ARMATUREN
free of cavities & maintenance

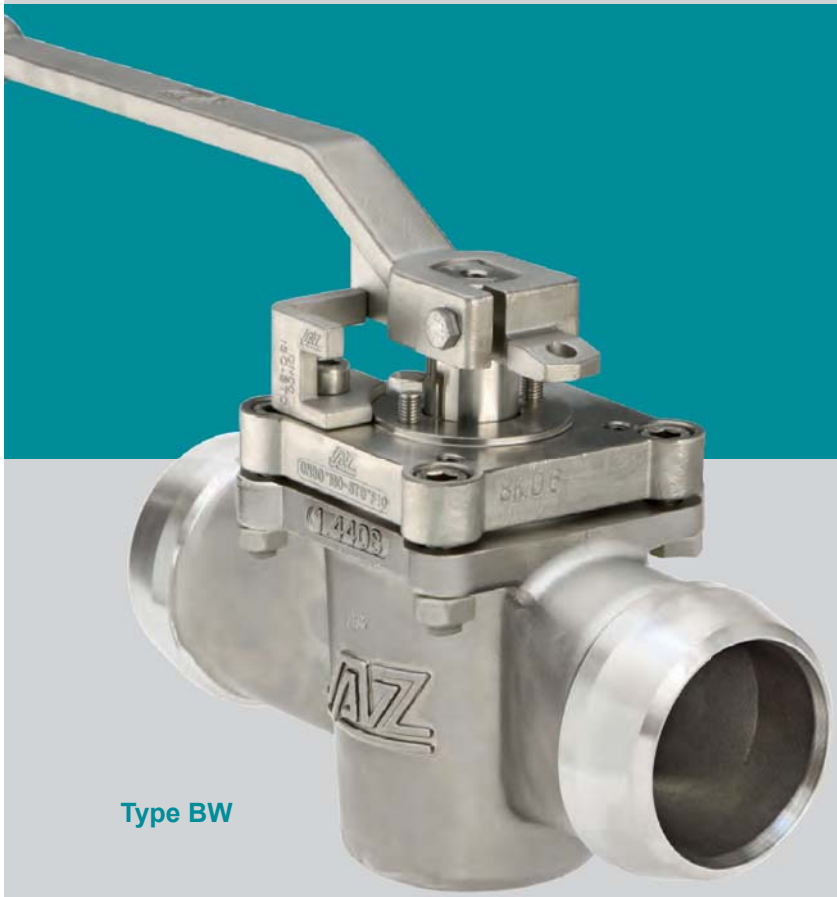
engineered.
fast.
dynamic.

Type SW / BW

Plug valves with weld-ends

Product leaflet

Type SW / BW
Welded-end plug valves



Type BW

- **weld-ends**
- **2-way up to 4 way**

DN 15 - 600 / PN 10 - 40
NPS ½ - 24 / Class 150 - 300
(higher pressure type HDS / RO)

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

Design characteristics

- easy accessible adjustment of the plug
- vacuum-capable
- PED 2014/68/EU
- Fire-Safe - API 607 / ISO 10497
- mounting-flange for actuators acc. to ISO 5211
- low fugitive emission in line with TA LUFT, ISO 15848 & API 641 requirements
- SIL 3 certified

Type SW

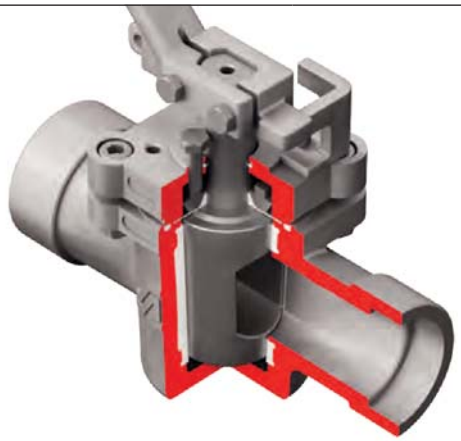
Options

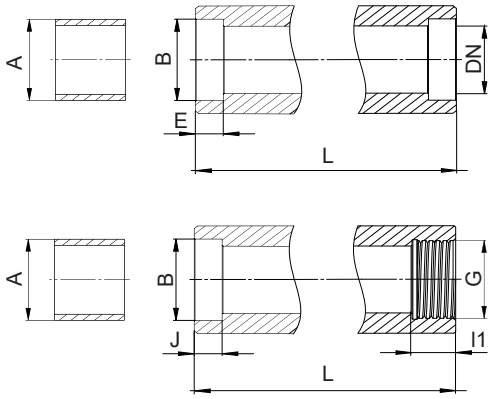
- heating jacket
- flushing device
- FDA compliant
- painting
- oil- and grease-free assembling

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

Type SW

with socket-weld-ends, technical information





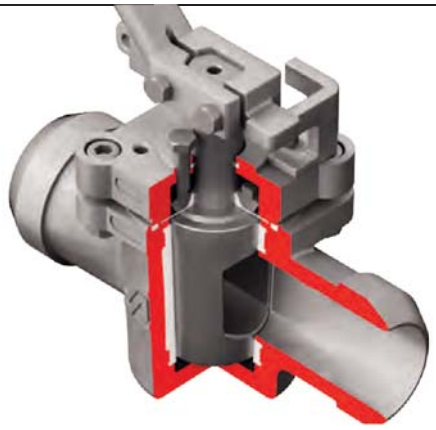
	DN	NPS	L [mm]		A [1])		B (min / max)		J (min)		I1	G
			EN	ASME	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	ISO 7-1, EN 10226-1
ASME B16.10 / ISO 5211	10	⅜	165	165	17,1	0,675	17,6 / 18,0	0,690 / 0,710	9,5	0,38		Rp⅜
	15	½	165	165	21,3	0,840	21,8 / 22,2	0,855 / 0,875	9,5	0,38	22	Rp½
	20	¾	165	165	26,7	1,050	27,2 / 27,6	1,065 / 1,085	12,5	0,5	22	Rp¾
	25	1	165	165	33,4	1,315	33,9 / 34,3	1,330 / 1,350	12,5	0,5	22	Rp1
	32	1¼	180	178	42,2	1,660	42,7 / 43,1	1,675 / 1,695	12,5	0,5	22	Rp1¼
	40	1½	200	190	48,3	1,900	48,8 / 49,2	1,915 / 1,925	12,5	0,5	22	Rp1½
	50	2	230	216	60,3	2,375	61,2 / 61,7	2,406 / 2.426	16	0,62	23	Rp2
	65	2½	290	241	73,0	2,875	73,9 / 74,4	2,906 / 2,921	16	0,62	24	Rp2½
	80	3	305	305	88,9	3,500	89,8 / 90,3	3,535 / 3,560	16	0,62	24	Rp3
	100	4	350	356	114,3	4,500	115,2 / 115,7	4,545 / 4,570	19	0,75	-	-

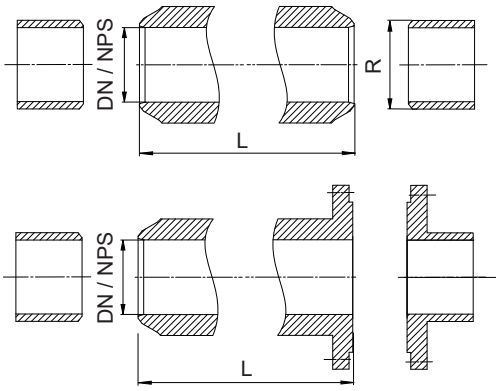
[1]) Tolerance acc. ASTM A530

In case of order ...

- please state external and internal dimensions of pipe
- other connection sizes on request

Type BW
with butt-weld-ends, technical information

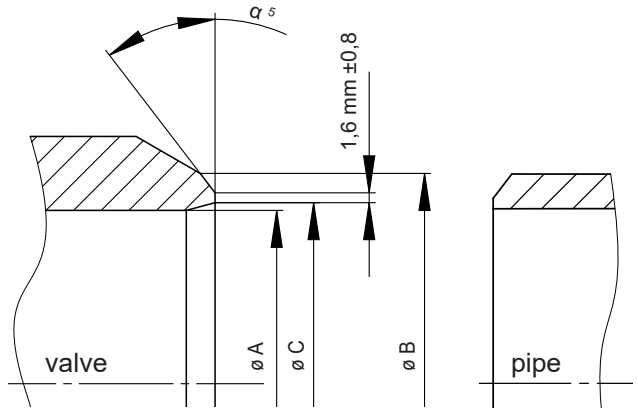




	DN	NPS	L [mm]		R [mm] *	
			EN	ASME	EN	ANSI
EN 12627 / EN 12982 / ASME B16.10 / B16.25	10	⅜	165	130	18	18
	15	½	165	140	22	22
	20	¾	165	152	28	28
	25	1	165	165	35	35
	32	1¼	180	178	44	44
	40	1½	200	190	50	50
	50	2	230	216	62	62
	65	2½	290	241	77	77
	80	3	310	283	91	91
	100	4	350	305	117	117
	125	5	325	381	144	144
	150	6	432	403	172	172
	200	8	508	419	223	223
	250	10	450	450	278	278
	300	12	500	500	329	329
	350	14	550	550	362	362
	400	16	600	600	413	413
	450	18	650	650	464	464
	500	20	700	700	516	516
	600	24	800	800	619	619

*) Dimensions of column L / R acc to: DIN EN 12627 / EN 12982 (max. PN 100), ASME B16.10 / B16.25 Schedule No. 40 (max. 600 lbs)

Type AF-2-BWF-HM-2
valve with weld- and flange ends, heating jacket and T-wrench



ASME B16.25

Pipe wall thickness ≥ 3 mm up to ≤ 22 mm

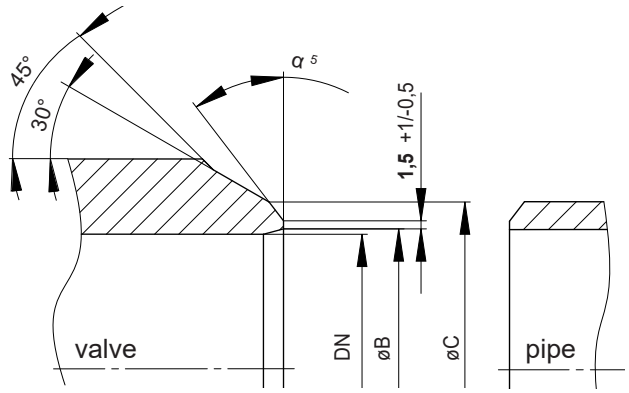
[1]) Dimensions not available in ASME (acc. AZ Standard)

[2]) Wall thickness ≤ 3 mm (possible orbital ends)

[3]) Wall thickness > 22 mm

ASME B16.25

Schedule 40				Schedule 60				Schedule 80				Schedule STD			
NPS	øA	øB	øC	NPS	øA	øB	øC	NPS	øA	øB	øC	NPS	øA	øB	øC
½ [2]	15	23 [1]	16 [1]	½				½	14	23 [1]	14 [1]	½			
¾ [2]	20	28 [1]	21 [1]	¾				¾	20	28 [1]	20 [1]	¾			
1	25	35 [1]	27 [1]	1				1	25	35 [1]	25 [1]	1			
1½	40	55 [1]	41 [1]	1½				1½	38	55 [1]	38 [1]	1½			
2	50	62 [1]	52,5 [1]	2				2	50	62 [1]	50 [1]	2			
3	80	91	78	3				3	72	91	73,5	3			
4	100	117	102	4				4	95	117	97	4			
6	150	172	154	6				6	145	172	146,5	6			
8	200	223	203	8	195	223	198,5	8	190	223	193,5	8			
10	250	278	254,5	10	245	278	247,5	10	240	278	243	10			
12	300	329	303	12	290	329	295	12	287	329	289	12	300	329	305
14	330	362	333,5	14	325	362	325,5	14	315	362	317,5	14	335	362	336,5
16	378	413	381	16	370	413	373	16	360	413	363,5	16	385	413	387,5
18	425	461	428,5	18	415	464	419	18 [3]				18	435	464	438
20	475	516	478	20	465	516	467	20 [3]				20	485	516	489
24				24	[3]	[3]	[3]	24	[3]	[3]	[3]	24			



EN 12627

Pipe wall thickness ≥ 3 mm up to ≤ 22 mm

EN 12627

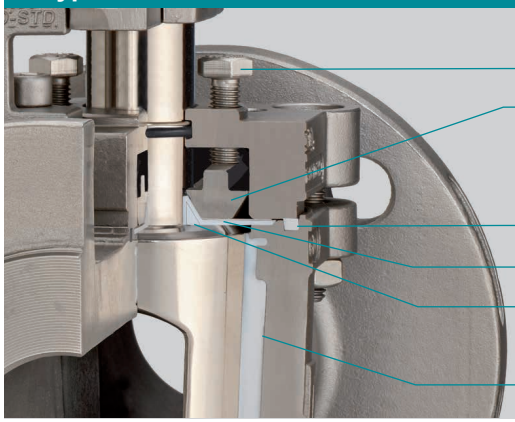
DN	ØC [mm]	tolerance [mm]	tolerance for ØB [4]) [mm]	DN	ØC [mm]	tolerance [mm]	tolerance for ØB [4]) [mm]
10	18	+2,5 / -1	+1 / -1	125	144	+4 / -2,5	+1 / -1
15	22			150	172		
20	28	+2,5 / -1,5	+1 / -1	200	223	+4 / -2,5	+1 / -1
25	35			250	278		
32	44	+2,5 / -2	+1 / -1	300	329	+4 / -2,5	+2 / -2
40	50			350	362		
50	62	+2,5 / -2	+1 / -1	400	413	+4 / -2,5	+2 / -2
65	78			450	464		
80	91	+2,5 / -2,5	+1 / -1	500	516	+4 / -2,5	+3 / -2
100	117			600	619		

[4]) I.D. "B" of the welding end must correspond to the I.D. of the pipe to which it is welded. Tolerance of "ØC" according to table.

[5]) α = 30° acc. EN 1092-1, 37,5° acc. ASME B16.25

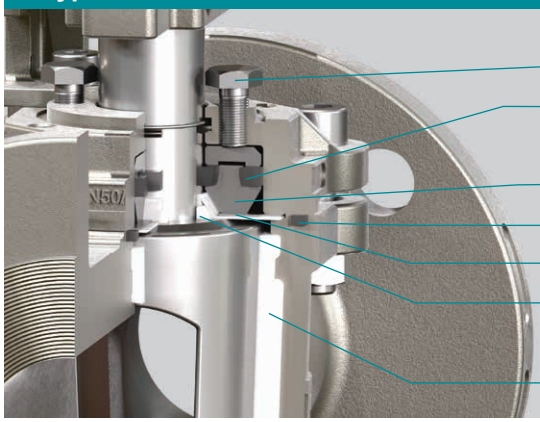
Cover and stem sealing systems suitable for general applications

Type STANDARD



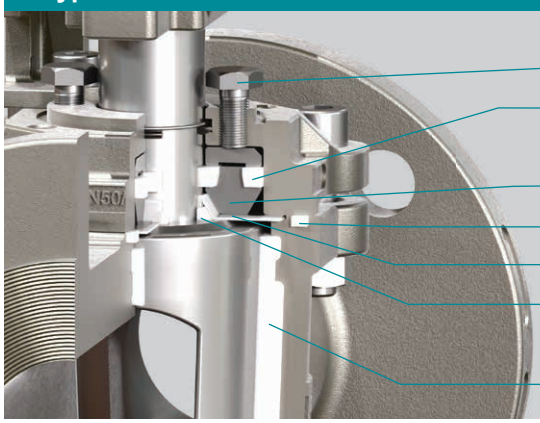
- plug adjustment
- thrust collar
- cover sealing (PTFE)
- stainless steel diaphragm
- **Secondary sealing**:
  V-diaphragm (PTFE), delta thrust collar (PTFE)
- **Primary sealing**: sleeve*

Type FS2 — 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 CA2 — 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

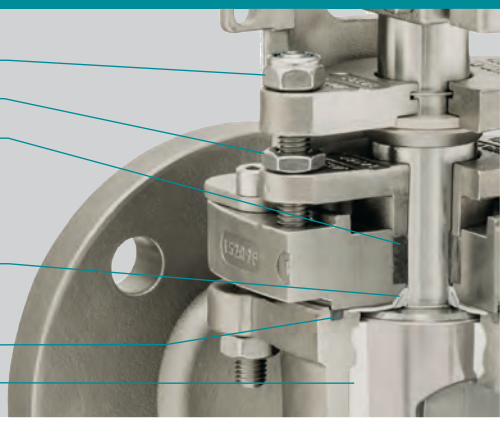
engineered.
fast.
dynamic.

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)

NEW!

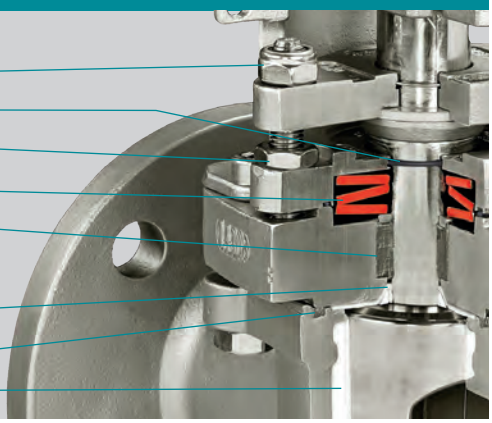
Emission Free

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*

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

Cover and stem sealing systems for lined plug valves

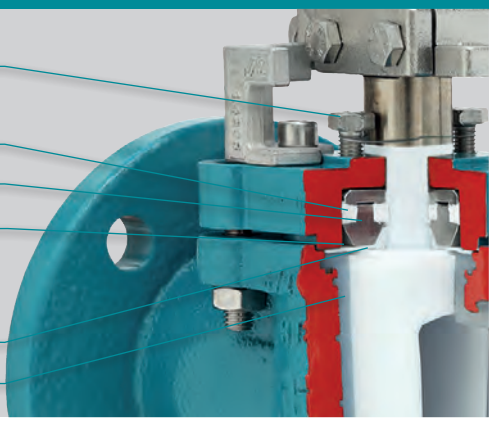
engineered.
fast.
dynamic.

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

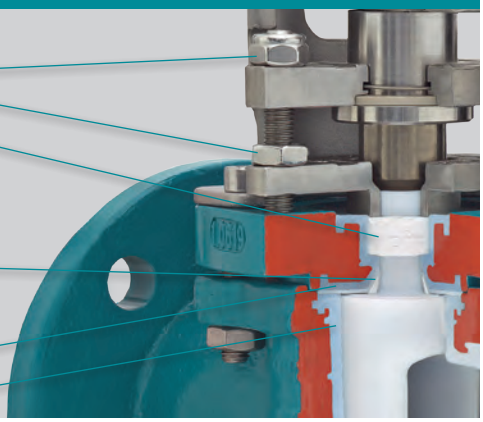


Type SAFE-LINED — Chemistry sealing

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)

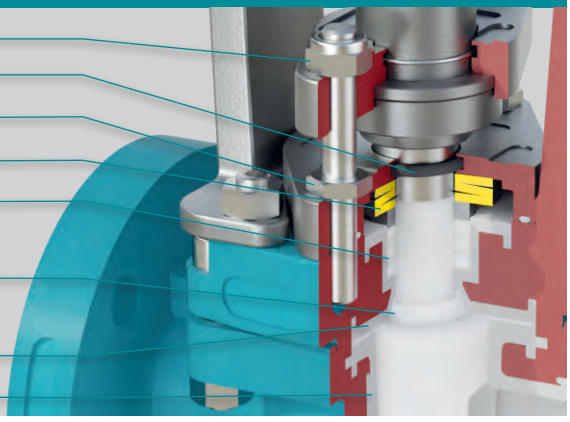
lined cover
Primary sealing: lined body*



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.

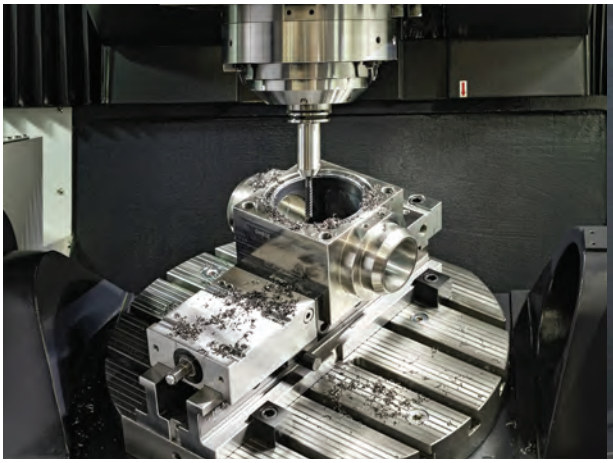
Casting materials

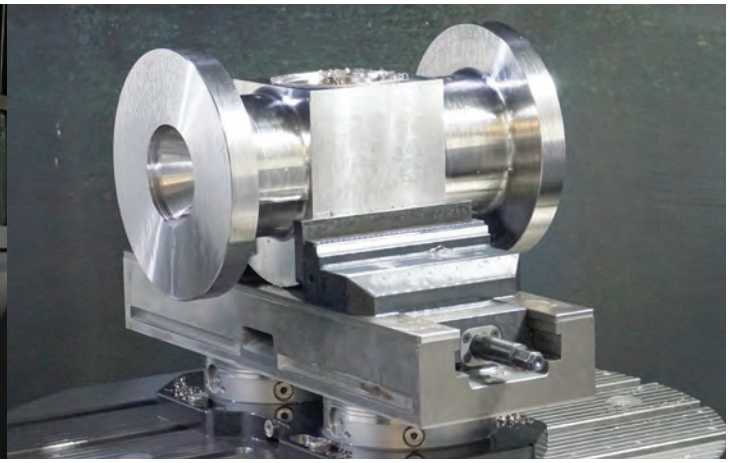
		Casting Material					
Material Group	**Common Name**	**EN / DIN**	**Short name**	**Material-No.**	**ASTM**	**Grade**	**UNS**
Carbon Steel / Ductile Iron							
Ductile Iron	SG Iron	EN 1563	EN-GJS-400-18-LT	5.3103	A395	-	F32800
Carbon Steel	CS	EN 10213	GP240GH	1.0619	A216	WCB	J03002
Low Temp. Carbon Steel	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	-

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



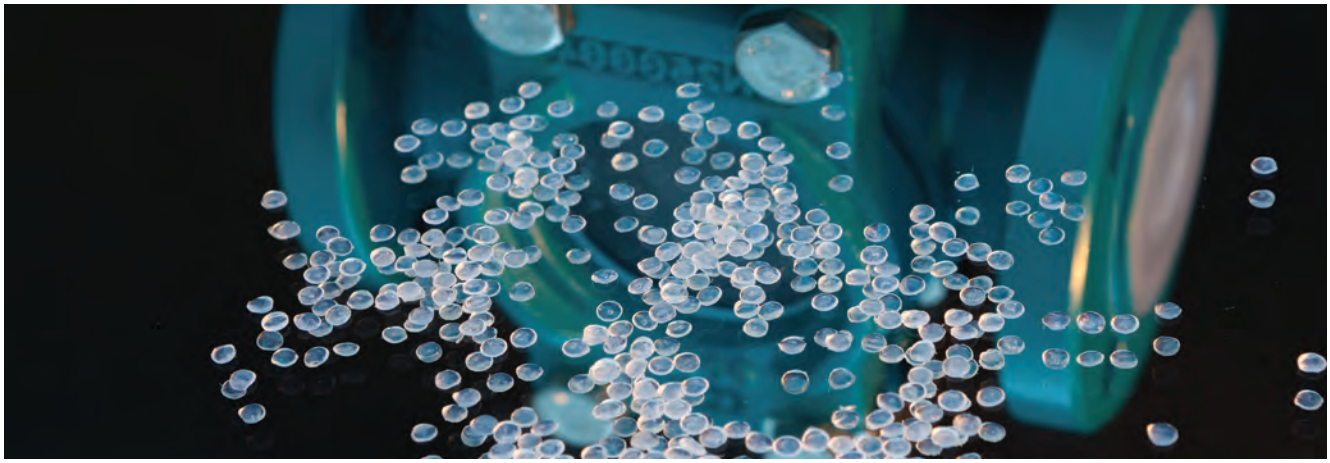


			Similar Forged Material						Bar Material	
Common Name	**Mat.Nr.**	**Grade**	**EN / DIN**	**Short Name**	**Mat.Nr.**	**ASTM**	**Grade**	**UNS**	**ASTM**	**Short**
Carbon Steel / Ductile Iron										
SG Iron	5.3103	-	EN 1563	EN-GJS-400-18-LT	5.3103	A395-99	60-40-18	-	-	-
CS	1.0619	WCB	EN 10213	GP240GH	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

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

Combination of linings		
body lining	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

Type	UHMW-PE	PFA	PTFE, virgin	PTFE, glass	PTFE, graphite	TFM	PTFE-P
T_{max}	80°C / 176°F	200°C / 392°F	230°C / 446°F	230°C / 446°F	250°C / 482°F	250°C / 482°F	320°C / 608°F

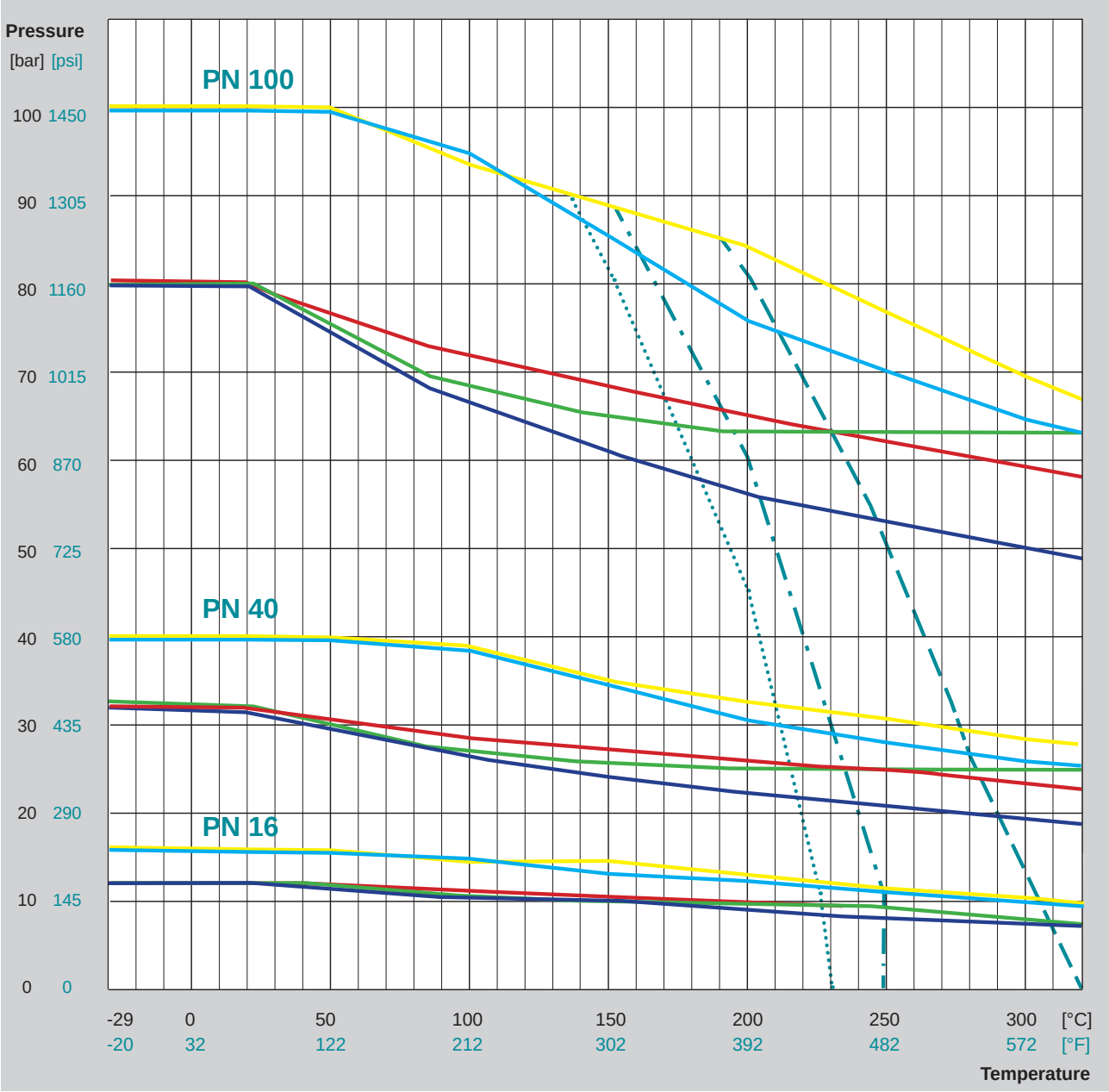
Category	Sleev Material	Characteristics	Typical applications	T_{MAX}
PTFE	PTFE, virgin	low friction, very good sealing characteristic	standard sleeve material for most applications	230°C / 446°F
RPTFE	PTFE-Glass	reinforced PTFE	additional stability for multiway valves with horizontal ports	230°C / 446°F
	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 resistent, 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

Subject to technical change without notice.

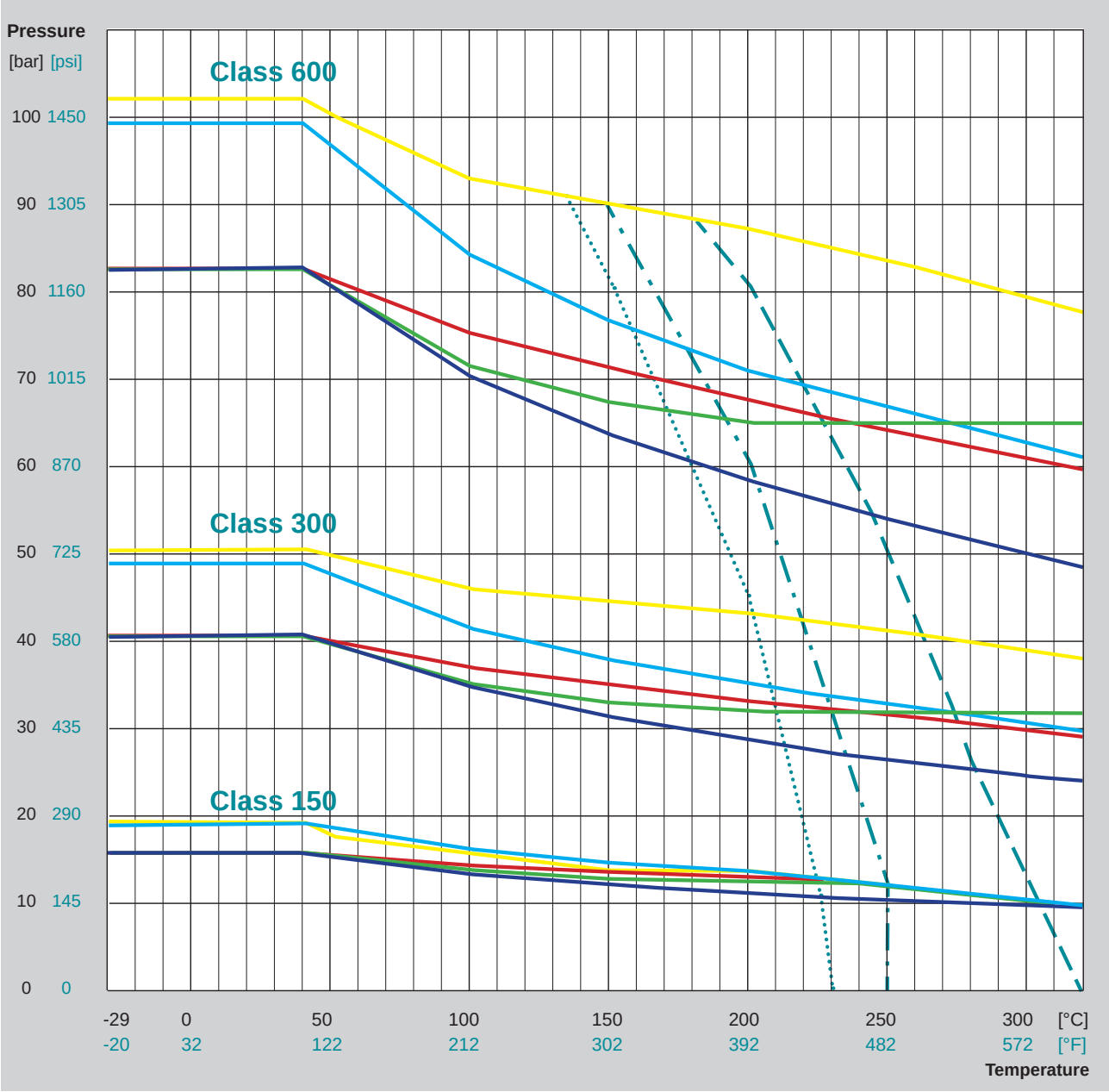
The data given are max. values according to EN 12516-1 and EN 1092-1.

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.

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

Subject to technical change without notice.

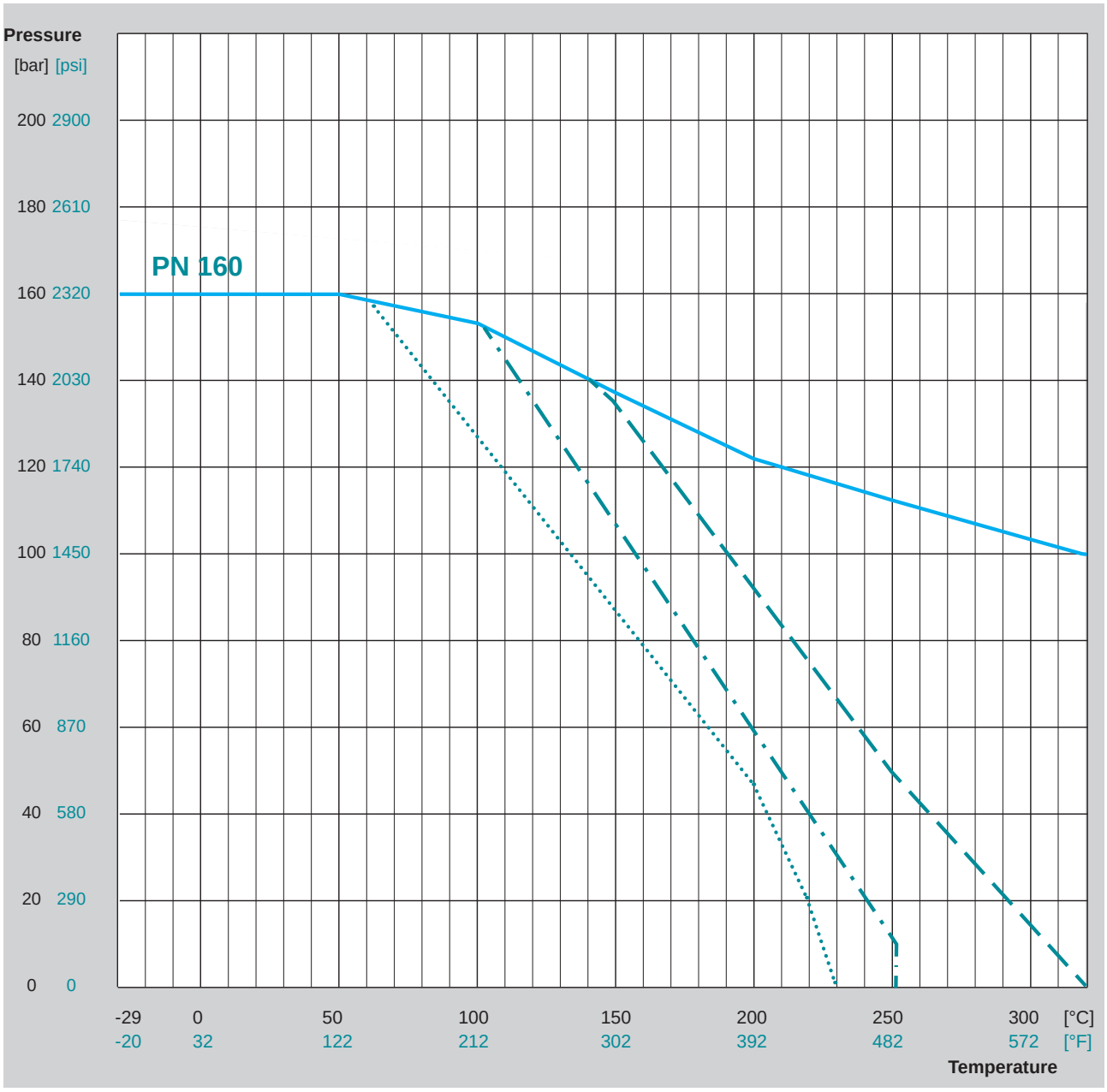
The data given are max. values according to ASME B16.34.

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 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

Subject to technical change without notice.

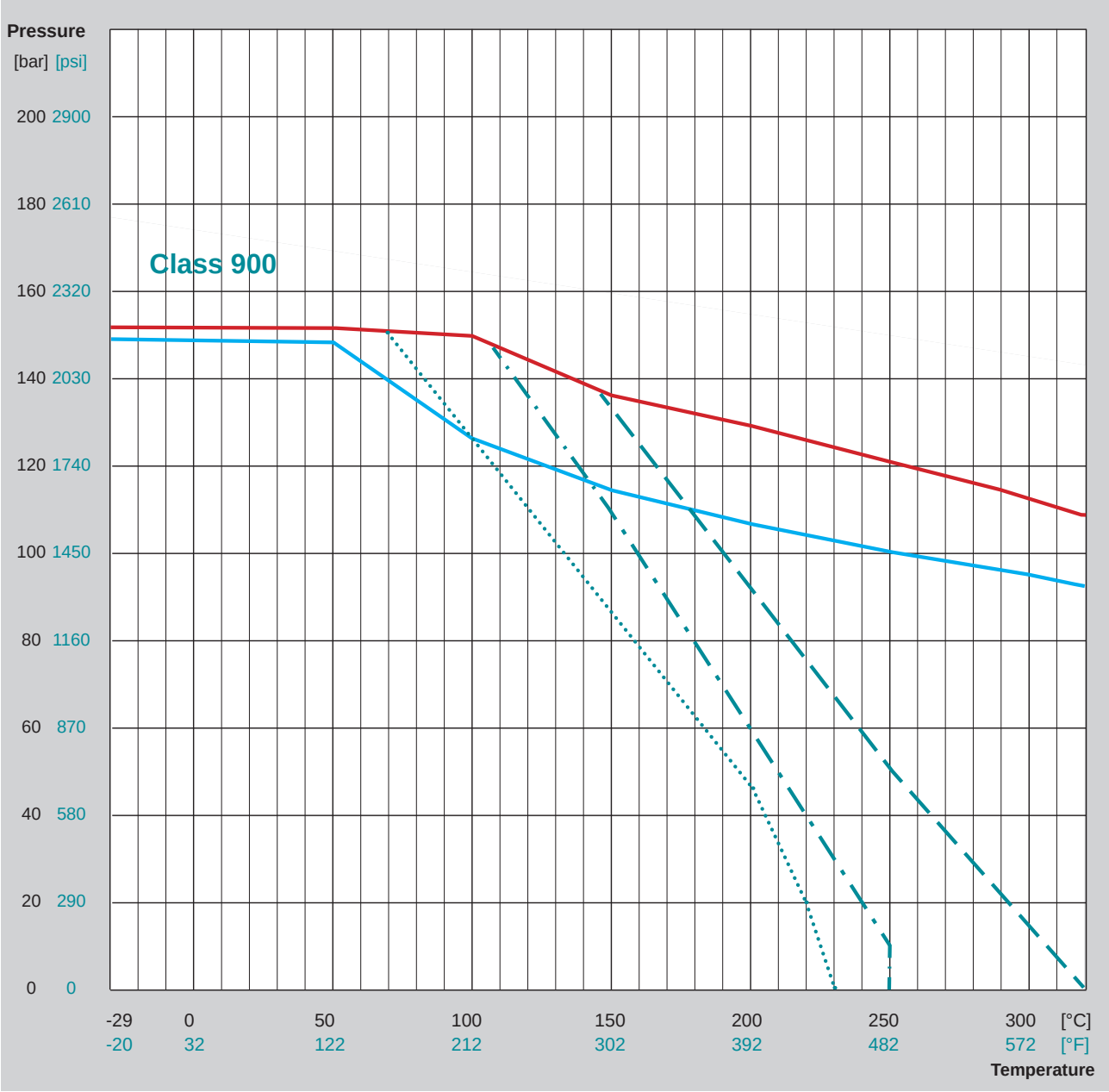
The data given are max. values according to EN 12516-1 and EN 1092-1.

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.

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.

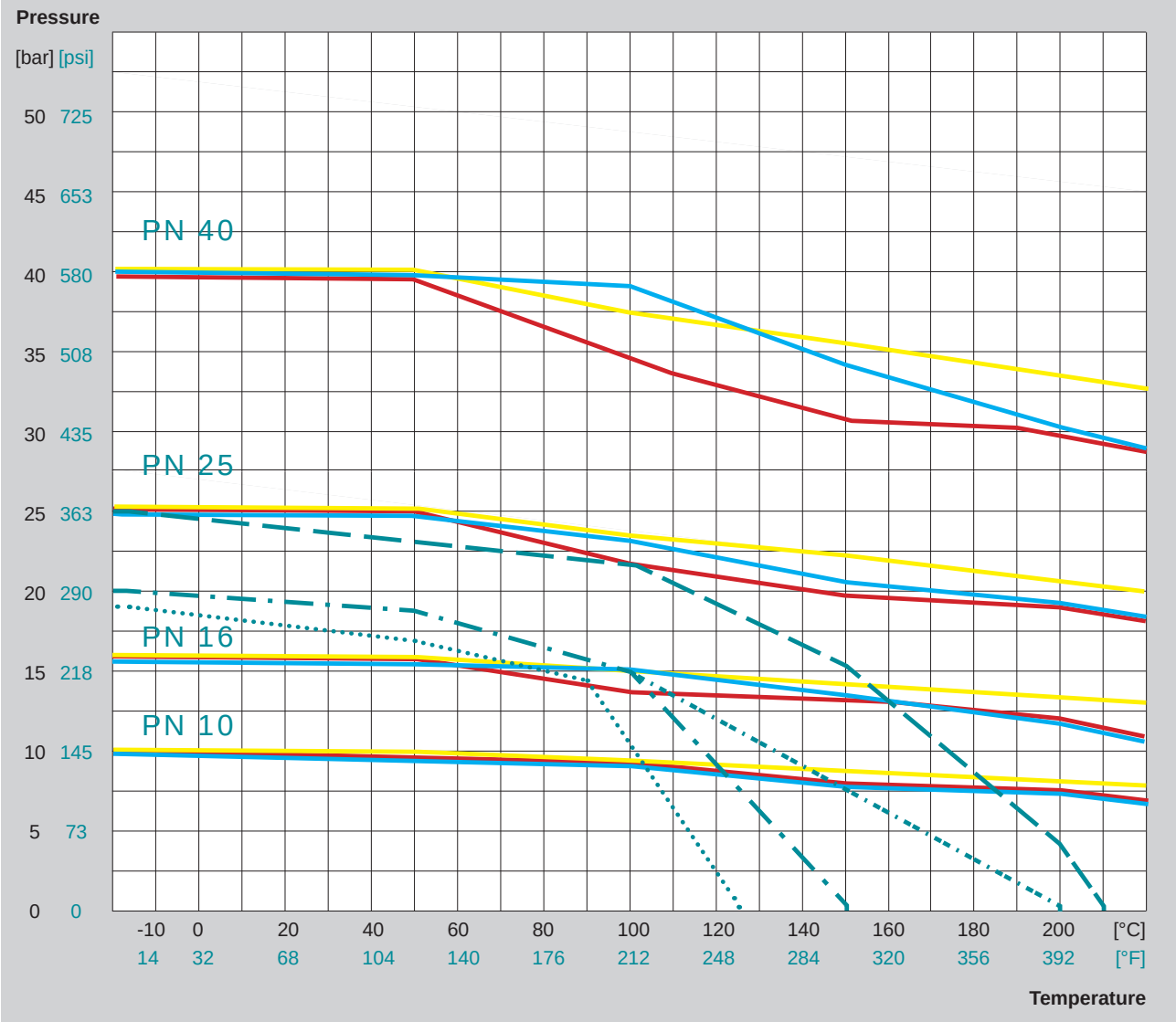
The data given are max. values according to ASME B16.34.

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_{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

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

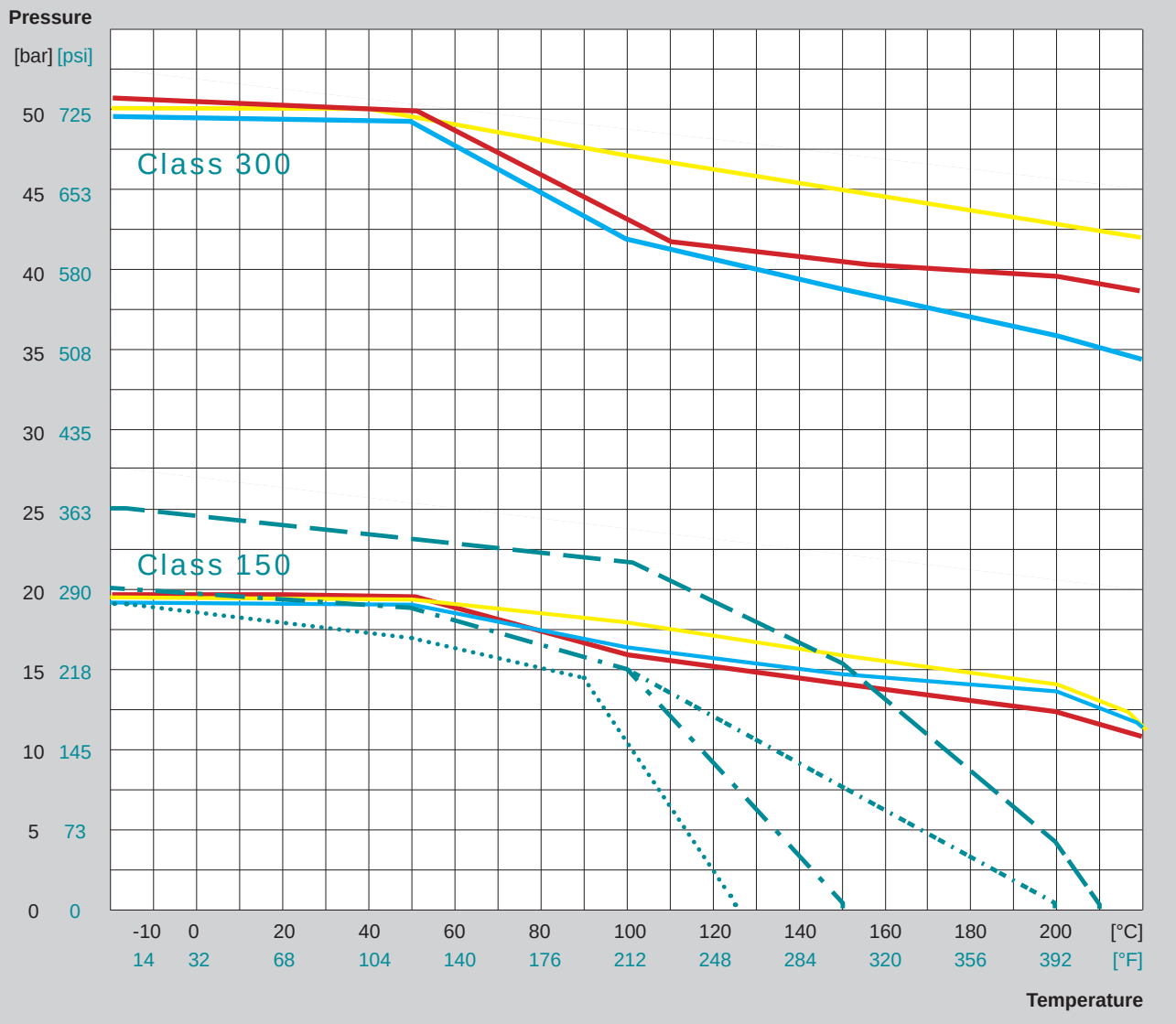
Subject to technical change without notice.

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.

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

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

Subject to technical change without notice.

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.

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

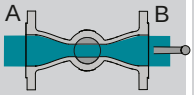
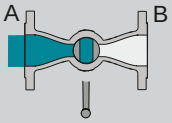
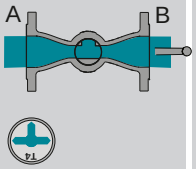
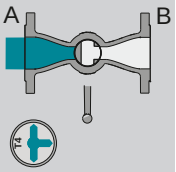
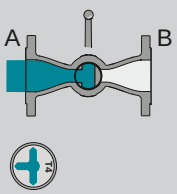
Design	STANDARD	EXTRA (full bore)	multiway
Plug type	two-way	two-way	e.g. T4

- 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

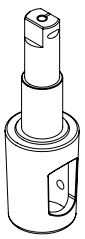
Recommendation for three-way valves type F-3-S with vertical outlet (longer life-time compared to type F-3-W with horizontal outlet)

Options

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

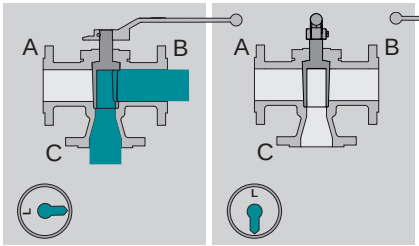
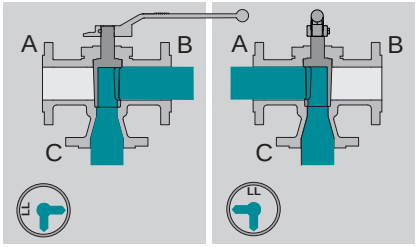
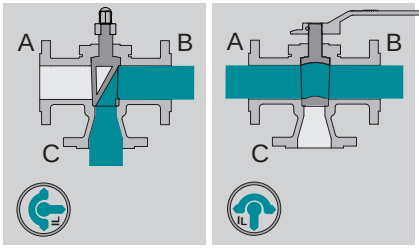
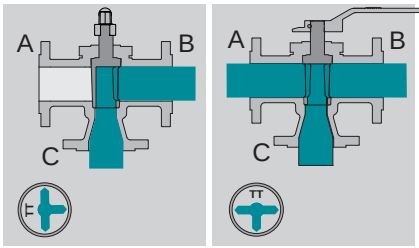
2-way	Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°
 Type F-2-ISO-STANDARD	D 				
 Type F-2-ISO-STANDARD-A	T4 * 				

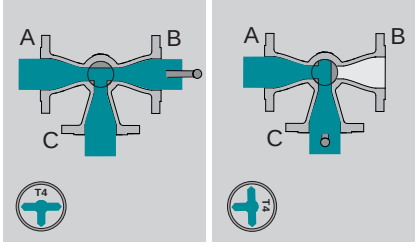
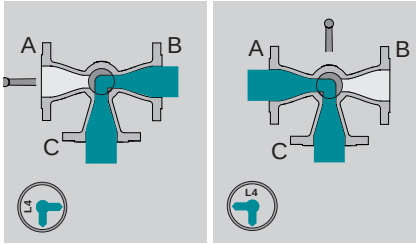
*) For highly expanding media AZ recommends the "i-plug" (relief hole and open plug buttom)



"i-plug"

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					
LL					Type F-3-S-ISO-STANDARD
IL*					
TT					Type F-3-S-ISO-STANDARD-A

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

Type **F-3-W-ISO-STANDARD-A**

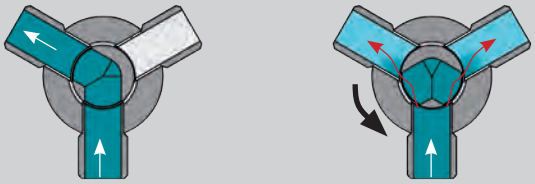
*) for EXTRA valves with IL-plug, F-3-W-EXTRA with T4-plug is recommended (higher flowrate)
Lined valves: the IL-plug is only available in special materials

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

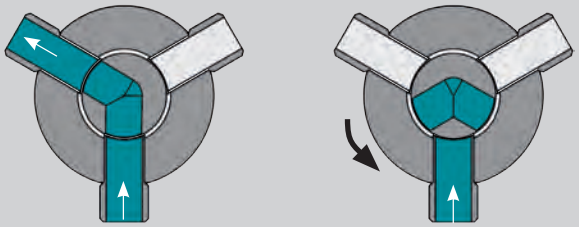
transflow design

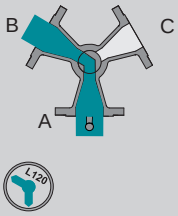
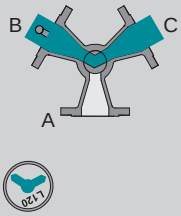
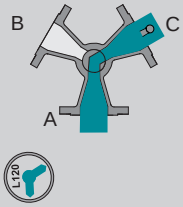


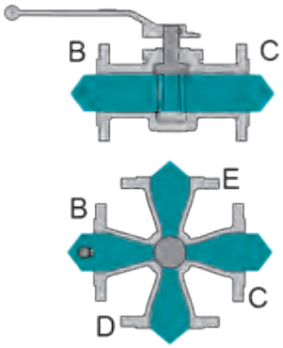
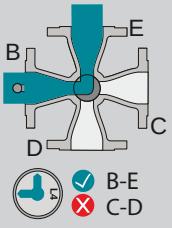
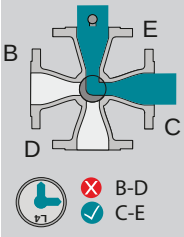
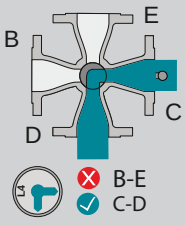
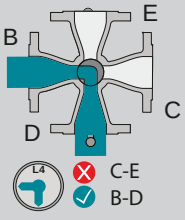
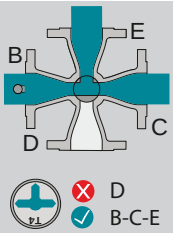
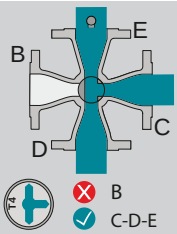
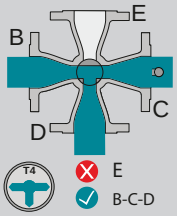
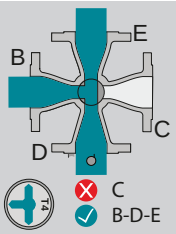
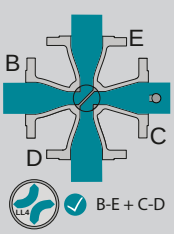
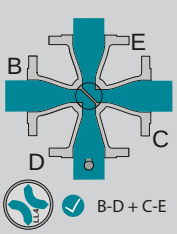
3-way (120°) type 3-WP-120

- with positive overlap
- flow interruption / isolation

positive overlap

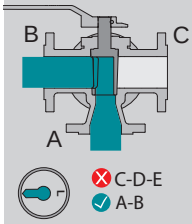
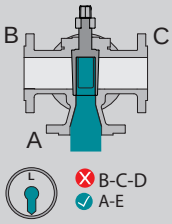
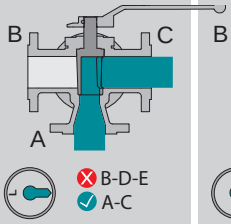
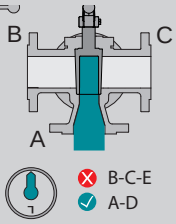
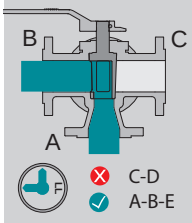
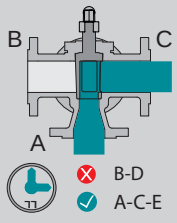
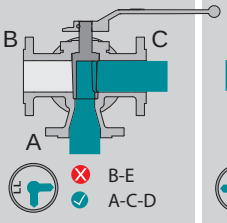
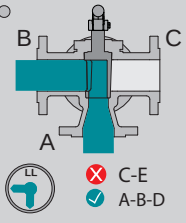
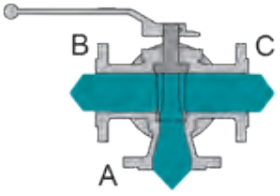
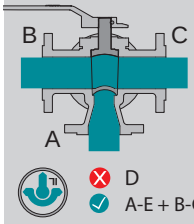
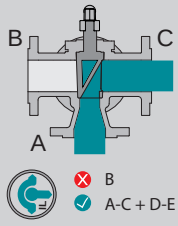
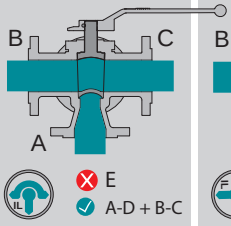
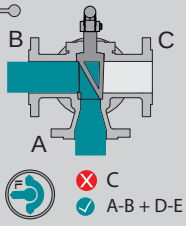
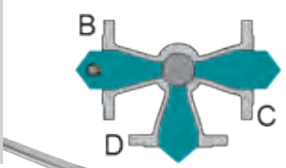
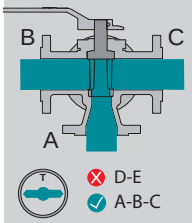
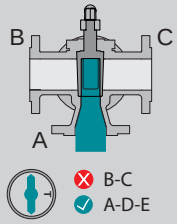
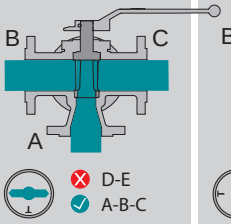
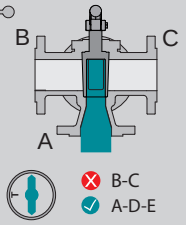
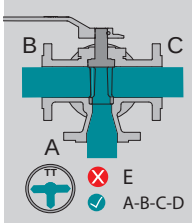
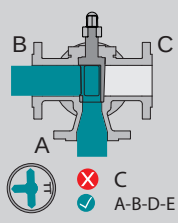
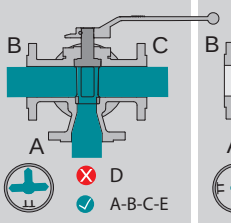
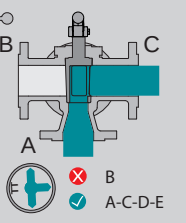
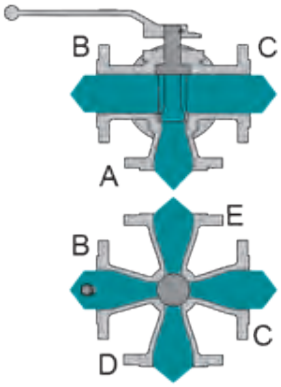


3-way (120°)	Plug type	Pos. I = 0°	Pos. II = 120°	Pos. III = 240°	
	L120 				

4-way	Plug type	Pos. I = 0°	Pos. II = 90°	Pos. III = 180°	Pos. IV = 270°
 Type F-4-ISO-STANDARD 	L4 	 B-E C-D	 B-D C-E	 B-E C-D	 C-E B-D
	T4 	 D B-C-E	 B C-D-E	 E B-C-D	 C B-D-E
	LL4 	 B-E + C-D	 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
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
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	 Type F-5-ISO-STANDARD
TT 	 ✗ E ✓ A-B-C-D	 ✗ C ✓ A-B-D-E	 ✗ D ✓ A-B-C-E	 ✗ B ✓ A-C-D-E	

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