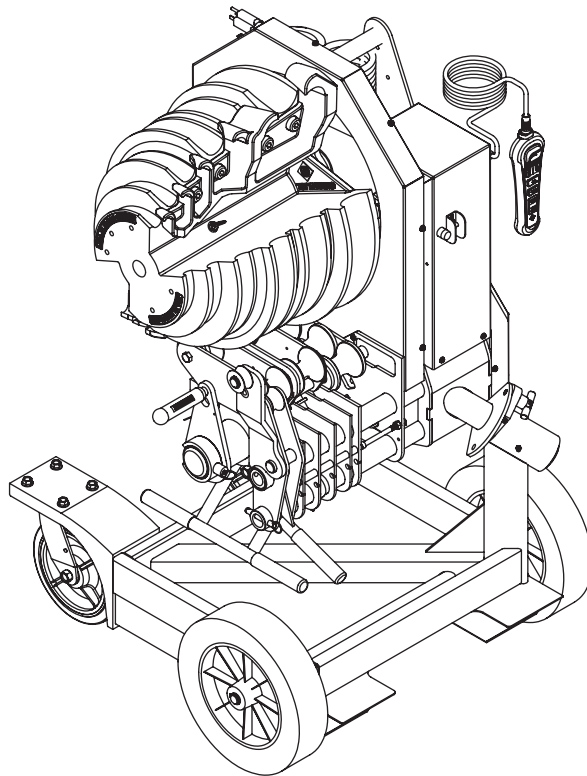


# INSTRUCTION MANUAL



## **854DX** **Electric Bender**

Patents Pending



**Read and understand** all of the instructions and safety information in this manual before operating or servicing this tool.

Register this product at [www.greenlee.com](http://www.greenlee.com)

## Table of Contents

Description .....	2
Safety .....	2
Purpose of this Manual .....	2
Important Safety Information .....	3–5
Grounding Instructions .....	6
Specifications .....	6
Identification .....	7
Features .....	8
Transporting Bender and Pivoting Bending Head .....	9
Setup .....	10
Operation .....	10–15
Basic Programmed Bending .....	12
Optional 02840 Shoe Group for PVC-Coated Conduit Bending .....	13–14
COATED PIPE or STANDARD PIPE Modes .....	14
Squeeze Adjustment .....	15
Illustrated Bending Glossary .....	16
Bending Instructions .....	17–18
Additional Bending Instructions .....	19–21
Additional Bending Tables .....	22–30
Maintenance .....	31–32

## Description

The Greenlee 854DX Electric Bender is intended to bend 1/2" to 2" conduit and pipe. This bender has the capability to accommodate the following types of conduit and pipe:

- Electrical Metallic Tubing
- Intermediate Metallic Conduit
- Rigid Conduit
- Aluminum Rigid
- Schedule 40 Pipe
- Stainless Steel Rigid
- PVC-Coated Rigid Conduit (with optional accessory)

In addition, the 02840 shoe group accessory is available for bending 1/2" to 2" 40 MIL PVC-coated rigid conduit.

## Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This instruction manual and any markings on the tool provide information for avoiding hazards and unsafe practices related to the use of this tool. Observe all of the safety information provided.

## Purpose of this Manual

This manual is intended to familiarize all personnel with the safe operation and maintenance procedures for the Greenlee 854DX Electric Bender.

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge at [www.greenlee.com](http://www.greenlee.com).



**Do not discard this product or throw away!**

For recycling information, go to [www.greenlee.com](http://www.greenlee.com).

All specifications are nominal and may change as design improvements occur. Greenlee Textron Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

# KEEP THIS MANUAL

**IMPORTANT SAFETY INFORMATION**



**SAFETY ALERT SYMBOL**

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

**⚠ DANGER**

Immediate hazards which, if not avoided, **WILL** result in severe injury or death.

**⚠ WARNING**

Hazards which, if not avoided, **COULD** result in severe injury or death.

**⚠ CAUTION**

Hazards or unsafe practices which, if not avoided, **MAY** result in injury or property damage.



**⚠ WARNING**

Electric shock hazard:

- Inspect the power cord before use. Repair or replace the cord if damaged.
- Connect the power cord to a 120 volt, 20 amp receptacle on a ground fault protected circuit only. Refer to “Grounding Instructions.”
- Do not modify the power cord or plug.
- Disconnect the unit from power before servicing.

Failure to observe this warning could result in severe injury or death.

**⚠ WARNING**

For continued protection against risk of fire and electric shock, replace **ONLY** with same manufacturer, type, and rating of fuse. Refer to the “Maintenance” section of this manual.

Failure to observe this warning could result in severe injury or death.



**⚠ DANGER**

Read and understand all of the instructions and safety information in this manual before operating or servicing this tool.

Failure to observe this warning will result in severe injury or death.



**⚠ WARNING**

- Do not use in dangerous environment. Do not use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.
- Do not immerse the pendant switch in water or any other liquid.

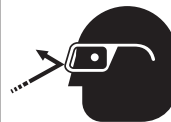
Failure to observe these warnings could result in severe injury or death.



**⚠ DANGER**

Do not use this tool in a hazardous environment. Hazards include flammable liquids, gases, or other materials. Using this tool in a hazardous environment can result in a fire or explosion.

Failure to observe this warning will result in severe injury or death.




**⚠ WARNING**


Always use safety glasses. Everyday glasses only have impact resistant lenses; they are **NOT** safety glasses. When using in dusty environment, use face or dust mask.

Failure to wear eye protection could result in serious eye injury from flying debris.


## IMPORTANT SAFETY INFORMATION

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <ul style="list-style-type: none"> <li>Keep guards in place and in working order.</li> <li>Remove any tools from bender before operating. Form habit of checking to see that all tools are removed from bender before turning it on.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>
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<b>⚠ WARNING</b>
<ul style="list-style-type: none"> <li>Reduce the risk of unintentional starting. Make sure switch is in off position before plugging in.</li> <li>Never leave tool running unattended. Turn power off. Do not leave tool until it comes to a complete stop.</li> <li>Disconnect tools before servicing and when changing accessories such as shoes, rollers, and the like. Accidental start-up could result in serious injury.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Extension cords:</p> <ul style="list-style-type: none"> <li>Use only three-wire, 12 AWG extension cords that have three-prong grounding-type plugs and three-hole receptacles that accept the tool's plug.</li> <li>Do not use extension cords that are longer than 30 m (100').</li> <li>Repair or replace damaged extension cords.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>
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<b>⚠ WARNING</b>
<ul style="list-style-type: none"> <li>Never stand on tool. Serious injury could occur if the tool is tipped.</li> <li>Do not overreach. Keep proper footing and balance at all times.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>Pinch points:</p> <ul style="list-style-type: none"> <li>Keep hands away from bending shoe, rollers, and conduit when bender is in use.</li> <li>Support conduit when unloading. Conduit can become loose and fall if not properly supported.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>
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<b>⚠ WARNING</b>
<p>Adjust fork spacing to match fork tubes on bender. Ensure front wheel brakes are engaged before inserting forks into fork tubes.</p> <p>Failure to observe this warning could result in severe injury or death.</p>

<b>⚠ CAUTION</b>
<ul style="list-style-type: none"> <li>Select the appropriate shoe groove and support roller for the type and size of conduit before bending.</li> <li>Do not bend conduit over 96 degrees. Overbending could result in the other shoe hook colliding with the conduit.</li> </ul> <p>Failure to observe these precautions may result in injury or property damage.</p>

## **IMPORTANT SAFETY INFORMATION**

### **⚠ CAUTION**

- Conduit moves rapidly as it is bent. The path of the conduit must be clear of obstructions. Be sure clearance is adequate before starting the bend.
- Wear proper apparel. Do not wear loose clothing, gloves, neckties, rings, bracelets, or other jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.
- Do not force rollers or alter tool. It will do the job better and safer at the rate for which it was designed.
- Use right tool. Do not force tool or attachment to do a job for which it was not designed.
- Use this tool for the manufacturer's intended purpose only. Use other than that which is instructed in this manual can result in injury or property damage.

Failure to observe these precautions may result in injury or property damage.

### **⚠ CAUTION**

- Keep work area clean. Cluttered areas and benches invite accidents.
- Keep children away. All visitors should be kept safe distance from work area.
- Make workshop kid proof with padlocks, master switches, or by removing starter keys.

Failure to observe these precautions may result in injury or property damage.


### **⚠ CAUTION**

- Inspect the bender before use. Replace worn, damaged, or missing parts with Greenlee replacement parts. A damaged or improperly assembled component could break and strike nearby personnel.
- Maintain tools with care. Keep tool clean for best and safest performance. Follow instructions for lubricating and changing accessories.
- Check damaged parts. Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
- Use recommended accessories. Consult the instruction manual for recommended accessories. The use of improper accessories may cause risk of injury to persons.
- Some bender parts and accessories are heavy and may require more than one person to lift and assemble.

Failure to observe these precautions may result in injury or property damage.

*Note: Keep all decals clean and legible, and replace when necessary.*

**Grounding Instructions**

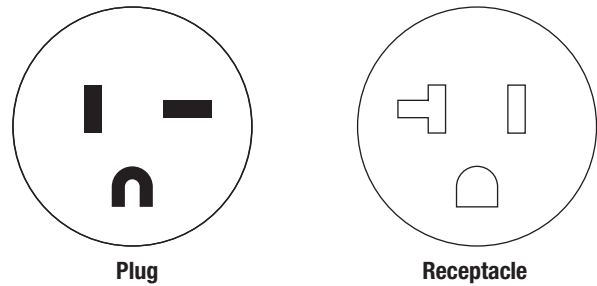
	<p><b>⚠ WARNING</b></p>
	<p>Electric shock hazard:</p> <ul style="list-style-type: none"> <li>• Do not modify the plug provided with the tool.</li> <li>• Connect this tool to a grounded receptacle on a 20 amp ground fault protected circuit.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>

This tool must be grounded. In the event of a malfunction or breakdown, an electrical ground provides a path of least resistance for the electric current. This path of least resistance is intended to reduce the risk of electric shock.

This tool's electric cord has a grounding conductor and a grounding plug as shown. Do not modify the plug. Connect the plug to a corresponding GFCI-protected receptacle that is properly installed and grounded in accordance with all national and local codes and ordinances.

Do not use an adapter.

**20 Amp/120 Volt Plug and Receptacle**

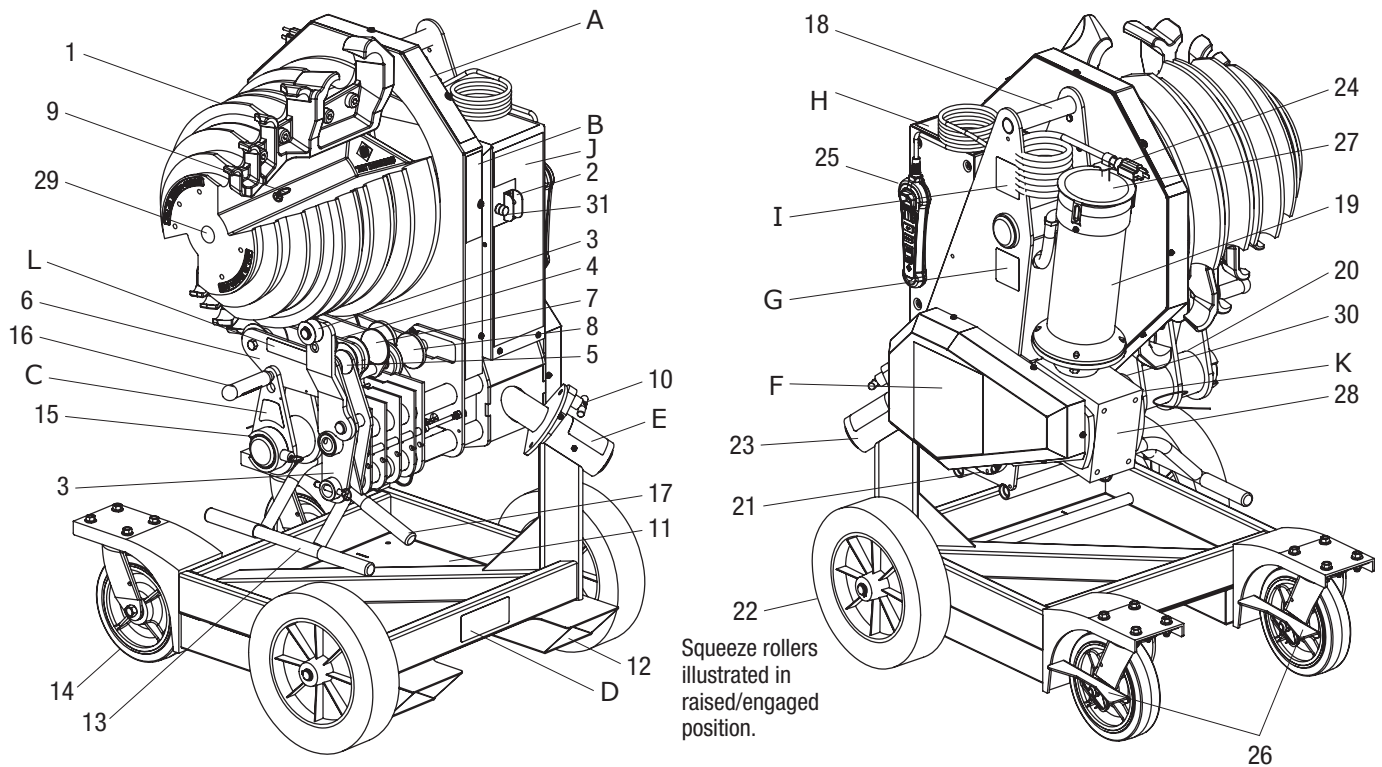


Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician. Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal. Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.

**Specifications**

Height (vertical bending position).....	117.1 cm (46.1")
Width .....	74.7 cm (29.4")
Depth (vertical bending position).....	84 cm (33.0")
Mass/Weight (bender with shoes and roller supports) .....	233 kg (513 lb)
Power Supply .....	120 VAC, 20 amp GFCI-protected receptacle
<b>Operating Conditions</b>	
Temperature .....	-20 °C to 49 °C (-5 °F to 120 °F)
Relative Humidity .....	0% to 98%
Capacity .....	1/2" to 2" conduit, schedule 40 pipe

## Identification



### Features

1. 1/2" to 2" shoe for EMT/IMC/rigid conduit
2. Main power (On-Off) switch/circuit breaker
3. 1/2" roller support
4. 3/4" roller support
5. 1" roller support
6. 1-1/4" roller support
7. 1-1/2" roller support
8. 2" roller support
9. Shoe retaining pin
10. Bending head pivoting detent lock
11. Storage area
12. Fork tube
13. Transport handle
14. Locking swivel casters
15. Roller support retainer
16. Roller engagement handle
17. Lower pivot handle
18. Hoist lifting bar
19. Motor
20. Roller support
21. Squeeze adjuster
22. Rear wheels

23. Bending head pivot
24. Power cord with tie strap
25. Pendant
26. Brake (caster)
27. Motor debris guard
28. Gearbox
29. Absolute encoder
30. Squeeze roller release lever
31. Fuse holder

### Decals

- A. Bending
- B. Bend angle chart
- C. Engage rollers
- D. Fork tube
- E. Pivot
- F. Squeeze
- G. Identification
- H. Instruction
- I. Lifting
- J. Warning
- K. Support release
- L. Raise rollers



## Features

- Single shoe bending of 1/2" to 2" EMT, IMC, and rigid conduit.
- 1/2" to 2" PVC-coated conduit bending capability with optional shoe group.
- Four large wheels for easy transportability.
- Waist level working height.
- Patented roller system automatically adjusts between IMC and EMT conduit.
- No homing or initial setup required—just load conduit and bend.
- Squeeze adjustment allows for variations in conduit.
- Programmable memory will stop bender at any programmed angle.
- Digital display shows bend angle on pendant.
- Removable patent pending pendant prevents unauthorized use of bender. Pendant includes cord strain relief and strong rare earth magnets for holding on steel surfaces.
- Bottom tray for storage area for pendant, instruction manual, etc.
- Lifting bar provided for easy hoisting.
- Fork tubes provided for easy forklift mobility.
- Adjustable height handle for easy and comfortable mobility.
- Front locking swivel wheels to securely keep bender in place during use.
- Quick release retainers for bending shoe and rollers.
- Quick release lock pin to easily pivot bender between vertical and horizontal positions.



## Transporting Bender and Pivoting Bending Head

Refer to the “Identification” section of this manual.

### To transport the bender on the ground:

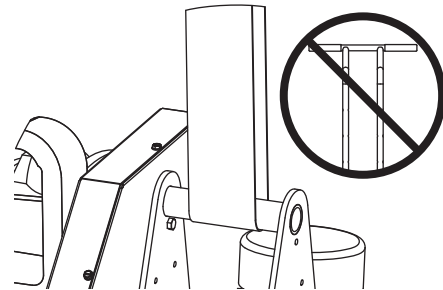
1. Pivot the bending head to the horizontal bending position.
2. Push down on the lower pivot handle (17) to remove the preload from the detent pin while pulling the detent pin (10) out.
3. Rotate the bending head as shown below until it locks in the horizontal position.
4. Remove the handle locking pins and raise the handle to the desired height.
5. Reverse steps 1 through 4 to return the bending head to its vertical position.

### To transport the bender with a forklift:

Insert the forks into the fork tubes (12) and lift.

### To transport the bender with a crane:

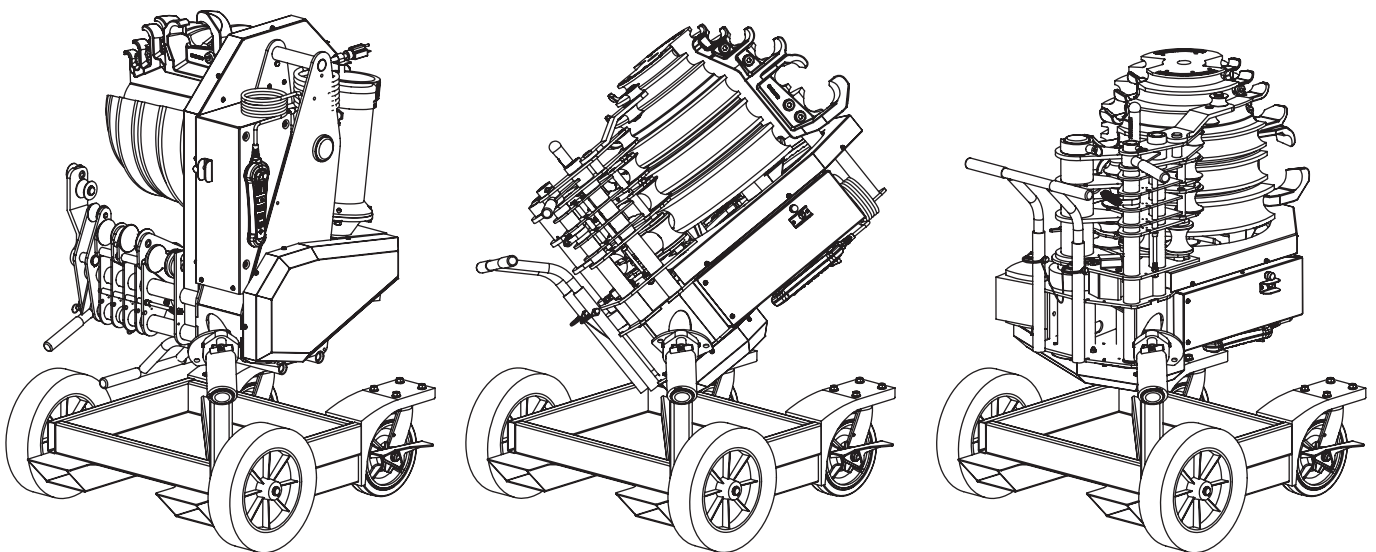
1. Pivot the bending head to the vertical bending position.
2. Confirm that the shoe and roller support retainers (15) are in place and locked.
3. Use a sling around the lifting bar (18) to support the full weight. **DO NOT USE HANDLES.** Lift only with the head in the vertical position.



### **WARNING**

Adjust fork spacing to match fork tubes on bender. Ensure front wheel brakes are engaged before inserting forks into fork tubes.

Failure to observe this warning could result in severe injury or death.




**Setup**


	<b>⚠ WARNING</b>
	<p>Always use safety glasses. Everyday glasses only have impact resistant lenses; they are NOT safety glasses. When using in dusty environment, use face or dust mask.</p> <p>Failure to wear eye protection could result in serious eye injury from flying debris.</p>


Refer to the “Identification” section of this manual.

1. Position the bender so that there is room to load conduit and engage the front wheel brakes.
2. Place the bender in the desired vertical or horizontal bending position.
3. Plug the bender into a grounded 20 amp outlet.
4. Plug the pendant switch into the pendant receptacle (25).

**Operation**

	<b>⚠ DANGER</b>
	<p>Do not use this tool in a hazardous environment. Hazards include flammable liquids, gases, or other materials. Using this tool in a hazardous environment can result in a fire or explosion.</p> <p>Failure to observe this warning will result in severe injury or death.</p>

	<b>⚠ WARNING</b>
	<p>Electric shock hazard:</p> <ul style="list-style-type: none"> <li>• Inspect the power cord before use. Repair or replace the cord if damaged.</li> <li>• Connect the power cord to a 120 volt, 20 amp receptacle on a ground fault protected circuit only. Refer to “Grounding Instructions.”</li> <li>• Do not modify the power cord or plug.</li> <li>• Disconnect the unit from power before servicing.</li> </ul> <p>Failure to observe this warning could result in severe injury or death.</p>

	<b>⚠ WARNING</b>
	<p>Pinch points:</p> <ul style="list-style-type: none"> <li>• Keep hands away from bending shoe, rollers, and conduit when bender is in use.</li> <li>• Support conduit when unloading. Conduit can become loose and fall if not properly supported.</li> </ul> <p>Failure to observe these warnings could result in severe injury or death.</p>

<b>⚠ WARNING</b>
<p>Disconnect tools before servicing and when changing accessories such as shoes, rollers, and the like. Accidental start-up could result in serious injury.</p> <p>Failure to observe this warning could result in severe injury or death.</p>

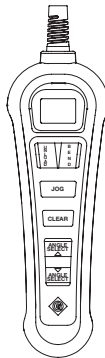
**Operation (cont'd)**
**CAUTION**

Wear proper apparel. Do not wear loose clothing, gloves, neckties, rings, bracelets, or other jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.

Failure to observe this precaution may result in injury or property damage.

Refer to the "Identification" section of this manual.

1. Turn on the main power switch (2).
2. Use the **BEND** or **UNLOAD** button to orient the shoe so that the hooks of the conduit type to be bent are around the 7 o'clock (approximately  $-5^\circ$ ) position. (Silver hooks are for EMT; green hooks are for IMC and rigid.)

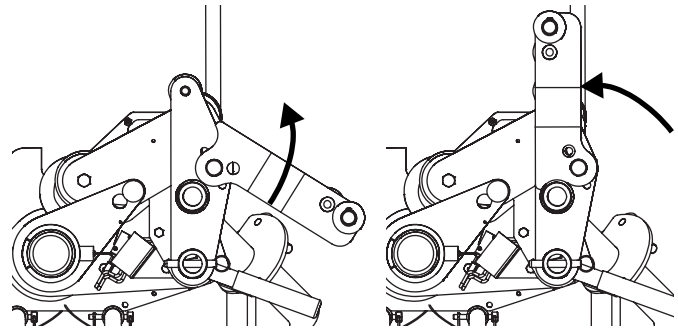


The bender automatically stops at the load position (approximately  $-5^\circ$ ). To continue past the load position, release the **BEND** or **UNLOAD** button, and then repress the **BEND** or **UNLOAD** button as needed.

The bender actively prevents operation at certain angles while the roller supports are up. This is done to prevent the shoe hooks from damaging the roller supports. When the roller supports are up and the hooks are close to or within the roller supports, the pendant will blink "UP" twice. When the pendant blinks "UP", the bender can often be moved in the opposite direction by pressing **BEND** or **UNLOAD**. If the bender will not move in any direction and continues to blink "UP", then the roller supports must be fully retracted before the bender will move.

3. Load the conduit so that the bending mark is aligned with the front edge of the hook.

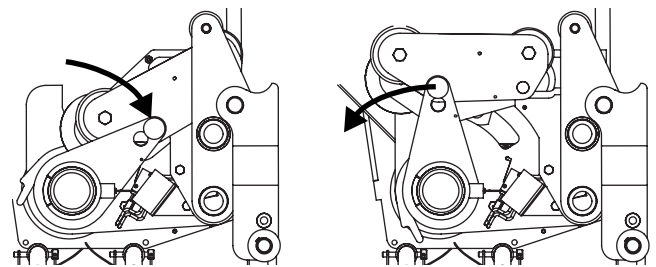
4. Bend the conduit.
  - a. For 1/2" and 3/4" EMT, IMC, or rigid conduit, raise the rollers from the retracted position to the upright position, as shown below.



**Squeeze Rollers Retracted**

**Squeeze Rollers Engaged**

- b. For 1-1/4", 1-1/2", and 2" EMT or IMC conduit, use the roller engagement handle (16) to raise the rollers from the retracted position to the upright (engaged) position, as shown below.

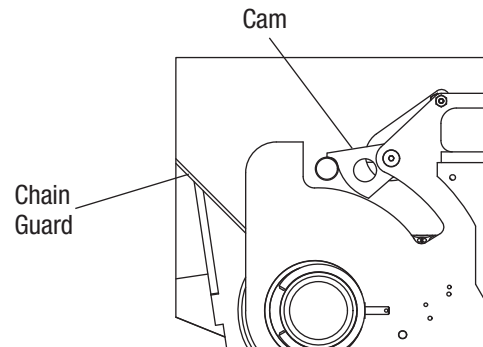


**Squeeze Rollers Retracted**

**Squeeze Rollers Engaged**

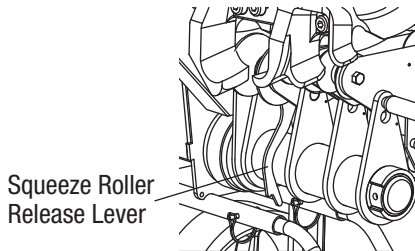
Press **BEND** while applying pressure to the roller engagement handle until the rollers hit their stop.

*Note: Lifting the tail of a long stick of conduit will aid in engaging the rollers. The cam should hold the rollers in the upright position, as shown below.*



## Operation (cont'd)

*Note: To retract the rollers without bending after the cam locks them in place, pump the lever below the 2" split roller several times. If this does not release the cam, lift the tail of the conduit while pumping the release lever. Otherwise, advance the shoe forward just enough for the cam to release, and then unload.*



- c. For all other conduit, press **BEND** while making sure the bend mark stays at the front of the hook until the conduit contacts the tail roller.
5. Continue to press **BEND** until the pendant display is close to the desired reading. Use **JOG** to complete the bend. **JOG** will advance the shoe about 1/2" and help prevent accidental overbending. The displayed angle in the pendant is the shoe rotation and does not include springback in the conduit. Refer to the Bend Angle Chart in the "Bending Instructions" section of this manual for display readings for common bend angles.
6. Press **UNLOAD** to free the conduit.
7. Twist the conduit to release it from the hook and remove it from the shoe.

## Programmed Bending

If an angle is preset into memory, the bender will automatically stop at that angle.

*Note: "Angle" represents the angle of the shoe and does not include conduit springback. The digital display chart shown in this manual and on the decal on the bender provides display readings for common bend angles.*

1. Select the angle by using the **ANGLE SELECT ▲** or **ANGLE SELECT ▼** button on the pendant to change the programmed angle. A single press changes the angle by 1°. Holding down an **ANGLE SELECT** key changes the angle rapidly in 5° increments. Pressing **CLEAR** resets the programmed angle back to 0°.

This programmed angle stays in the memory until **CLEAR** is pressed, a new angle is selected, or the power is turned off. The programmed angle remains in the pendant display for about 2 seconds and then reverts to the actual shoe angle.

2. Press **BEND** until the bender stops. The bender may slow down before reaching the selected angle. This is normal. When the bender stops at the programmed bend, the pendant display blinks twice with the programmed angle. To continue a bend, reset the programmed angle with the **CLEAR** button, or increase the programmed angle to be greater than the actual shoe angle with the **ANGLE SELECT ▲** button.

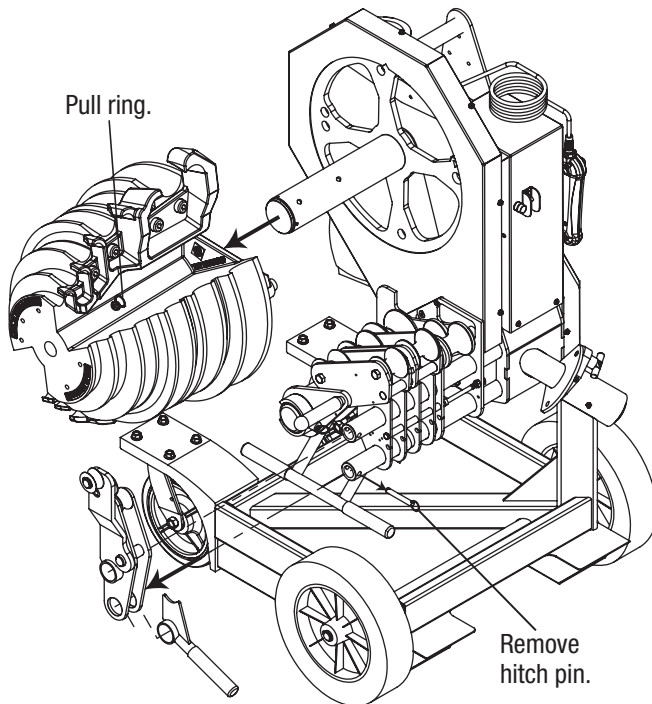
## Operation (cont'd)

### Optional 02840 Shoe Group for PVC-Coated Conduit Bending

This bender is compatible with the single-shoe 02840 PVC Shoe Group. The bender must be in COATED PIPE mode, which allows the bender to display the correct shoe angles on the pendant when using the single PVC shoe and roller supports.

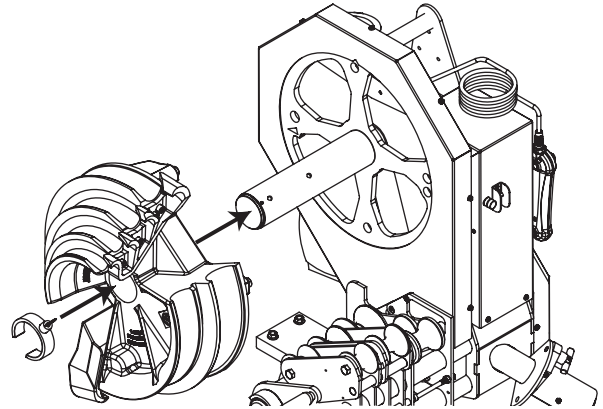
#### Setup

1. Disconnect power to the bender.
2. Position the bender head in the vertical position.
3. Remove the short hitch pin and 1/2" to 1" roller unit, and lift the handle from the roller support tubes.
4. Pull the ring of the lock pin in the shoe, and while pulling the lock pin slide the shoe off the main spindle, as shown below.

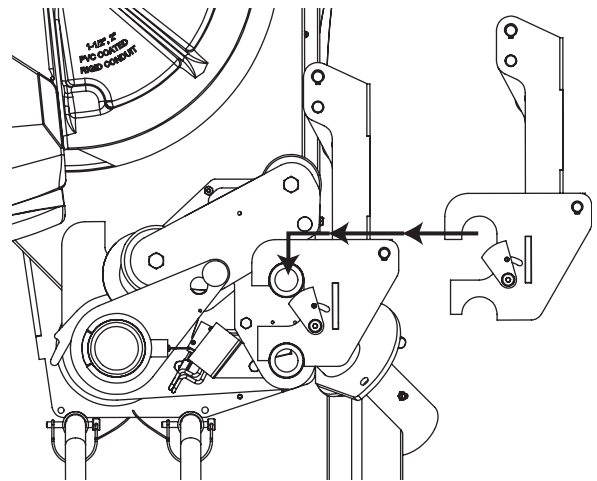


5. Install the PVC bending shoe onto the main spindle and align the drive studs in the shoe with the holes in the sprocket.

6. Install the shoe retaining collar, as shown below.



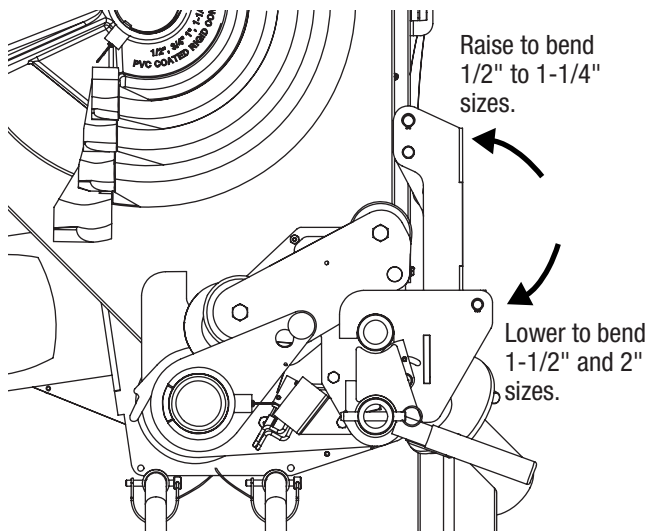
7. Install the 1/2" to 1-1/4" PVC-coated conduit roller support by sliding it between the existing rollers from the right side of the bender and dropping it down so it hooks on the bender frame roller support tubes, as shown below.



8. Reinstall the lift handle and short hitch pin.

**Operation (cont'd)****Optional 02840 Shoe Group for PVC-Coated Conduit Bending (cont'd)**

9. Place the bender in COATED PIPE mode.
10. To bend 1/2" to 1-1/4" conduit sizes, rotate the rollers to the raised position, as shown below.



11. To bend 1-1/2" and 2" conduit sizes, lower the 1/2" to 1-1/4" rollers and use the 1-1/2" or 2" rigid rollers.

**COATED PIPE and STANDARD PIPE Modes**

By default the bender always turns on in the STANDARD PIPE mode.

Whenever the optional 02840 shoe group for bending PVC-coated conduit is used, the bender must be placed in COATED PIPE mode. This ensures that the bend angles displayed on the pendant will be accurate.

**To enter COATED PIPE mode:**

1. Press and hold the **CLEAR** button on the pendant, then in addition press and hold the **ANGLE SELECT ▼** button.
2. Continue to hold both buttons until the text "COATED PIPE" scrolls across the pendant and the two decimal points ". ." on the pendant are on continuously. The buttons must be held for approximately 2 seconds.
3. The two decimal points remain on while the bender is in COATED PIPE mode.

**To exit COATED PIPE mode or return to STANDARD PIPE mode:**

1. Press and hold the **CLEAR** button, then in addition press and hold the **ANGLE SELECT ▼** button.
2. Continue to hold both buttons until the text "STANDARD PIPE" scrolls across the pendant and the two decimal points ". ." on the pendant are off. The buttons must be held for approximately 2 seconds.



## Operation (cont'd)

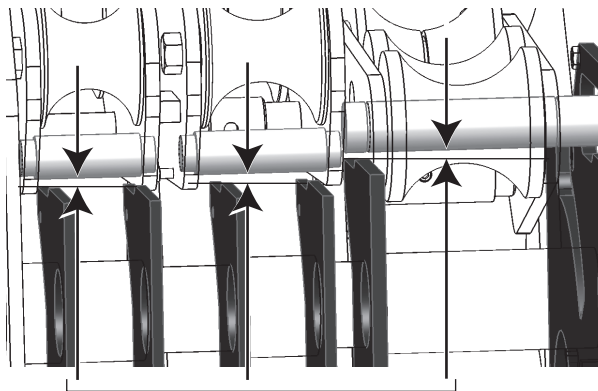
### Squeeze Adjustment

Squeeze is factory set and should not normally need to be adjusted.

When bending 1-1/4", 1-1/2", or 2" EMT or IMC, the amount of squeeze applied to the conduit can be adjusted to compensate for conduit variations. The squeeze is set properly if the support shaft does not contact the support plates while bending EMT, as shown by the shaded parts below. The shaft should not be more than approximately 1/4" (6 mm) above the lower flat surface.

Squeeze can be checked by loading EMT conduit and advancing the shoe until conduit starts to bend. If support shafts touch plates or are more than 1/4" (6 mm) from plates, unload conduit and adjust squeeze as described.

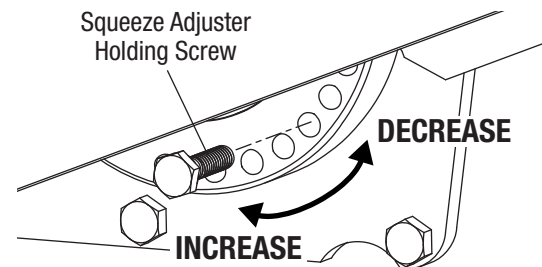
- If shaft is touching, **increase** squeeze.
- If shaft is farther than 1/4" (6 mm), **decrease** squeeze.



1/4" (6 mm) max. gap between shaft and top of side plates

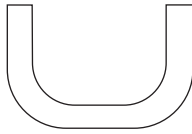
### To adjust the squeeze:

1. Unplug the bender.
2. Remove screw (refer to illustration below).
3. Rotate the squeeze adjuster:
  - If the shaft is contacting the support plates, **increase** the squeeze by rotating the squeeze adjuster clockwise.
  - If the shaft is too high above the support plates, **decrease** the squeeze by rotating the squeeze adjuster counterclockwise.



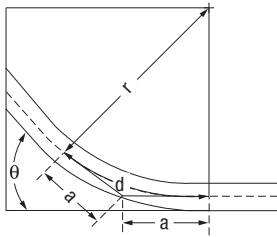


## Illustrated Bending Glossary



**back-to-back bend** — any U-shaped bend formed by two parallel 90° bends with a straight section of conduit or pipe between the bends.

**center-to-center distance** — the distance between the successive bends that make up an offset or a three-bend saddle.



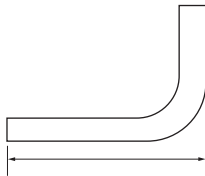
**developed length** — the actual length of pipe that will be bent; refer to distance “d” in the illustration at left.

**gain** — the difference between the straight-line distance ( $a + a$ ) and the shorter radial distance, ( $d$ ) where:

$\theta$  = angle of bend

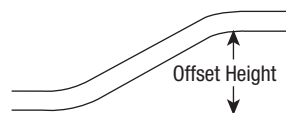
$r$  = the centerline bending radius of the bending shoe

**kick** — single bend of less than 90°

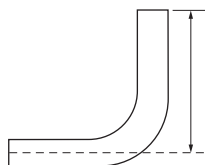


**leg length** — the distance from the end of a straight section of conduit or pipe to the bend; measured from the end to the outside edge of the conduit or pipe.

**offset bend** — two opposite bends with the same degree of bend; used to avoid an obstruction.



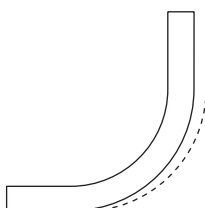
**offset height** — the distance between the two legs of an offset bend, measured perpendicular to the two legs; also called amount of offset and depth of offset.



**rise** — the distance from the end of a straight section of conduit or pipe to the bend; measured from the end to the center line of the conduit or pipe. Also called stub or stub-up.

**saddle** — a three-bend or four-bend combination; used to avoid an obstruction.

**shrink** — the amount of conduit “lost” when laying out an offset bend working toward an obstruction.



**springback** — the amount, measured in degrees, that a conduit or pipe tends to straighten after being bent.

## Bending Instructions

### 90° STUBS

1. Measure the length of the required stub.
2. Refer to the Minimum Stub Length formula on the Deduct Table. The required stub must be equal to or longer than the Minimum Stub Length.
3. Measure and mark the stub length on the conduit. This is Mark 1. Subtract the Deduct from this mark and make a new mark. This is Mark 2.
4. Align Mark 2 with the front edge of the hook and bend the conduit.

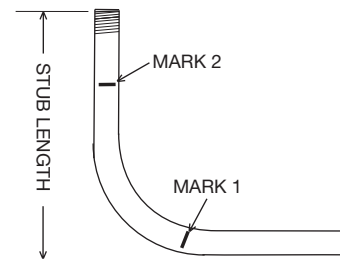
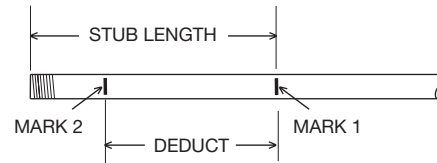
*Note: The shoe bends to 90° maximum.*

*Note: When the operator presses **UNLOAD**, the conduit may spring back a few degrees. Compensate by over-bending as shown in the Bend Angle Chart below.*

### Deduct Table

CONDUIT SIZE		1/2	3/4	1	1-1/4	1-1/2	2
DEDUCT	RIGID	8	9-7/8	11-7/8	14-3/8	15-3/8	16-5/8
	EMT	7-11/16	9-11/16	11-13/16	14-1/4	15-5/16	16-3/4
	IMC	8	9-7/8	11-7/8	14-3/8	15-3/8	16-5/8
	PVC-COATED RIGID	7-3/8	8-15/16	10-13/16	14	15	16-7/16
<b>MINIMUM STUB LENGTH = DEDUCT PLUS 2 INCHES</b>							

Figures are approximate.



### Bend Angle Chart

CONDUIT SIZE	RIGID					EMT					IMC					PVC-COATED RIGID				
	15°	30°	45°	60°	90°	15°	30°	45°	60°	90°	15°	30°	45°	60°	90°	15°	30°	45°	60°	90°
1/2	16	31	46	62	92	16	32	47	63	94	20	35	51	66	97	17	32	47	63	93
3/4	16	31	46	62	92	16	31	47	62	93	18	33	49	64	95	18	33	48	64	94
1	17	33	48	64	95	18	33	49	64	95	20	35	51	66	97	17	32	47	63	93
1-1/4	16	31	47	62	93	20	35	51	66	97	22	37	52	68	98	17	32	47	63	93
1-1/2	16	31	46	62	92	17	33	48	64	95	20	35	50	66	96	18	33	49	64	95
2	17	32	47	63	93	17	32	47	63	93	20	35	51	66	97	19	34	50	65	96

Figures are approximate.

Note: Due to varying conduit material properties, 1-1/2" or 2" aluminum rigid may require IMC squeeze rollers for bending. If flattening occurs, reduce the squeeze setting two positions and use IMC bending procedures.

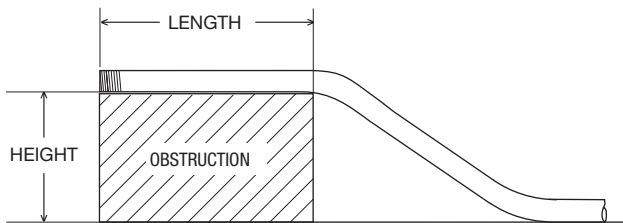
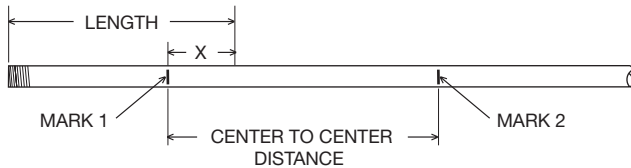
## Bending Instructions (cont'd)

### Offsets

1. Measure the height and length of the obstruction. Select the angle to be used.
2. Refer to the Offset Table. The height of the obstruction must be equal to or greater than the minimum offset.
3. Refer to the X Table to find the X dimension. Refer to the Offset Table to find the center-to-center distance.

*Note: If the center-to-center distance is not shown, calculate it by using the multipliers shown in the Offset Table.*

4. Mark the conduit as shown.
5. Insert the conduit into the bender. Align Mark 1 with the front edge of the hook and bend the conduit.
6. Align Mark 2 with the front edge of the hook. Without removing the conduit from the bender, rotate the conduit 180°. Make the second bend.



### Offset Table

OFFSET	Finished Angle					
	15°		30°		45°	
	Max. Conduit Size	Center-to-Center	Max. Conduit Size	Center-to-Center	Max. Conduit Size	Center-to-Center
2	1-1/4	7-3/4				
4	2	15-7/16	1	7-15/16		
6	2	23-3/16	2	11-15/16		
8	2	30-15/16	2	15-15/16	1	11-5/16
10	2	38-5/8	2	19-15/16	2	14-1/8
12	2	46-3/8	2	23-15/16	2	16-15/16
14	2	54-1/16	2	27-15/16	2	19-13/16
16	2	61-13/16	2	31-15/16	2	22-5/8
18	2	69-9/16	2	35-15/16	2	25-7/16
20	2	77-1/4	2	39-15/16	2	28-1/4
22	2	85	2	43-15/16	2	31-1/8

CENTER-TO-CENTER DISTANCE = OFFSET HEIGHT x MULTIPLIER					
OFFSET ANGLE	10°	15°	22-1/2°	30°	45°
MULTIPLIER	5.8	3.9	2.6	2.0	1.4

Figures are approximate.

### X Table

CONDUIT SIZE		1/2	3/4	1	1-1/4	1-1/2	2
"X"	RIGID/IMC	3-3/16	3-3/4	4-1/16	5-1/16	5-7/8	6-1/8
	EMT	2-15/16	3-1/2	4	5	5-13/16	6-1/8
	PVC-COATED RIGID	2-1/2	2-3/4	3	4-1/8	5-1/2	6

Figures are approximate.

### Centerline Bending Radii

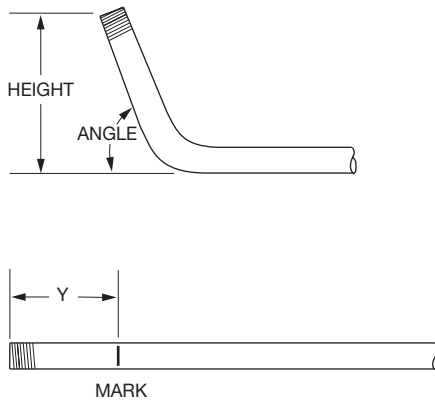
CONDUIT SIZE	EMT		IMC/RIGID		PVC-COATED RIGID	
	in	mm	in	mm	in	mm
1/2	4-5/16	109.5	4-1/4	108.0	4-1/4	108.0
3/4	5-1/2	139.7	5-7/16	138.1	5-7/16	138.1
1	7	177.8	6-15/16	176.2	6-15/16	176.2
1-1/4	8-1/4	209.6	8-3/16	208.0	8-3/4	222.3
1-1/2	8-3/8	212.7	8-1/4	209.6	8-1/4	209.6
2	9-1/4	235.0	9	228.6	9	228.6

## Additional Bending Instructions

The following drawings and bending tables are intended to provide the information necessary to accomplish the most common types of bends. The bending tables contain conduit marking information.

### STUBS

1. Select the size and type of conduit. Determine the height of stub and the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled ANGLE, find the appropriate angle.
4. Find the row labeled Y. In the row at the top of the page, find the height (H) of the stub. The number shown at the intersection of row Y and column H is the distance Y. Place the bending mark Y inches from the end of the conduit.
5. Bend the conduit.



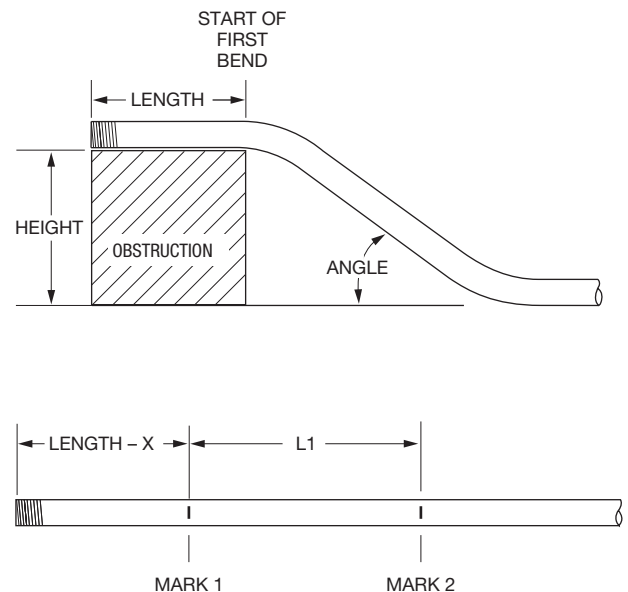
### OFFSETS

An offset is used to route the conduit around an obstruction. To make an offset, two equal bends are required. The distance between the two bends is the center-to-center distance.

When working past an obstruction, it is necessary to determine the location of the first bend. The center-to-center distance is then used to determine the location of the second bend. When working toward an obstruction, it is necessary to determine the location of the second bend. The center-to-center distance is then used to determine the location of the first bend.

### Working Past an Obstruction

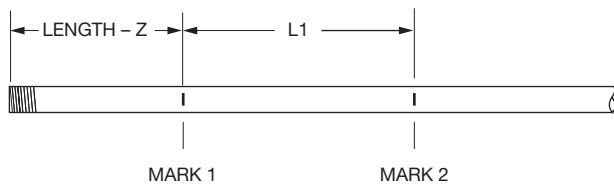
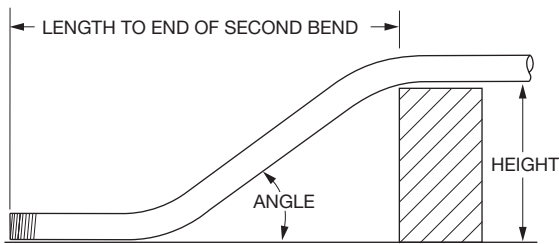
1. Select the size and type of conduit. Measure the height of the obstruction and the distance labeled LENGTH. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. To the right of the size and type of conduit, find the dimension labeled X. Subtract X from LENGTH. Place the first bending mark this distance from the end of the conduit.
4. Under the column labeled ANGLE, find the appropriate angle. Find the row labeled L1. In the row at the top of the page, find the height (H) of the offset. The number shown at the intersection of row L1 and column H is L1. Place the second bending mark L1 inches from the first bending mark.
5. Bend the conduit.



## Additional Bending Instructions (cont'd)

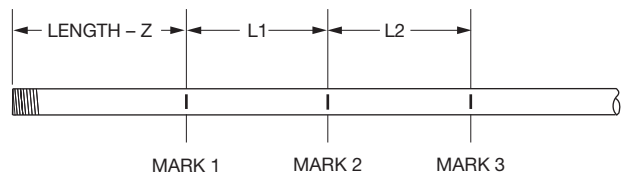
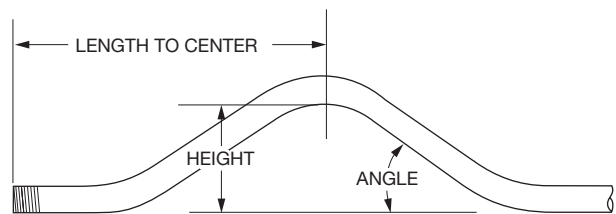
### Working Toward an Obstruction

1. Select the size and type of conduit. Measure the height of the obstruction and the distance labeled **LENGTH TO END OF SECOND BEND**. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled **ANGLE**, find the appropriate angle. Find the row labeled **Z**. In the row at the top of the page, find the height (**H**) of the offset. The number shown at the intersection of the **Z** row and the **H** column is **Z**. Subtract **Z** from **LENGTH TO THE END OF SECOND BEND**. Place the first bending mark this distance from the end of the conduit.
4. In the same column, find the row labeled **L1**. Place the second bending mark **L1** inches from the first bending mark.
5. Bend the conduit.



### THREE-BEND SADDLE

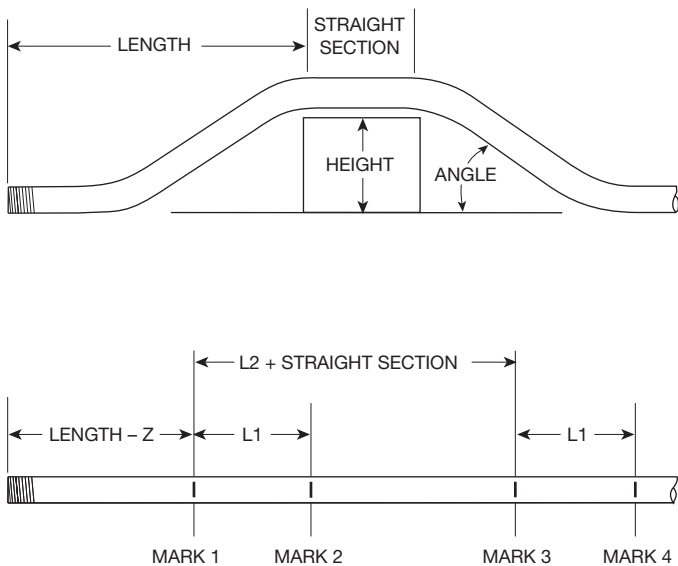
1. Select the size and type of conduit. Measure the height of the obstruction and the distance from the end of the conduit to the center (**LENGTH TO CENTER**) of the bend. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled **ANGLE**, find the appropriate angle. Find the row labeled **Z**. In the row at the top of the page, find the height (**H**) of the offset. The number shown at the intersection of the **Z** row and the appropriate **H** column is **Z**. Subtract **Z** from the **LENGTH TO CENTER**. Place the first bending mark this distance from the end of the conduit.
4. In the same column, find the row labeled **L1**. Place the second bending mark **L1** inches from the first bending mark.
5. In the same column, find the row labeled **L2**. Place the third bending mark **L2** inches from the second bending mark.
6. Bend the conduit.



## Additional Bending Instructions (cont'd)

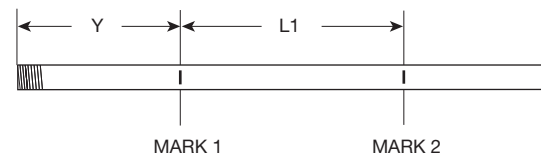
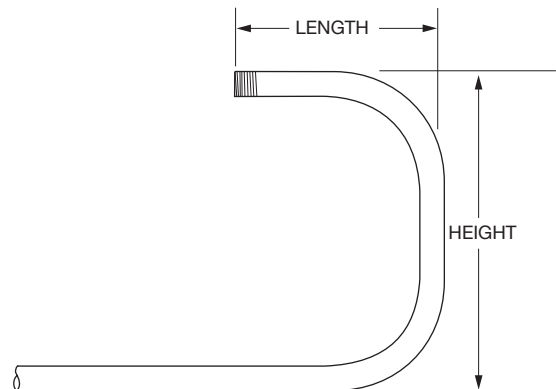
### FOUR-BEND SADDLE

1. Select the size and type of conduit. Measure the height of the obstruction, the distance labeled LENGTH, and the distance labeled STRAIGHT SECTION. Determine the angle to be used.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled ANGLE, find the appropriate angle. Find the row labeled Z. In the row at the top of the page, find the height (H) of the offset. The number shown at the intersection of the Z row and the appropriate H column is Z. Subtract Z from the LENGTH. Place the first bending mark this distance from the end of the conduit.
4. In the same column, find the row labeled L1. Place the second bending mark L1 inches from the first bending mark.
5. In the same column, find the row labeled L2. Add L2 to the STRAIGHT SECTION. Place the third bending mark this distance from the first bending mark.
6. Make the final bending mark L1 inches from the third bending mark.
7. Bend the conduit.



### U-BENDS

1. Select the size and type of conduit. Determine the LENGTH and the HEIGHT.
2. Find the table that corresponds to the size and type of conduit selected in Step 1.
3. Under the column labeled ANGLE, find 90°.
4. Find the row labeled Y. In the row at the top of the page, find the height (H) that corresponds to the LENGTH. The number shown at the intersection of the Y row and the appropriate H column is the distance Y. Place the bending mark Y inches from the end of the conduit.
5. Find the row labeled L1, and go to the right to find the height (H) that corresponds to the HEIGHT.
6. The number shown at the intersection of the L1 row and the appropriate H column is L1. Place the second bending mark L1 inches from the first mark.
7. Bend the conduit.



**Additional Bending Tables**
**1/2" EMT**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.06	Y	15	2.84	10.57	18.30	26.03	33.75	41.48	53.07	64.66	87.85	134.21
	L1		7.72	15.45	23.18	30.90	38.63	46.36	57.95	69.54	92.72	139.09
	L2		8.88	16.61	24.33	32.06	39.79	47.52	59.11	70.70	93.88	140.24
	Z		11.57	19.03	26.49	33.96	41.42	48.89	60.08	71.28	93.67	138.46
MINIMUM H = 1.80	Y	22.5	0.49	5.71	10.94	16.17	21.39	26.62	34.46	42.30	57.98	89.33
	L1		5.20	10.43	15.66	20.88	26.11	31.33	39.17	47.01	62.69	94.05
	L2		6.94	12.17	17.39	22.62	27.84	33.07	40.91	48.75	64.43	95.79
	Z		9.52	14.35	19.18	24.01	28.84	33.67	40.91	48.15	62.64	91.61
MINIMUM H = 2.65	Y	30		3.17	7.17	11.17	15.17	19.17	25.17	31.17	43.17	67.17
	L1			7.95	11.95	15.95	19.95	23.95	29.95	35.95	47.95	71.95
	L2			10.26	14.26	18.26	22.26	26.26	32.26	38.26	50.26	74.26
	Z			12.23	15.70	19.16	22.63	26.09	31.29	36.48	46.88	67.66
MINIMUM H = 4.67	Y	45			3.22	6.05	8.87	11.70	15.95	20.19	28.67	45.64
	L1				8.30	11.12	13.95	16.78	21.02	25.27	33.75	50.72
	L2				11.77	14.60	17.42	20.25	24.50	28.74	37.22	54.19
	Z				12.60	14.60	16.60	18.60	21.60	24.60	30.60	42.60
MINIMUM H = 6.96	Y	60				3.34	5.65	7.96	11.42	14.89	21.82	35.67
	L1					8.76	11.07	13.38	16.85	20.31	27.24	41.09
	L2					13.39	15.70	18.01	21.47	24.94	31.87	45.72
	Z					12.66	13.82	14.97	16.70	18.43	21.90	28.83
MINIMUM H = 11.78	Y	90					2.29	4.29	7.29	10.29	16.29	28.29
	L1					8.10	10.10	13.10	16.10	22.10	34.10	
	L2					15.05	17.05	20.05	23.05	29.05	41.05	
	Z					11.78	11.78	11.78	11.78	11.78	11.78	

**3/4" EMT**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.29	Y	15	1.70	9.43	17.16	24.88	32.61	40.34	51.93	63.52	86.70	133.07
	L1		7.72	15.45	23.17	30.90	38.63	46.36	57.95	69.54	92.72	139.08
	L2		9.20	16.93	24.65	32.38	40.11	47.84	59.43	71.02	94.20	140.57
	Z		12.45	19.92	27.38	34.85	42.31	49.77	60.97	72.17	94.56	139.34
MINIMUM H = 2.20	Y	22.5		4.62	9.85	15.08	20.30	25.53	33.37	41.21	56.89	88.24
	L1			10.42	15.65	20.88	26.10	31.33	39.17	47.01	62.69	94.04
	L2			12.64	17.87	23.10	28.32	33.55	41.39	49.23	64.91	96.26
	Z			15.41	20.24	25.06	29.89	34.72	41.96	49.21	63.69	92.66
MINIMUM H = 3.27	Y	30			6.06	10.06	14.06	18.06	24.06	30.06	42.06	66.06
	L1			7.93	11.93	15.93	19.93	23.93	29.93	35.93	47.93	71.93
	L2			10.89	14.89	18.89	22.89	26.89	32.89	38.89	50.89	74.89
	Z			13.46	16.92	20.39	23.85	27.32	32.51	37.71	48.10	68.88
MINIMUM H = 5.79	Y	45			1.99	4.82	7.65	10.48	14.72	18.96	27.45	44.42
	L1				8.24	11.07	13.90	16.73	20.97	25.21	33.70	50.67
	L2				12.68	15.51	18.34	21.17	25.41	29.65	38.14	55.11
	Z				14.19	16.19	18.19	20.19	23.19	26.19	32.19	44.19
MINIMUM H = 8.69	Y	60					4.25	6.56	10.02	13.49	20.42	34.27
	L1					10.94	13.25	16.71	20.18	27.10	40.96	
	L2					16.86	19.17	22.64	26.10	33.03	46.88	
	Z					15.80	16.96	18.69	20.42	23.89	30.82	
MINIMUM H = 14.81	Y	90						2.38	5.38	8.38	14.38	26.38
	L1						9.57	12.57	15.57	21.57	33.57	
	L2						18.46	21.46	24.46	30.46	42.46	
	Z						14.81	14.81	14.81	14.81	14.81	



**Additional Bending Tables (cont'd)**
**1" EMT**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.53	Y	15	0.53	8.26	15.99	23.71	31.44	39.17	50.76	62.35	85.53	131.90
	L1		7.72	15.44	23.17	30.90	38.63	46.35	57.94	69.54	92.72	139.08
	L2		9.60	17.33	25.06	32.79	40.51	48.24	59.83	71.42	94.61	140.97
	Z		13.36	20.83	28.29	35.75	43.22	50.68	61.88	73.08	95.47	140.25
MINIMUM H = 2.63	Y	22.5		3.50	8.73	13.95	19.18	24.40	32.24	40.08	55.76	87.12
	L1		5.19	10.42	15.64	20.87	26.09	31.32	39.16	47.00	62.68	94.04
	L2		8.02	13.25	18.47	23.70	28.93	34.15	41.99	49.83	65.51	96.87
	Z		11.70	16.53	21.35	26.18	31.01	35.84	43.08	50.32	64.81	93.78
MINIMUM H = 3.93	Y	30		0.91	4.91	8.91	12.91	16.91	22.91	28.91	40.91	64.91
	L1		3.91	7.91	11.91	15.91	19.91	23.91	29.91	35.91	47.91	71.91
	L2		7.69	11.69	15.69	19.69	23.69	27.69	33.69	39.69	51.69	75.69
	Z		11.33	14.79	18.26	21.72	25.18	28.65	33.84	39.04	49.43	70.22
MINIMUM H = 7.05	Y	45			0.68	3.50	6.33	9.16	13.40	17.65	26.13	43.10
	L1				8.18	11.00	13.83	16.66	20.90	25.15	33.63	50.60
	L2				13.84	16.67	19.49	22.32	26.57	30.81	39.29	56.26
	Z				15.97	17.97	19.97	21.97	24.97	27.97	33.97	45.97
MINIMUM H = 10.67	Y	60				0.40	2.71	5.02	8.49	11.95	18.88	32.74
	L1						10.77	13.08	16.55	20.01	26.94	40.79
	L2						18.32	20.63	24.10	27.56	34.49	48.34
	Z						18.10	19.25	20.99	22.72	26.18	33.11
MINIMUM H = 18.42	Y	90						0.21	3.21	6.21	12.21	24.21
	L1									14.91	20.91	32.91
	L2									26.23	32.23	44.23
	Z									18.42	18.42	18.42

**1-1/4" EMT**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.87	Y	15		6.42	14.15	21.87	29.60	37.33	48.92	60.51	83.69	130.06
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2		9.94	17.67	25.39	33.12	40.85	48.57	60.17	71.76	94.94	141.30
	Z		14.70	22.16	29.63	37.09	44.56	52.02	63.22	74.41	96.81	141.59
MINIMUM H = 3.21	Y	22.5		1.79	7.02	12.24	17.47	22.70	30.53	38.37	54.05	85.41
	L1		5.18	10.41	15.64	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2		8.52	13.74	18.97	24.20	29.42	34.65	42.49	50.33	66.01	97.36
	Z		13.21	18.04	22.86	27.69	32.52	37.35	44.59	51.83	66.32	95.29
MINIMUM H = 4.78	Y	30			3.21	7.21	11.21	15.21	21.21	27.21	39.21	63.21
	L1			7.90	11.90	15.90	19.90	23.90	29.90	35.90	47.90	71.90
	L2			12.34	16.34	20.34	24.34	28.34	34.34	40.34	52.34	76.34
	Z			16.48	19.94	23.41	26.87	30.34	35.53	40.73	51.12	71.90
MINIMUM H = 8.51	Y	45				1.73	4.56	7.39	11.63	15.87	24.36	41.33
	L1					10.95	13.78	16.61	20.85	25.09	33.58	50.55
	L2					17.62	20.45	23.28	27.52	31.76	40.25	57.22
	Z					20.04	22.04	24.04	27.04	30.04	36.04	48.04
MINIMUM H = 12.82	Y	60					0.77	3.08	6.55	10.01	16.94	30.79
	L1							12.94	16.41	19.87	26.80	40.66
	L2							21.84	25.30	28.76	35.69	49.55
	Z							21.73	23.47	25.20	28.66	35.59
MINIMUM H = 21.98	Y	90							0.75	3.75	9.75	21.75
	L1									14.36	20.36	32.36
	L2									27.69	33.69	45.69
	Z									21.98	21.98	21.98

**Additional Bending Tables (cont'd)**
**1-1/2" EMT**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 2.09	Y	15		5.15	12.88	20.61	28.33	36.06	47.65	59.24	82.42	128.79
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2		9.96	17.69	25.42	33.14	40.87	48.60	60.19	71.78	94.96	141.33
	Z		15.54	23.00	30.47	37.93	45.39	52.86	64.05	75.25	97.64	142.43
MINIMUM H = 3.53	Y	22.5		0.66	5.89	11.11	16.34	21.56	29.40	37.24	52.92	84.28
	L1		5.18	10.41	15.63	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2		8.55	13.78	19.01	24.23	29.46	34.68	42.52	50.36	66.04	97.40
	Z		14.06	18.88	23.71	28.54	33.37	38.20	45.44	52.68	67.17	96.14
MINIMUM H = 5.21	Y	30			2.15	6.15	10.15	14.15	20.15	26.15	38.15	62.15
	L1			7.89	11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89
	L2			12.39	16.39	20.39	24.39	28.39	34.39	40.39	52.39	76.39
	Z			17.34	20.81	24.27	27.73	31.20	36.39	41.59	51.98	72.77
MINIMUM H = 9.14	Y	45				0.71	3.54	6.37	10.61	14.86	23.34	40.31
	L1					10.94	13.77	16.60	20.84	25.09	33.57	50.54
	L2					17.69	20.52	23.34	27.59	31.83	40.31	57.28
	Z					20.92	22.92	24.92	27.92	30.92	36.92	48.92
MINIMUM H = 13.62	Y	60						2.08	5.55	9.01	15.94	29.80
	L1							12.93	16.40	19.86	26.79	40.65
	L2							21.92	25.39	28.85	35.78	49.64
	Z							22.65	24.39	26.12	29.58	36.51
MINIMUM H = 22.98	Y	90								2.73	8.73	20.73
	L1									14.32	20.32	32.32
	L2									27.80	33.80	45.80
	Z									22.98	22.98	22.98

**2" EMT**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 2.23	Y	15		3.83	11.56	19.29	27.02	34.74	46.33	57.93	81.11	127.47
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.71	139.08
	L2		10.20	17.93	25.66	33.39	41.11	48.84	60.43	72.02	95.20	141.57
	Z		16.09	23.56	31.02	38.49	45.95	53.41	64.61	75.81	98.20	142.98
MINIMUM H = 3.79	Y	22.5			4.79	10.02	15.24	20.47	28.31	36.15	51.83	83.19
	L1		5.18	10.40	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.02
	L2		8.91	14.14	19.36	24.59	29.82	35.04	42.88	50.72	66.40	97.76
	Z		14.74	19.57	24.39	29.22	34.05	38.88	46.12	53.36	67.85	96.82
MINIMUM H = 5.61	Y	30			1.13	5.13	9.13	13.13	19.13	25.13	37.13	61.13
	L1			7.88	11.88	15.88	19.88	23.88	29.88	35.88	47.88	71.88
	L2			12.86	16.86	20.86	24.86	28.86	34.86	40.86	52.86	76.86
	Z			18.15	21.61	25.08	28.54	32.01	37.20	42.40	52.79	73.58
MINIMUM H = 9.90	Y	45					2.52	5.35	9.60	13.84	22.32	39.29
	L1					10.90	13.73	16.56	20.80	25.05	33.53	50.50
	L2					18.37	21.20	24.03	28.27	32.52	41.00	57.97
	Z					22.00	24.00	26.00	29.00	32.00	38.00	50.00
MINIMUM H = 14.82	Y	60						0.97	4.44	7.90	14.83	28.68
	L1							12.83	16.30	19.76	26.69	40.55
	L2							22.79	26.26	29.72	36.65	50.51
	Z							24.04	25.77	27.50	30.96	37.89
MINIMUM H = 25.15	Y	90								1.27	7.27	19.27
	L1									13.92	19.92	31.92
	L2									28.86	34.86	46.86
	Z									25.15	25.15	25.15

**Additional Bending Tables (cont'd)**
**1/2" IMC, Steel Rigid and Aluminum Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.12	Y	15	2.34	10.07	17.80	25.53	33.25	40.98	52.57	64.16	87.35	133.71
	L1		7.72	15.45	23.18	30.90	38.63	46.36	57.95	69.54	92.72	139.09
	L2		8.86	16.59	24.31	32.04	39.77	47.50	59.09	70.68	93.86	140.23
	Z		11.80	19.26	26.73	34.19	41.65	49.12	60.31	71.51	93.90	138.69
MINIMUM H = 1.88	Y	22.5	0.08	5.30	10.53	15.75	20.98	26.21	34.05	41.89	57.56	88.92
	L1		5.20	10.43	15.66	20.88	26.11	31.34	39.17	47.01	62.69	94.05
	L2		6.91	12.14	17.37	22.59	27.82	33.04	40.88	48.72	64.40	95.76
	Z		9.75	14.58	19.40	24.23	29.06	33.89	41.13	48.37	62.86	91.83
MINIMUM H = 2.76	Y	30		2.81	6.81	10.81	14.81	18.81	24.81	30.81	42.81	66.81
	L1			7.95	11.95	15.95	19.95	23.95	29.95	35.95	47.95	71.95
	L2			10.23	14.23	18.23	22.23	26.23	32.23	38.23	50.23	74.23
	Z			12.45	15.91	19.38	22.84	26.30	31.50	36.70	47.09	67.87
MINIMUM H = 4.80	Y	45			2.90	5.73	8.56	11.39	15.63	19.87	28.36	45.33
	L1				8.30	11.13	13.95	16.78	21.03	25.27	33.75	50.72
	L2				11.72	14.54	17.37	20.20	24.44	28.69	37.17	54.14
	Z				12.79	14.79	16.79	18.79	21.79	24.79	30.79	42.79
MINIMUM H = 7.11	Y	60			0.74	3.05	5.36	7.67	11.14	14.60	21.53	35.38
	L1					8.77	11.08	13.39	16.85	20.32	27.24	41.10
	L2					13.33	15.64	17.95	21.41	24.87	31.80	45.66
	Z					12.83	13.99	15.14	16.87	18.60	22.07	29.00
MINIMUM H = 11.89	Y	90				0.04	2.04	4.04	7.04	10.04	16.04	28.04
	L1							10.13	13.13	16.13	22.13	34.13
	L2							16.97	19.97	22.97	28.97	40.97
	Z							11.89	11.89	11.89	11.89	11.89

**3/4" IMC, Steel Rigid and Aluminum Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.35	Y	15	1.21	8.94	16.67	24.39	32.12	39.85	51.44	63.03	86.21	132.58
	L1		7.72	15.45	23.17	30.90	38.63	46.36	57.95	69.54	92.72	139.08
	L2		9.18	16.91	24.64	32.37	40.09	47.82	59.41	71.00	94.19	140.55
	Z		12.69	20.15	27.62	35.08	42.54	50.01	61.20	72.40	94.79	139.58
MINIMUM H = 2.29	Y	22.5		4.22	9.44	14.67	19.90	25.12	32.96	40.80	56.48	87.84
	L1			10.42	15.65	20.88	26.10	31.33	39.17	47.01	62.69	94.04
	L2			12.62	17.85	23.07	28.30	33.53	41.37	49.20	64.88	96.24
	Z			15.63	20.46	25.29	30.12	34.95	42.19	49.43	63.92	92.89
MINIMUM H = 3.37	Y	30		1.70	5.70	9.70	13.70	17.70	23.70	29.70	41.70	65.70
	L1			7.93	11.93	15.93	19.93	23.93	29.93	35.93	47.93	71.93
	L2			10.86	14.86	18.86	22.86	26.86	32.86	38.86	50.86	74.86
	Z			13.68	17.14	20.60	24.07	27.53	32.73	37.93	48.32	69.10
MINIMUM H = 5.93	Y	45			1.68	4.50	7.33	10.16	14.40	18.65	27.13	44.10
	L1				8.24	11.07	13.90	16.73	20.97	25.22	33.70	50.67
	L2				12.64	15.47	18.30	21.12	25.37	29.61	38.09	55.07
	Z				14.39	16.39	18.39	20.39	23.39	26.39	32.39	44.39
MINIMUM H = 8.84	Y	60				1.65	3.96	6.27	9.73	13.20	20.13	33.98
	L1						10.95	13.25	16.72	20.18	27.11	40.97
	L2						16.80	19.11	22.58	26.04	32.97	46.83
	Z						15.98	17.14	18.87	20.60	24.07	31.00
MINIMUM H = 14.94	Y	90					0.13	2.13	5.13	8.13	14.13	26.13
	L1							12.60	15.60	21.60	33.60	
	L2							21.39	24.39	30.39	42.39	
	Z							14.94	14.94	14.94	14.94	

**Additional Bending Tables (cont'd)**
**1" IMC, Steel Rigid and Aluminum Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.54	Y	15	0.19	7.91	15.64	23.37	31.10	38.82	50.41	62.00	85.19	131.55
	L1		7.72	15.44	23.17	30.90	38.63	46.35	57.94	69.54	92.72	139.08
	L2		9.58	17.31	25.04	32.77	40.49	48.22	59.81	71.40	94.59	140.95
	Z		13.40	20.87	28.33	35.80	43.26	50.72	61.92	73.12	95.51	140.29
MINIMUM H = 2.64	Y	22.5		3.25	8.48	13.71	18.93	24.16	32.00	39.84	55.52	86.87
	L1		5.19	10.42	15.64	20.87	26.09	31.32	39.16	47.00	62.68	94.04
	L2		7.99	13.22	18.44	23.67	28.90	34.12	41.96	49.80	65.48	96.84
	Z		11.73	16.56	21.38	26.21	31.04	35.87	43.11	50.36	64.84	93.81
MINIMUM H = 3.94	Y	30		0.71	4.71	8.71	12.71	16.71	22.71	28.71	40.71	64.71
	L1		3.91	7.91	11.91	15.91	19.91	23.91	29.91	35.91	47.91	71.91
	L2		7.65	11.65	15.65	19.65	23.65	27.65	33.65	39.65	51.65	75.65
	Z		11.35	14.81	18.28	21.74	25.20	28.67	33.87	39.06	49.45	70.24
MINIMUM H = 7.05	Y	45			0.54	3.37	6.20	9.02	13.27	17.51	25.99	42.97
	L1				8.18	11.01	13.84	16.66	20.91	25.15	33.63	50.60
	L2				13.78	16.61	19.44	22.26	26.51	30.75	39.24	56.21
	Z				15.97	17.97	19.97	21.97	24.97	27.97	33.97	45.97
MINIMUM H = 10.65	Y	60				0.30	2.61	4.92	8.38	11.85	18.77	32.63
	L1						10.78	13.09	16.55	20.02	26.95	40.80
	L2						18.25	20.56	24.02	27.49	34.41	48.27
	Z						18.07	19.23	20.96	22.69	26.15	33.08
MINIMUM H = 18.33	Y	90						0.15	3.15	6.15	12.15	24.15
	L1									14.94	20.94	32.94
	L2									26.14	32.14	44.14
	Z									18.33	18.33	18.33

**1-1/4" IMC, Steel Rigid and Aluminum Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.88	Y	15		6.08	13.80	21.53	29.26	36.99	48.58	60.17	83.35	129.71
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2		9.92	17.65	25.38	33.10	40.83	48.56	60.15	71.74	94.92	141.29
	Z		14.75	22.21	29.67	37.14	44.60	52.07	63.26	74.46	96.85	141.63
MINIMUM H = 3.22	Y	22.5		1.55	6.77	12.00	17.22	22.45	30.29	38.13	53.81	85.17
	L1		5.18	10.41	15.64	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2		8.49	13.72	18.94	24.17	29.40	34.62	42.46	50.30	65.98	97.34
	Z		13.24	18.07	22.90	27.73	32.56	37.38	44.63	51.87	66.36	95.33
MINIMUM H = 4.79	Y	30			3.02	7.02	11.02	15.02	21.02	27.02	39.02	63.02
	L1			7.90	11.90	15.90	19.90	23.90	29.90	35.90	47.90	71.90
	L2			12.31	16.31	20.31	24.31	28.31	34.31	40.31	52.31	76.31
	Z			16.51	19.97	23.43	26.90	30.36	35.56	40.75	51.15	71.93
MINIMUM H = 8.52	Y	45				1.59	4.42	7.24	11.49	15.73	24.21	41.19
	L1					10.95	13.78	16.61	20.85	25.09	33.58	50.55
	L2					17.57	20.40	23.23	27.47	31.71	40.20	57.17
	Z					20.04	22.04	24.04	27.04	30.04	36.04	48.04
MINIMUM H = 12.81	Y	60					0.66	2.97	6.44	9.90	16.83	30.68
	L1							12.95	16.41	19.88	26.81	40.66
	L2							21.77	25.24	28.70	35.63	49.49
	Z							21.72	23.45	25.18	28.65	35.58
MINIMUM H = 21.91	Y	90							0.68	3.68	9.68	21.68
	L1									14.38	20.38	32.38
	L2									27.62	33.62	45.62
	Z									21.91	21.91	21.91

**Additional Bending Tables (cont'd)**
**1-1/2" IMC, Steel Rigid and Aluminum Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 2.10	Y	15		4.79	12.52	20.24	27.97	35.70	47.29	58.88	82.06	128.43
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2		9.94	17.67	25.40	33.12	40.85	48.58	60.17	71.76	94.94	141.31
	Z		15.58	23.04	30.51	37.97	45.44	52.90	64.10	75.29	97.68	142.47
MINIMUM H = 3.54	Y	22.5		0.40	5.63	10.86	16.08	21.31	29.15	36.99	52.67	84.02
	L1		5.18	10.41	15.64	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2		8.52	13.75	18.98	24.20	29.43	34.65	42.49	50.33	66.01	97.37
	Z		14.09	18.92	23.74	28.57	33.40	38.23	45.47	52.71	67.20	96.17
MINIMUM H = 5.22	Y	30			1.95	5.95	9.95	13.95	19.95	25.95	37.95	61.95
	L1			7.90	11.90	15.90	19.90	23.90	29.90	35.90	47.90	71.90
	L2			12.35	16.35	20.35	24.35	28.35	34.35	40.35	52.35	76.35
	Z			17.36	20.83	24.29	27.75	31.22	36.41	41.61	52.00	72.79
MINIMUM H = 9.14	Y	45				0.57	3.40	6.23	10.47	14.71	23.20	40.17
	L1					10.95	13.78	16.60	20.85	25.09	33.58	50.55
	L2					17.63	20.46	23.28	27.53	31.77	40.26	57.23
	Z					20.92	22.92	24.92	27.92	30.92	36.92	48.92
MINIMUM H = 13.59	Y	60						1.97	5.44	8.90	15.83	29.69
	L1							12.94	16.41	19.87	26.80	40.65
	L2							21.85	25.31	28.78	35.71	49.56
	Z							22.62	24.36	26.09	29.55	36.48
MINIMUM H = 22.89	Y	90								2.67	8.67	20.67
	L1									14.35	20.35	32.35
	L2									27.71	33.71	45.71
	Z									22.89	22.89	22.89

**2" IMC, Steel Rigid and Aluminum Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 2.22	Y	15		3.52	11.25	18.98	26.71	34.43	46.02	57.62	80.80	127.16
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.71	139.08
	L2		10.14	17.86	25.59	33.32	41.05	48.77	60.36	71.96	95.14	141.50
	Z		16.03	23.49	30.95	38.42	45.88	53.35	64.54	75.74	98.13	142.92
MINIMUM H = 3.75	Y	22.5			4.61	9.84	15.06	20.29	28.13	35.97	51.65	83.00
	L1		5.18	10.41	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.03
	L2		8.81	14.04	19.26	24.49	29.72	34.94	42.78	50.62	66.30	97.66
	Z		14.63	19.46	24.29	29.12	33.95	38.78	46.02	53.26	67.75	96.72
MINIMUM H = 5.54	Y	30			1.02	5.02	9.02	13.02	19.02	25.02	37.02	61.02
	L1			7.89	11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89
	L2			12.73	16.73	20.73	24.73	28.73	34.73	40.73	52.73	76.73
	Z			18.01	21.48	24.94	28.40	31.87	37.06	42.26	52.65	73.44
MINIMUM H = 9.75	Y	45					2.51	5.33	9.58	13.82	22.30	39.27
	L1					10.92	13.74	16.57	20.82	25.06	33.54	50.51
	L2					18.18	21.01	23.84	28.08	32.32	40.81	57.78
	Z					21.79	23.79	25.79	28.79	31.79	37.79	49.79
MINIMUM H = 14.56	Y	60						1.02	4.48	7.95	14.87	28.73
	L1							12.86	16.33	19.79	26.72	40.57
	L2							22.55	26.02	29.48	36.41	50.26
	Z							23.74	25.47	27.20	30.67	37.59
MINIMUM H = 24.63	Y	90								1.44	7.44	19.44
	L1										20.03	32.03
	L2										34.56	46.56
	Z										24.63	24.63

**Additional Bending Tables (cont'd)**
**1/2" 40 Mil PVC-Coated Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 0.94	Y	15	2.88	10.60	18.33	26.06	33.79	41.51	53.11	64.70	87.88	134.24
	L1		7.72	15.45	23.18	30.90	38.63	46.36	57.95	69.54	92.72	139.09
	L2		8.86	16.59	24.31	32.04	39.77	47.50	59.09	70.68	93.86	140.23
	Z		11.11	18.57	26.04	33.50	40.97	48.43	59.63	70.82	93.22	138.00
MINIMUM H = 1.62	Y	22.5	0.66	5.88	11.11	16.34	21.56	26.79	34.63	42.47	58.15	89.50
	L1		5.20	10.43	15.66	20.88	26.11	31.34	39.17	47.01	62.69	94.05
	L2		6.91	12.14	17.37	22.59	27.82	33.04	40.88	48.72	64.40	95.76
	Z		9.06	13.89	18.72	23.54	28.37	33.20	40.44	47.69	62.17	91.14
MINIMUM H = 2.42	Y	30		3.41	7.41	11.41	15.41	19.41	25.41	31.41	43.41	67.41
	L1			7.95	11.95	15.95	19.95	23.95	29.95	35.95	47.95	71.95
	L2			10.23	14.23	18.23	22.23	26.23	32.23	38.23	50.23	74.23
	Z			11.76	15.22	18.69	22.15	25.62	30.81	36.01	46.40	67.19
MINIMUM H = 4.32	Y	45			3.53	6.36	9.19	12.02	16.26	20.50	28.99	45.96
	L1				8.30	11.13	13.95	16.78	21.03	25.27	33.75	50.72
	L2				11.72	14.54	17.37	20.20	24.44	28.69	37.17	54.14
	Z				12.11	14.11	16.11	18.11	21.11	24.11	30.11	42.11
MINIMUM H = 6.52	Y	60			1.38	3.69	6.00	8.31	11.78	15.24	22.17	36.03
	L1					8.77	11.08	13.39	16.85	20.32	27.24	41.10
	L2					13.33	15.64	17.95	21.41	24.87	31.80	45.66
	Z					12.14	13.30	14.45	16.19	17.92	21.38	28.31
MINIMUM H = 11.20	Y	90				0.69	2.69	4.69	7.69	10.69	16.69	28.69
	L1							10.13	13.13	16.13	22.13	34.13
	L2							16.97	19.97	22.97	28.97	40.97
	Z							11.20	11.20	11.20	11.20	11.20

**3/4" 40 Mil PVC-Coated Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.09	Y	15	2.06	9.79	17.51	25.24	32.97	40.69	52.29	63.88	87.06	133.42
	L1		7.72	15.45	23.17	30.90	38.63	46.36	57.95	69.54	92.72	139.08
	L2		9.18	16.91	24.64	32.37	40.09	47.82	59.41	71.00	94.19	140.55
	Z		11.69	19.15	26.62	34.08	41.54	49.01	60.20	71.40	93.79	138.58
MINIMUM H = 1.90	Y	22.5		5.11	10.34	15.57	20.79	26.02	33.86	41.70	57.38	88.73
	L1			10.42	15.65	20.88	26.10	31.33	39.17	47.01	62.69	94.04
	L2			12.62	17.85	23.07	28.30	33.53	41.37	49.20	64.88	96.24
	Z			14.63	19.46	24.29	29.12	33.95	41.19	48.43	62.92	91.89
MINIMUM H = 2.87	Y	30		2.62	6.62	10.62	14.62	18.62	24.62	30.62	42.62	66.62
	L1			7.93	11.93	15.93	19.93	23.93	29.93	35.93	47.93	71.93
	L2			10.86	14.86	18.86	22.86	26.86	32.86	38.86	50.86	74.86
	Z			12.68	16.14	19.60	23.07	26.53	31.73	36.93	47.32	68.10
MINIMUM H = 5.22	Y	45			2.62	5.45	8.28	11.10	15.35	19.59	28.07	45.05
	L1				8.24	11.07	13.90	16.73	20.97	25.22	33.70	50.67
	L2				12.64	15.47	18.30	21.12	25.37	29.61	38.09	55.07
	Z				13.39	15.39	17.39	19.39	22.39	25.39	31.39	43.39
MINIMUM H = 7.98	Y	60				2.60	4.91	7.22	10.69	14.15	21.08	34.94
	L1						10.95	13.25	16.72	20.18	27.11	40.97
	L2						16.80	19.11	22.58	26.04	32.97	46.83
	Z						14.98	16.14	17.87	19.60	23.07	30.00
MINIMUM H = 13.94	Y	90					1.09	3.09	6.09	9.09	15.09	27.09
	L1							12.60	15.60	21.60	33.60	
	L2							21.39	24.39	30.39	42.39	
	Z							13.94	13.94	13.94	13.94	

**Additional Bending Tables (cont'd)**
**1" 40 Mil PVC-Coated Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.26	Y	15	1.09	8.82	16.55	24.28	32.00	39.73	51.32	62.91	86.09	132.46
	L1		7.72	15.44	23.17	30.90	38.63	46.35	57.94	69.54	92.72	139.08
	L2		9.58	17.31	25.04	32.77	40.49	48.22	59.81	71.40	94.59	140.95
	Z		12.34	19.81	27.27	34.73	42.20	49.66	60.86	72.06	94.45	139.23
MINIMUM H = 2.23	Y	22.5		4.21	9.44	14.66	19.89	25.12	32.96	40.79	56.47	87.83
	L1			10.42	15.64	20.87	26.09	31.32	39.16	47.00	62.68	94.04
	L2			13.22	18.44	23.67	28.90	34.12	41.96	49.80	65.48	96.84
	Z			15.49	20.32	25.15	29.98	34.81	42.05	49.29	63.78	92.75
MINIMUM H = 3.41	Y	30		1.69	5.69	9.69	13.69	17.69	23.69	29.69	41.69	65.69
	L1			7.91	11.91	15.91	19.91	23.91	29.91	35.91	47.91	71.91
	L2			11.65	15.65	19.65	23.65	27.65	33.65	39.65	51.65	75.65
	Z			13.75	17.21	20.68	24.14	27.61	32.80	38.00	48.39	69.18
MINIMUM H = 6.30	Y	45			1.54	4.37	7.20	10.03	14.27	18.51	27.00	43.97
	L1					11.01	13.84	16.66	20.91	25.15	33.63	50.60
	L2					16.61	19.44	22.27	26.51	30.75	39.24	56.21
	Z					16.91	18.91	20.91	23.91	26.91	32.91	44.91
MINIMUM H = 9.73	Y	60				1.31	3.62	5.93	9.40	12.86	19.79	33.65
	L1						10.78	13.09	16.55	20.02	26.95	40.80
	L2						18.25	20.56	24.02	27.49	34.42	48.27
	Z						17.01	18.16	19.90	21.63	25.09	32.02
MINIMUM H = 17.27	Y	90						1.17	4.17	7.17	13.17	25.17
	L1									14.94	20.94	32.94
	L2									26.14	32.14	44.14
	Z									17.27	17.27	17.27

**1-1/4" 40 Mil PVC-Coated Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 1.68	Y	15		6.79	14.51	22.24	29.97	37.70	49.29	60.88	84.06	130.42
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2		10.06	17.79	25.52	33.25	40.97	48.70	60.29	71.88	95.07	141.43
	Z		13.95	21.42	28.88	36.35	43.81	51.27	62.47	73.67	96.06	140.84
MINIMUM H = 2.95	Y	22.5		2.27	7.49	12.72	17.95	23.17	31.01	38.85	54.53	85.89
	L1			10.41	15.63	20.86	26.09	31.31	39.15	46.99	62.67	94.03
	L2			13.93	19.16	24.38	29.61	34.84	42.68	50.52	66.19	97.55
	Z			17.35	22.18	27.01	31.84	36.67	43.91	51.15	65.64	94.61
MINIMUM H = 4.47	Y	30			3.73	7.73	11.73	15.73	21.73	27.73	39.73	63.73
	L1				11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89
	L2				16.59	20.59	24.59	28.59	34.59	40.59	52.59	76.59
	Z				19.33	22.79	26.26	29.72	34.92	40.11	50.51	71.29
MINIMUM H = 8.18	Y	45				2.24	5.07	7.90	12.14	16.38	24.87	41.84
	L1						13.76	16.58	20.83	25.07	33.55	50.53
	L2						20.81	23.64	27.88	32.12	40.61	57.58
	Z						21.56	23.56	26.56	29.56	35.56	47.56
MINIMUM H = 12.55	Y	60					1.23	3.54	7.01	10.47	17.40	31.26
	L1							16.36	19.82	26.75	40.60	
	L2							25.76	29.22	36.15	50.01	
	Z							23.15	24.88	28.35	35.28	
MINIMUM H = 22.08	Y	90							1.03	4.03	10.03	22.03
	L1										20.15	32.15
	L2										34.25	46.25
	Z										22.08	22.08



**Additional Bending Tables (cont'd)**
**1-1/2" 40 Mil PVC-Coated Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 2.00	Y	15		5.02	12.74	20.47	28.20	35.92	47.52	59.11	82.29	128.65
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2		9.93	17.66	25.39	33.11	40.84	48.57	60.16	71.75	94.93	141.30
	Z		15.19	22.66	30.12	37.59	45.05	52.51	63.71	74.91	97.30	142.08
MINIMUM H = 3.39	Y	22.5		0.68	5.91	11.13	16.36	21.59	29.43	37.27	52.94	84.30
	L1		10.41	15.64	20.86	26.09	31.31	39.15	46.99	62.67	94.03	
	L2		13.73	18.96	24.19	29.41	34.64	42.48	50.32	66.00	97.35	
	Z		18.52	23.35	28.18	33.01	37.84	45.08	52.32	66.81	95.78	
MINIMUM H = 5.02	Y	30			2.25	6.25	10.25	14.25	20.25	26.25	38.25	62.25
	L1				11.90	15.90	19.90	23.90	29.90	35.90	47.90	71.90
	L2				16.33	20.33	24.33	28.33	34.33	40.33	52.33	76.33
	Z				20.43	23.89	27.36	30.82	36.02	41.21	51.61	72.39
MINIMUM H = 8.85	Y	45				0.91	3.74	6.56	10.81	15.05	23.53	40.51
	L1						13.78	16.61	20.85	25.09	33.58	50.55
	L2						20.43	23.25	27.50	31.74	40.22	57.20
	Z						22.51	24.51	27.51	30.51	36.51	48.51
MINIMUM H = 13.23	Y	60					0.02	2.33	5.79	9.25	16.18	30.04
	L1							16.41	19.87	26.80	40.66	
	L2							25.27	28.74	35.67	49.52	
	Z							23.93	25.67	29.13	36.06	
MINIMUM H = 22.43	Y	90							0.05	3.05	9.05	21.05
	L1										20.37	32.37
	L2										33.66	45.66
	Z										22.43	22.43

**2" 40 Mil PVC-Coated Rigid**

	DIM	ANGLE	2"	4"	6"	8"	10"	12"	15"	18"	24"	36"
MINIMUM H = 2.18	Y	15		3.50	11.23	18.95	26.68	34.41	46.00	57.59	80.77	127.14
	L1		7.71	15.44	23.17	30.90	38.62	46.35	57.94	69.53	92.72	139.08
	L2		10.12	17.85	25.58	33.31	41.03	48.76	60.35	71.94	95.13	141.49
	Z		15.89	23.35	30.82	38.28	45.75	53.21	64.41	75.60	97.99	142.78
MINIMUM H = 3.70	Y	22.5			4.64	9.87	15.09	20.32	28.16	36.00	51.68	83.03
	L1		10.41	15.63	20.86	26.08	31.31	39.15	46.99	62.67	94.03	
	L2		14.02	19.25	24.47	29.70	34.93	42.77	50.61	66.28	97.64	
	Z		19.32	24.15	28.98	33.81	38.63	45.88	53.12	67.61	96.58	
MINIMUM H = 5.47	Y	30			1.08	5.08	9.08	13.08	19.08	25.08	37.08	61.08
	L1				11.89	15.89	19.89	23.89	29.89	35.89	47.89	71.89
	L2				16.71	20.71	24.71	28.71	34.71	40.71	52.71	76.71
	Z				21.33	24.79	28.26	31.72	36.92	42.11	52.50	73.29
MINIMUM H = 9.64	Y	45					2.59	5.42	9.66	13.90	22.39	39.36
	L1						13.75	16.57	20.82	25.06	33.54	50.52
	L2						20.98	23.81	28.05	32.29	40.78	57.75
	Z						23.63	25.63	28.63	31.63	37.63	49.63
MINIMUM H = 14.41	Y	60						1.12	4.59	8.05	14.98	28.83
	L1							16.33	19.79	26.72	40.58	
	L2							25.98	29.44	36.37	50.22	
	Z							25.30	27.03	30.49	37.42	
MINIMUM H = 24.42	Y	90								1.56	7.56	19.56
	L1										20.05	32.05
	L2											46.51
	Z											24.42

## Maintenance

### Reinstalling 1/2" to 2" Combination Shoe

1. Slide the shoe onto the spindle and orient it so the EMT hook (silver) is about 90° clockwise of the sprocket spoke with two drive lug holes.
2. Pull the ring on the shoe retaining pin to clear the spindle and fully slide on the shoe so that the drive lugs engage into the sprocket holes.
3. Verify that the retaining pin is engaged into the spindle and the shoe is secured.

### Replacing the Fuse

#### **⚠ WARNING**

For continued protection against risk of fire and electric shock, replace **ONLY** with same manufacturer, type, and rating of fuse.

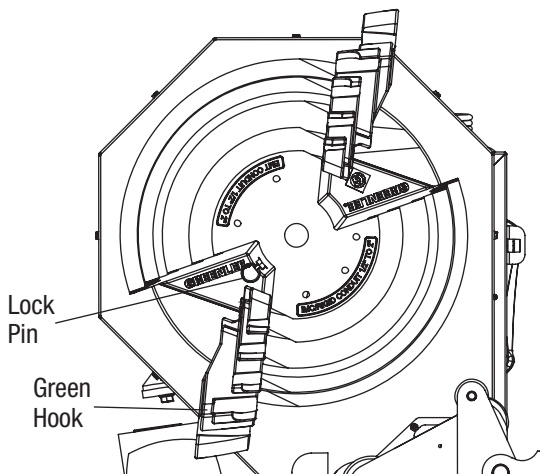
Failure to observe this warning could result in severe injury or death.

If the fuse needs to be replaced, use only a Cooper Bussmann GBB-30 Very Fast-Acting fuse, 1/4" x 1-1/4" (6.3 x 32 mm).

### Zeroing the 854DX

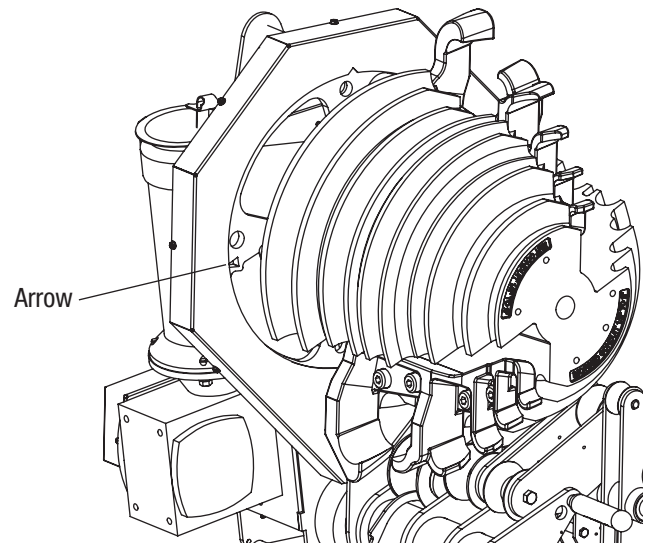
The shoe timing is set at the factory and should never need to be adjusted unless the encoder assembly is removed.

1. Pivot the bending head to the vertical bending position.
2. Press the **BEND** or **UNLOAD** button until the green IMC/rigid hook is in the loading position (or -5°), as shown below.



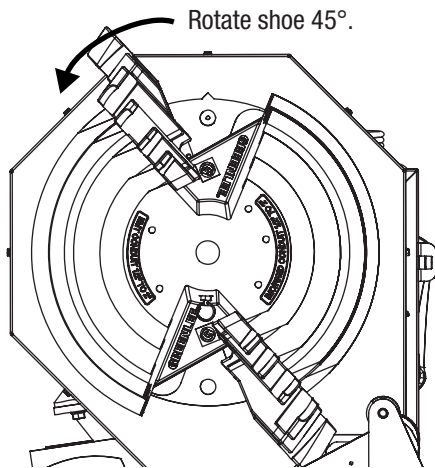
*Note: The bender can be zeroed without completely removing the shoe **only if the bender is on a level surface.***

3. To zero the bender without completely removing the shoe, follow these steps; otherwise, skip to step 4.
  - a. Check to make sure the bender is on a level surface and the shoe will not slide off after it is unlocked from the bender. If the bender is not on a level surface, skip to step 4.
  - b. Check that the spoke with the arrow is at the 9 o'clock position, as shown below.
  - c. While pulling the lock pin, slide the shoe 1" away from the sprocket so the drive bolts clear the sprocket.



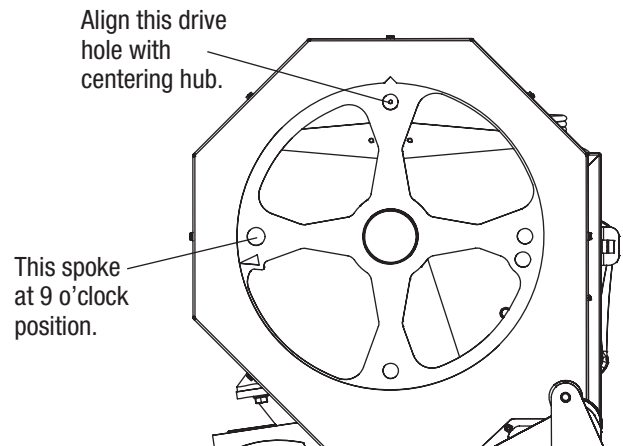
**Maintenance (cont'd)**

- d. Being careful not to impact the rollers with the shoe hooks, carefully rotate the shoe 45° counterclockwise so the drive hole and round centering hub behind the sprocket are visible at the 12 o'clock position.



- e. Continue to step 5.
4. Completely remove the shoe by following these steps.
  - a. While pulling the lock pin, slide the shoe 1" away from the sprocket.
  - b. After the shoe is unlocked, lift and remove the shoe by performing a two-person lift, with one person on each side of the shoe.

5. Using the **BEND** or **UNLOAD** button, accurately align the drive hole at the 12 o'clock position with the round centering hub behind the sprocket.



6. To reset and zero the bender, first press and hold the **CLEAR** button on the pendant, and then in addition press and hold the **JOG** button. Continue to hold both buttons until the pendant displays "--", which indicates the bender has been successfully reset and zeroed. The buttons must be held for approximately 10 seconds.
7. Reinstall the shoe, making sure the lock pin is engaged and the shoe is locked.