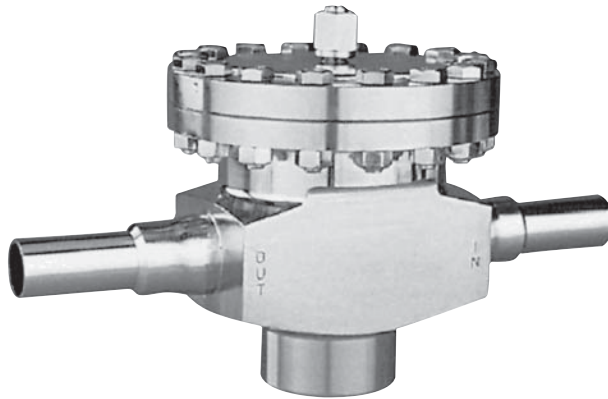




## MODEL SAP

### ULTRA HIGH PURITY PRESSURE REDUCING REGULATOR Piston-Operated



**Model SAP  
(Barstock)**

Model SAP is a high performance, dome loaded, piston-style, flow-to-open pressure reducing regulator with internal pressure balancing piston-cylinder that provides medium flow capacity and high pressure drop capability.

#### FEATURES

- All SST wetted trim materials.
- Electro-polished.
- Tube-end connections.
- High pressure capability.
- Body Finish -15  $\mu$ -in Ra average surface finish is standard.  
(Opt. 77: 10  $\mu$ -in Ra average surface finish available for Barstock body only.)
- In-line maintenance.

#### APPLICATIONS

For “electronic grade” and other ultra high purity fluids. For gaseous service. Most common fluids are high purity oxygen, nitrogen, hydrogen, helium and argon.

Cryogenic construction available; consult factory.

#### TECHNICAL SPECIFICATIONS

##### **BODY SIZES**

3/4", 1", 2", 3", 4"  
(DN20, 25, 50, 80, 100)

##### **MAXIMUM INLET PRESSURE**

Up to 3000 psig (207 Barg)  
Function of body size and elastomeric internal materials. See Table 1 for Design Pressure vs. Temperature Ratings, and maximum operating pressures. (Internals can withstand a full vacuum.)

##### **OUTLET PRESSURE RANGE**

5 – 600 psig (.34 – 41.4 Barg)  
Maximum available controlled pressure a function of body size.

##### **TEMPERATURE RANGE**

-20 to +400° F (-29° to +204° C)  
Function of elastomeric internal materials. See Table 1.

## TECHNICAL SPECIFICATIONS (cont.)

### FLOW CAPACITY

Body Size		Max Useable Cv
in	(DN)	
3/4"	(20)	5
1"	(25)	6
2"	(50)	48
3"	(80)	90
4"	(100)	120

### AGGREGATE INTERNAL LEAKAGE

Combination of dynamic seal and seat leakage rates:  
0.000 1% of rated Cv.

### HELIUM LEAK TEST

Inboard leakage less than  $1 \times 10^{-9}$  std cc/sec, actual test.

### END CONNECTIONS

Tube-ends for butt welding using orbital welder.  
Wall thickness = 0.065 in. (1.65 mm) for 3/4" - 3" sizes.  
Wall thickness = 0.083 in. (2.11 mm) for 4" size.  
Nominal body size = Tube OD.

## MATERIAL SPECIFICATIONS

### BODY FORM

Investment Casting: 3/4" & 1" (DN20 & 25).  
Barstock: All sizes.

### BODY MATERIALS - SST

Investment Casting: ASTM A351, Gr. CF3M.  
Barstock: ASTM A479, Tp. 316L.

Loading Chamber fabricated from materials of 316L SST.

### INTERNAL TRIM & MISC MATERIALS

- Trim - 316L SST
- Static Seals - FKM - Fluorocarbon Elastomer O-ring;
- Dynamic Seal - Type "UC": TFE/SST
- Seat - PolyAll (GN2, He, Ar, H2)  
V-TFE (GOX)  
CTFE (All above fluids)
- Lower Piston Spring - 17-7PH SST
- Cap Screws - Ag-plated SST
- Flange Bolting - SST
- Diaphragm Seal - Ag-jacketed C-ring

### SURFACE FINISH

Metallic parts are electro-polished, passivated, and ultra-sonically cleaned to Cashco cleaning spec. #S-1662.

Surface Finish - $\mu$ -in.	
Metal Trim Parts	15 Ra Avg

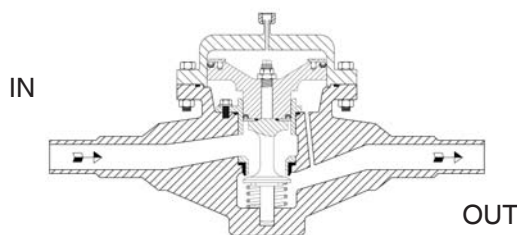
**OPT-77: 10  $\mu$ -in Ra AVG. SURFACE FINISH.** For Barstock body only. Body and trim electro-polished to 10  $\mu$ -in Ra average surface finish.



Type "UC"  
Dynamic  
U-Cup Seal



Diaphragm  
Ag-jacketed  
"C-ring" Seal



**TABLE 1  
MAXIMUM DESIGN PRESSURE vs. TEMPERATURE:  
MAXIMUM OPERATING PRESSURES, TEMPERATURES  
AND PRESSURE DROPS**

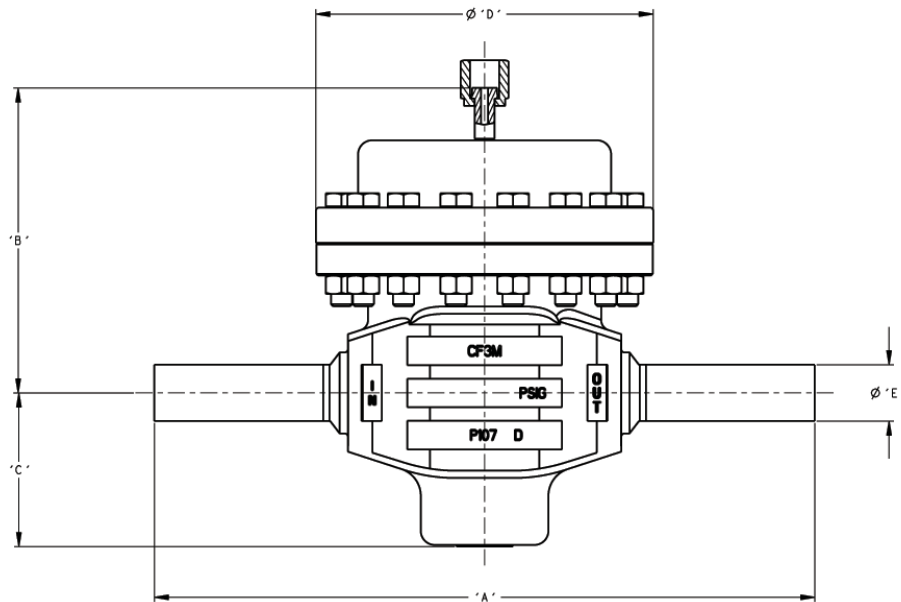
**NOTE: The below ratings may be further "derated" by limitations thru the Pressure Equipment Directive (97/23/EC-May '97')**

Nominal Body Size in (DN)	Design Pressure**		Temperature Range	Seat Material	Maximum Operating Pressures		
	Inlet psig	Outlet psig	°F		Inlet psig	Outlet psig	ΔP psig
3/4" (20)	3000	600	-20 to +225	PolyAll	1050	600	750
	3000	600	-20 to +300	V-TFE	900	600	600
	2895	600	400			600	
	3000	600	-20 to +300	CTFE	3000	600	2950
1" (25)	2400	600	-20 to +225	PolyAll	1050	600	750
	2400	600	-20 to +300	V-TFE	900	600	600
	2230	600	400			600	
	2400	600	-20 to +300	CTFE	2400	600	2350
2" (50)	1200	600	-20 to +225	PolyAll	1050	600	750
	1115	600	-20 to +300	V-TFE	900	600	600
	1200	600	400			600	
	1200	600	-20 to +300	CTFE	1200	600	1150
3" (80)	600	600	-20 to +225	PolyAll	600	600	300
	600	600	-20 to +300	V-TFE		600	
	450	450	400		450	600	150
	600	600	-20 to +300	CTFE	600	600	300
4" (100)	600	600	-20 to +225	PolyAll	600	300	600
	600	600	-20 to +300	V-TFE		450	
	450	450	400		450	150	450
	600	600	-20 to +300	CTFE	600	300	600

\*\* For fluid containment only - Reaching these levels of pressure will damage internals and may render unit inoperable.

METRIC CONVERSION FACTOR: psi / 14.5 = Bar Cv / 1.16 = kv

### DIMENSIONS & WEIGHTS

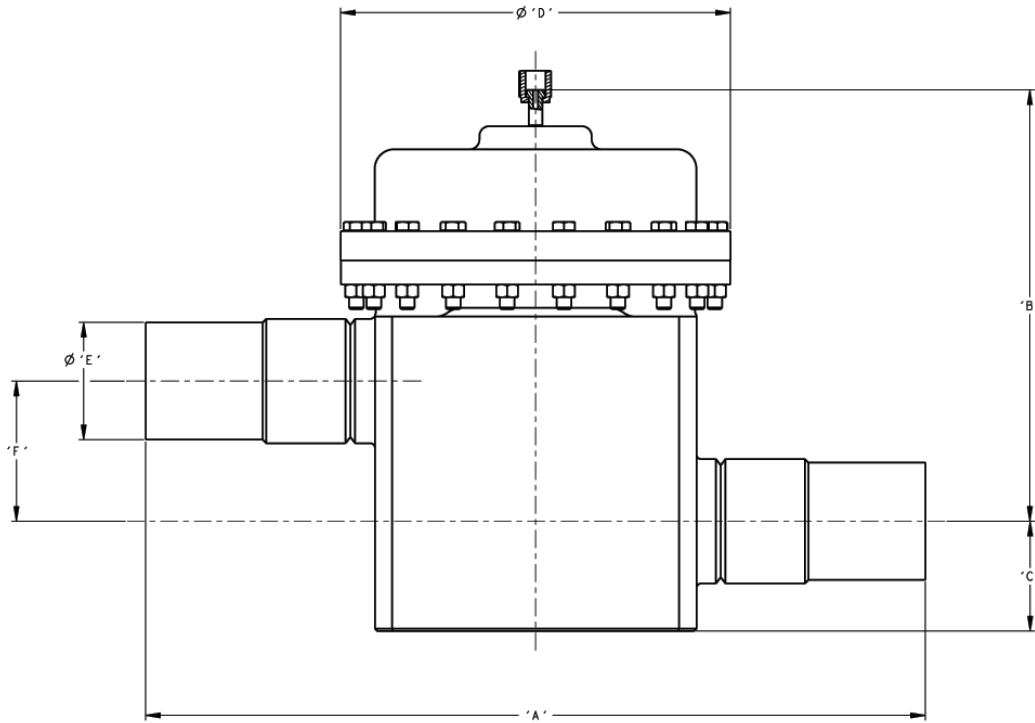


SIZE	ENGLISH UNITS (Inches)					Weight lbs
	A	B	C	Dia. D	Dia. E	
3/4"	10.75	5.44	2.75	6.00	0.75	25
1"	11.75	5.44	2.75	6.00	1.00	25
2"	15.75	8.00	4.49	8.00	2.00	75

SIZE	METRIC UNITS (mm)					Weight kg
	A	B	C	Dia. D	Dia. E	
DN20	273	138	70	152	19	12
DN25	298	138	70	152	25	12
DN50	400	203	114	203	51	35

## DIMENSIONS

### 3" & 4" Sizes



ENGLISH UNITS (in)							Wt. lbs.
SIZE	A	B	C	Dia. D	Dia. E	Dia. F	
3"	20.00	11.06	2.81	10.00	3.00	3.60	150
4"	20.00	11.06	2.81	10.00	4.00	3.60	150

METRIC UNITS (mm)							Wt. kgs.
SIZE	A	B	C	Dia. D	Dia. E	Dia. F	
DN80	508	281	71	254	76	91	69
DN100	508	281	71	254	102	91	69

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**MODEL SAP PRODUCT CODER** 03/14/16

**S** **P** POS 3 — POS 5 **L** POS 7 POS 8 — **T** **0** **3** **0** **0** **0** POS 16 **0** **D**

POSITION 3 - SIZE		
Size		CODE
in	(DN)	
3/4"	20	<b>B</b>
1"	25	<b>C</b>
2"	50	<b>F</b>
3"	80	<b>H</b>
4"	100	<b>R</b>
See Position 5		

POSITION 5 - BODY STYLE		
Body	Body/Topworks Material	CODE
Investment Casting <input checked="" type="checkbox"/>	CF3M/316L SST	<b>C</b>
Bar Stock	316L SST/316L SST	<b>S</b>
√ 3/4" & 1" (DN20 & 25) sizes only.		

POSITION 7 - SEAT / SEALS / GASKETS			
Seat	Static	Dynamic	CODE
V-TFE	FKM	U-Cup TFE/SST	<b>W</b>
PA	FKM	U-Cup TFE/SST	<b>Y</b>
CTFE	FKM	U-Cup TFE/SST	<b>H</b>

POSITION 8 - Product Classification Under European "Pressure Equipment Directive"		
Product Destination	Hazard Category	CODE
Anywhere except Europe	N/A	<b>7</b>
European Countries * (CE Mark does not apply to DN25 and below)	Sound Engineering Practice (SEP)	<b>S</b>
	CE Marked Hazard Cat I or II	<b>E</b>
* For products to be placed in service in Europe - Ref to Directive 97/23/EC. Forward Completed "EU" Application Recorder prior to quotation. (Without Recorder- Processing of Purchase Order will be delayed). Contact Cashco for Assistance.		

POSITION 16- SURFACE FINISH OPTIONS	
Option	CODE
Standard High Purity Electro Polish to 15 μ-in Ra Average Finish Cleaned to Spec #S-1662; Helium Leak Test per Spec #S-1661	<b>0</b>
Opt-77 Barstock Only High Purity Electro Polish to 10 μ-in Ra Average Finish. Cleaned to Spec #S-1662; Helium Leak Test per Spec #S-1661	<b>4</b>

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