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## PLIDCO® CLAMP+RING INSTALLATION INSTRUCTIONS

### !! WARNING!!

IMPROPER SELECTION OR USE OF THIS PRODUCT CAN RESULT IN EXPLOSION, FIRE, DEATH, PERSONAL INJURY, PROPERTY DAMAGE AND/OR HARM TO THE ENVIRONMENT.

Do not use or select a PLIDCO Clamp+Ring until all aspects of the application are thoroughly analyzed. Do not use the PLIDCO Clamp+Ring until you read and understand these installation instructions.

Every effort has been made to securely package this product prior to shipment. If you have any questions, or encounter any difficulties using this product, please contact:

**PLIDCO “DEPARTMENT 100” at 440-871-5700  
 toll free U.S. & Canada at 800-848-3333**

### READ CAREFULLY

The person in charge of the installation must be familiar with these instructions and communicate them to all personnel involved.

### Safety Check List

- 1. Read and follow these instructions carefully. Follow your company’s safety policy and applicable codes and standards.
- 2. Do not exceed the maximum end restraint indicated on the label of the PLIDCO Clamp+Ring. A PLIDCO Clamp+Ring is designed for a specific longitudinal end restraint in units of force. Verify the maximum end restraint indicated on the label is sufficient to resist your combination of hydrostatic, dynamic, external, and thermal induced forces.
- 3. Do not exceed the maximum temperature indicated on the label of the PLIDCO Clamp+Ring. The maximum temperature indicated on the label refers only to the maximum operating temperature of the PLIDCO Clamp+Ring. It does not imply the PLIDCO Clamp+Ring is capable of resisting longitudinal thermal expansion forces associated with raising the temperature of the pipeline from ambient to the maximum temperature indicated on the label. Please refer to “designed end restraint” described earlier. If necessary, please consult PLIDCO Department 100 for further detail.

- ❑ 4. Pressurizing of the pipeline should be done with extreme caution. Pressurizing should be accomplished slowly and steadily without surges that could vibrate the pipeline and fitting. Industry codes and standards are a good source of information on this subject. Do not exceed the maximum end restraint indicated on the label as described earlier. Personnel should not be allowed near the installation until the PLIDCO Clamp+Ring has been proven.

## Pipe Preparation

1. Remove all coatings, rust and scale from the pipe surface where the PLIDCO Clamp+Ring will contact the pipe.
2. Survey the outside of the pipe to confirm a circular cross section, particularly in the area of the clamping sections. This area should be a smooth curved surface without indentations or flat spots that could adversely affect proper gripping.
3. If applicable, grind pipe welds flush with the outside pipe surface where the PLIDCO Clamp+Ring will contact the pipe. Failure to do so will concentrate all the clamping force directly on the crown of the weld and could cause the weld to fail.
4. A ring gauge should be used for submerged pipelines where visibility is limited. PLIDCO has available ring gauges that can accurately survey the cross sectional shape of the pipe. Information is available upon request.
5. The bolting force generated when assembling the two halves is capable of reshaping minor out-of-round pipe. Maximum allowable ovality is approximately 5%, depending on the pipe wall thickness. Flat spots are very difficult to reshape and the bolting force should not be relied on to correct flattened or indented areas.
6. Except for underwater installations, clean and lubricate all PLIDCO Clamp+Ring studbolts and nuts. Prove free and easy nut running prior to installation. Lubricants are not recommended for underwater installation due to the potential to collect sand and grit.

## Installation

Careless handling can damage the PLIDCO Clamp+Ring. Lifting devices such as chains, cables or lift truck forks should not contact the clamping sections.

1. If the ring halves were shipped as an assembled unit it would have been shipped with spacers between two halves. Typically small diameter nuts are used for the spacers. The spacers must be removed and discarded before installing the PLIDCO Clamp+Ring. Failure to remove the spacers will prevent the PLIDCO Clamp+Ring from properly gripping the pipe.
2. Assemble the PLIDCO Clamp+Ring loosely on the pipe, centered over the PLIDCO Fitting, making certain the yellow painted ends are matched. The definition of a PLIDCO Fitting as used in these instructions is the fitting that the PLIDCO Clamp+Ring is being assembled around.
3. Additional lifting lugs may be welded to the PLIDCO Clamp+Ring to facilitate alignment or rotation on the pipe.
4. The length of the tie studbolts is such that there should be approximately six (6) inches of clearance between the inside tie studbolt nuts and the PLIDCO Fitting. This should allow adequate room for welding of the PLIDCO Fitting if required. If the PLIDCO Fitting is not to be welded the PLIDCO Clamp+Ring can be positioned closer if desired. See **PLIDCO Clamp+Ring Components**.

5. With the tie studbolt lugs in alignment, insert the tie studbolts. Hand tighten a nut on each side of the lugs for a total of four nuts for each tie studbolt. The length of studbolt protruding past the outer nuts should be approximately a half of nut height.
6. All clamping studbolts and nuts should be uniformly torqued as indicated in the **Torque Chart for PLIDCO Clamp+Ring**. The best results are obtained by maintaining an equal gap between the sidebars while tightening the clamping studbolts. The sidebars will be gapped approximately ¼ to ½ inch, depending of the diameter of the PLIDCO Clamp+Ring.
7. The tie studbolt nuts need only be snug. A high pre-stress on the tie studbolts is undesirable and could be detrimental.
8. To complete assembly, the clamping studbolts should be rechecked at the recommended torque. An increase in torque on one clamping studbolt can cause a decrease in torque on neighboring clamping studbolts.
9. If a PLIDCO Clamp+Ring is be reused, it may be removed after the PLIDCO Fitting is completely welded to the pipe. The root pass by itself does not have sufficient strength.

## Field Testing

The PLIDCO Clamp+Ring is capable of being field tested up to 1½ times its maximum end restraint indicated on the label of the PLIDCO Clamp+Ring. Your combination of hydrostatic, dynamic, external and thermal induced forces anticipated during testing must be considered. Please refer to “designed end restraint” described in **Safety Check List**. If necessary, please consult PLIDCO Department 100 for further detail.

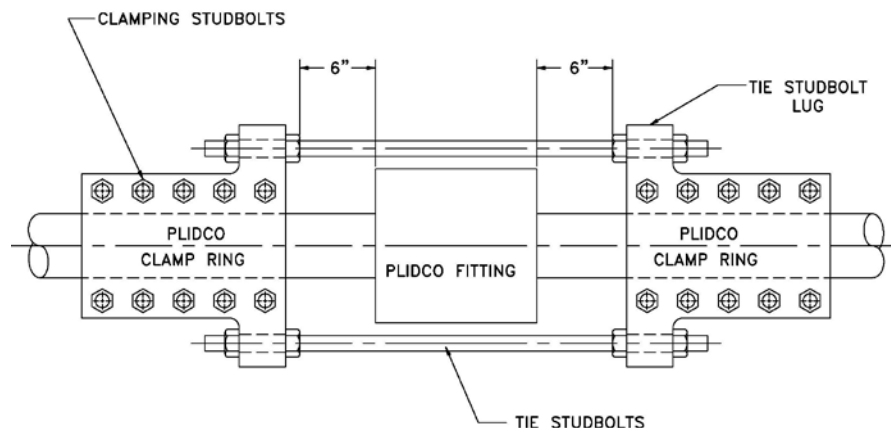
## Storage

PLIDCO Clamp+Rings should be stored in a dry environment to prevent any unpainted surfaces from rusting. PLIDCO Clamp+Rings put back into storage after being used should be cleaned and the studs and nuts oiled.

## Traceability

PLIDCO Clamp+Rings, as most PLIDCO products, have a unique serial number by which the fitting is fully traceable.

## Clamp+Ring Components



## Torque Chart for PLIDCO Clamp+Ring

Nominal Diameter of Studbolt (inches) (see Note 2)	Wrench Opening Across Flats (inches)	Torque Values (see Note 1)			
		0.08 C <sub>f</sub>		0.15 C <sub>f</sub>	
		ft-lbs	Nm	ft-lbs	Nm
<b>52,500 psi pre-stress (see Note 3)</b>					
5/8--11	1-1/16	70	100	120	160
3/4--10	1-1/4	120	160	210	280
7/8--9	1-7/16	190	260	330	450
1--8	1-5/8	280	390	490	660
1-1/8--8	1-13/16	410	560	720	980
1-1/4--8	2	580	780	1,010	1,370
1-3/8--8	2-3/16	780	1,060	1,370	1,860
1-1/2--8	2-3/8	1,020	1,380	1,800	2,440
1-5/8--8	2-9/16	1,300	1,760	2,300	3,120
1-3/4--8	2-3/4	1,640	2,230	2,930	3,970
1-7/8--8	2-15/16	2,030	2,760	3,630	4,930
2--8	3-1/8	2,480	3,360	4,440	6,030
2-1/4--8	3-1/2	3,560	4,830	6,410	8,690
2-1/2--8	3-7/8	4,910	6,660	8,890	12,000
<b>47,500 psi pre-stress (see Note 3)</b>					
2-3/4--8	4-1/4	5,950	8,060	10,800	14,600
3--8	4-5/8	7,820	10,600	14,200	19,300
3-1/4--8	5	9,970	13,500	18,200	24,600
3-1/2--8	5-3/8	12,500	16,900	22,800	30,900
3-3/4--8	5-3/4	15,400	20,900	28,100	38,200
4--8	6-1/8	18,700	25,400	34,300	46,500
<b>37,500 psi pre-stress (see Note 3)</b>					
4-1/4--8	6-1/2	17,700	24,100	32,500	44,100
4-1/2--8	6-7/8	21,100	28,600	38,700	52,500
4-3/4--8	7-1/4	24,900	33,700	45,600	61,900
5--8	7-5/8	29,000	39,300	53,300	72,300
5-1/4--8	8	33,600	45,500	61,900	83,900
5-1/2--8	8-3/8	38,600	52,400	71,200	96,600
5-3/4--8	8-3/4	44,200	59,900	81,500	111,000
6--8	9-1/8	50,200	68,100	92,800	126,000

Studs: ASTM A193 Grade B7 - Nuts: ASTM A194 Grade 2H

Note 1: Torque values shown in the table represent two different coefficients of friction (C<sub>f</sub>); 0.08 and 0.15. When C<sub>f</sub> equals 0.08, it is assumed the studs and nuts are clean, free running, free of obvious flaws and lubricated with a high-grade graphite-oil thread lubricant. When C<sub>f</sub> equals 0.15, it is assumed the studs and nuts are clean, free running, free of obvious flaws and lubricated with light weight machine oil. The torque values are safe minimums and represent approximately the bolt pre-stress values.

Note 2: The second number is the pitch, which is shown in number of threads per inch.

Note 3: Use the pre-stress value shown for the applicable studbolt size if bolt tensioners are to be used and follow the bolt tensioner manufacturer's instructions.