



# DRP SELF REGULATING SERIES

CONTROL VALVES





# DRP Series - Control Valves

## Product Features

Armstrong Delta2 - DRP SERIES is a globe self actuated pressure reducing/relief Control Valve for a wide range of process applications.

- available size from DN15 to DN100 and from 1/2" to 4".
- available pressure rating DIN from PN10 to PN40.
- available pressure rating ANSI from 150lbs to 300lbs.

## Materials

Full range of materials and special alloys are available for valve body and trim including hardening treatment. Special NACE design and material construction for Sour Service with a Compliance Declaration in accordance to NACE regulations.

## Guiding

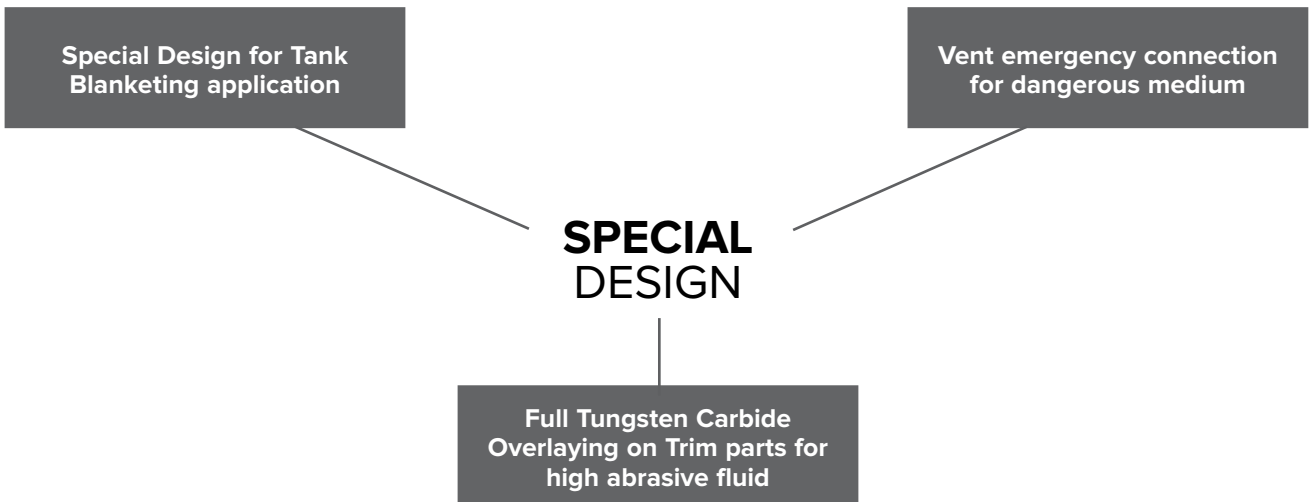
Valve guiding is top for standard disk plug and is made directly on plug shaft to guarantee a larger guiding and plug stability for accurate control application.

## Trim

Standard construction includes disk plug and threaded replaceable seat.

## Stem Seal

Standard stem seal for DRP - Pressure Reducing valves up to 50 barg is full Stainless Steel Bellow seal for zero leakage in case of Higher class or Pressure Relief applications a Standard Low Emission packing and the integral diaphragm is used.



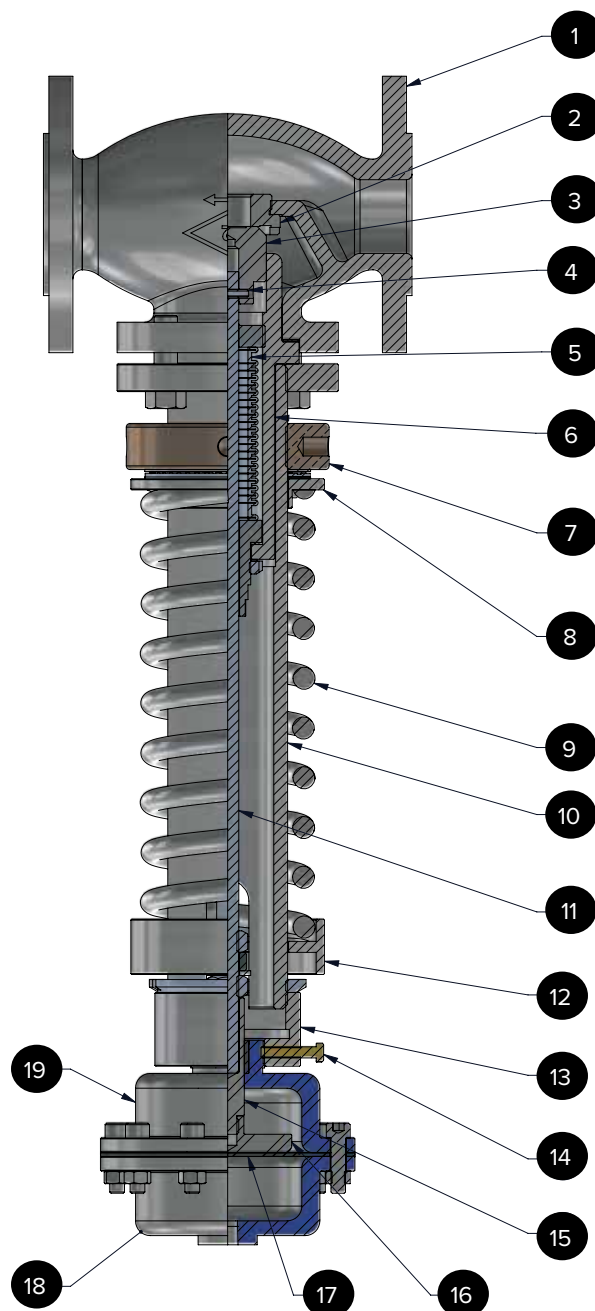
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## Standard Part List

<b>1</b>	Body	<b>8</b>	Spring Guide	<b>15</b>	Stem
<b>2</b>	Seat	<b>9</b>	Spring	<b>16</b>	Diaphragm Plate
<b>3</b>	Std Plug (1)	<b>10</b>	Spring Tube	<b>17</b>	Diaphragm
<b>4</b>	Pin	<b>11</b>	Spindle	<b>18</b>	Upper Casing
<b>5</b>	Bellow	<b>12</b>	Spring Guide	<b>19</b>	Lower Casing
<b>6</b>	Bonnet	<b>13</b>	Actuator Flange		
<b>7</b>	Spring Adjuster	<b>14</b>	Bolt		

(1) Available in soft, metal or hardened version and several materials options standard configuration is metal to metal seating.



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# Armstrong® DRP Series - Control Valves

## Functioning of pressure reducing valves on steam

Steam enters through port 1 (valve is normally open but flow direction close the plug), flowing through seat 2 and plug 3 and reduces its pressure moving out through port 4.

The piping 5 connect the condensation pot 6 with the control area 7 and transmits the variation of reduced pressure at the bottom of Diaphragm 8.

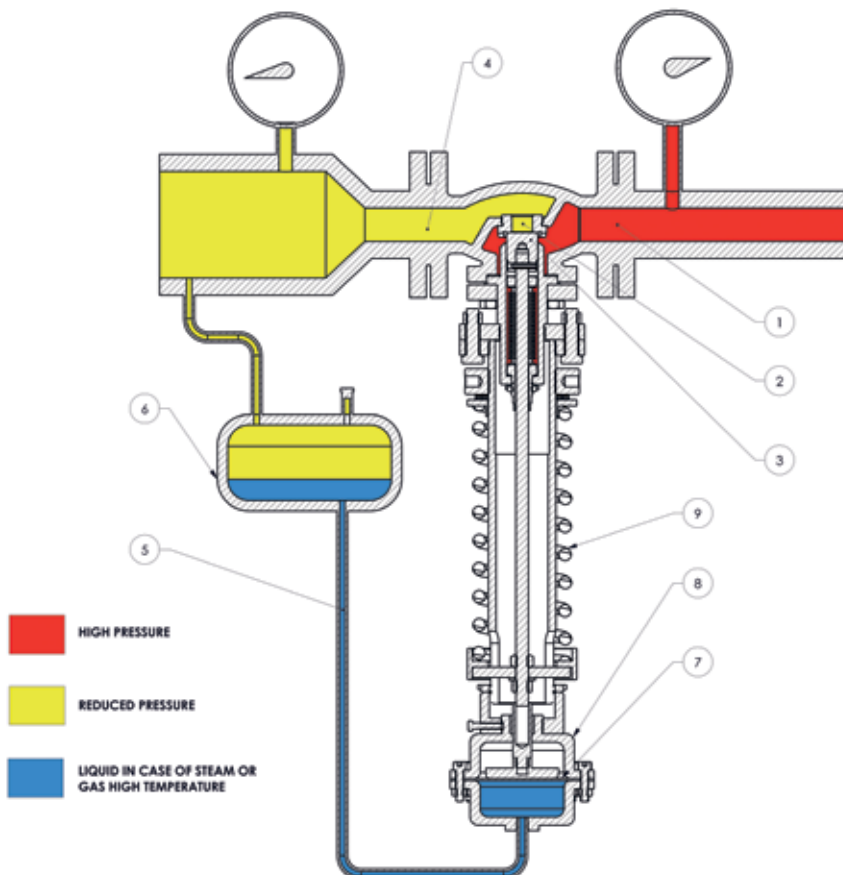
Example given is supposing that the reduced pressure exceeds the value of valve spring range setted up.

Then the control spring 9 will be compressed by the higher force present in the control area 7 and therefore the plug will close slicely to valve seat causing an higher pressure drop that in a short time will results in a downstream pressure balanced according to the spring set range.

In fact an opposite action happens when the downstream pressure tend to decrease: the pressure of control area 7 decreases, allowing to control spring 9 to move the plug in opening direction and therefore the downstream pressure will be re-established.

The value of reduced pressure can be change by operating on the spring range setting with the apposite key.

Bellow Seal Bonnet



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# Valve Specification

Specifications	EN / DIN	ASME
Valve Body Size	DN 15, 20, 25, 32, 40, 50, 65, 80, 100	NPS 1/2, 3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3, 4
Pressure Rating	PN 10 ÷ PN 40 as per EN 1092-1	CL150 ÷ CL300 as per ASME B16.34
End Connections	Flanged raised face per EN 1092-1 (Standard) Flanged Ring Joint / Threaded Ends / Welded Ends (Optional)	Flanged raised face per ASME B16.5 (Standard) Flanged Ring Joint / Threaded Ends / Welded Ends (Optional)
Face-to-Face Dimensions	EN 558-1 Series 1 <b>(1)</b>	
Shutoff per IEC 60534-4 and ANSI/FCI 70-2	Metal seat - Class IV (standard) Metal seat - Class V (optional) PTFE seat - Class VI (optional) (For 4.8 to 14 mm ports, Class VI shutoff is achieved without PTFE seat)	
Flow Direction	Flow-Down for Reducing Function and Flow-Up for Relief Function	
Flow Control Characteristics	Linear	

**(1)** ANSI / ISA 75.08.01 or ISA S75.03 on request

Trim Style	Port Diameters	Trim Style Description
Standard Disk Plug	From 10 to 100 mm <b>(2) (3)</b>	Parabolic Plug with tTop shaft Guided
Severe Service Trim (Option)	From 40 to 100 mm <b>(2) (3)</b>	Single Stage Low-Noise Trim and Cavitation Control Trim with Top and cage Guided

**(2)** Special high capacity trim are available on request.

**(3)** Standard rangeability 30:1. Optional higher rangeabilities can be provided.

EN / DIN Valve DN	EN / DIN PN 10-16					EN / DIN PN 25-40				
	RF	RTJ	SW	BW	THD	RF	RTJ	SW	BW	THD
15										
20										
25										
32										
40										
50										
65										
80										
100										

Standard Facing according to EN 1092-1 Form B1 up to PN40 and Form B2 above.

ASME Valve Size	ANSI 150					ANSI 300				
	RF	RTJ	SW	BW	THD	RF	RTJ	SW	BW	THD
1/2"										
3/4"										
1"										
1-1/4"										
1-1/2"										
2"										
2-1/2"										
3"										
4"										

Standard Facing according to ASME B16.5 Form RF (Ra 125-250 AARH Smooth Finish).

	Available
	Not available

# Materials of Construction

	Basic Materials	Nace Materials
Valve Body	Ductile Iron ASTM A395 / Carbon Steel ASTM A216 WCB / Stainless Steel ASTM A351 CF8M / Specials (1)	Carbon Steel ASTM A216 WCB / Stainless Steel ASTM A351 CF8M / Specials (1) (suitable for NACE MR 01.75 or MR 01.03 Service)
Plug	316L SS 316L SS + Partial/Full Alloy 6 Overlaying 316L SS + PTFE/RPTFE Soft Insert 440C SS, 17-4PH SS and other Special Materials (1) with Thermal or Chemical Treatment to meet any customer request	316L SS 316L SS + Partial/Full Alloy 6 Overlaying 17-4PH SS and other Special Materials <b>(1)</b> with Thermal or Chemical Treatment to meet any customer request According to NACE Standards
Seat	316L SS 316L SS + Partial/Full Alloy 6 Overlaying 440C SS, 17-4PH SS and other Special Materials (1) with Thermal or Chemical Treatment to meet any customer request	316L SS 316L SS + Partial/Full Alloy 6 Overlaying 17-4PH SS, Nitronic 50 and other Special Materials (1) with Thermal or Chemical Treatment to meet any customer request According to NACE Standards
Stem	316L SS strain hardened 316L SS + Alloy 6 overlaying 440C SS Treated, 17-4PH SS Treated	316L SS strain hardened 316L SS + Alloy 6 overlaying Nitronic 50, 17-4PH SS Treated According to NACE Standards

**(1)** = Special materials available on request.

	Basic Materials	Nace Materials
Packing Gland	Stainless Steel 304 SS or 316/316L SS Grade available	
Body/Bonnet Bolting and Nuts	SA193-B7 studs / SA194-2H nuts for Ductile Iron and Carbon Steel constructions	B7M stud and 2HM nuts for Carbon Steel constructions. According to NACE Standards
	SA193-B8 studs / SA194-8 nuts for Stainless Steel and Alloy Steel constructions	SA193-B8M studs / SA194-8M nuts for Stainless Steel and Alloy Steel constructions. According to NACE Standards
Packing	Full Stainless Steel 316 SS Grade Bellow Seal Zero Leakage	
Bonnet Gasket	Laminated Graphite or Virgin PTFE Spyrometallic SS/graphite or Inconel/graphite Special gaskets set on request.	

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Diaphragm Actuator Materials				
Actuator Housing	Carbon Steel (Standard)	Stainless Steel - rough finish		
Diaphragm	Reinforced NBR (Standard)	Reinforced Silicon	Reinforced FKM	Metallic Diaphragm (Special)
Bolting	Carbon Steel B7/2H (Standard)	Stainless Steel B8/8	Carbon Steel NACE B7M/2HM	Stainless Steel NACE B8M/8M
Coating	Epoxy powder RAL 5002 (Standard)	Surface preparation with sandblasting and Inorganic zinc primer		Several Corrosion resistant coatings

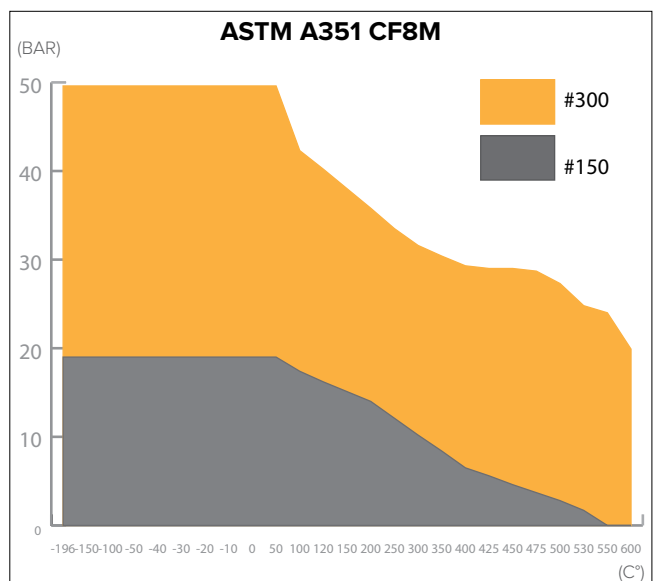
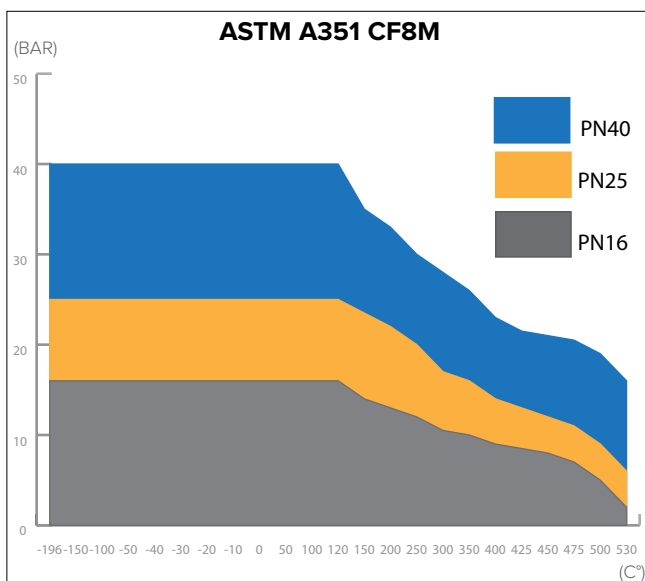
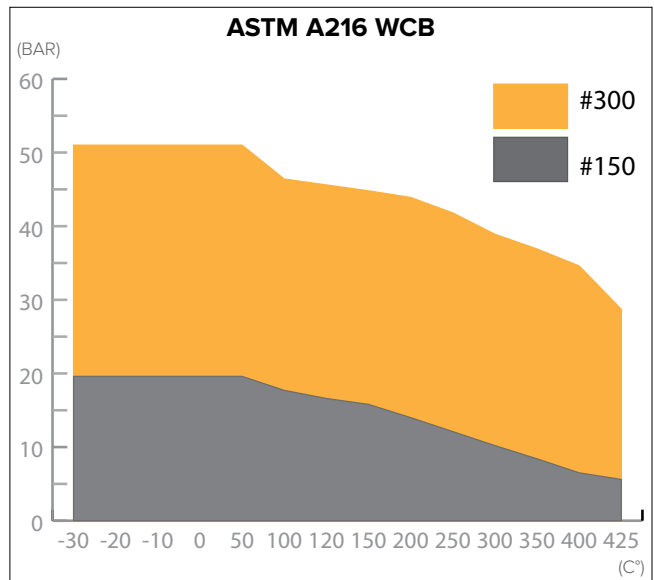
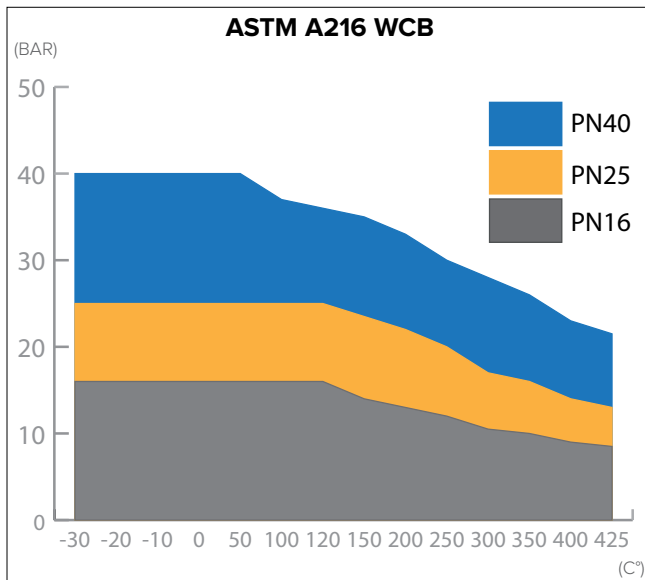
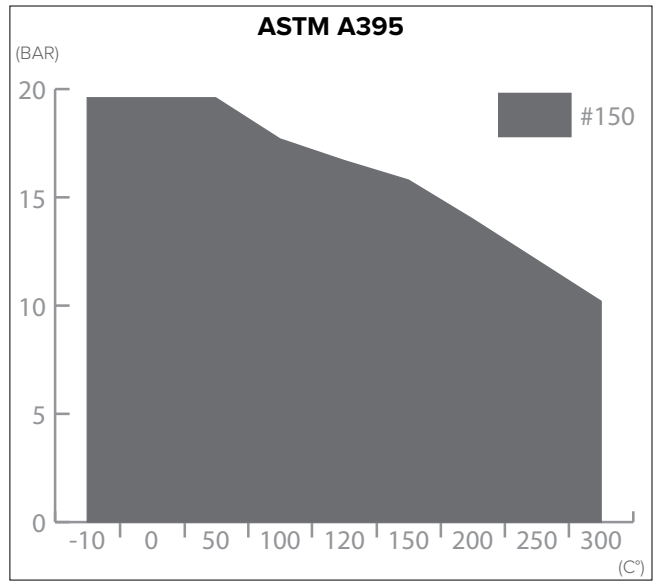
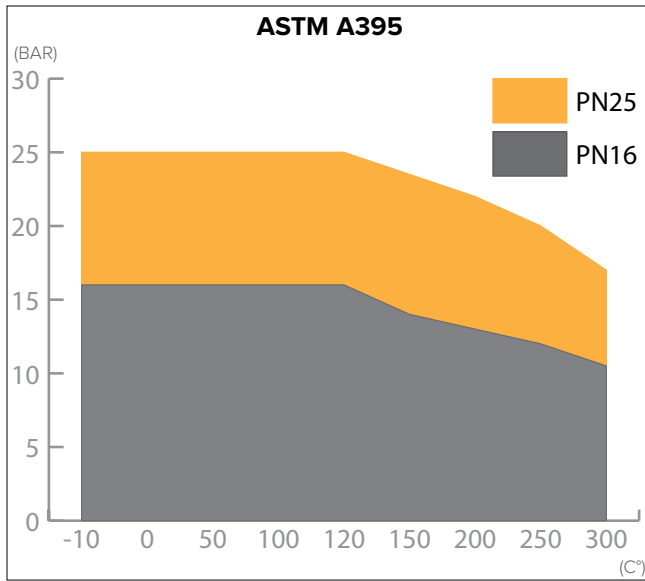
## Pressure and Temperature Ratings

Body & Bonnet Material	Bonnet Style	Packing	Body Gasket	Trim Style	Temperature Unit °C	
					Min	Max
DIN 0.7040 ASTM A395 (GJS400-18) Ductile Iron	Bellow Seal	Graphite	Graphite laminate	Metal (All Severe Service Trim)	-10	300 (*)
DIN 1.0619 ASTM A216 WCB Carbon Steel	Bellow Seal	Graphite	Graphite laminate (Spyrometallic)	Metal (All Severe Service Trim)	-29	300 (*)
DIN 1.4581 ASTM A351 CF8M Stainless Steel	Cryo Design	RPTFE or Graphite	Graphite laminate (Spyrometallic)	Metal (All Severe Service Trim)	-196	210 (*)
	Bellow Seal	Graphite	Graphite laminate (Spyrometallic)	Metal (All Severe Service Trim)	-60	300 (*)
DIN 1.6220 ASTM A352 LCB Low Temp Alloy Steel	Bellow Seal	Graphite	Graphite laminate (Spyrometallic)	Metal (All Severe Service Trim)	-46	250 (*)
DIN 1.5419 ASTM A217 WC6 High Temp Alloy Steel	Bellow Seal	Graphite	Graphite laminate (Spyrometallic)	Metal (All Severe Service Trim)	-29	300 (*)

(\*) = Maximum allowable temperature of Gases without Condensation Pot is 120°C.



# Pressure and Temperature Curves



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# Flow Coefficient Table

KV (CV)	Seat Diameter mm (inch)	Stroke mm (inch)	Nominal Diameter								
			15 1/2"	20 3/4"	25 1"	32 1.1/4"	40 1.1/2"	50 2"	65 2.1/2"	80 3"	100 4"
2.0 (2.3)	12 (1/2)	16 (5/8)									
3.0 (3.5)	15 (3/5)	16 (5/8)									
5.5 (6.4)	19 (3/4)	16 (5/8)									
10 (11.2)	25 (1.0)	16 (5/8)									
14 (16.3)	32 (1.1/4)	19 (3/4)									
17.5 (20.4)	40 (1.1/2)	19 (3/4)									
29 (33.8)	50 (2.0)	19 (3/4)									
48 (56)	64 (2.1/2)	25 (1.0)									
72 (84)	76 (3.0)	25 (1.0)									
107 (125)	100 (4.0)	28 (1.1/9)									

 Available  
 Standard

**KV** = flowrate in m<sup>3</sup>/h with 1 bar of differential Pressure  
**CV** = flowrate in USGPM with 1 psi of differential Pressure

### Options:

- Full Hard Facing through Overlaying or Treatments available for all Port Size.

## Actuators Down Pressure Range Table

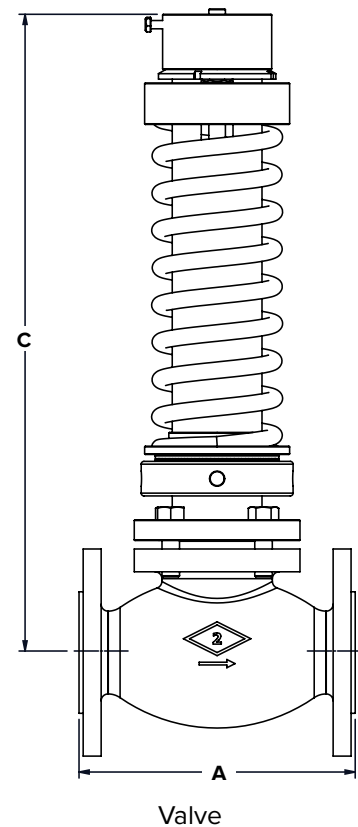
Maximum P1 suitable for DRP Valve = 30 barg									
DN (mm)	Actuator Selection								
	15	20	25	32	40	50	65	80	100
Actuator Ranget	8-20 D20	8-20 D20	8-20 D20	8-20 D20	8-20 D20	8-20 D20	8-20 D20	8-20 D20	8-20 D20
Actuator Range	1-10 D10	1-10 D10	1-10 D10	1-10 D10	1-10 D10	1-10 D10	1-10 D10	2-10 D6	2-10 D6
Actuator Range	1.2-6 D8	1.2-6 D8	1.2-6 D8	11.2-6 D8	1.2-6 D8	1.2-6 D8	1.2-6 D8	1-4 D4	1-4 D4
Actuator Range	1-4 D4	1-4 D4	1-4 D4	1-4 D4	1-4 D4	1-4 D4	1-4 D4	1-4 D4	1-4 D4
Actuator Range	0.1-1 D3	0.1-1 D3	0.1-1 D3	0.1-1 D3	0.1-1 D3	0.1-1 D3	0.1-1 D3	0.1-1 D3	0.1-1 D3
Actuator Range	0.2-1.5 D1	0.2-1.5 D1	0.2-1.5 D1	0.2-1.5 D1	0.2-1.5 D1	0.2-1.5 D1	0.2-1.5 D1	0.2-1.5 D1	0.2-1.5 D1

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## Valve Dimensions

Valve DN (inch)	A = Face to Face length (mm)			C = Bonnet Height (mm)
	DIN PN10 to PN40	ANSI 150	ANSI 300	Bellow Seal
15 (1/2")	130	150	150	480
20 (3/4")	150	150	150	490
25 (1")	160	160	160	495
32 (1-1/4")	180	180	180	505
40 (1-1/2")	200	200	200	525
50 (2")	230	230	230	555
65 (2-1/2")	290	290	290	570
80 (3")	310	310	310	635
100 (4")	350	350	350	650

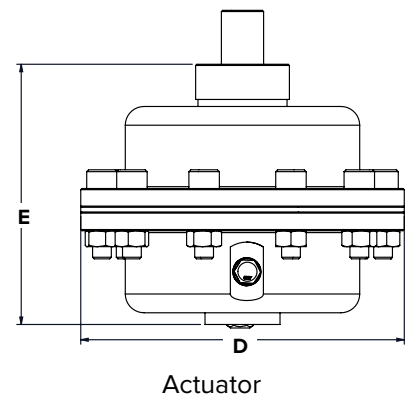
- 1) DIN PN10 to PN40 Face to Face length according to EN 558-1 serie 1, DIN 3202 F1 (ANSI/ISA 75.08.01 on request)



## Actuators Dimensions

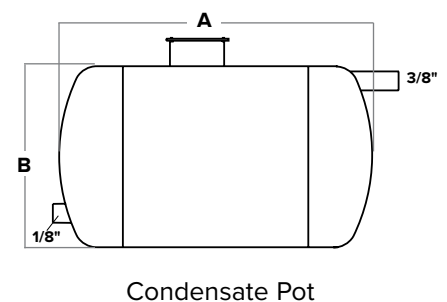
Actuator Type	D = Actuator Diameter (mm)	E = Actuator Height
D-20	136	91
D-10	136	91
D-8	160	58
D-4	160	70
D-3	205	90
D-1	280	100

- 1) ED = Envelope Diameter is the minimum horizontal space necessary for valve maintenance.
- 2) EH = Envelope Height is the minimum vertical space necessary for valve maintenance.



## Condensate Pot Dimensions

Type	Ø	A	B
BCS-1	3/8"	130	110
BCS-2	1/2"	165	155



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