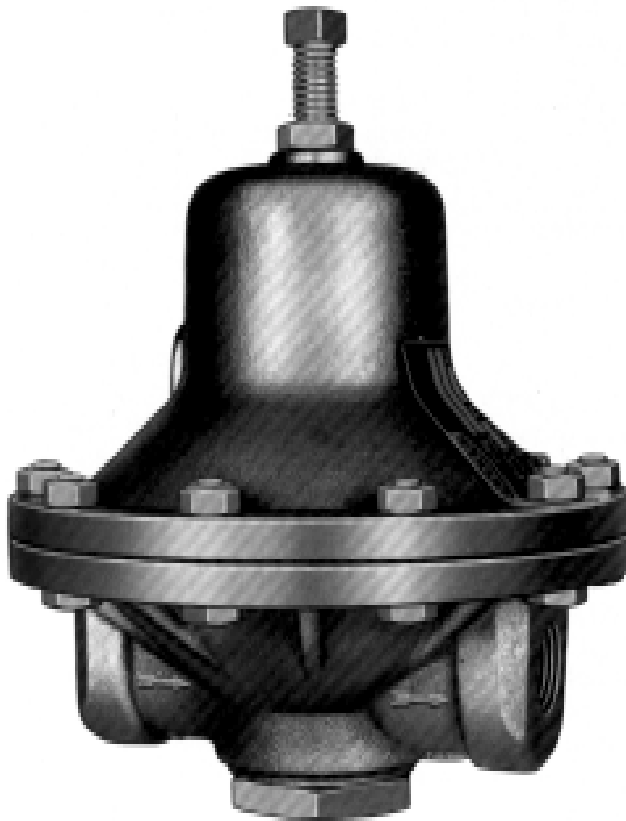




MODEL DL

PRESSURE REDUCING REGULATOR BODY SIZES 1-1/2" & 2"(DN40 & 50)



MODEL DL

Model DL is a redesignation of the former Model D product, limited to 1-1/2" & 2" (DN40 & 50) body sizes.

The Model DL is a basic general service, self-contained regulator. Unit handles inlet pressure of up to 300 psig (20.7 Barg) and outlet pressures from 2-150 psig (.14-10.3 Barg) in multiple spring ranges. Model DL is the Cashco reducing regulator product utilized for the majority of industrial applications. A time-proven product with 80+ years of experience.

FEATURES

- | | |
|-----------------------------------|--|
| Versatile: | Four body materials and seventeen trim material combinations to select from. |
| Tight Shutoff: | Composition seats of TFE, Buna-N or EPDM available. |
| Non-Asbestos Construction: | Standard design incorporates no asbestos containing materials. |
| Capacity: | Handles mid-range flow rates on a line size basis. |
| Pressure Drop: | Handles mid-range pressure drops while maintaining good stability. |
| Flow-to-Close Plug: | Incorporates the typical reducing regulator internal design. |
| Incorporated Cylinder: | Plug is guided through its travel by the cylinder, which also serves to block harmful debris from entry to the seating surfaces. |
| Overpressure Travel Stop: | In the event of downstream over-pressurization, diaphragm over-travel is restricted by mechanical stops. |

APPLICATIONS

Used in all types of fluids, including sour gas, industrial gases, chemicals, as well as the common industrial fluids - water, oil, steam and compressed air.

STANDARD/GENERAL SPECIFICATIONS

Body Sizes: 1-1/2", 2" (DN40, & 50). *For sizes 3/8", 1/2", 3/4", 1": (DN10, 15, 20, 25) see D-TB.*

End Connections: Standard: NPT female.
Option-30: Weld-on 150# (PN20) or 300# (PN50) RF flanges.
Option-31: BSP (British Standard Pipe Thread) female.
Option-32: Sch. 80 Extended Nipples.

Body/Spring Chamber Material Combinations: CI/CI, BRZ/CI, CS/CI, SST/CI, BRZ/BRZ, CS/CS, SST/CS, and SST/SST

CI = Cast gray iron
 CS = Cast carbon steel
 BRZ = Cast bronze
 SST = Cast stainless steel
See Table 1 for materials specifications.

Inlet Pressure:

Body Material	Max. Pressure	
	psig	(Barg)
CI	250	(17.2)
BRZ	250	(17.2)
CS	300	(20.7)
SST	300	(20.7)

See Table 1.

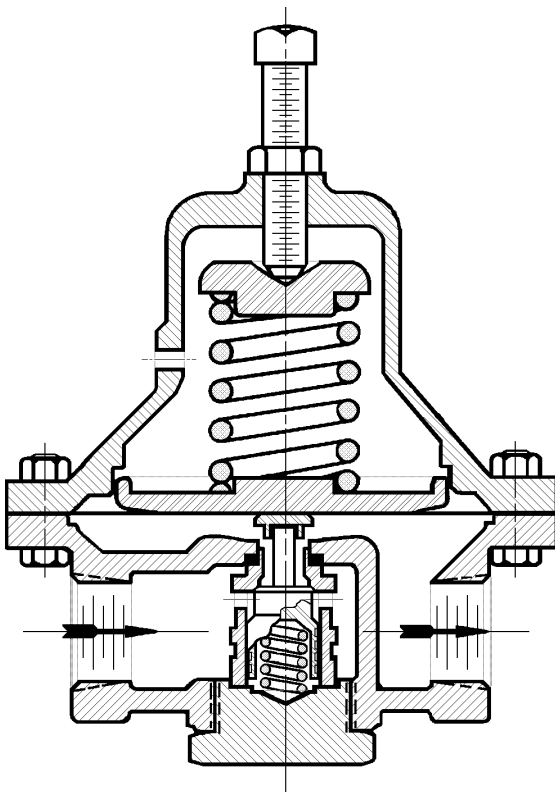


Figure 1: Model DL - Standard Metal Seat Design

Temperature: Standard: -20° to 400°F (-29° to +205°C)
See Table 1.

Outlet Pressure: Standard: 2-150 psig (0.14 - 10.3 Barg); in four range springs – *see Tables 1 and 2.*

Pressure Drop: Up to 150 psid (10.3 Bard). Dependent on range spring selection. *See Table 2.*

Trim Designs: Metal seated or composition seated, brass or SST materials. *See Tables 3 and 4.*

Capacities: Up to 10 Cv; see Table 7 for Cv vs. outlet pressure vs. body size vs. diaphragm material.

Water flow - see Table 8.

Compressed air flow - see Table 9.

Steam flow - see Table 10.

For wide open Cv's, *see Table 6*; use for safety relief sizing.

Seat Leakage: Meets ANSI/FCI 70-2
Standard: Metal seated, Class IV.
Optional: Composition (soft) seated Class VI.

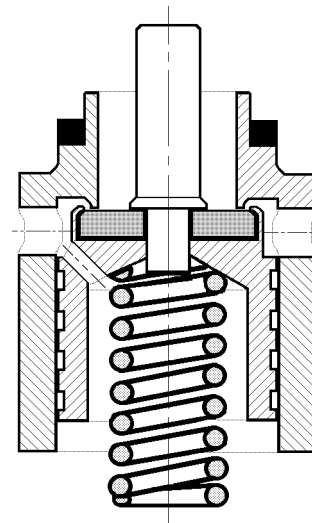


Figure 2: Optional Composition Seat

Diaphragms: SST, Phosphor Bronze, Neoprene, Fluorocarbon Elastomer, EPDM, TFE coated SST.

Gaskets: Standard: Non-asbestos. **NOT SUITABLE FOR OXYGEN SERVICE.**
 Cylinder: Graphite/NBR.
 Diaphragm: Graphite/NBR. (**NOTE:** *Composition diaphragms do not use a diaphragm gasket.*)
Alternate: See Options -45 and -46.

Range Springs: Standard: Epoxy coated steel.

Standard	
Steel Range Springs	
psig	(Barg)
2-15	(0.14-1.03)
10-40	(0.69-2.8)
30-80	(2.1-5.5)
70-150	(4.8-10.3)

Flange Bolting: Standard: Cadmium or zinc plated, heat treated steel.

Painting: Standard: CI & CS — Enamel. Per Cashco Spec. #S-1545. SST and BRZ — Non-painted.

Alternate: See Opt. -95.

NOTE: Refer to *OPTION SPECIFICATIONS* for alternate design options, and to *TECHNICAL SPECIFICATIONS* for a more complete description of the above specifications.

OPTION SPECIFICATIONS

Option -3: HANDWHEEL & LOCKING LEVER. Utilize when P₂ pressure setting changes are frequent.

Option -25: TAPPED VENT. 1/4" (DN8) NPT tapped opening in spring chamber for piping vent to remote location, in the event of diaphragm failure.

Option -30: FLANGED END CONNECTIONS. CS or SST body materials only. Flange and pipe nipple materials of same general chemistry as body material. Short-threaded nipples seal welded at body; nipples socket welded at flange. Available in 150# RF or 300# RF flanges only.

NOTES: 1. The body P vs. T ratings of Table 1 are the limiting variables for flanged end connections, unless further restricted by ASME B16.5.
 2. No post-weld stress relieving performed.

Option -31: BSP END CONNECTIONS. British Standard Pipe threads per ISO 7/1; used as an alternate to NPT ends.

Option -32: EXTENDED NIPPLES. Schedule 80 extension nipples available for carbon

steel or 316 SST bodies. Nipples of same basic material as body. Nipples are seal welded after screwing into body. **NOTE:** *Used where welded connections are required and in lieu of socket weld ends.*

Option -40: CS NACE CONSTRUCTION. Internal wetted portions meet NACE standard MR0175, when the exterior of the regulator is not directly exposed to a sour gas environment, buried, insulated or otherwise denied direct atmospheric exposure. CS/CS body/spring chamber materials only. S40, and S40T only trim selections available. Diaphragm flange bolting of heat treated steel per ASTM A449 and per NACE Class III. NPT ends only; not available with Option -30.

Option -40SST: SST NACE CONSTRUCTION. Same as Option -40, except uses SST/SST body/spring chamber construction.

Option - 45: NON-ASBESTOS GASKETS. For oxygen service. Utilizes TFE diaphragm gasket and fluorocarbon elastomer cylinder gasket over standard gaskets. Temperature range; -20° to +400°F (-29° to +205°C).

Option -55: SPECIAL CLEANING. BRZ or SST body materials **ONLY**. Cleaning per Cashco Spec. #S-1134. Acceptable cleaning level for oxygen service.

Option -56: SPECIAL CLEANING. CI, CS or SST body materials only. Cleaning per Cashco Spec. #S-1542. Not suitable for oxygen service.

Option - 95: EPOXY PAINTED. Two-step epoxy coated for severe ambient conditions to minimize external corrosion. Applied to all exposed parts, except those of SST. Procedures and specifications per Cashco Spec. #S-1547.

APPLICATION AND SELECTION

The following procedure will help determine a suitable selection for an application:

STEP 1. FIVE KNOWNs. The following minimal parameters / information must be available before a selection procedure can begin:

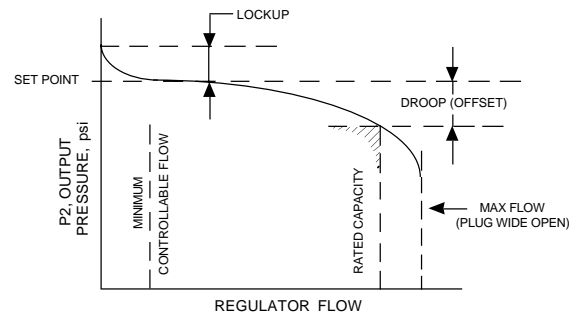
- a. Service Fluid - What is it? Liquid or gas? Specific Gravity (std. cond.)?
- b. Inlet Pressure - P_1 (upstream pressure).
- c. Outlet Pressure - P_2 (downstream pressure). How much can P_2 vary as flow varies?
- d. Desired capacity - C_V , GPM, SCFH; minimum & maximum.
- e. Fluid temperature - T_1 , Specific Gravity (actual).

STEP 2. INLET PRESSURE AND TEMPERATURE. Ensure that the actual design inlet pressure and temperature limits do not exceed the limits established in Table 1. Both body and spring chamber must comply.

STEP 3. PRESSURE DROP. Check the maximum pressure drop ($P_1 - P_2$) against all limits established in Table 2 to ensure not exceeding.

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. (Tags will show the standard ranges.) A setpoint 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 5. DIAPHRAGM MATERIAL. Select the diaphragm first considering its pressure-temperature limits. *See Tables 1, 3, and 4.*

Composition diaphragms will give approximately an extra 20-30% in capacity over a metal diaphragm at equal levels of droop.

Systems subject to pulsating inlet or outlet pressures should be provided with metal diaphragms.

Refer to Table 5 as a guide for recommended diaphragms for various services.

STEP 6. GASKET MATERIAL. Considering the fluid, determine the desired gasket material from the three choices offered.

STEP 7. CAPACITY. The five knowns of Step 1 allow proper sizing of the regulator. (Specific Gravity tables are required.) With P_1 , P_2 , % droop, flow rate (C_v , GPM, SCFH or #/HR) and the diaphragm type per Step 5, enter the capacity tables and confirm Model D

capability. Refer to Tables 7 through 13 for capacities.

STEP 8.

TRIM MATERIAL. Combining diaphragm material choice of Step 5, and the use of Tables 3 and 4 allows proper selection of "Trim Designation Numbers" for materials and temperatures. See Table 2 for type of service and allowable pressure drops.

Composition trim will initially provide bubble-tight shutoff in clean service and without downstream overpressurization. Minute leakage should be expected with metal seated designs. A downstream safety relief valve is recommended.

TECHNICAL SPECIFICATIONS

**TABLE 1
DESIGN PRESSURE - TEMPERATURE
MATERIAL SPECIFICATIONS**

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

STANDARD CONSTRUCTIONS				
Material Specifications (Body/Spring Chamber)		Inlet Pressure psig (Barg)	Outlet Pressure psig (Barg)	Temperature [‡] °F (°C)
Description (Abbr.)	ASTM No.			
CI/CI [†]	A126, Class B	250 (17.2)	175 (12.1)	-20 to +400°F (-29 to +205°C)
BRZ/CI	B62, Alloy C83600/A126, Class B			
CS/CI	A216, Gr. WCB/A126, Class B			
SST/CI	A351, Gr. CF8M/A126, Class B			
BRZ/BRZ	B62, Alloy C83600	300* (20.7)	175 (12.1)	-20 to +400°F (-29 to +205°C)
CS/CS	A216, Gr. WCB			
SST/CS	A351, Gr. CF8M/A216, Gr. WCB			
SST/SST	A351, Gr. CF8M			

Note: Certification of material chemical and physical properties are routinely available ONLY for BRZ, CS or SST castings; CI material certifications are NOT AVAILABLE. Wrought barstock or diaphragm sheet material certifications are NOT AVAILABLE routinely.

* SST Materials used in Oxygen Service have a Design Pressure Rating of 290 psig (20.0 Barg).

† See Table 5 restrictions for use with Fuel Oil and Hydrocarbon Gas or Liquid applications.

‡ The design temperature range of the regulator may be limited by the trim selection. See Tables 3, 4a, and 4b.

**TABLE 2
RANGE SPRINGS WITH
RECOMMENDED PRESSURE DROPS**

Construction	Range spring		Recommended Max. Pressure Drop					
	P2 - Outlet Reduced Pressure Range		Liquid Service (Non-Cavitating)		Gaseous Service		Steam Service*	
	psig	(Barg)	psid	(Bard)	psid	(Bard)	psid	(Bard)
Standard	2-15	(0.14-1.03)	100	(6.9)	125	(8.6)	100	(6.9)
	10-40	(0.69-2.8)	125	(8.6)	150	(10.3)	125	(8.6)
	30-80	(2.1-5.5)	150	(10.3)	150	10.3	150	(10.3)
	70-150	(4.8-10.3)	150	(10.3)	150	10.3	150	(10.3)

*For steam service, all B0 & B5 trim options are limited to 50 psid (3.4 Bard).

**TABLE 3
BRASS TRIM MATERIAL COMBINATIONS**

PART	BRASS TRIM #				
	METAL SEAT	COMPOSITION SEAT			
	B0 *	B2	B3	B4	B5
Diaphragm	Phos. Brz	BC	BC	FKM	Phos.Brz
Cylinder	Brass	Brass	Brass	Brass	Brass
Piston	Brass	Brass	Brass	Brass	Brass
Seat Disc	None (Metal)	NBR	V-TFE	V-TFE	V-TFE
Piston Spring	302 SST	Phos. Brz	Phos. Brz	Inconel X-750	Phos. Brz
Body Cap	Brass	Brass	Brass	Brass	Brass
Pusher Plate	Brass	Brass	Brass	Brass	Brass
Temperature Range	-20 to +200°F (-29 to +94°C)	-20 to +180°F (-29 to +83°C)	-20 to +180°F (-29 to +83°C)	-20 to +400°F (-29 to +205°C)	-20 to +200°F (-29 to +94°C)

* MAX pressure drop = 100 psid (6.9 Bard).

**TABLE 4(a)
STAINLESS STEEL TRIM MATERIAL COMBINATION – METAL SEAT**

ABBREVIATIONS	
NBR	= Buna-N
BC	= Neoprene
EPDM	= Ethylene Propylene
TFE	= Polytetrafluoroethylene
FKM	= Fluorocarbon elastomer
V-TFE	= Virgin TFE
Phos BRZ	= Phosphor Bronze
Note 1: SST body is limited to use of S1, S3 and S36 trims only.	
Note 2: Cashco, Inc. does not recommend metal seated trim on any service where the flow will be dead ended down stream of the pressure reducing regulator.	

PART	STAINLESS STEEL TRIM #				
	S0	S1	S2	S2N	S40 ¹
Diaphragm	TFE coated 302 SST	302 SST	302 SST	BC	BC
Cylinder	316 SST	316 SST	416 SST	416 SST	316 SST
Piston	316 SST	316 SST	416 SST	416 SST	316 SST
Seat Disc	None (metal)	None (metal)	None (metal)	None (metal)	None (metal)
Piston Spring	302 SST	302 SST	302 SST	302 SST	Inconel X-750
Body Cap	316 SST	316 SST	416 SST	416 SST	316 SST
Pusher Plate	316 SST	316 SST	316 SST	316 SST	316 SST
Temperature Range	-20 to +400°F (-29 to +205°C)	-20 to +400°F (-29 to +205°C)	-20 to +400°F (-29 to +205°C)	-20 to +180°F (-29 to +83°C)	-20 to +180°F (-29 to +83°C)

¹ Trim designation for NACE service.

NOTE: SST Trim Materials used in Oxygen Service have a Design Pressure Rating of 290 psig (20.0 Barg).

**TABLE 4(b)
STAINLESS STEEL TRIM MATERIAL COMBINATION – COMPOSITION (SOFT) SEAT**

PART	STAINLESS STEEL TRIM #					
	S3	S4	S4N	S9	S36	S40T ¹
Diaphragm	BC	BC	BC	TFE coated	302 SST 302 SST	FC Elast.
Cylinder	316 SST	416 SST	416 SST	316 SST	316 SST	316 SST
Piston	316 SST	416 SST	416 SST	316 SST	316 SST	316 SST
Seat Disc	TFE	TFE	Buna-N	TFE	TFE	TFE
Piston Spring	302 SST	302 SST	302 SST	302 SST	302 SST	Inconel X-750
Body Cap	316 SST	416 SST	416 SST	316 SST	316 SST	316 SST
Pusher Plate	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Temperature Range	-20 to +180°F (-29 to +83°C)	-20 to +180°F (-29 to +83°C)	-20 to +180°F (-29 to +83°C)	-20 to +400°F (-29 to +205°C)	-20 to +400°F (-29 to +205°C)	-20 to +400°F (-29 to +205°C)

¹ Trim designations for NACE service.

NOTE: SST Trim Materials used in Oxygen Service have a Design Pressure Rating of 290 psig (20.0 Barg).

**TABLE 5
APPLICATIONS**

FLUID	RECOMMENDED CONSTRUCTION	*TRIM DESIGNATION #
Air or Inert Gases	Composition Seat and Diaphragm Metal Seat and Composition Diaphragm Metal Seat and Diaphragm	B2, B3, B4, S4N S2N B0
Oxygen	Metal Seat and Diaphragm Composition Seat and Metal Diaphragm Composition Seat and Diaphragm	S1 B5, S36 B4, S40T
Chemicals	Metal Seat and Diaphragm Metal Seat and Composition Diaphragm Composition Seat and Diaphragm TFE seat and Metal Diaphragm	S1, S2, S0 S40 S3, S4, S4N, or S40T S9
Sour Gas	Metal Seat and Composition Diaphragm Composition Seat and Diaphragm	S40 S40T
Fuel Oil †	Composition Seat and Diaphragm	B2, B3, B4, S3, S4, or S4N
Hydrocarbon Gas or Liquids †	Composition Seat and Diaphragm	B2, B3, B4, S3, S4, or S4N
Saturated Steam, Low Pressures - up to 50 psig (3.4 Barg)	Metal Seat and Diaphragm	S2, S1, or B0
Saturated Steam, Pressures up to 100 psig (6.8 Barg) 50 psid (3.4 Barg)	Metal Seat and Diaphragm	S2, S1 or B0
Steam Pressures above 100 psig (6.9 Barg) Saturated or Superheated	Metal Seat and Diaphragm	S2 or S1
Water and Condensate Low Temperature – 32–180°F (0–83°C)	Composition Seat and Diaphragm Metal Seat and Composition Diaphragm Metal Seat and Diaphragm	B2, B3, S3, S4, or S4N S2N S1, S2
Water and Condensate High Temperature – 180–300°F (83–149°C)	Metal Seat and Diaphragm	S1 or S2

Note 1: Trim Designation Nos. in "boldface" are the most commonly used. Cashco, or its representatives may make recommendations or suggestions as to the suitability of certain trims for specific services. These are trims that have been used successfully in the past in similar applications. However, the user has final responsibility for materials selected.

Note 2: Cashco, Inc. does not recommend metal seated trim on any service where the flow will be dead ended down stream of the pressure reducing regulator.

† In accordance with ASME B31.3 "process piping", do not use Cast Iron Body for hydrocarbon or flammable fluid service with inlet pressures greater than 150 psig (10.3 Barg) or temperatures greater than 300° F (149° C).

**TABLE 6
MAXIMUM C_v WITH PLUG
WIDE OPEN
(Use for Relief Valve Sizing)**

Body Size		Cv
Inch	(mm)	
1-1/2"	(DN40)	7.0
2"	(DN50)	10.0

**TABLE 7
CAPACITY - Cv
AT FLOWING PRESSURE
(FL = 0.95)**

Outlet Pressure psig	1-1/2" (DN40) Body			2" (DN50) Body		
	% Droop			% Droop		
	10%	20%	30%	10%	20%	30%
5	0.54	1.22	1.94	0.60	1.46	2.55
10	0.69	1.60	2.70	0.85	2.05	3.70
15	0.84	1.98	3.41	1.05	2.64	4.80
25	0.67	1.53	2.60	0.77	1.91	3.54
35	0.80	1.86	3.20	0.97	2.43	4.36
50	1.14	2.60	4.31	1.50	3.79	7.01
75	1.50	3.41	5.52	2.00	5.17	9.07
100	1.14	2.66	4.46	1.50	3.89	7.28
150	1.56	3.65	5.92	2.15	5.58	9.59

Outlet Pressure psig	1-1/2" (DN40) Body			2" (DN50) Body		
	% Droop			% Droop		
	10%	20%	30%	10%	20%	30%
5	0.90	2.04	3.23	1.00	2.44	4.26
10	1.16	2.67	4.51	1.42	3.41	6.16
15	1.34	3.30	5.68	1.75	4.40	7.99
25	1.12	2.55	4.34	1.28	3.18	5.90
35	1.34	3.10	5.34	1.62	4.05	7.26
50	1.89	4.34	7.00	2.49	6.32	10.00
75	2.49	5.68	7.00	3.33	8.61	10.00
100	1.89	4.43	7.00	2.49	6.48	10.00
150	2.61	6.09	7.00	3.59	9.30	10.00

METRIC CONVERSION FACTORS: psi / 14.5 = Bar; Cv / 1.16 = kv

**TABLE 8
WATER CAPACITIES - GPM
S.G. = 1.0 T = 60° F_L = 0.95**

Composition Diaphragm Only

Outlet Pressure P2, psig	Inlet Pressure P1, psig	1-1/2" (DN40) Body Size			2" (DN50) Body Size		
		DROOP			DROOP		
		10%	20%	30%	10%	20%	30%
5	25	4	9	14	5	11	19
	50	6	14	22	7	16	29
	75	8	17	27	8	20	36
	100	9	20	32	10	24	42
	125	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
10	25	5	10	18	6	13	24
	50	7	17	29	9	22	39
	75	9	22	36	11	28	50
	100	11	25	43	14	32	58
	125	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
15	25	4	10	18	6	14	25
	50	8	20	34	10	26	47
	75	10	26	44	14	34	62
	100	12	30	52	16	41	74
	125	14	35	60	18	46	84
150	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
25	50	6	13	22	6	16	30
	75	8	18	31	9	23	42
	100	10	22	38	11	28	51
	125	11	26	43	13	32	59
	150	13	29	49	14	36	66
175	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
35	50	5	12	21	6	16	28
	75	9	20	34	10	26	46
	100	11	25	43	13	33	59
	125	13	29	51	15	38	69
	150	14	33	57	17	43	78
175	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
50	75	10	22	35	13	32	50
	100	13	31	50	18	45	71
	125	16	38	61	22	55	87
	150	19	43	70	25	63	100
	175	21	49	78	28	71	112
200	23	53	86	31	77	123	
75	100	13	28	35	17	43	50
	125	18	40	50	24	61	71
	150	22	49	61	29	75	87
	175	25	57	70	33	86	100
	200	28	64	78	37	96	112
100	125	10	22	35	13	32	50
	150	13	31	50	18	46	71
	175	16	38	61	22	56	87
	200	19	44	70	25	65	100
135	150	9	22	27	13	33	39
	175	15	35	44	21	53	63
	200	19	45	56	26	68	81
150	175	13	31	35	18	47	50
	200	19	43	50	25	66	71

SIZE	MAX VEL
1-1/2" (DN40)	25 fps
2" (DN50)	27 fps

NOTE: Where "HI DP" is indicated, the actual pressure drop has exceeded the recommended limits of Table 2.

METRIC CONVERSION FACTORS: psi / 14.5 = Bar; GPM X 3.785 = LPM

TABLE 9
AIR CAPACITY - SCFH
S.G = 1.0 T - 60°F F_L - 0.95

Composition Diaphragm Only

Outlet Pressure P2, psig	Inlet Pressure P1, psig	1-1/2" (DN40) Body Size			2" (DN50) Body Size		
		DROOP			DROOP		
		10%	20%	30%	10%	20%	30%
2	25	500	1000	1600	500	1200	2100
	50	700	1700	2700	800	2000	3500
	75	1000	2300	3700	1100	2800	4900
	100	1300	3000	4700	1500	3600	6200
	125	1600	3600	5700	1800	4400	7600
	150	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
5	25	1100	2600	4100	1300	3100	5400
	50	1900	4200	6700	2100	5000	8800
	75	2600	5800	9200	2900	7000	12200
	100	3300	7500	11800	3700	8900	15600
	125	4000	9100	14400	4500	10900	19000
	150	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
10	25	1500	3400	5700	1800	4300	7800
	50	2400	5500	9300	2900	7000	12700
	75	3300	7600	12900	4100	9700	17600
	100	4200	9800	16500	5200	12500	22500
	125	5200	11900	20100	6300	15200	27400
	150	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
15	25	1600	3900	6700	2100	5200	9500
	50	2800	6800	11700	3600	9100	16500
	75	3800	9400	16200	5000	12600	22800
	100	4900	12100	20700	6400	16100	29200
	125	6000	14700	25300	7800	19600	35600
	150	7000	17300	29800	9200	23100	41900
175	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
25	50	2300	5100	8800	2600	6400	11900
	75	3200	7300	12400	3700	9100	16800
	100	4100	9300	15800	4700	11600	21500
	125	5000	11300	19300	5700	14200	26300
	150	5900	13400	22800	6700	16700	31000
	175	6800	15400	26300	7700	19200	35700
200	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
35	50	2400	5500	9500	2900	7200	13000
	75	3800	8800	15100	4600	11400	20500
	100	4900	11300	19500	5900	14800	26500
	125	6000	13800	23800	7200	18000	32300
	150	7000	16300	28000	8500	21300	38100
	175	8100	18800	32300	9800	24500	43900
200	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
50	75	4800	11100	17900	6400	16100	25500
	100	6800	15500	25100	8900	22600	35800
	125	8400	19300	31100	11100	28100	44400
	150	9900	22800	36700	13100	33200	52500
	175	11400	26300	42300	15100	38200	60500
	200	12900	29700	47900	17100	43300	68500
250	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
75	100	7400	16900	20800	9900	25600	29800
	125	10400	23700	29200	13900	36000	41800
	150	12800	29200	36000	17100	44300	51500
	175	15000	34200	42200	20100	51900	60200
	200	17100	38900	47900	22800	59000	68500
	250	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
100	125	6300	14800	23400	8300	21700	33400
	150	8900	20800	32900	11700	30400	47000
	175	10900	25600	40400	14400	37400	57700
	200	12700	29800	47000	16700	43500	67200
	250	15900	37400	59100	21000	54700	84400
	300	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
135	150	5600	13100	20700	7300	19100	29500
	175	9000	21200	33400	11900	31000	47800
	200	11500	26900	42600	15100	39400	60800
	250	15400	36200	57200	20300	52900	81700
300	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP	
150	175	10400	24200	27800	14200	36900	39700
	200	14600	34000	39100	20100	51900	55900
	250	20700	48300	55500	28500	73800	79300
	300	25700	60000	69000	35400	91700	98500

NOTE: Where "HI DP" is indicated, the actual pressure drop has exceeded the recommended limits of Table 2.

METRIC CONVERSION FACTORS: psi / 14.5 = Bar; SCFH / 35.31 = Sm³/Hr; SCFH / 37.32 = Nm³/Hr

TABLE 10
STEAM - LBS/HR
S.G. = Actual T = Saturated F_L = 0.95

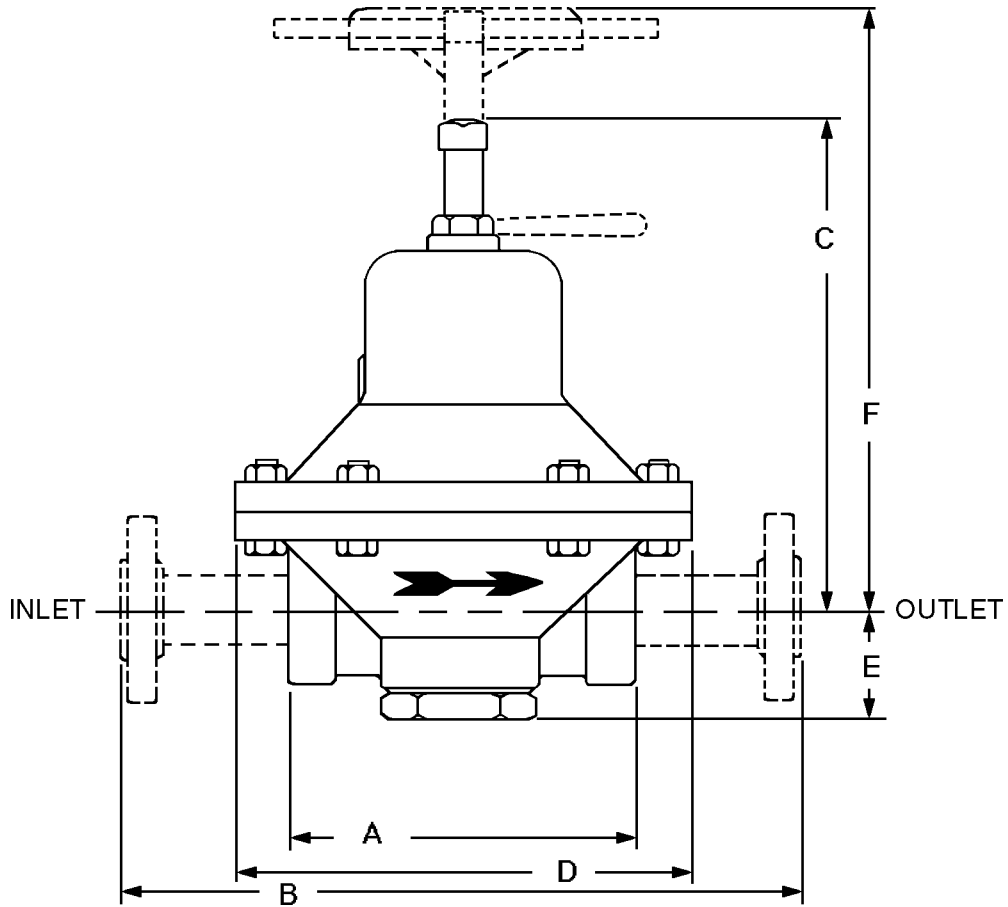
Metal Diaphragm Only

Outlet Pressure P2, psig	Inlet Pressure P1, psig	1-1/2" (DN40) Body Size			2" (DN50) Body Size		
		DROOP			DROOP		
		10%	20%	30%	10%	20%	30%
2	25	14	31	42	15	34	66
	50	23	51	69	25	57	110
	75	32	71	96	35	79	153
	100	40	90	122	44	100	194
	125	49	109	148	53	121	235
	150	57	128	173	63	142	276
	175	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
5	25	36	81	129	40	97	170
	50	60	135	214	66	161	282
	75	85	192	305	94	230	401
	100	108	244	388	120	292	510
	125	131	296	470	145	354	618
	150	154	347	551	171	415	725
	175	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
10	25	43	100	168	53	127	230
	50	76	176	296	93	225	406
	75	106	246	415	131	315	569
	100	138	320	540	170	410	740
	125	167	388	654	206	497	897
	150	196	455	768	242	583	1052
	175	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
15	25	46	108	186	57	144	261
	50	91	214	368	113	285	518
	75	127	300	516	159	400	727
	100	166	392	674	208	522	949
	125	204	480	826	254	640	1163
	150	239	563	969	299	750	1364
	175	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
25	50	67	153	261	77	191	355
	75	100	228	387	115	284	527
	100	129	294	500	148	367	681
	125	158	360	612	181	450	834
	150	190	435	739	219	543	1006
	175	219	500	849	252	624	1156
	200	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
35	50	68	157	271	82	205	369
	75	114	265	457	138	347	622
	100	152	353	607	184	461	827
	125	186	433	745	226	566	1015
	150	219	510	877	266	666	1195
	175	258	599	1031	313	783	1405
	200	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
50	75	142	323	535	186	470	870
	100	206	469	778	271	684	1265
	125	260	593	983	342	865	1599
	150	310	707	1172	408	1031	1906
	175	358	817	1354	471	1191	2203
	200	405	924	1532	533	1348	2492
	250	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
75	100	216	492	796	288	746	1308
	125	311	707	1145	415	1072	1881
	150	389	884	1431	518	1340	2351
	175	460	1045	1692	613	1585	2780
	200	527	1198	1939	703	1816	3186
	250	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
	100	125	184	430	721	242	629
150		263	614	1030	347	899	1682
175		328	765	1282	431	1118	2093
200		385	899	1508	507	1315	2461
250		490	1144	1918	645	1673	3130
300		HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
135		150	198	474	779	269	693
	175	326	779	1281	442	1139	1999
	200	419	1003	1650	569	1467	2576
	250	572	1369	2252	776	2002	3514
	300	HI DP	HI DP	HI DP	HI DP	HI DP	HI DP
150	175	299	699	1133	412	1068	1836
	200	426	996	1615	587	1522	2616
	250	615	1438	2332	847	2198	3778
	300	773	1808	2932	1065	2763	4749

NOTE: Where "HI DP" is indicated, the actual pressure drop has exceeded the recommended limits of Table 2.

Metric Conversion Factors: psi / 14.5 = Bar; LBS/HR X 0.4536 = KG/HR

DIMENSIONS & WEIGHTS



Valve Size (Inches)	DIMENSIONS – ENGLISH (INCHES)								Shipping Weight lbs. ⁴
	A	B ¹	B ²	B ³	C	D	E	F	
1-1/2	6.38	14	14	14.38	7.62	8.12	2.50	8.72	25
2	7.25	15	15	15.25	9.44	9.62	2.94	10.53	37

*NPT Only ¹ 150# (PN20) Flanged, Opt. -30 ² 300# (PN50) Flanged, Opt. -30 ³ Extended Nipples, Opt. -32
⁴ Weights do not include flanges.

Valve Size (DN)	DIMENSIONS – METRIC (mm)								Shipping Weight kgs. ⁴
	A	B ¹	B ²	B ³	C	D	E	F	
40	162	356	356	365	194	206	64	221	11.34
50	184	381	381	387	240	245	75	267	16.78

*NPT Only ¹ 150# (PN20) Flanged, Opt. -30 ² 300# (PN50) Flanged, Opt. -30 ³ Extended Nipples, Opt. -32
⁴ Weights do not include flanges.



TABLE 4

BRASS TRIM		STAINLESS STEEL TRIM				
DESIG.	CODE	DESIG.	BODY MATERIAL			
			BR CODE	CI CODE	CS CODE	SS CODE
B0	B0	S0	--	S0	S0	S0
B2	B2	S1*	S1	S1	S1	S1
B3	B3	S2	S2	S2	S2	S2
B4	B4	S2N	SN	SN	SN	SN
B5	B5	S3*	S3	S3	S3	S3
		S4	S4	S4	S4	S4
		S4N	SD	SD	SD	SD
		S9	---	S9	S9	S9
		S36*	36	36	36	36
		S40	40	40	40	40
		S40T	---	---	4T	4T

* SST body material is limited to use of S1, S3 and S36 trims only.

TABLE 3

BODY/SP.CH.	CODE
CI/CI	1
BRZ/CI	2
BRZ/BRZ	3
CS/CI	4
CS/CS	5
SST/CI	7
SST/CS	9
SST/SST	A

NOTE: See TB Table 1 for material limitations of Design Pressure Ratings.

TABLE 2

SIZE		CODE
in	(mm)	
1-1/2"	(DN40)	8
2"	(DN50)	9

TABLE 1

GASKETS/SERVICE *	OPTIONS	CODE
Standard : Non-Asbestos/Non-Oxygen	--	H
Non-Asbestos TFE/Oxygen	-45	J

* Refer to Tech Bulletin for suitable gasket temp. range

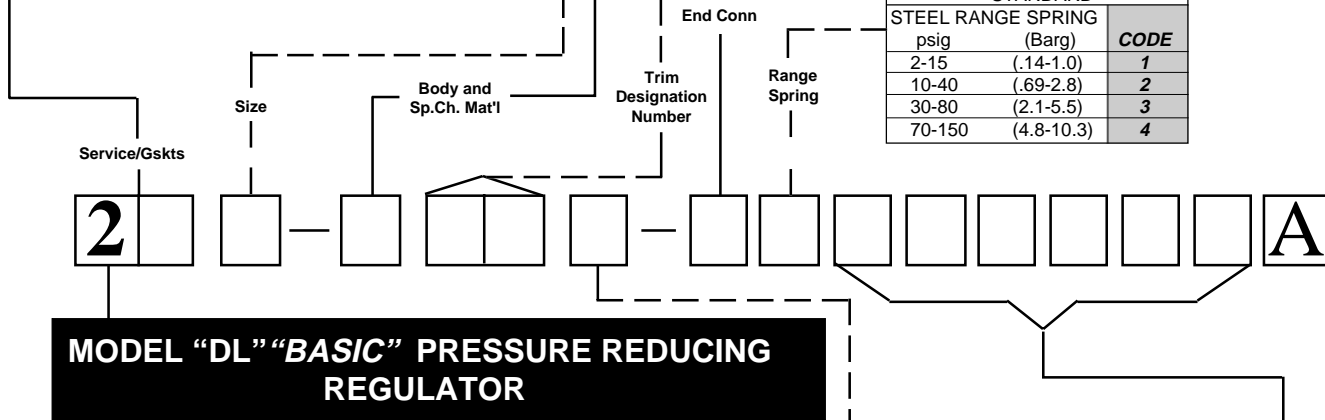
TABLE 5

DESCRIPTION	CODE
NPT - SCREWED	1
-30 Opt. - 150 LB RF FLGS *	6
-30 Opt. - 300 LB RF FLGS *	7
-31 Opt. - BSP - SCREWED British Standard Pipe thread	B
-32 Opt. - SCH. 80 PE EXT. NIPPLES*	E

*Nipples & flanges of same material as body. CS or SST bodies only.

TABLE 6

STANDARD STEEL RANGE SPRING		
psig	(Barg)	CODE
2-15	(.14-1.0)	1
10-40	(.69-2.8)	2
30-80	(2.1-5.5)	3
70-150	(4.8-10.3)	4



MODEL "DL" "BASIC" PRESSURE REDUCING REGULATOR

TABLE 7

DESCRIPTION	OPTION	CODE
SPECIAL CONSTRUCTION	--	X
HANDWHEEL & LOCKING LEVER	-3	3
1/4" (DN8) NPT SPG. CH. VENT TAP, 1-1/2" & 2" (DN40 & 50) Sizes, CI or CS mat'ls.	-25	E
NACE CONST: CS/CS/XX Per MR0175, NPT Body, S40,S40T Trims	-40	J
NACE CONST: SST/SST/XX Per MR0175, NPT Body, S40,S40T Trims	-40SST	K
SPECIAL CLEANING: Per Cashco Spec #S-1134.W/properly selected mat'ls,this procedure suitable for oxy.serv.BRZ or SST body material.	-55	M
SPECIAL CLEANING: Per Cashco Spec #S-1542. SST_CS & CI body/sp.ch.mat'ls.	-56	N
EPOXY PAINTED	-95	W

PRODUCT	HAZARD CATEGORY (See Cashco Spec #7E13)	CODE
Standard	N/A	7
European ¹	CE Marked I or II	E

¹ For product to be placed in service in the EU consult factory.

- ASSIGNMENT OF "OPTION" CODES**
- 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.
 - NUMERIC digits assigned first in "ascending" order.
 - ALPHA designations are assigned second (excluding the "X") in "alphabetical" order.
 - Left justify.
 - Add "0" to all unused squares.
 - If insufficient quantity of squares, consult factory for proper code.

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