EAGLE LOC 900™

INTERNAL JOINT RESTRAINT SYSTEM
INSTALLATION GUIDE

JM Eagle™

DELIVERING GOOD WATER TO YOU

EAGLE LOC 900™

CONTENTS

LIMITED WARRANTY

1. PERIODS AND SCOPE OF COVERAGE

JM Eagle™ warrants that the pipe products certified to the standards of the American Water Works Association (AWWA) for water distribution, transmission and force sewer mains including C900, C905, C909, C901 and C906 products manufactured by JM Eagle™ (each a "Product" and collectively, the "Products")* are manufactured in accordance with the following AWWA, ASTM, ANSI/NSF, and UL standards as follows: **(1)** AWWA C900 and ASTM 1784 cell class 12454; Gaskets meet ASTM F477; Joints meet ASTM D3139; ANSI/NSF-61, UL 1285 for the C900, **(2)** AWWA C905 and ASTM 1784 cell class 12454; Gaskets meet ASTM F477; Joints meet ASTM D3139; ANSI/NSF-61, UL 1285 for C905, **(3)** AWWAC909 and UL 1285; Gaskets meet ASTM F477; Joints meet ASTM D3139 for C909 and **(4)** AWWA C901/906, ASTM D2239, ASTM D2737, ASTM D3035, F714, cell class per ASTM D3350, PPI listed material (TR-4) PE3408/3608 & PE4710, ASNI/NSF-14 for C901 and C906. JM Eagle™ warrants that each of these Products manufactured by JM Eagle™ leaves our plant free from defects in workmanship and materials. These Products as manufactured by JM Eagle™ are backed by our unprecedented fifty (50) year Limited Warranty. This Limited Warranty provides that Products manufactured by JM Eagle™ meet the above stated quality standards published by the AWWA, ASTM International (ASTM), American National Standards Institute/NSF International (ANSI/NSF), and Underwriters Laboratories (UL).

If any Product is determined within fifty (50) years from the date of invoice by JM Eagle™ to be defective because it failed to meet the above stated standards, JM Eagle™ will then provide replacement product of the same type, size and quantity of the product and pay for the costs directly related to its replacement*** or issue credits, offsets or a combination thereof for the wholesale purchase price of the defective product.

JM Eagle™ also warrants that the design of our Products are independently tested and/or certified by AWWA, NSF and UL to meet their respective standards and that our plants manufacturing the Products are already certified or in process of being certified to ISO 9001 certification** as part of our program to develop manufacturing processes that consistently produce high quality plastic pipe.

JM Eagle™ quality control programs encompass three critical aspects of the manufacturing process: the incoming raw material, pipe production, and the finished goods.

2. EXCLUSIONS FROM COVERAGE AND EXCLUSIVE REMEDY:

Products manufactured by JM Eagle™ are marked with JM Eagle, PW Eagle or US Poly stencil markings. This limited warranty excludes any Product not manufactured by JM Eagle™, even if it is sold by JM Eagle™, and also excludes defects or failures caused after shipment by:

- improper installation (including, without limitation, misalignment),
- use in improper applications or conditions or in conjunction with improper materials (including, without limitation, improper lubricants, pastes, solvents or sealants),
- contact with aggressive chemical agents, freezing or overheating of liquids in the Product, or unusual pressure surges or pulsation,
- vibration,
- temperature shocking,
- U.V. degradation,
- failure to adhere to JM Eagle™'s instructions concerning the proper handling, installation, testing and use of the Product,
- failure to adhere to applicable standards set forth by local laws, codes, or regulations and the applicable industry standards, or
- any other improper activities not listed above or damage caused by the fault or negligence of anyone other than JM Eagle™.

THE WARRANTIES IN THIS LIMITED WARRANTY ARE THE ONLY WARRANTIES APPLICABLE TO THE PRODUCTS. THERE ARE NO OTHER WARRANTIES, REPRESENTATIONS OR CONDITIONS OF ANY KIND, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, WITH RESPECT TO THE PRODUCTS SUPPLIED HEREUNDER INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED AND JM EAGLE™ SHALL NOT BE LIABLE IN THIS RESPECT NOTWITHSTANDING JM EAGLE'S™ ACTUAL KNOWLEDGE OF THE PRODUCT'S INTENDED USE OR ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY JM EAGLE™ CONCERNING THE DESIGN, MANUFACTURE, FABRICATION, SALE, USE, INSTALLATION OR PROVISION OF THE PRODUCTS. NO STATEMENT, CONDUCT OR DESCRIPTION BY JM EAGLE™ OR ITS REPRESENTATIVES, IN ADDITION TO OR BEYOND THIS LIMITED WARRANTY, SHALL CONSTITUTE A WARRANTY.

BUYER AGREES THAT ITS SOLE AND EXCLUSIVE REMEDY FOR BREACH OF THIS LIMITED WARRANTY, AND THE SOLE AND EXCLUSIVE OBLIGATION OF JM EAGLE™ IN RESPECT OF ANY CLAIMS FOR BREACH OF THIS LIMITED WARRANTY, SHALL BE (1) THE REPLACEMENT OF THE SAME TYPE, SIZE AND LIKE QUANTITY OF NON-DEFECTIVE PRODUCT, AT THE ORIGINAL POINT OF DELIVERY AND COSTS RELATED TO ITS REPLACEMENT*, OR (2) CREDITS, OFFSETS, OR A COMBINATION THEREOF, FOR THE WHOLESALE PURCHASE PRICE OF THE DEFECTIVE PRODUCT. IN NO EVENT SHALL JM EAGLE™ BE LIABLE FOR LOST PROFITS, LOSS OF GOODWILL, LOSS OF BUSINESS OPPORTUNITIES, DAMAGE TO REPUTATION, SPECIAL DAMAGES, INDIRECT DAMAGES, DELAY DAMAGES, PUNITIVE DAMAGES, EXEMPLARY DAMAGES, CONSEQUENTIAL DAMAGES OR INCIDENTAL DAMAGES.**

3. REQUIREMENTS FOR MAKING CLAIMS:

Every claim for breach under this warranty shall be void unless it is made in writing to JM Eagle™ and postmarked **within five business (5) days** of the date the defect was discovered or in the exercise of ordinary care should have been discovered and, in any event, the claim must also be made within fifty (50) years of the date of the JM Eagle™ invoice. As noted above, Products manufactured by JM Eagle™ are marked with a JM Eagle, PW Eagle or US Poly stencil. This limited warranty excludes any Product not manufactured by JM Eagle™, even if it is sold by JM Eagle™.

Any claim for breach of warranty must be sent to:

Product Assurance Department
JM Eagle
5200 W. Century Boulevard
Los Angeles, CA, 90045

For questions regarding claims, the Product Assurance Department may be also contacted at 1-800-621-4404 or JMWebSupport1@jmeagle.com.

No claim under this limited warranty will be valid unless (1) proof of purchase with the date thereof as well as a description of the alleged defect in reasonable detail is presented to the satisfaction of JM Eagle™, (2) written permission and/or a Return Goods Authorization (RGA) is obtained from JM Eagle™, (3) JM Eagle™ is given a meaningful and reasonable opportunity to inspect the allegedly defective Product and its installation at the site and (4) at JM Eagle™'s request, representative samples of the allegedly defective Product are returned to JM Eagle™ in accordance with JM Eagle™'s instructions.

* Products covered by this Limited Warranty include similar PW Eagle and US Poly products manufactured by JM Eagle after July 1, 2007.
** JM Eagle's Corona, Texas plant is in the process of obtaining ISO 9001 certification. The other plants are already certified to ISO 9000.
*** Replacement costs shall be reasonable and based on industry standard cost parameters such as those listed in the RS Means Assemblies Cost Data Book.

The Eagle Loc 900™ Installation Guide is a supplement to the Blue Brute™ Installation Guide.

1.0 ASSEMBLY INSTRUCTIONS

1.1 INTRODUCTION

Proper assembly of Eagle Loc 900 requires:

- A clean bell and spigot
- Inspecting the Eagle Loc Hardware
- Installing the Insertion Stop on the spigot (Required)
- Application of the recommended lubricant (a container of lubricant is typically provided with each shipment of pipe)
- Maintenance of straight alignment during assembly
- Inserting the spigot into the bell until the reference mark is even with the lip of the bell

1.2 CLEAN

As with conventional bell-and-spigot pipe, the gasket and the groove area behind it should be wiped clean. If mud, dirt, silt, or other foreign material is in the sealing area, it may prevent the gasket from sealing against the spigot. In addition to cleaning the gasket area, the restraint hardware needs to be clean. Debris in this area may prevent the hardware from engaging and keep the restraint mechanism from activating.

Figure 1: The sand and grit shown above must be cleaned from the restraint hardware. Dirty hardware may prevent the restraint mechanism from working.

To make an easy installation even simpler, the product comes supplied with end plugs. The end plugs make it easier to keep the bell, gasket area, and restraint hardware clean. The plugs should be left in place as long as possible. Remove them just prior to assembling the joint.

Figure 2: The end plugs in these pipes keep dirt and other foreign material out of the bell.

1.3 INSPECT EAGLE LOC HARDWARE

There are a few items to check that are unique to Eagle Loc. Checking these items prior to assembly will help ensure that the job goes smoothly. The grip ring and casing should be clean with the ring teeth pointed toward the back of the bell. The grip ring should sit at the back of the casing and be easy to rotate inside the casing.

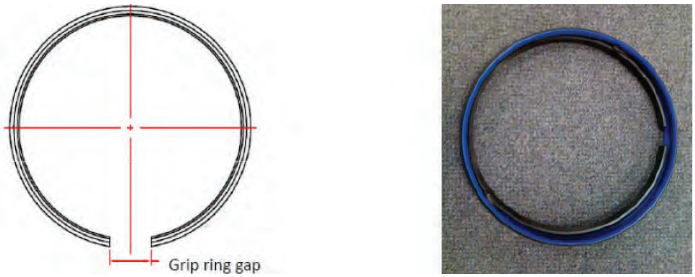

Figure 3

Occasionally, the grip ring may have a gap that is too small. The picture to the right in Figure 3 shows a grip ring with an excessively narrow gap and demonstrates how the grip ring sits too low at the 3:00 o'clock position. (Note: The grip ring was wedged to a much smaller diameter with steel shims. The situation was greatly exaggerated to better illustrate the point.)

In Figure 3, the grip ring may become cocked inside the casing when it comes in contact with the spigot during assembly. If this occurs, assembly forces increase dramatically.

If the gap in the grip ring is too narrow, the grip ring should be removed from the casing. Then, the gap can be increased by manually springing the ring apart as shown in Figure 4. Thick gloves are recommended as the teeth on the grip ring are quite sharp. Once the gap has been increased, re-install the grip ring in the casing.

Figure 4

Note, when re-installing the grip ring, the grip ring should be oriented such that the tapered end of the grip ring matches the tapered end of the casing pocket. If the grip ring is installed backwards, it will not be able to be rotated easily inside the casing. Moreover, it will not be possible to make the joint.

1.4 INSTALL THE INSERTION STOP (REQUIRED)

The Eagle Insertion Stop will greatly reduce the possibility of over insertion of the spigot into the bell when assembling PVC pipe.

Figure 5: JM Eagle Insertion Stop

Ensure that the spigot is clean removing all dirt, dust, water, pipe lubrication, etc. Eagle Loc 900 comes with two assembly mark lines on the spigot end of the pipe. These dual lines indicate the maximum and minimum depth of insertion of the spigot into the bell. The Insertion Stop should be placed **centered** on top of the assembly line furthest from the spigot (Ex. Dashed red line below).

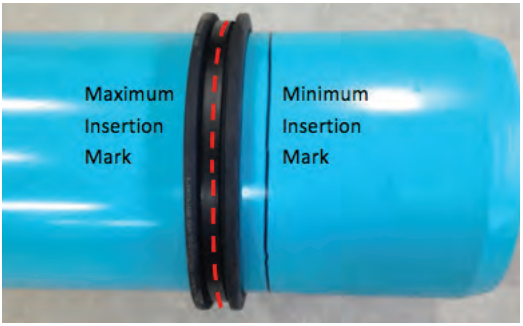

Figure 6: JM Eagle Insertion Stop Location

1.5 LUBRICATE

The lubricating technique is different from standard C900 pipe. Prior to assembly, apply lube to the gasket only (Do not apply lube to the spigot or grip ring. After applying lube to the gasket, inspect the grip ring to ensure it is free of lube. Wipe any lube from the grip ring). Use only lubricant supplied or recommended by JM Eagle.

1.6 ALIGN AND ASSEMBLE

Deflection is not allowed at the joint. Straight alignment is a key element for proper assembly. Misaligned pipe greatly increases the assembly force required to make the joint. This is especially true for Eagle Loc 900 due to the hardware in the bell of the pipe. When properly aligned, the pipe joint can be assembled manually using a pry bar.

Figure 7: Example of an Eagle Loc joint assembly

To assemble, slide the spigot into the bell, maintaining straight alignment, until the bell contacts the insertion stop. Do not push the spigot farther into the bell as this reduces the rotational flexibility at the joint and causes unnecessary stress on the bell.

1.7 PREVENT OVER ASSEMBLY

When the second black line goes past the lip of the bell, it is called over assembled or homed. When a spigot is over-inserted, there may not be adequate room for movement of the joint caused by thermal expansion and/or hydrostatic pressure. If over-insertion is combined with axial deflection of the joint, contact between the bell and spigot may cause joint leakage or significant stress in the bell wall.

Eagle Loc 900 comes with two assembly mark lines on the spigot end of the pipe. These dual lines indicate the maximum and minimum depth of insertion of the spigot into the bell. After correct assembly of a joint with two insertion lines, the line closest to the spigot end (minimum) should not be visible and the line furthest from the spigot end (maximum) should be visible.

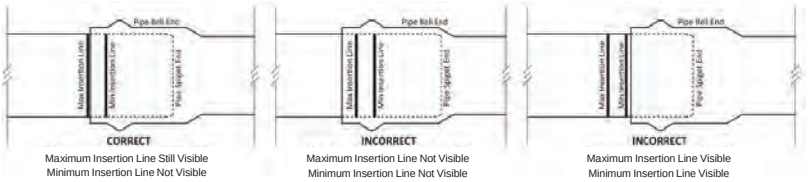

Figure 8

A properly assembled joint may become over assembled when subsequent joints are made. (See Figure 9) The force levering together a new joint (Joint B), may cause further insertion of Pipe 2 into the bell of Pipe 1. This may result in the spigot in Joint A being over-inserted. During installation, the previously assembled joint can be center loaded using equipment or material to prevent over assembly at the previous joint.

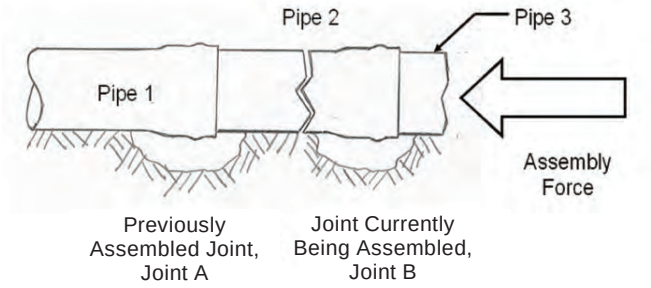

Figure 9

Alternatively, assembly tools may be used that prevent the assembly forces from moving previously installed pipe. Examples of these tools are shown in Figure 10, 11, and 12.

Figure 10: The backhoe's bucket center loads the previously installed length of pipe to keep it from moving while the new joint is being assembled

Figure 11: This assembly tool is called the Eagle Claw and is available from Pro Pipe Solutions.

Figure 12: This assembly tool uses a chain wrapped around the bell and a lever bar to make the joint.

CHECKLIST

- ☐ Bell, spigot, gasket, and Eagle Loc hardware are clean and free of foreign material
- ☐ Check the grip ring fit and positioning
- ☐ Install the Eagle Insertion Stop
- ☐ Apply lube to the gaskets. Do not apply to the spigot or grip ring
- ☐ Align the bell and spigot for straight assembly
- ☐ Straight alignment was maintained during assembly
- ☐ Assembly stopped when the spigot contacts the insertion stop
- ☐ Previously assembled pipe did not move when subsequent joints were made

2.0 COLD WEATHER INSTALLATION OF EAGLE LOC 900

Cold temperatures add construction variables that should be considered for all piping materials. The Eagle Loc 900 restraint system employs a circumferential grip ring in the bell to engage the spigot of the next piece of PVC pipe. In wet and cold conditions there is a potential for the presence of ice on the spigot or inside the grip ring which may prevent the grip ring from 'biting' into the spigot. In addition, PVC pipe has a greater thermal expansion/ contraction coefficient than the ductile iron grip rings and casings; therefore as temperatures drop, the pipe spigot will decrease in outside diameter at a greater rate than the ductile iron casing.

ASTM D2122 requires that the PVC pipe be conditioned at 73.4 before measuring to determine dimensions. As the temperature increase or decreases all materials will change dimensions due to thermal expansion and contraction. Assembled joints with traditional PVC pipe and fittings, the changes have little or no effect, as all aspects of the product change equally.

The ductile iron grip ring and casing of the Eagle Loc 900 restraint system do not react to changes in temperature as dramatically as PVC. As the temperature is reduced, the clearance between the grip ring and the spigot of the pipe increases. This increased clearance could result in grip rings that do not engage.

In cold conditions the surface tension or hardness of the PVC also increases; discouraging engagement of the grip ring and as stated earlier, moisture can freeze and form on the grip ring teeth and/or the spigot surface, also discouraging engagement.

Cold weather installations with open ditch type construction do not require the setting the joint, as the grip ring engagement is accomplished when the line is pressurized. Care should be taken to assure the spigot and gripping components are free from moisture, and the grip ring should be properly adjusted to fit inside the casing.

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