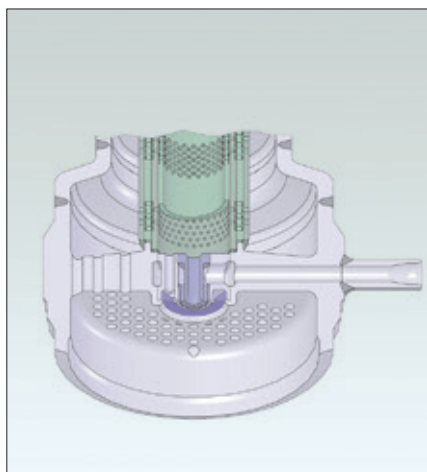
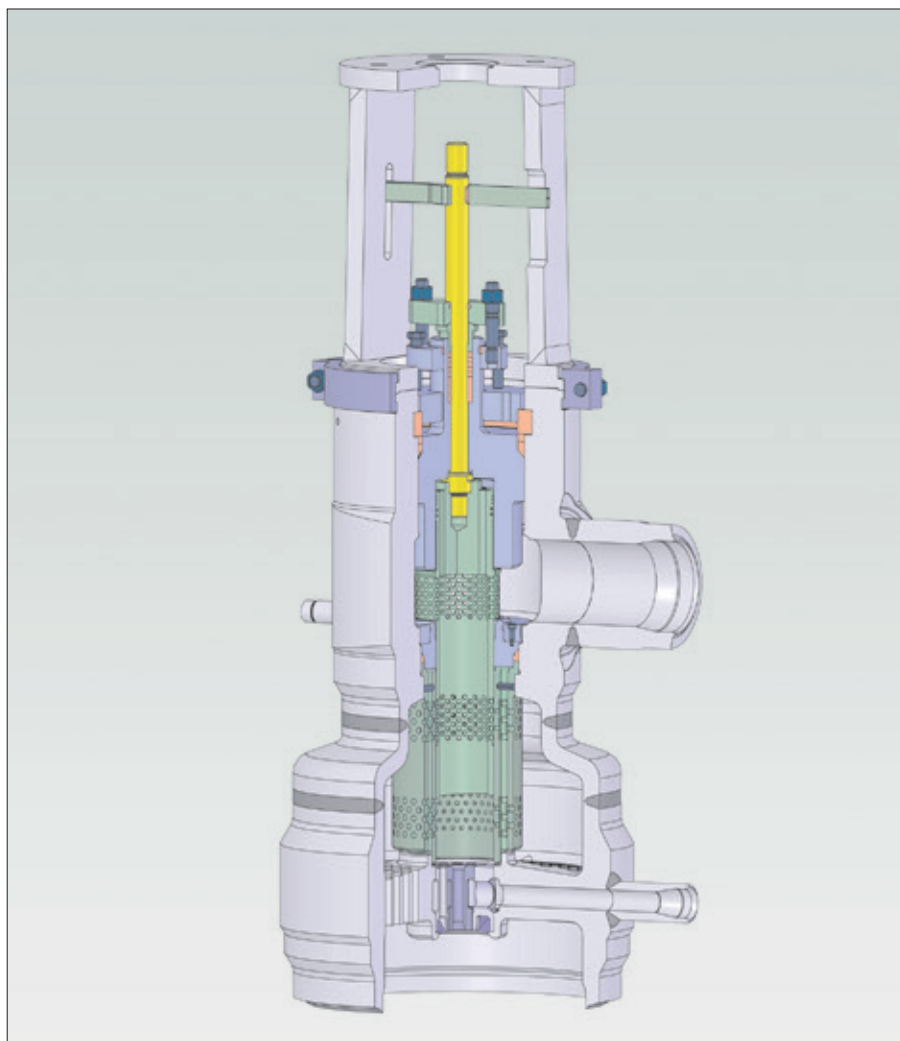


SEMPELL

Steam Turbine and Boiler protection at Steam Turbine trip. Steam Turbine bypass to Cold Reheat or Condenser while Boiler/Turbine start-up and shut-down.

Features and Benefits

- Pressure reduction by multi-stage controlled, subcritical expansion peculiar low noise
- Trim can be changed in the system
 - valve seat can be changed
 - cage can be changed"
- Subsequently adjustment to changed operational conditions is possible
- Good adjustment to the task by optimum-staged CV-value-series and large turn-down ratio
- Steam bypass over downstream two-fluid nozzle at outlet
 - integrated in restrictor
- replaceable via flanges without bonnet disassembly
- Pressure seal bonnet
- Low maintenance gland (packing pure graphite) can be retightened
- Burnished valve stem
- Surfaces treated guiding faces on each moving part
- Optional
 - pressure balanced plug
 - hardfaced sealing faces
 - pre-warming and drain studs"
- Easy storage of spare parts by modular design
- Universal connections by various design of welding ends as standard
- Deviating designs of welding ends in regard of dimension and material as well as designs with accessories according customers request
- Pickling resistant of trim
- All usual actuator types can be used



Technical Data

Size	: 3" – 16" further design on request
Pressure class	: Class 2500
Body material	: 11 CrMo 9-10 (1.7383 / A182F22) other design on request
Materials trims	: Stem 1.4922 Cages 1.7380 / A335P22 Seat ring 1.7380 - hardfaced Stellite 6
Stem sealing	: Pure graphite
Trim design	: Perforated disc, 1. stage Cages, 2 - 5. stage"
Guide	: Stem guide, guidance at seat ring
Turn-down ratio	: Standard 1:25
Sealing seat/plug	: Metallic, class IV
Shutoff leakage class	: (DIN EN1349), other design on request

HP Steam bypass valves

The steam bypass valves of series 115 are used to transform steam, i.e. to reduce pressure and temperature of steam. The processes of pressure reduction and desuperheating are separated in the valve and take place one after the other. The desuperheating takes place at the outlet of the valve by means of atomizing steam spray through special nozzles.

An optimum-staged CV-value-series and a large turn-down ratio allow an exact adjustment to the pertaining task. The trim can be easily changed. An adjustment to subsequently changed operational conditions is thus possible.

A combination of material choice and multi-stage pressure reduction in radial cage system make the valve highly resistant to wear in spite of extreme working conditions.

Type 115 with integral steam desuperheating orifice

Balanced trim

Prepared for mounting a pneumatic actuator

Flow tends to close

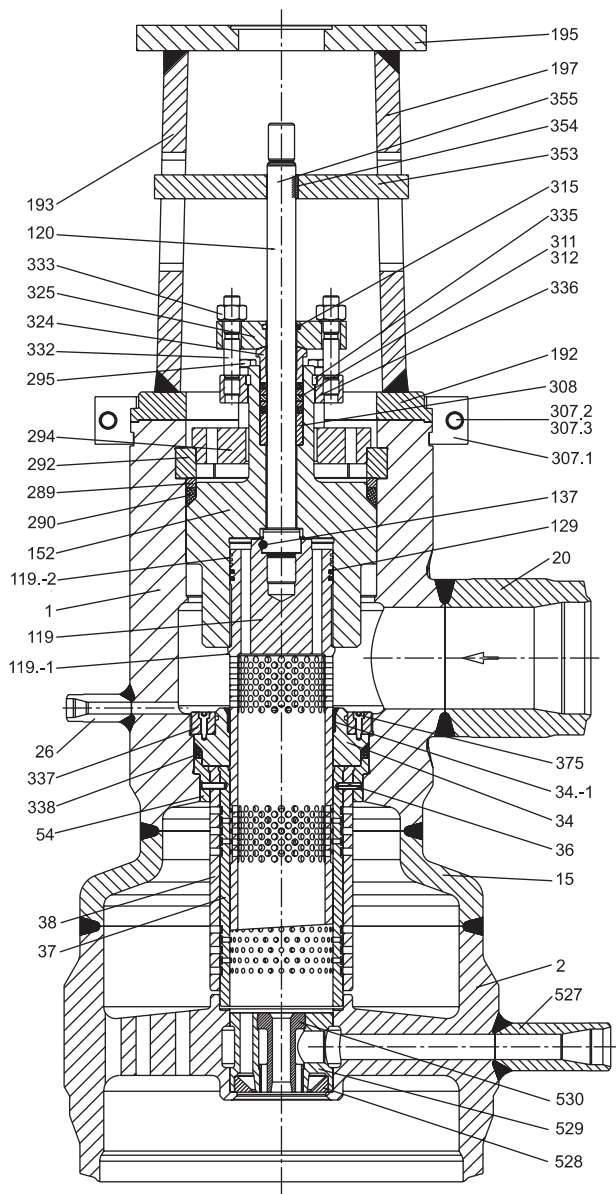


Figure 1

Type 115 with nozzle complete

Non-balanced trim

Prepared for mounting a pneumatic actuator

Flow tends to close

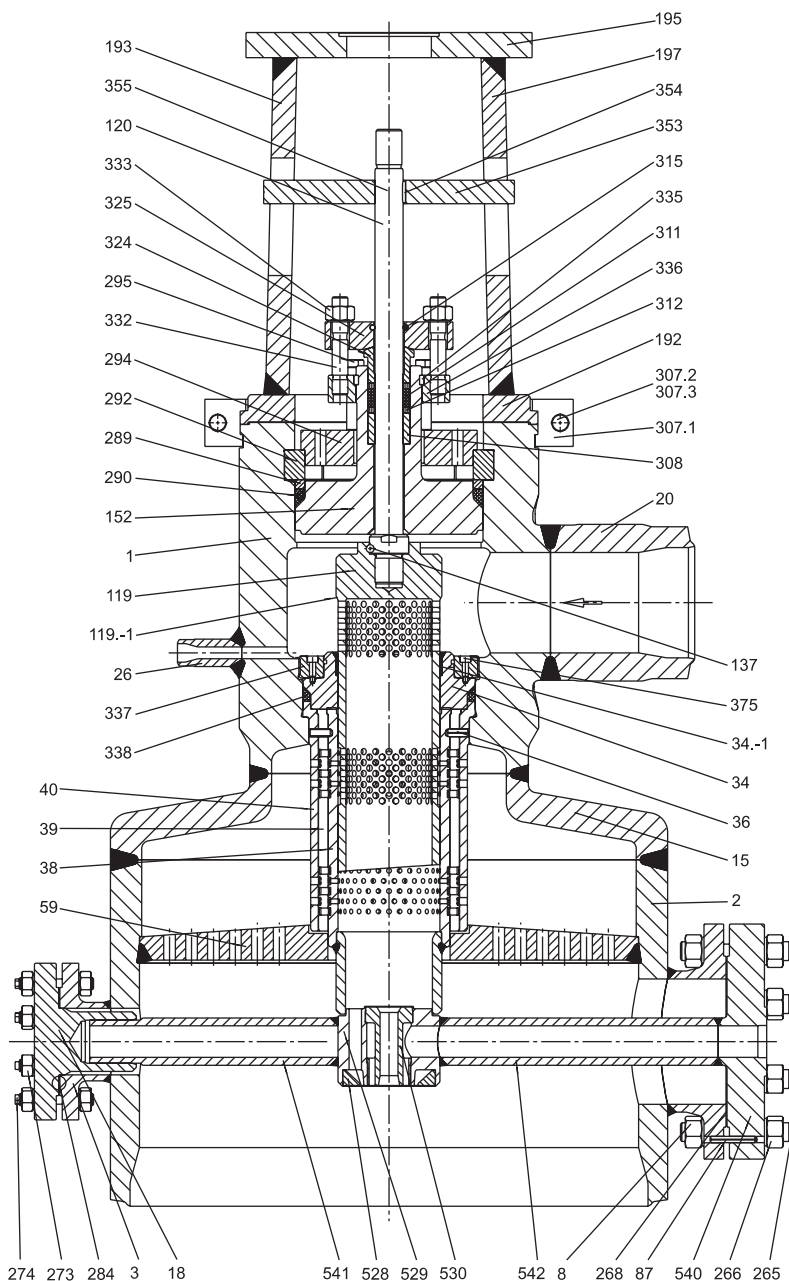


Figure 2

Pressure balancing systems

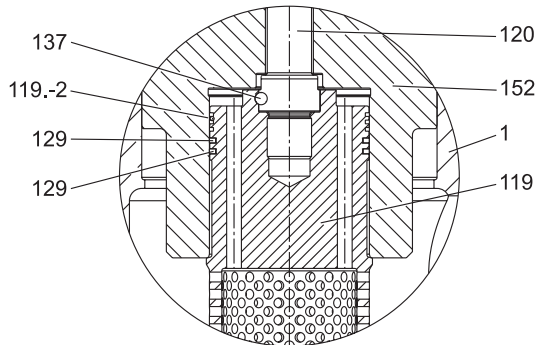


Figure 3
Detail pressure balance without pilot disc

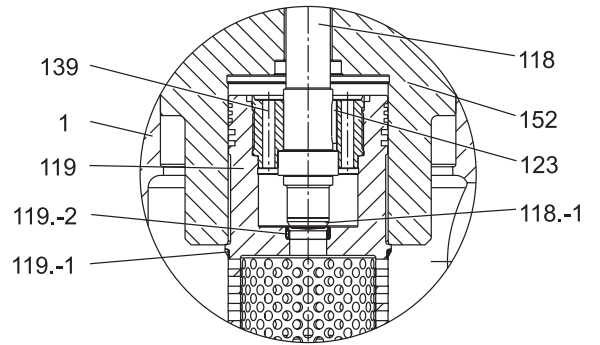


Figure 4
Detail pressure balance with pilot disc

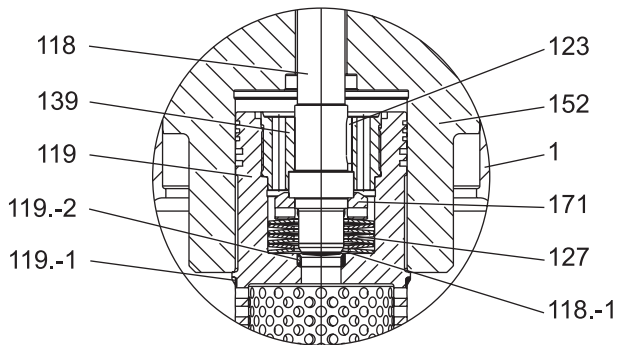


Figure 5
Detail pressure balance with pilot disc and cup spring set

Trims

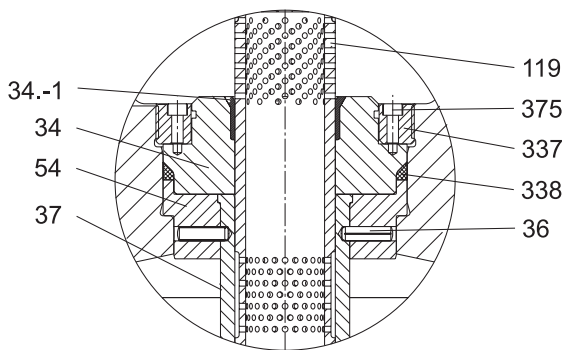


Figure 6
Two-stage controlled perforated disc trim

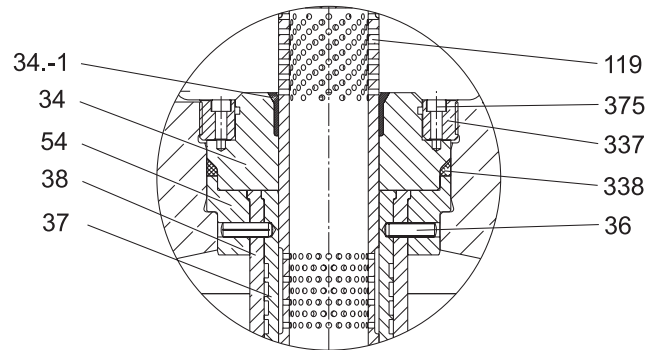


Figure 7
Three-stage controlled perforated disc trim

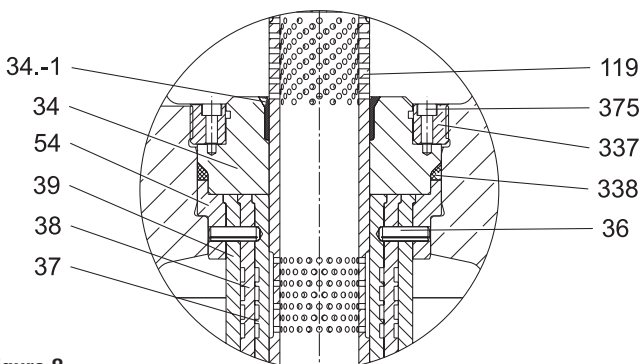


Figure 8
Four-stage controlled perforated disc trim

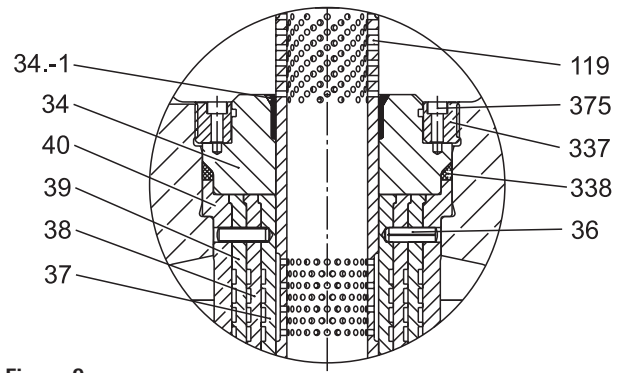


Figure 9
Five-stage controlled perforated disc trim

High Pressure Steam Bypass Valves - Type 115 ASME

Table 1 - Materials, material specification

Pos.	Name	DIN-Material			
		51	60	63	80
1	body	A 105	A182 F12	A182 F22	A182 F91
2	pipe connection	A 105	A182 F12	A182 F22	A182 F91
15	distance piece	A 105	A182 F12	A182 F22	A182 F91
20	pipe connection	A 105	A182 F12	A182 F22	A182 F91
26	nozzle	A 105	A182 F12	A182 F22	A182 F91
Design L-type (without pressure balance)					
* 34	seat ring	1.7380	1.7380	1.7380	1.4903
34.-1	seat hard faced	Stellit 6	Stellit 6	Stellit 6	Stellit 6
36	grooved pin	Austenit	Austenit	Austenit	Austenit
* 37	cage	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22
* 38	cage	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22
* 39	cage	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22
* 40	cage	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22	1.7380 / SA335P22
54	change holder	1.7380	1.7380	1.7380	1.4903
* 119	plug	1.7380 nitr.	1.7380 nitr.	1.7380 nitr.	1.4903
119.-1	plug hard faced	Stellit 6	Stellit 6	Stellit 6	Stellit 6
* 120	stem	1.4922	1.4922	1.4922	1.4922
152	closure	A182 F22	A182 F22	A182 F22	A182 F91
192	yoke flange	1.5415	1.5415	1.7335	1.7380
193	yoke arm	1.5415	1.5415	1.7335	1.7380
195	yoke head	1.5415	1.5415	1.7335	1.7380
197	yoke arm	1.5415	1.5415	1.7335	1.7380
289	distance piece	A182 F22	A182 F22	A182 F22	A182 F91
* 290	gasket	Grafit / Austenit	Grafit / Austenit	Grafit / Austenit	Grafit / Austenit
292	segmented ring	A182 F22	A182 F22	A182 F22	A182 F91
294	cover	1.7380	1.7380	1.7380	1.7380
295	hexagon screw	1.7709	1.7709	1.7709	1.7709
307.1	locking ring	1.7335 (1.7380)	1.7335 (1.7380)	1.7335 (1.7380)	1.7335 (1.7380)
307.2	stud	1.7709	1.7709	1.7709	1.7709
307.3	hexagon nut	1.7258	1.7258	1.7258	1.7258
* 308	guide bush	1.8550 nitr.	1.8550 nitr.	1.8550 nitr.	1.4903/Stel.
* 311	packing ring	Grafit	Grafit	Grafit	Grafit
* 312	packing ring	Grafit / Austenit	Grafit / Austenit	Grafit / Austenit	Grafit / Austenit
* 315	packing cord	Grafit	Grafit	Grafit	Grafit
324	gland	1.8550 nitr.	1.8550 nitr.	1.8550 nitr.	1.8550 nitr.
325	gland flange	1.7335	1.7335	1.7335	1.7335
332	stud	1.7709	1.7709	1.7709	1.7709
333	hexagonal nut	1.7258	1.7258	1.7258	1.7258
335	divided ring	1.7335	1.7335	1.7335	1.7335 / 1.7380
336	fixing ring	1.7335	1.7335	1.7335	1.7335
337	locking screw	1.7380 nitr.	1.7380 nitr.	1.7380 nitr.	1.4903 nitr.
* 338	gasket	Grafit	Grafit	Grafit	Grafit
353	clamp	1.1191	1.1191	1.1191	1.1191
354	parallel key	1.0503	1.0503	1.0503	1.0503
355	hexagon screw	8.8	8.8	8.8	8.8
375	socket head screw	Austenit	Austenit	Austenit	1.4986
Design M-type (with pressure relief)					
118	stem plug	1.4922	1.4922	1.4922	1.4903
118.-1	plug hard faced	Stellit 6	Stellit 6	Stellit 6	Stellit 6
119.-2	plug hard faced	Stellit 6	Stellit 6	Stellit 6	Stellit 6
123	parallel key	1.7380 nitr.	1.7380 nitr.	1.7380 nitr.	1.4922
127	cup spring	1.4922	1.4922	1.4922	2.4668
* 129	rectangular ring	1.4922 nitr.	1.4922 nitr.	1.4922 nitr.	Stellite
137	cylindrical pin	Austenit	Austenit	Austenit	1.4922
139	retaining nut	1.7380	1.7380	1.7380	1.4903
171	stop plate	1.7380	1.7380	1.7380	1.4903
Cooling water injection					
Integral steam desuperheating orifice					
527	pipe	A 105	A182 F12	A182 F22	A182 F22
528	spout piece	1.4922	1.4922	1.4922	1.4922
529	nozzle body	1.4922	1.4922	1.4922	1.4922
530	nozzle	1.4922	1.4922	1.4922	1.4922
Nozzle complete					
3	flange	A 105	A182 F12	A182 F22	A182 F22
8	flange	A 105	A182 F12	A182 F22	A182 F22
18	load carrying tube	A182 F12	A182 F12	A182 F12 / A182 F22	A182 F12 / A182 F22
59	perforated disc	1.7335	1.7335	1.7335/1.7380	1.7335 / 1.7380
87	pin / bolt	Austenit	Austenit	Austenit	Austenit
265	stud	1.7709	1.7709	1.7709	1.7709
266	hexagon nut	1.7258	1.7258	1.7258	1.7258
* 268	gasket	Austenit - Grafit	Austenit - Grafit	Austenit - Grafit	Austenit - Grafit
273	stud	1.7709	1.7709	1.7709	1.7709
274	hexagon nut	1.7258	1.7258	1.7258	1.7258
* 284	gasket	Austenit - Grafit	Austenit - Grafit	Austenit - Grafit	Austenit - Grafit
528	spout piece	1.4922	1.4922	1.4922	1.4922
529	nozzle body	1.4922	1.4922	1.4922	1.4922
530	nozzle	1.4922	1.4922	1.4922	1.4922
540	out-of-flange	A182 F12	A182 F12	A182 F12 / A182 F22	A182 F12 / A182 F22
541	pipe	A182 F22	A182 F22	A182 F22	A182 F22
542	connection pipe	A182 F22	A182 F22	A182 F22	A182 F22

* Recommended spare parts

Main dimensions and characteristic data of HP Steam Bypass Valve

Dimensions valve bodies Pipe connections and weights

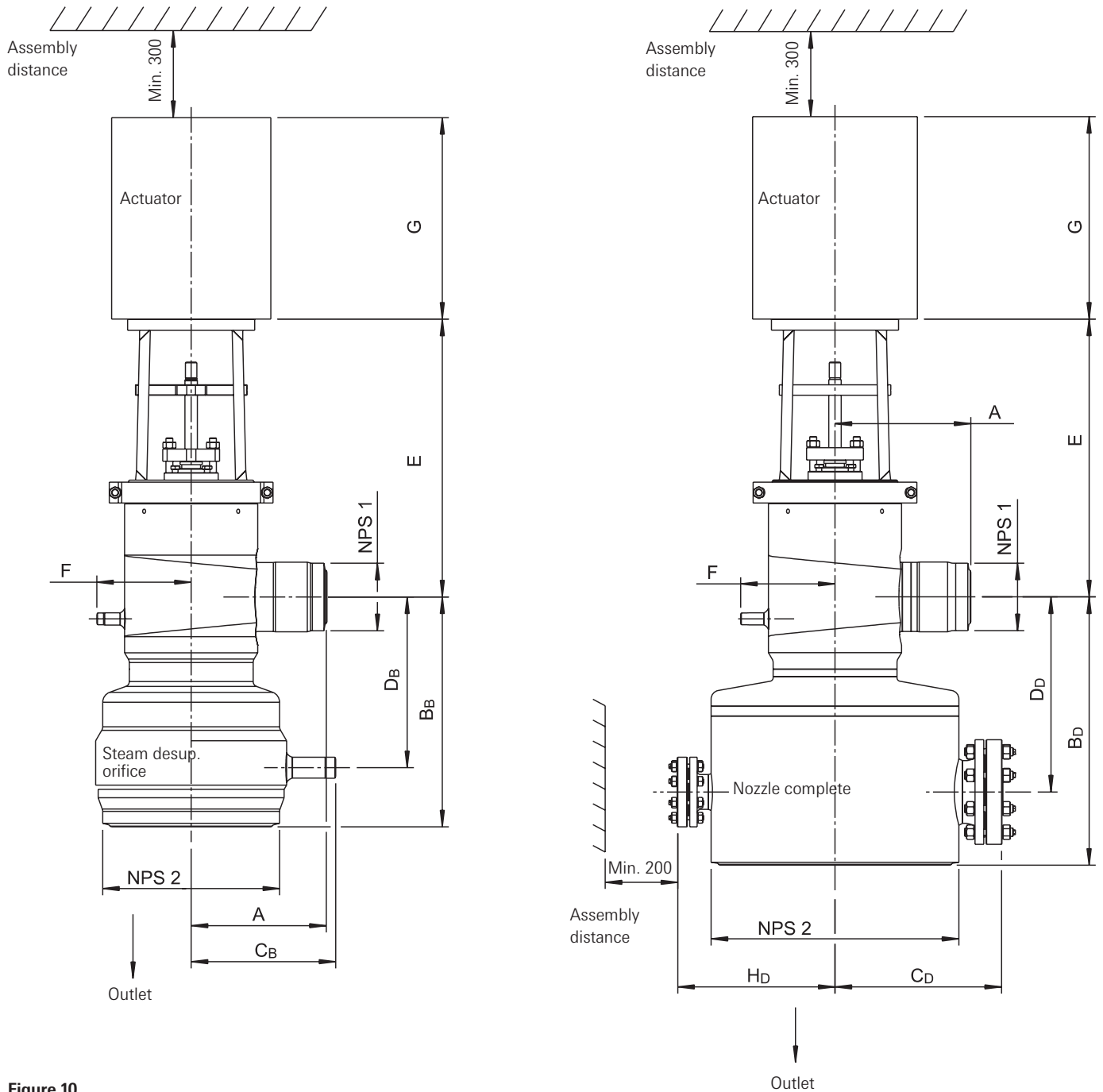


Figure 10

Actuators

Valves of type 115 can be equipped with all commercial electric, pneumatic and hydraulic actuators.

Table 2 - Dimensions & weights

BG	seat	lift	NPS1 inlet	NPS2 outlet	A	E	E1	F	Steam								Weight (kg)
									desuperh. orifice			Nozzle complete					
									BB	CB	DB	BD	BD1	CD	DD	DD1	
3"			2 1/2"	8"					460	265	340	--	--	--	--	--	230
	55	45	3"	10"	250	630	680	205	490	290		--	--	--	--	--	250
	70		5"	12"					500	315		--	--	--	--	--	270
4"			3"	10"					560	290	420	--	--	--	--	--	350
	70	60	4"	12"	290	650	710	225		315		--	--	--	--	--	400
	90		6"	16"					575	365		--	--	--	--	--	460
5"			4"	12"	330				600	315	440	--	--	--	--	--	520
	90	60	5"	16"		670	740	253		365		--	--	--	--	--	590
	110		8"	20"	360					415		--	--	--	--	--	650
6"			5"	14"	390	710	780	271	660	335	490	--	--	--	--	--	650
			6"	16"						365		--	--	--	--	--	690
	110	70	8"	20"						415		--	--	--	--	--	780
	130		10"	24"	430				675	465		780	840	450	500	560	445
8"			6"	16"		800	870	292	745	365	575	--	--	--	--	--	970
			8"	20"	420					415		--	--	--	--	--	1040
	130	80	10"	24"					760	465		865	925	450	585	645	445
	155		12"	28"	470				--	--	--	795	925	485	585	645	480
10"			8"	20"		860	940	326	800	415	640	--	--	--	--	--	1330
			10"	24"	470				850	465		915	975	450	635	695	445
	155	90	12"	28"					--	--	--	845	905	485			480
	180		14"	32"	520				--	--	--	--	925	535		715	530
12"			10"	24"		910	990	352	880	465	690	980	1040	450	700	760	445
			12"	28"	520				--	--	--	910	970	485			480
	180	105	14"	32"					--	--	--			535	780		530
	205		16"	36"	550				--	--	--			585			580
14"			12"	28"		1010	1080	378	--	--	--	980	1040	485	770	830	480
			14"	32"	560				--	--	--		1060	535		850	530
	205	120	16"	36"					--	--	--		585				580
	235		18"	40"	610				--	--	--		1080	635		870	630
16"			14"	32"		1030	1120	401	--	--	--	1010	1090	535	800	880	530
			16"	36"	630				--	--	--			585			580
	235	125	18"	40"					--	--	--		1110	635		900	630
	260		20"	48"	670				--	--	--			735			730

Notes

Other combinations and dimensions on request

- G = Acc. to actuator specification
- BG = Size
- E1 = Definition as "E", but control valve with balanced trim
- BD1 + DD1 = Definition as "BD" and "DD", but nozzle with additional perforated disc

Weights including pressure balance trim and bonnet

Table 3 - Cvs-Values of the HP steam bypass valves, seat diameters, valve strokes and the pertaining max. Cvs-values

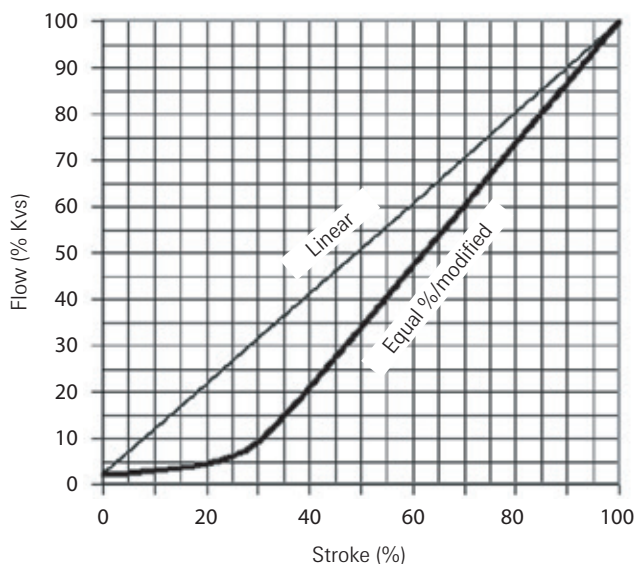
BG	3"	4"	5"	6"	8"	10"	12"	14"	16"									
lift	45	60	60	70	80	90	105	120	125									
seat	55	70	70	90	90	110	110	130	130	155	155	180	180	205	205	235	235	260
stage	Complete - Cvs max (gal./min) [linear]																	
1	70	105	105	193	193	281	281	421	421	632	632	837	837	1065	1065	1463	1463	1843
2	68	101	103	187	176	257	269	392	404	591	591	772	790	989	1006	1340	1340	1656
3	66	95	100	176	176	246	257	363	380	556	556	714	737	919	948	1234	1234	1492
4	60	89	94	164	158	217	234	334	363	515	515	655	690	831	866	1129	1123	1363
5	53	--	82	--	140	--	217	--	328	--	468	--	608	--	802	--	1036	--
6	Orifice/disc in outlet extension																	

Notes

- BG = size
- Equal percent start and special characteristics on request
- Conversion factor into Kvs values:
Kvs [m³/h] = 0,855 Cvs [gal./min]
- Feasibility depending on use conditions

Figure 11

Flow characteristic



Characteristic Curves

The HP steam bypass valves can be delivered with different flow characteristics. As basic characteristic curve the linear characteristic is provided.

Table 4 - Application Limits Subject to Pressure and Temperature

Body material	Application range																													
A182 F91	Design temperature [°F]																													
p max [psig]	932	968	986	1004	1022	1040	1058	1076	1085	1094	1103	1112	1121	1130	1139	6888	5858	5365	4872	4408	3944	3538	3132	2944	2770	2610	2451	2277	2117	1987
Body material	Application range																													
A182 F22	Design temperature [°F]																													
p max [psig]	716	752	788	824	860	896	932	950	968	986	1004	1013	1022	1031	1040	4597	4495	4379	4278	4162	4060	3901	3422	2958	2567	2204	2059	1871	1740	1610
Body material	Application range																													
A182 F12	Design temperature [°F]																													
p max [psig]	680	716	752	788	824	860	896	914	932	950	968	977	986	995	1004	4466	4408	4350	4234	4133	4060	4002	3973	3756	3132	2480	2248	2016	1827	1624
Body material	Application range																													
A 105	Design temperature [°F]																													
p max [psig]	284	392	500	572	608	644	680	698	716	734	752	761	770	781	788	4742	4220	3567	3132	2958	2799	2610	2494	2393	2277	2175	2117	2059	2016	1958

Example Coding System

115L 4 6 16 130 5 B S 63 28 XXX

Valve type

115L	Without pressure balance
115H	Pressure balance without pilot disc
115N	Press. balance + pilot disc without springs
115M	Press.balance + pilot disc with springs

Inlet nominal size

3	=	NPS 3"
4	=	NPS 4"
5	=	NPS 5"
6	=	NPS 6"
8	=	NPS 8"
10	=	NPS 10"
12	=	NPS 12"
14	=	NPS 14"
16	=	NPS 16"
18	=	NPS 18"

Size

3	=	NPS 3"
4	=	NPS 4"
5	=	NPS 5"
6	=	NPS 6"
8	=	NPS 8"
10	=	NPS 10"
12	=	NPS 12"
14	=	NPS 14"
16	=	NPS 16"

Outlet nominal size

6	=	NPS 6"
8	=	NPS 8"
10	=	NPS 10"
12	=	NPS 12"
14	=	NPS 14"
16	=	NPS 16"
18	=	NPS 18"
20	=	NPS 20"
24	=	NPS 24"
28	=	NPS 28"
32	=	NPS 32"
36	=	NPS 36"

Accessories

See TO.108.00.xxxx ED

Max. design (pressure rate)

28 = class 2500

Material Specification

51	body	A105
60	body	A182F12
63	body	A182F22
80	body	A182F91

Pipe Connection

S	Welding end
F	Flange

Steam Bypass

B	Steam desup. orifice
D	Nozzle complete

Stages

2	=	2 Stages
3	=	3 Stages
4	=	4 Stages
5	=	5 Stages
6	=	6 Stages

Seat diameter

055	=	ø 55
070	=	ø 70
090	=	ø 90
110	=	ø 110
130	=	ø 130
155	=	ø 155
180	=	ø 180
205	=	ø 205
235	=	ø 235
260	=	ø 260