

## Type ISO-BAR-STOCK

Plug valves made from bar material



# Type ISO-BAR STOCK

## Block valves made of bar stock materials

Highest valve quality for  
best plant performance

- shortest lead times for valves made of special materials

DN 15 - 100 / PN 10 - 160  
NPS ½ - 4 / Class 150 - 900

Range of application:  
-60 < T < 230/320°C  
vacuum-capable



- Nickel
- Hastelloy, Monel, Inconel
- Duplex, Super Duplex
- Titanium, Zirconium
- Tantalum

### Design characteristics

- body with integral flanges and same material grade
- resistance to pitting and crevice corrosion
- x-ray and dye penetrant not necessary
- reduced and full bore plug
- mounting-flange for actuators
- standard: safety sealing type FSN (Fire-Safe) or CASN
- low fugitive emission in line with TA LUFT, ISO 15848 & API 641
- SIL 3 certified

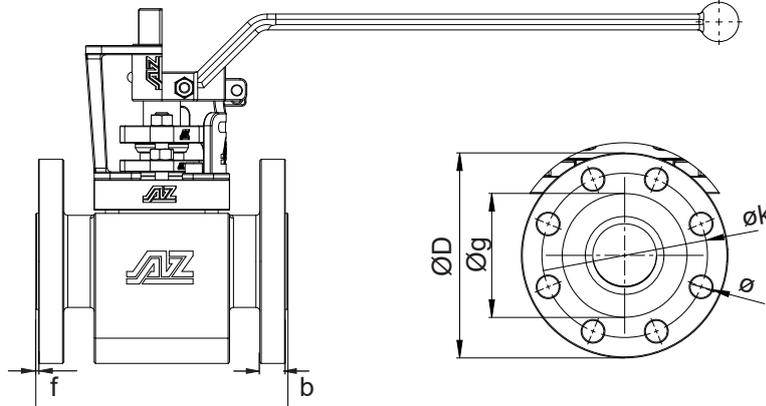
### Options

- flushing device
- FDA-compliant
- painting
- oil and grease-free assembly



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

# Flange dimensions acc. to DIN EN / ASME



DIN EN 1092-1	DN	PN	ØD [mm]	flange bore [mm]		Øg [mm]	b [mm]	f [mm]	DIN EN 1092-1	DN	PN	ØD [mm]	flange bore [mm]		Øg [mm]	b [mm]	f [mm]	
				Øk	no. Ø									Øk	no. Ø			
DIN EN 1092-1	15	10-40	95	65	4 14	45	16	2	DIN EN 1092-1	80	10-16	200	160	8	18	138	20	3
	20	10-40	105	75	4 14	58	18	2		100	25-40	200	160	8	26	188	20	3
	25	10-40	115	85	4 14	68	18	2		100	10-16	220	180	8	18	158	20	3
	40	10-40	150	110	4 18	88	18	2		100	25-40	235	190	8	22	162	24	3
	50	10-40	165	125	4 18	102	20	3										
ASME B16.5	NPS	Class	ØD [mm]	flange bore [mm]		Øg [mm]	b [mm]	f [mm]	ASME B16.5	NPS	Class	ØD [mm]	flange bore [mm]		Øg [mm]	b [mm]	f [mm]	
				Øk	no. Ø									Øk	no. Ø			
ASME B16.5	½	150	90	60,3	4 15,7	34,9	10,0*	2	ASME B16.5	3	150	190	152,4	4 5/8"	127,0	19,5*	2	
		300	95	66,7	4 15,7	34,9	14,7	2			300	210	168,3	8 22,3	127,0	29,0	2	
	¾	150	100	69,9	4 15,7	42,9	10,9*	2			4	150	230	190,5	8 5/8"	157,2	24,3	2
		300	115	82,6	4 19,1	42,9	16,3	2				300	255	200,0	8 22,3	157,2	32,2	2
	1	150	110	79,4	4 1/2"	50,8	11,6*	2										
		300	125	88,9	4 19,1	50,8	17,9	2										
	1½	150	125	98,4	4 15,7	73,0	14,7*	2										
		300	155	114,3	4 22,3	73,0	21,1	2										
	2	150	150	120,7	4 5/8"	92,1	16,3*	2										
		300	165	127,0	8 19,1	92,1	22,7	2										

# Type ISO-BAR-STOCK

## Technical information DN 15 - 50 / NPS ½ - 2

AZ-ISO-bracket  
for actuator acc. to  
ISO 5211

DIN EN 558 / ISO 5211	DN Design*	PN	L [mm]	A [mm]	H [mm]	R [mm]	bracket type	SW [mm]	SW1 [mm]	torque** [Nm]	weight [kg]	K <sub>vs</sub> [m <sup>3</sup> /h]	C <sub>v</sub> [US.gal/min]
	15	FM	10-40	130	114	126	200	F05	11	17	45	6	12
20	RB	10-40	150	114	126	200	F05	11	17	45	7	13	15
25	FB	10-40	160	141	159	320	F05	14	17/22	120	9	49	57
40	RB	10-40	200	164	182	420	F07	19	22/27	210	17	80	93
50	RB	10-40	230	204	192	600	F07	22	22/27	360	29	114	133
ASME B16.10 / ISO 5211	NPS Design*	Class	L [mm]	A [mm]	H [mm]	R [mm]	bracket type	SW [mm]	SW1 [mm]	torque** [Nm]	weight [kg]	K <sub>vs</sub> [m <sup>3</sup> /h]	C <sub>v</sub> [US.gal/min]
	½	FB	150 300	108 140	114	126	200	F05	11	17	45	5 6	13
¾	RB	150 300	117 152	114	126	200	F05	11	17	45	6 7	13	15
1	FB	150 300	127 165	141	159	320	F5	14	17/22	120	10 10	52 49	60 57
1½	RB	150 300	165 190	164	182	420	F07	19	22/27	210	14 18	91 93	105 108
2	RB	150 300	178 216	204	192	600	F07	22	22/27	360	28 30	122 122	141 141

\* ) manufacturer standard: FB = Full Bore, RB = Reduced Bore,  
Full Bore available for all sizes on request

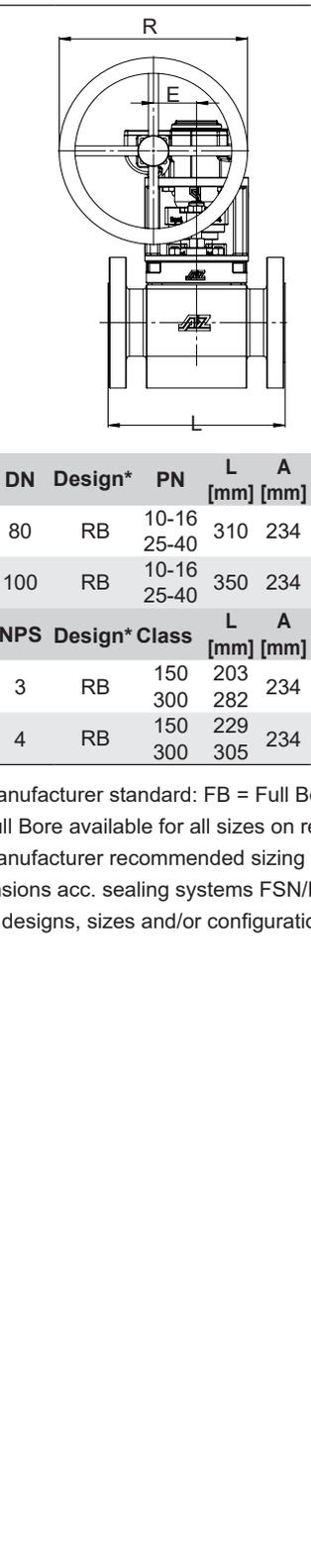
\*\* ) manufacturer recommended sizing torque (incl. 100% safety)

Dimensions acc. sealing systems FSN/FSN-SL and CASN/CASN-SL

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

# Type ISO-BAR-STOCK

## Technical information DN 80- 100 / NPS 3 - 4



ASME B16.10 / ISO 5211	DIN EN 558 / ISO 5211		DN	Design*	PN	L	A	E	R	H	I	gearbox	bracket	SW	SW1	torque**	weight	$K_{vs}$	$C_v$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	(Pro-Gear)	type	[mm]	[mm]	[Nm]	[kg]	[m <sup>3</sup> /h]	[US.gal/min]
	80	RB	10-16 25-40			310	234	69	300	202	315	Q800	F12	27	36	525	55	306	357
	100	RB	10-16 25-40			350	234	69	500	225	330	Q1500S	F12	27	36	900	72	245	286
ASME B16.10 / ISO 5211	NPS	Design*	Class	L	A	E	R	H	I	gearbox	bracket	SW	SW1	torque**	weight	$K_{vs}$	$C_v$		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	(Pro-Gear)	type	[mm]	[mm]	[Nm]	[kg]	[m <sup>3</sup> /h]	[US.gal/min]		
	3	RB	150 300	203 282	234	69	300	202	315	Q800	F12	27	36	525	53 58	309 327	361 382		
	4	RB	150 300	229 305	234	69	500	225	330	Q1500S	F12	27	36	900	78 78	268 255	313 298		

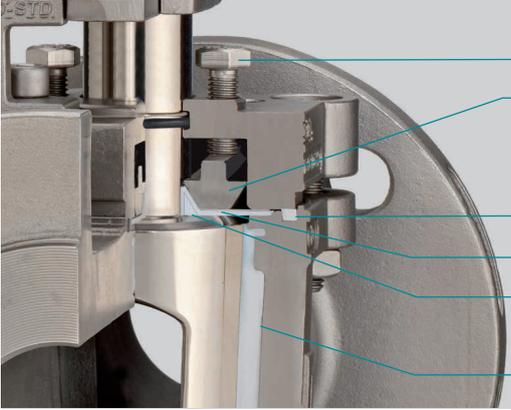
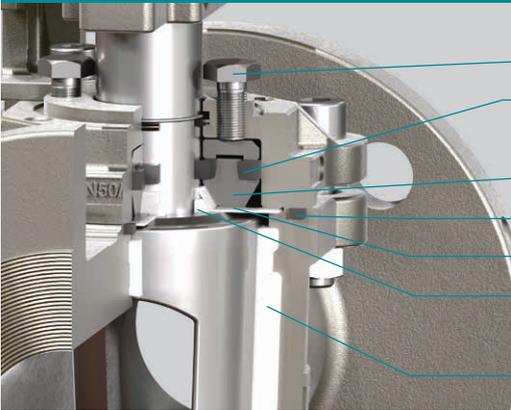
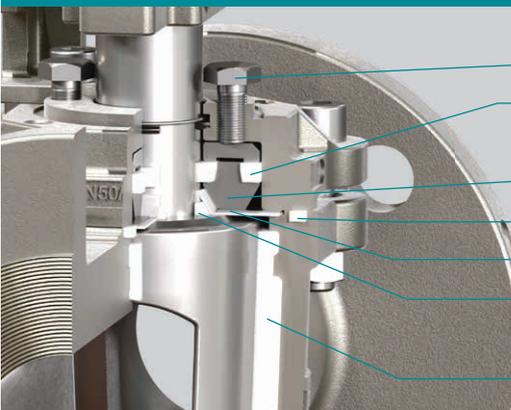
\*) manufacturer standard: FB = Full Bore, RB = Reduced Bore,  
Full Bore available for all sizes on request

\*\*\*) manufacturer recommended sizing torque (incl. 100% safety)

Dimensions acc. sealing systems FSN/FSN-SL and CASN/CASN-SL

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

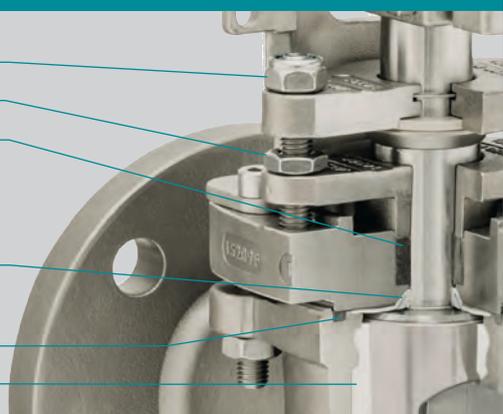
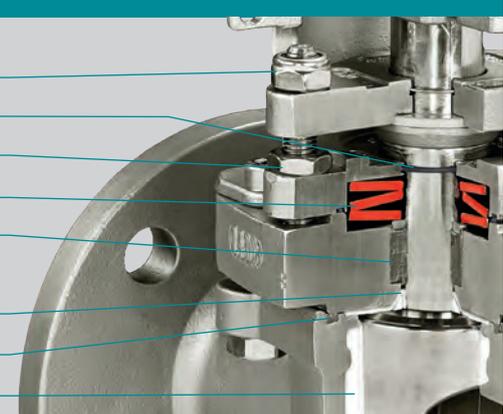
# Cover and stem sealing systems suitable for general applications

	<p><b>Type STANDARD</b></p> <ul style="list-style-type: none"> <li>● plug adjustment</li> <li>● thrust collar</li> <li>● cover sealing (PTFE)</li> <li>● stainless steel diaphragm</li> <li>● <b>Secondary sealing:</b> V-diaphragm (PTFE), delta thrust collar (PTFE)</li> <li>● <b>Primary sealing:</b> sleeve*</li> </ul>
	<p><b>Type FS2 Fire-Safe-sealing (API 607)</b></p> <ul style="list-style-type: none"> <li>● plug &amp; packing adjustment</li> <li>● <b>Tertiary sealing:</b> Packing to atmosphere (graphite)</li> <li>● thrust collar</li> <li>● cover sealing (graphite)</li> <li>● stainless steel diaphragm</li> <li>● <b>Secondary sealing:</b> V-diaphragm (PTFE) and delta thrust collar (PTFE)</li> <li>● <b>Primary sealing:</b> sleeve*</li> </ul>
	<p><b>Type CA2 Chemistry sealing</b></p> <ul style="list-style-type: none"> <li>● plug &amp; packing adjustment</li> <li>● <b>Tertiary sealing:</b> Packing to atmosphere (PTFE)</li> <li>● thrust collar</li> <li>● cover sealing (PTFE)</li> <li>● stainless steel diaphragm</li> <li>● <b>Secondary sealing:</b> V-diaphragm, delta thrust collar (PTFE)</li> <li>● <b>Primary sealing:</b> sleeve*</li> </ul>

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

\*) 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

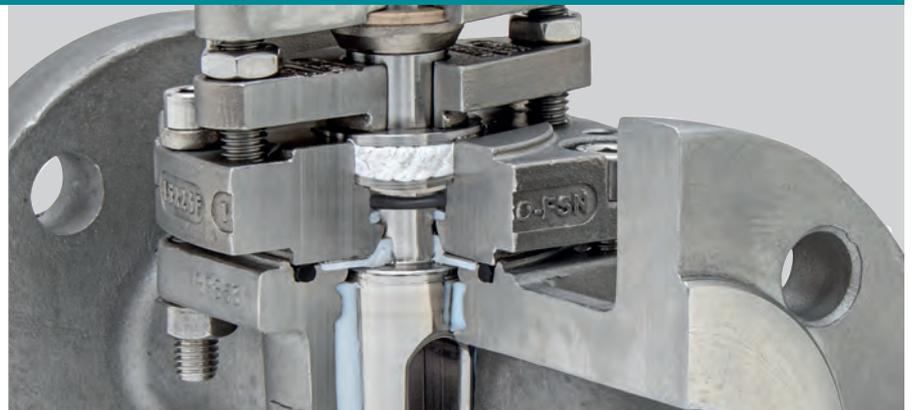
## Chevron packing

- 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

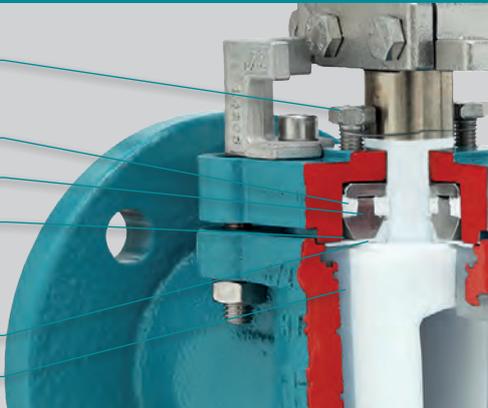
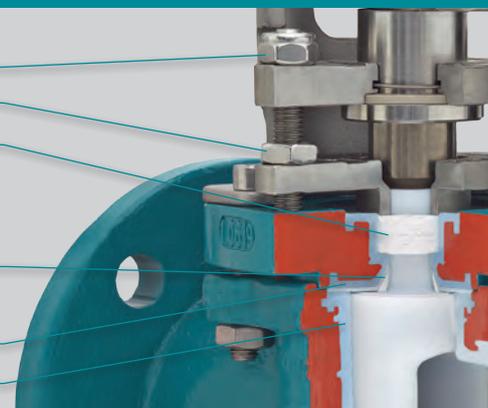
cover sealing

flange sealing



# Cover and stem sealing systems for lined plug valves

*engineered.  
fast.  
dynamic.*

Type CA	Chemistry sealing	
<p>plug &amp; packing adjustment</p> <p><b>Tertiary sealing:</b> Packing to atmosphere (PTFE)</p> <p>thrust collar</p> <p>stainless steel diaphragm</p> <p><b>Secondary sealing:</b> V-diaphragm &amp; delta thrust collar (PTFE)</p> <p><b>Primary sealing:</b> lined body</p>		
	<p><b>lined cover</b></p> <p>plug adjustment</p> <p>triple safety stem packing adjustment</p> <p><b>Tertiary sealing:</b> triple safety stem packing (PTFE) to atmosphere</p> <p><b>Secondary sealing:</b> V-diaphragm (PTFE), delta thrust collar (PTFE)</p> <p>lined cover</p> <p><b>Primary sealing:</b> lined body*</p>	
	<p><b>live-loaded</b></p> <p>plug adjustment</p> <p>o-rings protect the springs against corrosion</p> <p>triple safety stem packing adjustment</p> <p>disk springs (optionally made of Inconel)</p> <p><b>Tertiary sealing:</b> triple safety stem packing (PTFE) to atmosphere</p> <p><b>Secondary sealing:</b> V-diaphragm (PTFE), delta thrust collar (PTFE)</p> <p>lined cover</p> <p><b>Primary sealing:</b> lined body*</p>	

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

# Casting materials



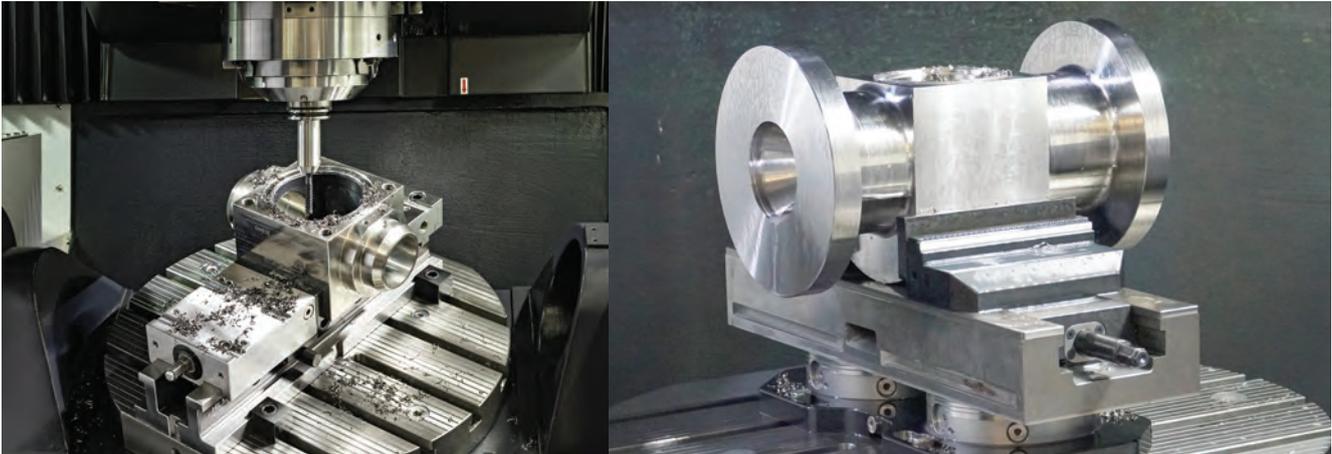
Material Group	Common Name	Casting Material					
		EN / DIN	Short name	Material-No.	ASTM	Grade	UNS
<b>Carbon Steel / Ductile Iron</b>							
Ductile Iron	SG Iron	EN 1563	EN-GJS-400-18-LT	5.3103	A395	-	F32800
Carbon Steel	CS	EN 10213	GP240GH	1.0619	A216	WCB	J03002
Low Temp. Carbon Steel	LTCS	EN 10213	G17Mn5	1.1131	A352	LCB	J03003
Low Temp. Carbon Steel	LTCS	EN 10213	G21Mn5	1.1138	A352	LCC	J02505
<b>Stainless Steel</b>							
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
<b>Nickel Alloy</b>							
	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
<b>Other Material Groups</b>							
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



Common Name	Mat.Nr.	Grade	Similar Forged Material						Bar Material	
			EN / DIN	Short Name	Mat.Nr.	ASTM	Grade	UNS	ASTM Short	
<b>Carbon Steel / Ductile Iron</b>										
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	-	-
<b>Stainless Steel</b>										
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	-	-
<b>Nickel Alloy</b>										
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
<b>Other Material Groups</b>										
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 <sub>max</sub>
PFA	PTFE <sup>1)</sup> 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 <sub>MAX</sub>
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

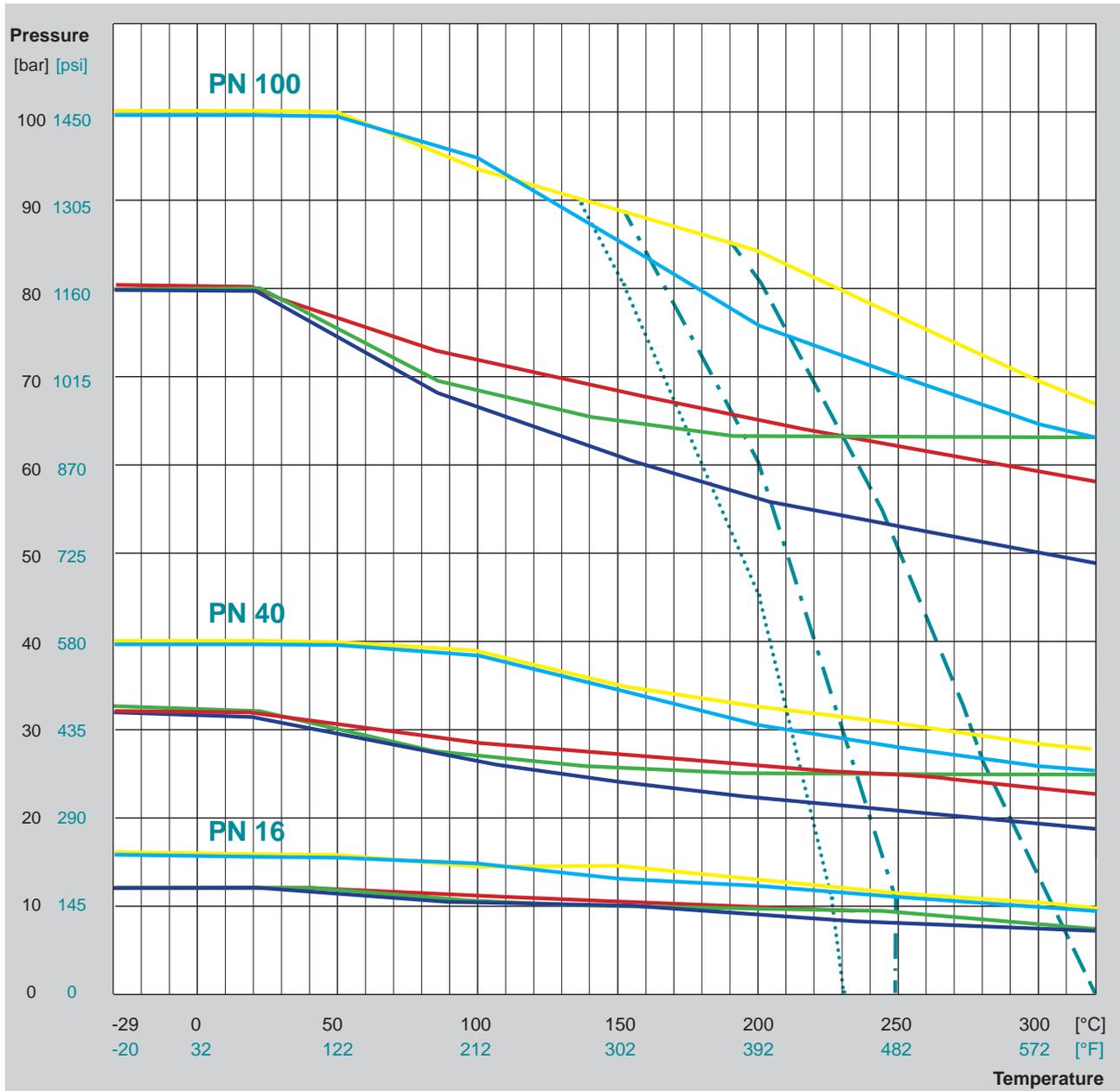
\*) sleeve material selection depending on availability at AZ manufacturing site

## 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

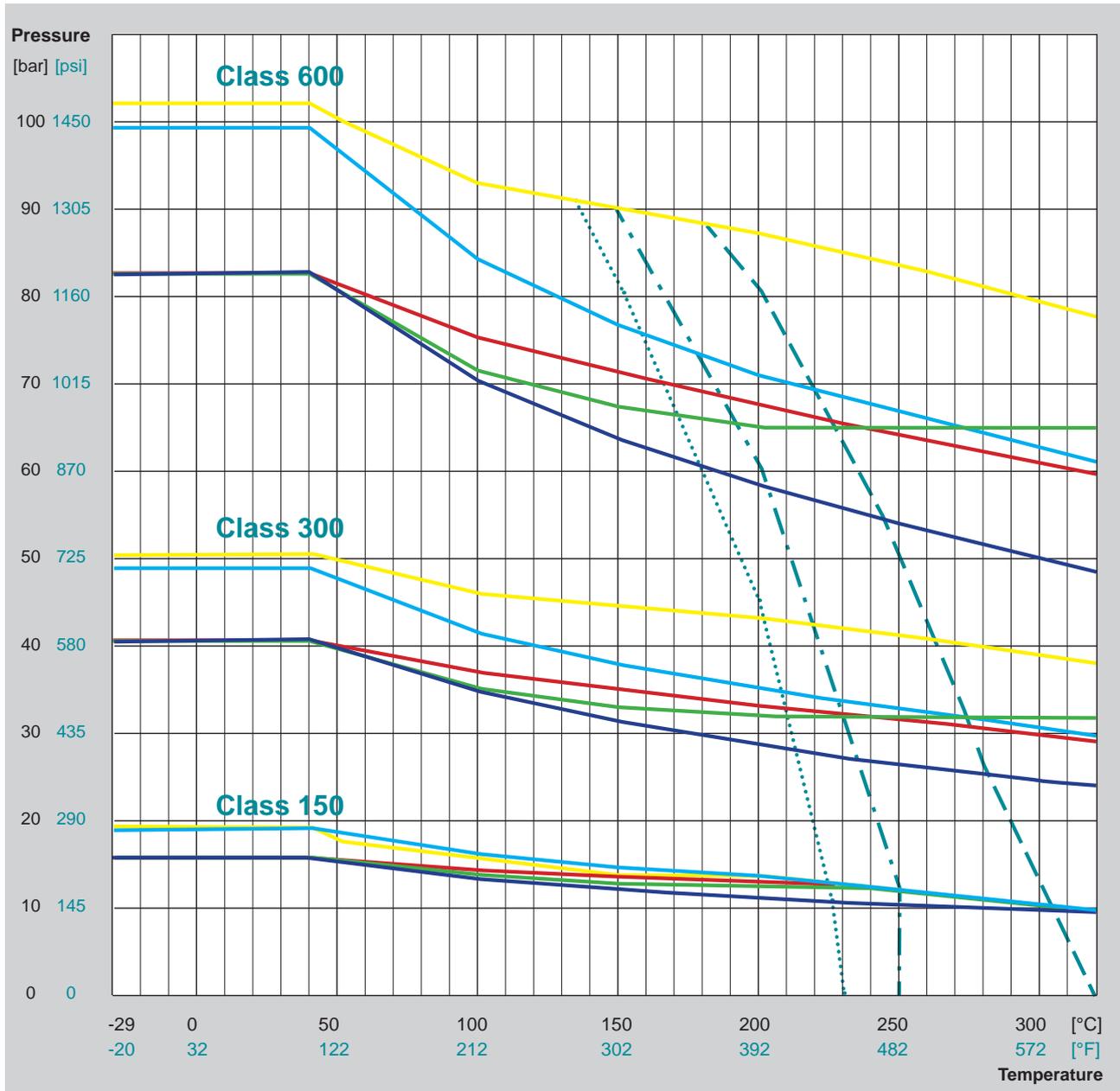
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

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°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

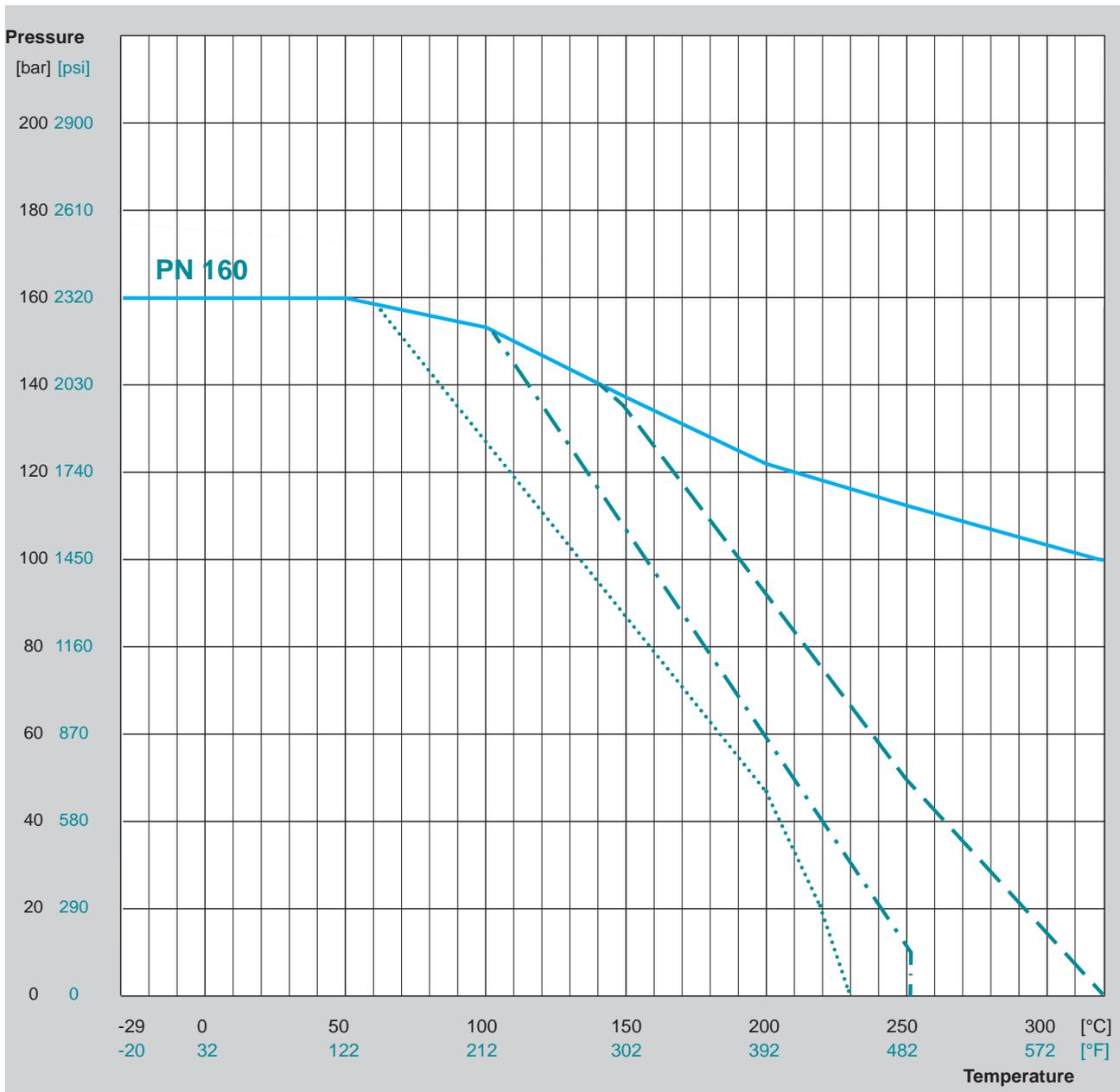
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

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, 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

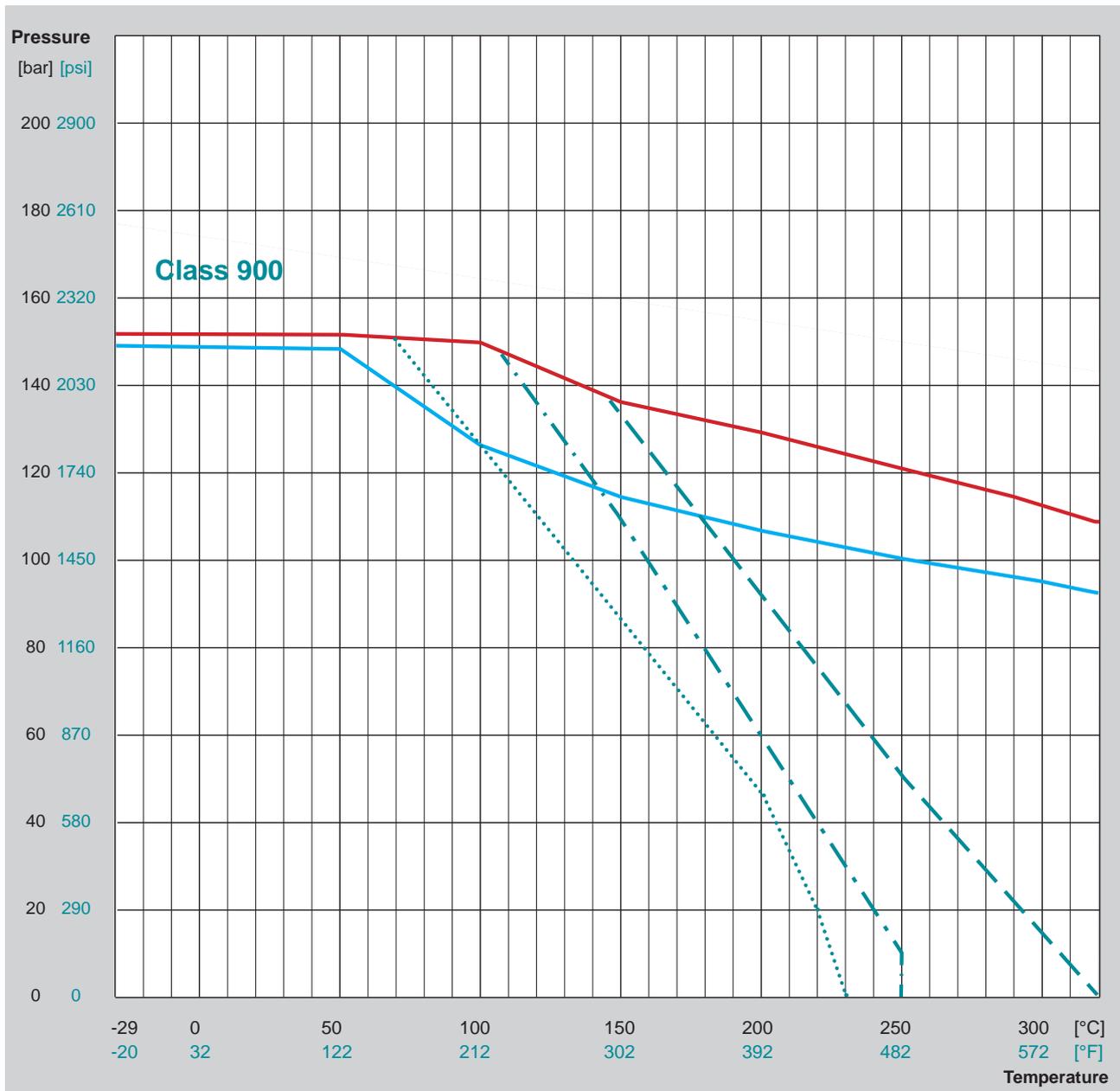
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

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

Subject to technical change without notice.

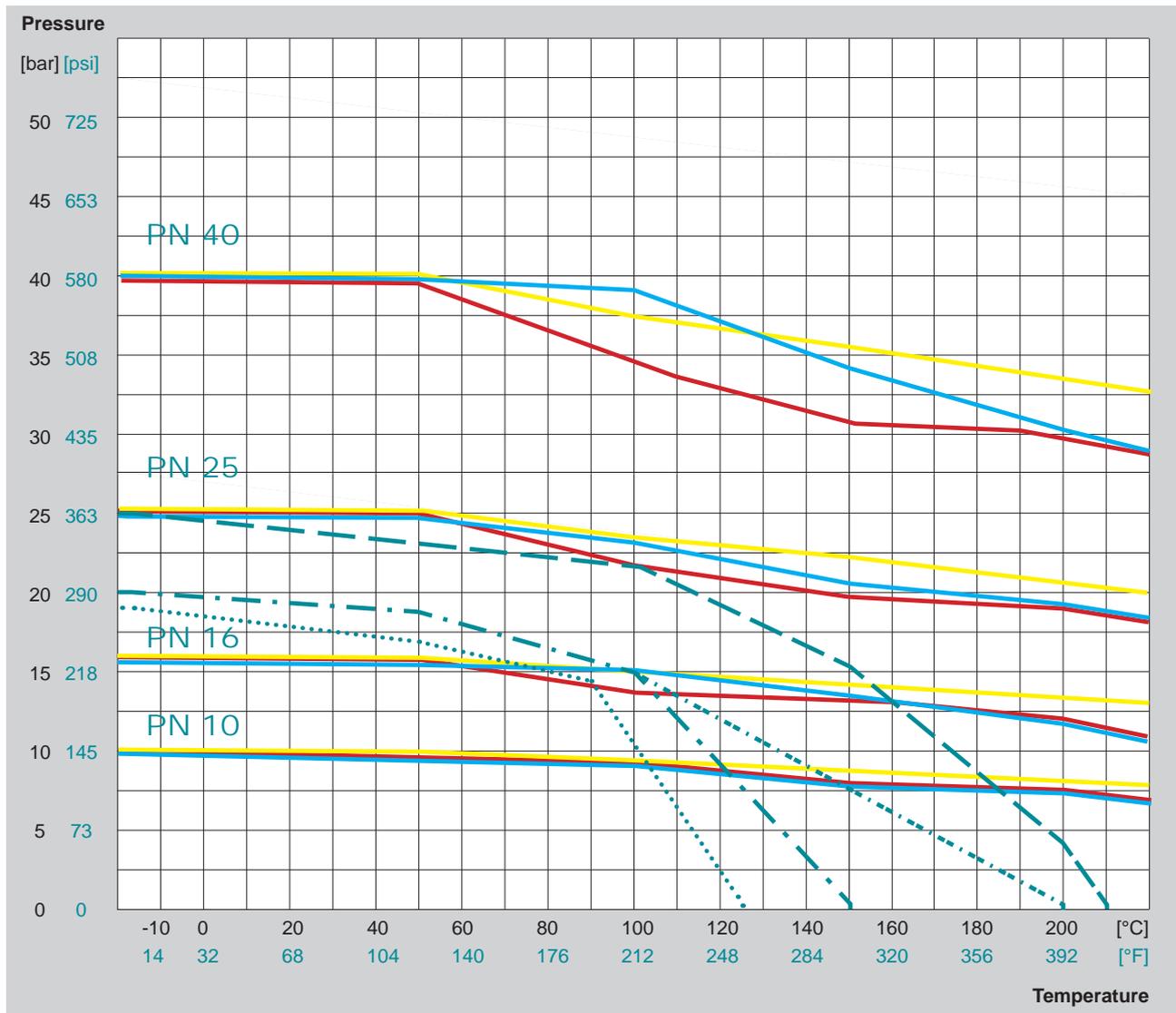
The data given are max. values according to ASME B16.34.

### 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.

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 <sub>MAX</sub>
<span style="color: teal;">- - -</span>	PFA	PTFE or special*	210°C / 410°F
<span style="color: teal;">. . . . .</span>	PFA	PFA	200°C / 392°F
<span style="color: teal;">- . - . -</span>	all combinations with PFA and FEP		150°C / 302°F
<span style="color: teal;">. . . . .</span>	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.

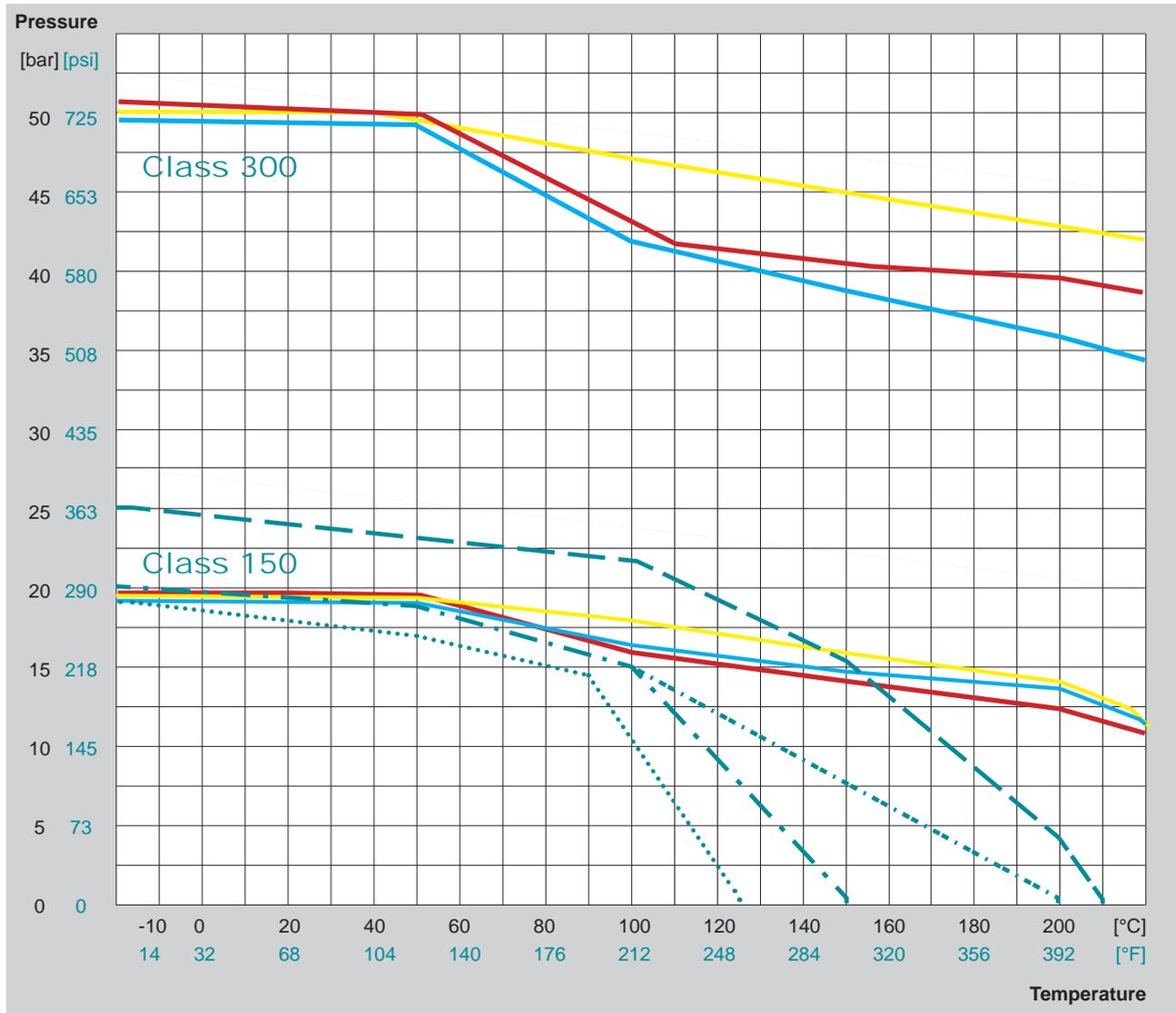
## IMPORTANT NOTE

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 <sub>MAX</sub>
<span style="color: green;">- - -</span>	PFA	PTFE or special*	210°C / 410°F
<span style="color: green;">. . .</span>	PFA	PFA	200°C / 392°F
<span style="color: green;">- . -</span>	all combinations with PFA and FEP		150°C / 302°F
<span style="color: green;">. . . .</span>	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

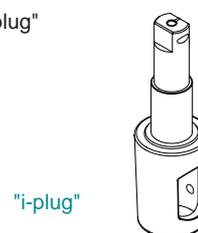
Plugs made of special materials or special designs, e.g. with flushing devices, vent holes in plug bottom or plug upstream / downstream side

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

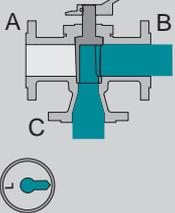
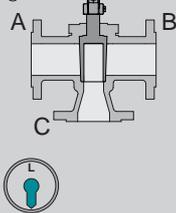
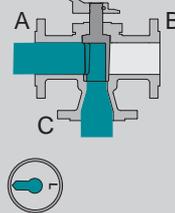
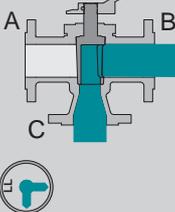
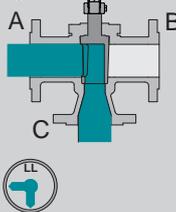
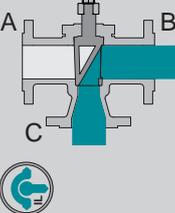
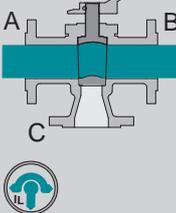
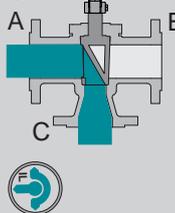
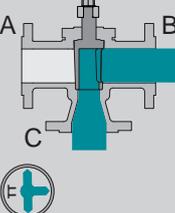
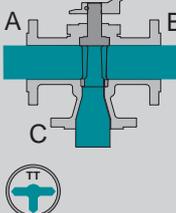
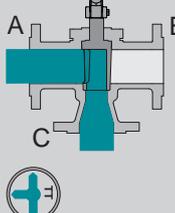


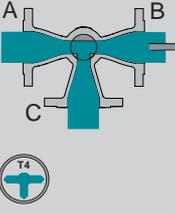
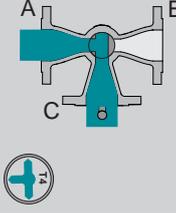
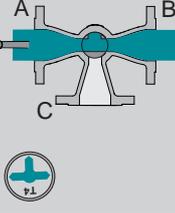
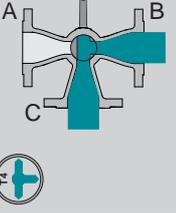
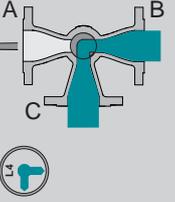
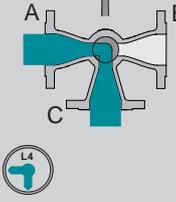
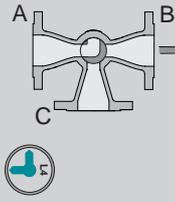
Type F-2-ISO-STANDARD-A

\*) 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)
<b>L</b> 					 Type F-3-S-ISO-STANDARD
<b>LL</b> 					
<b>IL*</b> 					 Type F-3-S-ISO-STANDARD-A
<b>TT</b> 					

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

\*) 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

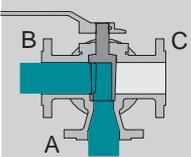
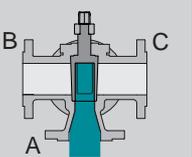
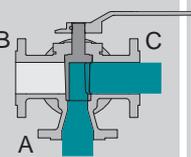
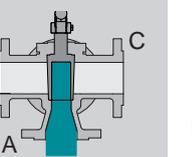
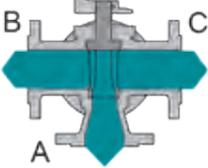
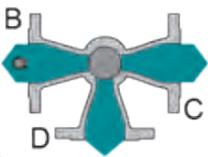
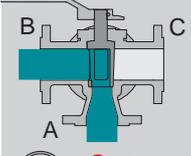
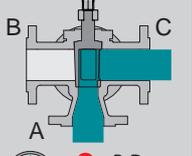
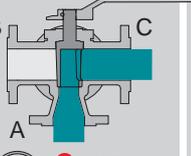
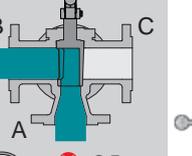
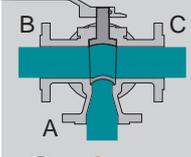
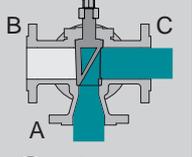
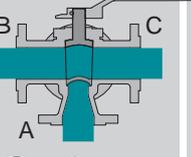
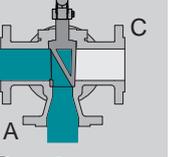
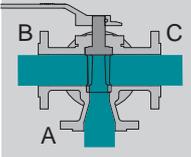
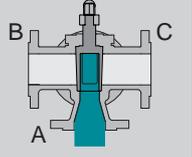
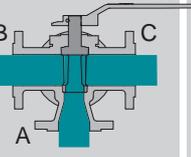
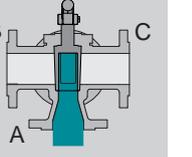
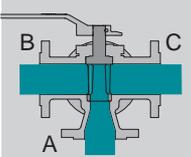
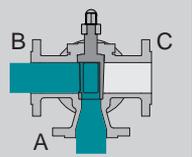
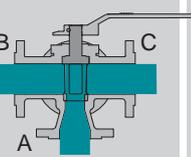
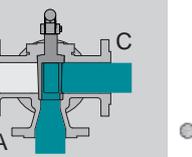
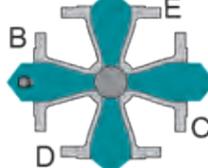
**positive overlap**

3-way (120°)	Plug type	Pos. I = 0°	Pos. II = 120°	Pos. III = 240°	
	<b>L120</b> 	 A, B, C	 A, B, C	 A, B, C	

4-way	Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°
 Type F-4-ISO-STANDARD   	<b>L4</b> 	 A, B, C, D, E ✓ B-E ✗ C-D	 A, B, C, D, E ✗ B-D ✓ C-E	 A, B, C, D, E ✗ B-E ✓ C-D	 A, B, C, D, E ✗ C-E ✓ B-D
	<b>T4</b> 	 A, B, C, D, E ✗ D ✓ B-C-E	 A, B, C, D, E ✗ B ✓ C-D-E	 A, B, C, D, E ✗ E ✓ B-C-D	 A, B, C, D, E ✗ C ✓ B-D-E
	<b>LL4</b> 	 A, B, C, D, E ✓ B-E + C-D	 A, B, C, D, E ✓ B-D + C-E		

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
<b>L</b> 	 A B C ✓ A-B ✗ C-D-E	 A B C ✓ A-E ✗ B-C-D	 A B C ✓ A-C ✗ B-D-E	 A B C ✓ A-D ✗ B-C-E	 Type F-4-Special-ISO-STANDARD  
<b>LL</b> 	 A B C ✓ A-B-E ✗ C-D	 A B C ✓ A-C-E ✗ B-D	 A B C ✓ A-C-D ✗ B-E	 A B C ✓ A-B-D ✗ C-E	
<b>IL</b> 	 A B C ✓ A-E + B-C ✗ D	 A B C ✓ A-C + D-E ✗ B	 A B C ✓ A-D + B-C ✗ E	 A B C ✓ A-B + D-E ✗ C	
<b>T</b> 	 A B C ✓ A-B-C ✗ D-E	 A B C ✓ A-D-E ✗ B-C	 A B C ✓ A-B-C ✗ D-E	 A B C ✓ A-D-E ✗ B-C	
<b>TT</b> 	 A B C ✓ A-B-C-D ✗ E	 A B C ✓ A-B-D-E ✗ C	 A B C ✓ A-B-C-E ✗ D	 A B C ✓ A-C-D-E ✗ B	
 open  closed					 Type F-5-ISO-STANDARD  



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## AZ services

### Europe

- Germany (Moenchweiler & Rhineland)
- France (Lyon/ Bourg-lès-Valence)
- Great Britain (York/Roecliffe)
- Italy (Milan/Caltignaga)
- Poland (Warsaw/Opoczno)
- The Netherlands (Amsterdam)
- Russia (St. Petersburg)

### America

- USA (Houston/TX)
- Brazil (São Paulo, Itatiba & Belem)
- Chile (Santiago de Chile)
- Mexico (Mexico-City)
- Peru (Lima)

### Asia

- China (Taicang)
- South Korea
- Thailand (Rayong)
- Vietnam (Hanoi)

### Africa

- South Africa (Johannesburg)



Detailed addresses  
on our website

[www.az-armaturen.com](http://www.az-armaturen.com)