

Manual and Hand Held Power Cutting and Threading	3
Clamping	3
Cutting	6
Threading	7-8
Geared Threading	9
Stationary Power Threading	9-10
Manual and Powered Bending	11
Bending	11
Hand Bending	11
Electric Bending	11
Hydraulic Bending	12
Installation	13-15
Recommended Hand Tools	16

OCAL[®] Recommended Installation Procedures

PVC coated conduit is installed in much the same manner as conventional rigid galvanized steel conduit; however, certain precautions must be taken to assure satisfactory results. By following these guidelines and by using the proper tooling, a *damage free installation* can be obtained.

When an engineer has specified OCAL PVC coated, conduit the intent is for the total run to be PVC coated. There are no exceptions to this rule. This means from the beginning of the run to its completion and all in between, *no exposed metal* shall be allowed.

Manual and Hand Held Power Cutting and Threading



Yoke Style Vise



Ocal Jaw Vice Adapters (JAWS 23)

Clamping

The first step is the correct clamping of the PVC coated conduit. It is recommended that a yoke style vise be used.

When this vise is used the lower jaw inserts and the upper jaw insert should be replaced with the specially designed OCAL jaw vice adapters. These adapters provide greater clamping force and will prevent the pipe from spinning during the threading operation.



Manual and Hand Held Power Cutting and Threading



Chain Style Vise

If a chain style vise is to be used, the chain as well as the jaw inserts will tear the PVC coating when the threading force takes place.

To prevent this from happening, you can make “shells” in the field that fit over the PVC coated conduit. Steps to make the “shells” are outlined below:

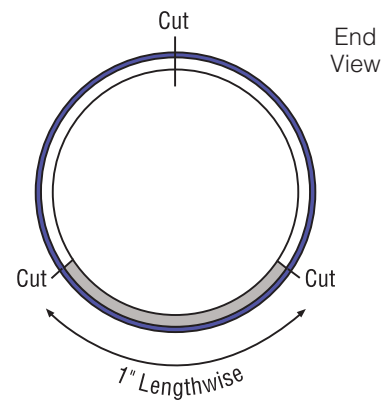
1. Use a piece of rigid conduit one size larger than the PVC coated conduit. This “nipple without threads” should be cut 6” to 8” in length.



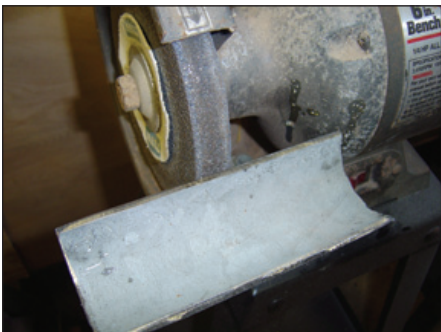
2. Remove 1” piece lengthwise from the nipple.



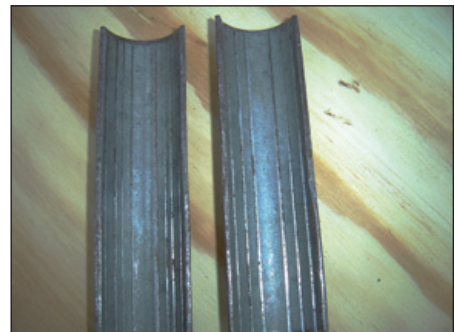
3. Cut the remaining nipple lengthwise in half.



4. Grind and brush the edges smooth.



5. Score Interior of shells lengthwise.



Thomas & Betts

Manual and Hand Held Power Cutting and Threading

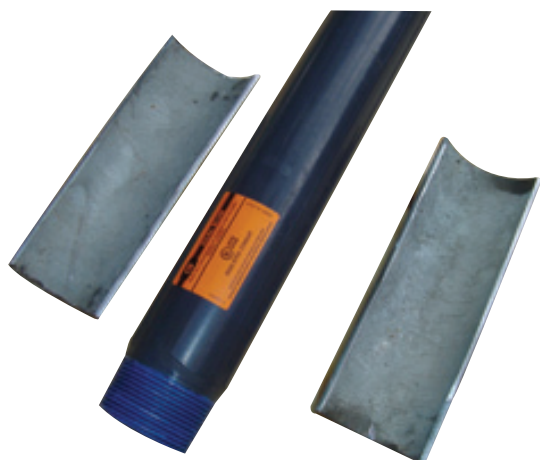


Chain Style Vise

Use the shell type pieces around the conduit and place in the vise.









The vise jaws and chain will now clamp around the shells and hold the conduit without damage.

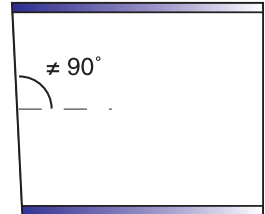
Manual and Hand Held Power Cutting and Threading



Band Saw Cutter

The band saw style cutter will cut the PVC coating and conduit flush with the end of the conduit. PVC material flush to the end of the conduit will not allow the die teeth to bite into the steel to start the threading process.

The removal of approximately 1/4" of the PVC coating will be required in preparation of the threading. Using a knife, whittle in a pencil sharpening style, cutting the coating from the conduit. A wire brush may also be used to remove PVC coating.



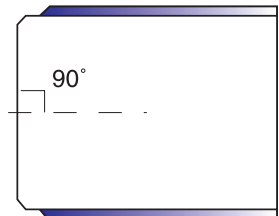
A band saw cutter will usually not cut the conduit at a "perfect" 90° angle (the accuracy of this cut depends heavily on the skill of the operator).



Roller Style Cutter

Although most personnel in the field prefer a band saw style cutter, it is recommended that a roller style cutter be used.

A roller style cutter cuts the edge of the conduit at a bevel and removes 1/4" of the coating at the same time. Also, a roller cutter provides an exact 90° cut in relation to the conduit. No additional removal of PVC coating is necessary.



Ocal®

Threading



Throat & Collar Shown

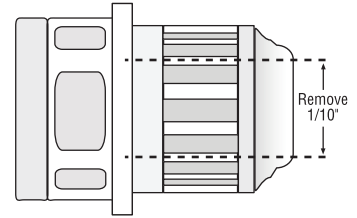


Cover Plate Shown



Manual and Hand Held Threading

PVC coated conduit has a larger OD than uncoated conduit. Standard dies will not clear the additional thickness. Hand held as well as power threading devices requires a die head for the correct size conduit. The standard die head is factory set for rigid conduit and will not fit over the PVC coating. These die heads are available from OCAL as well as the factory, machined for use with PVC coated conduit. You can have these dies machined as well.



If you have the dies machined, you will need to adhere to the following procedure:

1. Remove the cover plate and the four die teeth.
2. Have the machinist remove 100 thousands of an inch (1/10") from the throat and collar diameter of the die head.
3. Replace the dies and cover.

The die teeth are cutting tapered threads and will become clogged with PVC and metal shavings.

To prevent this, use a knife and score the conduit lengthwise from the point where the threads will end to where they begin. This will allow the PVC and metal shavings to fall into the throat of the die head.



Ocal® Threading

Threading

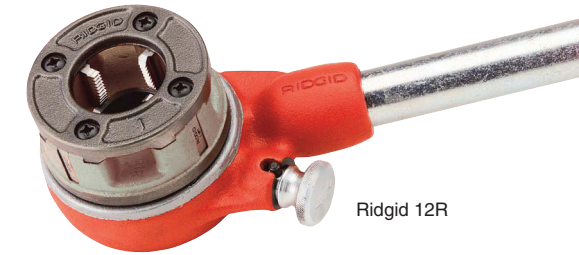
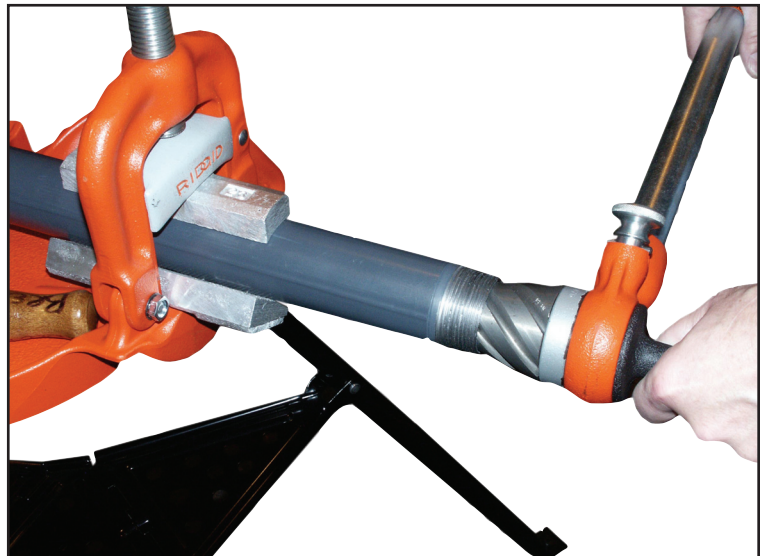
Handheld

The Ridgid #12R is typically used for smaller size conduit. The ratchet knob indicates forward and reverse. Die heads snap in from both sides and lock in place. (#12R includes ratchet and handle only)

Handheld Powered

The Ridgid 700 Power Drive is a heavy duty handheld tool typically used for conduit up to 2 inches diameter. The 700 Power Drive is designed for Ridgid 12R dies, available in both 115V and 230V models. Optional case is available for this tool.

Ream the conduit with approved reamers. Spiral and straight-style reamers are both acceptable.



Ridgid 12R



Ridgid 700 Power Drive



Ridgid Reamers

The threads must be dressed per NEC (article 300.6 [a]): “Where unusually corrosive elements require additional protection, it is recommended that threads be zinc coated with a hot dipped process or equivalent.”

Use a good quality degreaser and apply OCAL interior touch up compound or Thomas & Betts Kopr-Shield®.



Ocal Urethane Compound
(Ocal Patch Blue)



Kopr-Shield®

Thomas & Betts

Manual and Hand Held Power Stationary Threading



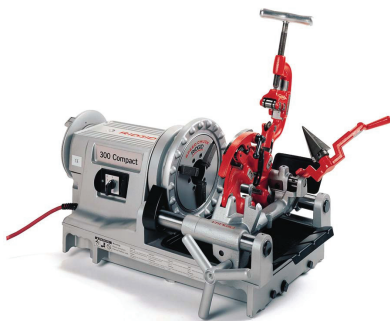
Ridgid Geared Threader ("Hog Head")



Ridgid 300 Power Drive



Ridgid Model 535



Ridgid 300 Compact Threader



Ridgid 300 Power Drive Complete

Geared Threading

These units will thread 2½" through 6" PVC coated conduit. However, geared threaders are typically only used for 5" and 6" conduit. The cutting dies are adjustable and will not require pencil cutting the conduit.

The geared threader requires a clamp screw to secure the conduit. The clamp screw will penetrate the PVC coating. Make sure the clamp screw is tight as it will slip around the conduit and tear the coating. After the threading process is complete, touch up the penetrated area with OCal exterior patching compound. Ream the conduit and dress the threads as described earlier.



Ridgid 700 Power Drive ("Power Pony")

Stationary Power Threading

Make sure the machine is set up for NPT threading. All machines can cut straight threads, however, not all machines can cut tapered as well as straight threads. Always make sure the thread cutting oil is clean and the type of oil recommended through the manufacturer. The preferred machines will use a hand wheel to tighten three jaws to the conduit.

Stationary power threading machines such as **Ridgid model numbers 300 and 535** have the capacity to thread rigid conduit from ½" to 2".

The standard jaw inserts with these units are intended to secure un-coated rigid conduit. The teeth of the standard jaw inserts will penetrate the PVC coating, but not bite into the steel. As a result, the standard jaw inserts will grind the PVC coating off of the conduit. To prevent this, shell style clamps or jaw inserts for coated conduit may be used.

- Shell Clamps – Range: ½" to 1½"

To properly clamp the conduit, the shell style clamps described earlier can be used on conduit sizes from ½" to 1½". However, for 2" conduit, there is not enough room in the chuck to accommodate both the 2" conduit and shell clamps

- Jaw inserts for coated conduit – Range: ½" to 2"

The jaw inserts for coated conduit have teeth that will penetrate the PVC coating and bite into the conduit itself. **Ridgid catalog number 97365** is the jaw insert for coated conduit used in threading machine model numbers 300 and 535.

The jaw inserts for coated conduit will leave "slits" in the PVC jacket. These "slits" will need to be touched up with Ocal exterior patching compound. Since an extra step is required with the special jaw inserts, most installers usually only use them for 2" conduit with the Ridgid 300 & 535 machines.

There is no need to pencil cut or score the PVC as these machines use a roller cutter and will remove a ¼" of the PVC coating and the cuttings will fall onto the screen on the lower portion of the machine.

Manual and Hand Held Power Stationary Threading



Ridgid Model 1224

Stationary Power Threading (Continued)

Stationary power threading machines such as **Ridgid model number 1224** have the capacity to thread rigid conduit from ½" to 4".

The standard jaw inserts with these units are intended to secure un-coated rigid conduit. The teeth of the standard jaw inserts will penetrate the PVC coating, but not bite into the steel. As a result, the standard jaw inserts will grind the PVC coating off of the conduit. To prevent this, shell style clamps or jaw inserts for coated conduit may be used.

- Shell Clamps – Range: ½" to 3½"

To properly clamp the conduit, the shell style clamps described earlier can be used on conduit sizes from ½" to 3½". However, for 4" conduit, there is not enough room in the chuck to accommodate both the 4" conduit and shell clamps.

- Jaw inserts for coated conduit – Range: ½" to 4"

The jaw inserts for coated conduit have teeth that will penetrate the PVC coating and bite into the conduit itself. **Ridgid catalog number 26187** is the jaw insert for coated conduit used in threading machine model number 1224.

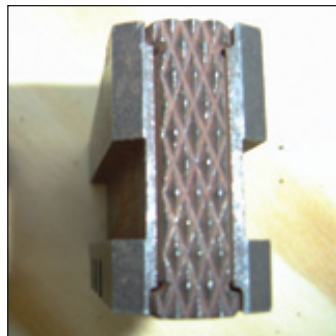
The jaw inserts for coated conduit will leave "slits" in the PVC jacket. These "slits" will need to be touched up with Ocal exterior patching compound. Since an extra step is required with the special jaw inserts, most installers usually only use them for 4" conduit with the Ridgid 1224 machine.

There is no need to pencil cut or score the PVC as these machines use a roller cutter and will remove a ¼" of the PVC coating and the cuttings will fall onto the screen on the lower portion of the machine.

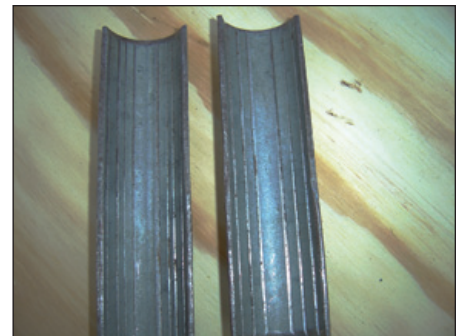
Machines that use centrifugal force (slap chucks) to tighten the jaws around the conduit can be used, but only with shell clamps attached. These types of threaders will damage the PVC coating without the use of shell clamps.



Special Jaw Insert for PVC Coated Conduit Ridgid model #97365 and #26187



Standard Jaw Insert



In hot weather, use scored shell clamps to prevent slipping

Manual and Powered Bending



Chicago Bender



Bending

Never use any type of lubricant on the shoes. Use rubbing alcohol to clean the shoe prior to bending.

Hand Bending

A standard hand bender can be used for saddles, offsets and conventional bending. The next size larger shoe of the EMT size should be used.

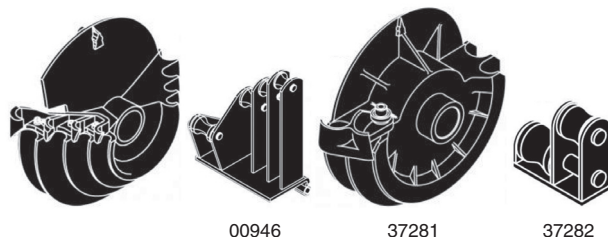
Shoe Size	PVC Coated Rigid Nominal Size	EMT Nominal Size
1/2"	—	1/2"
3/4"	1/2"	3/4"
1"	3/4"	1"
1 1/4"	1"	1 1/4"

Electric Bending

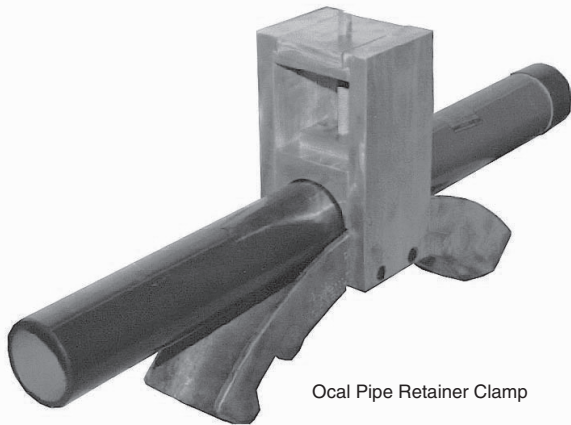
These machines are designed for bending with 1/2" through 2" conduit. The shoes as well as the roller assembly should be of the design for use with PVC coated conduit.

37279 40 Mil PVC Coated Rigid 1/2" - 2" Shoe Group Consists of One Each:

Cat. No.	Description
00946	1/2" through 1 1/4" Roller Support
00573	1/2" through 1 1/4" Shoe
37281	1 1/2" and 2" Shoe
37282	1 1/2" through 2" Roller Support
23818	Metal Storage Box (not shown)



If you use conventional shoes they must be machined 60 thousands as well as each of the rollers in the roller assembly. Some manufacturers use slide bars instead of a roller assembly and these must also be machined 60 thousands. Be sure to compensate for "spring back" since PVC coating often requires the setting to be off as much as 5°.



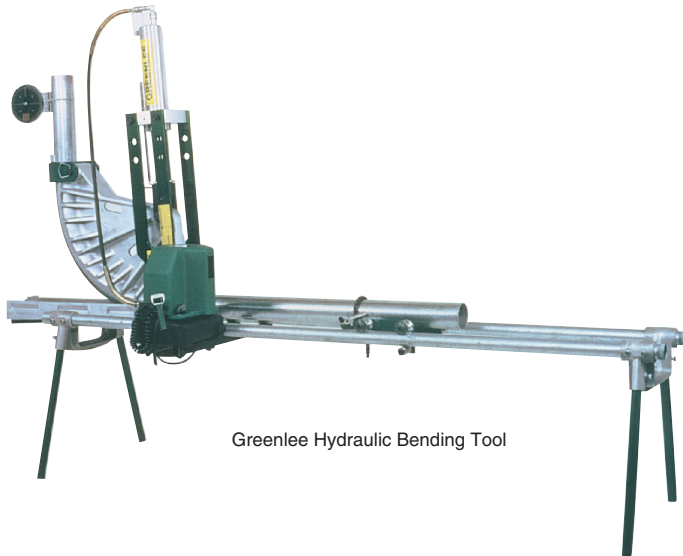
Ocal Pipe Retainer Clamp

Hydraulic Bending

This is the preferred style of bending for larger sizes of conduit, 2½" and above. The shoe assembly should be of the design for PVC coated conduit. The roller wheel and or slide bar do not need to be machined as they will accommodate PVC coated conduit. Some hydraulic benders have trouble with larger sizes of PVC coated conduit slipping vertically out of the shoe during the bending process and can cause kinking. Ocal offers a pipe retainer clamp, which can be modified to the shoes of any style bender, sizes 3", 3½" and 4".

Note:

- Sequential bends can be manufactured by Ocal upon request.
- Five and six inch conduit must be bent in the factory.



Greenlee Hydraulic Bending Tool



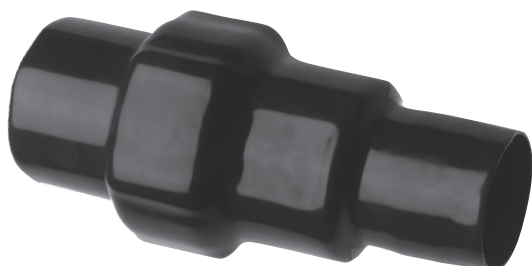
Shoe for Greenlee Hydraulic Bending Tool



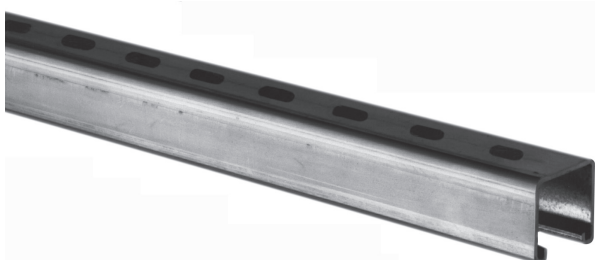
T&B Hub



ST 1/2



Reducing Coupling



Stainless Steel Superstrut

Installation

As mentioned above “no exposed metal shall be allowed”. The PVC sleeve should cover all exposed threads. An example of this would be a PVC coated conduit into a standard enclosure. A PVC coated hub is required for exit out of the enclosure [not a nut on the pipe and another nut on the inside of the enclosure] with the PVC sleeve covering the exposed threads.

Flexible conduit and fittings are a large area of concern as some installers use conventional flex and fittings. The flex as well as the fittings should be PVC coated.

When changing from one size PVC coated conduit to another, an “REC style” reducing coupling is preferred over a standard “RE” reducing bushing.

Stainless steel strut is recommended over PVC coated strut.

Installation (Continued)

Close nipple assembly and how to cut the sleeve.

Top hat assembly for lighting fixtures.



How to use touch up compound

Interior patch

Blue Urethane Compound

Exterior patch – Ocal Patch

For Special Colors, Order Color Touch-Up Compound at the Same Time

to Insure Color Accuracy.

Spray touch-up compound

For Aesthetic Purposes Only. Does Not Offer PVC Protection.

Installation (Continued)

RA & Edge clamps

Edge Clamps are Recommended in High Vibration Installations.

Form 8 vs Form 7

Form 8 conduit bodies are Recommended for Washdown Locations.

Power Tools

NEMA 6 Application

Ocal[®]
Recommended Hand Tools



Strap Wrench



J Wrench



Ridgid Pipe Wrench
