



Atomac & Durco fully lined process valves and accessories

Designed and produced by the latest technologies



Experience In Motion

Index

Flowserve Corporation	03
Introduction	04
Ahaus History	05
AKH2 – Lined Ball Valve	06
AKH2.2 – Lined Ball Valve	07
AKH3, AKH2A – Lined Ball Valve	08
AKH5 – Partially Stabilized Zirconia Ceramic Lined Ball Valve	09
AKH6 – Lined Tank Drain Valve	09
AKH7 – Lined Ball Valve For Glass Pipe Systems	09
AMP3 – 3-Way Lined Ball Valves	10
AtoStar – Stainless Steel PFA Lined Ball Valve	11
AKH2-300 – Lined Ball Valve per ANSI Class 300	11
AtoPro – Stainless Steel and Lined Ball Sampling Systems	12
ARK2 – Lined Swing Check Valve	13
ARV2 – Lined Ball Check Valve	13
ARL – Lined 45° Ball Check Valve	14
ARV/SG – Lined Check/Sight Glass Combination	14
ASG – Lined Sight Glass	15
ASG3 – lined 3-Way Sight Glass	15
ASG4 – Lined 4-Way Sight Glass	15
ASF – Lined Strainer	15
BTV – Lined Butterfly Valves	16
BTV 2000 LP – Lined Butterfly Valves - Long Pattern	17
T4E – PFA-Lined Plug Valve	18-19
Atomac Products – Options	20
Durco Products – Options	21
Automation	22-23
Technical Data – AKH2	24
Technical Data – AKH2.2	25
Technical Data – AKH3	26
Technical Data – AKH2A	27
Technical Data – AKH5	28
Technical Data – AKH6	29
Technical Data – AKH7/K	30
Technical Data – AMP3	31
Technical Data – AtoStar	32-33
Technical Data – AKH2 300lbs	34
Technical Data – AtoPro	35
Technical Data – ARK2	36
Technical Data – ARV2, ARL	37
Technical Data – ARV/SG, ASG	38
Technical Data – ASG3, ASG4	39
Technical Data – ASG/B, ASF	40
Technical Data – BTV	41
Technical Data – BTV/LP (long pattern)	42
Technical Data – T4E1 - (DN½"-DN6"), T4E2 - (DN15-DN150)	43
Technical Data – T4E3 - (DN½"-DN6")	44
Technical Data – T4E1 - (DN8"-DN12"), T4E2 - (DN200-DN300), T4E3 - (DN8", 10")	45
Technical Data – T4E1 - (DN4"-DN12"), T4E2 - (DN100-DN300), T4E3 - (DN4"-10") with Gear Operated	46
Application examples for Lined Flowserve Atomac and Durco Valve Products	47



Introduction

Valve supplier to the world

Flowserve is the driving force in the global industrial valve marketplace. No other valve company in the world has such a long proven expertise in the successful application of engineered special purpose valve and valve systems.

Flow control solutions

Flowserve is providing valve solutions which permit customers to continuously improve productivity, profitability and valve reliability.

Market focused customer support

Product and Industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the inquiry.

Dynamic Technologies

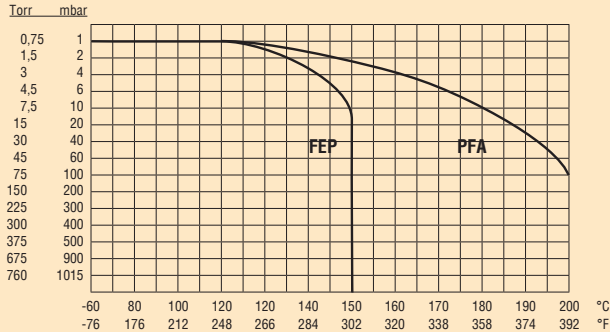
Flowserve is spending without any doubt a lot of efforts in development and application of valve technology, including: Manufacturing technology materials, metal & non metals science.

Flowserve Ahaus History

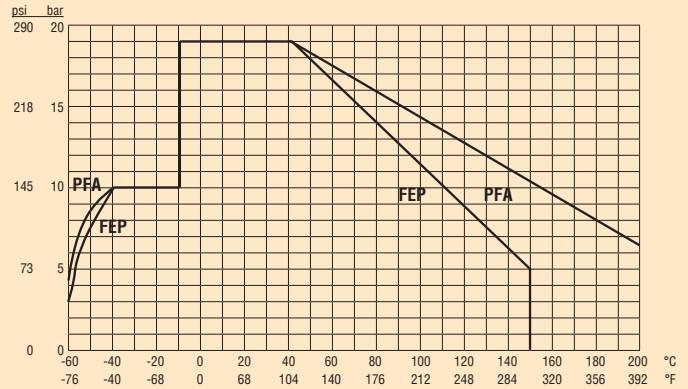
- 1964** Established in Ahaus, NRW, Germany as Atomac KG. Manufacturing of special PTFE parts such as bellows, seals, cup&cone packing, plugs as well radial shaft packings.
- 1970** Commissioning of the first injection moulding machine.
- 1974** Extension and upgrading production, development of FEP lined ball valves, 3 piece design, sizes DN25-100.
- 1975** Extension and upgrading of the production with PTFE lined products such as pipes, elbows, tees and dip pipes.
- 1977** Further extension of the production and development of glass pipe valves and vessels, mixing vessels and accessories as well the manufacturing of inclined seat valves.
- 1982** Acquisition of Atomac by the US company Posi Seal Incorporated. Further developments of Atomac products. Manufacturing of high performance butterfly valves. Discontinued production of lined piping & fittings. Concentration on manufacturing of lined valves.
- 1983** The inauguration of the new administration and production buildings.
- 1985** Acquisition of Posi Seal by the Fisher Controls Incorporated. Continuation of the developments and the extension of the Atomac product program and production of Fisher control valves and transmitters.
- 1988** Acquisition of Atomac by The Duriron Company Incorporated Dayton, Ohio.
- 1990** Launch of the AKH2.2 lined ball valve with a metal to metal middle flange connection (Patent No. EP 0 645 565 BL) providing a maintenance free lined ball valve.
- 1996** Transfer of the plug valve & butterfly valve production from the Petit-Rechain plant in Belgium to the Ahaus facilities..
- 1997** Merger of Duriron with BW/IP; Creation of Flowserve Corporation.
- 1998** Change of company name to: **Flowserve Ahaus GmbH**

Atomac valves can be applied to duties within the below illustrated graphs. These graphs are based on our experience in engineering and production of lined valves and accessories for more than 30 years. For applications outside these graphs, please consult with Flowserve Ahaus.

Vacuum-Temperature-Diagram



Pressure-Temperature-Diagram



Operation parameter for other linings available on request

The production of the fluoropolymer liners is based on processes developed by Flowserve Ahaus on equipment and tools produced by ourselves, dedicated for our products. The process parameters are dedicated to each component to ensure stressfree moulding of the parts with utmost and reproduceable quality.

Typical properties of liner materials used for atomac products

Properties	PFA	PFA-conductive	FEP	PP	PVDF	Tefzel
Density	2,12-2,17 g/cm ³	2,12 g/cm ³	2,12-2,17 g/cm ³	0,912 g/cm ³	1,75-1,78 g/cm ³	1,7 g/cm ³
Tensile strength	min. 26,7 N/mm ²	22 N/mm ²	min. 20,7 N/mm ²	26 N/mm ²	38-50 N/mm ²	44,1 N/mm ²
Breakage elongation	min. 300 %	275 %	min. 250 %	11 %	20-250 %	200 %
Shore-hardness	D55-60	D63	D55	D67	D73-85	D72
Flexural strength	breakproof	breakproof	breakproof	breakproof	-	breakproof
Notched bar impact strength	breakproof	breakproof	breakproof	40 KJ/m ²	12 KJ/m ²	breakproof
Friction	0,1	0,2	0,2	0,20	0,2-0,4	0,40
Practical temperature range (depressurized state)	-270 / +260 °C	-200 / +260 °C	-270 / +205 °C	0 / +82 °C	-60 / +90 °C	-100 / +150 °C
Chemical resistance	excellent	excellent	excellent	good	good	very good

Ductile cast iron per ASTM A395 and DIN EN 1563 GGG40.3 is used as the standard material for the body casting. For applications beyond the acceptance of ductile cast iron we can offer cast stainless steel per ASTM A351 Gr. CF8M and DIN material 1.4408 as an alternative for the atomac product range.

Specification of Ductile Iron EN-GJS-400-18U-LT (GGG-40.3), ASTM A395

Tensile Strength	400 to 450	N/mm ²
0,2% Offset Yield Strength	240 to 300	N/mm ²
Breakage Elongation	18	%
Brinell Hardness HB 30	120 to 165	
Notched Bar Impact Work at -20°C (ISO-V)	12	J
Density	7,1 to 7,3	kg/dm ³
Intermediate Linear Coefficient Thermal Expansion 20 to 500°C	10 to 13	(1/K) multiplied by 10 ⁻⁵
Thermal Conductivity 20 to 400°C	0,42 to 0,25	W/(cm multiplied by K)
Specific Heat Capacity 20 to 100°C	0,54 to 0,71	J/(g multiplied by K)
Working Temperature	-10 to 350°C	AD-W3/2
Load II	-60	AD-W10
Service Pressure max.	10 bar	

Specification of Stainless Steel 1.4408, ASTM A351 Gr. CF8M

Tensile Strength	440 to 640	N/mm ²
0,2% Offset Yield Strength	185	N/mm ²
Breakage Elongation	30	%
Brinell Hardness HB 30	130 to 200	
Notched Bar Impact Work at -20°C (ISO-V)	60	J
Density bei ~ 20°C	7,9	kg/dm ³
Intermediate Linear Coefficient Thermal Expansion 20 to 500°C	15,8 - 17,7	(1/K) multiplied by 10 ⁻⁵
Thermal Conductivity bei ~ 50°C	14,5	W/(cm multiplied by K)
Specific Heat Capacity bei ~ 20°C	530	J/(kg multiplied by K)
Working Temperature	-200 to 500°C	

Overview of Flowserve Ahaus Products

Since 1964 a large variety of components and products are made from, or lined with Teflon® and other fluoropolymers in Ahaus. The initial design of a 3-piece DIN ball valve was continuously re-designed and extended to meet all requirements within the global process industries. Today Flowserve Ahaus offers a large range and a vast variety of valves including ball valves, butterfly valves, plug valves besides a range of complimentary products such as strainers, sight glasses, various check valve designs and sampling valves. Below is a summary of the standard portfolio available from Flowserve Ahaus. For extensions or modifications of the standard portfolio, please consult with Flowserve Ahaus.

Valve Type	Valve Model	Description	Face to Face	Flanges	Size Range	Remarks	
ball valve	atomac AKH2	2-piece fully lined ball valve with full port	DIN	DIN EN 558	DIN EN 1092-2, PN16; DN 200, DN 250, DN 300: DIN EN 1092-2, PN10	15 - 350 mm	DN200 and larger to ANSI face to face
			ANSI	manufacturer standard	ANSI B 16.5, 150lbs	½" - 14"	
ball valve	atomac AKH2.2	2-piece fully lined ball valve with full port	DIN	DIN EN 558	DIN EN 1092-2, PN16	15 - 100 mm	maintenance free,
			ANSI	manufacturer standard	ANSI B 16.5, 150lbs	½" - 4"	maintenance free,
ball valve	atomac AKH2A	2-piece fully lined ball valve with full port	ANSI	ISO 5752 tab. 6, short ANSI B 16.10, short (col. 19)	ANSI B 16.5, 150lbs	1" - 6"	short pattern, full port
ball valve	atomac AKH3	2-piece lined ball valve	ANSI	ISO 5752 tab. 6, short ANSI B 16.10, short (col. 19)	ANSI B 16.5, 150lbs	1" - 14"	short pattern, reduced port
ball valve	atomac AKH5	2-piece fully lined ball valve with full port	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 150 mm	fully ceramic lined
			ANSI	manufacturer standard	ANSI B 16.5, 150lbs	1" - 6"	fully ceramic lined
ball valve	atomac AKH6	2-piece fully lined ball valve with full port	DIN	manufacturer standard	DIN EN 1092-2, PN16	25/50 - 150/250 mm	tank drain valve with enlarged outlet flange
			ANSI		ANSI B 16.5, 150lbs	1"½" - 6"½"	tank drain valve with enlarged outlet flange
ball valve	atomac AKH7	2-piece fully lined ball valve with full port	glass	manufacturer standard	glass connections	25 - 50 mm	ball valve for glass piping systems
ball valve	atomac AKH8	2-piece fully lined ball valve with full port	DIN	DIN EN 558	DIN EN 1092-2, PN16	15 - 100 mm	monobloc ball valve
ball valve	atomac AtoStar AS1	2-piece fully lined ball valve with full port	DIN	DIN EN 558	DIN EN 1092-2, PN16	15 - 150 mm	stainless steel / PFA lined ball valve
	atomac AtoStar AS2		ANSI	manufacturer standard	ANSI B 16.5, 150lbs	½" - 6"	stainless steel / PFA lined ball valve
	atomac AtoStar AS3		ANSI	ISO 5752 tab. 6, short ANSI B 16.10, short (col. 19)	ANSI B 16.5, 150lbs	½" - 6"	stainless steel / PFA lined ball valve
	atomac AtoStar AS4		JIS	ANSI B 16.10, short (col. 19)	JIS B 2220 - 10K	15 - 150 mm	stainless steel / PFA lined ball valve
	atomac AtoStar AS5		JIS	Japanese industrial standard	JIS B 2220 - 10K	15 - 150 mm	stainless steel / PFA lined ball valve
	atomac AtoStar AS6		DIN / ANSI	2-piece fully lined ball valve with full port and integral heating jacketed	various	various	1" - 8"
ball valve	atomac AMP3	2-piece lined 3-way ball valve	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 150 mm	lined 3-way-ball valve
			ANSI		ANSI B 16.5, 150lbs	1" - 6"	lined 3-way-ball valve
ball valve	atomac AKH2-300	2-piece fully lined ball valve with full port	ANSI	ANSI B 16.10, 300lbs (col. 8)	ANSI B 16.5, 300lbs	1" - 6"	pressure rating per ANSI class ANSI 300
ball valve-sampling systems	atomac AtoPro lined	2-piece fully lined ball valve with full port	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 80 mm	only in DIN face to face
			ANSI		ANSI B 16.5, 150lbs	1" - 3"	only in DIN face to face
	atomac AtoPro metallic		DIN		DIN EN 1092-2, PN16	25 - 80 mm	1.4408, other materials on request
	ANSI		ANSI B 16.5, 150lbs		1" - 3"	1.4408, other materials on request	
check valve	atomac ARV2	2-piece fully lined check valve with full port	DIN	DIN EN 558	DIN EN 1092-2, PN16	15 - 200 mm	DN150 & 200 to ANSI face to face
			ANSI	manufacturer standard	ANSI B 16.5, 150lbs	½" - 8"	
	atomac ARV SG	check valve / sight glass combination	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 150 mm	
			ANSI	manufacturer standard	ANSI B 16.5, 150lbs	1" - 4"	DN6" is in DIN face to face
	atomac ARL	45° check valve	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 80 mm	
ANSI			ANSI B 16.5, 150lbs	ANSI B 16.5, 150lbs	1" - 3"	all ANSI ARL to DIN face to face	
atomac ARK2	swing check valve	DIN	DIN EN 558 (basic series 20)	DIN EN 1092-2, PN16	50 - 400 mm		
		ANSI	ANSI B 16.10 table 9 col. 3	ANSI B 16.5, 150lbs	2" - 16"		
sight glass	atomac ASG	lined sight glass offers clear visual inspection from either side	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 250 mm	DN200 & 250 to ANSI face to face
			ANSI	manufacturer standard	ANSI B 16.5, 150lbs	1" - 10"	DN6" is in DIN face to face
	atomac ASG3	3-way sight glass	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 100 mm	DIN face to face
			ANSI		ANSI B 16.5, 150lbs	1" - 4"	DIN face to face
	atomac ASG4	4-way sight glass	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 80 mm	all DIN face to face
			ANSI		ANSI B 16.5, 150lbs	1" - 3"	all DIN face to face
atomac ASG B	vessel sight glass	DIN	manufacturer standard	DIN EN 1092-2, PN16	80 - 200 mm	for direct mountings on vessel studs	
strainer	atomac ASF	Y-Type strainer	DIN	DIN EN 558	DIN EN 1092-2, PN16	25 - 200 mm	DN40, 150 and 200 to ANSI face to face
			ANSI	ANSI B 16.10	ANSI B 16.5, 150lbs	1" - 8"	other sizes on request
plug valve	Durco T4E1	PFA lined plug valve	ANSI	ANSI B 16.10 (col. 19)	ANSI B 16.5, 150lbs	½" - 12"	
	Durco T4E2		DIN	DIN EN 558	DIN EN 1092-2, PN16	15 - 300 mm	DN150, 200, 250 and 300 to ANSI face to face
	Durco T4E3		ANSI	ANSI B 16.10	ANSI B 16.5, 300lbs	½" - 12"	
butterfly	Durco BTW	lined butterfly	DIN	DIN EN 558 (basic series 20)	DIN wafer butterfly	50 - 600 mm	standard pattern face to face
			ANSI		ANSI wafer butterfly	2" - 24"	standard pattern face to face
	DIN		DIN lug butterfly		50 - 600 mm	standard pattern face to face	
	ANSI		ANSI lug butterfly		2" - 24"	standard pattern face to face	
butterfly	Durco BTW LP	lined butterfly (long pattern)	DIN	DIN EN 558 (basic series 16)	DIN wafer butterfly	50 - 600 mm	long pattern face to face
			ANSI	ANSI wafer butterfly	2" - 24"	long pattern face to face	
	Durco BTL LP		DIN	DIN lug butterfly	50 - 600 mm	long pattern face to face	
		ANSI	ANSI lug butterfly	2" - 24"	long pattern face to face		



AKH2 Lined Ball Valve*

A two piece full port standard lined ball valve which offers high safety factors, high stability, rigidity and eliminates a potential leak path. The full port design minimizes pressure losses and increases flow capacities thus reducing energy and pumping costs.

Atomac lined ball valves are engineered to include a free floating ball design which offers the following benefits:

- Low frictional coefficients resulting in low operating torques
- Positive shut - off across the pressure range
- Reduction of stem side loads eliminating potential leaks to atmosphere through the valve gland.

A real anti blow-out stem design offers increased safety. Each lined ball valve has its anti-static device, which provides

protection against potentially dangerous electrostatic discharges.

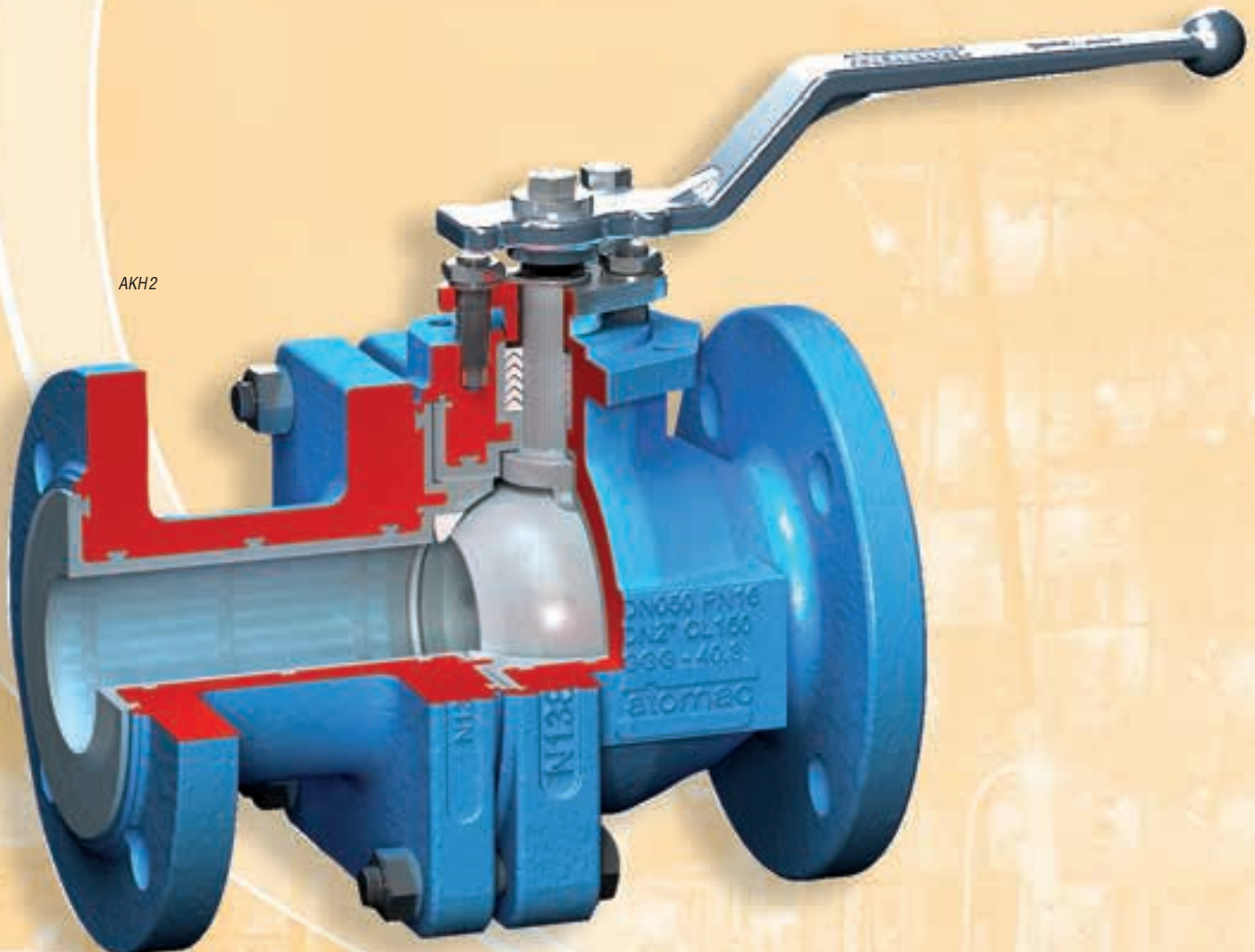
Long life seats, large stem sealing area as well as the substantial middle flanges and the molded liner take care for a leak and trouble free valve and minimizes downtime and maintenance.

Due to the actuator mounting flanges design according to DIN EN ISO 5211, pneumatic, electric or hydraulic actuators can easily be fitted.

A wide range of liner material can be selected from FEP, PFA, Tefzel, PP, PVDF as well as conductive PFA.

** Also available with a V-port ball for precise modulating control service or with C-ball available.*

AKH2



AKH2.2 Lined Ball Valve*



The Atomac full port AKH2.2 lined ball valve has the same characteristics as the AKH2 however the AKH2.2 offers enhanced features to improve suitability for toxic and corrosive applications.

The AKH2.2 design features a static and dynamic middle flange seal and in comparison with the AKH2 the metal-to-metal body joint which protects this seal.

The metal-to-metal body joint absorbs destructive pipe vibrations and distortions so that there will be no negative effects on the sealing performance. Thermal cycling does not require retightening of the bolts anymore.

The packing is constantly preloaded through a set of Belleville washers retained within a top cap. The packing is maintenance free and meets environmental standards such as TA Luft. The top cap also provides the actuator mounting platform per ISO 5211.

Seats have a larger diameter and therefore create less flow turbulences across the seat area and the integral retention lip cares for extra seat stability.

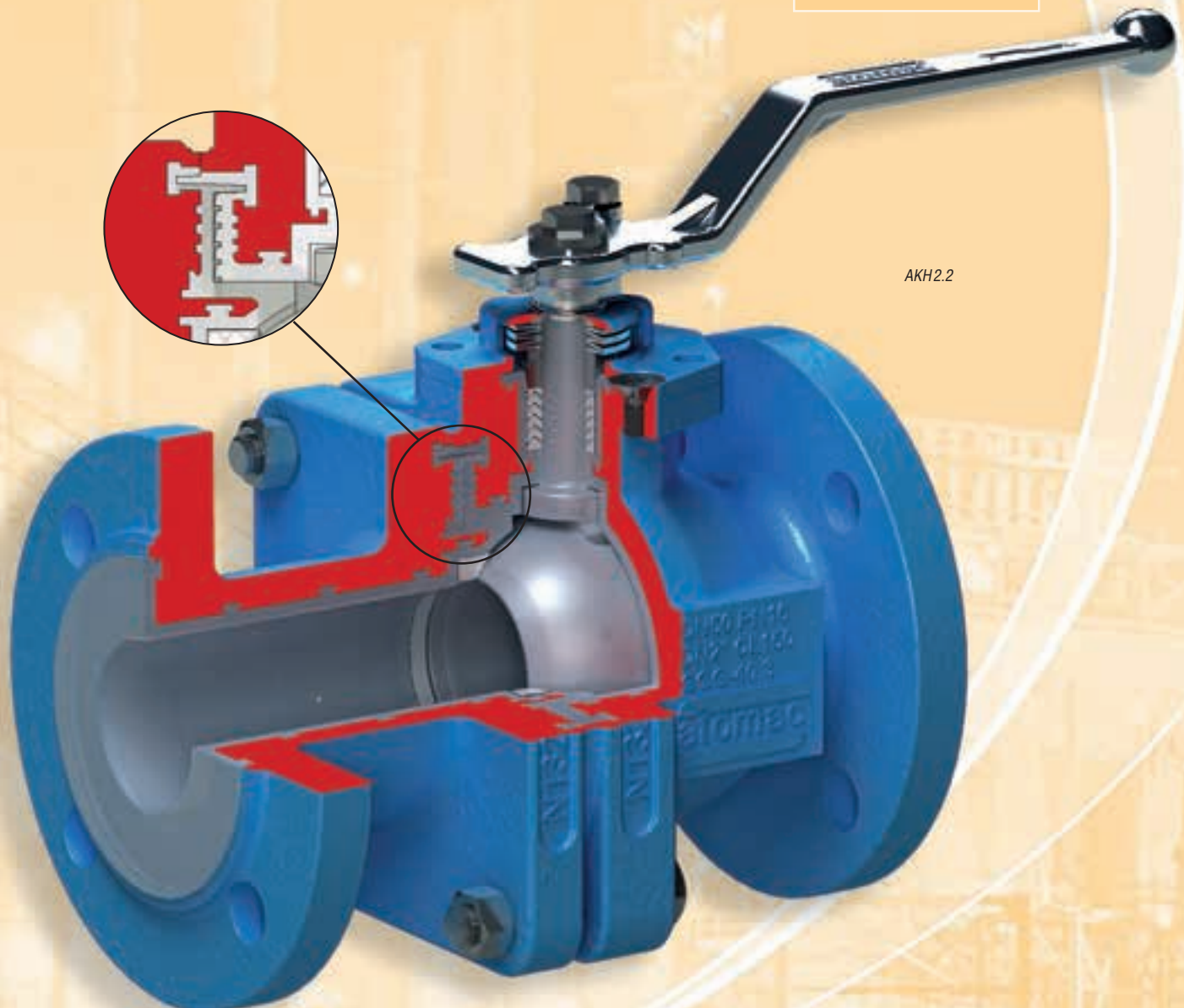
** Also available with FEP, PFA, Tefzel, PP, PVDF and PFA-conductive liner materials as well with a V-ball for precise modulating control service or with C-ball available.*



AKH2.2 with ceramic ball



AKH2.2 PFA-conductive lined

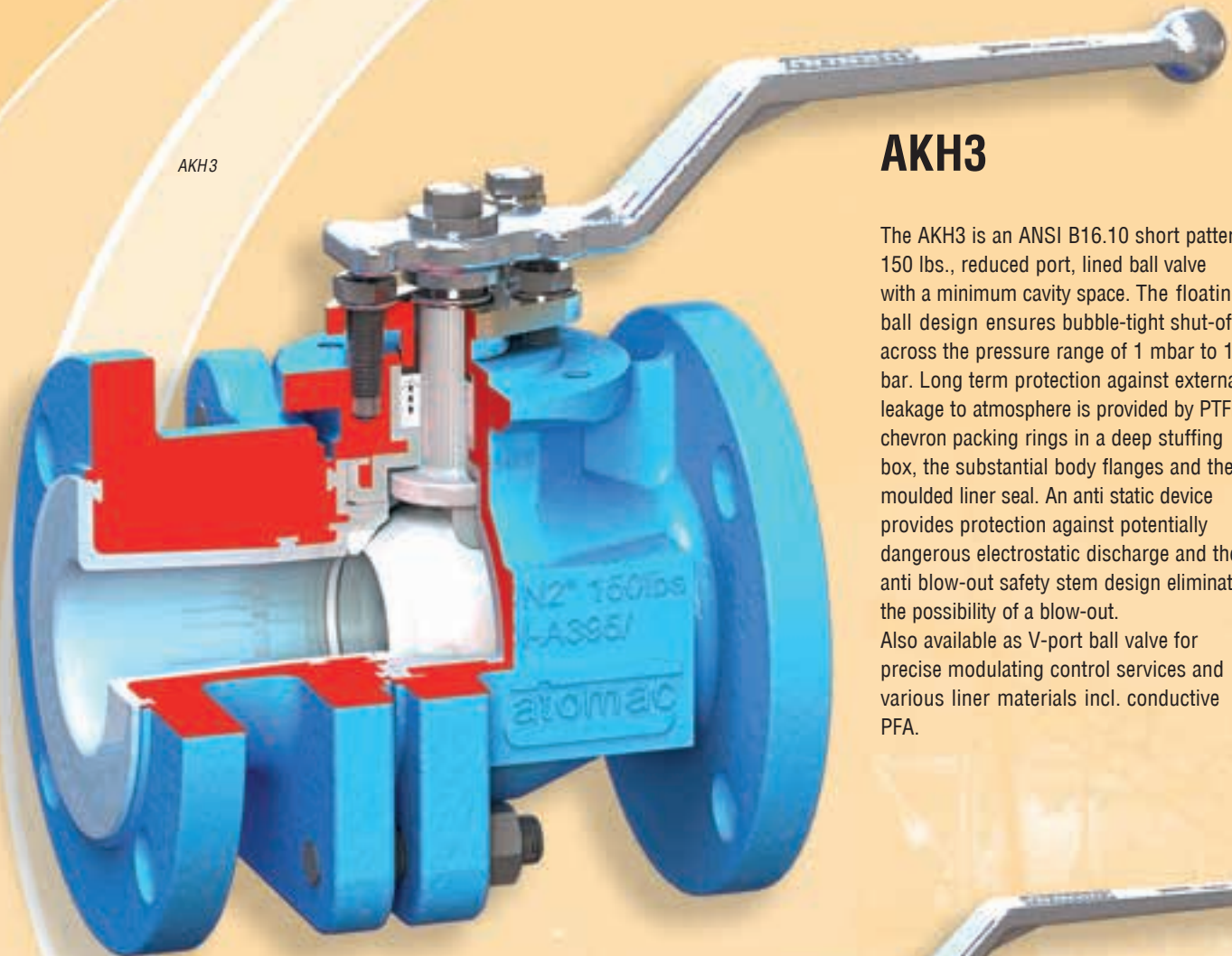


AKH2.2



AKH3, AKH2A

AKH3

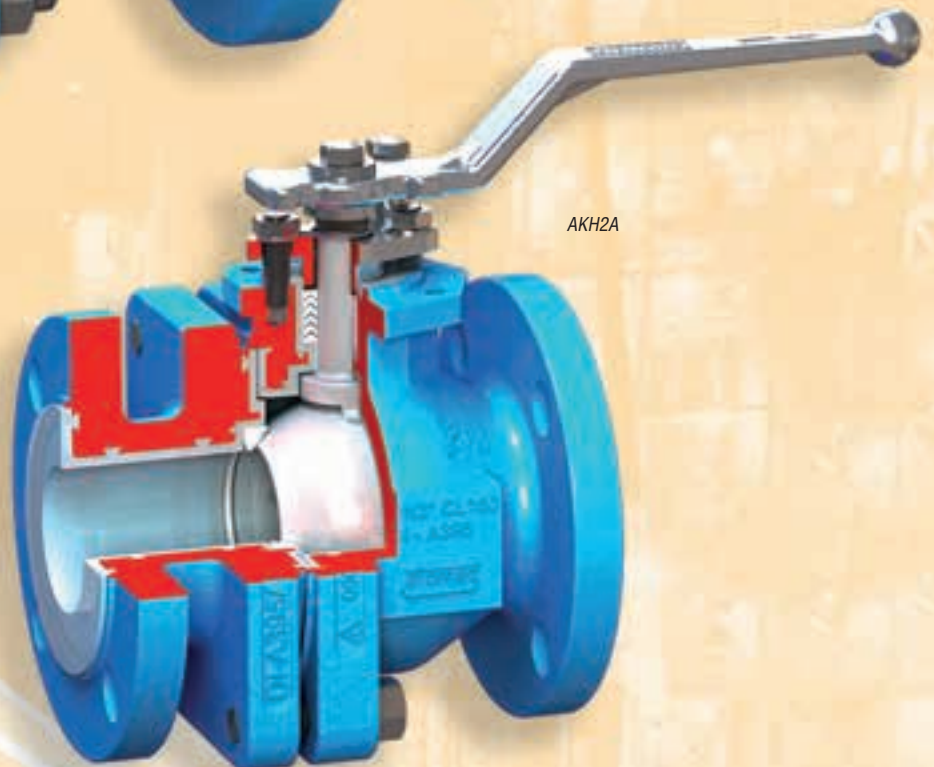


AKH3

The AKH3 is an ANSI B16.10 short pattern, 150 lbs., reduced port, lined ball valve with a minimum cavity space. The floating ball design ensures bubble-tight shut-off across the pressure range of 1 mbar to 19 bar. Long term protection against external leakage to atmosphere is provided by PTFE chevron packing rings in a deep stuffing box, the substantial body flanges and the moulded liner seal. An anti static device provides protection against potentially dangerous electrostatic discharge and the anti blow-out safety stem design eliminates the possibility of a blow-out.

Also available as V-port ball valve for precise modulating control services and various liner materials incl. conductive PFA.

AKH2A



AKH2A

The AKH2A is an ANSI B 16.10 short pattern full port lined ball valve. This valve has the same characteristics as the AKH2 however, at reduced space and weight. The AKH2A is available with FEP and PFA liners as standard – other lining materials on request.

AKH5, AKH6, AKH7



AKH5 Magnesia Partially Stabilized Zirconia (Mg PSZ) Ceramic Lined Ball Valve*

Due to advanced ceramic technology, the AKH5 achieves an unequalled performance that offers the ideal solution for many difficult applications in which erosion, wear, abrasion, impact, corrosion and high temperature cause conventional materials to fail. Furthermore the design of the AKH5 offers minimum cavity space that reduces the retention of line media within the body cavity so therefore product contamination problems are significantly reduced.

The Mg-PSZ Zirconia Ceramic material offers :

Wear Resistance:

Abrasive slurries have little effect on its rock hard surfaces.

Corrosion Resistance:

It is virtually inert to acid bases and most other corrosives.

Impact Resistance:

The composition of the materials and the advanced process technology result in high mechanical strength and toughness.

Temperature Resistance:

High operating temperatures and thermal shock are not a problem. The melting point of Mg-PSZ ceramic is well beyond the valve limits of 350°C. Higher ratings on request.

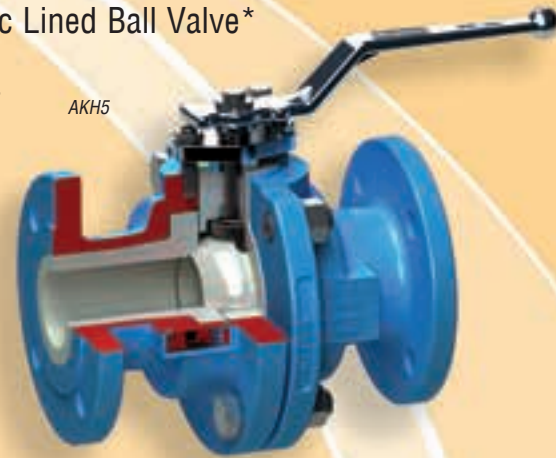
Cavitation Resistance:

Cavitation related problems are sharply reduced due to the extreme hardness of the ceramic material (Rockwell 89)

Unequalled Benefits:

The Mg-PSZ ceramics have consistently outperformed steels, cobalt,

AKH5



nickel alloys and other ceramics in a wide range of severe applications such as, steam services, abrasive slurries, fly ash, high temperature corrosives and sand abrasion are only a few of the many conditions where the AKH5 Mg-PSZ lined ball valve has solved serious problems.

** Also available as V-port ball valve for precise modulating control service*

AKH6 Lined Tank Drain Valve

The AKH6 is originally designed to serve as tank drain valve, but it also can be installed in place of reducing spools to downsize piping dimensions. There is a wide range of various dimensions available with flange connections per DIN PN16 as well ANSI 150Lbs.

Furthermore the AKH6 has the same characteristics as former mentioned lined ball valves included high corrosion resistant liners either FEP or PFA, full ports, anti blow-out stem, anti-static design, actuator mounting flanges according DIN EN ISO 5211 and a long term protection against external leakage to the atmosphere. All internal components and spare parts are interchangeable with the components of the atomac ball valve AKH2.

AKH6



AKH7



AKH7 Lined Ball Valve For Glass Pipe Systems

Designed for easy installation in glass pipe systems with socket/ball or plane ends according to DIN EN 12585 and for the flange/glass end connections the AKH7 KPF is available.

The AKH7 offers high corrosion resistant liners made of either FEP or PFA (others on request) anti-static design, ant blow-out stem and long term protection against external leakage to the atmosphere.



AMP3 3-Way Lined Ball Valves*

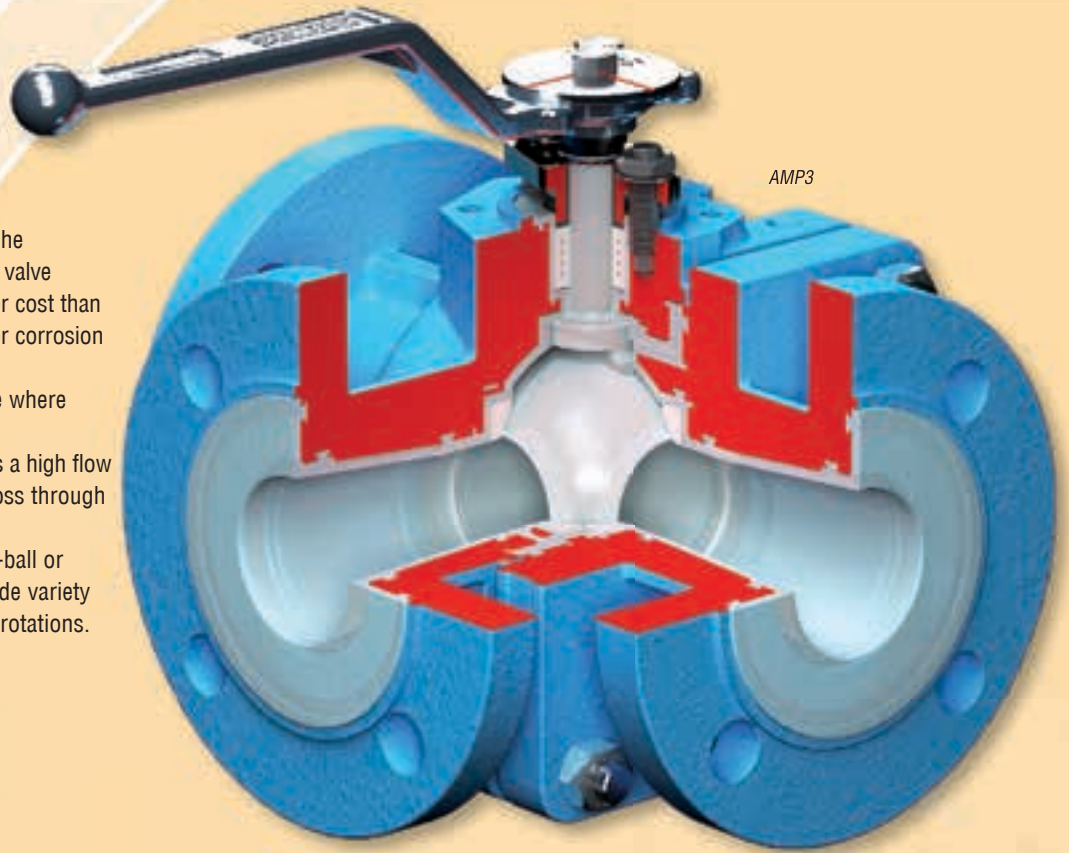
The AMP3, 3-way ball valve is the best choice for corrosive diverter valve applications and available at lower cost than alloy valves with equal or superior corrosion resistance in difficult services.

The compact design permits use where space constraints are a concern.

The 3-way ball valve design offers a high flow capacity with minimal pressure loss through the valve.

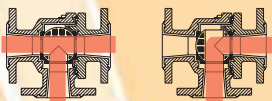
The AMP3 is available with an L-ball or T-ball configuration to offer a wide variety of flow patterns for 90° or 180° rotations.

* Optional PFA-conductive liner material

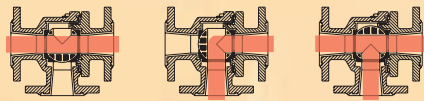


AMP3

AMP3T-Ball



symbol No. 2 - 90° switch



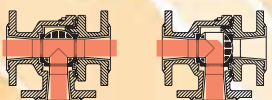
symbol No. 6 - 180° switch



symbol No. 3 - 90° switch



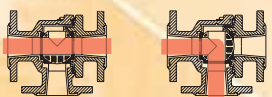
symbol No. 7 - 180° switch



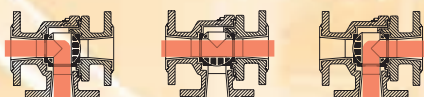
symbol No. 4 - 90° switch



symbol No. 8 - 180° switch

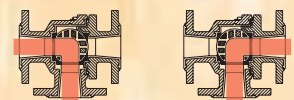


symbol No. 5 - 90° switch

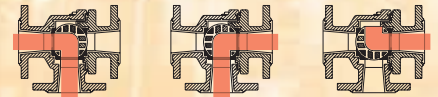


symbol No. 9 - 180° switch

AMP3L-Ball



symbol No. 1 - 90° switch



symbol No. 1.1 - 180° switch

AtoStar

Stainless Steel PFA Lined Ball Valve



The AtoStar stainless steel, fluorocopolymer lined ball valves deliver improved performance, reliability and safety.

AtoStar full port valves provide bubble tight shutoff, low maintenance, No-leak stem seals and the safety assurance of a blowout-proof stem assembly. AtoStar ball valves meet ASME, DIN and JIS standards.

AtoStars are very suitable for use in the pharmaceutical and semiconductor industries but also recommended for the following cases;

- At frequent solvent and chemical cleaning services.
- In highly corrosive atmospheres.
- At service temperatures below DCI rating $> -60^{\circ}\text{C}$ (-76°F).

d) For offshore applications.

AtoStars are also available as a V-port valve for precise modulating control services, or can be fitted with a C-ball for internal cavity cleaning purposes.

The AtoStar spare parts are interchangeable with the balance of the lined Atomac ball valve range.

The AtoStar ball valve range consists of 6 models:

AS1 with Face-to-Face dimensions per DIN EN 558-1 (as our AKH2), AKH2.2 - DIN version) flanged per DIN PN16

AS2 with Face-to-Face dimensions per ANSI (as our AKH2 and AKH2.2 - ANSI version), flanged per ANSI B 16.5 class 150

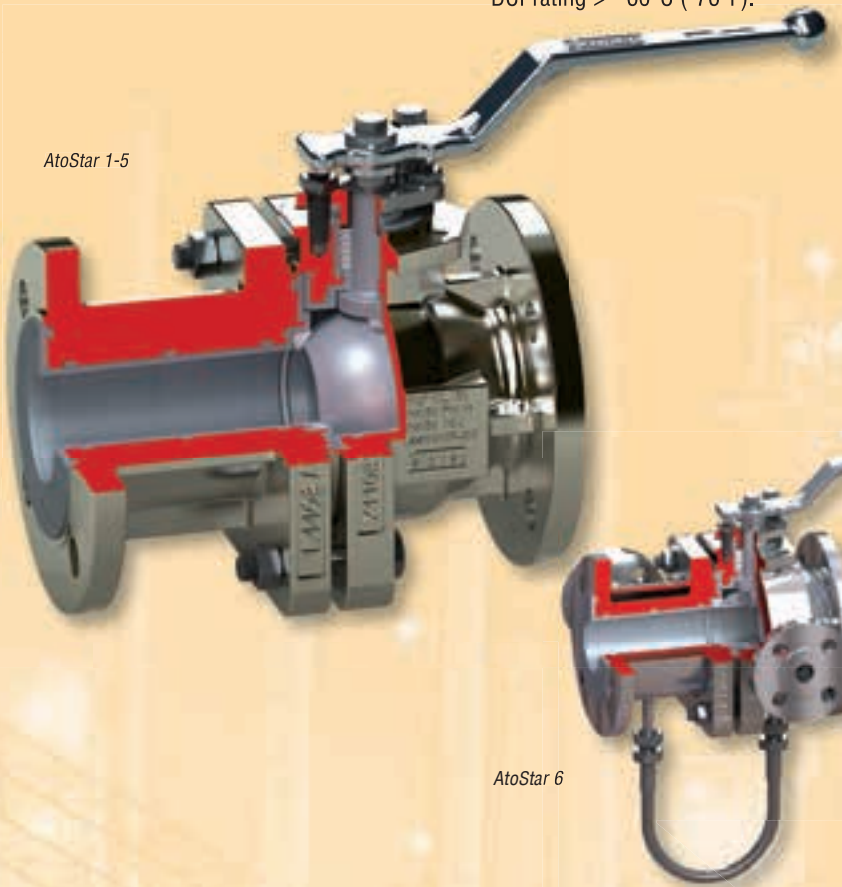
AS3 with Face-to-Face dimensions per ANSI B 16.10 (as our AKH3 and AKH2A), flanged per ANSI B 16.5 class 150

AS4 with Face-to-Face dimensions per ANSI B 16.10 - short pattern (as our AKH3 and AKH2A), flanged per JIS 10 K

AS5 with Face-to-Face dimensions per Japanese Industrial Standard, flanged per JIS 10 K

AS6 AtoStar with integral heating jacket for critical applications

AtoStar 1-5

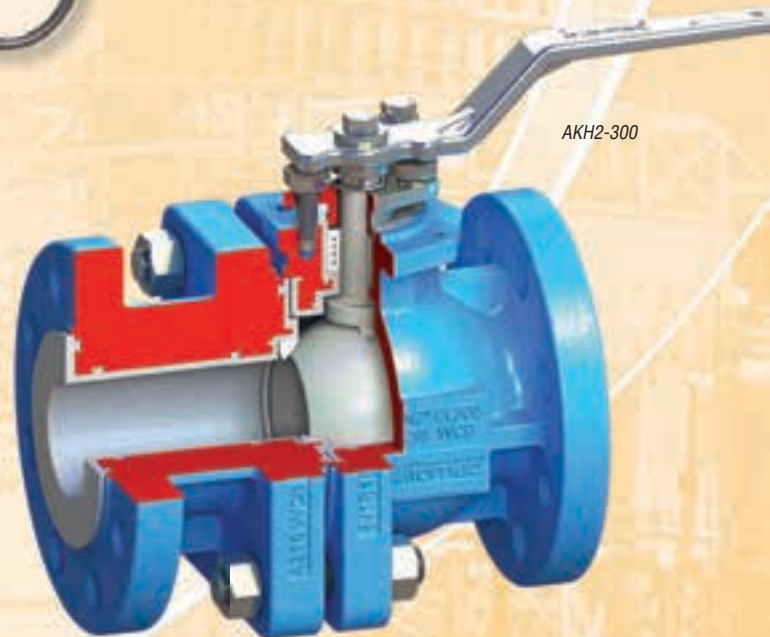


AtoStar 6

AKH2-300

Lined Ball Valve

The ANSI class 300 AKH2 ball valve series was primarily designed to suit pressure requirements of the chlorine and related industries. Although most applications are within ANSI class 150, the piping requirements often need to meet ANSI class 300 for enhanced safety purposes. The AKH2-300 meets pressure requirements, Face-to-Face and flange dimensions as well as wall thickness per ANSI class 300 while offering the same design features and benefits as the standard AKH2 ball valve series, such as 2-piece design, full port and free floating ball assembly associated with positive retention of the liner within the valve components. All internal components and spare parts are fully interchangeable within the atomac AKH2 ball valve range. Please contact Flowserve in Ahaus for detailed pressure / temperature capabilities of this product range.



AKH2-300



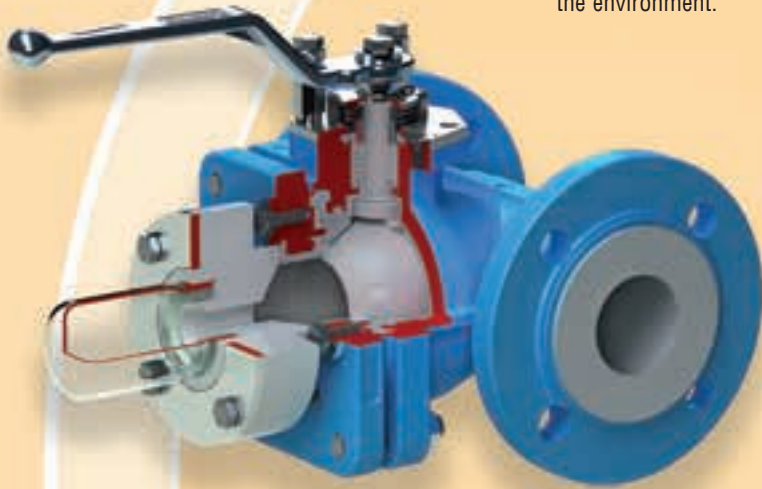
AtoPro Stainless Steel and Lined Ball Sampling Systems

The AtoPro sampling ball valve systems are developed and produced with the latest technology and offer you a wide scale of sampling possibilities, this can go from just a simple quick sampling up to sampling protected by a stainless steel case or high security sampling with a stainless steel protecting case in combination with integrated detoxification filters to protect the environment.

Bottle adaptors can be made to meet almost all common standard threads, heating jackets as well angled connection pieces are available.

Due to the use of stainless steel bodies as well PFA* lined stainless steel bodies both designs can be suitable for "clean room" services.

** Option PFA-conductive.*



AtoPro PFA lined



*AtoPro
PFA-conductive*



*AtoPro PFA or PFA-conductive lined with
protecting casing and actuator*



AtoPro stainless steel

> For sizes/technical info see page 20 & 35

Contact your nearest Flowserve sales office for separate documentation.

ARK2, ARV2 Check Valve



ARK2 Swing Check Valve

The fully PFA lined atomac swing check valves are ideal for use in highly corrosive applications and can replace swing check valves made from exotic alloys due to the universal chemical resistance of the fluoropolymer lining. These valves can be used in horizontal and vertical installations due to the special design of the hinge pin, which enables the disc to achieve a seal without support of any system pressure.

The ARK2 eliminates a potential leak path of conventional 3-piece and 2-piece designs with a seat face integrated in the body liner to seal against the disc in the closed position. The disc can swing freely within piping system without interference with the diameter of the connecting pipe.



ARK2

ARV2

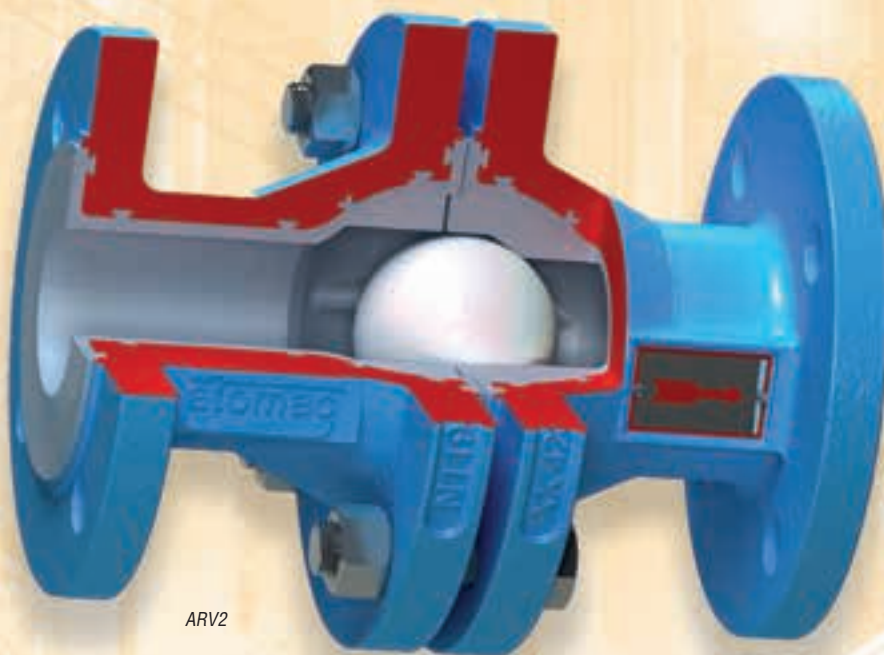
Lined Ball Check Valve*

This two piece body designed check valve provides high stability, rigidity and eliminates potential leak path and can be installed either vertically and dependent upon application horizontally as well. Ball material consists of solid PTFE. Liner materials such as FEP, PFA and conductive PFA have outstanding corrosion resistant properties.

The ARV2 can be considered as a full port design which offers excellent flow characteristics.

Low opening pressure is needed to unseat the ball in then vertical position.

* Optional PTFE hollow ball/spring supported/PFA-conductive



ARV2

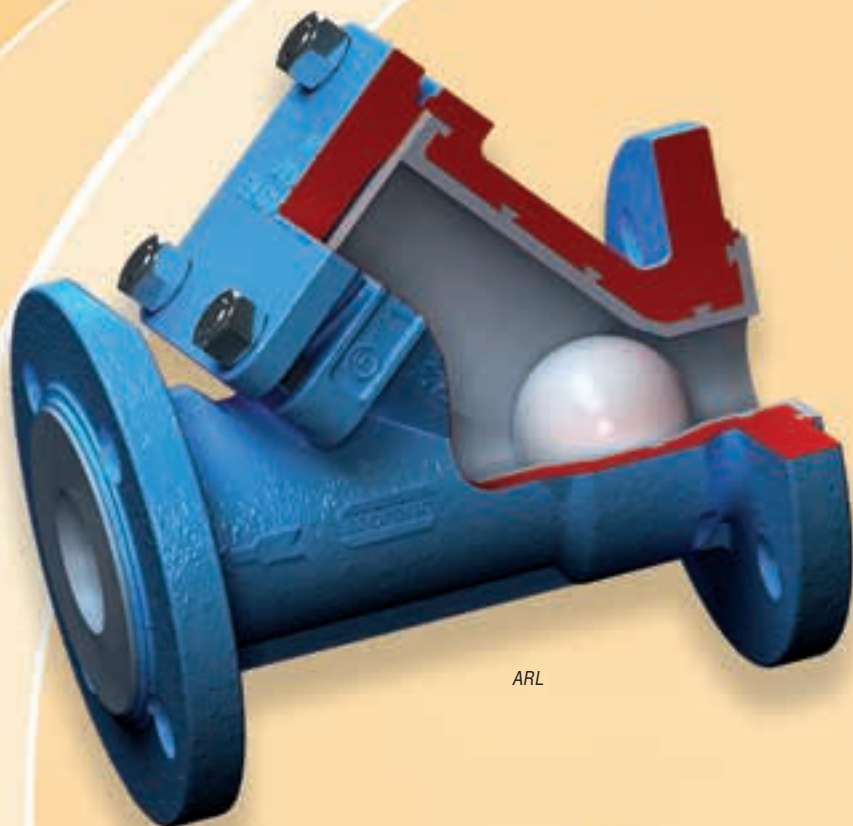


ARL, ARV/SG Check Valves

ARL Lined 45° Ball Check Valve

This ball check valve can be installed either vertically or horizontally and offers an unobstructed flow due to the fact that the ball is pushed into the 45° cavity.

For applications where high medium flow turbulences can be expected, installation of an ARL check valve can be the ideal solution to avoid liner damages, as well as for use in horizontal pipes with low flow and low back-pressures.

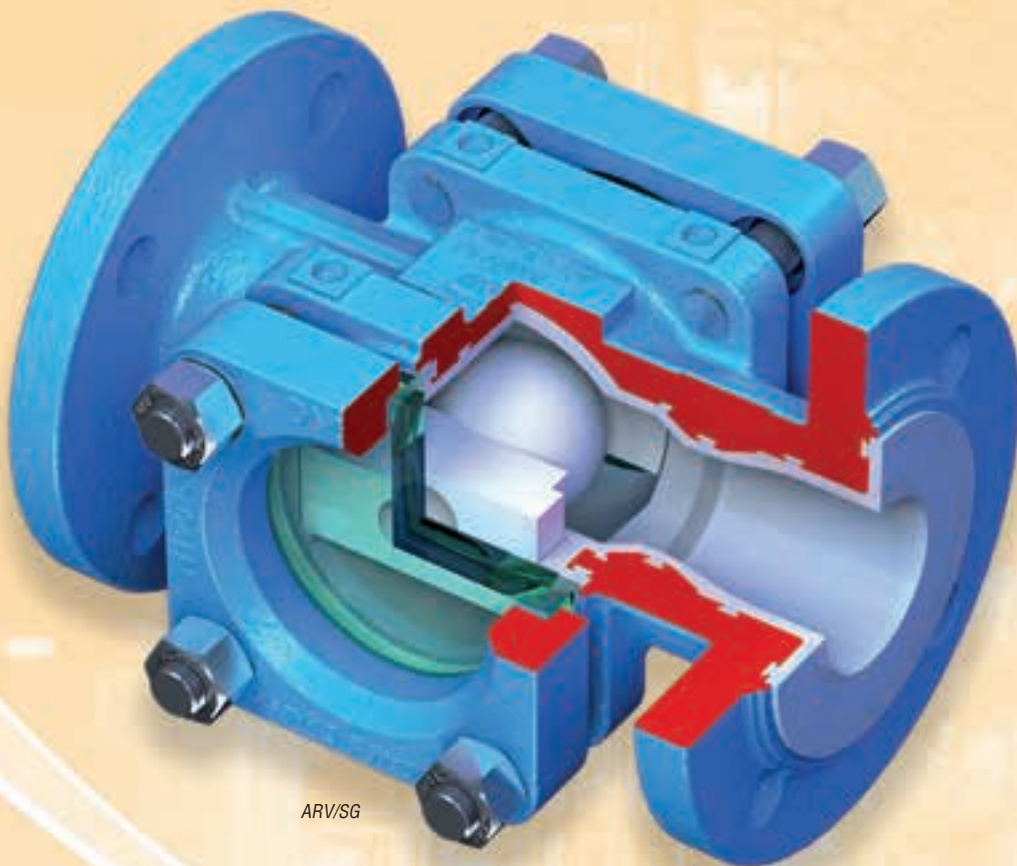


ARL

ARV/SG Lined Check/ Sight Glass Combination

The ARV/SG is a sight glass with an integrated check valve for use in both vertical and horizontal installations. This combination of two products saves space and allows the performance of the check valve to be monitored visually.

Borosilicate glass, in accordance with DIN 7080, is incorporated to withstand the high temperatures, mechanical stress and corrosion resistance required by end users.



ARV/SG

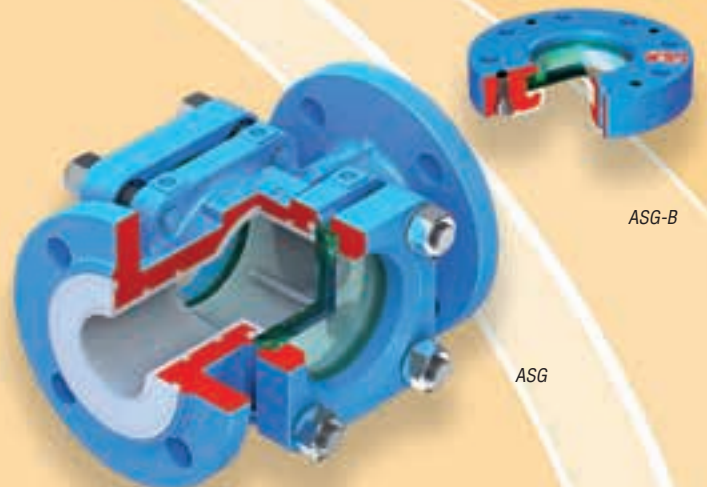
ASG, ASG3, ASG4, ASF Sight Glasses & Strainer



ASG Lined Sight Glass

The Atomac sight glass offers clear visual inspection from either side. The integrated drip lip with its cast core provide visual flow indication even at low velocity (optional rotor). Borosilicate glass, in accordance with DIN 7080, is utilized to withstand high temperatures, mechanical stress and corrosion. All internal components other than the glass have highly corrosion resistant liners. These are made of either FEP or PFA*, depending upon application and offer both a long service life.

* Optional PFA-conductive liner material



ASG3 Lined 3-Way Sight Glass*

The Atomac 3-Way Sight Glass offers clear visual inspection from either side, highly corrosion resistant liners cover all internal parts and borosilicate glass, in accordance with DIN 7080 is utilized to withstand high temperatures, mechanical stress and corrosion.

* Optional PFA-conductive liner material



ASG3 sight glass

ASG4 Lined 4-Way Sight Glass*

The ASG4 sight glass offers clear visual inspection from either side, highly corrosion resistant liners cover all internal parts and borosilicate glass, in accordance with DIN 7080 is utilized to withstand high temperatures, mechanical stress and corrosion.

* Optional PFA-conductive liner material



ASF strainer

ASF Lined Strainer

The flow path through the filter insert is a larger area than the original pipe cross-section to minimize possible pressure loss. The corrosion resistant filter insert consists of two perforated PTFE cylinders with an ETFE filter screen in between which offers the same outstanding corrosion resistant properties as the lining material FEP or PFA*. Clogged filter inserts can be easily exchanged or cleaned without removing the strainer from the line. For added operator safety, the residual fluid in the insert area can be removed by means of a PTFE drain plug prior to removing the access flange when changing or cleaning the filter. Various mesh sizes of filter screens or drillings are available to accommodate different levels of contamination. Permanent drain connections are available as an option.

* Optional PFA-conductive liner material

> For options and sizes/technical info see page 20 & 38-40



ASG4 Schauglas



BTV Lined Butterfly Valves

BTV PFA lined



Thanks to advanced technology we can state firmly that the BTV butterfly valves keep chemical fluids in your process piping and out of the environment.

A self adjusting triple stem seal system assures No leakage to the atmosphere. Viton seat energizer and concave PTFE* liner design provide dependable consistent shutoff and closure torque.

Spherical seat design of the disc and liner provides a 360° seal for long service life. The viton energizer is isolated and protected in a machined groove of the valve body. The concave designed liner is recessed into the valve body and this reduces the possibility of torn liners due to cold flow into the valve waterway.

BTV PFA-conductive lined



** Optional available UHMWP and Durlon II and PFA-conductive liner materials*

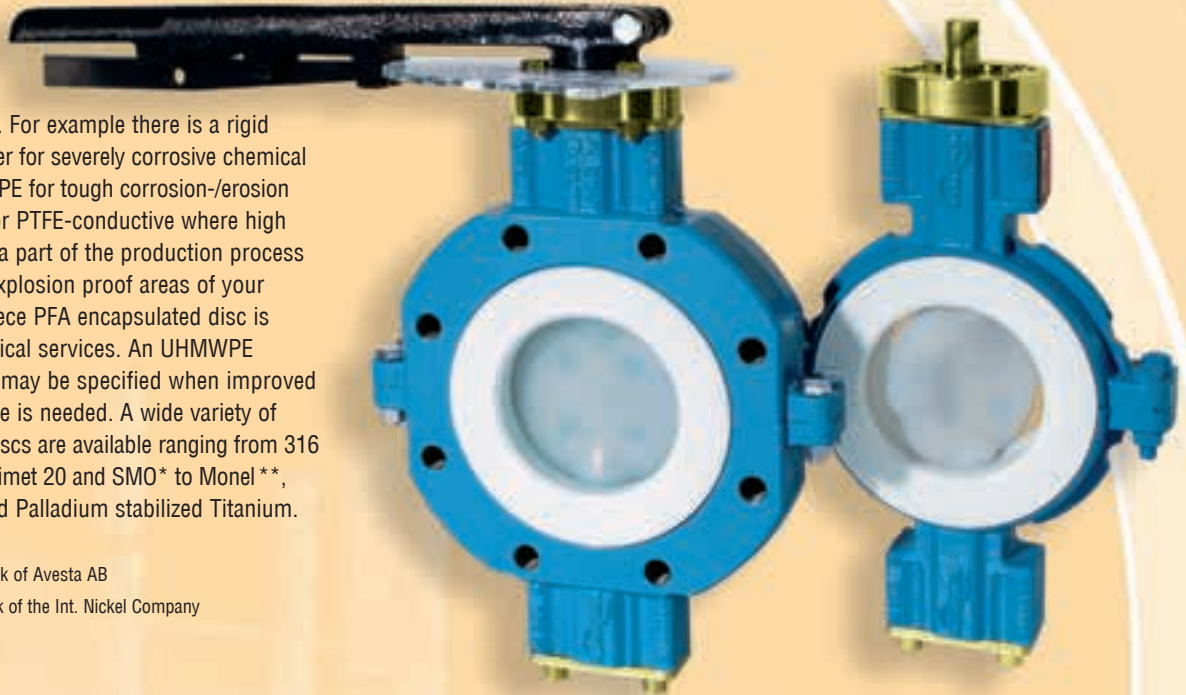
BTV 2000 / BTV 2000 LP Lined Butterfly Valves



The BTV 2000 lined butterfly valve series are maintenance free thanks to its live loaded triple seal stem design and assures bubble tight shutoff for a long service life. In addition the BTV 2000 series offer a wide choice of materials for the toughest service conditions. For example there is a rigid machined PTFE liner for severely corrosive chemical services or UHMWPE for tough corrosion-/erosion area applications or PTFE-conductive where high velocity fluids are a part of the production process or installation in explosion proof areas of your industry. A one-piece PFA encapsulated disc is standard for chemical services. An UHMWPE encapsulated disc may be specified when improved abrasion resistance is needed. A wide variety of optional metallic discs are available ranging from 316 stainless steel, Durimet 20 and SMO* to Monel**, Chlorimet 2 & 3 and Palladium stabilized Titanium.

* Registered trademark of Avesta AB

** Registered trademark of the Int. Nickel Company



BTL

BTW



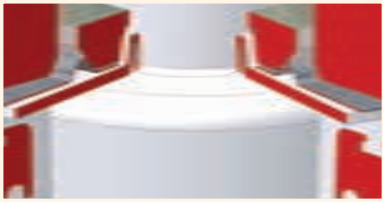
BTV 2000 LP (Long Pattern, Face-to-Face)

BTV 2000 LP offers the same properties as the standard BTV series however instead of a short pattern body it has a long pattern body. The extended Face-to-Face eliminates the potential for the disc to interface with heavy duty lined piping systems. Face-to-Face on BTV 2000 LP is DIN-EN 558-2 col 16. All parts of the BTV and BTV-LP are interchangeable with the exception of the body and liner.

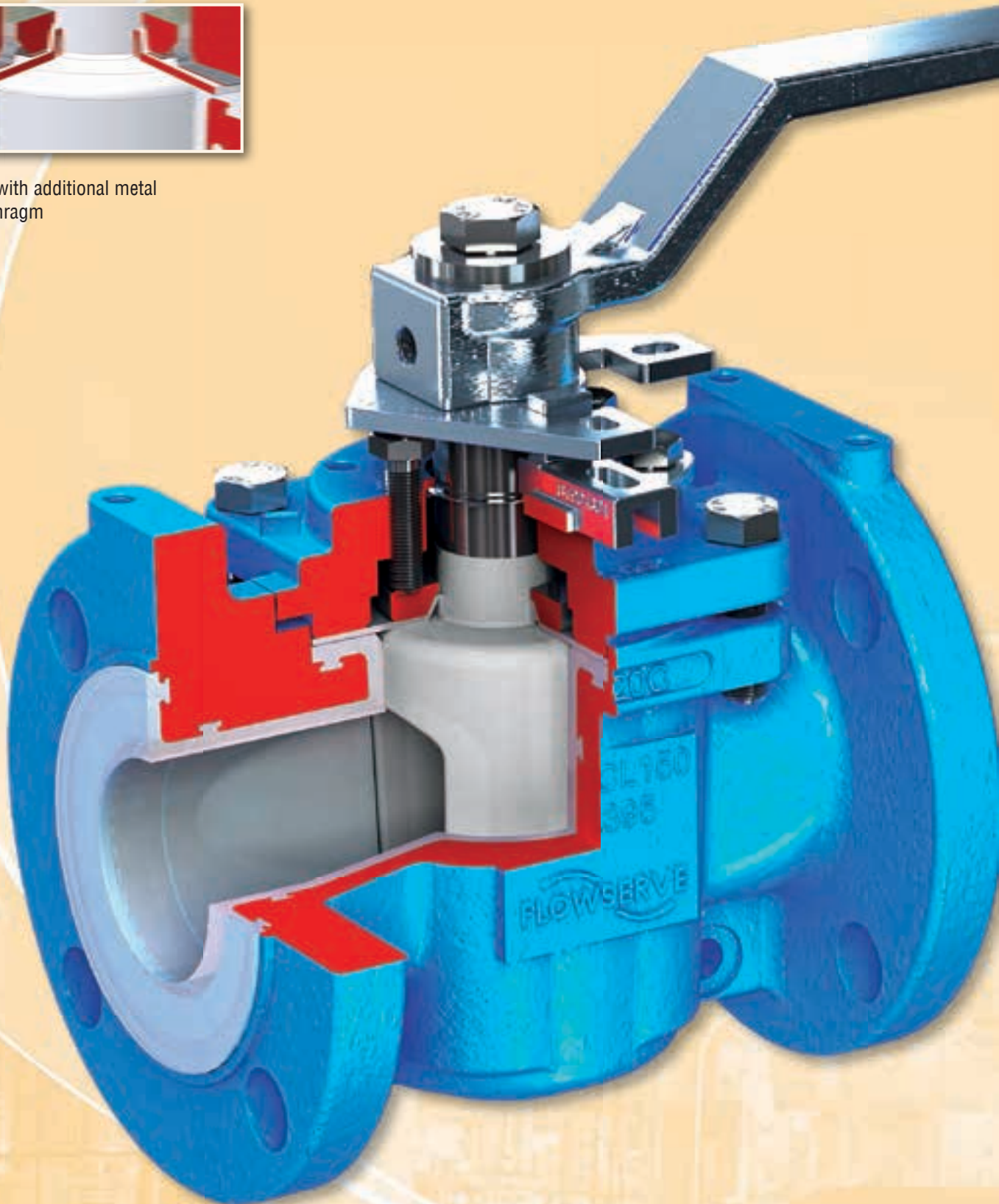
For more info or separate documentation please contact Flowserve Ahaus GmbH or your nearest Flowserve sales office.



T4E Lined Plug Valve



T4E with additional metal diaphragm





The T4E series is designed and developed with the latest technology and therefore very suitable for the chemical process industries and available in the ANSI Class 150 & 300 as well DIN Class PN16 and a max. temperature of 204°C. The T4E lined plug valves provide maximum corrosion resistance and the elimination of product contamination at reasonable costs.

PFA body liner is well anchored against the body by means of machined and cast T-slots and the solid encapsulated/anchored PFA-plug liner material ensures a strong adhesion. This makes the T4E series so suitable for extreme service and vacuum conditions.

A large sealing surface guarantees a bubble-tight shut-off.

A secondary dynamic self adjusting, self-energized PFA* reverse lip diaphragm prevents stem leakage. You never replace valve seats; you only reseal the plug with a quick and easy in-line adjustment.

Standard material of construction is Ductile Cast Iron, however, stainless steel valve bodies can be made available upon request.

** Optional stainless steel diaphragm support.*

ET4E Lined Control Plug Valve



In addition to the features and benefits that have made Plug Valves the process industry's premier isolation valve, Flowserve offers the ET4E V-port valve for precise modulating control services.

ET4E V-port control valves are available in a variety of trim configurations to satisfy your exact flow control needs.

Sizes include DN1" / DN25 through DN4" / DN100 with full open Cv values of 0,8 to 187.



Overview of Opt

Options available on Atomac Products



Lined C-balls will help to eliminate media build-up in ball cavity.



Lined characterized V-port balls for control/throttling applications. For AKH5 available in Mg-PSZ ceramic.



AtoPro system with heating jacket and stainless steel protecting case in combination with integrated detoxification filters.



Lockable hand levers and extensions are available for all atomac lined ball valves.



ASF Strainers with flange and drain valve.



Cavity flush
A custom request successfully designed for the pharmaceutical industry to flush the cavity to avoid product build-up.



AS6 with heating jacket. recommended for suitable "clean room" applications.



Extended Packing for AKH2, AKH2A, AKH3, AtoStar with double stuffing box. Also available with lantern ring to monitor gland seal.

Seat rings

Will be available for all atomac lined ball valves, in the following materials, glass-fiber reinforced PTFE, PFA – conductive. Other materials on request.

Options Choices



Options available on Durco Products



V-port PFA lined characterized plugs for modulating applications are available for various sizes of the T4E lined plug valves.



T-wrench stem extensions are available for T4E lined plug valves up till DN80/3".



Vented plugs for chlorine applications. PFA lined plug with side hole or bottom vent is available for the T4E lined plug valves.



Liner BTV for the BTV 2000 lined butterfly valves the following liner materials are available; Sentinel liner/Durlon superior permeation resistant material UHMWPE, PFA-conductive.



Discs availability
UHMWPE lined,
PFA-conductive lined,
Alloy: 316, Durimet
20, 254 SMO*,
Monel**, Chlorimet
2&3, Palladium
stabilized Titanium.



body alloy BTV series instead of DCI also available in 316 stainless steel.

* Registered trademark of Avesta AB

** Registered trademark of the Int. Nickel Company



T4E PFA lined plug valves as well lined plug inserts can be made available in 316 stainless steel.



BTV available as standard/ DIN EN 558, col. 20 as well long pattern design DIN EN 558, col. 16 long pattern.



Automation

Manual and Automated Operations

Atomac and Durco lined valve are equipped with a lever as a standard operator for the following size range:

- Atomac ball valves up to 10" (DN 250) full port and 12" (DN 300) reduced port
- Durco T4E plug valves up to 4" (DN 100)
- Durco BTV butterfly valves up to 8" (DN 200).

All larger valve are equipped with a manual gear. Changes can be made on request. The modular construction of lined atomac as well Durco valves allows for easy use of all types of pneumatic or electric actuation systems. Due to the ISO 5211 universal mounting pad, actuators can be mounted to the valves on-site, without removing them from the pipeline.





Automation

Valve Automation

Flowserve offers a range of pneumatic and electric actuators from prime brands within its own portfolio. Actuators are of rack and pinion design as well as scotch yoke design to cover the torque requirements of the Flowserve Ahaus valve portfolio. Besides actuators Flowserve also offers a range of accessories such as limit switches and positioners, also with digital communication capabilities. These automation components complement our range of valves.

If required, Flowserve also offers assembly and test of non-Flowserve actuator and accessories.

Sizing of Actuator

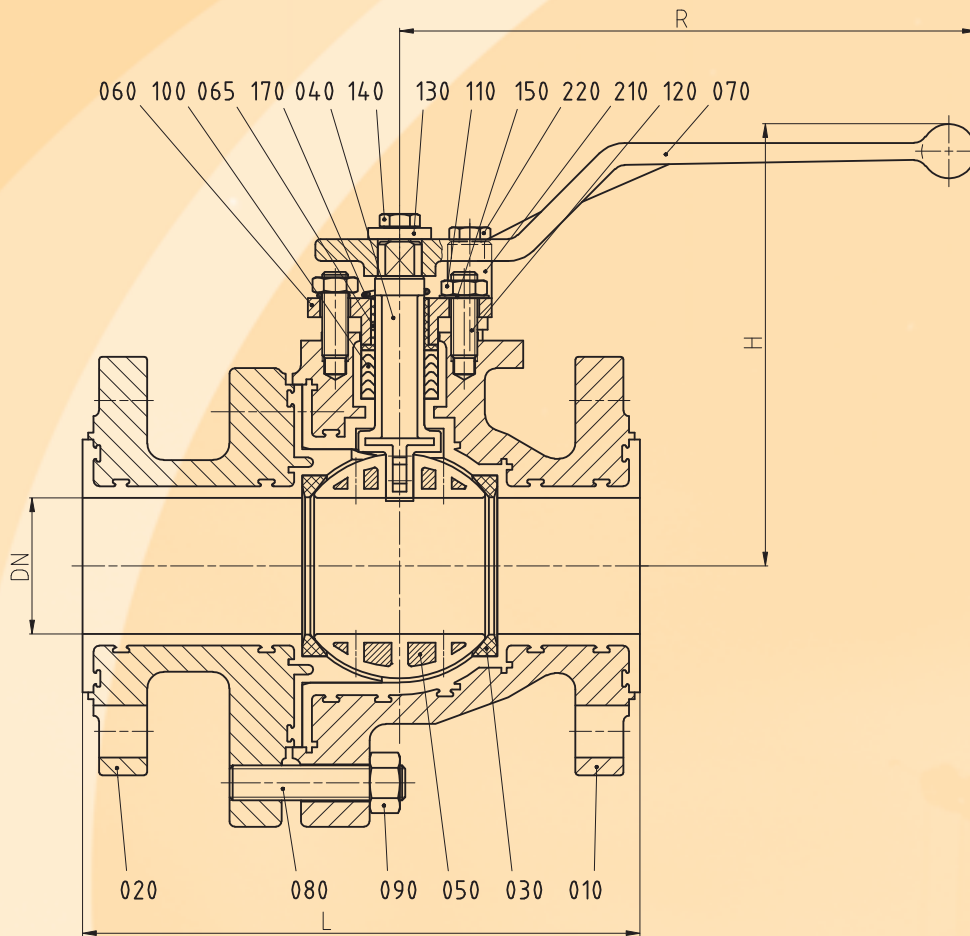
Torque data to help sizing of actuators are available from Flowserve Ahaus GmbH, or your nearest Sales office.





Technical Data

AKH2

**DIN****Face-to-Face Dimensions:**

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2 PN16

DN 200, DN 250, DN 300

DIN EN 1092-2 PN10

ANSI**Flange Connections:**

ANSI B 16.5 - 150lbs

AKH2 - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	side piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
030	seat ring	PTFE
040	stem	stainless steel / Hastelloy C4**, PFA
050	ball	alloy steel / ductile cast iron - EN-JS1049/ASTM A395 / ceramic Al ₂ O ₃ *, PFA° / FEP°
060	gland follower	stainless steel - 1.4308
065	gland insert	PTFE-graphite
070	hand lever	die-cast metal / ductile cast iron - EN-JS1082/ASTM A536 (galvanized) / steel
080	stud bolt / hexagon bolt	stainless steel - 1.4301-K70 [^]

No.	designation	material
090	hexagon nut	stainless steel - 1.4301-K70 [^]
100	packing material (chevron)	PTFE° / PTFE-graphite°
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
170	grounding device	stainless steel - 1.4310
210	stop	steel (galvanized) / stainless steel
220	hexagon bolt	stainless steel - 1.4301

* ceramic ball on request

** Hastelloy stem on request

° optional

[^] other on request

AKH2 - dimensions - DIN

DN/DIN	L	H	R	weight
015	130	120	160	kg 4,0
020	150	120	160	kg 4,8
025	160	123	160	kg 5,4
032	180	145	210	kg 10,2
040	200	145	210	kg 10,7
050	230	160	210	kg 14,1
065	290	200	313	kg 24,0
080	310	205	313	kg 31,0
100	350	220	313	kg 47,5
150	480	312	337 ^{°°}	kg 100,0
200/150 ^{**}	457	312	337 ^{°°}	kg 117,0
200 ^{**}	457	373	450 [°]	kg 208,0
250 ^{**}	534	--	--	kg 320,0
300 ^{**}	610	--	--	kg 432,0
350	on request			

^{°°} pass-through handlever Ø 674 mm standard[°] pass-through handlever Ø 900 mm standard^{**} Face-to-Face dimensions acc. to ANSI B 16.10

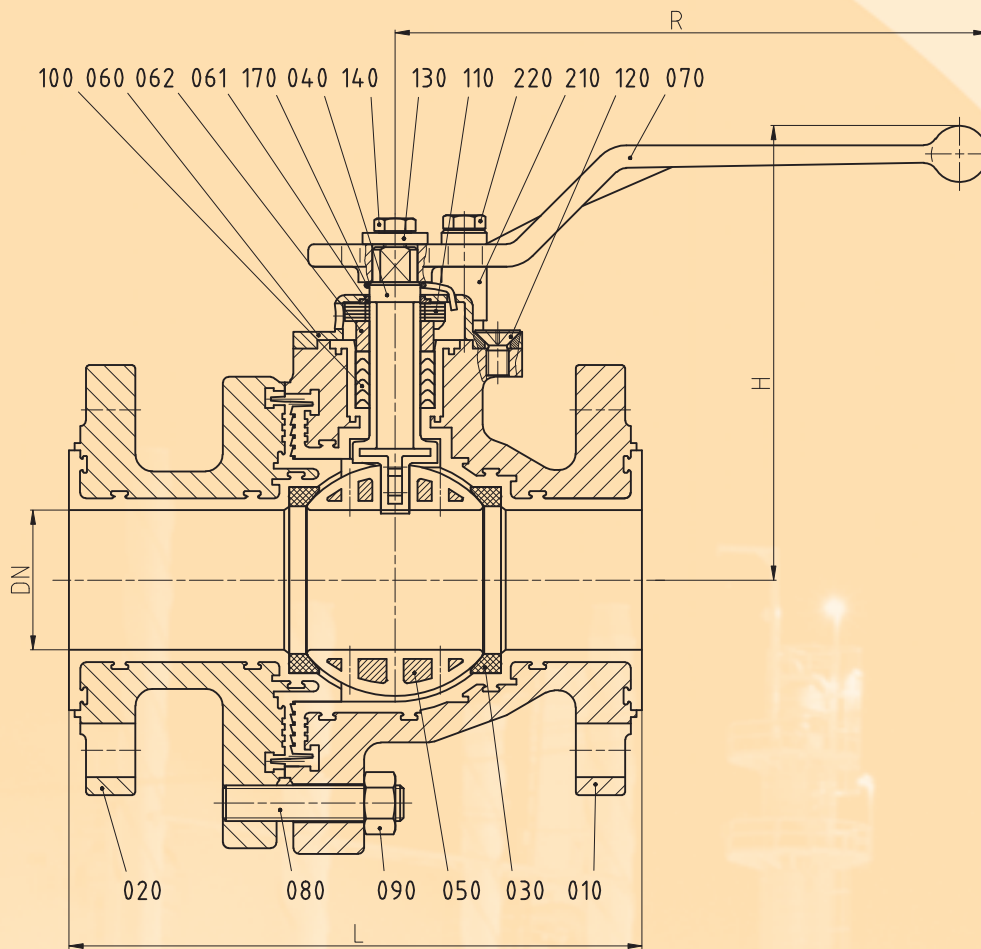
AKH2 - dimensions - ANSI

DN/ANSI	L	H	R	weight
½ ^{**}	130	120	160	kg 4,3
¾ ^{**}	150	120	160	kg 4,6
1"	152	123	160	kg 5,0
1½"	178	145	210	kg 8,4
2"	203	160	210	kg 12,8
3"	241	205	313	kg 29,1
4"	292	220	313	kg 43,5
6"	356	312	337 ^{°°}	kg 97,1
8"/6"	457	312	337 ^{°°}	kg 108,0
8"	457	373	450 [°]	kg 208,0
10"	534	--	--	kg 320,0
12" [*]	610	--	--	kg 450,0
14" [*]	686	--	--	kg 575,0

^{°°} pass-through handlever Ø 674 mm standard[°] pass-through handlever Ø 900 mm standard^{**} Face-to-Face dimensions acc. to DIN EN 558 (basic series 1)^{*} ball valve only with manual actuator (weight without actuator)

Technical Data

AKH2.2



DIN
Face-to-Face Dimensions:
 DIN EN 558 (basic series 1)
Flange Connection:
 DIN EN 1092-2, PN16

ANSI
Flange Connection:
 ANSI B 16.5, 150lbs

AKH2.2 - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	side piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
030	seat ring	PTFE
040	stem	stainless steel / Hastelloy C4**, PFA
050	ball	alloy steel / ductile cast iron - EN-JS1049/ASTM A395 / ceramic Al ₂ O ₃ *, PFA° / FEP°
060	top cap	stainless steel - 1.4308
061	sleeve	PTFE
062	spacer	stainless steel - 1.4304
070	hand lever	die-cast metal / ductile cast iron - EN-JS1082/ASTM A536 (galvanized)
080	stud bolt / hexagon bolt	stainless steel - 1.4301-K70 [^]

No.	designation	material
090	hexagon nut	stainless steel - 1.4301-K70 [^]
100	packing material (chevron)	PTFE° / PTFE-graphite°
110	belleville washer	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
170	grounding device / curved spring washer	stainless steel - 1.4310
210	stop	steel (galvanized)
220	hexagon bolt	stainless steel - 1.4301

* ceramic ball on request
 ° optional
 ^ other on request
 ** Hastelloy stem on request

AKH2.2 - dimensions - DIN

DN/DIN	L	H	R	weight
015	130	120	160	kg 4,0
020	150	120	160	kg 4,8
025	160	123	160	kg 5,4
032	180	145	210	kg 10,2
040	200	145	210	kg 10,7
050	230	160	210	kg 14,1
065	290	200	313	kg 24,0
080	310	207	313	kg 31,0
100	350	220	313	kg 47,5

AKH2.2 - dimensions - ANSI

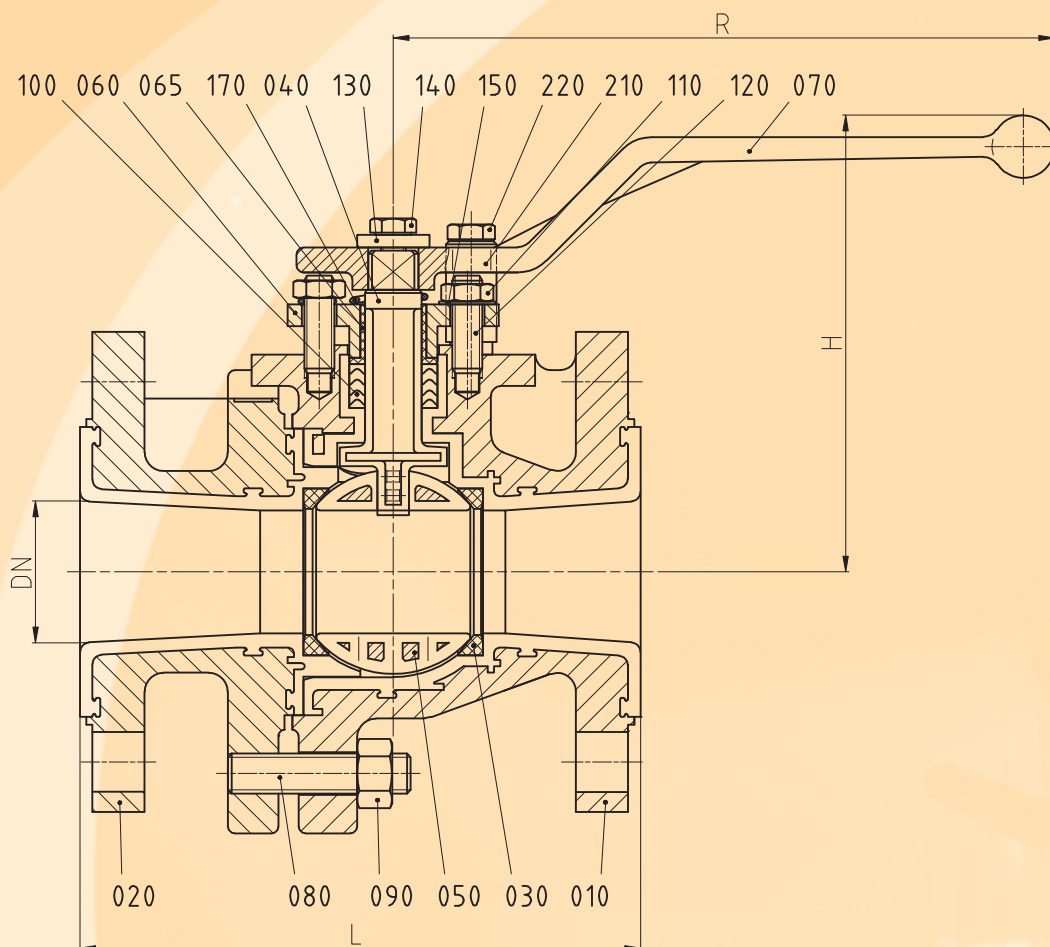
DN/ANSI	L	H	R	weight
½" *	130	120	160	kg 4,3
¾" *	150	120	160	kg 4,6
1"	152,4	123	160	kg 5,0
1½"	178	145	210	kg 8,4
2"	203	160	210	kg 12,8
3"	241	207	313	kg 29,1
4"	292	220	313	kg 43,5

* Face-to-Face dimensions acc. to DIN EN 558 (basic series 1)



Technical Data

AKH3



ANSI
Face-to-Face Dimensions:
 ISO 5752 tab. 6, short
 ANSI B 16.10, short
Flange Connection:
 ANSI B 16.5, 150lbs

AKH3 - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	side piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
030	seat ring	PTFE
040	stem	stainless steel / Hastelloy C4**, PFA
050	ball	alloy steel / ductile cast iron - EN-JS1049/ASTM A395 / ceramic Al ₂ O ₃ *, PFA° / FEP°
060	gland follower	stainless steel - 1.4308
065	gland insert	PTFE-graphite
070	hand lever	die-cast metal / ductile cast iron - EN-JS1082/ASTM A536 (galvanized) / steel (chromatiert)
080	stud bolt	stainless steel - 1.4301-K70^

No.	designation	material
090	hexagon nut	stainless steel - 1.4301-K70^
100	packing material (chevron)	PTFE° / PTFE-graphite°
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
170	grounding device	stainless steel - 1.4310
210	stop	steel (galvanized) / stainless steel
220	hexagon bolt	stainless steel - 1.4301

* ceramic ball on request **Hastelloy stem on request
 ° optional
 ^ other on request

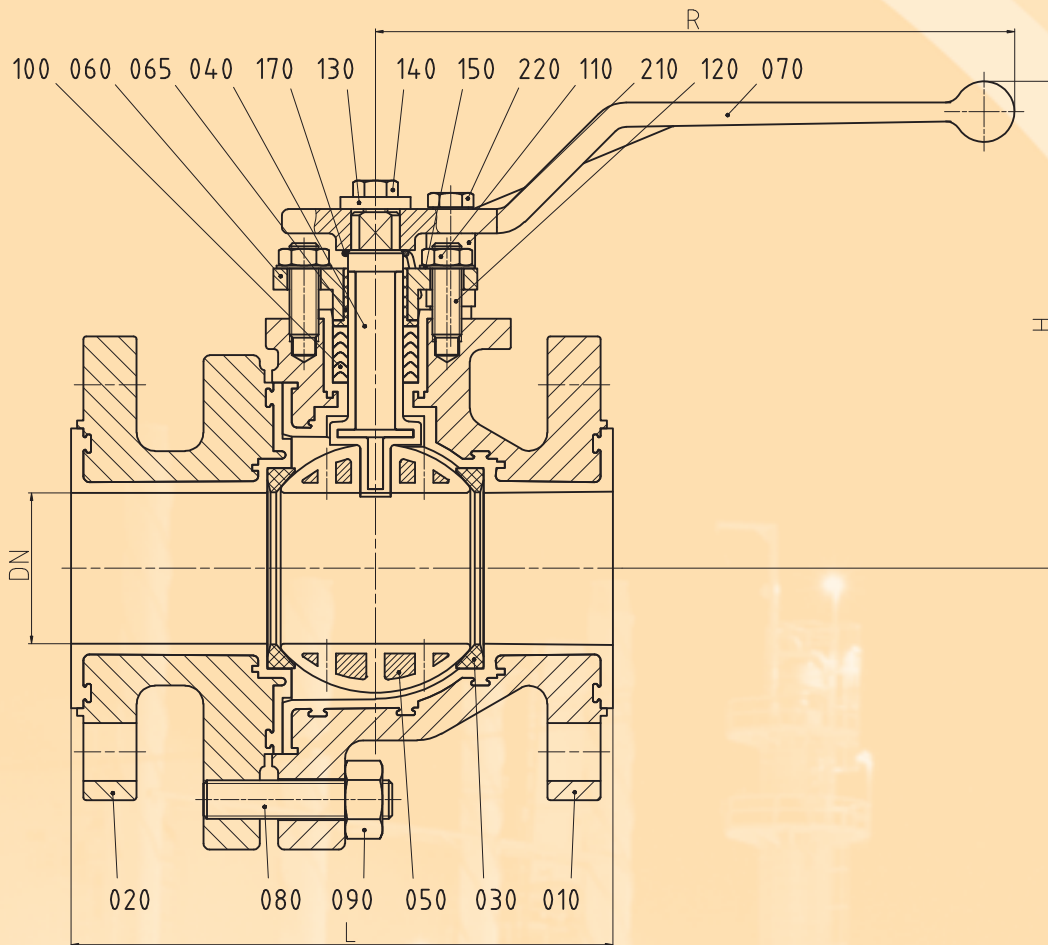
AKH3 - dimensions - reduced port - ANSI

DN/ANSI	L	H	R	weight
1"	127	120	160	kg 4,4
1½"	165	120	160	kg 6,2
2"	178	145	210	kg 10,6
3"	203	160	210	kg 16,1
4"	229	205	313	kg 30,2
6"	267	220	313	kg 50,2
8"	292	312	337 ^{°°}	kg 106,6
10"	330	373	450 [°]	kg 173,7
12"	356	363	450 [°]	kg 237,0
14 ^{**}	381	-	-	kg 320,0

^{°°} pass-through handlever Ø 674 mm standard
[°] pass-through handlever Ø 900 mm standard
^{*} ball valve only with manual actuator (weight without actuator)

Technical Data

AKH2A



ANSI
Face-to-Face Dimensions:
 ISO 5752 tab. 6, short
 ANSI B 16.10, short
Flange Connection:
 ANSI B 16.5, 150lbs

AKH2A - material specification

No.	designation	material	No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°	090	hexagon nut	stainless steel - 1.4301-K70 [^]
020	side piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°	100	packing material (chevron)	PTFE° / PTFE-graphite°
030	seat ring	PTFE	110	hexagon nut	stainless steel - 1.4301
040	stem	stainless steel / Hastelloy C4 ^{**} , PFA	120	stud bolt	stainless steel - 1.4301
050	ball	alloy steel / ductile cast iron - EN-JS1049/ASTM A395 / ceramic Al ₂ O ₃ [*] , PFA° / FEP°	130	lock washer	stainless steel - 1.4301
060	gland follower	stainless steel - 1.4308	140	hexagon bolt	stainless steel - 1.4301
065	gland insert	PTFE-graphite	150	serrated lock washer	stainless steel - 1.4301
070	hand lever	die-cast metal / ductile cast iron - EN-JS1082/ASTM A536 (galvanized) / steel (galvanized)	170	grounding device	stainless steel - 1.4310
080	stud bolt	stainless steel - 1.4301-K70 [^]	210	stop	steel (galvanized) / stainless steel
			220	hexagon bolt	stainless steel - 1.4301

* ceramic ball on request
 ° optional
 ^ other on request

**Hastelloy stem on request

AKH2A - dimensions - ANSI

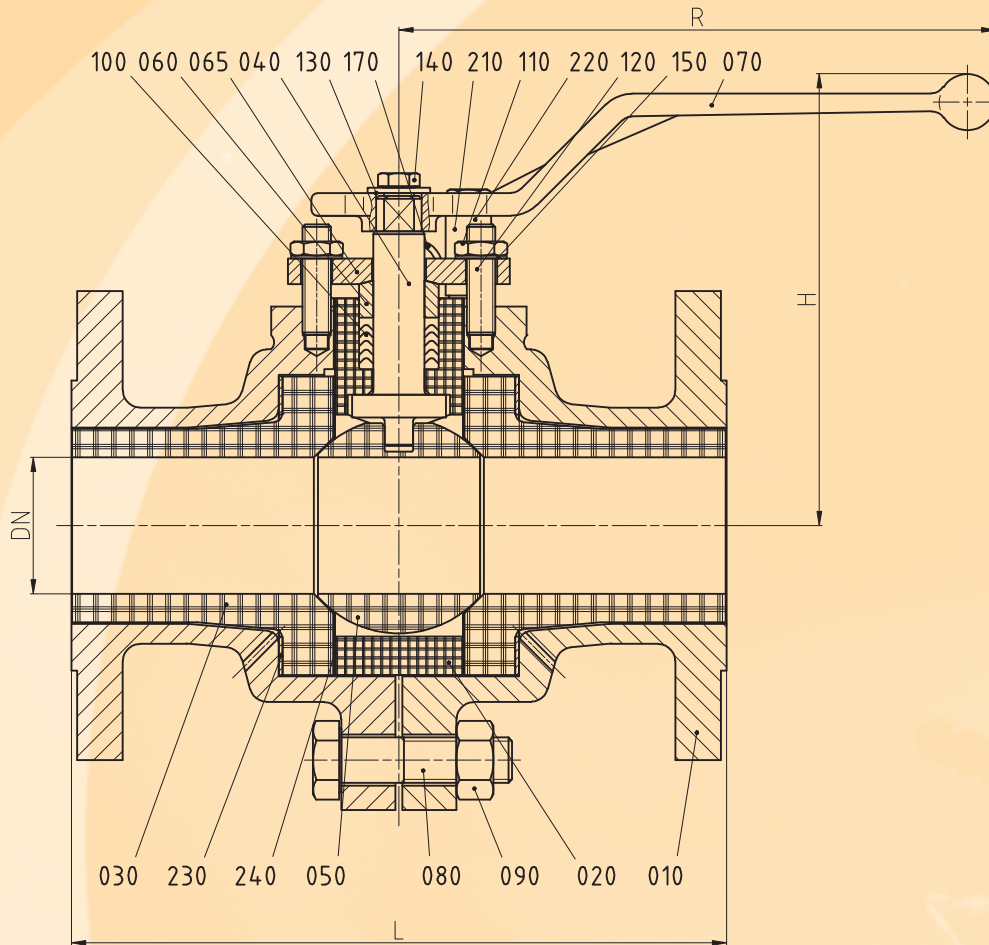
DN/ANSI	L	H	R	weight
1"	127	120	160	kg 4,2
1½"	165	145	210	kg 7,8
2"	178	160	210	kg 11,6
3"	203	205	313	kg 25,7
4"	229	220	313	kg 36,9
6"	267	299	337*	kg 78,0

* pass-through handlelever Ø 674 mm standard



Technical Data

AKH5

**DIN****Face-to-Face Dimensions:**

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2, PN16

Tightness Test:

DIN EN 12266-1 (P10)

ANSI B 16.10, Classe IV

ANSI**Flange Connection:**

ANSI B 16.5, 150lbs

Tightness Test:

DIN EN 12266-1 (P10)

ANSI B 16.10, Classe IV

AKH5 - material specification

No.	designation	material
010	body piece	ductile cast iron - EN-JS1049/ASTM A395
020	body	ceramic
030	bushing	ceramic
040	stem	stainless steel° / ceramic°
050	ball	ceramic
060	gland	stainless steel - 1.4301
065	gland shaped ring	stainless steel - 1.4301
070	hand lever	die-cast metal / ductile cast iron - EN-JS1082/ ASTM A536 (galvanized)
080	stud bolt	stainless steel - 1.4301-K70 [^]
090	hexagon nut	stainless steel - 1.4301-K70 [^]
100	packing material (chevron) / packing ring	PTFE Grafseal

No.	designation	material
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
170	grounding device ^{**}	stainless steel - 1.4310
210	stop	steel (galvanized)
220	hexagon bolt	stainless steel - 1.4301
230/240	flat gasket	Gylon / Garfite S

° Optional stainless steel or ceramic stem

If special stem materials are necessary,
consult Flowserve GmbH, please.^{**} grounding device only in combination with
stainless steel stem[^] other on request

AKH5 - dimensions - ceramic lined - DIN

DN/DIN	L	H	R	weight
025	160	122	160	kg 7,5
040	200	150	210	kg 14,5
050	230	160	210	kg 19,1
080	310	205	313	kg 42,5
100	350	210	313	kg 57,1
150*	356	212	313	kg 85,0

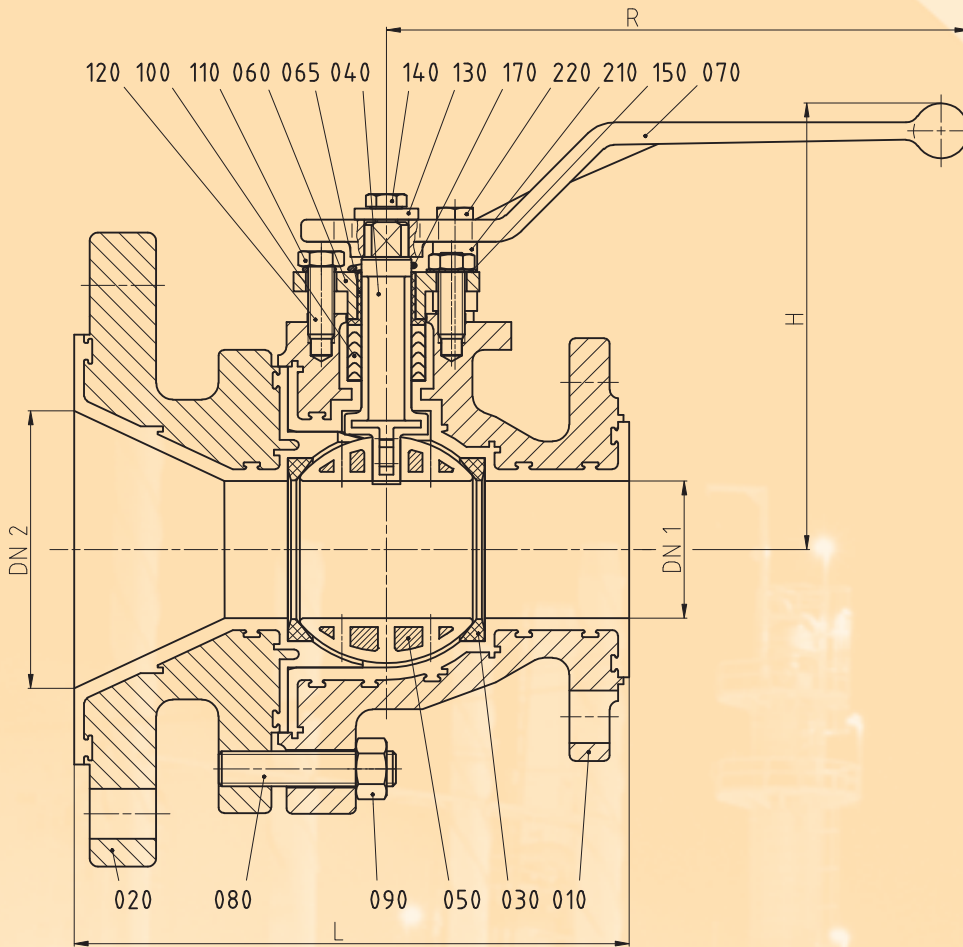
* Face-to-Face dimensions acc. to ANSI B 16.10 and with reduced port

AKH5 - dimensions - ceramic lined - ANSI

DN/ANSI	L	H	R	weight
1"	152,4	122	160	kg 6,9
1½"	178	150	210	kg 12,5
2"	203	160	210	kg 18,5
3"	241	205	313	kg 40,0
4"	292	210	313	kg 61,1
6" *	356	212	313	kg 85,0

* reduced port

Technical Data AKH6



DIN
Flange Connection:
DIN EN 1092-2, PN16

ANSI
Flange Connection:
ANSI B 16.5, 150lbs

AKH6 - material specification

No.	designation	material	No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°	100	packing material (chevron)	PTFE° / PTFE-graphite°
020	side piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°	110	hexagon nut	stainless steel - 1.4301
030	seat ring	PTFE	120	stud bolt	stainless steel - 1.4301
040	stem	stainless steel / Hastelloy C4**, PFA	130	lock washer	stainless steel - 1.4301
050	ball	alloy steel / ductile cast iron - EN-JS1049/ASTM A395 / ceramic Al ₂ O ₃ *, PFA° / FEP°	140	hexagon bolt	stainless steel - 1.4301
060	gland follower	stainless steel - 1.4308	150	serrated lock washer	stainless steel - 1.4301
065	gland insert	PTFE-graphite	170	grounding device	stainless steel - 1.4310
070	hand lever	die-cast metal / ductile cast iron - EN-JS1082/ ASTM A536 (galvanized) / steel	210	stop	steel (galvanized) / stainless steel
080	stud bolt / hexagon bolt	stainless steel - 1.4301-K70^	220	hexagon bolt	stainless steel - 1.4301
090	hexagon nut	stainless steel - 1.4301-K70^			

* ceramic ball on request **Hastelloy stem on request
 ° optional
 ^ other on request

AKH6 - dimensions - DIN

DN1/DN2	L	H	R	weight	
025/050	150	123	160	kg	7,6
025/100	150	123	160	kg	10,7
040/080	185	145	210	kg	10,7
050/080	195	160	210	kg	17,7
050/100	200	160	210	kg	9,8
050/150	185	160	210	kg	22,6
080/100	245	205	313	kg	39,0
080/150	280	205	313	kg	37,8
100/150	290	220	313	kg	52,0
150/200	305	312	337*	kg	90,0
150/250	350	312	337*	kg	211,0

* pass-through handlever Ø 674 mm

AKH6 - dimensions - ANSI

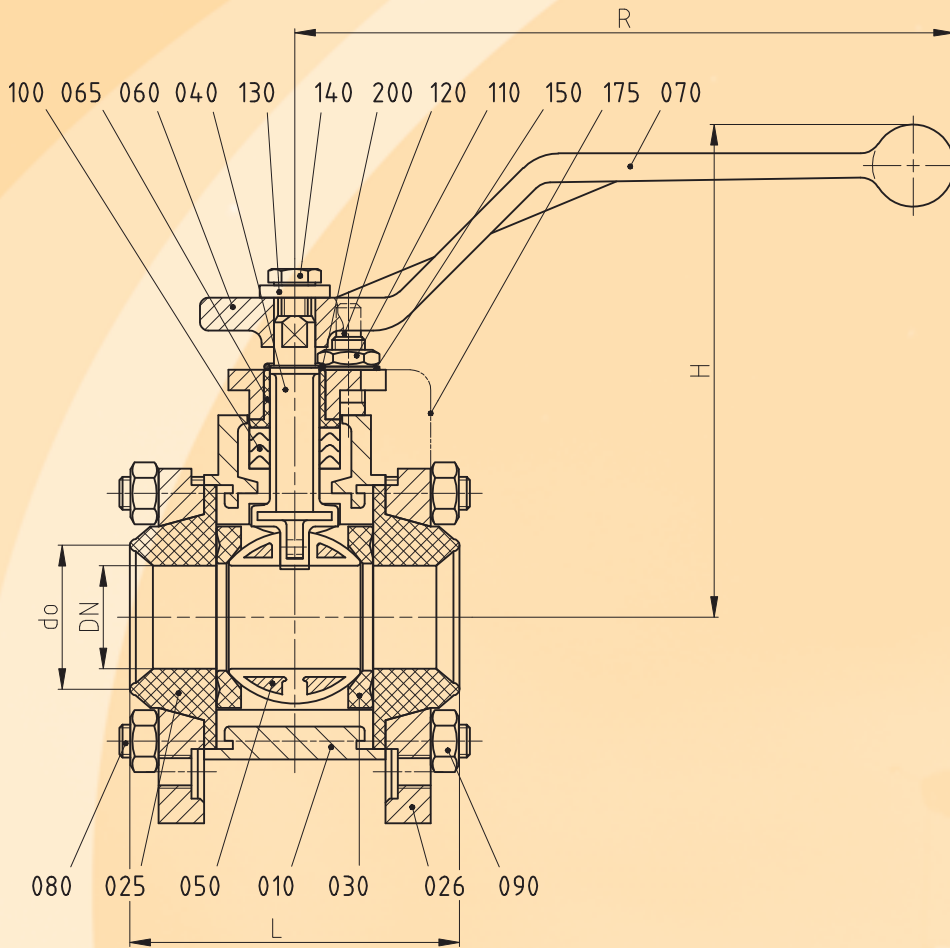
DN1/DN2	L	H	R	weight	
1 1/2"/2"	150	123	160	kg	7,6
1 1/2"/3"	185	145	210	kg	10,7
2"/3"	195	160	210	kg	17,1
2"/4"	200	160	210	kg	19,8
2"/6"	185	160	210	kg	22,1
3"/4"	245	205	313	kg	37,5
4"/6"	290	220	313	kg	56,1
6"/8"	305	312	337*	kg	90,0

* pass-through handlever Ø 674 mm



Technical Data

AKH7/KP



AKH7/KP - material specification

No.	designation	material
010	center piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
025	side piece/glass pip connection	PTFE-glass
026	flange	steel
030	seat ring*	PTFE
040	stem	steel / Hastelloy C4°, PFA
050	ball	ductile cast iron - EN-JS1049/ASTM A395 / ceramic Al ₂ O ₃ ** , PFA° / FEP°
060	gland follower	stainless steel - 1.4308
065	gland insert	PTFE-graphite
070	hand lever	die-cast metal
080	stud bolt	stainless steel - 1.4301-K70^

No.	designation	material
090	hexagon nut	stainless steel - 1.4301-K70^
100	packing material (chevron)	PTFE° / PTFE-graphite°
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
175	grounding strap	stainless steel - 1.4301
200	grounding device	stainless steel - 1.4310

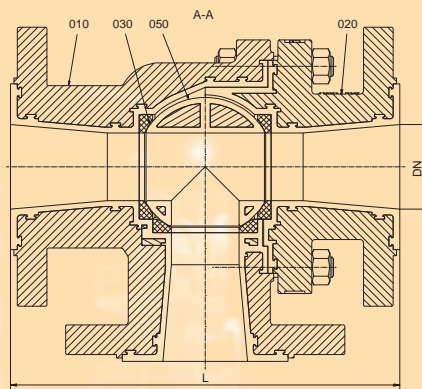
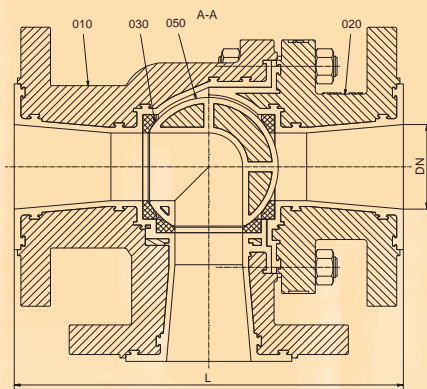
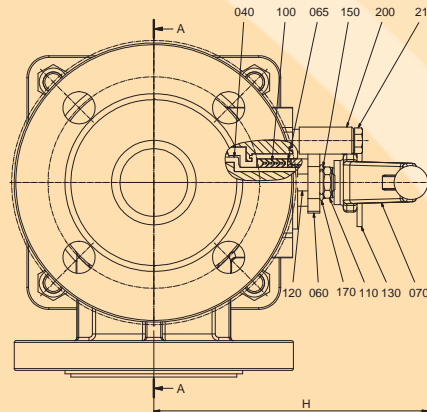
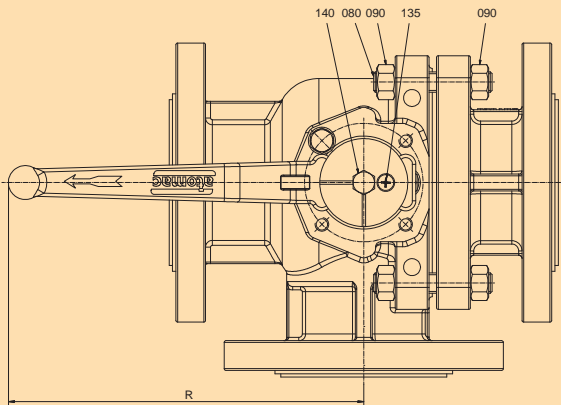
* seat ring available in normal and in minimum-dead-space design
 ** ceramic ball on request **Hastelloy stem on request
 ° optional
 ^ other on request

AKH7/KP - dimensions - DIN

DN/DIN	L	H	R	do	weight	
025	80	118	160	35	kg	2,2
040	110	146	210	51	kg	5,2
050	125	150	210	64	kg	7,5

Flange connection with ball cup or planned face is possible.
 stem lining DN 25 1,5 mm
 all other sizes at least 2,5 mm

Technical Data AMP3



L - ball

T - ball

DIN

Face-to-Face Dimensions:
DIN EN 558 (basic series 1)

Flange Connection:
DIN EN 1092-2

ANSI

Face-to-Face Dimensions:
DIN EN 558 (basic series 1)

Flange Connection:
ANSI B 16.5

AMP3 - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	side piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
030	seat ring	PTFE
040	stem	stainless steel, PFA
050	ball	tool steel, alloyed / ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
060	gland follower	stainless steel - 1.4308
065	gland insert	PTFE-graphite
070	hand lever	die-cast metal (galvanized) / ductile cast iron - EN-JS1082/ASTM A536 (galvanized)
080	stud bolt	stainless steel - 1.4301-K70 [^]
090	hexagon nut	stainless steel - 1.4301-K70 [^]

No.	designation	material
100	packing material (chevron)	PTFE
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	Rasterscheibe	stainless steel - 1.4301
135	countersunk screw	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
170	grounding device	stainless steel - 1.4310
200	stop	stainless steel / steel (galvanized)
210	hexagon bolt	stainless steel - 1.4301

° optional
^ other on request

AMP3 Dimensions - DIN

DN/DIN	L	R	H	weight	
025	160	160	125	kg	5,2
040	200	210	149	kg	12,0
050	230	210	165	kg	16,7
080	310	313	200	kg	32,0
100	350	313	220	kg	45,0
150*	480	674	313,5	kg	139,5

* T-wrench

AMP3 - dimensions - ANSI

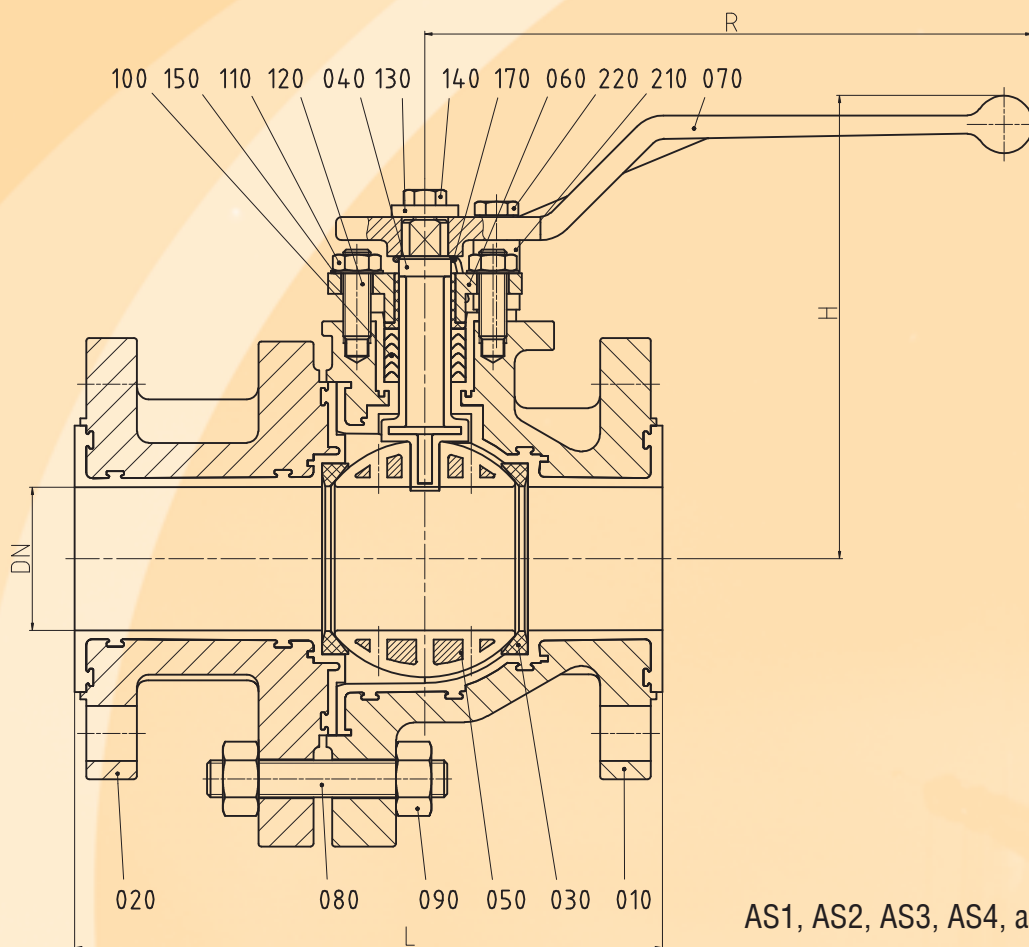
DN/ANSI	L	R	H	weight	
1"	160	160	125	kg	5,2
1½"	200	210	149	kg	12,0
2"	230	210	165	kg	16,7
3"	310	313	200	kg	32,0
4"	350	313	220	kg	45,0
6" *	480	674	313,5	kg	137,7

* T-wrench



Technical Data

AtoStar



AS1, AS2, AS3, AS4, and AS5

AtoStar AS1 - AS5 - material specification

No.	designation	material
010	body	stainless steel, PFA
020	side piece	stainless steel, PFA
030	seat ring	PTFE
040	stem	stainless steel, PFA
050	ball	alloy steel / stainless steel / ductile cast iron - EN-JS1049/ASTM A395, PFA
060	gland follower	stainless steel, PTFE-graphite
070	hand lever	stainless steel - 1.4308
080	stud bolt	stainless steel - 1.4301-K70 [^]
090	hexagon nut	stainless steel - 1.4301-K70 [^]
100	packing material (chevron)	PTFE [°] / PTFE-graphite [°]

No.	designation	material
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
170	grounding device	stainless steel - 1.4310
210	stop	stainless steel - 1.4301
220	hexagon bolt	stainless steel - 1.4301

[°] optional
[^] other on request

AtoStar - AS1 - dimensions - DIN

DN/DIN	L	H	R	weight
015	130	120	160	kg 4,5
020	150	120	160	kg 5,1
025	160	120	160	kg 5,7
040	200	145	210	kg 11,2
050	230	160	210	kg 14,8
065	290	200	313	kg 17,2
080	310	205	313	kg 32,5
100	350	220	313	kg 49,9
150	480	316	337 [*]	kg 103,0

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2, PN16

* pass-through handlever Ø 674 mm standard

Technical Data AtoStar



AtoStar - AS2 - dimensions - ANSI

DN/ANSI	L	H	R	weight
½"	127	120	160	kg 4,3
¾"	150**	120	160	kg 4,8
1"	152,4	120	160	kg 5,3
1½"	178	145	210	kg 8,8
2"	203	160	210	kg 13,4
3"	241	205	313	kg 30,6
4"	292	220	313	kg 45,7
6"	356	312	337*	kg 95,0

* pass-through handlever Ø 674 mm standard
** Face-to-Face dimensions acc. to DIN EN 558 (basic series 1)

Flange Connection:
ANSI B 16.5, 150lbs

AtoStar - AS3 - dimensions - ANSI

DN/ANSI	L	H	R	weight
½"	127**	120	160	kg 4,3
¾"	127**	120	160	kg 4,6
1"	127	120	160	kg 4,7
1½"	165	145	210	kg 7,8
2"	178	160	210	kg 11,5
3"	203	205	313	kg 25,7
4"	229	220	313	kg 36,9
6"	267	303	337*	kg 93,0

* pass-through handlever Ø 674 mm standard
** Face-to-Face dimensions not acc. ISO 5752, ANSI 16.10

Face-to-Face Dimensions:
ISO 5752 Tab.6, short
ANSI B 16.10, short
Flange Connection:
ANSI B 16.5, 150lbs

AtoStar - AS4 - dimensions - JIS

DN/JIS	L	H	R	weight
015	127	120	160	kg 4,5
020	127	120	160	kg 4,7
025	127	120	160	kg 4,7
040	165	145	210	kg 7,8
050	178	160	300	kg 11,5
065	190,5	200	450	kg 23,7
080	203	205	450	kg 25,7
100	229	220	450	kg 36,9
150	267	303	337*	kg 92,0

* pass-through handlever Ø 674 mm standard

Face-to-Face Dimensions:
ANSI B 16.10
Flange Connection :
JIS B 2220 table 5

AtoStar - AS5 - Dimensions

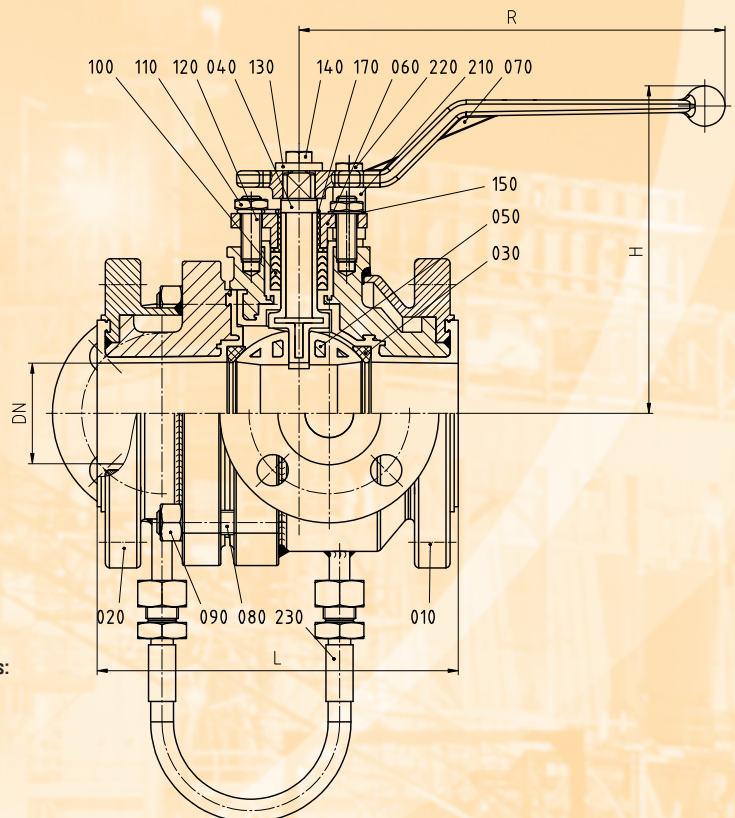
DN	L	H	R	weight
015	140	120	160	kg 4,3
020	152	120	160	kg 4,8
025	165	120	160	kg 5,0
040	191	145	210	kg 8,1
050	216	160	210	kg 12,3
065	240	200	313	kg 24,4
080	250	205	313	kg 27,4
100	280	220	313	kg 39,5
150	on request			

Flange Connection:
JIS B 2220 table 5

AtoStar AS6 (mit heating jacket) - material specification

No.	designation	material
010	body / heating jacket	stainless steel, PFA
020	side piece / heating jacket	stainless steel, PFA
030	seat ring	PTFE
040	stem	stainless steel, PFA
050	ball	alloy steel / stainless steel / ductile cast iron - EN-JS1049/ASTM A395, PFA
060	gland follower	stainless steel, PTFE-graphite
070	hand lever	stainless steel - 1.4308
080	stud bolt	stainless steel - 1.4301-K70^
090	hexagon nut	stainless steel - 1.4301-K70^
100	packing material (chevron)	PTFE
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
170	grounding device	stainless steel - 1.4310
210	stop	stainless steel - 1.4301
220	hexagon bolt	stainless steel - 1.4301
230	flexible hose - set	PTFE

^ other on request



AtoStar - AS6 - dimensions - ANSI

DN/ANSI	L	H	R	weight
1"	127	120	160	kg 7,5
1½"	165	145	210	kg 12,1
2"	178	160	210	kg 17,2
3"	203	205	313	kg 33,4
4"	229	220	313	kg 45,0
6"	267	303	337*	kg 82,0
8"	292	312	337*	kg 112,0

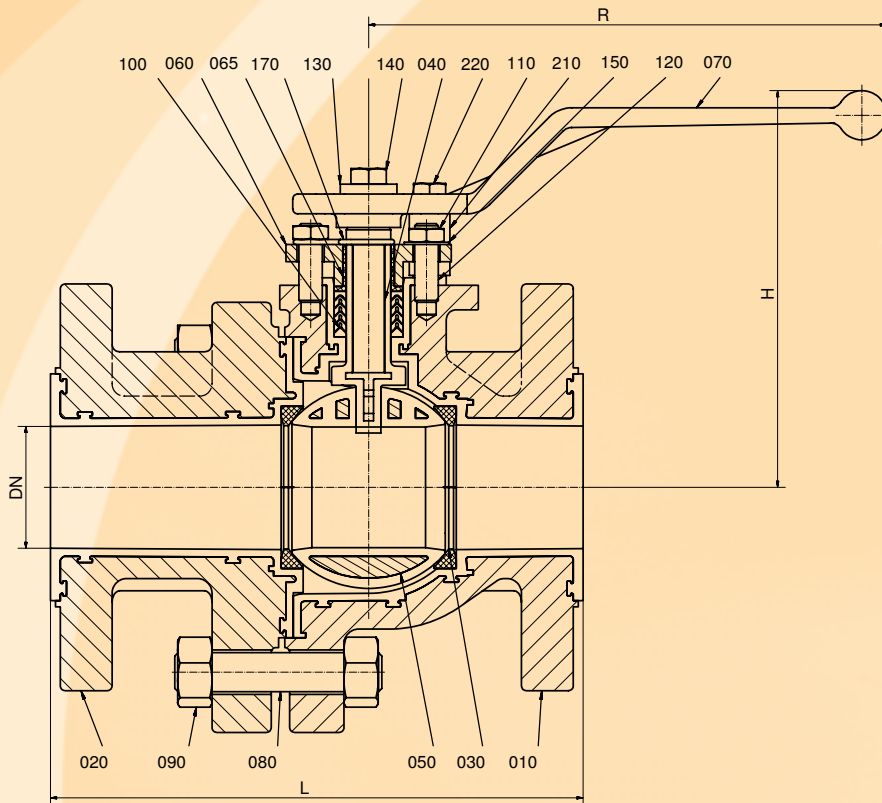
° pass-through handlever Ø 674 mm standard
* reduced port

Face-to-Face Dimensions:
ISO 5752 Tab.6, short
ANSI B 16.10, short
Flange Connection:
ANSI B 16.5, 150lbs



Technical Data

AKH2-300



ANSI

Face-to-Face Dimensions:
ANSI B16.10, tab. 2 serial 10

Flange Connection:
ANSI B 16.5

AKH2-300 - material specification

No.	designation	material
010	body	carbon steel ASTM A216 Gr WCB, PFA
020	side piece	carbon steel ASTM A216 Gr WCB, PFA
030	seat ring	PTFE
040	stem	duplex stainless steel, PFA
050	ball	steel, PFA / ceramic Al_2O_3 *
060	gland follower	stainless steel - 1.4308
065	gland insert	PTFE-graphite
070	hand lever	die-cast metal (galvanized)
080	hexagon bolt	ASTM A193 B7 (yellow chromatiert)
090	hexagon nut	ASTM A194 2H (yellow chromatiert)

No.	designation	material
100	packing material (chevron)	PTFE
110	hexagon nut	stainless steel - 1.4301
120	stud bolt	stainless steel - 1.4301
130	lock washer	stainless steel - 1.4301
140	hexagon bolt	stainless steel - 1.4301
150	serrated lock washer	stainless steel - 1.4301
170	grounding device	stainless steel - 1.4310
210	stop	steel (galvanized)
220	hexagon bolt	stainless steel - 1.4301

* ceramic ball on request

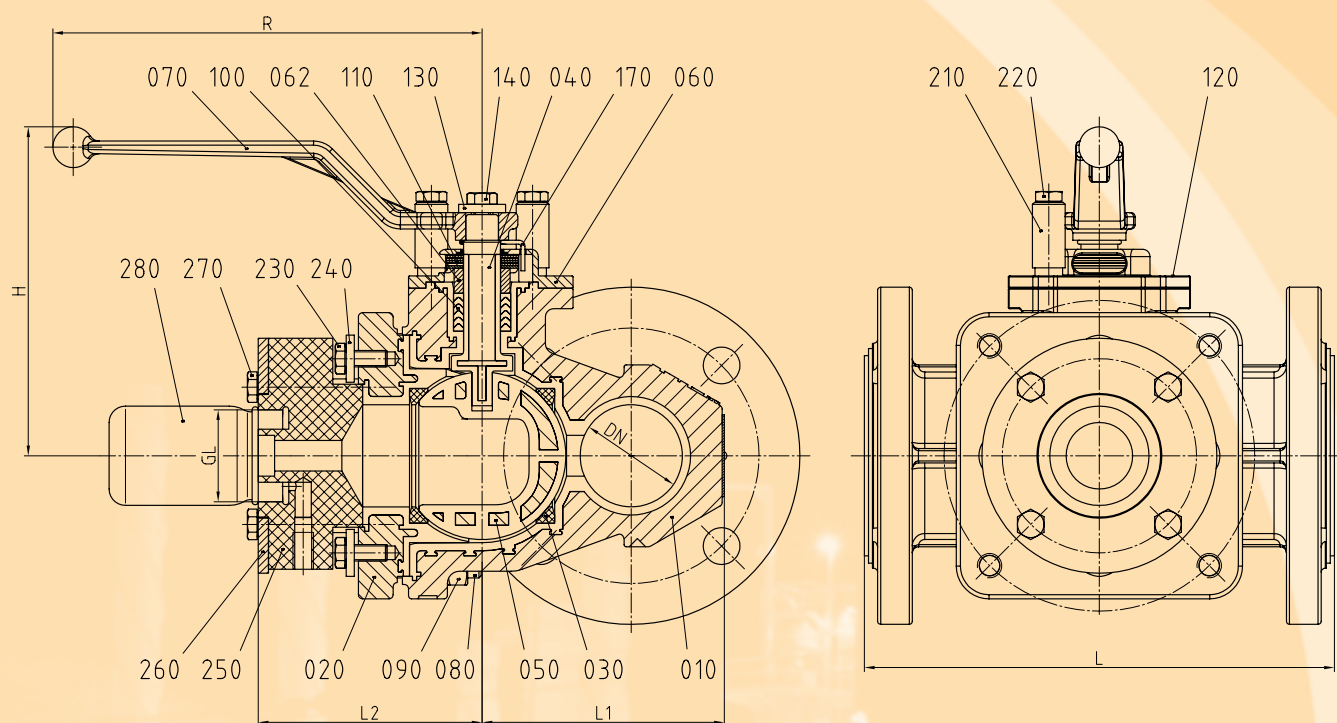
AKH2-300 - dimensions - ANSI

DN/ANSI	L	H	R	weight
1"	165	123	160	kg 7,5
1½"	190	145	210	kg 13,9
2"	216	160	210	kg 18,5
3"	282	205	313	kg 42,2
4"	305	220	313	kg 60,7
6"	403	312	337 ^{oo}	kg 143,9

^{oo} pass-through handlelever Ø 674 mm

Technical Data

AtoPro



DIN

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2

AtoPro - material specification

No.	designation	material	No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / PFA-conductive °	120	countersunk screw	stainless steel - 1.4301
020	side piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / PFA-conductive °	130	lock washer	stainless steel - 1.4301
030	seat ring	PTFE° / PTFE-conductive°	140	hexagon bolt	stainless steel - 1.4301
040	stem	stainless steel, PFA	170	grounding device	stainless steel - 1.4310
050	ball	stainless steel, PFA° / PFA-conductive °	210	stop	steel (galvanized)
060	gland follower	stainless steel - 1.4308, PTFE° / PTFE-conductive°	220	hexagon bolt	stainless steel - 1.4301
062	spacer	stainless steel - 1.4104	230	hexagon bolt	stainless steel - 1.4301
070	hand lever	die-cast metal	240	lock washer	stainless steel - 1.4301
080	stud bolt	stainless steel - 1.4301-K70 [^]	250	adapter	PTFE-conductive
090	hexagon nut	stainless steel - 1.4301-K70 [^]	260	plate	stainless steel - 1.4301
100	packing material	PTFE° / PTFE-graphite°	270	hexagon bolt	stainless steel - 1.4301
110	belleville washer	stainless steel - 1.4310	280	bottle	glass

° optional
^ other on request

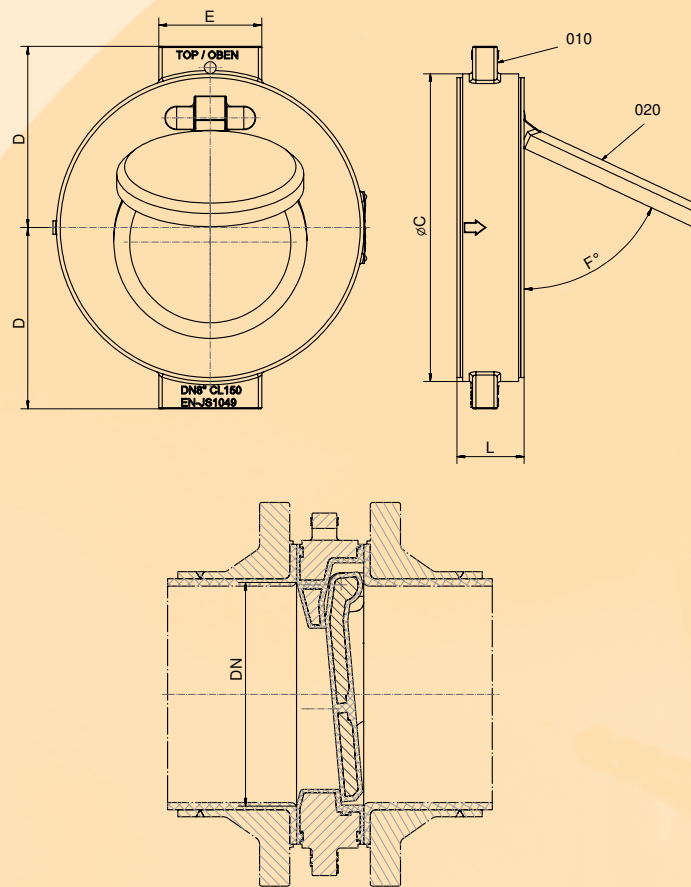
AtoPro - dimensions - DIN

DN/DIN	L	L1	L2	H	R	GL DIN 168-1	max. sampl. vol. cm ³	weight	
025	160	90,5	109,5	160	210	GL45	90 ml	kg	14,6
050	230	117,5	109,5	160	210	GL45	90 ml	kg	19,6
080	310	148,5	109,5	160	210	GL45	90 ml	kg	26,0



Technical Data

ARK2



DIN

Face-to-Face Dimensions:

DIN EN 558 (basic series 20)

Flange Connection:

DIN EN 1092-2, PN16

ANSI

Face-to-Face Dimensions:

ANSI B 16.10 table 9 col. 3

Flange Connection:

ANSI B 16.5, 150lbs

ARK2 - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	disc	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°

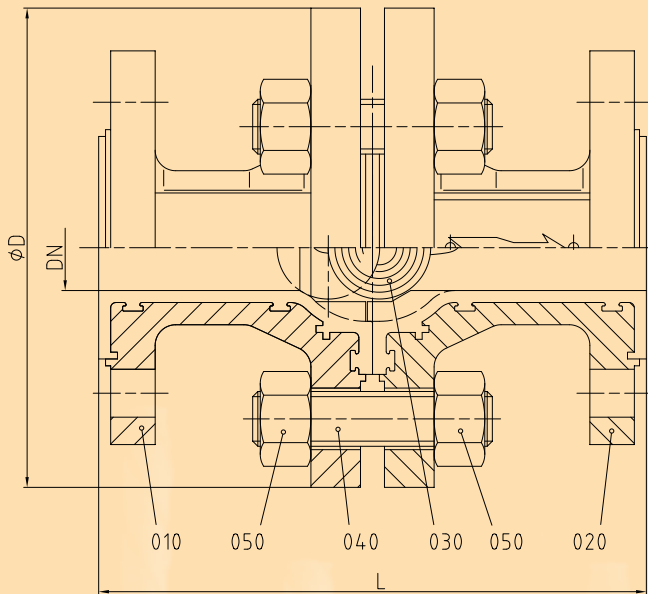
° optional

ARK2 - dimensions - DIN and ANSI

DN	C	D	E	L	F°	weight
050	2"	101	70	66	43	62 kg 2,2
080	3"	133	85	89	46	65 kg 3,8
100	4"	170	105	54	52	65 kg 6,6
150	6"	219	135	70	56	65 kg 11,1
200	8"	275	162	92	60	63 kg 18,2
250	10"	336	198	69	68	65 kg 29,8
300	12"	406	234	87	78	62 kg 49,8
350	14"	445	255	95	78	62 kg 62,1
400	16"	510	290	77	102	58 kg 104,4

Technical Data

ARV2, ARL



ARV2 - material specification

No.	designation	material
010	body piece	ductile cast iron - EN-JS1049/ASTM A395, PFA [°] / FEP [°]
020	body piece	ductile cast iron - EN-JS1049/ASTM A395, PFA [°] / FEP [°]
030	ball	PTFE-solid ball
040	stud bolt	stainless steel - 1.4301-K70 [^]
050	hexagon nut	stainless steel - 1.4301-K70 [^]

[°] optional
[^] other on request

ARV2 - dimensions - DIN

DN/DIN	L	ØD	weight	
015	130	105	kg	3,5
020	150	105	kg	3,9
025	160	140	kg	6,5
032	180	150	kg	8,2
040	200	165	kg	11,0
050	230	185	kg	13,7
065	290	220	kg	21,2
080	310	250	kg	32,6
100	350	285	kg	42,0
150*	356	395	kg	80,0
200*	457	515	kg	195,0

* Face-to-Face dimensions acc. ANSI B 16.10

ARV2 - dimensions - ANSI

DN/ANSI	L	ØD	weight	
½"	131	105	kg	3,4
¾"	150	105	kg	3,8
1"	152,4	140	kg	6,0
1½"	178	165	kg	9,3
2"	203	185	kg	13,2
3"	241	250	kg	28,0
4"	292	285	kg	42,0
6"	356	395	kg	78,0
8"	457	515	kg	166,0

DIN

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2, PN16

DN200: DIN EN 1092-2, PN10

Tightness Test:

DIN EN 12266-1 (leak rate B)

ANSI

Flange Connection:

ANSI B 16.5, 150lbs

Tightness Test:

DIN EN 12266-1 (leak rate B)

ARL - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA [°] / FEP [°]
020	flange	ductile cast iron - EN-JS1049/ASTM A395
030	ball	PTFE-solid ball
040	stud bolt	stainless steel - 1.4301-K70 [^]
050	hexagon nut	stainless steel - 1.4301-K70 [^]
060	flat gasket	PTFE

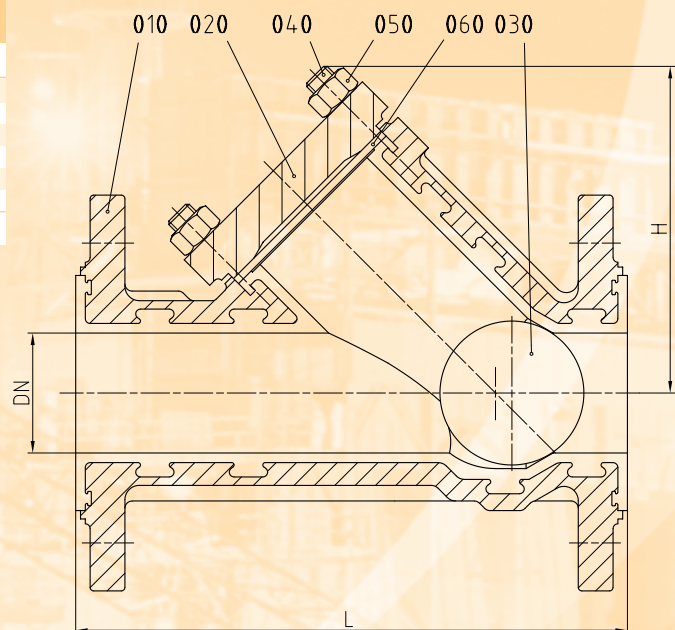
[°] optional
[^] other on request

ARL - dimensions - DIN

DN/DIN	L	H	weight	
025	160	90	kg	4,8
040	200	120	kg	9,2
050	230	136	kg	12,2
080	310	206	kg	20,5

ARL - dimensions - ANSI

DN/ANSI	L	H	weight	
1"	160	90	kg	4,8
1½"	200	120	kg	9,2
2"	230	136	kg	12,2
3"	310	206	kg	20,5



DIN

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2, PN16

Tightness Test:

DIN EN 12266-1 (leak rate B)

ANSI

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

Flange Connection:

ANSI B 16.5, 150lbs

Tightness Test:

DIN EN 12266-1 (leak rate B)



Technical Data

ARV/SG, ASG

ARV/SG - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	flange	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
030	glass	borosilicate-glass
040	flat gasket	UNITEC 300 green
050	stud bolt	stainless steel - 1.4301-K70 [^]
060	hexagon nut	stainless steel - 1.4301-K70 [^]
100	ball	PTFE-solid ball
110	ball guide	PTFE

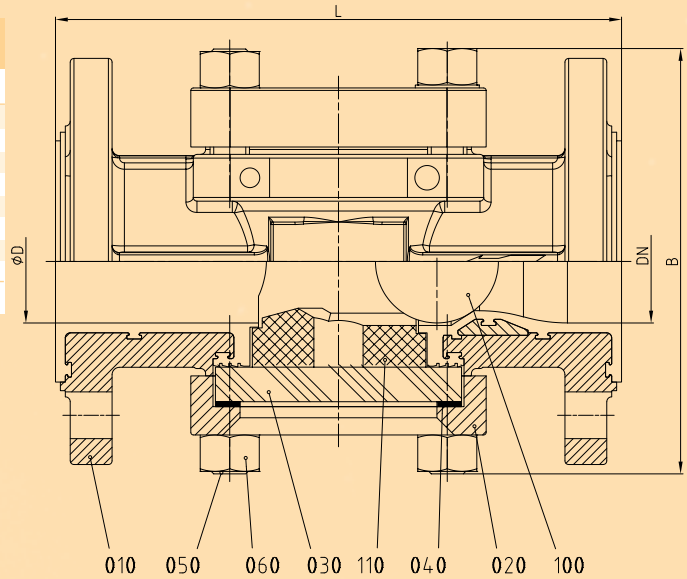
° optional
[^] other on request

ARV/SG - dimensions - DIN

DN/DIN	L	ØD	B	weight	
025	160	25	140	kg	5,2
040	200	32	148	kg	11,0
050	230	40	191	kg	12,2
080	310	65	222	kg	21,2
100	350	80	260	kg	28,6
150	480	150	360	kg	65,0

ARV/SG - Dimensions - ANSI

DN/ANSI	L	ØD	B	weight	
1"	152,4	25	138	kg	4,7
1½"	178	32	148	kg	9,0
2"	203	40	189	kg	10,8
3"	241	65	242	kg	18,2
4"	292	80	264	kg	28,2



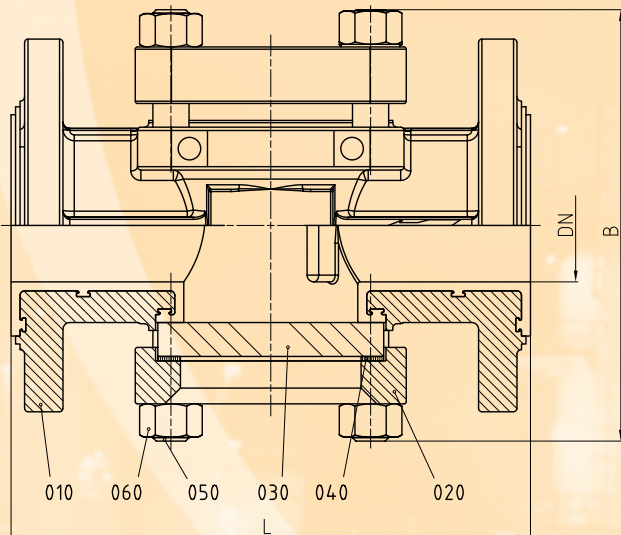
DIN

Face-to-Face Dimensions:
 DIN EN 558 (basic series 1)

Flange Connection:
 DIN EN 1092-2, PN16

ANSI

Flange Connection:
 ANSI B 16.5, 150lbs



ASG - material specification

No.	designation	material
010	body piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	flange	ductile cast iron - EN-JS1049/ASTM A395
030	glass	borosilicate-glass
040	flat gasket	UNITEC 300 green
050	stud bolt	stainless steel - 1.4301-K70 [^]
060	hexagon nut	stainless steel - 1.4301-K70 [^]

° optional
[^] other on request

ASG - dimensions - DIN

DN/DIN	L	B	weight	
025	160	140	kg	5,2
040	200	148	kg	9,1
050	230	193	kg	13,0
065	290	203	kg	15,0
080	310	248	kg	19,8
100	350	270	kg	28,1
150	480	355	kg	61,0
200	457*	404	kg	94,0
250	534*	459	kg	132,0

* Face-to-Face dimensions acc. ANSI B 16.10

DIN

Face-to-Face Dimensions:
 DIN EN 558 (basic series 1)

Flange Connection:
 DIN EN 1092-2, PN16
 up DN 200: DIN EN 1092-2, PN10

ANSI

Flange Connection:
 ANSI B 16.5, 150lbs

ASG - dimensions - ANSI

DN/ANSI	L	B	weight	
1"	152,4	135	kg	4,5
1½"	178	148	kg	6,9
2"	203	189	kg	10,5
3"	241	242	kg	18,0
4"	292	264	kg	28,2
6"	480	346,6	kg	59,0
8"	457*	406	kg	96,3
10"	534*	457	kg	125,7

* Face-to-Face dimensions acc. ANSI B 16.10

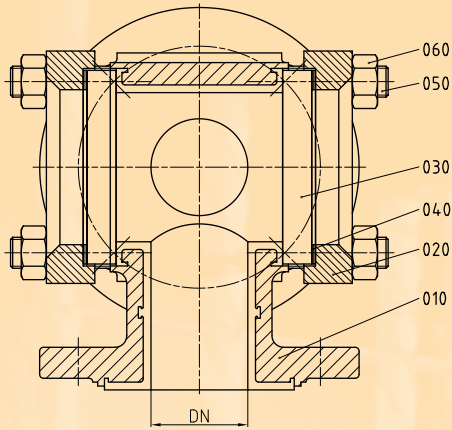
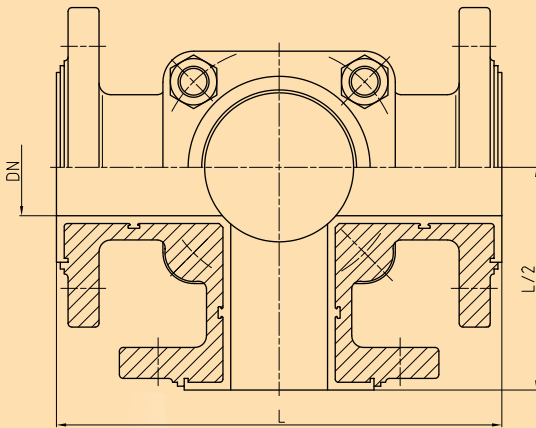
Attention!

Thermal Shock Resistance of Borosilicate-Glass is according to DIN 7080 $t = \max. 80^{\circ}\text{C}$ (176°F).

Everything else according to atomac Pressure / Temperature Diagram.

Technical Data

ASG3, ASG4



ASG 3 - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	flange	ductile cast iron - EN-JS1049/ASTM A395
030	glass	borosilicate-glass
040	flat gasket	UNITEC 300 green
050	stud bolt	stainless steel - 1.4301-K70 [^]
060	hexagon nut	stainless steel - 1.4301-K70 [^]

[°] optional
[^] other on request

ASG3 - dimensions - DIN

DN/DIN	L	L/2	weight	
025	160	80	kg	6,3
050	230	115	kg	15,3
080	310	155	kg	26,7
100	350	175	kg	28,1

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2, PN16

Attention!

Thermal Shock Resistance of Borosilicatglass is according to DIN 7080 t = max. 80°C, (176°F).

Everything else according to atomac Pressure / Temperature Diagram.

ASG4 - material specification

No.	designation	material
010	body piece	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP°
020	flange	ductile cast iron - EN-JS1049/ASTM A395
030	glass	borosilicate-glass
040	flat gasket	UNITEC 300 green
050	stud bolt	stainless steel - 1.4301-K70 [^]
060	hexagon nut	stainless steel - 1.4301-K70 [^]
100	serrated lock washer	stainless steel

[°] optional
[^] other on request

ASG4 - dimensions - DIN

DN/DIN	L	weight	
025	160	kg	7,5
050	230	kg	18,4
080	310	kg	27,8

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

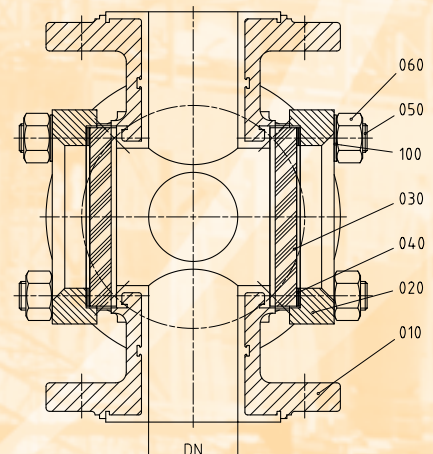
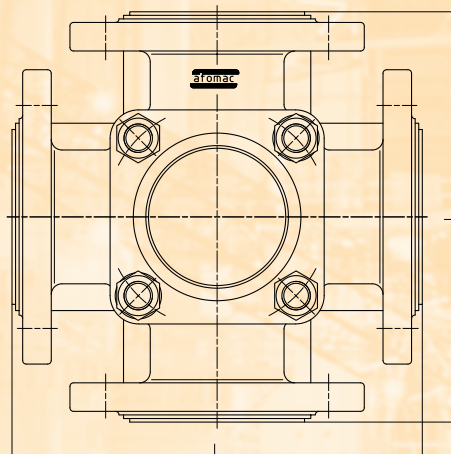
Flange Connection:

DIN EN 1092-2, PN16

Attention!

Thermal Shock Resistance of Borosilicate-Glass is according to DIN 7080 t = max. 80°C (176°F).

Everything else according to atomac Pressure / Temperature Diagram.





Technical Data

ASG/B, ASF

ASG/B - material specification

No.	designation	material
010	basic flange	steel, PFA
020	counter flange	steel
030	glass	borosilicate-glass
040	flat gasket	UNITEC 300 green
050	hexagonal socket head	steel

ASG/B - dimensions - DIN

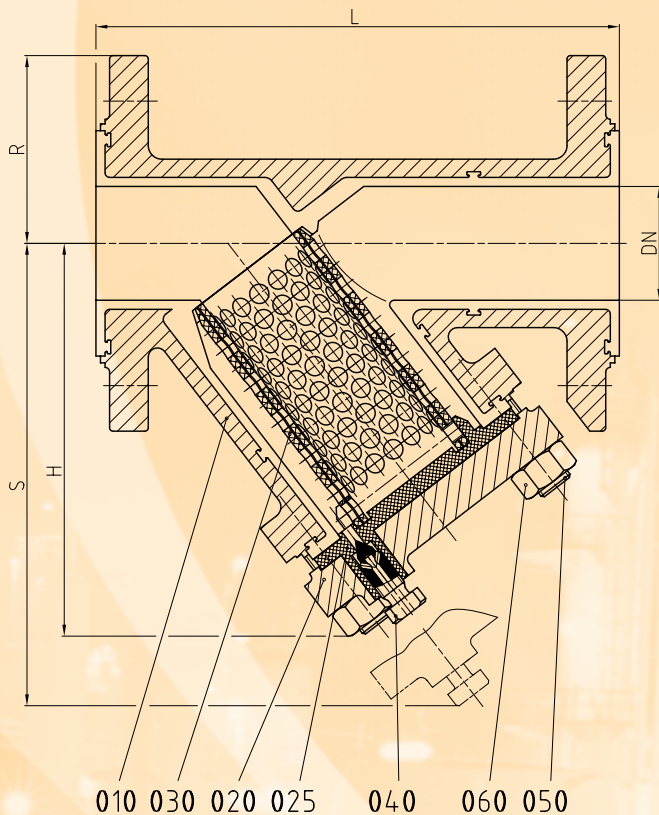
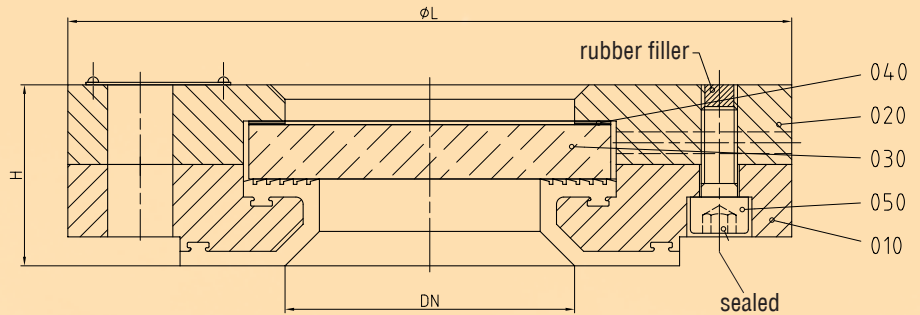
DN/DIN	ØL	H	weight	
080	200	50	kg	8,2
100	220	50	kg	11,0
125	250	58	kg	15,7
150	285	58	kg	19,0
200	340	58	kg	33,0

Max. Allowed Overpressure:

10 bar / 145 psi DIN 28121

Flange Connection:

DIN EN 1092-2, PN10



ASF - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA° / FEP °
020	flange	ductile cast iron - EN-JS1049/ASTM A395, PFA
025	drain cover	PTFE
030	filter	PTFE / ETFE-monofilamented filter screen
040	drain bolt	PTFE
050	stud bolt	stainless steel - 1.4301-K70 [^]
060	hexagon nut	stainless steel - 1.4301-K70 [^]

° optional
[^] other on request

ASF - dimensions - DIN

DN/DIN	L	H	S	R	weight	
025	160	125	190	57,5	kg	4,8
040	200	160	255	75	kg	9,1
050	230	165	290	82,5	kg	12,2
080	310	280	460	100	kg	27,0
100	350	305	490	110	kg	34,2
150*	470	410	550	139,7	kg	92,0
200	600	595	1030	171,5	kg	200,0

* Face-to-Face dimensions acc. ANSI B 16.10

ASF - dimensions - ANSI

DN/ANSI	L	H	S	R	weight	
1"	165	125	190	54	kg	4,9
1½"	203	160	255	63,5	kg	8,7
2"	228,6	165	290	76,2	kg	12,4
3"	317,5	280	460	95,3	kg	28,0
4"	368	305	490	114,3	kg	37,6
6"	470	410	550	139,7	kg	92,0
8"	600	595	1030	171,5	kg	200,0

DIN

Face-to-Face Dimensions:

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2, PN16

ANSI

Face-to-Face Dimensions:

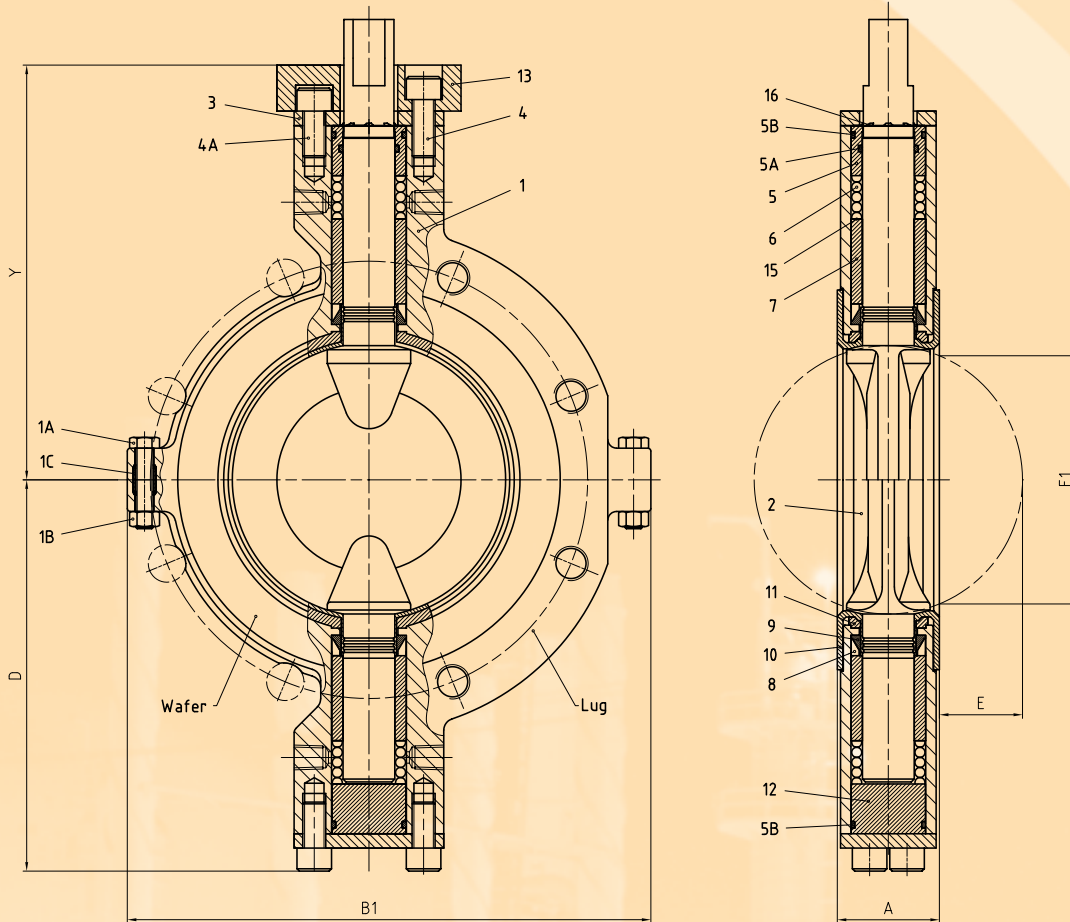
ANSI B 16.10

Flange Connection:

ANSI B 16.5, 150lbs

Technical Data

BTV Standard Pattern per DIN EN 558 series 20



BTV
Face-to-Face Dimensions:
DIN EN 558, basic series 20

BTV - material specification

No.	designation	material
1	body	ductile cast iron - EN-JS1049/ASTM A395
1A	body bolts	ASTM A193 Gr. B7
1B	body nuts	ASTM A194 Gr. 2H
1C	bushing	carbon steel
2	disc	ductile cast iron - EN-JS1049/ASTM A395, PFA
3	retainer plate	zinc plated steel
4	retainer bolts	zinc plated steel
4A	retainer bolts	zinc plated steel
5	gland top	stainless steel - 304
5A	O-ring shaft	Viton
5B	O-ring Cbor	Viton

No.	designation	material
6	spring	stainless steel - 302
7	bearing	composite
8	gland seal	stainless steel - 302
9	seal	Viton
10	liner	PTFE
11	seal seat	Viton
12	gland bottom	stainless steel - 304
13	plate mounting	carbon steel
15	shim	stainless steel - 303*304 (*if required)
16	grounding device	stainless steel - 302

BTV - dimensions - ANSI and DIN

DN	A	D	E	E1	Y	BTW B1	BTL B1	BTW weight in kg*	BTL
2"	050	42,8	125,4	9,9	45,8	151,8	152,4	6	8
3"	080	46	137,3	17	65,7	160,5	200	8	11
4"	100	52,3	162,7	25,2	88,5	173,4	222,2	10	15
6"	150	56,3	215,9	47,2	140	228,6	276,2	13	23
8"	200	60,3	239,7	68,2	187,5	251,9	364,4	17	34
10"	250	68,2	302,4	92,1	243	311,5	441,3	40	56
12"	300	78,5	328,6	112,7	293,7	337,7	487,4	52	79
14"	350	78,5	354	127,4	324	375	552,4	107	125
16"	400	101,6	385,7	142,8	373,7	404,6	635	127	168
18"	450	114,3	465,9	162,7	424,6	483,7	679,4	184	222
20"	500	127	622,3	181,7	437,8	509	762	234	280
24"	600	154	660,4	197,6	527,2	555,6	933,7	453	621

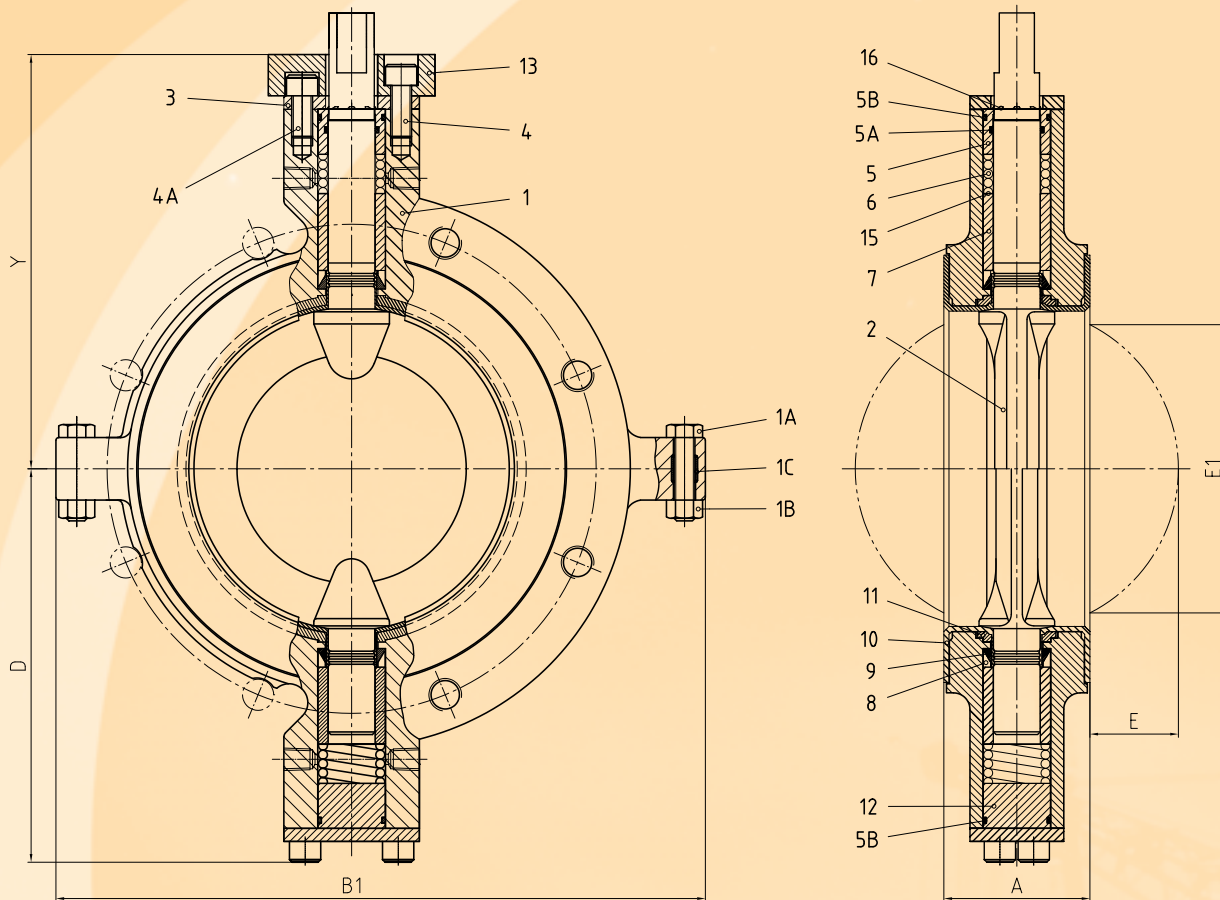
until DN8"/DN200 with hand lever, from DN10"/DN600 with gear

* weight without hand lever or gear



Technical Data

BTW Long Pattern per DIN EN 558 series 16



BTW/LP

Face-to-Face Dimensions:

DIN EN 558, basic series 16 (long pattern)

BTW/LP (long pattern) - material specification

No.	designation	material
1	body	ductile cast iron - EN-JS1049/ASTM A395
1A	body bolts	ASTM A193 Gr. B7
1B	body nuts	ASTM A194 Gr. 2H
1C	bushing	carbon steel
2	disc	ductile cast iron - EN-JS1049/ASTM A395, PFA
3	retainer plate	zinc plated steel
4	retainer bolts	zinc plated steel
4A	retainer bolts	zinc plated steel
5	gland top	stainless steel - 304
5A	O-ring shaft	Viton
5B	O-ring Cbor	Viton

No.	designation	material
6	spring	stainless steel - 302
7	bearing	composite
8	gland seal	stainless steel - 302
9	seal	Viton
10	liner	PTFE
11	seal seat	Viton
12	gland bottom	stainless steel - 304
13	plate mounting	carbon steel
15	shim	stainless steel - 303*304 (*if required)
16	grounding device	stainless steel - 302

BTW/LP (long pattern) - dimensions - ANSI and DIN

DN	A	D	E	E1	Y	BTW/LP	BTL/LP	BTW/LP	BTL/LP	
						B1	B1	weight in kg*	weight in kg*	
2"	050	43	125,4	10	46	151,8	152,4	168,2	6	8
3"	080	64	137,3	8	48	160,5	200	235	9	14
4"	100	64	162,7	20	81	173,4	222,2	254	11	18
6"	150	76	215,9	38	131	228,6	276,2	311	18	30
8"	200	89	239,7	54	176	251,9	364,4	384	26	49
10"	250	114	302,4	70	226	311,5	441,3	470	43	81
12"	300	114	328,6	95	282	337,7	487,4	535	53	109
14"	350	127	354	104	309	375	552,4	552,4	113	170
16"	400	140	385,7	124	362	404,6	635	635	133	213
18"	450	152	465,9	144	413	483,7	679,4	679,4	188	280
20"	500	152	622,3	170	467	509	762	635	243	317
24"	600	178	660,4	186	521	555,6	933,7	933,7	458	679

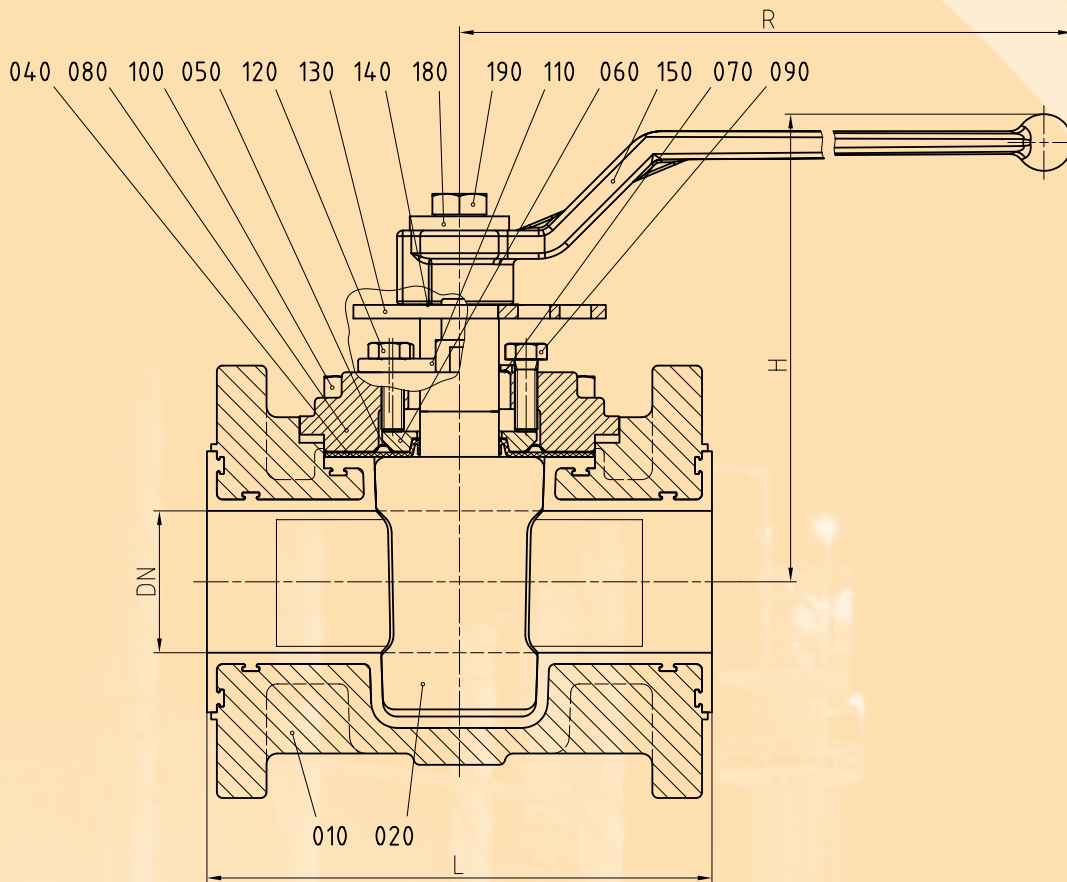
until DN8"/DN200 with hand lever, from DN10"/DN600 with gear

* weight without hand lever or gear



Technical Data

T4E1 ANSI 150 (DN½"-DN6"), T4E2 DIN PN 16 (DN15-DN150)

**T4E1****Face-to-Face Dimensions:**

ANSI B16.10 (short pattern)

Flange Connection:

ANSI B 16.5, 150lbs

T4E2**Face-to-Face Dimensions:**

DIN EN 558 (basic series 1)

Flange Connection:

DIN EN 1092-2, PN16

T4E1 DN½" - DN6" - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA lined
020	plug	ductile cast iron - EN-JS1049/ASTM A395, PFA lined
040	diaphragm	TFM (PFA*)
050*	metal diaphragm	stainless steel - 302
060	thrust gland	stainless steel - 304
070	grounding device	stainless steel - 302
080	top cap	ductile cast iron - EN-JS1049/ASTM A395
090	adjuster bolt	ASTM A193 Gr. B7
100	top cap bolt	ASTM A193 Gr. B7
110	stop	stainless steel ASTM A351/A744 Gr. CF-8M (316 SS)
120	stop fastener	stainless steel - 1.4301
130	stop collar	carbon steel, protective plated
140	stop collar retainer	stainless steel - 302
150	hand lever	ductile cast iron - EN-JS1082/ASTM A536
180	lock washer	stainless steel - 1.4301
190	hexagon bolt	stainless steel - 1.4301

* optional

T4E2 DN15 - DN150 - material specification

No.	designation	material
010	body	ductile cast iron - EN-JS1049/ASTM A395, PFA lined
020	plug	ductile cast iron - EN-JS1049/ASTM A395, PFA lined
040	diaphragm	TFM (PFA*)
050*	metal diaphragm	stainless steel - 302
060	thrust gland	stainless steel - 304
070	grounding device	stainless steel - 302
080	top cap	ductile cast iron - EN-JS1049/ASTM A395
090	adjuster bolt	stainless steel - 1.4301
100	top cap bolt	stainless steel - 1.4301
110	stop	stainless steel ASTM A351/A744 Gr. CF-8M (316 SS)
120	stop fastener	stainless steel - 1.4301
130	stop collar	carbon steel, protective plated
140	stop collar retainer	stainless steel - 302
150	hand lever	ductile cast iron - EN-JS1082/ASTM A536
180	lock washer	stainless steel - 1.4301
190	hexagon bolt	stainless steel - 1.4301

* optional

T4E1 DN½" - DN6" - dimensions - ANSI

DN/ANSI	L	H	R	weight	
½"	108	139	260	kg	3,7
¾"	117,5	139	260	kg	4,1
1"	127	139	260	kg	4,9
1½"	165	145	260	kg	7,4
2"	178	165	410	kg	11,3
3"	203	179	410	kg	17,5
4"	229	222	674	kg	31,1
6"	267	-	-	kg	43,2

T4E2 DN15 - DN150 - dimensions - DIN

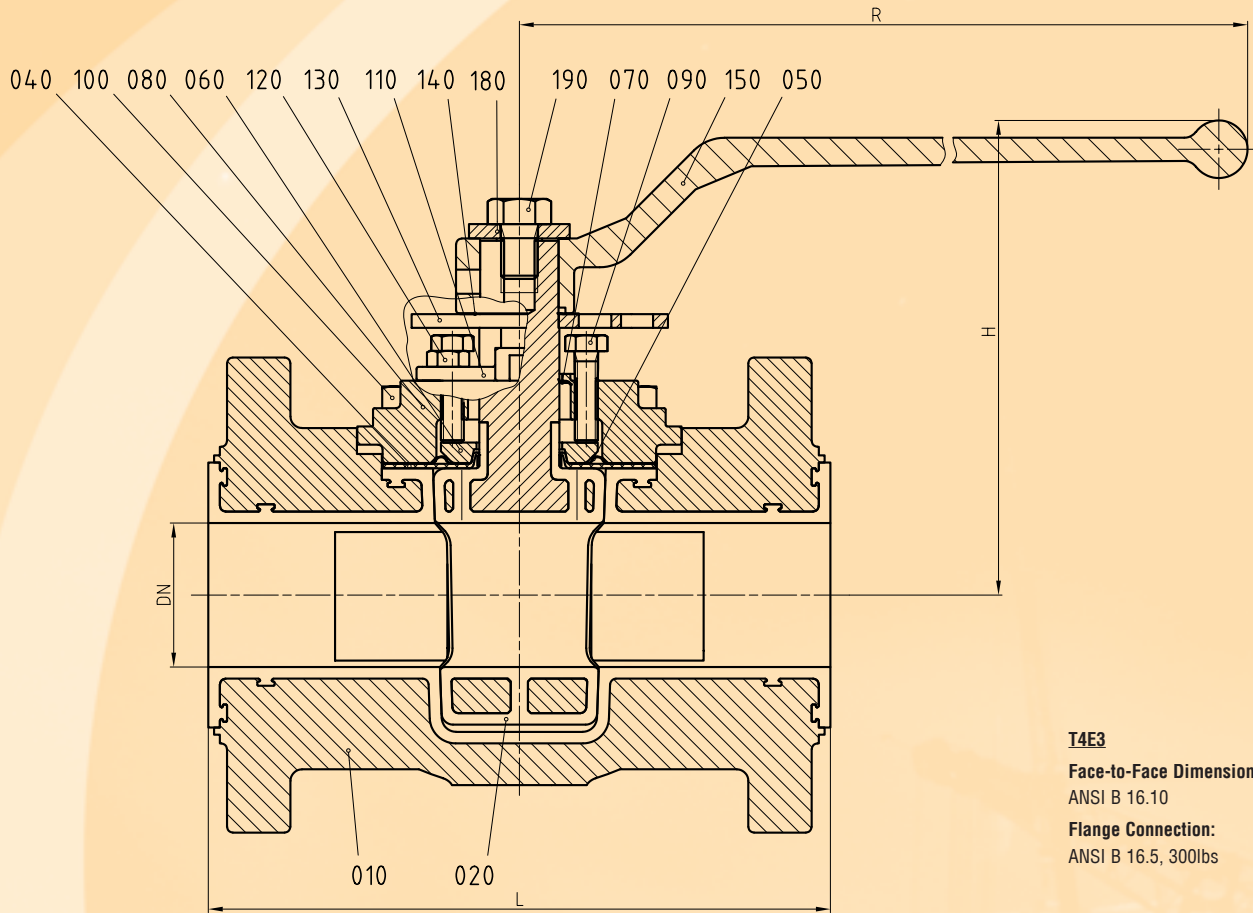
DN/DIN	L	H	R	weight	
015	130	139	260	kg	4,2
020	150	139	260	kg	4,9
025	160	139	260	kg	5,8
040	200	145	260	kg	9,1
050	230	165	410	kg	13,2
080	310	179	410	kg	20,8
100	350	222	674	kg	34,7
150*	267	-	-	kg	43,2

* Face-to-Face dimensions acc. ANSI B 16.10 (short pattern)



Technical Data

T4E3 ANSI 300 (DN1/2"-DN6")



T4E3

Face-to-Face Dimensions:

ANSI B 16.10

Flange Connection:

ANSI B 16.5, 300lbs

T4E3 DN1/2" - DN6" - material specification

No.	designation	material	No.	designation	material
010	body	carbon steel ASTM A216 Gr. WCB, PFA lined	100	top cap bolt	ASTM A193 Gr. B7
020	plug	ductile cast iron - EN-JS1049/ASTM A395, PFA lined	110	stop	stainless steel ASTM A351/A744 Gr. CF-8M (316 SS)
040	diaphragm	PFA	120	stop fastener	stainless steel - 1.4301
050*	metal diaphragm	stainless steel - 302	130	stop collar	carbon steel, protective plated
060	thrust gland	stainless steel - 304	140	stop collar retainer	stainless steel - 302
070	grounding device	stainless steel - 302	150	hand lever	ductile cast iron - EN-JS1082/ASTM A536
080	top cap	duplex stainless steel ASTM A995 Gr CD-4MCuN	180	lock washer	stainless steel - 1.4301
090	adjuster bolt	ASTM A193 Gr. B7	190	hexagon bolt	stainless steel - 1.4301

* optional

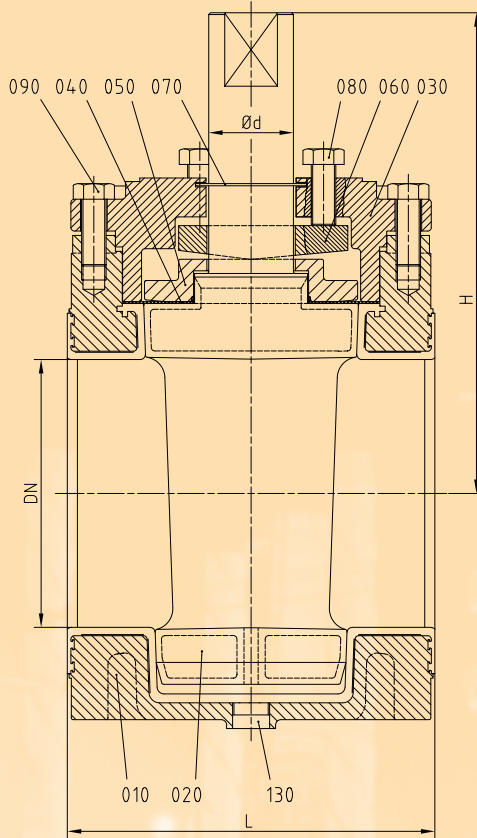
T4E3 DN1/2" - DN6" - dimensions - ANSI

DN/ANSI	L	H	R	weight	
1/2"	139,5	139	260	kg	4,6
3/4"	152,5	139	260	kg	5,6
1"	165	139	260	kg	6,5
1 1/2"	190,5	145	260	kg	10,1
2"	216	165	410	kg	14,0
3"	282,5	179	410	kg	23,7
4"	305	222	674	kg	42,4
6"	403,5	-	-	kg	69,2



Technical Data

T4E1 ANSI 150 (DN8"-12"),
 T4E2 DIN PN 16 (DN200-300),
 T4E3 ANSI 300 (DN8", 10", 12")



T4E1

Face-to-Face Dimensions:
 ANSI B16.10 (short pattern)
Flange Connection:
 ANSI B 16.5, 150lbs

T4E2

Face-to-Face Dimensions:
 ANSI B16.10 (short pattern)
Flange Connection:
 DIN EN 1092-2, PN10

T4E3

Face-to-Face Dimensions:
 ANSI B16.10
Flange Connection:
 ANSI B 16.5, 300lbs

**T4E1 DN8" - DN12",
 T4E2 DN200 - DN300 - material specification**

No.	designation	material
010	body*	ductile cast iron - EN-JS1049/ASTM A395, PFA lined
020	plug*	ductile cast iron - EN-JS1049/ASTM A395, PFA lined
030	top cap	ductile cast iron - EN-JS1049/ASTM A395
040	diaphragm	DN8"/200 TFM (PFA**), DN10"/250 - DN12"/300 PFA
050	thrust gland	duplex stainless steel ASTM A995 Gr CD-4MCuN
060	adjuster	duplex stainless steel ASTM A995 Gr CD-4MCuN
070	grounding device	stainless steel - 302
080	adjuster bolt	stainless steel - 1.4301
090	hexagon bolt	stainless steel - 1.4301
130	locking screw	stainless steel - 1.4401

* other on request
 ** optional

T4E3 DN8", DN10", DN12" - material specification

No.	designation	material
010	body	carbon steel ASTM A216 Gr. WCB / PFA lined
020	plug	ductile cast iron - EN-JS1049/ASTM A395, PFA lined
030	top cap	duplex stainless steel ASTM A995 Gr CD-4MCuN
040	diaphragm	PFA
050	thrust gland	duplex stainless steel ASTM A995 Gr CD-4MCuN
060	adjuster	duplex stainless steel ASTM A995 Gr CD-4MCuN
070	grounding device	stainless steel - 302
080	adjuster bolt	stainless steel - 1.4301
090	hexagon bolt	stainless steel - 1.4301
130	locking screw	stainless steel - 1.4401

**T4E1 DN8" - DN12" (150lbs),
 T4E2 DN200 - DN300 (PN10) - Dimensions**

DN	L	H	Ød	weight
8"	200	292,1	63,4	kg 157,0
10"	250	330,2	431,8	kg 190,0
12"	300	355,6	454	kg 220,0

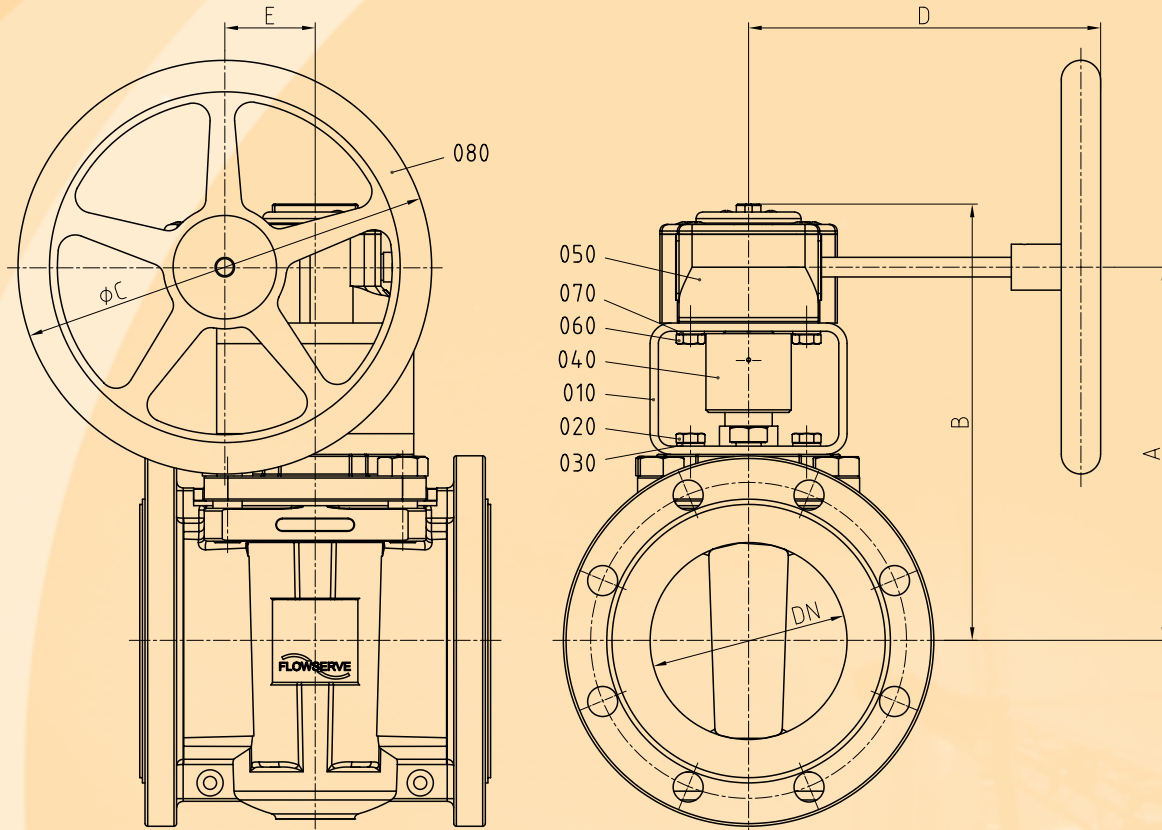
T4E3 DN8", DN10", DN12" (300lbs) - Dimensions

DN	L	H	Ød	weight
8"	419	362	63,4	kg 185,0
10"	457	432	76,2	kg 216,0
12"	502	518	76,2	kg 285,0



Technical Data

T4E1 (DN4"-12"), T4E2 (DN100-300),
T4E3 (DN4"-10") Gear Operated



T4E1 (DN4"-12"), T4E2 (DN100-300), T4E3 (DN4"-10") with gear operated - material specification

No.	designation	material
010	bracket	steel (yellow chromatiert)
020	hexagon bolt	stainless steel - 1.4301
030	serrated lock washer	stainless steel - 1.4301
040	adapter	stainless steel - 1.4104
050	gear	
060	hexagon bolt	stainless steel - 1.4301
070	serrated lock washer	stainless steel - 1.4301
080	hand wheel	

T4E1 (DN4"-12"), T4E2 (DN100-300), T4E3 (DN4"-10") with gear operated - Dimensions

DN	A	B	ØC	D	E	weight	
						T4E1/T4E2	T4E3
4"	100	240,6	281,6	200	203	52,5	kg 38 48
6"	150	283,6	331,6	315	268	68,75	kg 59 85
8"	200	439,9	513,4	400	405	137,5	kg 211 240
10"	250	534,8	608,3	400	405	137,5	kg 256 290
12"	300	556,2	629,7	400	405	137,5	kg 295 -

Application Examples for Lined Atomac and Durco Valve Products



Although it is known that Flowserve Atomac and Durco are leaders in the design and manufacture of corrosion resistant fluoropolymer lined valves and that these valves are used in the toughest fluids of the CPI, we like to indicate a few application examples for your convenience.

Pulp & Paper Industries

Atomac lined products for:

Spent acid, tall oil, sodium chlorate, sulphuric acid, HCL, chlorine dioxide and sodium hypochlorite

Atomac ceramic lined for:

All type of strong abrasive slurries & high temperatures

Durco BTV's / SMO* disc:

Bleach Filtrate

* SMO registered trademark of Avesta AB

Titanium Dioxide Production (both sulphate and chloride)

Atomac lined products for:

Chlorine, liquid and vapour, sulphuric acid, barium Chloride, calcium chlorides, HCL

Atomac ceramic lined for:

Titanium Tetrachloride, Titanium dioxide slurries

Durco BUW 400/490:

Caustic, 20% Titanium dioxide slurries.

Durco T4E lined plugvalve:

Sulfuric acid, HCL, chlorine, liquid & vapour

Steel Industry

Durco lined plugvalve T4E:

Steam service / Hydrogen sulfide scrubber

Durco BTW 480:

CO₂, HCN, CS₂ / Amonia scrubber

Durco BTW 480 / PFA:

Sulfuric Pickle Line

Atomac PFA lined valves:

Pickling Line

Pharmaceutical Industry

Durco PFA* lined plugvalves T4E series:

Suspensions containing solids

Durco PTFE lined butterfly valve with PFA or alloy disc:

Powder applications

Atomac lined products**:

Solvents, acids, alkaline and mixtures of these

* All liner materials are FDA approved

** A very recommendable valve is for example the stainless steel fully lined PFA Atostar ball valve



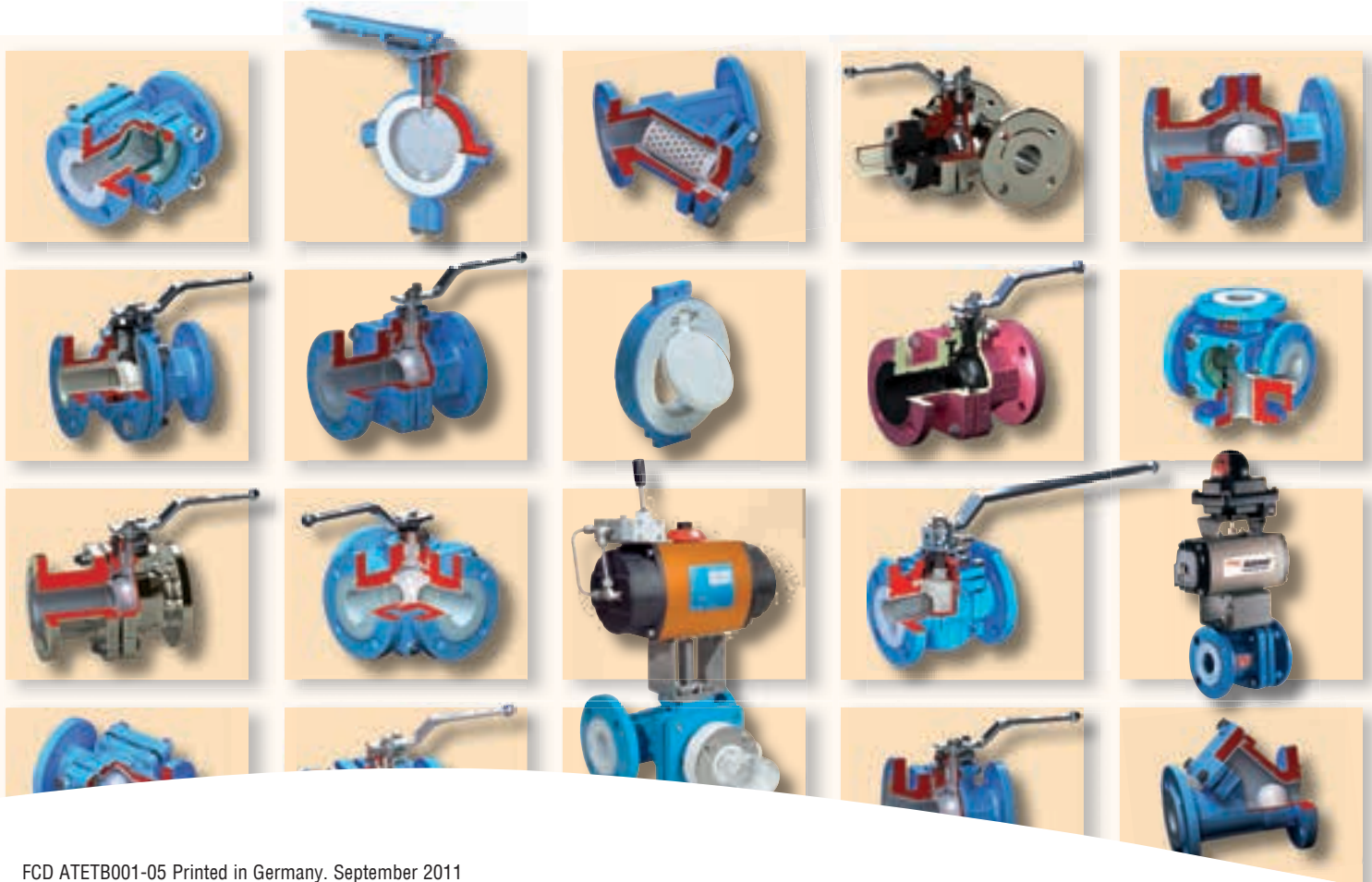
AKH5



BTV



T4E



FCD ATETB001-05 Printed in Germany. September 2011

To find your local Flowserve representative:

For more information about Flowserve Corporation,
visit www.flowserve.com



Flowserve Ahaus GmbH
von-Braun-Straße 19a
D-48683 Ahaus, Germany
Telefon: +49 (0) 2561 686 100
Telefax: +49 (0) 2561 686 200

Due to continuous development of our product range, we reserve the right to alter the dimensions and information contained in this leaflet as required. Information given in this leaflet is made in good faith and based upon specific testing but does not, however, constitute a guarantee