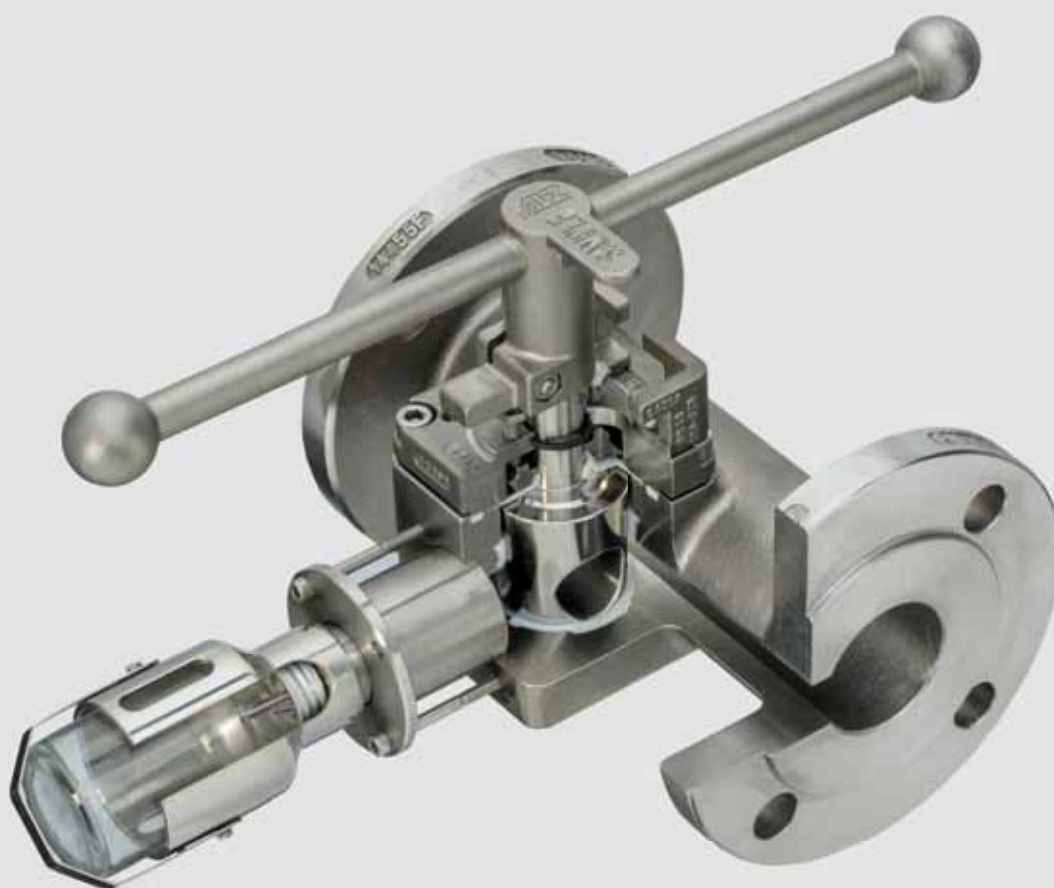


Type CONTIFLOW

Sampling plug valves



Type CONTIFLOW

Sample drawing without flow interruption



for liquids and solids-containing media

Sampling volume / operation:



$V_{P \min}$ 25 ml / $V_{P \max}$ 100 ml

Bottle volume: $V_{F \min}$ 50 ml / $V_{F \max}$ 2000 ml

- safe and simple operation
- emission-free
- piggable

DN 15 - 200 / PN 10 - 40

NPS ½ - 8 / Class 150 - 300

Ventilation: internally back to system or to atmosphere



Design characteristics

- safe sample drawing - pressureless
- representative sample, defined volume
- individual bottle connections

Options

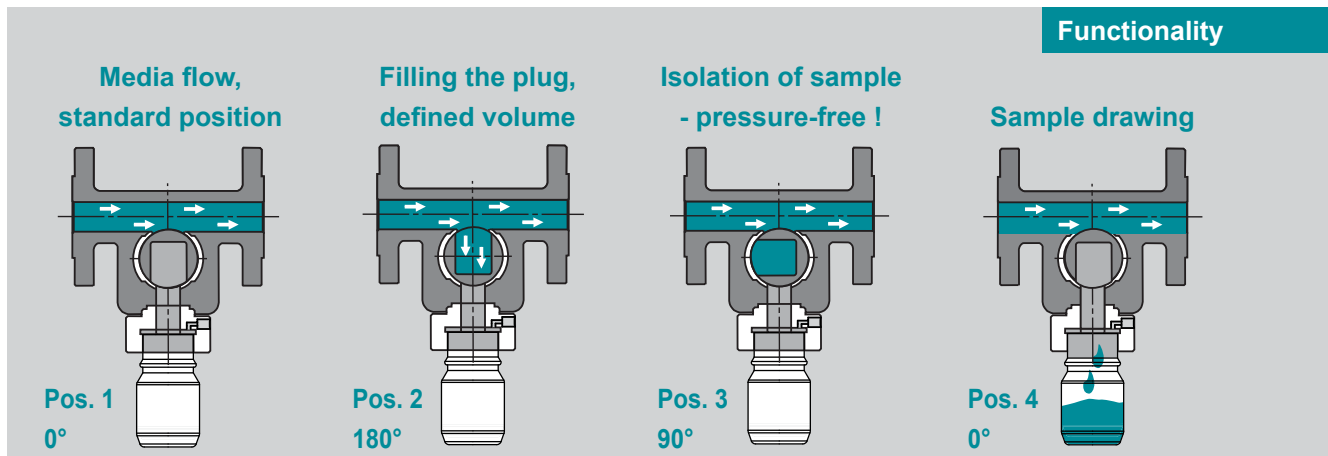
- closed needle system
- heating jacket
- air-evacuation device
- purge device
- fully PFA / FEP / PTFE lined design



PT diagram, plug types, sealing systems, material selection: see catalogue part **ENGINEERING**

Pressureless, easy, safe, representative,
defined sample volume

Safety first !



Safe sample drawing

- pressure-free sampling for incompressible media
- isolated from the product flow (positive overlap)
- spillage-free sampling with individual bottle connections (option)

Representative sample

- directly from main product flow, no flow interruption
- no contamination or sediment due to the cavity-free design

Emission-free

- closed system
- product flow never exposed to atmosphere
- integrated ventilation into system during sample release (optional)

Easy operation

- no failures due to single lever operation and position indicator
- operation with
 - hand lever
 - actuator / gearbox 180°

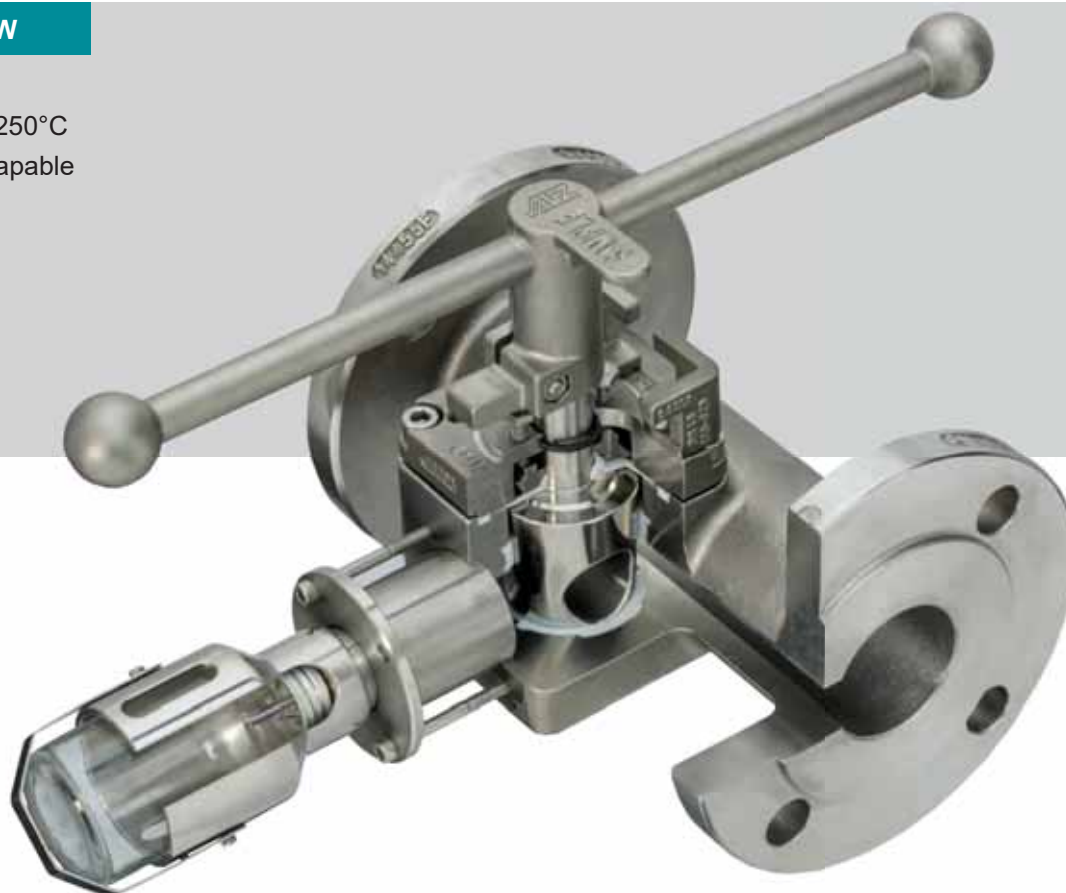


Type CONTIFLOW

metallic with PTFE sleeve

Type CONTIFLOW

T	-60 < T < 250°C
P _{MIN}	vacuum-capable
P _{MAX}	50 bar



Type CONTIFLOW-SB

Compact Face to Face dimension
wafer type

Installation positions

STANDARD



HORIZONTAL



VERTICAL



Type CONTIFLOW-AB / CONTIFLOW-A

fully PFA lined

Type CONTIFLOW-AB

Based on type CONTIFLOW-A
& exchangeable PTFE sleeve

- reduced torque
- repairable
- higher temperature resistance
- sustainable solution

NEW !

T -10 < T < 210°C
P_{MIN} vacuum-capable
P_{MAX} 25 bar



Repair kit for CONTIFLOW-AB

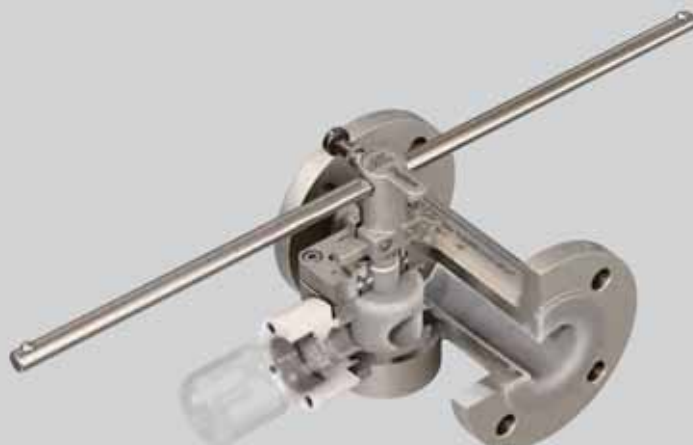
consisting of

- lined plug
- PTFE sleeve
- cover / stem sealing

Type CONTIFLOW-A

Body and plug with PFA lining

T -10 < T < 150°C
P_{MIN} vacuum-capable
P_{MAX} 25 bar



Type CONTIFLOW

Air-evacuation and purge devices

Air-evacuation device

Drawing vacuum from plug volume directly before sample drawing

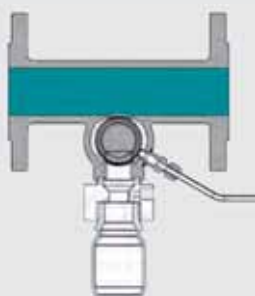
- locking pin ensures vacuum position
- direction of rotation only counterclockwise

OPTION: EV

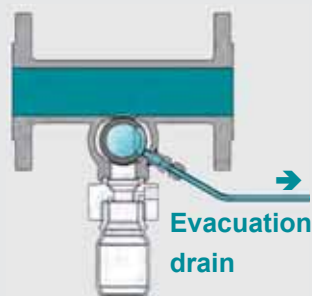


Functionality

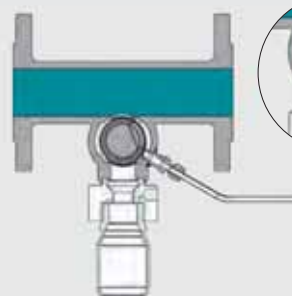
Basic position



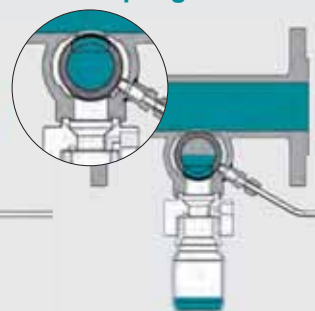
Evacuation



Vacuum



Filling the plug sampling into bottle



Purge device

Purging of plug, needle system and lab bottle with Nitrogen N_2 or steam

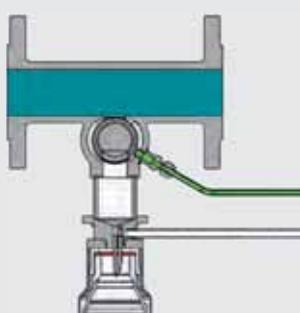
- locking pin ensures purging position
- OPEN/CLOSE of purging line by plug (no additional valve necessary)

OPTION: SP

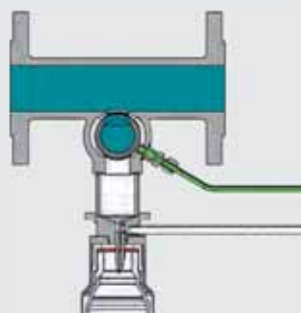


Functionality

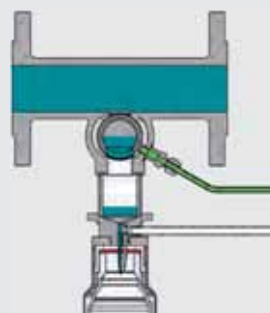
Basic position



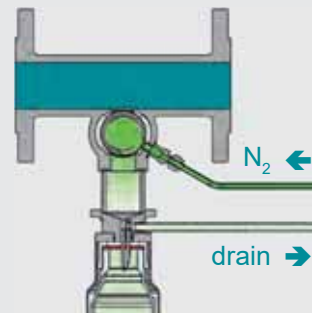
Filling the plug



Sampling into bottle



Nitrogen (N_2) purge



Type CONTIFLOW

Accessories



Increased sample volume

Increase of sample volume V_p by additional, modular adapter (standard installation position)

- plug volume V_p
 - 75 ml
 - 100 ml
 - (standard plug 25/50 ml)
- modular design

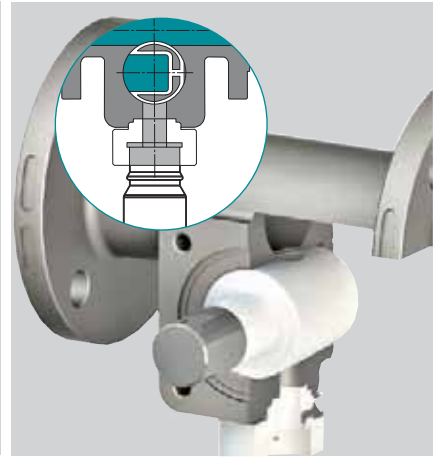
OPTION: V_p



Heating / cooling jacket

- solid cast full heating jacket, flange to flange
- heated cover seat
- different connections for heating medium
 - flanges
 - threaded
 - welding ends

OPTION: HM



Cleaning in Place – CIP

- CIP-compliant
- with PTFE/PFA lined plug
- without sleeve, gapless
- for pharmaceutical applications



Protection box

Types

- for the whole sampling valve
- with ventilation, exhaust
- lockable
- heatable / coolable
- with lighting
- detection of bottles, filling level etc.



**CONTIFLOW-PLC
with protection box**

ATEX option



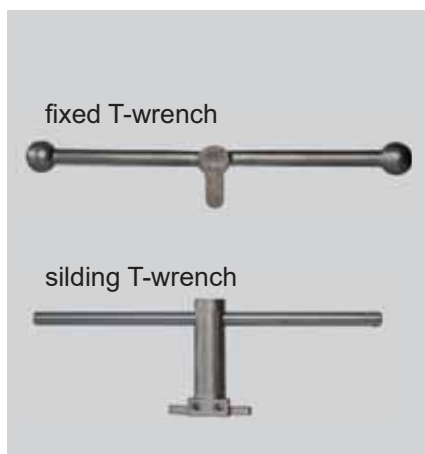
Protection box combination

Integrated control cabinet for automated sampling

- individual setting of time period, sampling cycle, volume
- sensors monitoring the sampling operation
- standard interface for actuator, sensor, pneumatic

Type CONTIFLOW

Operation



Hand operation

- Standard lever material: stainless steel
- T-wrench with plug stem extension, Type KSV, 150 mm high, stainless steel
- Locking devices (option)



Gearbox Type CGB

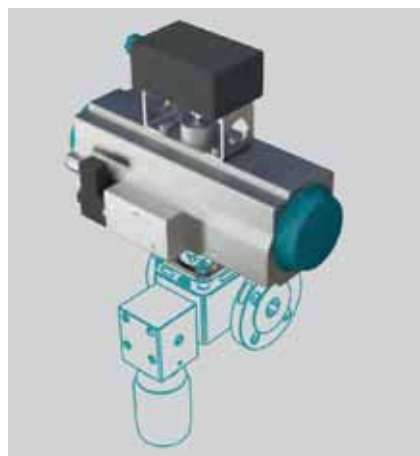
- smooth operation
- transmission ratio 80 : 1
- plug position indicator

Type CGB 125

recommended for CONTIFLOW

Type CGB 250

recommended for CONTIFLOW-A



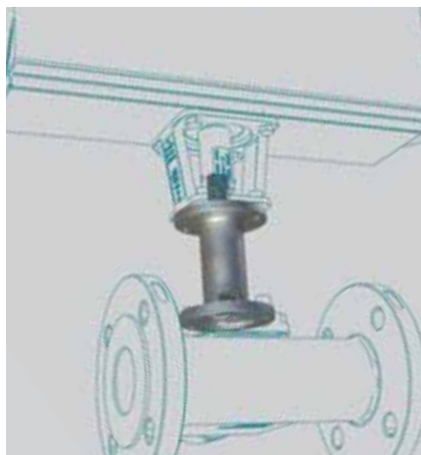
Actuator, pneumatic 180°

- single or double acting
- optional with switch boxes, positioners, solenoid valves



Operation switch

for single or multiple operation to increase the sample volume



Plug stem extension, type FV

- simple mounting of the extension and the actuators
- 100 mm height, others on request



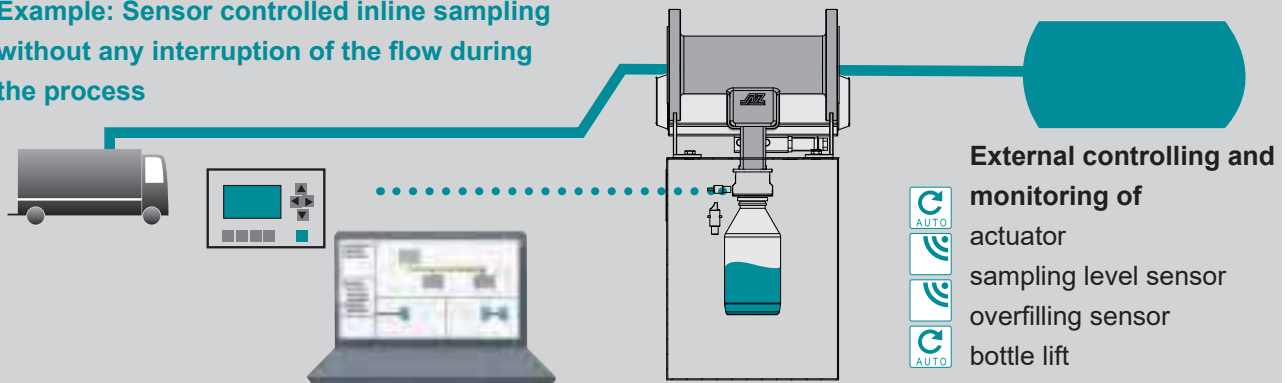
Locking device

- for the safety operation for authorized personnel only
- optional for position
 - open
 - close
 - both positions

Type CONTIFLOW-PLC-II

fully automated sampling - easily programmable controller

Example: Sensor controlled inline sampling without any interruption of the flow during the process



Sampling protection box combination with integrated control box for advanced functions, e.g.

- runtime error
- sampling interruption
- collective fault signal



CONTIFLOW-PLC-II
with protection box

Process of the sampling

- 1 Insert empty or partly filled bottle, close door
- 2 The bottle is lifted pneumatically
- 3 Automated sampling system
- 4 Indication after termination of program
(no overfilling of bottle due to sensor)

Type CONTIFLOW

Technical information

Type CONTIFLOW

Technical drawing of Type CONTIFLOW valve. The front view shows a horizontal valve body with two vertical stems. Dimensions R and L are indicated for the stem spacing. Dimension E is the height from the base to the stem centerline. The side view shows the valve body with four bolt holes and a central port. Dimension H is the height from the base to the center of the valve body.

Type CONTIFLOW-V

Technical drawing of Type CONTIFLOW-V valve. The front view shows a vertical valve body with a horizontal stem. Dimension 99 is the distance from the centerline to the edge of the valve body. Dimension 72 is the height from the base to the centerline.

Type CONTIFLOW-W

Technical drawing of Type CONTIFLOW-W valve. The front view shows a vertical valve body with a horizontal stem. Dimension 99 is the distance from the centerline to the edge of the valve body. Dimension 72 is the height from the base to the centerline.

Type CONTIFLOW-AB
Type CONTIFLOW-A

Technical drawing of Type CONTIFLOW-AB and Type CONTIFLOW-A valve. The front view shows a horizontal valve body with two vertical stems. Dimensions R and L are indicated for the stem spacing. Dimension E is the height from the base to the stem centerline. The side view shows the valve body with four bolt holes and a central port. Dimension H is the height from the base to the center of the valve body.

Type CONTIFLOW-AB-V
Type CONTIFLOW-A-V

Technical drawing of Type CONTIFLOW-AB-V and Type CONTIFLOW-A-V valve. The front view shows a vertical valve body with a horizontal stem. Dimension 70 is the distance from the centerline to the edge of the valve body. Dimension 50 is the height from the base to the centerline.

Type CONTIFLOW-AB-W
Type CONTIFLOW-A-W

Technical drawing of Type CONTIFLOW-AB-W and Type CONTIFLOW-A-W valve. The front view shows a vertical valve body with a horizontal stem. Dimension 70 is the distance from the centerline to the edge of the valve body. Dimension 50 is the height from the base to the centerline.

DIN EN 1092-1 / 558

DN	PN	L [mm]	R* [mm]	E [mm]	H** [mm]	weight [kg]
15	10-40	130	330/500	78	135/128	7,5
25	10-40	160	330/500	85	135/128	8,5
40	10-40	200	330/500	90	135/128	10,5
50	10-40	230	330/500	96	135/128	13,5
80	10-40	310	330/500	110	190/173	20,5
100	10-16	350	330/500	125	190/173	22,0

ASME
B16.5 / B16.10

NPS	class	L [mm]	R* [mm]	E [mm]	H** [mm]	weight [kg]
½	150	127	330/500	78	135/128	7,2
1	150	127	330/500	85	135/128	8,0
1½	150	165	330/500	90	135/128	9,0
2	150	178	330/500	96	135/128	11,5
3	150	203	330/500	110	190/173	17,5
4	150	229	330/500	125	190/173	20,5

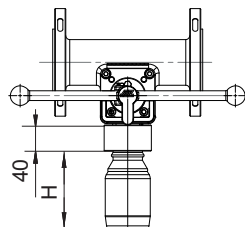
*) 330 mm for metallic CONTIFLOW with PTFE-virgin or TFM sleeve
 500 mm for metallic CONTIFLOW with P-sleeve and for lined CONTIFLOW-AB / CONTIFLOW-A
 Note: CONTIFLOW-AB possible with 330 mm in case of space constraints

**) Size CONTIFLOW / CONTIFLOW-AB + CONTIFLOW-A

Other sizes and ratings on request.

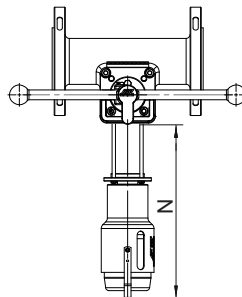
Some designs, sizes and/or configurations may be fitted with threaded flange holes.

PTFE adapter

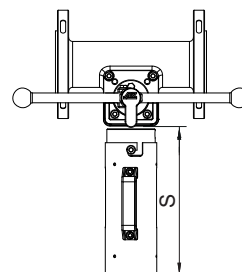


H = height of lab bottle

needle system, type NH



clamping bottle holder, type SFH



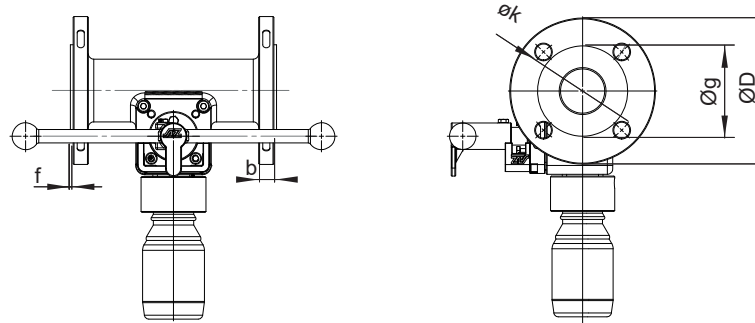
Type	plug sample volume V_p [ml]			bottle volume V_f [ml]	sample volume V_p [ml]	N [mm]	S [mm]
	PTFE adapter	needle system	clamping bottle				
CONTIFLOW	25/50/75/100	25/50/75/100	25/50/75/100	50 (GL32) / 60 (PP25)	25	172	224
CONTIFLOW-V	25**	25**	25**		50	202	
CONTIFLOW-W	25**	25**	25**	100 (GL 45 / PP28)	25	185	224
CONTIFLOW-AB	25/50*	***	25/50*		≥50	215	
CONTIFLOW-A	25	***	25	250 (GL45) / 300 (PP28)	25	225	224
CONTIFLOW-AB-V					≥50	255	
CONTIFLOW-A-V	25	***	25	500 (GL45 / PP28)	25	259	258
CONTIFLOW-AB-W					≥50	289	
CONTIFLOW-A-W	25	***	25	1000 (GL45 / PP28)	25	314	—
CONTIFLOW-CIP					≥50	344	

*) V_p 50 ml only for metal plugs (not lined)**) $V_p > 25$ ml on request

***) on request

Type CONTIFLOW

Flange dimensions acc. to DIN EN / ASME



	DIN EN 558									
	DN	PN	ØD [mm]	flange bore Øk [mm]	No.	Ø [mm]	Øg [mm]	b [mm]	f [mm]	
	15	10-40	95	65	4	14	45	16	2	
	20	10-40	105	75	4	14	58	18	2	
	25	10-40	115	85	4	14	68	18	2	
	32	10-40	140	100	4	18	78	18	2	
	40	10-40	150	110	4	18	88	18	3	
	50	10-40	165	125	4	18	102	20	3	
	65	10-16	185	145	4	18	122	18	3	
		25-40			8			22		
	80	10-40	200	160	8	18	138	24	3	
	80S	10-40	200	160	8	18	138	24	3	
	100	10-16	220	180	8	18	158	20	3	
		25-40	235	190		22	162	24		
	ASME B16.10									
	NPS	Class	ØD [mm]	flange bore Øk [mm]	no.	Ø [mm]	Øg [mm]	b [mm]	f [mm]	
	½	150	90	60,3	4	15,7	34,9	10,0	2	
		300	95	66,7				14,7		
	¾	150	100	69,9	4	15,7	42,9	10,9	2	
		300	115	82,5		19,1		16,3		
	1	150	110	79,4	4	15,7	50,8	11,6	2	
		300	125	88,9		19,1		17,9		
	1¼	150	115	88,9	4	15,7	63,5	13,2	2	
		300	135	98,4		19,1		19,5		
	1½	150	125	98,4	4	15,7	73,0	14,7	2	
		300	155	114,3		22,3		21,1		
	2	150	150	120,7	4	19,1	92,1	16,3	2	
		300	165	127,0	8	19,1		22,7		
	2½	150	180	139,7	4	19,1	104,8	17,9	2	
		300	190	149,3	8	22,3		25,9		
	3	150	190	152,4	4	19,1	127	19,5	2	
		300	210	168,3	8	22,3		29,0		
	4	150	230	190,5	8	19,1	157,2	24,3	2	
		300	255	200,0		22,3		32,2		

Type CONTIFLOW

How to order

Order Example

CONTIFLOW	-	DN 25	PN16	FS	PTFE	1.4408/1.4408	V _p 25	PTFE GL45	250	HL	HM/FV
-----------	---	-------	------	----	------	---------------	-------------------	-----------	-----	----	-------

TYPE

CONTIFLOW
CONTIFLOW-AB / -A

INSTALLATION

- standard
W horizontal
V vertical

SIZE

NPS ½ up to 6
DN 15 up to 150

PRESSURE RATING

CL150 PN10
CL300 PN16
PN25
PN40

SEALING SYSTEMS

STD for all major applications
FS Fire-Safe sealing
FSN Fire-Safe safety sealing
FSN-SL Fire-Safe safety sealing
(live loaded disc spring)
CA Chemical sealing
CASN Chemical safety sealing
CASN-SL Chemical safety sealing
(live loaded disc spring)

SLEEVE MATERIALS

PTFE T_{max} 230°C
PTFE (glass) T_{max} 230°C
mod. PTFE T_{max} 250°C
PTFE graphite T_{max} 250°C
PTFE-P T_{max} 320°C

STANDARD MATERIALS

CONTIFLOW
body Stainless Steel A351 Gr. CF8M 1.4408
plug Stainless Steel A351 Gr. CF8M 1.4408

CONTIFLOW-AB
body Carbon Steel A216 Gr. WCB 1.0619
Stainless Steel A351 Gr. CF8M 1.4408
Lining PFA, PFA-conductive, FEP
plug Lining PTFE, PFA, PFA-conductive, FEP

SAMPLE VOLUME (plug)

V_p 25 / 50 / 75 / 100 ml

SAMPLING CONNECTION

PTFE PTFE adapter, GL 32/45 PP 25/28
NH Needle system, needle 2 / 3 / 4 / 6 mm
SFH Clamping bottle holder, GL 32/45 PP 25/28

BOTTLE VOLUME

GL 50 / 100 / 250 / 500 / 1000
for PTFE adapter and
Clamping bottle holder
PP 60 / 100 / 300 / 500
for needle system

ACTUATION

HL lever
HLL lever, lockable
KSV T-wrench
KSVL T-wrench, lockable
CGB gearbox
GBL hand gear, lockable
AT Actuator (please note type and accessories)
PLC fully automated sampling
(separate description)

OPTIONS (multiple use possible)

CIP clean-in-place
HM heating jacket / cooling jacket
SP purge device
EV air-evacuation device
FV cover extension
SK Protection box (separate description)
ATEX

AZ-plug valve: the design principle

Key advantages

- free of cavities
- no contamination of process media
- adjustability of the plug and sealings
- maintenance-free due to self-lubricating and chemical-resistant PTFE-sleeve
- low emission design
- constant torque (Δp independent !)
- vacuum-capable

Tapered plug

- plug pressed into the PTFE-sleeve
- polished surface



Body

- tapered body interior
- integrated supporting ribs avoid rotation and coldflow of the sleeve
- large sealing surface

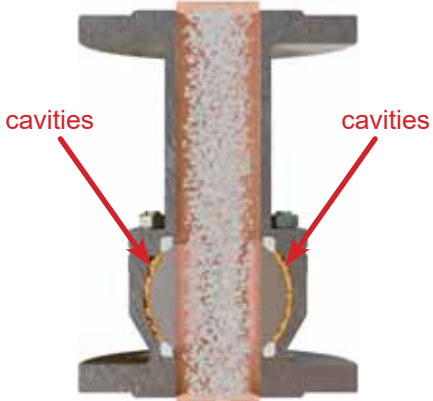
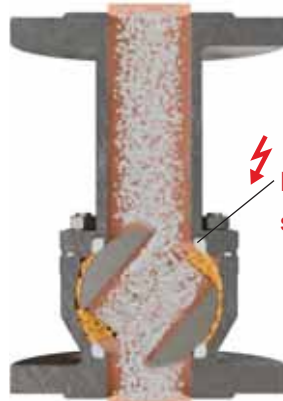
PTFE-sleeve

- mechanically locked into the valve body
- complete PTFE chambering
- robust, one-piece sleeve covers and protects the entire plug



Cavity-free: suitable for all media

Technical comparison

AZ-plug valve	Ball valve
Soft seated plug valve with PTFE-sleeve  Main sealing components • metallic plug • sleeve	Soft seated ball valve with PTFE sealing rings, floating ball  Main sealing components • metallic ball • sealing rings
OPEN position	
• suitable for all media due to cavity-free design • sealing surfaces are completely protected  free of cavities	• critical for the following media due to design with cavities ○ corrosives: crevice corrosion ○ polymerizing: clogging ○ crystallizing: abrasion / clogging  cavities
During operation	
• free of cavities, media cannot settle or be trapped • solids are pushed away • no contamination with old media 	• with cavities, media can settle or be trapped • solids cause abrasion of the sealing rings • contamination of process media  Damage of the sealing rings

Safe and reliable tightness for years

Adjustable



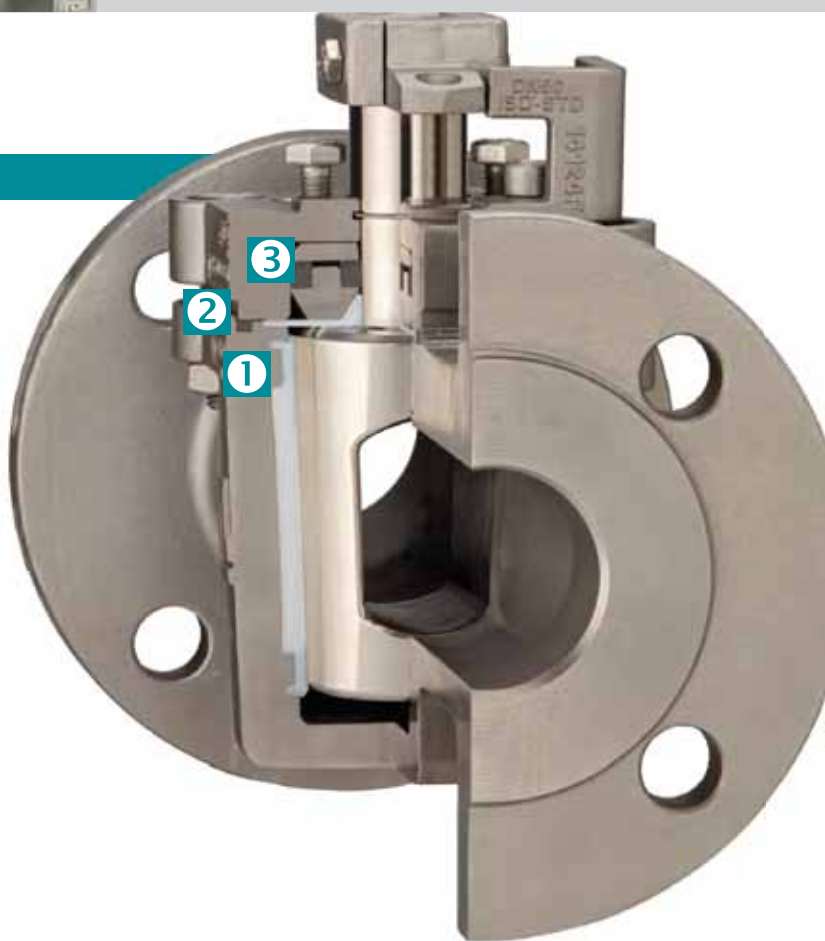
- tapered plug design allows retightening of the sealing on site - if needed
- adjusting bolt even accessible with mounted actuator / gearbox

Several sealings to atmosphere

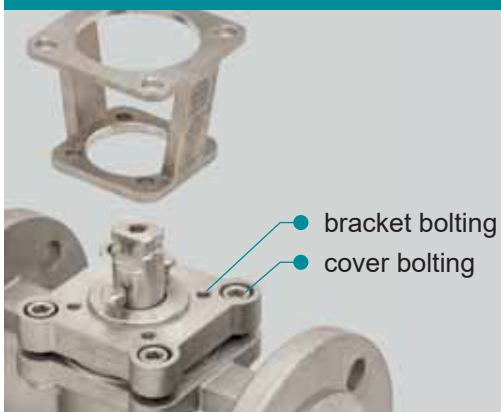
- ❶ Primary: sleeve
- ❷ Secondary: V-diaphragm/cover seal
- ❸ Tertiary: stem packing (optional)



Detailed information about
all certified AZ cover & stem
sealing systems see chapter
SEALING SYSTEMS



ISO cover



- pressure containing cover bolts separated from bracket boltings
- cover and bracket acc. to ISO 5211 for efficient actuator / gearbox assembly

Reduced and full bore design

Execution

Reduced bore

Type STANDARD

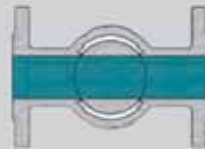
- compact valve (FF / weight)
- optimal torques for economic automation



Full round bore

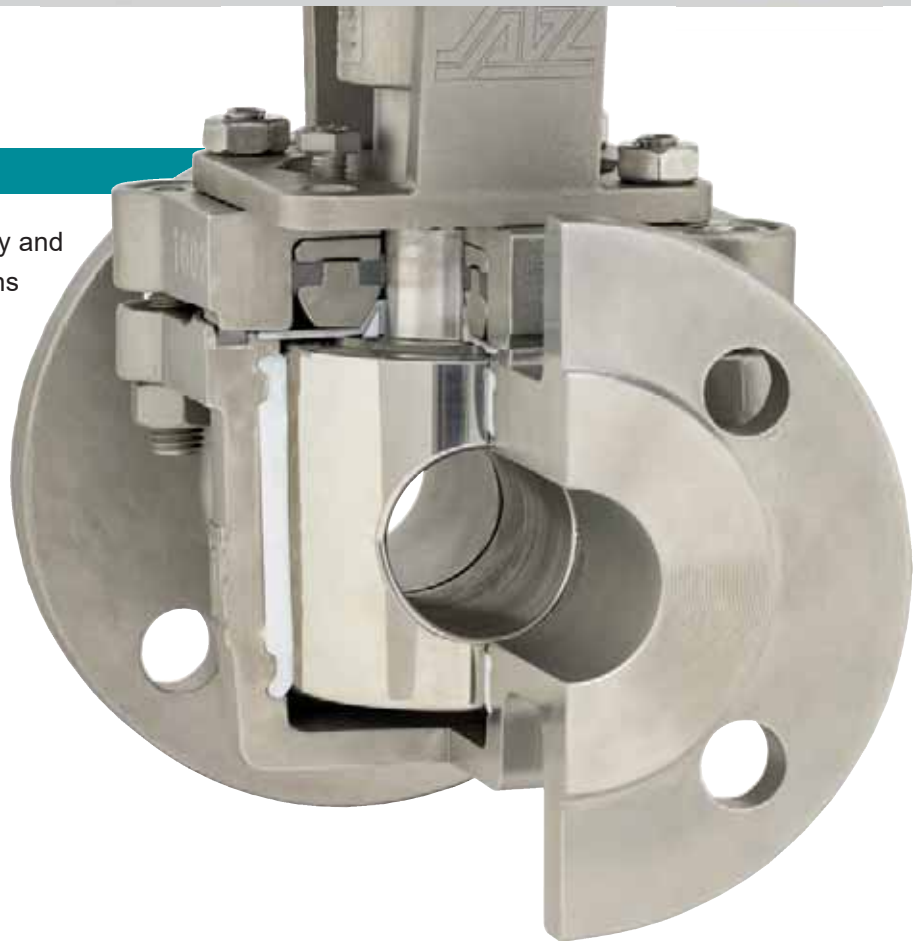
Type EXTRA

- maximum flow rate
- minimal pressure drop
- piggable (optional)

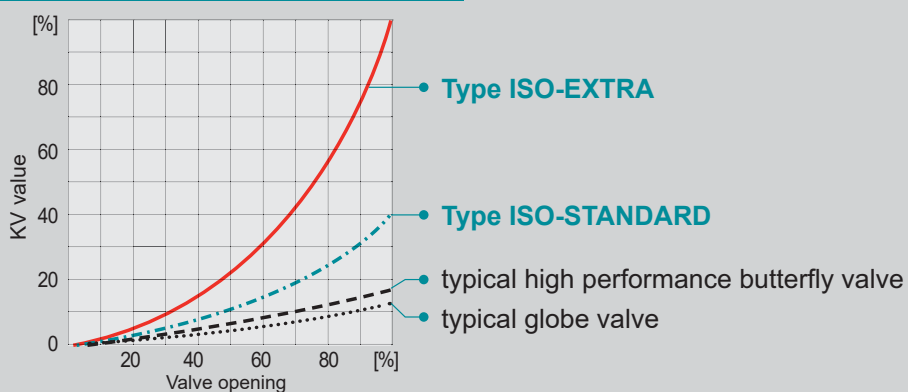


Type ISO-EXTRA

- excellent for abrasive, slurry and solid-containing applications
- maximum flow rate compared to other valve types with the same nominal size



Maximum flow rate

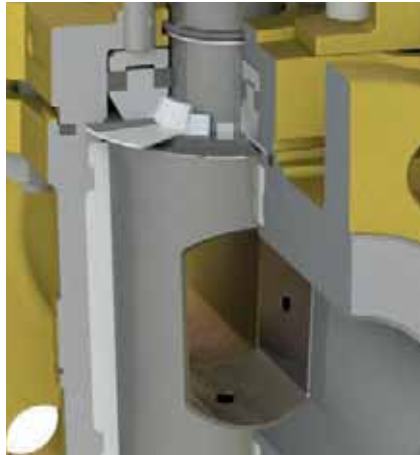


Options



Multi-port

- whole range of multi-port plugs for all configurations (up to 7-way)
- horizontal and vertical installation



Vented options

- plug bottom
- plug upstream / downstream automatic pressure balance in case of thermal media expansion



System requirements

- **FDA** = Food and Drug Administration certifications and compliant materials
- **GMP** = Good-Manufacturing-Practice
- **CIP** = Clean-in-Place
- Polished internal surfaces, surface finish <0.8 Ra μm (<32 Ra μin)
- oil and grease free
- water-free



All connections possible

- flanges acc. to DIN, ASME, JIS etc.
- welded ends
- screwed and threaded ends
- combinations of connections
- oversize flanges
- compression fittings and ferrule ring couplings
- special connections



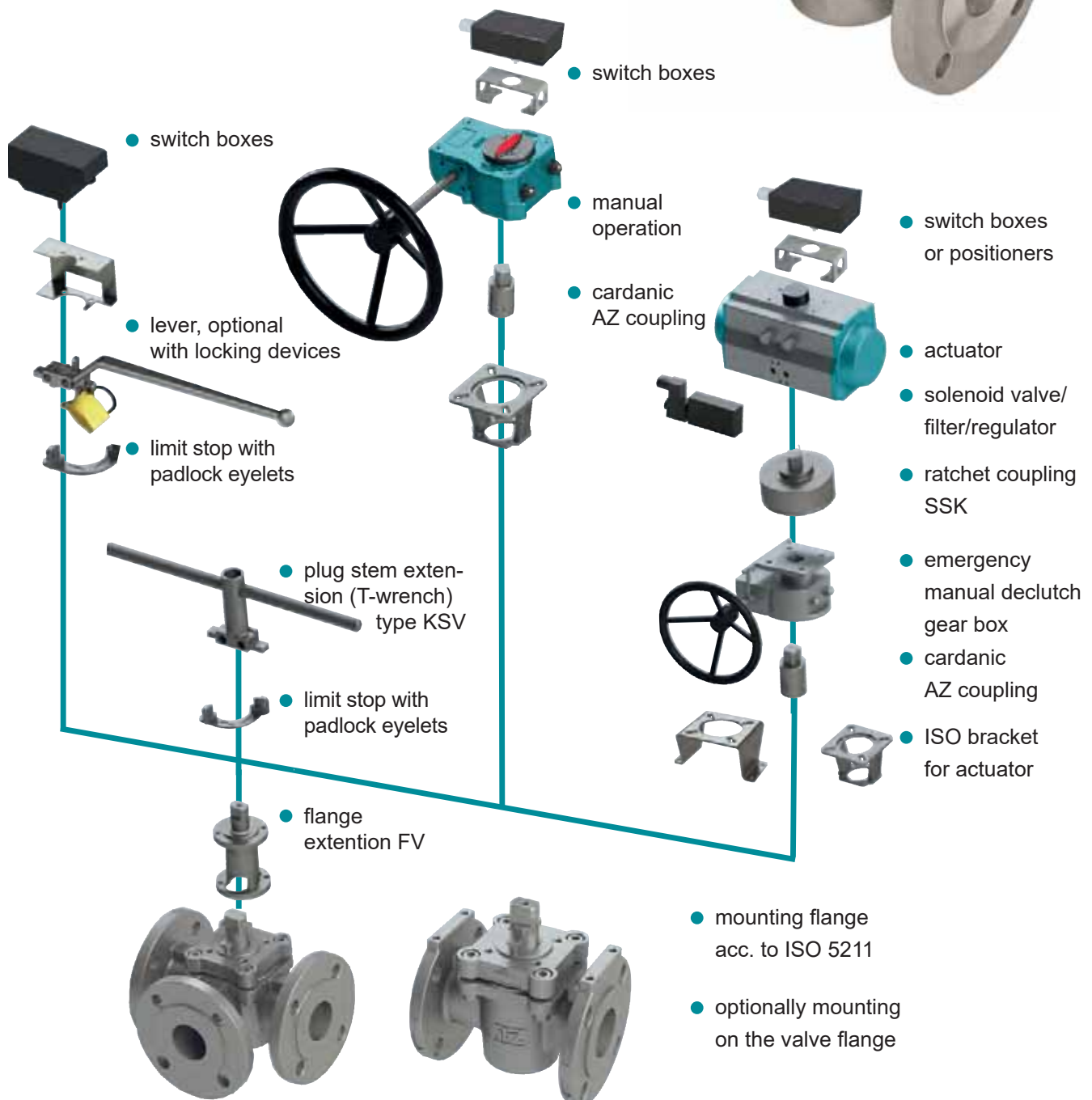
High and low temperature

- extended bonnet with sealing at the top
- stem extension for insulated valves

Modular operation concept

Bracket according to ISO 5211

- standard installation of gearbox and actuator
- safe due to independent mounting of cover and bracket
- covering bonnet bolts to prevent opening of valve in service
- precise centering of the bracket to the plug stem due to adjusting ring
- easy inline plug adjustment during the process, screws are always accessible



Cover and stem sealing systems suitable for general applications

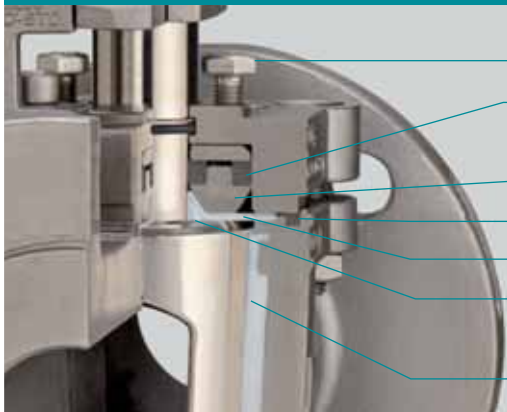
Type STANDARD



- plug adjustment
- thrust collar
- cover sealing (PTFE)
- stainless steel diaphragm
- **Secondary sealing:** V-diaphragm (PTFE), delta thrust collar (PTFE)
- **Primary sealing:** sleeve*

Type FS

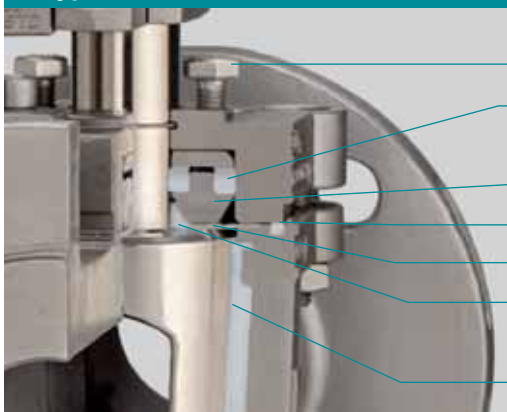
Fire-Safe-sealing (API 607)



- plug & packing adjustment
- **Tertiary sealing:** Packing to atmosphere (graphite)
- thrust collar
- cover sealing (graphite)
- stainless steel diaphragm
- **Secondary sealing:** V-diaphragm (PTFE) and delta thrust collar (PTFE)
- **Primary sealing:** sleeve*

Type CA

Chemistry sealing

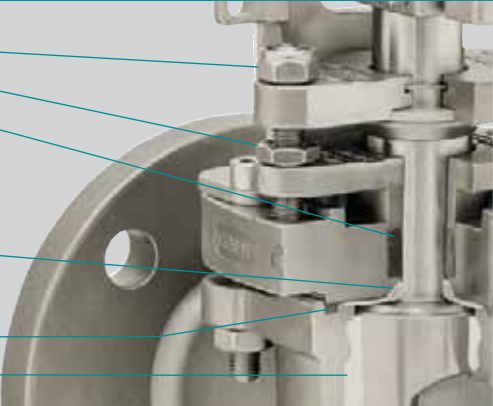
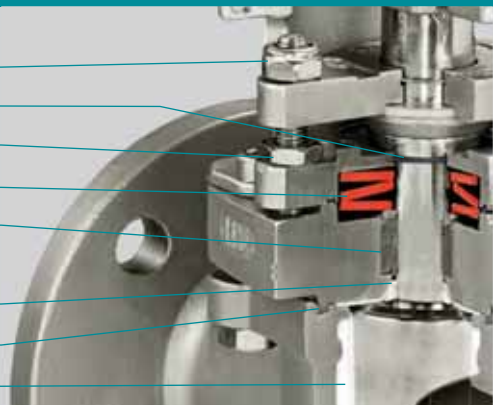


- plug & packing adjustment
- **Tertiary sealing:** Packing to atmosphere (PTFE)
- thrust collar
- cover sealing (PTFE)
- stainless steel diaphragm
- **Secondary sealing:** V-diaphragm, delta thrust collar (PTFE)
- **Primary sealing:** sleeve*

*) The sleeve material has a decisive influence on the maximum operating temperature
Material selection acc. to PT-diagram

More safety for severe applications

*engineered.
fast.
dynamic.*

Type FSN	Fire-Safe-sealing (API 607)	
	plug adjustment ● triple safety stem packing adjustment ● Tertiary sealing: triple safety stem packing (graphite) ● Secondary sealing: V-diaphragm (PTFE) and delta thrust collar (PTFE) ● cover sealing (graphite) ● Primary sealing: sleeve* ●	
Type FSN-EF	Fire-Safe-sealing (API 607)	
Emission Free	plug adjustment ● triple safety stem packing adjustment ● Quaternary sealing: three o-rings at the stem ● Tertiary sealing: triple safety stem packing ● Secondary sealing: V-diaphragm (PTFE) and delta thrust collar (PTFE) ● cover sealing (graphite) ● Primary sealing: sleeve* ●	NEW! 
Type FSN-SL	Fire-Safe-sealing (API 607)	
live-loaded	plug adjustment ● o-rings protect the springs against corrosion ● triple safety stem packing adjustment ● disk springs (optionally made of Inconel) ● Tertiary sealing: triple safety stem packing (graphite) ● Secondary sealing: V-diaphragm (PTFE) and delta thrust collar (PTFE) ● cover sealing (graphite) ● Primary sealing: sleeve* ●	

*) The sleeve material has a decisive influence on the maximum operating temperature
Material selection acc. to PT-diagram

Material for **type CASN** and **CASN-SL** chemistry safety sealing: packing and cover sealing in PTFE

Special sealing systems

Chevron packing

- increases the contact pressure (when pressure builds up on the safety stem packing towards plug stem)
- for toxic and fugitive media
- high wear resistance



Type CL Chlorine / gas applications

- approved for chlorine applications and other toxic gases
- ideal for media with changing state of aggregate (e.g. liquid to gas, vice versa)
- vacuum capable



Detection ports for monitoring purpose of lethal gases (phosgene, etc.)

- detection ports for early recognition of potential leakages
- sniffing at sealing surfaces to atmosphere

stem packing

cover sealing

flange sealing



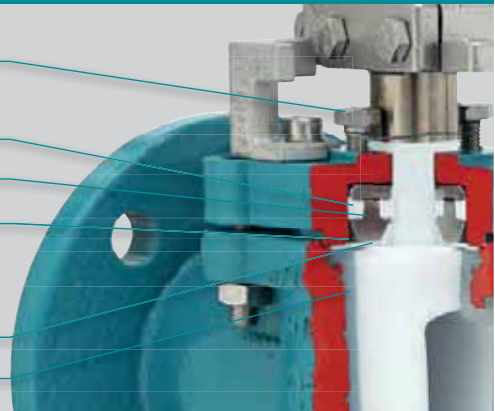
Cover and stem sealing systems for lined plug valves

*engineered.
fast.
dynamic.*

Type CA

Chemistry sealing

- plug & packing adjustment
- Tertiary sealing:** Packing to atmosphere (PTFE)
- thrust collar
- stainless steel diaphragm
- Secondary sealing:**
V-diaphragm & delta thrust collar (PTFE)
- Primary sealing:** lined body

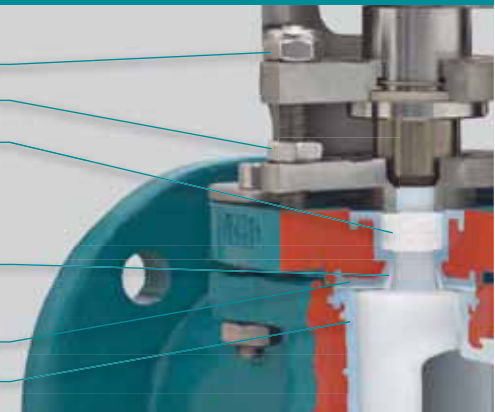


Type SAFE-LINED

Chemistry sealing

lined cover

- plug adjustment
- triple safety stem packing adjustment
- Tertiary sealing:**
triple safety stem packing (PTFE) to atmosphere
- Secondary sealing:**
V-diaphragm (PTFE), delta thrust collar (PTFE)
- lined cover
- Primary sealing:** lined body*

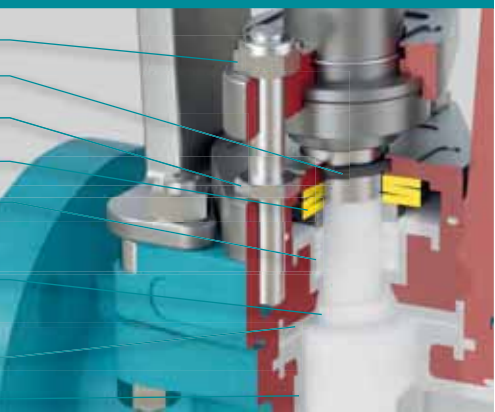


Type SAFE-LINED-SL

Chemistry sealing

live-loaded

- plug adjustment
- o-rings protect the springs against corrosion
- triple safety stem packing adjustment
- disk springs (optionally made of Inconel)
- Tertiary sealing:**
triple safety stem packing (PTFE) to atmosphere
- Secondary sealing:**
V-diaphragm (PTFE), delta thrust collar (PTFE)
- lined cover
- Primary sealing:** lined body*



*) Lining and plug material have a decisive influence on the maximum operating temperature
Material selection according to PT-diagram.

WORLD'S FIRST EMISSION FREE
plug valve certified acc. to **ISO 15848-1 / AH**
Type FSN-EF

NEW!



Fugitive
Emissions



Low-Emission according ISO 15848, TA-Luft & API 641



For all important information about ISO 15848, TA-Luft & API 641, as well as the current certificates, please refer to the "AZ Fugitive Emission" brochure



Latest information about
ISO 15848 / API 641 /
TA Luft see AZ **Fugitive
Emissions** leaflet



Casting materials



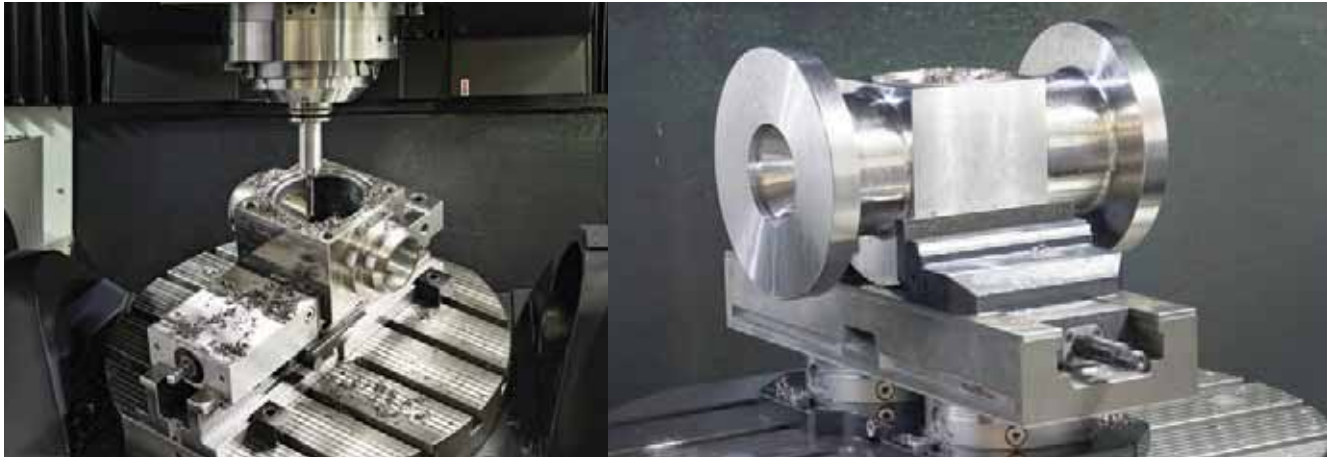
		Casting Material					
Material Group	Common Name	EN / DIN	Short name	Material-No.	ASTM	Grade	UNS
Carbon Steel / Ductile Iron							
Ductile Iron	SG Iron	EN 1563	EN-GJS-400-18-LT	5.3103	A395	-	F32800
Carbon Steel	CS	EN 10213	GP240GH	1.0619	A216	WCB	J03002
Low Temp. Carbon Steel	LTCS	EN 10213	G17Mn5	1.1131	A352	LCB	J03003
Low Temp. Carbon Steel	LTCS	EN 10213	G21Mn5	1.1138	A352	LCC	J02505
Stainless Steel							
Stainless Steel	Duplex 2205	EN 10213	GX2CrNiMoN22-5-3(4A)	1.4470	A995	4A-CD3MN	J92205
Stainless Steel	Duplex 1B	EN 10213	GX3NiCrMoCuN26-6-3-3	1.4517	A995	1B-CD4MCuN	J93372
Austenitic	SS	EN 10213	GX5CrNi19-10	1.4308	A351	CF8	J92600
Austenitic	SS	EN 10213	GX2CrNi19-11	1.4309	A351L	CF3	J92700
Austenitic	SS	EN 10213	GX5CrNiMo19-11-2	1.4408	A351	CF8M	J92900
Austenitic	SS	EN 10213	GX2CrNiMo19-11-2	1.4409	A351	CF3M	J92800
Super Austenitic	Alloy 20	EN 10213	NiC420CuMo	1.4500	A351	CN7M	N08007
Super Austenitic	Alloy 20 mod.	EN 10213	GX2NiCrMoCuN25-20	1.4536	A743	CN7MS	J94650
Super Austenitic	AL6XN	-	-	-	A351	CN3MN	J94651
Superduplex	Superduplex 5A	EN 10213	25Cr-7Ni-Mo-N	1.4469	A995	CE3MN	J93404
Nickel Alloy							
	Monel/Alloy400	DIN 17730	G-NiCu30 Nb	2.4365	A494	M35-1	N24135
	Hastelloy C mod.	-	-	-	A494	CW6M	N30107
	Hastelloy C	-	-	2.4537	A494	CW12MW	N30002
	Hastelloy C-276	-	-	2.4883	-	-	-
	Hastelloy B-3	-	-	-	-	-	-
	Inconel 600	-	-	-	A494	CY40	N06040
	Inconel 625	-	-	-	A494	CW6MC	N26625
	Inconel 825	-	-	-	A494	CU5MCuC	N08826
	Nickel	DIN 17730	G-Ni 95	2.4170	A494	CZ100	N02100
Other Material Groups							
Tantalum	Tantalum	-	-	-	-	-	-
Titanium	Ti 2	DIN 17865	G-Ti 2	3.7031	B367	C-2	R52550
Zirconium	Zirconium 702	-	-	-	B752	702C	-
Zirconium	Zirconium 705	-	-	-	-	705C	-

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The use of these equivalents has to be evaluated on a case-by-case basis.

Other materials on request.

Equivalent forged and bar-stock materials



			Similar Forged Material							Bar Material	
Common Name	Mat.Nr.	Grade	EN / DIN	Short Name	Mat.Nr.	ASTM	Grade	UNS	ASTM	Short	
Carbon Steel / Ductile Iron											
SG Iron	5.3103	-	EN 1563	EN-GJS-400-18-LT	5.3103	A395-99	60-40-18	-	-	-	
CS	1.0619	WCB	EN 10213	GP240GH	1.0619	A105	A105	-	-	-	
LTCS	1.1131	LCB	-	-	-	A350	LF2-Class1	G10300	-	-	
LTCS	1.1138	LCC	-	-	1.0566	A350	LF2-Class1	G10250	-	-	
Stainless Steel											
Duplex 2205	1.4470	4A-CD3MN	EN 10028-7	X2CrNiMoN22-5-3	1.4462	A182	F51	S32205	A479	S31803	
Duplex 1B	1.4517	1B-CD4MCuN	EN 10028-7	X2CrNiMoCuN25-5-3	1.4507	A182	F59	S32520	A479	S32550	
SS	1.4308	CF8	EN 10028-7	X5CrNi18-10	1.4301	A182	F304	S30400	A276	304	
SS	1.4309	CF3	EN 10028-7	X2CrNi19-11	1.4306	A182	F304L	S30403	A276	304L	
SS	1.4408	CF8M	EN 10028-7	X5C4NiMo17-12-2	1.4401	A182	F316	S31600	A276	316	
SS	1.4409	CF3M	EN 10028-7	X2CrNiMo 17-12	1.4404	A182	316L	S31603	A276	316L	
Alloy 20	1.4500	CN7M	-	-	2.4660	B462	N08020	N08020	B473	N08020	
Alloy 20 mod.	1.4536	CN7MS	-	-	-	-	-	-	-	-	
AL6XN	-	CN3MN	EN 10028-7	X1NiCrMoCuN25-20-7	1.4529	A182	F62	N08367	B462	N08367	
Superduplex 5A	1.4469	CE3MN	EN 10028-7	X2CrNiMoN25-7-4	1.4410	A182	F63	S32615	-	-	
Nickel Alloy											
Monel/Alloy400	2.4365	M35-1	DN 17744	NiCu30Fe	2.4360	B165	Alloy 400	N04400	B164	N04400	
Hastelloy C mod.	-	CW6M	-	-	-	A494	-	-	-	-	
Hastelloy C		CW12MW	-	NiMo16CrW	-	A494	-	-	-	-	
Hastelloy C-276		-	DIN 17744	NiMo16Cr15W	2.4819	B565	N10675	N10276	B574	N10276	
Hastelloy B-3	-	-	DIN 17744	NiMo29Cr	2.4600	B565	N10675	N10675	B335	N10675	
Inconel 600	-	CY40	DIN 17742	NiCr15Fe	2.4816	B565	N06600	N06600	B166	N06600	
Inconel 625	-	CW6MC	DIN 17744	NiCr22Mo9Nb	2.4856	B565	N06625	N06625	B446	N06625	
Inconel 825	-	CU5MCuC	DIN 17744	NiCr21Mo	2.4858	B564	N08825	N08825	B425	N08825	
Nickel	2.4170	CZ100	-	-	-	-	-	-	B160	N02200	
Other Material Groups											
Tantalum	-	-				B365	TaW2,5	R05252	-	-	
Ti 2	3.7031	C-2	DIN 17864	Grade 2	3.7035	B381	F2	R50400	B348	Grade 2	
Zirconium 702	-	702C	-	-	6.0702	B493	R60702	R60702	B550	R60702	
Zirconium 705	-	705C	-	-	-	B493	R60705	R60705	B550	R60705	

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The use of these equivalents has to be evaluated on a case-by-case basis.

Other materials on request.

Lining materials



Lining materials

The high density, extremely resistant lining is at least 3 mm thick. New granulate is used exclusively, no refurbished regenerates or similar materials.

Fluoropolymer lining materials

- Body: PFA, PFA conductive and FEP
- Plug: PTFE, PFA, PFA conductive and FEP

body lining	Combination of linings plug lining	T _{max}
PFA	PTFE ¹⁾ or special materials	210°C / 410°F
PFA	PFA	200°C / 392°F
PFA	FEP	150°C / 302°F
PFA conductive	PFA conductive	125°C / 257°F
FEP	FEP	150°C / 302°F
FEP	PFA	150°C / 302°F

1) Plugs with PTFE lining only for two-way valves up to DN 100.
Plugs for multi-way valves not with PTFE lining available.

IMPORTANT NOTE

For demanding conditions, such as process temperatures exceeding 150°C / 302°F:
Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of lining material, cover sealing type and special features.

Sleeve materials



Category	Sleeve Material	Characteristics	Typical applications	T _{MAX}
PTFE	PTFE, virgin	low friction, very good sealing characteristic	standard sleeve material for most applications	230°C / 446°F
RPTFE	PTFE-Glass	reinforced PTFE	additional stability for multiway valves with horizontal ports	230°C / 446°F
	PTFE-Graphite	reinforced PTFE	high temperature applications	250°C / 482°F
modified PTFE	TFM 1600* NXT 75* M 111*	chemically modified PTFE, reduced permeation, low friction	chemical applications where reduced permeability compared to PTFE is required	250°C / 482°F
Special Sleeves	PTFE-P* NFCE* NCS*	high performance sleeve materials	severe service highest temperatures, high pressure, abrasive applications	320°C / 608°F
PFA	PFA	reduced permeation	chemical applications where reduced permeability compared to PTFE is required	200°C / 392°F
UHMW-PE	UHMW-PE	Ultra High Molecular Weight Polyethylene	radiation resistant, abrasive application	80°C / 176°F

*) sleeve material selection depending on availability at AZ manufacturing site

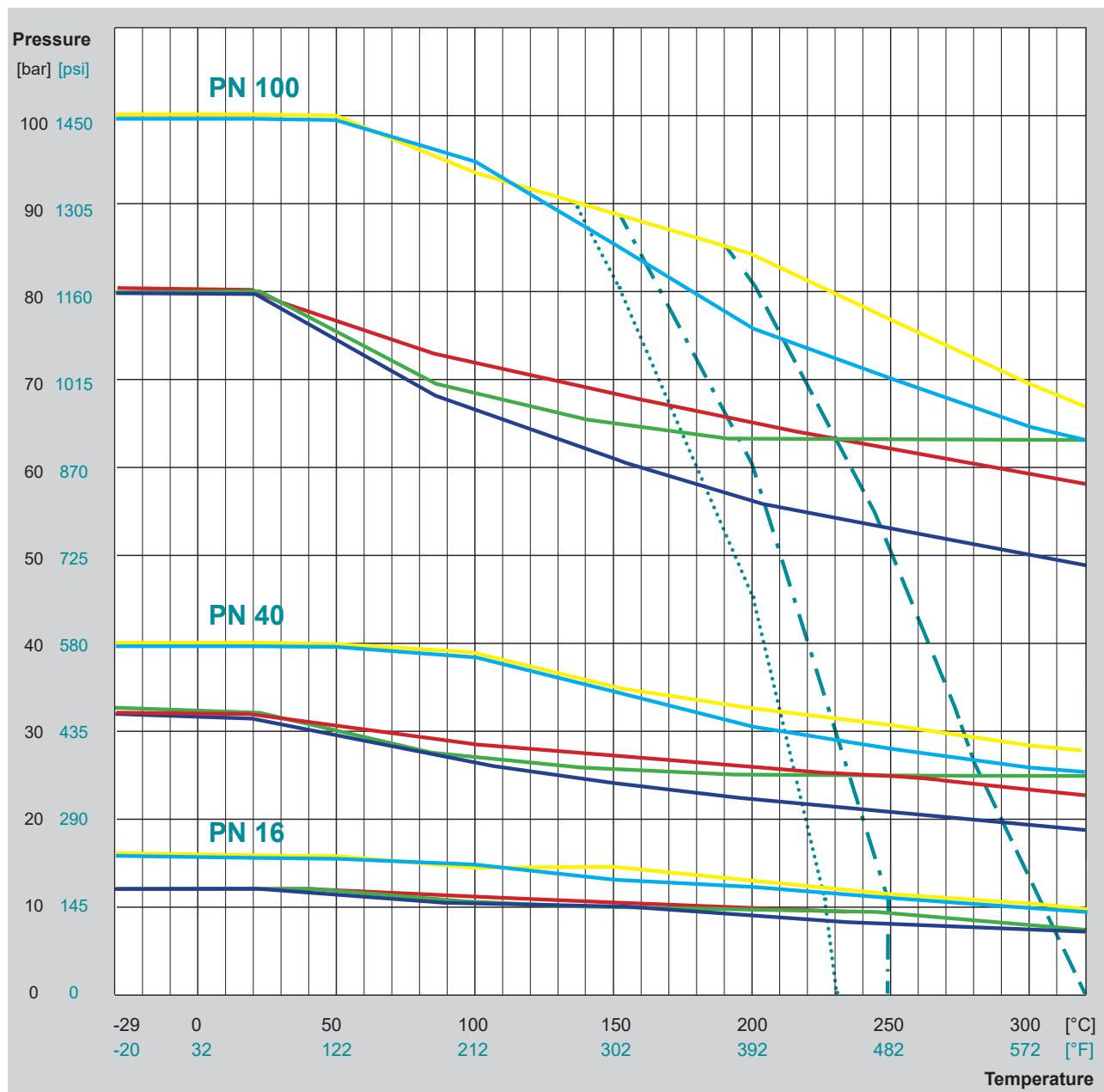
IMPORTANT NOTE

for demanding conditions, such as process temperatures exceeding 200°C / 392°F:

Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features. For other sleeve materials not listed above: please contact your AZ sales representative.

PT Diagram, PN 16 - PN 100

PTFE sleeved plug valves



Body material

- EN 10213 - 1.0619 / Carbon Steel
 - EN 10213 - 1.4408 / Stainless Steel
 - EN 17744 - 2.4819 / Hastelloy
 - EN 17730 - 2.4365 / Monel 400
 - UNS N08007 - 1.4500 / Alloy 20
- other body materials on request

Sleeve material

- PTFE (virgin) / PTFE (glass) T_{max} 230°C / 446°F
 - TFM / NXT / M111 / PTFE graphite T_{max} 250°C / 482°F
 - PTFE-P / NFCE / NCS T_{max} 320°C / 608°F
- other sleeve materials on request

The data given are max. values according to EN 12516-1 and EN 1092-1.

IMPORTANT NOTE

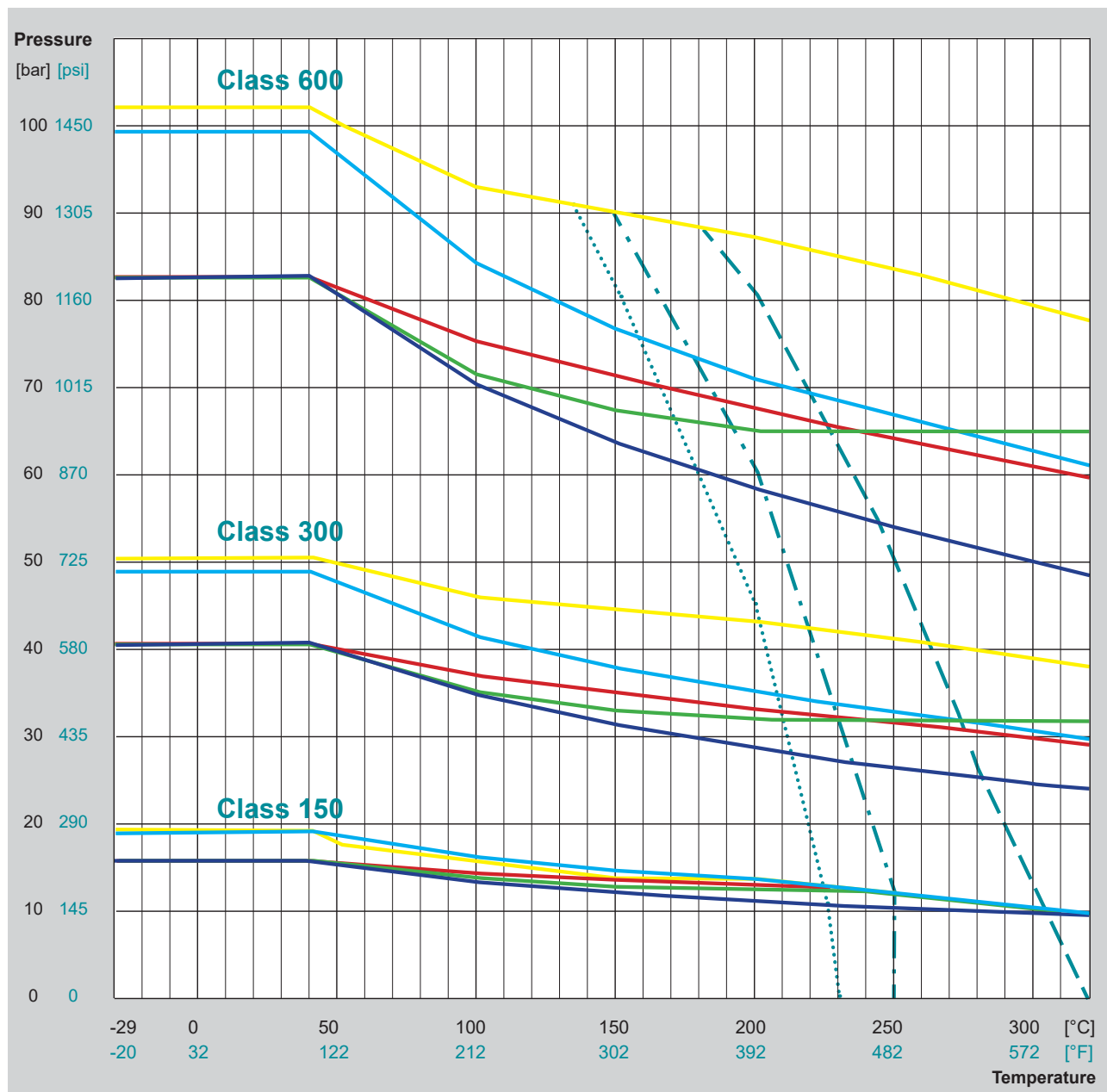
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

For temperatures < -29°C / -20°F, (T_{limit} = -60°C / -76°F) operating temperature, low-temperature carbon steel or austenitic stainless steels are required.

Subject to technical change without notice.

PT Diagram, Class 150 - Class 600

PTFE sleeved plug valves



Body material

- ASTM A216 - WCB
- ASTM A351 - CF8M
- ASTM A494 - CW12MW / Hastelloy
- ASTM A494 - M35.1 / Monel 400
- ASTM A351 - CN7M Alloy 20
- other body materials on request

Sleeve material

- PTFE (virgin) / PTFE (glass) $T_{max} 230^{\circ}\text{C} / 446^{\circ}\text{F}$
- .-.- TFM / NXT / M111 / PTFE graphite $T_{max} 250^{\circ}\text{C} / 482^{\circ}\text{F}$
- PTFE-P / NFCE / NCS $T_{max} 320^{\circ}\text{C} / 608^{\circ}\text{F}$
- other sleeve materials on request

The data given are max. values according to ASME B16.34.

IMPORTANT NOTE

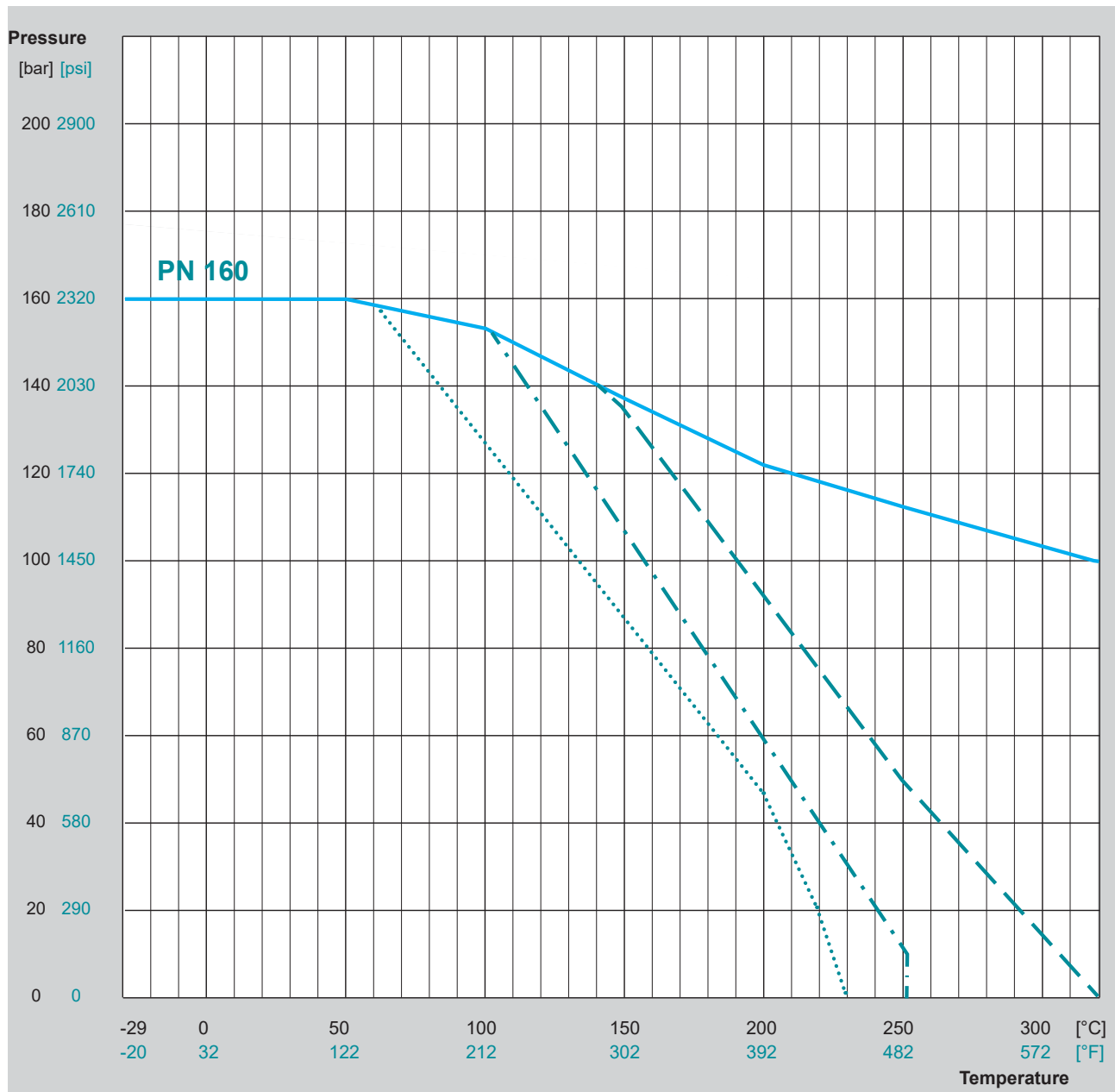
for demanding conditions, such as process temperatures exceeding $200^{\circ}\text{C} / 392^{\circ}\text{F}$: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

For temperatures $< -29^{\circ}\text{C} / -20^{\circ}\text{F}$, ($T_{limit} = -60^{\circ}\text{C} / -76^{\circ}\text{F}$) operating temperature, low-temperature carbon steel or austenitic stainless steels are required.

Subject to technical change without notice.

PT Diagram High Pressure, PN 160

PTFE sleeved plug valves with trunnion mounted design



Body material (in line with EN 12516-1 and EN 1092-1)

— EN 10213 - 1.4408 / Stainless Steel
other body materials on request

Sleeve material

..... PTFE (virgin) / PTFE (glass) T_{max} 230°C / 446°F
 - - - TFM / NXT / M111 / PTFE graphite T_{max} 250°C / 482°F
 — PTFE-P / NFCE / NCS T_{max} 320°C / 608°F
 other sleeve materials on request

The data given are max. values according to EN 12516-1 and EN 1092-1.

IMPORTANT NOTE

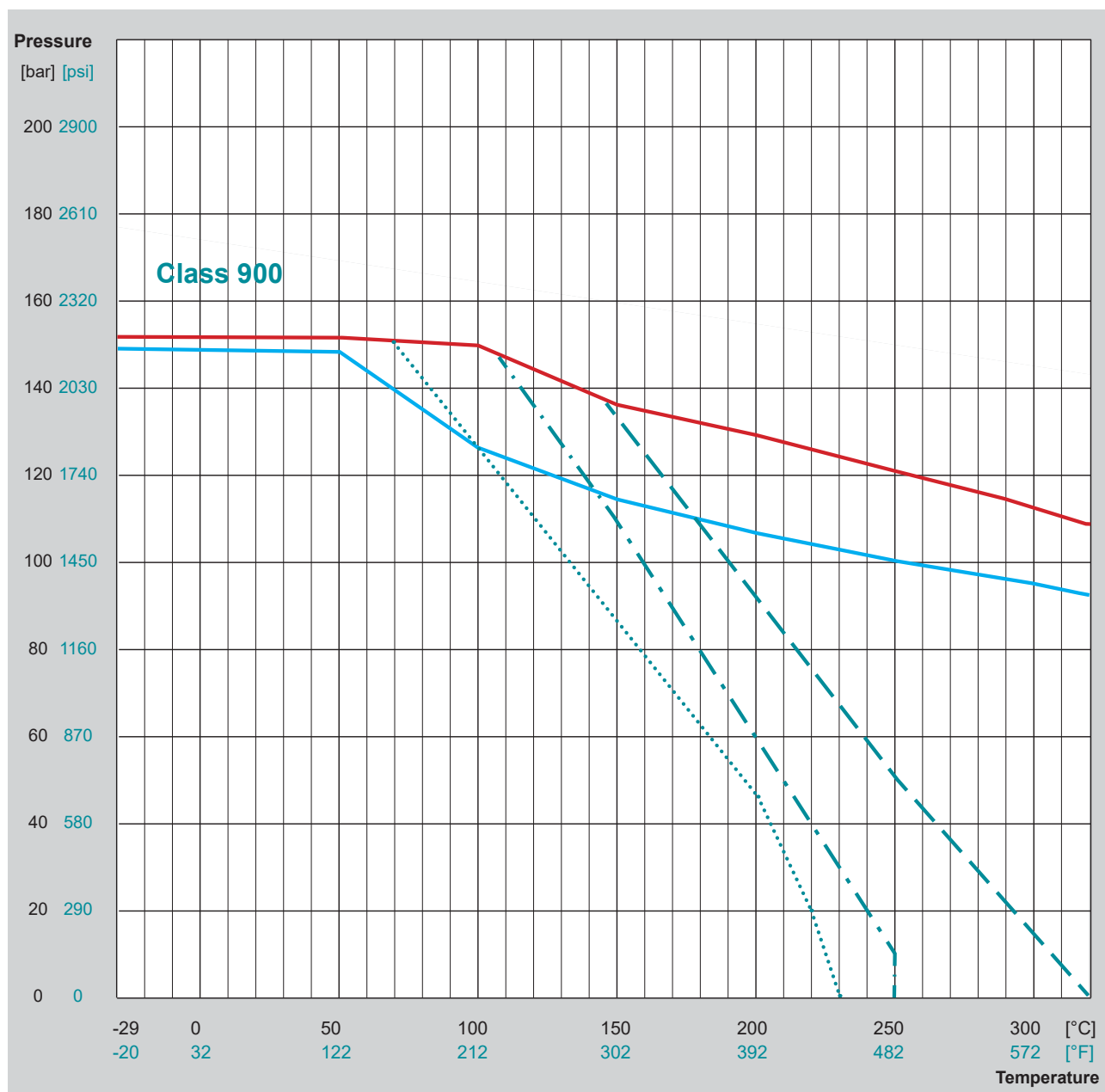
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

For temperatures < -29°C / -20°F, (T_{limit} = -60°C / -76°F) operating temperature, low-temperature carbon steel or austenitic stainless steels are required.

Subject to technical change without notice.

PT Diagram High Pressure, Class 900

PTFE sleeved plug valves with trunnion mounted design



Body material (in line with ASME B16.34)

- ASTM A351 - CF8M / Stainless Steel
- ASTM A995 - CD3MN / Superduplex
- other body materials on request

Sleeve material

- PTFE (virgin) / PTFE (glass) T_{max} 230°C / 446°F
- · - · TFM / NXT / M111 / PTFE graphite T_{max} 250°C / 482°F
- PTFE-P / NFCE / NCS T_{max} 320°C / 608°F
- other sleeve materials on request

The data given are max. values according to ASME B16.34.

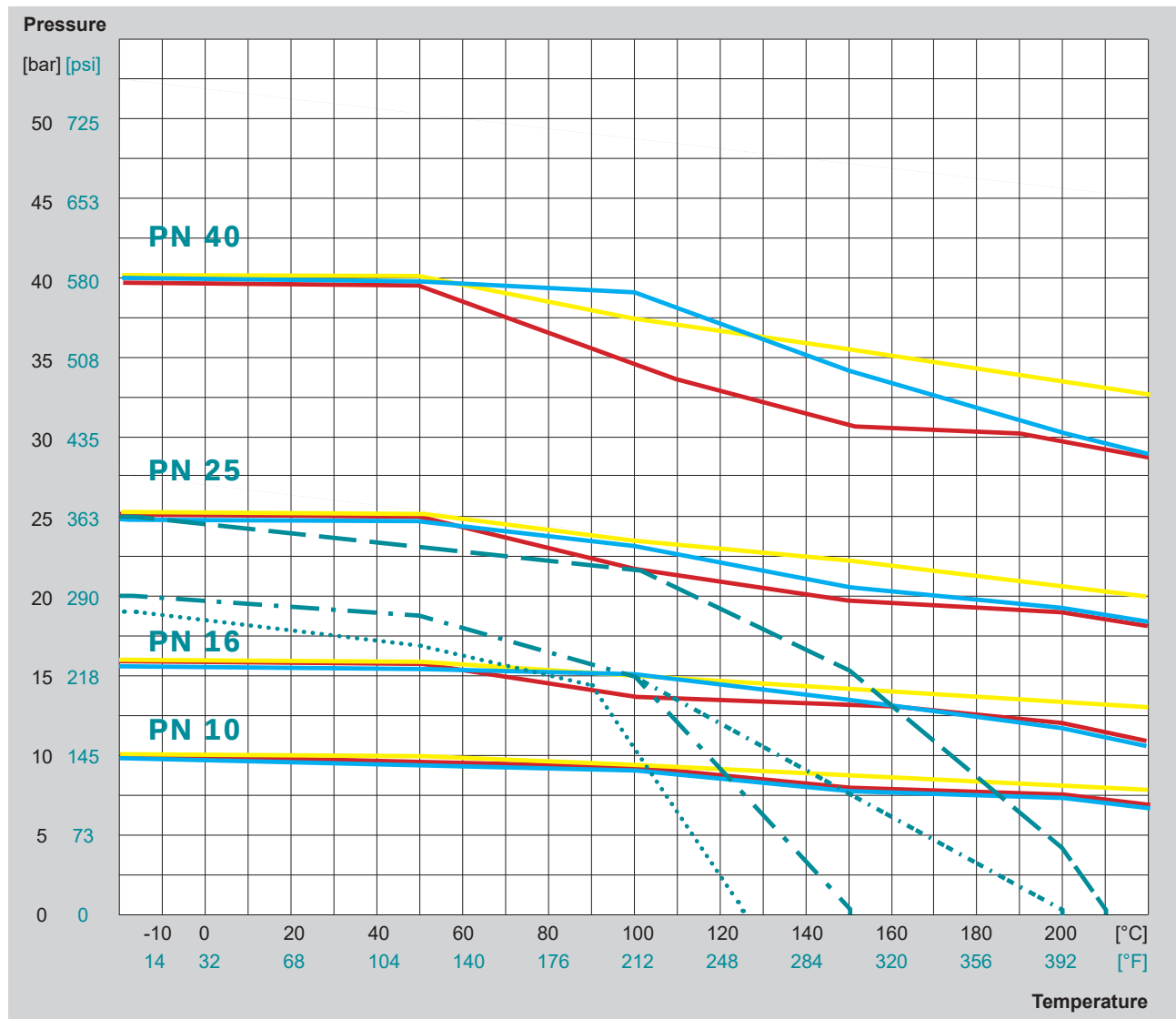
IMPORTANT NOTE

for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

Subject to technical change without notice.

For temperatures < -29°C / -20°F, (T_{limit} = -60°C / -76°F) operating temperature, low-temperature carbon steel or austenitic stainless steels are required.

PT Diagram, PN 10 - PN 40 lined valves



Body material

- EN 10213 - 1.0619 / Carbon Steel
 - EN 10213 - 1.4408 / Stainless Steel
 - EN 1563 - EN-GJS-400-18-LT / Ductile Iron
- other body materials on request

Lining combination

	Body	Plug / Ball	T _{MAX}
—	PFA	PTFE or special*	210°C / 410°F
—	PFA	PFA	200°C / 392°F
—	all combinations with PFA and FEP		150°C / 302°F
—	PFA conductive	PFA conductive**	125°C / 257°F

*) Special materials (metallic) for plugs without lining on request

**) Material combination PFA / FEP possible

The data given are max. values according to EN 12516-4.

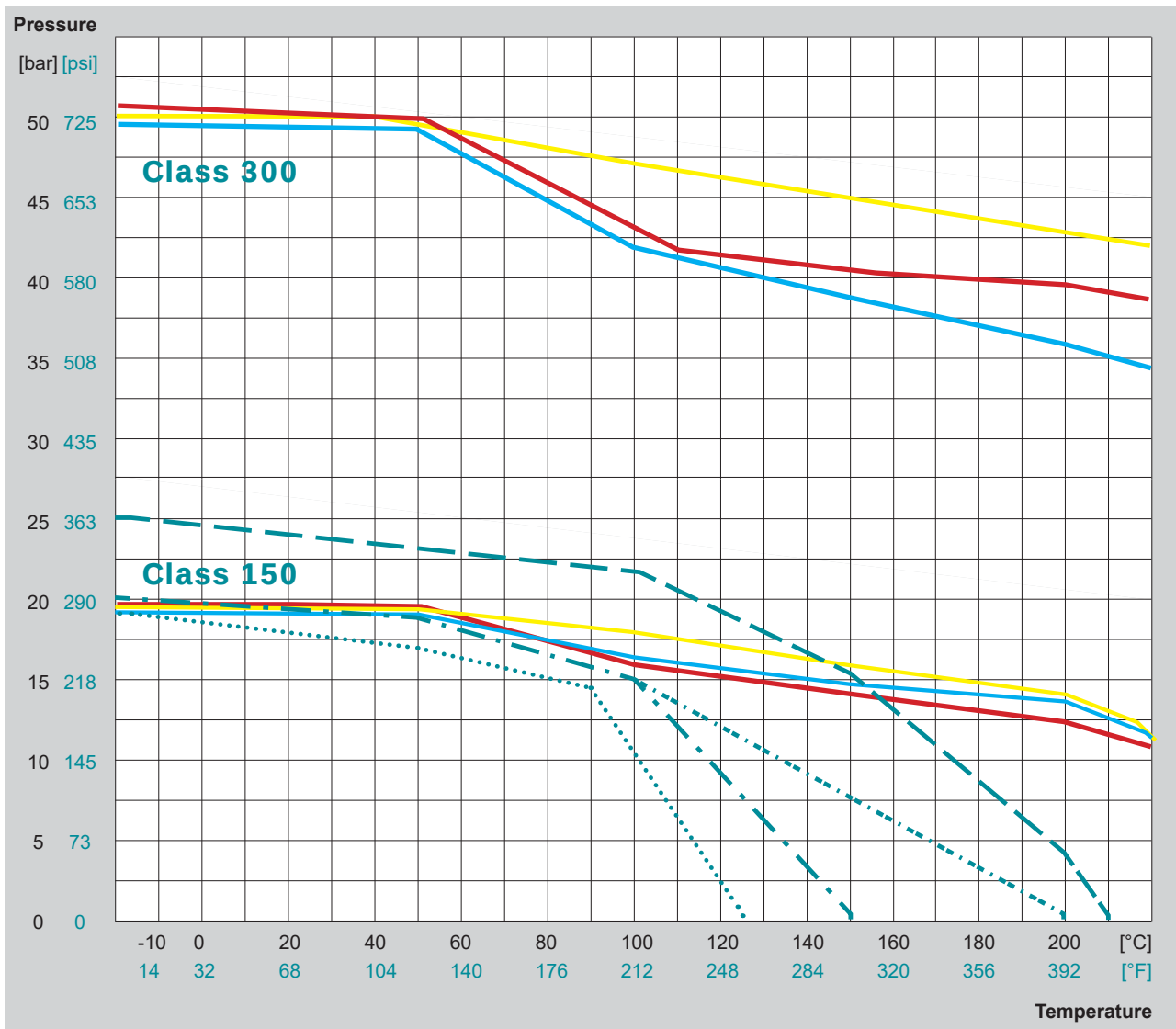
IMPORTANT NOTE

for demanding conditions, such as process temperatures exceeding 150°C / 302°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of lining material, cover sealing type and special features.

Maximum breakaway torque depending on material combinations according to the technical data sheets of the plug valve.

Subject to technical change without notice.

PT Diagramm, Class 150 - Class 300 lined valves



Body material

- ASTM A216 - WCB
- ASTM A351 - CF8M / Stainless Steel
- ASTM A395 / Ductile Iron
- other body materials on request

Lining combination

	Body	Plug / Ball	T _{MAX}
—	PFA	PTFE or special*	210°C / 410°F
---	PFA	PFA	200°C / 392°F
---	all combinations with PFA and FEP		150°C / 302°F
.....	PFA conductive	PFA conductive**	125°C / 257°F

*) Special materials (metallic) for plugs without lining on request

**) Material combination PFA / FEP possible

The data given are max. values according to EN 12516-4.

IMPORTANT NOTE

for demanding conditions, such as process temperatures exceeding 150°C / 302°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of lining material, cover sealing type and special features.

Maximum breakaway torque depending on material combinations according to the technical data sheets of the plug valve.

Subject to technical change without notice.

Plug types: two-way and multi-port for standard reduced and full bore design



- position indicator for all multi-way valves welded on lever or stem extension
- Lined plug valves: multi-way plugs only with PFA / FEP plug lining or made of special materials. Two-way plugs with PTFE lining up to DN 100 / NPS 4 available

Recommendation for three-way valves type F-3-S with vertical outlet (longer life-time compared to type F-3-W with horizontal outlet)

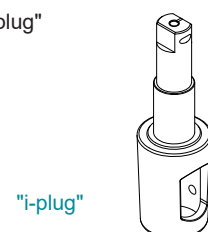
Options

Plugs made of special materials or special designs, e.g. with flushing devices, vent holes in plug bottom or plug upstream / downstream side

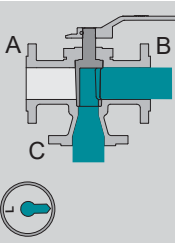
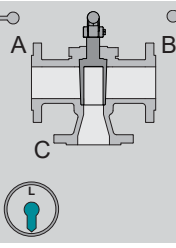
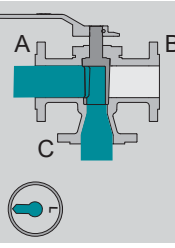
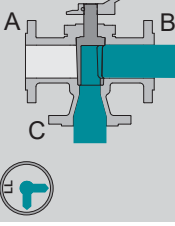
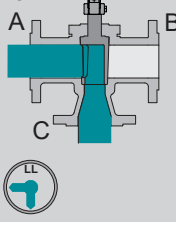
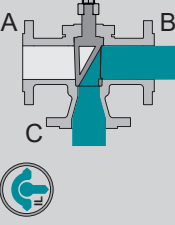
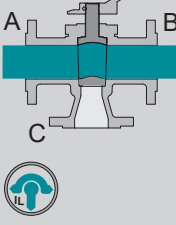
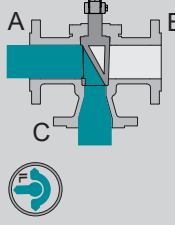
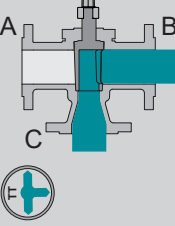
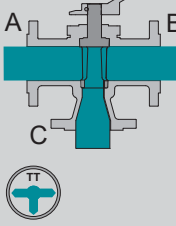
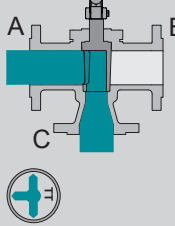
2-way	Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°
	D 				
Type F-2-ISO-STANDARD	T4 * 				

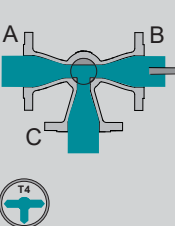
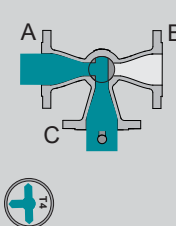
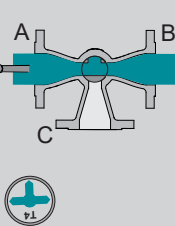
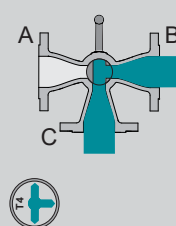
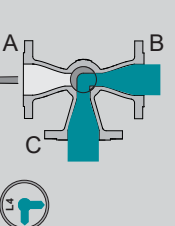
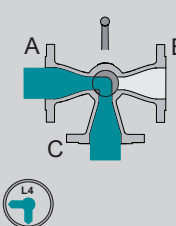
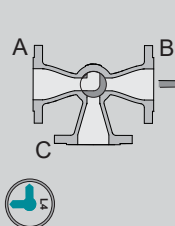


*) For highly expanding media AZ recommends the "i-plug" (relief hole and open plug bottom)



Plug types: 3-way valve for STANDARD and EXTRA design

Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°	3-way (vertical)
L 					 Type F-3-S-ISO-STANDARD
LL 					
IL* 					 Type F-3-S-ISO-STANDARD-A
TT 					

Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°	3-way (horizontal)
T4 					 Type F-3-W-ISO-STANDARD
L4 					

*) for EXTRA valves with IL-plug, F-3-W-EXTRA with T4-plug is recommended (higher flowrate)
Lined valves: the IL-plug is only available in special materials



Plug types 3-way (120°) valves and 4-way valves for STANDARD and EXTRA design

3-way (120°) type 3-W-120:

- min. cross section guaranteed (switching phase)
- piggable execution on request
- minimum flow guaranteed

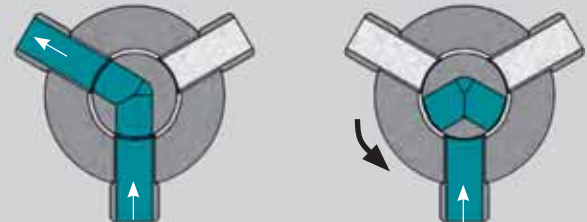
transflow design



3-way (120°) type 3-WP-120

- with positive overlap
- flow interruption / isolation

positive overlap

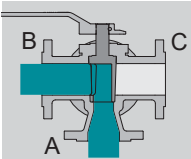
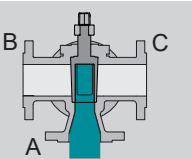
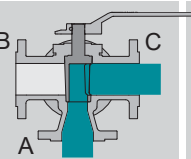
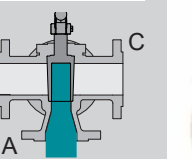
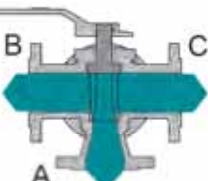
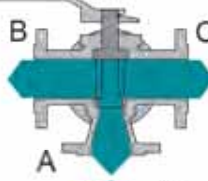
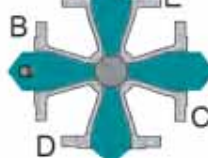
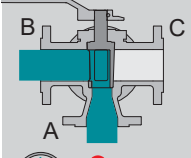
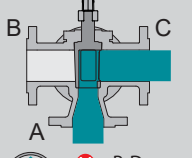
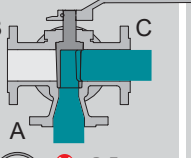
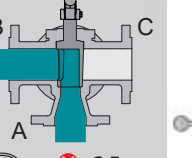
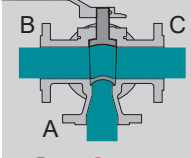
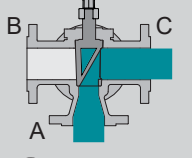
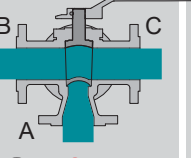
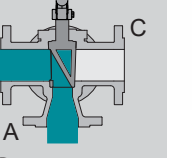
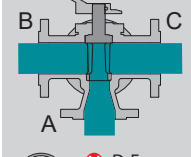
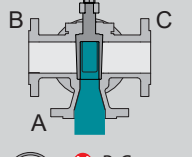
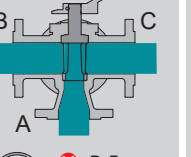
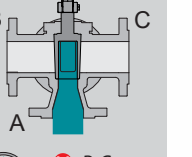
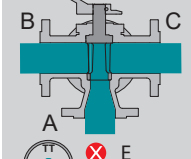
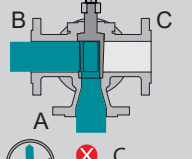
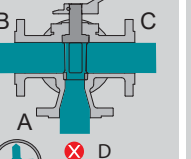
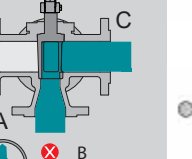


3-way (120°)	Plug type	Pos. I = 0°	Pos. II = 120°	Pos. III = 240°	
	L120 				

4-way	Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°
 Type F-4-ISO-STANDARD 	L4 				
	T4 				
	LL4 				

open
 closed

Plug types 4-way (special) and 5-way valves for STANDARD and EXTRA design

Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°	4-way (special) / 5-way
L	  ✗ C-D-E ✓ A-B	  ✗ B-C-D ✓ A-E	  ✗ B-D-E ✓ A-C	  ✗ B-C-E ✓ A-D	 Type F-4-Special-ISO-STANDARD    Type F-5-ISO-STANDARD  
LL	  ✗ C-D ✓ A-B-E	  ✗ B-D ✓ A-C-E	  ✗ B-E ✓ A-C-D	  ✗ C-E ✓ A-B-D	
IL	  ✗ D ✓ A-E + B-C	  ✗ B ✓ A-C + D-E	  ✗ E ✓ A-D + B-C	  ✗ C ✓ A-B + D-E	
T	  ✗ D-E ✓ A-B-C	  ✗ B-C ✓ A-D-E	  ✗ D-E ✓ A-B-C	  ✗ B-C ✓ A-D-E	
TT	  ✗ E ✓ A-B-C-D	  ✗ C ✓ A-B-D-E	  ✗ D ✓ A-B-C-E	  ✗ B ✓ A-C-D-E	

 open

 closed



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