

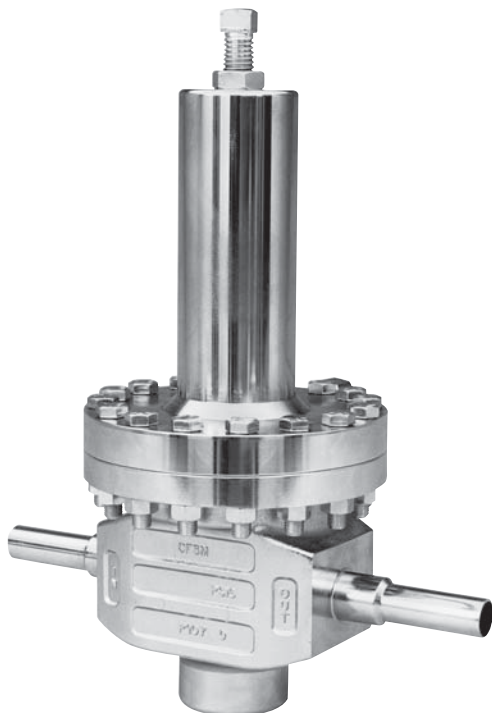


ISO Registered Company



# MODELS CA1 and SA1

## ULTRA HIGH PURITY PRESSURE REDUCING REGULATORS Spring-Operated: 3/4" - 2" (DN20 – DN50)



**Model CA1**  
**(Investment Casting)**

### APPLICATIONS

For "electronic grade" and other ultra high purity fluids. For either gaseous or liquid service. Most common fluids are high purity oxygen, nitrogen, hydrogen, helium and argon. (A "special" variation including Hastelloy C internal parts is available for anhydrous HCl; consult factory.) Cryogenic construction is also available; consult factory.

Models CA1 and SA1 are high performance spring-operated, flow-to-open pressure reducing regulators with internal pressure balancing piston-cylinder that provides medium flow capacity and high pressure drop capability.

### FEATURES

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

### TECHNICAL SPECIFICATIONS

#### BODY SIZES

3/4", 1", 1-1/2", 2"  
(DN20, 25, 40, 50)

#### OUTLET PRESSURE RANGE

5 – 300 psig (.34 – 20.7 Barg)  
In multiple spring ranges. Maximum available controlled pressure a function of body size. See Position 11 of "Product Coder" for available range springs.

#### 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.)

#### TEMPERATURE RANGE

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

## TECHNICAL SPECIFICATIONS (cont.)

### FLOW CAPACITY

Function of body form:

Body Size		Body Form	Max Cv
in	(DN)		
3/4", 1"	(20,25)	IC, BS	3.5
1-1/2"	(40)	BS	11.0
2"	(50)	BS	18.0

### END CONNECTIONS

Tube-ends for buttwelding using orbital welder.  
Wall thickness = 0.065 in. (1.65 mm);  
Nominal Body Size = Tube OD.

### 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.

## MATERIAL SPECIFICATIONS

### BODY FORM

IC - Investment Casting; 3/4" & 1" (DN20 & 25).  
BS - Barstock; All sizes.

### SURFACE FINISH

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

### BODY MATERIALS - SST

IC - ASTM A351, Gr. CF3M.  
BS - ASTM A479, Tp. 316L.

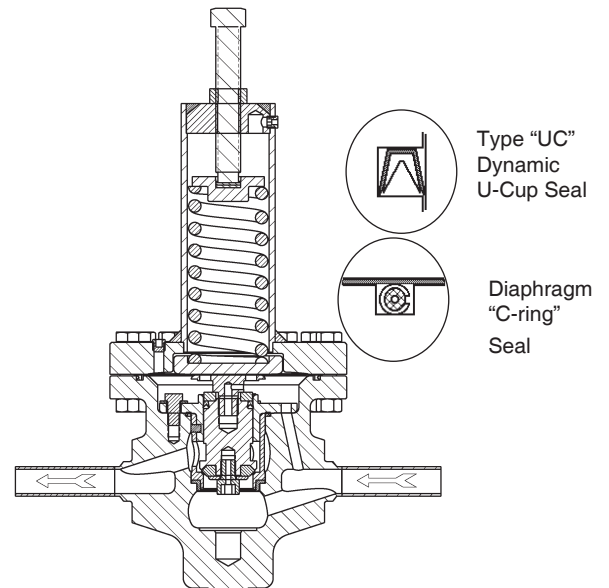
Spring Chamber fabricated from materials of 316L SST.

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

Alternate: See Opt-77.

### INTERNAL TRIM & MISC MATERIALS

<u>Trim</u>	- 316L SST
<u>Diaphragm</u>	- 17-7PH SST
<u>Static Seals</u>	- TFE/SST U-cup
<u>Dynamic Seal</u>	- Type "UC": TFE/SST or CTFE/SST
<u>Seat</u>	- PolyAll (GN2, He, Ar, H2) V-TFE (GOX) CTFE (All above fluids)
<u>Lower Piston Spring</u>	- 17-7PH SST;
<u>Cap Screws</u>	- Ag-plated SST
<u>Flange Bolting</u>	- SST
<u>Adjusting Screw</u>	- Ag-plated SST
<u>Diaphragm Seal</u>	- Ag-jacketed C-ring



## OPTION SPECIFICATIONS

**OPT-1: CLOSING CAP.** Modification to top of spring chamber to include a 316L SST closing cap to cover adjusting screw and discourage frequent adjusting of the set point.

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

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

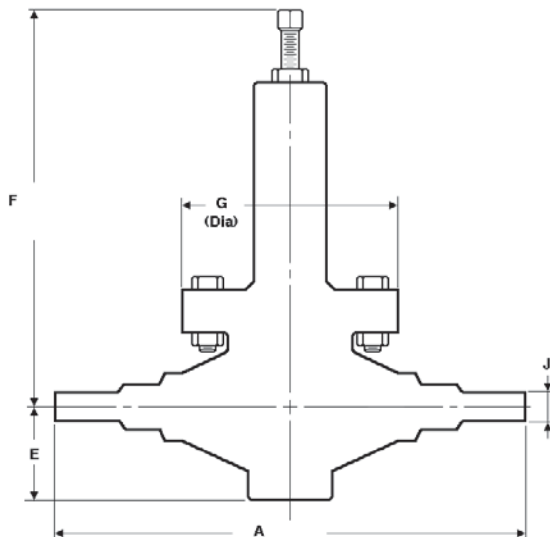
**NOTE: The below ratings may be further "derated" by limitations through the Pressure Equipment Directive (2014/68/EU)**

Size in (DN)	Form	Design Pressure *		Temperature Range °F	Seat	Maximum Operating Pressures						Max Flow Capacity			
		Inlet psig	Outlet psig			GAS			LIQUID **			Form			
						Inlet psig	Outlet psig	ΔP psid	Inlet psig	Outlet psig	ΔP psid	Wideopen		20% Droop Cv	
		IC	BS									IC	BS		
3/4" (20)	IC or BS	3000	600	-20 to +225	PolAll	1050	300	750	900	300	600	3.5	3.5	3.0	3.0
		3000	600	-20 to +300	V-TFE	900	300	600	600	300	300				
		2895	600	400	CTFE	3000	300	2950	900	300	600				
		3000	600	-20 to +300		2945	300	2895							
1" (25)	IC or BS	2400	600	-20 to +225	PolyAll	1050	300	750	900	300	600	3.5	3.5	3.0	3.0
		2400	600	-20 to +300	V-TFE	900	300	600	600	300	300				
		2230	600	400	CTFE	2400	300	2350	900	300	600				
		2400	600	-20 to +300		2315	300	2265							
1-1/2" (40)	BS	1600	600	-20 to +225	PolyAll	1050	300	750	900	300	600	-	11.0	-	9.8
		1600	600	-20 to +300	V-TFE	900	300	600	600	300	300				
		1485	600	400	CTFE	1600	300	1550	900	300	600				
		1600	600	-20 to +300		1540	300	1490							
2" (50)	BS	1200	600	-20 to +225	PolyAll	1050	300	750	900	300	600	-	18.0	-	16.0
		1200	600	-20 to +300	V-TFE	900	300	600	600	300	300				
		1115	600	400	CTFE	1200	300	1150	900	300	600				
		1200	600	-20 to +300		1155	300	1105							

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

\*\* Non-Cavitating Liquid.

## DIMENSIONS & WEIGHTS



ENGLISH UNITS								
Size in	Body Form	Dimension (inches)						Weight (lbs.)
		A	E	F	F- Opt-1	G	J	
3/4"	IC, BS	10.75	2.75	11.75	12.92	6.00	.75	30
1"	IC, BS	11.75	2.75	11.75	12.92	6.00	1.00	
1-1/2"	BS	13.50	3.19	14.00	15.81	8.00	1.50	55
2"	BS	16.75	3.88	18.00	18.75	10.00	2.00	85

METRIC UNITS								
Size (DN)	Body Form	Dimension (mm)						Weight (kg)
		A	E	F	F- Opt-1	G	J	
(20)	IC, BS	273	70	298	328	152	19.1	14
(25)	IC, BS	298	70	298	328	152	25.4	
(40)	BS	343	81	356	402	203	38.1	25
(50)	BS	425	99	457	476	254	50.8	39

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# MODELS CA1 & SA1 PRODUCT CODER

03/11/16



POSITION 1 & 2 - MODEL	
Body	CODE
SA1 - Barstock	B1
CA1 - Investment Casting	C1
See Position 3 & 5	

POSITION 3 - SIZE & STYLE				
Size		Barstock	Investment Casting	CODE
in.	(DN)			
3/4"	(20)	Yes	Yes	B
1"	(25)			C
1-1/2"	(40)		No	E
2"	(50)			F

POSITION 5 - BODY / SPRING CHAMBER MATERIALS	
Materials	CODE
CF3M/316L SST Inv. Cast 3/4" and 1" Size Only (Select "C1" in Position 1 & 2)	C
316L SST/316L SST Barstock Body (Select "B1" in Position 1 & 2)	S

POSITION 7 - TRIM MATERIALS						
Inlet Pressure	Service	Diaphragm	Seat	Seals		CODE
				Static	Dynamic	
P <sub>1</sub> ≤ 750 PSIG	GN2, Ar, H2, He	17-7 PH SST	PolyAll	U-Cup; TFE/SST	Type "UC" TFE/SST	U
	* ALL	17-7 PH SST	V-TFE	U-Cup; TFE/SST	Type "UC" TFE/SST	W
P <sub>1</sub> ≤ 3000 PSIG	* ALL	17-7 PH SST	CTFE	U-Cup; TFE/SST	Type "UC" TFE/SST	H
	* ALL	17-7 PH SST	CTFE	U-Cup; TFE/SST	Type "UC" CTFE/SST	K

\* ALL = GOX, GN2, Ar, H2 and He.

POSITION 8 - Product Classification Under European "Pressure Equipment Directive"		
Product Destination	Hazard Category	CODE
Anywhere except Europe	N/A	7
European Countries * (CE Mark does not apply to DN25 and below)	Sound Engineering Practice (SEP)	S
	CE Marked Hazard Cat I or II	E
	ATEX	A

\* For products to be placed in service in Europe - Ref to Directive 2014/68/EU. Forward Completed "EU" Application Recorder prior to quotation. (Without Recorder- Processing of Purchase Order will be delayed). Contact Cashco for Assistance.

POSITION 11 - RANGE SPRING							
Body Size	Pressure Range		CODE	Body Size	Pressure Range		CODE
	psig	(barg)			psig	(barg)	
3/4" & 1" (DN20 & DN25)	5-20	(.34-1.4)	A	2" (DN50)	5-15	(.34-1.0)	M
	10-35	(.69-2.4)	B		10-30	(.69-2.1)	N
	20-80	(1.4-5.5)	C		15-50	(1.0-3.4)	P
	30-150	(2.1-10.3)	D		30-90	(2.1-6.2)	Q
	70-200	(4.8-13.8)	E		50-150	(3.4-10.3)	R
	100-300	(6.9-20.7)	F				
1-1/2" (DN40)	5-20	(.34-1.4)	A				
	15-45	(1.0-3.1)	H				
	10-70	(.69-4.8)	J				
	40-125	(2.8-8.6)	K				
	70-200	(4.8-13.8)	E				

POSITION 14 - SPRING CHAMBER OPTION OPTIONS		
Description	Option	CODE
None	-	0
Closing Cap.	-1	Y

POSITION 16 - SURFACE FINISH OPTIONS			
Body	Option	Description	CODE
Barstock & Investment Casting	Standard	Ultra High Purity Electro-Polish to 15 Ra Average Finish. Cleaned to Spec #S-1662.	0
Barstock ONLY	-77	Ultra High Purity Electro-Polish to 10 Ra Average Finish. Cleaned to Spec #S-1662.	4

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