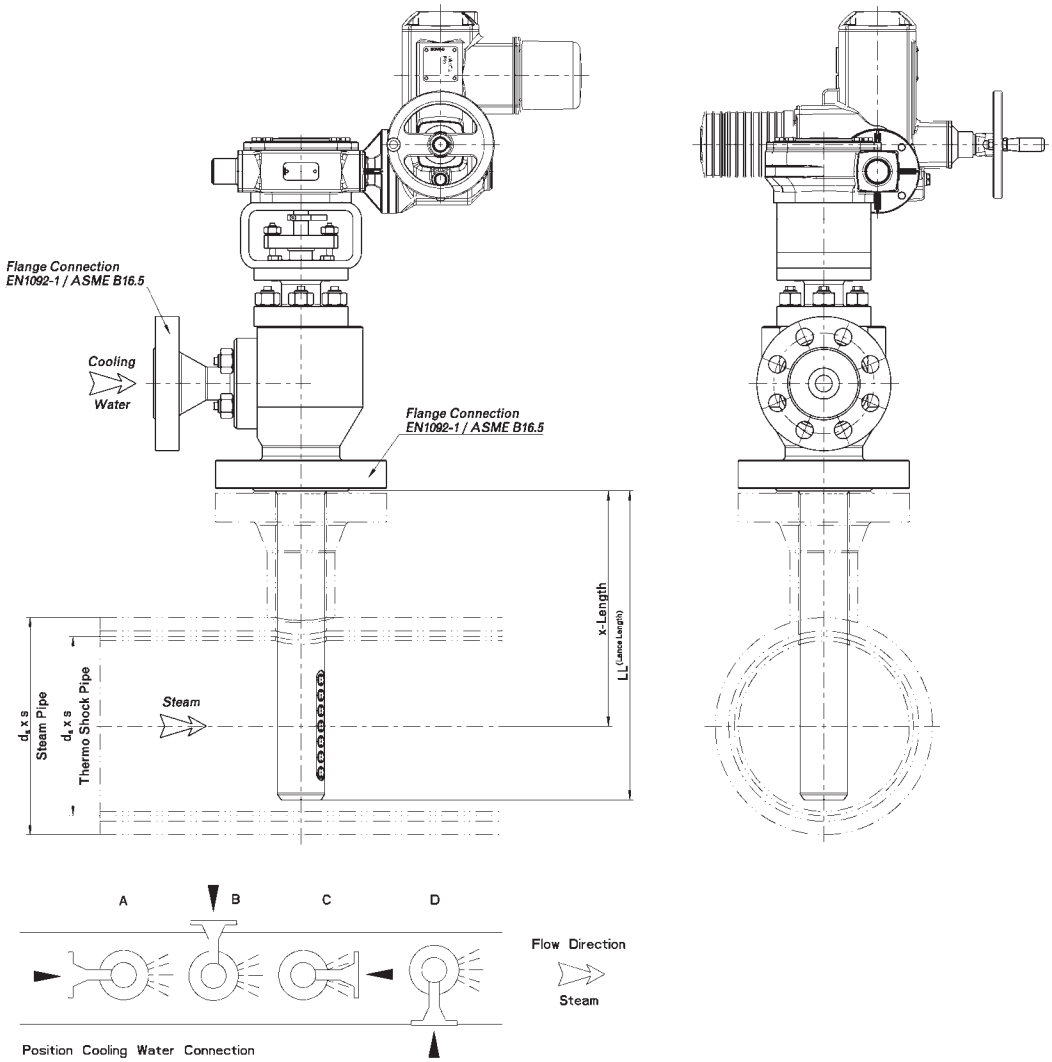
# Facts

| | |
|---|---|
| **Steam pipe:** | >= DN80 or 3" |
| **Temperatures:** | up to 620°C |
| **Pressure levels:** | Max. PN420 or ANSI class 2500 |
| **Body material:** | 1.0460, 1.5415, 1.7335, 1.7380, 1.4903, 1.4541, 1.4571 or equivalent ASME materials |
| **Standards:** | Pressure Equipment Directive 97/23/EC, ASME, TRD, AD2000, EN standards |
| **Steam pipe connection:** | Flange connection EN1092-1 or ASME B16.5, buttweld ends |
| **Injection volume (water):** | 0 ... 80 t/h |
| **Pressure difference: water / steam** | optimal: approx. 5 to 60 bar |
| **Standard versions with:** | 3, 6, 9, 12, 15, 18, 21 or 24 nozzles |



# ARCA Flow Group

## ARTES VALVE & SERVICE GmbH

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