

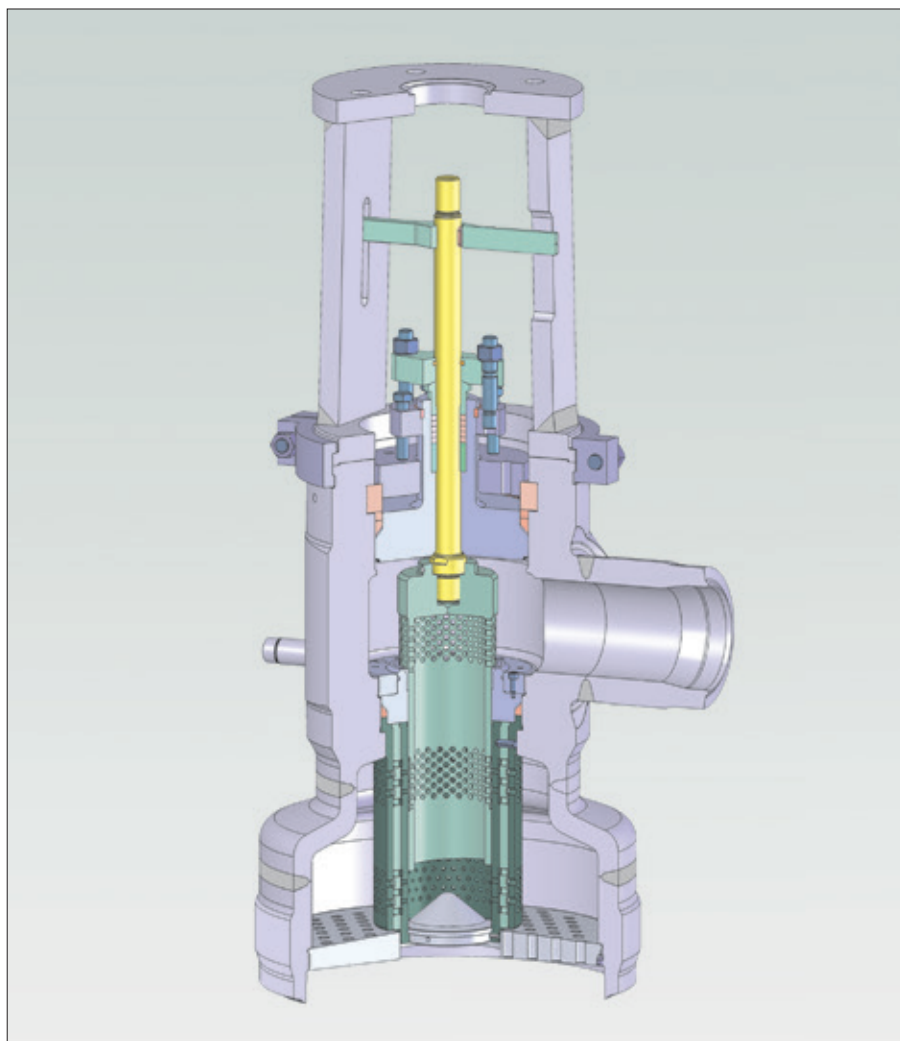


SEMPELL

Low noise steam reducing valves controlled by multi-stage trims are used for both boiler start-up and process steam generation.

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
- pressure seal bonnet
- low maintenance gland (packing pure graphite) can be retightened
- burnished valve stem
- surfaces treaded guiding faces on each moving part
- optional :
 - pressure balanced plug
 - hardfaces 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
Max.design body (inlet side)	: Class 2500
Body material	: 11 CrMo 9-10 (1.7383 / A182F22) other design on request
Materials trims	: Stem 1.4922 Cages 1.7380 / A335 P22 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 - leakage class	: Metallic, class IV (DIN EN 1349) other design on request

HP Steam reducing valves

The series 155 as angular steam reducing valve is designed for the following applications:

- steam start-up valve
- process steam control

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.

Basic design Type 155

Prepared for mounting a pneumatic actuator
Flow tends to close

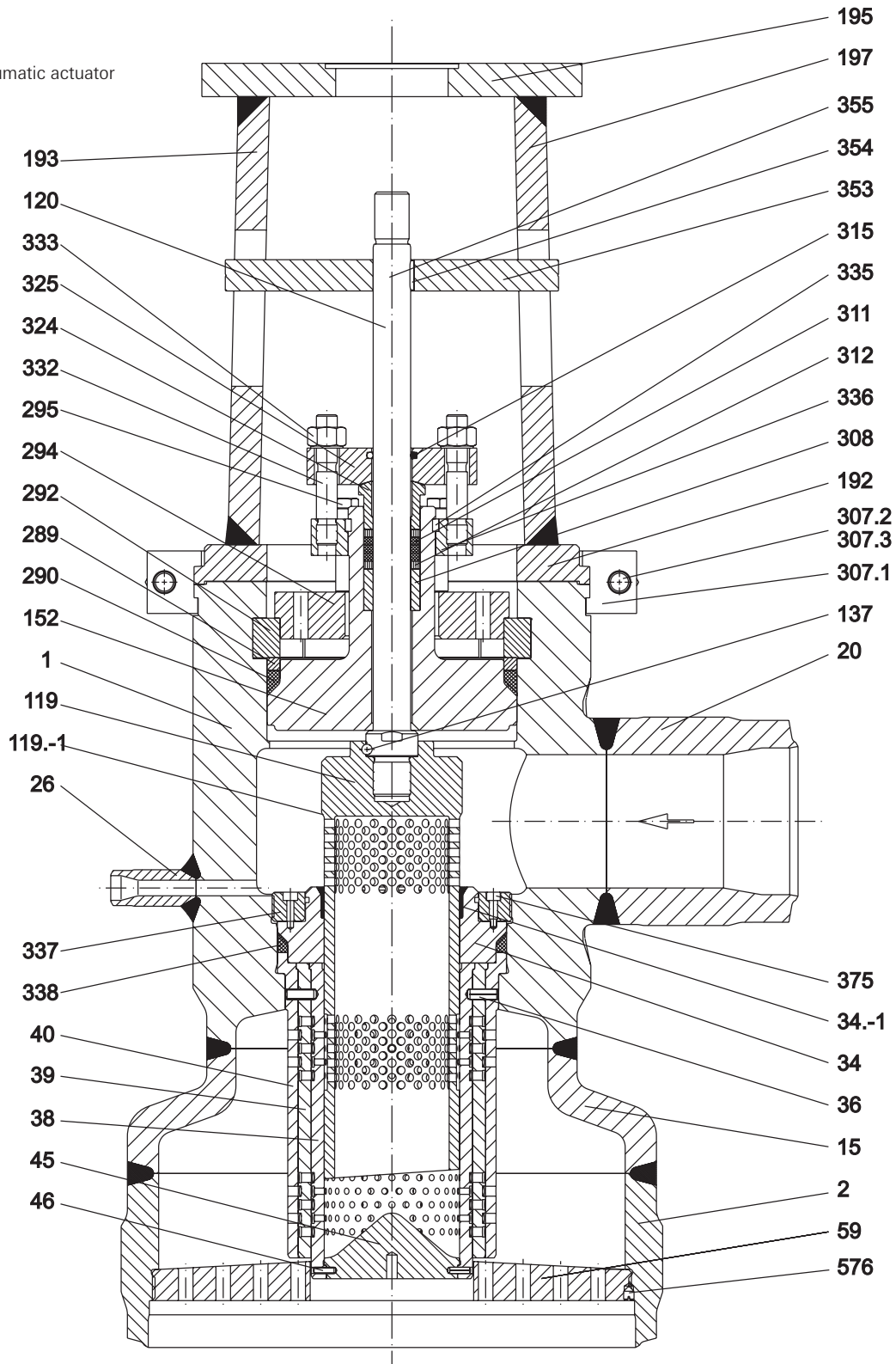


Figure 1

Pressure balancing systems

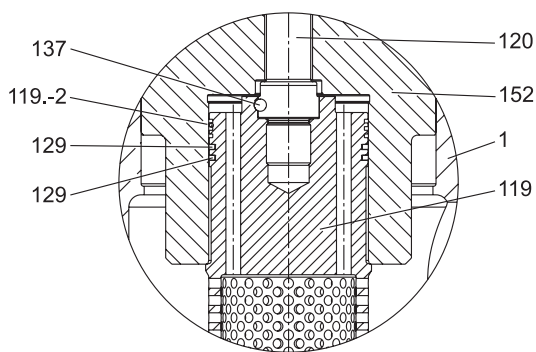


Figure 2
Detail pressure balance without pilot disc

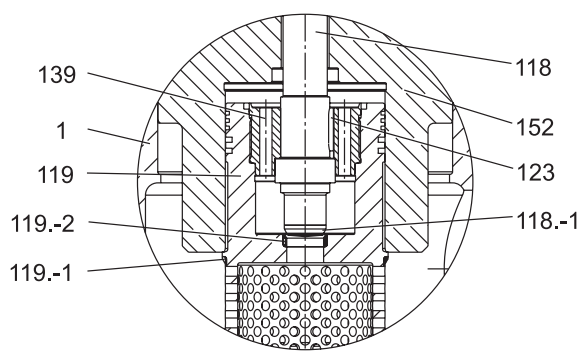


Figure 3
Detail pressure balance with pilot disc

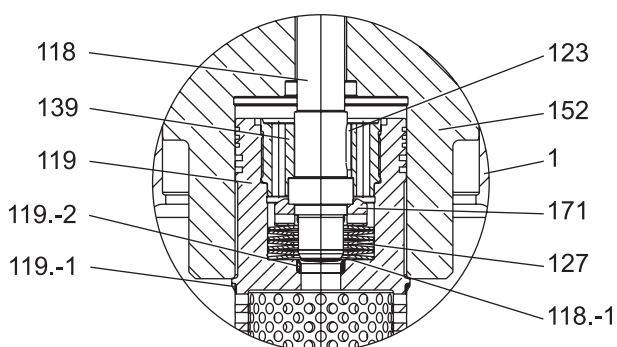


Figure 4
Detail pressure balance with pilot disc and cup spring set

Trims

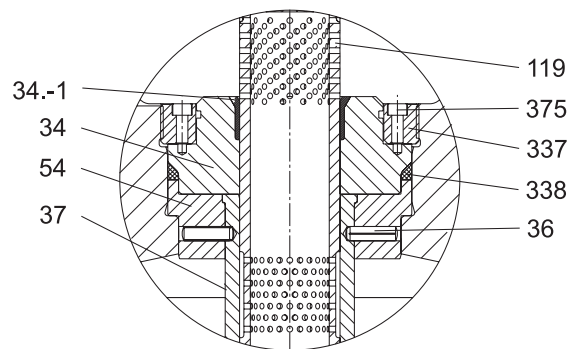


Figure 5
Two-stage controlled perforated disc trim

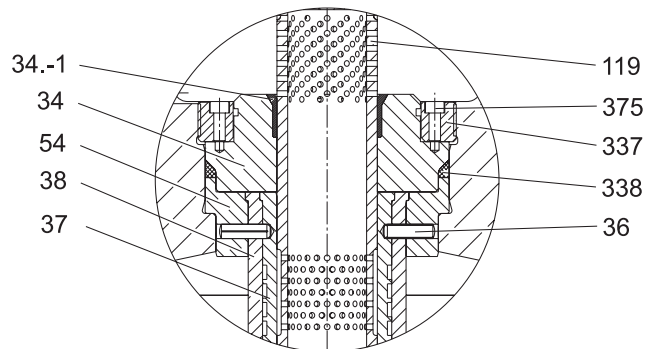


Figure 6
Three-stage controlled perforated disc trim

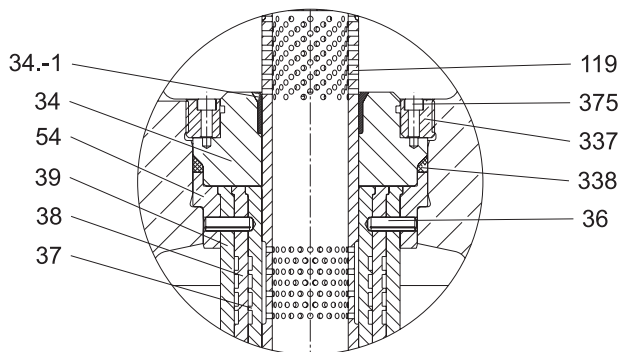


Figure 7
Four-stage controlled perforated disc trim

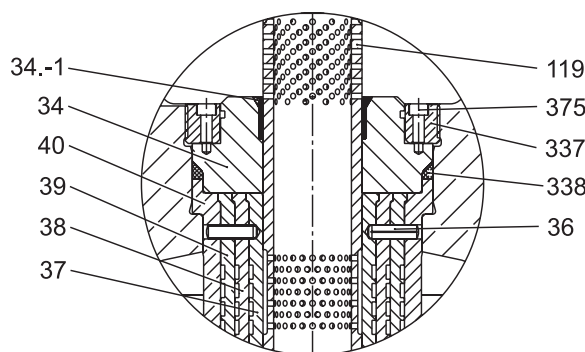


Figure 8
Five-stage controlled perforated disc trim

Table 1 - Materials, material specification

Pos.	Name	ASTM-Material			
		51	60	63	80
1	body	A105	A182F12	A182F22	A182F91
2	pipe connection	A105	A182F12	A182F12	A182F22
15	distance piece	A105	A182F12	A182F12	A182F22
20	pipe connection	A105	A182F12	A182F22	A182F91
26	nozzle	A105	A182F12	A182F22	A182F91
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
45	cage bottom	1.7380	1.7380	1.7380	1.7380
46	cylindrical pin	Austenit	Austenit	Austenit	1.4922
54	change holder	1.7380	1.7380	1.7380	1.4903
59	perforated disc	1.7335	1.7335	1.7335/1.7380	1.7335/1.7380
* 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
137	cylindrical pin	Austenit	Austenit	Austenit	1.4922
152	closure	A182F22	A182F22	A182F22	A182F91
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	A182F22	A182F22	A182F22	A182F91
* 290	gasket	Grafit / Austenit	Grafit / Austenit	Grafit / Austenit	Grafit / Austenit
292	segmented ring	A182F22	A182F22	A182F22	A182F91
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	head cap screw	Austenit	Austenit	Austenit	1.4986
576	threaded pin	5.8	5.8	5.8	5.8
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
139	retaining nut	1.7380	1.7380	1.7380	1.4903
171	stop plate	1.7380	1.7380	1.7380	1.4903

* Recommended spare parts

Main Dimensions and Characteristic Data of HP Steam Reducing Valve

Dimensions valve bodies
Pipe connections and weights

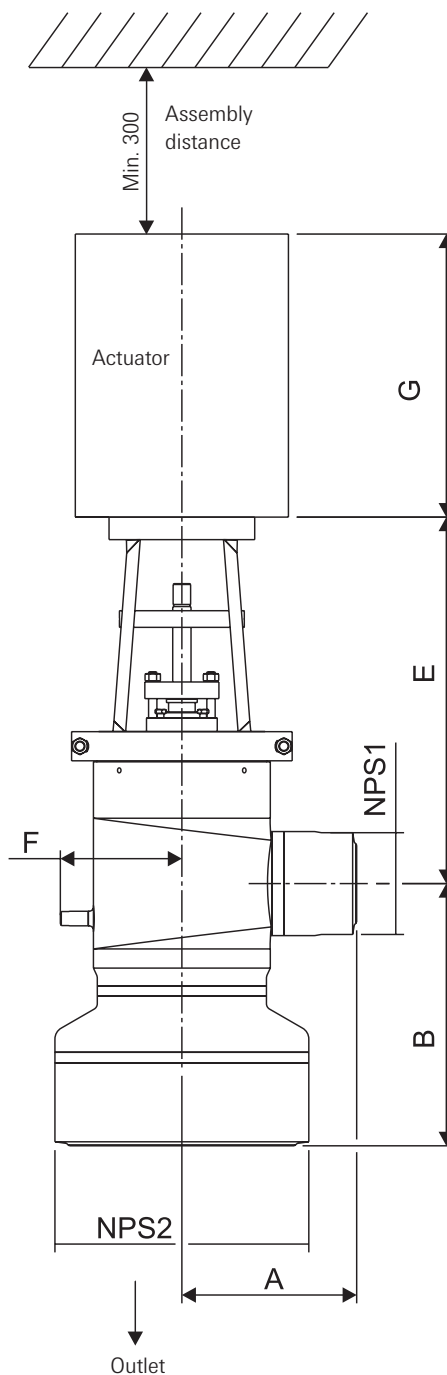


Figure 9

Actuators

Valves of type 155 can be equipped with all commercial electric, pneumatic and hydraulic actuators.

Table 2 - Dimensions & weights

BG	seat	lift	NPS1 inlet	NPS2 outlet	A	B	B1 (LS1)	E	E1	F	Weight (kg)
3"		2 1/2"	65	200	8"						200
	55	3"	80	250	10"	340	380	630	680	205	215
	70	5"	125	300	12"						230
4"		3"	80	250	10"						310
	70	4"	100	300	12"	420	460	650	710	225	350
	90	6"	150	400	16"						400
5"		4"	100	300	12"						450
	90	5"	125	400	16"	440	490	670	740	253	470
	110	8"	200	500	20"						490
6"		5"	125	350	14"						570
	110	6"	150	400	16"	490	540	710	780	271	590
	130	8"	200	500	20"						620
		10"	250	600	24"						660
8"		6"	150	400	16"						890
	130	8"	200	500	20"	575	635	800	870	292	920
	155	10"	250	600	24"						960
		12"	300	700	28"						1000
10"		8"	200	500	20"						1180
	155	10"	250	600	24"	640	700	860	940	326	1240
	180	12"	300	700	28"						1280
		14"	350	800	32"						1330
12"		10"	250	600	24"						1550
	180	12"	300	700	28"	690	750	910	990	352	1650
	205	14"	350	800	32"						1710
		16"	400	900	36"						1790
14"		12"	300	700	28"						1980
	205	14"	350	800	32"	760	820	1010	1080	378	2120
	235	16"	400	900	36"						2250
		18"	450	1000	40"						2380
16"		14"	350	800	32"						2630
	235	16"	400	900	36"	800	860	1030	1120	401	2960
	260	18"	450	1000	40"						3210
		20"	500	1200	48"						3500

Notes

Other combinations and dimensions on request

- G = Acc. to actuator specification
- BG = Size
- E1 = Definition as "E", but control valve with balanced trim
- B1 = Definition as "B" but control valve with additional perforated disc

Weights including pressure balance trim and bonnet

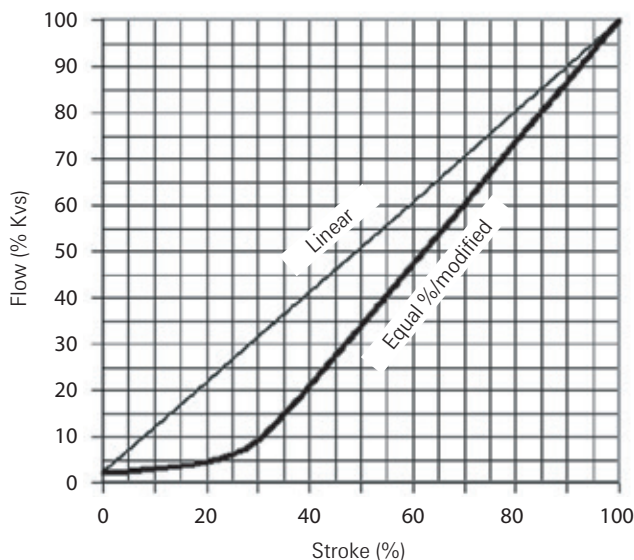
Table 3 - Cvs-Values of the HP steam reducing valves, seat diameters, valve strokes and the pertaining max. Cvs-values

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	680	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 10
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

155L 4 6 16 130 5 S 63 28 XXX

Valve type

Generally:

*Trim, perforated disc,
2-5 stages*

155L Without pressure balance

155H Pressure balance without pilot disc

155N Press. balance + pilot disc without springs

155M 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.101.00.xxxx ED

Max. design (pressure rate) body inlet side

28 = class 2500

Material Specification

51 body A105

60 body A82F12

63 body A82F22

80 body A182F91

Pipe Connection

S Welding end

F Flange

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