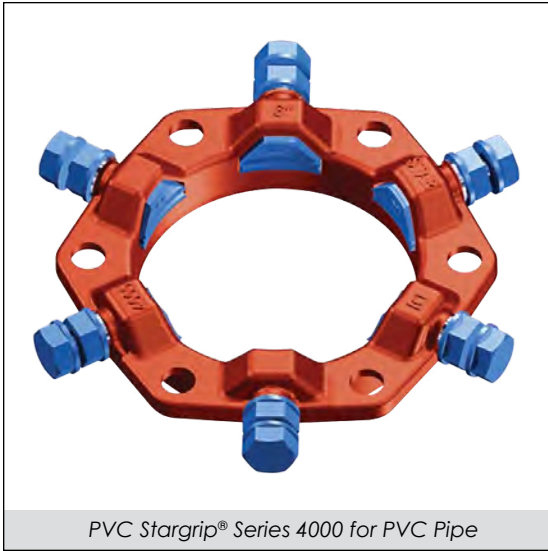




# PVC Stargrip® series 4000

Mechanical Joint Wedge Action Restraint for AWWA C900/C905 and IPS PVC Pipe



PVC Stargrip® Series 4000 for PVC Pipe

### INFORMATION

The PVC Stargrip® Mechanical Joint Restraint System is a unique product with a proven design that provides an exceptional restraining system for mechanical joint fittings (AWWA C153 or C110), valves, fire hydrants on all classes of PVC pipe.

## Unique Product with a Proven Design

### FEATURES & ADVANTAGES

- The design has been proven in the market since 1992.
- Can be used on 4"-12" AWWA C900, 14"-36" AWWA C905 PVC pipe or 3"-12" IPS PVC pipe\* (**\*transition gasket required on IPS PVC Pipe 12" and under**).
- Gland is made from high strength Ductile Iron per ASTM A536 Grade 65-45-12 and is compatible with all Mechanical Joints Conforming to ANSI/AWWA C111/A21.11.
- Eliminates tie rods and thrust blocks
- Listed with Underwriters Laboratories in sizes 4"-12" for use on DR18 class 235 C900 PVC pipe at 150 PSI. Approved by Factory Mutual Research in sizes 4"-12" for use on DR18 class 235 at 150 PSI and for sizes 4"-10" DR14 class 305 C900 PVC pipe at 200 PSI.
- Tested to and meets the requirements of ASTM F1674 through 14" size for DR18 PVC pipe.
- The safety factor is twice (2:1) the standardized pressure rating listed on Page 18.
- Double headed torque limiting bolts utilize 1 1/4" wrench size on both hex heads.
- Will fit any Mechanical Joint configuration, meaning compatibility with different types of installations.
- PVC Stargrip® offers 5° deflection through 12", 3° on 14"-24" and 2° on 30"-36".
- Larger ID allows easier installation on out-of-round pipe.
- Torque limiting bolts are designed with collars so that a wrench won't slip off the bottom for easier installation.
- Torque limiting bolts are designed so that you can't over torque and damage PVC pipe.
- All sizes have curved wedges that will not flatten pipe.
- For use on HDPE or C909 pipe, please contact Star Engineering.
- Standard gland color is Coral Red (RAL 3016).

### SAMPLE SPECIFICATIONS

*Restrainer mechanism shall be integrated into the design of the follower gland. As the mechanism is activated, multiple wedging action shall be imparted against the pipe increasing its resistance as internal pressure increases. After burial of the restraining mechanism, joint flexibility shall be maintained.*

*The actuating bolt shall be threaded into the gland and have a 1-1/4" hex operating nut. The actuating bolt system shall have a torque-limiting head designed to break off at preset torque levels, thus insuring proper action of the restraining device. After removal of the torque-limiting head, a 1 1/4" hex head shall remain to facilitate the removal and re-assembly of the gland. Glands, bolts and wedges shall be manufactured of high strength ductile iron in accordance with ASTM A536 Grade 65-45-12 requirements.*

*Applicable dimensions conforming to ANSI/AWWA C111/A21.11, C110/A21.10 and C153/A21.53 and shall be incorporated into the design so that the device facilitates use with standard mechanical joint sockets.*

*The restraining mechanism shall have a pressure rating as stated in most current catalog and shall have a safety factor of at least 2:1. The restraining device for C900/C905 PVC and IPS PVC Pipe shall be Star® Pipe Products PVC Stargrip® Series 4000 or equal.*

REV.11-1



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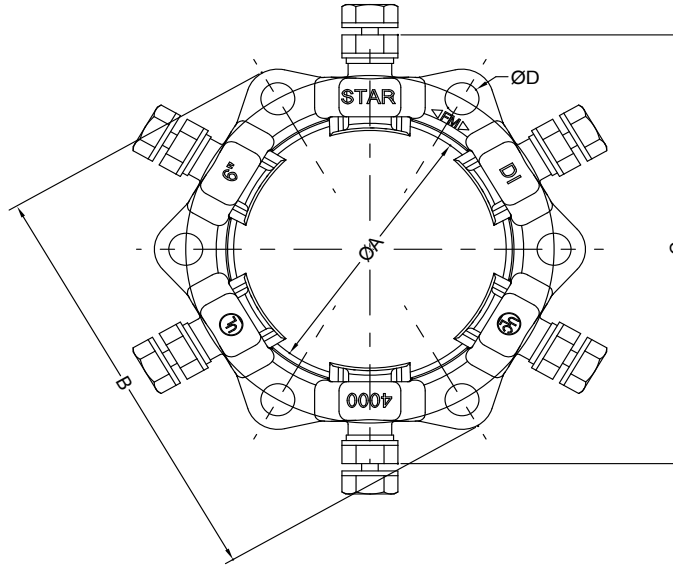
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# PVC Stargrip® series 4000

Mechanical Joint Wedge Action Restraint for AWWA C900/C905 and IPS PVC Pipe

TECHNICAL INFORMATION



PVC STARGRIP® 4000 SPECIFICATIONS\*

NOM. SIZE	C900/C905 PIPE CI OD	IPS PIPE OD (TRANSITION GASKET REQUIRED)	ØA	B	C'	ØD	T-BOLTS SIZE (QTY)	WEDGES (QTY)	APPROX WT. (LBS)
3	N/A	3.50	4.09	7.69	8.50	3/4	5/8 (4)	4	7
4	4.80	4.50	4.93	9.12	9.53	7/8	3/4 (4)	4	9
6	6.90	6.63	7.03	11.12	11.63	7/8	3/4 (6)	6	13
8	9.05	8.63	9.18	13.37	13.97	7/8	3/4 (6)	6	17
10	11.10	10.75	11.23	15.62	16.18	7/8	3/4 (8)	8	23
12	13.20	12.75	13.33	17.87	18.18	7/8	3/4 (8)	8	28
14	15.30	N/A	15.45	20.75	20.36	7/8	3/4 (10)	10	50
16	17.40	N/A	17.55	23.00	22.46	7/8	3/4 (12)	12	60
18	19.50	N/A	19.65	25.25	24.56	7/8	3/4 (12)	12	65
20	21.60	N/A	21.75	27.50	26.66	7/8	3/4 (14)	14	76
24	25.80	N/A	25.95	32.00	30.86	7/8	3/4 (16)	16	98
30	32.00	N/A	32.18	39.38	36.82	1-1/8	1 (20)	20	173
36	38.30	N/A	38.48	46.25	43.12	1-1/8	1 (24)	24	219

\*All dimensions in inches except where indicated.

1 - dimension after assembly on pipe

NOM. SIZE (IN)	MAXIMUM WORKING PRESSURE RATING WITH OCCASSIONAL & RECURRING SURGES									
	C900			C905				ASTM D2241		
	DR14	DR18	DR25	DR18	DR21	DR25	DR32.5	SDR17	SDR21	SDR26
3								250	200	160
4	305	235	165					250	200	160
6	305	235	165					250	200	160
8	305	235	165					250	200	160
10	305	235	165					250	200	160
12	305	235	165					250	200	160
14				235	200	165	125			
16				235	200	165	125			
18				200	200	165	125			
20				200	200	165	125			
24				165	165	165	125			
30						165	125			
36						165	125			

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# PVC Stargrip® series 4000

Mechanical Joint Wedge Action Restraint for AWWA C900/C905 and IPS PVC Pipe

## INSTALLATION INSTRUCTIONS - SIZES 3" - 36"



STEP 1

The rubber gasket seals more effectively if the surfaces with which it comes in contact are thoroughly cleaned just before assembly to remove all loose foreign material. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or pipe lubricant. Slide the PVC Stargrip® on the plain end, followed by the MJ gasket.



STEP 2

After insertion of the pipe into the bell of the fitting, firmly press the gasket into the gasket recess. During this process the joint should be kept straight.



STEP 3

Slide the PVC Stargrip® toward the MJ bell with the gland lip against the gasket. Insert T-bolts and hand tighten nuts.

**IMPORTANT:** Make deflection after joint is assembled but before tightening T-bolts.



STEP 4

While tightening T-bolts, it is essential that the gland be brought up toward the bell flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. All T-bolts should be tightened until they are within the torque range per ANSI/AWWA C600 (See Table A). T-Bolts should be tightened alternately on opposite sides (Star Pattern).



STEP 5

Hand tighten the Torque-limiting twist-off Bolts in a clockwise direction until all wedges are in firm contact with the pipe surface.

**IMPORTANT:** When installing sizes 4" through 12" on IPS PVC, the spacer washers must be removed from the torque limiting bolts.



STEP 6

Continue tightening in an alternative manner going on opposite sides [Star Pattern], until all of the Torque-limiting twist-off Bolt heads have been twisted off. Never turn a single bolt over 180 degrees without alternating to another bolt.

If removal is necessary, utilize the 1 1/4" hex head provided. [If reassembly is required, assemble the joint in the same manner as above and tighten the wedge bolt to 90 ft-lbs].

(TABLE A) T-HEAD BOLT & NUT DETAILS		
PIPE SIZE (IN)	BOLT SIZE (IN)	RANGE <sup>1</sup> OF TORQUE (FT-LBS)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120

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

### Notes:

- If effective sealing is not attained at the maximum torque indicated, then the joint should be disassembled, thoroughly cleaned, and reassembled. **Overstressing the bolts to compensate for poor installation practice is not acceptable.**
- Not to be used on DI or steel pipe.
- Stargrips must be adequately wrapped or protected if they are covered by concrete to ensure that concrete is not allowed to enter the wedge pocket.
- For applications with vertical offsets please contact Star Pipe Products for technical assistance.



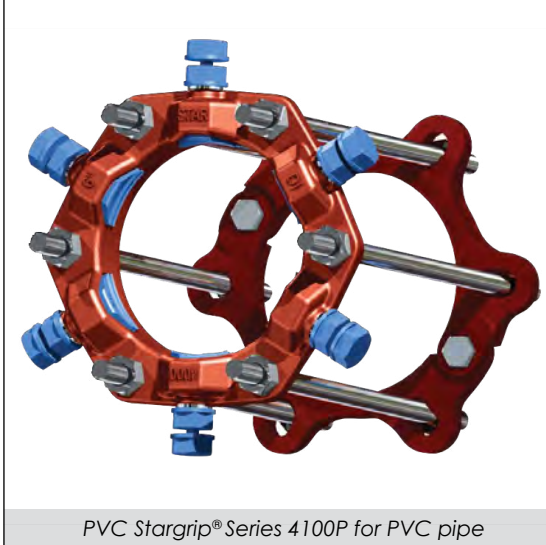
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# PVC Stargrip® series 4100P

Wedge Action Restraint for AWWA C900/C905 PVC Pipe Bells  
New Installations Only



PVC Stargrip® Series 4100P for PVC pipe

### FEATURES & ADVANTAGES

- For use on ANSI/AWWA C900/C905 CI OD PVC pipe
- For new Push-On Pipe Bell installations only
- Includes PVC Stargrip®, Split Back-Up Ring and high strength low alloy steel double ended rods and nuts which meet the requirements of ANSI/AWWA C111/A21.11
- Please refer to chart for maximum bell outside diameter for rod clearance.
- The safety factor is twice (2:1) the product pressure rating (see chart on pg. 18).
- Standard gland color is Coral Red (RAL 3016).

## New Installations Only

### TECHNICAL INFORMATION

#### PVC STARGRIP® 4100P SPECIFICATIONS\*

NOM. SIZE	RODS (QTY)	ROD DIA x LENGTH	MAX. BELL OD	APPROX WT. (LBS)
4	4	3/4 x 17	6.62	24
6	6	3/4 x 17	8.62	34
8	6	3/4 x 17	10.88	42
10	8	3/4 x 24	13.12	61
12	8	3/4 x 24	15.38	70
14	8	3/4 x 24	17.88	121
16	10	3/4 x 24	20.12	144
18	10	3/4 x 24	22.38	161
20	12	3/4 x 24	24.62	189
24	14	3/4 x 30	29.12	250
30	18	1 x 40	35.75	470
36	22	1 x 40	42.62	576

\*All dimensions in inches except where indicated. See page 22 for installation instructions.

### SAMPLE SPECIFICATIONS

Restraint for PVC push-on bells shall incorporate the use of a solid wedge action restraint and split follower into its design. Restrainer mechanism shall be integrated into the design of the follower gland. As the mechanism is activated, multiple wedging action shall be imparted against the pipe increasing its resistance as internal pressure increases. After burial of the restraining mechanism, joint flexibility shall be maintained.

The actuating bolt shall be threaded into the gland and have a 1-1/4" hex operating nut. The actuating bolt system shall have a torque-limiting head designed to break off at preset torque levels, thus insuring proper action of the restraining device. After removal of the torque-limiting head, a 1 1/4" hex head shall remain to facilitate the removal and re-assembly of the gland. Glands, bolts and wedges shall be manufactured of high strength ductile iron in accordance with ASTM A536 Grade 65-45-12 requirements.

Applicable dimensions conforming to ANSI/AWWA C111/A21.11, C110/A21.10 and C153/A21.53 and shall be incorporated into the design so that the device facilitates use with standard mechanical joint sockets.

All sizes shall have a minimum safety factor of 2:1 (i.e. twice the product pressure rating as stated in most current catalog). The restraint mechanism shall be Star® Pipe Products, PVC Stargrip® series 4100P or approved equal.

REV.11-1



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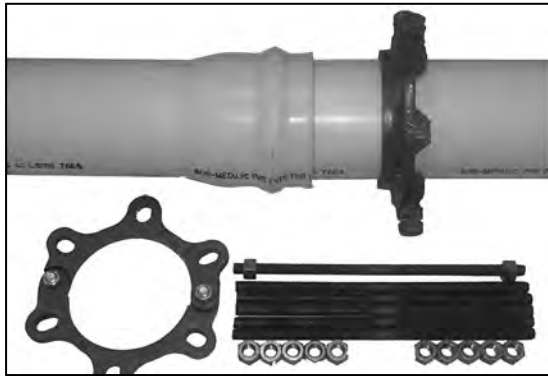
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# PVC Stargrip® series 4100P

Wedge Action Restraint for AWWA C900/C905 PVC Pipe Bells  
New Installations Only

## INSTALLATION INSTRUCTIONS - SIZES 4" - 36"

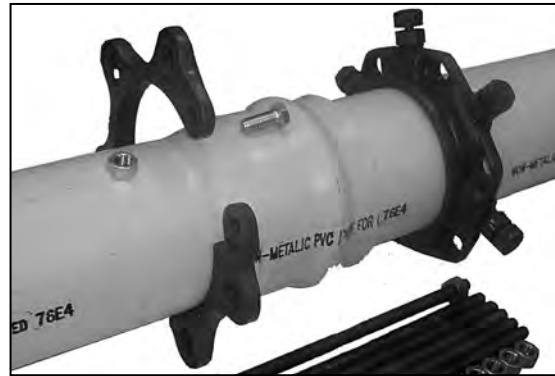


STEP 1

PVC Stargrip® Series 4100P is designed to restrain PVC Pipe, conforming to AWWA/ANSI AWWA C900/C905 (all pressure classes), push-on pipe bells. It includes a PVC Stargrip® Series 4000 gland for the spigot end and a split back-up ring behind the bell.

Place the PVC Stargrip® Series 4000 restraint gland on the spigot end of the second pipe with the lip extension facing towards the mating bell.

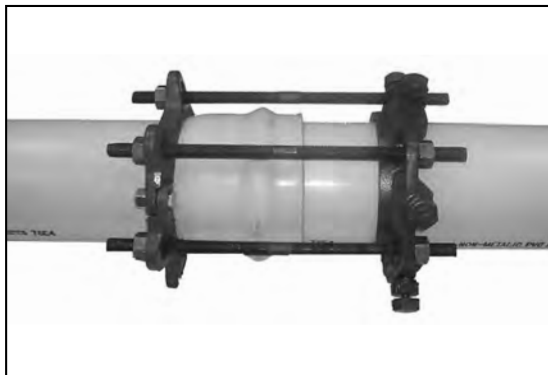
Assemble the PVC Pipe Push-On joint per the pipe manufacturer's installation instructions.



STEP 2

Install the split back up ring, behind the pipe bell in the direction indicated on the casting. Tighten clamping bolts on the split back-up ring to 90 ft-lb.

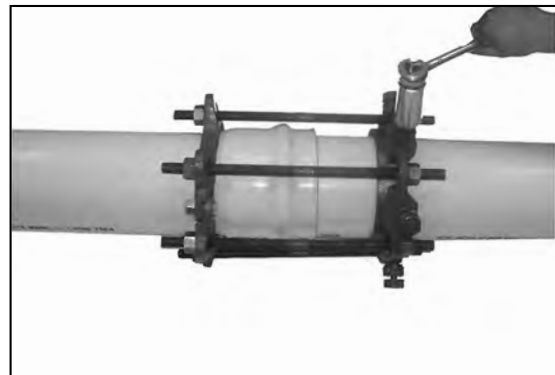
Rotate PVC Stargrip® Series 4000 restraint gland on the spigot such that the bolt holes are in alignment and adjust the position so that the distance between the glands is suitable for the double-ended rod length. Adequate room should be allowed on the double-ended rods so that nuts can be fully engaged with several threads showing.



STEP 3

Install the remaining double-ended rods provided in each bolt hole for evenly distributing the operating load. Place nuts on the ends of each double-ended rod. It is to be ensured that adequate room is allowed on rods to fully engage the nuts with several threads showing.

Pull PVC Stargrip® Series 4000 restraint gland away from the joint until there is no slack in the rods.



STEP 4

Tighten the torque limiting twist off nuts in a clockwise direction until all the wedges are in firm contact with the pipe OD. Continue tightening in an alternative manner going on opposite sides (Star Pattern), until all of the nuts have been twisted off. Never turn a single nut over 180 degrees without alternating to another nut.

The nuts on the double-ended rods must be tightened until the back-up ring is in firm contact with the back of the bell. These nuts should not be over tightened.

If removal of the PVC Stargrip® Series 4000 restraint gland is necessary, utilize the 1 1/4" hex head provided. If reassembly is required, assemble the product in the same manner as above and tighten the wedge bolts to 90 ft-lbs.

### Notes:

- Not to be used on DI or steel pipe.
- Stargrips must be adequately wrapped or protected if they are covered by concrete to ensure that concrete is not allowed to enter the wedge pocket.
- For applications with vertical offsets please contact Star Pipe Products for technical assistance.

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