



MODEL C-BPV

BACK PRESSURE/RELIEF REGULATOR

3/4" - 3" (DN20 - DN80)

The Model C-BPV* is a 316L SST self-contained back pressure/relief regulator designed for liquid or gaseous fluids utilized in sanitary biotechnological process piping systems. The unit is capable of controlling inlet pressure to setpoint levels between 2-125 psig (.14-8.6 Barg).



**1" MODEL C-BPV
with Investment Body**
(pictured with hex adjustment nut)

CAUTION

This is not a safety device and must not be substituted for a code approved pressure safety relief valve or a rupture disc. CONTACT FACTORY BEFORE APPLYING IN CONTINUOUS STEAM SERVICE!

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 and other similar equipment.

FEATURES

- Clean-in-Place (CIP):** Lock-open lever feature on the spring chamber area allows the regulator to be cleaned with 50 psig (3.45 Barg) cleaning solution.
- Steam-in-Place (SIP):** The combination of materials allows for steam-in-place up to 20 psig (1.38 Barg) of saturated steam.
- Self-Draining:** Angle style body with side inlet and bottom outlet.
- Readily Accessible:** Unit can be easily and quickly disassembled in-line for inspection and manual cleaning.
- Polished Interior:** Interior of body surface electropolished to 10 micro-inch R_a finish with electro-polished exterior.
- Wetted Materials Construction:** All metallic wetted parts of 316L SST. All diaphragms and some plug/stem selections are of non-metallic materials. Unit is cleaned to Cashco Spec. #S-1576.
- 3A Construction:** Selection of the metallic plug/stem constructions meets 3A Sanitary Standards, Authorization No. 782.
- Setpoint Adjustment:** The pressure setpoint is adjusted with a hex adjusting nut as illustrated or with, opt - 4 Tee Handle.



SPECIFICATIONS

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

Body Size and Material: **3/4", 1", 1-1/2", 2", 3" (DN20, 25, 40, 50, 80) size.**
ASTM A182, Gr. F316L; Forged 316L SST for superior quality and finish. Interior and exterior of body material is electro-polished.

1" (DN25) size only.
ASTM A351, Gr. CF3M; Investment Cast 316L SST. Interior of standard body material is mechanically polished to 10 micro-inch R_a finish with electro-polished exterior.

See Table 5 for dimensions.

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

Diaphragm Clamp: 304 SST Tri-Clamp® 1-piece design with thumbscrew fastener. Alternate: **See Opt.-80**

Body Design Pressure vs. Temperature Rating: Inlet & Outlet; See Table 1. Up to 150 psig (10.3 Barg). Up to 300°F (149°C).

Operating Pressure and Spring Ranges: Recommended maximum pressure build = 30%.
NOTE: Contact the factory for setting below 2 psig (.14 Barg).

SST Range Springs	
psig	(Barg)
2-15	(.14-1.0)
10-30	(.69-2.1)
20-75	(1.4-5.2)
60-125	(4.1-8.6)

Maximum Pressure Drop: Function of range spring and setpoint pressure utilized; See Table 2.

Maximum CIP Conditions: Maximum Cleaning Fluid: Pressure = 50 psig (3.45 Barg); Temperature = 300°F (149°C)

Maximum SIP Conditions: Saturated steam only. Recommended Pressure = 20 psig (1.38 Barg) Maximum Pressure = 30 psig (2.07 Barg); at reduced elastomer life.

Seat Leakage: ANSI/FCI 70-2 (Rev. 1982). Class IV. **Not designed for continuous shutoff service.**

Capacity: Up to 27 Cv. See Table 2 for Cv vs Setpoint pressure vs body size. ($K_v = C_v / 1.17$). See Table 3 — Water capacities. See Table 4 — GN_2 capacities.

Wetted Trim Materials:

Trim Material Combinations 3A Approved				
Part	Trim Designation No.			
	LC	LE	LV	LG
Diaphragm	Silicone	EPDM	FKM	GYLON
Stem & Plug	316L SST	316L SST	316L SST	316L SST
These materials conform with FDA Code of Federal Regulations Title 21, Part 177.2600 . For LG See Option -80				

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

Special Cleaning: Units cleaned per Cashco Spec. #S-1576

TABLE A
Maximum Cv with Plug Locked Wide Open
(Use for Relief Valve Sizing and Initial Flow into an evacuated chamber.)

Body Size		Configuration (Port)	Cv
inch	(DN)		
3/4"	(20)	Forged (full)	4.4
1"	(25)	Investment Cast (full)	4.4
1"	(25)	Forged (full)	4.4
1-1/2"	(40)	Forged (reduced)	6.5
1-1/2"	(40)	Forged (full)	14.0
2"	(50)	Forged (full)	20.0
3"	(80)	Forged (full)	27.0

OPTION SPECIFICATIONS

Option -4: TEE HANDLE. SST material. Utilize for frequent setpoint changes.

Option -80: TRI-CLAMP 2 PIECE BOLTED. SST bolts and fastener designed for higher pressure and temperature ratings. Required for use with "LG" Trim. (See Table 1.) (Requires wrenches for disassembly.)

TECHNICAL SPECIFICATIONS

TABLE 1a
MAXIMUM PRESSURE VS. TEMPERATURE RATINGS
for LE / LV / LC TRIMS

Body & Port Size	Maximum Pressure		Temperature Range	
1 PIECE THUMBSCREW CLAMP (Standard)				
3/4", 1" Full Port, 1-1/2" Reduced Port	psig	(Barg)	°F	(°C)
	150	(10.3)	+40 to +300	(+4 to +149)
1-1/2" Full Port, 2", 3"	150	(10.3)	+40 to +70	(+4 to +21)
	75	(5.2)	+40 to +300	(+4 to +149)
2 PIECE BOLTED CLAMP - Opt -80 on Lower Spring Ranges, - Standard on 60-125 psig spring range.				
3/4", 1" Full Port, 1-1/2" Reduced & Full Port 2", 3"	150	(10.3)	+40 to +300	(+4 to +149)

TABLE 1 b
MAXIMUM PRESSURE VS. TEMPERATURE RATINGS
for CONTINUOUS STEAM SERVICE
WITH LG TRIM

Body & Port Size	Maximum Pressure		Temperature Range	
2 PIECE BOLTED CLAMP - OPT-80 - Standard all spring ranges				
3/4", 1" Full Port, 1-1/2" Reduced & Full Port 2", 3"	psig	(Barg)	°F	(°C)
	80	(5.5)	+40 to +353	(+4 to +178)

TABLE 2
CAPACITY – Cv (F_L = 0.85)

2-15 psig Spring Range															
PSP	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%
5	0.50	0.80	1.10	0.70	1.10	1.5	1.50	2.60	3.80	2.50	4.60	6.50	2.90	5.00	7.7
10	0.70	1.30	1.80	1.00	1.80	2.5	2.30	4.30	6.40	3.90	7.20	10.70	4.40	8.80	13.8
15	1.00	1.90	2.60	1.40	2.60	3.6	2.80	5.40	8.60	4.90	9.10	12.50	5.50	11.50	18.8
10-30 psig Spring Range															
PSP	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%
10	0.7	1.3	1.6	0.8	1.7	2.2	1.7	3.0	4.3	2.4	4.1	6.0	2.7	4.9	7.5
15	1.0	1.7	2.4	1.2	2.2	2.9	2.2	4.1	6.0	3.1	5.6	8.4	3.6	6.8	9.2
20	1.1	1.9	2.6	1.5	2.4	3.2	2.6	5.0	7.8	3.7	7.0	10.9	4.3	8.9	12.0
25	1.2	2.0	3.0	1.5	2.7	3.6	3.0	5.9	9.1	4.4	8.2	13.0	5.0	9.9	14.2
30	1.3	2.5	3.4	1.8	2.9	4.1	3.4	6.8	10.8	4.8	9.4	15.2	5.8	11.0	16.1
20-75 psig Spring Range															
PSP	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%
20	0.5	0.9	1.3	0.8	1.3	1.9	1.6	2.9	4.1	2.2	4.0	5.8	2.6	4.8	7.1
30	0.8	1.3	1.9	1.2	1.9	2.8	2.1	3.9	5.7	2.9	5.4	8.0	3.4	6.6	10.1
40	1.0	1.6	2.4	1.4	2.2	3.3	2.6	4.8	7.2	3.6	6.8	10.1	4.1	8.6	13.0
50	1.1	2.0	2.6	1.5	2.9	3.7	2.9	5.6	8.6	4.1	7.7	12.4	4.8	10.2	16.2
60	1.3	2.3	3.0	1.8	3.3	4.3	3.3	5.8	9.6	4.6	8.9	14.3	5.5	11.6	18.8
75	1.5	2.6	3.4	2.1	3.8	5.0	3.7	7.6	12.0	5.3	10.5	17.0	6.3	14.0	21.9
60-125 psig Spring Range															
PSP	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%	Cv @10%	Cv @20%	Cv @30%
60	0.8	1.2	1.6	1.0	1.8	2.4	2.8	5.2	8.0	3.9	7.2	11.4	4.4	9.4	13.9
75	0.9	1.4	1.8	1.2	2.1	2.8	3.2	6.1	9.6	4.5	8.5	13.1	5.3	10.9	16.8
90	1.2	1.6	2.2	1.4	2.4	3.2	3.5	7.1	11.1	5.0	9.9	15.1	5.9	12.6	20.7
100	1.2	1.7	2.3	1.4	2.6	3.4	3.7	7.7	12.0	5.3	10.5	16.4	6.4	14.0	22.8
120	1.3	1.9	2.5	1.6	2.9	3.9	4.2	8.7	13.7	5.9	12.0	18.7	7.2	16.0	26.0

TABLE 3
WATER CAPACITY – GPM
S.G. = 1.0 T = 60° F (F_L = 0.85)

Recommended flow rate (gpm) limitation to ensure the fluid velocity through the valve body is not excessive		
Regulator Size	Maximum Velocity (fps)	Maximum flow rate (gpm)
3/4, 1"	20	25
1.5" Reduced Port	20	50
1.5" Full Port	25	75
2"	25	125
3"	30	300

Qmax is maximum flow in gpm at the given inlet pressure and outlet setpoint

2-15 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	5	1.2	2.0	2.8	1.6	2.7	3.8	3.5	6.4	9.7	5.9	11.3	16.6	6.8	12.2	19.6
0	10	2.3	4.5	6.5	3.3	6.2	9.0	7.6	14.9	23.1	12.9	24.9	38.6	14.6	30.5	49.8
0	15	4.1	8.1	11.5	5.7	11.0	15.9	11.4	22.9	38.0	19.9	38.6	55.2	22.3	48.8	83.0
5	10	1.7	3.4	5.1	2.5	4.8	7.1	5.6	11.4	18.1	9.6	19.1	30.3	10.8	23.3	39.0
5	15	3.4	6.9	9.9	4.7	9.4	13.7	9.5	19.5	32.7	16.6	32.8	47.6	18.7	41.5	71.6
10	15	2.6	5.4	8.0	3.6	7.4	11.1	7.1	15.3	26.5	12.5	25.7	38.5	14.0	32.5	57.9
10-30 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	10	2.3	4.5	5.8	2.7	5.9	7.9	5.6	10.4	15.5	8.0	14.2	21.6	9.0	17.0	27.0
0	15	4.1	7.2	10.6	4.9	9.3	12.8	8.9	17.4	26.5	12.6	23.8	37.1	14.6	28.9	40.6
0	20	5.2	9.3	13.9	7.2	11.8	17.1	12.2	24.5	41.8	17.4	34.3	58.3	20.2	43.6	64.2
0	25	6.3	11.2	17.3	7.9	15.2	20.8	15.7	33.1	52.6	23.1	46.1	75.1	26.2	55.6	82.0
0	30	7.5	15.0	21.0	10.5	17.4	25.3	19.7	40.7	66.6	27.9	56.3	93.8	33.7	65.9	99.3
5	10	1.7	3.4	4.5	2.0	4.5	6.2	4.2	7.9	12.2	5.9	10.8	17.0	6.6	13.0	21.2
5	15	3.4	6.1	9.1	4.1	7.9	11.0	7.5	14.8	22.8	10.5	20.2	32.0	12.2	24.5	35.0
5	20	4.5	8.3	11.9	6.4	10.5	14.7	10.7	21.8	35.7	15.3	30.5	50.0	17.7	38.8	55.0
5	25	5.7	10.0	15.7	7.1	13.5	18.9	14.2	29.5	47.7	20.9	41.0	68.2	23.7	49.5	74.5
5	30	6.9	13.9	21.0	9.5	16.1	25.3	18.0	37.9	66.6	25.4	52.3	93.8	30.7	61.2	99.3
10	15	2.6	4.8	7.4	3.1	6.2	8.9	5.6	11.6	18.5	7.9	15.8	25.9	9.2	19.2	28.4
10	20	3.8	7.1	10.4	5.3	9.0	12.8	9.0	18.7	31.2	12.8	26.2	43.6	14.9	33.3	48.0
10	25	5.0	8.9	14.2	6.3	12.1	17.1	12.6	26.4	43.2	18.4	36.7	61.7	20.9	44.3	67.4
10	30	6.2	12.7	18.3	8.6	14.8	22.1	16.3	34.7	58.2	23.0	47.9	81.9	27.8	56.1	86.7
15	20	2.9	5.7	8.6	4.1	7.2	10.6	6.9	15.0	25.9	9.8	21.0	36.2	11.4	26.7	39.8
15	25	4.2	7.7	12.6	5.3	10.5	15.1	10.6	22.9	38.1	15.6	31.8	54.4	17.7	38.3	59.4
15	30	5.5	11.5	16.7	7.6	13.3	20.1	14.4	31.2	52.9	20.4	43.1	74.5	24.6	50.4	78.9
20	25	3.3	6.3	10.6	4.1	8.5	12.7	8.2	18.7	32.2	12.1	25.9	46.0	13.7	31.3	50.2
20	30	4.7	10.0	14.8	6.5	11.6	17.9	12.3	27.2	47.1	17.3	37.6	66.3	20.9	44.0	70.2
25	30	3.7	8.3	12.7	5.1	9.6	15.3	9.6	22.6	40.4	13.6	31.2	56.9	16.4	36.5	60.2

**TABLE 3 (cont.):
WATER CAPACITY – GPM
S.G. =1.0 T = 60° F (F_L = 0.85)**

Qmax is maximum flow in gpm at the given inlet pressure and outlet setpoint.																
20-75 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	20	2.3	4.4	7.0	3.8	6.4	10.2	7.5	14.2	21.9	10.3	19.6	31.1	12.2	23.5	38.0
0	30	4.6	7.8	11.7	7.0	11.4	17.3	12.2	23.4	35.2	16.8	32.3	49.3	19.7	39.5	62.3
0	40	6.5	10.7	16.5	9.0	14.7	22.7	16.8	32.0	49.6	23.2	45.4	69.6	26.5	57.4	89.5
0	50	7.7	14.6	19.6	10.6	21.2	27.9	20.4	40.9	64.8	28.9	56.2	93.5	33.8	74.4	122.1
0	60	9.9	18.1	24.4	13.7	26.0	35.0	25.0	45.6	78.1	34.9	70.0	116.4	41.7	91.3	153.0
0	75	12.5	22.5	30.5	17.5	32.9	44.8	30.8	65.8	107.5	44.2	90.9	152.3	52.5	121.2	196.3
5	20	2.1	3.9	6.0	3.3	5.7	8.7	6.6	12.6	18.8	9.1	17.4	26.6	10.7	20.9	32.5
5	30	4.2	7.2	11.7	6.4	10.6	17.3	11.1	21.7	35.2	15.3	30.1	49.3	18.0	36.7	62.3
5	40	6.2	10.7	16.5	8.7	14.7	22.7	16.2	32.0	49.6	22.5	45.4	69.6	25.6	57.4	89.5
5	50	7.7	14.6	19.6	10.6	21.2	27.9	20.4	40.9	64.8	28.9	56.2	93.5	33.8	74.4	122.1
5	60	9.9	18.1	24.4	13.7	26.0	35.0	25.0	45.6	78.1	34.9	70.0	116.4	41.7	91.3	153.0
5	75	12.5	22.5	30.5	17.5	32.9	44.8	30.8	65.8	107.5	44.2	90.9	152.3	52.5	121.2	196.3
10	20	1.7	3.4	5.2	2.8	4.9	7.6	5.5	10.9	16.4	7.6	15.0	23.2	9.0	18.0	28.4
10	30	3.8	6.6	10.2	5.8	9.7	15.1	10.1	19.9	30.7	13.9	27.5	43.1	16.3	33.7	54.4
10	40	5.8	9.9	16.5	8.2	13.6	22.7	15.2	29.6	49.6	21.0	41.9	69.6	23.9	53.0	89.5
10	50	7.4	14.6	19.6	10.1	21.2	27.9	19.5	40.9	64.8	27.5	56.2	93.5	32.2	74.4	122.1
10	60	9.9	18.1	24.4	13.7	26.0	35.0	25.0	45.6	78.1	34.9	70.0	116.4	41.7	91.3	153.0
10	75	12.5	22.5	30.5	17.5	32.9	44.8	30.8	65.8	107.5	44.2	90.9	152.3	52.5	121.2	196.3
15	20	1.3	2.7	4.3	2.1	3.9	6.3	4.2	8.7	13.6	5.8	12.0	19.2	6.9	14.4	23.5
15	30	3.4	6.0	9.3	5.1	8.7	13.7	8.9	17.9	27.9	12.3	24.7	39.2	14.4	30.2	49.5
15	40	5.4	9.2	14.6	7.5	12.6	20.1	14.0	27.6	43.8	19.4	39.1	61.4	22.1	49.4	79.1
15	50	7.0	13.4	19.6	9.5	19.5	27.9	18.3	37.6	64.8	25.9	51.7	93.5	30.4	68.4	122.1
15	60	9.3	18.1	24.4	12.9	26.0	35.0	23.6	45.6	78.1	32.9	70.0	116.4	39.3	91.3	153.0
15	75	12.5	22.5	30.5	17.5	32.9	44.8	30.8	65.8	107.5	44.2	90.9	152.3	52.5	121.2	196.3
20	30	2.9	5.2	8.3	4.3	7.6	12.2	7.6	15.6	24.8	10.5	21.6	34.9	12.3	26.4	44.0
20	40	4.9	8.5	13.6	6.9	11.6	18.7	12.7	25.4	40.7	17.6	36.0	57.1	20.1	45.5	73.5
20	50	6.5	12.7	17.4	8.9	18.3	24.8	17.2	35.4	57.7	24.3	48.7	83.2	28.4	64.5	108.7
20	60	8.8	16.6	24.4	12.2	23.8	35.0	22.4	41.8	78.1	31.2	64.2	116.4	37.3	83.6	153.0
20	75	11.9	22.5	30.5	16.6	32.9	44.8	29.3	65.8	107.5	41.9	90.9	152.3	49.8	121.2	196.3
30	40	3.7	6.8	11.3	5.2	9.3	15.5	9.7	20.4	33.8	13.5	28.9	47.4	15.3	36.5	61.0
30	50	5.5	11.0	15.4	7.5	15.9	21.9	14.5	30.7	50.9	20.5	42.2	73.4	24.0	55.9	95.8
30	60	7.8	14.9	20.8	10.8	21.4	29.8	19.8	37.6	66.5	27.6	57.7	99.1	33.0	75.2	130.3
30	75	10.9	20.1	30.5	15.2	29.4	44.8	26.8	58.9	107.5	38.4	81.3	152.3	45.6	108.4	196.3
40	50	4.3	8.9	13.0	5.8	13.0	18.5	11.2	25.0	43.0	15.9	34.4	62.0	18.6	45.6	81.0
40	60	6.6	13.0	18.5	9.2	18.7	26.5	16.8	32.8	59.2	23.5	50.3	88.2	28.1	65.6	115.9
40	75	9.8	18.4	25.8	13.7	26.9	37.9	24.1	53.7	91.0	34.6	74.2	128.9	41.1	99.0	166.1

**TABLE 3 (cont.):
WATER CAPACITY – GPM
S.G. =1.0 T=60° F (F_L = 0.85)**

Qmax is maximum flow in gpm at the given inlet pressure and outlet setpoint.																
60-125 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Full Port Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	60	6.1	9.4	13.0	7.6	14.2	19.5	21.2	40.9	65.1	29.6	56.6	92.8	33.4	73.9	113.1
0	75	7.5	12.1	16.1	10.0	18.2	25.1	26.7	52.8	86.0	37.5	73.6	117.4	44.2	94.3	150.6
0	90	10.8	15.0	21.4	12.6	22.5	31.1	31.6	66.6	107.8	45.1	92.8	146.7	53.2	118.1	201.1
0	100	11.3	16.7	23.4	13.2	25.6	34.6	35.0	75.7	122.3	50.1	103.2	167.1	60.5	137.6	232.3
0	120	13.3	20.3	27.7	16.4	31.0	43.2	43.1	92.9	151.7	60.5	128.1	207.0	73.9	170.8	287.9
10	60	6.1	9.4	13.0	7.6	14.2	19.5	21.2	40.9	65.1	29.6	56.6	92.8	33.4	73.9	113.1
10	75	7.5	12.1	16.1	10.0	18.2	25.1	26.7	52.8	86.0	37.5	73.6	117.4	44.2	94.3	150.6
10	90	10.8	15.0	21.4	12.6	22.5	31.1	31.6	66.6	107.8	45.1	92.8	146.7	53.2	118.1	201.1
10	100	11.3	16.7	23.4	13.2	25.6	34.6	35.0	75.7	122.3	50.1	103.2	167.1	60.5	137.6	232.3
10	120	13.3	20.3	27.7	16.4	31.0	43.2	43.1	92.9	151.7	60.5	128.1	207.0	73.9	170.8	287.9
20	60	5.4	8.7	13.0	6.8	13.0	19.5	19.0	37.5	65.1	26.5	51.9	92.8	29.8	67.8	113.1
20	75	7.1	12.1	16.1	9.5	18.2	25.1	25.3	52.8	86.0	35.6	73.6	117.4	41.9	94.3	150.6
20	90	10.8	15.0	21.4	12.6	22.5	31.1	31.6	66.6	107.8	45.1	92.8	146.7	53.2	118.1	201.1
20	100	11.3	16.7	23.4	13.2	25.6	34.6	35.0	75.7	122.3	50.1	103.2	167.1	60.5	137.6	232.3
20	120	13.3	20.3	27.7	16.4	31.0	43.2	43.1	92.9	151.7	60.5	128.1	207.0	73.9	170.8	287.9
30	60	4.8	7.8	11.1	6.0	11.7	16.6	16.8	33.7	55.4	23.4	46.7	79.0	26.4	60.9	96.3
30	75	6.5	10.8	16.1	8.7	16.3	25.1	23.2	47.3	86.0	32.6	65.8	117.4	38.4	84.4	150.6
30	90	10.0	15.0	21.4	11.6	22.5	31.1	29.1	66.6	107.8	41.5	92.8	146.7	49.0	118.1	201.1
30	100	10.7	16.7	23.4	12.5	25.6	34.6	33.1	75.7	122.3	47.4	103.2	167.1	57.2	137.6	232.3
30	120	13.3	20.3	27.7	16.4	31.0	43.2	43.1	92.9	151.7	60.5	128.1	207.0	73.9	170.8	287.9
40	60	4.1	6.8	9.9	5.1	10.2	14.8	14.3	29.4	49.3	19.9	40.7	70.3	22.4	53.2	85.7
40	75	5.9	9.9	13.7	7.8	14.9	21.2	20.9	43.1	72.8	29.3	60.1	99.3	34.6	77.1	127.4
40	90	9.2	13.2	21.4	10.8	19.8	31.1	26.9	58.5	107.8	38.4	81.6	146.7	45.3	103.9	201.1
40	100	10.0	15.2	23.4	11.7	23.3	34.6	31.0	68.9	122.3	44.3	93.9	167.1	53.5	125.2	232.3
40	120	12.5	20.3	27.7	15.3	31.0	43.2	40.3	92.9	151.7	56.6	128.1	207.0	69.1	170.8	287.9
50	60	3.2	5.6	8.5	4.0	8.4	12.7	11.2	24.4	42.3	15.6	33.8	60.3	17.6	44.1	73.6
50	75	5.1	8.9	12.4	6.8	13.3	19.3	18.2	38.6	66.2	25.7	53.8	90.3	30.2	68.9	115.8
50	90	8.4	12.2	18.0	9.8	18.3	26.2	24.5	54.1	90.9	35.0	75.4	123.6	41.3	96.0	169.4
50	100	9.3	14.2	20.6	10.8	21.8	30.4	28.7	64.4	107.3	41.1	87.9	146.7	49.6	117.1	203.9
50	120	11.8	18.4	27.7	14.5	28.1	43.2	38.0	84.4	151.7	53.4	116.3	207.0	65.2	155.1	287.9

TABLE 4
NITROGEN CAPACITY – SCFH
S.G. = 0.987 T = 60° F (F_L = 0.85)

2-15 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	5	273	457	654	382	628	892	819	1484	2260	1365	2625	3865	1583	2853	4579
0	10	550	1104	1549	785	1529	2151	1806	3652	5507	3062	6115	9207	3454	7474	11874
0	15	985	2036	2823	1379	2787	3909	2757	5788	9338	4825	9753	13573	5416	12326	20414
5	10	461	961	1373	659	1331	1907	1515	3179	4883	2570	5323	8163	2899	6505	10528
5	15	921	1946	2712	1290	2664	3754	2580	5532	8969	4515	9322	13036	5067	11781	19606
10	15	767	1696	2419	1074	2321	3349	2149	4821	8001	3760	8124	11629	4220	10266	17491
10-30 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	10	550	1070	1377	628	1400	1893	1335	2470	3700	1884	3375	5163	2120	4034	6453
0	15	985	1761	2606	1182	2279	3149	2166	4247	6515	3052	5800	9121	3545	7043	9990
0	20	1284	2344	3423	1798	2960	4213	3036	6167	10269	4320	8634	14351	5021	10978	15799
0	25	1655	2964	4756	2068	4002	5707	4136	8745	14427	6067	12154	20610	6894	14674	22512
0	30	2088	4323	6299	2891	5015	7596	5460	11760	19661	7709	16256	28159	9315	19023	29826
5	10	461	926	1221	527	1211	1678	1120	2138	3280	1581	2921	4577	1779	3491	5722
5	15	921	1672	2503	1106	2163	3024	2027	4032	6257	2856	5507	8760	3317	6687	9594
5	20	1252	2300	3331	1752	2905	4100	2958	6053	9994	4210	8474	13966	4892	10774	15375
5	25	1600	2836	4502	2000	3828	5402	3999	8365	13655	5866	11626	19507	6666	14036	21308
5	30	1972	4035	5881	2730	4680	7092	5158	10975	18681	7281	15171	26292	8798	17753	27849
10	15	767	1449	2233	921	1875	2698	1688	3495	5582	2379	4773	7815	2762	5796	8559
10	20	1154	2161	3175	1616	2730	3907	2729	5688	9524	3883	7963	13309	4513	10124	14652
10	25	1537	2755	4411	1922	3719	5293	3843	8128	13379	5637	11296	19114	6405	13638	20878
10	30	1935	3988	5776	2679	4626	6965	5061	10847	18347	7145	14995	25822	8633	17547	27351
15	20	960	1883	2853	1344	2378	3512	2270	4955	8560	3230	6937	11962	3754	8820	13169
15	25	1406	2576	4189	1758	3477	5027	3515	7598	12706	5156	10560	18152	5859	12749	19827
15	30	1842	3847	5626	2551	4463	6785	4819	10465	17872	6803	14466	25153	8220	16929	26643
20	25	1172	2258	3793	1465	3048	4551	2930	6660	11505	4297	9257	16436	4883	11176	17953
20	30	1677	3588	5337	2322	4162	6436	4386	9760	16953	6191	13491	23860	7481	15788	25273
25	30	1403	3166	4865	1942	3672	5867	3668	8611	15455	5179	11903	21751	6257	13929	23039

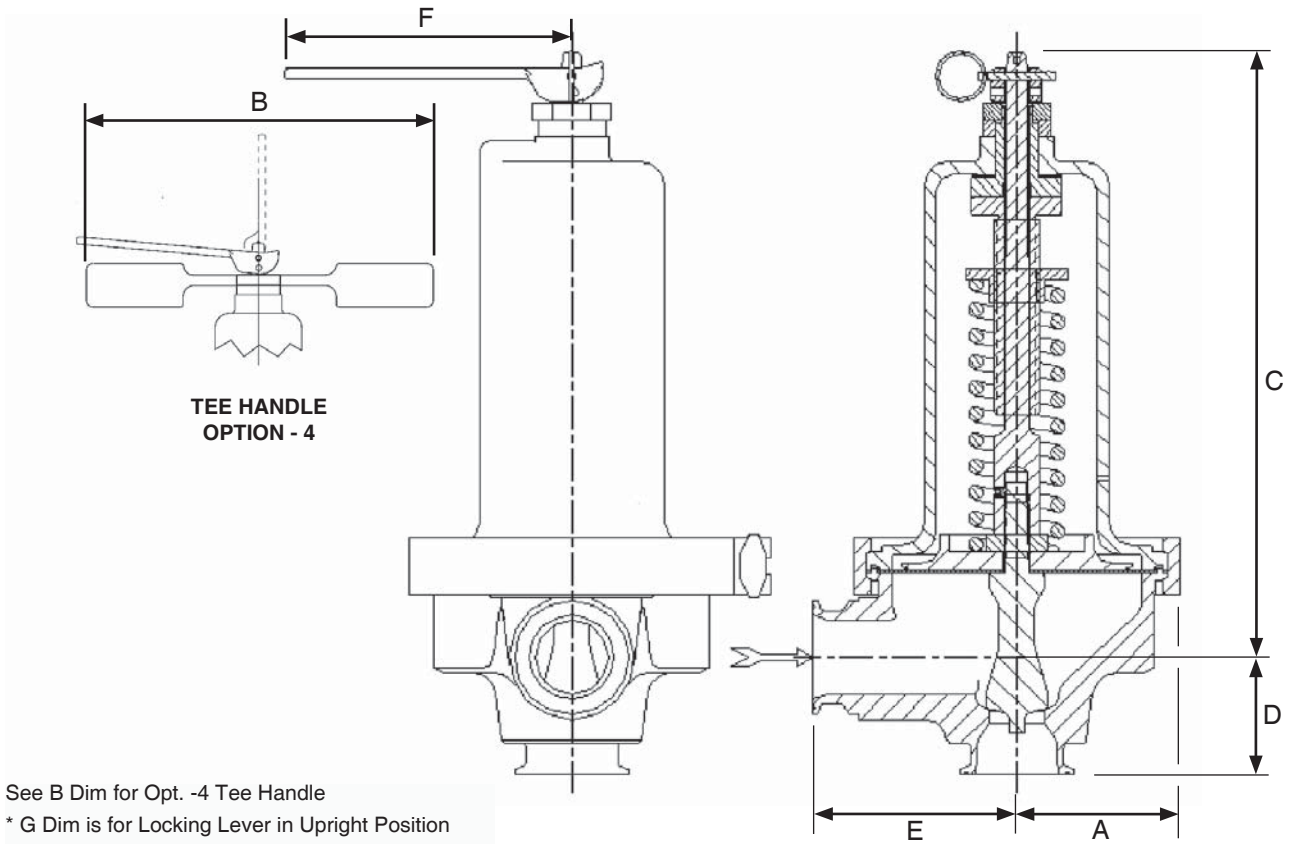
**TABLE 4 (cont.):
NITROGEN CAPACITY – SCFH
S.G. = 0.987 T = 60° F (F_L = 0.85)**

20-75 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	20	584	1110	1712	934	1603	2502	1868	3577	5398	2569	4934	7636	3036	5920	9348
0	30	1285	2248	3520	1927	3286	5187	3373	6745	10560	4657	9339	14821	5460	11414	18711
0	40	2058	3554	5723	2881	4887	7869	5349	10661	17169	7407	15104	24084	8436	19102	30999
0	50	2758	5422	7408	3761	7862	10785	7270	15182	25068	10279	20875	28494	12034	27653	47221
0	60	3842	7360	7408	5320	10560	14811	9754	18560	33066	13596	28480	28494	16256	37120	64754
0	75	5441	7408	7408	7618	14944	17096	13422	29889	50854	19226	28494	28494	22853	55058	92809
5	20	569	1090	1666	910	1574	2434	1820	3511	5253	2503	4842	7431	2958	5811	9097
5	30	1214	2098	3287	1820	3066	4843	3186	6294	9860	4399	8715	13838	5158	10652	17470
5	40	1937	3364	5441	2712	4625	7481	5036	10091	16323	6973	14295	22897	7942	18079	29471
5	50	2629	5191	7281	3586	7527	10362	6932	14535	24084	9801	19986	34726	11474	26475	45368
5	60	3694	7100	9996	5115	10187	14328	9377	17904	31988	13071	27474	38188	15628	35808	62644
5	75	5274	9937	9929	7383	14523	20639	13009	29047	49533	18634	38188	38188	22150	53507	90398
10	20	525	1024	1587	840	1479	2320	1679	3299	5006	2309	4550	7082	2729	5460	8669
10	30	1191	2074	3228	1786	3031	4757	3126	6221	9683	4317	8614	13590	5061	10528	17158
10	40	1866	3194	5143	2612	4391	7072	4852	9581	15430	6718	13573	21645	7651	17166	27860
10	50	2495	4950	6971	3402	7177	9921	6576	13859	23059	9298	19056	33248	10885	25243	43437
10	60	3539	6830	9648	4901	9799	13829	8984	17223	30873	12524	26429	45989	14974	34446	60460
10	75	5101	9640	12449	7141	14090	20073	12582	28179	48176	18023	38932	47882	21424	51909	87921
15	20	437	892	1427	698	1288	2085	1397	2874	4499	1921	3964	6365	2270	4757	7792
15	30	1134	2001	3144	1701	2924	4634	2976	6002	9433	4110	8310	13239	4819	10157	16714
15	40	1838	3166	5076	2574	4354	6980	4780	9499	15229	6618	13456	21363	7537	17018	27497
15	50	2437	4757	6647	3323	6897	9459	6424	13319	21986	9082	18313	31701	10632	24259	41415
15	60	3378	6549	9287	4677	9396	13311	8574	16514	29717	11951	25341	44265	14290	33028	58195
15	75	4922	9334	13254	6891	13642	19491	12141	27285	46779	17390	37696	66271	20672	50261	85372
20	30	1032	1866	2983	1548	2727	4395	2709	5597	8947	3741	7750	12558	4386	9473	15854
20	40	1777	3092	4993	2488	4251	6865	4620	9274	14979	6397	13139	21012	7286	16617	27045
20	50	2407	4724	6580	3282	6850	9364	6345	13228	21766	8971	18188	31383	10502	24093	41001
20	60	3333	6350	8910	4616	9110	12772	8462	16012	28513	11795	24570	42473	14103	32024	55838
20	75	4736	9018	12846	6630	13180	18892	11682	26359	45340	16734	36418	64231	19891	48557	82745
30	40	1517	2759	4591	2124	3794	6313	3944	8278	13773	5462	11727	19321	6220	14831	24868
30	50	2250	4506	6368	3068	6534	9061	5931	12617	21062	8386	17349	30368	9817	22982	39674
30	60	3233	6231	8766	4477	8940	12564	8207	15712	28050	11441	24110	41783	13679	31424	54932
30	75	4616	8655	12153	6462	12650	17871	11385	25300	42891	16309	34954	60762	19386	46606	78276
40	50	1910	4018	5858	2604	5826	8337	5035	11251	19377	7118	15470	27939	8333	20492	36501
40	60	2989	5896	8428	4139	8460	12081	7588	14868	26971	10577	22815	40175	12647	29736	52817
40	75	4478	8490	12014	6269	12408	17667	11045	24816	42401	15821	34285	60067	18806	45714	77381

**TABLE 4 (cont.):
NITROGEN CAPACITY – SCFH
S.G. = 0.987 T = 60° F (F_L = 0.85)**

60-125 psig range spring																
P2	P1	3/4" & 1" Rated Cv 4.4			1-1/2" Reduced Port Rated Cv 6.5			1-1/2" Rated Cv 14			2" Rated Cv 20			3" Rated Cv 27		
		Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30	Q@10	Q@20	Q@30
0	60	2365	3840	5511	2956	5760	8266	8276	16640	19661	11527	23040	29494	13005	30080	47876
0	75	3265	5506	7408	4353	8259	11866	11608	19661	19661	16324	29494	29494	19226	42867	71196
0	90	5159	7408	7408	6018	11196	16100	15046	19661	19661	21494	29494	29494	25363	58779	95169
0	100	5696	7408	7408	6645	13398	17096	17562	19661	19661	25156	29494	29494	30377	95169	95169
0	120	7334	7408	7408	9026	17776	17096	19661	19661	19661	29494	29494	29494	40617	98072	95169
10	60	2178	3563	5146	2723	5345	7718	7623	15441	25728	10618	21380	36662	11979	27913	44702
10	75	3061	5191	7226	4081	7786	11241	10882	22618	33039	15303	31516	52592	18023	40415	67446
10	90	4891	7110	10585	5706	10665	15396	14266	31551	33039	20380	43994	47882	24048	55992	99594
10	100	5431	8387	12286	6336	12828	18162	16744	33039	33039	23985	47882	47882	28963	69073	121793
10	120	7050	11234	12449	8678	17147	24969	22778	33039	33039	31998	47882	47882	39049	94606	159927
20	60	2051	3313	4752	2564	4969	7128	7180	14355	23761	10000	19877	33859	11282	25950	41285
20	75	2842	4856	6801	3789	7284	10579	10104	21157	36272	14208	29481	49496	16734	37805	63475
20	90	4608	6738	10078	5376	10106	14659	13441	29898	46417	19201	41689	67271	22657	53058	94826
20	100	5152	7997	11763	6011	12231	17389	15885	36222	46417	22754	49394	67271	27477	65858	116608
20	120	6755	10807	15448	8314	16495	24098	21825	46417	46417	30659	67271	67271	37414	91007	160656
30	60	1990	3251	4675	2487	4876	7013	6964	14087	23375	9700	19504	33310	10943	25464	40614
30	75	2769	4661	6434	3693	6991	10008	9847	20307	34313	13847	28296	46823	16309	36286	60047
30	90	4347	6343	9545	5072	9515	13883	12679	28148	48156	18113	39249	65510	21374	49953	89805
30	100	4857	7587	11216	5667	11603	16580	14977	34363	58517	21453	46859	79973	25905	62479	111182
30	120	6447	10362	14869	7934	15816	23196	20828	47448	59795	29258	65445	86660	35705	87261	154636
40	60	1840	3076	4495	2299	4614	6743	6438	13330	22475	8968	18457	32028	10118	24097	39051
40	75	2687	4571	6360	3582	6857	9893	9552	19918	33920	13433	27755	46287	15821	35591	59361
40	90	4303	6231	9225	5020	9346	13418	12550	27648	46543	17929	38551	63316	21156	49065	86797
40	100	4753	7295	10640	5546	11157	15729	14657	33042	55514	20994	45057	75869	25352	60076	105476
40	120	6123	9897	14267	7535	15106	22256	19780	45319	73174	27787	62509	106715	33909	83346	148373
50	60	1560	2749	4147	1950	4123	6220	5459	11910	20733	7604	16491	29544	8578	21530	36023
50	75	2520	4372	6164	3360	6558	9589	8959	19050	32876	12599	26545	44862	14839	34040	57533
50	90	4180	6115	9119	4876	9172	13264	12190	27133	46010	17415	37834	62590	20549	48152	85803
50	100	4674	7225	10564	5453	11051	15616	14410	32727	55116	20642	44627	75325	24926	59503	104720
50	120	6058	9609	13638	7457	14666	21275	19573	43997	74735	27496	60686	102011	33554	80914	141834

**TABLE 5
DIMENSIONS & WEIGHTS**



English Units											
Regulator Size (Inches)	Forged Body - Inches										Approx. ShipWeight lbs.
	A	B (Opt-4)		C		D	E	G *		F	
		2-75 psig	60-125 psig	2-75 psig	60-125 psig			2-75 psig	60-125 psig		
3/4", 1", & 1 1/2" Red. Port	3.75	12.00	16.00	11.13	12.00	2.00	3.31	16.75	18.25	6.31	25
1 1/2"	5.00	12.00	16.00	13.63	15.25	2.60	4.50	19.38"	21.50	6.31	50
2"	5.00	12.00	16.00	13.63	15.25	2.60	4.50	19.38	21.50	6.31	50
3"	5.00	12.00	16.00	13.63	15.25	2.60	4.50	19.38	21.50	6.31	50
Investment Cast - Inches											
1"	3.75	12.00	16.00	11.06	11.94	1.59	3.31	16.69	18.19	6.31	20
Metric Units											
Regulator Size (DN)	Forged Body - mm										Approx. Ship Weight kg
	(20, 25, & 40 Red. Port)	9.5	305	406	283	305	50	84	425	464	
(40)	127	305	406	346	387	66	114	492	546	160	22.7
(50)	127	305	406	346	387	66	114	492	546	160	22.7
(80)	127	305	406	346	387	66	114	492	546	160	22.7
Investment Cast - mm											
(25)	95	305	406	281	303	40	84	424	462	160	9.0

Note: Unit must be installed with spring chamber in vertical position to achieve self draining feature.

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TABLE 1 - SIZE			
Port	Size		CODE
	in	(DN)	
Full	3/4"	(20)	5
Full Inv. Cast *	1"	(25)	6
Full Forged	1"	(25)	F
Reduced	1-1/2"	(40)	8
Full	1-1/2"	(40)	G
Full	2"	(50)	9
Full	3"	(80)	B

* Must select 316L Investment Cast Body from Table 2

TABLE 2 - BODY / SPRING CHAMBER MATERIAL		
SST Body / Spring Chamber	Body Sizes	CODE
316 L Forged Body / 316 Investment Cast	All	F
316 L Investment Cast / 316 Investment Cast	1" (DN25) Only	M

TABLE 3 - TRIM DESIGNATION NO.		
SST Trim - 3A Approved		
Desig. No.	Certs Provided	CODE
LE *	'FDA' Only	LE
LV *	'FDA' Only	LV
LG **√	'FDA' & 'USP'	LG
LC **	'FDA' & 'USP'	LC

* Comply w/ FDA 21 CFR 177.2600
 ** Comply w/ FDA 21 CFR 177.2600 & USP Class VI material classification.
 √ Must Select Opt-80 from Table 6 for Spring Ranges 2 - 75 psig




TABLE 4 - Product Classification Under European "Pressure Equipment Directive"		
PRODUCT	HAZARD CATEGORY	CODE
Standard	N/A	7
EUROPEAN ¹ Consult Factory for Special Code (PED does not apply to DN25 and below)	Sound Engineering Practice (SEP)	S
	CE Marked Hazard Cat I or II	E

¹ For products to be placed in service in Europe (Ref PED-Art. 3, sec 1.3; Art. 9; and Annex II Tables)

TABLE 5 - SST RANGE SPRING		
psig	(Barg)	CODE
2 - 15	(.14 - 1.0)	4
10 - 30	(.69 - 2.1)	1
20 - 75	(1.4 - 5.2)	5
60 - 125 *	(4.1 - 8.6)	6

* Includes Opt-4 & -80

TABLE 6 - OPTIONS		
Description	Option	CODE
None	-	0
Tee Handle	-4	4
Tri-Clamp 2- piece design with SST bolts. Standard on 60-125 psig spring range.	-80	A

For Special Construction Other Than Above Contact Cashco for Special Product Code

1. NUMERIC digits assigned first in "ascending" order.
2. ALPHA designations are assigned second in "alphabetical" order.
3. Left justify.
4. Add "0" to all unused squares.
5. If insufficient quantity of squares, consult factory for proper code.