



# Pipe Restrainers series 1000

1000C Restrainers for AWWA C900 PVC Pipe and MJ or Push-On Fittings  
1000S Restraint for IPS PVC and MJ or Push-On Fittings  
Sizes 4" - 48"



6" Series 1000C for DI OD PVC Pipe

## INFORMATION

The Series 1000 provides joint restraint between PVC pipe and ductile iron fittings. The device works with fittings with either mechanical joint ends or push-on, and it may be installed on new or existing systems. Mechanical joint restraints totally eliminate the need for thrust blocks. The restraints have internal serrations that lock onto the pipe and give 360 degrees of contact and pipe wall support. These restraints may be used with PVC pipe made to either a CIOD or IPS OD diameter regimen.

### Can be Installed on New or Existing Systems

## FEATURES & ADVANTAGES

- 360° contact, no pipe distortion or point loading and supports the wall of the pipe
- Made of Ductile Iron - ASTM Grade A536, Grade 65-45-12
- Restrainers work with Mechanical Joint Fittings (Table A) or Push-On Fittings (Table B).
- All restraints are machined to exact tolerances.
- Rated pressures carry a 2:1 safety factor.
- Can be installed outside the trench, to ease installation
- Maintains full deflection on Mechanical Joint and Push-On Fittings
- T-Bolts/Rods/Hex Nuts: low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade 5
- Series 1000C is approved by Factory Mutual Research in sizes 4" - 6" for use on C900 PVC DR18 for 150 PSI.
- Standard color is Graphite Black (RAL 9011).
- Casting halves for IPS PVC pipe are painted Moss Green (RAL 6005).



6" 1000C with MJ Fitting

## SAMPLE SPECIFICATIONS

*PVC restraint devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be machined to provide exact tolerances to provide 360° contact and support of the pipe wall. PVC Restraint devices shall have a safety factor of 2:1 over the pressure rating.*



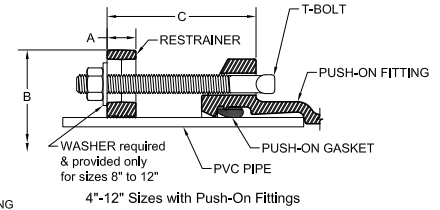
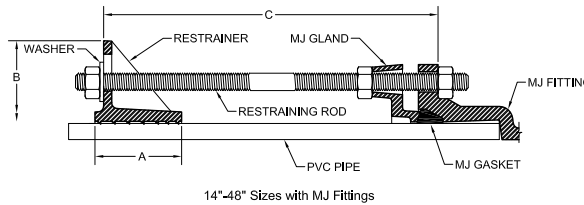
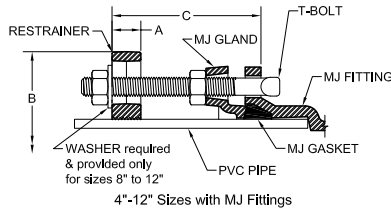
# Pipe Restrainers series 1000

1000C Restrainers for AWWA C900 PVC Pipe and MJ or Push-On Fittings

1000S Restrainer for IPS PVC and MJ or Push-On Fittings

Sizes 4" - 48"

## TECHNICAL INFORMATION



### PIPE RESTRAINERS 1000 SPECIFICATIONS\*

NOM. SIZE	PVC PIPE WITH DUCTILE IRON PIPE O.D. STYLE 1000C	PVC PIPE WITH STEEL PIPE O.D. STYLE 1000S	A	B APPROX.	C MAX.	RESTRAINT BOLTS/RODS		CLAMPING BOLTS		APPROX WT. (LBS)
	O.D.	O.D.				QTY	SIZE	QTY	SIZE	
4	4.80	4.50	1.12	9.12	6.00	2	3/4 x 7	2	5/8 x 3 1/2	8
6	6.90	6.63	1.15	11.12	6.00	2	3/4 x 7	2	5/8 x 3 1/2	10
8	9.05	8.63	1.47	14.75	6.00	2	3/4 x 7	2	3/4 x 4	15
10	11.10	10.75	1.38	16.82	6.00	4	3/4 x 7	2	7/8 x 5	25
12	13.20	12.75	1.42	19.46	6.00	4	3/4 x 7	2	7/8 x 5	27
14	15.30	N/A	4.00	22.68	15.00	6	3/4 x 17	4	7/8 x 7	68
16	17.40	N/A	3.75	24.65	15.00	6	3/4 x 17	4	7/8 x 6 1/2	62
18	19.50	N/A	4.25	26.65	15.00	8	3/4 x 17	4	7/8 x 6 1/2	78
20	21.60	N/A	5.00	28.88	22.00	8	3/4 x 24	4	1 1/8 x 8 1/2	113
24	25.80	N/A	5.00	33.98	22.00	12	3/4 x 24	4	1 1/8 x 8 1/2	145
30	32.00	N/A	7.00	42.48	22.00	12	1 x 24	6	1 1/8 x 6	247
36	38.30	N/A	7.00	48.61	22.00	12	1 x 24	6	1 1/8 x 6	304
42	44.50	N/A	11.00	57.20	26.00	12	1-1/4 x 30	6	1 1/2 x 10	701
48	50.80	N/A	11.00	64.07	26.00	12	1-1/4 x 30	6	1 1/2 x 10	764

\*All dimensions in inches except where indicated.

Table A - Pressure Rating (PSI) For PVC Pipe To Ductile Iron MJ Fitting Connections

NOM. SIZE (IN.)	AWWA C900 (CIOD)										AWWA C909 PVC0			ASTMD2241* (IPS OD)		
											IPEX PVC0	JM EAGLE PVC0				
	DR14	DR17	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51		PC235	PC235	PC165	SDR 17	SDR 21	SDR 26
4	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160	
6	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160	
8	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160	
10	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160	
12	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160	
14	305	250	235	200	165	-	-	-	-	235	-	-	-	-	-	
16	-	250	235	200	165	-	-	-	-	200	-	165	-	-	-	
18	-	250	235	200	165	-	-	-	-	200	-	-	-	-	-	
20	-	-	235	200	165	-	-	-	-	-	-	-	-	-	-	
24	-	-	235	200	165	-	-	-	-	-	-	-	-	-	-	
30	-	-	235	200	165	150	125	100	80	-	-	-	-	-	-	
36	-	-	235	200	165	150	125	100	80	-	-	-	-	-	-	
42	-	-	-	200	165	150	125	100	80	-	-	-	-	-	-	
48	-	-	-	-	165	150	125	100	80	-	-	-	-	-	-	

\* Transition Gasket Required

Table B - Pressure Rating (PSI) For PVC Pipe To Ductile Iron Push-On Fitting Connections

NOM. SIZE (IN.)	AWWA C900 (CIOD)										ASTMD2241** (IPS OD)		
	DR14	DR17	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51		SDR 17	SDR 21	SDR 26
4	200	-	150	-	100	-	-	-	-	-	250	200	160
6	200	-	150	-	100	-	-	-	-	-	250	200	160
8	200	-	150	-	100	-	-	-	-	-	250	200	160
10	100	-	75	-	50	-	-	-	-	-	125	100	80
12	100	-	75	-	50	-	-	-	-	-	125	100	80

\*\* Transition Push-On Gasket Required

STAR® PIPE PRODUCTS



# Pipe Restrainers series 1000

1000C Restrainers for AWWA C900 PVC Pipe and MJ or Push-On Fittings

1000S Restrainer for IPS PVC and MJ or Push-On Fittings

Sizes 4" - 48"

## 4"- 12" SERIES 1000 INSTALLATION INSTRUCTIONS FOR MJ FITTINGS



STEP 1

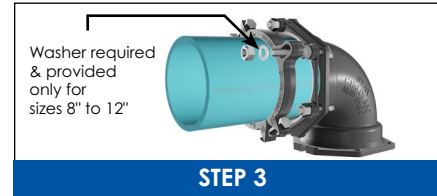
Insert pipe into the MJ fitting bell. Then insert one of the long T-bolts/rods provided through one of the holes. Mark a line 1 1/4" away from the end of the T-bolt/rod and towards the MJ bell as shown. Assemble the MJ joint using the gland, gasket and T-bolts to AWWA standards. Assemble the restrainer on the pipe while making sure restrainer ears line up with the bolt holes of the MJ gland. Evenly tighten the restrainer clamping bolts to recommended torque, ensuring the gap between pads on both sides remain even.



STEP 2

Insert one of the long T-bolts/rods provided, installing one nut each between the gland and the restrainer as shown. Follow the same procedure for remaining long T-bolts/rods. Tighten nuts against MJ Gland to AWWA standards. (See table for Tbolt/nut torque details)

RECOMMENDED TORQUE (CLAMPING BOLTS)	
PIPE SIZE (IN)	RANGE OF TORQUE (FT-LBS)
4"-12"	90-110



STEP 3

Washer required & provided only for sizes 8" to 12"

Place a washer (Provided and required only for sizes 8"-12") on each end of restrainer ear as shown. Snug the second nut on each long T-bolt/rod against the restrainer as shown. **Caution: Do not over - tighten restraining nuts. Turn nut to hand tight plus half turn.**

T-HEAD NUT & BOLT DETAILS		
PIPE SIZE (IN)	BOLT SIZE (IN)	RANGE OF TORQUE (FT. LBS)
4"-12"	3/4	75-90

## 14"- 36" SERIES 1000 INSTALLATION INSTRUCTIONS FOR MJ FITTINGS

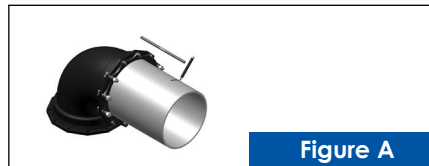


Figure A

**Step 1:** Insert pipe into the MJ fitting bell and assemble the MJ joint using the gland, gasket and T-bolts to A WW A standards. Leave out T-Bolts corresponding to restrainer ears on Series 1000.



Figure B

**Step 2:** Use one of the Restraint rods as a guide to position SERIES 1000 Restraint. Mark a reference line such that the rod ends extend past each nut approximately 0.50". Assemble the restrainer on the pipe such that restrainer ears line up with the bolt holes of the MJ Gland. **Make sure that the open end of the restrainer ears are toward the joint.** Evenly tighten the restrainer clamping bolts to recommended torque, ensuring the gap between pads on both sides remain even.

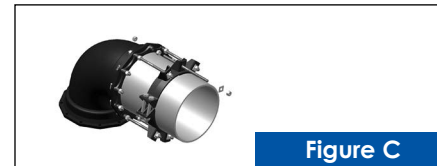


Figure C

**Step 3:** Insert rods through bolt holes. Install one nut behind MJ fitting bell and another nut against the gland. Tighten these nuts and T-bolts to recommended torque as per T-head bolts and nuts torque details. Install washers and remaining nuts behind restrainer ears (**Caution: Do not over-tighten nuts. Turn nuts to hand tight plus half turn.**)

## 42"- 48" SERIES 1000 INSTALLATION INSTRUCTIONS FOR MJ FITTINGS

**Step 1:** (Figure A) Insert pipe into the MJ fitting bell and assemble the MJ joint using the gland, gasket and T-bolts to A WW A standards. Leave out T-Bolts corresponding to restrainer ears on Series 1000ST.

**Step 2:** (Figure B) Use one of the Restraint rods as a guide to position SERIES 1000ST Restraint. Mark a reference line such that the rod ends extend past each nut approximately 0.50". Assemble the restrainer on the pipe such that restrainer ears line up with the bolt holes of the MJ Gland. **Make sure that the open end of the restrainer ears are toward the joint.** Evenly tighten the restrainer clamping bolts to recommended torque, ensuring the gap between pads on both sides remain even.

**Step 3:** (Figure C) Insert rods through bolt holes. Install chamfered nut behind MJ fitting bell and another nut against the gland. Tighten these nuts and T-bolts to recommended torque as per T-head bolts and nuts torque details. Install washers and remaining nuts behind restrainer ears (**Caution: Do not over-tighten nuts. Turn nuts to hand tight plus half turn.**)

(TABLE A) T-HEAD BOLT & NUT DETAILS			
PIPE SIZE (IN)	BOLT SIZE (IN)	RANGE OF TORQUE (FT-LBS)	PIPE
14-24	3/4	75-90	C900 PVC
14-16	3/4	75-90	DIP
30-36	1	100-120	C900 PVC
42-48	1 1/4	120-150	C900 PVC

(TABLE B) CLAMPING BOLTS RECOMMENDED TORQUE		
PIPE SIZE (IN)	RANGE OF TORQUE (FT-LBS)	PIPE
14-16	200 min.	C900 PVC
14-36	130 min.	DIP
42-48	300-350	C900 PVC

<sup>1</sup>These torque ranges are requirements of AWWA C600

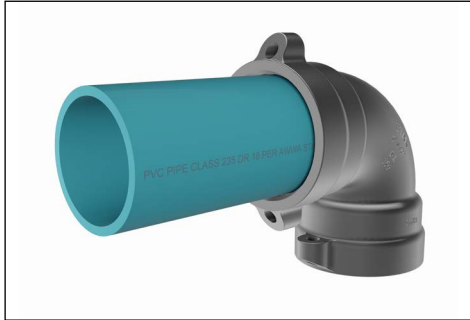
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# Pipe Restrainers series 1000

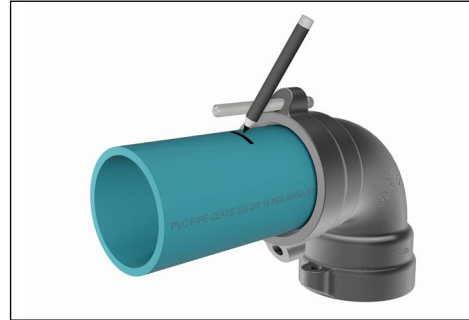
1000C Restrainers for AWWA C900 PVC Pipe and MJ or Push-On Fittings  
1000S Restrainer for IPS PVC and MJ or Push-On Fittings  
Sizes 4" - 12"

## 4"-12" SERIES 1000 INSTALLATION INSTRUCTIONS FOR PUSH-ON FITTINGS



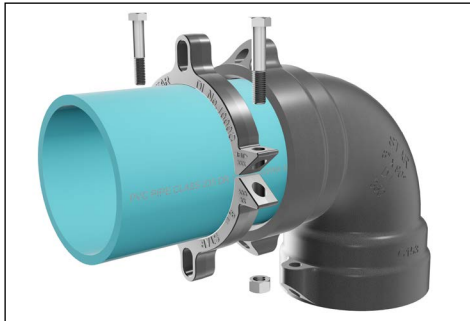
STEP 1

Insert pipe into the fitting bell according to standard procedure.



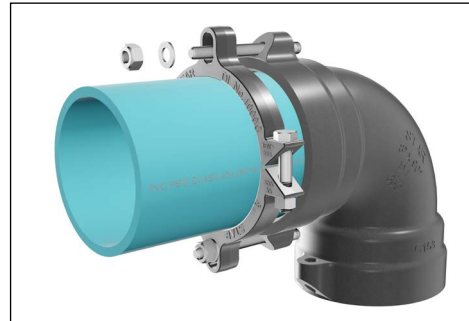
STEP 2

Use one of the T-bolts (provided) as an alignment guide to position serrated restrainer on pipe. Leave sufficient room for threads on the rod ends to fully engage nuts (provided). Full engagement occurs when there are at least two threads showing past the nut on the bolt.



STEP 3

Assemble the restrainer on the pipe as shown above. Make sure that the entire length of all the serrations are in contact with the pipe before installing the clamping bolts. Tighten the clamping bolts evenly between 90 and 110 ft-lbs of torque. Make sure the gap between the bolt pads on both sides remain the same.



STEP 4

Insert the restraining T-bolts (provided) through the fitting lugs and the restrainer as shown. Snug tighten the nuts so that the spigot end is secured into the bell end.

**CAUTION: Do not over-tighten restraint nuts. Turn nuts to hand tight plus half a turn.**

### Notes:

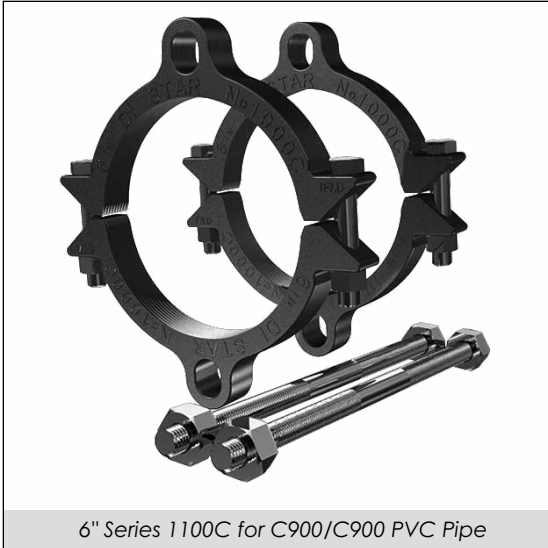
- Not recommended for use with Push-On fittings in sizes 14-inch and larger.

STAR® PIPE PRODUCTS



# Pipe Restrainers series 1100

1100C Bell Restrainers for AWWA C900 PVC Pipe and 1100S Bell Joint for IPS PVC Pipe  
Sizes 4" - 48"



6" Series 1100C for C900/C900 PVC Pipe

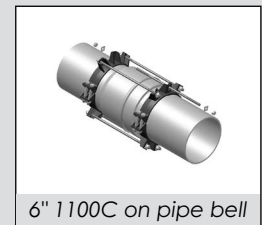
### INFORMATION

The Series 1100 provides joint restraint for PVC pipe-to-pipe joints, and it may be installed on new or existing systems. Joint restraints totally eliminate the need for thrust blocks. The restraints have internal serrations that lock onto the pipe and give 360 degrees of contact and pipe wall support. These restraints may be used with PVC pipe made to either a CIOD or IPS OD diameter regimen. See the table below for the product's rated pressure.

## Can be Installed on New or Existing Systems

### FEATURES & ADVANTAGES

- 360° contact, no pipe distortion or point loading
- Made of Ductile Iron - ASTM Grade 536, Grade 65-45-12
- Restrainers work with Push-On Pipe Bells.
- All restraints are machined to exact tolerances.
- Rated pressures carry a 2:1 safety factor.
- Can be installed outside the trench, to ease installation
- T-Bolts/Rods/Hex Nuts: low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade 5
- Series 1100C is approved by Factory Mutual Research in sizes 4"-6" for use on C900 PVC DR18, for 150 PSI.
- Available in sizes 4"-48"
- Standard color is Graphite Black (RAL 9011).
- Casting halves for IPS PVC pipe are painted Moss Green (RAL 6005).



6" 1100C on pipe bell

### SAMPLE SPECIFICATIONS

*PVC restraint devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be machined to provide exact tolerances to provide 360° contact and support of the pipe wall. PVC Restraint devices shall have a safety factor of 2:1 over the pressure rating.*

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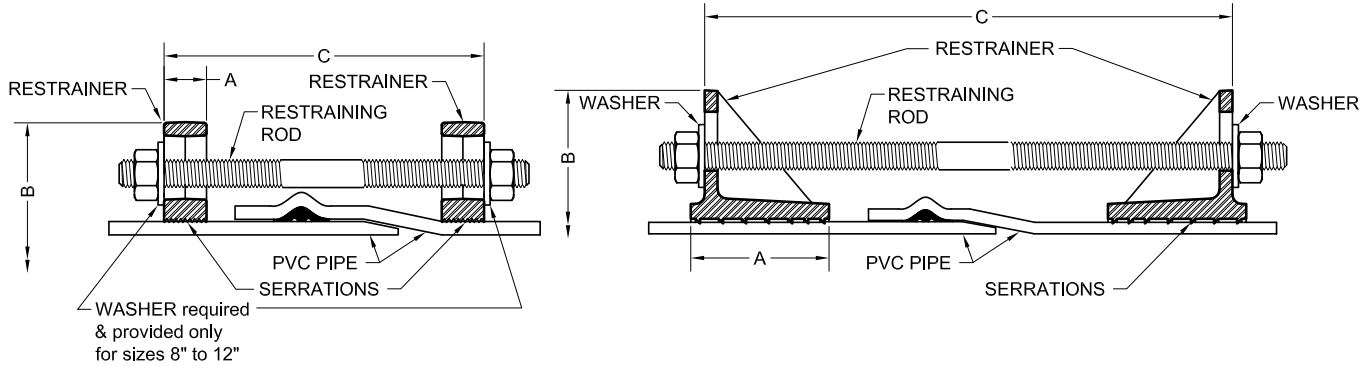
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# Pipe Restainers series 1100

1100C Bell Restainers for AWWA C900 PVC Pipe  
and 1100S Bell Joint for IPS PVC Pipe  
Sizes 4" - 48"

## TECHNICAL INFORMATION



4" - 12" Sizes

14" - 48" Sizes

### PIPE RESTRAINERS 1100 SPECIFICATIONS\*

NOM. SIZE	PVC PIPE WITH DUCTILE IRON PIPE O.D. STYLE 1100C	PVC PIPE WITH STEEL PIPE O.D. STYLE 1100S	A	B APPROX.	C MAX.	RESTRAINT BOLTS/RODS		CLAMPING BOLTS		APPROX WT. (LBS)
	O.D.	O.D.				QTY	SIZE	QTY	SIZE	
4	4.80	4.50	1.12	9.12	15.00	2	3/4 x 17	4	5/8 x 3 1/2	16
6	6.90	6.63	1.15	11.12	15.00	2	3/4 x 17	4	5/8 x 3 1/2	20
8	9.05	8.63	1.47	14.75	15.00	2	3/4 x 17	4	3/4 x 4	32
10	11.10	10.75	1.38	16.82	22.00	4	3/4 x 24	4	7/8 x 5	52
12	13.20	12.75	1.42	19.46	22.00	4	3/4 x 24	4	7/8 x 5	56
14	15.30	N/A	4.00	22.68	27.00	6	3/4 x 30	8	7/8 x 7	150
16	17.40	N/A	3.75	24.65	27.00	6	3/4 x 30	8	7/8 x 6 1/2	117
18	19.50	N/A	4.25	26.65	27.00	8	3/4 x 30	8	7/8 x 6 1/2	147
20	21.60	N/A	5.00	28.88	33.00	8	3/4 x 36	8	1 1/8 x 8 1/2	206
24	25.80	N/A	5.00	33.98	33.00	12	3/4 x 36	8	1 1/8 x 8 1/2	265
30	32.00	N/A	7.00	42.48	44.00	12	1 x 48	12	1 1/8 x 6	492
36	38.30	N/A	7.00	48.61	44.00	12	1 x 48	12	1 1/8 x 6	561
42	44.50	N/A	11.00	57.20	50.00	12	1 1/4 x 54	12	1 1/2 x 10	1355
48	50.80	N/A	11.00	64.07	50.00	12	1 1/4 x 54	12	1 1/2 x 10	1481

\*All dimensions in inches except where indicated.

NOM. SIZE (IN.)	Standardized Pressure Ratings**														
	AWWA C900 (CIOD)									AWWA C909 PVCO			ASTMD2241* (IPS OD)		
	DR14	DR17	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51	IPEX PVCO PC235	JM EAGLE PVCO PC235	PC165	SDR 17	SDR 21	SDR 26
4	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160
6	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160
8	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160
10	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160
12	200	-	150	-	100	-	-	-	-	-	-	-	250	200	160
14	305	250	235	200	165	-	-	-	-	235	-	-	-	-	-
16	-	250	235	200	165	-	-	-	-	200	-	165	-	-	-
18	-	250	235	200	165	-	-	-	-	200	-	-	-	-	-
20	-	-	235	200	165	-	-	-	-	-	-	-	-	-	-
24	-	-	235	200	165	-	-	-	-	-	-	-	-	-	-
30	-	-	235	200	165	150	125	100	80	-	-	-	-	-	-
36	-	-	235	200	165	150	125	100	80	-	-	-	-	-	-
42	-	-	-	200	165	150	125	100	80	-	-	-	-	-	-
48	-	-	-	-	165	150	125	100	80	-	-	-	-	-	-

\* Transition Push-On Gasket Required

\*\*For ordinary water works with transient surges only. Ratings are for PVC pipes with SERIES 1100 Restrainer.

STAR® PIPE PRODUCTS



# Pipe Restrainers series 1100

1100C Bell Restrainers for AWWA C900 PVC Pipe and 1100S Bell Joint for IPS PVC Pipe  
Sizes 4" - 48"

## 4" - 12" SERIES 1100 INSTALLATION INSTRUCTIONS



Assemble the spigot end of first pipe into the second pipe bell using standard procedure per pipe manufacturer.



Assemble one restrainer behind the bell of pipe. Evenly tighten the restrainer clamping bolts to the recommended torque, ensuring the gap between pads on both sides remain even. Use one of the Restraint rods as a guide to position Restraint on spigot end. Mark a reference line such that the Restraint rod ends extend past each nut approximately 0.50".



Assemble the second restrainer on the spigot end of pipe. After aligning second restrainer with the first one, tighten the clamping bolts to the recommended torque evenly such that the gap between pads on both sides remain even .



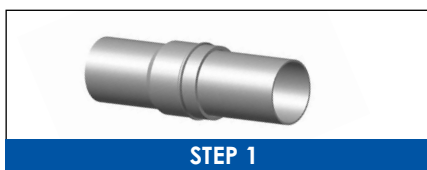
Insert the restraining rods through the restrainer ears. Place a washer (Provided and required only for sizes 8"-12") on each end of restrainer ear as shown. Snug tighten all nuts such that rods stick out approximately 0.50" past the nut on each end.

**Caution: Do not over - tighten restraining nuts. Turn nut to hand tight plus half turn.**

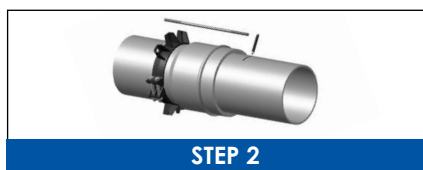
**NOTE: Due to variability of PVC Pipe bell lengths, please contact Star Pipe Products if rod lengths are short.**

RECOMMENDED TORQUE (CLAMPING BOLTS)	
PIPE SIZE (IN)	RANGE OF TORQUE (FT-LBS)
4"-12"	90-110

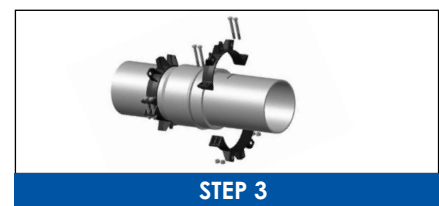
## 14" - 36" SERIES 1100 INSTALLATION INSTRUCTIONS



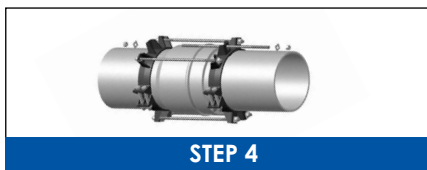
Assemble the spigot end of first pipe into the second pipe bell using standard procedure per pipe manufacturer.



Assemble one restrainer behind the bell of pipe. **Make sure that the open end of the restrainer ears are toward the joint.** Evenly tighten the restrainer clamping bolts to the recommended torque, ensuring the gap between pads on both sides remain even. Use one of the Restraint rods as a guide to position Restraint on spigot end. Mark a reference line such that the Restraint rod ends extend past each nut approximately 0.50". **NOTE: Due to variability of PVC Pipe bell lengths, please contact Star Pipe Products if rod lengths are short.**



Assemble the second restrainer on the spigot end of pipe. **Make sure the open end of the restrainer ears are toward the joint.** After aligning second restrainer with the first one tighten restrainer clamping bolts to the recommended torque.



Insert the restraining rods through the restrainer ears. Snug tighten all nuts against the washer on restrainer such that the spigot end is secured into the bell end and rod sticks out approximately 0.50" past the nut on each end. **Caution: Do not over-tighten restraining nuts. Turn nut to hand tight plus half turn.**

(TABLE B) CLAMPING BOLTS RECOMMENDED TORQUE		
PIPE SIZE (IN)	RANGE OF TORQUE (FT-LBS)	PIPE
14-36	130 min.	C900 PVC
14-16	200 min.	DIP

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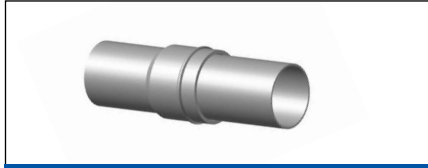
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# Pipe Restrainers series 1100

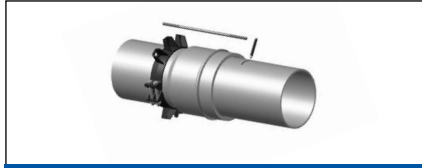
1100C Bell Restrainers for AWWA C900 PVC Pipe  
and 1100S Bell Joint for IPS PVC Pipe  
Sizes 4" - 48"

## 42" - 48" SERIES 1100 INSTALLATION INSTRUCTIONS



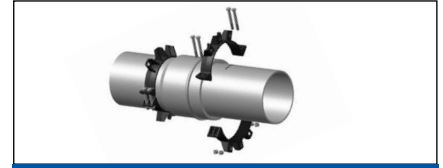
STEP 1

Assemble the spigot end of first pipe into the second pipe bell using standard procedure per pipe manufacturer.



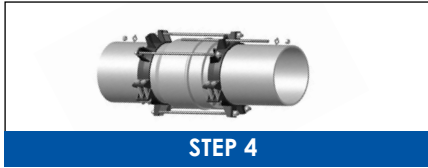
STEP 2

Assemble one restrainer behind the bell of pipe. **Make sure that the open end of the restrainer ears are toward the joint.** Evenly tighten the restrainer clamping bolts to the recommended torque, ensuring the gap between pads on both sides remain even. Use one of the Restraint rods as a guide to position Restraint on spigot end. Mark a reference line such that the Restraint rod ends extend past each nut approximately 0.50". **NOTE: Due to variability of PVC Pipe bell lengths, please contact Star Pipe Products if rod lengths are short.**



STEP 3

Assemble the second restrainer on the spigot end of pipe. **Make sure the open end of the restrainer ears are toward the joint.** After aligning second restrainer with the first one tighten restrainer clamping bolts to the recommended torque.



STEP 4

Insert the restraining rods through the restrainer ears. Snug tighten all nuts against the washer on restrainer such that the spigot end is secured into the bell end and rod sticks out approximately 0.50" past the nut on each end. **Caution: Do not over-tighten restraining nuts. Turn nut to hand tight plus half turn.**

(TABLE B) CLAMPING BOLTS RECOMMENDED TORQUE

PIPE SIZE (IN)	RANGE OF TORQUE (FT-LBS)	PIPE
42-48	130 min.	C900 PVC

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# Pipe Restrainers series 1000C & 1100C

1000C & 1100C For Use On Ductile Iron Pipe

Sizes 4" - 16"



Above Image Represents a 6" Series 1100C

### INFORMATION

Pipe restrainers for ductile iron pipe-to-pipe joints, ductile iron pipe to mechanical joint fitting connections, or ductile iron to push-on fitting joints.

Pipe restrainers can be installed on new or existing systems, totally eliminating the use of thrust blocks. These restrainers have internal serrations that lock onto the pipe and give 360° contact and support the pipe wall.

## For Use on Ductile Iron Pipe

### FEATURES & ADVANTAGES

- Castings made of Ductile Iron - ASTM A536, Grade 65-45-12
- Restrainers work with Mechanical Joint Fittings (Table A), Push-On Fittings (Table B), and Pipe-to-Pipe connections (Table A). Ductile iron pipe to be manufactured in accordance with ANSI/AWWA C151/A21.51.
- All restrainers are machined to exact tolerances
- Maintains full deflection on Mechanical Joint and Push-On Fittings
- T-Bolts/Rods/Hex Nuts: Low alloy steel per ASTM/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade 5

### Notes:

- *Not recommended for installations on machined end pipe or fittings*
- *Installation requires the clamping bolts to be installed to the torque shown in Table A & B on next page.*
- *Installation and testing to be in accordance with the latest version of ANSI/AWWA C600*
- *For higher pressure requirements, please contact Star® Pipe Products*
- *Pipe hardness not to exceed 230 BHN.*
- *Not recommended for use with Push-On fittings in sizes 14-inch and larger.*

### SAMPLE SPECIFICATIONS

*Pipe restraining devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be machined to provide exact tolerance to provide 360° contact and support of the pipe wall. Pipe restraining devices shall have a safety factor of 2:1 over the pressure rating.*

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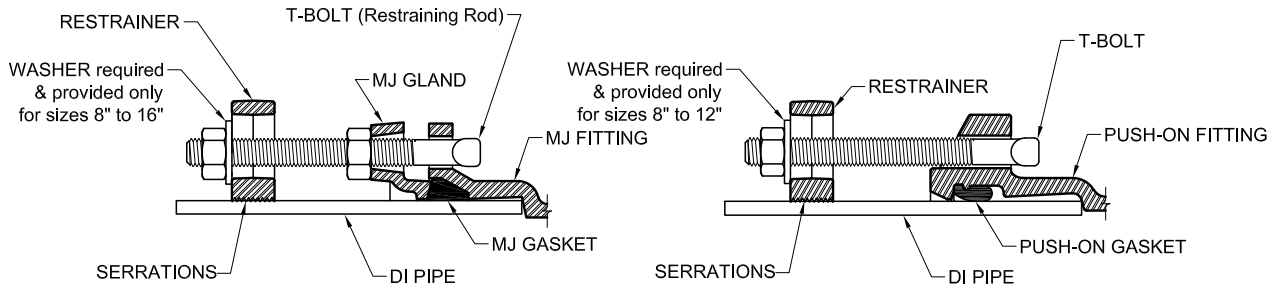


# Pipe Restrainers series 1000C & 1100C

1000C & 1100C For Use On Ductile Iron Pipe

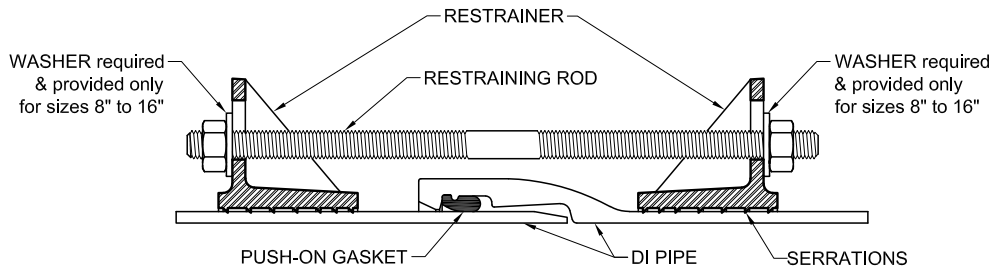
Sizes 4" - 16"

## TECHNICAL INFORMATION



**Series 1000C**  
4"-16" Sizes with MJ Fittings

**Series 1000C**  
4"-12" Sizes with Push-On Fittings



**Series 1100C**  
4"-16" Sizes for Pipe to Pipe

**TABLE A - Pressure Rating For Ductile Iron Pipe-To-Pipe Connections and Ductile Iron Pipe to MJ Fitting Connections**

NOMINAL SIZE	MAXIMUM PRESSURE RATINGS (PSI)	CLAMP BOLT TORQUE (FT-LBS)
4" - 8"	250	110 min.
10" - 12"	200	110 min.
14"	150	200 min.
16"	100	200 min.

**TABLE B - Pressure Rating For DI Pipe To Ductile Iron Push-On Fitting Connections**

NOMINAL SIZE	MAXIMUM PRESSURE RATINGS (PSI)	CLAMP BOLT TORQUE (FT-LBS)
4" - 8"	250	110 min.
10" - 12"	100	110 min.

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# Pipe Restrainers series 1200

1200C Restrainers for PVC Pipe and PVC Pressure Fittings  
w/Ductile Iron Pipe OD  
Sizes 4" - 8"



6" 1200C Restrainers for C900/C900 PVC Pipe

## INFORMATION

PVC Restrainers are for restraining bell joints between AWWA C900 PVC pipe and PVC pressure fittings. The PVC pressure fitting may be PC235 psi molded AWWA C907 PVC pressure fittings or PR235 psi fabricated PVC pressure fittings.

PVC restrainers can be installed on new or existing systems, totally eliminating the use of thrust blocks. These restrainers have internal serrations that lock onto the pipe and give 360° contact and support the pipe wall.

## Can be Installed on New or Existing Systems

## FEATURES & ADVANTAGES

- 360° contact, no pipe distortion or point loading
- Made of Ductile Iron - ASTM Grade 536, Grade 65-45-12
- Restrainers work with either
  - PC235 psi molded AWWA C907 PVC pressure fittings or
  - PR235 psi fabricated PVC pressure fittings.
- All restrainers are machined to exact tolerances.
- Supports wall of pipe with 360 degree contact
- Can be installed outside the trench, to ease installation
- T-Bolts/Rods/Hex Nuts: low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade5
- Standard gland color is Graphite Black (RAL 9011).



6" 1200C on PVC Fitting

NOM. SIZE (IN.)	AWWA C900 (CIOD)								
	DR14	DR17	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51
4	200	-	150	-	100	-	-	-	-
6	200	-	150	-	100	-	-	-	-
8	200	-	150	-	100	-	-	-	-

## SAMPLE SPECIFICATIONS

*PVC restraint devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be machined to provide exact tolerances to provide 360° contact and support of the pipe wall. PVC Restraint devices shall have a safety factor of 2:1 over the pressure rating.*

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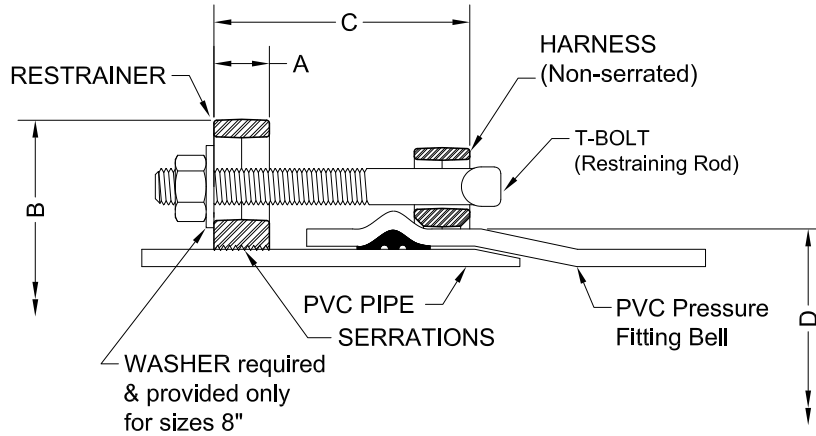
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# Pipe Restrainers series 1200

1200C Restrainers for PVC Pipe and PVC Pressure Fittings w/Ductile Iron Pipe OD  
**Sizes 4" - 8"**

**TECHNICAL INFORMATION**



4"- 8" Sizes

**PIPE RESTRAINERS 1200 SPECIFICATIONS\***

NOM. SIZE	PVC PIPE WITH DUCTILE IRON PIPE O.D. STYLE 1200C	PVC FITTING BELL OD "D"		A	B APPROX.	C MAX.	RESTRAINT BOLTS/ RODS		CLAMPING BOLTS		APPROX WT. (LBS)
		MIN	MAX				QTY	SIZE	QTY	SIZE	
4	4.80	5.44	5.61	1.12	9.12	6.00	2	3/4 x 9	4	5/8 x 3-1/2	13.8
6	6.90	7.84	8.03	1.15	11.12	6.00	2	3/4 x 9	4	5/8 x 3-1/2	17.0
8	9.05	10.29	10.55	1.47	14.75	8.00	2	3/4 x 12	4	3/4 x 4	28.0

\*All dimensions in inches except where indicated.

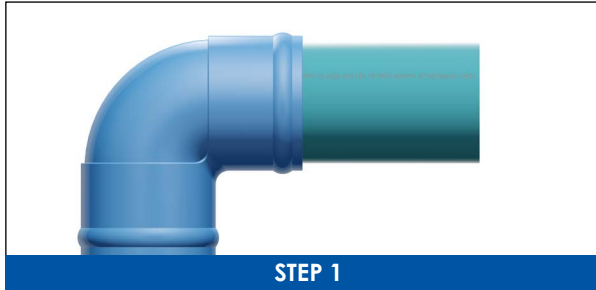
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# Pipe Restrainers series 1200

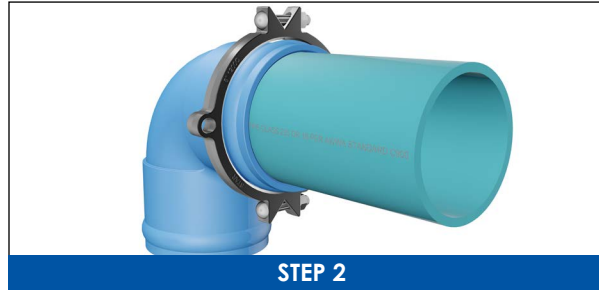
1200C Restrainers for PVC Pipe and PVC Pressure Fittings  
w/Ductile Iron Pipe OD  
Sizes 4" - 8"

## 4"- 8" SERIES 1200 INSTALLATION INSTRUCTIONS



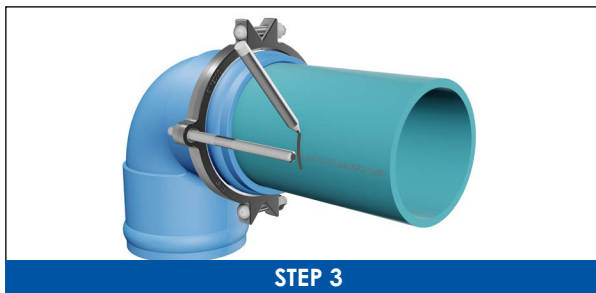
STEP 1

Insert the pipe into fitting bell per fitting manufacturer's instructions.



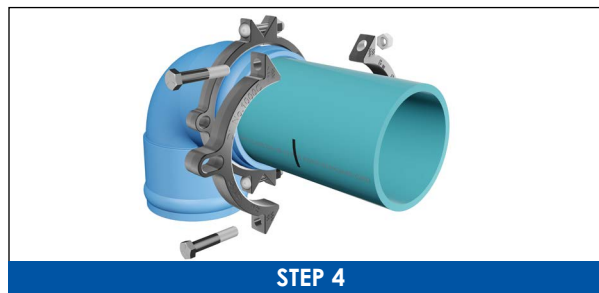
STEP 2

Assemble harness behind the bell of fitting using supplied clamping bolts and nuts. Evenly tighten to recommended torque.



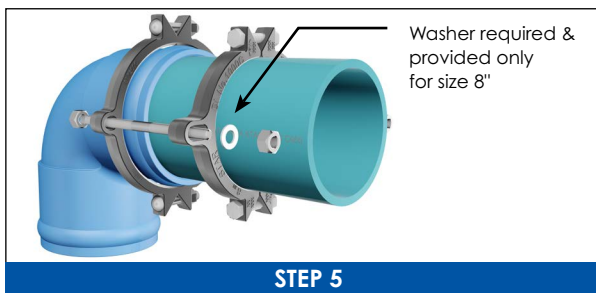
STEP 3

Using one of the T-bolts / rods (provided) mark a reference line such that the T-bolts / rod end extends past the nut by approximately 1/2".



STEP 4

Tighten serrated restraints clamp bolts evenly to recommended torque making sure the gap between bolt pads on both sides remain even.



STEP 5

Insert the T-bolts/rods (provided) through harness and restrainer as shown. Place a washer (Provided and required only for size 8") on each rod behind the serrated restrainer ears. Snug tighten the nuts so that the spigot end is secured into the bell end. **Caution: Do not over - tighten restraining nuts. Turn nut to hand tight plus half turn.**

CLAMPING BOLTS RECOMMENDED TORQUE	
PIPE SIZE (IN)	MINIMUM TORQUE (FT-LBS)
4"-8"	90-110

STAR® PIPE PRODUCTS





# Pipe Restrainers series 1000G2

1000G2C Restrainers for AWWA CI OD C900/C909 PVC/PVCO Pipe with MJ or Ductile Iron Push-On Fittings (Formerly Series 9000)  
Sizes 4" - 12"



## INFORMATION

Second Generation (Gen 2) PVC Restrainers for restraining mechanical joint or ductile iron push-on fittings with PVC pipe. These restraints work in any type of soil for a guaranteed joint restraint with rated pressure as listed below.

PVC restraints can be installed on new or existing systems, totally eliminating the use of thrust blocks. These restraints have internal serrations that lock onto the pipe and give 360° contact and support the pipe wall.

**Rated to the New, Higher Pressure Classes in Latest Editions of AWWA C900 and C909**

## FEATURES & ADVANTAGES

- 360° contact, no pipe distortion or point loading and supports the wall of the pipe
- Made of Ductile Iron - ASTM Grade A536, Grade 65-45-12
- Restrainers work with Mechanical Joint or Ductile Iron Push-On Fittings.
- For use on 4" - 12" C900 PVC and C909 PVCO Pipe.
- The safety factor is twice (2:1) the maximum pressure rating listed on next page.
- Can be installed outside the trench, to ease installation
- Maintains full deflection on Mechanical Joint and Ductile Iron Push-On Fittings
- T-Bolts/Hex Nuts: low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade 5
- Series 1000G2 is approved by Factory Mutual Research in sizes 4" - 12" for use on C900 DR18 pipe for 150 PSI.
- Standard color is Graphite Black (RAL 9011).
- Originally introduced as the 9000, this improved design (Gen 2) provides increased performance and is rated to the new, higher pressure classes in latest editions of AWWA C900 and C909.



6" 1000G2C with MJ Fitting

## SAMPLE SPECIFICATIONS

*PVC restraint devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be provided with exact tolerances for a 360° contact and support of the pipe wall. PVC Restraint devices shall have a safety factor of 2:1 over the pipe pressure rating.*

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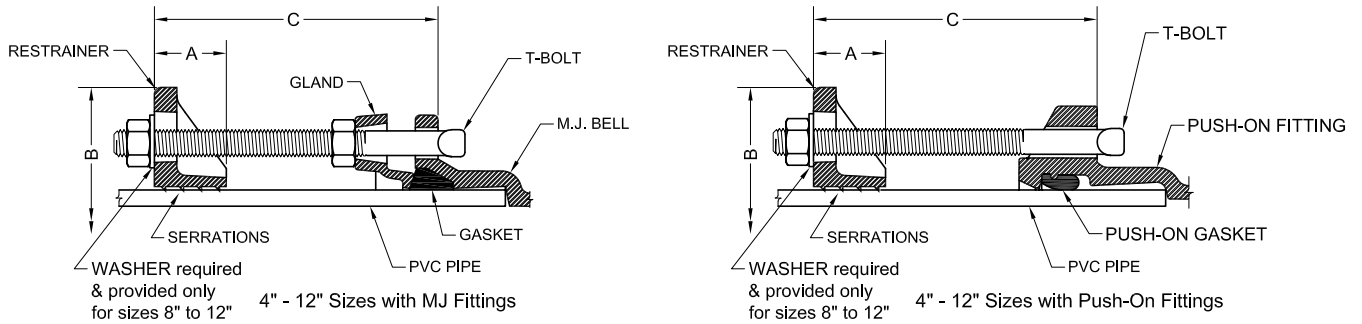
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# Pipe Restrainers series 1000G2

1000G2C Restrainers for AWWA CI OD C900/C909 PVC/PVCO Pipe with MJ or Ductile Iron Push-On Fittings (Formerly Series 9000)  
**Sizes 4" - 12"**

## TECHNICAL INFORMATION



### PIPE RESTRAINERS 1000G2C SPECIFICATIONS\*

NOM. SIZE	PVC/PVCO PIPE WITH DUCTILE IRON PIPE O.D. STYLE 1000G2C O.D.	A	B APPROX.	C MAX.	RESTRAINT BOLTS (T-BOLTS)		CLAMPING BOLTS		APPROX WT. (LBS)
					QTY	SIZE	QTY	SIZE	
4	4.80	1.44	9.32	6.00	2	3/4 x 7	2	5/8 x 3 1/2	7.24
6	6.90	1.50	11.26	6.00	2	3/4 x 7	2	5/8 x 3 1/2	8.10
8	9.05	2.00	14.76	8.00	2	3/4 x 9	2	3/4 x 4	14.92
10	11.10	2.38	17.26	8.00	4	3/4 x 9	2	7/8 x 5	26.49
12	13.20	2.38	20.00	8.00	4	3/4 x 9	2	7/8 x 5	30.67

\* All dimensions in inches except where indicated.

Table A - Pressure Rating (PSI) For PVC Pipe To Ductile Iron MJ Fitting Connections\*

NOM. SIZE (IN.)	AWWA C900 (CIOD)									AWWA C909 PVCO		
										IPEX PVCO	JM EAGLE PVCO	
	DR14	DR17	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51	PC235	PC235	PC165
4	305	250	235	200	165	-	-	-	-	235	-	-
6	305	250	235	200	165	-	-	-	-	235	235	-
8	305	250	235	200	165	-	-	-	-	235	235	-
10	305	250	235	200	165	-	-	-	-	235	235	-
12	305	250	235	200	165	-	-	-	-	235	235	-

\*For ordinary water works with transient surges only. Ratings are for PVC pipes with SERIES 1000G2 Restraint.

Table B - Pressure Rating (PSI) For PVC Pipe To Ductile Iron Push-On Fitting Connections\*

NOM. SIZE (IN.)	AWWA C900 (CIOD)									AWWA C909 PVCO		
										IPEX PVCO	JM EAGLE PVCO	
	DR14	DR17	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51	PC235	PC235	PC165
4	305	250	235	200	165	-	-	-	-	235	-	-
6	305	250	235	200	165	-	-	-	-	235	235	-
8	305	250	235	200	165	-	-	-	-	235	235	-
10	150	125	115	100	80	-	-	-	-	100	100	-
12	150	125	115	100	80	-	-	-	-	100	100	-

\*For ordinary water works with transient surges only. Ratings are for PVC pipes with SERIES 1000G2 Restraint.

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# Pipe Restrainers series 1000G2

1000G2C Restrainers for AWWA CI OD C900/C909 PVC/PVCO and Ductile Iron Pipe with MJ or Ductile Iron Push-On Fittings (Formerly Series 9000)  
Sizes 4" - 12"

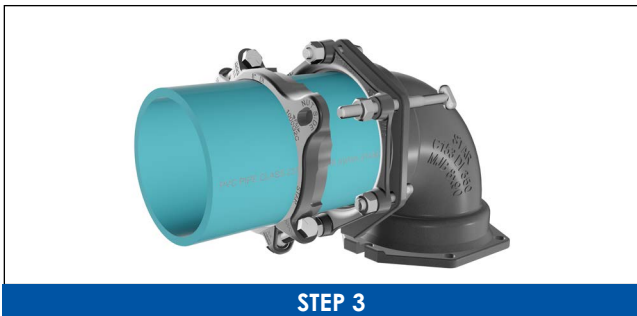
## 4"-12" SERIES 1000G2 INSTALLATION INSTRUCTIONS



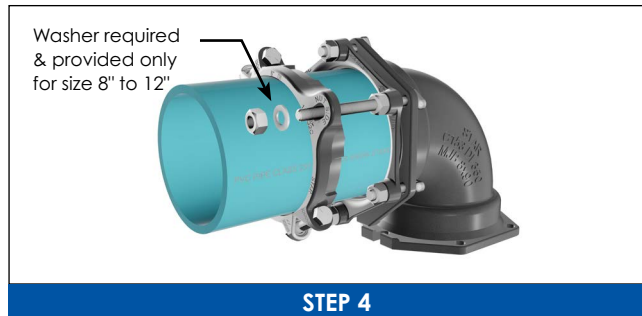
Insert and completely home the pipe into the MJ fitting bell. Then insert one of the long T-bolts/rods provided through one of the holes as shown. Mark a line 1 ¼" away from the end of the T-bolt/rod and towards the MJ bell as shown.



Assemble the MJ joint using the gland, gasket and T-bolts per the AWWA standards and as modified for AWWA C909 pipe in these guidelines. (Note that the long T-bolts/rods are installed later.) Next, assemble the restrainer on the pipe so that it is even with the line marked on the pipe in Step No. 1. Make sure that the open ends of the restrainer ears are toward the MJ fitting bell. Also ensure that the holes in the restrainer ears line up with the bolt holes of the MJ gland. Evenly tighten the restrainer clamping bolts to the recommended torque shown below, ensuring the gap between pads on both sides remain even.



Insert one of the long T-bolts/rods provided, installing one nut each between the gland and the restrainer as shown. Follow the same procedure for the remaining long T-bolts/rods. Tighten nuts against the MJ gland per the AWWA standards and as modified for AWWA C909 pipe in these guidelines. (See table for T-bolt/nut torque details.)



Place a washer (Provided and required only for sizes 8"-12") on each end of restrainer ear as shown. Snug the second nut on each long T-bolt/rod against the restrainer. **Caution: Do not over-tighten restraining nuts. Turn nut to hand tight plus a half turn.**

CLAMP BOLT TORQUE MINIMUM		
PIPE SIZE (IN)	C900/C909 (FT-LBS)	DI PIPE (FT-LBS)
4-10	100	110
12	130	130

T-HEAD BOLT & NUT DETAILS			
PIPE SIZE (IN)	BOLT SIZE (IN)	RANGE OF TORQUE (FT-LBS)	
		C900/DI PIPE	C909
4-12	3/4	75 - 90	55 - 65

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# Pipe Restrainers series 1000G2

1000G2C Restrainers for AWWA CI OD C900/C909 PVC/PVCO and Ductile Iron Pipe with MJ or Ductile Iron Push-On Fittings (Formerly Series 9000)  
Sizes 4" - 12"

## 4"-12" SERIES 1000G2 INSTALLATION INSTRUCTIONS FOR PUSH-ON FITTINGS



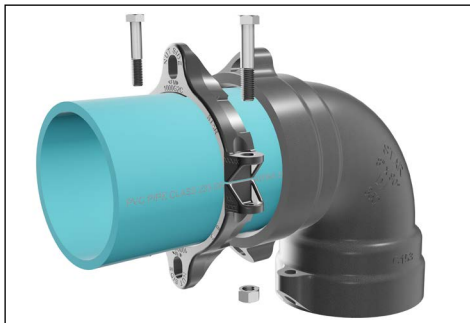
STEP 1

Insert pipe into the fitting bell according to standard procedure.



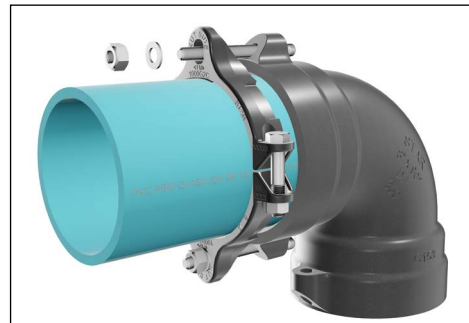
STEP 2

Use one of the T-bolts (provided) as an alignment guide to position serrated restrainer on pipe. Leave sufficient room for threads on the rod ends to fully engage nuts (provided). Full engagement occurs when there are at least two threads showing past the nut on the bolt.



STEP 3

Assemble the restrainer on the pipe as shown above. Make sure that the entire length of all the serrations are in contact with the pipe before installing the clamping bolts. Tighten the clamping bolts evenly between 90 and 110 ft-lbs of torque. Make sure the gap between the bolt pads on both sides remain the same.



STEP 4

Insert the restraining T-bolts (provided) through the fitting lugs and the restrainer as shown. Snug tighten the nuts so that the spigot end is secured into the bell end.

**CAUTION: Do not over-tighten restraint nuts. Turn nuts to hand tight plus half a turn.**

### Notes:

- Not recommended for use with Push-On fittings in sizes 14-inch and larger.

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# Pipe Restrainers series 1100G2

1100G2C Bell Restrainers for AWWA CI OD C900/C909 PVC/PVCO Pipe Joints  
(Formerly Series 9100)  
Sizes 4" - 12"



**INFORMATION**

Second Generation (Gen 2) PVC Restrainers for restraining PVC pipe bell joints. These restraints work in any type of soil for a guaranteed joint restraint with rated pressure as listed below.

PVC restrainers can be installed on new or existing systems, totally eliminating the use of thrust blocks. These restrainers have internal serrations that lock onto the pipe and give 360° contact and support the pipe wall. Restraint devices may be used with any type of PVC piping system.

**Rated to the New, Higher Pressure Classes in Latest Editions of AWWA C900 and C909\***

**FEATURES & ADVANTAGES**

- 360° contact, no pipe distortion or point loading
- Made of Ductile Iron - ASTM Grade 536, Grade 65-45-12
- Restrainers work with Push-On Pipe Bells.
- For use on 4" - 12" C900 PVC and C909 PVCO pipe.
- The safety factor is twice (2:1) the maximum pressure rating listed on next page.
- Can be installed outside the trench, to ease installation
- Rods/Hex Nuts: low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade 5
- Series 1100G2 is approved by Factory Mutual Research in sizes 4"- 12" for use on C900 PVC DR18 for 150 PSI.
- Standard color is Graphite Black (RAL 9011).
- Originally introduced as the 9100, this improved design (Gen 2) provides increased performance and is rated to the new, higher pressure classes in latest editions of AWWA C900 and C909\*.



\* See table on next page.

**SAMPLE SPECIFICATIONS**

*PVC restraint devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be provided with exact tolerances for a 360° contact and support of the pipe wall. PVC Restraint devices shall have a safety factor of 2:1 over the pressure rating.*

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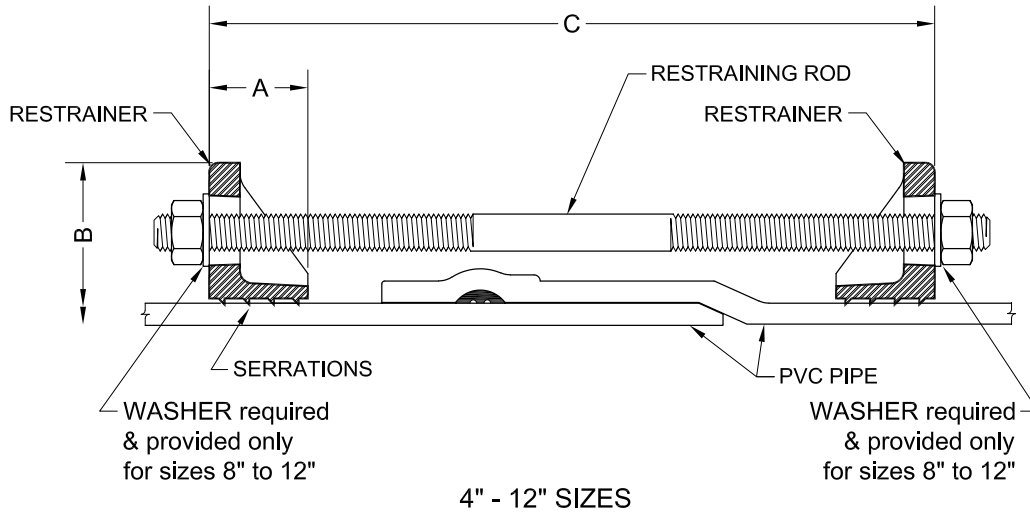
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# Pipe Restrainers series 1100G2

1100G2C Bell Restrainers for AWWA CI OD C900/C909 PVC/PVCO Joints  
(Formerly Series 9100)  
Sizes 4" - 12"

TECHNICAL INFORMATION



STAR® PIPE PRODUCTS

PIPE RESTRAINERS 1100G2C SPECIFICATIONS\*

NOM. SIZE	PVC/PVCO PIPE WITH DUCTILE IRON PIPE O.D. STYLE 1100G2C O.D.	A	B APPROX.	C MAX.	RESTRAINT RODS		CLAMPING BOLTS		APPROX WT. (LBS)
					QTY	SIZE	QTY	SIZE	
4	4.80	1.44	9.32	15.00	2	3/4 x 17	4	5/8 x 3 1/2	12.63
6	6.90	1.50	11.26	15.00	2	3/4 x 17	4	5/8 x 3 1/2	14.35
8	9.05	2.00	14.76	22.00	2	3/4 x 24	4	3/4 x 4	27.45
10	11.10	2.38	17.26	22.00	4	3/4 x 24	4	7/8 x 5	48.21
12	13.20	2.38	20.00	22.00	4	3/4 x 24	4	7/8 x 5	56.57

\* All dimensions in inches except where indicated.

NOM. SIZE (IN.)	Standardized Pressure Rating (PSI)*											
	AWWA C900 (CIOD)										AWWA C909 PVCO	
	DR14	DR17	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51	IPEX PVCO PC235	JM EAGLE PVCO PC235	PC165
4	305	250	235	200	165	-	-	-	-	235	-	-
6	305	250	235	200	165	-	-	-	-	235	235	-
8	305	250	235	200	165	-	-	-	-	235	235	-
10	305	250	235	200	165	-	-	-	-	235	235	-
12	305	250	235	200	165	-	-	-	-	235	235	-

\*For ordinary water works with transient surges only. Ratings are for PVC pipes with SERIES 1100G2 Restrainer.



# Pipe Restrainers series 1100G2

1100G2C Bell Restrainers for AWWA CI OD C900/C909 PVC/PVCO and Ductile Iron Pipe Joints (Formerly Series 9100)  
Sizes 4" - 12"

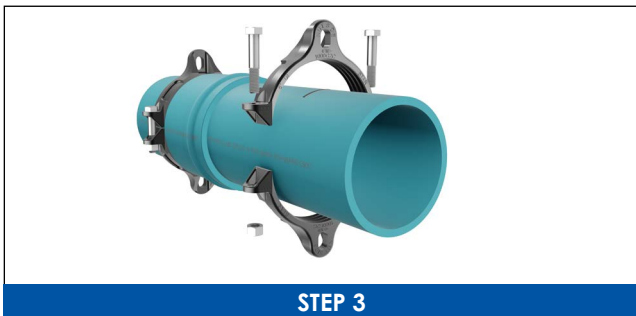
## 4"-12" SERIES 1100G2 INSTALLATION INSTRUCTIONS



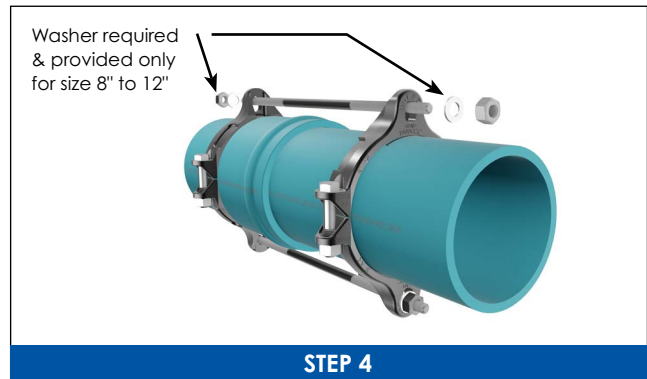
Assemble the spigot end of first pipe into the second pipe's bell per the pipe manufacturer's instructions.



Assemble one restrainer behind the bell of pipe. Make sure that the open end of the restrainer ears are toward the joint. Evenly tighten the restrainer clamping bolts to the recommended torque shown below, ensuring the gap between pads on both sides remain even. Use one of the restraint rods as a guide to position the restraint on spigot end. Mark a reference line such that the restraint rod ends extend past each nut approximately 1/2". **NOTE: The length of the PVC pipe bell varies from manufacturer to manufacturer. Please contact Star Pipe Products if rod length is too short.**



Assemble the second restrainer on the spigot end of pipe. Make sure that the open end of the restrainer ears are toward the joint. After aligning the second restrainer with the first one, tighten the clamping bolts to recommended torque evenly such that the gap between pads on both sides remain even.



Insert the restraining rods through the restrainer ears. Place a washer (Provided and required only for sizes 8"-12") on each end of restrainer ear as shown. Snug tighten all nuts such that rods stick out approximately 0.50" past the nut on each end. **Caution: Do not over-tighten restraining nuts. Turn nut to hand tight plus half turn.**

CLAMPING BOLTS TORQUE (MINIMUM)		
PIPE SIZE (IN)	C900/C909 (FT-LBS)	DI PIPE (FT-LBS)
4-10	100	110
12	130	130

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# Pipe Restrainers series 1000G2 & 1100G2

1000G2C & 1100G2C For Use On Ductile Iron Pipe

Sizes 4" - 12"



Above Image Represents a 6" Series 1100G2C

## INFORMATION

Second Generation (Gen 2) Pipe restrainers for restraining ductile iron pipe with mechanical joint or push-on fittings and DIP bell joints.

Pipe restrainers can be installed on new or existing systems, totally eliminating the use of thrust blocks. These restrainers have internal serrations that lock onto the pipe and give 360° contact and support the pipe wall.

## For Use on Ductile Iron Pipe

## FEATURES & ADVANTAGES

- Castings made of Ductile Iron - ASTM A536, Grade 65-45-12
- Restrainers work with Mechanical Joint or Ductile Iron Push-On Fittings and with Ductile Iron Pipe manufactured per ANSI/AWWA C-151/A21.51.
- The safety factor is twice (2:1) the maximum pressure rating listed on next page.
- Maintains full deflection on Mechanical Joint and Push-On Fittings
- T-Bolts/Rods/Hex Nuts: Low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade 5

## Notes:

- *Not recommended for installations on machined end pipe or fittings*
- *Installation requires clamp bolt torque values be applied as indicated on the next page.*
- *Installation and testing to be in accordance with the latest version of ANSI/AWWA C600*
- *For higher pressure requirements, please contact Star® Pipe Products*
- *Pipe hardness not to exceed 230 BHN.*

## SAMPLE SPECIFICATIONS

*Pipe restraining devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be provided with exact tolerance for a 360° contact and support of the pipe wall. Pipe restraining devices shall have a safety factor of 2:1 over the pressure rating.*

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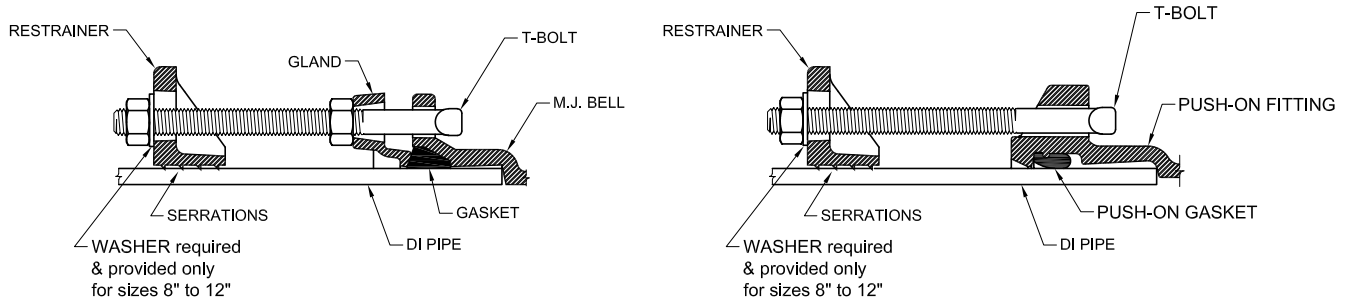


# Pipe Restrainers series 1000G2 & 1100G2

1000G2C & 1100G2C For Use On Ductile Iron Pipe

Sizes 4" - 12"

## TECHNICAL INFORMATION

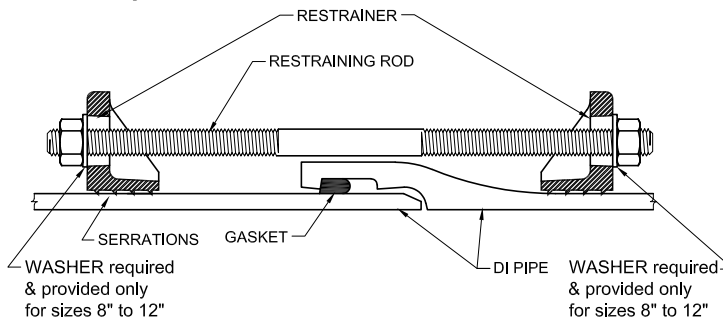


**Series 1000G2**

4" - 12" Sizes with MJ Fittings

**Series 1000G2**

4" - 12" Sizes with Push-On Fittings



**Series 1100G2**

4"-12" Sizes with Pipe to Pipe Connection

**TABLE A - Pressure Rating For Ductile Iron Pipe-To-Pipe Connections and Ductile Iron Pipe to MJ Fitting Connections**

NOMINAL SIZE	MAXIMUM PRESSURE RATINGS (PSI)	CLAMP BOLT TORQUE (FT-LBS)
4" - 10"	250	110 min.
12"	200	110 min.

**TABLE B - Pressure Rating For DI Pipe To Ductile Iron Push-On Fitting Connections**

NOMINAL SIZE	MAXIMUM PRESSURE RATINGS (PSI)	CLAMP BOLT TORQUE (FT-LBS)
4" - 8"	250	110 min.
10" - 12"	100	110 min.

STAR® PIPE PRODUCTS





# Pipe Restrainers series 1200G2

1200G2C Restrainers for C900/C909 PVC/PVCO Pipe and PVC Pressure Fittings w/Ductile Iron Pipe OD (Formerly Series 9200)  
Sizes 4" - 12"



6" 1200G2C Restrainers for C900/C909 PVC Pipe with C907 Fitting Bell

### INFORMATION

Second Generation (Gen 2) PVC Restrainers are for restraining bell joints between AWWA C900/C909 PVC/PVCO pipe and PVC pressure fittings. The PVC pressure fitting may be PC235 psi molded AWWA C907 PVC pressure fittings or PR 235 psi fabricated PVC pressure fittings.

PVC restrainers can be installed on new or existing systems, totally eliminating the use of thrust blocks. These restrainers have internal serrations that lock onto the pipe and give 360° contact and support the pipe wall.

**Rated to the New, Higher Pressure Classes in Latest Editions of AWWA C900 and C909\***

### FEATURES & ADVANTAGES

- 360° contact, no pipe distortion or point loading and supports the wall of the pipe and fitting bell.
- Made of Ductile Iron - ASTM Grade 536, Grade 65-45-12
- Restrainers work with either
  - PC235 psi molded AWWA C907 PVC pressure fittings or
  - PR235 psi fabricated PVC pressure fittings.
- The safety factor is twice (2:1) the maximum pressure rating listed on next page.
- Can be installed outside the trench, to ease installation
- T-Bolts/Rods/Hex Nuts: low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade5
- Standard gland color is Graphite Black (RAL 9011).
- Originally introduced as the 9200, this improved design (Gen 2) provides increased performance and is rated to the new, higher pressure classes in latest editions of AWWA C900 and C909\*.



6" 1200G2 Restrainer

\* See table on next page.

### SAMPLE SPECIFICATIONS

*PVC restraint devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be provided with exact tolerances for a 360° contact and support of the pipe wall. PVC Restraint devices shall have a safety factor of 2:1 over the pressure rating.*

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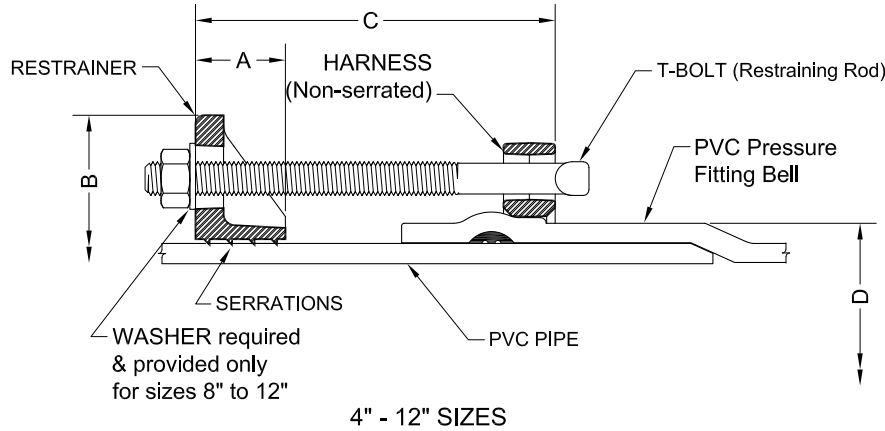
STAR® PIPE PRODUCTS



# Pipe Restrainers series 1200G2

1200G2C Restrainers for C900/C909 PVC/PVCO Pipe and PVC Pressure Fittings w/Ductile Iron Pipe OD (Formerly Series 9200)  
**Sizes 4" - 12"**

**TECHNICAL INFORMATION**



NOMINAL SIZE	RECOMMENDED CLAMP BOLT TORQUE (FT-LBS)
4"- 10"	100
12"	130

**PIPE RESTRAINERS 1200G2C SPECIFICATIONS\***

NOM. SIZE <sup>1</sup>	PVC/PVCO PIPE WITH DUCTILE IRON PIPE O.D. STYLE 1200G2C O.D.	A	B APPROX.	C MAX.	PVC FITTING BELL OD "D"		RESTRAINT BOLTS/RODS		CLAMPING BOLTS		APPROX WT. (LBS)
					MIN	MAX	QTY	SIZE	QTY	SIZE	
4	4.80	1.44	9.32	8.00	5.44	5.61	2	3/4 x 9	4	5/8 x 3-1/2	13.58
6	6.90	1.50	11.26	8.00	7.84	8.03	2	3/4 x 9	4	5/8 x 3-1/2	16.84
8	9.05	2.00	14.76	11.00	10.29	10.55	2	3/4 x 12	4	3/4 x 4	28.28
10	11.10	2.38	17.26	11.00	12.63	12.96	4	3/4 x 12	4	7/8 x 5	43.10
12	13.20	2.38	20.00	11.00	15.07	15.46	4	3/4 x 12	4	7/8 x 5	54.38

\* All dimensions in inches except where indicated.

NOM. SIZE (IN.)	Pressure Rating (PSI) For PVC Pipe To PVC Pressure Fitting Connections*												
	AWWA C900 (CIOD)										AWWA C909 PVCO		
	DR14+	DR17+	DR18	DR21	DR25	DR27.5	DR32.5	DR41	DR51	IPEX PVCO PC235	JM EAGLE PVCO PC235	PC165	
4	235	235	235	200	165	-	-	-	-	235	-	-	
6	235	235	235	200	165	-	-	-	-	235	235	-	
8	235	235	235	200	165	-	-	-	-	235	235	-	
10	235	235	235	200	165	-	-	-	-	235	235	-	
12	235	235	235	200	165	-	-	-	-	235	235	-	

\* For ordinary water works with transient surges only. Ratings are for PVC pipes with SERIES 1200G2 Restrainer.

+ Derated due to rating of PVC pressure fitting.

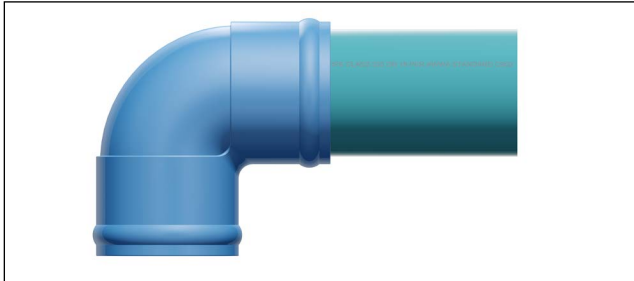
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# Pipe Restrainers series 1200G2

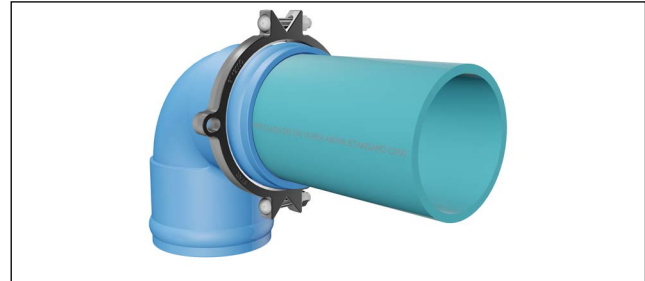
1200G2C Restrainers for C900/C909 PVC/PVCO Pipe and PVC Pressure Fittings w/Ductile Iron Pipe OD (Formerly Series 9200)  
Sizes 4" - 12"

## 4"-12" SERIES 1200G2 INSTALLATION INSTRUCTIONS



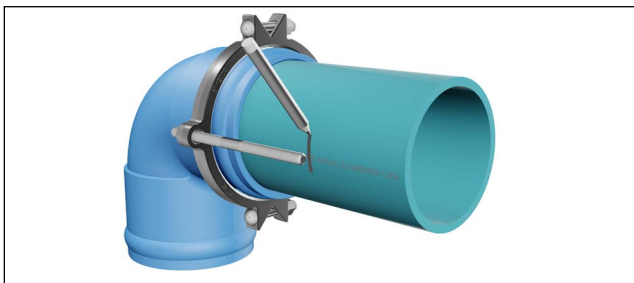
STEP 1

Insert the pipe into fitting bell per fitting manufacturer's instructions.



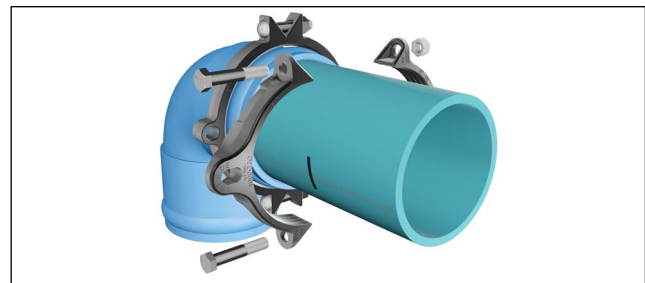
STEP 2

Assemble harness behind the bell of fitting using clamping bolts and nuts supplied. Evenly tighten to recommended torque.



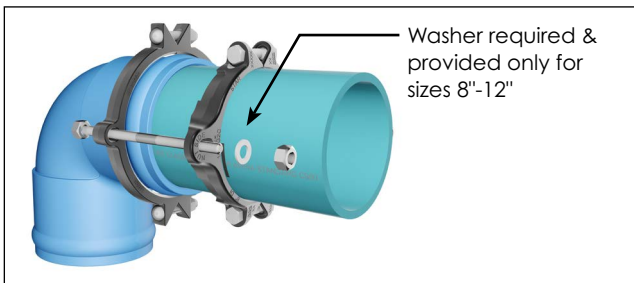
STEP 3

Using one of the T-bolts / rods (provided) mark a reference line such that the T-bolt / rod end extends past the nut by approximately 1/2".



STEP 4

**Make sure the open end of the restrainer ears are toward the joint.** Tighten serrated restrainer clamp bolts evenly to recommended torque making sure the gap between bolt pads on both sides remain even.



STEP 5

Insert the T-bolts / rods (provided) through harness and restrainer as shown. Place a washer (Provided and required only for sizes 8" to 12") on each end of rod behind the restrainer ears. Snug tighten the nuts so that the spigot end is secured into the bell end. **Caution: Do not over - tighten restraining nuts. Turn nut to hand tight plus half turn.**

CLAMP BOLT TORQUE (MINIMUM)	
PIPE SIZE (IN)	C900/C909 (FT-LBS)
4-10	100
12	130

STAR® PIPE PRODUCTS

