Conval INC.

World Class Camseal® Metal-Seated Ball Valves

- *Unique Zero Leakage Design*
- *Top Quality Manufacturing*
- *Long, Reliable Life Cycle*
- *Top Entry Design for In-Line Maintenance & Repair*
- *Enormous Savings in Labor, Materials & Downtime*



Camseal® Metal-Seated, Cartridge-Style, Top Entry, Zero Leakage Ball Valves save significant time and money on installation, maintenance, replacement and downtime.

STANDARD SIZES
1/2" through 4" Top Entry
SW, BW, FNPT and a variety of ends
TDP-1-2013 compliant and full port valves available

PRESSURE RATING
ASME Class up to 4500

STANDARD MATERIALS
Carbon Steel SA-105
Stainless Steel SA-182-F316/F316L
Alloy SA-182-F22 Cl.3, SA-182-F91
Other materials available upon request

STANDARD ACCESSORIES
ISO-5211 Integral Mounting Pad
Actuators - Electric, Pneumatic or Hydraulic, Gear Operator





CE

N

ISO 9001

NPT

Canadian Registration Numbers for all provinces

DESIGN FEATURES

Conval Camseal Ball Valve Provides Zero Leakage

Zero Body Leakage: The body/bonnet bolting for the top entry design is not susceptible to pipeline stresses – precluding the potential for leakage.

Zero Seat Leakage: Conval's Camseal has been type-tested using high pressure Nitrogen gas, achieving zero bubbles in four minutes. The result is industry leading performance with every valve and the longest in-service life compared to competitive brands.

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.

Cartridge-style Top Entry

With top entry access, maintenance and replacement of the cartridge internals are very convenient, with no effect on existing piping and welds.

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.

Stem-Ball Alignment

The easy to read Position Indicator Disc (patent pending) increases the visibility and accuracy of stem and ball alignment into the valve seat. This is especially important when adding an actuator to a valve or resetting valve actuation. It is also critical in severe applications such as steam where positive, sustainable shutoff is critical and even slight misalignments will compromise the ball/seat sealing band. This indicator eliminates the need for costly and multiple manufacturing features that have traditionally been used with less accuracy. The indicator is self-securing to the stem; no set screws are required.

In-line Servicing

In-line renewability can be accomplished in 30 minutes and restores Zero Leakage performance.

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® is a registered trademark of Conval, Inc.
United States Patent No. 7,267,323

Plant managers, engineers and maintenance personnel appreciate these practical Camseal benefits.



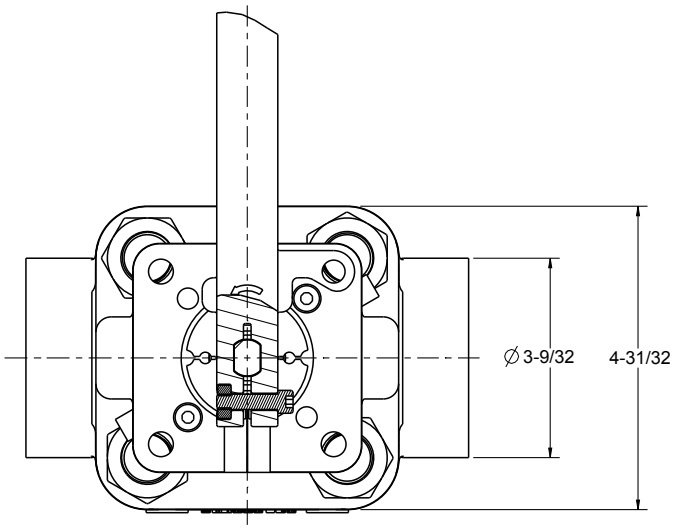
+ ***Single forged body:*** The top entry, single forged body design effectively eliminates the potential for leakage as a function of pipe line stresses, unlike two-piece, end-entry or side-entry designs.
+ ***Patented cartridge design:*** The cartridge design allows for in-line welding and stress relieving without concern for seat distortion and eventual leakage.
+ ***Top entry design:*** The top entry design allows for rebuilding the valve to as-new condition without any welding or stress relieving, typically within 30 minutes.
+ ***5-ring chevron style packing set:*** The robust 5-ring packing set allows for trouble-free performance, longer packing life, and zero emissions.
+ ***Integral gland wrench (IGW):*** The IGW allows for easy packing adjustments and locking the packing in place, so system vibration cannot loosen the packing gland (concentric 360 degree packing load). Live-loaded packing option is also available.
+ ***Stem-ball alignment:*** The increased visibility of an easy-to-read stem and ball alignment indicator is an additional benefit to the end user that ensures accurate instrumentation adjustment during automation.
+ ***Proprietary coating and finishing:*** The advanced coating and finishing methods allow for longer, more reliable performance through thermal cycles, operational cycles and erosive system fluids.
+ ***ISO-5211 configuration and bearing guided stem:*** The ISO-5211 mounting configuration and bearing-guided stem assure precise actuation alignment and minimize side loading of the stem, leading to extended packing life and superior repeatability.

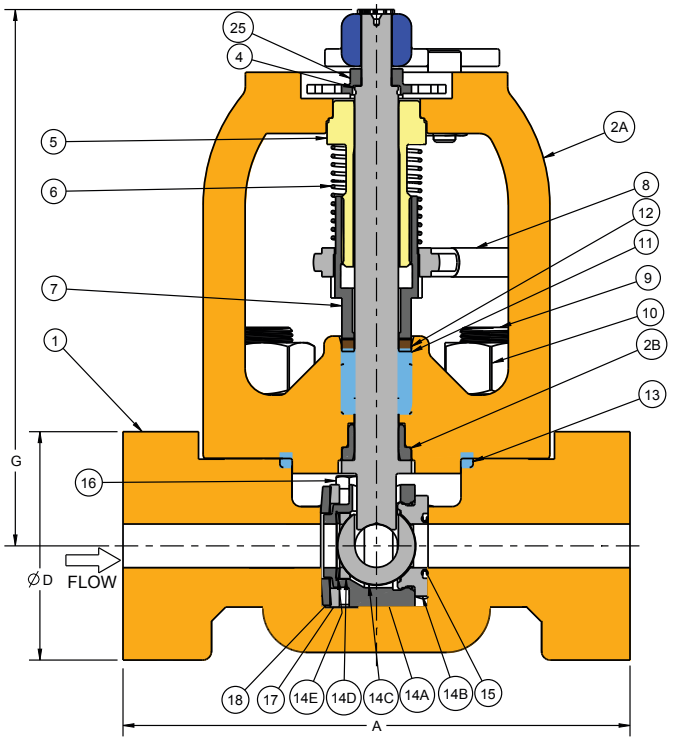


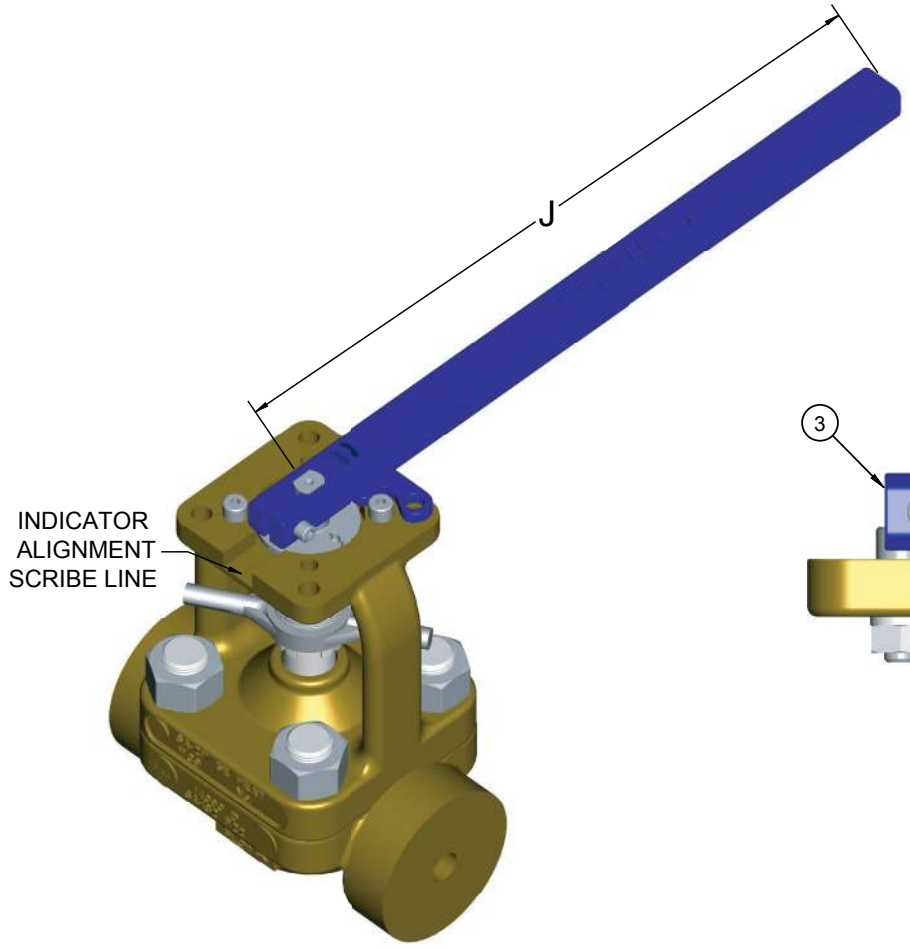


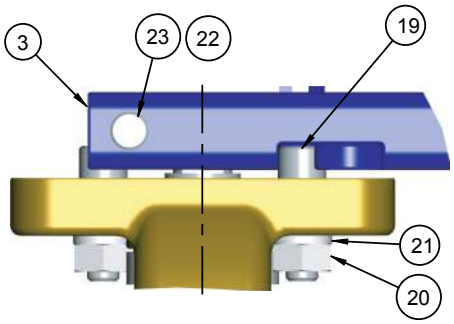
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Add it all up, and you've got a superior ball valve for the world's most demanding high-pressure, high-temperature applications.


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ALIGNMENT
SCRIBE LINE


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CAMSEAL® BALL VALVE LIST OF MATERIALS

LIST OF MATERIALS FOR 1700# AND 3100# VALVES

NO.	NAME	QTY	MATERIAL			
1	BODY	1	ASME SA-105	ASME SA-182 F22	ASME SA-182 F91	ASME SA-182 F316
2	BONNET ASSEMBLY	1	SEE MATERIALS BELOW			
2A	BONNET	1	ASME SA-216 Gr WCB	ASME SA-217 Gr WC9	ASME SA-217 Gr C12A	ASME SA-351 Gr CF3M
2B	BONNET STEM BUSHING****	1	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	AMS 5387 STELLITE #6
3	HANDLE*	1	ASME SA-216 Gr WCB			
4	STEM**	1	ASTM A582 TYPE 416	ASME SB637 UNS N07718	ASME SB637 UNS N07718	ASME SB637 UNS N07718
5	BUSHING	1	ASME SB150 ALUMINUM BRONZE			
6	IGW SPRING	1	MFR STANDARD STAINLESS			
7	GLAND	1	ASTM A582 TYPE 416	ASTM A582 TYPE 416	ASTM A582 TYPE 416	ASME SA-479 TYPE 316
8	INTEGRAL GLAND WRENCH (IGW)	1	MFR STANDARD STAINLESS			
9	BODY STUD*	SD	ASME SA193 Gr B16	ASME SA193 Gr B16	ASME SA193 Gr B16	ASME SA193 Gr 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	1	BRAIDED & DIE-MOLDED FLEXIBLE GRAPHITE			
12	PACKING SPACER	1	ASME SA-479 UNS S21800 (NITRONIC 60)			
13	BODY/BONNET SEAL***	1	316 SST/FLEXIBLE GRAPHITE LAMINATE			
14	CARTRIDGE ASSEMBLY	1	SEE MATERIALS BELOW			
14A	CARTRIDGE	1	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	ASME SA-479 TYPE 316
14B	COATED SEAT	1	ASME SB637 UNS N07718/CHROME CARBIDE			
14C	COATED BALL	1	ASME SB637 UNS N07718/CHROME CARBIDE			
14D	UPSTREAM SEAT	1	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	AMS 5387 STELLITE #6
14E	UPSTREAM SEAT BELLEVILLE	1	ASME SB637 UNS N07718			
15	SEAT/BODY SEAL (C-RING)	1	ASTM B670 PLATED			
16	CAM	1	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	ASME SA-479 TYPE 410	ASME SA-479 UNS S20910
17	SPACER	1	ASME SB637 UNS N07718			
18	CAM BELLEVILLE	1	ASME SB637 UNS N07718			
19	STOP BOLT*	1	MFR STANDARD STAINLESS			
20	STOP NUT*	1	MFR STANDARD STAINLESS			
21	STOP LOCK WASHER*	1	MFR STANDARD STAINLESS			
22	HANDLE NUT*	1	MFR STANDARD CARBON STEEL			
23	HANDLE BOLT*	1	MFR STANDARD ALLOY STEEL			
24	SNAP RING STEM RETAINER*	1	MFR STANDARD			
25	POSITION INDICATOR DISC	1	ANODIZED ALUMINUM ALLOY T6061			

* SD = SIZE DEPENDENT

** FOR 4500#, STEM IS ASME SB637 UNS N07718 (INCONEL 718)

*** FOR 4500#, BODY/BONNET SEAL IS ASTM B670 PLATED

**** FOR 4500#, STEM BUSHING IS AMS 5387 STELLITE #6

			INCHES						LBS
PIPE SIZE(S)	CODE	ASME CLASS	A	B	D	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
1/2 THRU 1-1/4	7E	4500#	9 1/4	2	4	5/8	10 5/32	24 3/16	62
1/2 THRU 1-1/2	5F	2700#	7 1/4	1 5/8	3 1/4	3/4	10 5/16	24 3/16	30
2 THRU 2-1/2	7H	1700# 3100#	9 1/4	2	4	1 1/16	10 5/32	31 5/8	62
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
3 THRU 4 (BW ONLY)	9K	1700#	11	2 11/32	4 11/16	1 15/16	11 1/2	32	180
2-1/2 & 3 THRU 4" (BW ONLY)	10K	3100#	17 3/4	3 1/8	4 3/4	1 15/16	13 1/2	(2)	233
2-1/2 & 3 THRU 4" (BW ONLY)	10L	1700#	17 3/4	3 1/8	4 3/4	2 1/4	13 1/2	(2)	250
2-1/2 & 3 THRU 4" (BW ONLY)	10N	600#	14	4	4 3/4	2 29/32	20 3/8	(2)	261

			MILLIMETERS						KG
PIPE SIZE(S)	CODE	ASME CLASS	A	B	D	F	G	J	WEIGHT
DN15 THRU DN40	5E	1700# 3100#	184	42	83	16	187	386	13.7
DN15 THRU DN32	7E	4500#	235	51	102	16	258	614	28.1
DN15 THRU DN40	5F	2700#	184	42	83	19	262	614	13.6
DN50 THRU DN65	7H	1700# 3100#	235	51	102	27	258	803	28.1
DN40 THRU DN100	9H	4500#	279	60	119	27	292	813	45.4
DN80 THRU DN100 (BW ONLY)	9J	1700# 3100#	279	60	119	38	292	813	50.8
DN80 THRU DN100 (BW ONLY)	9K	1700#	279	60	119	49	292	813	81.6
DN65 & DN80 THRU DN100 (BW ONLY)	10K	3100#	451	79	121	49	342	(2)	105.7
DN65 & DN80 THRU DN100 (BW ONLY)	10L	1700#	451	79	121	59	342	(2)	113.4
DN65 & DN80 THRU DN100 (BW ONLY)	10N	600#	356	102	121	74	517	(2)	118.4

(1) 9J and 9K standard offering has a gear box with a handwheel, and as an option can be ordered with the handle and its associated hardware.

(2) 10K, 10L and 10N must be supplied with a gear box with handwheel to operate.

CAMSEAL® BALL VALVE WORKING PRESSURE BY CLASS, PSIG

BODY IS FORGED WITH SA-182-F22 Cl.3, YOKE/BONNET ARE CAST WITH SA 217-WC9

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °F	1700	3100	4500	1700	3100	4500	1700	3100	4500
-20 TO 100	4250	7750	11250	4250	7750	11250	4250	7750	11250
200	4250	7750	11250	4250	7750	11250	4250	7750	11250
300	4126	7527	10925	4188	7639	11090	4188	7639	11090
400	4000	7292	10585	4125	7520	10915	4125	7520	10915
500	3768	6868	9965	4103	7484	10865	4103	7484	10865
600	3428	6249	9070	4086	7452	10815	4086	7452	10815
650	3333	6081	8825	4057	7396	10735	4057	7396	10735
700	3218	5866	8515	4007	7308	10605	4007	7308	10605
750	3014	5492	7970	4007	7308	10605	4007	7308	10605
800	2878	5244	7610	4007	7308	10605	4007	7308	10605
850	2760	5034	7305	3837	7000	10160	3837	7000	10160
900	2545	4644	6740	3400	6200	9000	3400	6200	9000
950	2188	3993	5795	2674	4872	7070	2744	5120	7556
1000	1514	2764	4010	1893	3454	5015	2052	4047	6213
1050	991	1806	2625	1240	2258	3280	1344	2646	4064
1100	623	1134	1645	777	1418	2055	842	1661	2546
1200	233	426	615	290	532	770	314	623	954

BODY IS FORGED WITH SA-182-F91, YOKE/BONNET ARE CAST WITH SA 217-C12A

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °F	1700	3100	4500	1700	3100	4500	1700	3100	4500
-20 TO 100	4250	7750	11250	4250	7750	11250	4250	7750	11250
200	4250	7750	11250	4250	7750	11250	4250	7750	11250
300	4126	7527	10925	4250	7750	11250	4250	7750	11250
400	4000	7292	10585	4250	7750	11250	4250	7750	11250
500	3768	6868	9965	4250	7750	11250	4250	7750	11250
600	3428	6249	9070	4250	7750	11250	4250	7750	11250
650	3333	6081	8825	4250	7750	11250	4250	7750	11250
700	3218	5866	8515	4154	7576	10995	4154	7576	10995
750	3014	5492	7970	4130	7528	10930	4130	7528	10930
800	2878	5244	7610	4080	7440	10800	4080	7440	10800
850	2760	5034	7305	3837	7000	10160	3837	7000	10160
900	2545	4644	6740	3400	6200	9000	3400	6200	9000
950	2188	3993	5795	2674	4872	7070	2744	5120	7556
1000	2062	3756	5450	2385	4347	6310	2585	5015	7556
1050	2040	3720	5400	2385	4347	6310	2585	5015	7556
1100	1711	3118	4525	2137	3898	5655	2316	4568	7006
1150	1263	2302	3345	1580	2878	4180	1712	3373	5179
1200	816	1488	2160	1020	1860	2700	1105	2180	3345

BODY IS FORGED WITH SA 105, YOKE/BONNET ARE CAST WITH SA 216-WCB

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °F	1700	3100	4500	1700	3100	4500	1700	3100	4500
-20 TO 100	4198	7652	11110	4250	7750	11250	4250	7750	11250
200	3847	7014	10185	4250	7750	11250	4250	7750	11250
300	3706	6760	9815	4194	7651	11105	4194	7651	11105
400	3592	6548	9505	4153	7572	10995	4153	7572	10995
500	3417	6230	9040	4153	7572	10995	4153	7572	10995
600	3218	5866	8515	4153	7572	10995	4153	7572	10995
650	3111	5675	8240	4052	7391	10730	4052	7391	10730
700	3017	5486	7960	3916	7142	10365	3916	7142	10365
750	2874	5244	7610	3593	6554	9515	3593	6554	9515
800	2330	4252	6170	2913	5314	7715	2913	5314	7715

BODY IS FORGED WITH SA 182-F316, BODY/BONNET ARE CAST WITH SA 351-CF8M

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °F	1700	3100	4500	1700	3100	4500	1700	3100	4500
-20 TO 100	4080	7440	10800	4250	7750	11250	4250	7750	11250
200	3508	6399	9290	3916	7142	10365	3916	7142	10365
300	3168	5779	8390	3536	6448	9360	3536	6448	9360
400	2912	5308	7705	3247	5923	8600	3247	5923	8600
500	2708	4936	7165	3020	5507	7995	3020	5507	7995
600	2556	4663	6770	2855	5203	7555	2855	5203	7555
650	2504	4564	6625	2793	5092	7395	2793	5092	7395
700	2460	4489	6515	2748	5009	7270	2748	5009	7270
750	2420	4415	6410	2703	4928	7150	2703	4928	7150
800	2392	4365	6335	2670	4872	7070	2670	4872	7070
850	2368	4316	6265	2641	4817	6990	2641	4817	6990
900	2352	4291	6230	2624	4787	6950	2624	4787	6950
950	2188	3993	5795	2595	4732	6870	2595	4732	6870
1000	2062	3756	5450	2385	4347	6310	2385	4347	6310

Flanged and threaded end valve ratings terminate at 2500 class and 1000 °F.
Flanged end valves may only be Standard Class, and Nominal Ratings.

[1] NDE is required for Special Class ratings.
1700# and 3100# are interpolated intermediate values per ASME B16.34.

CAMSEAL® BALL VALVE WORKING PRESSURE BY CLASS, BARS

BODY IS FORGED WITH SA-182-F22 Cl.3, YOKE/BONNET ARE CAST WITH SA 217-WC9

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °C	PN292	PN522	PN760	PN292	PN522	PN760	PN292	PN522	PN760
-29 TO 38	293	534	776	293	534	776	293	534	776
93	293	534	776	293	534	776	293	534	776
149	284	519	753	289	527	765	289	527	765
204	276	503	730	284	518	753	284	518	753
260	260	473	687	283	516	749	283	516	749
316	236	431	625	282	514	746	282	514	746
343	230	419	608	280	510	740	280	510	740
371	222	404	587	276	504	731	276	504	731
399	208	379	550	276	504	731	276	504	731
427	198	362	525	276	504	731	276	504	731
454	190	347	504	265	483	701	265	483	701
482	175	320	465	234	427	621	234	427	621
510	151	275	400	184	336	487	189	353	521
538	104	191	276	131	238	346	141	279	428
566	68	125	181	85	156	226	93	182	280
593	43	78	113	54	98	142	58	115	176
649	16	29	42	20	37	53	22	42	66

BODY IS FORGED WITH SA-182-F91, YOKE/BONNET ARE CAST WITH SA 217-C12A

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °C	PN292	PN522	PN760	PN292	PN522	PN760	PN292	PN522	PN760
-29 TO 38	293	534	776	293	534	776	293	534	776
93	293	534	776	293	534	776	293	534	776
149	284	519	753	293	534	776	293	534	776
204	276	503	730	293	534	776	293	534	776
260	260	473	687	293	534	776	293	534	776
316	236	431	625	293	534	776	293	534	776
343	230	419	608	293	534	776	293	534	776
371	222	404	587	286	522	758	286	522	758
399	208	379	550	285	519	754	285	519	754
427	198	362	525	281	513	745	281	513	745
454	190	347	504	265	483	701	265	483	701
482	175	320	465	234	427	621	234	427	621
510	151	275	400	184	336	487	189	353	521
538	142	259	376	164	300	435	178	346	521
566	141	256	372	164	300	435	178	346	521
593	118	215	312	147	269	390	160	315	483
621	87	159	231	109	198	288	118	233	357
649	56	103	149	70	128	186	76	150	231

BODY IS FORGED WITH SA 105, YOKE/BONNET ARE CAST WITH SA 216-WCB

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °C	PN292	PN522	PN760	PN292	PN522	PN760	PN292	PN522	PN760
-29 TO 38	289	528	766	293	534	776	293	534	776
93	265	484	702	293	534	776	293	534	776
149	256	466	677	289	527	766	289	527	766
204	248	451	655	286	522	758	286	522	758
260	236	430	623	286	522	758	286	522	758
316	222	404	587	286	522	758	286	522	758
343	214	391	568	279	510	740	279	510	740
371	208	378	549	270	492	715	270	492	715
399	198	362	525	248	452	656	248	452	656
427	161	293	425	201	366	532	201	366	532

BODY IS FORGED WITH SA 182-F316, BODY/BONNET ARE CAST WITH SA 351-CF8M

	STANDARD CLASS			SPECIAL CLASS[1]			LIMITED CLASS		
TEMP °C	PN292	PN522	PN760	PN292	PN522	PN760	PN292	PN522	PN760
-29 TO 38	281	513	745	293	534	776	293	534	776
93	242	441	641	270	492	715	270	492	715
149	218	398	578	244	445	645	244	445	645
204	201	366	531	224	408	593	224	408	593
260	187	340	494	208	380	551	208	380	551
316	176	322	467	197	359	521	197	359	521
343	173	315	457	193	351	510	193	351	510
371	170	309	449	189	345	501	189	345	501
399	167	304	442	186	340	493	186	340	493
427	165	301	437	184	336	487	184	336	487
454	163	298	432	182	332	482	182	332	482
482	162	296	430	181	330	479	181	330	479
510	151	275	400	179	326	474	179	326	474
538	142	259	376	164	300	435	164	300	435

Flanged and threaded end valve ratings terminate at 2500 class and 1000 °F.
Flanged end valves may only be Standard Class, and Nominal Ratings.

[1] NDE is required for Special Class ratings.

CAMSEAL® BALL VALVE OPERATING TORQUES

WATER
ACTUATION TORQUE VS. LINE PRESSURE FOR WATER

PRESSURE (PSI)	5E TORQUE (FT-LB)	5F TORQUE (FT-LB)	7E TORQUE (FT-LB)	7H TORQUE (FT-LB)	9H TORQUE (FT-LB)	9J TORQUE (FT-LB)	9K TORQUE (FT-LB)
0	31	31	31	80	80	195	245
500	37	38	38	100	100	242	314
1000	44	46	44	119	119	289	384
1500	50	53	51	139	139	336	453
2000	56	60	58	159	159	384	522
2500	63	67	65	178	178	431	592
3000	69	75	71	198	198	478	661
3500	75	82	78	218	218	525	730
4000	82	89	85	237	237	572	800
4500	88	96	92	257	257	619	869
5000	94	104	98	277	277	666	–
5500	101	111	105	296	296	713	–
6000	107	118	112	316	316	761	–
6500	113	125	118	335	335	808	–
7000	120	133	125	355	355	855	–
7500	126	140	132	375	375	902	–
8000	–	–	139	–	394	–	–
8500	–	–	145	–	414	–	–
9000	–	–	152	–	434	–	–
9500	–	–	159	–	453	–	–
10000	–	–	166	–	473	–	–
10500	–	–	172	–	493	–	–
11000	–	–	179	–	512	–	–
11500	–	–	186	–	532	–	–

STEAM
ACTUATION TORQUE VS. LINE PRESSURE FOR STEAM

PRESSURE (PSI)	5E TORQUE (FT-LB)	5F TORQUE (FT-LB)	7E TORQUE (FT-LB)	7H TORQUE (FT-LB)	9H TORQUE (FT-LB)	9J TORQUE (FT-LB)	9K TORQUE (FT-LB)
0	33	33	33	84	84	205	257
500	41	43	42	112	112	271	354
1000	50	53	51	139	139	337	451
1500	59	63	61	167	167	403	548
2000	68	73	70	194	194	469	645
2500	77	83	80	222	222	535	742
3000	86	93	89	249	249	601	840
3500	95	104	98	277	277	667	937
4000	103	114	108	304	304	733	1034
4500	112	124	117	332	332	799	1131
5000	121	134	127	359	359	865	–
5500	130	144	136	387	387	931	–
6000	139	154	146	414	414	997	–
6500	148	165	155	442	442	1062	–
7000	157	175	164	469	469	1128	–
7500	165	185	174	497	497	1194	–
8000	–	–	183	–	524	–	–
8500	–	–	193	–	552	–	–
9000	–	–	202	–	579	–	–
9500	–	–	211	–	607	–	–
10000	–	–	221	–	634	–	–
10500	–	–	230	–	662	–	–
11000	–	–	240	–	689	–	–
11500	–	–	249	–	717	–	–

WATER
ACTUATION TORQUE VS. LINE PRESSURE FOR WATER (METRIC)

PRESSURE (BAR)	5E TORQUE (N-M)	5F TORQUE (N-M)	7E TORQUE (N-M)	7H TORQUE (N-M)	9H TORQUE (N-M)	9J TORQUE (N-M)	9K TORQUE (N-M)
0	42	42	42	108	108	264	332
42	52	54	53	141	141	342	447
69	59	62	60	162	162	392	520
103	68	71	69	188	188	455	613
138	76	81	79	215	215	520	708
172	85	91	88	241	241	583	801
207	94	101	97	268	268	648	896
241	102	111	106	295	295	711	989
276	111	121	115	322	322	776	1085
310	119	130	124	348	348	839	1177
345	128	140	133	375	375	904	–
379	136	150	142	401	401	967	–
414	145	160	152	428	428	1032	–
448	153	170	161	455	455	1095	–
483	162	180	170	482	482	1160	–
517	171	189	179	508	508	1223	–
552	–	–	188	–	535	–	–
586	–	–	197	–	561	–	–
621	–	–	206	–	588	–	–
655	–	–	215	–	615	–	–
689	–	–	224	–	641	–	–
724	–	–	234	–	668	–	–
758	–	–	243	–	694	–	–
793	–	–	252	–	721	–	–

STEAM
ACTUATION TORQUE VS. LINE PRESSURE FOR STEAM (METRIC)

PRESSURE (BAR)	5E TORQUE (N-M)	5F TORQUE (N-M)	7E TORQUE (N-M)	7H TORQUE (N-M)	9H TORQUE (N-M)	9J TORQUE (N-M)	9K TORQUE (N-M)
0	44	44	44	114	114	278	349
42	59	61	60	159	159	387	509
69	68	72	70	189	189	457	612
103	80	85	82	225	225	545	742
138	92	99	95	263	263	636	875
172	104	113	108	300	300	724	1005
207	116	127	121	338	338	815	1139
241	128	140	133	375	375	903	1269
276	140	154	146	412	412	994	1402
310	152	168	159	449	449	1082	1532
345	164	182	172	487	487	1173	–
379	176	195	185	524	524	1261	–
414	188	209	197	562	562	1352	–
448	200	223	210	599	599	1440	–
483	212	237	223	636	636	1531	–
517	224	251	236	673	673	1619	–
552	–	–	249	–	711	–	–
586	–	–	261	–	748	–	–
621	–	–	274	–	786	–	–
655	–	–	287	–	823	–	–
689	–	–	299	–	859	–	–
724	–	–	312	–	897	–	–
758	–	–	325	–	934	–	–
793	–	–	338	–	972	–	–

These are approximations. Please consult the factory for actual specifications.

CAMSEAL® BALL VALVE Cv VALUES

NPS	SCHEDULE	PIPE ID	SIZE CODE	Cv
0.5	SCH 80/XS	0.546	5E	38
	SCH 160	0.464	5E	28
	XXS	0.252	5E	16
	XXS	0.252	7E	16
0.75	SCH 80/XS	0.742	5E	29
	SCH 80/XS	0.742	5F	61
	SCH 160	0.612	5E	42
	SCH 160	0.612	5F	52
	XXS	0.434	5E	28
	XXS	0.434	5F	37
	XXS	0.434	7E	28
1	SCH 80/XS	0.957	5E	23
	SCH 80/XS	0.957	5F	23
	SCH 160	0.815	5E	32
	SCH 160	0.815	5F	48
	XXS	0.599	5E	41
	XXS	0.599	5F	51
	XXS	0.599	7E	41
1.25	SCH 80/XS	1.218	5E	14
	SCH 80/XS	1.218	5F	20
	SCH 160	1.160	5E	17
	SCH 160	1.160	5F	20
	XXS	0.896	5E	26
	XXS	0.896	5F	30
	XXS	0.896	7E	26
1.5	SCH 80/XS	1.500	5E	12
	SCH 80/XS	1.500	5F	18
	SCH 160	1.338	5E	14
	SCH 160	1.338	5F	19
	XXS	1.100	5E	18
	XXS	1.100	5F	21
	XXS	1.100	7E	18
	XXS	1.100	9H	97

NPS	SCHEDULE	PIPE ID	SIZE CODE	Cv
2	SCH 80/XS	1.939	7H	50
	SCH 80/XS	1.939	9J	110
	SCH 160	1.678	7H	55
	SCH 160	1.678	9J	150
	XXS	1.503	7H	71
	XXS	1.503	9H	71
	XXS	1.503	9J	240
2.5	SCH 80/XS	2.323	7H	31
	SCH 80/XS	2.323	10N	300
	SCH 160	2.125	7H	37
	SCH 160	2.125	10L	240
	XXS	1.771	7H	50
	XXS	1.771	9J	135
	XXS	1.771	9H	50
	XXS	1.771	9K / 10K	220
3	SCH 80/XS	2.900	9J	60
	SCH 80/XS	2.900	10N	690
	SCH 160	2.624	9J	95
	SCH 160	2.624	10L	245
	XXS	2.300	9J	107
	XXS	2.300	9H	32
	XXS	2.300	9K / 10K	190
4	SCH 80/XS	3.826	9J	56
	SCH 80/XS	3.826	10N	350
	SCH 160	3.438	9J	69
	SCH 160	3.438	10L	160
	XXS	3.152	9J	73
	XXS	3.152	9H	20
	XXS	3.152	9K / 10K	70

CAMSEAL® BALL VALVES
DESIGN VALIDATION AND COMPARISON TESTING

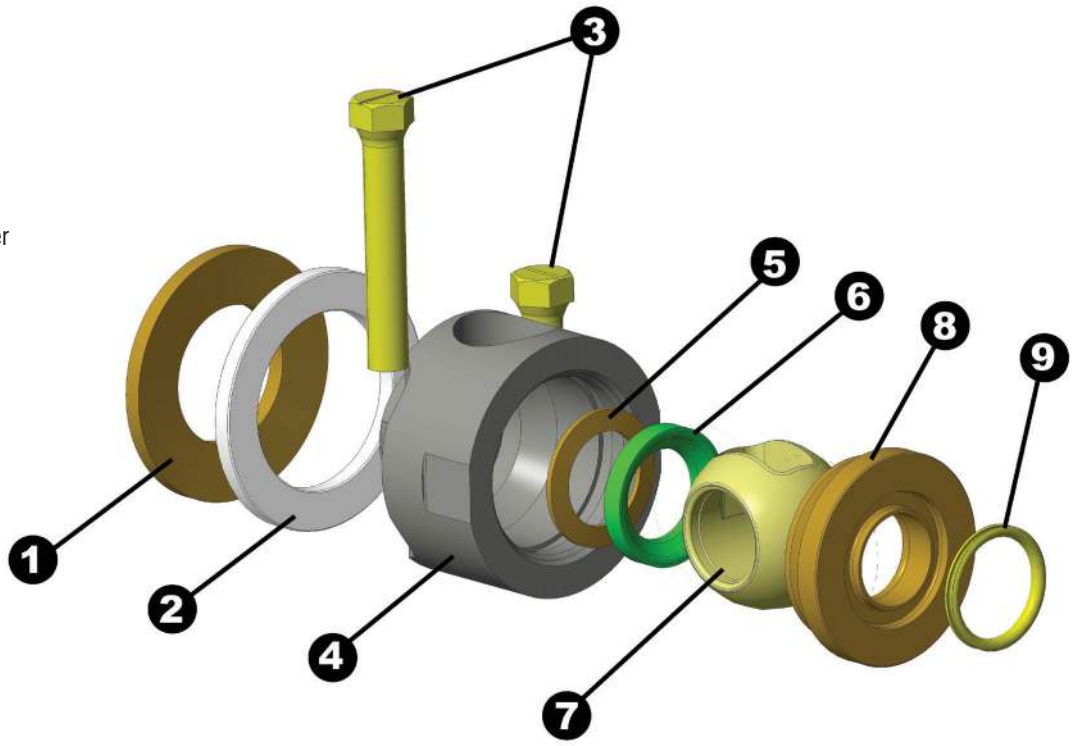
The Camseal Ball Valve has been subjected to computer-aided analysis, laboratory and field testing during its development. Not only were benchmarks established against which performance was measured, but evaluation valves manufactured by competitors were also tested alongside the Camseal Ball Valve.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

- 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 approach verified pressure boundary integrity, including all body and bonnet sections that are not directly defined by the code.
- 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.
- Computational Fluid Dynamics flow modeling software was used to streamline internal waterway sections and maximize Cv and flow efficiency.
- Sophisticated coating and finishing techniques were proven through nitrogen leak testing. 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 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 with minimal degradation to the original Zero-Leakage integrity.

Every valve undergoes pressure testing per ASME B16.34, in addition to special nitrogen gas leak testing of the cartridge assembly.

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

1. Belleville Spring Washer
2. Thrust Washer
3. Cams
4. Cartridge Housing
5. Upstream Belleville
6. Upstream Seat
7. Ball
8. Downstream Seat
9. Downstream Seal



Fire-safe Camseal valves are available for CNG, LNG, refining and chemical applications where fire safety is a major concern.









Yarmouth Research and Technology, LLC

Customer: Conval, Inc.	**Date:**	12/30/2015
Specification: ANSI/API Standard 607, Sixth Edition, 2010 ISO 10497: 2010		
Product Description: 2 inch Class 1720 Ball Valve		
Valve Code: 9J		
Project Number: 215207		
Yarmouth Engineer: Matthew J. Wasielewski, P.E.		
Equipment Confirmed to be in Calibration to NIST Standards: Yes		
Burn and Cool Down Test		
Burn Start Time:	9:50:00	
Average Pressure During Burn:	3238	psig
Seat Leak Rate During Burn:	11	ml/min
Allowable Seat Leak Rate:	800	ml/min
External Leak Rate During Burn/Cool Down:	6	ml/min
Allowable External Leak Rate:	200	ml/min
Amount of Time of Avg. Cal. Blocks > 650 deg. C:	21.5	minutes
Were Test Conditions Within Compliance?	Yes	
Were the Valve Leakages Below the Allowables?	Yes	
Operational Test		
Average Pressure During Test:	3125	psig
External Leak Rate After Operating:	1	ml/min
Allowable External Leak Rate:	50	ml/min
Was the Leakage Below the Allowable?	Yes	
Does Valve Pass or Fail the Test Standard?	**PASS**	

Certified by

Matthew J. Wasielewski, PE
President and Manager
Yarmouth Research & Technology, LLC

STATE OF MAINE · MATTHEW J WASIELEWSKI No. 7437 · LICENSED PROFESSIONAL ENGINEER

Camseal ball valves are certified for fire-safe service in ½" through 4" sizes, to both API 607 and 6FA; for all pressure classes 2500# and lower; for low-alloy steel body materials such as A105 and F22, and austenitic body materials such as 316 stainless steel.

The Conval Story



In 1962, Mr. Chester Siver completed designs for a revolutionary line of high-pressure, forged steel valves. Hamilton Standard (now UTC Aerospace Systems), 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. 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 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 seal, check, gate, globe, throttling, and urea service valves for the world's most demanding applications.



Thank you for your business!
ISO 9001 certified since 1992
PED certified since 2003
Nuclear N-stamp since 2006

MADE IN U. S. A

Conval INC.

ARMOUR VALVE

Distributed by Armour Valve

Phone: 1-800-268-3508

Email: sales@armourvalve.com

Website: armourvalve.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.

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