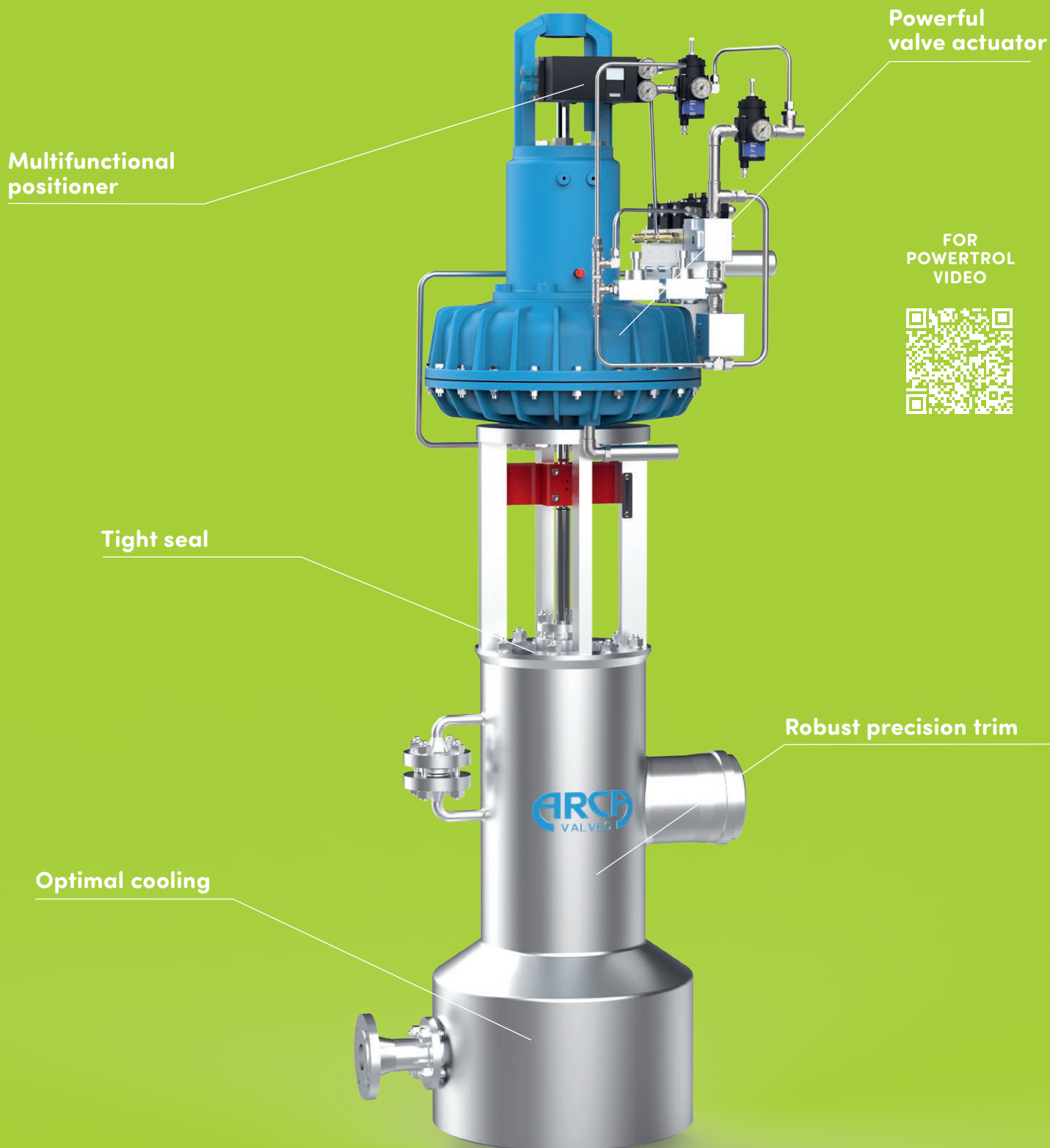


# POWERTROL

CONTROL VALVE FOR STEAM CONDITIONING

SERIES 500:



ARCA-VALVE.COM

ARCA  
VENTILE

# YOUR SOLUTION: OUR POWERTROL CONTROL VALVES

## Powerful valve actuator

No matter whether it's a control task or safety function – the valve actuator is precisely calibrated to the application for the ARCA steam conditioning valve. A wide range of pneumatic, electric and hydraulic actuators are available for this purpose, such as the 811 series pneumatic actuator shown here. The required valve closing force of all actuators dimensioned according to customer requirements. See the *ARCA Actuators brochure* for more details.

## Multifunctional positioner

The digital positioner is the multifunctional interface to controllers or process control systems. For analog systems the self-adapting positioner type 826 ARCASMART is your first choice with its easy operation and intuitive user interface. Due to its versatile diagnostic and communication options, we recommend the 827 ARCAPRO® type for demanding applications. As a standard, it works with a 4–20 mA input signal. Among others, HART, Profibus (PA) and Foundation Fieldbus (FF) can be used for bidirectional data exchange including status messages. With auxiliary devices, such as boosters, limit switches, solenoid valves and the like, the valve is customized to your application. See the *ARCA Positioner brochure* for more details.

## Statically and dynamically leak-proof

The dynamic stem seal and the static bonnet seal in the force bypass are precisely selected for pressure and temperature range. The surface finish of the stem and packing space and the packing material are taken into consideration. The chambered version general used for the bonnet seal prevents potential assembly errors during service and maintenance. A self-sealing (Brettschneider) ring closure is used for higher pressures, so that the seal remains tight regardless of the tightening torque of the bonnet screws. These design features prevent shear forces on the valve seat and control plug, ensuring minimum internal leaking.

## Robust and versatile precision trims

The valve internals are the critical function elements for controlling pressure and temperature. Perforated plugs are calculated and designed in accordance with the flow conditions and the required rangeability. The selection of the water injection is made in relation to the temperature of the steam and cooling water. For safety applications, a dirt strainer is connected upstream in the steam inlet. This prevents the ingress of foreign bodies and protects against defects. The patented clamping seat ensures rapid, easy and cost-effective maintenance without special tools.

The POWERtrol system series stands for holistically conceived technology with unique service and maintenance convenience, low operating costs and low life cycle costs.

ARCA is a specialist in sophisticated industrial process control.

Our story began in 1917 with a groundbreaking innovation. Since then, outstanding engineering skills and pioneering spirit have been key strengths of our family-run company. Today our control technology provides reliable interfaces for your process.

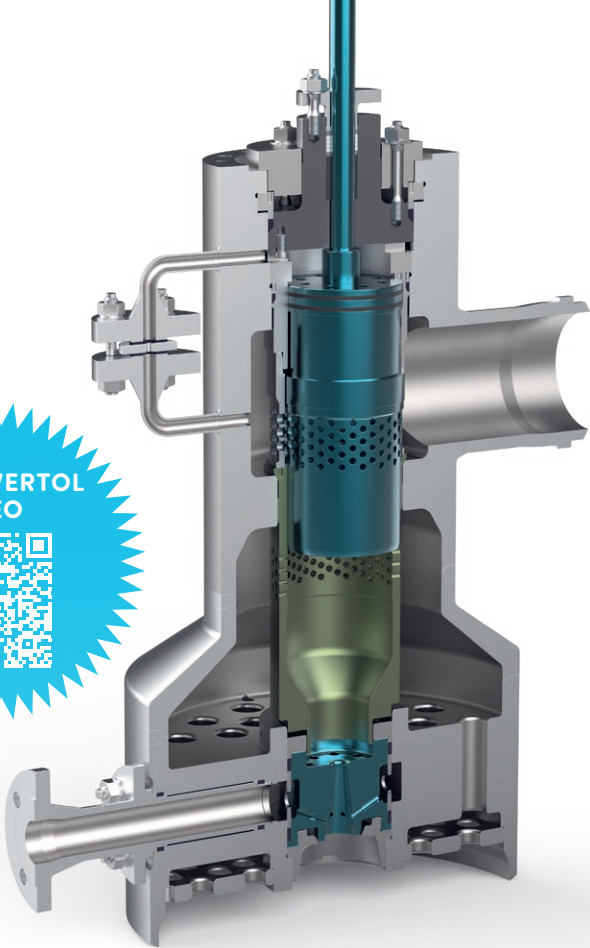
Our comprehensive services guarantee the secure and efficient control of your production, from early project consulting to maintenance all the way to process optimization.

CONTROL THE FLOW

# EXTREMELY ROBUST, RELIABLE, SAFE

The POWERtrol family solves the versatile and increasing requirements for steam conditioning and cooling with a flexible design principle and maximum efficiency. Starting with the classic nozzle from the seat or stem injection to the high-tech 2-phase nozzle we specify the correct solution for your application.

POWERtrol stands for maximum control performance in steam conditioning with unique service and maintenance convenience.



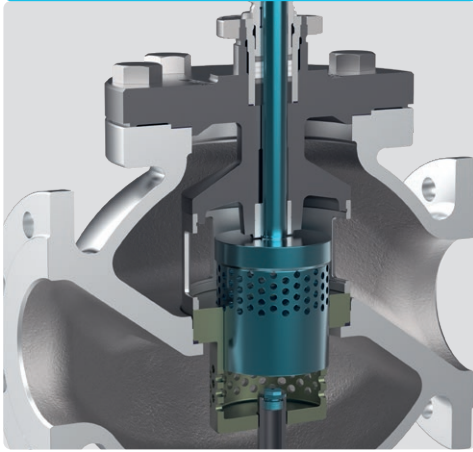
## OUR INNOVATIONS

- 1 Modular system with standardized components
- 2 Flow-optimized body shapes
- 3 Optimized trims of plug and seat for all areas of application
- 4 Standardized interface to the valve actuator
- 5 Trim can be completely dismantled

## YOUR ADVANTAGES

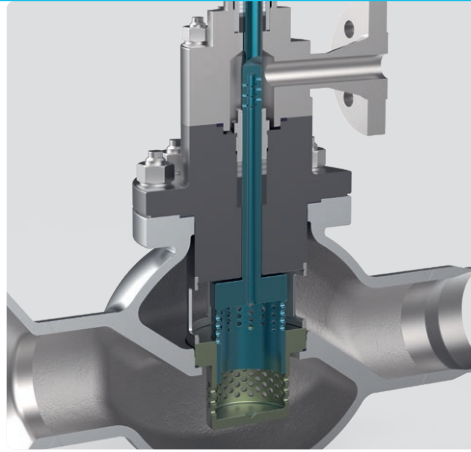
- All nominal sizes
- Fewer components
- Only a single special tool
- High availability
- Low noise emission
- Optimized KV value per nominal size
- Precisely adapted to the application
- Maximum control performance
- Large control range
- Low sound emission
- High efficiency
- All actuator types can be used pneumatically, electrically and hydraulically
- Easy modification later
- Maintenance work quick and easy
- All trim can be disassembled
- All trim clamped or screwed, not welded
- No special machines necessary

## DESIGNS



**Straightway design with seat injection  
(type 520)**

This steam conditioning valve is based on our cast straightway body from the basic control valve series. Combined with the lower seat injection, it is optimized for simple cooling applications. The pressure is reduced in the perforated plug/perforated seat combination and at the same time water is injected for cooling by means of a nozzle. The differential pressure via the nozzle and the turbulence in the plug chamber help to ensure that most of the cooling water evaporating even before it exits into the pipeline.



**Straightway design with stem injection  
(type 510)**

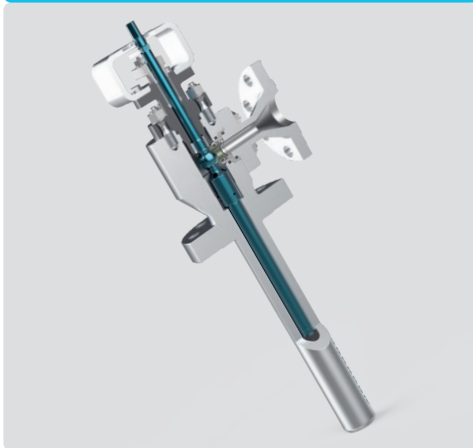
With this steam conditioning valve, a hole pattern is freed by the hollow stem depending on the volumetric steam flow and injection takes place directly into the intermediate space of the pressure reduction. The greatest turbulence prevails in this intermediate space of the perforated plug/perforated seat combination, as the flow cross-section is reduced to the required amount of steam. This ensures optimum evaporation of the injection water even with high rangeabilities and protects the valve body against direct contact with water. The cast standard valve can be combined with an outlet extension in a flange design or according to the expanded steam.



**Single-component nozzle  
(type 596)**

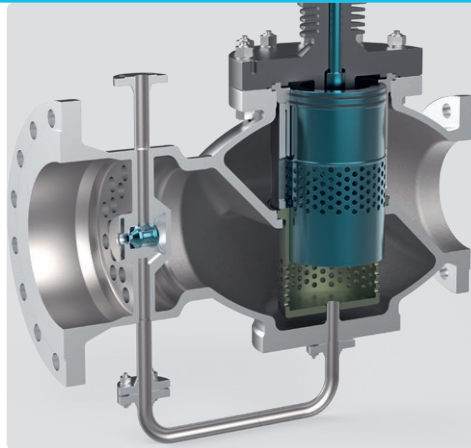
Superheated steam is cooled in a simple way with this single-component nozzle. It is used with a sufficiently high injection water pressure and continuous steam quantity. The amount of cooling water is controlled by the interaction between the single-component nozzle and the cooling water control valve (in this case an ECOTROL®), which are matched to each other. The matching and the number of nozzles allow use in many applications.

## DESIGNS



**Desuperheater  
(typ 3)**

Desuperheaters are single-component nozzles connected in series, which are activated one after the other depending on the injection water requirement, wherein the required differential pressure at the individual nozzle remains almost constant and an optimal spray pattern is generated. Due to the rotary movement and nozzle control, the cooling water is always injected in the middle of the pipeline, regardless of the amount of water. In addition, the packing does not draw any foreign substances or dirt into the cooler. The design of the ball/seal ring system and the hollow stem avoids fatigue fractures and leaks at the nozzle. A patented three-stage pressure reduction significantly reduces wear on the nozzle and prolongs the lifetime and service life of the valve.



**Straightway design with 2-phase nozzle**

Motive steam cooling is used in applications with valves in straightway design and critical, demanding cooling. From an intermediate stage of the perforated plug/perforated seat combination, a partial flow is extracted as motive steam and fed directly through the additional line into a 2-phase nozzle or a motive steam cooler. The required control valve for regulating the motive steam thus becomes superfluous.

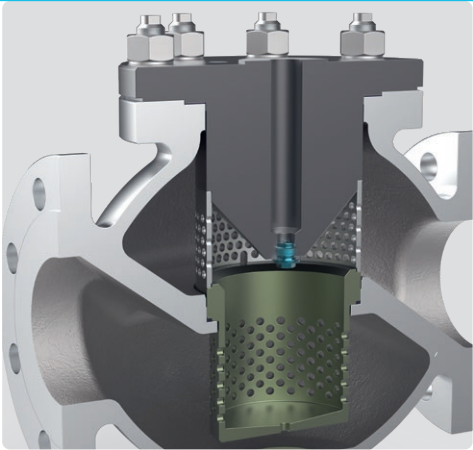


**Motive steam cooler**

Motive steam coolers are cooling systems for steam temperature control and ensure the best possible cooling, even at low water pressures. Their task is to reduce temperatures in pipelines or providing process steam at a precisely defined temperature. The motive steam supports the nozzle in the atomization of the water and generates extremely fine water drops, the spray, and low evaporation times and distances.

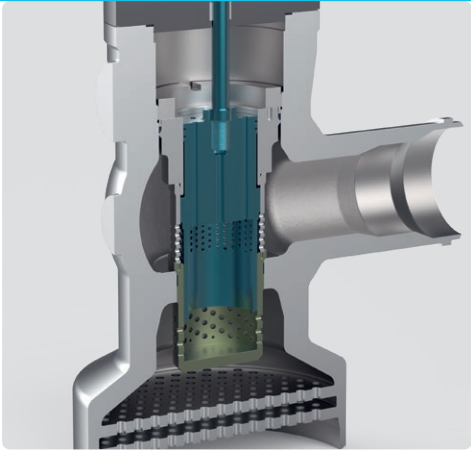


## DESIGNS



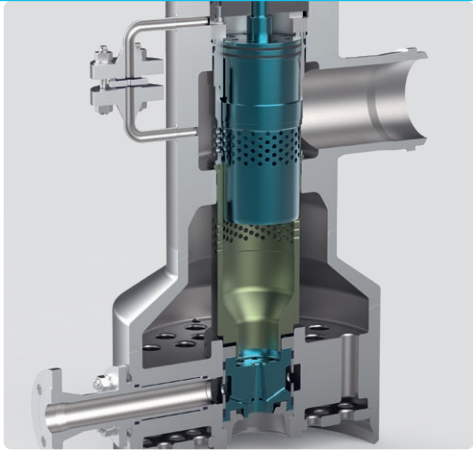
**Mini cooler  
(type 595)**

The mini cooler is based on the single-component nozzle, but is used in steam-conditioning stations with very small injection water quantities. Following the pressure reduction, the injection water is added to a perforated seat cage, where maximum turbulence ensures optimal evaporation conditions. The perforated seat cage also protects the valve body against direct contact with injection water. The valve body can optionally be equipped with a condensate drain connection.



**Angle design with stem injection  
(type 550/570)**

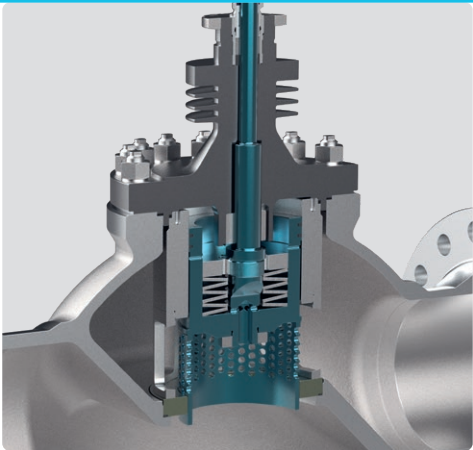
These flow/sound-optimized steam valves in an angle design are based on cast angle bodies with welded ends and can be expanded as required in the outlet and equipped with the desired connections. The stem injection enables a controlled pressure reduction and, if necessary, prevents or reduces cavitation at the injection water control valve. The multi-stage trim relaxes the vapor pressure sub-critically and, in the outlet, the perforated discs adapted to the process further reduce the sound level.



**Angle design with 2-phase nozzle  
(type 560/580)**

The 2-phase nozzle is the ideal solution if the temperature difference between the injection water and the live steam is very large, or if the injection water pressure is low, or if minor low-flow cases have to be regulated. The injection water is drawn in by the live steam according to the injector principle and atomized with the motive steam at the intermediate stage. Thus, small evaporation sections can be realized even without turbulence due to perforated plug/perforated seat combinations. The bonnet is screwed as well as having a self-sealing (Brettschneider) ring closure.

## FEATURES



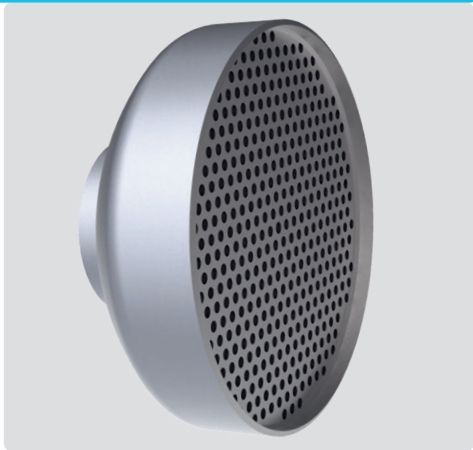
**High level of sealing**

High forces develop during high pressures and large seat diameters, acting on the valve stems and actuators. In order to reduce the actuating forces and ensure a stable control behavior, the pressure on the plug is relieved by means of bores and piston rings. In cases with particularly high seat tightness the pilot plug can be used as an option. This involves a plug in the plug, which releases the relief bores first when the valve opens. The pressure balanced main plug then opens.



**Safety requirements**

In cases where the low-pressure piping in the outlet of the steam-conditioning station should be protected from unacceptable excess pressure, our steam-conditioning stations can be designed as protection apparatuses against excessive pressure pursuant to DIN EN 12952-10 or TRD421 and SIL2. We equip our steam-conditioning stations with the corresponding safety equipment for the rapid and secure shutting off and closing of the pipeline. We offer steam test units for electronic pressure monitoring tailored to the requirements of the operator.



**Dump tube**

In the condenser region the dump tubes from ARCA offer highly efficient technical solutions for sound and pressure reduction. They are located in the pipeline segment between the LP-steam-conditioning station and the transition to the condenser and build the steam pressure in one or more stages via a silencer disc-perforated cage combination. In the outlet of the bypass station, the back pressure in front of the dump tube causes the reduction of the nominal pipeline size and length, hence lowering overall costs for the system. At ARCA you get the dump tube and the steam-conditioning station from a single source, matched to each other and designed application-specific taking the installation circumstances into consideration.



### POWERTROL general data

Series	51...& 52...	55... & 56...	57... & 58...	59...
<b>DN</b>	50–800 / 2"–32"	100–250 / 4"–10"	25–800 / 1"–32"	25–1200 / 1" – 48"
<b>PN / ANSI</b>	16–250 / Class 150–1500	16–250 / Class 150–1500	16–400 / Class 150–2500	16–400 / Class 150–2500
<b>Body shape</b>	Straight	Angle	Angle	Angle
<b>Body material</b>	Cast	Cast	Forged	Forged
Materials	EN	for temperatures	ASTM	for temperatures
<b>Body cast</b>	1.0619 GP240GH	up to 450 °C	A 216 WCB	up to 450 °C
	1.7357 G17CrMo5–5	up to 530 °C	A 217 WC6	up to 530 °C
	1.4408 GX5CrNiMo19–11–2	up to 500 °C	A 351 CF8M	up to 538 °C
	1.7379 G17CrMo9–10	up to 580 °C	A 216 WC9	up to 595 °C
	1.4931 GX23CrMoV12–1	up to 600 °C	A 217 C12A	up to 650 °C
<b>Body forged</b>	1.0460 P250GH	up to 450 °C	A 105	up to 450 °C
	1.5415 16Mo3	up to 530 °C		
	1.7335 13CrMo4–5	up to 570 °C	A 182 F12 Cl.2	up to 570 °C
	1.7383 11CrMo9–10	up to 600 °C	A 182 F22 Cl.3	up to 600 °C
	1.4903 X10CrMoVNb9–1	up to 620 °C	A 182 F91 – P91	up to 620 °C
	1.4901 X10CrWMoVNb9–2	up to 650 °C	A 182 F92 – P92	up to 650 °C
<b>Upper part</b>	Standard, with cooling fins, with cooling water connection, self-sealing ring closure			
<b>Trims</b>	1.4021 X20Cr13 1.4122 X39CrMo17–1 1.4571 X6CrNiMoTi17 12 2 1.4922 X20CrMoV12 1			
<b>Plug characteristic curve</b>	Standard: linear Optional: linear modifiziert			
<b>Rangeability</b>	25 : 1			
<b>Seat leakage</b>	metallic sealing: Leakage class IV (0.01% of Kvs); optional Leakage class V Pressure-relieved Class < 0.05% from Kv value			

## ARE YOU FAMILIAR WITH OUR ARCA SERVICE PACKAGES?

On the basis of our comprehensive application knowledge about the entire process or control loop ARCA Services underscore our promise to you:  
**CONTROL THE FLOW**

## ARCA launch

With ARCAlaunch we assist you with the commissioning of your control valves. That applies to support during construction and also during the cold and hot commissioning.

## ARCA care

With ARCAcare, we offer maintenance contracts that are precisely tailored to your plant. This way, planned prophylactic service dates aren't hampered by everyday operation. The failure of important valves is prevented.