

DBO(Y)(S)-3 CONTROL VALVE

SIZES 2" – 8"

ANSI CLASS 125/250, 150/300, 600

- **High Flow Capacities** provide larger flow area, reduced body velocity and pressure loss
- **Bolted Actuator Yoke** guarantees easy disassembly
- **Controlled Seat Loading** maintains constant seat gasket load
- **Hung Cage Design** allows thermal expansion without seat damage
- **Hardened/Stainless Steel Trim** provides twice the service life of 316 stainless trim
- **Rugged Plug Seal** with three times the wear surface of competitive valves for long lasting leak tight seal
- **Multiple Cage Options** for maximum versatility
- **Balanced Plug Design** provides smooth high pressure control
- **Ultra Compact Actuators** install in tight spaces
- **Tighter Shutoff** design provides exceptional performance up to Class VI

APPLICATION DATA

- Control systems for food, pulp and paper, chemical, petrochemical, power & other industries
- HVAC systems
- Feed water and fuel system controls in boiler rooms
- Packaged systems (OEM) such as heat exchangers, water purification systems & vaporizers, metal cleaning and plating

OPTIONS

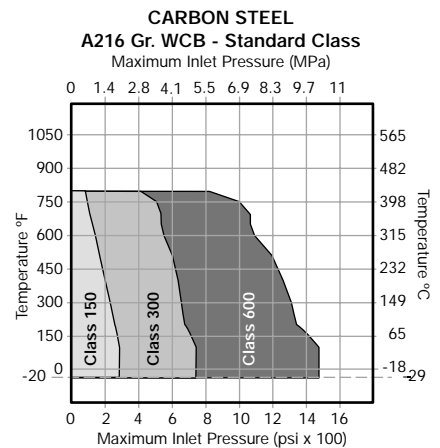
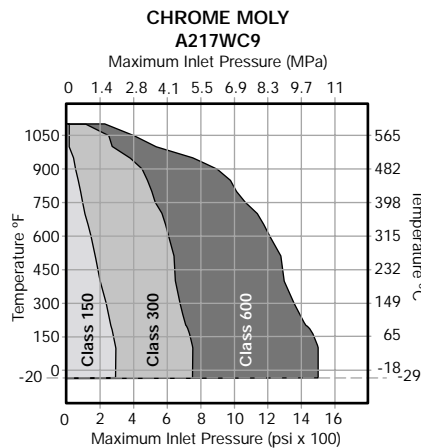
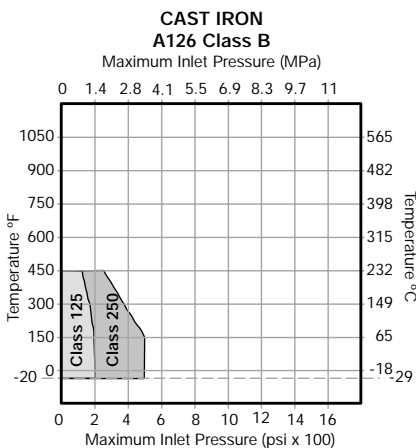
- 35, 55, 85 or 135 sq. in. Actuator, Reverse or Direct
- Soft Seats
- Threaded, Socketweld, Flanged and Butt-weld End Connections
- Positioners
- Noise and Cavitation Reducing Trim
- Reduced Flow Cage
- Alternate Packings for Severe Service
- High Temperature Trim

MODELS

- U841 — Cast Iron
- U843 — Carbon Steel
- U845 — Chrome Moly

APPLICABLE INDUSTRY STANDARDS

See Reference Section on page 195



DBO(Y)(S)-3 CONTROL VALVE

Dimensions & Weights

"A", "B" and "C" DIMENSIONS inches (mm)

Size	A				B				C	
	NPT	125, 150 (ND-16)	250, 300 (ND-25 ² ND-40)	600 (ND-100)	CI	CS NPT ¹ , 150 (ND-16)	CS 300 (ND-40)	CS 600 (ND-100)	CI	CS
2 (50)	9 $\frac{1}{4}$ (235)	10 (254)	10 $\frac{1}{2}$ (267)	11 $\frac{1}{4}$ (286)	3 $\frac{3}{4}$ (95)	3 (76)	3 $\frac{3}{4}$ (83)	3 $\frac{3}{4}$ (83)	7 $\frac{1}{4}$ (184)	7 $\frac{1}{8}$ (181)
2 $\frac{1}{2}$ (65)	—	10 $\frac{3}{8}$ (276)	11 $\frac{1}{2}$ (292)	12 $\frac{1}{4}$ (311)	4 $\frac{3}{8}$ (111)	3 $\frac{1}{2}$ (89)	3 $\frac{3}{4}$ (95)	3 $\frac{3}{4}$ (95)	6 $\frac{5}{8}$ (168)	6 $\frac{5}{8}$ (168)
3 (80)	—	11 $\frac{3}{4}$ (299)	12 $\frac{1}{2}$ (318)	13 $\frac{1}{4}$ (337)	4 $\frac{1}{2}$ (114)	3 $\frac{3}{4}$ (95)	4 $\frac{1}{8}$ (105)	4 $\frac{1}{8}$ (105)	6 $\frac{7}{8}$ (175)	6 $\frac{7}{8}$ (175)
4 (100)	—	13 $\frac{3}{8}$ (352)	14 $\frac{1}{2}$ (368)	15 $\frac{1}{2}$ (394)	5 $\frac{1}{2}$ (140)	4 $\frac{1}{2}$ (114)	5 (127)	5 $\frac{3}{8}$ (137)	8 $\frac{1}{8}$ (206)	8 $\frac{5}{8}$ (219)
6 (150)	—	17 $\frac{3}{8}$ (451)	18 $\frac{5}{8}$ (473)	20 (508)	5 $\frac{7}{8}$ (149)	5 $\frac{1}{2}$ (140)	6 $\frac{1}{4}$ (159)	7 (178)	9 $\frac{1}{4}$ (248)	9 $\frac{1}{4}$ (248)
8 (200)	—	21 $\frac{3}{8}$ (543)	22 $\frac{3}{8}$ (568)	24 (610)	7 $\frac{5}{8}$ (194)	6 $\frac{3}{4}$ (172)	7 $\frac{1}{2}$ (191)	8 $\frac{1}{4}$ (210)	12 $\frac{1}{4}$ (311)	12 $\frac{1}{4}$ (311)

"D" DIMENSIONS inches (mm)

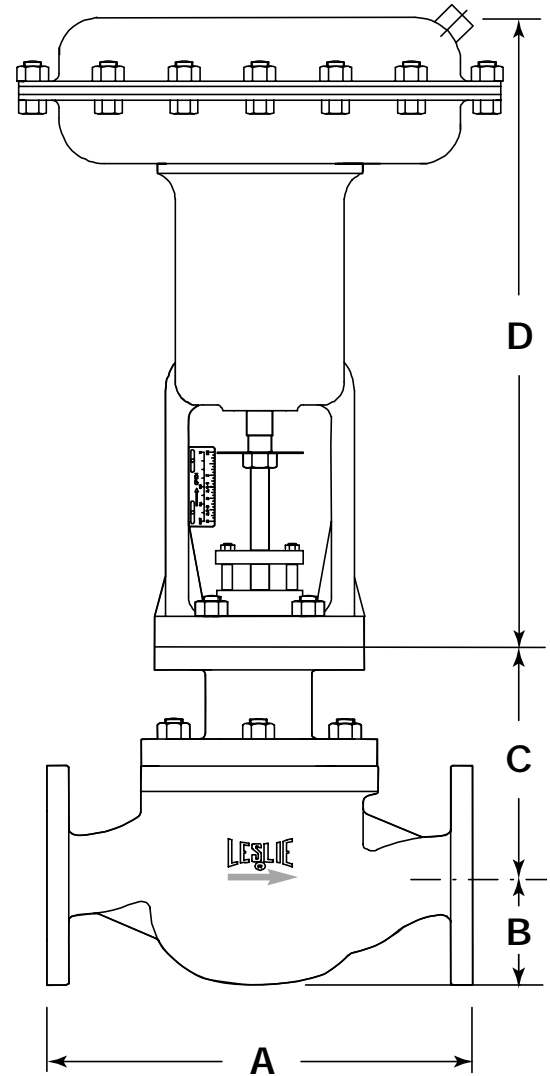
Size	D											
	35	35R	55	55R	55(A)	55AR	85	85R	85A	85AR	135	135R
2 (50)	12 $\frac{3}{8}$ (314)	12 $\frac{3}{8}$ (314)	15 $\frac{1}{4}$ (387)	18 (457)	—	—	—	—	—	—	—	—
2 $\frac{1}{2}$ (65)	—	—	—	—	15 $\frac{1}{4}$ (387)	18 (457)	19 $\frac{5}{8}$ (499)	23 $\frac{1}{4}$ (591)	—	—	—	—
3 (80)	—	—	—	—	15 $\frac{1}{4}$ (387)	18 (457)	19 $\frac{5}{8}$ (499)	23 $\frac{1}{4}$ (591)	—	—	—	—
4 (100)	—	—	—	—	15 $\frac{1}{4}$ (387)	18 (457)	19 $\frac{5}{8}$ (499)	23 $\frac{1}{4}$ (591)	—	—	—	—
6 (160)	—	—	—	—	—	—	—	—	22 $\frac{1}{4}$ (565)	25 $\frac{1}{8}$ (657)	27 $\frac{3}{8}$ (695)	32 $\frac{1}{4}$ (819)
8 (200)	—	—	—	—	—	—	—	—	—	—	27 $\frac{3}{8}$ (695)	32 $\frac{1}{4}$ (819)

Note: Go to lesliecontrols.com web site for 10/0.4.3 and 10/0.4.4 for Actuator dimensions with HOD and Handjack

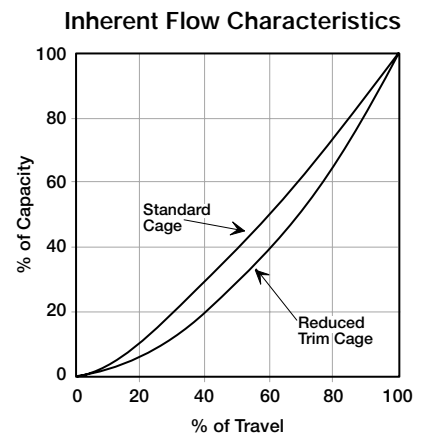
WEIGHTS³ pounds (kg)

Size	CI			CS			
	NPT	125	250	NPT	150	300	600
2 (50)	80 (36.3)	85 (39)	88 (40)	45 (20.4)	85 (39)	88 (40)	90 (41)
2 $\frac{1}{2}$ (65)	—	125 (57)	130 (59)	—	125 (57)	130 (59)	135 (61)
3 (80)	—	145 (66)	152 (69)	—	145 (66)	152 (69)	158 (72)
4 (100)	—	190 (86)	198 (90)	—	190 (86)	198 (90)	205 (93)
6 (150)	—	460 (209)	480 (218)	—	450 (204)	470 (213)	485 (220)
8 (200)	—	625 (284)	640 (290)	—	600 (272)	635 (288)	660 (299)

1. NPT available in 2" only.
2. BWE same as 300
3. Weights are approximate.



LINEAR



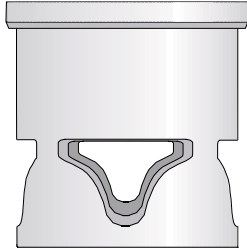
DBO(Y)(S)-3 HUNG CAGE DESIGN

Unlike competitor's valves (which use the cage to compress the seat ring into the body), Leslie's cage is suspended in the body from a machined shoulder. This eliminates bonnet gasket leakage, cage deformation, sticking plugs, seat gasket and body washout which can occur with cage retained seat designs. The Leslie hung cage design utilizes a 17-4 Ph stainless steel Belleville load ring

to maintain a constant seat gasket load, even in temperature cycling service.

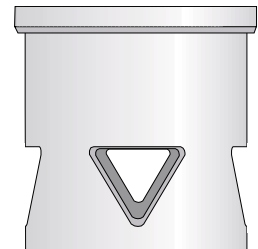
The Leslie DBO(Y)(S)-3 Control Valves are specifically designed for high pressure drop service. Pressure drop, high velocities and throttling occur between the cage window and the plug, thereby protecting the seat ring and tight shutoff capability of the valve.

STANDARD CAGE



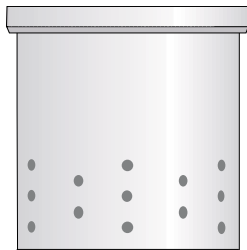
The full ported, standard cage, provides maximum flow with minimum pressure drop. The inherent modified linear flow characteristic provides excellent low flow control, high rangeability and maximum flow per given body size.

40% REDUCED TRIM CAGE



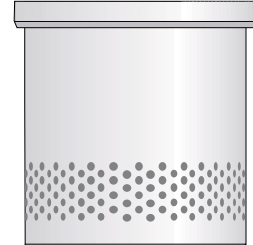
This optional cage reduces the maximum Cv and flow to 40% of the normal, full port valve. Used to provide body velocity control, future flow expandability, or to correct for oversized valve conditions.

ANTI-CAVITATION CAGE



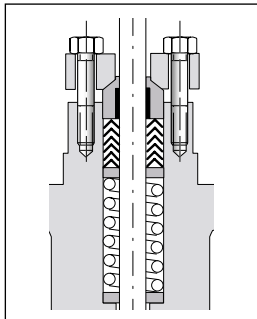
The Les-Cav cage controls the effects of valve cavitation providing a normal valve/trim life expectancy in cavitating conditions. Diametrically opposed holes, increase the valves cavitation index (Kc) and direct impinging flow to the center of the cage, preventing mechanical trim/body damage.

NOISE REDUCING CAGE



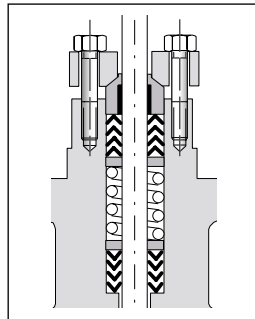
The Les-Sonic cage is designed to reduce fluid generated noise up to 10dBA in steam, gas or any compressible fluid service. When used in conjunction with a Les-Sonic silencing orifice, noise attenuations of 15-20dBA can be achieved.

PACKING CONFIGURATIONS



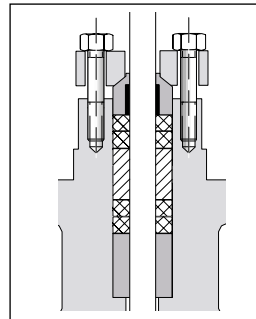
PTFE - V-RING

Live-loaded PTFE V-ring packing provides the most maintenance free stem seal. The V-ring packing is both pressure energized and live-loaded by a 304 stainless steel spring to automatically compensate for packing wear. Maximum service temperature is 460°F (238°C).



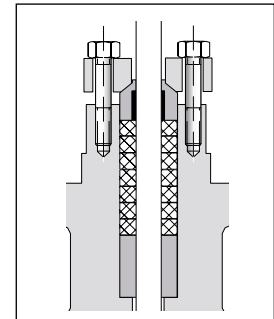
DOUBLE PTFE V-RING

Inverted sets of PTFE V-ring packing provide tight sealing in valves which may be controlling pressure or vacuum at different times. Maximum temperature 460°F (238°C).



HIGH TEMPERATURE LAMINATED GRAPHITE

Precision die-cut laminated graphite rings provide a reliable, tight stem seal to operating temperatures of 800°F (426°C).



BRAIDED TEFLON GRAPHITE

Split rings allow packing replacement without removal of actuator. Graphite impregnated PTFE provides 500°F (260°C) service temperature, better memory and sealing than pure PTFE rings, lowered stem hysteresis, and is ideal for fluids that contain suspended particles.

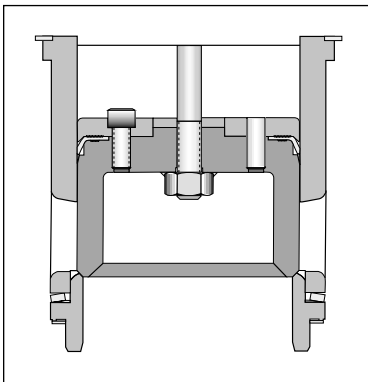
DBO(Y)(S)-3 TRIM MATERIAL SELECTION

Balanced Plug design allows line pressure under the plug to build up above the plug, effectively cancelling out any unbalanced stem force due to pressure. In addition to providing smooth, high pressure control, balanced plugs allow use of small, light, cost effective actuators. Class III, IV or VI shutoff can be provided.

The piston seal is critical to maintaining tight shutoff in any cage valve. The DBOY's heavy cupwasher style PTFE plug seal has three times the cross sectional area and wear surface of competitive valves. This provides tight shutoff longer than competitor's designs at both low and high pressures.

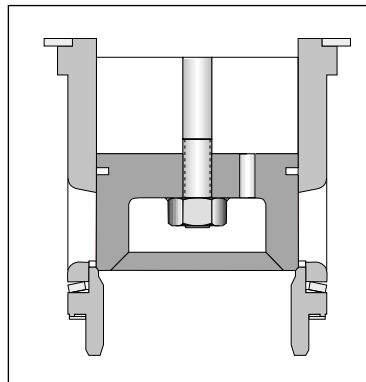
Trim	Maximum Service Temp.	Plug	Seat Ring	Stem	Gaskets	ANSI/ISA 70-2 Shutoff
Standard Balanced	500°F (260°C)	AISI 410 SS w/PTFE Seal	AISI Type 400 SS ¹	AISI Type 316 SS	Filled Type 304 SS	IV
High Temperature	800°F (426°C)	AISI 410 SS w/ Ni-Resist Seal	AISI Type 400 SS Stellite®	AISI Type 316 SS	Inconel Graphite	III
Soft-Seated	460°F (238°C)	AISI 410 SS w/PTFE Seal	AISI Type 400 SS w/PTFE Insert	AISI Type 316 SS	Filled Type 304 SS	VI

1. Stellite® seat optional. STELLITE® is a trademark of Stoodly Deloro Stellite, Inc.



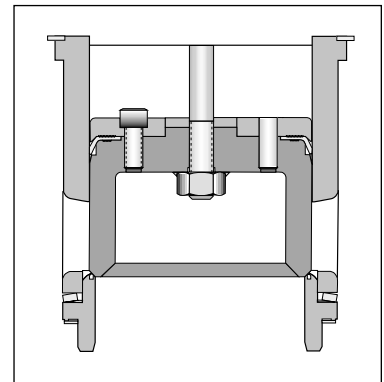
STANDARD BALANCED PLUG

Balanced plug design eliminates large stem forces allowing the use of small, cost-effective actuators. Provides smooth throttling control even at pressures to 1000 psi. Standard PTFE plug seal provides ANSI Class IV tight shutoff to temperatures of 500°F. (Flow over seat only)



HIGH-TEMP BALANCED PLUG

Balanced plug with high-temp ni-resist or carbon plug seal provides ANSI Class III shutoff at temperatures up to 800°F.



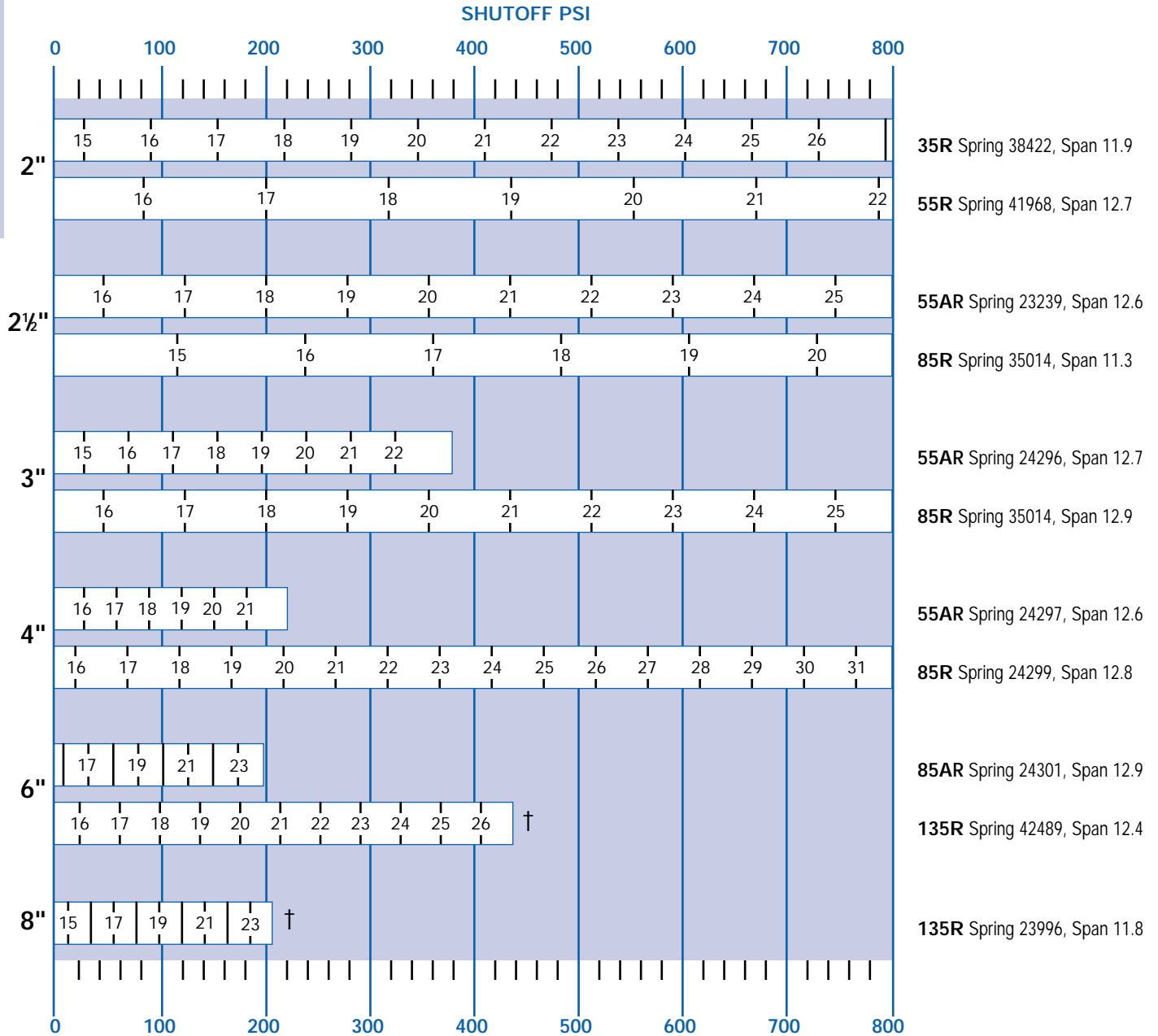
SOFT SEATED TRIM

Balanced plug with PTFE plug seal and an optional seat design with PTFE insert provide ANSI Class VI bubble tight shutoff at temperatures up to 460°F. (Flow over seat only)

DBO(Y)(S)-3 SHUTOFF TABLE - REVERSE ACTING

ACTUATOR SHUTOFF TABLE

LINEAR

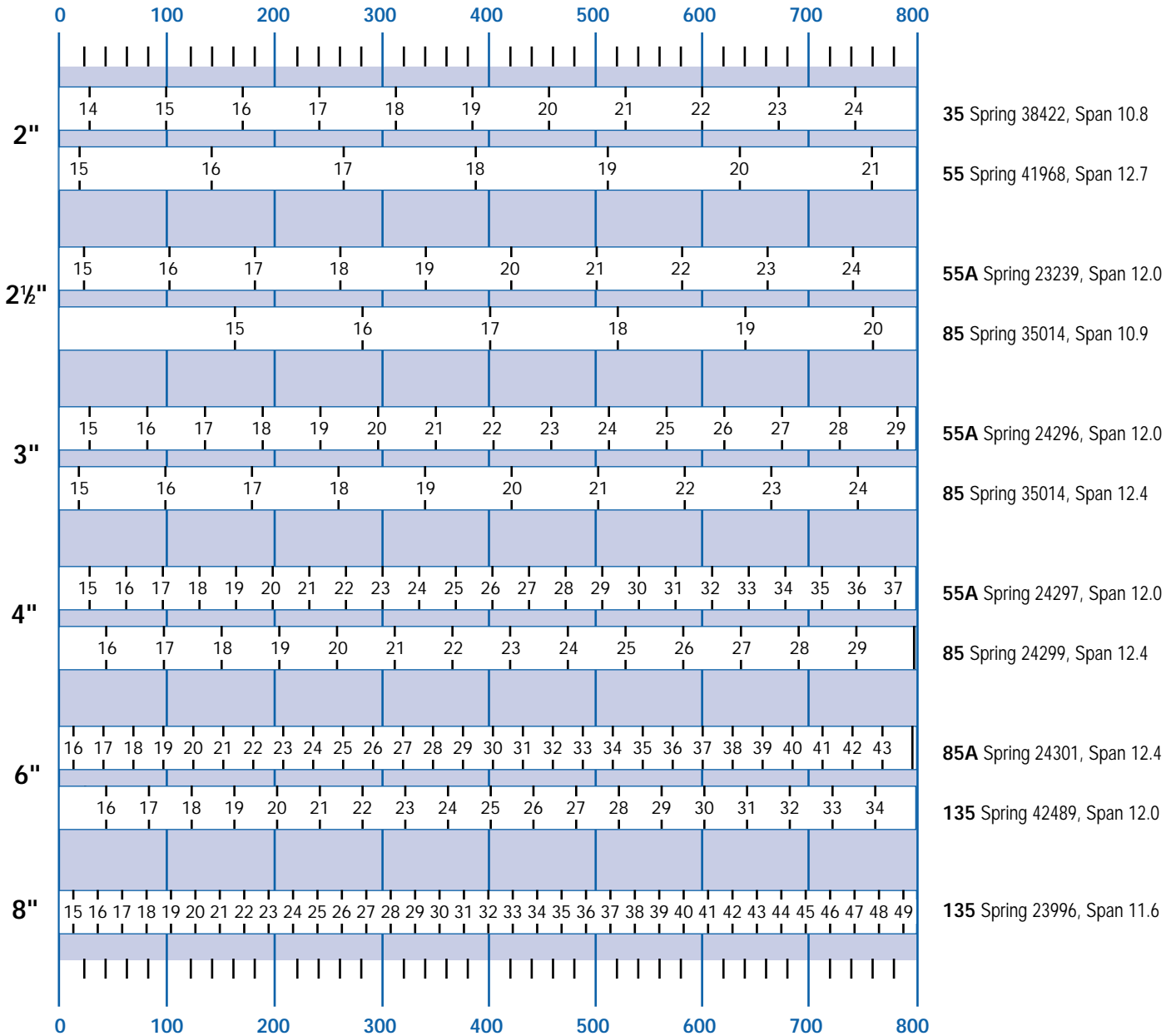


† For shutoff pressure above this value, consult factory.

DBO(Y)(S)-3 SHUTOFF TABLE - DIRECT ACTING

ACTUATOR SHUTOFF TABLE

SHUTOFF PSI



LINEAR

DBO(Y)(S)-3 SPECIFICATIONS

BODY ASSEMBLY:

Style: Single seated, top entry bolted bonnet, globe style body, cage guided balanced plug

ANSI Body Ratings:

Class 125 & 250 Cast Iron
Class 150, 300, & 600 Steel and Alloy Steel

BODY/BONNET MATERIALS:

Cast Iron, ASTM A126 Class B
Carbon Steel, ASTM A216 Gr WCB
Chrome Moly, ASTM A217 Gr WC9

SIZES:

2"-8" (50-200mm)

END CONNECTIONS:

ANSI Class all Integral Flanged, 2-8"
Threaded, NPT - 2" only, (ANSI 250 Cast Iron Bodies), (ANSI 600 Carbon Steel & Alloy Steel)
Socketweld - 2" only, (ANSI 600 Class)
Buttweld Ends
DIN Flanges: ND-16, ND-25, ND-40, ND-64, ND-100

BONNET:

Bolted Bonnet, Standard

BODY/BONNET BOLTING:

ASTM A-193 GRB7 Studs
ASTM A-194 GR2H Nuts

STEM PACKING:

PTFE V-Rings, -40 to 460°F(-22 to 238°C)
PTFE/Graphite, -40 to 500°F(-22 to 260°C)
Laminated Graphite, -320 to 800°F (-195 to 426°C)

PACKING STUDS, NUTS & FOLLOWER:

300 Series Stainless Steel

GASKETS:

Body/Bonnet and Seat Ring/Body:
Filled 304 stainless steel: 500°F (260°C) Max.
Inconel/Graphite: 800°F (426°C) Max.

TRIM SIZES:

Full Port
40% reduced
Custom, contact Leslie Application Engineering

PLUG (PISTON) SEAL MATERIALS:

Standard TFE/Graphite
max. temp. 500°F (Class IV shutoff)
Ni-Resist
max. temp. 800°F (Class III shutoff)

FLOW CHARACTERISTICS:

Modified Linear, Standard
Equal Percentage (w/ CAM
Characterized Positioner)

SHUTOFF CLASS (ANSI / ISA 70-2):

Standard trim, 0-500°F(-18 to 260°C)
Max. Class IV (.01% Cv)
Metal/PTFE seats - Class VI, bubble tight to 460°F (238°C)
High-temp trim, 0-800°F(-18 to 426°C),
Class III (.1% Cv)
For optional Class IV or V shutoff above 500°F, contact factory

TRIM MATERIAL COMBINATIONS:

See chart above

ACTUATORS:

Standard:
Spring and Diaphragm
Optional:
Piston, Double Acting/Spring Return
Hydraulic
Electric
Electro-Hydraulic

DBO(Y)(S)-3 Cv TABLE

Valve Size	Full Port		40% Red.		Les-Sonic		Les-Cav		Stroke (in.)	Seat Dia.	Unbalanced Area (in ²)
	Cv ¹	Range	Cv ¹	Range	Cv ¹	Range	Cv ¹	Range			
2	65	30:1	26	20:1	48	30:1	32	14:1	0.750	2.3	0.14
2½	90	40:1	36	25:1	70	40:1	40	17:1	0.875	2.9	0.18
3	125	40:1	50	25:1	97	40:1	63	20:1	1.00	3.5	0.21
4	205	50:1	82	30:1	156	50:1	103	25:1	1.25	4.6	0.28
6	435	50:1	174	30:1	349	50:1	217	25:1	2.00	6.9	0.42
8	760	50:1	304	30:1	579	50:1	304	25:1	2.75	9.2	0.56

1. Minimum Cv controllable is Cv from table divided by rangeability.

SIZING COEFFICIENTS

CASE TYPE	LIQUID		GAS
	F _L	K _C	X _T
Standard	.8	.65	.7
Les Cav	.9	.79	N/A
Les Sonic	N/A	N/A	.65

DBO(Y)(S)-3 ORDER CODE

Class	Material			Valve Size	End Conn.	Actuator	Bonnet Packing	Trim Form	Trim Mat'l.	Accessories
U	8	4	1	F	2	A	1	S	J	4
1	2	3	4	5	6	7	8	9	10	11

Class - Position 1 U	Actuator - Position 7 A = 35 B = 35R C = 35 HOD D = 35R HOD E = 55 ¹ F = 55R ¹ G = 55A H = 55AR ¹ I = 55 HOD ¹ J = 55R HOD ¹ K = 55A HOD ¹ L = 55AR HOD ¹ M = 85/85A ² N = 85R/85AR ² P = 85/85A HOD ² Q = 85R/85AR HOD ² R = 135 S = 135R T = 135 HOD U = 135R HOD V = 270 W = 270R X = w/o Actuator Y = 270 HOD Z = 270R HOD	Bonnet & Packing - Position 8 1 = Std. Bonnet, Braided Teflon® Graphite Pkg. 2 = Std. Bonnet, PTFE Pkg. 3 = Std. Bonnet, Laminated Graphite Pkg. 4 = Std. Bonnet, Double Teflon® Pkg.
Material - Position 2, 3 & 4 841 = Iron 843 = Carbon Steel 845 = Chrome Moly, WC9 XXX = Other	End Connection - Position 6 1 = Threaded 2 = Flanged 150 Steels Flanged 125 Iron 3 = Flanged 300 Steels Flanged 250 Iron 4 = SWE Steels 5 = BWE 40 Steels 6 = ND 16 Steels & Iron) 7 = ND 40 Steels ND 10 Iron (8" only) 8 = Flanged 600 Steels 9 = BWE 80 Steels 0 = ND 100 Steels A = RTJ 300 Steels B = RTJ 600 Steels C = SWE Sch. 80 Steels D = ND64 Steels	Trim Form - Position 9 S = Full Capacity T = Reduced 40% Capacity V = Les-Cav W = Les-Sonic
Valve Size - Position 5 F = 2 G = 2½ H = 3 J = 4 K = 6 L = 8		Trim Material - Position 10 J = Standard 400 SS L = Stellite® Hard Faced P = DBOS, Hi-Temp HF V = TFE Soft Seat
End Connection - Position 6 1 = Threaded 2 = Flanged 150 Steels Flanged 125 Iron 3 = Flanged 300 Steels Flanged 250 Iron 4 = SWE Steels 5 = BWE 40 Steels 6 = ND 16 Steels & Iron) 7 = ND 40 Steels ND 10 Iron (8" only) 8 = Flanged 600 Steels 9 = BWE 80 Steels 0 = ND 100 Steels A = RTJ 300 Steels B = RTJ 600 Steels C = SWE Sch. 80 Steels D = ND64 Steels	Accessories - Position 11 1 = 1 accessory 2 = 2 accessory 3 = 3 accessory 4 = 4 accessory 5 = 5 accessory 6 = 6 accessory 7 = 7 accessory 8 = 8 accessory 9 = 9 accessory 0 = 0 accessory	

DigiDBOY: Specify X for Actuator (Position 7) Specify Actuator, Mounting Kit and each option as a separate line item.
See page 39

1. 55/R used on 2" D(D)BOY(S)-3; 55A/AR used on 2½" - 4" valves.
2. 85A/AR used on 6" D(D)BOY(S)-3; 85/R used on 2½" - 4" valves.

Applications

FEEDWATER CONTROL regulates level of water in boiler drum. A 1 - 3 drum design is commonly based on HP, IP & LP applications. Valve receives water flow from pump and supplies water to drum to make up for that used to produce steam.

FEEDWATER RECIRCULATION valve insures that adequate flow is maintained through feedwater pump. The pump manufacturer calculates minimum flow required to prevent risk of premature pump failure due to bearings overheating or excessive thermal expansion of impeller blades.

AUXILIARY STEAM PRESSURE REDUCTION

- 1) Soot Blowers increase thermal efficiencies. Valve controls steam supplied to header from super heated source. PRV sees high pressure drop, intermittent operation and rapid load swings.
- 2) Building Heat, extraction steam control.
- 3) Pegging, Deaerators use super heated steam to heat and remove air from condensate normally closed against high differential pressure.

DRAIN VALVES, the presence of condensate in the turbine at startup or shutdown can be extremely damaging. As the steam temperature and pressure increase, the drain valves gradually throttle closed. These valves see a wide range of conditions, cool condensate followed by increasing temperature and pressure.

GLAND SEAL STEAM, valves are used to maintain constant steam pressure in gland to seal air from turbine. Application requires HP steam, throttling a low flow at high DP. Typically these valves operate in a split range mode. One pressure signal either loads or vents the gland.

ATTEMPERATOR SPRAY, SUPERHEAT, REHEAT - Spray Control valve, is used for controlling steam temperature to turbine. The purpose of valve is to maintain a tight temperature band resulting in maximum efficiency.

- 1) Superheat spray, low DP, turndown and accuracy are important.
- 2) Reheat spray, high DP, with Cavitation and seat leakage concerns as the valve operates close to the seat.

DBO(Y)(S)-3 Linear Valve Specification Form

LINEAR



CONTROL VALVE SPEC SHEET

Project/Job _____
 Unit/Customer _____
 P.O./LCO File # _____
 Item _____
 Contract _____
 MFR Serial# _____

Data Sheet _____ of _____
 Spec _____
 Tag _____
 Dwg _____
 Service _____

Fluid Steam Water Gas _____ Liquid _____ Crit Pres PC

Service Conditions

Flow #/hr gpm scfh _____
 Inlet Pressure psig psia _____
 Outlet Pressure psig psia _____
 Temperature °C °F _____
 Max Press/Temperature: _____ / _____
 Density/MW/SG _____ / _____ / _____
 Viscosity _____ CP
 Vapor Pressure psia _____
 Required C_v _____ Noise (dBA) Allowable _____

Max. Flow	Norm. Flow	Min. Flow	Shut-off Pressure

Line Info Pipe Size In _____ /Sch _____ Pipe Size Out _____ /Sch _____

Valve, Body & Bonnet

Body Size in. 2 2½ 3 4 6 8
 ANSI Class 125 150 250 300 600 Other _____
 Body/Bonnet Material: Cast Iron Cast Steel Cr Mo Other _____
 End Conn. Inlet/Outlet: NPT SWE BWE Sch. _____ Int. Flanges Other _____
 Packing Material: PTFE BTG Laminated Graphite DTFE Other _____

Trim Size 100% 40% Les-Cav Les-sonic Other _____

Actuator

Spring Action: Air to Open Air to Close Last Position Other _____ None
 Available Air Supply Pressure: Max. _____ Min. _____
 Manual Override: Yes No Type _____

Solenoid Yes No Type _____ Voltage _____

Positioner Yes No Type _____ Pneu E/P

Switch Yes No Type _____ Voltage _____

Air Set Yes No Type: _____ Range: _____

Other Accessories Yes No Type _____

Test ANSI/FCI Leakage Class: III IV V VI

QUESTIONS? CALL LESLIE CONTROLS @ (813) 978-1000 PLEASE FAX COMPLETED FORM TO: (813) 977-0174