



CHRYSSAFIDIS



Armstrong®

DRP SELF REGULATING 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

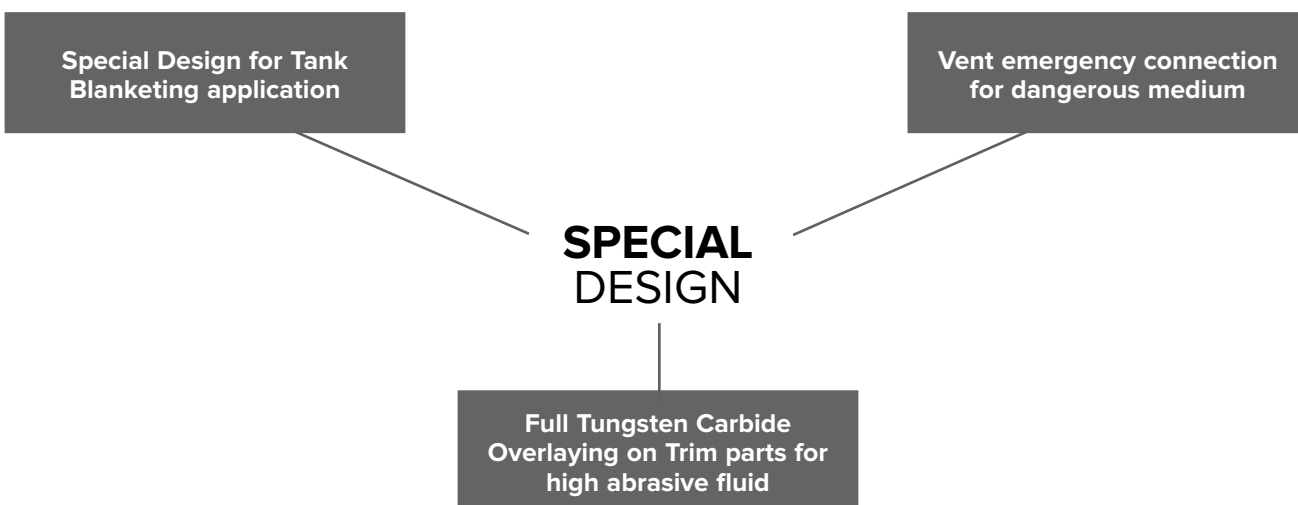
Valve guiding is top for standard disk plug and is made directly on plug shaft to guarantee a larger guiding and plug stability for accurate control application.

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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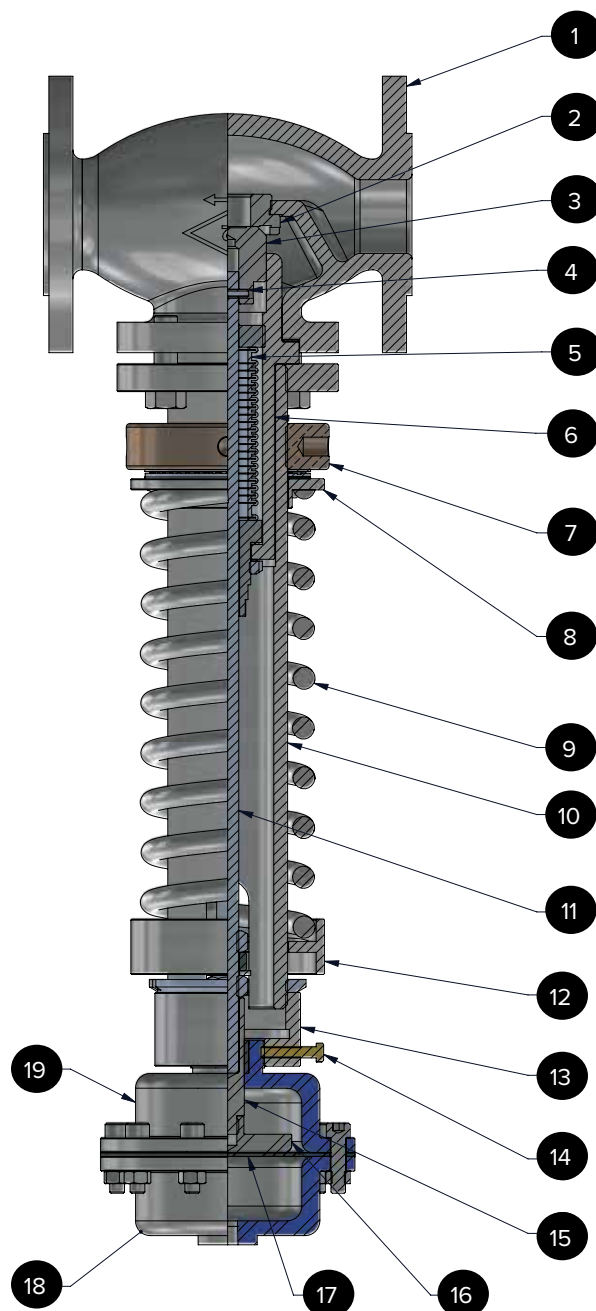
DRP Series - Control Valves



Standard Part List

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

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



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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.

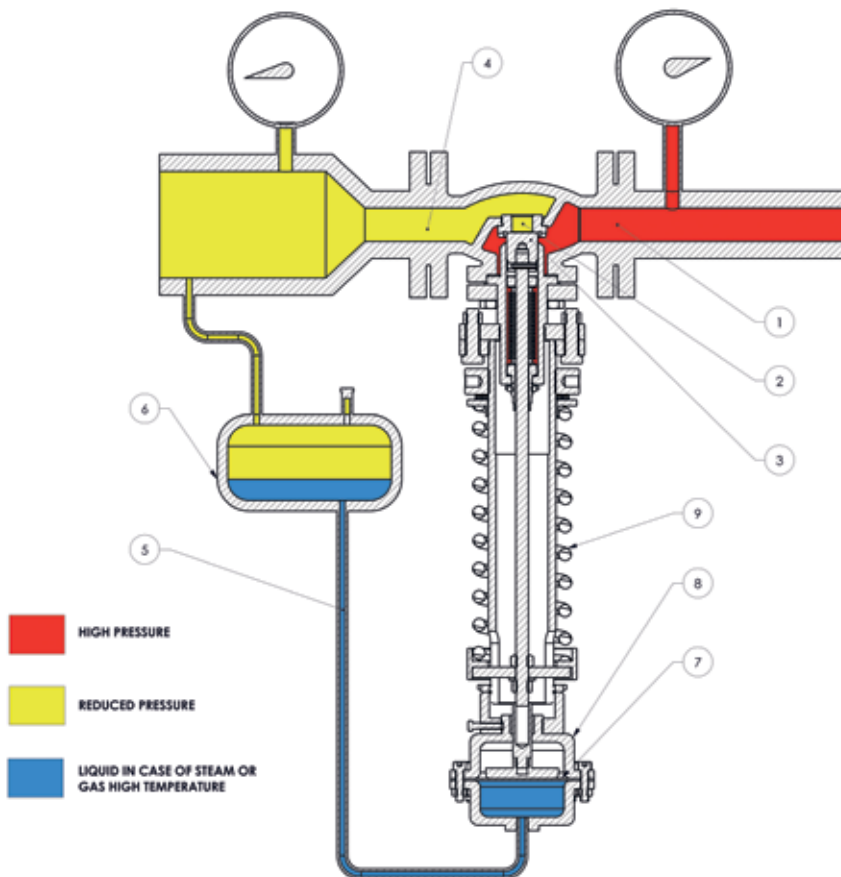
The piping 5 connect the condensation pot 6 with the control area 7 and transmits the variation of reduced pressure at the bottom of Diaphragm 8.

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


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 (1) | |
| 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 (2) (3) | Parabolic Plug with tTop shaft Guided |
| Severe Service Trim (Option) | From 40 to 100 mm (2) (3) | 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.

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| 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 (1) 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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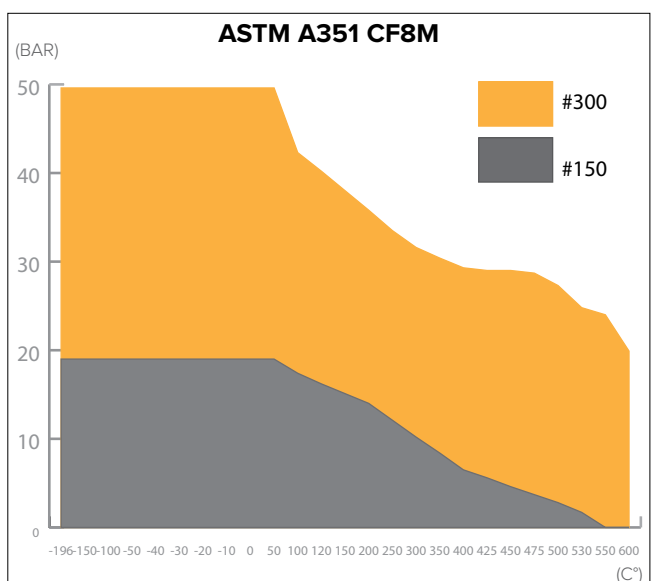
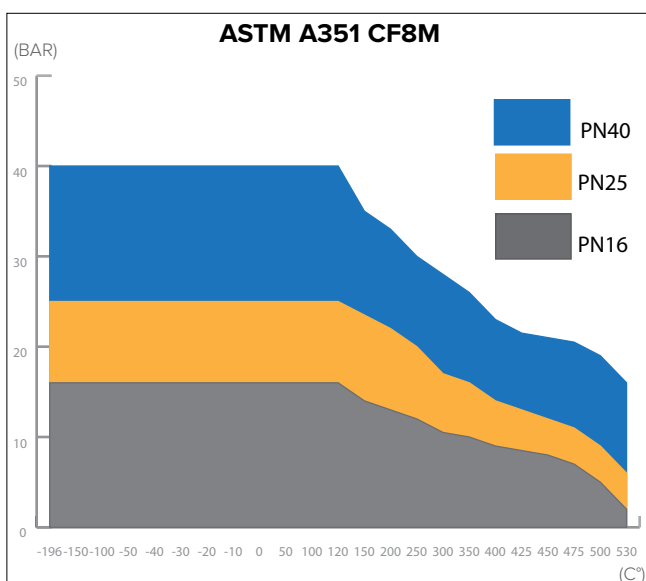
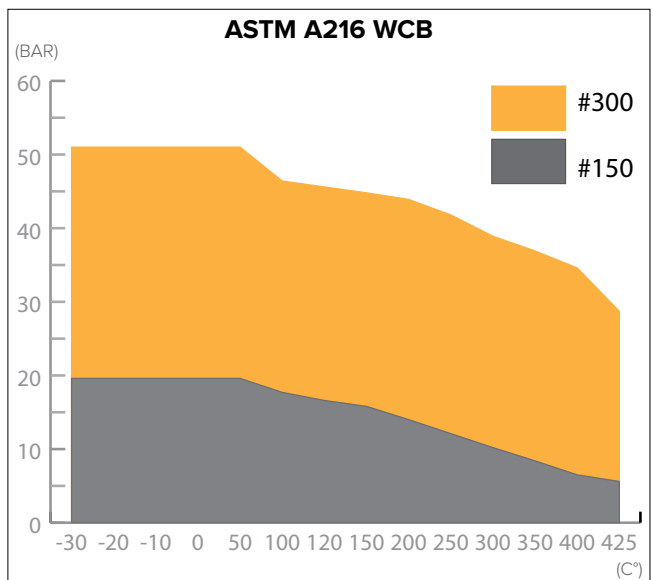
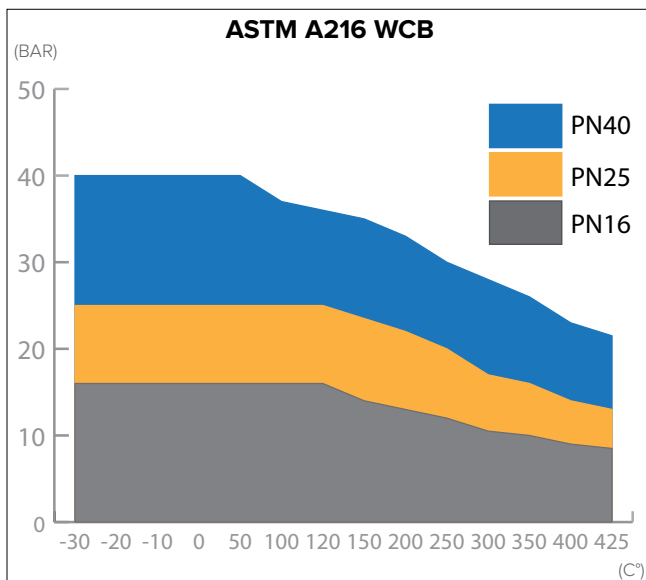
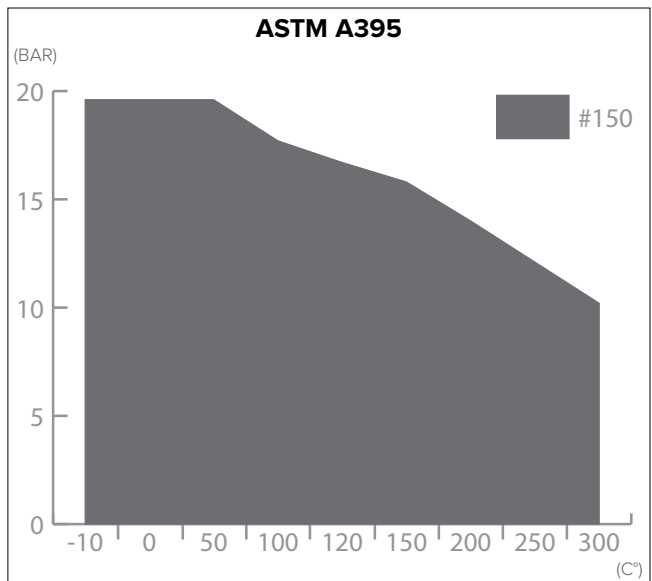
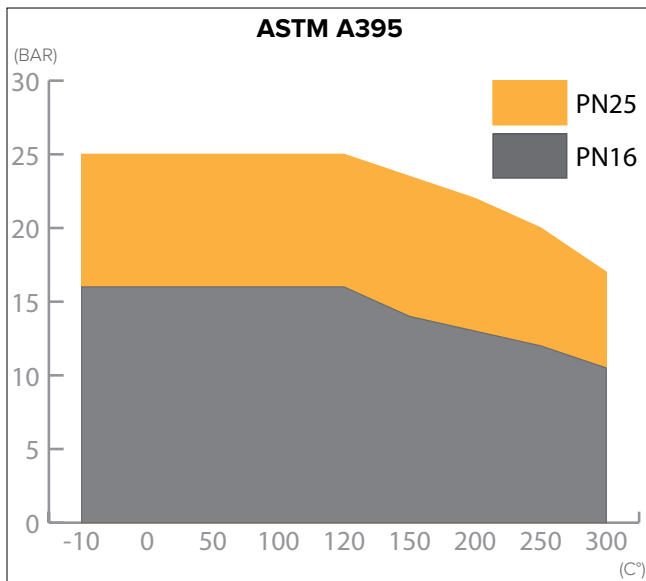
| Diaphragm Actuator Materials | | | | |
|------------------------------|----------------------------------|---|---------------------------|--------------------------------------|
| Actuator Housing | Carbon Steel (Standard) | Stainless Steel - rough finish | | |
| Diaphragm | Reinforced NBR (Standard) | 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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| 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 m³/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

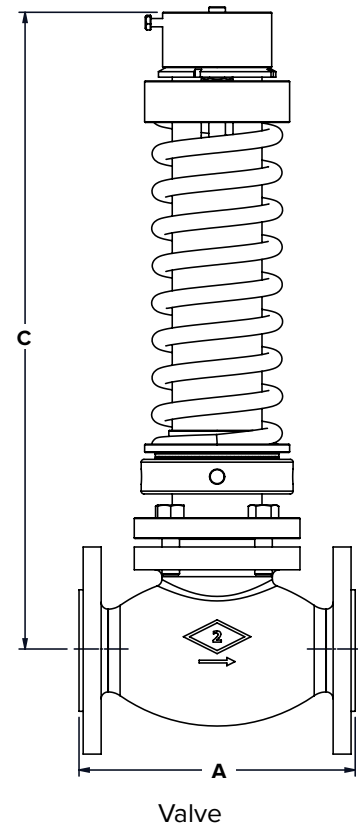
| Maximum P1 suitable for DRP Valve = 30 barg | | | | | | | | | |
|---|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| DN (mm) | Actuator Selection | | | | | | | | |
| | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 |
| Actuator Rangenet | 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



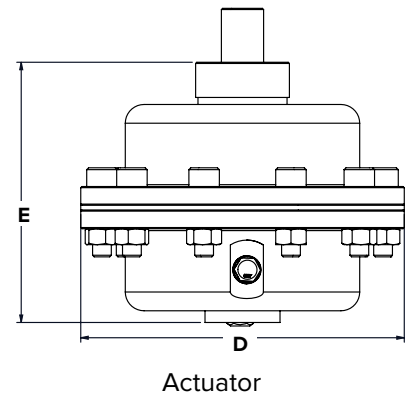
| Valve DN (inch) | A = Face to Face length (mm) | | | C = Bonnet Height (mm) |
|--------------------|---------------------------------|----------|----------|---------------------------|
| | DIN PN10 to PN40 | ANSI 150 | ANSI 300 | Bellow Seal |
| 15 (1/2") | 130 | 150 | 150 | 480 |
| 20 (3/4") | 150 | 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

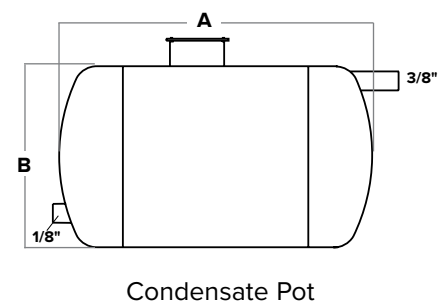
| Actuator Type | D = Actuator Diameter (mm) | E = Actuator Height |
|---------------|-------------------------------|---------------------|
| D-20 | 136 | 91 |
| D-10 | 136 | 91 |
| D-8 | 160 | 58 |
| D-4 | 160 | 70 |
| D-3 | 205 | 90 |
| D-1 | 280 | 100 |



- 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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