Preparation for all installations

Planning the route and reel inspection

This installation guide covers the buried, underground and aerial installation of CIC. However, review these important points for all styles of installation.

BEFORE INSTALLATION, CUT THE CABLE FREE FROM THE PAYOFF END OF THE DUCT. DO NOT RESTRAIN THE CABLE MOVEMENT.
Restraining may cause damage to the cable and/or conduit.

KEEP THE ROUTE AS STRAIGHT AS POSSIBLE.
Changes in depth and/or direction should be as few and as gradual as possible - this is especially true for buried duct.

DO NOT EXCEED THE BEND RADIUS
for the CIC you are installing.

Nom. Duct Size	1.00"	1.25"	1.50"	2.00"
Duct OD	1.315"	1.66"	1.9"	2.375"
Min. Bend Radius	14"	18"	20"	28"

Note: recommended by NEC®

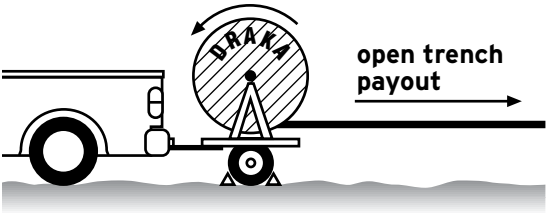
INSPECT THE REEL
for broken flanges, nails or any other flaw that may hinder reel rotation while paying off the CIC. Use reel collars to center the reel on the trailer.

IMPORTANT NOTE ON DUCT LENGTH:
A typical CIC has 1.5% more conduit than cable (example: 1,000 feet of cable is inside 1,015 feet of conduit). This difference is carried at the payoff/top end of the CIC.

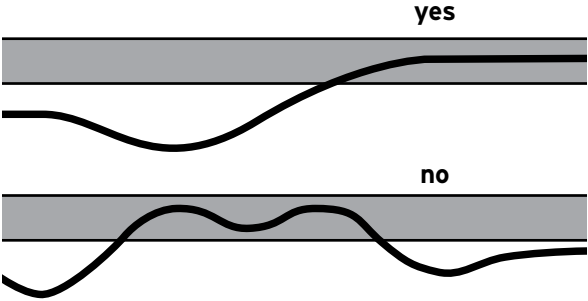
Buried installation
Open trench

Setting up the reel to avoid reverse bends

Load the reel onto the trailer so as to avoid reverse bending during pay out. **WHEN LAYING CIC IN AN OPEN TRENCH,** set the cable to pay out the bottom. Use reel collars to center the reel on the trailer. Do not apply excessive brake tension to the CIC during payout.



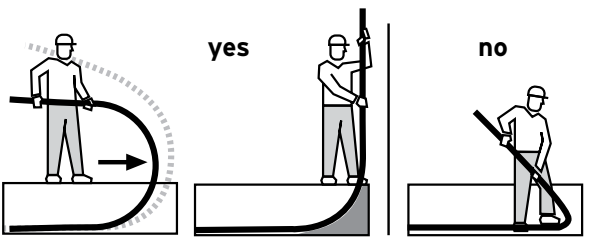
The pathway should be as straight as possible. Avoid unnecessary bends in the pathway or in the conduit itself.



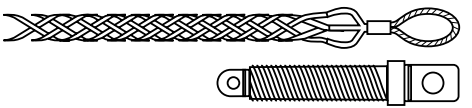
Buried installation
Handling the conduit

Forming bends and pulling the conduit

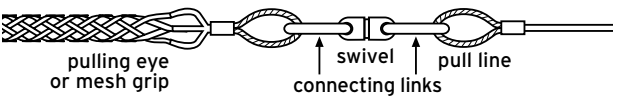
When placing conduit in the trench, **roll** it into place as shown. Do not force a bend with your foot - this may kink the conduit. Use backfill to support the bend in the conduit.



A wire mesh grip or a screw-in plug can be used to attach a pull



line to the conduit.



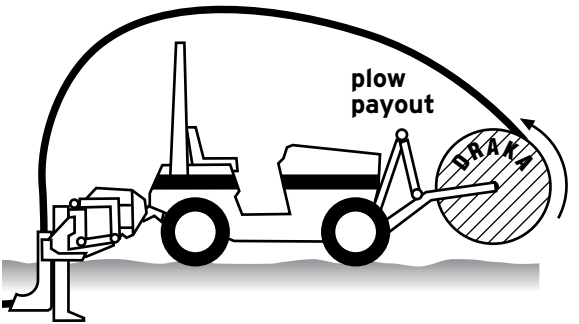
For longer pulls, a swivel should be used between the grip and the pull line.

Buried installation
Plowing

Setting up the reel to avoid reverse bends

CIC can be installed with either a static or vibratory plow. Directional boring is also an option (see page 6). Plow pulling is possible, but only with experienced technicians and for limited distances (see page 7).

Load the reel onto the trailer or plow so as to avoid reverse bending during pay out. **WHEN STATIC OR VIBRATORY PLOWING,** set the cable to pay out the top.

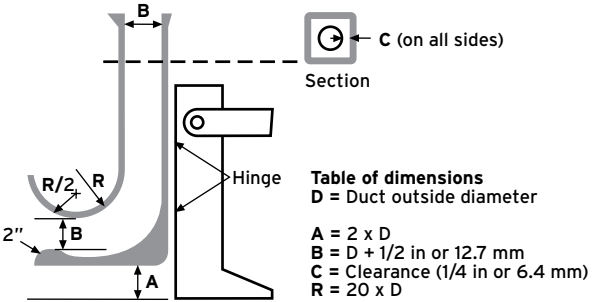


Dig a starter trench for initial placement of the conduit. Once plowing begins, keep all turns and changes in elevation as gradual as possible.

Buried installation
Plow chute

Match the chute to the conduit outside diameter

Inspect the plow chute to see if it meets the required dimensions shown below. The inside of the chute must be 1/2 inch or 13 mm larger than the outside diameter of the duct.



The chute should have a removable gate to allow flexibility during placement. The chute interior must be free of burrs, sharp edges or any surface roughness. The gate should not shift or deflect under a load.

Internal feed chute rollers are not recommended. The duct will feed smoothly through a maintained clean chute of the recommended radius.

Buried installation Directional boring

An alternative installation method

CIC may be installed by directional boring methods as long as these important differences are applied.

The cable must not be restrained during back pull. Cut the restraining cord at the payoff/top end prior to installation. Failure to do so could result in cable damage.

Pull additional slack to allow for the excess 1.5% amount of duct.

If a mesh grip is being used, securely cap the CIC prior to boring so that mud, water and debris cannot enter the duct.

If using a screw-in pulling eye (which forms its own cap), use a swivel between the eye and the back reamer.

Use a back reamer that is at least 1.5 times larger than the outer diameter of the CIC being installed. For instance, 1.25 inch CIC has an outer diameter of 1.66 inches. 1.66 x 1.5 = 2.49, so use a 2.5 inch back reamer. Two 1.25 CICs pulled at the same time have an outer diameter equalling 3.32 inches. 3.32 x 1.5 = 4.98, so use a 5 inch back reamer.

Using a back reamer smaller than 1.5x of the CIC outer diameter could result in a build-up of water pressure and the need to dig a hole to relieve this pressure.

Buried installation
Plow pulling

Recommended only for pulls of 200 ft or less

PLOW PULLING SHOULD BE USED ONLY IF NO OTHER METHOD IS AVAILABLE. IF DONE INCORRECTLY, PLOW PULLING WILL DAMAGE THE CIC BY STRETCHING IT.

Plow pulling places CIC in the ground by dragging it behind a modified plow blade that makes a compacted tunnel in the earth.

The tunnel is formed by a **tunneling missile** with a diameter at least 1 inch larger than the outside diameter of the CIC being installed.

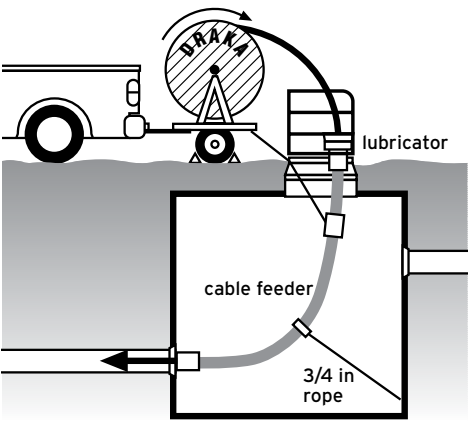
If you are plow pulling, prepare the route by pre-ripping with a standard pre-ripping blade.

DO NOT USE PLOW PULLING FOR INSTALLATIONS OF GREATER THAN 200 FEET OR 61 METERS.

Underground installation Basics

Tools and set-up

CIC is installed in underground duct with the same tools, lubricants and techniques as other conduit or cable products. Additional tools that may be helpful are 1) a tension-monitoring device or breakaway link of the proper strength for the CIC being installed and 2) substituting a 24 inch bull wheel or cable sheave for the standard 18 inch versions. The trailer should be equipped with a brake to control reel rotation. A lubricator and a cable feeder are essential.



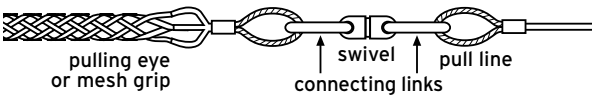
A threading wire or light string should already be in place. Use it to pull the pull line through the lubricator and cable feeder and then through the duct.

Set the reel so that the CIC pays out over the top so as to avoid reverse bending. The trailer should be level and directly over the duct entry.

Underground installation
Pulling equipment

Pull line attachment

Make sure that the pull line is in good condition - check for frayed sections. Place a swivel between the line and the eye or grip to prevent twisting the CIC during installation.



Place a marker on the line 20 feet from the connection to signal that the CIC is about to enter the vault.

For installations of over 3,200 feet (1 km), a screw-type pulling eye is recommended. Be sure to check with Draka to confirm the tensile strength of your duct.

For installations of 3,200 feet or less (1 km or less), a mesh grip may be used. Wrap friction tape around the end of the CIC to keep the grip from slipping off the CIC. Fit a wooden dowel the same length as the mesh grip inside the CIC for added strength.

A duct cone may be used at pull-through holes to avoid excessive abrasion.

Underground installation Pulling technique

Pull slowly and don't stop

Prior to starting the pull, make sure that there is a clear and open communication link (phone or radio is preferred) between the reel and pull location. Start/stop commands must be able to be given and received INSTANTANEOUSLY!

Constant lubrication helps a pull go smoothly. Both the pull line and the CIC should be lubricated. Follow the lubricant manufacturer's directions for application techniques and quantities.

Ideally, the CIC should be pulled in one operation without stopping. Keep a close watch on any tension-monitoring device. NEVER permit the force of the pull to exceed the maximum pulling tension for the CIC.

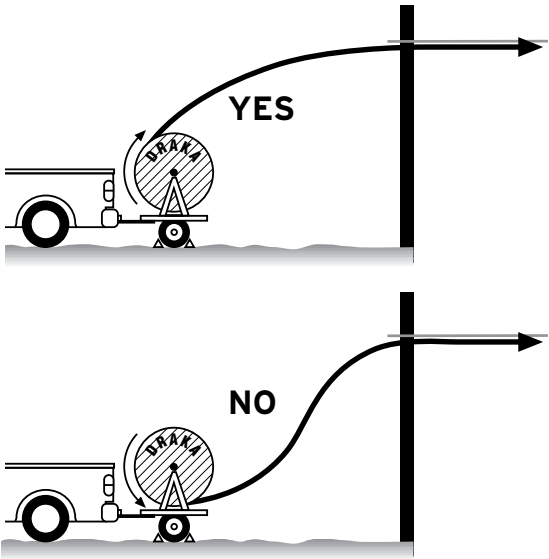
If the operation is paused, keep tension on the pull line - do not let it go slack. Restart the pull SLOWLY, gradually increasing tension until the CIC starts to move.

Aerial installation Preparation

Setting up the reel to avoid reverse bends

Aerial installation of CIC is very similar to placing any aerial cable and uses the same techniques and tools.

Load the reel onto the trailer so as to avoid reverse bending during pay out.



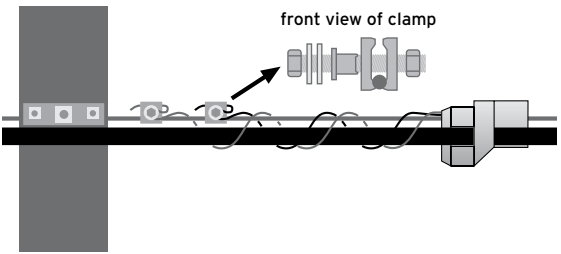
Do not apply excessive brake tension to the CIC during payout.

Aerial installation
Lashing

Double-lash the CIC

CIC is lashed to the messenger with the same lashing equipment used to attach any aerial cable.

Double-lash the CIC to the messenger. DO NOT lash it tightly. Leave some space to allow the CIC to expand/contract. When terminating the lashing wire, place no more than 1/2 turn of the wire between the washers of the clamp. Cut and tuck the wire into the clamp.



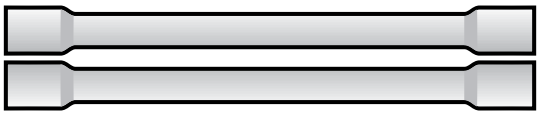
Lashing wire must be terminated at every pole. Overlashing poles is not permitted.

Splices must be at least 20 feet from any pole. Leave enough lashing wire at the splice location to reach the pole once the the CIC has been spliced. Terminate the wire as shown above.

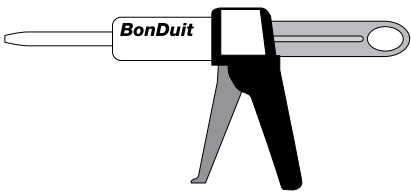
Duct repair Preparation

Required materials

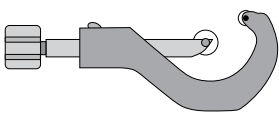
Damaged conduit can be repaired with a properly-sized "split" HDPE or PVC repair kit.



Other required materials and tools are:
Polywater Bonduit™ conduit adhesive and applicator gun



Ring-style tubing cutter (NOTE: Do NOT use a ratchet-type cutter. It can damage the cable in the conduit)



Vinyl tape

Duct repair
Preparation

Set up

Place the bottom half of the repair kit next to the duct to determine where the cuts will be made. Mark the cutting points as accurately as possible.

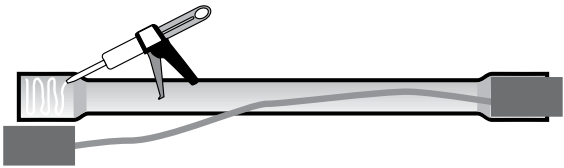
Use the tubing cutter to make two ring cuts.

Rotate the blade 90º and make two lateral cuts. Remove the damaged conduit.

Duct repair Preparation

Place the conduit in the kit

Thoroughly clean the cupped ends of the kit. Coat them with Polywater Bonduit and press the conduit into the flanges. Follow the instructions supplied by Polywater Bonduit to prevent adhesive failure.

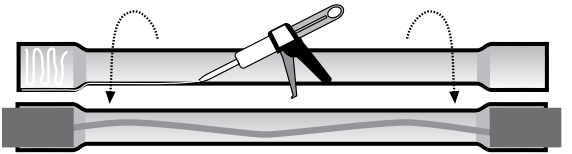


Avoid getting adhesive on the cable. Use vinyl tape to hold the conduit in place.

Duct repair Preparation

Seal the kit

Apply Polywater Bonduit to the cupped ends and the seam of the other half of the kit.



Press it in position and wrap vinyl tape around both ends and middle of the kit to hold it in place during the curing process. The tape may be left on for extra security.

If the cable is damaged, remove it while installing a pull tape. Repair the conduit with a standard coupling(s) and a length of HDPE where required. New cable can now be pulled in.