ISO Registered Company

TECHNICAL BULLETIN

1000HP-BASIC-TB
02-16

MODEL 1000HP

PROCESS PRESSURE REDUCING REGULATOR

CE

Model 1000HP

APPLICATIONS

Used primarily in utilities services – saturated steam, superheated steam, industrial gases, fuel oils, compressed air, or water condensate. Also used in sour gas, chemical and other process services.

Refer to technical bulletin 1000HP-DIFF-TB for differential pressure applications. Refer to technical bulletin 1000HP-CRYO-TB for cryogenic reducer applications.

Refer to technical bulletins 1000LP-BASIC-TB for the low pressure (LP) variation of the Model 1000 products. Refer to technical bulletin 1000HP-SF for the high inlet pressure variation.

The Model 1000HP is a high capacity, high pressure regulator used to control downstream pressure between 10 and 300 psig (0.69 and 20.7 Barg). Available in sizes from 1/2" through 2" (DN15 through DN50).

The unique internal design allows use in a multitude of applications, including process fluids that normal pressure reducing regulators can not match. The most versatile self-contained, pressure reducing regulator available to users.

FEATURES

Streamlined Flow Path: Straight-through flow path reduces internal turbulence and resistance to flow, increasing stability and capacity.

High Inlet Pressures: Standard construction allows inlet pressures up to 740 psig (51.0 Barg).

High Outlet Pressures: Controlled outlet pressure up to 300 psig (20.7 Barg).

High Pressure Drop: Standard construction with extended guiding allows pressure drop up to 650 psid (44.8 Bard). This regulator is routinely applied in severe service conditions.

Flow-to-Open Plug: Provides unmatched rangeability – far greater than competitive flow-to-close designs. Highly stable at either high or low flow rates.

Versatility: Four body materials and nineteen trim material selections allow usage in a multitude of various fluids. Optional constructions extend the capability.

Protected Diaphragm Zone: Internal arrangement isolates the diaphragm from direct impingement, negating any flow induced instability at either low or high flow rates. Allows incorporation of dynamic boost from jet section. Uniformly registers pressure on the diaphragm.

Diaphragm Travel Stops: Incorporates mechanical stop in spring chamber to limit diaphragm uptravel and in body for downtravel, minimizing potential internal damage from over-travel conditions.

STANDARD/GENERAL SPECIFICATIONS

Body Sizes: 1/2", 3/4", 1", 1-1/4", 1-1/2" and 2" (DN15, 20, 25, 32, 40 and 50).

End Connections:
Standard – NPT female.
Opt-30: 150# or 300# RF flanged.
Opt-31: BSPT Tapered Thread.
Opt-31P: BSPP Parallel Thread.
Opt-32: Extended plain end nipples.
Opt-34: 14" Face to Face Flange Dim. (Sizes 1/2"- 1"& 1-1/2" only)

Body/Spring Chamber Material Combinations:
Uniform – DI/DI, BRZ/BRZ, CS/CS and SST/SST.
Combinations – CS/DI, BRZ/DI, SST/DI and SST/CS.

DI = Ductile iron
CS = Cast carbon steel
BRZ = Cast bronze
SST = Cast stainless steel

See Table 5 for material specifications.
NOTE: 1-1/4" (DN32) SST or BRZ bodies not available.

Trim Designs: Metal seated or composition seat (see Figure 1). Metal or composition diaphragms.

"B_" series designations – BRZ, BR, SST; see Table 7 for materials.
"S_" series designations – SST; See Table 8 for materials.

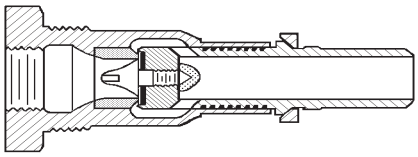


Figure 1: Composition Seat Design

Body/Cylinder Material Combinations:
DI/BRZ, DI/SST.
BRZ/BRZ.
CS/SST, SST/SST.

Maximum Inlet Pressure: Dependent only on cylinder material and type of end connection (See Table 16):

BRZ – 400 psig (27.6 Barg);
SST – 740 psig (51.0 Barg);

NOTES: 1. 1000HP is a flow-to-open (FTO) design; this places an upper limitation on inlet pressure for a given outlet pressure setting.
2. Pressure/temperature ratings are reduced for Opt-37 and -37S due to use of SST bolting.

Temperature Range:
Standard: For body/cylinder/spring chamber construction with:
any BRZ materials –
-20° to + 400°F (-29° to +205°C).
DI, CS (WCB) or SST materials –
-20° to +450°F (-29° to +232°C)

Optional: For body/cylinder/spring chamber construction with Opt-46G carbon graphite gasket:
CS (WCB) or SST materials –
-20° to +600°F (-29° to +315°C)

NOTE: Composition trim materials may lower above ranges.

Outlet Pressure Range: See Table 2 for individual range spring span.

Body Size		Full Range		Number of Range Springs
in	(DN)	psig	(Barg)	
1/2"	(15)	10 - 300	(0.7-20.7)	5
3/4"	(20)			6
1"	(25)			6
1-1/4"	(32)	10 - 225	(0.7-15.5)	5
1-1/2"	(40)			4
2"	(50)	10 - 150	(0.7-10.3)	3

NOTES: 1. 1000HP is a flow-to-open (FTO) design; this places a lower limitation on outlet pressure setting for some inlet pressure levels.
2. Opt-37 and -37S use SST range springs, reducing number of range spring choices available.

Maximum Pressure Drop:
Metal Seat Designs:
"B_" series trim designations – up to 390 psid (26.9 Bard).
"S_" series trim designations – up to 650 psid (44.8 Bard).

Composition Seat Designs:
"B_" series trim designations – up to 390 psid (26.9 Bard).
"S_" series trim designations – up to 650 psid (44.8 Bard).

Minimum Pressure Drop: Standard: $\Delta P > 5$ psid (0.34 Bard)
Opt-17: $\Delta P \leq$ 1-5 psid (0.07-0.34 Bard)
Minimum = 1 psid (0.07 Bard).

Seat Leakage: Meets ANSI/FCI 70-2.
Metal Seated – Class IV.
Composition Seat – Class VI.

See Tables 9 through 12 for flow capacity expressed in Cv's for full port and 1-step reduced port (Opt-12).

See Table 3 for "Wide Open Cv"; use for sizing of safety relief device.

Range Springs Standard: Heat treated steel, zinc plated.
Opt-37 and -37S: SST.

Diaphragm Flange Bolting: Standard: High strength, zinc plated, heat treated steel.
Opt-37 and -37S: SST.

Gaskets: Required for metal diaphragm constructions only; not required for composition diaphragm construction.
Standard: Graphite/NBR.
(**Not suitable for oxygen service**.)
T_{max} = 450°F (232°C)
Opt-45: Alternate TFE gaskets primarily for oxygen service.
T_{max} = 400°F (205°C).
Opt-46G: Alternate carbon graphite gaskets.
T_{max} = 600°F (315°C).

Painting: Standard All non-corrosion resistant portions to be painted with corrosion resistant epoxy paint per Cashco Spec #S-1606.

Alternate: See Opt-95 or -95OS.

OPTION SPECIFICATIONS

Option -1: CLOSING CAP. A removable ductile iron cap discourages tampering with spring setting. Available only with DI or CS spring chamber materials. Includes a gasket for sealing the closing cap to the spring chamber, a sealing lock nut and a 1/4" NPT female vent connection.

Option -1+6:
Option -1+8: DIFFERENTIAL CONSTRUCTION. Refer to Technical Bulletin 1000HP-DIFF-TB for technical information for differential pressure applications.

Option -3: MANUAL ADJUSTOR AND LOCKING LEVER. Use when frequent spring range settings are required. For sizes 1/2", 3/4" and 1" (DN15, 20 and 25) adjusting screw has handwheel fixed to end, and locking nut is replaced by a locking lever that is easily loosened/tightened. For sizes 1-1/4", 1-1/2" and 2" (DN32, 40, 50) handwheel is replaced by T-bar adjustor.

Option -5: BRZ/BR CRYOGENIC CONSTRUCTION. Refer to Technical Bulletin 1000HP-CRYO-TB for technical information for cryogenic applications.

Option -12: REDUCED PORT ORIFICE. Used when high inlet pressure negates use of the standard full port orifice. Also used when oversized body is desired to accommodate piping size. Available in metal seated or composition seat materials, in all "B_" or "S_" series trim designations, and in all body sizes except 1-1/4" (DN32). See Tables 10 and 12 for flow capacity in Cv's.

Option -14: INTEGRAL SEAT. Standard pressed-in seat ring-to-cylinder joint is sealed as a path of leakage by brazing or welding. The procedure also serves as a permanent joint for flow conditions where service conditions are "severe", subject to vibration, or thermal cycling.

Seat ring is silver brazed to cylinder for all "B_" series **composition** trim designations, and to 1/2" (DN15) body size cylinders with "S_" series trim designations. For all other body sizes with "S_" series designations the seat ring is welded to the cylinder.

OPTION SPECIFICATIONS

Recommended for all hydrogen or helium applications. Recommended when pressure drop exceeds 300 psid (20.7 Bard). Required when pressure drop exceeds 450 psid (31.0 Bard).

NOTE: Opt-14 is now included whenever Opt-15, stellited seat surfaces is specified.

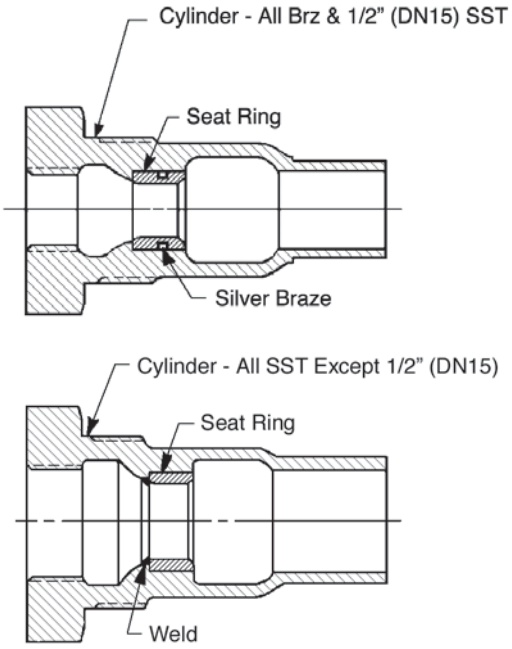


Figure 2:
Opt-14 Integral Seat

Option -15: STELLITED SEAT SURFACES. Available with metal seated S1 trim only, and with full port orifice or Opt-12 reduced port orifice. Both plug face and seat ring's seat edge are coated with stellite hard surfacing using a flame spray process. Includes integral seat ring Opt-14.
Required for applications when:

1. Liquid flow is flashing and when both outlet pressure P2 < 50 psig (3.5 Barg) and ΔP > 50 psid (3.5 Bard).
2. Steam service when inlet pressure P1 > 450 psig (31.0 Barg).
3. Steam service when ΔP > 300 psid (20.7 Bard).
4. 2-phase flow (liquid + vapor i.e. "wet" steam) at inlet.

Option -17: PISTON SPRING. Required for applications where pressure drop is less than 5 psid (0.34 Bard). Minimizes plug/cylinder frictional effects. 302 SST material only. Not available in 2" (DN50) body size with CS cylinder.

Option -20: PRESSURE LOADED. Former Opt-20 with dome loaded topworks is obsoleted. Use 1000HP-1+6 as alternate. See technical bulletin 1000HP-DIFF-TB.

Option -25: REMOTE VENTING. Use with hazardous or explosive gases where personnel/equipment safety is at issue when a diaphragm leak occurs. 1/4" NPT female connection in spring chamber for piping.

Option -25P: PLASTIC RAIN PROOF BUG VENT. (For Opt-25).

Option -25S: SST RAIN PROOF BUG VENT. (For Opt-25).

Option -26: DRAIN HOLE. 1/4" NPT drain tap with plug in body underside. Recommend use with highly viscous fluids (above 100 centipoise (Cp)) for downstream piping pressure sensing. Plug material similar to body material. Recommended for flashing liquids.

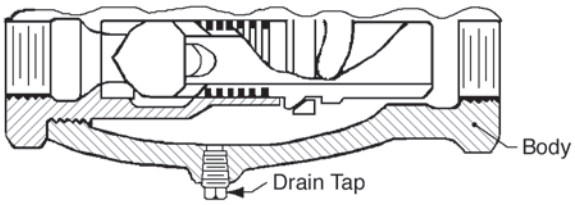


Figure 3:
Opt-26 Drain Hole

Option -27: VISCOUS LIQUID SERVICE. Incorporates special valve plug with drilled openings near the "jet effect" zone to stabilize operation for fluids with viscosity greater than 100 Cp. Brass or SST metal seated trim ONLY.

Option -30: FLANGED END CONNECTIONS. CS or SST body materials only. Flange and pipe nipple materials of same general chemistry as body material. Available as 150# RF or 300# RF flange configurations. Pressure \ Temperature ratings for Carbon Steel body per ASME B16.5. Group 1.1 and ASME B16.5 for SST body. Requires lapped joint-type flange on inlet (cylinder) end. Pipe nipples socket welded to body and cylinder. Outlet connection flange is socket

weld-type. See Table 16 for lowered P vs T ratings. No post-weld stress relieving performed. Not available in 1-1/4" (DN32) body size. (Suitable for NACE service with post-weld, stress relief, heat treatment).

Option -31 BSPT END CONNECTIONS. British Standard Tapered Pipe threads per ISO 7/1; used as alternate to NPT.

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

Option -32: EXTENDED P.E. NIPPLES. Schedule 80 plain end pipe nipples used for field butt or socket welding into pipeline. Pipe nipples of same general chemistry as body material. Short-threaded pipe nipples seal welded to body and cylinder. Adds approximately 8 inches (200 mm) to the face-to-face dimension of standard unit. Use for socket weld pipe systems. (Suitable for NACE service with post-weld, stress relief, heat treatment).

Option -34: SPECIAL 14" FACE TO FACE DIMENSION FOR FLANGED END CONNECTIONS. Sizes 1/2" - 1" & 1-1/2" only. See Opt.-30 for standard face to face dimension.

Option -36: SST CRYOGENIC CONSTRUCTION. Refer to technical bulletin 1000HP-CRYO-TB for technical information for cryogenic applications.

Option -37: ALL SST/CLEAN UNIT FOR LIQUIDS AND GASES. Packaged primarily for the food and pharmaceutical industries. NPT and 150# SST RF flanged end connections ONLY. 316 SST body and spring chamber materials ONLY. Use with S6 trim ONLY. T-bar handle, spring chamber internals, and flange bolting of SST materials. All wetted and external castings are electropolished, and the unit is cleaned to Cashco Spec. #S-1576. Includes Opt-26 1/4" NPT tap with SST plug.

Use of SST diaphragm flange bolting limits P vs T ratings to levels below standard unit (see Table 16). Also limits pressure settings to overall range of 10–80 psig (0.7–5.5 Barg) using multiple SST springs.

Option -37S: ALL SST/CLEAN UNIT FOR STEAM. Similar to Option -37, except is equipped with different trim; use with S1 trim ONLY. Includes carbon graphite diaphragm gasket material. Includes Opt-26 1/4" NPT tap with SST plug.
Use of SST flange bolting limits P vs T ratings to levels below standard unit (see Table 16). Also limits pressure settings to overall range of 10–80 psig (0.7–5.5 Barg) using multiple SST springs.

Option -40: NACE CONSTRUCTION. Internal wetted portions meet NACE standard MR0175 for application in sour gas service. Exterior of the unit to not be directly exposed to a sour gas environment, buried, insulated or otherwise denied direct atmospheric exposure. CS/CS or SST/CS body/spring chamber materials ONLY. Acceptable ONLY with S40, S40V, S3, or S3N trims. Not available with Opt-14, Opt-15, Opt-17, or Opt-37.

Option -45: TFE/SILICATE-GASKET. Primarily for oxygen service. Limits temperature range to -20° to +400°F (-29° to +205°C). Not required when using a composition diaphragm.

Option -46G: HIGH TEMPERATURE GASKETS. CS (WCB) or SST body/spring chamber materials only with S1 or S2 trim. Utilizes carbon graphite gaskets over standard gaskets. Primarily applied at temperatures over 400°F (205°C) or at customer's request; range of -20° to +600°F (-29° to +315°C).
(See Table 8 a.1)

Option -55: SPECIAL CLEANING. BRZ or SST body materials ONLY. Cleaning per Cashco Spec #S-1134 for Oxygen gas Service. **NOTE:** Design Pressure Rating shall not exceed 375 psig (25.8 Barg) when body material is SST and process medium is oxygen.

Option -56: SPECIAL CLEANING. Cleaning per Cashco Spec #S-1542. **NOT suitable for Oxygen Service.**

Option -87: TWO 1/8" (DN6) NPT TAPS. One located on the inlet, one on the outlet for gauge connections for Opt-34 only.

Option -95: EPOXY PAINT. Special epoxy painting of all non-corrosion resistant external surfaces per Cashco Spec #S-1547. Utilized in harsh atmospheric conditions.

Option -95OS: EPOXY PAINT. Special epoxy painting of all non-corrosion resistant external surfaces per Cashco Spec #S-1687 for OFFSHORE installations.

TECHNICAL SPECIFICATIONS

TABLE 1

RECOMMENDED PRESSURE DROP VS. TRIM DESIGN/MATERIALS

NOTE: Consult Factory with Application Details For ΔP's > 450 psid (31 Bard).

NOTE: 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.

Fluid	Maximum Inlet Pressure		Operating Pressure Drop Range		Seat Design	Basic Trim Materials	Trim Designation Numbers
	psig	(Barg)	psid	(Barg)			
Liquids (Noncavating)	400	(27.6)	5 - 250	(0.34 - 17.2)	Soft Seat - All Comp Materials	BRZ/BR	BB, B2, B3, B5, BK
	740	(51.0)	5 - 400	(0.34 - 27.6)	Soft Seat - All Comp Materials	SST	S3, S3N, S6, S7, S9, SB, S40V, S36
	400	(27.6)	5 - 390	(0.34 - 26.9)	Metal Seated	BRZ/BR/SST	B1
	740	(51.0)	5 - 650	(0.34 - 44.8)	Metal Seated	SST	S2, S2N, S0, S1, S5, S40
Gas	400	(27.6)	5 - 390	(0.34 - 26.9)	Soft Seat - All Comp Materials **except SST/TFE**	BRZ/BR	BB, B2, B3, B5, BK
						SST	S6, S3N, SB, S40V
	740	(51.0)	5 - 650	(0.34 - 44.8)	Soft Seat - **SST/TFE ONLY**	SST	S3, S9, S36
					Metal Seated	SST	S2, S2N, S0, S1, S5, S40
Steam	400*	(27.6)	5 - 200*	(0.34 - 13.8)	Metal Seated	BRZ/BR/SST	B1
	450	(31.0)	5 - 300	(0.34 - 20.7)	Metal Seated	SST	S1, S2
	740	(51.0)	5 - 650	(0.34 - 44.8)	Metal Seated - Opt-15 Stellite	SST	S1

* Saturated Only **NOTE:** For ΔP = 1-5 psid (.07 - .34 Bard), use Opt-17 piston spring.

TABLE 2

RANGE SPRINGS

Body Size		Standard - Steel		SST - Opts. -37 & 37S	
in.	**(DN)**	**psig**	**(Barg)**	**psig**	**(Barg)**
1/2"	(15)	10-50	(.7-3.4)	10-50	(.7-3.4)
		40-100	(2.7-6.9)	40-80	(2.7-5.5)
		80-150	(5.5-10.3)	N/A	N/A
		120-190	(8.3-13.1)		
		150-300	(10.3-20.7)		
3/4"	(20)	10-40	(.7-2.7)	10-40	(.7-2.7)
		30-60	(2.1-4.1)	30-60	(2.1-4.1)
		50-90	(3.4-6.2)	50-80	(3.4-5.5)
		70-110	(4.8-7.6)	N/A	N/A
		90-170	(6.2-11.7)		
		140-300	(9.6-20.7)		
1"	(25)	10-40	(.7-2.7)	10-30	(.7-2.1)
		30-60	(2.1-4.1)	25-45	(1.7-3.1)
		50-70	(3.4-4.8)	35-50	(2.4-3.4)
		55-80	(3.8-5.5)	40-80	(2.7-5.5)
		65-130	(4.5-8.9)	N/A	N/A
		100-300	(6.9-20.7)		
1 1/4"	(32)	10-40	(.7-2.7)		
		30-50	(2.1-3.4)		
		40-60	(2.7-4.1)		
		50-90	(3.4-6.2)		
		70-225	(4.8-15.5)		
1-1/2"	(40)	10-40	(.7-2.7)	10-50	(.7-3.4)
		30-75	(2.1-5.2)	40-80	(2.7-5.5)
		60-100	(4.1-6.9)	N/A	N/A
		80-225	(5.5-15.5)		
2"	(50)	10-40	(.7-2.7)	10-30	(.7-2.1)
		30-60	(2.1-4.1)	25-45	(1.7-3.1)
		50-150	(3.4-10.3)	35-80	(2.4-5.5)

TABLE 3

MAXIMUM CAPACITY – Cv

FOR SIZING SAFETY RELIEF DEVICE

(WITH PLUG WIDE OPEN)

Body Size		Orifice Size			
		Standard		Opt.-12 Reduced	
inch	**(DN)**	**Size**	**Cv**	**Size**	**Cv**
1/2"	(15)	1/2"	5	3/8"	3
3/4"	(20)	3/4"	9	1/2"	7
1"	(25)	7/8"	9	5/8"	8
1-1/4"	(32)	1"	13	NA[1]	NA[1]
1-1/2"	(40)	1-1/4"	17	7/8"	13
2"	(50)	1-1/2"	22	1-1/4"	20

NOTES: 1. NA = Not Available.
2. See Footnote 1 of Table 16 for technical information on safety relief valve or rupture disc setpoint pressure.

TABLE 4
MAXIMUM ALLOWABLE PRESSURE vs. TEMPERATURE; FOR PRESSURE CONTAINMENT OF BODY, SPRING CHAMBER AND CYLINDER
(See Table 5 for Material Specifications)

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

Materials of Construction[1]		Inlet - Cylinder				Outlet - Body & Spring Chamber			
Description - Abbreviation Body/Spring Chamber/Cylinder		Pressure		Temperature		Pressure		Temperature	
		psig	(Barg)	°F	(°C)	psig	(Barg)	°F	(°C)
DI/DI/BRZ or BRZ/DI/BRZ		400	(27.6)	-20 to +150	(-29 to +66)	300	(20.7)	-20 to +300	(-29 to +149)
		385	(26.5)	+200	(+94)	250	(17.2)	+400	(+205)
		365	(25.2)	+250	(+121)				
		335	(23.1)	+300	(+149)				
		300	(20.7)	+350	(+177)				
		250	(17.2)	+400	(+205)				
BRZ/BRZ/BRZ		400	(27.6)	-20 to +150	(-29 to +66)	400	(27.6)	-20 to +150	(-29 to +66)
		385	(26.5)	+200	(+94)	250	(17.2)	+400	(+205)
		365	(25.2)	+250	(+121)				
		335	(23.1)	+300	(+149)				
		300	(20.7)	+350	(+177)				
		250	(17.2)	+400	(+205)				
DI/DI/SST or CS/DI/SST or SST/DI/SST		740	(51.0)	-20 to +450	(-29 to +232)	300	(20.7)	-20 to +300	(-29 to +149)
						250	(17.2)	+450	(+232)
CS/CS/SST or SST/CS/SST or SST/SST/SST	Standard Gasket or Option-45	740	(51.0)	-20 to +450[2]	(-29 to +232)[2]	400	(27.6)	-20 to +450[2]	(-29 to +232)[2]
CS/CS/SST or SST/CS/SST or SST/SST/SST	Option-46G	740	(51.0)	-20 to +600[3]	(-29 to +315)[3]	400	(27.6)	-20 to +600[3]	(-29 to +315)[3]

1 Pressure vs. temperature ratings in accordance with ASME B31.3.
2 Operating Temperature limit for Option-45 is 400F (+205C).
3 Requires use of Opt-46G, carbon graphite gasket for temperatures from +450 to +600°F (+232 to +315°C), S1 or S2 Trim only.

TABLE 5
MATERIAL SPECIFICATIONS OF BODY, SPRING CHAMBER AND CYLINDER

Material	ASTM Specifications
BRZ - cast bronze	B62, Alloy 83600
DI - ductile iron	A395 Gr. 60-40-18
CS - cast carbon steel	A216, Gr. WCC (Body)
	A216, Gr. WCB (Spring Chamber)
SST - cast stainless steel	A351, Gr. CF8M (cast 316 SST)
	A479 UNS 31600/03

TABLE 6

APPLICATIONS

FLUID	Recommended Construction	Trim Designation No. [1]
Air or Inert Gases	Composition Seat & Diaphragm Metal Seat & Composition Diaphragm	BB,**B2**, BK, B3, S3N, SB, S40V S2N
Liquids	Metal Seat & Diaphragm Composition Seat & Diaphragm	B1, S1 BB, **B2**, B3, BK,S3N, SB, S40V
Chemicals	Metal Seat & Composition Diaphragm Metal Seat & Diaphragm Composition Seat & Diaphragm Composition Seat & Metal Diaphragm	S5, S40 S0 S3, S6, S40V S9, S36
Sour Gas/Crude	Metal Seat & Composition Diaphragm	S40
Sour Gas/Crude	Composition Seat & Diaphragm	S3, S40V, S3N
Fuel Oil	Composition Seat & Diaphragm	BB, SB
Hydrocarbon Gas or Liquids	Composition Seat & Diaphragm	BB, S3, S3N, S7, SB, S40V
Steam, Saturated or Superheated	Metal Seat & Diaphragm	**S2**, B1, S1
Water and Condensate, Low Temperature (32° - 180°F) (0° - 83° C)	Composition Seat & Diaphragm Metal Seat & Composition Diaphragm	BB, **B2**, B3, **S3**, S3N. SB S2N
Water and Condensate High Temperature (180° - 300°) (83° - 149°C)	Metal Seat & Diaphragm	**S1**, B1, or S2

[1] S1 trim is available with stellite faced plug and valve seat (Opt. -15)..

Note: 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.

TABLE 7

BRASS TRIM MATERIAL COMBINATIONS

Part	Brass Trim#					
	B1	B2	B3	B5	BB	BK
Diaphragm	302 SST	BC	BC	Phos. BRZ	NBR	FKM
Cylinder	Brass	Brass	Brass	Brass	Brass	Brass
Valve Seat	316 SST	Brass	Brass	Brass	Brass	Brass
Plug	416 SST	Brass	Brass	Brass	Brass	Brass
Seat Disc	None (metal)	NBR	V-TFE	V-TFE	NBR	FKM
Seat Disc Screw	None	Brass	Brass	Brass	Brass	Brass
Plug Collar	Brass	Brass	Brass	Brass	Brass	Brass
Rocker Arm Shaft	Brass	Brass	Brass	Brass	Brass	Brass
Rocker Arm	Sizes 1/2" - 1" = SST CF8M Sizes 1-1/4" - 2" = Bronze					
Pusher Plate Stud	Brass	Brass	Brass	Brass	Brass	Brass
Pusher Plate	Bronze	Bronze	Bronze	Bronze	Bronze	Bronze
Stud Collar	Brass	Brass	Brass	Brass	Brass	Brass
Cotter Pin	Brass	Brass	Brass	Brass	Brass	Brass
Nut	Brass	Brass	Brass	Brass	Brass	Brass
Temperature Range °F Temperature Range °C	-20 to +400 -29 to +205	-20 to +180 -29 to +83	-20 to +180 -29 to +83	-20 to +200 -29 to +93	-20 to +180 -29 to +83	-20 to +400 -29 to +205

NOTE: 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.

TABLE 8 a

STAINLESS STEEL TRIM MATERIAL COMBINATIONS

Part	Metal Seat					
	S0	S1[1]	S2	S2N	S5	S40 *
Diaphragm	TFE Coated 302 SST	302 SST	302 SST	BC	FKM	BC
Cylinder	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M
Valve Seat	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Plug	316 SST	316 SST	416 SST	416 SST	416 SST	316 SST
Seat Disc	None (Metal)	None (Metal)	None (Metal)	None (Metal)	None (Metal)	None (Metal)
Set Disc Screw	None	None	None	None	None	None
Plug Collar	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Rocker Arm Shaft	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Rocker Arm	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M
Pusher Plate and Stud	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M
Stud Collar	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Cotter Pin	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Nut	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Temperature Range °F	-20 to 400	See Side Table 8 a.1		-20 to 180	-20 to 400	-20 to 180
Temperature Range °C	-29 to 205			-29 to 83	-29 to 205	-29 to 83

Table 8 a.1
Temperature Ranges for Trims S1 & S2

Gasket	Temp. Range
Standard	-20 to +450 (-29 to +232)
Option-45	-20 to +400 (-29 to + 205)
Option-46G	-20 to +600F (-29 to +315)

[1] Available with Stellite faced plug and valve seat (Opt. -15). Includes a screwed-in seat cone.

* Use for NACE service.

NOTE: 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.

TABLE 8 b

STAINLESS STEEL TRIM MATERIAL COMBINATIONS

Part	Composition Seat							
	S3 *	S3N *	SB	S6	S7	S40V *	S9	S36
Diaphragm	BC	BC	NBR	EPDM	FKM	FKM	TFE Coated 302SST	302 SST
Cylinder	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M
Valve Seat	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Plug	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Seat Disc	V-TFE	NBR	NBR	EPR	V-TFE	FKM	V-TFE	V-TFE
Set Disc Screw	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Plug Collar	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Rocker Arm Shaft	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Rocker Arm	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M
Pusher Plate and Stud	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M	CF8M
Stud Collar	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Cotter Pin	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Nut	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST	316 SST
Temperature Range °F	-20 to 180			-20 to 300	-20 to 400			
Temperature Range °C	-29 to 83			-29 to 149	-29 to 205			

ABBREVIATIONS	
NBR	= Buna-N
BC	= Neoprene
EPR	= Ethylene Propylene
EPDM	= Ethylene Propylene Diene
TFE	= Polytetrafluoroethylene
FKM	= Fluorocarbon elastomer
V-TFE	= Virgin TFE
Phos. BRZ	= Phosphor Bronze

* Use for NACE service.

TABLE 9
Cv – FLOW CAPACITY

FULL PORT – COMPOSITION DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

COMPOSITION DIAPHRAGM - SIZE - 1/2" (DN15) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	185	(12.8)	185	(12.8)	0.71	1.30	1.89	10-50	(0.7-3.4)
15	(1.0)	300	(20.7)	300	(20.7)	0.77	1.39	1.98	10-50	(0.7-3.4)
20	(1.4)	420	(29.0)	420	(29.0)	0.84	1.48	2.08	10-50	(0.7-3.4)
25	(1.7)	535	(36.9)	425	(29.3)	0.90	1.57	2.17	10-50	(0.7-3.4)
35	(2.4)	685	(47.2)	435	(30.0)	1.03	1.74	2.35	10-50	(0.7-3.4)
50	(3.4)	700	(48.3)	450	(31.0)	1.33	2.17	2.82	40-100	(2.8-6.9)
75	(5.2)	740	(51.0)	475	(32.8)	1.58	2.52	3.43	40-100	(2.8-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	2.07	3.35	3.50	80-150	(5.5-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	2.17	3.50	3.50	80-150	(5.5-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	1.98	3.28	3.50	120-190	(8.3-13.1)
175	(12.1)	740	(51.0)	575	(39.7)	2.00	3.39	3.50	120-190	(8.3-13.1)
200	(13.8)	740	(51.0)	600	(41.4)	2.02	3.50	3.50	150-300	(10.3-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	2.05	3.50	3.50	150-300	(10.3-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	2.09	3.50	3.50	150-300	(10.3-20.7)

COMPOSITION DIAPHRAGM - SIZE - 3/4" (DN20) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	145	(10.0)	145	(10.0)	1.16	2.23	2.86	10-40	(0.7-2.8)
15	(1.0)	230	(15.9)	230	(15.9)	1.26	2.34	3.00	10-40	(0.7-2.8)
20	(1.4)	320	(22.1)	320	(22.1)	1.37	2.44	3.15	10-40	(0.7-2.8)
25	(1.7)	410	(28.3)	410	(28.3)	1.47	2.55	3.29	10-40	(0.7-2.8)
35	(2.4)	540	(37.2)	435	(30.0)	1.97	3.15	4.12	30-60	(2.1-4.1)
50	(3.4)	700	(48.3)	450	(31.0)	2.30	2.69	4.85	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	2.83	4.77	5.00	50-90	(3.4-6.2)
100	(6.9)	740	(51.0)	500	(34.5)	3.33	5.00	5.00	70-110	(4.8-7.6)
125	(8.6)	740	(51.0)	525	(36.2)	3.10	5.00	5.00	90-170	(6.2-11.7)
150	(10.3)	740	(51.0)	550	(37.9)	3.33	5.00	5.00	90-170	(6.2-11.7)
175	(12.1)	740	(51.0)	575	(39.7)	2.17	3.54	4.77	140-300	(9.7-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	2.24	3.60	5.00	140-300	(9.7-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	2.37	3.74	5.00	140-300	(9.7-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	2.58	3.87	5.00	140-300	(9.7-20.7)

COMPOSITION DIAPHRAGM - SIZE - 1" (DN25) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	130	(9.0)	130	(9.0)	1.25	2.41	3.61	10-40	(0.7-2.8)
15	(1.0)	205	(14.1)	205	(14.1)	1.40	2.69	3.81	10-40	(0.7-2.8)
20	(1.4)	285	(19.7)	285	(19.7)	1.55	2.96	4.01	10-40	(0.7-2.8)
25	(1.7)	360	(24.8)	360	(24.8)	1.70	3.24	4.21	10-40	(0.7-2.8)
35	(2.4)	485	(33.4)	435	(30.0)	2.49	4.21	5.07	30-60	(2.1-4.1)
50	(3.4)	695	(47.9)	450	(31.0)	2.90	5.00	6.00	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	3.67	6.00	6.00	55-80	(3.8-5.5)
100	(6.9)	740	(51.0)	500	(34.5)	3.85	6.00	6.00	65-130	(4.5-9.0)
125	(8.6)	740	(51.0)	525	(36.2)	3.70	6.00	6.00	100-300	(6.9-20.7)
150	(10.3)	740	(51.0)	550	(37.9)	3.76	6.00	6.00	100-300	(6.9-20.7)
175	(12.1)	740	(51.0)	575	(39.7)	3.83	6.00	6.00	100-300	(6.9-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	3.89	6.00	6.00	100-300	(6.9-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	4.02	6.00	6.00	100-300	(6.9-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	4.15	6.00	6.00	100-300	(6.9-20.7)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 9 (Continued)
Cv – FLOW CAPACITY

FULL PORT – COMPOSITION DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

COMPOSITION DIAPHRAGM - SIZE - 1-1/4" (DN32) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	105	(7.2)	105	(7.2)	**1.83**	**4.07**	**6.25**	10-40	(0.7-2.8)
15	(1.0)	170	(11.7)	170	(11.7)	**2.11**	**4.55**	**6.69**	10-40	(0.7-2.8)
20	(1.4)	235	(16.2)	235	(16.2)	**2.40**	**5.03**	**7.13**	10-40	(0.7-2.8)
25	(1.7)	300	(20.7)	300	(20.7)	**2.68**	**5.51**	**7.58**	10-40	(0.7-2.8)
35	(2.4)	380	(26.2)	380	(26.2)	**4.10**	**7.70**	**9.00**	30-50	(2.1-3.4)
50	(3.4)	525	(36.2)	450	(31.0)	**5.30**	**8.83**	**9.00**	40-60	(2.7-4.1)
75	(5.2)	670	(46.2)	475	(32.8)	**7.70**	**9.00**	**9.00**	50-90	(3.4-6.2)
100	(6.9)	495	(34.1)	495	(34.1)	**8.68**	**9.00**	**9.00**	70-225	(4.8-15.5)
125	(8.6)	700	(48.3)	525	(36.2)	**8.73**	**9.00**	**9.00**	70-225	(4.8-15.5)
150	(10.3)	740	(51.0)	550	(37.9)	**8.79**	**9.00**	**9.00**	70-225	(4.8-15.5)
175	(12.1)	740	(51.0)	575	(39.7)	**8.84**	**9.00**	**9.00**	70-225	(4.8-15.5)
200	(13.8)	740	(51.0)	600	(41.4)	**8.90**	**9.00**	**9.00**	70-225	(4.8-15.5)
225	(15.5)	740	(51.0)	625	(43.1)	**8.95**	**9.00**	**9.00**	70-225	(4.8-15.5)

COMPOSITION DIAPHRAGM - SIZE - 1-1/2" (DN40) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	110	(7.6)	110	(7.6)	**2.37**	**4.59**	**6.87**	10-40	(0.7-2.8)
15	(1.0)	180	(12.4)	180	(12.4)	**2.75**	**5.20**	**7.38**	10-40	(0.7-2.8)
20	(1.4)	245	(16.9)	245	(16.9)	**3.14**	**5.80**	**7.90**	10-40	(0.7-2.8)
25	(1.7)	315	(21.7)	315	(21.7)	**3.52**	**6.41**	**8.41**	10-40	(0.7-2.8)
35	(2.4)	395	(27.3)	395	(27.3)	**4.40**	**8.80**	**10.00**	30-75	(2.1-5.2)
50	(3.4)	600	(41.4)	450	(31.0)	**5.50**	**9.05**	**10.55**	30-75	(2.1-5.2)
75	(5.2)	740	(51.0)	475	(32.8)	**6.35**	**9.65**	**10.90**	60-100	(4.1-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	**7.33**	**10.25**	**11.00**	80-225	(5.5-15.5)
125	(8.6)	740	(51.0)	525	(36.2)	**7.49**	**10.32**	**11.00**	80-225	(5.5-15.5))
150	(10.3)	740	(51.0)	550	(37.9)	**7.65**	**10.39**	**11.00**	80-225	(5.5-15.5)
175	(12.1)	740	(51.0)	575	(39.7)	**7.81**	**10.46**	**11.00**	80-225	(5.5-15.5)
200	(13.8)	740	(51.0)	600	(41.4)	**7.97**	**10.53**	**11.00**	80-225	(5.5-15.5)
225	(15.5)	740	(51.0)	625	(43.1)	**8.13**	**10.60**	**11.00**	80-225	(5.5-15.5)

COMPOSITION DIAPHRAGM - SIZE - 2" (DN50) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	120	(8.3)	120	(8.3)	**3.60**	**7.27**	**10.30**	10-40	(0.7-2.8)
15	(1.0)	220	(15.2)	220	(15.2)	**3.84**	**7.60**	**10.83**	10-40	(0.7-2.8)
20	(1.4)	315	(21.7)	315	(21.7)	**4.08**	**7.92**	**11.36**	10-40	(0.7-2.8)
25	(1.7)	415	(28.6)	415	(28.6)	**4.32**	**8.25**	**11.89**	10-40	(0.7-2.8)
35	(2.4)	420	(29.0)	420	(29.0)	**7.90**	**11.05**	**12.80**	30-60	(2.1-4.1)
50	(3.4)	690	(47.6)	450	(31.0)	**8.80**	**11.75**	**13.00**	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	**7.27**	**10.63**	**12.37**	50-150	(3.4-10.3)
100	(6.9)	740	(51.0)	500	(34.5)	**7.78**	**10.95**	**12.70**	50-150	(3.4-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	**8.29**	**11.26**	**12.90**	50-150	(3.4-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	**8.80**	**11.58**	**13.00**	50-150	(3.4-10.3)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 10
Cv – FLOW CAPACITY

OPT -12, 1-STEP REDUCED PORT – COMPOSITION DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

COMPOSITION DIAPHRAGM - SIZE - 1/2" (DN15) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	200	(13.8)	220	(15.2)	0.47	1.00	1.55	10-50	(0.7-3.4)
15	(1.0)	335	(23.1)	370	(25.5)	0.53	1.10	1.61	10-50	(0.7-3.4)
20	(1.4)	475	(32.8)	420	(29.0)	0.60	1.18	1.68	10-50	(0.7-3.4)
25	(1.7)	610	(42.1)	425	(29.3)	0.66	1.26	1.74	10-50	(0.7-3.4)
35	(2.4)	685	(47.2)	435	(30.0)	0.78	1.42	1.86	10-50	(0.7-3.4)
50	(3.4)	740	(51.0)	450	(31.0)	1.06	1.79	2.22	40-100	(2.8-6.9)
75	(5.2)	740	(51.0)	475	(32.8)	1.26	2.09	2.36	40-100	(2.8-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	1.67	2.44	2.50	80-150	(5.5-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	1.79	2.50	2.50	80-150	(5.5-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	1.74	2.48	2.50	120-190	(8.3-13.1)
175	(12.1)	740	(51.0)	575	(39.7)	1.81	2.50	2.50	120-190	(8.3-13.1)
200	(13.8)	740	(51.0)	600	(41.4)	1.57	2.37	2.50	150-300	(10.3-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	1.66	2.42	2.50	150-300	(10.3-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	1.75	2.48	2.50	150-300	(10.3-20.7)

COMPOSITION DIAPHRAGM - SIZE - 3/4" (DN20) - 1-STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	175	(12.1)	300	(20.7)	0.71	1.30	1.89	10-40	(0.7-2.8)
15	(1.0)	280	(19.3)	415	(28.6)	0.77	1.39	1.98	10-40	(0.7-2.8)
20	(1.4)	380	(26.2)	420	(29.0)	0.84	1.48	2.08	10-40	(0.7-2.8)
25	(1.7)	480	(33.1)	425	(29.3)	0.90	1.57	2.17	10-40	(0.7-2.8)
35	(2.4)	665	(45.9)	435	(30.0)	1.03	1.74	2.35	30-60	(2.1-4.1)
50	(3.4)	740	(51.0)	450	(31.0)	1.33	2.17	2.82	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	1.58	2.52	3.43	50-90	(3.4-6.2)
100	(6.9)	740	(51.0)	500	(34.5)	2.07	3.35	3.50	70-110	(4.8-7.6)
125	(8.6)	740	(51.0)	525	(36.2)	2.17	3.50	3.50	90-170	(6.2-11.7)
150	(10.3)	740	(51.0)	550	(37.9)	2.12	3.47	3.50	140-300	(9.7-20.7)
175	(12.1)	740	(51.0)	575	(39.7)	2.00	3.39	3.50	140-300	(9.7-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	2.02	3.50	3.50	140-300	(9.7-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	2.05	3.50	3.50	140-300	(9.7-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	2.09	3.50	3.50	140-300	(9.7-20.7)

COMPOSITION DIAPHRAGM - SIZE -1" (DN25) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	170	(11.7)	250	(17.2)	0.86	1.72	2.57	10-40	(0.7-2.8)
15	(1.0)	270	(18.6)	400	(27.6)	0.96	1.93	2.83	10-40	(0.7-2.8)
20	(1.4)	370	(25.5)	420	(29.0)	1.07	2.15	3.09	10-40	(0.7-2.8)
25	(1.7)	475	(32.8)	425	(29.3)	1.17	2.36	3.36	10-40	(0.7-2.8)
35	(2.4)	635	(43.8)	435	(30.0)	1.57	3.50	4.60	30-60	(2.1-4.1)
50	(3.4)	740	(51.0)	450	(31.0)	1.95	4.50	5.46	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	2.85	5.46	5.46	55-80	(3.8-5.5)
100	(6.9)	740	(51.0)	500	(34.5)	2.74	5.38	5.46	65-130	(4.5-9.0)
125	(8.6)	740	(51.0)	525	(36.2)	2.50	5.20	5.46	100-300	(6.9-20.7)
150	(10.3)	740	(51.0)	550	(37.9)	2.58	5.38	5.46	100-300	(6.9-20.7)
175	(12.1)	740	(51.0)	575	(39.7)	2.66	5.46	5.46	100-300	(6.9-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	2.74	5.46	5.46	100-300	(6.9-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	2.91	5.46	5.46	100-300	(6.9-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	3.07	5.46	5.46	100-300	(6.9-20.7)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 10 (Continued)
Cv – FLOW CAPACITY

OPT -12, 1-STEP REDUCED PORT – COMPOSITION DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

COMPOSITION DIAPHRAGM - SIZE -1-1/2" (DN40) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	165	(11.4)	225	(15.5)	**1.25**	**2.41**	**3.61**	10-40	(0.7-2.8)
15	(1.0)	265	(18.3)	365	(25.2)	**1.40**	**2.69**	**3.81**	10-40	(0.7-2.8)
20	(1.4)	360	(24.8)	420	(29.0)	**1.55**	**2.96**	**4.01**	10-40	(0.7-2.8)
25	(1.7)	460	(31.7)	425	(29.3)	**1.70**	**3.24**	**4.21**	10-40	(0.7-2.8)
35	(2.4)	570	(39.3)	435	(30.0)	**2.49**	**4.21**	**5.07**	30-75	(2.1-5.2)
50	(3.4)	700	(48.3)	450	(31.0)	**2.90**	**5.00**	**6.00**	30-75	(2.1-5.2)
75	(5.2)	740	(51.0)	475	(32.8)	**3.67**	**6.00**	**6.00**	60-100	(4.1-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	**3.65**	**6.00**	**6.00**	80-225	(5.5-15.5)
125	(8.6)	740	(51.0)	525	(36.2)	**3.70**	**6.00**	**6.00**	80-225	(5.5-15.5)
150	(10.3)	740	(51.0)	550	(37.9)	**3.76**	**6.00**	**6.00**	80-225	(5.5-15.5)
175	(12.1)	740	(51.0)	575	(39.7)	**3.83**	**6.00**	**6.00**	80-225	(5.5-15.5)
200	(13.8)	740	(51.0)	600	(41.4)	**3.89**	**6.00**	**6.00**	80-225	(5.5-15.5)
225	(15.5)	740	(51.0)	625	(43.1)	**3.95**	**6.00**	**6.00**	80-225	(5.5-15.5)

COMPOSITION DIAPHRAGM - SIZE -2" (DN50) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	145	(10.0)	145	(10.0)	**2.37**	**4.59**	**6.87**	10-40	(0.7-2.8)
15	(1.0)	245	(16.9)	245	(16.9)	**2.75**	**5.20**	**7.38**	10-40	(0.7-2.8)
20	(1.4)	340	(23.4)	340	(23.4)	**3.14**	**5.80**	**7.90**	10-40	(0.7-2.8)
25	(1.7)	430	(29.7)	425	(29.3)	**3.52**	**6.41**	**8.41**	10-40	(0.7-2.8)
35	(2.4)	460	(31.7)	435	(30.0)	**4.40**	**8.80**	**10.00**	30-60	(2.1-4.1)
50	(3.4)	690	(47.6)	450	(31.0)	**5.50**	**9.05**	**10.55**	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	**6.35**	**9.65**	**10.90**	50-150	(3.4-10.3)
100	(6.9)	740	(51.0)	500	(34.5)	**7.33**	**10.25**	**11.00**	50-150	(3.4-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	**7.49**	**10.32**	**11.00**	50-150	(3.4-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	**7.65**	**10.39**	**11.00**	50-150	(3.4-10.3)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 11
Cv – FLOW CAPACITY

FULL PORT – METAL DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

METAL DIAPHRAGM - SIZE - 1/2" (DN15) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	215	(14.8)	215	(14.8)	0.42	0.81	1.18	10-50	(0.7-3.4)
15	(1.0)	335	(23.1)	335	(23.1)	0.47	0.89	1.27	10-50	(0.7-3.4)
20	(1.4)	450	(31.0)	420	(29.0)	0.53	0.98	1.37	10-50	(0.7-3.4)
25	(1.7)	570	(39.3)	425	(29.3)	0.58	1.04	1.45	10-50	(0.7-3.4)
35	(2.4)	685	(47.2)	435	(30.0)	0.67	1.18	1.62	10-50	(0.7-3.4)
50	(3.4)	740	(51.0)	450	(31.0)	0.88	1.52	2.01	40-100	(2.8-6.9)
75	(5.2)	740	(51.0)	475	(32.8)	1.03	1.78	2.34	40-100	(2.8-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	1.59	2.58	3.50	80-150	(5.5-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	1.72	2.69	3.50	80-150	(5.5-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	1.64	2.66	3.40	120-190	(8.3-13.1)
175	(12.1)	740	(51.0)	575	(39.7)	1.72	2.80	3.50	120-190	(8.3-13.1)
200	(13.8)	740	(51.0)	600	(41.4)	1.58	2.64	3.50	150-300	(10.3-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	1.67	2.72	3.50	150-300	(10.3-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	1.77	2.88	3.50	150-300	(10.3-20.7)

METAL DIAPHRAGM - SIZE - 3/4" (DN20) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	160	(11.0)	160	(11.0)	0.70	1.36	2.07	10-40	(0.7-2.8)
15	(1.0)	250	(17.2)	250	(17.2)	0.76	1.50	2.20	10-40	(0.7-2.8)
20	(1.4)	340	(23.4)	340	(23.4)	0.82	1.65	2.34	10-40	(0.7-2.8)
25	(1.7)	425	(29.3)	425	(29.3)	0.88	1.77	2.44	10-40	(0.7-2.8)
35	(2.4)	580	(40.0)	435	(30.0)	1.00	2.01	2.65	30-60	(2.1-4.1)
50	(3.4)	700	(48.3)	450	(31.0)	1.33	2.66	3.47	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	1.93	3.32	4.43	50-90	(3.4-6.2)
100	(6.9)	740	(51.0)	500	(34.5)	2.56	4.18	5.00	70-110	(4.8-7.6)
125	(8.6)	740	(51.0)	525	(36.2)	2.43	4.00	5.00	90-170	(6.2-11.7)
150	(10.3)	740	(51.0)	550	(37.9)	2.57	4.18	5.00	90-170	(6.2-11.7)
175	(12.1)	740	(51.0)	575	(39.7)	1.72	3.07	4.14	140-300	(9.7-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	1.80	3.13	4.20	140-300	(9.7-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	2.00	3.38	4.67	140-300	(9.7-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	2.18	3.63	5.00	140-300	(9.7-20.7)

METAL DIAPHRAGM - SIZE -1" (DN25) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	145	(10.0)	145	(10.0)	0.78	1.55	2.42	10-40	(0.7-2.8)
15	(1.0)	220	(15.2)	220	(15.2)	0.87	2.10	2.67	10-40	(0.7-2.8)
20	(1.4)	300	(20.7)	300	(20.7)	0.96	1.92	2.93	10-40	(0.7-2.8)
25	(1.7)	375	(25.9)	375	(25.9)	1.04	2.13	3.13	10-40	(0.7-2.8)
35	(2.4)	515	(35.5)	435	(30.0)	1.21	2.54	3.53	30-60	(2.1-4.1)
50	(3.4)	700	(48.3)	450	(31.0)	1.67	3.47	4.62	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	2.25	4.79	6.00	55-80	(3.8-5.5)
100	(6.9)	740	(51.0)	500	(34.5)	3.03	5.20	6.00	65-130	(4.5-9.0)
125	(8.6)	740	(51.0)	525	(36.2)	2.80	4.93	6.00	100-300	(6.9-20.7)
150	(10.3)	740	(51.0)	550	(37.9)	2.88	5.02	6.00	100-300	(6.9-20.7)
175	(12.1)	740	(51.0)	575	(39.7)	2.95	5.11	6.00	100-300	(6.9-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	3.03	5.20	6.00	100-300	(6.9-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	3.18	5.32	6.00	100-300	(6.9-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	3.33	5.45	6.00	100-300	(6.9-20.7)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 11 (Continued)
Cv – FLOW CAPACITY

FULL PORT – METAL DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

METAL DIAPHRAGM - SIZE -1-1/4" (DN32) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	115	(7.9)	115	(7.9)	1.30	2.80	4.40	10-40	(0.7-2.8)
15	(1.0)	180	(12.4)	180	(12.4)	1.47	3.18	4.87	10-40	(0.7-2.8)
20	(1.4)	240	(16.6)	240	(16.6)	1.64	3.55	5.34	10-40	(0.7-2.8)
25	(1.7)	300	(20.7)	300	(20.7)	1.81	3.93	5.81	10-40	(0.7-2.8)
35	(2.4)	370	(25.5)	370	(25.5)	2.35	6.13	8.30	30-50	(2.1-3.4)
50	(3.4)	500	(34.5)	450	(31.0)	4.55	8.60	9.00	40-60	(2.8-4.1)
75	(5.2)	670	(46.2)	475	(32.8)	5.30	8.92	9.00	50-90	(3.4-6.2)
100	(6.9)	740	(51.0)	495	(34.1)	6.80	9.00	9.00	70-225	(4.8-15.5)
125	(8.6)	740	(51.0)	525	(36.2)	6.90	9.00	9.00	70-225	(4.8-15.5)
150	(10.3)	740	(51.0)	550	(37.9)	6.99	9.00	9.00	70-225	(4.8-15.5)
175	(12.1)	740	(51.0)	575	(39.7)	7.09	9.00	9.00	70-225	(4.8-15.5)
200	(13.8)	740	(51.0)	600	(41.4)	7.19	9.00	9.00	70-225	(4.8-15.5)
225	(15.5)	740	(51.0)	625	(43.1)	7.38	9.00	9.00	70-225	(4.8-15.5)

METAL DIAPHRAGM - SIZE -1-1/2" (DN40) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	115	(7.9)	115	(7.9)	1.75	3.27	4.82	10-40	(0.7-2.8)
15	(1.0)	190	(13.1)	190	(13.1)	2.04	3.79	5.42	10-40	(0.7-2.8)
20	(1.4)	260	(17.9)	260	(17.9)	2.33	4.30	6.01	10-40	(0.7-2.8)
25	(1.7)	330	(22.8)	330	(22.8)	2.62	4.82	6.61	10-40	(0.7-2.8)
35	(2.4)	435	(30.0)	435	(30.0)	3.75	6.53	8.70	30-75	(2.1-5.2)
50	(3.4)	635	(43.8)	450	(31.0)	4.15	7.15	9.10	30-75	(2.8-5.2)
75	(5.2)	740	(51.0)	475	(32.8)	5.30	8.75	10.30	60-100	(4.1-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	6.10	9.40	10.75	80-225	(5.5-15.5)
125	(8.6)	740	(51.0)	525	(36.2)	6.23	9.49	10.78	80-225	(5.5-15.5)
150	(10.3)	740	(51.0)	550	(37.9)	6.37	9.58	10.80	80-225	(5.5-15.5)
175	(12.1)	740	(51.0)	575	(39.7)	6.50	9.68	10.83	80-225	(5.5-15.5)
200	(13.8)	740	(51.0)	600	(41.4)	6.63	9.77	10.85	80-225	(5.5-15.5)
225	(15.5)	740	(51.0)	625	(43.1)	6.90	9.95	10.90	80-225	(5.5-15.5)

METAL DIAPHRAGM - SIZE -2" (DN50) - FULL PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	165	(11.4)	165	(11.4)	2.10	4.27	6.55	10-40	(0.7-2.8)
15	(1.0)	270	(18.6)	270	(18.6)	2.26	4.58	6.90	10-40	(0.7-2.8)
20	(1.4)	370	(25.5)	370	(25.5)	2.42	4.90	7.25	10-40	(0.7-2.8)
25	(1.7)	470	(32.4)	425	(29.3)	2.59	5.21	7.60	10-40	(0.7-2.8)
35	(2.4)	500	(34.5)	435	(30.0)	5.55	9.60	11.30	30-60	(2.1-4.1)
50	(3.4)	700	(48.3)	450	(31.0)	6.85	10.35	12.00	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	5.87	9.70	11.40	50-150	(3.4-10.3)
100	(6.9)	740	(51.0)	500	(34.5)	6.48	10.03	11.73	50-150	(3.4-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	7.09	10.37	12.07	50-150	(3.4-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	7.70	10.70	12.40	50-150	(3.4-10.3)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 12
Cv – FLOW CAPACITY

OPT -12, 1-STEP REDUCED PORT – METAL DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

METAL DIAPHRAGM - SIZE - 1/2" (DN15) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	270	(18.6)	300	(20.7)	**0.23**	**0.57**	**0.87**	10-50	(0.7-3.4)
15	(1.0)	405	(27.9)	415	(28.6)	**0.27**	**0.59**	**0.95**	10-50	(0.7-3.4)
20	(1.4)	540	(37.2)	420	(29.0)	**0.31**	**0.61**	**1.03**	10-50	(0.7-3.4)
25	(1.7)	670	(46.2)	425	(29.3)	**0.36**	**0.63**	**1.12**	10-50	(0.7-3.4)
35	(2.4)	685	(47.2)	435	(30.0)	**0.44**	**0.66**	**1.28**	10-50	(0.7-3.4)
50	(3.4)	740	(51.0)	450	(31.0)	**0.63**	**1.21**	**1.67**	40-100	(2.8-6.9)
75	(5.2)	740	(51.0)	475	(32.8)	**0.83**	**1.52**	**2.03**	40-100	(2.8-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	**1.24**	**2.10**	**2.45**	80-150	(5.5-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	**1.32**	**2.18**	**2.52**	80-150	(5.5-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	**1.29**	**2.17**	**2.52**	120-190	(8.3-13.1)
175	(12.1)	740	(51.0)	575	(39.7)	**1.36**	**2.22**	**2.52**	120-190	(8.3-13.1)
200	(13.8)	740	(51.0)	600	(41.4)	**1.28**	**2.13**	**2.52**	150-300	(10.3-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	**1.37**	**2.21**	**2.52**	150-300	(10.3-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	**1.45**	**2.29**	**2.52**	150-300	(10.3-20.7)

METAL DIAPHRAGM - SIZE - 3/4" (DN20) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	190	(13.1)	325	(22.4)	**0.42**	**0.81**	**1.18**	10-40	(0.7-2.8)
15	(1.0)	295	(20.3)	415	(28.6)	**0.47**	**0.89**	**1.27**	10-40	(0.7-2.8)
20	(1.4)	395	(27.2)	420	(29.0)	**0.53**	**0.98**	**1.37**	10-40	(0.7-2.8)
25	(1.7)	500	(34.5)	425	(29.3)	**0.58**	**1.04**	**1.45**	10-40	(0.7-2.8)
35	(2.4)	685	(47.2)	435	(30.0)	**0.67**	**1.18**	**1.62**	30-60	(2.1-4.1)
50	(3.4)	740	(51.0)	450	(31.0)	**0.88**	**1.52**	**2.01**	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	**1.03**	**1.78**	**2.34**	50-90	(3.4-6.2)
100	(6.9)	740	(51.0)	500	(34.5)	**1.59**	**2.58**	**3.50**	70-110	(4.8-7.6)
125	(8.6)	740	(51.0)	525	(36.2)	**1.72**	**2.69**	**3.50**	90-170	(6.2-11.7)
150	(10.3)	740	(51.0)	550	(37.9)	**1.40**	**2.48**	**3.45**	140-300	(9.7-20.7)
175	(12.1)	740	(51.0)	575	(39.7)	**1.49**	**2.56**	**3.50**	140-300	(9.7-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	**1.58**	**2.64**	**3.50**	140-300	(9.7-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	**1.67**	**2.72**	**3.50**	140-300	(9.7-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	**1.77**	**2.88**	**3.50**	140-300	(9.7-20.7)

METAL DIAPHRAGM - SIZE - 1" (DN25) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	190	(13.1)	280	(19.3)	**0.51**	**1.05**	**1.55**	10-40	(0.7-2.8)
15	(1.0)	290	(20.0)	415	(28.6)	**0.57**	**1.17**	**1.74**	10-40	(0.7-2.8)
20	(1.4)	395	(27.2)	420	(29.0)	**0.63**	**1.29**	**1.93**	10-40	(0.7-2.8)
25	(1.7)	495	(34.1)	425	(29.3)	**0.68**	**1.29**	**1.93**	10-40	(0.7-2.8)
35	(2.4)	675	(46.6)	435	(30.0)	**0.68**	**1.40**	**2.13**	30-60	(2.1-4.1)
50	(3.4)	740	(51.0)	450	(31.0)	**0.92**	**1.90**	**3.10**	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	**1.13**	**2.41**	**4.02**	55-80	(3.8-5.5)
100	(6.9)	740	(51.0)	500	(34.5)	**1.75**	**4.08**	**5.46**	65-130	(4.5-9.0)
125	(8.6)	740	(51.0)	525	(36.2)	**2.02**	**4.83**	**5.46**	65-130	(4.5-9.0)
150	(10.3)	740	(51.0)	550	(37.9)	**1.88**	**4.28**	**5.46**	100-300	(6.9-20.7)
175	(12.1)	740	(51.0)	575	(39.7)	**1.94**	**4.39**	**5.46**	100-300	(6.9-20.7)
200	(13.8)	740	(51.0)	600	(41.4)	**1.99**	**4.50**	**5.46**	100-300	(6.9-20.7)
250	(17.2)	740	(51.0)	650	(44.8)	**2.04**	**4.60**	**5.46**	100-300	(6.9-20.7)
300	(20.7)	740	(51.0)	700	(48.3)	**2.15**	**4.82**	**5.46**	100-300	(6.9-20.7)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 12 (Continued)
Cv – FLOW CAPACITY

OPT -12, 1-STEP REDUCED PORT – METAL DIAPHRAGM

Based on 400 psid (27.6 Bard) max pressure drop limit for composition seat, and on 650 psid (44.8 Bard) for metal seat.

(F_L = 0.93)

METAL DIAPHRAGM - SIZE - 1-1/2" (DN40) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	185	(12.8)	255	(17.6)	**0.78**	**1.55**	**2.42**	10-40	(0.7-2.8)
15	(1.0)	285	(19.7)	395	(27.2)	**0.87**	**2.10**	**2.67**	10-40	(0.7-2.8)
20	(1.4)	385	(26.6)	420	(29.0)	**0.96**	**1.92**	**2.93**	10-40	(0.7-2.8)
25	(1.7)	385	(26.6)	425	(29.3)	**1.04**	**2.13**	**3.13**	10-40	(0.7-2.8)
35	(2.4)	660	(45.5)	435	(30.0)	**1.21**	**2.54**	**3.53**	30-75	(2.1-5.2)
50	(3.4)	740	(51.0)	450	(31.0)	**1.67**	**3.47**	**4.62**	30-75	(2.1-5.2)
75	(5.2)	740	(51.0)	475	(32.8)	**2.25**	**4.79**	**6.00**	60-100	(4.1-6.9)
100	(6.9)	740	(51.0)	500	(34.5)	**2.72**	**4.84**	**6.00**	80-225	(5.5-15.5)
125	(8.6)	740	(51.0)	525	(36.2)	**2.80**	**4.93**	**6.00**	80-225	(5.5-15.5)
150	(10.3)	740	(51.0)	550	(37.9)	**2.88**	**5.02**	**6.00**	80-225	(5.5-15.5)
175	(12.1)	740	(51.0)	575	(39.7)	**2.95**	**5.11**	**6.00**	80-225	(5.5-15.5)
200	(13.8)	740	(51.0)	600	(41.4)	**3.03**	**5.20**	**6.00**	80-225	(5.5-15.5)
225	(15.5)	740	(51.0)	625	(43.1)	**3.10**	**5.26**	**6.00**	80-225	(5.5-15.5)

METAL DIAPHRAGM - SIZE - 2" (DN50) - 1 -STEP REDUCED PORT										
Outlet Pressure		Max Inlet Pressure				Cv @ % DROOP			Range Spring	
		Metal Seated		Composition Seated						
psig	(Barg)	psig	(Barg)	psig	(Barg)	10%	20%	30%	psig	(Barg)
10	(0.7)	165	(11.4)	165	(11.4)	**1.75**	**3.27**	**4.82**	10-40	(0.7-2.8)
15	(1.0)	265	(18.3)	265	(18.3)	**2.04**	**3.79**	**5.42**	10-40	(0.7-2.8)
20	(1.4)	365	(25.2)	365	(25.2)	**2.33**	**4.30**	**6.01**	10-40	(0.7-2.8)
25	(1.7)	460	(31.7)	425	(29.3)	**2.62**	**4.82**	**6.61**	10-40	(0.7-2.8)
35	(2.4)	530	(36.6)	435	(30.0)	**3.75**	**6.53**	**8.70**	30-60	(2.1-4.1)
50	(3.4)	700	(48.3)	450	(31.0)	**4.15**	**7.15**	**9.10**	30-60	(2.1-4.1)
75	(5.2)	740	(51.0)	475	(32.8)	**5.30**	**8.75**	**10.30**	50-150	(3.4-10.3)
100	(6.9)	740	(51.0)	500	(34.5)	**6.10**	**9.40**	**10.75**	50-150	(3.4-10.3)
125	(8.6)	740	(51.0)	525	(36.2)	**6.23**	**9.49**	**10.78**	50-150	(3.4-10.3)
150	(10.3)	740	(51.0)	550	(37.9)	**6.37**	**9.58**	**10.80**	50-150	(3.4-10.3)

METRIC CONVERSION FACTOR: $C_V \div 1.16 = k_V$

TABLE 13
WATER CAPACITY - GPM
S.G. = 1.0 T = 60°F F_L = 0.93

FULL PORT – COMPOSITION DIAPHRAGM & SEAT

Outlet Pressure P2, psig	Inlet Pressure P1, psig	Pressure Drop psig	GPM @ 1/2" Body Size			GPM @ 3/4" Body Size			GPM @ 1" Body Size			GPM @ 1-1/4" Body Size			GPM @ 1-1/2" Body Size			GPM @ 2" Body Size		
			Droop			Droop			Droop			Droop			Droop			Droop		
			10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
10	25	15	2.7	5.0	7.3	4.5	8.6	11.1	4.8	9.3	14.0	7.1	15.8	24.2	9.2	17.8	26.6	13.9	28.2	39.9
	50	40	4.5	8.2	12.0	7.3	14.1	18.1	7.9	15.2	22.8	11.6	25.7	39.5	15.0	29.0	43.4	22.8	46.0	65.1
	75	65	5.7	10.5	15.2	9.4	18.0	23.1	10.1	19.4	29.1	14.8	32.8	50.4	19.1	37.0	55.4	29.0	58.6	83.0
	100	90	6.7	12.3	17.9	11.0	21.2	27.1	11.9	22.9	34.2	17.4	38.6	59.3	22.5	43.5	65.2	34.2	69.0	97.7
	125	115	7.6	13.9	20.3	12.4	23.9	30.7	13.4	25.8	38.7	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
	150	140	8.4	15.4	22.4	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
	175	165	9.1	16.7	24.3	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
	200	190	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
15	25	10	2.4	4.4	6.3	4.0	7.4	9.5	4.4	8.5	12.0	6.7	14.4	21.2	8.7	16.4	23.3	12.1	24.0	34.2
	50	35	4.6	8.2	11.7	7.5	13.8	17.7	8.3	15.9	22.5	12.5	26.9	39.6	16.3	30.8	43.7	22.7	45.0	64.1
	75	60	6.0	10.8	15.3	9.8	18.1	23.2	10.8	20.8	29.5	16.3	35.2	51.8	21.3	40.3	57.2	29.7	58.9	83.9
	100	85	7.1	12.8	18.3	11.6	21.6	27.7	12.9	24.8	35.1	19.5	41.9	61.7	25.4	47.9	68.0	35.4	70.1	99.8
	125	110	8.1	14.6	20.8	13.2	24.5	31.5	14.7	28.2	40.0	22.1	47.7	70.2	28.8	54.5	77.4	40.3	79.7	113.6
	150	135	8.9	16.2	23.0	14.6	27.2	34.9	16.3	31.3	44.3	24.5	52.9	77.7	32.0	60.4	85.7	44.6	88.3	125.8
	175	160	9.7	17.6	25.0	15.9	29.6	37.9	17.7	34.0	48.2	HI P1	HI P1	HI P1	34.8	65.8	93.4	48.6	96.1	137.0
	200	185	10.5	18.9	26.9	17.1	31.8	40.8	19.0	36.6	51.8	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	52.2	103.4	147.3
	250	235	CAV	CAV	CAV	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
20	25	5	1.9	3.3	4.7	3.1	5.5	7.0	3.5	6.6	9.0	5.4	11.2	15.9	7.0	13.0	17.7	9.1	17.7	25.4
	50	30	4.6	8.1	11.4	7.5	13.4	17.3	8.5	16.2	22.0	13.1	27.6	39.1	17.2	31.8	43.3	22.3	43.4	62.2
	75	55	6.2	11.0	15.4	10.2	18.1	23.4	11.5	22.0	29.7	17.8	37.3	52.9	23.3	43.0	58.6	30.3	58.7	84.2
	100	80	7.5	13.2	18.6	12.3	21.8	28.2	13.9	26.5	35.9	21.5	45.0	63.8	28.1	51.9	70.7	36.5	70.8	101.6
	125	105	8.6	15.2	21.3	14.0	25.0	32.3	15.9	30.3	41.1	24.6	51.5	73.1	32.2	59.4	81.0	41.8	81.2	116.4
	150	130	9.6	16.9	23.7	15.6	27.8	35.9	17.7	33.7	45.7	27.4	57.4	81.3	35.8	66.1	90.1	46.5	90.3	129.5
	175	155	10.5	18.4	25.9	17.1	30.4	39.2	19.3	36.9	49.9	29.9	62.6	88.8	39.1	72.2	98.4	50.8	98.6	141.4
	200	180	11.3	19.9	27.9	18.4	32.7	42.3	20.8	39.7	53.8	32.2	67.5	95.7	42.1	77.8	106.0	54.7	106.3	152.4
	250	230	12.7	22.4	31.5	20.8	37.0	47.8	23.5	44.9	60.8	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	61.9	120.1	172.3
25	50	25	4.5	7.9	10.9	7.4	12.8	16.5	8.5	16.2	21.1	13.4	27.6	37.9	17.6	32.1	42.1	21.6	41.3	59.5
	75	50	6.4	11.1	15.3	10.4	18.0	23.3	12.0	22.9	29.8	19.0	39.0	53.6	24.9	45.3	59.5	30.5	58.3	84.1
	100	75	7.8	13.6	18.8	12.7	22.1	28.5	14.7	28.1	36.5	23.2	47.7	65.6	30.5	55.5	72.8	37.4	71.4	103.0
	125	100	9.0	15.7	21.7	14.7	25.5	32.9	17.0	32.4	42.1	26.8	55.1	75.8	35.2	64.1	84.1	43.2	82.5	118.9
	150	125	10.1	17.6	24.3	16.4	28.5	36.8	19.0	36.2	47.1	30.0	61.6	84.7	39.4	71.7	94.0	48.3	92.2	132.9
	175	150	11.0	19.2	26.6	18.0	31.2	40.3	20.8	39.7	51.6	32.8	67.5	92.8	43.1	78.5	103.0	52.9	101.0	145.6
	200	175	11.9	20.8	28.7	19.4	33.7	43.5	22.5	42.9	55.7	35.5	72.9	100.3	46.6	84.8	111.3	57.1	109.1	157.3
	250	225	13.5	23.6	32.6	22.1	38.3	49.4	25.5	48.6	63.2	40.2	82.7	113.7	52.8	96.2	126.2	64.8	123.8	178.4
35	50	15	4.0	6.7	9.1	7.6	12.2	16.0	9.6	16.3	19.6	15.9	29.8	34.9	17.0	34.1	38.7	30.6	42.8	49.6
	75	40	6.5	11.0	14.9	12.5	19.9	26.1	15.7	26.6	32.1	25.9	48.7	56.9	27.8	55.7	63.2	50.0	69.9	81.0
	100	65	8.3	14.0	18.9	15.9	25.4	33.2	20.1	33.9	40.9	33.1	62.1	72.6	35.5	70.9	80.6	63.7	89.1	103.2
	125	90	9.8	16.5	22.3	18.7	29.9	39.1	23.6	39.9	48.1	38.9	73.0	85.4	41.7	83.5	94.9	74.9	104.8	121.4
	150	115	11.0	18.7	25.2	21.1	33.8	44.2	26.7	45.1	54.4	44.0	82.6	96.5	47.2	94.4	107.2	84.7	118.5	137.3
	175	140	12.2	20.6	27.8	23.3	37.3	48.7	29.5	49.8	60.0	48.5	91.1	106.5	52.1	104.1	118.3	93.5	130.7	151.5
	200	165	13.2	22.4	30.2	25.3	40.5	52.9	32.0	54.1	65.1	52.7	98.9	115.6	56.5	113.0	128.5	101.5	141.9	164.4
	250	215	15.1	25.5	34.5	28.9	46.2	60.4	36.5	61.7	74.3	60.1	112.9	132.0	64.5	129.0	146.6	115.8	162.0	187.7
50	75	25	6.7	10.9	14.1	11.5	13.5	24.3	14.5	25.0	30.0	26.5	44.2	45.0	27.5	45.3	52.8	44.0	58.8	65.0
	100	50	9.4	15.3	19.9	16.3	19.0	34.3	20.5	35.4	42.4	37.5	62.4	63.6	38.9	64.0	74.6	62.2	83.1	91.9
	125	75	11.5	18.8	24.4	19.9	23.3	42.0	25.1	43.3	52.0	45.9	76.5	77.9	47.6	78.4	91.4	76.2	101.8	112.6
	150	100	13.3	21.7	28.2	23.0	26.9	48.5	29.0	50.0	60.0	53.0	88.3	90.0	55.0	90.5	105.5	88.0	117.5	130.0
	175	125	14.9	24.3	31.5	25.7	30.1	54.2	32.4	55.9	67.1	59.3	98.7	100.6	61.5	101.2	118.0	98.4	131.4	145.3
	200	150	16.3	26.6	34.5	28.2	32.9	59.4	35.5	61.2	73.5	64.9	108.1	110.2	67.4	110.8	129.2	107.8	143.9	159.2
	250	200	18.8	30.7	39.9	32.5	38.0	68.6	41.0	70.7	84.9	75.0	124.9	127.3	77.8	128.0	149.2	124.5	166.2	183.8
75	100	25	7.9	12.6	17.2	14.2	23.9	25.0	18.4	30.0	30.0	38.5	45.0	45.0	31.8	48.3	54.5	36.4	53.2	61.9
	125	50	11.2	17.8	24.3	20.0	33.7	35.4	26.0	42.4	42.4	54.4	63.6	63.6	44.9	68.2	77.1	51.4	75.2	87.5
	150	75	13.7	21.8	29.7	24.5	41.3	43.3	31.8	52.0	52.0	66.7	77.9	77.9	55.0	83.6	94.4	63.0	92.1	107.1
	175	100	15.8	25.2	34.3	28.3	47.7	50.0	36.7	60.0	60.0	77.0	90.0	90.0	63.5	96.5	109.0	72.7	106.3	123.7
	200	125	17.7	28.2	38.3	31.6	53.3	55.9	41.0	67.1	67.1	86.1	100.6	100.6	71.0	107.9	121.9	81.3	118.8	138.3
	250	175	20.9	33.3	45.4	37.4	63.1	66.1	48.5	79.4	79.4	101.9	119.1	119.1	84.0	127.7	144.2	96.2	140.6	163.6
100	125	25	10.4	16.8	17.5	16.7	25.0	25.0	19.3	30.0	30.0	43.4	45.0	45.0	36.7	51.3	55.0	38.9	54.8	63.5
	150	50	14.6	23.7	24.7	23.5	35.4	35.4	27.2	42.4	42.4	61.4	63.6	63.6	51.8	72.5	77.8	55.0	77.4	89.8
	175	75	17.9	29.0	30.3	28.8	43.3	43.3	33.3	52.0	52.0	75.2	77.9	77.9	63.5	88.8	95.3	67.4	94.8	110.0
	200	100	20.7	33.5	35.0	33.3	50.0	50.0	38.5	60.0	60.0	86.8	90.0	90.0	73.3	102.5	110.0	77.8	109.5	127.0
	250	150	25.4	41.0	42.9	40.8	61.2	61.2	47.2	73.5	73.5	106.3	110.2	110.2	89.8	125.5	134.7	95.3	134.1	155.5
125	150	25	10.9	17.5	17.5	15.5	25.0	25.0	18.5	30.0	30.0	43.7	45.0	45.0	37.5	51.6	55.0	41.5	56.3	64.5
	175	50	15.3	24.7	24.7	21.9	35.4	35.4	26.2	42.4	42.4	61.7	63.6	63.6	53.0	73.0	77.8	58.6	79.6	91.2
	200	75	18.8	30.3	30.3	26.8	43.3	43.3	32.0	52.0	52.0	75.6	77.9	77.9	64.9	89.4	95.3	71.8	97.5	111.7
	250	125	24.3	39.1	39.1	34.7	55.9	55.9	41.4	67.1	67.1	97.6	100.6	100.6	83.7	115.4	123.0	92.7	125.9	144.2
150	175	25	10.6	17.4	17.5	16.7	25.0	25.0	18.8	30.0	30.0	44.0	45.0	45.0	38.3	52.0	55.0	44.0	57.9	65.0
	200	50	15.0	24.5	24.7	23.5	35.4	35.4	26.6	42.4	42.4	62.2	63.6	63.6	54.1	73.5	77.8	62.2	81.9	91.9
	250	100	21.2	34.7	35.0	33.3	50.0	50.0	37.6	60.0	60.0	87.9	90.0	90.0	76.5	103.9	110.0	88.0	115.8	HI P1
175	200	25	10.0	17.0	17.5	10.9	17.7	23.9	19.2	30.0	30.0	44.2	45.0	45.0	39.1	52.3	55.0	HI P1	HI P1	HI P1
	250	75	17.3	29.4	30.3	18.8	30.7	41.3	33.2	52.0	52.0	76.6	77.9	77.9	67.6	90.6	95.3	HI P1	HI P1	HI P1
200	250	50	14.3	24.7	24.7	15.8	25.5	35.4	27.5	42.4	42.4	62.9	63.6	63.6	56.4	74.5	77.8	HI P1	HI P1	HI P1

NOTES: 1. Were "HI P1" is indicated, the inlet pressure exceeds the limit established in Table 9.
2. Where "HI P2" is indicated, the maximum outlet pressure is exceeded.
3. Where "CAV" is indicated, the flow has reached choked flow, full cavitation.

Metric Conversion Factors: psi ÷ 14.5 = Bar; GPM X 3.785 = LPM

Size		Max Velocity	Size		Max Velocity
in	(mm)		in.	(mm)	
1/2"	(DN15)	15 fps	1-1/4"	(DN32)	22.5 fps
3/4"	(DN20)	18 fps	1-1/2"	(DN40)	25 fps
1"	(DN25)	20 fps	2"	(DN50)	27 fps

TABLE 14
COMPRESSED AIR CAPACITY – SCFH
S.G. = 1.0 T = 60°F F_L = 0.93

FULL PORT – COMPOSITION DIAPHRAGM & SEAT

Outlet Pressure P2, psig	Inlet Pressure P1, psig	Pressure Drop psi	SCFH @ 1/2" Body Size			SCFH @ 3/4" Body Size			SCFH @ 1" Body Size			SCFH @ 1-1/4" Body Size			SCFH @ 1-1/2" Body Size			SCFH @ 2" Body Size		
			Droop			Droop			Droop			Droop			Droop			Droop		
			10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
10	25	15	800	1500	2200	1400	2600	3300	1500	2800	4200	2100	4800	7300	2800	5400	8000	4200	8500	12000
	50	40	1500	2700	3900	2400	4600	5900	2600	5000	7400	3800	8400	12900	4900	9400	14100	7400	15000	21200
	75	65	2000	3700	5400	3300	6400	8200	3600	6900	10300	5200	11600	17800	6800	13100	19600	10300	20800	29400
	100	90	2600	4700	6900	4200	8100	10400	4600	8800	13200	6700	14900	22800	8700	16800	25100	13100	26600	37600
	150	140	3700	6800	9900	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	18900	38100	54000
	200	190	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	24600	49700	70500
15	25	10	800	1400	2000	1300	2400	3100	1400	2800	3900	2200	4700	6900	2800	5400	7600	4000	7800	11200
	50	35	1600	2800	4000	2600	4800	6100	2900	5500	7800	4300	9300	13600	5600	10600	15100	7800	15500	22100
	75	60	2200	4000	5700	3600	6700	8600	4000	7700	10900	6000	13000	19100	7900	14800	21100	11000	21700	30900
	100	85	2800	5100	7200	4600	8500	11000	5100	9800	13900	7700	16600	24400	10000	19000	27000	14000	27800	39600
	150	135	4000	7300	10400	6600	12300	15700	7300	14100	20000	11100	23900	35100	14400	27300	38700	20100	39900	56800
	200	185	5300	9500	13500	8600	16000	20500	9600	18400	26100	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	26300	52000	74100
	250	235	6500	11700	16700	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	32400	64100	91400
	300	285	7700	14000	SONIC	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	38600	76300	108700
	350	335	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	44700	88500	126100
20	25	5	700	1200	1600	1100	1900	2500	1200	2300	3100	1900	3900	5600	2500	4600	6200	3200	6200	8900
	50	30	1700	3000	4100	2700	4900	6300	3100	5900	8000	4800	10000	14200	6300	11600	15800	8100	15800	22700
	75	55	2400	4200	5900	3900	7000	9000	4400	8400	11400	6800	14300	20300	9000	16500	22500	11600	22600	32400
	100	80	3100	5400	7600	5000	8900	11500	5700	10800	14600	8800	18400	26000	11500	21200	28900	14900	28900	41500
	150	130	4400	7800	10900	7200	12800	16500	8100	15500	21000	12600	26400	37400	16500	30400	41400	21400	41600	59600
	200	180	5700	10100	14200	9400	16700	21600	10600	20300	27400	16400	34400	48800	21500	39700	54100	27900	54200	77700
	250	230	7100	12500	17600	11600	20600	26600	13100	25000	33800	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	34400	66900	95900
	300	280	8400	14900	SONIC	13800	24500	31600	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	41000	79500	114100
	350	330	9800	17200	SONIC	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	47500	92200	132200
	400	380	11100	19600	SONIC	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	54000	104900	150400
	500	480	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP
25	50	25	1700	3000	4200	2800	4900	6300	3300	6200	8100	5100	10600	14500	6700	12300	16100	8300	15800	22800
	75	50	2600	4500	6200	4200	7200	9300	4800	9200	11900	7600	15600	21500	10000	18200	23900	12300	23400	33700
	100	75	3300	5700	7900	5400	9300	12000	6200	11800	15400	9800	20100	27700	12900	23400	30700	15800	30100	43400
	150	125	4700	8200	11400	7700	13400	17300	8900	17000	22100	14100	28900	39800	18500	33600	44100	22700	43300	62400
	200	175	6200	10700	14800	10100	17400	22500	11600	22200	28800	18300	37700	51900	24100	43900	57500	29600	56500	81400
	250	225	7600	13300	18300	12400	21500	27800	14300	27300	35500	22600	46500	64000	29700	54100	71000	36500	69600	100400
	300	275	9000	15800	21800	14800	25600	33000	17100	32500	42300	26900	55300	76100	35300	64400	84400	43400	82800	119400
	350	325	10500	18300	SONIC	17100	29700	38300	19800	37700	49000	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	50300	96000	138400
	400	375	11900	20800	SONIC	19500	33800	SONIC	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	57200	109200	157400
	500	475	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP
35	50	15	1700	2800	3800	3200	5100	6700	4100	6900	8300	6700	12600	14700	7200	14400	16300	12900	18100	20900
	75	40	2800	4800	6400	5400	8600	11300	6800	11600	13900	11300	21100	24700	12100	24100	27400	21700	30300	35100
	100	65	3700	6300	8500	7200	11400	15000	9000	15300	18400	14900	28000	32700	16000	32000	36300	28700	40100	46500
	150	115	5400	9100	12300	10300	16500	21600	13100	22100	26600	21500	40400	47200	23100	46200	52500	41400	58000	67200
	200	165	7000	11900	16100	13500	21600	28200	17000	28800	34700	28100	52700	61600	30100	60200	68400	54100	75600	87600
	250	215	8700	14700	19800	16600	26600	34800	21000	35500	42800	34600	65000	76000	37100	74300	84400	66700	93300	108000
	300	265	10300	17500	23600	19800	31600	41400	25000	42300	50900	41200	77300	90400	44200	88400	100400	79300	110900	128500
	350	315	12000	20300	27400	22900	36700	48000	29000	49000	59000	47700	89600	104800	51200	102400	116400	92000	128600	149000
	400	365	13600	23000	SONIC	26100	41700	SONIC	33000	55700	67100	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	104600	146300	169500
	500	465	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP
50	75	25	3200	5200	6800	5600	6500	11700	7000	12100	14500	12800	21300	21700	13300	21900	25500	21300	28400	31400
	100	50	4600	7600	9900	8000	9400	16900	10100	17500	21000	18500	30900	31500	19200	31600	36900	30800	41100	45400
	150	100	7000	11400	14800	12100	14100	25400	15200	26200	31400	27800	46300	47200	28800	47400	55300	46100	61600	68100
	200	150	9100	14800	19300	15700	18400	33200	19800	34200	41100	36300	60400	61600	37600	61900	72200	60200	80400	89000
	250	200	11200	18300	23800	19400	22700	40900	24500	42200	50600	44700	74500	76000	46400	76400	89000	74300	99200	109700
	300	250	13400	21800	28300	23100	27000	48700	29100	50200	60200	53200	88700	90400	55200	90900	105900	88400	118000	130500
	350	300	15500	25300	32800	26800	31300	56500	33800	58200	69800	61700	102800	104800	64000	105400	122800	102400	136800	151300
	400	350	17600	28700	37300	30500	35600	64200	38400	66200	79400	70200	116900	119200	72800	119800	139700	116500	155600	172100
	500	450	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP
75	100	25	4500	7100	9700	8000	13500	14200	10400	17000	17000	21800	25500	25500	18000	27300	30900	20600	30100	35100
	150	75	8000	12800	17400	14300	24200	25300	18600	30400	30400	39000	45600	45600	32200	48900	55200	36800	53800	62600
	200	125	10800	17200	23400	19300	32500	34100	25000	40900	40900	52500	61400	61400	43300	65800	74400	49600	72500	84400
	250	175	13300	21300	29000	23900	40300	42200	31000	50600	50600	65000	76000	76000	53600	81500	92000	61400	89700	104400
	300	225	15900	25300	34400	28400	47900	50200	36800	60200	60200	77300	90400	90400	63800	96900	109400	73000	106700	124200
	350	275	18400	29300	39900	32900	55500	58200	42700	69800	69800	89600	104800	104800	73900	112300	126900	84600	123700	144000
	400	325	20900	33400	45400	37500	63200	66200	48600	79400	79400	102000	119200	119200	84100	127800	144300	96300	140700	163800
	500	425	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP

Metric Conversion Factors: psi ÷ 14.5 = Bar; SCFH ÷ 35.31 = Sm^3/Hr; SCFH ÷ 37.32 = Nm^3/Hr

NOTES: See Next Page.

TABLE 14 (Continued)
COMPRESSED AIR CAPACITY – SCFH
S.G. = 1.0 T = 60°F F_L = 0.93

FULL PORT – COMPOSITION DIAPHRAGM & SEAT

Outlet Pressure P2 psig	Inlet Pressure P1, psig	Pressure Drop psi	SCFH @ 1/2" Body Size			SCFH @ 3/4" Body Size			SCFH @ 1" Body Size			SCFH @ 1-1/4" Body Size			SCFH @ 1-1/2" Body Size			SCFH @ 2" Body Size		
			Droop			Droop			Droop			Droop			Droop			Droop		
			10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
100	150	50	9400	15300	16000	15200	22800	22800	17600	27400	27400	39600	41100	41100	33400	46800	50200	35500	50000	58000
	200	100	13700	22200	23200	22100	33200	33200	25500	39800	39800	57600	59700	59700	48600	68000	73000	51600	72600	84200
	250	150	17400	28100	29400	28000	42000	42000	32300	50400	50400	72900	75600	75600	61600	86100	92400	65300	92000	106600
	300	200	20800	33600	35100	33400	50200	50200	38700	60200	60200	87100	90400	90400	73600	102900	110400	78100	109900	127500
	350	250	24100	39000	40700	38800	58200	58200	44800	69800	69800	101000	104800	104800	85300	119300	128100	90600	127500	147800
	400	300	27400	44400	46300	44100	66200	66200	51000	79400	79400	114900	119200	119200	97100	135700	145600	103000	145000	168200
	500	400	34000	55100	57500	54700	82200	82200	63300	98600	98600	HI P1	HI P1	HI P1	120500	168500	180800	127900	180000	208800
	600	500	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP
125	150	25	7700	12400	12400	10900	17600	17600	13100	21200	21200	30800	31800	31800	26400	36400	38800	29300	39700	45500
	200	75	13500	21700	21700	19200	31000	31000	23000	37200	37200	54200	55800	55800	46500	64000	68200	51400	69900	80000
	250	125	17800	28700	28700	25400	41000	41000	30300	49200	49200	71600	73800	73800	61400	84600	90200	68000	92300	105800
	300	175	21600	34900	34900	30900	49900	49900	36900	59800	59800	87100	89800	89800	74700	102900	109700	82700	112300	128600
	350	225	25200	40700	40700	36100	58200	58200	43100	69800	69800	101600	104700	104700	87100	120100	128000	96500	131000	150100
	400	275	28700	46300	46300	41000	66200	66200	49000	79400	79400	115600	119200	119200	99200	136600	145600	109800	149100	170800
	500	375	35700	57500	57500	51000	82200	82200	60800	98600	98600	143500	147900	147900	123100	169600	180800	136300	185100	212000
	600	475	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP
150	200	50	11500	18900	19000	18100	27200	27200	20500	32600	32600	47800	49000	49000	41600	56500	59800	47900	63000	70700
	250	100	16600	27100	27300	26000	39100	39100	29400	46900	46900	68700	70300	70300	59800	81200	85900	68800	90500	101600
	300	150	20700	33900	34200	32500	48900	48900	36700	58600	58600	85900	87900	87900	74700	101500	107500	86000	113100	127000
	350	200	24500	40100	40400	38500	57700	57700	43400	69300	69300	101500	103900	103900	88300	120000	127000	101600	133700	150100
	400	250	28000	45900	46300	44000	66100	66100	49700	79300	79300	116200	119000	119000	101200	137400	145500	116400	153100	171900
	500	350	34800	57000	57500	54700	82200	82200	61800	98600	98600	144500	147900	147900	125700	170800	180800	144600	190300	213700
	600	450	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI DP	HI DP	HI DP
175	200	25	8200	13900	14400	89000	14600	19600	15800	24700	24700	36400	37000	37000	32100	43000	45200	HI P2	HI P2	HI P2
	250	75	14400	24300	25100	15600	25400	34300	27500	43100	43100	63500	64600	64600	56100	75100	79000	HI P2	HI P2	HI P2
	300	125	18800	31900	32900	20400	33300	44900	36000	56500	56500	83200	84700	84700	73500	98400	103500	HI P2	HI P2	HI P2
	350	175	22700	38400	39700	24600	40100	54100	43400	68000	68000	100300	102100	102100	88600	118600	124800	HI P2	HI P2	HI P2
	400	225	26200	44500	45900	28500	46400	62600	50200	78700	78700	116000	118100	118100	102500	137200	144300	HI P2	HI P2	HI P2
	500	325	32900	55700	57500	35700	58200	78400	63000	98600	98600	145300	147900	147900	128400	171900	180800	HI P2	HI P2	HI P2
	600	425	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P2	HI P2	HI P2
200	250	50	12500	21700	21700	13900	22300	31000	24100	37200	37200	55200	55800	55800	49400	65300	68200	HI P2	HI P2	HI P2
	300	100	17900	31000	31000	19800	31900	44300	34400	53100	53100	78800	79700	79700	70600	93200	97400	HI P2	HI P2	HI P2
	350	150	22200	38500	38500	24600	39600	55000	42800	66000	66000	97900	99000	99000	87700	115800	121000	HI P2	HI P2	HI P2
	400	200	26100	45200	45200	28900	46500	64600	50200	77500	77500	114900	116200	116200	102900	135900	142000	HI P2	HI P2	HI P2
	500	300	33100	57400	57400	36700	59000	81900	63700	98300	98300	145800	147500	147500	130600	172600	180300	HI P2	HI P2	HI P2
	600	400	39700	68700	68700	44000	70700	98200	76400	117800	117800	174800	176700	176700	156500	206800	216000	HI P2	HI P2	HI P2
250	300	50	14100	24100	24100	16300	25700	34400	27700	41300	41300	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	350	100	20100	34300	34300	23200	36600	49000	39400	58800	58800	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	400	150	24800	42400	42400	28700	45300	60600	48700	72700	72700	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	500	250	32900	56200	56200	38000	60000	80200	64500	96300	96300	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	600	350	40100	68400	68400	46300	73100	97700	78600	117300	117300	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
300	350	50	15700	26300	26300	19400	29000	37500	31100	45000	45000	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	400	100	22300	37300	37300	27500	41300	53300	44200	64000	64000	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	500	200	32000	53600	53600	39500	59300	76600	63600	91900	91900	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	600	300	40100	67100	67100	49500	74200	95900	79600	115100	115100	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2

Metric Conversion Factors: psi ÷ 14.5 = Bar; SCFH ÷ 35.31 = Sm^3/Hr; SCFH ÷ 37.32 = Nm^3/Hr

NOTES:
1. Where "HI P1" is indicated, the inlet pressure exceeds the limit established in Table 9.
2. Where "HI P2" is indicated, the maximum outlet pressure is exceeded.

TABLE 15
SATURATED STEAM CAPACITY - LBS/HR
T = Sat. F_L = 0.93

FULL PORT – METAL DIAPHRAGM & SEAT

Outlet Pressure P2, psig	Inlet Pressure P1, psig	Pressure Drop psi	LBS/HR @ 1/2" BODY SIZE			LBS/HR @ 3/4" BODY SIZE			LBS/HR @ 1" BODY SIZE			LBS/HR @ 1-1/4" BODY SIZE			LBS/HR @ 1-1/2" BODY SIZE			LBS/HR @ 2" BODY SIZE		
			Droop			Droop			Droop			Droop			Droop			Droop		
			10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
10	25	15	26	50	73	43	84	128	48	96	149	80	173	272	108	202	298	130	264	404
	50	40	46	88	128	76	147	224	84	168	262	141	303	476	190	354	522	227	462	709
	75	65	65	125	181	108	209	318	120	238	372	200	431	677	269	503	741	323	657	1007
	100	90	83	159	232	138	268	407	154	305	476	256	551	866	344	644	949	413	840	1289
	125	115	100	193	281	167	324	494	186	370	577	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	501	1018	1562
	150	140	118	227	330	196	381	579	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	588	1195	1832
	175	165	135	260	379	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
	200	190	153	294	428	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
	250	240	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
15	25	10	26	48	69	41	81	119	47	114	145	80	172	264	111	205	294	123	248	374
	50	35	50	95	136	81	160	235	93	224	285	157	339	520	218	405	579	241	489	737
	75	60	70	133	189	113	224	328	130	313	398	219	474	726	304	565	808	337	683	1029
	100	85	93	175	250	150	295	433	171	413	526	289	626	959	402	746	1067	445	901	1358
	125	110	112	212	303	181	358	525	208	501	637	351	758	1161	487	904	1293	539	1092	1646
	150	135	132	249	355	213	420	616	243	588	747	411	890	1362	571	1060	1516	632	1281	1930
	175	160	151	286	408	244	482	707	280	675	858	473	1022	1565	656	1218	1742	726	1472	2218
	200	185	171	323	461	276	545	799	316	762	969	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	821	1663	2505
	250	235	210	397	566	339	669	981	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	1008	2043	3077
	300	285	249	471	672	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
	350	335	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
20	25	5	22	40	56	34	68	96	39	79	120	67	146	219	96	176	247	99	201	297
	50	30	55	102	142	85	171	243	100	200	304	170	369	555	242	447	624	251	509	753
	75	55	79	146	204	122	245	348	143	285	435	244	527	793	346	639	893	360	728	1077
	100	80	102	188	263	157	317	449	184	368	562	315	681	1024	447	825	1153	464	940	1391
	125	105	126	234	327	196	394	558	229	458	699	391	847	1274	556	1026	1433	577	1169	1729
	150	130	148	274	383	229	462	655	269	537	820	459	993	1494	652	1203	1681	677	1371	2028
	175	155	170	315	440	264	530	752	309	617	942	527	1141	1716	749	1382	1932	778	1575	2330
	200	180	192	356	497	298	599	850	349	697	1064	595	1289	1939	846	1561	2182	879	1779	2632
	250	230	236	437	611	366	736	1044	428	856	1307	HI P1	HI P1	HI P1	1039	1918	2680	1079	2185	3233
	300	280	281	519	725	434	873	1239	508	1016	1551	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	1281	2594	3837
	350	330	325	600	839	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	1482	3002	4441
	400	380	369	683	954	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1
25	50	25	58	103	144	88	176	243	103	212	311	180	391	578	261	479	657	258	518	756
	75	50	85	153	213	130	261	359	153	314	461	266	578	855	386	709	973	381	767	1118
	100	75	110	197	275	167	336	463	197	404	593	343	745	1102	497	914	1253	491	988	1441
	125	100	137	245	341	207	417	575	245	502	737	426	925	1368	617	1135	1556	610	1227	1790
	150	125	162	291	406	246	495	683	291	596	876	506	1099	1625	733	1348	1849	725	1458	2126
	175	150	186	334	466	283	569	784	334	685	1006	582	1263	1867	842	1549	2125	833	1675	2443
	200	175	211	378	526	320	643	886	378	773	1136	657	1427	2109	951	1750	2400	940	1892	2759
	250	225	259	464	647	393	789	1088	464	950	1396	807	1753	2591	1169	2150	2948	1155	2324	3389
	300	275	307	550	768	466	937	1291	550	1127	1657	958	2080	3075	1387	2551	3499	1371	2758	4023
	350	325	355	637	888	539	1084	1495	637	1305	1917	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	1587	3192	4656
	400	375	404	725	1010	613	1233	1700	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	HI P1	1804	3630	5295
35	50	15	56	99	136	84	169	223	102	214	297	198	516	699	316	550	733	467	808	952
	75	40	95	167	229	142	284	375	171	359	499	332	867	1174	531	924	1231	785	1358	1599
	100	65	126	221	304	188	377	497	227	476	662	441	1150	1556	703	1225	1631	1041	1800	2119
	125	90	154	271	372	230	462	608	278	583	810	540	1407	1906	861	1499	1997	1274	2204	2594
	150	115	183	322	442	273	548	723	330	693	963	641	1672	2264	1023	1781	2373	1514	2619	3083
	175	140	215	379	521	321	646	852	389	816	1135	755	1970	2668	1205	2099	2796	1784	3086	3632
	200	165	243	428	588	363	730	962	439	922	1282	853	2226	3013	1362	2371	3159	2015	3485	4103
	250	215	299	526	723	446	896	1182	540	1133	1574	1048	2734	3702	1672	2912	3880	2475	4281	5040
	300	265	355	625	857	529	1064	1403	640	1344	1868	1244	3245	4393	1985	3456	4605	2938	5081	5981
	350	215	410	723	992	613	1231	1623	741	1556	2162	1440	3755	5084	2297	4000	5329	3400	5881	6922
	400	365	467	822	1129	697	1400	1846	843	1770	2459	HI P1	HI P1	HI P1	2612	4549	6061	3866	6688	7872

NOTE: See Next Page

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

TABLE 15 (Continued)
STEAM CAPACITY - LBS/HR
T = Sat. F_L = 0.93

FULL PORT – METAL DIAPHRAGM & SEAT

Outlet Pressure P2 psig	Inlet Pressure P1, psig	Pressure Drop psi	LBS/HR @ 1/2" BODY SIZE			LBS/HR @ 3/4" BODY SIZE			LBS/HR @ 1" BODY SIZE			LBS/HR @ 1-1/4"" BODY SIZE			LBS/HR @ 1-1/2"" BODY SIZE			LBS/HR @ 2" BODY SIZE		
			Droop			Droop			Droop			Droop			Droop			Droop		
			10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%	10%	20%	30%
50	75	25	109	188	248	164	329	429	206	429	571	562	1062	1112	513	883	1124	846	1278	1482
	100	50	158	272	360	238	476	621	299	621	827	814	1539	1611	743	1280	1629	1226	1852	2148
	125	75	199	343	454	300	600	783	377	783	1042	1027	1940	2031	936	1613	2053	1545	2335	2707
	150	100	236	408	539	357	714	931	448	931	1240	1221	2308	2415	1114	1919	2442	1838	2778	3220
	175	125	273	471	622	412	824	1075	517	1075	1431	1409	2663	2787	1285	2214	2818	2121	3205	3716
	200	150	312	538	712	471	942	1229	591	1229	1636	1611	3046	3187	1470	2532	3223	2426	3665	4250
	250	200	393	678	896	593	1186	1548	745	1548	2060	2029	3835	4014	1851	3189	4058	3055	4616	5352
	300	250	466	805	1064	704	1408	1837	884	1837	2445	2408	4552	4764	2197	3784	4816	3626	5478	6351
	350	300	539	931	1231	815	1630	2126	1023	2126	2830	2787	5268	5513	2542	4380	5574	4196	6340	7351
	400	350	613	1059	1400	927	1853	2417	1163	2417	3219	3170	5991	6270	2891	4981	6340	4772	7210	8360
75	100	25	148	256	336	277	477	636	323	688	862	761	1281	1293	761	1257	1480	843	1394	1638
	125	50	212	367	482	398	684	913	464	987	1236	1092	1838	1854	1092	1803	2122	1209	1998	2349
	150	75	265	457	601	496	853	1138	578	1230	1541	1361	2291	2312	1361	2248	2646	1508	2492	2928
	175	100	312	540	710	585	1007	1343	682	1453	1819	1607	2705	2729	1607	2653	3123	1780	2941	3457
	200	125	357	618	812	670	1152	1537	781	1662	2082	1839	3095	3123	1839	3036	3574	2037	3365	3955
	250	175	443	765	1006	829	1427	1904	967	2058	2578	2277	3833	3867	2277	3760	4426	2522	4168	4899
	300	225	538	930	1222	1008	1734	2314	1175	2502	3134	2768	4658	4700	2768	4570	5379	3066	5066	5954
	350	275	631	1090	1433	1182	2034	2714	1378	2934	3676	3247	5464	5513	3247	5360	6310	3596	5942	6983
	400	325	718	1240	1630	1345	2313	3086	1568	3337	4180	3692	6214	6270	3692	6096	7176	4089	6758	7942
100	125	25	256	416	564	412	673	805	488	838	967	1095	1450	1450	983	1514	1732	1044	1616	1890
	150	50	365	593	804	588	960	1149	696	1195	1378	1562	2068	2068	1401	2159	2470	1489	2304	2695
	175	75	454	736	999	731	1193	1427	865	1484	1712	1940	2568	2568	1741	2682	3068	1849	2862	3347
	200	100	533	864	1172	858	1400	1675	1015	1742	2010	2278	3015	3015	2043	3149	3601	2171	3360	3929
	250	150	676	1096	1487	1088	1776	2125	1288	2210	2549	2889	3824	3824	2592	3994	4568	2753	4262	4984
	300	200	810	1314	1782	1304	2129	2546	1543	2648	3055	3463	4583	4583	3106	4787	5474	3300	5108	5973
	350	250	941	1527	2072	1515	2474	2959	1793	3078	3551	4025	5327	5327	3610	5563	6362	3835	5936	6942
	400	300	1099	1784	2420	1770	2890	3457	2095	3596	4149	4702	6223	6223	4218	6500	7433	4481	6935	8111
125	150	25	304	475	618	429	706	883	494	871	1059	1218	1589	1589	1100	1676	1903	1252	1831	2131
	175	50	433	677	880	611	1006	1258	704	1240	1509	1736	2264	2264	1567	2387	2712	1784	2609	3036
	200	75	536	838	1090	757	1246	1557	872	1535	1869	2149	2803	2803	1940	2955	3357	2208	3229	3759
	250	125	710	1110	1444	1003	1650	2063	1155	2034	2476	2847	3713	3713	2871	3916	4448	2925	4279	4980
	300	175	865	1353	1761	1223	2012	2516	1409	2480	3019	3471	4528	4528	3134	4775	5424	3567	5217	6073
	350	225	1012	1583	2059	1430	2353	2942	1647	2900	3530	4059	5295	5295	3665	5583	6342	4171	6101	7101
	400	275	1155	1806	2350	1631	2685	3356	1880	3309	4028	4632	6042	6042	4182	6370	7236	4759	6961	8102
150	175	25	313	508	649	491	798	955	550	959	1146	1335	1719	1719	1217	1830	2063	1471	2044	2369
	200	50	446	723	924	698	1136	1358	783	1364	1630	1899	2445	2445	1731	2603	2934	2092	2907	3369
	250	100	642	1041	1330	1005	1635	1956	1127	1964	2347	2734	3520	3520	2492	3747	4224	3012	4185	4850
	300	150	805	1305	1668	1261	2051	2453	1413	2463	2943	3429	4415	4415	3125	4700	5298	3777	5249	6083
	350	200	953	1546	1976	1494	2430	2906	1674	2918	3487	4063	5231	5231	3702	5568	6277	4475	6219	7207
	400	250	1095	1777	2271	1717	2792	3339	1924	3353	4007	4669	6011	6011	4254	6398	7213	5143	7146	8282
175	200	25	352	572	716	352	628	846	603	1045	1227	1449	1840	1840	1329	1979	2214	HI P2	HI P2	HI P2
	250	75	616	1002	1253	616	1099	1482	1056	1829	2147	2537	3221	3221	2326	3464	3876	HI P2	HI P2	HI P2
	300	125	809	1317	1647	809	1444	1948	1388	2404	2823	3336	4234	4234	3058	4554	5095	HI P2	HI P2	HI P2
	350	175	978	1592	1990	978	1745	2354	1677	2905	3411	4031	5117	5117	3695	5503	6157	HI P2	HI P2	HI P2
	400	225	1135	1848	2310	1135	2026	2733	1947	3373	3960	4680	5940	5940	4290	6389	7148	HI P2	HI P2	HI P2
200	250	50	486	813	1078	554	964	1293	933	1601	1847	2213	2771	2771	2041	3008	3340	HI P2	HI P2	HI P2
	300	100	697	1164	1544	794	1380	1852	1336	2293	2646	3171	3969	3969	2924	4309	4785	HI P2	HI P2	HI P2
	350	150	868	1450	1923	989	1719	2307	1665	2857	3296	3950	4944	4944	3642	5367	5960	HI P2	HI P2	HI P2
	400	200	1023	1709	2265	1165	2026	2718	1961	3365	3883	4653	5825	5824	4291	6323	7022	HI P2	HI P2	HI P2
250	300	50	569	926	1192	681	1151	1590	1083	1811	2043	2948	3595	3595	2756	3975	4354	HI P2	HI P2	HI P2
	350	100	812	1322	1701	972	1643	2270	1546	2586	2917	3856	4702	4702	3605	5199	5695	HI P2	HI P2	HI P2
	400	150	1008	1642	2113	1207	2040	2819	1920	3211	3622	4640	5658	5658	4338	6255	6853	HI P2	HI P2	HI P2
300	350	50	655	1066	1296	807	1344	1851	1233	2018	2222	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2
	400	100	935	1521	1848	1151	1917	2640	1759	2878	3168	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2	HI P2

NOTE: 1. Where "HI P1" is indicated, the inlet pressure exceeds the limit established in Table 11.

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

TABLE 16
CONSOLIDATED PRESSURE vs. TEMPERATURE MATERIALS OPERATING LIMITS, INCLUDING TRIM AND OPTION LIMITS

Materials Body/Sprg. Chamber/Cyl	End Conn. Option No.	Trim Design. No.	Inlet Pressure		Outlet Pressure [1]		Inlet & Outlet Temperature Rg		Limiting Portion
			psig	(Barg)	psig	(Barg)	°F	(°C)	
DI / DI / BRZ BRZ / DI / BRZ BRZ / BRZ / BRZ [3]	Std. - NPT Opt-31, Opt-45, Opt-46G	BB, B2, B3	400	(27.6)	300	(20.7)	-20 to +150	(-29 to +66)	BRZ, Mech. Internals
			390	(26.9)	300	(20.7)	+180	(+83)	BRZ, BC, NBR
		B1	400	(27.6)	300	(20.7)	-20 to +150	(-29 to +66)	BRZ, Mech. Internals
			385	(26.6)	300	(20.7)	+200	(+94)	BRZ
			365	(25.2)	300	(20.7)	+250	(+121)	
			335	(23.1)	300	(20.7)	+300	(+149)	
			300	(20.7)	300	(20.7)	+350	(+177)	
			250	(17.2)	250	(17.2)	+400	(+205)	BRZ, V-TFE
		B5	400	(27.6)	300	(20.7)	-20 to +150	(-29 to +66)	BRZ, Mech. Internals, Phos. Bronze
			385	(26.6)	300	(20.7)	+200	(+94)	
DI / DI / SST CS / DI / SST SST / DI / SST	Std. - NPT Opt-31, Opt-32, Opt-45	S2N, S3, S3N SB, S40	740	(51.0)	300	(20.7)	-20 to +180	(-29 to +83)	BC, NBR
									Mech. Internals
		S6, S7	740	(51.0)	300	(20.7)	-20 to +250	(-29 to +121)	Mech. Internals
					300	(20.7)	+268	(+131)	DI, Mech. Internals
					300	(20.7)	+275	(+135)	DI
					300	(20.7)	+300	(+149)	DI, EPDM/EPR
		S0, S1, S2, S5, S9, S36	740	(51.0)	300	(20.7)	-20 to +250	(-29 to +121)	Mech. Internals
					300	(20.7)	+268	(+131)	DI, Mech. Internals
					300	(20.7)	+275	(+135)	DI
					300	(20.7)	+300	(+149)	
					300	(20.7)	+350	(+177)	
					295	(20.3)	+400	(+205)	DI, V-TFE, FKM
	Std-NPT Opt-31, Opt-32 Opt-46G	S1, S2	740	(51.0)	270	(18.6)	-20 to +425	(-29 to +219)	DI, Std. Gasket
					250	(17.2)	+450	(+232)	
CS / CS / SST SST / CS / SST SST / SST / SST	Std. - NPT, Opt-31, Opt-32, Opt-45	S2N, S3, S3N SB, S40	740	(51.0)	(51.0)	(27.6)	-20 to +180	(-29 to +83)	BC, NBR Mech. Internals
		S6	740	(51.0)	(51.0)	(27.6)	-20 to +300	(-29 to +149)	EPDM/EPR, Mech. Internals
		SO, S5 S9, S36	740	(51.0)	(51.0)	(27.6)	-20 to +400	(-29 to +205)	V-TFE, FKM, Mech. Internals
	Std. - NPT, Opt-31, Opt-32,	S1, S2	740	(51.0)	(51.0)	(27.6)	-20 to +450	(-29 to +232)	Mech. Internals, Std. Gaskets
	Std. - NPT, Opt-31, Opt-46G (Req'd)	S1, S2	740	(51.0)	(51.0)	(27.6)	-20 to +600	(-29 to +315)	Mech. Internals, Carbon Graphite Gasket
CS/ DI / SST CS / CS / SST	Opt-30, 150# Flg., Opt-45	S2N, S3, S3N SB, S40	285	(19.7)	285	(19.7)	-20 to +100	(-29 to +38)	150# Flg.
			265	(18.3)	265	(18.3)	+180	(+83)	150# Flg., BC, NBR
		S6, S7	285	(19.7)	285	(19.7)	-20 to +100	(-29 to +38)	150# Flg.
			260	(17.9)	260	(17.9)	+200	(+94)	
			230	(15.9)	230	(15.9)	+300	(+149)	150# Flg., EPDM/EPR
		S0, S5, S9, S36	285	(19.7)	285	(19.7)	-20 to +100	(-29 to +38)	150# Flg.
			260	(17.9)	260	(17.9)	+200	(+94)	
			230	(15.9)	230	(15.9)	+300	(+149)	
			200	(13.8)	200	(13.8)	+400	(+205)	V-TFE, FKM, 150# Flg.
		S1, S2	285	(19.7)	285	(19.7)	-20 to +100	(-29 to +38)	150# Flg.
			260	(17.9)	260	(19.9)	+200	(+94)	
			230	(15.9)	230	(15.9)	+300	(+149)	
			200	(13.8)	200	(13.8)	+400	(+205)	TFE Gasket, 150# Flg.
	OPT-30, 150# FLG., Opt-46G	S1, S2	185	(12.8)	185	(12.8)	-20 to +450	(-29 to +232)	Std. Gasket, 150# Flg., DI
CS / CS / SST	Opt-30, 150# Flg., & Opt-46G (Req'd)	S1, S2	170	(11.7)	170	(11.7)	-20 to +500	(-29 to +260)	150# Flg.
			140	(9.7)	140	(9.7)	+600	(315)	Carbon Graphite Gasket, 150# Flg., Mech. Internals
SST / DI / SST SST / CS / SST SST / SST / SST	Opt-30 150# Flg., Opt-45	S2N, S3, S3N SB, S40	275	(19.0)	275	(19.0)	-20 to +100	(-29 to +38)	150# Flg.
			245	(16.9)	245	(16.9)	+180	(+83)	150# Flg., BC, NBR
		S6, S7	275	(19.0)	275	(19.0)	-20 to +100	(-29 to +38)	150# Flg.
			240	(16.6)	240	(16.6)	+200	(+94)	
			215	(14.8)	215	(14.8)	+300	(+149)	150# Flg., EPDM/EPR
		S0, S5, S9, S36	275	(19.0)	275	(19.0)	-20 to +100	(-29 to +38)	150# Flg.
			240	(16.6)	240	(16.6)	+200	(+94)	
			215	(14.8)	215	(14.8)	+300	(+149)	
			195	(13.4)	195	(13.4)	+400	(+205)	V-TFE, FKM, 150# Flg.
		S1, S2	275	(19.0)	275	(19.0)	-20 to +100	(-29 to +38)	150# Flg.
			240	(16.6)	240	(16.6)	+200	(+94)	
			215	(14.8)	215	(14.8)	+300	(+149)	
			195	(13.4)	195	(13.4)	+400	(+205)	TFE Gasket, 150# Flg.
	**	S1, S2	180	(12.4)	180	(12.4)	-20 to +450	(-29 to +233)	Std. Gasket, 150# Flg., DI
SST / CS / SST SST / SST / SST	Opt-30 150# Flg. & Opt-46G (Req'd)	S1, S2	170	(11.7)	170	(11.7)	-20 to +500	(-29 to +260)	150# Flg.
			140	(9.7)	140	(9.7)	+600	(+315)	150# Flg., Carbon Graphite Gskt., Mech. Internals

** Opt-30 150# Flg., Opt-46G

1,3 & 4 See Next Page

TABLE 16 (Continued)

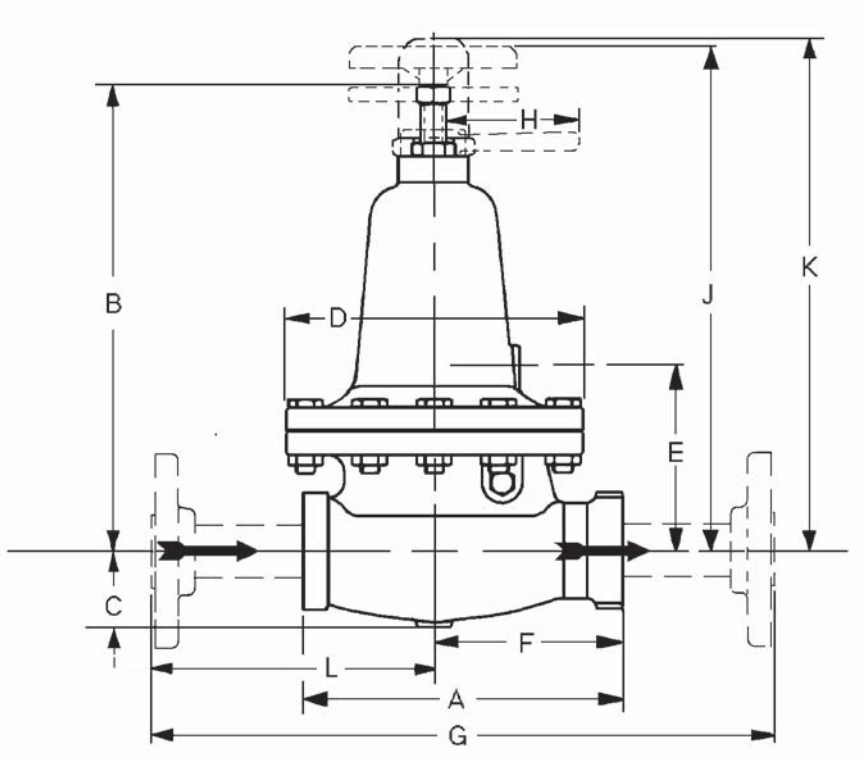
Materials Body/Sprg. Chamber/Cyl	End Conn. Option No.	Trim Design. No.	Inlet Pressure		Outlet Pressure [1]		Inlet & Outlet Temperature Rg.		Limiting Portion
			psig	(Barg)	psig	(Barg)	°F	(°C)	
CS / DI / SST [2] CS / CS / SST [2]	Opt-30 300# Flg., Opt-45	S2N, S3 S3N, S40, SB	740 685	(51.0) (47.2)	400 400	(27.6) (27.6)	-20 to +100 +180	(-29 to +38) (+83)	300# Flg., Mech. Internals 300# Flg., Mech.Internals, BC, NB
		S6, S7	740 675 655	(51.0) (46.6) (45.2)	400 [4] 400 [4] 400 [4]	(27.6) [4] (27.6) [4] (27.6) [4]	-20 to +100 +200 +300	(-29 to +38) (+94) (+149)	300# Flg., Mech. Internals 300# Flg., Mech. Internals, EPDM/EPR
		S0, S5 S9, S36	740 675 655 635	(51.0) (46.6) (45.2) (43.8)	400 [4] 400 [4] 400 [4] 400 [4]	(27.6) [4] (27.6) [4] (27.6) [4] (27.6) [4]	-20 to +100 +200 +300 +400	(-29 to +38) (+94) (+149) (+205)	300# Flg., Mech. Internals 300# Flg., Mech. Internals, V-TFE, FKM
		S1, S2	740 675 655 635	(51.0) (46.6) (45.2) (43.8)	400 400 400 400	(27.6) (27.6) (27.6) (27.6)	-20 to +100 +200 +300 +400	(-29 to +38) (+94) (+149) (+205)	300# Flg., Mech. Internals 300# Flg., Mech. Int., TFE Gskt.
	Opt-30 300# Flg., Opt-46G	S1, S2	615	(42.4)	400	(27.6)	-20 to +450	(-29 to +232)	300# Flg., Mech. Internals, Std. Gaskets, CI
CS / CS / SST	Opt-30, 300# Flg. & Opt-46G (Req'd)	S1, S2	600 550	(41.4) (37.9)	400 400	(27.6) (27.6)	-20 to +500 +600	(-29 to +260) (+315)	300# Flg., Mech. Internals 300# Flg., Mech. Internals, Carbon graphite Gasket
SST / DI / SST [2] SST / CS / SST SST / SST / SST	Opt-30 300# Flg., Opt-45	S2N, S3 S3N, S40, SB	720 640	(49.7) (44.1)	400 400	(27.6) (27.6)	-20 to +100 +180	(-29 to +38) (+83)	300# Flg., Mech. Internals 300# Flg., Mech. Internals, BC, NBR
		S6, S7	720 620 560	(49.7) (42.8) (38.6)	400 [4] 400 [4] 400 [4]	(27.6) [4] (27.6) [4] (27.6) [4]	-20 to +100 +200 +300	(-29 to +38) (+94) (+149)	300# Flg., Mech. Internals 300# Flg., Mech. Internals, EPDM/EPR
		S0, S5, S9, S36	720 620 560 515	(49.7) (42.8) (38.6) (35.5)	400 [4] 400 [4] 400 [4] 400 [4]	(27.6) [4] (27.6) [4] (27.6) [4] (27.6) [4]	-20 to + 100 +200 +300 +400	(-29 to +38) (+94) (+149) (+205)	300# Flg., Mech. Internals 300# Flg., Mech. Internals, V-TFE, FKM
		S1, S2	720 620 560 515	(49.7) (42.8) (38.6) (35.5)	400 400 400 400	(27.6) (27.6) (27.6) (27.6)	-20 to +100 +200 +300 +400	(-29 to +38) (+94) (+149) (+205)	300# Flg., Mech. Internals 300# Flg., Mech. Int., TFE Gskt.
	Opt-30, 300# Flg., Opt-46G	S1, S2	495	(34.1)	400	(27.6)	-20 to +450	(-29 to +232)	300# Flg., Mech. Internals, Std. Gaskets, CI
SST / CS / SST	Opt-300, 300# Flg. & Opt-46G (Req'd)	S1, S2	480 450	(33.1) (31.0)	400 400	(27.6) (27.6)	-20 to +500 +600	(-29 to +260) (+315)	300# Flg., Mech. Internals
SST / SST / SST									300# Flg., Mech. Internals Carbon graphite Gasket
SST / SST / SST	Opt-37	S6	250	(17.2)	100	(6.9)	-20 to +100	(-29 to +38)	Diaphragm Flg. Bolting
SST / SST / SST	Opt-37S	S1	100	(6.9)	100	(6.9)	-20 to +350	(-29 to +177)	Diaphragm Flg. Bolting

1 Indicated outlet pressure limits are those to contain overpressure conditions; such overpressure may cause diaphragm damage. It is recommended that pressure safety devices – safety relief valve or rupture disc – have their setpoint relief pressures at 110% of the UVRS (UVRS = "Upper Value of Range Spring"). Example: For a 90–170 psig (6.2–11.7 Barg) range spring, the safety device should be set to relieve at 110% x 170 psig = 187 psig (12.9 Barg). **See NOTE 2 below for 300 psig (20.7 barg) outlet pressure limit with Ductile Iron Spring Chamber.**

2 Outlet Pressure Limit for CS/DI/SST and SST/DI/SST is 300psig (20.7 barg).
Outlet Pressure Limit for CS/CS/SST and SST/SST/SST is 400psig (27.6 barg).

3 Outlet Pressure Limit for BRZ/BRZ/BRZ is equal to inlet pressure limit.

4 Outlet Pressure Limit for S5 & S7 Trim (FKM) is 300 psig (20.7 barg)



Regulator Size (Inch)	DIMENSIONS – ENGLISH (inch)													Approx. Weight - lbs.	
	A	B	C	D	E	F	G [1]	G [2]	G [3]	H	J	K	L [4]	wo/ Flanges	w/ Flanges
1/2"	5.94	10.00	1.62	5.62	3.75	3.94	10.75	11.00	13.94	3.13	11.19	11.62	5.38	18	25
3/4"	7.12	11.25	1.75	6.56	3.81	4.00	11.88	12.25	15.12	3.13	12.25	12.81	5.62	28	35
1"	7.94	11.75	2.12	7.38	4.38	4.69	13.62	14.00	15.94	3.13	12.81	13.44	6.75	37	46
1-1/4"	8.50	12.25	2.38	8.00	4.50	5.06	NA	NA	16.50	4.31	13.94	14.19	NA	48	N/A
1-1/2"	9.75	15.75	2.50	9.12	6.19	5.75	15.88	16.19	17.75	4.31	16.50	17.00	7.31	77	93
2"	11.25	16.00	2.88	11.25	7.06	6.62	19.31	19.62	19.22	4.31	16.88	17.38	9.81	109	131
Regulator Size (DN)	**DIMENSIONS – METRIC (mm)**													**Approx. Weight - kg.**	
	A	B	C	D	E	F	G [1]	G [2]	G [3]	H	J	K	L [4]	wo/ Flanges	w/ Flanges
(15)	151	254	41	143	95	100	273	279	354	79	284	295	137	8	11
(20)	181	286	44	167	97	102	302	311	384	79	311	325	143	13	16
(25)	202	298	54	187	111	119	346	356	405	79	325	341	171	17	21
(32)	216	311	60	203	114	129	NA	NA	419	110	354	360	NA	22	N/A
(40)	248	400	64	232	157	146	403	411	451	110	419	432	186	35	42
(50)	286	406	73	286	179	168	490	498	488	110	429	441	249	49	59

[1] 150# Flange - Also available with Opt-34, special 14" (356mm) face to face dimension - sizes 1/2" - 1" & 1-1/2" only.
[2] 300# Flange - Also available with Opt-34, special 14" (356mm) face to face dimension - sizes 1/2" - 1" & 1-1/2" only.
[3] P.E. Pipe Nipples.
[4] "L" dimension for 1-1/2" Size with Opt-34 is 6.13" (156mm).

OPT -37/-37S PRODUCT CODER

FOR THE FOOD AND PHARMACEUTICAL INDUSTRY

An “X” in POS 12 followed by a 5-digit control number overrides remaining selections.

BK	POS 3	—	A	POS 6 & 7	POS 8	—	POS 10	POS 11	POS 12	0	0	0	0	0	A

POSITION 3 - SIZE & SERVICE			
Size		Service	
in	(DN)	Gaseous	Liquid
		CODE	CODE
1/2"	(15)	4	J
3/4"	(20)	5	K
1"	(25)	6	L
1-1/2"	(40)	8	N
2"	(50)	9	P

POSITION 6 & 7 - TRIM DESIGNATION NUMBERS.	
Stainless Steel Trim	
Desig.	CODE
S1	S1
S6	S6

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 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 10 - END CONNECTIONS	
Description	CODE
NPT - Screwed	1
-30 Opt. - 150 LB RF Flgs	6

POSITION 11 - RANGE SPRINGS							
Size	psig (Barg)	(Barg)	CODE	SIZE	psig	(Barg)	CODE
1/2" (DN15)	10-50	(.69-3.4)	3	1-1/2" (DN40)	10-50	(.69-3.4)	3
	40-80	(2.8-5.5)	B		40-80	(2.8-5.5)	B
3/4" (DN20)	10-40	(.69-2.8)	2	2" (DN50)	10-30	(.69-2.1)	1
	30-60	(2.1-4.1)	6		25-45	(1.7-3.1)	5
	50-80	(3.4-5.5)	C		35-80	(2.4-5.5)	9
1" (DN25)	10-30	(.69-2.1)	1				
	25-45	(1.7-3.1)	5				
	35-50	(2.4-3.4)	8				
	40-80	(2.8-5.5)	B				

POSITION 12 - TRIM OPTIONS		
Description	Option	CODE
No Option	—	0
For Special Construction Contact Cashco for Special Product Code.	SPQ	X

MODEL 1000 HP Basic PRODUCT CODER 02/29/16

An "X" in POS 12 followed by a 5-digit control number overrides remaining selections.

B	POS 2	POS 3	—	POS 5	POS 6 & 7	POS 8	—	POS 10	POS 11	POS 12	POS 13	POS 14	POS 15	POS 16	POS 17	A

POSITION 2 - GASKETS * & SERVICE

Gaskets - Service	Options	CODE
Standard : Graphite / NBR/ - Non-Oxygen	--	B
TFE /- Primarily for Oxygen	-45	D
Carbon-Graphite - High Temp.	-46G **	G

* Refer to Tech Bulletin for temperature limits.
Gasket not required when selecting Composition Diaphragm
**** Only Available with CS or SST Body & Spring Chamber and S1 or S2 Trim.**

POSITION 3 - SIZE & SERVICE

Size		Service		
		Gaseous	Liquid	Viscous (-27 Opt) *
In	DN	CODE	CODE	CODE
1/2	(15)	4	J	R
3/4	(20)	5	K	S
1	(25)	6	L	T
1-1/4	(32)	7	M	U
1-1/2	(40)	8	N	V
2	(50)	9	P	W

* Metal Seated B1,S0,S1,S2,S2N,S5 or S40Trim Only.

POSITION 5 - BODY & SPRG CHAMBER MATERIALS

Body/Sp. Ch.	CODE	Body/Sp. Ch	CODE
DI/DI	1	CS/CS (WCC/ WCB)	5
BRZ/DI *	2	SST/DI *	7
BRZ/BRZ *	3	SST/CS *	9
CS/DI	4	SST/SST *	A

* **Note:** SST or BRZ Bodies Not Avail. in 1-1/4" (DN32)

POSITION 6 & 7 - TRIM DESIGNATION NUMBERS

Brass Trim **		Stainless Steel Trim	
Desig.	CODE	Desig.	CODE
B1	B1	S0 *	S0
B2	B2	S1	S1
B3	B3	S2	S2
B5	B5	S2N	SN
BB	BB	S3	S3
BK	BK	S3N	SC
		S5	S5
		S6 *	S6
		S7 *	S7
		S9 *	S9
		S36	36
		S40	40
		S40V	4V
		SB	SB

* Not available for 1-1/4" (DN32) size
** Brass Trims not available with nipple & flange end connections.

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 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 10 - END CONNECTIONS

Description	CODE
NPT - Screwed	1
-30 Opt. - 150 LB RF Flgs. * ** (Std)	6
-30 Opt.- 300 LB RF Flgs. * ** (Std)	7
-31 Opt.- BSPT Tapered Thread	B
-31P Opt.- BSPP Parallel Thread	P
-32 Opt. - SCH. 80 PE Ext. Nipples *	E
-34 Opt. - 150 LB RF Flgs. 14" F to F Dimension (Sizes 1/2 -1"& 1-1/2" only) *	V
-34 Opt. - 300 LB RF Flgs. 14" F to F Dimension (Sizes 1/2 -1"& 1-1/2" only)*	W

*Nipples & flanges of same material as body. CS or SST bodies. Use SST trim only.
** Not Available in 1-1/4" (DN32)

POSITION 11 - RANGE SPRINGS

Size	psig	CODE	Size	psig	CODE
1/2" (DN15)	10-50	1	1-1/4" (DN32)	10-40	2
	40-100	4		30-50	5
	80-150	7		40-60	N
	120-190	B		50-90	8
	150-300 *	F		70-225	L
3/4" (DN20)	10-40	2	1-1/2" (DN40)	10-40	2
	30-60	3		30-75	6
	50-90	8		60-100	A
	70-110	C		80-225	M
	90-170	G	2" (DN50)	10-40	2
	140-300 *	J		30-60	3
1" (DN25)	10-40	2		50-150	E
	30-60	3			
	50-70	9			
	55-80	D			
	65-130	H			
	100-300 *	K			

* With CS 150# Flange Connection max set point up to 285 psig.
With SST 150# Flange Connection max set point up to 275 psig.

POSITION 12 - TRIM VARIATIONS

Description	Option	CODE	W/ -17 OPTION Option	W/ -17 OPTION CODE
No Special Trim Variation	--	0	--	--
Reduced Orifice (One-Step) Not Available on 1-1/4"(DN32)	-12	A	-12+17	1
Integral Seat Surface (Not available with B1 Trim or NACE)	-14	C	-14+17	3
Stellited Seat Surface Integral Seat - S1 Trim Only	-15 *	D	-15+17 *	4
Reduced Orifice & Integral Seat See above for limitations	-12+14	E	-12+14+17	5
Reduced Orifice & Stellited Seat See above for limitations	-12+15 *	F	-12+15+17 *	6
Piston Spring Not Available on 2" (DN50)	-17	H	--	--
For Special Construction Contact Cashco for Special Product Code.	SPQ	X		

* Includes Opt-14 Integral Seat.

POSITION 13 - FEATURE OPTIONS

	Option	CODE
No Option	-	0
DI Closing Cap for DI or CS Spring Chambers.	-1	1
Handwheel & Locking Lever - 1/2"-1"(DN15 - DN25).	-3	3
T-Bar & Locking Lever - 1 1/4"-2" (DN32 - DN50).	-3	4

POSITION 14 - SPRING CHAMBER OPTIONS

	Option	CODE
No Option	-	0
1/4" (DN8) NPT Vent Tap.	-25	E
Plastic Rain-proof Bug Vent (includes Opt-25).	-25P	P
SST Rain-proof Bug Vent (includes Opt-25).	-25S	H

POSITION 15 - BODY OPTIONS

	Option	CODE
No Option	-	0
1/4" (DN8) NPT Drain Hole/Press. Tap.	-26	F
1/8" (DN6) NPT Taps -one at inlet, one at outlet, for Opt-34	-87	V

POSITION 16 - CERTIFICATE OPTIONS

	Option	CODE
No Option	-	0
NACE Const.: CS/CS/XX, All Sizes Except DN32 Per MR0175, S3, S3N, S40, S40V Trim.	-40	J
NACE Const.:SST/CS/XX, SST/SST/XX All Sizes Except DN32 Per MR0175, S3, S3N, S40, S40V Trim.	-40SST	K
Special Cleaning: Per Cashco Spec #S-1134. W/ properly selected mat'ls. Suitable for Oxygen Service. BRZ or SST body material.	-55	M
Special Cleaning: Per Cashco Spec #S-1542.	-56	N

POSITION 17 - PAINT OPTIONS

	Option	CODE
No Option	-	0
Epoxy Painted Per Cashco Spec #S-1547.	-95	W
Epoxy Painted Per Cashco Spec #S-1687 Offshore.	-95OS	Y

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Printed in U.S.A. 1000HP-BASIC-TB