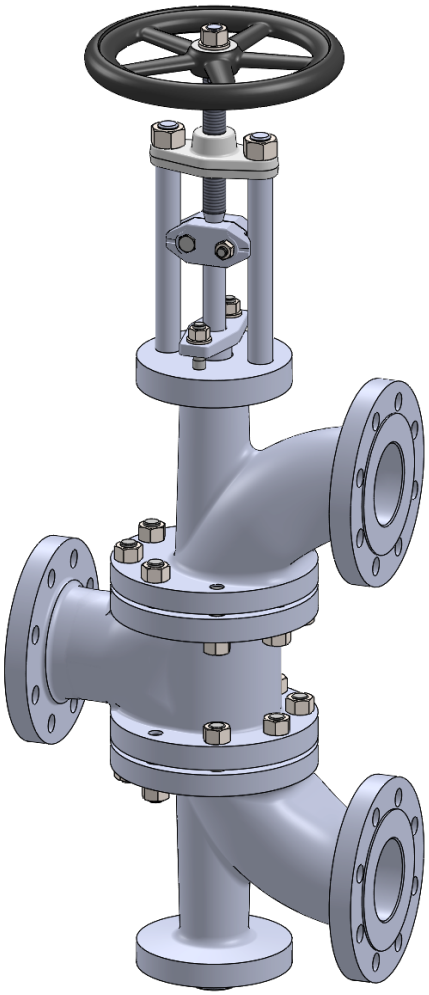
PHÖNIX STRACK DAUME REGELARMATUREN S+P Solent & Pratt Phönix Ltd



Change Over Valve

Type 320B

PN 25

Phönix Valve Group
Am Stadtbruch 6
34471 Volkmarsen

Phone: +49 5693 988 0
web: www.phoenix-valvegroup.com
eMail: info@phoenix-valvegroup.com

PHÖNIX VALVE GROUP

Technical indtroduction

The Phönix Change Over Valve is a three-way globe valve that is useful in all locations where a shutdown cannot be tolerated, either for safety reasons or due to plant and production conditions. With its globe valve style design the phönix valve offers advantages over conventional three-way ball or plug valves like bubble tight conical metal seating or an optional bellows stem seal. These and other features make the valve extremely useful for a wide range of applications.

Used as diverter valve (fig. 1) Change Over Valves enable a quick and safe switch between product lines, safety systems, or to start-up tanks for solvent flushing. To accommodate different piping situations the Phönix Valve allows the rotation of the elbows to any 90° angle.

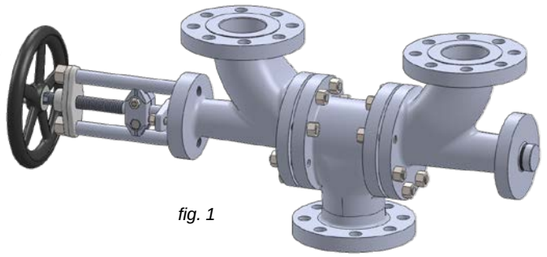


fig. 1

Pressurized systems should always be equipped with dual safety relief devices to allow frequent maintenance without disabling the overpressure protection. In many cases safety relief valves are used and are subject to frequent resetting due to operating conditions. Phönix Change Over Valves (fig. 2) offer the most convenient and ideal solution considering the short time of operation to switch between the safety relief valve in service and the standby valve. An important safety aspect is addressed due to the fact that the valve does not allow isolating both safety relief devices at the same time. Eliminating two full-bore shutoff valves as well as the reduction from two vessel/system connections to one provides additional cost benefits.

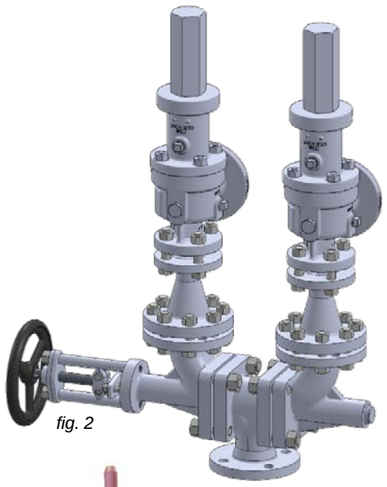


fig. 2

The applicable standards, impositions, technical rules, and recommendations allow explicitly the use of Change Over Valves when their design ensures that even during the switchover procedure the necessary free section for choke free flow is guaranteed. Phönix Change Over Valves comply with this requirement. In addition the valves are designed for a high flow rate and minimal pressure drop.

For critical services involving toxic, aggressive or corrosive products that pose direct or indirect threads to people, plant, and environment the discharge into a closed collecting system might be required. For this purpose Phönix offers Change Over Valve combinations to allow the mechanical link of two Change Over Valves. One upstream and one downstream of the safety relief devices (fig. 3). The mechanical link allows operating both valves into the same direction and prevents involuntary isolation of the safety relief devices.

Both the upstream and downstream Change Over Valve must have identical dimensions in order to provide a synchronized controllable operation. Full lift safety relief valves have different inlet and outlet orifices. Therefore, pipe reducers must be placed between the upstream Change Over Valve and the safety relief valves. This solution also allows for a very low pressure drop to the inlet of the safety relief valves and avoids expensive modifications of the Change Over Valves.

To suit the nature of the process fluid, Phönix offers either bellows sealed or gland packed valves. Both options are part of the standard manufacturing program and can be equipped with manual, pneumatic, or electric operation. For fluids that tend to polymerize or crystallize the valves are available with optional heating jackets. For more information regarding design, standard materials, and options please refer to the product description of valve models 370B and 320B.

fig. 3

Change Over Valve *Packing Sealed*

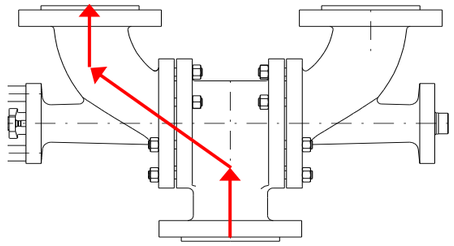
Model 320B

Design features

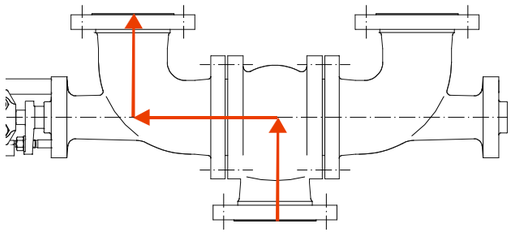
Advantages of the latest Phönix Change Over Valve generation

- Superior flow behaviors and a low pressure loss verified by using 3D flow behavior simulations and practical Kv and zeta measurements. Zeta values < 0,8 are achieved
- Optimization of the body interior and the trim parts
- Optimization of the deflection angle < 30°
- Compact height, therefore a short pipe feed to the safety relief valve
- No sharp passages that might cause flow disruption

Phönix optimized COV design
Flow path deflection angle < 30°



standard design
Flow path deflection angle 90°



Basics

The pressure drop in the feeding pipe towards the safety relief valve, considering the highest set mass flow listed in international rules and standards, is not allowed to exceed 3% of the pressure difference between set-to-operate pressure and the superimposed back pressure. Pressure drop in the feeding pipe is meant to be the pressure difference between the pressure in the tank and the pressure right upfront of the safety relief valve.

This is also meant for combinations of change over and safety relief valves. The change over valve is part of the feeding pipe! AD 2000 A2; ASME Section VIII Division 1 ug-135

Drag coefficient zeta

In order to calculate the pressure drop you need to have the drag coefficient zeta. The drag coefficient zeta is a dimensional coefficient for the flow resistivity of a medium passed through component within the pipe. The intention is to have this drag coefficient the lowest possible. The very low drag coefficient for the latest generation of the Phönix change over valves is assured by the following:

- Design and calculation with modern 3D cad- and flow-simulation programs
- Practical Cv measurements, zeta determination on the Phönix (in house!) Cv-measurement and test area
- Practical Cv measurements, zeta determination using also flow measurement areas form partners like universities and engineering companies

Change Over Valve combination (COVC)

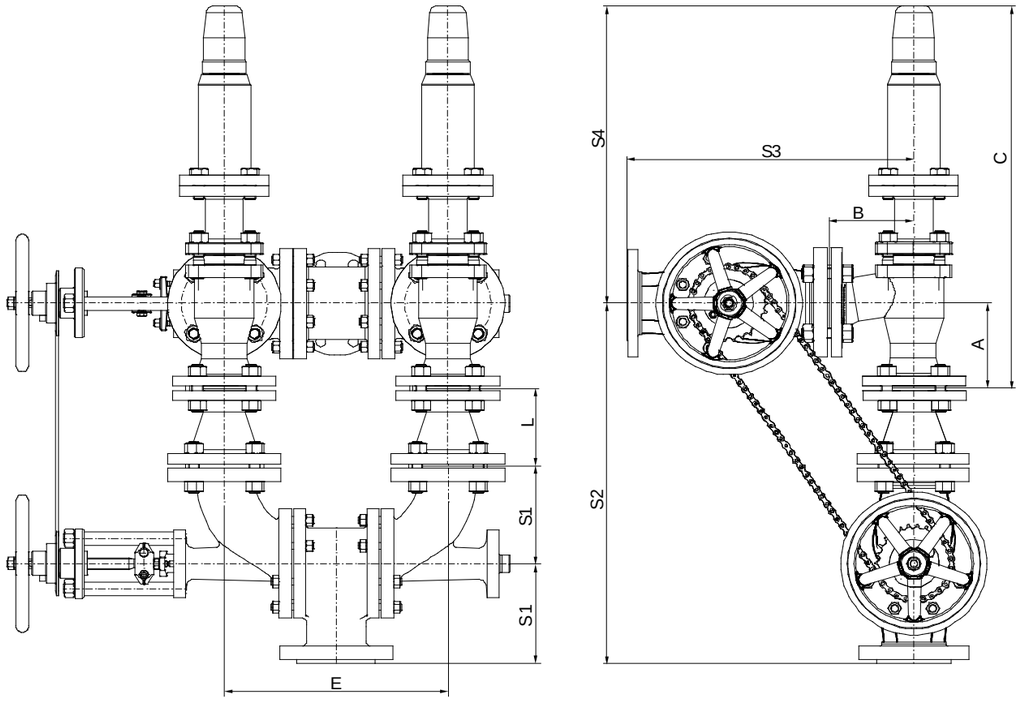
Phönix COVC with safety relief valves

The pressure drop in the feeding pipe towards the safety relief valve, considering the highest set mass flow listed in international rules and standards, is not allowed to exceed 3% of the pressure difference between set-to-operate pressure and the superimposed back pressure. Pressure drop in the feeding pipe is meant to be the pressure difference between the pressure in the tank and the pressure right upfront of the safety relief valve.

Interlockable combinations

Interlockable combinations are those that have a Change Over Valve at the inlet and at the outlet of a safety relief valve. It is necessary that both the change over valves have the same valve size and diameter to assure important dimensions being equal e.g. the stroke of the change over valve. The sizing of the change over valve is performed by using the one that is connected at the outlet of the safety relief valve

Both COVS will be adjusted to each other during the assembly into the line and afterwards connected via chain at the chainwheel. This assures that the stand by safety relief valve is cut off from the medium at the inlet and at the outlet.



Change Over Valve *Packing Sealed*

Model 320B

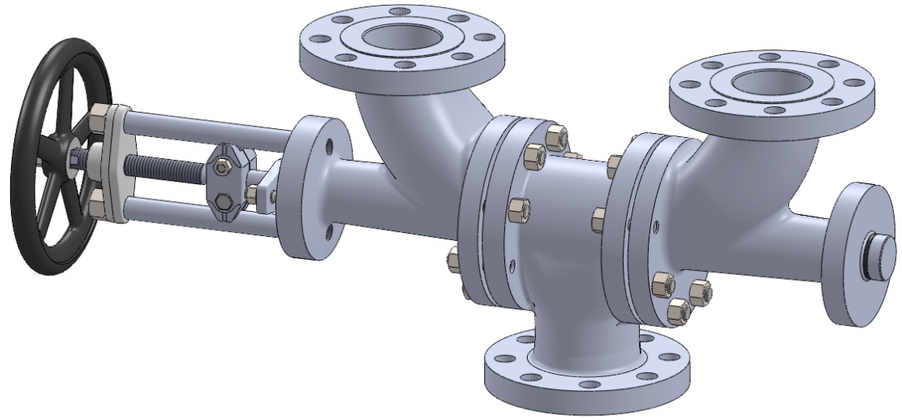
Applications & design features

Applications

The 320B series is designed for dual relief valve systems to allow maintenance of the relief valves without the system being down, for reduction of vessel connections, for fast and easy operation, and for protection against involuntary isolation of both safety relief devices at the same time. For applications that require discharge into a collecting system model 320.1B provides a simple mechanism for the linkage of two Change Over Valves for simultaneous operation.

Models 320B / 320.1B with a reliable, bubble tight shut-off can replace conventional three-way ball or plug valves. They are commonly used with non-hazardous media such as boiler and cooling water, saturated steam, and in similar systems as a bypass station to avoid shutdowns or as Change Over Valve in combination with safety relief devices. Additionally, in polymer systems the Change Over Valves are used to switch to start-up tanks for solvent flushing.

Design features



Body and bonnet

- split-body design allows for rotation of elbows to any 90° angle to accommondate different installation situation
- body bonnet joint gasket is fully confined to prevent gasket flow or blowout
- body parts are one-piece forgings or castings with larger than required wall thickness and integral flanges

Seats

- solid hardfacings for outstanding corrosion and wear resistance
- knife edge metal-to-metal seat for bubble-tight shutoff
- replaceable disc for inexpensive maintenance

Stem

- two-piece stem design eliminates stem bearings along with their maintenance needs
- cold-rolled and polished stem for reduced packing wear
- allows easy adaption for any type of actuation

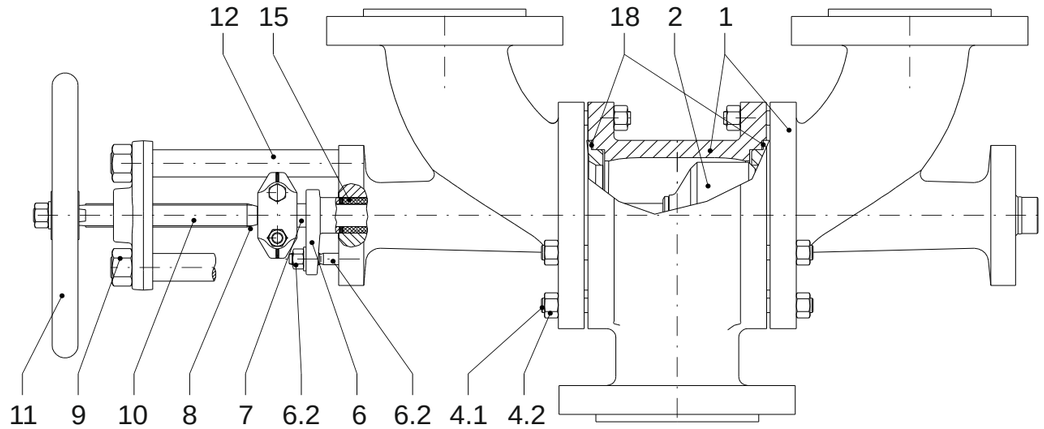
= Zero emissions, zero seat leakage, low maintenance

Standard Materials of Construction

Design / Testing / Marking
- PED 2014/68/EU, AD 2000 (A2), marking acc. to EN19, AD-A4
- Standard tests acc. to DIN EN12266, ISO 5208
- Preservation acc. to manufacturer standard
- Connections:
  - flanges acc. to DIN EN 1092-1
  - butt weld ends acc. to DIN EN 12627
  - socket weld ends acc. to DIN EN 12760
- F-t-F dimensions: manufacturer standard
- Pressure temperature ratings are in accordance to DIN EN 1092-1

Optio
Other materials per customer requirements are available!

Notes
Phönix reserves the right to change product design and specification without notice!

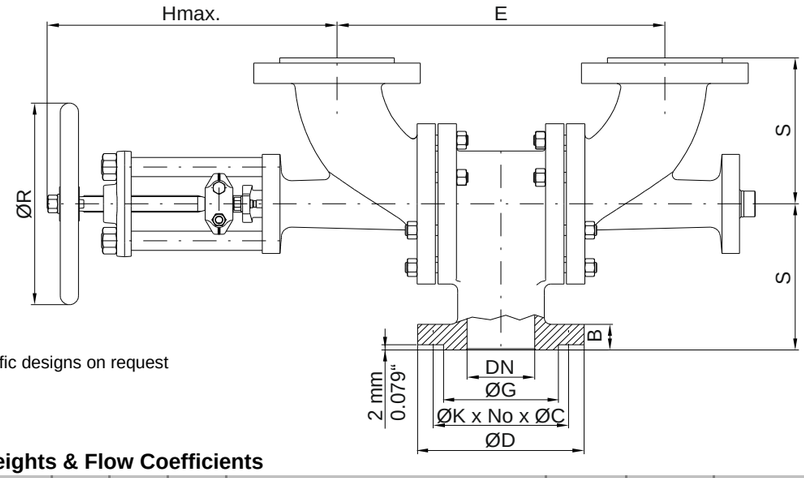


Materials

Item	Part Name	Carbon steel Model 320B C up to 450°C	low temp. Carbon steel Model 320B T -50°C up to 300°C	Stainless steel Model 320B V -200°C up to 400°C
1	Body	1.0460 / 1.0619	1.0566 / 1.1138	1.4404 / 1.4408
	Seat overlay	1.4370 (≈ 200HRB)	1.4370 (≈ 200HRB)	ike body (≈ 200HRB)
2	Disc	1.4021 hardened / 1.0460	1.4571 / 1.0566	1.4571
	Overlay	1.4009 (≈ 300HRB)	Stellite 6 (≈ 42HRC)	Stellite 6 (≈ 42HRC)
4.1	Stud bolt	1.7709	A4-70	A4-70
4.2	Hex. nut	1.7218	A4-70	A4-70
6	Gland follower	1.0619	1.5638	1.4408
6.1	Stud bolt	Steel 5.6	A4-70	A4-70
6.2	Hex. nut	Steel 5	A4-70	A4-70
7	Lower stem	1.4571	1.4571	1.4571
8	Coupling	1.4408	1.4408	1.4408
9	Bridge	1.0460, QPQ-nitrided	1.0460, QPQ-nitrided	1.0460, QPQ-nitrided
10	Upper stem	1.4057	1.4057	1.4057
11	Handwheel	Cast iron	Cast iron	Cast iron
12	Pillar	1.0501	1.4057	1.4057
15	Packing	Graphite	PTFE-silk *	Graphite
18	Gasket	Grooved SS / graphite	Grooved SS / graphite	Grooved SS / graphite

* ³ 220°C Packing of pure graphite

PN25 Sizes DN15 - DN500

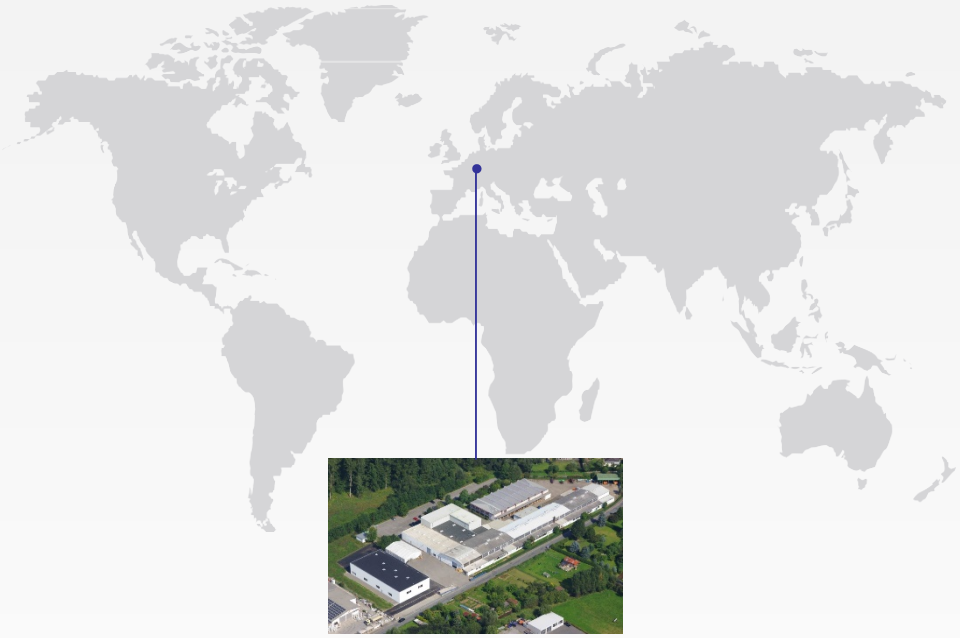


Options
- Other customer specific designs on request

Dimensions & Weights & Flow Coefficients

DN	Unit	E	S	Hmax. 320B	Hmax. 320B.1	ØR	Flanges facing type B1 ØG	ØK	No x ØC	ØD	B	Weight 320B	Weight 320B.1	Kv [m³/h] cv *[USGal/min]*	ζ [-]
15	[mm]	147	90	255	310	150	45	65	4 x 14	95	16	14.5 kg	18.5 kg	11	0.8
	[in]	*5.79*	*3.54*	*10.04*	*12.20*	*5.91*	*1.77*	*2.56*	*4 x 0.55*	*3.74*	*0.63*	*32 lbs*	*41 lbs*	*12.79*	
20	[mm]	147	90	255	310	150	58	75	4 x 14	105	18	14.5 kg	18.5 kg	18	0.8
	[in]	*5.79*	*3.54*	*10.04*	*12.20*	*5.91*	*2.28*	*2.95*	*4 x 0.55*	*4.13*	*0.71*	*32 lbs*	*41 lbs*	*20.93*	
25	[mm]	147	90	255	310	150	68	85	4 x 14	115	18	15 kg	19.5 kg	32	0.8
	[in]	*5.79*	*3.54*	*10.04*	*12.20*	*5.91*	*2.68*	*3.35*	*4 x 0.55*	*4.53*	*0.71*	*33 lbs*	*43 lbs*	*37*	
32	[mm]	260	130	330	425	200	78	100	4 x 18	140	18	32 kg	34 kg	46	0.8
	[in]	*10.24*	*5.12*	*12.99*	*16.73*	*7.87*	*3.07*	*3.94*	*4 x 0.71*	*5.51*	*0.71*	*71 lbs*	*75 lbs*	*53*	
40	[mm]	260	130	330	425	200	88	110	4 x 18	150	18	33 kg	35 kg	72	0.8
	[in]	*10.24*	*5.12*	*12.99*	*16.73*	*7.87*	*3.46*	*4.33*	*4 x 0.71*	*5.91*	*0.71*	*73 lbs*	*77 lbs*	*84*	
50	[mm]	260	130	390	425	200	102	125	4 x 18	165	20	34 kg	36 kg	110	0.83
	[in]	*10.24*	*5.12*	*15.35*	*16.73*	*7.87*	*4.02*	*4.92*	*4 x 0.71*	*6.50*	*0.79*	*75 lbs*	*79 lbs*	*128*	
65	[mm]	404	180	485	450	250	122	145	8 x 18	185	22	75 kg	80 kg	210	0.7
	[in]	*15.91*	*7.09*	*19.09*	*17.72*	*9.84*	*4.80*	*5.71*	*8 x 0.71*	*7.28*	*0.87*	*165 lbs*	*176 lbs*	*244*	
80	[mm]	404	180	485	450	250	138	160	8 x 18	200	24	80 kg	85 kg	300	0.73
	[in]	*15.91*	*7.09*	*19.09*	*17.72*	*9.84*	*5.43*	*6.30*	*8 x 0.71*	*7.87*	*0.94*	*176 lbs*	*187 lbs*	*349*	
100	[mm]	500	220	525	490	315	162	190	8 x 22	235	24	130 kg	135 kg	430	0.87
	[in]	*19.69*	*8.66*	*20.67*	*19.29*	*12.40*	*6.38*	*7.48*	*8 x 0.87*	*9.25*	*0.94*	*287 lbs*	*298 lbs*	*500*	
125	[mm]	500	220	525	490	400	188	220	8 x 26	270	26	150 kg	155 kg	430	0.87
	[in]	*19.69*	*8.66*	*20.67*	*19.29*	*15.75*	*7.40*	*8.66*	*8 x 1.02*	*10.63*	*1.02*	*331 lbs*	*342 lbs*	*500*	
150	[mm]	760	320	675	690	400	218	250	8 x 26	300	28	326 kg	332 kg	960	0.88
	[in]	*29.92*	*12.60*	*26.57*	*27.17*	*15.75*	*8.58*	*9.84*	*8 x 1.02*	*11.81*	*1.10*	*719 lbs*	*732 lbs*	*1116*	
200	[mm]	1019	430	925	1070	640	278	310	12 x 26	360	30	744 kg	801 kg	1835	0.75
	[in]	*40.12*	*16.93*	*36.42*	*42.13*	*25.20*	*10.94*	*12.20*	*12 x 1.02*	*14.17*	*1.18*	*1640 lbs*	*1766 lbs*	*2134*	
250	[mm]	1259	580	1115	1265	640	335	370	12 x 30	425	32	1142 kg	1192 kg	2620	0.9
	[in]	*49.57*	*22.83*	*43.90*	*49.80*	*25.20*	*13.19*	*14.57*	*12 x 1.18*	*16.73*	*1.26*	*2518 lbs*	*2628 lbs*	*3047*	
300	[mm]	On request													
	[in]														
350	[mm]														
	[in]														
400	[mm]														
	[in]														
500	[mm]														
	[in]														

Contact us



Volkmarsen, Germany

Sales and Operations

Phönix Valve Group GmbH
Volkmarsen, Germany
Phone: +49 5693 988 0
Email: info@phoenix-valvegroup.com
Website: www.phoenix-valvegroup.com

Phönix Armaturen Werke-Bregel GmbH
Volkmarsen, Germany
Phone: +49 5693 988 0
Email: info@phoenix-valvegroup.com
Website: www.phoenix-valvegroup.com

Strack GmbH
Volkmarsen, Germany
Phone: +49 5693 988 0
Email: info@phoenix-valvegroup.com
Website: www.phoenix-valvegroup.com

PAW SARL
Genay Cedex, France
Phone: +33 437 408 195
Email: commercial@phoenix-valvegroup.com
Website: www.phoenix-valvegroup.com

Daume Regelarmaturen GmbH
Volkmarsen, Germany
Phone: +49 5693 988 0
Email: info@phoenix-valvegroup.com
Website: www.phoenix-valvegroup.com

Solent & Pratt Phönix Ltd.
Volkmarsen, Germany
Phone: +49 5693 988 0
Email: info@phoenix-valvegroup.com
Website: www.phoenix-valvegroup.com

Printed in Germany
09/22-R0