

WELL CASING/ EAGLE LOC™/DROP PIPE

MEETS ASTM D1785 AND ASTM F480

INSTALLATION GUIDE



*Building essentials
for a better tomorrow™*

WELL CASING/ EAGLE LOC™/DROP PIPE

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THE PHYSICAL (OR CHEMICAL) PROPERTIES OF JM EAGLE™ WELL CASING PRODUCTS PRESENTED IN THIS BOOKLET, REPRESENT TYPICAL VALUES OBTAINED IN ACCORDANCE WITH ACCEPTED TEST METHODS AND ARE SUBJECT TO NORMAL MANUFACTURING VARIATIONS. THEY ARE SUPPLIED AS A TECHNICAL SERVICE AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. CHECK WITH JM EAGLE™ PRODUCT ASSURANCE TO ENSURE CURRENT INFORMATION.

HOW THIS GUIDE CAN HELP YOU

This booklet was written especially for the installer and those who direct the actual handling and installation of JM Eagle™ Well Casing Products. This guide should be used in conjunction with the following industry accepted installation and testing practices which are applicable. This document should not be considered a full guide or manual in lieu of:

1. ASTM D2564-04 “Solvent Cements for (PVC) Plastic Piping Systems.”
2. ASTM D2855-96-(2002) “Standard Practice for Making Solvent-Cemented Joints With (PVC) Pipe and Fittings.”
3. ASTM F402-05 “Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.”
4. ASTM F656-02 “Primers for Use in Solvent Cement Joints of (PVC) Plastic Pipe and Fittings.”

This guide is meant as an explanatory supplement to the materials above on how to install JM Eagle™ Well Casing Products under normal conditions. Any discrepancies between the above standards and the written information contained herein, should be brought to the attention of JM Eagle™ Product Assurance immediately for resolution by JM Eagle™, prior to any actions by either contractor, engineer, or municipality.

This guide is not intended to supply design information nor to assume the responsibility of the engineer (or other customer representative) in establishing procedures best suited to individual job conditions so as to attain satisfactory performance.

Engineers, superintendents, contractors, foremen, and installation crews will find much to guide them in the following specifications. This booklet will also be of help in determining pipe needs when ordering.

WARRANTY

J-M Manufacturing Company Inc. (JM Eagle™) warrants that its standard polyvinyl chloride (PVC), polyethylene (PE), conduit/plumbing/solvent weld and Acrylonitrile-Butadiene-Styrene (ABS) pipe products (“Products”) are manufactured in accordance with applicable industry specifications referenced on the Product and are free from defects in workmanship and materials. Every claim under this warranty shall be void unless in writing and received by JM Eagle™ within 30 days of the date the defect was discovered, and within one year of the date of shipment from the JM Eagle™ plant. Claims for Product appearance defects, such as sun-bleached pipe etc., however, must be made within 30 days of the date of the shipment from the JM Eagle™ plant. This warranty specifically excludes any Products allowed to become sun-bleached after shipment from the JM Eagle™ plant. Proof of purchase with the date thereof must be presented to the satisfaction of JM Eagle™, with any claim made pursuant to this warranty. JM Eagle™ must first be given an opportunity to inspect the alleged defective Products in order to determine if it meets applicable industry standards, if the handling and installation have been satisfactorily performed in accordance with JM Eagle™ recommended practices and if operating conditions are within standards. Written permission and/or a Return Goods Authorization (RGA) must be obtained along with instructions for return shipment to JM Eagle™ of any Products claimed to be defective.

The limited and exclusive remedy for breach of this Limited Warranty shall be, at JM Eagle’s sole discretion, the replacement of the same type, size and like quantity of non-defective Product, or credits, offsets or combination of thereof, for the wholesale purchase price of the defective unit.

This Limited Warranty does not apply for any Product failures caused by user’s flawed designs or specifications, unsatisfactory applications, improper installations, use in conjunction with incompatible materials, contact with aggressive chemical agents, freezing or overheating of liquids in the Product, and any other misuse causes not listed here. This Limited Warranty also excludes failure or damage caused by fire stopping materials, tread sealants, plasticized vinyl products or damage caused by the fault or negligence of anyone other than JM Eagle™, or any other act or event beyond the control of JM Eagle™.

JM Eagle's liability shall not, at any time, exceed the actual wholesale purchase price of the Product. The warranties in this document are the only warranties applicable to the product and there are no other warranties, expressed or implied. This Limited Warranty specifically excludes any liability for general damages, consequential or incidental damages, including without limitation, costs incurred from removal, reinstallation, or other expenses resulting from any defect. IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY DISCLAIMED AND JM EAGLE™ SHALL NOT BE LIABLE IN THIS RESPECT NOTWITHSTANDING JM EAGLE'S ACTUAL KNOWLEDGE THE PRODUCT'S INTENDED USE.

JM Eagle's Products should be used in accordance with standards set forth by local plumbing and building laws, codes or regulations and the applicable standards. Failure to adhere to these standards shall void this Limited Warranty. Products sold by JM Eagle™ that are manufactured by others are warranted only to the extent and limits of the warranty of the manufacturer. No statement, conduct or description by JM Eagle™ or its representative, in addition to or beyond this Limited Warranty, shall constitute a warranty. This Limited Warranty may only be modified in writing signed by an officer of JM Eagle™.

1.0 RECEIVING AND HANDLING PIPE SHIPMENTS



Figure 1

1.1 INSPECTION

Each pipe shipment shall be inspected with care upon its arrival. Each pipe shipment is carefully loaded at the factory using methods acceptable to the carrier. The carrier is then responsible for delivering the pipe as received from JM Eagle™. All shipments include an adequate amount of lubricant for the pipe and a short form installation guide. IT IS THE RESPONSIBILITY OF THE RECEIVER TO MAKE CERTAIN THERE HAS BEEN NO LOSS OR DAMAGE (including smoke) UPON ARRIVAL.

Check the materials, pipe, gaskets and fittings received against the bill of lading (tally sheet that accompanies every shipment) in accordance with the general guidelines below, reporting any error or damage to the transportation company representative and have proper notation made on the delivery receipt and signed by the driver. Present the claim in accordance with the carrier's instructions. Do not dispose of any damaged material. The carrier will advise you of the procedure to follow in order to procure samples and report the incident.

1. MAKE OVERALL EXAMINATION OF THE LOAD. If the load is intact, ordinary inspection while unloading should be enough to make sure pipe has arrived in good condition.
2. IF LOAD HAS SHIFTED OR SHOWS ROUGH TREATMENT, THEN EACH PIECE MUST BE CAREFULLY INSPECTED FOR DAMAGE.

3. CHECK THE TOTAL QUANTITIES OF EACH ITEM AGAINST THE TALLY SHEET (pipe, fittings, lubricant, etc.)
4. ANY DAMAGED OR MISSING ITEMS MUST BE NOTED ON THE DELIVERY RECEIPT AND RETURNED TO THE TRANSPORTATION COMPANY.
5. NOTIFY CARRIER IMMEDIATELY AND MAKE CLAIM IN ACCORDANCE WITH THEIR INSTRUCTIONS.
6. DO NOT DISPOSE OF ANY DAMAGED MATERIAL. Carrier will notify you of the procedure to follow.
7. SHORTAGES AND DAMAGED MATERIALS ARE NOT AUTOMATICALLY RESHIPPED. If replacement material is needed reorder through your distributor and make them aware of the claim.

1.2 UNLOADING



Figure 2

JM Eagle™ Well Casing Products are lightweight and may be unloaded by

1. Hand, either by passing over the side or off the truck ends. Sliding one length on another is standard practice in unloading PVC pipe, but lengths in the bottom layer should be lifted off of the rough surface of the truck body to avoid abrasion.
2. Conventional forklift, for large orders of pipe, which are usually bundled in pallets. Care shall be exercised to avoid impact or contact between the forks and the pipe.

The means by which JM Eagle™ Well Casing products are unloaded in the field is the decision and responsibility of

the customer. Preferred unloading is in units using mechanical equipment such as forklifts, cherry pickers or front-end loaders with adequate forks and trained, competent operators. When unloading units, the following instructions should be carefully followed. Remove only one unit at a time.

1. Remove restraints from the top unit loads. These may be either tie down straps, ropes, or chains with protection.
2. If there are boards across the top and down the sides of the load that are not part of the pipe packaging, remove them.
3. Use a forklift (or front-end loader equipped with forks) to remove each top unit one at a time from the truck. Remove back units first. Do not run the forks too far under the unit as fork ends striking adjacent units may cause damage. Do not let forks rub the underside of pipe to avoid abrasion.
4. If a forklift is not available, a crane or front end loader may be used to unload the pipe. We recommend employing a spreader bar with synthetic straps rated for the load. The straps should be placed approximately 8 feet apart and looped under the load. Cables maybe be used in place of synthetic straps if they are protected by a rubber hose sleeve to prevent damage to the pipe.
5. DO NOT:
 - a) Handle units with chains or single cables.
 - b) Attach cables to unit frames for lifting.
6. During the removal and handling be sure that the units do not strike anything. Severe impact could damage the pipe (particularly during cold weather).
7. Units should be stored and placed on level ground. Units should be protected by dunnage in the same way they were protected while loaded on the truck. The dunnage must support the weight of all units so that pipe lengths do not carry the weight of the unit loaded above them. Units should not be stacked more than two high.
8. To unload lower units, repeat the above unloading process (items 1 through 7).

WARNING: PVC pipe, though lighter than other material, is still heavy and may be dangerous if not handled properly. Not adhering to the above instructions may result in serious injury to pipe, property and/or people. Do not stand or climb on units. Stand clear of pipe during unloading.

NOTICE: Pipe at the bottom of a stack may become out-of-round due to the weight of the material above it. At normal application temperatures this corrects itself soon after the load is removed due to the property of elastic memory. Under freezing conditions this recovery to full initial roundness may take several hours.

1.3 COLD WEATHER HANDLING

As the temperature approaches and drops below freezing, the flexibility and impact resistance of PVC pipe is reduced. Extra care should be used in handling during cold weather to avoid any type of impact to the pipe to prevent damage.

1.4 STOCKPILES

Store pipe on a flat surface so as to support the barrel evenly, with bell ends overhanging. If mechanical equipment is being used for handling, the unit bearing pieces provide an excellent base. If unloading by hand, secure two timbers for a base. Set them on a flat area spaced the same as a factory load. Nail chock blocks at each end. Build up the stockpile in the same manner, as it was stacked for shipment, transferring dunnage and chock blocks from load to stockpile. Store random lengths separately where they will be readily available. Individual lengths of pipe should be stacked in piles no higher than 5 feet. Solvent cements should be stored in tightly sealed containers away from excessive heat.

It should be noted that when PVC pipe is stored outside and exposed to prolonged periods of sunlight, an obvious discoloration or UV degradation of pipe could occur. Based on the 24-month weathering study, performance of PVC pipe was equally impressive. No significant changes in tensile strength at yield was observed. Reductions in impact strength were apparent after two years of exposure to weathering and ultra violet radiation. However, considering PVC pipe's high initial-impact strength, the reductions were not significant enough to warrant concern. Pipe breakage due to impact loads encountered during normal handling and installation is not a problem with PVC pipe. This UV degradation does not continue after the pipe is removed from UV exposure.

A method of protecting pipe during long exposures (several months) to sunlight is to cover it with canvas or other opaque material. Clear plastic sheets are not satisfactory. Allow for adequate air circulation between the cover and the pipe. This will prevent heat build-up and possible dimensional distortion. Solvent cements should be stored in accordance with ASTM F402 “Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners used for joining Thermoplastic Pipe and Fittings.”

1.5 LOADING TRANSFER TRUCKS

Use trucks with long bodies so that pipe lengths do not over hang more than 2 feet. Make certain truck bed is smooth, without cross-strips, bolt heads or other protrusions that could damage the pipe.

Place the first layer carefully with the bell ends overhanging. Avoid sliding the pipe and abrading it. Subsequent layers can be slid into place. All bell ends should overhang the layer below.

Short-body trucks may be used if fitted with racks that properly support the pipe in the horizontal position. The rack shall support the pipe with supports spaced every 3 feet or less along the pipe lengths. Pad the contact areas to avoid damage to the pipe.

1.6 MAKING SOLVENT CEMENTED JOINTS FOR PVC SOLVENT WELD WELL CASING

The standard practice for making solvent cemented joints is outlined in ASTM D2855 “Standard Specification for Making Solvent-Cemented Joints with PVC Pipe and Fittings.” The following is a brief summary of the detailed instructions presented in the fore mentioned standard.

1. Select the proper Solvent Cement and Primer (if needed) for your application per the outline below:
 - PVC: PVC solvent cement must comply with ASTM D2564. Primer, if needed shall meet ASTM F656.
 - If system is intended for potable water, the primer and cement shall be ANSI/NSF STD 61 approved.

2. Condition the pipe and fittings at the same temperature before starting assembly.
3. Cut the pipe square to the desired length. A diagonal cut reduces the bonding area in the joint and may result in leakage. If tubing cutters are used, they will produce a raised bead that must be removed. A raised bead will wipe the solvent cement away when the pipe is joined.
4. Chamfer the pipe end, if needed. A factory bevel should be used as a guide to the length and angle of taper. Smaller sizes may not require a bevel (Figure 3A).
5. Clean and dry the pipe and fitting to remove all dirt, moisture and grease. (Figure 3B). Always use a clean, dry rag. Check the pipe and fitting for a dry fit before cementing (Figure 3C). For proper joining, the pipe must go one-third to three-fourths the distance to the fitting stop. Too tight of a fit is not desirable. You must be able to fully bottom the pipe into the socket after it has been softened. If the pipe and fittings are not completely round, a satisfactory joint can still be achieved with a “net” fit. This means that the pipe bottoms out into the fitting with no interference, but without too much play or wobble.
6. Primers need to be used to help prepare the material for bonding and fusing. Before any installation, it is recommended that the penetration and softening of a primer be checked on a scrap piece of the same lot of pipe. This should be done in the same environmental conditions as the actual installation. The effect of the primer will vary with time, temperature, and humidity. To check for proper priming, apply the primer as indicated in step 7. After primer is applied, use a knife or sharp scraper to scratch across the primed surface. If proper priming has been achieved, a few thousandths of an inch of material will be removed.
7. Using the correct applicator, apply the primer to the inside of the socket first. Use a scrubbing motion and ensure that the applicator is wet until the surface has been softened (use the time measured above). Next, apply the primer in the same way to the spigot. Primer should only be applied to a depth that the fitting will go onto the pipe. Ensure that both the spigot and the socket are completely well dissolved and softened. Ensure that all puddles of primer are removed from the pipe. Puddles of primer can weaken the pipe and/or joint, resulting in leakage, damage or injury.

8. Immediately before primer dries, apply cement lightly but uniformly to the spigot end (Figure 3D). The amount of cement should be sufficient to fill any gaps between the pipe and fitting, without being excessive.
9. Apply a medium layer of cement to the socket (Figure 3E). Do not apply cement beyond the socket depth or allow cement to run down past the socket depth to avoid weakening the pipe.
10. While the socket and spigot are still wet with cement (a second coat maybe required for the spigot, or on 3-inch and larger pipe, two people may be required), forcefully bottom the spigot into the pipe socket. Twist the spigot one-quarter turn (Figure 3F). Hold joint tight and in straight alignment until surfaces are fused. Properly made joints will have a ring or bead of cement completely around the juncture of the spigot and socket. Gaps may indicate poor assembly, wrong grade or insufficient cement.
11. Without disturbing the joint, use a clean, dry rag to remove all excess cement. Excess cement may cause weakening of the pipe and additional cure time. Handle the joint with care until initial set time has elapsed. Do not pressurize or test the well casing pipe until the appropriate cure time has been achieved. See Table 1 for recommended times.

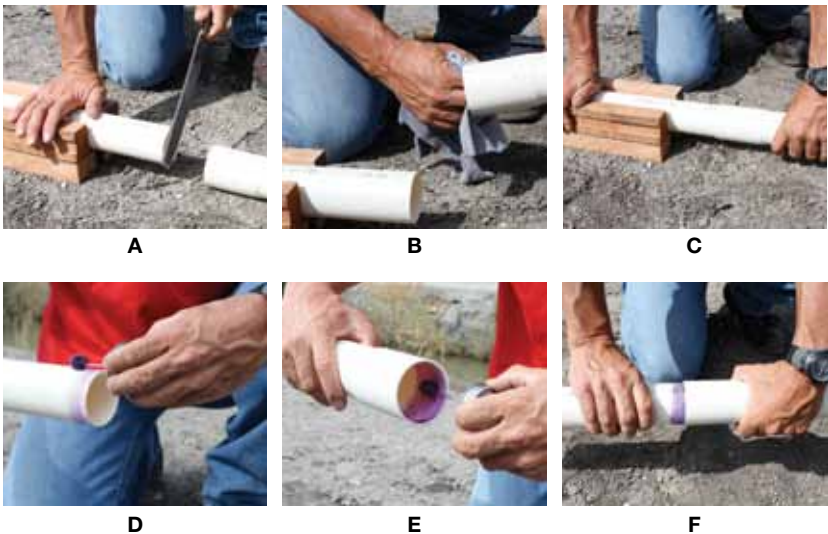


Figure 3

PIPE SIZE (inches)	MINIMUM RADIUS (feet)	OFFSET (in)	PIPE SIZE (inches)	MINIMUM RADIUS (feet)	OFFSET (in)
1.5	12.5	247.11	3.5	87.5	27.55
0.75	18.75	141.70	4	100	24.08
1	25	101.47	6	150	16.02
1.25	31.25	79.53	8	200	12.01
1.5	37.5	65.56	10	250	9.61
2	50	48.65	12	300	8.00
2.5	62.5	38.73	14	350	6.86
3	75	32.19	16	400	6.00

Table 1

WARNING: Keep primer and cement away from flame or excessive heat to avoid combustion or explosion. In confined areas sufficient concentrations of these fume may accumulate to cause nausea and/or dizziness.

To prevent toxic fume build-up, it is recommended that:

1. Pipe be assembled above ground where possible or in areas with good air circulation.
2. A blower should be used in confined areas with poor natural circulation.
3. Respirators should be used if the above installation environmental conditions are not practical or possible. Respirators approved under the Bureau of Mines Schedule 23—as manufactured by MSA, American Optical Corp, Welsh Mfg., etc., for protection against organic vapors—have been found to be satisfactory.

1.7 CUTTING

A square cut is essential to ensure proper assembly and/or beveling. Well Casing Products can easily be cut with a fine-toothed hacksaw, handsaw, or a power type saw with a steel blade or abrasive disc. (Do not use standard pipe cutters. The cutting wheel may crush or damage the pipe.) It is recommended that the pipe be marked around its entire circumference prior to cutting to ensure a square cut. Do not burn the pipe while cutting.



Figure 4

NOTICE: JM Eagle™ recommends using proper personal protective equipment, such as gloves and safety glasses, when cutting PVC pipe.

1.8 BEVELING

Use a factory-finished beveled end as a guide to determine the angle and length of taper. The end may be beveled using a plastic pipe-beveling tool as shown, which will cut the correct taper automatically or such tools as the Stanley “Surform” No.399, a coarse file or rasp. A portable sander or abrasive disc may also be used to bevel the pipe end. Remove all burrs and raised edges prior to assembly. Note that some smaller sizes of pipe are not shipped with a factory bevel.

2.0 EAGLE LOC™ WELL CASING ASSEMBLY INSTRUCTIONS



1. Clean the bell socket and spigot surfaces. Visually inspect the pipe ends for cracks, damaged grooves, etc. Do not use pipe with visible damage. Verify that the spigot end is chamfered.



2. Place the rubber O-ring in the first groove from the spigot end of the pipe. Place the O-ring in one side of the groove. Hold the O-ring in place and pull down on the other sides until it is completely in the groove. Do not roll the O-ring or excessively stretch it into place. Improper installation of O-ring may cause the joint to leak.



3. Apply generous amount of lubricant around the inside of the bell lip and to the spigot end of the pipe, including the O-ring. Do not apply lubricant to the spline or spline groove. Align the spigot above the bell and insert the spigot into the bell until the bell spine groove and spigot spline grooves are aligned. An insertion line provides an aid to the alignment process.



4. The spline groove in the spigot end of the pipe and the spline groove in the bell socket align to form a circular locking path for spline insertion.



5. Insert the pointed end of the spline into the slotted hole in the bell until the spline end is visible in the hole. Tapping the end of the spline with a hammer may be required to achieve full spline assembly.



6. This completes the joint assembly and readies the pipe for lowering into the well.

IMPORTANT: During the assembly process on the drilling platform, it is standard practice to use a tight-fitting holding clamp (Casing Elevators) which conforms to the pipe-to-bell transition section in order to provide adequate casing support. Contact JM Eagle™ Product Assurance for suggested source(s) of supply.

- Do not use pipe with cracked or damaged grooves.
- JM Eagle™ approved lubricant should be used for easier assembly.
- Do not lubricate the spline or the pipe line groove.
- Use only JM Eagle™ supplied O-Rings and splines.
- Failure to use an O-Ring on every spigot may cause leakage.

3.0 THREADED DROP PIPE INSTALLATION

Problems are sometimes encountered when users install threaded drop pipe. With care, satisfactory performance can be achieved. The following suggestions are based on information, which is available from public documentation. It does not purport to cover all installation issues.

A joint sealant should be used to obtain a watertight joint. Use either a paste sealant or tape, but never use both.

TAPE:

- Use PTFE (Teflon) tape.
- Tape should be ANSI/NSF 61 listed.
- Use a PTFE tape with minimum thickness of 2.5 millimeters.
- Cover end of threads to prevent thread seizing prior to proper joint make up.
- Wrap tape in direction of the threads.
- Use only 2-3 wraps of tape.
- Check joint; use only enough tape to enable screwing in by hand to half the full engagement depth.

PASTE:

- DO NOT USE hemp, grease, pipe lubricant or solvent cements.
- Use only a paste that is fully compatible with PVC material. Read the paste manufacturer's label.
- Paste should be ANSI/NSF 61 listed.

INSTALLATION CONSIDERATIONS:

PVC is “notch sensitive.” Indentations from pipe wrenches may promote failure.

Tighten threaded joints hand tight, plus a half turn with strap wrench.

DO NOT OVER TIGHTEN!

DO NOT USE PIPE WRENCHES!

ASTM F1498 note 1 states: The terms “wrench make up” and “wrench tight” are standard terminology for tightness and do not imply using a pipe wrench or other tools which would damage plastic pipe and fittings.

Proper design of a well involves many factors that are only available to the person designing the well. The data supplied is only a guide. The final responsibility for the design of the well lies with the person designing and/or installing the well. No warranty of performance for any specific purpose or particular installation of any JM Eagle™ product is expressed or implied. User assumes all liability for use of these guidelines.

4.0 HORSEPOWER RATING/DEPTH GUIDELINES PVC THREADED DROP PIPE

Follow the manufacturer’s recommendations for the use of torque arrestors and centering devices. Do not use standard injected molded couplings on any diameter drop pipe.

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The table was derived using the following assumptions:

- Pumping Limitation based on a cut-off switch set at 60 psi or less.
- Temperature is 73.4 degrees F or less.
- Weight of pump is 200 pounds or less.
- The entire drop pipe is full of water.

PIPE SIZE	MAX H.P.	SCH 80 MAX DEPTH	DEEP DROP MAX DEPTH	RECOMMENDED FITTINGS
1"	1.5	600'	725'	JM Eagle™ Extruded Couplings may be used to 400 feet. Deeper than 400 feet use steel or brass all the way.
1¼"	2	495'	590'	JM Eagle™ Extruded Couplings may be used to 400 feet. Deeper than 400 feet use steel or brass all the way.
1½"	5	455'	540'	Steel or brass couplings only.
2"	7.5	400'	485'	Steel or brass couplings only.

Table 2



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GLOBAL HEADQUARTERS:

Nine Peach Tree Hill Road
Livingston, NJ 07039
T: 973.535.1633
F: 973.533.4185

www.JMEagle.com

REGIONAL OFFICE:

5200 West Century Blvd
Los Angeles, CA 90045
T: 800.621.4404
F: 800.451.4170