

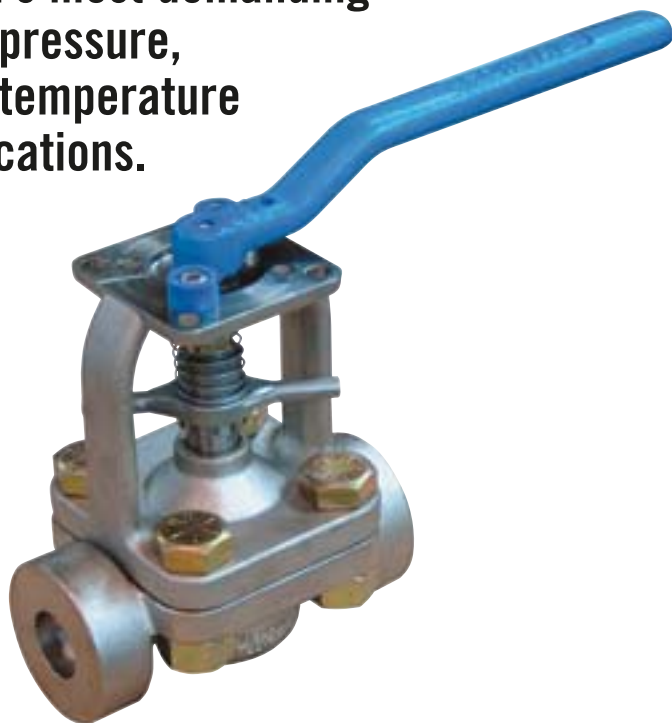


World Class Camseal Ball Valves

- *Metal Seat*
- *Zero Leakage*
- *Top Entry*
- *In-Line Servicing*



Conval Camseal Ball Valves
are designed for the
world's most demanding
high-pressure,
high-temperature
applications.



STANDARD SIZES

1/2" through 4" Top Entry
SW, BW and FNPT Ends

PRESSURE RATING

ASME Class 900 through 4500

STANDARD MATERIALS

Carbon Steel WCB, WC9, and C12A
Stainless Steel Cast 316/316L
Other materials available upon request

STANDARD ACCESSORIES

ISO-5211 Integral Mounting Pad
Actuators - Electric, Pneumatic or Hydraulic



DESIGN FEATURES

Camseal Ball Valve Provides Zero Leakage

Zero Body Leakage: The body/bonnet joint is not subject to pipeline stresses. There is no in-line body bolting to loosen and fatigue, so the body remains leak-free.

Zero Seat Leakage: All valves are capable of meeting zero bubbles for 4 minutes @ 50 psi and 1,000 psi Nitrogen at final factory hydrotest, after field in-line welding, following post-weld heat treat, during and after process thermal excursions including thermal shocks. Modular internals isolate critical seal surfaces from thermal effects..

Zero Stem Seal Leakage: Conval's exclusive Integral Gland Wrench concentrically loads the stem packing without tools, eliminating stem leaks and extending packing life. Live loading is available as an option.

Robust Stem-Ball Engagement

Reliable, accurate ball alignment is achieved due to the robust engagement between the one-piece stem and the ball.

Superior Bearing Support

Superior bearing support of the blowout-proof stem ensures proper axial alignment and Zero Seat Leakage even on actuated valves.

Chrome Carbide Coating System

Conval's highly-engineered flame spray Chrome Carbide coating system has superior bond strength and coating density to provide long-life, leak-free performance even in high temperature drop applications.

In-line Servicing

In-line renewability can be accomplished in 30 minutes and restores Zero Leakage performance in the event of process application abuse.

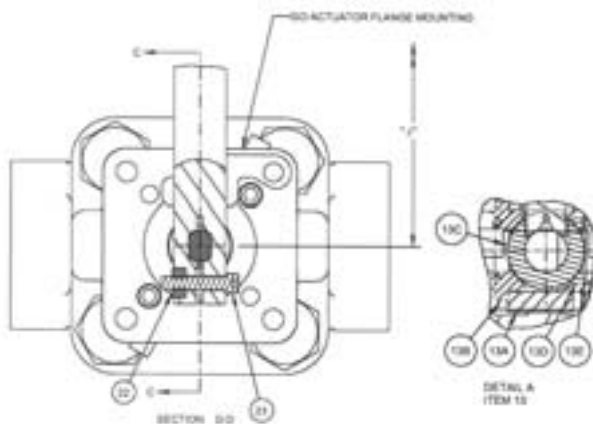
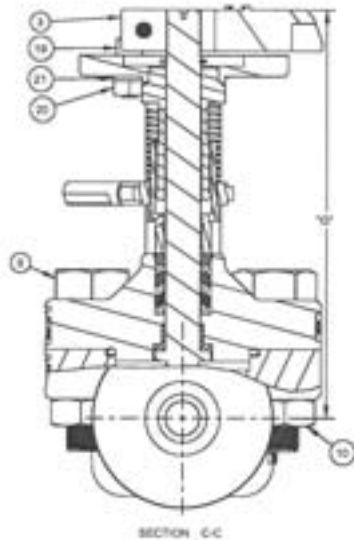
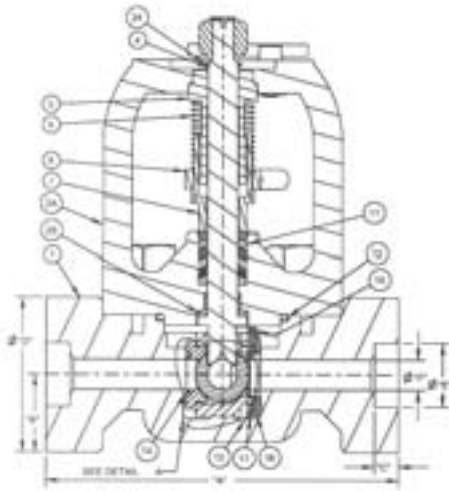
Integral Mounting Pad

An ISO-5211 integral mounting pad facilitates error-free, air, motor and gear operator actuation due to superior rigidity, precise alignment and a fully-guided stem bearing system. Lockout capability is standard.

Two-Year Warranty

Conval is committed to unsurpassed quality. We are so confident of the quality of our product, that we offer a two-year warranty.

CAMSEAL BALL VALVE LIST OF MATERIALS



NO.	NAME	QTY	MATERIAL	MATERIAL	MATERIAL	MATERIAL
1	BODY	1	ASME-SA-216 Gr. WCB	ASME-SA-217 Gr. WC9	ASME-SA-217 Gr. C12A	ASME-SA-351-CF3M/CF8M
2	BONNET ASSEMBLY	1				
2A	BONNET	1	ASME-SA-216 Gr. WCB	ASME-SA-217 Gr. WC9	ASME-SA-217 Gr. C12A	ASME-SA-351-CF3M/CF8M
2B	BONNET STEM BEARING	1	ASME-SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 410	AMS 5387
3	HANDLE	1	ASME-SA-216 Gr. WCB	ASME-SA-216 Gr. WCB	ASME-SA-216 Gr. WCB	ASME-SA-216 Gr. WCB
4	STEM	1	ASTM A582 TYPE 416	ASTM A582 TYPE 416	ASTM A582 TYPE 416	ASME SA479 TYPE XM-19H
5	BUSHING GLAND	1	ASME SB150	ASME SB150	ASME SB150	ASME SB150
6	IGW SPRING	1	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS
7	GLAND	1	ASTM A582 TYPE 416	ASTM A582 TYPE 416	ASTM A582 TYPE 416	ASME SA479 TYPE 316
8	IGW	1	AMS 5360, AMS 5370	AMS 5360, AMS 5370	AMS 5360, AMS 5370	AMS 5360, AMS 5370
9	BODY BOLT	SD	ASME SA193 B16	ASME SA193 B16	ASME SA193 B16	ASME SA193 B8M
10	BODY FLANGE NUT	SD	ASME SA194 GR 4	ASME SA194 GR 4	ASME SA194 GR 4	ASME SA194 GR 8M
11	PACKING SET	2	GARLOCK QUICK SET 9001 PACKING			
12	C-RING BONNET/BODY	1	ASTM B670	ASTM B670	ASTM B670	ASTM B670
13	CARTRIDGE ASSY	1				
13A	CARTRIDGE	1	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 316
13B	COATED SEAT	1	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME 5B637
13C	COATED BALL	1	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME 5B637
13D	UPSTREAM SEAT	1	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 316
13E	UPSTREAM SEAT BELLEVILLE		ASTM B670, AMS 5596	ASTM B670, AMS 5596	ASTM B670, AMS 5596	ASTM B670, AMS 5596
14	C-RING SEAT TO BODY	1	ASTM B670	ASTM B670	ASTM B670	ASTM B670
15	CAM	2	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE 410	ASME SA479 TYPE XM-19H
16	CAM LOCK	1	ASME SA240 TYPE 316	ASME SA240 TYPE 316	ASME SA240 TYPE 316	ASME SA240 TYPE 316
17	SPACER	1	ASME 5B637	ASME 5B637	ASME 5B637	ASME 5B637
18	CAM BELLEVILLE	1	ASTM B670, AMS 5596	ASTM B670, AMS 5596	ASTM B670, AMS 5596	ASTM B670, AMS 5596
19	STOP BOLT	2	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS
20	STOP NUT	2	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS
21	STOP LOCK WASHER	2	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS	MFR STD STAINLESS
22	HANDLE NUT	1	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
23	HANDLE BOLT	1	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
24	SNAP RING STEM RETAINER	1	MFR STD	MFR STD	MFR STD	MFR STD

Note: Stainless Steel Item 23 – key material shown (Nitronic 50) supplied for Inconel 718 stems. Key material not shown (Nitronic 60) supplied for Nitronic 50 stems.

SIZE		ASME	INCHES							LBS.		CV
SIZE	CODE	CLASS	A	B	C	D	E	F	G	J	WEIGHT	
1/2 THRU 1 1/2	5E	1700# 3100#	7 1/4	1 5/8		3 1/4	-	5/8	7 3/8	15 3/16	30 1/4	14-42*
1/2 THRU 1 1/4	7E	4500#	9 1/4	2		4	-	5/8	10 5/32	24 3/16	60	
2 THRU 2 1/2	7H	1700# 3100#	9 1/4	2		4	-	1 1/16	10 5/32	24 3/16	62	37-71*
1 1/2 THRU 4	9H	4500#	11	2 11/32	-	4 11/16	-	1 1/16	11 1/2	32	100	
3 THRU 4 (BW ONLY)	9J	1700# 3100#	11	2 11/32		4 11/16		1 1/2	11 1/2	32	112	69-107*

SIZE	ASME		MILLIMETERS								KG	CV
SIZE	CODE	CLASS	A	B	C	D	E	F	G	J	WEIGHT	
1/2 THRU 1 1/2	5E	1700# 3100#	184	41	- -	83	-	16	187	386	13.7	14-42*
1/2 THRU 1 1/4	7E	4500#	235	51	-	102	-	16	258	614	27.2	
2 THRU 2 1/2	7H 3100#	1700#	235	51	-	102	-	27	258	614	28.1	37-71*
1 1/2 THRU 4	9H	4500#	279	60	-	119	-	27	292	813	45.4	
3 THRU 4 (BW ONLY)	9J	1700# 3100#	279	60	-	119	-	38	292	813	50.8	69-107*

*The first number represents the Practical Cv based on pipe ID, the second number represents the Max Cv of the valve.

CAMSEAL BALL VALVE PRESSURE/TEMPERATURE CHARTS

Cast WCB

B16.34-2004 Standard Class (Table 2-1.1A)

TEMP F	1700	3100	4500
100	4198	7652	11110
200	3847	7014	10185
300	3706	6760	9815
400	3592	6548	9505
500	3417	6230	9040
600	3218	5866	8515
650	3111	5675	8240
700	3017	5486	7960
750	2874	5244	7610
800	2330	4252	6170

Cast WC9

B16.34-2004 Standard Class (Table 2-1.10A)

TEMP F	1700	3100	4500
100	4250	7652	11110
200	4250	7014	10185
300	4126	6760	9815
400	4000	6548	9505
500	3768	6230	9040
600	3428	5866	8515
650	3333	5675	8240
700	3218	5486	7960
750	3014	5244	7610
800	2878	4252	6170
850	2760	5034	7305
900	2545	4644	6740
950	2188	3993	5795
1000	1514	2764	4010
1050	991	1806	2625
1100	623	1134	1645

Cast C12A

B16.34-2004 Standard Class (Table 2-1.15A)

TEMP F	1700	3100	4500
100	4250	7750	11250
200	4250	7750	11250
300	4126	7527	10925
400	4000	7292	10585
500	3768	6868	9965
600	3428	6249	9070
650	3333	6018	8825
700	3218	5866	8515
750	3014	5492	7970
800	2878	5244	7610
850	2760	5034	7305
900	2545	4644	6740
950	2188	3993	5795
1000	2062	3756	5450
1050	2040	3720	5400
1100	1711	3118	4525
1150	1263	2302	3345
1200	816	1488	2160

Cast CF3M/CF8M Dual Rated

B16.34-2004 Standard Class (Table 2-2.2A)

TEMP F	1700	3100	4500
100	4080	7440	10800
200	3508	6399	9290
300	3168	5779	8390
400	2912	5308	7705
500	2708	4936	7165
600	2556	4663	6770
650	2504	4564	6625
700	2460	4489	6515
750	2420	4415	6410
800	2392	4365	6335
850	2368	4316	6265
900	2352	4291	6230
950	2188	3993	5795
1000	2062	3756	5450

Cast WCB

B16.34-2004 Special Class (Table 2-1.1B)

TEMP F	1700	3100	4500
100	4250	7750	11250
200	4250	7750	11250
300	4194	7651	11105
400	4153	7572	10995
500	4153	7572	10995
600	4153	7572	10995
650	4052	7391	10730
700	3916	7142	10365
750	3593	6554	9515
800	2913	5314	7715

Cast WC9

B16.34-2004 Special Class (Table 2-1.10B)

TEMP F	1700	3100	4500
100	4250	7750	11250
200	4250	7750	11250
300	4188	7639	11090
400	4125	7520	10915
500	4103	7484	10865
600	4086	7452	10815
650	4057	7396	10735
700	4007	7308	10605
750	4007	7308	10605
800	4007	7308	10605
850	3837	7000	10160
900	3400	6200	9000
950	2674	4872	7070
1000	1893	3454	5015
1050	1240	2258	3280
1100	777	1418	2055

Cast C12A

B16.34-2004 Special Class (Table 2-1.15B)

TEMP F	1700	3100	4500
100	4250	7750	11250
200	4250	7750	11250
300	4250	7750	11250
400	4250	7750	11250
500	4250	7750	11250
600	4250	7750	11250
650	4250	7750	11250
700	4154	7576	10995
750	4130	7528	10930
800	4080	7440	10800
850	3837	7000	10160
900	3400	6200	9000
950	2674	4872	7070
1000	2385	4347	6310
1050	2385	4347	6310
1100	2137	3898	5655
1150	1580	2878	4180
1200	1020	1860	2700

Cast CF3M/CF8M Dual Rated

B16.34-2004 Standard Class (Table 2-2.2B)

TEMP F	1700	3100	4500
100	4250	7750	11250
200	3916	7142	10365
300	3536	6448	9360
400	3247	5923	8600
500	3020	5507	7995
600	2855	5203	7555
650	2793	5092	7395
700	2748	5009	7270
750	2703	4928	7150
800	2670	4872	7070
850	2641	4817	6990
900	2624	4787	6950
950	2595	4732	6870
1000	2385	4347	6310

Cast WCB

B16.34-2004 Limited Class per Annex V-2.1.3

TEMP F	1700	3100	4500
100	4250	7750	11250
200	4250	7750	11250
300	4194	7651	11105
400	4153	7572	10995
500	4153	7572	10995
600	4153	7572	10995
650	4052	7391	10730
700	3916	7142	10365
750	3593	6554	9515
800	2913	5314	7715

Cast WC9

B16.34-2004 Limited Class per Annex V-2.1.3

TEMP F	1700	3100	4500
100	4250	7750	11250
200	4250	7750	11250
300	4116	7639	11090
400	4125	7520	10915
500	4103	7484	10865
600	4086	7452	10815
650	4057	7396	10735
700	4007	7308	10605
750	4007	7308	10605
800	4007	7308	10605
850	3837	7000	10160
900	3400	6200	9000
950	2744	5120	7556
1000	2052	4047	6213
1050	1344	2646	4064
1100	842	1661	2546

Cast C12A

B16.34-2004 Limited Class per Annex V-2.1.3

TEMP F	1700	3100	4500
100	4250	7750	11250
200	4250	7750	11250
300	4250	7750	10925
400	4250	7750	11250
500	4250	7750	11250
600	4250	7750	11250
650	4250	7750	11250
700	4154	7576	10995
750	4130	7528	10930
800	4080	7440	10800
850	3837	7000	10160
900	3400	6200	9000
950	2744	5120	7556
1000	2585	5015	7556
1050	2585	5015	7556
1100	2316	4568	7006
1150	1712	3373	5179
1200	1105	2180	3345

Cast CF3M/CF8M Dual Rated

B16.34-2004 Limited Class per Annex V-2.1.3

TEMP F	1700	3100	4500
100	4250	7750	11250
200	3914	7135	10365
300	3536	6448	9360
400	3247	5923	8600
500	3020	5507	7995
600	2855	5203	7555
650	2793	5092	7395
700	2748	5009	7270
750	2703	4928	7150
800	2670	4872	7070
850	2641	4817	6990
900	2624	4787	6950
950	2595	4732	6870
1000	2385	4347	6310

Note: Flanged and threaded end valve ratings terminate at 1000°F and at 2500 Class. Flanged end valves may only be standard rated, not immediate rated.
Special Class ratings not applicable to flanged end valves. Threaded end valve ratings terminate at 1000°F and at 2500 Class.
Limited class ratings not applicable to flanged end valves. Threaded end valve ratings terminate at 1000°F and at 2500 Class.

CAMSEAL BALL VALVES

DESIGN VALIDATION AND COMPARISON TESTING

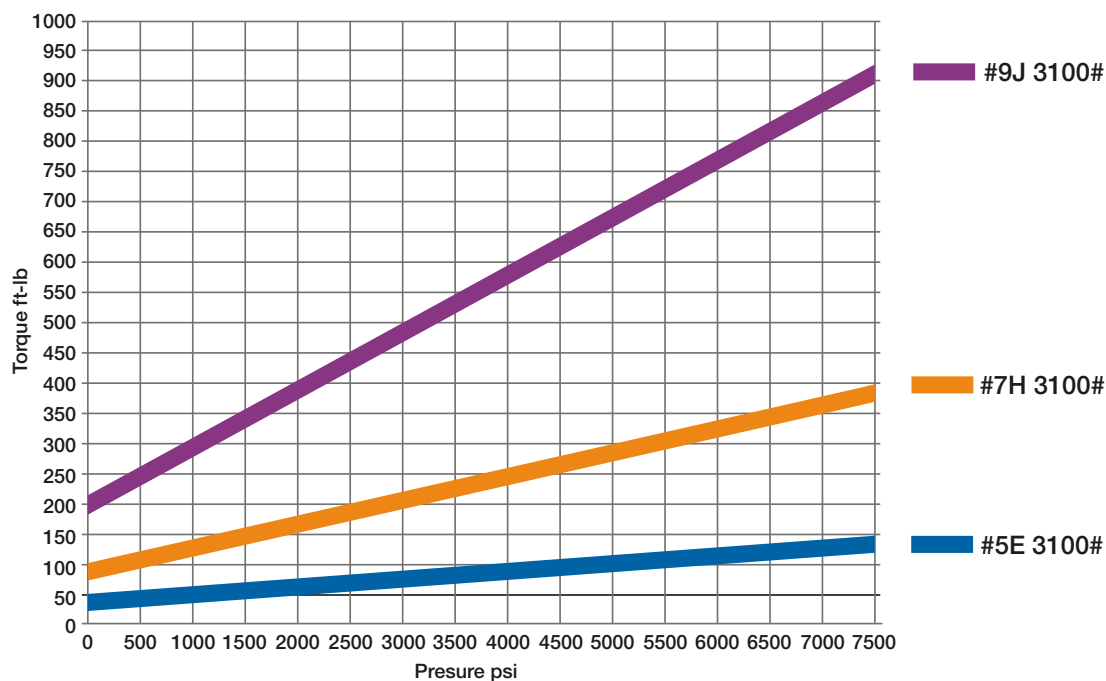
The Camseal Ball Valve has been subjected to extremely rigorous computer-aided analysis, laboratory and field testing during its development. Not only were benchmarks established against which performance was measured, but evaluation valves manufactured by competitors were also tested alongside the Camseal Ball Valve. A summary of the design validation and comparison testing is given below.

- CAD 3D-Finite Element Analysis was used to evaluate all strains and stresses associated with the Camseal Ball Valve. Though the design meets ASME B16.34, Conval's rigorous approach verified pressure boundary integrity, including all body and bonnet sections that are not directly defined by the code.
- CAD 3D-Thermal Modeling facilitated the design process by pictorially displaying thermal parameters and heat transfer to the ISO-5211 Mounting Pad. Subsequent lab and field testing validated the design and the model.
- CAD 3D-Flow Modeling software was used to streamline internal waterway sections and maximize Cv and flow efficiency.
- Sophisticated Thermal Spray coating, grinding and lapping techniques were proven through Nitrogen leak testing. The Camseal Ball Valve exhibits Zero Leakage from final inspection through pipeline welding and post weld heat treat. Zero bubble leak performance was subsequently verified during numerous positive and negative thermal gradients and at elevated temperatures above 1100° F and again at 70° F.
- Competitive valves subjected to the same rigorous thermal cycling leaked badly and continued to leak badly once back at room temperature.
- In addition to in-house lab and field testing, steam blow-down tests at a high-pressure steam laboratory were performed. In total, over 100 thermal cycles, 100 blow-down cycles and several hundred operational cycles were logged without degradation to the original Zero-Leakage integrity.

After manufacture, every valve undergoes pressure testing per ASME B 16.34 in addition to special, zero-bubble Nitrogen ball to seat leak tests.

All valves are manufactured under a sophisticated Quality Management System covered by one of the following Certifications: ISO-9000-2000, 10CFR50, Appendix B nuclear, ASME N- and NPT-Stamp nuclear; and CE marking per the European Pressure Equipment Directive (PED).

3100# CAMSEAL BALL VALVE TORQUE CHART



The Conval Story

In 1962, Mr. Chester Siver completed designs for a revolutionary line of high-pressure, forged steel valves. Hamilton Standard (now Hamilton Sunstrand), a division of United Technologies Corporation, was asked to use their then-new Electron Beam Welding technology for joining of parts into valves for subassemblies. Hamilton Standard became intrigued with the valve as an ideal application of the Electron Beam Welding technique, and negotiated a contract for the rights to manufacture and sell the valve. Mr. Siver served as manager of the valve project.



The first CLAMPSEAL® valves were introduced to the market by Hamilton Standard in 1964. However, in the mid-1960's, growing demand for the firm's popular aerospace products forced Hamilton Standard to make the decision to abandon its industrial products projects. The rights to the CLAMPSEAL valve reverted back to Mr. Siver. Since CLAMPSEAL valves were born in Connecticut, Mr. Siver founded "Conval" (short for Connecticut Valve) in 1967. Today, the valves are still manufactured in Connecticut, a state with a longstanding reputation for technological innovation and manufacturing excellence.

Conval celebrated its 40th anniversary in 2007 with the launch of the new Camseal Ball Valve. Conval has grown into a leader in valves for the world's most demanding applications. We have a global team of experts to help to meet your most challenging needs. We invite you to contact us today.

High-pressure, high-temperature ball, bellows, bonnetless, check, gate, globe, throttling, and urea service valves for the world's most demanding applications.



1967-2007

Celebrating 40+ years of excellence!

Thank you for your business.



MADE IN USA

***ISO 9001 certified since
September 11, 1992***



World Headquarters: 265 Field Road P.O. Box 1049, Somers, CT 06071-1049 USA

Phone (860) 749-0761 Fax (860) 763-3557

e-mail: sales@Conval.com www.Conval.com

Conval's policy is one of continuous development and improvement. Every effort is made to produce up-to-date literature but this catalog should not be regarded as an infallible guide to current specifications and does not form part of any contract. Conval reserves the right to make product improvements and changes without prior notice.