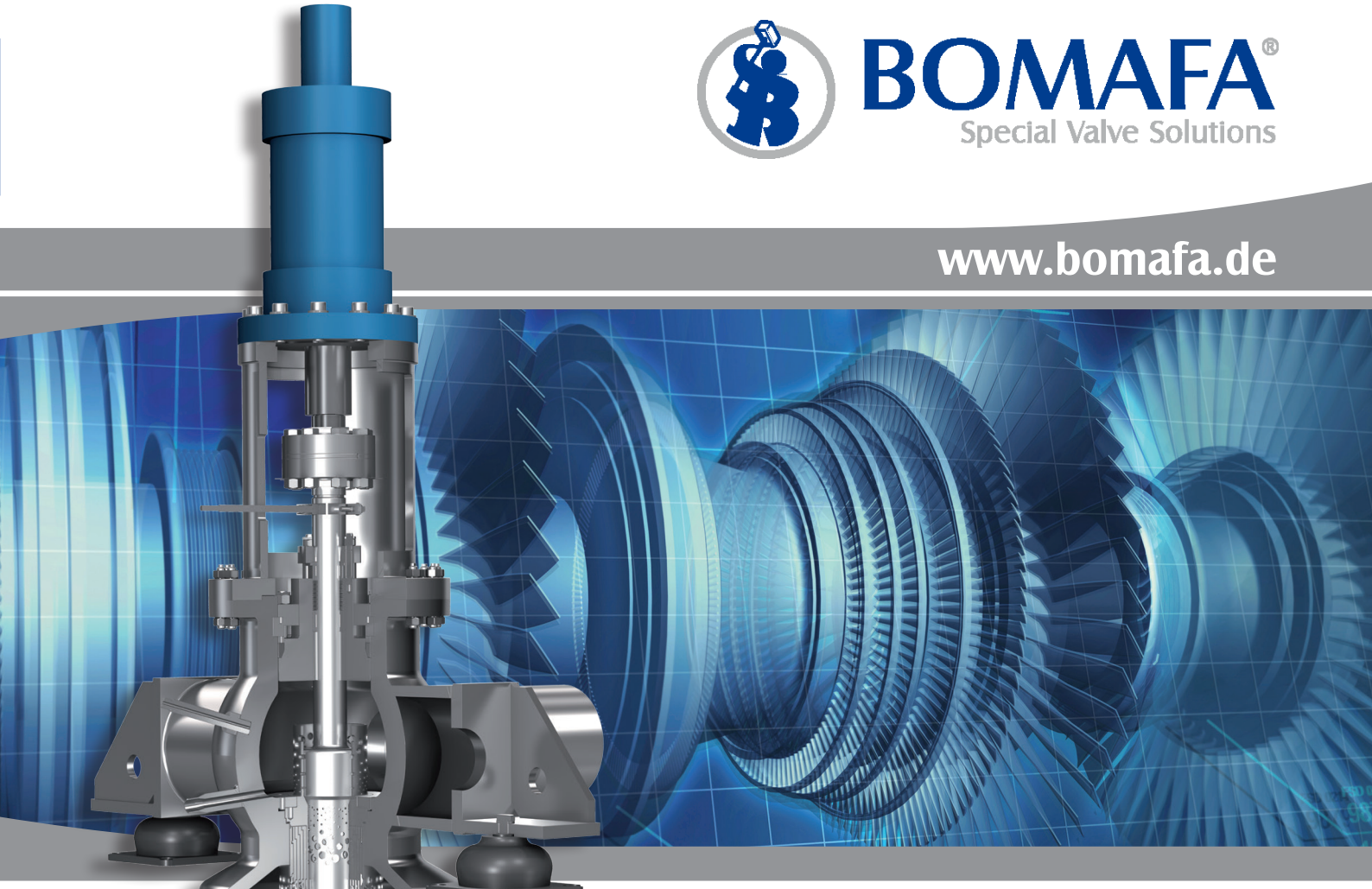
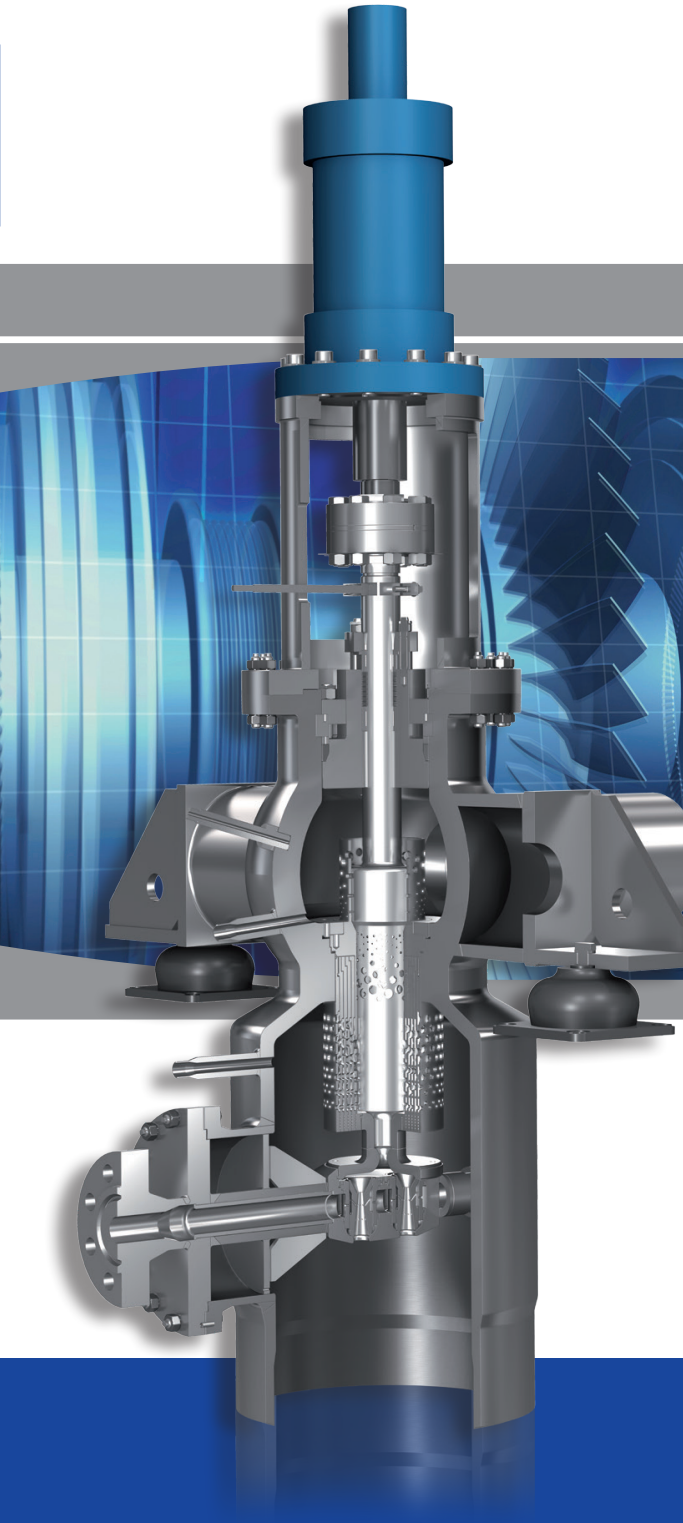
BOMAFA®
Special Valve Solutions

www.bomafa.de





BOMAFA GROUP

- BOMAFA Armaturen GmbH
- asfa Antriebssysteme GmbH
- Karl Schumacher GmbH
- BOMAFA Special Valve Solutions Pvt. Ltd. (India)
- BOMAFA (China) Company Ltd.

Corporate Profile

Special Valve Solutions: BOMAFA presents comprehensive experience in various fields of steam conditioning valves. Since almost one hundred years, BOMAFA plays a highly innovative and active role as a trusted partner in numerous power stations and industrial plants worldwide. Our customized industrial valves and desuperheaters are now used in a number of areas of critical application and continuously meet demanding operational standards.

To ensure the smooth and uninterrupted operation of any process, all BOMAFA products follow high quality guidelines. Consequently, by choosing BOMAFA you are choosing reliability and contribute to increase the efficiency of your plant.

Valves for Power Plants, Chemical Plants and other Industrial Applications

Product Type	DN Inlet (mm) (in.)	DN Outlet (mm) (in.)	Pressure Rating (PN) (ASME Cl.)
Steam Control Valves			
Steam Conditioning Valves	25 - 600 1“ - 24“	50 - 2500 2“ - 100“	16 - 630 Class 150 - 4500
Turbine Bypass Valves (HP-IP-LP Systems)	25 - 600 1“ - 24“	50 - 2500 2“ - 100“	16 - 630 Class 150 - 4500
Reheater Safety Valves	25 - 600 1“ - 24“	50 - 2500 2“ - 100“	16 - 630 Class 150 - 4500
Gate Valves			
Wedge Gate Valves	80 - 600 3“ - 24“	80 - 600 3“ - 24“	160 - 630 Class 900 - 4500
3-Way Mixing Gate Valves	80 - 600 3“ - 24“	80 - 600 3“ - 24“	160 - 630 Class 900 - 4500
Water Control Valves			
Condensate and Feedwater Control Valves	25 - 400 1“ - 16“	25 - 400 1“ - 16“	160 - 630 Class 900 - 4500
LP Spray Water Injection Control Valves	15 - 250 1/2“ - 10“	15 - 250 1/2“ - 10“	16 - 160 Class 150 - 900
Condensate Control Valves for boiler start-up	25 - 300 1“ - 12“	50 - 800 2“ - 32“	160 - 630 Class 900 - 4500
Preheater Safety Valves	80 - 500 3“ - 20“	80 - 500 3“ - 20“	160 - 400 Class 900 - 2500
Check valves			
Swing Check Valves	80 - 500 3“ - 20“	80 - 500 3“ - 20“	160 - 630 Class 900 - 4500
Steam Turbine Extraction Check Valves	80- 500 3“ - 20“	80- 500 3“ - 20“	40 - 160 Class 300 - 900
Axial Valves			
Axial On-Off Valves	80 - 600 3“ - 24“	80 - 600 3“ - 24“	25 - 400 Class 150 - 2500
Axial Control Valves	80 - 600 3“ - 24“	80 - 600 3“ - 24“	25 - 400 Class 150 - 2500
Desuperheaters			
Radial Desuperheaters	400 - 1600 16“ - 64“		
Venturi Desuperheaters	50 - 400 2“ - 16“		
Center - Flow Desuperheaters	200 - 1000 8“ - 40“		
Motive Steam Assisted Desuperheaters	200 - 1000 8“ - 40“		
Multi - Nozzle Injection Control Valves	200 - 1200 8“ - 48“		
Additional Components			
Metering Orifices	DN 25 - 500 1“ - 20“	DN 25 - 500 1“ - 20“	16 - 400 Class 150 - 2500
Dump Tubes	DN 300 - 1000 12“ - 40“	DN 500 - 2500 20“ - 100“	PN 16 - 63 Class 150 - 400

Steam Conditioning Valves

- Customized design with equal percentage / linear / specific control characteristics
- Water injection either integrated / downstream pressurized / downstream motive steam
- Pneumatic, hydraulic actuators with optional safety function or electric actuators

The task of a steam conditioning valve is a reduction of steam pressure combined with a desuperheating process in order to guarantee the required steam properties. For a safe reduction of pressure, BOMAFA uses special multi-stage systems that enable a subcritical pressure reduction. The direct combination of the cooling system with the valve creates a solid unit.

Turbine Bypass Valves (HP-IP-LP Systems)

- Customized design with equal / linear / specific control characteristics
- Water injection either integrated / downstream pressurized / downstream motive steam
- Pneumatic, hydraulic actuators with optional safety function or electric actuators
- Safety function supported by direction of flow (open / close)

In case of start-up, shut-down or malfunction of a turbine, turbine bypass valves are used to reduce the pressure and temperature of the steam medium according to the exact conditions of the downstream system. BOMAFA turbine bypass valves provide a combination of pressure-reduction and desuperheating. Hydraulic / Pneumatic actuators with optional safety functions allow for reaction times less than 1 second.

Gate Valves

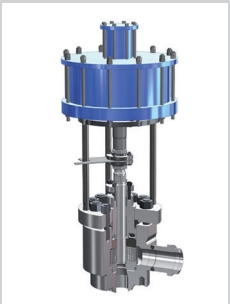
- Pressure seal
- Body made of forged material
- Flexible wedge plates with full guiding, hardfaced seat areas
- Bypass systems for reducing opening forces
- Overpressure safety devices
- Electric, hydraulic, pneumatic actuators or hand operation

The high pressure double disc gate valves developed by BOMAFA are designed for optimal use at high pressure classes. Through the cylindrical passage in the valve body, the speed of the flowing medium is not substantially changed. The pressure drop is almost as low as in a pipe with the same dimensions.

Condensate and Feedwater Control Valves

- Labyrinth discs with multiple reducing stages
- Applicable for a high delta p across the valve
- High controllability and secure handling of flashing
- High wear resistance

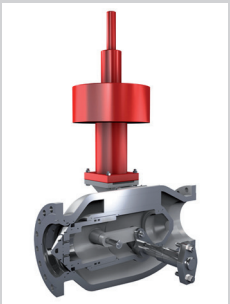
The valves control the water injection into steam conditioning or boiler systems. In addition to BOMAFA low pressure spray water injection control valves, our high pressure valves cope with severe operating conditions from PN160 onward. The labyrinth disc design with it's multiple stages contributes to a high controllability of water flow. Flashing can be handled securely. Easy maintenance on site is guaranteed by the modular design.



Axial On-Off Valves

- Weight reduction of up to 60% compared to ball and gate valves
- Neglectible pressure drop
- Designed for both upstream and downstream use
- Fast reaction times
- Flanged

The reliable axial safety on-off valves are particularly suitable for the upstream and downstream use and quick responsive safety operations. The valves can be opened against the full differential pressure. They are easy to maintain and to install on site. Particularly compared to ball valves and gate valves, BOMAFA on-off valves represent a convincing alternative.

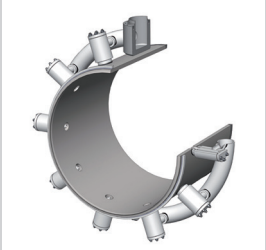


Actuators

Type	Description
Pneumatic Cylinders	• Differential or synchronous cylinders. • Single or double acting, with or without spring. • Optionally with position transmitter and limit switches.
Hydraulic Cylinders	• Differential or synchronous cylinders. • Single or double acting, with or without spring. • Optionally with position transmitter and limit switches.
Hydraulic Control Units	Design, project work and delivery of Hydraulic Control Units carried out according to specification. Available for all fields of application including installation, commissioning and maintenance.
Steam Pressure Check Devices (TRD 421)	With its pressure switches, Steam Pressure Check Devices guarantee a quick closing or opening (emergency shutdown) of the controlled safety valve, if the maximum pressure is exceeded.
Electric Control Cabinets	• Design, fabrication, installation and commissioning of Electric Control Systems and Actuations. • Programming of SPC-Control Systems (e.g. SIMATIC).

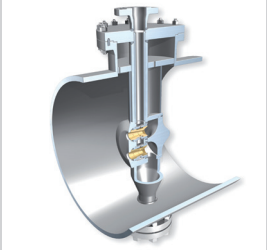
Desuperheaters

Stand-Alone Desuperheaters

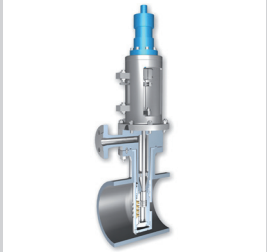


Radial Desuperheater

Venturi Desuperheater



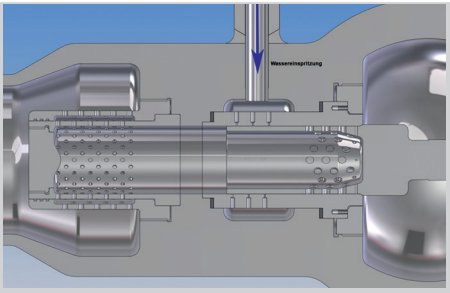
Motive Steam assisted Desuperheater



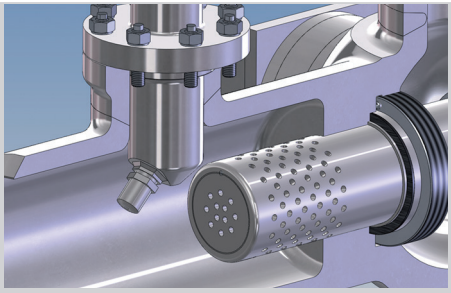
Multi - Nozzle Injection Control Valve

Center - Flow Desuperheater

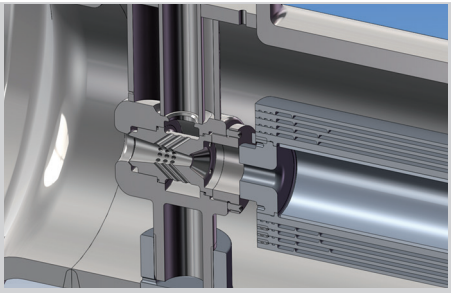
Steam Conditioning Valves with Desuperheaters



Integrated Injection (Steam Transformer)



Downstream Pressurized Atomization



Downstream Motive Steam

Customized Design

BOMAFA develops and manufactures customized control valves for steam, gas and water for processes under severe conditions. The valves are individually designed for specific use in nearly all kinds of power plants, chemical and petrochemical plants and a wide range of other industrial applications. Any design is made in accordance with modern construction techniques and meets the latest international safety and quality requirements.

Manufacturing

Machining: BOMAFA possesses a modern and efficient machinery which enables manufacturing of precision parts. Continuously, BOMAFA invests in state-of-the-art CNC machines and technologies. Workpieces weighing up to 25t can be integrated most effectively into the production process. CNC manufacturing capacity is also available for the market.
Coating: Karl Schumacher GmbH, member of BOMAFA Group, develops resistant special coatings for the application in highly corrosive and aggressive environments like chemical and petrochemical plants, refineries and power plants. Coating technologies (Metal Coat, Hard Coat, Inductive Coat) are used and constantly improved to increase the durability of each of your valves. As part of our scope of services, coating is available for all types of valvesand not limited to BOMAFA products.

Worldwide Service

BOMAFA performs maintenance work safely and reliably by its experienced service engineers. Our installation teams reach at your site quickly and will contribute to the smooth performance of your system. This guarantees a long life, low wear and secure operation of your equipment.

Quality Management

All companies of BOMAFA Group manufacture under strict quality control management systems according to international standards.

- DIN EN ISO 9001:2008
- Pressure Equipment Directive PED 97/23/EC
- AD 2000 - Merkblatt HP0
- DIN EN ISO 3834-2
- AREVA - KTA 1401
- KTA 3211.3 - Production
- GOST R
- I.B.R.
- Type Test Approval Mark TÜV SV. 11-862 (TRD 421)

Selection from References

Customer	Territory / Project	MW	Year	Type of Valves
Europe				
ABB	Germany / PP Cottbus	71	1998	HP Turbine Bypass System
ENBW	Germany / NPP Neckarwestheim (Konvoi)	1300	1985	Steam Conditioning and Condensate Control Valves for boiler start-up
	Germany / PP Münster	164	2012	Steam Conditioning Valves
Evonik	Germany / PP Worms	50	2009	Steam Conditioning Valves with Desuperheaters
Imtech Deutschland	Germany / BPP Klausner Holz	10	2008	HP Turbine Bypass System and Desuperheaters
Mainova	Germany / PP Nordweststadt	100	2010	Steam Conditioning Valves with Desuperheaters
RWE	Germany / Fortuna Nord	93	2006	HP Bypass System
	Germany / PP Ibbenbüren	752	1983	IP - LP Bypass System
Siemens	Hungary / PP Matra	200	2007	Steam Turbine Extraction Check Valves
	Norway / CCPP Karstoe	450	2006	HP Turbine Bypass System
Steag	Germany / PP Walsum	410	2003	HP Turbine Bypass System and Condensate Control Valves for boiler start-up
	Germany / PP Bergkamen	780	1979	HP Turbine Bypass System and Condensate Control Valves for boiler start-up
	Germany / PP Voerde	710	2009	Condensate Control Valves
Shell Deutschland	Germany / Refinery Wesseling	-	2011	Steam Conditioning Valves
Technopromexport	Croatia / PP Sisak	250	2011	HP Turbine Bypass System
	Russia / PP Kaliningradskaya	450	2010	HP Turbine Bypass System
Middle East				
Uhde	Qatar / Qafco III Fertilizer	-	1995	Axial On-Off Valves and 3 - Way Mixing Gate Valves
	Qatar / Qafco III Fertilizer	-	2002	Steam Conditioning Valves
	Egypt / Abu Qir III Fertilizer	-	1997	Axial On-Off Valves
	Egypt / Mopco Fertilizer	-	2008	Axial On-Off Valves
GPIC	Bahrain / Manama Ammonia and Urea Plant	-	2012	HP Turbine Bypass System
Asia				
BHEL	India / PP Raichur	250	2009	LP Bypass Stop and Control Valves
	India / PP Chabra 1+2	250	2008	LP Bypass Stop and Control Valves
	India / CCPP Dolphur	330	2007	HP Bypass Stop and Control Valves
	India / PP Bhusawhal	500	2009	LP Bypass Stop and Control Valves
	India / PP Khaperkheda	500	2009	LP Bypass Stop and Control Valves
	India / PP Bara	660	2012	LP Bypass Stop and Control Valves
Fauji Fertilizer	Pakistan / Goth Machhi	-	2000	Steam Contditioning Valves
Datang Group	China / CTO Duolun	-	2008	Steam Conditioning Valves with Desuperheaters
	China / PP Qitaihe	660	2008	HP-IP-LP Turbine Bypass System
Huadian Group	China / PP Baotou	600	2005	HP Turbine Bypass System
Guodian Group	China / PP Luanhe	600	2004	HP Turbine Bypass System
China Petro Group	China / Pengzhou (Sichuan) Refinery	-	2010	Steam Conditioning Valves
Huaneng Group	China / PP Fuzhou	660	2008	HP and LP Turbine Bypass Systems
Hongshan Thermal Power	China / PP Hongshan	1000	2012	HP Turbine Bypass System and HP Gate Valves
South America				
Grupo Carlos Lyra	Brazil / BPP Usina Caete	-	2008	HP Turbine Bypass System
Grupo Colorado	Brazil / BPP Usina Colorado	-	2009	HP Turbine Bypass System
Guaracachi	Bolivia / PP Planta Guaracachi	82	2012	HP Turbine Bypass System
Klabin S.A.	Brazil / Puma Project	-	2015	HP and LP Steam Distribution system with blow off vaves and blow off silencers
Sao Martinho	Brazil / BPP Usina Sao Martinho	-	2012	HP Turbine Bypass System

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