



Pipe Restrainers series 9000

9000C Restrainers for AWWA CI OD C900/C909 PVC/PVCO Pipe with MJ or Push-On Fittings



Series 9000C for C900 PVC Pipe/C909 PVCO Pipe

INFORMATION

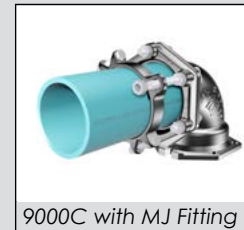
PVC Restrainers for restraining mechanical joint or push-on fittings with PVC pipe. These restraints work in any type of soil for a guaranteed joint restraint with rated pressure as listed below.

PVC 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 and supports the wall of the pipe
- Made of Ductile Iron - ASTM Grade A536, Grade 65-45-12
- Restrainers work with Mechanical Joint or Push-On Fittings.
- For use on 4" - 12" C900 PVC and C909 PVCO Pipe.
- All restrainers are machined to exact tolerances.
- 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 Push-On Fittings
- T-Bolts/Hex Nuts: low alloy steel per ANSI/AWWA C111/A21.11
- Clamping Bolts: SAE J429 Grade 5
- Series 9000C 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).



9000C with MJ Fitting

SAMPLE SPECIFICATIONS

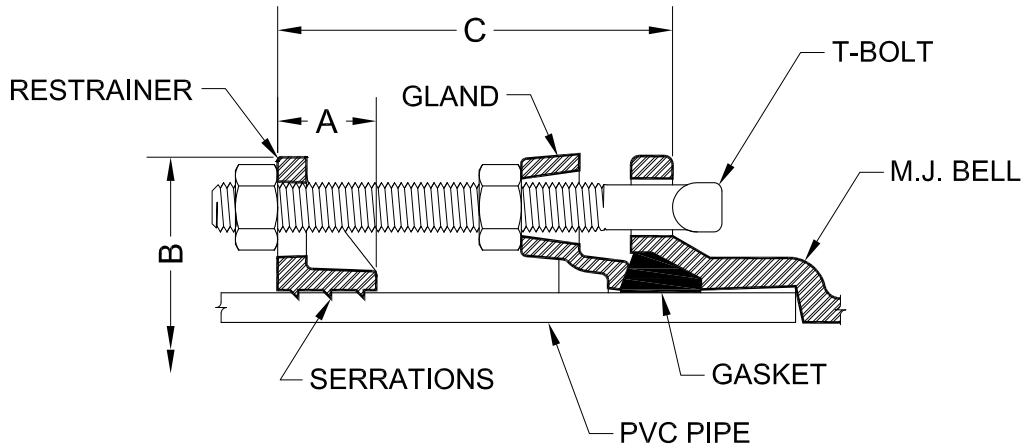
PVC restraint devices shall be manufactured of high strength ductile iron in accordance to ASTM A536 Grade 65-45-12 for all sizes. Internal serrations will be machined to provide exact tolerances to provide 360° contact and support of the pipe wall. PVC Restraint devices shall have a safety factor of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



Pipe Restrainers series 9000

9000C Restrainers for AWWA CI OD C900/C909 PVC/PVCO Pipe with MJ or Push-On Fittings

TECHNICAL INFORMATION



4" - 12" Sizes

PIPE RESTRAINERS 9000 SPECIFICATIONS*

NOM. SIZE	PVC PIPE WITH DUCTILE IRON PIPE O.D. STYLE 9000C	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	11.14	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.

** Contact Star for price and availability.

MAXIMUM WORKING PRESSURE RATING WITH OCCASSIONAL & RECURRING SURGES

NOM. SIZE (IN)	C900			C909
	DR14	DR18	DR25	PC 235
4	305	235	165	235
6	305	235	165	235
8	305	235	165	235
10	305	235	165	235
12	305	235	165	235

STAR® PIPE PRODUCTS



Pipe Restrainers series 9000

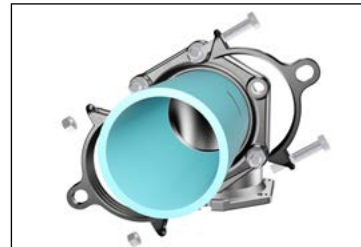
9000C Restrainers for AWWA CI OD C900/C909 PVC/PVCO and Ductile Iron Pipe with MJ or Push-On Fittings

INSTALLATION INSTRUCTIONS (SERIES 9000 4"-12")



STEP 1

To ensure the rubber gasket will seal effectively, clean and remove all loose materials from the mating surfaces. If the pipe being installed is PVC, verify that the end going into the MJ bell is square cut. If not, remove all but 1/8" of the bevel and debur it. Insert and completely home the pipe into the MJ fitting bell. Then insert one of the long T-bolts provided through one of the holes as shown. Mark a line 1 1/4" away from the end of the T-bolt and towards the MJ bell as shown.



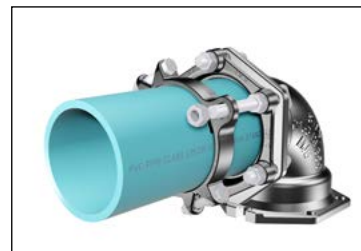
STEP 2

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 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.



STEP 3

Insert one of the long T-bolts provided, installing one nut each between the gland and the restrainer as shown. Follow the same procedure for the remaining long T-bolts. 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.)



STEP 4

Snug tighten the second nut on each long T-Bolt against the restrainer as shown. Washers are provided for sizes 8" to 12".

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

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

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

STAR® PIPE PRODUCTS



Pipe Restainers series 9100

9100C Bell Restainers for AWWA CI OD C900/C909 PVC/PVCO Pipe Joints



Series 9100C for C900 PVC/C909 PVCO Pipe

INFORMATION

PVC Restainers for restraining PVC pipe bell joints. These restrainers 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
- Restainers work with Push-On Pipe Bells.
- For use on 4" - 12" C900 PVC and C909 PVCO pipe.
- All restrainers are machined to exact tolerances.
- 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 9100C 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).



Series 9100C

* 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 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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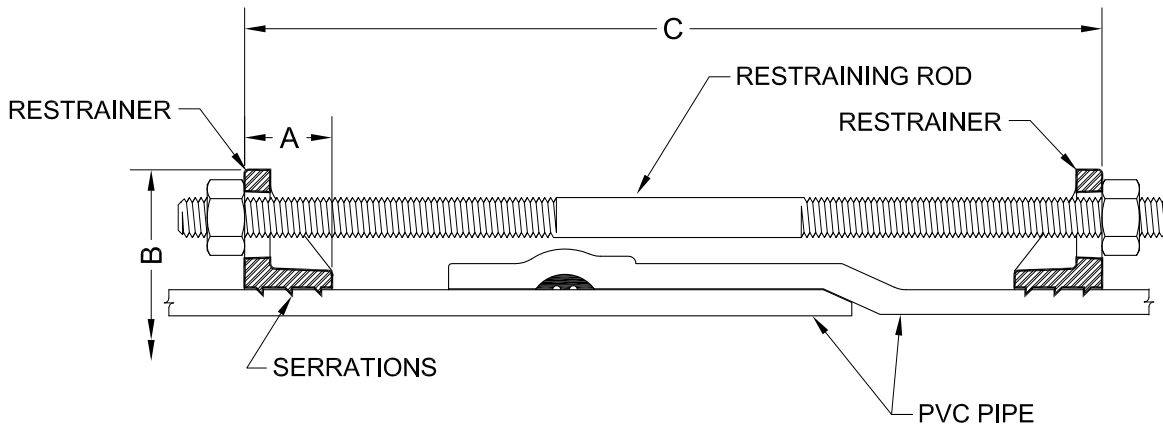
STAR® PIPE PRODUCTS



Pipe Restrainers series 9100

9100C Bell Restrainers for AWWA CI OD C900/C909 PVC/PVCO Joints

TECHNICAL INFORMATION



4" - 12" Sizes

PIPE RESTRAINERS 9100 SPECIFICATIONS*

NOM. SIZE	PVC PIPE WITH DUCTILE IRON PIPE O.D. STYLE 9100C 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	11.14	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.

** Contact Star for price and availability.

MAXIMUM WORKING PRESSURE RATING WITH OCCASSIONAL & RECURRING SURGES

NOM. SIZE (IN)	C900			C909
	DR14	DR18	DR25	PC 235
4	305	235	165	235
6	305	235	165	235
8	305	235	165	235
10	305	235	165	235
12	305	235	165	200

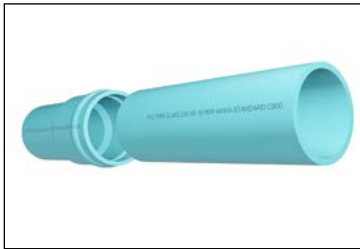
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Pipe Restrainers series 9100

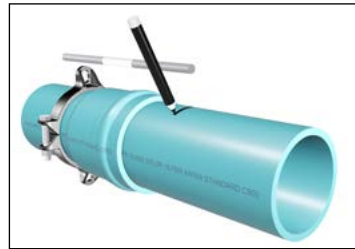
9100C Bell Restrainers for AWWA CI OD C900/C909 PVC/PVCO and Ductile Iron Pipe Joints

INSTALLATION INSTRUCTIONS (SERIES 9100 4"-12")



STEP 1

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



STEP 2

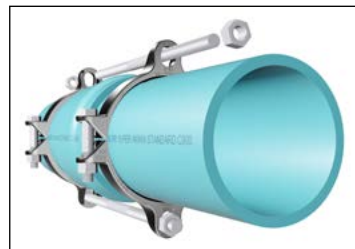
Assemble one restrainer behind the bell of pipe. Make sure that the open end of the restrainer ears are toward the joint. Evenly tighten the restrainer clamping bolts to the recommended torque, ensuring the gap between pads on both sides remain even. Use one of the restraint rods as a guide to position 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.



STEP 3

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.



STEP 4

Insert the restraining rods through the restrainer ears. Snug tighten all nuts such that rods stick out approximately 0.50" past the nut on each end. Washers are provided for size 8"-12".

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

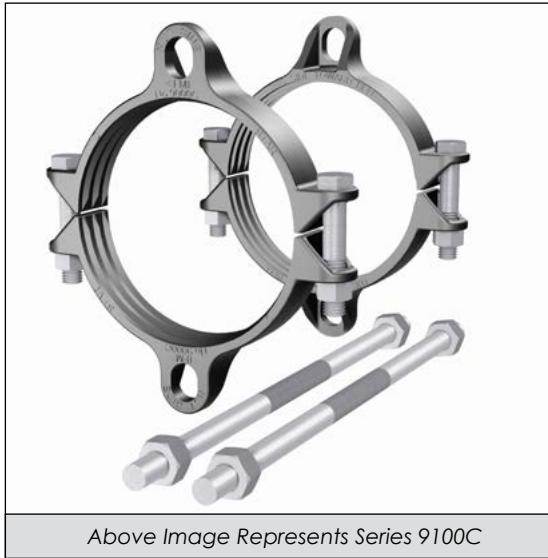
RECOMMENDED TORQUE (CLAMPING BOLTS)		
PIPE SIZE (IN)	C900/C909 (FT-LBS)	DI PIPE (FT-LBS)
4-10	100	110
12	130	130

STAR® PIPE PRODUCTS



Pipe Restrainers series 9000C & 9100C

9000C & 9100C For Use On Ductile Iron Pipe



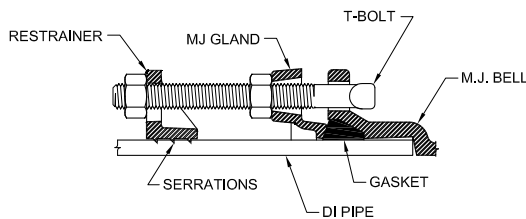
Above Image Represents Series 9100C

INFORMATION

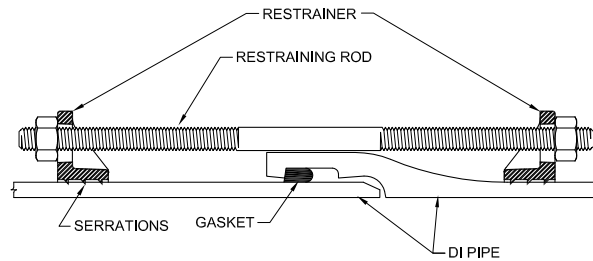
Pipe restrainers for restraining ductile iron pipe with mechanical joint or push-on fittings and DIP bell joints.

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



Series 9000C (4" - 12")



Series 9100C (4" - 12")

FEATURES & ADVANTAGES

- Castings made of Ductile Iron - ASTM A536, Grade 65-45-12
- Restrainers work with Mechanical Joint or Push-On Fittings and with Ductile Iron Pipe manufactured per ANSI/AWWA C-151/A21.51 & AWWA C150/A21.50
- All restrainers are machined to exact tolerances
- The safety factor is twice (2:1) the maximum pressure rating listed below.
- 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 clamp bolt torque values be applied as indicated above.*
- *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 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.

NOMINAL SIZE	MAXIMUM PRESSURE RATINGS (PSI)	RECOMMENDED CLAMP BOLT TORQUE (FT-LBS)
4" - 10"	250	110
12"	200	130



Pipe Restrainers series 9200

9200C Restrainers for C900/C909 PVC/PVCO Pipe and PVC Pressure Fittings w/Ductile Iron Pipe OD



9200C Restrainers for C900/C909 PVC Pipe with C907 Fitting Bell

INFORMATION

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
- 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.
- The safety factor is twice (2:1) the maximum pressure rating listed on next page.
- 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).



9200C Restraint

* 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 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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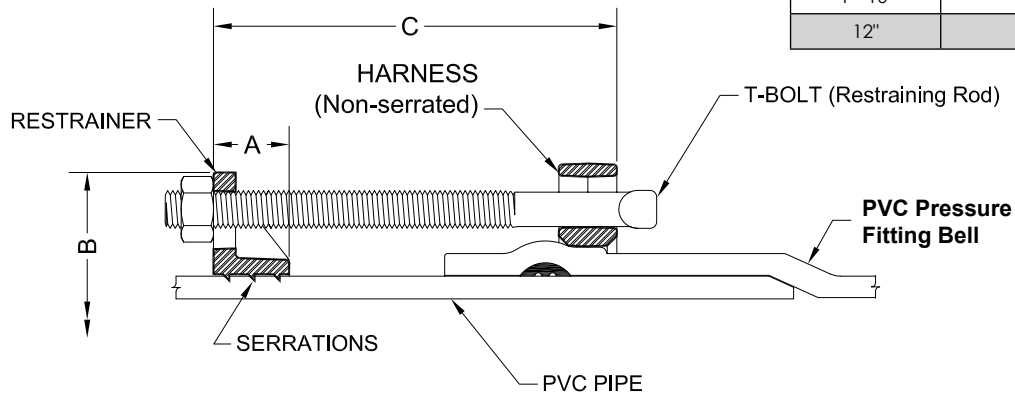


Pipe Restrainers series 9200

9200C Restrainers for C900/C909 PVC/PVCO Pipe and PVC Pressure Fittings w/Ductile Iron Pipe OD

TECHNICAL INFORMATION

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



4" - 12" SIZES

PIPE RESTRAINERS 9200 SPECIFICATIONS*

NOM. SIZE ¹	PVC PIPE WITH DUCTILE IRON PIPE O.D. STYLE 9200C O.D.	A	B APPROX.	C MAX.	RESTRAINT BOLTS/RODS		CLAMPING BOLTS		APPROX WT. (LBS)
					QTY	SIZE	QTY	SIZE	
** 4	4.80	1.44	9.32	8.00	2	3/4 x 9	4	5/8 x 3-1/2	13.58
** 6	6.90	1.50	11.14	8.00	2	3/4 x 9	4	5/8 x 3-1/2	16.84
8	9.05	2.00	14.76	11.00	2	3/4 x 12	4	3/4 x 4	28.28
10	11.10	2.38	17.26	11.00	4	3/4 x 12	4	7/8 x 5	43.10
12	13.20	2.38	20.00	11.00	4	3/4 x 12	4	7/8 x 5	54.38

* All dimensions in inches except where indicated.

** Contact Star for price and availability

NOM. SIZE (IN)	C900			C909
	DR14+	DR18	DR25	PC 235
4	235	235	165	235
6	235	235	165	235
8	235	235	165	235
10	235	235	165	235
12	235	235	165	175

+ Derated due to rating of PVC pressure fitting.

STAR® PIPE PRODUCTS



Pipe Restrainers series 9200

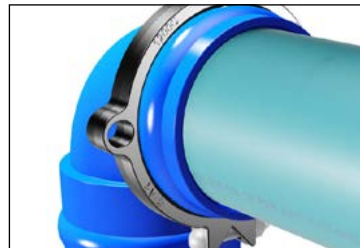
9200C Restrainers for C900/C909 PVC/PVCO Pipe and PVC Pressure Fittings w/Ductile Iron Pipe OD

INSTALLATION INSTRUCTIONS (SERIES 9200 4"-12")



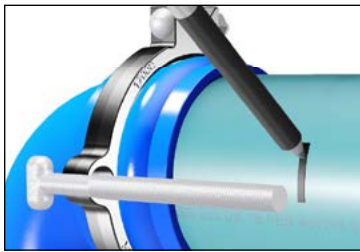
STEP 1

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



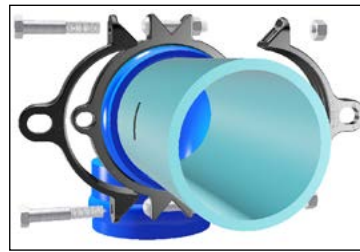
STEP 2

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



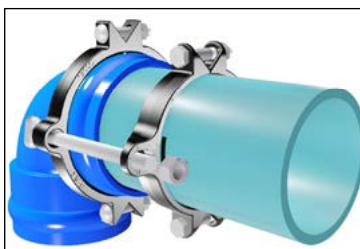
STEP 3

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 restrainers as shown. For size 8" to 12", place a washer (provided) 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 fight plus half turn.

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

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