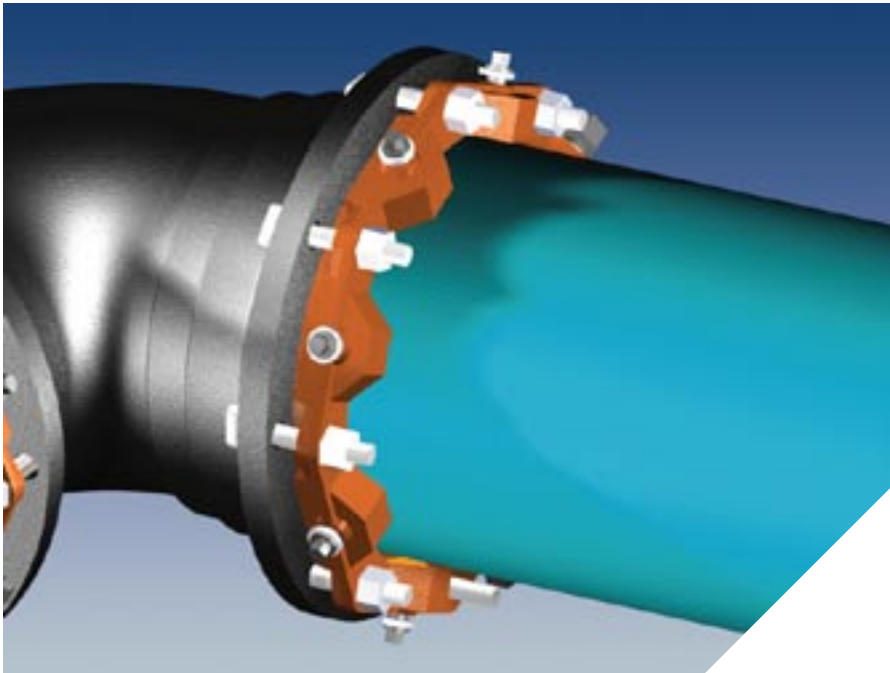




**Your Connection to the Future™**

# SERIES 2000PV

Mechanical Joint Restraint  
For PVC Pipe



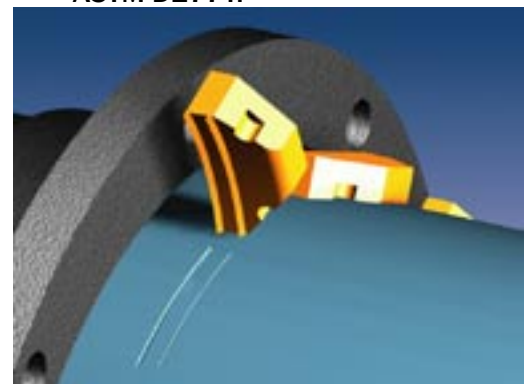
*Series 2012PV, for 12" Mechanical Joint Pipe or Fittings*

Nominal Pipe Size	Series Number	Shipping Weights
3	2003	7.0
4	2004	8.8
6	2006	12.1
8	2008	16.3
10	2010	26.0
12	2012	31.4
14	2014	47.6
16	2016	52.8
18	2018	61.8
20	2020	70.9
24	2024	92.9
30	2030	128.5
36	2036	161.3

Note: For applications or pressures other than the ones shown, please contact EBAA for assistance.

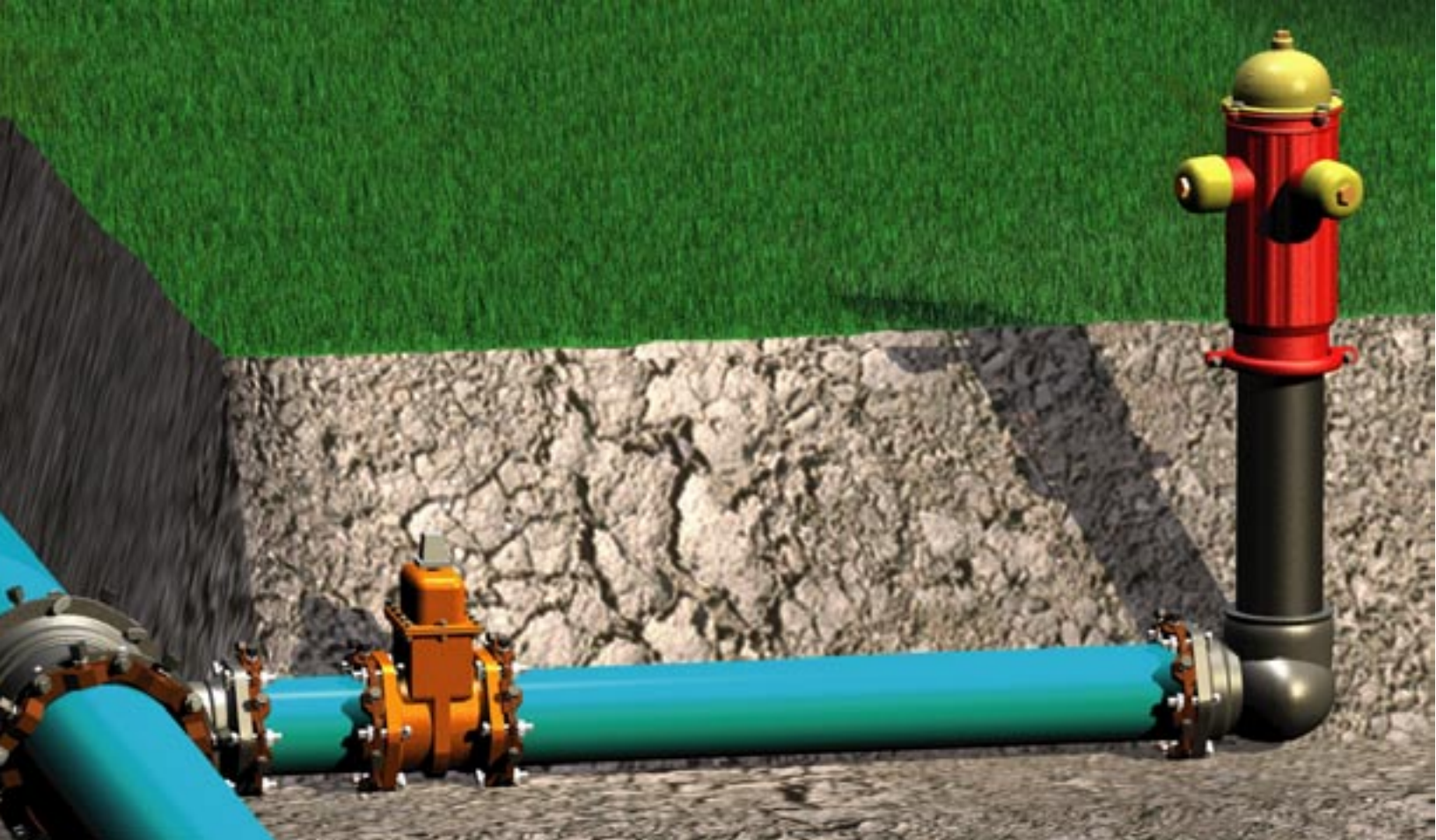
## Features and Application:

- Sizes 3" through 36"
- Constructed of ASTM, 65-45-12 Ductile Iron.
- The Mechanical Joint follower gland is incorporated into the restraint.
- Heavy Duty thick wall design
- Support Products Available:
  - Split MJ repair style available for 3 inch through 12 inch. EBAA Series 2000SV
  - Solid restraint harness available for C905 PVC pipe bells. EBAA Series 2800
  - Split restraint harness available for C900 and C905 pipe bells and PVC fittings. EBAA Series 2500
- All 2000PV and related restraint products can be furnished as packaged accessories complete with appropriate restraint, gasket, lubrication and bolting hardware.
- For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600 or ASTM D2774.



*2000PV wedge impression on PVC pipe.*

U.S. Patent No.  
4627774, 4896903, 5071175.



## **Series 2000PV: Mechanical Joint Restraint Gland for use with C900 or IPS OD PVC Pipe**

The 2000PV mechanical joint restraint is the fastest and most economical method of restraining PVC pipe to mechanical joints. Now the need for costly concrete thrust blocks and corrodible steel tie rods is eliminated. It can be used in straight alignment or at the preset deflection recommended for the mechanical joint.

The 2000PV was the first PVC joint restraint to be tested to UNI-B-13, Underwriters Laboratories, and Factory Mutual.

Tested to and meets the requirements of ASTM F 1674-96 "Standard" Test Method for Joint Restraint Products for Use with PVC Pipe" through 24 inch size.

UL-listed in the four through twelve inch sizes for joining UL-listed ductile iron fittings to UL-listed, Class 150 PVC pressure pipe. The maximum allowable joint deflection is five degrees.

Factory Mutual approved for use on DR18 PVC pipe in four through twelve inch sizes.



**ASTM  
A1674**



### **The 2000PV Concept**

EBAA Iron started manufacturing joint restraint products for PVC pipe in the early 1980s. The testing of early prototypes of various configurations of restraints on large diameter PVC pipe indicated that a restraint device must be capable of consistently and reliably gripping the pipe. If not, the restraint can slip under pressure, resulting in sudden impact, and cause the pipe to burst. Armed with this background knowledge and an appreciation for the capabilities of PVC pipe, EBAA purposefully deviated from what many in the industry once considered to be the "only" way to grip PVC pipe. This led to the development of the Series 2000PV restraint.

The design of the 2000PV incorporates the gripping mechanism into the design of the mechanical joint gland and utilizes a simple two part assembly process. The first step involves assembling the joint the same as any standard mechanical joint. The assembly procedure we recommend is that established in AWWA C600. The second is the actuation of the restraint.



# Three Testing Methods

The design philosophy behind the 2000PV joint restraint is that the pipe with the restraint should be capable of being tested to the same minimum requirements of the pipe alone. In doing so, the restraint is shown to have no detrimental effect on the pipe and will have the same pressure rating and safety factor as the pipe on which it is used. To that end the 2000PV has been subjected to hundreds of static and cyclic pressure tests to demonstrate the performance and reliability of the restraint.

One of the primary tests of PVC is its quick burst strength. For pipe meeting the requirements of AWWA C900, AWWA C905, and ASTM 2241, the minimum quick burst requirement for the hoop stress is 6400 psi. For DR18 pipe that pressure is 755 psi.

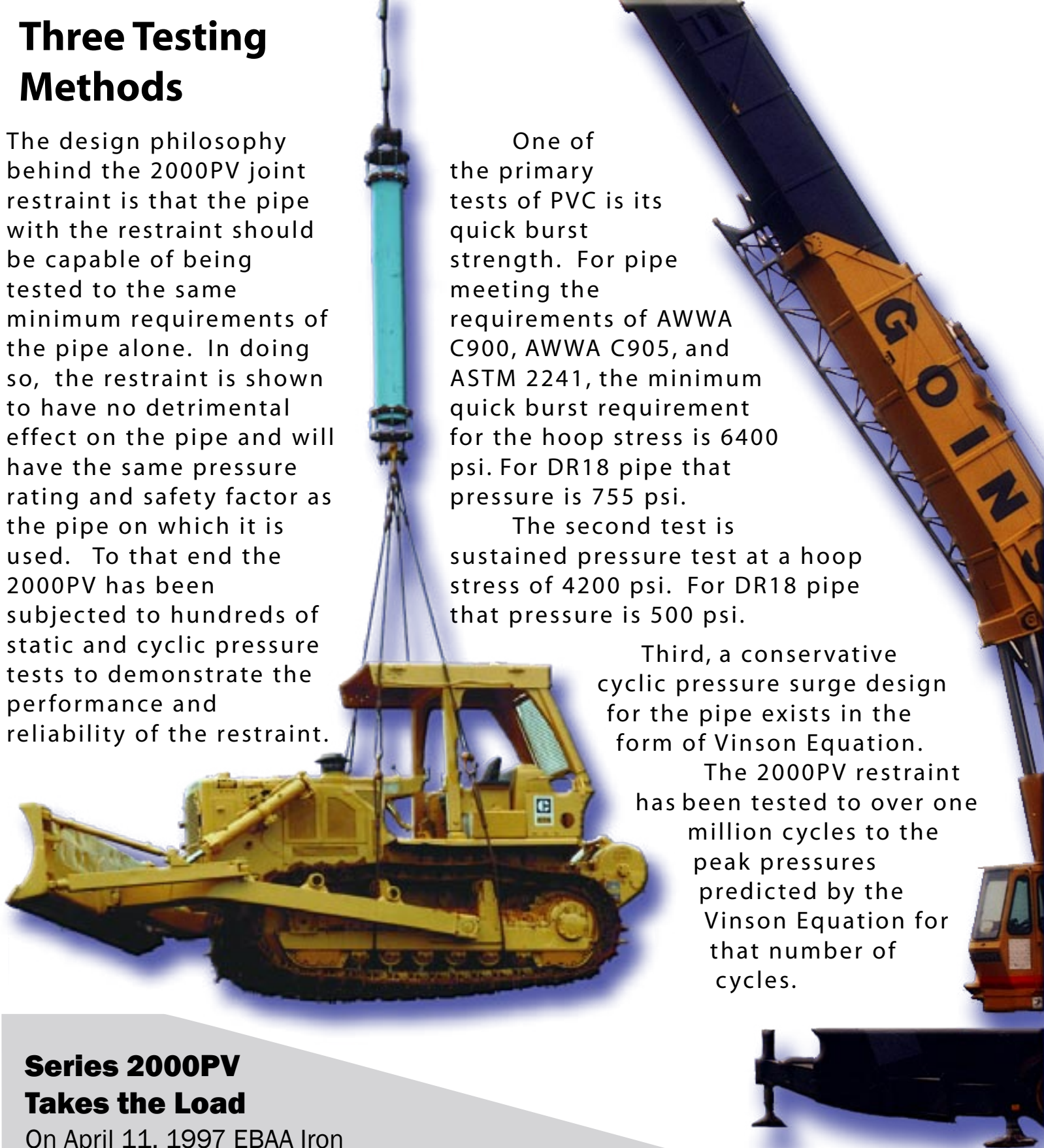
The second test is sustained pressure test at a hoop stress of 4200 psi. For DR18 pipe that pressure is 500 psi.

Third, a conservative cyclic pressure surge design for the pipe exists in the form of Vinson Equation.

The 2000PV restraint has been tested to over one million cycles to the peak pressures predicted by the Vinson Equation for that number of cycles.

## Series 2000PV Takes the Load

On April 11, 1997 EBAA Iron performed a remarkable force demonstration of their Series 2000PV joint restraint. With the use of EBAA's Series 2000PV using a standard mechanical joint installation on 12 inch PVC Pipe, and a 80 Ton motor crane, EBAA Iron lifted a D7 Caterpillar Track Type Tractor weighing in at 50,350 lbs. Along with this, the Series 2000PV has been tested to over 700 PSI. Concluding that EBAA's Series 2000PV can take the load.



# Mechanical Joint Restraint Sample Specification

(The text of the specifications below can be copied and pasted from [www.ebaa.com/download/2000spec.doc](http://www.ebaa.com/download/2000spec.doc))

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

## Design

Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C111/A21.11.

The devices shall have a working pressure rating equal to that of the pipe on which it is used. Ratings are for water pressure and must include a minimum safety factor of 2:1 in all sizes.

## Material

Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

## Traceability

An identification number consisting of year, day, plant and shift (YYDDD)(plant designation)(Shift number), shall be cast into each gland body.

All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.

Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging. All components shall be manufactured and assembled in the United States. The purchaser shall, with reasonable notice, have the right to plant visitation at his/her expense.

## Installation

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

## Approvals

Mechanical Joint Restraints shall be Listed by Underwriters Laboratories in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints shall be Factory Mutual Approved in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints, 4 inch through 24 inch, shall meet or exceed the requirements of ASTM F1674 of the latest revision.

Mechanical joint restraint shall be Series 2000PV produced by EBAA Iron Inc. or approved equal.

## Support Products

for more information concerning these products please consult the catalog or [www.ebaa.com](http://www.ebaa.com)



### Series RS3800

MEGALUG® Restraint Sleeve  
for Joining Two Plain Ends  
(sizes 3 in through 12 in)



### Series 1500

Bell Restraint Harness  
for C900 PVC Pipe



### Series 1600

Bell Restraint Harness  
for C900 PVC Pipe

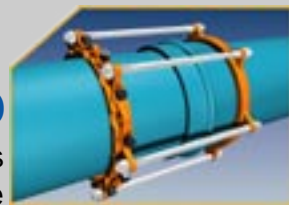
### Series 2500

Restraint for C900 and C905  
PVC pipe at PVC fittings



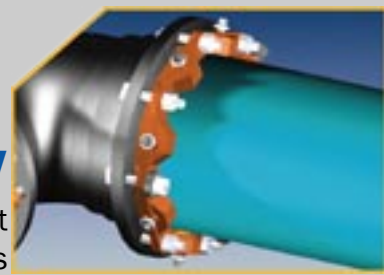
### Series 2800

Bell Restraint Harness  
for C905 PVC Pipe



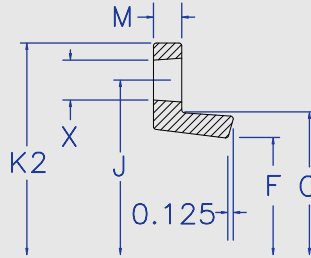
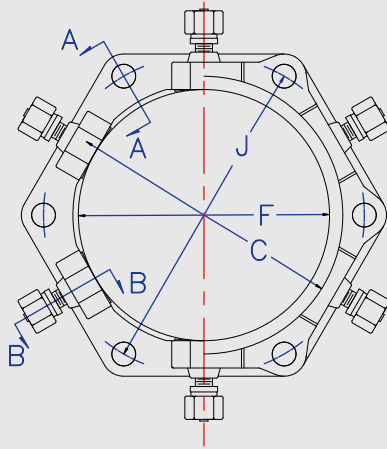
### Series 2000SV

Split 2000PV Restraint  
for Existing Mechanical Joints

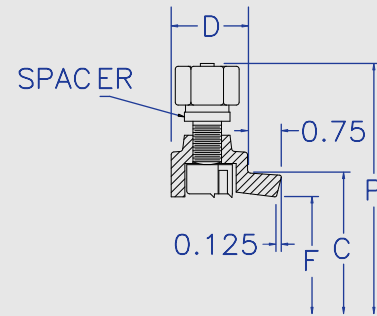


## Series 2000PV Submittal Reference Drawing

E B A A  
I R O N



SECTION A-A



SECTION B-B

M a d e  
i n  
U S A

Nominal Pipe Size	Series Number	C	D	F	M	P	P (with nuts Off)	X	J	K2	Wedge Qty	Bolt Qty	Weight LBS
3	2003	4.84	1.55	3.60	0.50	9.8	8.6	3/4	6.19	7.69	4	4	7.0
4	2004	5.92	1.68	4.90	0.50	10.5	9.5	7/8	7.50	9.13	4	4	8.8
6	2006	8.02	1.68	7.00	0.50	13.0	12.1	7/8	9.50	11.13	6	6	12.1
8	2008	10.17	1.68	9.15	0.62	14.5	13.6	7/8	11.75	13.38	6	6	16.3
10	2010	12.22	2.10	11.20	0.62	17.0	16.0	7/8	14.00	15.63	8	8	26.0
12	2012	14.32	2.10	13.30	0.75	19.0	18.1	7/8	16.25	17.88	8	8	31.4
14	2014	16.40	2.25	15.49	0.88	21.7	20.9	7/8	18.75	20.38	10	10	47.6
16	2016	18.50	2.25	17.58	0.88	23.8	23.0	7/8	21.00	22.63	12	12	52.8
18	2018	20.60	2.25	19.68	1.13	25.9	25.1	7/8	23.25	24.88	12	12	61.8
20	2020	22.70	2.25	21.79	1.25	28.0	27.2	7/8	25.50	27.13	14	14	70.9
24	2024	26.90	2.75	25.99	1.42	32.3	31.5	7/8	30.00	31.63	16	16	92.9
30	2030	33.29	2.70	32.22	1.50	38.5	37.7	1 1/8	36.88	39.12	20	20	128.5
36	2036	39.59	2.70	38.52	1.50	44.8	44.0	1 1/8	43.75	46.00	24	24	161.3

## Pressure Ratings

Note: Dimensions are in inches and are subject to change without notice.

Nominal Pipe Size	Series Number	Ratings for Ordinary Water Works w/Transient Surges Only						Ratings for Peak Pressures used in Sewage Force Mains and Other Installations Designed for Cyclic Surges of 1-Mill. Cycles						C905 PVC Pipe		
		DR-14	DR-18	DR-25	SDR-17	SDR-21	SDR-26	DR-14	DR-18	DR-25	SDR-17	SDR-21	SDR-26	DR-18	DR-25	DR-32.5
3	2003	200	150	100	250	200	160	200	150	100	200	160	120	.	.	.
4	2004	200	150	100	250	200	160	200	150	100	200	160	120	.	.	.
6	2006	200	150	100	250	200	160	200	150	100	200	160	120	.	.	.
8	2008	200	150	100	250	200	160	200	150	100	200	160	120	.	.	.
10	2010	200	150	100	250	200	160	200	150	100	200	160	120	.	.	.
12	2012	200	150	100	250	200	160	200	150	100	200	160	120	.	.	.
14	2014	.	.	.	.	.	.	.	.	.	.	.	.	235	165	.
16	2016	.	.	.	.	.	.	.	.	.	.	.	.	235	165	.
18	2018	.	.	.	.	.	.	.	.	.	.	.	.	235	165	.
20	2020	.	.	.	.	.	.	.	.	.	.	.	.	235	165	.
24	2024	.	.	.	.	.	.	.	.	.	.	.	.	235	165	.
30	2030	.	.	.	.	.	.	.	.	.	.	.	.	.	165	.
36	2036	.	.	.	.	.	.	.	.	.	.	.	.	.	.	125

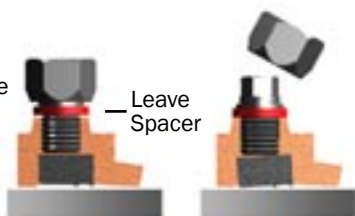
Note: For applications or pressures other than those shown, please contact EBAA for assistance.



## Spacer Instructions

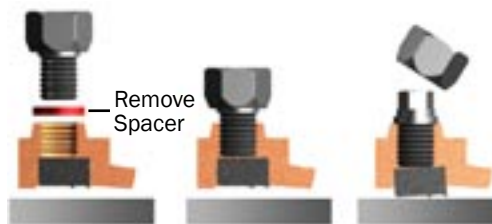
### C900 PVC Pipe

For installation on C900 PVC pipe, use as received and install per instructions.

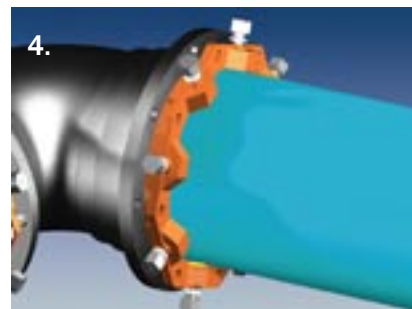


### ASTM 2241 PVC Pipe (IPS O.D.)

For installation on ASTM 2241 sized pipe, remove spacers and replace screws. Install per instructions.



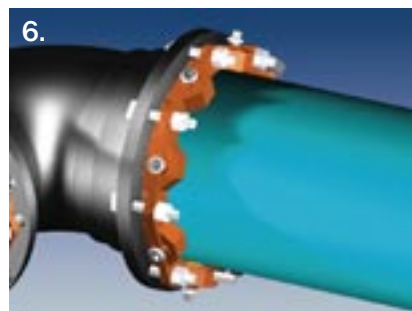
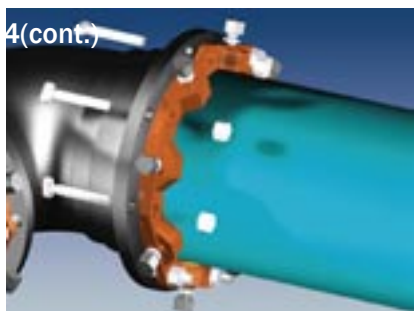
## Installation Instructions



1. Identify the pipe. The 2000PV is for use with PVC pipe. The 4" through 12" size may be used on both C900 and IPS PVC pipe. Check to see if the spacers under the screws are in place. If the pipe is C900, proceed with spacers in place. If the pipe is IPS OD, remove the spacers. Since the 3" and the 14" through 24" restraints are only used with one pipe diameter, no spacers are used.

- \* 2. Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or approved pipe lubrication meeting the requirements of ANSI/AWWA C111/A21.11, just prior to slipping the gasket onto the plain end for joint assembly. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket.

- \* 3. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
- \* 4. Push the gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand tighten nuts. Make deflection after joint assembly but before tightening bolts.



- \* 5. Tighten the bolts to the normal range of bolt torque (45-60 ft-lbs for 3", 75-90 ft-lbs for 4" through 24", 100-120 ft-lbs for 30" and 36", and 120-150 ft-lbs for 42" and 48") while at all times maintaining approximately the same distances between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, finally the

remaining bolts. Repeat the process until all bolts are within the appropriate range of torque. The use of a torque indicating wrench will facilitate this procedure.

6. Tighten the torque limiting twist off nuts in a clockwise direction (direction indicated by arrow on top of nut) until all wedges are in firm contact with the pipe surface. Continue tightening in an alternating manner until all of the nuts have been twisted off.

7. If removal is necessary, utilize the 5/8" hex heads provided. If reassembly is required, assemble the joint in the same manner as above, tighten the screws to 60 to 80 ft-lbs. If the Series 2000PV restraint is removed from the pipe, be sure that all of the screws, spacers (if required), and wedges are in place before the restraint is reassembled.

\* These steps are requirements of AWWA. AWWA Standards, C600, Sec. 3.4.2

Members of...



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