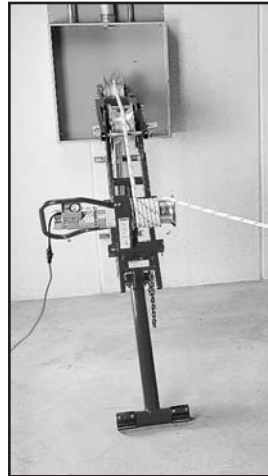


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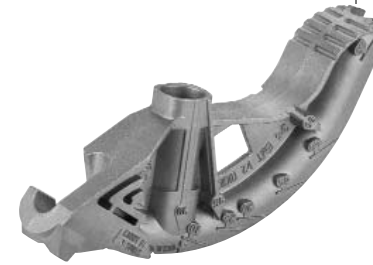
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## Gardner Bender Egor™ Hydraulic Bender

- Bends 2½", 3" and 4" conduit
- Each shoe size bends EMT, IMC, Steel Rigid and Aluminum Rigid
- 2" shoe for IMC and Rigid Conduit



## Wire Dispensers



WCM-10

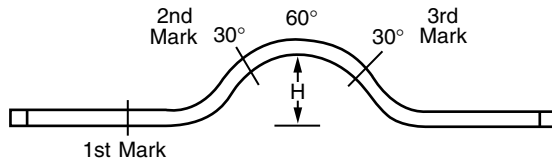


WSP-155



The contractor for this hospital project noted that the one shoe bending concept of the Egor™ bender means less weight and fewer parts for real cost savings.

## 3-point Saddle Bends with Eegor™, Mini-Eegor™, Sidewinder® and Cyclone® Benders



1. Determine saddle bend height (H) required.
2. Determine distance from end of pipe to the first mark. This distance is based upon the straight length required from the connection end to the beginning of the saddle bend. Scribe the 1st mark.

2 3/8" O.D. 2" Rigid Pipe

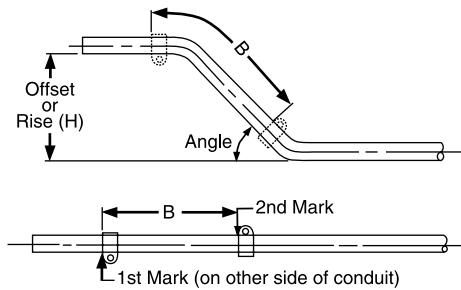


3. Calculate the distance between the 1st and 2nd mark by multiplying the (H) dimension by 2.  
If (H) = 12"  
then  $2 \times 12" = 24"$
4. The third mark is calculated by using the multiplier of 24" (from step 3) plus twice the O.D. of the pipe, which in our example is 2 3/8" O.D.  
 $24" + 2 \times 2\frac{3}{8}" = 24" + 4\frac{3}{4}" = 28\frac{3}{4}"$  Distance between 2nd and 3rd mark.

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## Offset Bend Instructions for Mini-Egor™, Egor™ and Ultra Egor™ Benders

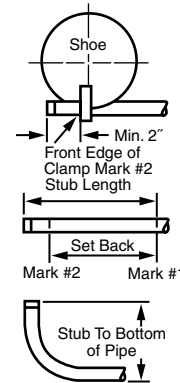


1. Make first mark at location determined either by edge of obstacle, or by following "Kick Bend" Instructions for Mini-Egor™ and Egor™ Benders (see pages 8 - 9).
2. From the "Offset Chart" for the size conduit to be bent, obtain measurement (B) for offset height (H) and bend angle desired (see pages 5 - 7).
3. Make second mark at distance (B) beyond first mark, and on opposite side of conduit, as illustrated above.
4. Place conduit in bender with first mark aligned with leading edge of U-strap (see figure above), and make first bend to the desired angle.
5. Advance the bent conduit through the frame assembly of the bender, and rotate the conduit 180°, so the second mark aligns with the leading edge of the U-strap.
6. Complete offset by making second bend to the exact same angle as the first bend.

## Cyclone®

**Table B**

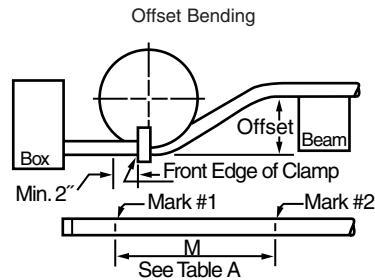
Conduit Size		Stub-Up Set-Back
1/2	Rigid	7 3/4"
1/2	IMC	7 3/4"
1/2	EMT	7 5/8"
3/4	Rigid	9"
3/4	IMC	9"
3/4	EMT	8 1/2"
1	Rigid	10 1/8"
1	IMC	10 1/8"
1	EMT	10 3/8"
1 1/4	Rigid	12 3/4"
1 1/4	IMC	12 1/2"
1 1/4	EMT	13"
1 1/2	Rigid	13 1/2"
1 1/2	IMC	13 1/2"
1 1/2	EMT	13 1/2"
2	Rigid	15 3/4"
2	IMC	15 1/2"
2	EMT	15 1/2"



### Stub-up Bending

1. Table B shows minimum length (inches).
2. Mark #1 is stub length, deduct from this as per table B, and obtain Mark #2.

## Cyclone® Bender (B2000) Instructions



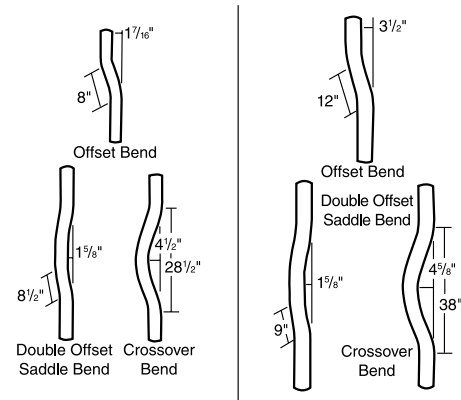
1. Obtain distance "M" from table A, and measure this distance from mark #1, and place mark #2.
2. Now place mark #1 in line with front edge of shoe-clamp, and make first bend. Refer to table "B" to set proper bend angle.
3. Next rotate conduit 180° level, place mark #2 in line with front edge of shoe clamp and make second bend.

**Table A**

Offset Required	15° Bend		30° Bend		45° Bend	
	Conduit Max. Size	M	Conduit Max. Size	M	Conduit Max. Size	M
2"	3/4	7 3/4"				
4"	1 1/2	15 7/16"	3/4	8"		
6"	2	23 3/16"	1	12"	1/2	8 1/2"
8"		30 5/8"	1 1/2	16"	1	11 5/16"
10"		38 5/8"	2	20"	1 1/4	14 1/8"
12"		46 3/8"		24"	1 1/2	16 15/16"
14"		54 1/16"		28"	2	19 13/16"
16"		61 13/16"		32"		22 5/8"
18"		67 7/16"		36"		25 7/16"
20"		77 1/4"		40"		28 1/4"
22"		85"		44"		31 1/8"

To locate distance between centers of offset bending marks other than listed in Table A, use the following multipliers: 15° Bend—3.9; 30° Bend—2.0; 45 Bend—1.4.

## Typical Offset Bends Mini-Eegor™ Eegor™ / Ultra Eegor™



For 3 point saddle bends see page 49.

### Mini-Eegor™ Chart - 1", 1 1/4", 1 1/2" & 2" Conduit

Desired Offset (H)	Measurement (B) (inches)							
	15°			60°				
	1"	1 1/4"	1 1/2", & 2"	1"	1 1/4"	1 1/2"	2"	
2"	7 1/16	—	—	—	—	—	—	
4"	15 3/8	7 13/16	—	—	—	—	—	
6"	23 1/8	11 13/16	8 5/16	—	—	—	—	
8"	30 13/16	15 13/16	11 1/8	8 7/16	—	—	—	
10"	38 9/16	19 13/16	13 5/16	10 3/4	10 9/16	10 7/16	—	
12"	46 5/16	23 13/16	16 3/4	13 1/16	12 7/8	12 3/4	12 9/16	
14"	54	27 13/16	19 9/16	15 3/8	15 3/16	15 1/16	14 7/8	
16"	61 3/4	31 13/16	22 7/16	17 1/16	17 1/2	17 3/8	17 3/16	
18"	69 1/2	35 13/16	25 1/4	20	19 13/16	19 1/16	19 1/2	
20"	77 3/16	39 13/16	28 1/16	22 5/16	22 1/16	22	21 13/16	
22"	84 15/16	43 13/16	30 7/8	24 5/8	24 3/8	24 1/4	24 1/8	
24"	92 11/16	47 13/16	33 3/4	26 5/16	26 1/16	26 9/16	26 7/16	
26"	100 3/8	51 13/16	36 9/16	29 1/4	29	28 7/8	28 3/4	
28"	108 1/8	55 13/16	39 3/8	31 9/16	31 5/16	31 3/16	31 1/16	
30"	115 13/16	59 13/16	42 3/16	33 7/8	33 3/8	33 1/2	33 3/8	

See Eegor™ offset charts on pages 6 - 7.

## For Egor™ and Ultra Egor™ Benders Only

### 2" & 2½" Conduit Offset Chart

Desired Offset (H)	Measurement (B) (inches)			
	15°	30°	45°	60°
2"	7 <sup>5</sup> / <sub>8</sub>	—	—	—
4"	15 <sup>3</sup> / <sub>8</sub>	—	—	—
6"	23 <sup>1</sup> / <sub>16</sub>	11 <sup>11</sup> / <sub>16</sub>	—	—
8"	30 <sup>13</sup> / <sub>16</sub>	15 <sup>11</sup> / <sub>16</sub>	—	—
10"	38 <sup>1</sup> / <sub>2</sub>	19 <sup>11</sup> / <sub>16</sub>	13 <sup>7</sup> / <sub>16</sub>	—
12"	46 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>16</sub>	16 <sup>1</sup> / <sub>4</sub>	—
14"	54	27 <sup>11</sup> / <sub>16</sub>	19 <sup>1</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>8</sub>
16"	61 <sup>11</sup> / <sub>16</sub>	31 <sup>11</sup> / <sub>16</sub>	21 <sup>7</sup> / <sub>8</sub>	16 <sup>15</sup> / <sub>16</sub>
18"	69 <sup>7</sup> / <sub>16</sub>	35 <sup>1</sup> / <sub>16</sub>	24 <sup>3</sup> / <sub>4</sub>	19 <sup>1</sup> / <sub>4</sub>
20"	77 <sup>3</sup> / <sub>16</sub>	39 <sup>11</sup> / <sub>16</sub>	27 <sup>9</sup> / <sub>16</sub>	21 <sup>9</sup> / <sub>16</sub>
22"	84 <sup>7</sup> / <sub>8</sub>	43 <sup>11</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	23 <sup>7</sup> / <sub>8</sub>
24"	92 <sup>5</sup> / <sub>8</sub>	47 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>16</sub>	26 <sup>3</sup> / <sub>16</sub>
26"	100 <sup>3</sup> / <sub>8</sub>	51 <sup>11</sup> / <sub>16</sub>	36 <sup>1</sup> / <sub>16</sub>	28 <sup>1</sup> / <sub>2</sub>
28"	108 <sup>1</sup> / <sub>16</sub>	55 <sup>11</sup> / <sub>16</sub>	38 <sup>7</sup> / <sub>8</sub>	30 <sup>13</sup> / <sub>16</sub>
30"	115 <sup>3</sup> / <sub>16</sub>	59 <sup>1</sup> / <sub>16</sub>	41 <sup>1</sup> / <sub>16</sub>	33 <sup>1</sup> / <sub>8</sub>

### 3" Conduit Offset Chart

Desired Offset (H)	Measurement (B) (inches)			
	15°	30°	45°	60°
2"	7 <sup>5</sup> / <sub>8</sub>	—	—	—
4"	15 <sup>5</sup> / <sub>16</sub>	—	—	—
6"	23 <sup>1</sup> / <sub>16</sub>	11 <sup>5</sup> / <sub>8</sub>	—	—
8"	30 <sup>3</sup> / <sub>4</sub>	15 <sup>5</sup> / <sub>8</sub>	—	—
10"	38 <sup>1</sup> / <sub>2</sub>	19 <sup>9</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>4</sub>	—
12"	46 <sup>1</sup> / <sub>4</sub>	23 <sup>3</sup> / <sub>8</sub>	16 <sup>1</sup> / <sub>16</sub>	—
14"	53 <sup>15</sup> / <sub>16</sub>	27 <sup>5</sup> / <sub>8</sub>	18 <sup>7</sup> / <sub>8</sub>	—
16"	61 <sup>11</sup> / <sub>16</sub>	31 <sup>5</sup> / <sub>8</sub>	21 <sup>3</sup> / <sub>4</sub>	16 <sup>5</sup> / <sub>8</sub>
18"	69 <sup>7</sup> / <sub>16</sub>	35 <sup>5</sup> / <sub>8</sub>	24 <sup>9</sup> / <sub>16</sub>	18 <sup>15</sup> / <sub>16</sub>
20"	77 <sup>1</sup> / <sub>8</sub>	39 <sup>5</sup> / <sub>8</sub>	27 <sup>3</sup> / <sub>8</sub>	21 <sup>1</sup> / <sub>4</sub>
22"	84 <sup>7</sup> / <sub>8</sub>	43 <sup>5</sup> / <sub>8</sub>	30 <sup>3</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>2</sub>
24"	92 <sup>5</sup> / <sub>8</sub>	47 <sup>5</sup> / <sub>8</sub>	33 <sup>1</sup> / <sub>16</sub>	25 <sup>13</sup> / <sub>16</sub>
26"	100 <sup>5</sup> / <sub>16</sub>	51 <sup>5</sup> / <sub>8</sub>	35 <sup>7</sup> / <sub>8</sub>	28 <sup>1</sup> / <sub>8</sub>
28"	108 <sup>1</sup> / <sub>16</sub>	55 <sup>5</sup> / <sub>8</sub>	38 <sup>1</sup> / <sub>16</sub>	30 <sup>7</sup> / <sub>16</sub>
30"	115 <sup>3</sup> / <sub>4</sub>	59 <sup>5</sup> / <sub>8</sub>	41 <sup>1</sup> / <sub>2</sub>	32 <sup>3</sup> / <sub>4</sub>

### Conduit Reamer

1. The conduit reaming tool has a blade for the inside and outside surface of the conduit. Complies with article 348-11 of NEC.
2. Press the open end of the conduit against the reamer blade. Hold the conduit firmly and rotate it 2 or 3 times to remove burrs and sharp edges. See Figure 8.



Figure 8

### Repeat Bending Feature

1. An adjustable length indicator is located on the front edge of the bend frame. The indicator has a maximum travel of 4 inches. See Figure 9.
2. Position the conduit into the bending jaws. Loosen the thumb screw and move the indicator until it contacts the end of the conduit. Tighten the thumb screw. See Figure 9.



Figure 9

### Forming a Saddle Bend

1. Repeat steps listed in Operating Procedures and complete the first offset bend.
2. Do not remove conduit. Keep all adjustments and settings the same. Raise the bender handle until the conduit can be slid forward. Slide the conduit forward until the end of the first offset bend is positioned past the second jaw. See Figure 6. Level the conduit and hold it steady.

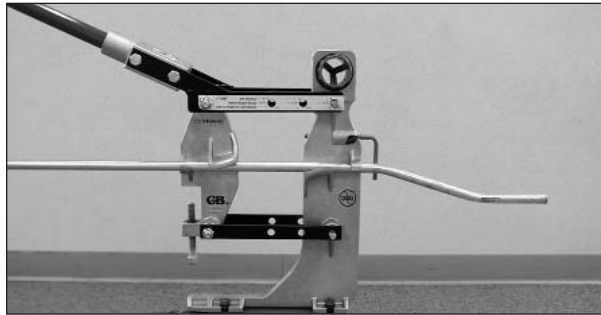


Figure 6

3. Push the handle down to complete the second offset bend. See Figure 7. Raise the handle and remove the conduit.

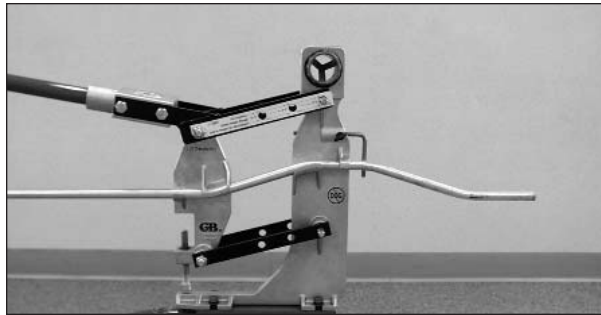


Figure 7

## For Egor™ and Ultra Egor™ Benders Only

### 3 1/2" Conduit Offset Chart

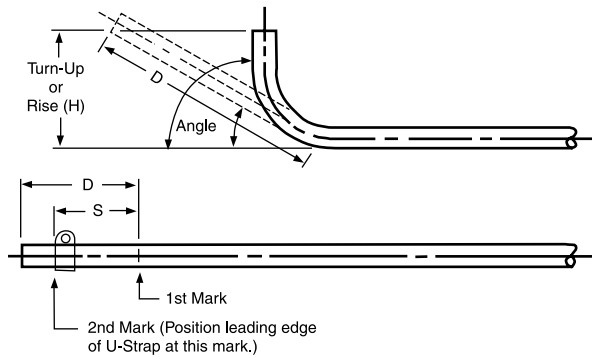
Desired Offset (H)	Measurement (B) (inches)			
	15°	30°	45°	60°
2"	7 <sup>9</sup> / <sub>16</sub>	—	—	—
4"	15 <sup>5</sup> / <sub>16</sub>	—	—	—
6"	23	—	—	—
8"	30 <sup>3</sup> / <sub>4</sub>	15 <sup>1</sup> / <sub>2</sub>	—	—
10"	38 <sup>1</sup> / <sub>2</sub>	19 <sup>1</sup> / <sub>2</sub>	—	—
12"	46 <sup>3</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>2</sub>	—	—
14"	53 <sup>15</sup> / <sub>16</sub>	27 <sup>1</sup> / <sub>2</sub>	18 <sup>5</sup> / <sub>8</sub>	—
16"	61 <sup>11</sup> / <sub>16</sub>	31 <sup>1</sup> / <sub>2</sub>	21 <sup>1</sup> / <sub>2</sub>	—
18"	69 <sup>3</sup> / <sub>8</sub>	35 <sup>1</sup> / <sub>2</sub>	24 <sup>3</sup> / <sub>16</sub>	—
20"	77 <sup>1</sup> / <sub>8</sub>	39 <sup>1</sup> / <sub>2</sub>	27 <sup>1</sup> / <sub>8</sub>	—
22"	84 <sup>7</sup> / <sub>8</sub>	43 <sup>1</sup> / <sub>2</sub>	29 <sup>15</sup> / <sub>16</sub>	—
24"	92 <sup>9</sup> / <sub>16</sub>	47 <sup>1</sup> / <sub>2</sub>	32 <sup>13</sup> / <sub>16</sub>	25 <sup>1</sup> / <sub>4</sub>
26"	100 <sup>5</sup> / <sub>16</sub>	51 <sup>1</sup> / <sub>2</sub>	35 <sup>5</sup> / <sub>8</sub>	27 <sup>9</sup> / <sub>16</sub>
28"	108	55 <sup>1</sup> / <sub>2</sub>	38 <sup>7</sup> / <sub>16</sub>	29 <sup>7</sup> / <sub>8</sub>
30"	115 <sup>3</sup> / <sub>4</sub>	59 <sup>1</sup> / <sub>2</sub>	41 <sup>1</sup> / <sub>4</sub>	32 <sup>3</sup> / <sub>16</sub>

### 4" Conduit Offset Chart

Desired Offset (H)	Measurement (B) (inches)			
	15°	30°	45°	60°
4"	15 <sup>5</sup> / <sub>16</sub>	—	—	—
6"	23	—	—	—
8"	30 <sup>3</sup> / <sub>4</sub>	—	—	—
10"	38 <sup>7</sup> / <sub>16</sub>	19 <sup>7</sup> / <sub>16</sub>	—	—
12"	46 <sup>3</sup> / <sub>16</sub>	23 <sup>7</sup> / <sub>16</sub>	—	—
14"	53 <sup>15</sup> / <sub>16</sub>	27 <sup>7</sup> / <sub>16</sub>	—	—
16"	61 <sup>9</sup> / <sub>8</sub>	31 <sup>7</sup> / <sub>16</sub>	21 <sup>5</sup> / <sub>16</sub>	—
18"	69 <sup>3</sup> / <sub>8</sub>	35 <sup>7</sup> / <sub>16</sub>	24 <sup>1</sup> / <sub>8</sub>	—
20"	77 <sup>1</sup> / <sub>8</sub>	39 <sup>7</sup> / <sub>16</sub>	27	—
22"	84 <sup>13</sup> / <sub>16</sub>	43 <sup>7</sup> / <sub>16</sub>	29 <sup>13</sup> / <sub>16</sub>	—
24"	92 <sup>9</sup> / <sub>16</sub>	47 <sup>7</sup> / <sub>16</sub>	32 <sup>5</sup> / <sub>8</sub>	24 <sup>15</sup> / <sub>16</sub>
26"	100 <sup>5</sup> / <sub>16</sub>	51 <sup>7</sup> / <sub>16</sub>	35 <sup>7</sup> / <sub>16</sub>	27 <sup>1</sup> / <sub>4</sub>
28"	108	55 <sup>7</sup> / <sub>16</sub>	38 <sup>5</sup> / <sub>16</sub>	29 <sup>9</sup> / <sub>16</sub>
30"	115 <sup>3</sup> / <sub>4</sub>	59 <sup>7</sup> / <sub>16</sub>	41 <sup>1</sup> / <sub>8</sub>	31 <sup>7</sup> / <sub>8</sub>

See page 11 for Egor™ bending shoe radii table.

## 90° Stub-up and Kick Bend Instructions for Mini-Egor™, Egor™ and Ultra Egor™ Benders



### To Make Either a Stub-up or Kick Bend:

1. Determine "H" dimension by measuring rise or height needed. From "Diagonal Distance Chart" (page 9), determine straight length of pipe (D) needed to reach to desired turn-up height (H) at desired bend angle.
2. Measure this distance (D) from end of conduit, and make first mark.
3. From "Set-back Chart", select proper set-back dimension (S) corresponding to conduit size and bend angle desired.
4. Measure distance (S) back from first mark, and make second mark (see figure above).
5. Place conduit in bender with second mark aligned with leading edge of U-strap (see figure above), and bend conduit to desired angle.

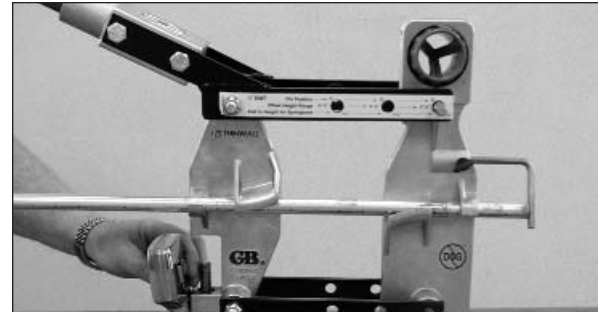


Figure 3

7. Lower the bender handle and complete the bend by pushing down until the handle stops moving. See Figure 4. Raise the handle and remove the conduit. See Figure 5.



Figure 4

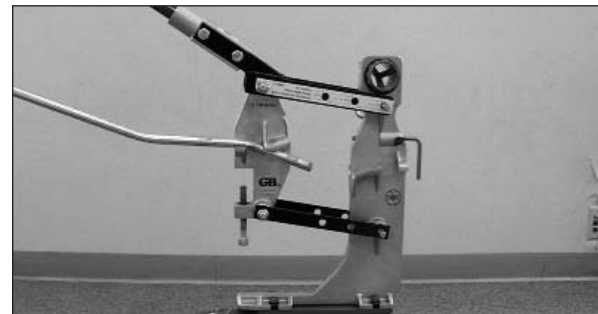


Figure 5





Figure 1

5. Raise the bender handle and insert the conduit into the correct size bending jaws (check bend bracket decals). See Figure 2. Be sure the conduit extends a minimum of 2" beyond the jaw.

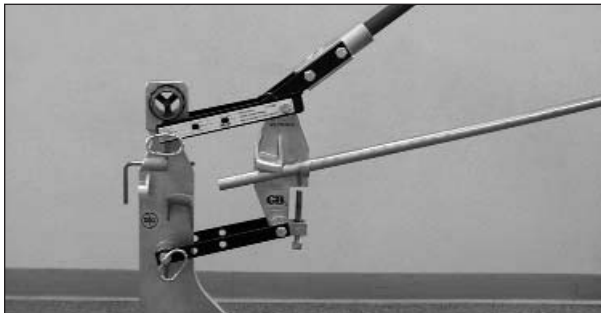


Figure 2

6. Set the bend stop screw adjustment by turning the screw until the distance between the bottom of hex head and the bottom of the frame is the offset height plus the fractional number on the decal. See Figure 3.

Example: Offset height required = 2 inches  
 Conduit is 1/2" EMT.  
 Hole Location is #2  
 Fraction added is +1/8", therefore 2"+1/8" = 2 1/8"  
 2 1/8" is stop screw measurement for step 6.

### Diagonal Distance (D) Chart For Mini-Egor™, Egor™ and Ultra Egor™ Benders

Rise (H)	Diagonal Distance (D) Bend Angle				
	15°	30°	45°	60°	90°
2	7 3/4	4	2 13/16	2 5/16	2
4	15 7/16	8	5 1 1/16	4 5/8	4
6	23 3/16	12	8 1/2	6 1 5/16	6
8	30 1 5/16	16	11 5/16	9 1/4	8
10	38 5/8	20	14 1/8	11 9/16	10
12	46 3/8	24	17	13 7/8	12
14	54 1/16	28	19 13/16	16 3/16	14
16	61 1 3/16	32	22 5/8	18 1/2	16
18	69 9/16	36	25 7/16	20 1 3/16	18
20	77 1/4	40	28 5/16	23 1/8	20
22	85	44	31 1/8	25 3/8	22
24	92 3/4	48	33 1 5/16	27 1 1/16	24
26	100 7/16	52	36 3/4	30	26
28	108 3/16	56	39 5/8	32 5/16	28
30	115 1 5/16	60	42 7/16	34 5/8	30

### Egor™ / Ultra Egor™ Set-back Chart

Nominal Conduit Size	Stub-ups 90°	"S" Set-back Dimension (inches)			
		Kick Bends			
		60°	45°	30°	15°
2"	15 3/4	10 1 1/16	8 3/4	7	5 3/8
2 1/2"	15 5/8	10 1/2	8 1/2	6 5/8	5
3"	18 3/4	12 3/8	9 7/8	7 5/8	5 5/8
3 1/2"	25	15 1/2	12 1/4	9 3/8	6 5/8
4"	28	18 3/8	14 5/8	11 1/4	8 3/16

See page 11 for Egor™ bending shoe radii table.

### Mini-Egor™ Set-back Chart

Conduit		"S" Set-back Dimension (inches)					
Type	Nominal Size	Stub-ups 90°	Kick Bends				
			75°	60°	45°	30°	15°
Rigid & IMC	1"	9 5/16	7 13/16	6 9/16	5 1/2	4 1/2	3 5/8
	1 1/4"	11 1/16	9 1/8	7 1/2	6 3/16	4 15/16	3 13/16
	1 1/2"	12 5/8	10 7/16	8 5/8	7 1/8	5 3/4	4 1/2
	2"	14 1/4	11 3/4	9 3/4	8	6 1/2	5 1/16
EMT (Thinwall)	1"	9 5/16	7 13/16	6 9/16	5 1/2	4 9/16	3 5/8
	1 1/4"	11 1/4	9 5/16	7 3/4	6 7/16	5 3/16	4 1/16
	1 1/2"	12 5/16	10 3/16	8 3/8	6 7/8	5 1/2	4 1/4
	2"	13 1 5/16	11 1/2	9 1/2	7 7/8	6 1/4	4 7/8

See page 13 for Mini-Egor™ bending shoe radii table.

## Other Bending Data for Egor™ Benders and Ultra Egor™ Benders

### Developed Length of Bend:

When conduit is bent, the length along the bend at the neutral axis (i.e., approximately the centerline of the pipe) is commonly called “developed length” of the bend.

### “Developed Length” of Bends Chart

Nominal Conduit Size	“Developed Length” of Bends (inches)				
	90°	60°	45°	30°	15°
2"	16 <sup>7</sup> / <sub>16</sub>	10 <sup>15</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>
2 1/2"	16 <sup>3</sup> / <sub>8</sub>	10 <sup>15</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>4</sub>
3"	20 <sup>1</sup> / <sub>4</sub>	13 1/2	10 <sup>1</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>8</sub>
3 1/2"	24 <sup>7</sup> / <sub>16</sub>	18 <sup>9</sup> / <sub>16</sub>	13 <sup>3</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>8</sub>	4 <sup>9</sup> / <sub>16</sub>
4"	31 <sup>3</sup> / <sub>8</sub>	20 <sup>15</sup> / <sub>16</sub>	15 <sup>11</sup> / <sub>16</sub>	10 <sup>7</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>4</sub>

### Gain of Bend:

The difference between the “squared off” distance (AB + BC) around a corner and the “developed length” (AC) along a bend is commonly called “gain” of the bend. (Measurements should be made at the pipe centerline).

### “Gain” of Bends Chart

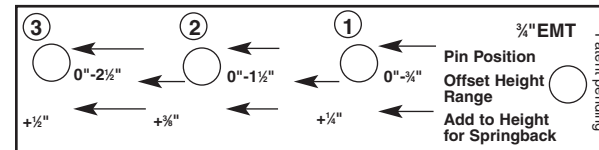
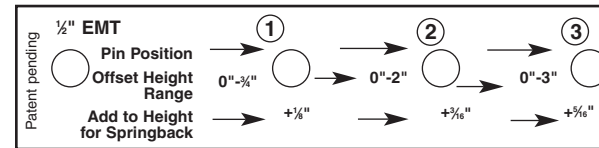
Nominal Conduit Size	“Gain” of Bends Measured at Centerline (inches)				
	90°	60°	45°	30°	15°
2"	5 <sup>1</sup> / <sub>16</sub>	1 <sup>7</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>16</sub>	1/4	1/16
2 1/2"	5 <sup>3</sup> / <sub>16</sub>	1 1/2	3/4	5/16	1/8
3"	6 <sup>3</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>	7/8	3/8	1/8
3 1/2"	8 <sup>7</sup> / <sub>16</sub>	2 <sup>7</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>8</sub>	1/2	1/8
4"	9 <sup>11</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>5</sup> / <sub>16</sub>	9/16	3/16

## No-Dog® Offset Bender Instructions BOS57/BOSA57

DO NOT ATTEMPT TO BEND CONDUIT OTHER THAN 1/2" EMT (THINWALL), IMC AND RIGID OR 3/4" EMT CONDUIT. USE OF ANY OTHER SIZES OR TYPES OF CONDUIT WILL DAMAGE THE BENDER AND COULD CAUSE INJURIES.

### Operating Procedures

- Bending conduit is accomplished using jaws on the frame to stabilize the conduit. The jaws are designed to accommodate specific types and sizes of conduit.
- Determine the size and type of conduit, and the offset height required. Review the bracket decals to locate the correct side of the frame to use. See Figure 5.



- Each bracket decal contains three vital pieces of information.
  - Pin Position: Three locations to insert retaining pin, which will produce different heights of offset bends.
  - Offset Height Range: The range of offset height that this pin hole position will produce. (ie. 0-3/4", 0-2" and 0-3")
  - Add to Height for Springback: The fraction with a plus sign indicates the amount to add to the offset height to correct for conduit springback.
- Select the correct hole location on the bracket, pull the retaining pin and move the bracket until the selected hole lines up with the frame hole. Insert the retaining pin. See Figure 1

**For Steel and Aluminum Rigid Conduit  
(Dimensions in inches)**

Nominal Size	Pipe Size Outside Dia.		Pipe Bend Centerline Radius A	Pipe Bend Inside Radius B	Type Shoe	Bending Shoe Model No.
	Actual O.D.	Frac. O.D.				
1/2	.840	27/32	4 3/8	3 31/32	Cyclone®	B2000
			3 9/16	2 7/8	One-shot	BZ12011
			3 1/4	2 13/16	Mechanical	BR57510
				6	Hand Bender	931/911
3/4	1.050	1 1/16	5 5/16	4 25/32	Cyclone®	B2000
			4 1/2	4	One-shot	BZ12021
			5	4 1/2	Mechanical	BR57510
				8	Hand Bender	932/912
1	1.315	1 19/64	6 7/32	5 9/16	Cyclone®	B2000
			5 3/4	5 1/16	Mini-Eegor™	BZ259
			5 13/16	5 1/8	One-shot	BZ12031
			5 11/16	5	Sweep	BZ12378
			6 7/16	5 3/4	Mechanical	BR57510
1 1/4	1.660	1 1/2	7 23/32	6 7/8	Cyclone®	B2000
			7 3/16	6 1/2	Mini-Eegor™	BZ260
			7 1/4	6 7/16	One-shot	BZ12041
			7 1/4	6 7/16	Sweep	BZ12379
			8 1/16	7 1/4	Mechanical	BR12515
1 1/2	1.900	1 21/32	8 15/16	7 9/32	Cyclone®	B2000
			7 15/16	7 3/16	Mini-Eegor™	BZ261
			8 1/4	7 5/16	One-shot	BZ12051
			8 1/4	7 9/16	Sweep	BZ12380
			9 9/16	8 9/8	Mechanical	BR12515
2	2.375	2 3/8	9 29/64	8 9/32	Cyclone®	B2000
			9	8	Mini-Eegor™	BZ262
			9 1/2	8 5/16	One-shot	BZ12061
			9 1/2	8 5/16	Sweep	BZ12381
			9 9/16	8 7/8	Mechanical	BR20000
2 1/2	2.875	2 7/8	10 1/2	9 1/16	Eegor™	BZ25
			10 1/2	9 1/16	One-shot	BZ12341
			10 1/2	9 1/16	Sweep	BZ12382
3	3.500	3 1/2	12 11/16	11 1/4	Eegor™	BZ30
			13	11 1/4	One-shot	BZ12351
			13	11 1/4	Sweep	BZ12383
3 1/2	4.000	4	17 1/2	15 1/2	Eegor™	BZ35
			17 1/2	15 1/2	One-shot	BZ12391
			17 1/2	15 1/2	Sweep	BZ12384
4	4.500	4 1/2	19 3/4	17 3/4	Eegor™	BZ40
			20	17 3/4	One-shot	BZ12392
			20	17 3/4	Sweep	BZ12385 5
	5.563	5 9/16	24 5/16	21 1/2	Sweep	BZ12386

**Eegor™ / Ultra Eegor™  
Radii Tables**

These radii tables for EMT, IMC and rigid conduit are provided for your general information. The Centerline and Inside radius are shown for each shoe.

In selecting a bender set, compare the shoe model numbers shown in the bender selection charts to these tables for complete shoe radii information.

Lubricate rollers, when needed, with molybdenum disulfide paste only (such as Dow Corning's Molykote #G-n paste, or equivalent.)

For heavy use, **lubricate rollers weekly.**

**Note:** Graphite formulations are not equivalent lubrication.

**Rigid Steel and Aluminum**

Nominal Conduit Size	Pipe Outside Diameters		Pipe Bend Radii*		Model Numbers		
	Actual	Fractional	A Centerline	B Inside Bend	Bending Shoe	Follower Bar	U-strap
2 1/2"	2.875	2 7/8	10 1/2	9 1/16	BZ25	BZ26	BZ28
3"	3.500	3 1/2	13	11 1/4	BZ30	BZ32	BZ34
3 1/2"	4.000	4	17 1/2	15 1/2	BZ35	BZ37	BZ39
4"	4.500	4 1/2	20	17 3/4	BZ40	BZ42	BZ44

**IMC**

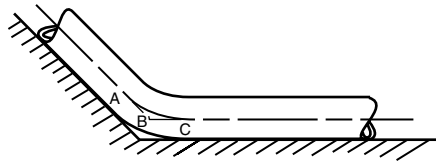
Nominal Conduit Size	Pipe Outside Diameters		Pipe Bend Radii*		Model Numbers		
	Actual	Fractional	A Centerline	B Inside Bend	Bending Shoe	Follower Bar	U-strap
2 1/2"	2.857	2 59/64	10 1/2	9 1/16	BZ25	BZ26	BZ28
3"	3.476	3 15/32	13	11 1/4	BZ30	BZ32	BZ34
3 1/2"	3.971	3 31/32	17 1/2	15 1/2	BZ35	BZ37	BZ39
4"	4.466	4 19/32	20	17 3/4	BZ40	BZ42	BZ44

**EMT**

Nominal Conduit Size	Pipe Outside Diameters		Pipe Bend Radii*		Model Numbers		
	Actual	Fractional	A Centerline	B Inside Bend	Bending Shoe	Follower Bar	U-Strap
2 1/2"	2.875	2 7/8	10 3/8	9 1/16	BZ25	BZ26	BZ28
3"	3.500	3 1/2	12 7/8	11 1/4	BZ30	BZ32	BZ34
3 1/2"	4.000	4	17 3/8	15 1/2	BZ35	BZ37	BZ39
4"	4.500	4 1/2	20	17 3/4	BZ40	BZ42	BZ44

\* Actual bend radii are slightly larger because of pipe springback.

## Other Bending Data for Mini-Eegor™ Benders



### Developed Length of Bend:

When conduit is bent, the length along the bend at the neutral axis (i.e., approximately the centerline of the pipe) is commonly called "developed length" of the bend.

### "Developed Length" of Bends Chart

Nominal Conduit Size	"Developed Length" of Bends (inches)				
	90°	60°	45°	30°	15°
1"	9	6	4½	3	1½
1¼"	11 ⅜	7 ⅝	5¾	3 ⅓	1 ⅞
1½"	12¾	8½	6¾	4¼	2 ⅞
2"	14¼	9½	7½	4¾	2¾

### Gain of Bend:

The difference between the "squared off" distance (AB + BC) around a corner and the "developed length" (AC) along a bend is commonly called "gain" of the bend. (Measurements should be made at the pipe centerline.)

### "Gain" of Bends Chart

Nominal Conduit Size	"Gain" of Bends Measured at Centerline (inches)				
	90°	60°	45°	30°	15°
1"	2¾	1 ⅓	¾	½	¼
1¼"	3½	1	½	⅓	¼
1½"	3 ⅝	1 ⅛	½	⅓	¼
2"	4 ⅞	1 ⅝	⅝	¼	¼

## For EMT Conduit (Dimensions in inches)

Nominal Size	EMT Size Outside Dia.		EMT Bend Centerline Radius A	EMT Bend Inside Radius B	Type Shoe	Bending Shoe Model No.
	Actual O.D.	Frac. O.D.				
½	.706	23/32	4¼	3⅞	Cyclone®	B2000
			3 ⅝	2 15/16	Mechanical	BT57510
¾	.922	15/16	5 ⅜	4 29/32	Cyclone®	B2000
			5 1/16	4 ⅞	Mechanical	BT57510
1	1.163	1 ⅝	6½	5 29/32	Cyclone®	B2000
			5¾	5 ⅜	Mini-Eegor™	BZ259
			6 7/16	5 ⅞	Mechanical	BT57510
1¼	1.510	1½	7 27/32	7 ⅜	Cyclone®	B2000
			7 ⅞	7½	Mini-Eegor™	BZ260
			7¼	6½	Thinwall	BZ1346
			9 7/8	9 ⅛	Mechanical	BT12515
1½	1.740	1¾	8 ⅜	7½	Cyclone®	B2000
			8 ⅞	7¼	Mini-Eegor™	BZ261
			8 ⅞	7¼	Thinwall	BZ1347
2	2.197	2 ⅝	9 21/32	8 9/16	Cyclone®	B2000
			9 ⅞	8	Mini-Eegor™	BZ262
			9	8	Thinwall	BZ1348
			9 7/16	8 5/16	Mechanical	BT2000
2½	2.875	2 7/8	10 ⅜	9 1/16	Eegor™	BZ25
3	3.500	3 ½	12 7/8	11 ¼	Eegor™	BZ30
3½	4.000	4	17 ⅜	15 ½	Eegor™	BZ35
4	4.500	4 ½	20	17 ¾	Eegor™	BZ40

## Bending Shoe Radii Table for Benders on pages 14 - 41

These radii tables are provided for your general information. The Centerline and Inside radius are shown for each shoe.

In selecting a bender set, compare the shoe model numbers shown in the bender selection charts to these tables for complete shoe radii information.

Three bending shoe tables are shown:

1. For thinwall (EMT) conduit. See chart on page 45.
2. For IMC conduit and pipe. See chart below.
3. For steel and aluminum rigid conduit and pipe. See chart on page 46.

(Bending shoe tables for Egor™ hydraulic benders are on page 11, for Mini-Egor™ hydraulic benders see page 13.)

### For IMC Conduit (Dimensions in inches)

Nominal Size	IMC Size Outside Dia.		IMC Bend Centerline Radius A	IMC Bend Inside Radius B	Type Shoe	Bending Shoe Model No.
	Actual O.D.	Frac. O.D.				
1/2	.815	13/16	43/8	331/32	Cyclone®	B2000
			3/4	213/16	Mechanical	BR57510
3/4	1.029	11/16	55/16	425/32	Cyclone®	B2000
			5	41/2	Mechanical	BR57510
1	1.290	119/64	67/32	59/16	Cyclone®	B2000
			53/4	51/16	Mini-Egor™	BZ259
			67/16	53/4	Mechanical	BR57510
1 1/4	1.638	141/64	723/32	67/8	Cyclone®	B2000
			75/16	61/2	Mini-Egor™	BZ260
			81/16	71/4	Mechanical	BR12515
1 1/2	1.883	157/64	87/32	79/32	Cyclone®	B2000
			87/32	79/32	Mini-Egor™	BZ261
			91/16	85/8	Mechanical	BR12515
2	2.360	223/64	915/32	89/32	Cyclone®	B2000
			93/16	8	Mini-Egor™	BZ262
2 1/2	2.857	255/64	101/2	91/16	Egor™	BZ25
3	3.476	315/32	13	111/4	Egor™	BZ30
3 1/2	3.971	315/32	171/2	151/2	Egor™	BZ35
4	4.466	415/32	20	173/4	Egor™	BZ40

## Mini-Egor™ Radii Tables

These radii tables for EMT, IMC and rigid conduit are provided for general information. The centerline and inside radius are shown for each shoe.

In selecting a bender set, compare the shoe model numbers shown in the bender selection charts to these tables for complete shoe radii information.

Lubricate rollers, when needed, with molybdenum disulfide paste only (such as Dow Corning's Molykote #G-n paste, or equivalent.)

For heavy use, **lubricate rollers weekly.**

**Note:** Graphite formulations are not equivalent lubrications.

### Rigid Steel and Aluminum

Nominal Conduit Size	Pipe Outside Diameters		Pipe Bend Radii*		Model Numbers		
	Actual	Frac-tional	A	B	Bending Shoe	Follower Bar	U-strap
			Center-line	Inside Bend			
1"	1.315	15/16	53/4	51/16	BZ259	—	BZ253
1 1/4"	1.660	25/16	71/4	65/8	BZ260	—	BZ254
1 1/2"	1.900	129/32	81/8	73/16	BZ261	—	BZ255
2"	2.375	23/8	91/16	77/8	BZ262	BZ258	BZ256

### IMC

Nominal Conduit Size	Pipe Outside Diameters		Pipe Bend Radii*		Model Numbers		
	Actual	Frac-tional	A	B	Bending Shoe	Follower Bar	U-strap
			Center-line	Inside Bend			
1"	1.290	119/64	53/4	51/16	BZ259	—	BZ253
1 1/4"	1.638	141/64	71/4	65/8	BZ260	—	BZ254
1 1/2"	1.883	157/64	81/8	73/16	BZ261	—	BZ255
2"	2.360	223/64	91/16	77/8	BZ262	BZ258	BZ256

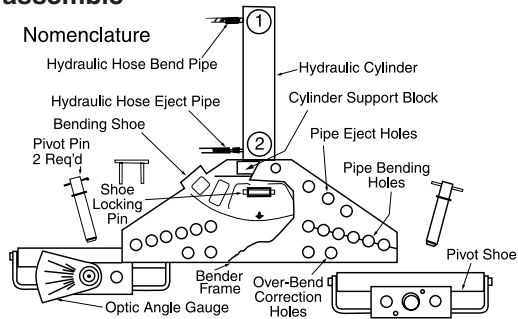
### EMT

Nominal Conduit Size	Pipe Outside Diameters		Pipe Bend Radii*		Model Numbers		
	Actual	Frac-tional	A	B	Bending Shoe	Follower Bar	U-strap
			Center-line	Inside Bend			
1"	1.163	15/32	53/4	53/16	BZ259	—	BZ253
1 1/4"	1.510	133/64	71/4	65/8	BZ260	BZ1343	BZ254
1 1/2"	1.740	147/64	81/8	71/4	BZ261	BZ1344	BZ255
2"	2.197	213/64	91/8	8	BZ262	BZ1345	BZ256

\* Actual bend radii are slightly larger because of pipe springback.

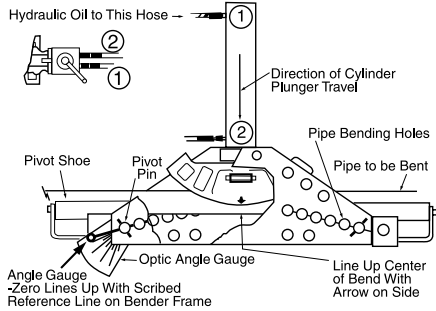
## How to Use the PVC Coated Conduit Bender

### A to assemble



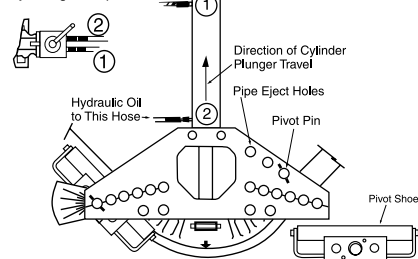
### B to bend pipe

#### Start of Bend



### C to eject pipe

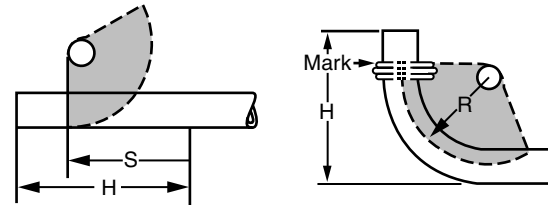
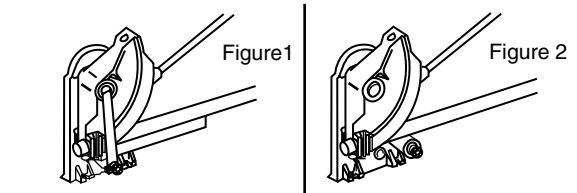
#### Ejecting of Pipe



## 90° Stub-up Instructions for Mechanical Sidewinder® Benders

For bending 2" EMT only,  
Load as shown

For bending conduit and EMT  
(except 2"), Load as shown

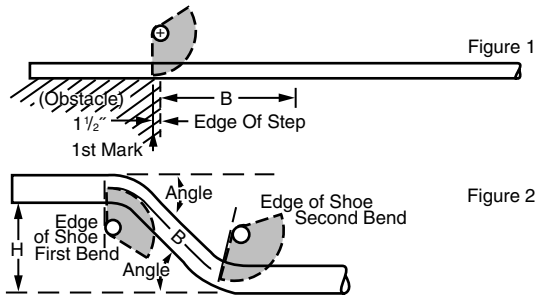


1. Mark desired turn-up dimension (H) on straight length of conduit or thinwall.
2. Locate the size of conduit or thinwall you are bending in chart and obtain dimension (S).
3. Measure back dimension (S) and mark conduit or thinwall.
4. Load conduit or thinwall in bender as shown in Figures 1 and 2.
5. Align forward edge of bending shoe with mark on conduit or thinwall.
6. Proceed to bend, reading angle on angle indicator — allowing for springback.

Thinwall / EMT			Conduit / Pipe		
Size (Inches)	Centerline Radius (R)	Set-Back (S)	Size (Inches)	Centerline Radius (R)	Set-back (S)
1/2	3 3/8	5 5/8	1/2	3 1/4	5 1/4
3/4	5 1/8	7 1/2	3/4	5	8 1/8
1	6 1/2	9 3/4	1	6 1/2	9 1/2
1 1/4	9 7/8	13 1/4	1 1/4	8	11 3/4
1 1/2	11 3/8	15 3/4	1 1/2	9 5/8	14 1/4
2	10	12 3/4	2 *	9 3/8	14 1/2

\* Aluminum conduit

## Offset Bend Instructions for Mechanical Sidewinder® Benders



1. Locate first bend at the edge of the step over which conduit will be formed. Place first mark 1 1/2" short of where bend is to start (see Figure 1 above).
2. Multiply known (H) dimension by **multiplier** shown in chart below under size of conduit and desired angle.
3. To obtain measurement (B), add **correction factor** in chart to the figure obtained in step 2 and mark (B) as illustrated.
4. Place conduit or thinwall in bender, aligning first bend mark with forward edge of bending shoe. Proceed to bend, reading angle on indicator.
5. Rotate conduit or thinwall 180° and align second bend mark with forward edge of bending shoe bend mark with the forward edge of bending shoe. Proceed to bend, reading angle on indicator.

Size	30°			45°		
	Multiplier	Correction Factor		Multiplier	Correction Factor	
		Rigid	EMT		Rigid	EMT
1/2	2	0	0	1.4	0	0
3/4	2	0	0	1.4	0	0
1	2	0	0	1.4	0	0
1 1/4	2	0	1/2	1.4	0	1/2
1 1/2	2	0	7/16	1.4	0	7/16
2	2	0	0	1.4	0	0

## IMPORTANT

Before starting a bend, make sure pivot pins are through the pivot assemblies, the bottom frame plate and locked firmly in the hole.

### CAUTION

When activating the hydraulic pump, the operator must stand at the cylinder side of the bender. Due to bending forces it is not recommended to operate any bender from the front or frame side of the bender.

During bending, watch the optic angle gauge until the gauge indicating line for the desired angle is aligned with the mark on the frame. Due to conduit spring back, it is usually necessary to bend slightly more than the required angle.

Use Stub-up, Kick Bend and Offset Bend Charts on pages 20 thru 24.

## ASSEMBLY

1. Thread the hydraulic cylinder into the cylinder support block on the bending frame.
2. Attach hoses to pump valve; connect cylinder hose ① to valve port ①; connect cylinder hose ② to valve port ②.
3. Select bending shoe for conduit size. Each shoe is marked for sizes. An arrow indicates the center of bend to be made.
4. Insert and lock bending shoe onto cylinder plunger. Use "U" shaped lock pin. Refer to Conduit Size Chart.

## BENDING

1. Place conduit into bender frame and against the shoe groove.
2. Attach the optic angle gauge to the pivot assembly being installed in the frame where the scribed line runs between each hole. Position the pivot assembly with the follower bar (grooved side) toward the conduit. Be sure follower bar is centered within the pivot assembly.
3. Secure the pivot assemblies with pivot pins. Press release knob on the pin and insert it through the top frame, pivot assembly and through the bottom frame. Pin retaining balls must be under the bottom frame.

continued on next page

## Bending continued

- The optic gauge zero mark must be aligned with the mark on the top frame.
- Start hydraulic pump. Press ADVANCE button on pump control pendent until bend is complete.

### Releasing Conduit

- To remove conduit from bender, press RETRACT button on pendant until pressure is off conduit. Release button.
- Remove left side pivot pin and pivot assembly. Place pivot pin in pipe eject hole (which is marked for conduit size). Pin must be through bottom frame.
- Press RETRACT button until cylinder plunger is fully retracted. Remove conduit from bender.

### Maximum Conduit Sizes

The "Poly Bender" shoes are manufactured to bend PVC coated rigid conduit with a coating thickness of 40 mil. Given tolerances on coating thickness and normal conduit tolerances, the bender shoes are capable of bending the following maximum diameters of PVC coated conduit.

### Conduit Size Chart

"Poly Bender" Shoe	Nominal PVC Coated Conduit Diameter (inches)	Maximum Allowable PVC Coated Conduit Diameter (inches)
BZ120111 - 1/2"	.920	.945
BZ120211 - 3/4"	1.130	1.155
BZ120311 - 1"	1.395	1.420
BZ120411 - 1 1/4"	1.740	1.765
BZ120511 - 1 1/2"	1.980	2.005
BZ120611 - 2"	2.455	2.485
BZ123411 - 2 1/2"	2.955	2.985
BZ123511 - 3"	3.580	3.610
BZ123911 - 3 1/2"	4.080	4.115
BZ123921 - 4"	4.580	4.615

If measured conduit diameter is greater than the maximum allowable diameter, do **not** attempt to bend that conduit. **Attempting to bend oversize conduit could cause damage to bender** and will result in an unacceptable bend. PVC coated conduit will expand when exposed to direct sunlight and warm temperatures, and may exceed the maximum diameter. Always measure conduit prior to bending.

## Mechanical Benders Kick Bending Charts

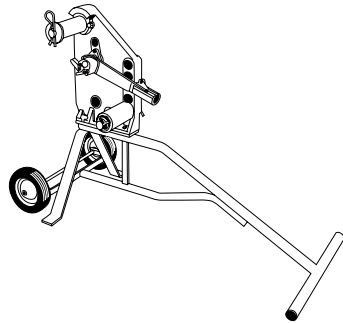
Kick Dim. (H)	For 1/2" Conduit (M) Dimension				For 1 1/4" Conduit (M) Dimension			
	30° Angle		45° Angle		30° Angle		45° Angle	
	Rigid	EMT	Rigid	EMT	Rigid	EMT	Rigid	EMT
2"	3	3	1 3/8	1 3/8	—	—	—	—
4"	7	7	4 1/8	4 1/8	5 5/8	5 1/8	—	—
6"	11	11	7	7	9 5/8	9 1/8	4 3/4	4 1/8
8"	15	15	9 3/4	9 3/4	13 5/8	13 1/8	7 5/8	7
10"	19	19	12 5/8	12 5/8	17 5/8	17 1/8	10 1/2	9 3/4
12"	23	23	15 1/2	15 1/2	21 5/8	21 1/8	13 1/4	12 5/8
14"	27	27	18 1/4	18 1/4	25 5/8	25 1/8	16 1/8	15 3/8
16"	31	31	21 1/8	21 1/8	29 5/8	29 1/8	19	18 1/4

Kick Dim. (H)	For 3/4" Conduit (M) Dimension				For 1 1/2" Conduit (M) Dimension			
	30° Angle		45° Angle		30° Angle		45° Angle	
	Rigid	EMT	Rigid	EMT	Rigid	EMT	Rigid	EMT
2"	2 1/2	2 1/2	—	—	—	—	—	—
4"	6 1/2	6 1/2	3 3/8	3 3/8	5 1/8	4 3/4	—	—
6"	10 1/2	10 1/2	6 1/4	6 1/4	9 1/8	8 3/4	4 1/8	3 3/8
8"	14 1/2	14 1/2	9	9	13 1/8	12 3/4	7	6 1/4
10"	18 1/2	18 1/2	11 7/8	11 7/8	17 1/8	16 3/4	9 3/4	9
12"	22 1/2	22 1/2	14 5/8	14 5/8	21 1/8	20 3/4	12 5/8	11 7/8
14"	26 1/2	26 1/2	17 1/2	17 1/2	25 1/8	24 3/4	15 1/2	14 3/4
16"	30 1/2	30 1/2	20 3/8	20 3/8	29 1/8	28 3/4	18 1/4	17 1/2

Kick Dim. (H)	For 1" Conduit (M) Dimension				For 2" Conduit (M) Dimension			
	30° Angle		45° Angle		30° Angle		45° Angle	
	Rigid	EMT	Rigid	EMT	Rigid	EMT	Rigid	EMT
2"	2 1/8	2 1/8	—	—	—	—	—	—
4"	6 1/8	6 1/8	2 3/4	2 3/4	5 1/4	5	—	—
6"	10 1/8	10 1/8	5 1/2	5 1/2	9 1/4	9	4 1/8	4
8"	14 1/8	14 1/8	8 3/8	8 3/8	13 1/4	13	7	6 3/4
10"	18 1/8	18 1/8	11 1/4	11 1/4	17 1/4	17	9 3/4	9 5/8
12"	22 1/8	22 1/8	14	14	21 1/4	21	12 5/8	12 3/8
14"	26 1/8	26 1/8	16 7/8	16 7/8	25 1/4	25	15 1/2	15 1/4
16"	30 1/8	30 1/8	19 3/4	19 3/4	29 1/4	29	18 1/4	18

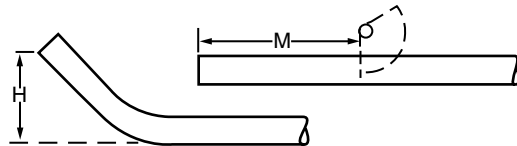


## How to Use the Mechanical Sidewinder® Benders



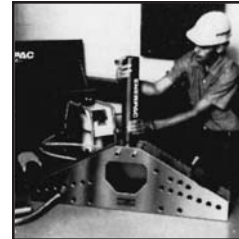
Monthly lubrication of the ratchet assembly, frame pivot tube, and roller shaft will result in easier operation. Also a light oil film in the frame roller and ratchet assembly mounting holes will retard corrosion and result in easier removal and installation of components.

### Kick Bend Instructions



1. Use chart on page 41 applicable to size of EMT or rigid conduit used.
2. Using desired kick dimension in (H) column, obtain measurement (M) under the angle of bend desired, according to the type of conduit used.
3. Mark off measurement (M) on EMT or rigid conduit as illustrated.
4. Place in bender so mark aligns with forward edge of bending shoe.
5. Proceed to bend, reading angle on indicator — allowing for springback.

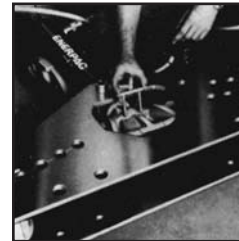
## Eject-O-Matic® Benders Easy to Assemble, Quick To Use



Thread in cylinder.



Assemble optic angle gauge and pivot shoe, insert pivot pin in gauge and pivot shoe.



Insert shoe lock pin, locking shoe to groove in cylinder saddle.



Consult pages 16 thru 31 for proper bending instructions.



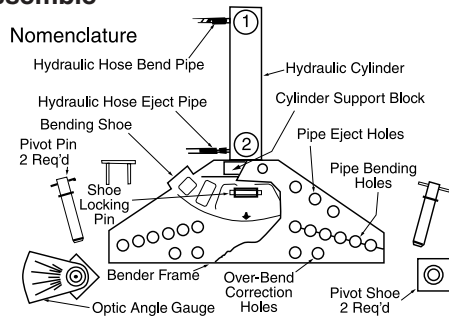
After pipe is bent, remove pivot pin and put in proper "Eject" hole (2 holes on 4" one-shot and 5" frames).



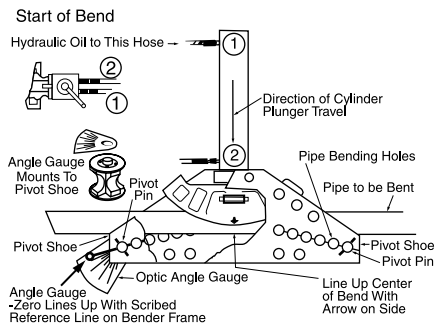
Pipe is ejected hydraulically.

## How to Use Eject-O-Matic® One-shot Benders

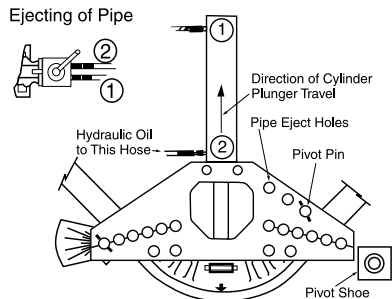
### A to assemble



### B to bend pipe



### C to eject pipe



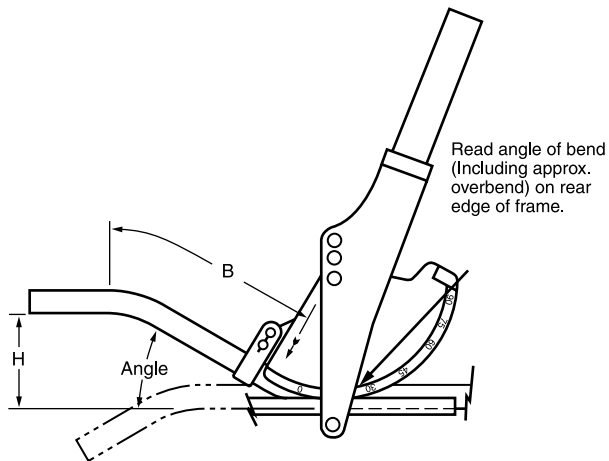
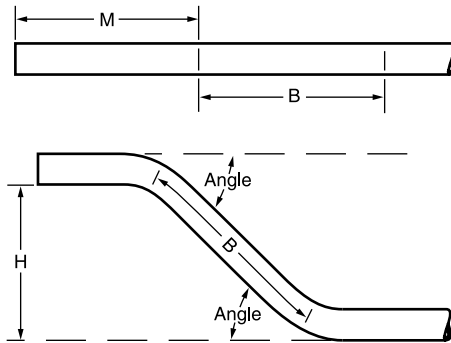
## For GB Thinwall Bender Sets

1. Mark first bend following instructions (1 - 3) in "Kick Bend" instructions for Thinwall Bender Sets (pg. 36) to get dimension (M).
2. Using the same dimension (H) and the same angle of bend, obtain measurement (B) in Offset Chart.
3. Mark off same dimension bend measurement (B) on thinwall as illustrated.
4. Place thinwall in bender, aligning first bend mark (M) with arrow on bending shoe. Proceed to bend, reading angle on rear edge of frame.
5. Rotate thinwall 180° and align second bend mark (B) with arrow on bending shoe. Proceed to bend, reading angle on rear edge of frame. (Angle on shoe includes approximate springback.)

### Offset Chart

Offset Required (H)	Measurement (B) (Inches)			
	15°	30°	45°	60°
2"	7 <sup>1</sup> / <sub>4</sub>	—	—	—
4"	15	7 <sup>3</sup> / <sub>8</sub>	—	—
6"	22 <sup>3</sup> / <sub>4</sub>	11 <sup>3</sup> / <sub>8</sub>	8	—
8"	30 <sup>1</sup> / <sub>2</sub>	15 <sup>3</sup> / <sub>8</sub>	10 <sup>5</sup> / <sub>8</sub>	—
10"	38 <sup>1</sup> / <sub>8</sub>	19 <sup>3</sup> / <sub>8</sub>	13 <sup>3</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>2</sub>
12"	45 <sup>3</sup> / <sub>4</sub>	23 <sup>3</sup> / <sub>8</sub>	16 <sup>1</sup> / <sub>2</sub>	12 <sup>7</sup> / <sub>8</sub>
14"	53 <sup>1</sup> / <sub>2</sub>	27 <sup>3</sup> / <sub>8</sub>	19 <sup>1</sup> / <sub>4</sub>	15 <sup>1</sup> / <sub>4</sub>
16"	61 <sup>1</sup> / <sub>4</sub>	31 <sup>3</sup> / <sub>8</sub>	22	17 <sup>1</sup> / <sub>2</sub>
18"	69	35 <sup>3</sup> / <sub>8</sub>	24 <sup>7</sup> / <sub>8</sub>	19 <sup>3</sup> / <sub>4</sub>
20"	76 <sup>3</sup> / <sub>4</sub>	39 <sup>3</sup> / <sub>8</sub>	27 <sup>3</sup> / <sub>4</sub>	22 <sup>1</sup> / <sub>8</sub>
22"	84 <sup>1</sup> / <sub>2</sub>	43 <sup>3</sup> / <sub>8</sub>	30 <sup>5</sup> / <sub>8</sub>	24 <sup>1</sup> / <sub>2</sub>
24"	92	47 <sup>3</sup> / <sub>8</sub>	33 <sup>1</sup> / <sub>4</sub>	26 <sup>3</sup> / <sub>4</sub>

## Offset Bend Instructions for GB Thinwall Benders



## IMPORTANT

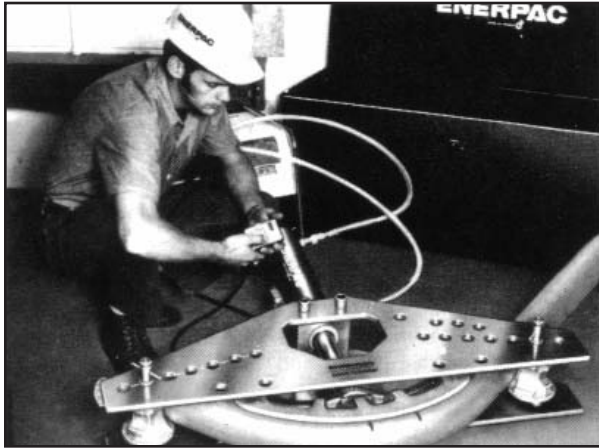
**Before starting a bend, be sure pivot pins are through the bottom frame plate and locked in position to properly anchor.**

**When actuating pump, either hand or electric, operator should position himself on the cylinder side. It is not recommended that any bender be operated from the front position.**

**As bend is generated, watch optic angle gauge until desired angle of bend is reached. Because of conduit springback, it will be necessary to go a bit beyond the desired angle.**

1. Thread hydraulic cylinder into cylinder support block on bending frame.
  2. Attach hoses to pump valve. Connect hose ① to cylinder port ① — hose ② to cylinder port ②.
  3. Select bending shoe for conduit to be bent. Each shoe is marked for size and has an arrow, indicating the center point of bend to be made.
  4. Insert and lock selected bending shoe on cylinder plunger with U-shaped lock pin.
- 
1. Place conduit in bender frame.
  2. Attach optic angle gauge to the top of pivot shoe as shown. Pin locator on top of pivot shoes locate for correct setting of zero before bending cycle.
  3. Mount other pivot shoe. Both pivot shoes are marked for various pipe sizes. The markings on pivot shoes must correspond to the pipe size being bent and face the pipe.
  4. Angle gauge should now read at zero when read along line scribed on bender frame.
  5. Lock both pivot shoes in position with push-button pivot pins. Pivot pin is operated by pushing down on button with thumb while grasping cross handle. Be sure pivot pins are inserted through corresponding marked pipe size holes.
  6. Turn pump valve as shown for manual valve and proceed to bend. If electric push-button model, push "advance" button.
- 
1. Retract cylinder plunger slightly by turning pump valve in opposite direction of outward bending stroke. This will take pressure off pivot shoes and pins. If electric push-button model, jog retract button.
  2. Remove either one or both of the pivot shoes and reposition **one** pivot pin in proper pipe-size "eject hole" where the pin will restrain the conduit, **not the shoe**, as they retract. Four inch one-shot frames and 5-inch frames have two eject holes. Use both holes.
  3. Now fully retract the cylinder plunger. Bending shoe and conduit will retract together until conduit meets pivot pin. On contact, conduit will strip from shoe.
  4. Remove other pivot pin and pivot shoe to remove conduit from bender.

## 90° Stub-up Instructions for One-shot PVC-coated Conduit Bender

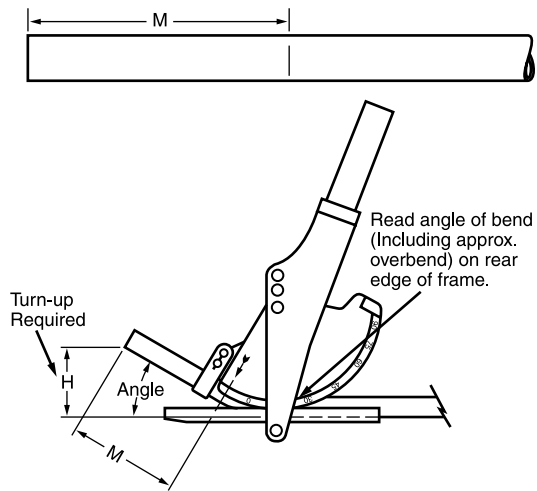


90° Stub-up Chart			
Nominal Conduit Size (inches)	Set - Back (S) (inches)	Centerline Radius (R) (inches)	Minimum Length (L) of Conduit Required on each end of bend mark (inches)
1/2	1/8	3/4	7 1/2
3/4	1/2	4 1/2	8 3/4
1	1 7/8	5 3/4	10 1/4
1 1/4	2 3/8	7 1/4	12
1 1/2	2 3/4	8 1/4	13 1/4
2	3 3/4	9 1/2	15
2 1/2	3 11/16	10 1/2	18
3	4 1/2	13	20
3 1/2	5 3/16	15	26 1/2
4	6 1/2	20	27

## For GB Thinwall Bender Sets

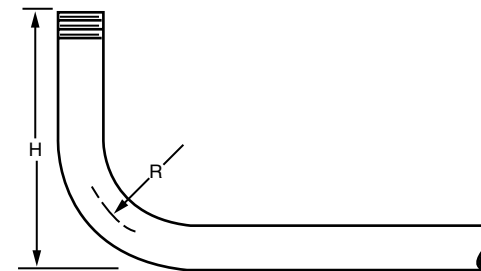
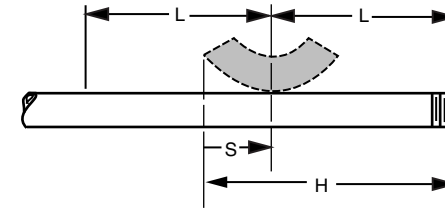
Size Thinwall	Kick Required (H) (in.)	Measurement (M) (in.)			
		15°	30	45	60
1 1/4" Thinwall	2	6	—	—	—
	4	13 3/4	4 1/2	—	—
	6	21 1/2	8 1/2	5 1/8	—
	8	29	12 1/2	7 1/4	—
	10	36 7/8	16 1/2	9 7/8	5 3/4
	12	44 1/2	20 1/2	12 7/8	8 5/8
	14	52 1/4	24 1/2	15 3/4	10 3/8
	16	60	28 1/2	18 1/2	12 3/4
	18	67 3/4	32 1/2	21 1/4	15
	20	75 1/2	36 1/2	24 1/8	17 3/8
	22	83 1/4	40 1/2	27	19 3/8
	24	91	44 1/2	29 7/8	21 7/8
1 1/2" Thinwall	2	4 3/4	—	—	—
	4	12 1/2	5 1/4	—	—
	6	20 1/4	9 1/4	4 1/4	—
	8	27 3/4	13 1/4	7 1/8	3 1/4
	10	35 5/8	17 1/4	9 3/4	5 1/2
	12	43 1/4	21 1/4	12 3/4	7 7/8
	14	51	25 1/4	15 5/8	10 1/8
	16	58 3/4	29 1/4	18 3/8	12 1/2
	18	66 1/2	33 1/4	21 1/8	14 3/8
	20	74 1/4	37 1/4	24	17 1/8
	22	82	41 1/4	26 7/8	19 3/8
	24	89 3/4	45 1/4	30 1/4	21 3/8
2" Thinwall	2	5 1/4	—	—	—
	4	13	4 1/2	—	—
	6	20 3/4	8 1/2	4 5/8	—
	8	28 1/4	12 1/2	6 1/2	2 3/8
	10	36 1/8	16 1/2	9 1/8	4 5/8
	12	43 3/4	20 1/2	13 3/8	6
	14	51 1/2	24 1/2	15	9 1/4
	16	58 1/4	28 1/2	17 3/4	11 5/8
	18	66	32 1/2	20 1/2	13 7/8
	20	73 3/4	36 1/2	23 3/8	16 1/4
	22	81 1/2	40 1/2	26 1/4	18 1/2
	24	89 1/4	44 1/2	29 1/8	20 3/4

## Kick Bend Instructions for GB Thinwall Benders



1. Use Thinwall Chart applicable to thinwall size used.
2. Using desired kick dimension in (H) column, obtain measurement (M) under the angle of bend desired.
3. Mark off measurement (M) on thinwall as illustrated.
4. Place in bender so mark aligns with arrow on bending shoe. Proceed to bend, reading angle on shoe at rear edge of bending frame. (Angle on shoe includes approximate springback.)

## For One-shot Hydraulic Benders

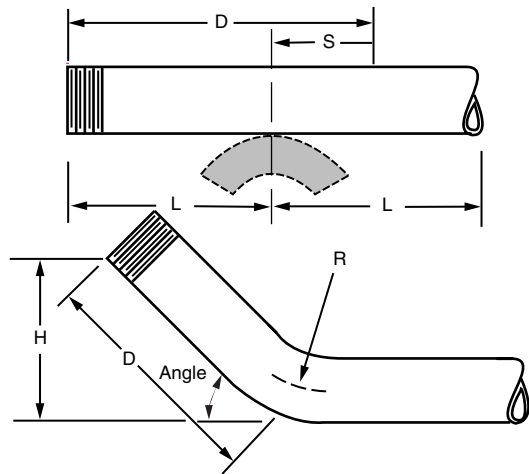


1. Mark desired turn-up dimension (H) on straight length of conduit.
2. Locate the size of conduit you are bending in chart and obtain set-back dimension (S).
3. Measure back dimension (S) and mark conduit.

Mark (S) cannot be closer to ends of conduit than minimum distance (L) shown in chart, or ends will not be supported on the pivot shoes.

4. Place conduit in bender so mark aligns with arrow on bending shoe. Proceed to bend, reading desired angle on optic angle gauge.

## Kick Bend Instructions for One-shot PVC-coated Conduit Benders

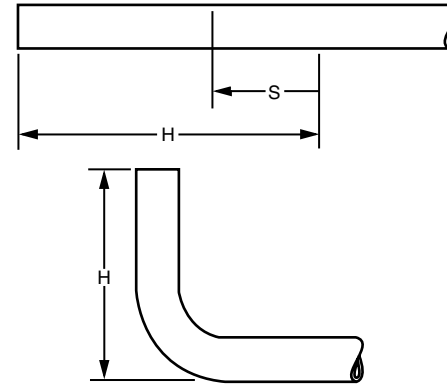


1. From the Diagonal Distance Chart (pg. 23), find diagonal distance (D) which corresponds with the desired turn-up dimension (H). Mark distance (D) from the end of a straight length of conduit.
2. Locate the size of conduit in chart to obtain Set-back measurement (S) under the angle of bend desired.
3. Mark off measurement (S) on conduit as illustrated.

Mark (S) cannot be closer to ends of conduit than minimum distance (L) shown in chart or ends will not be supported on the pivot shoes.

4. Place conduit in bender so mark aligns with arrow on bending shoe. Proceed to bend, reading desired angle on optic angle gauge.

## Gardner Bender Thinwall Bender Sets



1. Mark desired turn-up dimension (H) on straight length of thinwall.

**Note: (H) Must be at least 2" longer than Set-back (S) shown on chart.**

2. Locate the size of thinwall you are bending in chart and obtain dimension (S).
3. Measure back dimension (S) and mark thinwall.
4. Place thinwall in bender so mark (S) aligns with arrow on bending shoe. Proceed to bend, reading angle on shoe at rear edge of bending frame. (Angle on shoe includes approximate springback.)

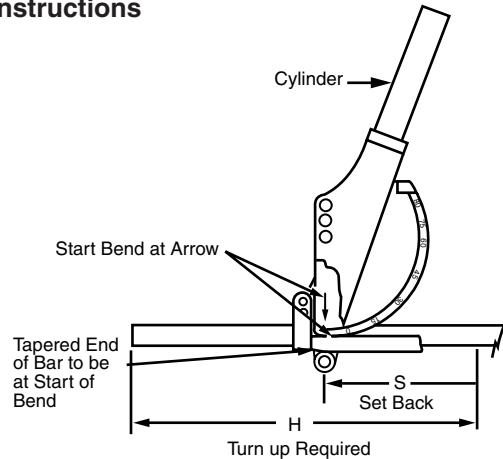
	Thinwall Nominal Size (in.)	Set-back (S)
<b>1 1/4</b>	Actual O.D. - 1.510 Centerline Radius of Bend - 7 1/4"	<b>8 7/8"</b>
<b>1 1/2</b>	Actual O.D. - 1.740 Centerline Radius of Bend - 8 1/8"	<b>9 3/8"</b>
<b>2</b>	Actual O.D. - 2.197 Centerline Radius of Bend - 9 1/8"	<b>10 3/4"</b>

## How to Use GB Thinwall Benders



Thinwall Benders 1 1/4"-2" EMT Conduit

### 90° Stub-up Instructions



## For One-shot Hydraulic Benders

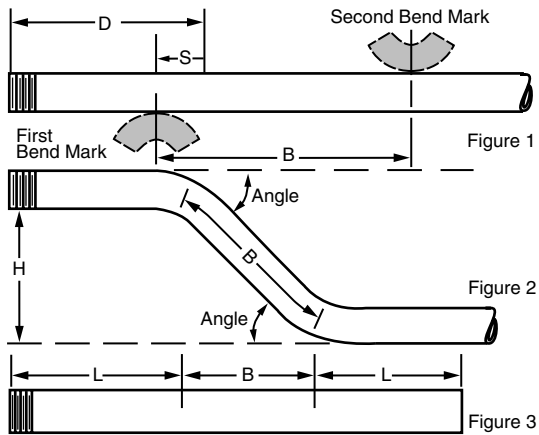
Rise (H) (in.)	Diagonal Distance (D) Chart			
	Bend Angle			
	15°	30°	45°	60°
2	7 3/4	4	2 13/16	2 5/16
4	15 7/16	8	5 11/16	4 5/8
6	23 3/16	12	8 1/2	6 15/16
8	30 15/16	16	11 9/16	9 1/4
10	38 5/8	20	14 1/8	11 9/16
12	46 3/8	24	17	13 7/8
14	54 1/16	28	19 13/16	16 3/16
16	61 13/16	32	22 5/8	18 1/2
18	69 9/16	36	25 7/16	20 13/16
20	77 1/4	40	28 5/16	23 1/8
22	85	44	31 1/8	25 3/8
24	92 3/4	48	33 15/16	27 11/16

Nominal Conduit Size	(S) Set-back measurement (in.)				(R) *	(L) **
	Sweep Benders		One-shot Benders			
	15°	30°	45°	60°		
1/2"	—	1/8	1/4	7/16	3/4	7 1/2
3/4"	1/16	3/16	5/16	9/16	4 1/2	8 3/4
1"	1/16	1/4	7/16	3/4	5 3/4	10 1/4
1 1/4"	1/8	1/4	1/2	7/8	7 1/4	11 1/2
1 1/2"	1/8	5/16	5/8	1	8 1/4	13 1/4
2"	3/16	3/8	1 1/16	1 3/16	9 1/2	15
2 1/2"	3/16	7/16	1 3/16	1 3/8	10 1/2	16 3/4
3"	1/4	9/16	1	1 11/16	13	18 1/2
3 1/2"	1/4	5/8	1 1/8	1 15/16	17 1/2	22 1/4
4"	5/16	3/4	1 3/8	2 1/2	20	24 1/4
5"	3/8	7/8	1 3/4	2 7/8	30	25

\*(R) Centerline radius (Inches)

\*\* (L) Minimum length of conduit required on each end of bend mark (inches)

## Offset Bend Instructions for One-shot PVC-coated Conduit Benders



1. Determine offset bend angle desired. Locate and mark first bend at distance (D) minus (S) from end of conduit, following "Kick Bend Instructions" 2 and 3 (page 22).
2. Find dimension (B) from Offset Chart, using the same angle of bend used to locate the first mark. **NOTE:** for any required offset (H), the maximum conduit size that can be bent to the angles given are listed.
3. Mark off second bend measurement (B) on conduit as illustrated (figure 1).

Marks (B) cannot be closer to **ends of conduit** than distance (L) or ends will not be supported on the pivot shoes (see figure 3 and "L" Requirement Chart).

4. Place conduit in bender, aligning first bend mark with arrow on bending shoe. Proceed to bend, reading desired angle on optic angle gauge.
5. Rotate conduit 180° and align second bend mark with arrow on bending shoe. Proceed to make second bend, reading angle on optic angle gauge.

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## For GB Sweep Benders

1. For concentric bending, determine the first radius.
2. Using the charts on pages 29-31 corresponding to the conduit size you are using, make smallest radius bend first, as covered in instructions.
3. Make all succeeding concentric bends in the same manner; noting each succeeding radius and its corresponding A, B and C specifications.

### Other Radii Bends

For developing your own specifications for radii other than those shown in charts, use the following formula:

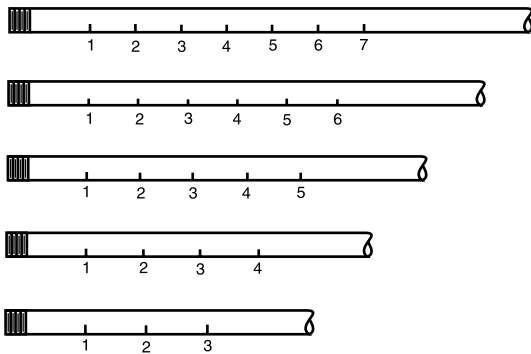
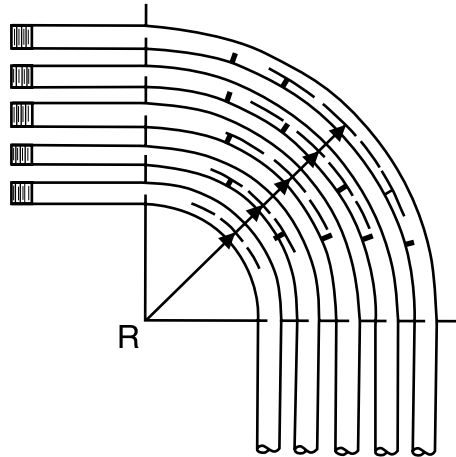
1. Determine the number of bites you wish to make—approximated from previous charts on pages 27-31.
2. Divide this (item 1) into the total number of degrees in your required angle of bend. This will give you the number of degrees per bite you will need to make. (Largest degree of bend with ENERPAC sweep shoes in one bite is 30°.)
3. Multiply bend radius by .018 and number of degrees per bite from step 2 ( $R \times .018 \times \text{degrees per bite}$ ). This will give you the spacing required between each bite.
4. Proceed to bend while following previous instructions.

For overbend corrections, see pages 26-27.

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## Concentric Bend Instructions for Sweep / Segmental Benders



## Offset Chart for Sweep, One-shot and PVC Coated Conduit Benders

Offset Required (H)	15° Bend		30° Bend	
	(B)	Max. Conduit Size	(B)	Max. Conduit Size
2"	7 <sup>1</sup> / <sub>16</sub>	<sup>3</sup> / <sub>4</sub>	—	—
4"	15 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>8</sub>	<sup>3</sup> / <sub>4</sub>
6"	23 <sup>3</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	11 <sup>7</sup> / <sub>8</sub>	1
8"	30 <sup>7</sup> / <sub>8</sub>	4	15 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>
10"	38 <sup>5</sup> / <sub>8</sub>	4	19 <sup>7</sup> / <sub>8</sub>	2
12"	46 <sup>5</sup> / <sub>16</sub>	5	23 <sup>7</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>
14"	54	5	27 <sup>7</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>
16"	61 <sup>13</sup> / <sub>16</sub>	5	31 <sup>7</sup> / <sub>8</sub>	4
18"	69 <sup>1</sup> / <sub>2</sub>	5	35 <sup>7</sup> / <sub>8</sub>	4
20"	77 <sup>1</sup> / <sub>4</sub>	5	39 <sup>7</sup> / <sub>8</sub>	5
22"	85	5	43 <sup>7</sup> / <sub>8</sub>	5

Offset Required (H)	45° Bend		60° Bend	
	(B)	Max. Conduit Size	(B)	Max. Conduit Size
6"	8 <sup>5</sup> / <sub>16</sub>	<sup>1</sup> / <sub>2</sub>	—	—
8"	11 <sup>1</sup> / <sub>8</sub>	1	8 <sup>3</sup> / <sub>4</sub>	<sup>1</sup> / <sub>2</sub>
10"	13 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>	10 <sup>13</sup> / <sub>16</sub>	1
12"	16 <sup>1</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>2</sub>	12 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>4</sub>
14"	19 <sup>1</sup> / <sub>2</sub>	2	15 <sup>1</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>
16"	22 <sup>3</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	17 <sup>3</sup> / <sub>8</sub>	2
18"	25 <sup>3</sup> / <sub>16</sub>	3	18 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>
20"	28	3 <sup>1</sup> / <sub>2</sub>	21 <sup>1</sup> / <sub>2</sub>	3
22"	30 <sup>7</sup> / <sub>8</sub>	4	23 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>

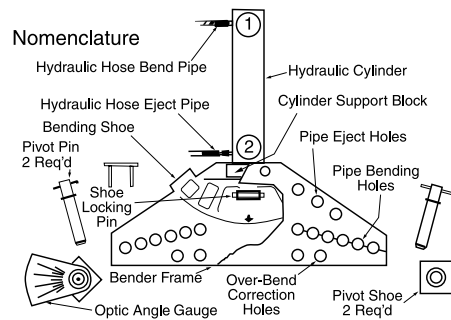
### "L" Requirement Chart

Conduit Size	(L) *
<sup>1</sup> / <sub>2</sub> "	7 <sup>1</sup> / <sub>2</sub>
<sup>3</sup> / <sub>4</sub> "	8 <sup>3</sup> / <sub>4</sub>
1"	10 <sup>1</sup> / <sub>4</sub>
1 <sup>1</sup> / <sub>4</sub> "	11 <sup>1</sup> / <sub>2</sub>
1 <sup>1</sup> / <sub>2</sub> "	13 <sup>1</sup> / <sub>4</sub>
2"	15
2 <sup>1</sup> / <sub>2</sub> "	16 <sup>3</sup> / <sub>4</sub>
3"	18 <sup>1</sup> / <sub>2</sub>
3 <sup>1</sup> / <sub>2</sub> "	22 <sup>1</sup> / <sub>4</sub>
4"	24 <sup>1</sup> / <sub>4</sub>
5"	25

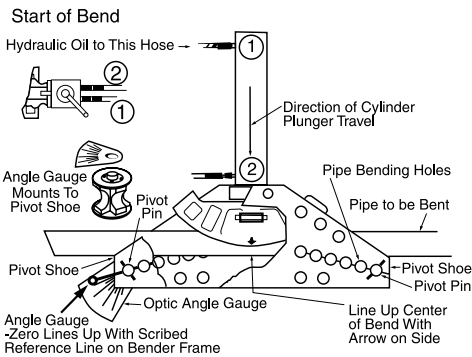
\* (L) = Min. length of conduit required on each end of dimension (B)

## How to Use Eject-O-Matic® Sweep Benders

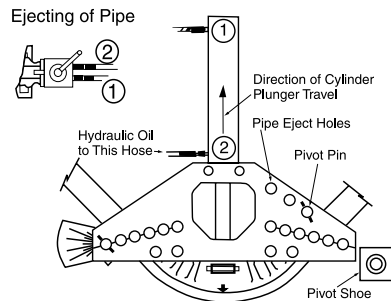
### First Bend



### Successive Bends



### Correcting Overbends



## 90° Sweep Bend Charts for Conduit Sizes 3", 3½", 4", 5" (See Instructions on pages 28 - 29)

Conduit Size	Centerline Radius (R) (in.)	(S) Set - back	(A) No. of Bites (90°)	(B) Spacing betw. Bites	(C) Degree per Bite
3"	13 *	11 <sup>3</sup> / <sub>8</sub>	3	6 <sup>3</sup> / <sub>4</sub> "	30°
	17 <sup>3</sup> / <sub>4</sub>	16 <sup>1</sup> / <sub>64</sub>	4	7"	22°
	22 <sup>1</sup> / <sub>2</sub>	20 <sup>3</sup> / <sub>4</sub>	5	7"	18°
	27 <sup>1</sup> / <sub>4</sub>	25 <sup>7</sup> / <sub>16</sub>	6	7 <sup>1</sup> / <sub>8</sub> "	15°
	32	30 <sup>5</sup> / <sub>32</sub>	7	7 <sup>1</sup> / <sub>8</sub> "	13°
3½"	17 <sup>1</sup> / <sub>2</sub> *	14 <sup>13</sup> / <sub>16</sub>	3	9 <sup>1</sup> / <sub>4</sub> "	30°
	22 <sup>7</sup> / <sub>8</sub>	20 <sup>3</sup> / <sub>8</sub>	4	9"	22°
	28 <sup>1</sup> / <sub>4</sub>	25 <sup>13</sup> / <sub>16</sub>	5	8 <sup>7</sup> / <sub>8</sub> "	18°
	33 <sup>3</sup> / <sub>8</sub>	31 <sup>1</sup> / <sub>4</sub>	6	8 <sup>3</sup> / <sub>4</sub> "	15°
	39	36 <sup>5</sup> / <sub>8</sub>	7	8 <sup>1</sup> / <sub>4</sub> "	13°
• 4" For B306S and B308S Benders	20 •	22 <sup>1</sup> / <sub>2</sub>	7	5 <sup>1</sup> / <sub>2</sub> "	13°
4" For Other 4" Sweep Bender Sets	20 *	17 <sup>1</sup> / <sub>64</sub>	3	10 <sup>1</sup> / <sub>2</sub> "	30°
	26	23 <sup>1</sup> / <sub>64</sub>	4	10 <sup>1</sup> / <sub>4</sub> "	22°
	32	29 <sup>1</sup> / <sub>4</sub>	5	10"	18°
	38	35 <sup>9</sup> / <sub>32</sub>	6	10"	15°
	44	41 <sup>5</sup> / <sub>16</sub>	7	9 <sup>7</sup> / <sub>8</sub> "	13°
5"	24 <sup>9</sup> / <sub>16</sub>	27 <sup>1</sup> / <sub>2</sub>	3	12 <sup>3</sup> / <sub>4</sub> "	30°
	30	28 <sup>7</sup> / <sub>8</sub>	6	8"	15°
	37 <sup>1</sup> / <sub>4</sub>	36 <sup>29</sup> / <sub>32</sub>	9	6 <sup>5</sup> / <sub>8</sub> "	10°
	44 <sup>1</sup> / <sub>2</sub>	44 <sup>1</sup> / <sub>8</sub>	11	6 <sup>1</sup> / <sub>2</sub> "	8°
	51 <sup>3</sup> / <sub>4</sub>	51 <sup>7</sup> / <sub>16</sub>	13	6 <sup>3</sup> / <sub>8</sub> "	7°
	59	58 <sup>11</sup> / <sub>16</sub>	15	6 <sup>1</sup> / <sub>8</sub> "	6°

\* These radii correspond to 90° one-shot bends.

• Smallest radius shown is 20". Succeeding radii figures can be extrapolated.

## 90° Sweep Bend Charts for Conduit Sizes 1¼", 1½", 2", 2½" (See instructions on pages 28 - 29)

Conduit Size	Centerline Radius (R) (in.)	(S) Set - back	(A) No. of Bites (90°)	(B) Spacing betw. Bites	(C) Degree per Bite
<b>1¼"</b>	7¼ *	6 <sup>3</sup> / <sub>16</sub>	3	3 <sup>3</sup> / <sub>4</sub> "	30°
	9 <sup>3</sup> / <sub>4</sub>	8 <sup>43</sup> / <sub>64</sub>	4	3 <sup>7</sup> / <sub>8</sub> "	22°
	12¼	11 <sup>5</sup> / <sub>32</sub>	5	3 <sup>7</sup> / <sub>8</sub> "	18°
	14 <sup>3</sup> / <sub>4</sub>	13 <sup>21</sup> / <sub>32</sub>	6	3 <sup>7</sup> / <sub>8</sub> "	15°
	17¼	16 <sup>9</sup> / <sub>32</sub>	7	3 <sup>7</sup> / <sub>8</sub> "	13°
<b>1½"</b>	8½ *	7 <sup>15</sup> / <sub>64</sub>	3	4½"	30°
	11¼	10	4	4 <sup>3</sup> / <sub>8</sub> "	22°
	14	12 <sup>3</sup> / <sub>4</sub>	5	4 <sup>3</sup> / <sub>8</sub> "	18°
	16 <sup>3</sup> / <sub>4</sub>	15½	6	4 <sup>3</sup> / <sub>8</sub> "	15°
	19½	18¼	7	4 <sup>3</sup> / <sub>8</sub> "	13°
<b>2"</b>	9½ *	8¼	3	5"	30°
	12 <sup>7</sup> / <sub>8</sub>	11½	4	5"	22°
	16¼	14 <sup>7</sup> / <sub>8</sub>	5	5½"	18°
	19 <sup>3</sup> / <sub>8</sub>	18¼	6	5½"	15°
	23	21 <sup>5</sup> / <sub>8</sub>	7	5½"	13°
<b>2½"</b>	10½ *	9 <sup>3</sup> / <sub>16</sub>	3	5½"	30°
	14½	13 <sup>3</sup> / <sub>32</sub>	4	5¾"	22°
	18½	17½	5	5¾"	18°
	22½	21	6	5 <sup>7</sup> / <sub>8</sub> "	15°
	26½	25 <sup>11</sup> / <sub>32</sub>	8	5¼"	11°

\*These radii correspond to 90° one-shot bends.  
For overbend corrections see pages 26-27.

## Important

Before starting bend, be sure pivot pins are through bottom frame plate and locked in position to properly anchor.

When actuating pump, either hand or electric, operator should position himself on the cylinder side. It is not recommended that any bender be operated from the front position.

As bend is generated, watch optic angle gauge until desired angle of bend is reached. Because of conduit springback, it will be necessary to go a bit beyond the desired angle.

Assemble, Bend and Eject Instructions (see pages 18-19).

### First Bend

1. Follow the same general procedure covered in Steps A & B, pages 18 - 19).
2. Be sure to place pivot pin and pivot shoe in properly marked hole size.
3. Do not bend beyond arc length of shoe or pipe will kink.
4. Back off shoe to release pressure on pivot shoes and proceed to release pipe as described in Step C, pages 18 - 19.

### Successive Bends

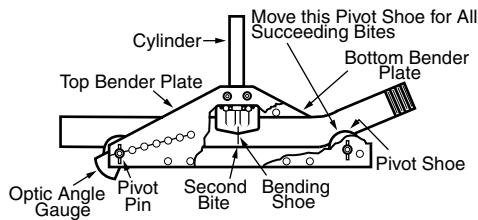
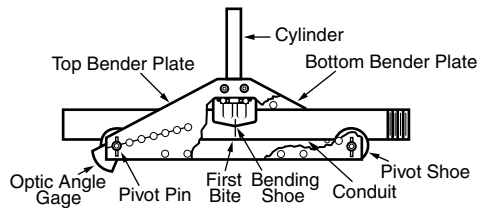
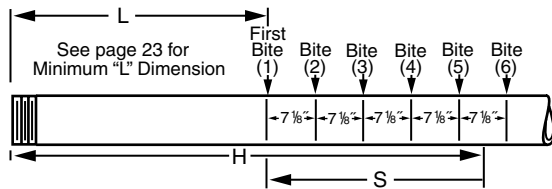
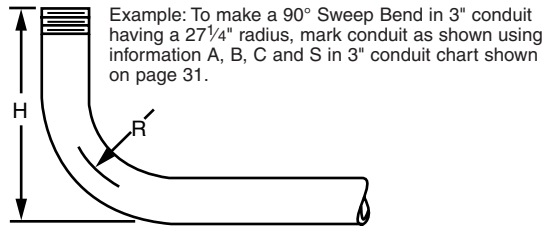
1. Depending on your sweep requirements, successive bends may be required. After first bend, shift pivot shoe and move bent pipe as shown, keeping unbent pipe parallel to edge of frame.
2. On bent end of pipe, pivot shoe must be shifted to **any** hole that will contact pipe.
3. Proceed to repeat bends in same manner until desired sweep is accomplished. Pipe is ejected in same manner as Step C on pages 18-19.

### Correcting Overbends

**In the event of an over-bend, reverse pipe in bender frame as shown.**

1. Reposition pivot shoes and pins at overbend correction holes as shown. Place one pivot shoe on straight end of conduit, the other at one end of bend.
2. Be sure correct pivot shoe surfaces face the particular size conduit you're working on.
3. Proceed to inch bending shoe forward a few degrees at a time, repositioning pivot shoes if necessary, until desired correction is made.

## 90° Sweep Bend Instructions for Sweep / Segmental Benders



## For GB Sweep Benders

1. Mark desired turn-up (H) dimension on straight length of conduit.
2. Locate the size of conduit you are bending in charts. Select the desired sweep radius to find set-back (S) dimension.
3. Measure back dimension (S) and mark conduit. **This is the first bite mark.**
4. Mark off given number of bites (column A) at spacing intervals given in column B.
5. Place pivot shoes in conduit hole size shown on frame. Make first bend to degree of angle shown in Column C.

**NOTE: It may be advisable to overbend the first bite slightly to compensate for accumulated springback.**

6. Make all succeeding bends by moving the pivot shoe (without the optic angle gauge) to a hole that keeps conduit parallel to edge of bending frame while using the same angle of bend.

For 15° and 30° Kicks and Offsets using a sweep bender, see pages 20 - 23.

Conduit Size	Centerline Radius (R)	(S) Set - back	(A) No. of Bites (90°)	(B) Spacing betw. Bites	(C) Degree per Bite
1"	5 3/4" *	4 7/8	3	3"	30°
	7 3/4"	6 7/8	4	3"	22°
	9 3/4"	8 7/8	5	3 1/8"	18°
	11 3/4"	10 7/8	6	3 1/8"	15°
	13 3/4"	12 7/8	7	3 1/8"	13°

See pages 30-31 for sizes 1 1/4" - 5".

\* Radii correspond to 90° one-shot bends