



MODEL C-CS

“CLEAN STEAM” PRESSURE REDUCING REGULATOR



MODEL C-CS

The Model C-CS is a 316L SST self-contained pressure reducing regulator designed primarily for steam control in sanitary biotechnological process piping systems. The unit is capable of controlling outlet pressure between 10-75 psig (0.69-5.17 Barg) with a maximum inlet pressure of 150 psig (10.3 Barg).

FEATURES

- Dual-guided Plug:** Combines a “winged” guide design directly above the seat and a bushing on the guide post above the diaphragm and wetted trim parts.
- Self-Draining:** Angle style body with bottom inlet and side outlet.
- Surface Finish:** Interior of body polished per ASME BPE 1997 (SFV-4 #10 micro-inch Ra finish). Interior and exterior surfaces are electro-polished.
- Wetted Materials Construction:** 316L SST metallic wetted parts. Unit is cleaned to Cashco Spec. #S-1576.

APPLICATIONS

Used in pharmaceutical industry in production of many health care products for both human and animal consumption. Widely applied for processed food production – candy, beverages, nutritional supplements and artificial sweeteners. May also be used in cosmetics production and specialty chemicals.

Would be found supporting fermenters, batching tanks, cookers, dryers, SIP systems, autoclaves, sterilizers, WFI systems and other similar equipment.

Though designed primarily for “clean steam” service, unit will give satisfactory performance on clean gaseous or liquid applications.

*Patented.

SPECIFICATIONS

Body Connections: Sanitary "Tri-Clamp®". Designed to seal against weld-type clamp liners per ISO 2852. (Lower inlet, side outlet connection.)

Body Size and Material: 3/4", 1", 1-1/2", 2", 3" (20, 25, 40, 50, 80 mm) size. ASTM A182, Gr. F316L; Forged 316L SST for superior quality and finish. Interior and exterior surface of body is electro-polished.

1" (25 mm) size only. ASTM A351, Gr. CF3M; Investment Cast 316L SST. Interior of standard body is mechanically polished to #10 micro-inch R_a with electro-polished exterior. Includes reduced orifice as standard construction. See capacity specifications.

See Table 5 for dimensions.

Spring Chamber: ASTM A351, Gr. CF8M; Cast 316 SST. Electro-polished.

Body Design Pressure Rating: 150 psig (10.3 Barg); inlet & outlet.

Maximum Operating Temp: 366°F (185°C).

Maximum Pressure Drop: 50 psid, (3.45 Bard) for 10-30 psig range spring.
100 psid, (6.9 Bard) for 10-75 psig range spring.

Minimum Pressure Drop: 3 psig.

Capacity: Up to 18 Cv. See Table 1 for Cv vs. outlet pressure vs. body size. See Tables 2A or 2B for steam mass flow vs. outlet pressure vs. body size.

Wetted Trim Materials:

Trim Material Combinations	
Part	Trim Designation #
Diaphragm	316L SST
Stem & Plug	316L SST

O-rings: TFE.

Gasket: Expanded PTFE.

Non-Wetted Trim Materials: Castings - CF8M (316 SST). Barstock - 18-8 SST. All cast parts electro-polished.

Special Cleaning: All units are cleaned per Cashco Spec. #S-1576.

Range Springs: SST material.

psig	(Barg)
10-30	(0.69 - 2.07)
10-75	(0.69 - 5.17)

NOTE: Contact the factory for settings below 10 psig (0.69 Barg).

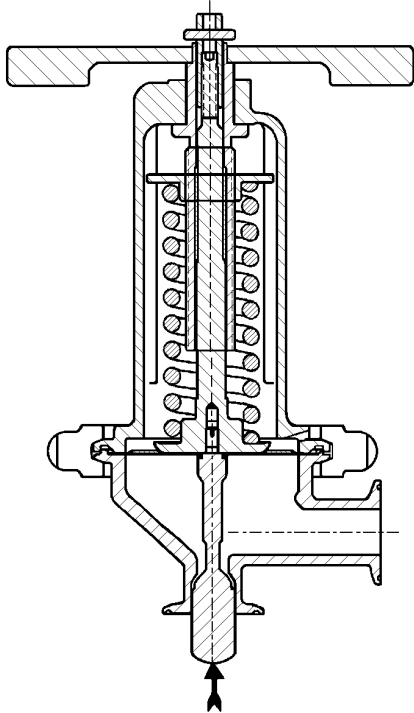


Figure 1: Investment Cast Body

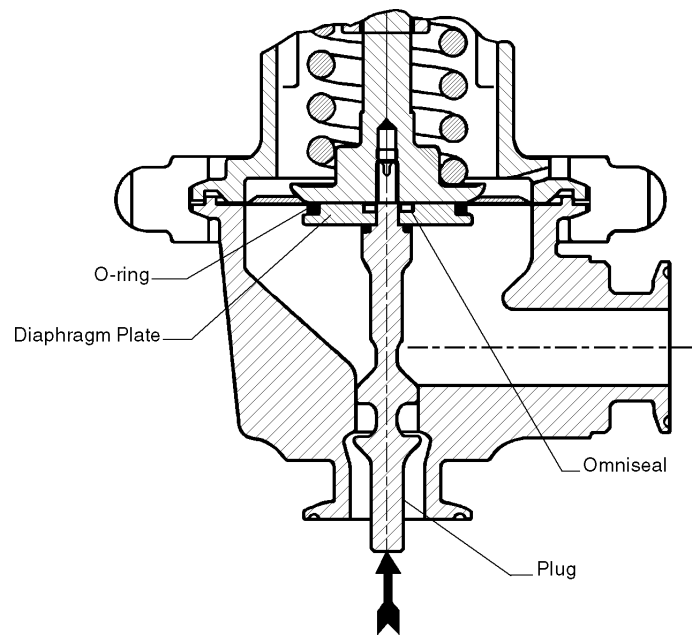


Figure 2: Forged Body with Opt-11

Option-11: DIAPHRAGM RESTRAINT. Utilizes a 316L SST lower diaphragm plate, TFE O-ring, Omniseal and a modified 316L SST plug. Design limits diaphragm deformation when regulator is exposed to vacuum conditions in normal operation sequence. Primarily of importance with autoclaves and sterilizers. See Figure 2.

- PTFE stem guide/seal,
- Opt-11 diaphragm restraint,
- 1/4" (6mm) female NPT pressurization tap,
- PTFE loading chamber flange gasket,
- No vent hole.

Option-20: PRESSURE LOADED. Standard spring chamber topworks is modified to a loading chamber, including:

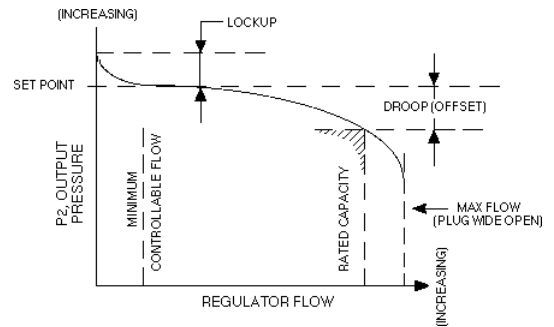
- SST closing cap,
- PTFE closing cap gasket,

Allows for gaseous pressurization from an external source; i.e. I/P transducer, airset, etc. Controlled P_2 - outlet pressure is approximately equal to P_3 - loading pressure. Cv capacity is per Table 3. (**NOTE:** Adjusting lever not supplied.) See Figure 5.

APPLICATION AND SELECTION

Pressure reducing regulators are control devices intended for continuous duty in throttling service. These valves are not designed for shutoff service. The following procedure will help determine the minimum suitable selection for an application.

- STEP 1.** FOUR KNOWNs. The following minimal parameters/information must be available before a selection procedure can begin:
- Inlet Pressure - P_1 (upstream pressure).
 - Outlet Pressure - P_2 (downstream pressure). How much can P_2 vary as flow varies?
 - Desired capacity - Cv, \dot{m} ; minimum & maximum.
 - Fluid temperature - T_1 , SG (actual).



(Tags will show the standard ranges.) A set point above the higher range spring level is not recommended. Setpoint at the upper limit of a range spring is acceptable. If final setpoint is questionable and expected near the upper limit, the next higher range spring should be utilized. Best performance will be obtained when the lowest range spring is utilized.

STEP 2. INLET PRESSURE. Ensure that the actual design inlet pressure and temperature limits do not exceed the limits indicated in the Specifications section. Determine operative influence effect.

STEP 3. PRESSURE DROP. Check the maximum pressure drop ($P_1 - P_2$); do not exceed limits established for each range spring.

STEP 4. OUTLET PRESSURE. All self-contained pressure reducing regulators “droop” or “falloff” from a setpoint pressure level at a given flow as the flow rate increases.

This deviation in setpoint is described as “% droop”. Droop is expressed on increasing flow, starting from a minimum flow level.

The “% droop” must be known to enter the capacity tables. The acceptable level of setpoint deviation should be known for the min-to-max flow variation.

A regulator may have a setpoint up to 15% below the lower stated range spring level.

STEP 5. CAPACITY. Using the four knowns of Step 1, calculate the Cv.

For Example:

Fluid = Steam
= 282#/Hr. Max.

P_1 = 120 psig
 P_2 = 25 psig
 T_1 = 350°F

Calc. Cv = 1.48
%Droop (deviation of setpoint) = 20%
10-75 psig range spring
Setpoint = 25 + (0.20 x 25) = 30 psig
 P_2 @ \dot{m} = 25 psig

Refer to IOM-C-CS for complete cleaning procedures and maintenance instructions.

TECHNICAL SPECIFICATIONS

TABLE 1
CAPACITY - C_v F_L = 0.8

RANGE SPRING 10-30 psig																						
Set Pressure		3/4" (20mm) Full Port			1" (25mm) Reduced Port			1" (25mm) Full Port			1-1/2" (40mm) Reduced Port			1-1/2" (40mm) Full Port			2" (50mm) Full Port			3" (80mm) Full Port		
		Droop			Droop			Droop			Droop			Droop			Droop			Droop		
psig	(Barg)	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
10	(.69)	.24	.39	.63	.55	.93	1.37	.90	1.56	2.09	.65	.88	1.34	1.42	2.18	4.38	1.46	2.42	5.42	1.79	2.63	7.45
15	(1.03)	.31	.65	1.11	.58	1.22	1.88	1.43	2.15	2.94	.68	1.12	1.66	1.73	3.96	5.76	2.11	4.13	7.98	2.28	4.27	8.86
20	(1.38)	.45	1.03	1.40	1.03	1.80	2.40	1.80	2.98	3.67	.84	1.43	2.07	2.46	4.80	6.47	2.52	5.64	9.41	2.78	5.90	10.27
25	(1.72)	.50	1.37	2.00	1.03	1.92	2.56	2.22	3.57	4.26	.91	1.66	2.45	3.06	5.20	7.25	3.16	7.00	9.53	3.27	7.54	11.68
30	(2.07)	.65	1.61	2.00	1.44	2.35	2.88	2.61	4.08	5.39	.97	1.84	2.78	3.13	5.39	7.61	3.34	7.26	10.40	3.77	9.17	13.09
RANGE SPRING 10-75 psig																						
Set Pressure		3/4" (20mm) Full Port			1" (25mm) Reduced Port			1" (25mm) Full Port			1-1/2" (40mm) Reduced Port			1-1/2" (40mm) Full Port			2" (50mm) Full Port			3" (80mm) Full Port		
		Droop			Droop			Droop			Droop			Droop			Droop			Droop		
psig	(Barg)	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
10	(.69)	.16	.26	.62	.31	.42	.64	.53	1.01	1.51	.50	.90	1.30	1.20	1.49	1.88	2.71	4.42	5.92	1.80	3.49	5.14
15	(1.03)	.22	.37	.71	.38	.53	.74	.58	1.13	1.72	.53	.96	1.36	1.30	1.88	2.73	2.95	4.85	6.56	1.88	4.03	6.13
20	(1.38)	.25	.55	.86	.42	.63	1.02	.63	1.25	1.93	.76	1.27	1.83	1.39	2.35	3.53	3.19	5.29	7.20	1.97	4.56	7.13
25	(1.72)	.35	.78	1.10	.49	.84	1.38	.68	1.37	2.14	.79	1.49	1.96	1.46	2.60	4.20	3.43	5.72	7.84	2.05	5.10	8.12
30	(2.07)	.44	.92	1.29	.59	1.08	1.73	.73	1.49	2.35	.87	1.50	2.24	1.56	3.24	5.01	3.67	6.15	8.48	2.14	5.63	9.12
35	(2.41)	.60	1.12	1.59	.64	1.28	1.96	.78	1.61	2.56	1.00	1.87	2.67	1.59	3.27	5.07	3.91	6.59	9.12	2.22	6.17	10.11
40	(2.75)	.64	1.25	1.71	.71	1.48	2.18	.83	1.73	2.77	1.03	1.88	2.70	1.74	3.78	5.48	4.15	7.02	9.76	2.31	6.70	11.10
45	(3.10)	.68	1.31	1.81	.76	1.59	2.36	.88	1.85	2.98	1.45	2.24	3.07	1.92	4.18	5.70	4.38	7.45	10.40	2.39	7.24	12.10
50	(3.45)	.88	1.54	2.00	.89	1.81	2.48	.93	1.97	3.18	1.52	2.37	3.43	2.20	4.52	6.09	4.62	7.89	11.04	2.48	7.77	13.09
55	(3.79)	.90	1.60	2.00	.92	1.85	2.68	.98	2.09	3.39	1.59	2.42	3.52	2.28	4.85	6.21	4.86	8.32	11.68	2.56	8.31	14.08
60	(4.14)	.94	1.70	2.00	.98	1.91	2.69	1.03	2.21	3.60	1.63	2.62	3.68	2.35	4.95	6.65	5.10	8.75	12.32	2.65	8.84	15.08
65	(4.48)	.96	1.78	2.00	1.04	2.11	2.84	1.08	2.33	3.81	1.66	2.67	3.84	2.62	5.22	7.16	5.34	9.19	12.96	2.73	9.38	16.07
70	(4.83)	.99	1.84	2.00	1.09	2.19	2.94	1.13	2.45	4.02	1.68	2.71	3.92	2.78	5.32	7.18	5.58	9.62	13.60	2.82	9.91	17.07
75	(5.17)	1.12	1.94	2.00	1.14	2.31	3.00	1.18	2.58	4.23	1.71	2.76	4.07	2.85	5.49	7.44	5.82	10.05	14.24	2.90	10.45	18.06

TABLE 2A
STEAM CAPACITY – #/Hr (10-30 psig Range Spring)
S.G. Actual T = Saturated F_L = 0.8
NOTE: 1-1/2" Reduced Port Capacities Approach that of 1" Full Port Performance

P2 - OUTLET PRESSURE		P1 - INLET PRESSURE		PRESSURE DROP		#/Hr @ 3/4" FULL PORT				#/Hr @ 1" INV. CAST RED. PORT				#/Hr @ 1" FULL PORT			
psig (Barg)		psig (Barg)		psid (Bard)		DROOP				DROOP				DROOP			
						10%	20%	30%	MAX	10%	20%	30%	MAX	10%	20%	30%	MAX
10	(0.7)	25	(1.7)	15	(1.0)	14	23	36	81	32	54	79	142	52	90	121	243
		50	(3.4)	40	(2.8)	24	39	63	149	55	92	136	260	89	155	208	446
		75	(5.2)	65	(4.5)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
15	(1.0)	25	(1.7)	10	(0.7)	16	34	58	66	30	63	98	116	74	112	153	198
		50	(3.4)	35	(2.4)	30	63	107	145	56	118	182	253	138	208	284	434
		75	(5.2)	60	(4.1)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
20	(1.4)	25	(1.7)	5	(0.3)	18	41	56	47	41	72	97	82	72	120	148	140
		50	(3.4)	30	(2.1)	43	98	133	134	98	171	228	235	171	283	349	402
		75	(5.2)	55	(3.8)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
25	(1.7)	50	(3.4)	25	(1.7)	46	127	186	122	96	178	238	214	206	331	395	367
		75	(5.2)	50	(3.4)	67	185	270	195	139	259	345	342	299	481	574	586
		100	(6.9)	75	(5.2)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
30	(2.1)	50	(3.4)	20	(1.4)	57	142	177	109	127	208	254	192	231	360	476	328
		75	(5.2)	45	(3.1)	85	211	263	185	189	308	378	324	343	536	707	556
		100	(6.9)	70	(4.8)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP

P2 - OUTLET PRESSURE		P1 - INLET PRESSURE		PRESSURE DROP		#/Hr @ 1-1/2" FULL PORT				#/Hr @ 2" FULL PORT				#/Hr @ 3" FULL PORT			
psig (Barg)		psig (Barg)		psid (Bard)		DROOP				DROOP				DROOP			
						10%	20%	30%	MAX	10%	20%	30%	MAX	10%	20%	30%	MAX
10	(0.7)	25	(1.7)	15	(1.0)	82	126	253	485	84	140	313	768	103	152	430	1092
		50	(3.4)	40	(2.8)	141	216	435	891	145	240	538	1411	178	261	740	2005
		75	(5.2)	65	(4.5)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
15	(1.0)	25	(1.7)	10	(0.7)	90	206	300	396	110	215	415	627	119	222	LO DP	891
		50	(3.4)	35	(2.4)	167	383	557	869	204	400	772	1375	221	413	857	1954
		75	(5.2)	60	(4.1)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
20	(1.4)	25	(1.7)	5	(0.3)	99	193	260	280	101	227	379	444	112	237	LO DP	630
		50	(3.4)	30	(2.1)	234	457	615	804	240	536	895	1273	264	561	977	1809
		75	(5.2)	55	(3.8)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
25	(1.7)	50	(3.4)	25	(1.7)	284	482	673	734	293	649	884	1162	303	700	1084	1652
		75	(5.2)	50	(3.4)	413	701	978	1171	426	944	1285	1854	441	1017	1575	2635
		100	(6.9)	75	(5.2)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
30	(2.1)	50	(3.4)	20	(1.4)	276	476	672	657	295	641	918	1040	333	810	1156	1477
		75	(5.2)	45	(3.1)	411	707	999	1111	438	953	1365	1759	495	1204	1718	2500
		100	(6.9)	70	(4.8)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP

NOTE: Where "HI DP" is indicated, the actual pressure drop has exceeded the recommended limits. Refer to "Maximum Pressure Drop" under "Specifications" on page 2.

See Page 6 for Table 2B

TABLE 3
Capacity – Cv FL = 0.8
Option -20: Pressure loaded

Size		Body	Cv @ 10 psi Droop*
in	(mm)	Configuration (Port)	
3/4"	(20)	Forged (Full)	2.0
1"	(25)	Investment Cast (Reduced)	2.8
1"	(25)	Forged (Full)	5.3
1-1/2"	(40)	Forged (Reduced)	2.7
1-1/2"	(40)	Forged (Full)	7.6
2"	(50)	Forged (Full)	10.4
3"	(80)	Forged (Full)	13.0

TABLE 4
Maximum Cv with Plug Locked Wide Open
(Use for Relief Valve Sizing)

Body Size		Configuration (Port)	Cv
inch	(mm)		
3/4"	(20)	Forged (Full)	2.0
1"	(25)	Investment Cast (Reduced)	3.5
1"	(25)	Forged (Full)	6.0
1-1/2"	(40)	Forged (Reduced)	10.0
1-1/2"	(40)	Forged (Full)	12.0
2"	(50)	Forged (Full)	19.0
3"	(80)	Forged (Full)	27.0

*With 10-30 psig range spring.

TABLE 2B
STEAM CAPACITY – #/Hr (10-75 psig Range Spring)
S.G. Actual T = Saturated F_L = 0.8
NOTE: 1-1/2" Reduced Port Capacities Approach that of 1" Full Port Performance

P2 - OUTLET PRESSURE		P1 - INLET PRESSURE		PRESSURE DROP		#/Hr @ 3/4" FULL PORT				#/Hr @ 1" INV. CAST RED. PORT				#/Hr @ 1" FULL PORT			
psig	(Barg)	psig	(Barg)	psid	(Bard)	DROOP				DROOP				DROOP			
						10%	20%	30%	MAX	10%	20%	30%	MAX	10%	20%	30%	MAX
10	(0.7)	25	(1.7)	15	(1.0)	9	15	36	81	18	24	37	142	31	58	87	243
		50	(3.4)	40	(2.8)	16	26	62	149	31	42	64	260	53	100	150	446
		75	(5.2)	65	(4.5)	22	35	85	197	42	57	87	345	72	138	206	592
		100	(6.9)	90	(6.2)	28	45	108	246	54	73	111	431	92	175	262	738
		125	(8.6)	115	(7.9)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
15	(1.0)	25	(1.7)	10	(0.7)	11	19	37	66	20	28	39	116	30	59	89	198
		50	(3.4)	35	(2.4)	21	36	69	145	37	51	72	253	56	109	166	434
		75	(5.2)	60	(4.1)	30	50	97	197	52	72	101	345	79	154	235	592
		100	(6.9)	85	(5.9)	38	64	123	246	66	92	128	431	101	196	298	738
		125	(8.6)	110	(7.6)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
20	(1.4)	25	(1.7)	5	(0.3)	10	22	35	47	17	25	41	82	25	50	78	140
		50	(3.4)	30	(2.1)	24	52	82	134	40	60	97	235	60	119	184	402
		75	(5.2)	55	(3.8)	34	75	117	197	57	86	139	345	86	170	263	592
		100	(6.9)	80	(5.5)	43	95	149	246	73	109	177	431	109	217	335	738
		125	(8.6)	105	(7.2)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
25	(1.7)	50	(3.4)	25	(1.7)	33	72	102	122	46	78	128	214	63	127	199	367
		75	(5.2)	50	(3.4)	47	105	148	195	66	113	186	342	92	185	289	586
		100	(6.9)	75	(5.2)	61	135	191	246	85	146	239	431	118	238	371	738
		125	(8.6)	100	(6.9)	74	164	231	294	103	176	290	515	143	288	450	883
		150	(10.3)	125	(8.6)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
30	(2.1)	50	(3.4)	20	(1.4)	39	81	114	109	52	95	153	192	65	132	208	328
		75	(5.2)	45	(3.1)	58	121	169	185	77	142	227	324	96	196	308	556
		100	(6.9)	70	(4.8)	76	160	224	246	102	187	300	431	127	258	407	738
		125	(8.6)	95	(6.6)	92	193	271	294	124	227	363	515	153	313	494	883
		150	(10.3)	120	(8.3)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
40	(2.8)	50	(3.4)	10	(0.7)	45	88	120	77	50	104	153	135	58	121	194	232
		75	(5.2)	35	(2.4)	82	160	218	163	91	189	278	286	106	221	354	490
		100	(6.9)	60	(4.1)	107	209	286	236	119	247	364	413	139	289	463	707
		125	(8.6)	85	(5.9)	134	263	359	294	149	311	458	515	174	363	582	883
		150	(10.3)	110	(7.6)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
50	(3.4)	75	(5.2)	25	(1.7)	104	182	236	138	105	213	292	242	110	232	375	414
		100	(6.9)	50	(3.4)	145	254	330	215	147	299	409	377	153	325	525	646
		125	(8.6)	75	(5.2)	179	314	408	286	182	369	506	500	190	402	648	857
		150	(10.3)	100	(6.9)	217	379	493	342	219	446	611	598	229	485	784	1026
		75	(5.2)	15	(1.0)	93	168	198	107	97	189	267	187	102	219	357	321
60	(4.1)	100	(6.9)	40	(2.8)	149	270	318	193	156	303	427	337	164	351	571	577
		125	(8.6)	65	(4.5)	189	342	403	266	197	384	541	465	207	445	725	798
		150	(10.3)	90	(6.2)	227	410	483	335	237	461	649	586	249	533	869	1005
		75	(5.2)	5	(0.3)	61	114	123	62	67	135	181	108	70	151	248	185
		100	(6.9)	30	(2.1)	146	271	294	167	160	322	433	292	166	360	591	500
70	(4.8)	125	(8.6)	55	(3.8)	195	362	394	245	215	431	579	428	223	483	792	734
		150	(10.3)	80	(5.5)	235	436	474	316	258	519	696	552	268	580	952	947
		100	(6.9)	25	(1.7)	155	269	277	152	158	320	416	266	164	358	587	457
		125	(8.6)	50	(3.4)	217	375	387	233	221	447	580	408	228	499	818	700
		150	(10.3)	75	(5.2)	264	457	471	306	269	544	707	535	278	608	997	917
P2 - OUTLET PRESSURE	P1 - INLET PRESSURE	PRESSURE DROP	#/Hr @ 1-1/2" FULL PORT				#/Hr @ 2" FULL PORT				#/Hr @ 3" FULL PORT						
			DROOP				DROOP				DROOP						
psig	(Barg)	psig	(Barg)	psid	(Bard)	10%	20%	30%	MAX	10%	20%	30%	MAX	10%	20%	30%	MAX
						10%	20%	30%	MAX	10%	20%	30%	MAX	10%	20%	30%	MAX
10	(0.7)	25	(1.7)	15	(1.0)	69	86	109	485	156	255	342	768	104	201	297	1092
		50	(3.4)	40	(2.8)	119	148	187	891	269	439	588	1411	179	346	510	2005
		75	(5.2)	65	(4.5)	164	203	256	1184	369	603	807	1874	245	476	701	2664
		100	(6.9)	90	(6.2)	208	258	326	1476	470	766	1026	2337	312	605	891	3321
		125	(8.6)	115	(7.9)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
15	(1.0)	25	(1.7)	10	(0.7)	68	98	142	396	153	252	341	627	98	210	LO DP	891
		50	(3.4)	35	(2.4)	126	182	264	869	285	469	635	1375	182	390	593	1954
		75	(5.2)	60	(4.1)	177	256	372	1184	402	661	894	1874	256	549	836	2664
		100	(6.9)	85	(5.9)	225	326	473	1476	511	841	1137	2337	326	699	1063	3321
		125	(8.6)	110	(7.6)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
20	(1.4)	25	(1.7)	5	(0.3)	56	95	142	280	128	213	290	444	79	184	LO DP	630
		50	(3.4)	30	(2.1)	132	224	336	804	303	503	685	1273	187	434	678	1809
		75	(5.2)	55	(3.8)	190	320	481	1184	435	721	981	1874	269	622	972	2664
		100	(6.9)	80	(5.5)	241	407	612	1476	553	917	1248	2337	342	790	1236	3321
		125	(8.6)	105	(7.2)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
25	(1.7)	50	(3.4)	25	(1.7)	136	241	390	734	318	531	727	1162	190	473	753	1652
		75	(5.2)	50	(3.4)	197	351	566	1171	463	771	1057	1854	276	688	1095	2635
		100	(6.9)	75	(5.2)	253	451	728	1476	595	992	1359	2337	355	884	1408	3321
		125	(8.6)	100	(6.9)	307	546	882	1765	720	1201	1647	2794	431	1071	1706	3971
		150	(10.3)	125	(8.6)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
30	(2.1)	50	(3.4)	20	(1.4)	138	286	442	657	324	543	749	1040	189	497	805	1477
		75	(5.2)	45	(3.1)	205	425	658	1111	482	807	1113	1759	281	739	1197	2500
		100	(6.9)	70	(4.8)	270	562	868	1476	636	1066	1470	2337	371	976	1581	3321
		125	(8.6)	95	(6.6)	328	681	1052	1765	771	1292	1781	2794	450	1183	1916	3971
		150	(10.3)	120	(8.3)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
40	(2.8)	50	(3.4)	10	(0.7)	122	265	384	464	491	683	735	162	469	LO DP	1045	
		75	(5.2)	35	(2.4)	222	482	699	980	530	896	1246	1551	295	855	1417	2205
		100	(6.9)	60	(4.1)	291	632	916	1414	693	1173	1631	2239	386	1119	1855	3182
		125	(8.6)	85	(5.9)	366	794	1151	1765	872	1474	2050	2794	485	1407	2331	3971
		150	(10.3)	110	(7.6)	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
50	(3.4)	75	(5.2)	25	(1.7)	259	533	718	828	545	930	1311	292	916	1543	1863	
		100	(6.9)	50	(3.4)	363	746	1005	1291	762	1302	1822	2044	409	1282	2160	2905
		125	(8.6)	75	(5.2)	449	922	1242	1713	942	1609	2251	2713	506	1584	2669	3855
		150	(10.3)	100	(6.9)	542	1114	1501	2051	1138	1944	2720	3248	611	1914	3225	4615
		75	(5.2)	15	(1.0)	233	490	659	841	505	867	1221	1016	263	876	1494	1443
60	(4.1)	100	(6.9)	40	(2.8)	373	786	1056	1155	810	1389	1956	1828	421	1403	2394	2598
		125	(8.6)	65	(4.5)	473	996	1339	1595	1027	1761	2480	2526	533	1779	3035	3589
		150	(10.3)	90	(6.2)	567	1195	1605	2009	1231	2112	2973	3181	640	2133	3639	4520
		75	(5.2)	5	(0.3)	172	328	443	370	LO DP	593	839	586	174	611	LO DP	833
		100	(6.9)	30	(2.1)	409	783	1056	1000	821	1415	2001	1584	415	1458	2511	2250

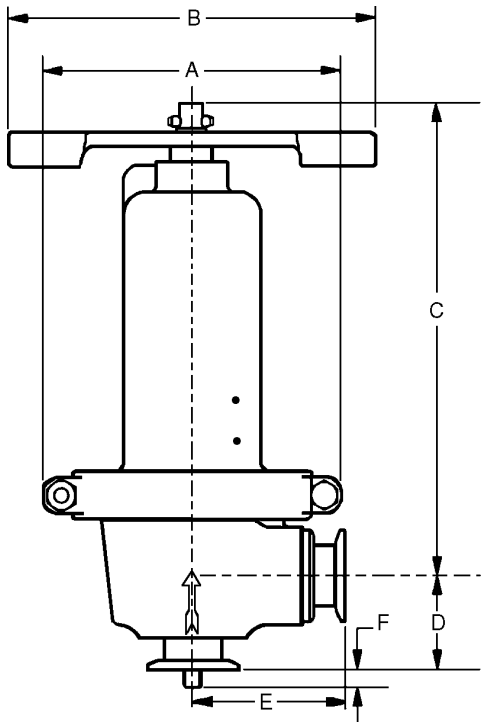


Figure 3:
Forged Body
Model C-CS

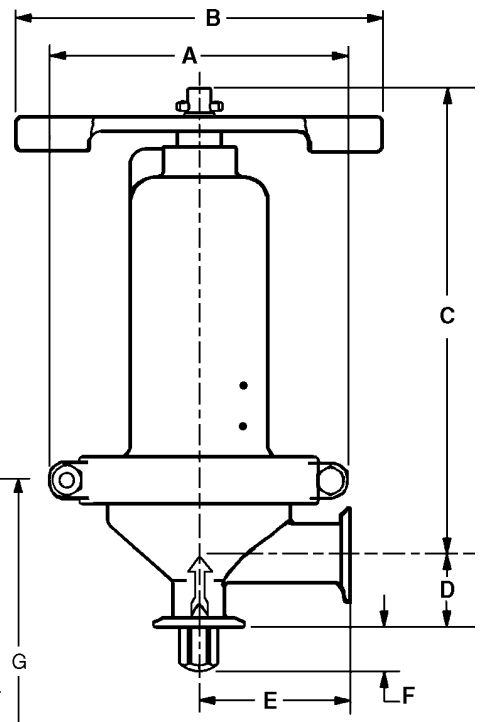


Figure 4:
Investment Cast Body
Model C-CS

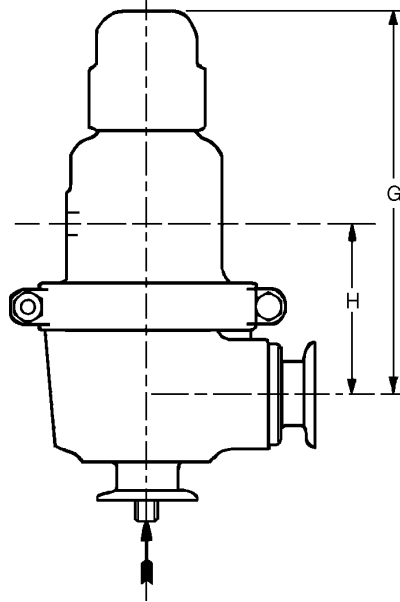


Figure 5:
Forged Body
Model C-CS-20

TABLE 5
DIMENSIONS

Regulator Size (Inches)	ENGLISH UNITS								Shipping Weight lbs.
	FORGED BODY-inch								
	A	B	C	D	E	F	G	H	
3/4"	7.50	8.00	10.13	2.00	3.31	0.32	NA	NA	22
1" (Full)	7.50	8.00	10.15	2.00	3.31	0.38	9.00	3.28	22
1-1/2" (Reduced)	7.50	8.00	10.15	2.00	3.31	0.44	9.00	3.28	22
1-1/2" (Full)	9.50	8.00	12.79	2.60	4.50	0.44	9.30	3.65	35
2"	9.50	8.00	12.79	2.60	4.50	0.57	9.30	3.65	35
3"	9.50	8.00	13.38	2.57	4.50	0.75	9.80	4.15	42
	INVESTMENT CAST BODY								
1" (Reduced)	7.75	8.00	9.94	2.00	3.31	0.94	9.00	3.28	15
Regulator Size (mm)	METRIC UNITS								Shipping Weight kgs.
	FORGED BODY-inch								
	A	B	C	D	E	F	G	H	
20	190	203	257	50	84	8	NA	NA	9.9
25 (Full)	190	203	258	50	84	10	228	83	9.9
40 (Reduced)	190	302	258	50	84	11	228	83	9.9
40 (Full)	241	203	325	66	114	11	236	93	15.8
50	241	203	325	66	114	14	236	93	15.8
80	241	203	340	65	114	19	249	105	19.0
	INVESTMENT CAST BODY								
25 (Reduced)	190	203	252	50	84	24	228	83	6.8

TABLE 2

SST BODY / SPRING CHAMBER	BODY SIZES	CODE
316L Forged Body / 316 Investment Cast	All	F
316L Investment Cast / 316 Investment Cast	1" w/reduced port only	M

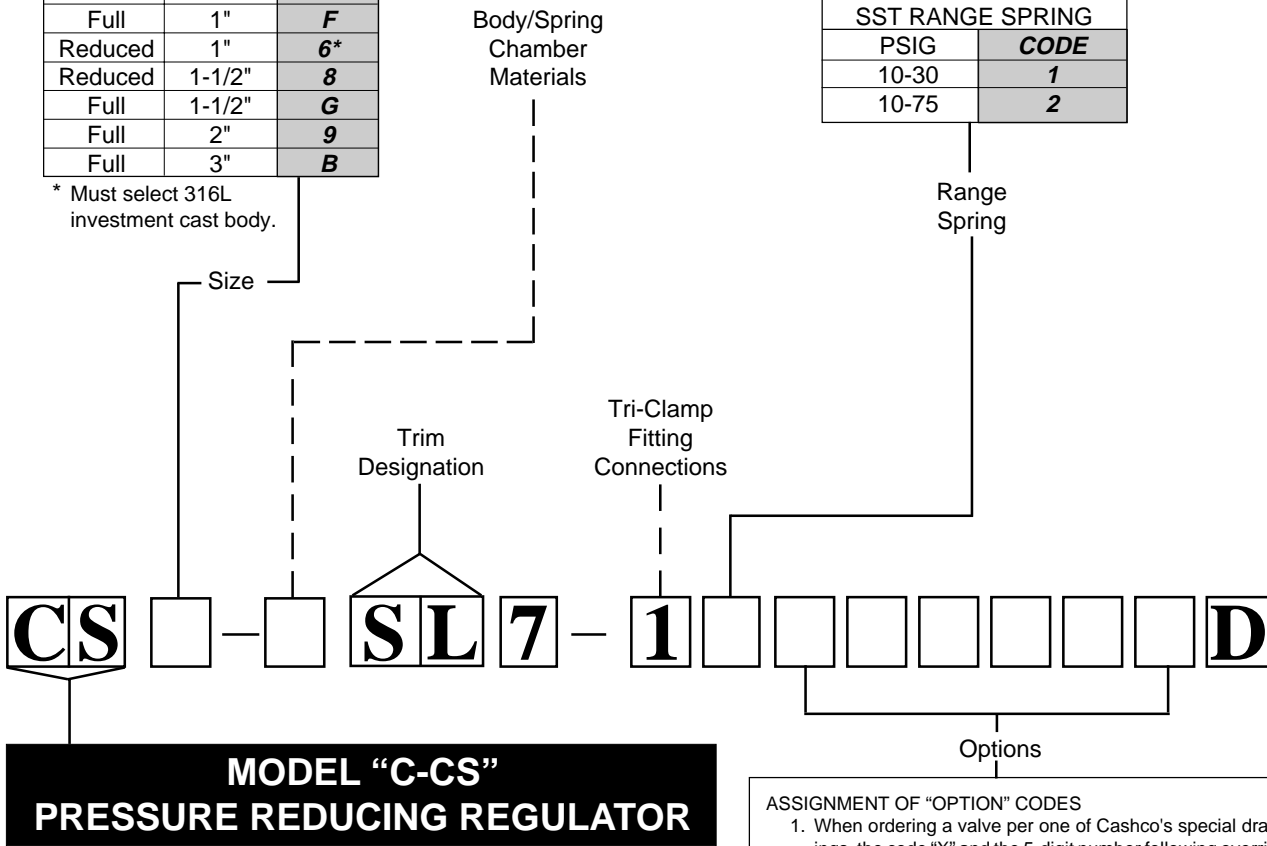
TABLE 1

PORT	SIZE	CODE
Full	3/4"	5
Full	1"	F
Reduced	1"	6*
Reduced	1-1/2"	8
Full	1-1/2"	G
Full	2"	9
Full	3"	B

* Must select 316L investment cast body.

TABLE 3

SST RANGE SPRING	
PSIG	CODE
10-30	1
10-75	2



ASSIGNMENT OF "OPTION" CODES

1. When ordering a valve per one of Cashco's special drawings, the code "X" and the 5-digit number following override all other options. Otherwise, proceed with the following.
2. NUMERIC digits assigned first in "ascending" order.
3. ALPHA designations are assigned second (excluding the "X" in "alphabetical" order).
4. Left justify.
5. Add "0" to all unused squares.
6. If insufficient quantity of squares, consult factory for proper code.

TABLE 4

DESCRIPTION	OPTION	CODE
None	—	0
Special Construction	—	X
Diaphragm Restraint	-11	2
Air Pressure (DOME) Loaded Construction	-20	8