

**SEMPELL TURBINE BYPASS VALVES**

MODEL 115 ASME

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**

- Pressure reduction by multi-stage controlled, subcritical expansion resulting in 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 C<sub>v</sub>-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.

**GENERAL APPLICATION**

The high pressure steam bypass valves are used to transform steam, i.e. to reduce pressure and temperature of steam.

**TECHNICAL DATA**

Valve size:	NPS 3 - 16
Pressure class:	ASME Class 2500
Temperature:	up to 1140°F
Body material:	A182-F91, A182-F22, A182-F12, A105
Range of control:	Standard 1:25
Shut-off class:	ASME FCI 70.2 class IV, class V on request

# SEPELL TURBINE BYPASS VALVES

## MODEL 115 ASME

### HP STEAM BYPASS VALVES

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  $C_v$ -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

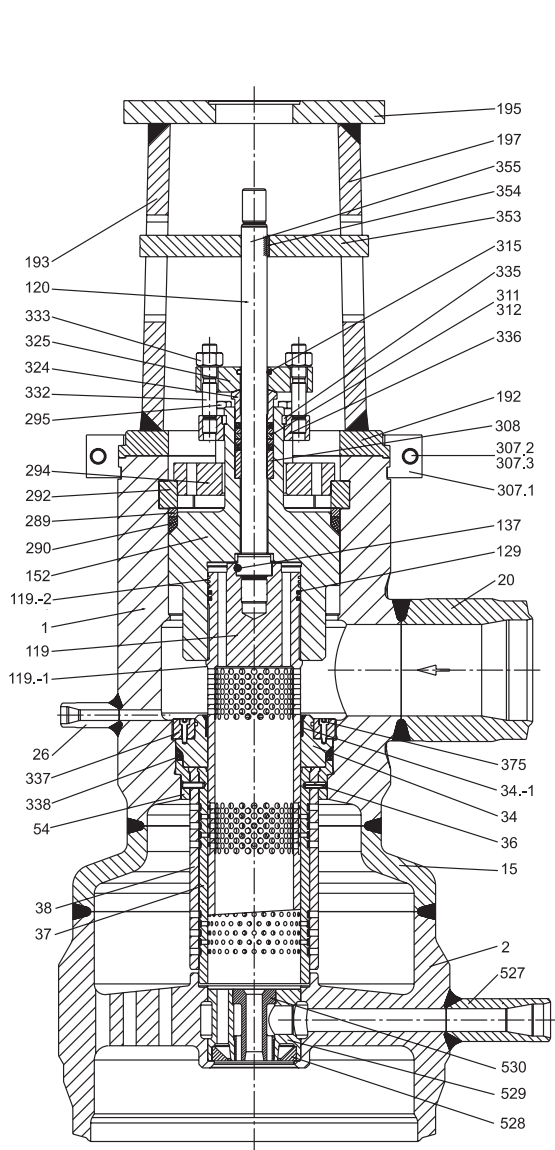


FIGURE 1

#### Type 115 with nozzle complete

Non-balanced trim

Prepared for mounting a pneumatic actuator

Flow tends to close

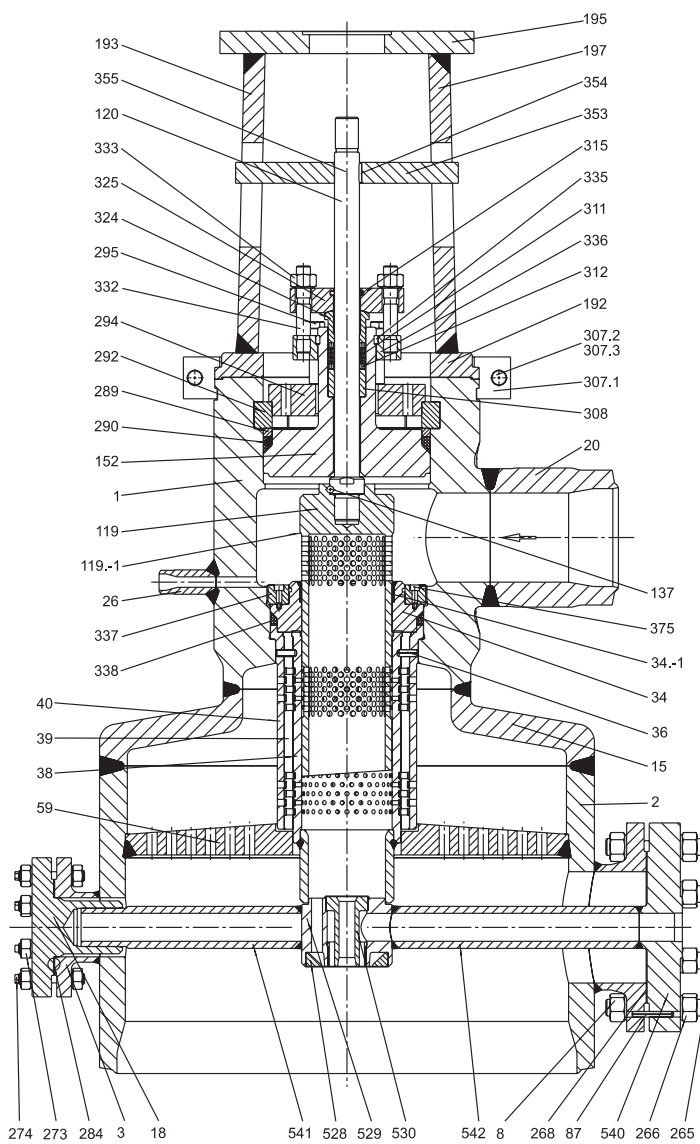


FIGURE 2

# SEPELL TURBINE BYPASS VALVES

MODEL 115 ASME

## PRESSURE BALANCING SYSTEMS

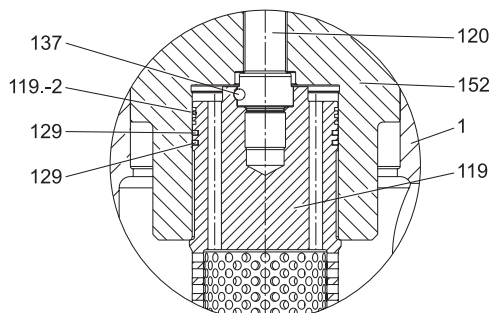


FIGURE 3  
Detail pressure balance without pilot disc

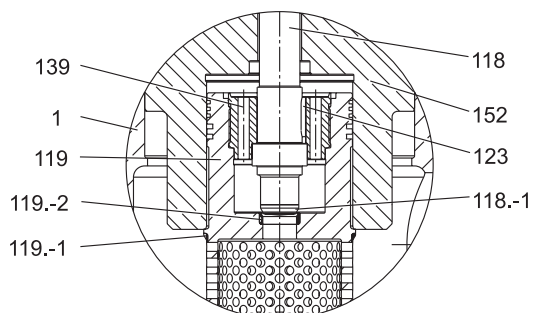


FIGURE 4  
Detail pressure balance with pilot disc

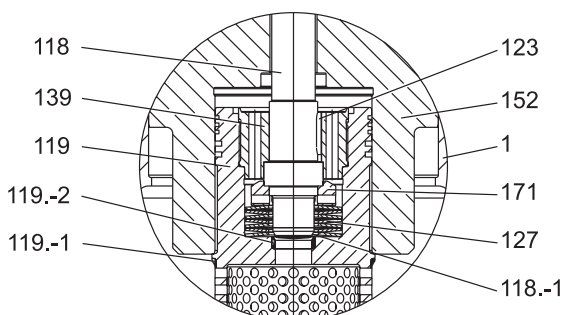


FIGURE 5  
Detail pressure balance with pilot disc and cup spring set

## TRIMS

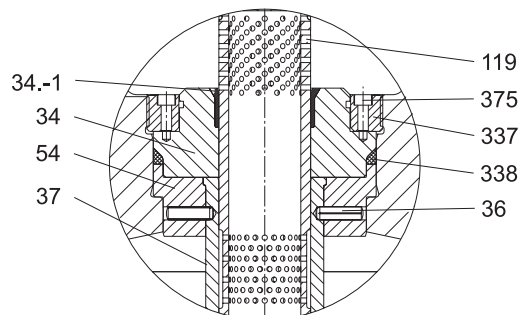


FIGURE 6  
Two-stage controlled perforated disc trim

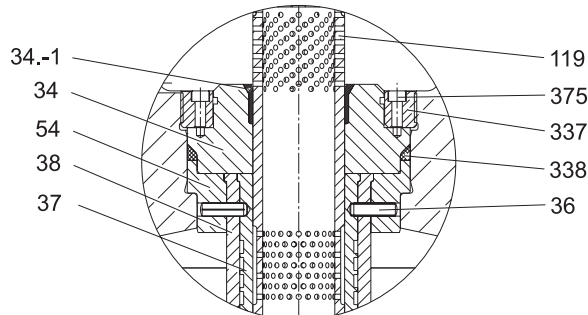


FIGURE 7  
Three-stage controlled perforated disc trim

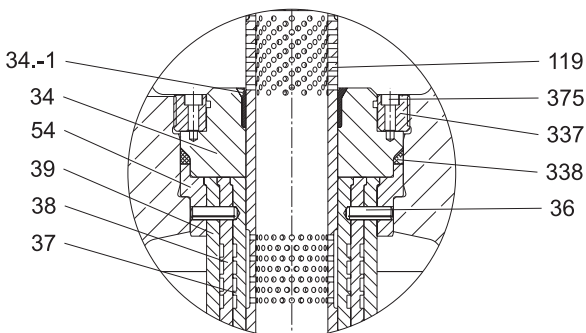


FIGURE 8  
Four-stage controlled perforated disc trim

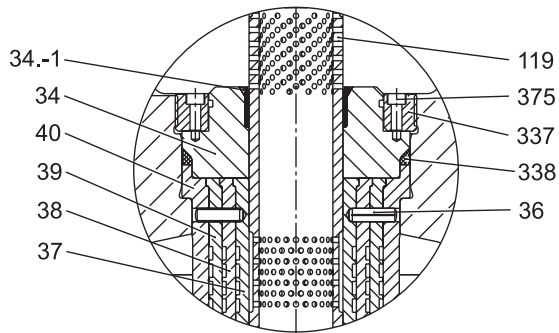


FIGURE 9  
Five-stage controlled perforated disc trim

# SEPELL TURBINE BYPASS VALVES

## MODEL 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
<b>Design L-type (without pressure balance)</b>					
* 34	Seat ring	1.7380	1.7380	1.7380	1.4903
34.-1	Seat hard faced	Stellite 6	Stellite 6	Stellite 6	Stellite 6
36	Grooved pin	Austenite	Austenite	Austenite	Austenite
* 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	Stellite 6	Stellite 6	Stellite 6	Stellite 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	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite
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	Graphite	Graphite	Graphite	Graphite
* 312	Packing ring	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite
* 315	Packing cord	Graphite	Graphite	Graphite	Graphite
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	Graphite	Graphite	Graphite	Graphite
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	Austenite	Austenite	Austenite	1.4986
<b>Design M-type (with pressure relief)</b>					
118	Stem plug	1.4922	1.4922	1.4922	1.4903
118.-1	Plug hard faced	Stellite 6	Stellite 6	Stellite 6	Stellite 6
119.-2	Plug hard faced	Stellite 6	Stellite 6	Stellite 6	Stellite 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	Austenite	Austenite	Austenite	1.4922
139	Retaining nut	1.7380	1.7380	1.7380	1.4903
171	Stop plate	1.7380	1.7380	1.7380	1.4903

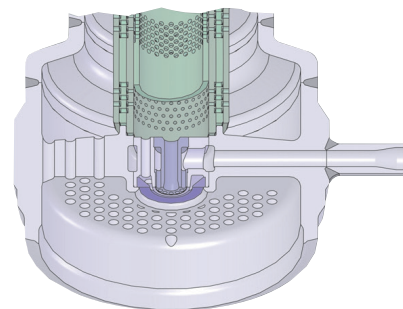
# SEMPELL TURBINE BYPASS VALVES

## MODEL 115 ASME

**TABLE 1 - MATERIALS, MATERIAL SPECIFICATION (Continued)**

Pos.	Name	DIN-Material			
		51	60	63	80
<b>Cooling water injection</b>					
<b>Integral steam desuperheating orifice</b>					
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
<b>Nozzle complete</b>					
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	Austenite	Austenite	Austenite	Austenite
265	Stud	1.7709	1.7709	1.7709	1.7709
266	Hexagon nut	1.7258	1.7258	1.7258	1.7258
* 268	Gasket	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite
273	Stud	1.7709	1.7709	1.7709	1.7709
274	Hexagon nut	1.7258	1.7258	1.7258	1.7258
* 284	Gasket	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite	Graphite / Austenite
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



# SEPELL TURBINE BYPASS VALVES

## MODEL 115 ASME

### MAIN DIMENSIONS AND CHARACTERISTIC DATA OF HP STEAM BYPASS VALVE

Dimensions valve bodies  
Pipe connections and weights

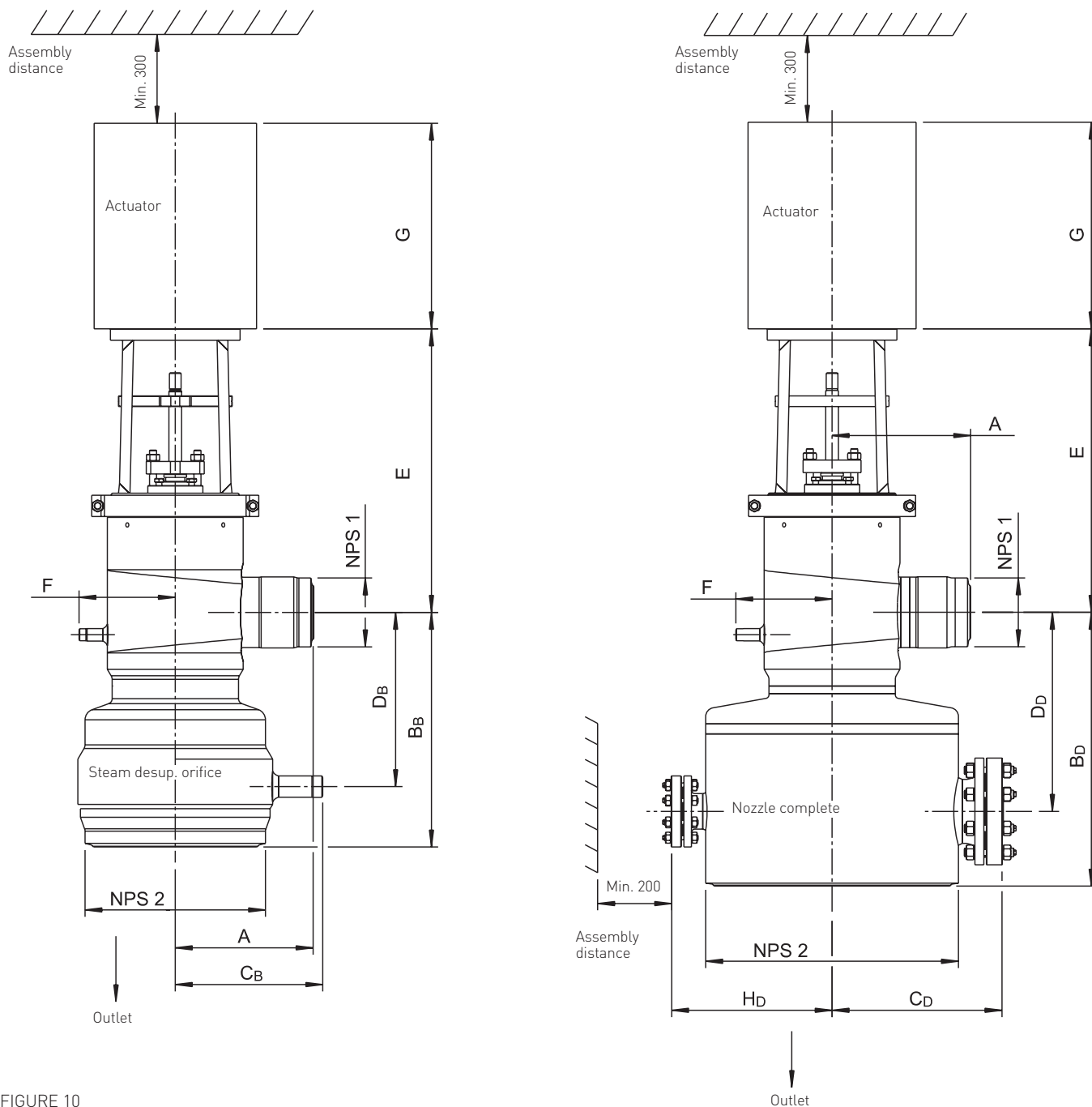


FIGURE 10

### ACTUATORS

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

# SEPELL TURBINE BYPASS VALVES

## MODEL 115 ASME

**TABLE 2 - DIMENSIONS AND WEIGHTS**

Valve size (NPS)	Seat	Lift	NPS1 inlet	NPS2 outlet	A	E	E1	F	Steam desuperh. orifice			Nozzle complete						Weight (kg)		
									BB	CB	DB	BD	BD1	CD	DD	DD1	HD			
3			2½"	8"	250	630	680	205	460	265	340	-	-	-	-	-	-	230		
	55	45	3"	10"					490	290	-	-	-	-	-	-	-	-	-	250
	70		5"	12"					500	315	-	-	-	-	-	-	-	-	-	270
4			3"	10"	290	650	710	225	560	290	420	-	-	-	-	-	-	350		
	70	60	4"	12"					315	315	-	-	-	-	-	-	-	-	400	
	90		6"	16"					575	365	-	-	-	-	-	-	-	-	460	
5			4"	12"	330	670	740	253	600	315	440	-	-	-	-	-	-	520		
	90	60	5"	16"					365	365	-	-	-	-	-	-	-	-	590	
	110		8"	20"					415	415	-	-	-	-	-	-	-	-	650	
6			5"	14"	390	710	780	271	660	335	490	-	-	-	-	-	-	650		
			6"	16"					365	365	-	-	-	-	-	-	-	-	690	
	110	70	8"	20"					415	415	-	-	-	-	-	-	-	-	780	
	130		10"	24"					430	675	465	780	840	450	500	560	445	-	-	
8			6"	16"	420	800	870	292	745	365	575	-	-	-	-	-	-	970		
			8"	20"					415	415	-	-	-	-	-	-	-	-	1040	
	130	80	10"	24"					760	465	865	925	450	585	645	445	-	-	1160	
	155		12"	28"					470	-	-	795	925	485	585	645	480	-	-	
10			8"	20"	470	860	940	326	800	415	640	-	-	-	-	-	-	1330		
			10"	24"					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"	520	910	990	352	880	465	690	980	1040	450	700	760	445	1680		
			12"	28"					-	-	910	970	485	-	-	480	-	-		
	180	105	14"	32"					-	-	-	-	535	-	-	780	530	-		
	205		16"	36"					550	-	-	-	585	-	-	-	580	-		
14			12"	28"	560	1010	1080	378	-	-	-	980	1040	485	770	830	480	2150		
			14"	32"					-	-	-	1060	535	-	-	850	530	-		
	205	120	16"	36"					-	-	-	-	585	-	-	-	580	-		
	235		18"	40"					610	-	-	-	1080	635	-	870	630	-		
16			14"	32"	630	1030	1120	401	-	-	-	1010	1090	535	800	880	530	2770		
			16"	36"					-	-	-	1110	585	-	-	900	580	-		
	235	125	18"	40"					-	-	-	-	635	-	-	900	630	-		
	260		20"	48"					670	-	-	-	735	-	-	-	730	-		

**NOTES**

Other combinations and dimensions on request

G = Acc. to actuator specification

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

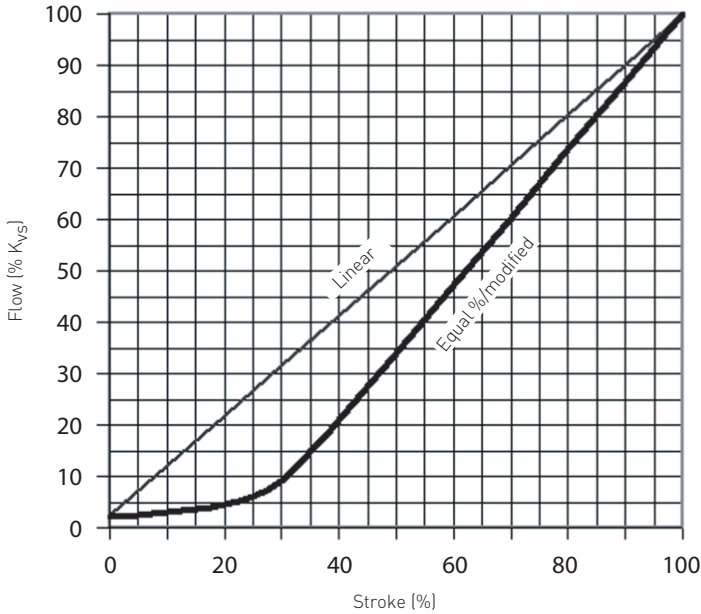
# SEPELL TURBINE BYPASS VALVES

## MODEL 115 ASME

**TABLE 3 - C<sub>V</sub>S-VALUES OF THE HP STEAM BYPASS VALVES, SEAT DIAMETERS, VALVE LIFT AND MAX. C<sub>V</sub>S-VALUES**

Valve size (NPS)	3		4		5		6		8		10		12		14		16	
Lift (mm)	45		60		60		70		80		90		105		120		125	
Seat (mm)	55	70	70	90	90	110	110	130	130	155	155	180	180	205	205	235	235	260
Stage	Complete - C <sub>V</sub> S max (gal./min) [linear]																	
1	70	105	105	193	193	281	281	421	421	632	632	837	837	1065	1065	1463	1463	1843

C<sub>v</sub> values are given only for the first stage, for design purposes detail calculation including all load cases is required.



**NOTES**

- Equal percent start and special characteristics on request
- Conversion factor into K<sub>V</sub>S values:  
K<sub>V</sub>S [m³/h] = 0.855 C<sub>V</sub>S [gal/min]
- Feasibility depending on use conditions

**CHARACTERISTIC CURVES**

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

FIGURE 11  
Flow characteristic

**TABLE 4 - APPLICATION LIMITS SUBJECT TO PRESSURE AND TEMPERATURE**

Body material A182 F91	Application range														
	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 A182 F22	Application range														
	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 A182 F12	Application range														
	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 A 105	Application range														
	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



# SEPELL TURBINE BYPASS VALVES

## MODEL 115 ASME

### SELECTION GUIDE

Example:	115L	4	6	16	130	5	B	S	63	28	XXX
<b>Valve type</b>											
<b>115L</b>	Without pressure balance										
<b>115H</b>	Pressure balance without pilot disc										
<b>115N</b>	Press. balance + pilot disc without springs										
<b>115M</b>	Press. balance + pilot disc with springs										
<b>Inlet nominal size</b>											
<b>3</b>	NPS 3		<b>10</b>	NPS 10							
<b>4</b>	NPS 4		<b>12</b>	NPS 12							
<b>5</b>	NPS 5		<b>14</b>	NPS 14							
<b>6</b>	NPS 6		<b>16</b>	NPS 16							
<b>8</b>	NPS 8		<b>18</b>	NPS 18							
<b>Valve size</b>											
<b>3</b>	NPS 3		<b>10</b>	NPS 10							
<b>4</b>	NPS 4		<b>12</b>	NPS 12							
<b>5</b>	NPS 5		<b>14</b>	NPS 14							
<b>6</b>	NPS 6		<b>16</b>	NPS 16							
<b>8</b>	NPS 8										
<b>Outlet nominal size</b>											
<b>6</b>	NPS 6		<b>18</b>	NPS 18							
<b>8</b>	NPS 8		<b>20</b>	NPS 20							
<b>10</b>	NPS 10		<b>24</b>	NPS 24							
<b>12</b>	NPS 12		<b>28</b>	NPS 28							
<b>14</b>	NPS 14		<b>32</b>	NPS 32							
<b>16</b>	NPS 16		<b>36</b>	NPS 36							
<b>Seat diameter</b>											
<b>055</b>	ø 55		<b>155</b>	ø 155							
<b>070</b>	ø 70		<b>180</b>	ø 180							
<b>090</b>	ø 90		<b>205</b>	ø 205							
<b>110</b>	ø 110		<b>235</b>	ø 235							
<b>130</b>	ø 130		<b>260</b>	ø 260							
<b>Stages</b>											
<b>2</b>	2 Stages										
<b>3</b>	3 Stages										
<b>4</b>	4 Stages										
<b>5</b>	5 Stages										
<b>6</b>	6 Stages										
<b>Steam bypass</b>											
<b>B</b>	Steam desup. orifice										
<b>D</b>	Nozzle complete										
<b>Pipe connection</b>											
<b>S</b>	Welding end										
<b>F</b>	Flange										
<b>Material specification</b>											
<b>51</b>	Body A105										
<b>60</b>	Body A182F12										
<b>63</b>	Body A182F22										
<b>80</b>	Body A182F91										
<b>Max. design (pressure rate)</b>											
<b>28</b>	Class 2500										
<b>Accessories</b>											
See TO.108.00.xxxx ED											

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