

**Type F-3 / F-4 / F-5 ISO-STANDARD**  
Multiport plug valves



# Type F-3 ISO-STANDARD

## Multiport plug valves with reduced bore



Type F-3-W

Type F-3-S



Type F-3-W-120

- Flange connections
- 3-way vertical, horizontal, and horizontal 120°

DN 15 - 600 / PN 10 - 40

NPS 1/2 - 24 / Class 150 - 300

Range of application:

-60 < T < 230/320°C

vacuum-capable

### Advantages of multiport plug valves

- free of cavities
- no contamination with media deposits
- permanent internal sealing ( $\Delta p$  independent!)

### Design characteristics

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

### Options

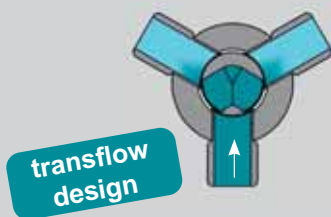
- heating jacket
- oversize design
- flushing device
- FDA compliant
- painting
- oil and grease-free assembly

### 3-way (120°) type 3-W-120:

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

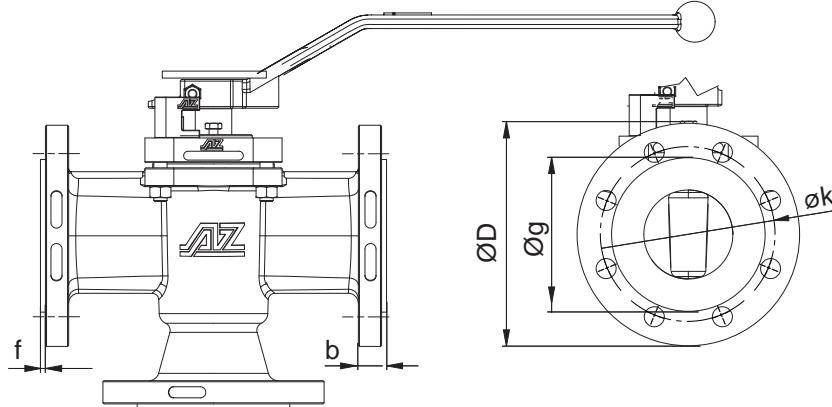
### 3-way (120°) type 3-WP-120

- with positive overlap
- flow interruption / isolation



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

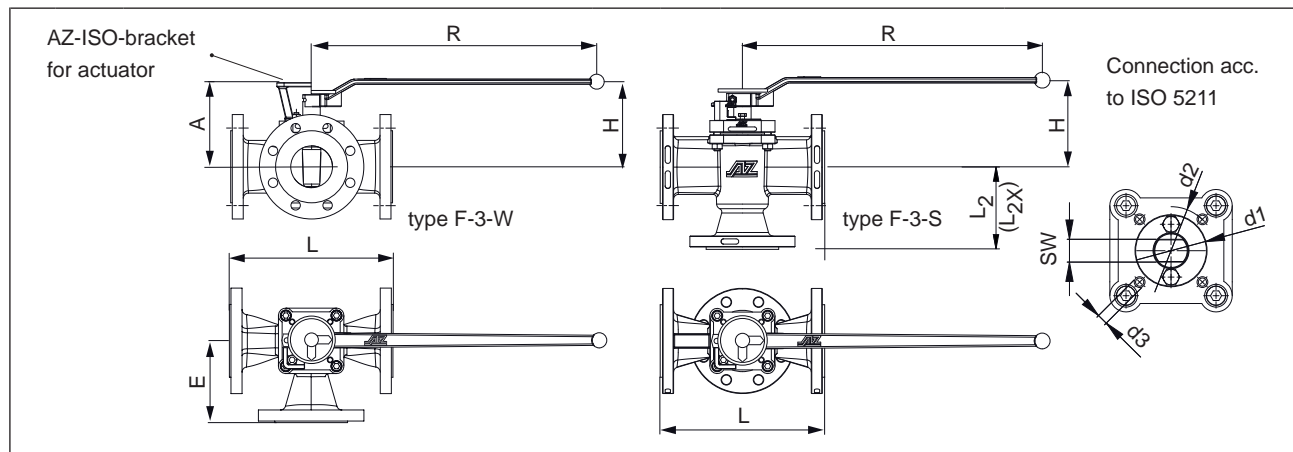
# Flange dimensions acc. to DIN EN / ASME



DIN EN 1092-1										DIN EN 1092-1									
DN	PN	øD [mm]	flange bore [mm]		øg [mm]	b [mm]	f [mm]			DN	PN	øD [mm]	flange bore [mm]		øg [mm]	b [mm]	f [mm]		
			øk	no.	ø								øk	no.	ø				
15	10-40	95	65	4	14	45	16	2		125	10-16	250	210	8	18	188	22	3	
20	10-40	105	75	4	14	58	18	2		125	25-40	270	220	8	26	188	26	3	
25	10-40	115	85	4	14	68	18	2		150	10-16	285	240	8	22	212	22	3	
32	10-40	140	100	4	18	78	18	2		150	25-40	300	250	8	26	218	28	3	
40	10-40	150	110	4	18	88	18	3		200	10-16	340	295	8/12	22	268	24	3	
50	10-40	165	125	4	18	102	20	3		200	25 40	360 375	310 320	12	26 30	278 285	30 34	3	
65	10-16	185	145	4 8	18	122	18	3		250	10 16	395 405	350 355	12	22 26	320	26	3	
	25-40			8			22			250	25 40	425 450	370 385	12	30 33	335 345	32 38	3	
80	10-40	200	160	8	18	138	24	3		300	10 16	445 460	400 410	12	22 26	370 378	26 28	4	
80S	10-40	200	160	8	18	138	24	3		300	25 40	485 515	430 450	16	30 33	395 410	34 42	4	
100	10-16	220	180	8	18	158	20	3		350	10 16	505 520	460 470	12	22 26	430 438	26 30	4	
	25-40	235	190	8	22	162	24	3		350	25 40	555 580	490 510	16	33 36	450 465	38 46	4	
100S	10-16	220	180	8	18	158	20	3		400	10 16	565 580	515 525	16	26 30	482 490	26 32	4	
	25-40	235	190	8	22	162	24	3		400	25 40	620 660	550 585	16	36 39	505 535	40 50	4	
										450	10 16	615 640	565 585	20	26 30	532 550	28 36	4	
										450	25 40	670 685	600 610	20	36 39	555 560	46 57	4	
										500	10 16	670 715	620 650	20	26 33	585 610	28 38	4	
										500	25 40	730 755	660 670	20	36 42	615 615	48 57	4	
										600	10 16	780 840	725 770	20	30 36	685 725	30 47	5	
										600	25 40	845 890	770 795	20	39 48	720 735	58 72	5	
ASME B16.5										ASME B16.5									
NPS	Class	øD [mm]	flange bore [mm]		øg [mm]	b [mm]	f [mm]			NPS	Class	øD [mm]	flange bore [mm]		øg [mm]	b [mm]	f [mm]		
			øk	no.	ø							øk	no.	ø					
½	150	90	60,3	4	15,7	34,9	10,0	2		5	150	255	215,9	8	22,3	185,7	24,3	2	
	300	95	66,7	4	15,7	34,9	14,7	2		5	300	280	235	8	22,3	185,7	35,4	2	
¾	150	100	69,9	4	15,7	42,9	10,9	2		6	150	280	241,3	8	22,3	215,9	25,9	2	
	300	115	82,5	4	19,1	42,9	16,3	2		6	300	320	269,9	12	22,3	215,9	37,0	2	
1	150	110	79,4	4	15,7	50,8	11,6	2		8	150	345	298,5	8	22,4	269,9	29,0	2	
	300	125	88,9	4	19,1	50,8	17,9	2		8	300	380	330,2	12	25,4	269,9	41,7	2	
1¼	150	115	88,9	4	15,7	63,5	13,2	2		10	150	405	362	12	25,4	323,8	30,6	2	
	300	135	98,4	4	19,1	63,5	19,5	2		10	300	445	387,4	16	28,4	323,8	48,1	2	
1½	150	125	98,4	4	15,7	73,0	14,7	2		12	150	485	431,8	12	25,4	381	32,2	2	
	300	155	114,3	4	22,3	73,0	21,1	2		12	300	520	450,8	16	31,7	381	51,3	2	
2	150	150	120,7	4	19,1	92,1	16,3	2		14	150	535	476,3	12	28,4	412,8	35,4	2	
	300	165	127,0	8	19,1	92,1	22,7	2		14	300	585	514,4	20	31,7	412,8	54,4	2	
2½	150	180	139,7	4	19,1	104,8	17,9	2		16	150	595	539,8	16	28,4	469,9	37,0	2	
	300	190	149,3	8	22,3	104,8	25,9	2		16	300	650	571,5	20	35	469,9	57,6	2	
3	150	190	152,4	4	19,1	127	19,5	2		18	150	635	577,9	16	31,8	533,4	40,1	2	
	300	210	168,3	8	22,3	127	29,0	2		18	300	710	628,6	24	35	533,4	60,8	2	
4	150	230	190,5	8	19,1	157,2	24,3	2		20	150	700	635	20	31,8	584,2	43,3	2	
	300	255	200,0	8	22,3	157,2	32,2	2		20	300	775	685,8	24	35	584,2	64	2	
4S	150	230	190,5	8	19,1	157,2	24,3	2		24	150	815	749,3	20	35,1	692,2	48,1	2	
	300	255	200,0	8	22,3	157,2	32,2	2		24	300	915	812,8	24	41,1	692,2	70,3	2	

# Type F-3 ISO-STANDARD

## Technical information DN 15 - 100S / NPS ½ - 4S



	DN	PN	L [mm]	L <sub>2</sub> /E [mm]	L <sub>2</sub> X [mm]	A [mm]	H [mm]	R [mm]	flange Type	ISO 5211			SW [mm]	torque* [Nm]	weight [kg]	K <sub>vs</sub> ** [m <sup>3</sup> /h]	C <sub>v</sub> ** [US.gal/min]
										d1	d2	d3					
DIN EN 558 / ISO 5211	15	10-40	130	65	***	101	103	200	F05	35	50	M6	11	30	4	10	12
	20	10-40	150	75	***	101	103	200	F05	35	50	M6	11	30	5	6	7
	25	10-40	160	80	***	107	109	200	F05	35	50	M6	11	30	6	8	9
	25X																
	32	10-40	180	90	***	111	117	320	F07	55	70	M8	14	70	10,5	23	27
	40	10-40	200	100	***	119	125	320	F07	55	70	M8	14	80	17	37	43
	50	10-40	230	115	***	153	159	420	F07	55	70	M8	19	120	20	68	77
	65	10-40	290	145	***	168	165	600	F10	70	102	M10	22	200	26	93	108
	80	10-40	310	155	***	168	165	600	F10	70	102	M10	22	200	28	94	109
	100	10-16 25-40	350 350	175	***	168	165	600	F10	70	102	M10	22	200	27	98	113
100S	10-16 25-40	350 350	175	***	183	180	600	F12	70	102	M10	22	300	32	170	197	
ASME B16.10 / ISO 5211	½	150	108	54	70	101	103	200	F05	35	50	M6	11	30	3,5	10	12
		300	140	70	73										4		
	¾	150	117	59	73	101	103	200	F05	35	50	M6	11	30	3,4	6	7
		300	152	76	76										5		
	1	150	127	64	89	107	109	200	F05	35	50	M6	11	30	4,3	8	9
		300	165	83	95										6		
	1½	150	165	82,5	105	119	125	320	F07	55	70	M8	14	80	7,9	37	43
		300	190	95	111										10,5		
	2	150	178	89	114	153	159	420	F07	55	70	M8	19	120	12,3	68	77
		300	216	108	121										17		
	2½	150	290	145	***	168	165	600	F10	70	102	M10	22	200	20	93	108
		300	282	142	141										26		
	3	150	203	102	130	168	165	600	F10	70	102	M10	22	200	20	94	109
300		282	142	141	26												
4	150	229	152,5	152,5	168	165	600	F10	70	102	M10	22	200	22	98	113	
	300	305	171,5	171,5										27			
4S	150	229	152,5	152,5	183	180	600	F12	85	125	M12	22	300	28	170	197	
	300	305	171,5	171,5										32			

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

\*\*) F-3-S valid for L, LL form of the plug

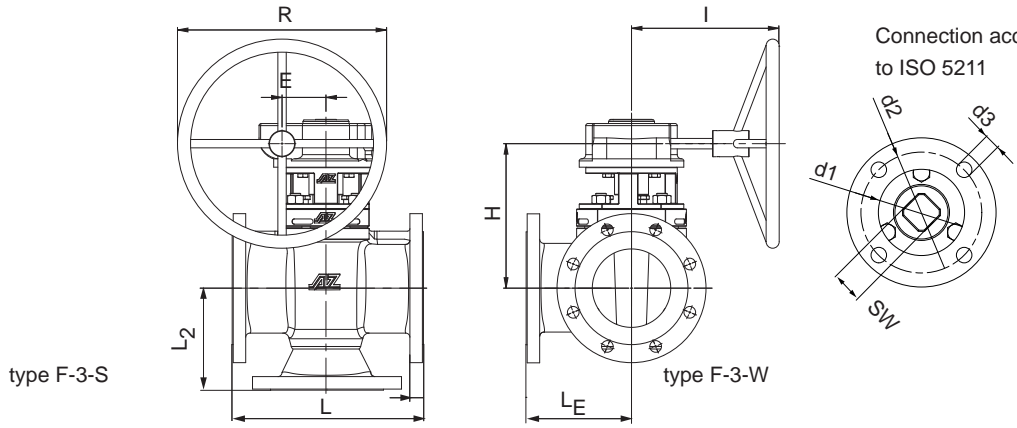
\*\*\*) on request

\*\*\*\*) for F-3-W Class 150 only in lengths according to DIN EN 558

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

# Type F-3 ISO-STANDARD

## Technical information DN 125 - 600 / NPS 5 - 24



		DN	PN	L [mm]	L <sub>2</sub> [mm]	L <sub>E</sub> [mm]	E [mm]	R [mm]	H [mm]	I [mm]	gear (Pro-Gear)	flange ISO 5211 Typ	d1	d2	d3	SW [mm]	torque* [Nm]	weight [kg]	K <sub>VS</sub> ** [m <sup>3</sup> /h]	C <sub>V</sub> ** [US.gal/min]
DIN EN 558 / ISO 5211	125	10-16 25-40	325	162	162	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	73 ***	284	329	
	150	10-16 25-40	350	200	175	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	85 ***	304	353	
	200	10-16 25 40	400	220	200	117,5	500	321	365	Q3000-S	F16	130	165	M20	36	1200	130 ***	527	611	
	250	10 16 25 40	450	275	300	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	1500	172 ***	650	754	
	300	10 16 25 40	500	325	350	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	2600	182 ***	1100	1276	
	350	10 16 25 40	550	381	***	137,5	600	382	465	Q6500-S	F25	200	254	M16	55	5500	225 ***	1491	1729	
	400	10 16 25 40	600	406	***	137,5	600	460	465	Q6500-S	F25	200	254	M16	55	5500	330 ***	2082	2415	
	450	10 16 25 40	650	***	***	180	600	485	520	Q12000-S	F25	200	254	M16	55	8000	***	***	***	
	500	10 16 25 40	700	***	***	252,5	700	460	600	***	F25	200	254	M16	55	***	***	***	***	
	ASME B16.10 / ISO 5211	NPS	Class	L**** [mm]	L <sub>2</sub> [mm]	L <sub>E</sub> [mm]	E [mm]	R [mm]	H [mm]	I [mm]	gear (Pro-Gear)	flange ISO 5211 Typ	d1	d2	d3	SW [mm]	torque* [Nm]	weight [kg]	K <sub>VS</sub> ** [m <sup>3</sup> /h]	C <sub>V</sub> ** [US.gal/min]
5		150 300	254 325	178 163	162 ***	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	*** 73	284	329	
6		150 300	267 403	190 216	175 201	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	74 85	304	353	
8		150 300	292 419	229 254	200 ***	96,5	600	321	350	Q3000-S	F16	130	165	M20	36	1200	105 130	527	611	
10		150 300	330 457	350 ***	300 ***	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	1500	146 172	650	754	
12		150 300	356 502	349 356	350 ***	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	1500 2600	184 182	1100	1276	
14		150 300	381/686 762	***	343 ***	137,5	600	460	465	Q6500-S	F25	200	254	M16	55	5500	219 225	1491	1729	
16		150 300	406 600	***	***	137,5	600	460	465	Q6500-S	F25	200	254	M16	55	5500	279 330	2082	2415	
18		150 300	864 914	***	***	180	600	485	520	Q12000-S	F25	200	254	M16	55	8000	***	***	***	
20		150 300	914 991	***	***	252,5	700	460	600	***	F25	200	254	M16	55	***	***	***	***	

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

\*\*) F-3-S valid for L, LL form of the plug

\*\*\*) on request

\*\*\*\*) for F-3-W Class 150 only in lengths according to DIN EN 558

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

# Type ISO-STANDARD F-4 / F-5

## Multiport plug valves with reduced bore



Type F-4



Type F-4-special

Type F-5

- Flange connections
- 4-way up to 5-way

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

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

### Advantages of multiport plug valves

- free of cavities
- no contamination with media deposits
- permanent internal sealing ( $\Delta p$  independent!)

### Design characteristics

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

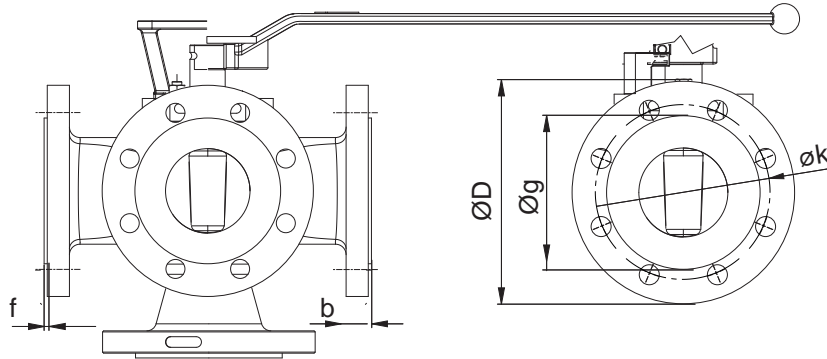
### Options

- heating jacket
- oversize design
- flushing device
- FDA compliant
- painting
- oil and grease-free assembly



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

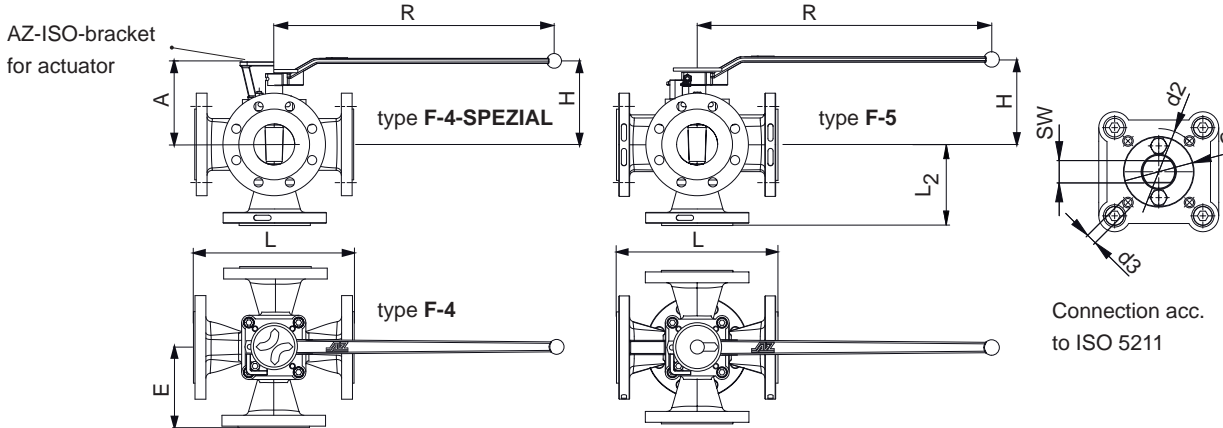
# Flange dimensions acc. to DIN EN / ASME



DIN EN 1092-1										DIN EN 1092-1										
DN	PN	øD [mm]	flange bore [mm]	no.	ø [mm]	øg [mm]	b [mm]	f [mm]		DN	PN	øD [mm]	flange bore [mm]	no.	ø [mm]	øg [mm]	b [mm]	f [mm]		
15	10-40	95	65	4	14	45	16	2		125	10-16	250	210	8	18	188	22			
20	10-40	105	75	4	14	58	18	2		125	25-40	270	220	8	26	188	26	3		
25	10-40	115	85	4	14	68	18	2		150	10-16	285	240	8	22	212	22			
32	10-40	140	100	4	18	78	18	2		150	25-40	300	250	8	26	218	28			
40	10-40	150	110	4	18	88	18	3		200	10-16	340	295	8/12	22	268	24			
50	10-40	165	125	4	18	102	20	3		200	25 40	360 375	310 320	12	26 30	278 285	30 34			
65	10-16	185	145	4 8	18	122	18	3		250	10 16	395 405	350 355	12	22 26	320	26			
	25-40			8			22			250	25 40	425 450	370 385	12	30 33	335 345	32 38			
80	10-40	200	160	8	18	138	24	3		300	10 16	445 460	400 410	12	22 26	370 378	26 28			
80S	10-40	200	160	8	18	138	24	3		300	25 40	485 515	430 450	16	30 33	395 410	34 42			4
100	10-16	220	180	8	18	158	20	3		350	10 16	505 520	460 470	12	22 26	430 438	26 30			
	25-40	235	190	8	22	162	24			350	25 40	555 580	490 510	16	33 36	450 465	38 46			
100S	10-16	220	180	8	18	158	20	3		400	10 16	565 580	515 525	16	26 30	482 490	26 32			
	25-40	235	190	8	22	162	24			400	25 40	620 660	550 585	16	36 39	505 535	40 50			
										450	10 16	615 640	565 585	20	26 30	532 550	28 36			
										450	25 40	670 685	600 610	20	36 39	555 560	46 57			
										500	10 16	670 715	620 650	20	26 33	585 610	28 38			
										500	25 40	730 755	660 670	20	36 42	615 615	48 57			
										600	10 16	780 840	725 770	20	30 36	685 725	30 47			
										600	25 40	845 890	770 795	20	39 48	720 735	58 72			
ASME B16.5										ASME B16.5										
NPS	Class	øD [mm]	flange bore [mm]	no.	ø [mm]	øg [mm]	b [mm]	f [mm]		NPS	Class	øD [mm]	flange bore [mm]	no.	ø [mm]	øg [mm]	b [mm]	f [mm]		
½	150	90	60,3	4	15,7	34,9	10,0			5	150	255	215,9	8	22,3	185,7	24,3			
	300	95	66,7	4	15,7	34,9	14,7	2		5	300	280	235	8	22,3	185,7	35,4	2		
¾	150	100	69,9	4	15,7	42,9	10,9			6	150	280	241,3	8	22,3	215,9	25,9			
	300	115	82,5	4	19,1	42,9	16,3	2		6	300	320	269,9	12	22,3	215,9	37,0	2		
1	150	110	79,4	4	15,7	50,8	11,6			8	150	345	298,5	8	22,4	269,9	29,0			
	300	125	88,9	4	19,1	50,8	17,9	2		8	300	380	330,2	12	25,4	269,9	41,7	2		
1¼	150	115	88,9	4	15,7	63,5	13,2			10	150	405	362	12	25,4	323,8	30,6			
	300	135	98,4	4	19,1	63,5	19,5	2		10	300	445	387,4	16	28,4	323,8	48,1	2		
1½	150	125	98,4	4	15,7	73,0	14,7			12	150	485	431,8	12	25,4	381	32,2			
	300	155	114,3	4	22,3	73,0	21,1	2		12	300	520	450,8	16	31,7	381	51,3	2		
2	150	150	120,7	4	19,1	92,1	16,3			14	150	535	476,3	12	28,4	412,8	35,4			
	300	165	127,0	8	19,1	92,1	22,7	2		14	300	585	514,4	20	31,7	412,8	54,4	2		
2½	150	180	139,7	4	19,1	104,8	17,9			16	150	595	539,8	16	28,4	469,9	37,0			
	300	190	149,3	8	22,3	104,8	25,9	2		16	300	650	571,5	20	35	469,9	57,6	2		
3	150	190	152,4	4	19,1	127	19,5			18	150	635	577,9	16	31,8	533,4	40,1			
	300	210	168,3	8	22,3	127	29,0	2		18	300	710	628,6	24	35	533,4	60,8	2		
4	150	230	190,5	8	19,1	157,2	24,3			20	150	700	635	20	31,8	584,2	43,3			
	300	255	200,0	8	22,3	157,2	32,2	2		20	300	775	685,8	24	35	584,2	64	2		
4S	150	230	190,5	8	19,1	157,2	24,3			24	150	815	749,3	20	35,1	692,2	48,1			
	300	255	200,0	8	22,3	157,2	32,2	2		24	300	915	812,8	24	41,1	692,2	70,3	2		

# Type F-4 / F-5 ISO-STANDARD

## Technical information DN 15 - 100S / NPS ½ - 4S



	DN	PN	L [mm]	L <sub>2</sub> /E [mm]	A [mm]	H [mm]	R [mm]	flange ISO 5211 Type	d1	d2	d3	SW [mm]	torque* [Nm]	weight [kg]	K <sub>vs</sub> ** [m <sup>3</sup> /h]	C <sub>v</sub> ** [US.gal/min]
DIN EN 558 / ISO 5211	15	10-40	130	65	101	103	200	F05	35	50	M6	11	30	4,8	6	7
	20	10-40	150	75	101	103	200	F05	35	50	M6	11	30	7	7	8
	25	10-40	160	80	107	109	200	F05	35	50	M6	11	30	8,8	8	9
	25X	10-40	160	80	107	117	320	F05	55	70	M8	14	70	8,8	12	14
	32	10-40	180	90	111	117	320	F07	55	70	M8	14	70	10,2	17	20
	40	10-40	200	100	119	125	320	F07	55	70	M8	14	80	12	29	34
	50	10-40	230	115	153	159	420	F07	55	70	M8	19	120	19,5	54	63
	65	10-40	290	145	168	165	600	F10	70	102	M10	22	200	25	88	103
	80	10-40	310	155	168	165	600	F10	70	102	M10	22	200	32	89	103
	100S	10-16 25-40	350 350	175	183	180	600	F12	70	102	M10	22	300	39	170	197
ASME B16.10 / ISO 5211	½	150	108	54	101	103	200	F05	35	50	M6	11	30	***	6	7
		300	140	70	101	103	200	F05	35	50	M6	11	30	4,8	7	8
	¾	150	118	59	101	103	200	F05	35	50	M6	11	30	***	7	8
		300	152	76	101	103	200	F05	35	50	M6	11	30	7	7	8
	1	150	127	64	107	109	200	F05	35	50	M6	11	30	***	8	9
		300	165	83	107	109	200	F05	35	50	M6	11	30	8,8	8	9
	1½	150	165	82,5	119	125	320	F07	55	70	M8	14	80	***	29	34
		300	191	95	119	125	320	F07	55	70	M8	14	80	10,2	29	34
	2	150	178	89	153	159	420	F07	55	70	M8	19	120	***	54	63
		300	216	108	153	159	420	F07	55	70	M8	19	120	12	54	63
	2½	150	190	145	168	165	600	F10	70	102	M10	22	200	25	88	103
		300	283	142	168	165	600	F10	70	102	M10	22	200	***	88	103
	3	150	203	102	168	165	600	F10	70	102	M10	22	200	***	89	103
300		283	142	168	165	600	F10	70	102	M10	22	200	32	89	103	
4S	150	228	152,5	183	180	600	F12	85	125	M12	22	300	***	170	197	
	300	305	171,5	183	180	600	F12	85	125	M12	22	300	39	170	197	

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

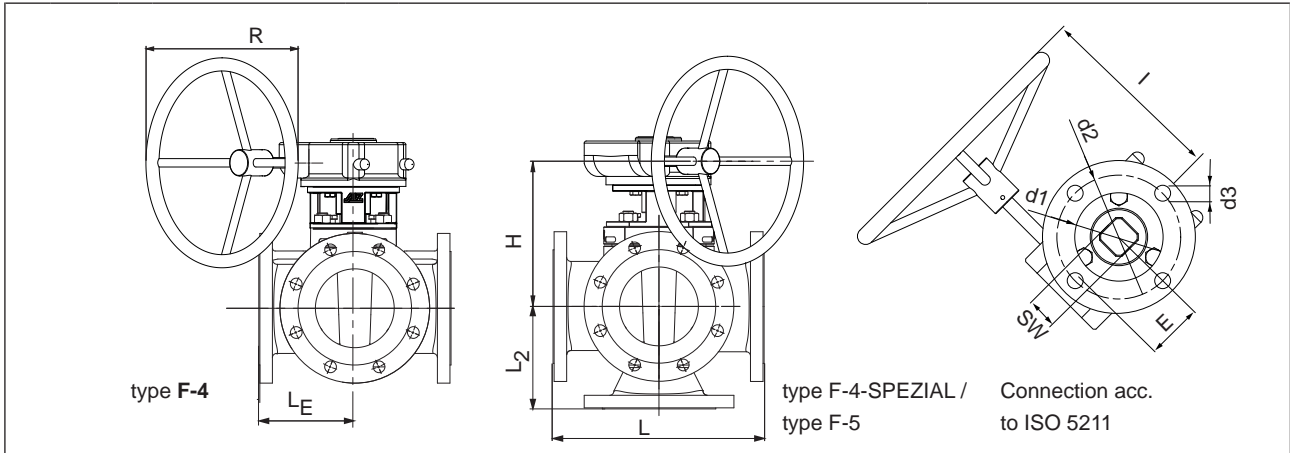
\*\*\*) F-4 valid for LL4 form of the plug

\*\*\*\*) on request

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

# Type F-4 / F-5 ISO-STANDARD

## Technical information DN 125 - 600 / NPS 5 - 24



DN	PN	L	L <sub>2</sub>	L <sub>E</sub>	E	R	H	I	gear (Pro-Gear)	flange ISO 5211			SW [mm]	torque* [Nm]	weight [kg]	K <sub>vs</sub> ** [m <sup>3</sup> /h]	C <sub>v</sub> ** [US.gal/min]		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		Type	d1	d2						d3	
DIN EN 558 / ISO 5211	125	10-16 25-40	325	162	162	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	79	281	329
	150	10-16 25-40	350	200	175	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	92	301	352
	200	10-16 25 40	400	220	200	96,5	500	321	365	Q3000-S	F16	130	165	M20	36	1200	142	522	663
	250	10 16 25 40	450	275	225	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	1500	186	643	752
	300	10 16 25 40	500	325	250	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	2600	196	1093	1280
	350	10 16 25 40	550	***	***	137,5	600	460	465	Q6500-S	F25	200	254	M16	55	5500	***	***	***
	400	10 16 25 40	600	***	***	137,5	600	460	465	Q6500-S	F25	200	254	M16	55	5500	***	***	***
	450	10 16 25 40	650	***	***	180	600	485	520	Q12000-S	F25	200	254	M16	55	8000	***	***	***
	500	10 16 25 40	700	***	***	52,5	700	460	600	***	F25	200	254	M16	55	***	***	***	***
ASME B16.10 / ISO 5211	5	150	254	178	127	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	***	281	329
		300	325	163	162												79		
	6	150	267	191	133	84	400	275	290	Q1500-S	F16	130	165	M20	36	900	***	301	352
		300	403	216	201												92		
	8	150	292	228	146	96,5	600	321	365	Q3000-S	F16	130	165	M20	36	1200	***	522	663
		300	419	254	209												142		
	10	150	330	350	165	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	1500	***	643	752
		300	457	***	228												186		
	12	150	356	349	178	137,5	600	356	465	Q6500-S	F16	130	165	M20	46	1500	***	1093	1280
		300	502	356	251											2600	196		
	14	150	550	***	***	137,5	600	460	465	Q6500-S	F25	200	254	M16	55	5500	***	***	***
		300																	
16	150	600	***	***	137,5	600	460	465	Q6500-S	F25	200	254	M16	55	5500	***	***	***	
	300																		
18	150	864	***	***	180	600	485	520	Q12000-S	F25	200	254	M16	55	8000	***	***	***	
	300	914																	
20	150	914	***	***	52,5	700	460	600	***	F25	200	254	M16	55	***	***	***	***	
	300	991																	

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

\*\*\*) F-4 valid for LL4 form of the plug

\*\*\*) on request

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

# 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 ( $\Delta p$  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



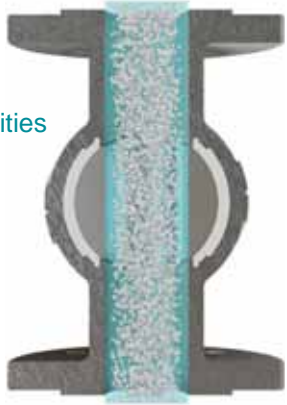
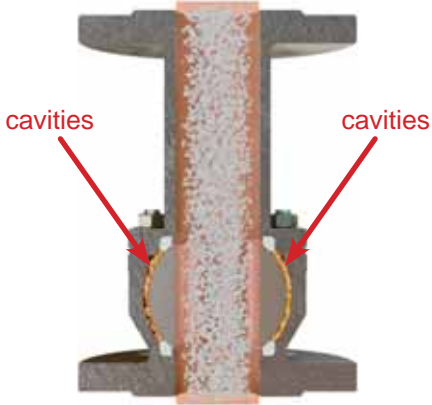
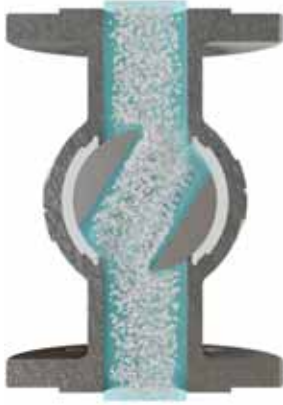
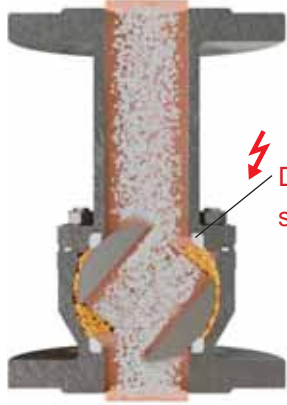
## PTFE-sleeve

- 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
<p><b>Soft seated plug valve with PTFE-sleeve</b></p>  <p><b>Main sealing components</b></p> <ul style="list-style-type: none"> <li>• metallic plug</li> <li>• sleeve</li> </ul>	<p><b>Soft seated ball valve with PTFE sealing rings, floating ball</b></p>  <p><b>Main sealing components</b></p> <ul style="list-style-type: none"> <li>• metallic ball</li> <li>• sealing rings</li> </ul>
OPEN position	
<ul style="list-style-type: none"> <li>• suitable for all media due to cavity-free design</li> <li>• sealing surfaces are completely protected</li> </ul>  <p>free of cavities</p>	<ul style="list-style-type: none"> <li>• critical for the following media due to design with cavities <ul style="list-style-type: none"> <li>○ corrosives: crevice corrosion</li> <li>○ polymerizing: clogging</li> <li>○ crystallizing: abrasion / clogging</li> </ul> </li> </ul>  <p>cavities</p> <p>cavities</p>
During operation	
<ul style="list-style-type: none"> <li>• free of cavities, media cannot settle or be trapped</li> <li>• solids are pushed away</li> <li>• no contamination with old media</li> </ul> 	<ul style="list-style-type: none"> <li>• with cavities, media can settle or be trapped</li> <li>• solids cause abrasion of the sealing rings</li> <li>• contamination of process media</li> </ul>  <p>Damage of the sealing rings</p>

# Safe and reliable tightness for years

## Adjustable



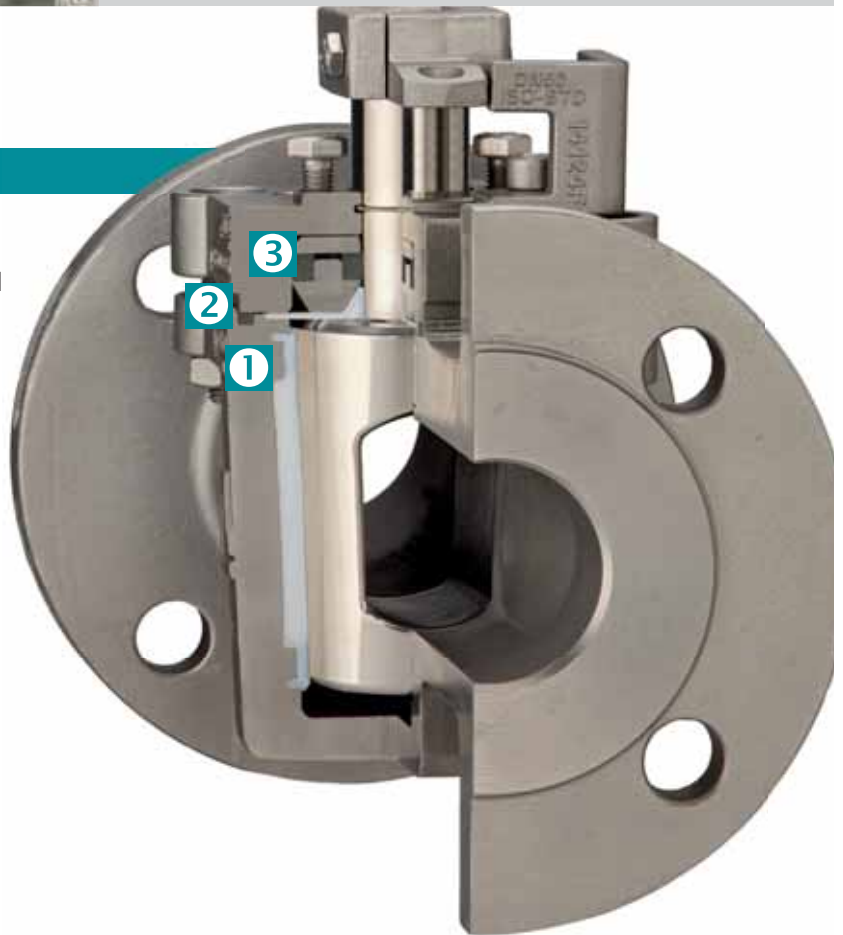
- tapered plug design allows retightening of the sealing on site - if needed
- adjusting bolt even accessible with mounted actuator / gearbox

## Several sealings to atmosphere

- 1 Primary: sleeve
- 2 Secondary: V-diaphragm/cover seal
- 3 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

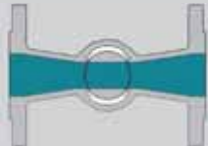
# Reduced and full bore design

## Execution

### Reduced bore

#### Type STANDARD

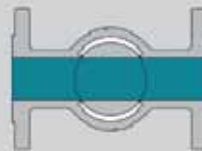
- compact valve (FF / weight)
- optimal torques for economic automation



### Full round bore

#### Type EXTRA

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

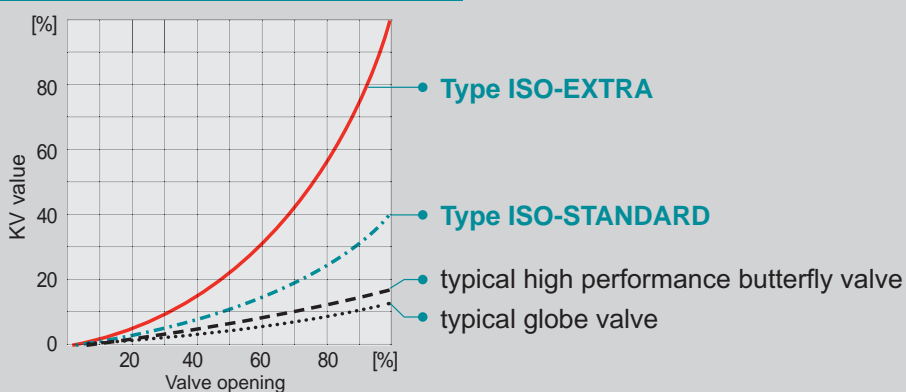


## Type ISO-EXTRA

- 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 <math><0.8 \text{ Ra } \mu\text{m}</math> (<math><32 \text{ Ra } \mu\text{in}</math>)
- 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



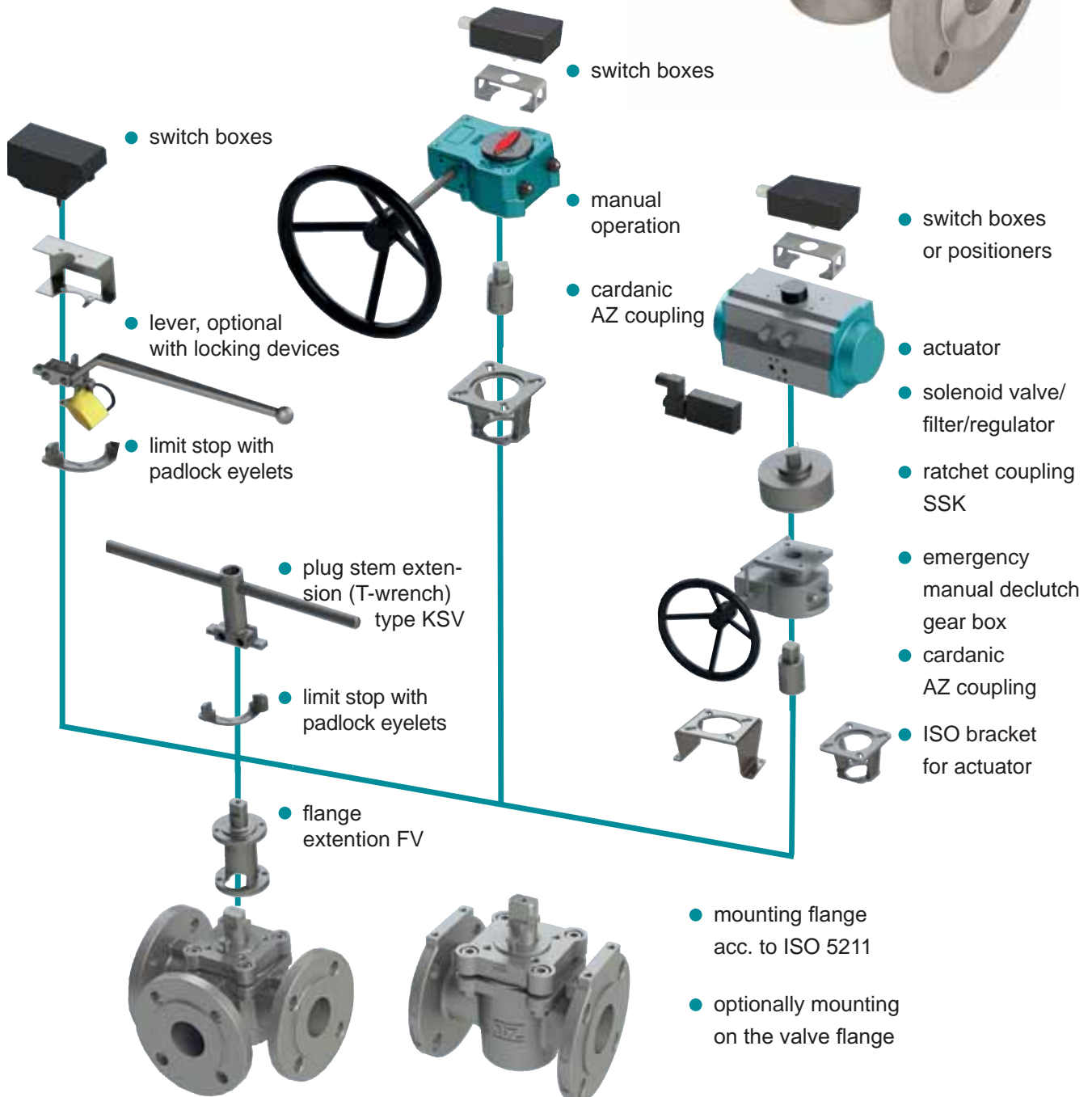
## High and low temperature

- 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			
	<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>		
	Type FS2		
		<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>	
		Fire-Safe-sealing (API 607)	
			<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>
			Chemistry sealing

\*) 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.)


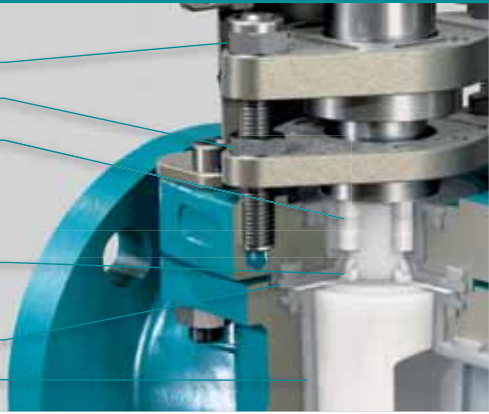
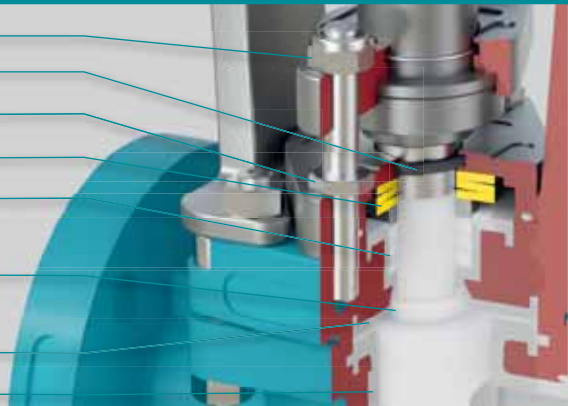
- detection ports for early recognition of potential leakages
- sniffing at sealing surfaces to atmosphere

- stem packing
- cover sealing
- flange sealing



# Cover and stem sealing systems for lined plug valves

*engineered.  
fast.  
dynamic.*

Type CA 2A	Chemistry sealing	
<p><b>NEW!</b></p>	<ul style="list-style-type: none"> <li>plug &amp; packing adjustment</li> <li>stem O-ring</li> <li><b>Tertiary sealing:</b> O-ring (FKM / FFKM)</li> <li>thrust collar</li> <li>stainless steel diaphragm</li> </ul>	
	<ul style="list-style-type: none"> <li><b>Secondary sealing:</b> V-diaphragm &amp; delta thrust collar (PTFE)</li> <li><b>Primary sealing:</b> lined body</li> </ul>	
		
	<hr/>	
	Type SAFE-LINED	Chemistry sealing
	<p><b>lined cover</b></p>	<ul style="list-style-type: none"> <li>plug adjustment</li> <li>triple safety stem packing adjustment</li> <li><b>Tertiary sealing:</b> triple safety stem packing (PTFE) to atmosphere</li> <li><b>Secondary sealing:</b> V-diaphragm (PTFE), delta thrust collar (PTFE)</li> <li>lined cover</li> <li><b>Primary sealing:</b> lined body*</li> </ul>
		
<hr/>		
Type SAFE-LINED-SL		Chemistry sealing
<p><b>live-loaded</b></p>		<ul style="list-style-type: none"> <li>plug adjustment</li> <li>o-rings protect the springs against corrosion</li> <li>triple safety stem packing adjustment</li> <li>disk springs (optionally made of Inconel)</li> <li><b>Tertiary sealing:</b> triple safety stem packing (PTFE) to atmosphere</li> <li><b>Secondary sealing:</b> V-diaphragm (PTFE), delta thrust collar (PTFE)</li> <li>lined cover</li> <li><b>Primary sealing:</b> lined body*</li> </ul>
		

\*) 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



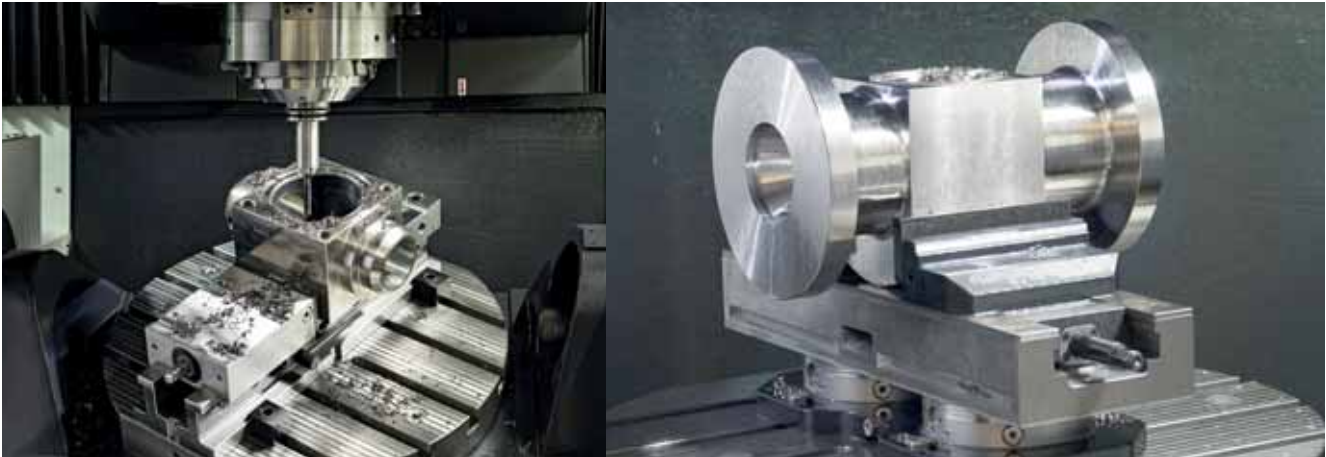
Material Group	Common Name	Casting Material					
		EN / DIN	Short name	Material-No.	ASTM	Grade	UNS
<b>Carbon Steel / Ductile Iron</b>							
Ductile Iron	SG Iron	EN 1563	EN-GJS-400-18-LT	5.3103	A395	-	F32800
Carbon Steel	CS	EN 10213	GP240GH	1.0619	A216	WCB	J03002
Low Temp. Carbon Steel	LTCS	EN 10213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

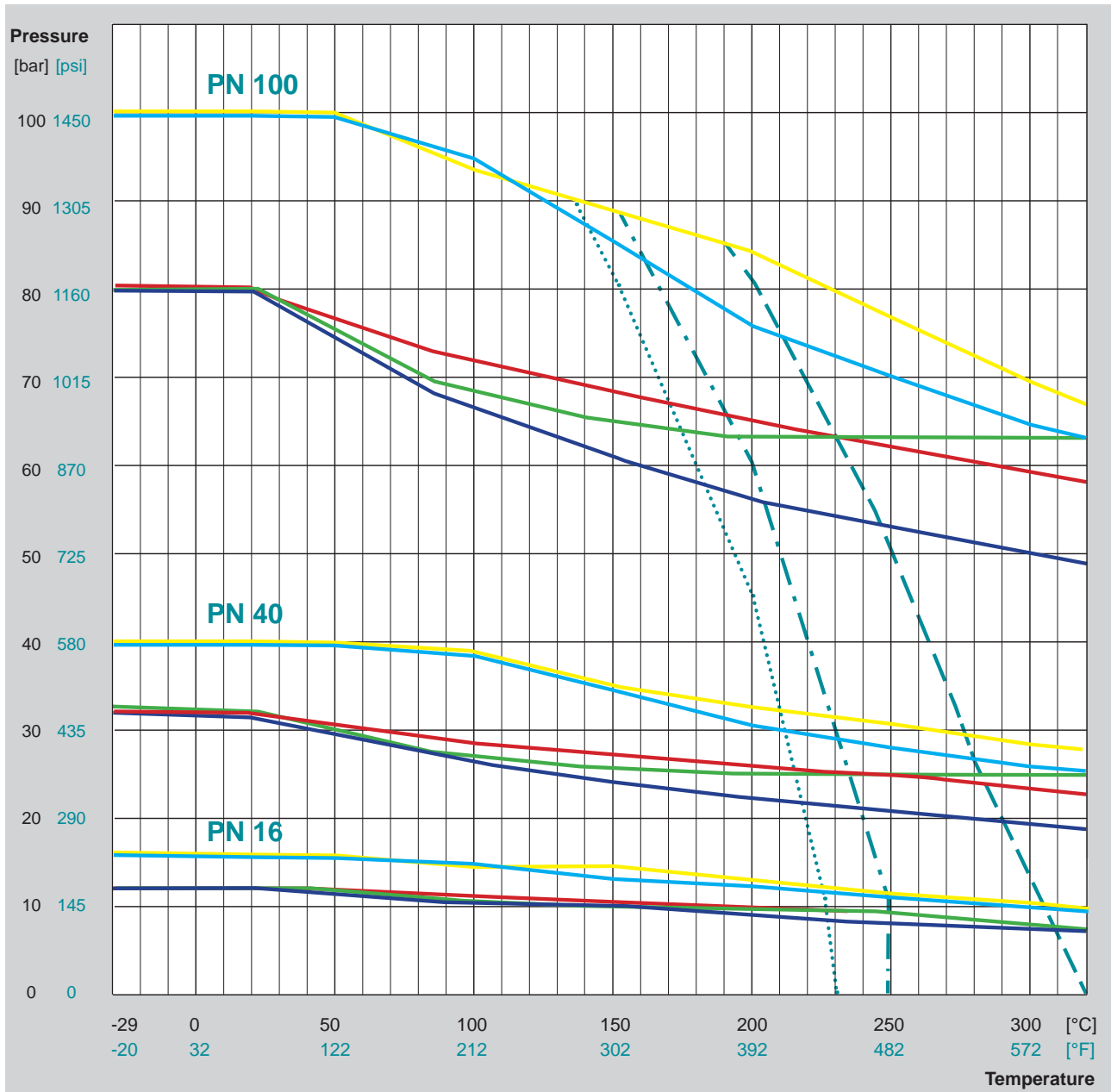
\*) sleeve material selection depending on availability at AZ manufacturing site

## 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

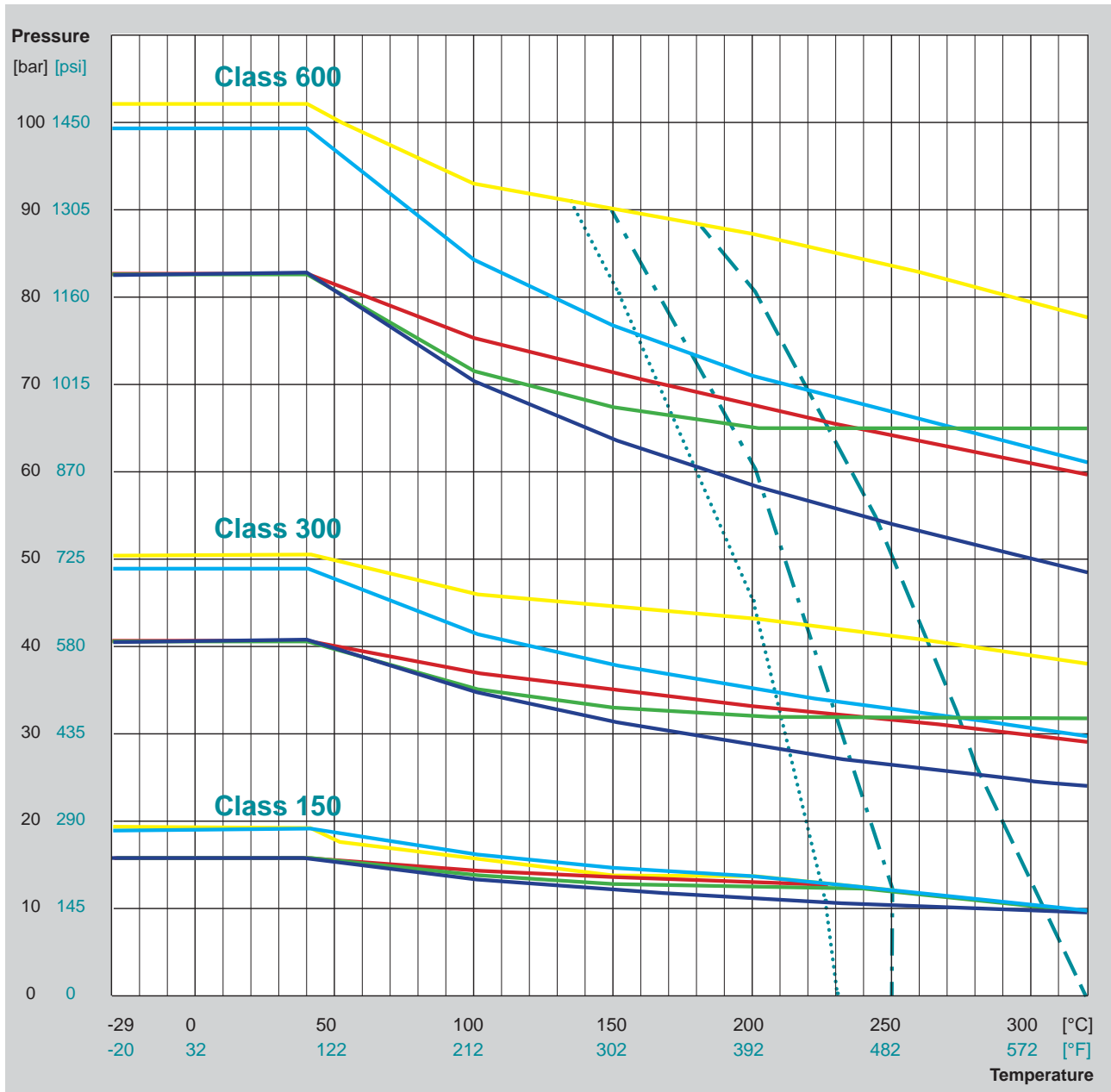
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

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

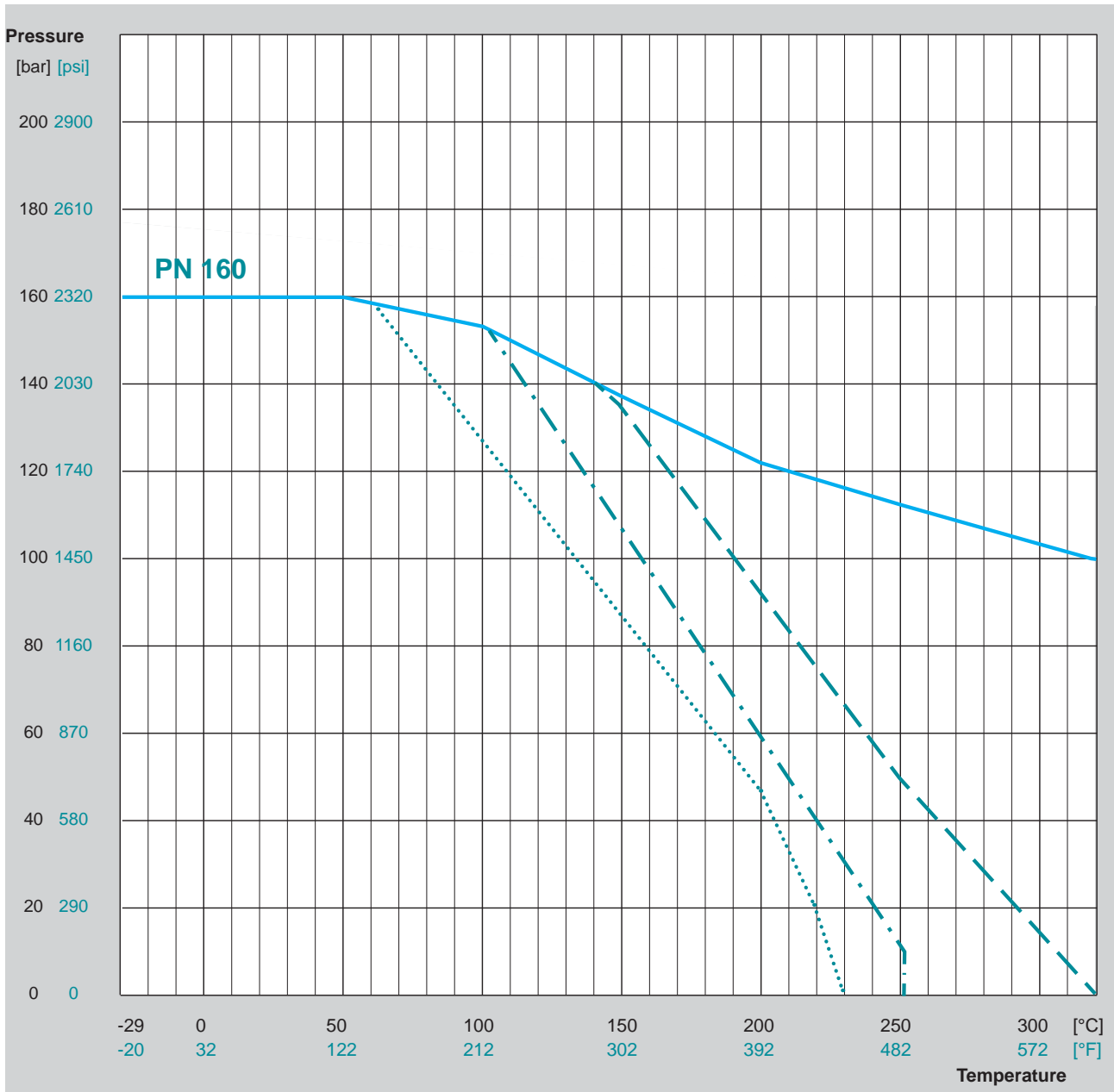
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

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

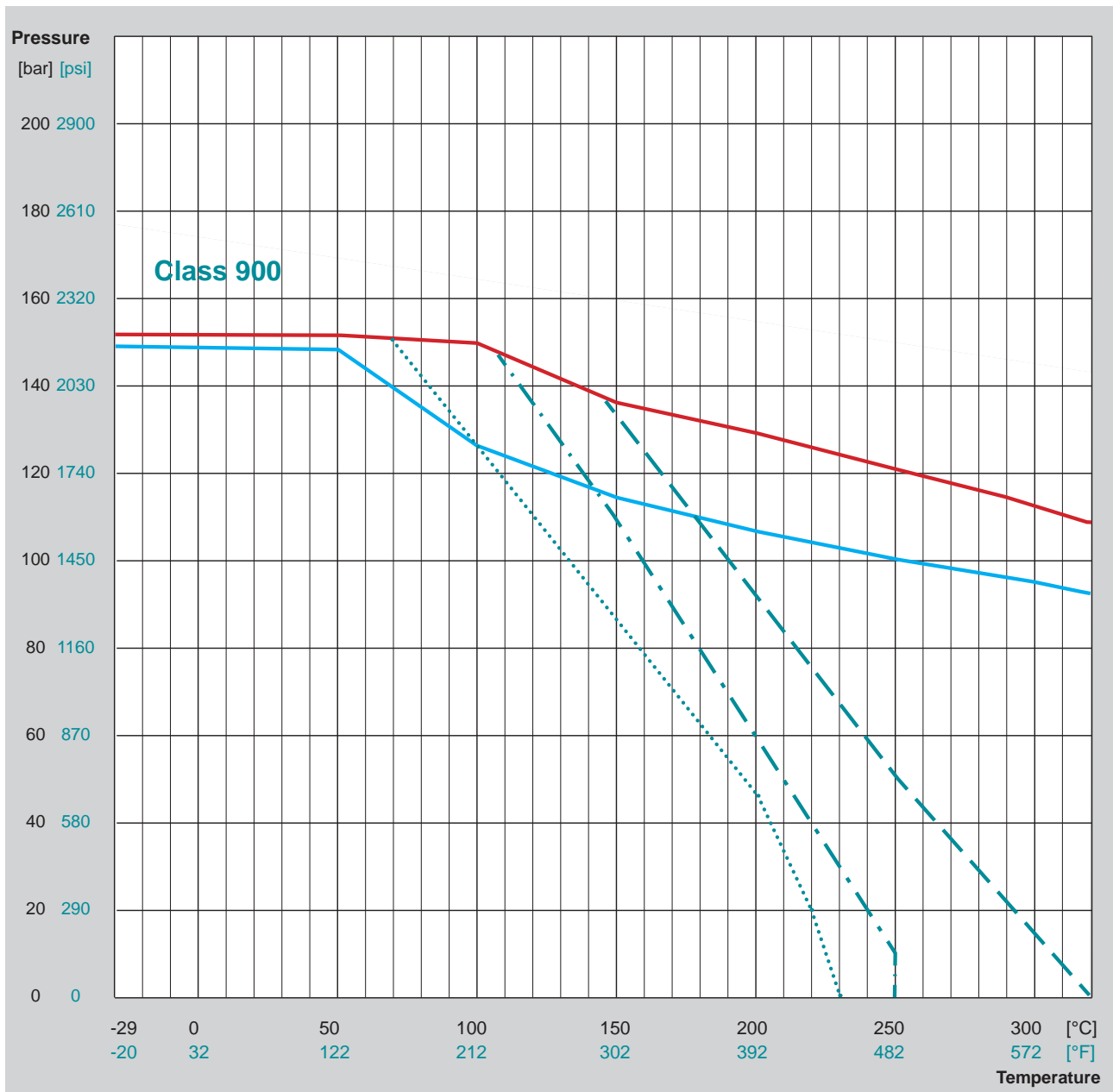
for demanding conditions, such as process temperatures exceeding 200°C / 392°F: Valve size, media phase, plug position & temperature (constant or fluctuating) may have an impact on the lifetime. Consult factory for proper selection of sleeve material, cover sealing type and special features.

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

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

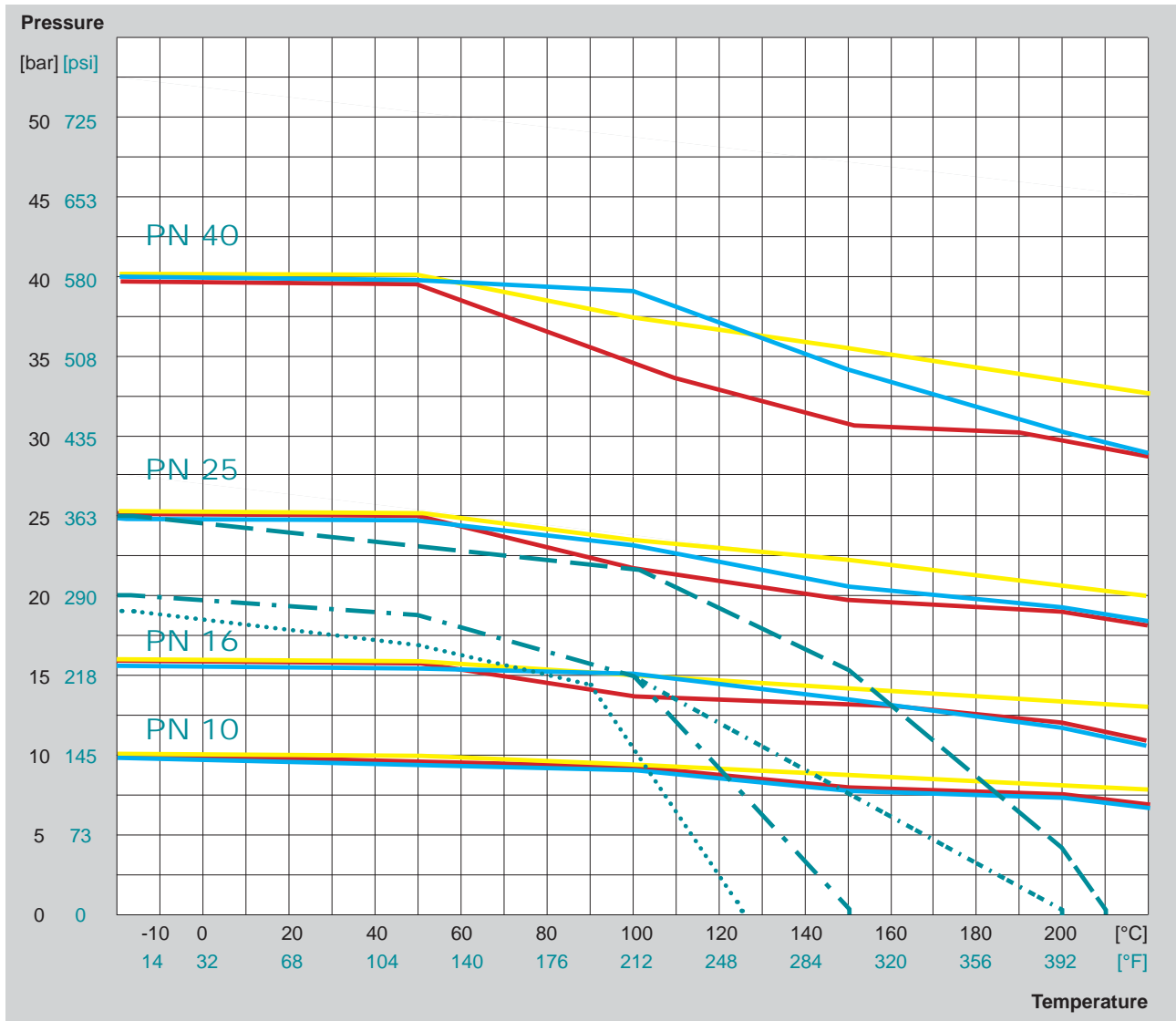
### IMPORTANT NOTE

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

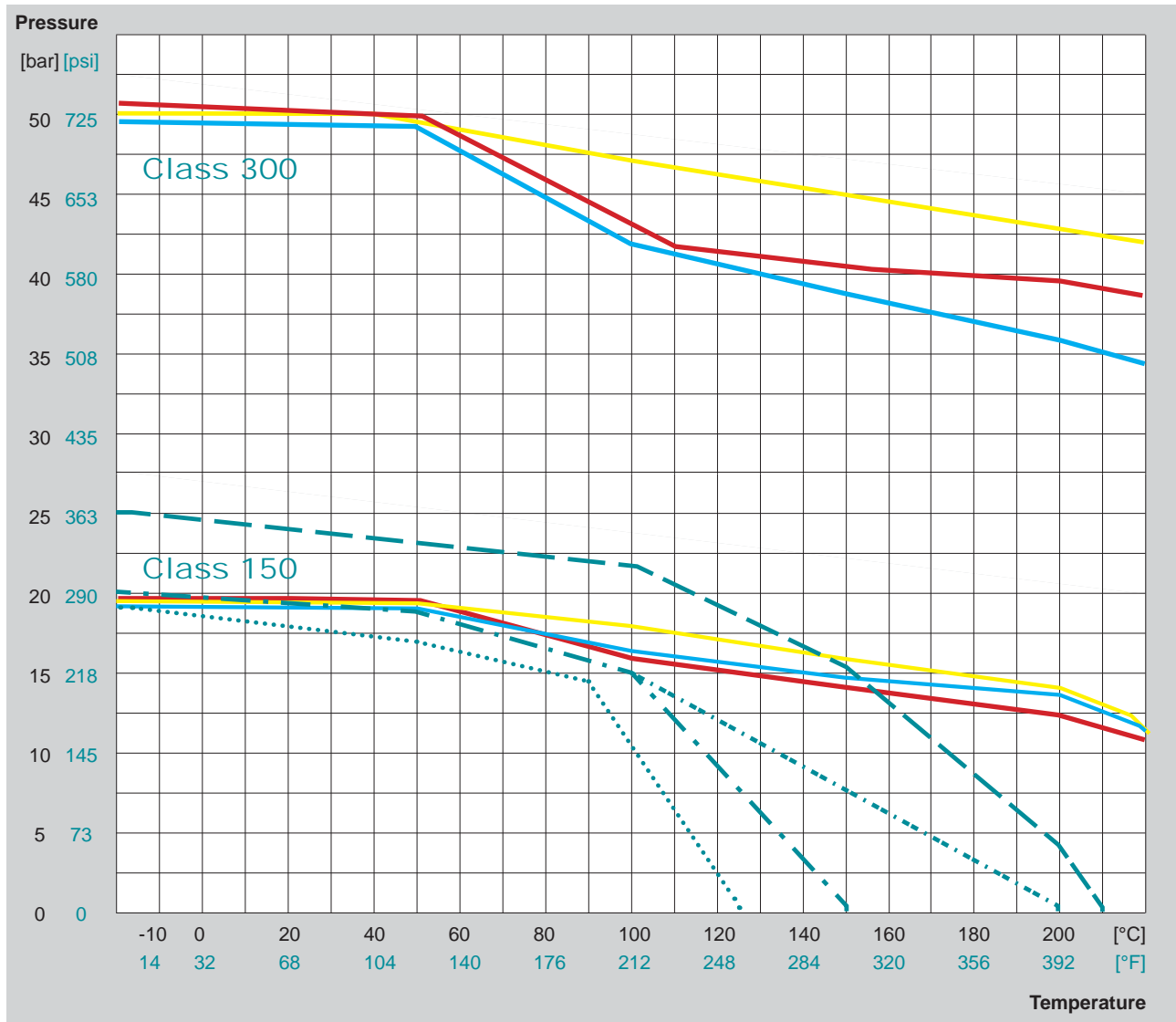
## IMPORTANT NOTE

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 ASME B16.34 / B16.42.

### 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

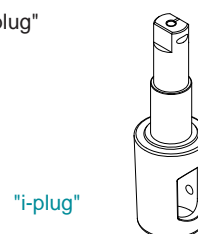
Recommendation for three-way valves type F-3-S with vertical outlet (longer life-time compared to type F-3-W with horizontal outlet)

### 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°
Type F-2-ISO-STANDARD					

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



Type F-2-ISO-STANDARD-A

# 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   Type F-3-S-ISO-STANDARD-A
<b>LL</b>					
<b>IL*</b>					
<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   Type F-3-W-ISO-STANDARD-A
<b>L4</b>					

\*) 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> 				

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

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    Type F-5-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



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## AZ services

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- 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)

### Middle East

- Saudi Arabia (Dammam)

### 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)