FORM QA75

VALVES KEROTEST FITTINGS PITTSBURGH, PA.	TITLE	NO. WB-001 REV. 5 DATE 6/17/99 PAGE 1 OF 12

KEROTEST MANUFACTURING CORP.
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PITTSBURGH, PA 15207
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KEROTEST WELDBALL VALVE

OPERATIONS MANUAL

MANUAL NO. WB-001

WRITTEN BY: _____
RICHARD ADAMS

APPROVED BY: _____
DENNIS J. ZOLKOS

Q.A. APPROVED: _____
JULIAN BERARDUCCI

VALVES KEROTEST FITTINGS PITTSBURGH, PA.	TITLE KEROTEST WELDBALL VALVE OPERATIONS MANUAL	NO. WB-001 REV. 5 DATE 6/17/99 PAGE 2 OF 12

REVISION SHEET WB-001

REV./DATE	WRITTEN BY	APPROVED BY	Q.A. APPROVAL	DESCRIPTION OF REVISION
1 9/6/89				Added 6" and 8" short end to end flange end dimensions; added Welding Recommendations
2 1/23/98				Added information on 8", 10" and 12" and Class 300 Valves. Also added information on 3/4" through 1 1/4" valves.
3 9/9/98	R.T.A.	D.J.Z.	J.F.B.	Added information on Ultrastop Failure Torques to Critical Torque Table, Page 9.
4 3/15/99	R.T.A.	D.J.Z.	J.F.B.	Added stem seal o-ring replacement for stop collar design on Page 8. Added ref. to stop collar design on bill of materials, Page 10. Added full port weldball data on Page 12.
5 6/17/99	R.T.A.	D.J.Z.	J.F.B.	Revised welding precautions on Page 4.

INTRODUCTION

The Kerotest Weldball Ball Valve design employs the use of numerous unique features. These include:

- Maintenance Free
- No Lubrication
- No Gland Tightening
- Polished 304 Stainless Steel Ball
- Sealed for Life Construction
- Low Operating Torque
- Welded Steel Construction
- Double O-Ring Stem Seal
- Weathersealed Actuator
- Lightweight
- API Class 150/Class 300
- Position Indication

The intent of this manual is to acquaint our customers with some of the installation procedures and repair techniques. The basic understanding of the valve will enable the customer to enjoy many years of trouble-free service.

Problems with Kerotest valves are few and far between. We stand ready to service our valves no matter where the location. Factory personnel or our field representatives are there to serve you on very short notice.

Finally, this manual is offered as a useful tool for the customer in preparing his "Systems Manual" if required by current specifications.

VALVE INSTALLATION

General Instructions

Kerotest Weldball Valves are of an elastomeric seat seal design and are bi-directional.

Valves should be installed with the ball in the full open position.

Butt Weld End Valves

Valve ends are machined per ANSI B16.25.

Note: In order that the elastomeric seat seals are not affected during the welding operation, the ball should be placed in the full open position. Care should be taken to prevent excessive heat build up in the valve body, which may cause seat seal damage.

Valves should be installed by an electric arc welding process using welders and welding procedures that have been qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code or an equivalent Code or Standard. Care should be taken to insure compliance with any local Codes or requirements.

Please read all of the advice below before installation:

Prepare the adjoining pipe ensuring it is properly supported, aligned, and spaced apart to accommodate the valve.

Insure the ends of the pipe and valve are square and clean.

Check to insure the Weldball valve is open. The valve must be welded in the open position.

Use arc welding only to minimize heat input into the valve. Do not use gas-welding methods.

During welding, cool the end of the valve body nearest the weld by a suitable means. A wet cloth wrapped around the valve and kept continuously wet may be used for this purpose, however, it is not mandatory.

The valve body center section should not get hotter than 250°F during welding.

When the weld is complete, continue to cool for approximately 15 minutes, or until the valve body is obviously near ambient temperature.

After welding, wait at least 15 minutes before attempting to turn or cycle the valve. This will insure that the valve body, ball, and seats have reached equilibrium.

Caution: Turning or cycling the valve while it is still hot from welding may damage the valve seats.

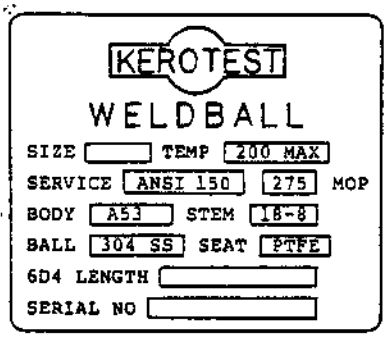
VALVE INSTALLATION (CONTINUED)

Caution Tag

Caution tags are attached to valve ends.

Valve I.D. Tag (Sample)

I.D. tags are attached to valve body.



TESTING

TEST PRESSURE AND DURATIONS									
		HIGH PRESSURE AIR SEAT TEST			LOW PRESSURE AIR SEAT TEST		SHELL TEST		MEDIA
VALVE SIZE (INCHES)	VALVE CLASS	WOG (CWP)	PRESS. (PSIG)	DURATION (SEC)*	PRESS. (PSIG)	DURATION (SEC)*	PRESS. (PSIG)	DURATION (MIN.)	AIR/ WATER
3/4" – 6"	150	275	300	30	80-100	30	425	1	AIR
2"	-	500	550	30	80-100	30	875	1	AIR
8"	150	275	300	30	80-100	30	425	5	WATER
10"	150	275	300	60	80-100	60	425	5	WATER
12"	150	275	300	60	80-100	60	425	15	WATER
3/4" – 6"	300	720	800	30	80-100	30	1100	1	AIR

*Duration each side

TROUBLE SHOOTING

Valve Shut-Off

During closing, the valve ball is rotated against the elastomeric seat seals until the solid portion of the valve ball contacts the seat seals. Positive contact pressure is maintained between the ball and the seat seals by Belleville springs behind each seat seal. A pin through the valve stem and/or stop on the operating square provides a positive stop against the valve neck and/or locking plate in the full open and the full closed position. If seat shut-off is unattainable, there may be some debris trapped between the valve ball and the seat seals. Reopen the valve fully and cycle until desired shut-off has been obtained.

Valve Packing Leakage

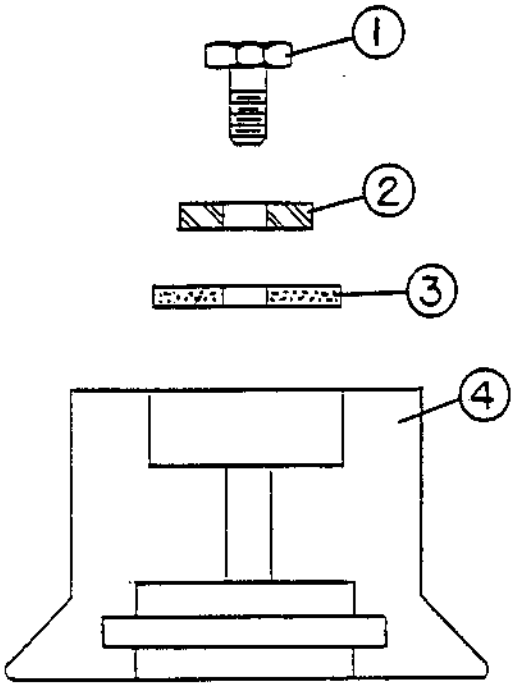
Valve stem leakage may occur if the stem or stem seal o-rings are worn or damaged or utilized outside the valve temperature limitations.

If stem leakage is occurring, the upper stem seal o-ring may be replaced as described in the Stem Seal O-Ring Replacement Procedure in this manual.

Stop Pin Replacement (For Valves So Equipped)

See attached Procedure K-872.

STEM SEAL O-RING REPLACEDMENT PROCEDURE (FOR VALVES WITH STOP PIN)



Valve must be in closed position if valve will be under pressure during this procedure.

Remove bolt (1), washer (2), gasket (3), and operating square (4) with weatherseal (5).

Remove stop pin (6) from valve stem (9) being careful not to damage pin or stem.

Remove stem seal washer (7) from valve neck (10). Using a pointed tool, remove upper stem seal o-ring (8) from valve neck (10) being careful not to scratch finish on stem (9) or valve neck (10).

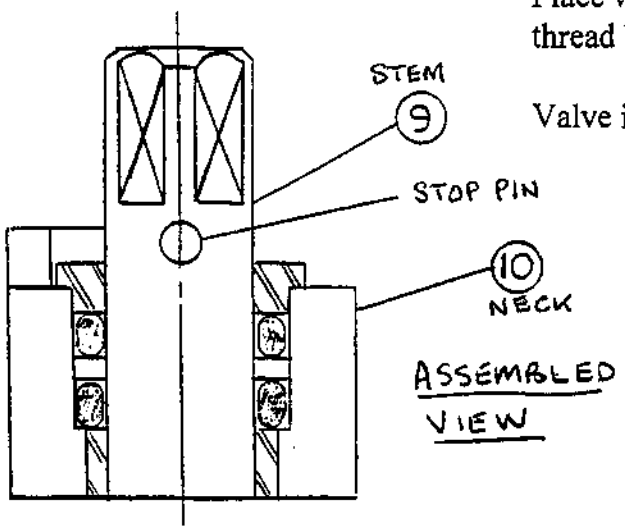
Lubricate new o-ring with Aero Lubriplate or other suitable lubricant and install over stem (9) and into valve neck (10).

Place stem seal washer (7) over stem and into valve neck. Replace stop pin (6) through valve stem, centering in stem.

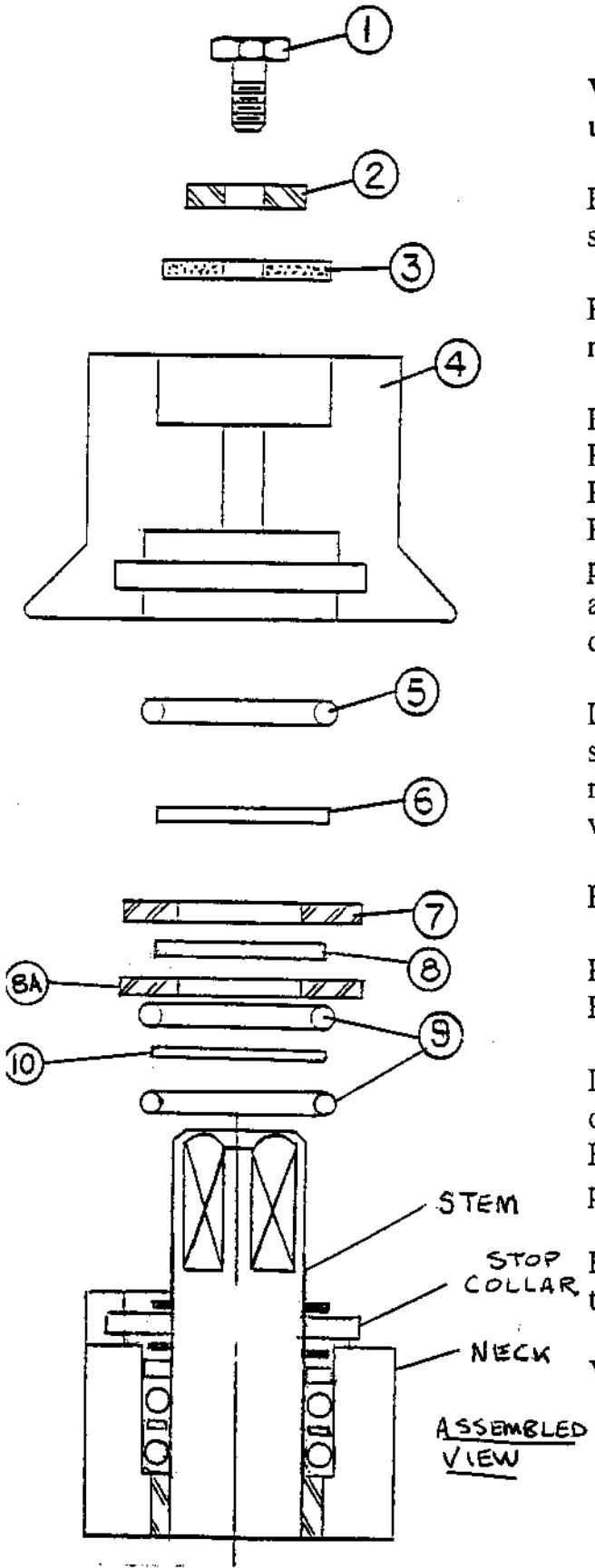
Lubricate weather seal (5) with Aero Lubriplate or other suitable lubricant and replace in actuator (4). Place actuator (4) over stem being careful not to cut or pinch weatherseal (5).

Place washer (2) and gasket (3) over bolt (1) and thread bolt into valve stem and tighten.

Valve is ready for service.



STEM SEAL O-RING REPLACEDMENT PROCEDURE (FOR VALVES WITH STOP COLLAR)



Valve must be in closed position if valve will be under pressure during this procedure.

Remove bolt (1), washer (2), gasket (3), and operating square (4) with weatherseal (5).

Remove snap ring (6) from valve stem being careful not to damage snap ring or stem.

Remove stem stop collar (7) from valve neck.
Remove second snap ring (8) from valve neck.
Remove stem seal washer (8A) from valve neck.
Remove upper o-ring (9) from valve neck using a pointed tool. O-ring spacer (10) and lower o-ring (9) are not normally removed because of difficulty in doing so.

Lubricate new o-ring (9) with Aero Lubriplate or other suitable lubricant and install over stem and into valve neck. Place stem seal washer (8A) over stem and into valve neck.

Replace snap ring (8) over stem.

Place stop collar (7) over stem and into valve neck.
Replace snap ring (6) over valve stem.

Lubricate weather seal o-ring (5) with Aero Lubriplate or other suitable lubricant and replace in actuator (4). Place actuator (4) over stem being careful not to cut or pinch weatherseal (5).

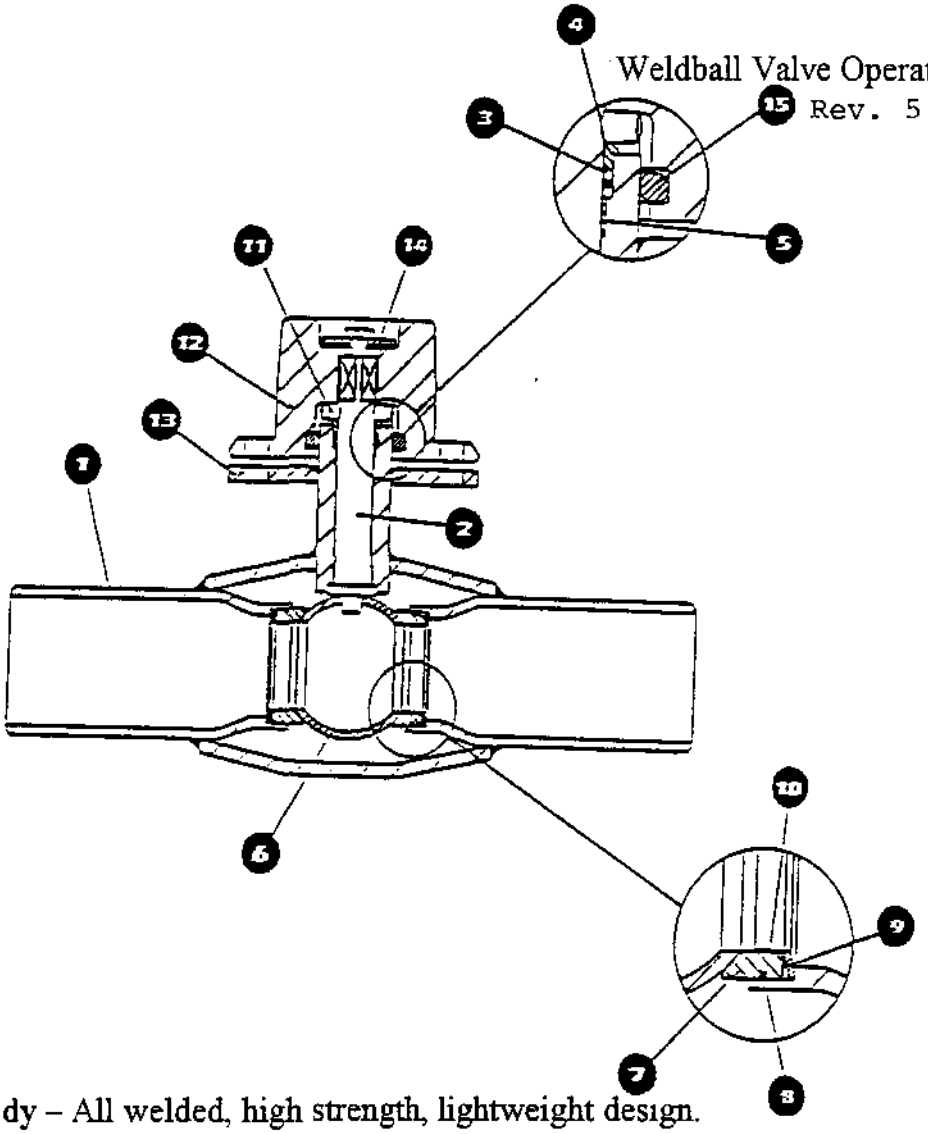
Place washer (2) and gasket (3) over bolt (1) and thread bolt into valve stem and tighten.

Valve is ready for service.

CRITICAL TORQUE

Excessive or unlimited operating torque will ultimately cause failure of the stop pin or ultrastop. The chart below indicates the minimum torque value where a failure will occur.

NOMINAL VALVE SIZE	MAXIMUM OPERATING TORQUE	(VALVES WITHOUT ULTRASTOP) MINIMUM SHEAR PIN FAILURE TORQUE	NOMINAL ULTRASTOP FAILURE TORQUE
3/4"	5 ft-lbs.	25 ft-lbs.	325 ft-lbs.
1"	8 ft-lbs.	60 ft-lbs.	325 ft-lbs.
1-1/4"	12 ft-lbs.	70 ft-lbs.	325 ft-lbs.
2"	50 ft-lbs.	150 ft-lbs.	800 ft-lbs.
3"	80 ft-lbs.	150 ft-lbs.	800 ft-lbs.
4"	100 ft-lbs.	150 ft-lbs.	1000 ft-lbs.
6"	200 ft-lbs. (Class 150) 300 ft-lbs. (Class 300)	500 ft-lbs. 500 ft-lbs.	1500 ft-lbs. 1500 ft-lbs.
8"	350 ft-lbs. Without Gear Operator	The Stop Failure Mechanism Is Designed into the Gear Operator	N/A
10"	Only Supplied with Gear Operator	The Stop Failure Mechanism Is Designed into the Gear Operator	N/A
12"	Only Supplied with Gear Operator	The Stop Failure Mechanism Is Designed Into the Gear Operator	N/A



1. **Body** – All welded, high strength, lightweight design.
2. **Stem** – Stainless steel, blow-out proof design.
3. **Stem Seals** – Double o-rings provide an effective seal within a wide temperature range of –20°F to 200°F.
4. **Retainer** – Provides stem support and o-ring retention.
5. **Stem Bearing** – Prevents the development of static charges and provides stem support.
6. **Ball** – Highly polished stainless steel ensures excellent seating sealing.
7. **Seat Ring** – Preloaded to provide bubble-tight shut-off and continuous wiping of the ball.
8. **Seat O-Ring** – Ensures bubble-tight shut-off in low temperature applications.
9. **Belleville Spring** – Preloads seats to provide low pressure, bubble-tight sealing.
10. **Seat Support Ring** – Provides seat ring containment and rigidity.
11. **Travel Stop Pin or Stop Collar** – Permits 1/4 turn operation and protects stem area from excessive torque damage.
12. **2" Operating Square** – Provides both dual position indication and locking capabilities.
13. **Locking Plate** – Enables the valve to be secured in the full open or full closed position.
14. **Weather Seal Gasket** – Protects stem area from moisture and debris.
15. **Operating Square O-Ring** – Protects stem area from moisture and debris.

Specification Tables

Note: All dimensions are in inches. Flow coefficient, Cv, is dimensionless.

CLASS 150, 275 MOP — Specify: Size/WB-275/End configuration

VALVE SIZE	End to End								Weight/lbs. (approx.)		
	Weld A	Flange B	WxF C	D	E	F	G	Cv	Weld	Flange	WxF
¾	9.06	—	—	4.17	.59	—	—	17	2	—	—
1¼	10.25	—	—	4.83	.98	—	—	49	4	—	—
2	11.81	7.00	12.11	5.59	1.57	—	—	120	10	16	15
3	11.81	8.00	12.11	6.46	2.56	—	—	350	16	28	25
4	12.80	9.00	13.09	7.56	3.15	—	—	550	21	41	34
6	13.78	10.50	14.08	9.33	4.92	—	—	1400	42	77	59
8	15.75	11.50	16.14	13.56	5.91	—	—	2100	115	157	143
*8	15.75	11.50	16.14	—	5.91	12.75	8.00	2100	132	172	160
*10	21.00	21.00	21.38	—	7.87	13.77	9.00	3900	205	282	245
*12	25.00	24.00	25.39	—	9.65	17.32	11.00	5400	368	461	438

*With gear operator

500 WOG, 500 MOP — Specify: Size/WB-500/End configuration

VALVE SIZE	End to End							Weight/lbs. (approx.)			
	Weld A	Threaded A	Flange B	WxF C	D	E	Cv	Weld	Threaded	Flange	WxF
2"	11.81	5.71	8.50	12.11	5.59	1.57	120	10	7	21	18
3"	11.81	—	11.12	12.11	6.46	2.56	450	17	—	40	30
4"	12.80	—	12.00	13.09	7.56	3.15	740	28	—	66	52
6"	13.78	—	15.87	14.08	9.33	4.92	1820	49	—	114	85

CLASS 300, 720 MOP — Specify: Size/WB-720/End configuration

VALVE SIZE	End to End						Weight/lbs. (approx.)		
	Weld A	Flange B	WxF C	D	E	Cv	Weld	Flange	WxF
¾	9.06	—	—	4.17	.59	17	2	—	—
1¼	10.25	—	—	4.83	.98	49	4	—	—
2	11.81	8.50	12.11	5.59	1.57	155	11	21	18
3	11.81	11.12	12.11	6.46	2.56	450	17	40	30
4	12.80	12.00	13.09	7.56	3.15	740	28	66	52
6	13.78	15.87	14.08	9.33	4.92	1820	49	114	85

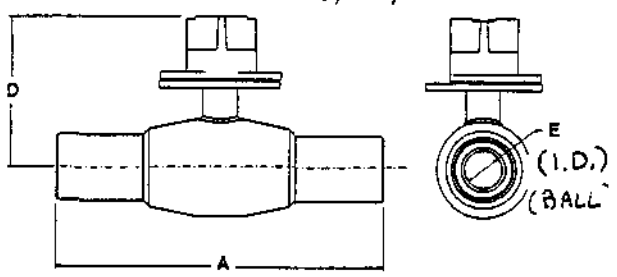
Option: 4" and 6" valve with gear operator

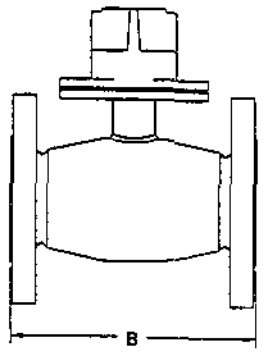
Materials of Construction

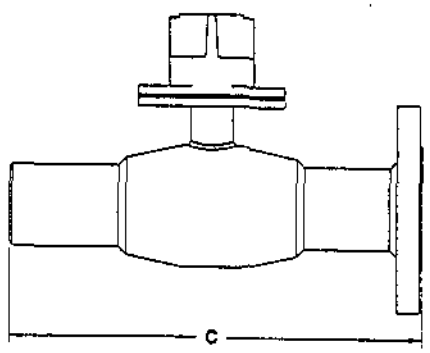
	CLASS 150	CLASS 300
Body	ASTM A53, Grade A	ASTM A53, Grade A
Ball	AISI 304 Stainless Steel	AISI 304 Stainless Steel
Stem	AISI 303 Stainless Steel	AISI 303 Stainless Steel
Stop Pin	Stainless Steel	Stainless Steel
Weld Ends	ASTM A53, Grade A	ASTM A53, Grade A
Flanges	ASTM A283, Grade D	ASTM A283, Grade D
Seat Seals	Carbonized PTFE (Teflon™)	Carbonized PTFE (Teflon™)
Stem Seals	BUNA-N O-Rings	BUNA-N O-Rings
Operating Square	Ductile Iron (2" thru 8") Carbon Steel (¾" & 1¼")	Ductile Iron (2" thru 6") Carbon Steel (¾" & 1¼")
Gear Operator	Water tight construction for above and below ground applications	Water tight construction for above and below ground applications
Weld Ends	Machined per ANSI B16.25 requirements	Machined per ANSI B16.25 requirements
Flanges	Per ANSI B16.5 and end to end dimensions per ANSI B16.10. End to end dimensions for 6" and 8" valves are short pattern.	Per ANSI B16.5 and end to end dimensions per ANSI B16.10

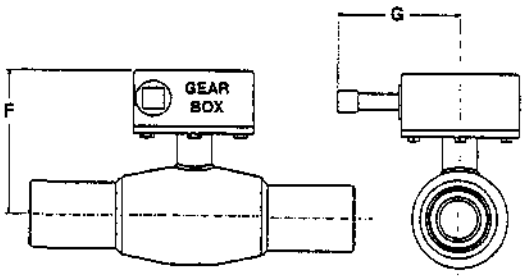
Codes and Standards

• Weldball valves meet or exceed the applicable requirements of the Code of Federal Regulations, Title 49, Part 192 and API 6D. • Pressure-Temperature ratings are per API 6D. • Weldball valve Qualification and Production Testing exceeds the minimum requirements of the Code of Federal Regulations and API 6D. • Production welding meets ASME Boiler and Pressure Vessel Code, Section IX requirements.









KEROTEST SINCE 1909

An Employee-Owned Total Quality Management Company

Kerotest Manufacturing Corp.
5500 Second Avenue • Pittsburgh, PA 15207-1861

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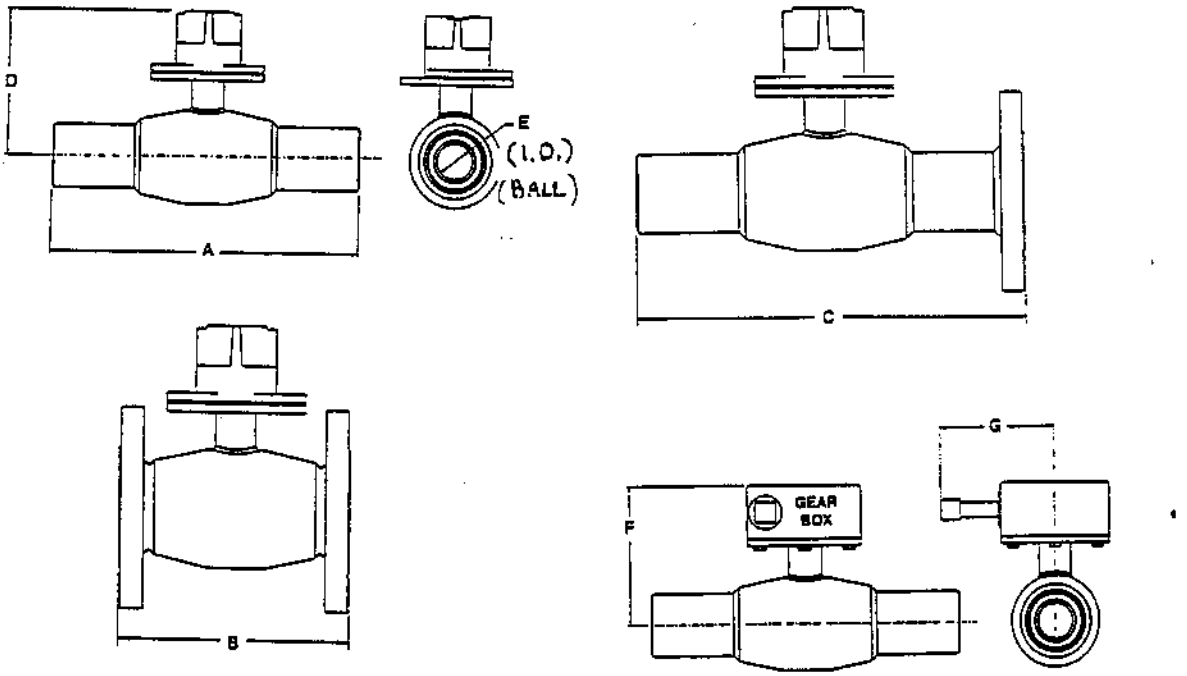
KEROTST FULL PORT WELDBALL DATA SPECIFICATION TABLES

NOTE: ALL DIMENIONS ARE IN INCHES. FLOW COEFFICIENT, Cv, IS DIMENSIONLESS.

CLASS 150, 275 MOP						SPECIFY: SIZE/WB-275/END CONFIGURATION/FP					
	END TO END								WEIGHT, LBS (APPROX.)		
VALVE SIZE	WELD A	FLANGE B	WXF C	D	E	F	G	Cv	WELD	FLANGE	WXF
2"	11.81	7.00	12.08	5.55	1.97			245	12	22	15
3"	12.80	11.13	13.07	7.87	3.15			620	25	42	33
4"	12.80	12.00	13.07	8.48	3.94			1120	34	66	49
6"	15.35	15.50	15.63	11.69	5.90	12.75	7.99	2500	97	154	126
8"	20.47	18.00	20.75	13.20	7.87	13.78	9.01	4500	176	287	231
10"	25.00	22.00	25.28	16.02	9.64	17.32	10.98	6600	363	463	408

CLASS 300, 720 MOP					SPECIFY: SIZE/WB-720/END CONFIGURATION/FP				
	END TO END						WEIGHT, LBS (APPROX.)		
VALVE SIZE	WELD A	FLANGE B	WXF C	D	E	Cv	WELD	FLANGE	WXF
2"	11.81	8.50	12.08	5.55	1.97	320	13	33	24
3"	12.80	11.13	13.07	7.87	3.15	1030	26	66	46
4"	12.80	12.00	13.07	8.47	3.94	1740	35	99	66

MATERIALS OF CONSTRUCTION	
BODY	ASTM A53, GRADEA
BALL	AISI 304, STAINLESS STEEL HOLLOW DESIGN CLASS 150, SOLID DESIGN CLASS 300
STEM	A1S1 303, STAINLESS STEEL
STOP COLLAR	ASTM A252 GRADE B
WELD END	ASTM A53, GRADE A
FLANGES	ASTM A283, GRADE D
SEAT RING	CARBONIZED PTFE
STEM BEARING	COATED STEEL
STOP PLATE	ASTM A252, GRADE B
O-RINGS	BUNA-N
SUPPORT RING	A151 316, STAINLESS STEEL
CUP SPRING	ASTM A682



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FORM QA75

KEROTEST VALVES PITTSBURGH, PA.	TITLE KEROTEST WELDBALL VALVE, STOP PIN & OPERATING SQUARE WEATHER SEAL O-RING REPLACEMENT PROCEDURE	NO. K-872 REV. - DATE 4-26-94 PAGE 1 OF 3

Kerotest Weldball Valve
Stop Pin & Operating Square Weather Seal O-Ring Replacement Procedure

KEROTEST MANUFACTURING CORP.

5500 SECOND AVENUE
PITTSBURGH, PA 15207

Written By: D. M. Lakatos Date: 4-26-94

KEROTEST VALVES & FITTINGS PITTSBURGH, PA.	KEROTEST WELDBALL VALVE TITLE STOP PIN AND OPERATING SQUARE WEATHER SEAL O-RING REPLACEMENT PROCEDURE	NO. K-872 REV. DATE 4/26/94 PAGE 2 OF 3

1. If possible, the valve should not be pressurized when the stop pin is replaced. If the valve is pressurized, extra precautions must be followed as outlined below.

2. If the valve is pressurized, cycle the valve to the full closed position, if possible (this is not mandatory).

3. "Match Mark" the position of the operating square relative to the valve body for reinstallation of the operating square later in this procedure.

4. Remove the operating square.

5. If the valve is pressurized, tap the stop pin on the non-grooved side of the pin approximately halfway through the stem hole with a "punch" and hammer. Do not completely remove the stop pin because the stop pin holds the o-ring retainer and stem o-rings "in place" when the valve is pressurized.

   A. Install the new stop pin into the stem hole by tapping the pin with a hammer on the grooved side of the pin. As the new stop pin is inserted, the "old" stop pin will be pushed completely out of the stem hole.

   B. Center the stop pin; the pin must not hang over the edge of the valve neck on either side.

6. If required, remove the weather seal o-ring from the operating square.

7. Install the new weather seal o-ring.

   A. Apply lubricant to the new o-ring.

   B. The main purpose of the lubricant is ease of assembly and o-ring damage protection. "Clean" lubricant from the existing parts can be applied to the o-ring.

   C. If more lubricant is required, any lubricant that is compatible with Buna-N is acceptable; Kerotest uses Lubriplate No. 3V, made by Fiske Bros. Refining Company.

8. Position the operating square properly for reinstallation.

   A. Align the match marks on the operating square and body for proper orientation of the operating square.

   Caution: If the operating square is not reinstalled correctly, the pointers (indicators) of the operating square will not indicate the proper position of the valve's ball opening. As an assurance check, the pointers of the operating square must be in-line (parallel) with the stem indicator notch which is located on the top surface of the stem. The stem indicator notch is cut in-line (parallel) with the centerline of the valve's ball opening (flow bore). **Do not use the stop pin to establish the operating square position. Depending on the valve style (old vs. new), the stop pin may be either perpendicular or parallel to the stem indicator notch.**

9. Reinstall the operating square; "work" the operating square over the stem and neck by hand; do not "pound" the operating square on with a hammer. Make sure the operating square is completely bottomed. If the valve has a locking plate, the clearance between the bottom of the operating square and the top of the locking plate is approximately 1/32".

10. Place the rubber gasket then the metal washer into the top recess of the operating square. Secure the operating square to the valve stem with the hex head cap screw (tighten firmly).

11. For any questions or comments, contact Kerotest directly at (412)521-7766 or your local Kerotest Representative.

NOTE:

KEROTEST WELDBALL VALVES OPERATE COUNTER-CLOCKWISE TO OPEN.