

# LINK-PIPE<sup>®</sup>

INC.

Manufacturer of No-Dig Pipe Repair Products

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## **RIB and Trough General Installation Tips** (Troughs are Laid before Ribs Installation)

### **1. INSTALLATION**

#### **1.1. Installation Equipment and Materials**

All installation equipment used shall be in accordance with the recommendations of the manufacturer. Minimum required equipment shall be vertical jack assembly with hose assembly, hydraulic pump and required fittings (see page 6). Jack assembly shall have Quick Couplers. Other required equipment includes winches and cables for installation. Materials include temporary supports to secure the repaired structure if host pipe become oval, or weakened because of structural deformation. Yet other temporary supports are needed to avoid Trough deformation during grouting process. All equipment and materials shall meet or exceed the recommendations of the Manufacturer (Link-Pipe Inc.) or equal.

#### **1.2. General**

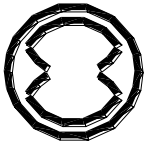
All culverts need to be cleaned prior to installing the Rib and Trough (R&T) system. All obstructions protruding more than 1/8" from the inner surface of the culvert, any loose pipe pieces and any solid objects shall be removed.

If host pipe has become oval, or weakened because of structural deformation, this shall be repaired before R&T installation is proceed. **Use temporary supports to secure the repaired culvert in place (Pic.1).**

#### **1.3. Trough and Ribs Installation.**

Troughs shall be laid out before the Ribs are installed. In the case of a culvert is a corrugated metal pipe (CMP) the supports from closed cells polyethylene foam (Foam Sealer) shall be placed in the pipe under the curved edges of the Troughs (Pic.2). This Foam Sealer shall be adhered to the crest of the CMP as a close loop.

The Rib can then be transported into the pipe. In some cases the ribs are disassembled for easy access the repair location. Hinges are reinstalled when the rib arrives to the projected



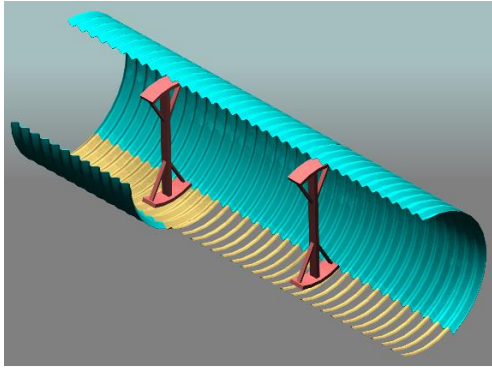
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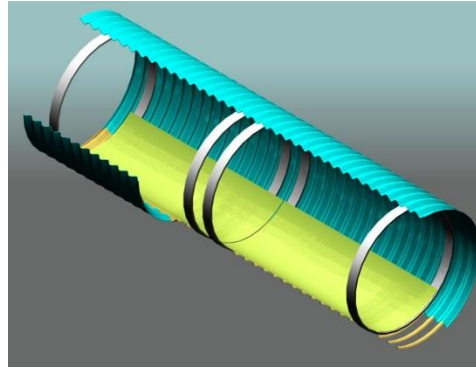
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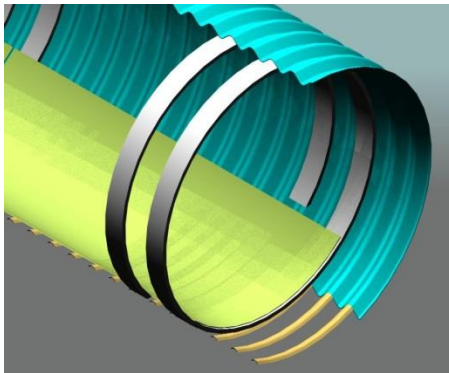
location. For first and last Ribs second Foam Sealer is then placed above the trough between the host pipe and the Rib to prevent Rib grouting from escape (Pic.3).



Pic.1



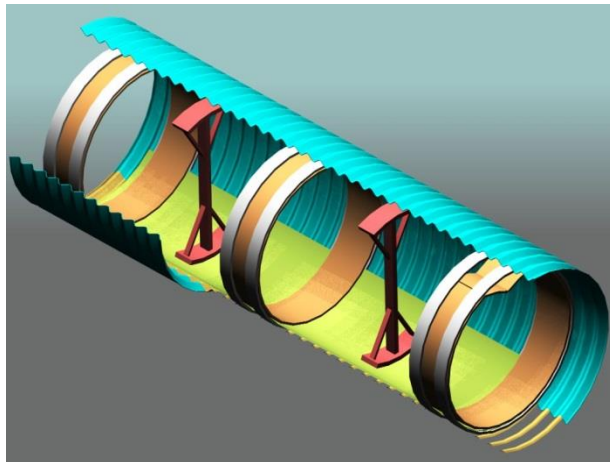
Pic.2



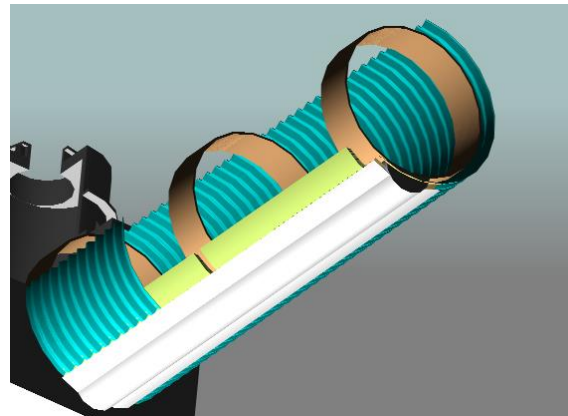
Pic.3



Pic.4

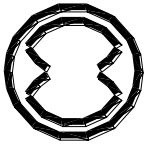


Pic.5



Pic.6

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## 1.4. Rib Expansion

You only need one hydraulic jack for the installation of the LPR series design.

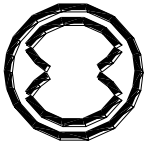
- a) Set up the jack vertically sitting on the bottom plate pushing up to the ‘Flaps’ and expand the jack carefully while observing the tongues in line of hinge pins of ‘Flaps’ on both sides slides into the grooves (Pic.4).
- b) Expanding the jack always pushes the ‘Flaps’ to spring out with a snapping sound. It indicates a good and tight installation.
- c) Foam Sealer creates a holding force that prevents the Rib from becoming loose.
- d) Use predrilled holes in the Rib bottom piece ‘B’ to secure Rib to the Trough with stainless steel self-tapping screws.

The next Rib is installed at specified distance from the previous one (Pic.5 – Closest Rib shown uninstalled yet).

## 1.5. Grouting.

The rib is designed to have an annular space between the outside of the rib and the inside of the culvert. This space must be filled to provide a load transfer medium in case of damaged pipe repair or a sealer in case of infiltration.

- a) If using cementitious grout, easy flow cement can be pumped into the annular space through grouting ports located at 10 and 2 o’clock. Once the cement is cured, fill the rest of the annular space with cement through the grouting port located at the crown (12 o’clock).
- b) Pump the same cementitious grout for the troughs through the gaps between the troughs and the culvert. In order to avoid big buoyancy forces, fill only partially space between troughs and culvert with cement and let it set before filling it fully (Pic.6).  
**Use temporary supports to avoid Trough deformation during grouting process (Pic.5).**
- c) All vent holes are then closed and the job is complete.



## 2. FURTHER EXPLANATION AND SUGGESTIONS

Metal hinges alone in the rib are not strong enough to withstand the installation forces. Their purpose is only to guide the first tongue of the 'Flap' into the groove of segments 'S'. Those tongues provide hinge strength for installation. It is therefore important to watch that the tongue fits into the groove without slipping out. Slip-out may happen if hinges may have been twisted in transport or handling.

### 2.1. Rib Assembly and Installation

To install the rib, only one jack and one hydraulic pump is needed. For the hydraulic pump, model P80 from 'SIMPLEX' or 'ENERPAC' is recommended (see page 6). Be aware that the jack is heavy and very slippery when working on the PVC material. It is recommended to set up the jack and try it once before the real installation.

- a. Prepare and place the bottom piece segment 'B' on the trough. Adhere the second piece of the Foam Sealer to the crests of the corrugated host pipe just above the Trough, and this Foam Sealer shall match second curved end of the following rib (Pic.3).





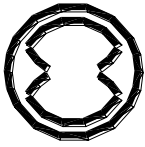
Pic.7



Pic.8

- b. Prepare and set up one of the side piece segment 'S'. Screw the hinges.

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**Notes:** When you are assembling the rib, keep in mind that three big grouting holes should be located at 12, 2 and 10 o'clock.

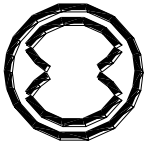
- c. Prepare and set up another side piece segment 'S'. Screw the hinges.
- d. Assemble the top parts, the segments 'C', the 'Flaps' (Pic.7).
- e. Set up the jack for the installation (Pic.8).
- f. Pump the jack slowly with caution.
- g. Installation is completed.

### Notes:

1. When holding the sleeve, never place hand/fingers to the sleeve segment joints or you may have your fingers jammed as the **PVC material is very slippery**.
2. Before pumping up the jack, **make sure all tongue grooves are matched**.
3. Pump the jack slowly with caution. When you feel the pump is very tight, it is advised to give about 20 seconds for the sleeve to settle after every 2-3 pumps.
4. When all the Ribs are installed, screw the 1¼" NPT fittings (included in the package) to the segment 'S' and connect a piece of flexible hose for partial grout pumping. When the grout is cured fill the rest of annular space through the top segment "C" grouting port. Screw out the fittings and use plugs (in the package) to seal grouting holes.
5. Fill the same cementitious grout for the troughs through the vent from the sides as mentioned in pos. 1.5. Grouting.
6. **Please Note that when assembling the Side Piece Segments, GROUTING PORT must be located at 10 o'clock and 2 o'clock.**
7. Some pictures above are from other files for your reference only.

## Link-Pipe Hydraulic Jack Set-up Information (For LPR 1010 jack only)

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For the vertical jack set-up, you need

1. One hydraulic cylinder of model #R1010 from 'SIMPLEX' or model #RC1010 from 'ENERPAC'. (These 2 kinds of cylinders both have 10 tons capacity with a 10-inch stroke. They are almost the same, just from different manufacturers.)
2. A steel pipe spacer (Refer to the chart bellow) of 2.25" O.D. can be used to extend the height of the cylinder. Join the cylinder and the steel pipe spacer with a connector of 24" length x 2.25" I.D. (approximately) thin pipe.
3. Two pieces of 3" x 24" long heavy-duty channel iron pushers at both ends.

A model #P-392 from 'ENERPAC' or model #P42 from 'SIMPLEX' hydraulic hand pump will be able to control the system. You will also need the appropriate length of hydraulic hose and fittings.

Spacer reference  
(In inches)

Pipe Dia.	36	39	42	48	54	60	66	72			
Spacer length	10	13	16	22	28	34	40	46			

Note:

- 1) The hydraulic cylinder has a 2.24" O.D., however, with paint the dimension can vary up to 2.29". The pipe selected to host the cylinder and the spacer (This is here call the connector) may have to be about 2.29" I.D. or greater.
- 2) And this cylinder host pipe as the connector wall thickness may be thinner as 1/8" in order for the whole assembly to be lighter in weight. The spacer wall thickness can be 3/16" or thicker.

