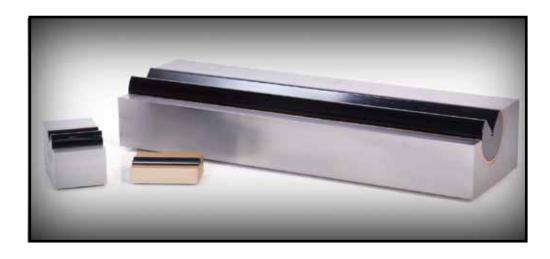




**ACCU-BEND™** 

#### ACCU-BEND™

# ACCU-BEND™ DESIGN AND MAINTENANCE RECOMMENDATIONS



## INSIST ON AN ACCU-BEND™

To protect your Accu-Bend™ and for optimal performance, please remember the following:

- Use light oil (20W) before the first start-up.
- Clean and inspect the unit every 125k cycles. Re-lubricate with light oil (20W) before returning to service. NOTE: The 125k interval is a general service recommendation, and certain applications may require more or less maintenance.
- Clean the setscrew and use Loctite® 222 when reinstalling the set screw.
- Provide backup key to saddle.
- Use the proper method to modify a rocker for more over-bend (consult Anchor Lamina if assistance is needed). NEVER shim the Bender downward when attempting to create more over-bend.
- Provide over-bend back taper allowance in anvil.
- > The groove in the anvil for the dart must allow for material thickness.
- The groove in the anvil for the dart must line up with the bender.
- Provide proper land for Z bend.
- Allow for material thickness tolerance when locating the saddle.
- > Don't overstroke.

## **ACCU-BEND™ CONTENTS**

### PAGE NUMBER The Accu-Bend™ Advantage 1 How Accu-Bend™ Works 2 **Standard Bender Specifications** 3 **Compact Bender Specifications** 6 **Bender Design Information** 7 **Modified Bends** 8 **Available Options** 10 Accu-Bend™ Quotation Form 13

Accu-Bend™ Rotary Benders are manufactured in the USA.

#### Accu-Bend™ - Simplifying Your Bending Process!



#### **Product Features You Will Appreciate**

The Accu-Bend<sup>™</sup> is manufactured with the same precise methods and processes you put into your own designs. The saddle liner is a bronze alloy chosen for the ability to hold up to a bearing load with little to no wear.

#### The Flexibility To Handle Custom Orders

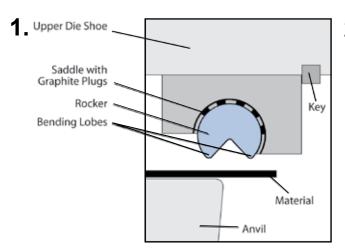
Having a wide range of standard sizes is never enough. When you have an application that calls for something

special, call us. Our team of engineering specialists are waiting to tackle your job head-on. They will work with you to quickly find solutions that fit your specific application.

Once designed, making your custom order(s) will be quick and efficient, using our extensive production resources which utilize the latest in tooling.

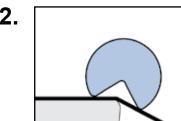
#### How Accu-Bend™ Works

#### **Product Features**



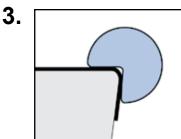
#### START POSITION

Downward pressure of the press clamps the part with the rocker's bending lobes before the bending action starts.



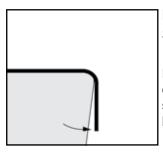
#### **BEND**

The rocker's rotation forms the material around the anvil with less pressure and material distortion than wipe bending.



#### **OVERBEND** by 3°

Bending action continues to form the material around the anvil until desired angle is completed. The anvil should have 5° relief to allow for the 3° overbend.\*



#### MATERIAL SPRINGBACK

Rocker bends past 90° to compensate for material springback, leaving a 90° bent part (±1/2°).

\*The 3° overbend applies to cold rolled steel only.

#### **CUSTOM ORDERS:**

- Requests for custom orders can be made by completing a Special Request Quote Form (page 13) or contacting Customer Service.
- Shorter lengths or segmenting are possible.
- Pressure pads can be ordered with Accu-Bend™ units.

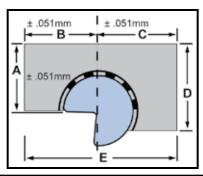
#### **FEATURES:**

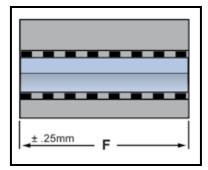
- 87° rocker for 90° bends. This allows a 3° overbend for material spring back.
- Rockers and saddles are precision machined.
- Graphite plugs are included in the bronze saddle liner to provide lubrication.

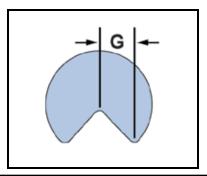
#### MATERIALS THAT CAN BE BENT:

- ♦ Hot Rolled Steel
- ♦ Cold Rolled Steel
- ◆ Dual Phase Steel (DP590, DP780, DP980)
- ♦ High Strength Low Alloy Steel
- ♦ Advanced High Strength Steel
- Ultra High Strength Steel
- Stainless Steel
- Galvanized Steel
- ◆ Aluminum
- Pre-painted Aluminum
- ♦ Brass
- ♦ Copper
- ♦ And Much More!

## **Standard Bender Specifications**







Model Number	Max. Part Thickness mm	Minimum Part Height mm	A mm	B mm	C mm	D mm	E mm	F mm	F	G mm	Bolt for Mounting
115 00 50	(in)	(in)	(in)	(in)	(in)	(in)	(in)		(in)	(in)	
MB-20-50								50	1.97		
MB-20-100								100	3.94		
MB-20-150	4.0	0.5	0.4	0.5	25	20	00	150	5.91	0.5	
MB-20-200	1.2 ( <i>0.05</i> )	8.5 (0.33)	24 (0.94)	25 (0.98)	35 (1.38)	30 (1.18)	60 (2.36)	200	7.87	6.5 (0.26)	M6
MB-20-250	(0.00)	(0.00)	(0.54)	(0.30)	(1.50)	(1.10)	(2.00)	250	9.84	(0.20)	
MB-20-300 MB-20-400								300 400	11.81 15.75		
MB-20-500								500	19.69		
MB-25-75								75	2.95		
MB-25-150								150	5.91		
MB-25-130								225	8.86		
MB-25-300	0	40	20	20	45	20	75	300	11.81	0.5	MO
MB-25-375	2 (0.08)	10 (0.39)	30 (1.18)	30 (1.18)	45 (1.77)	38 (1.50)	75 (2.95)	375	14.76	8.5 (0.33)	M6
MB-25-450	(0.00)	(0.59)	(1.10)	(1.10)	(1.11)	(1.50)	(2.30)	450	17.72	(0.33)	
MB-25-525								525	20.67		
MB-25-600								600	23.62		
MB-35-75								75	2.95		
MB-35-150								150	5.91		
MB-35-225								225	8.86		
MB-35-300	3	14	40	38	60	51	98	300	11.81	11.5	M8
MB-35-375	(0.12)		(1.57)	(1.50)	(2.36)	(2.01)	(3.86)	375	14.76	(0.45)	IVIO
MB-35-450								450	17.72		
MB-35-525								525	20.67		
MB-35-600								600	23.62		
MB-40-75								75	2.95		
MB-40-150								150	5.91		
MB-40-225								225	8.86		
MB-40-300	3.5	17	48	40	58	60	98	300	11.81	12.9	M8
MB-40-375	(0.14)	(0.67)	(1.89)	(1.58)	(2.28)	(2.36)	(3.86)	375	14.76	(0.51)	IMI8
MB-40-450	, ,		(1.00)	, ,	(2.20)	(2.00)	(0.00)	450	17.72	(0.51)	
MB-40-525								525	20.67		
MB-40-600								600	23.62		

#### NOTES:

- ◆ Dimension A is to center of rocker. Saddle is 0.10 0.15mm above.
- The MB-20 and MB-25 series benders have an S7 rocker that sits in a self-lubricating, bronze saddle.
- ♦ Material thickness capacity is based on 50KSI yield strength.
- ◆ All Accu-Bend<sup>™</sup> units are made-to-order

## Standard Bender Specifications (continued)

Model Number	Max. Part Thickness mm (in)	Min. Part Height mm <i>(in)</i>	A mm (in)	B mm (in)	C mm (in)	D mm (in)	E mm (in)	F mm	F (in)	G mm (in)	Bolt for Mounting
MB-50-75				, ,				75	2.95	, ,	
MB-50-150								150	5.91		
MB-50-225								225	8.86		
MB-50-300			l					300	11.81	40.5	
MB-50-375	4.5	20	55	50	76	70	126	375	14.76	16.5	M10
MB-50-450	(0.18)	(0.79)	(2.17)	(1.97)	(2.99)	(2.76)	(4.96)	450	17.72	(0.65)	
MB-50-525								525	20.67		
MB-50-600								600	23.62		
MB-50-750								750	29.53		
MB-65-75								75	2.95		
MB-65-150								150	5.91		
MB-65-225								225	8.86		
MB-65-300								300	11.81		
MB-65-375	6	25.5	70	60	92	90	152	375	14.76	21.5	M12
MB-65-450	(0.24)	(1.00)	(2.76)	(2.36)	(3.62)	(3.54)	(5.98)	450	17.72	(0.85)	IVIIZ
MB-65-525								525	20.67		
MB-65-600								600	23.62	-	
MB-65-750								750	29.53		
MB-65-900								900	35.43		
MB-80-75								75	2.95		
MB-80-150		31.5	80	70	105			150	5.91	26.5	M12
MB-80-225								225	8.86		
MB-80-300								300	11.81		
MB-80-375	7.5							375	14.76		
MB-80-450	(0.30)	(1.24)	(3.15)	(2.76)	(4.13)		(6.89)	450	17.72	(1.04)	IVIIZ
MB-80-525								525	20.67		
MB-80-600								600	23.62		
MB-80-750								750	29.53		
MB-80-900								900	35.43		
MB-100-100								100	3.94		
MB-100-200								200	7.87		
MB-100-300								300	11.81		
MB-100-400	8.5	47	96	85	120	126	205	400	15.75	32.8	
MB-100-500	(0.33)	(1.85)	(3.77)	(3.34)	(4.72)	(4.96)	(8.07)	500	19.69	(1.29)	M12
MB-100-600	, ,	, ,	, ,	, ,	, ,	, ,	, ,	600	23.62	, ,	
MB-100-700								700	27.56		
MB-100-800								800	31.50		
MB-100-900								900	35.43		
MB-115-100								100	3.94		
MB-115-200								200	7.87		
MB-115-300								300	11.81		
MB-115-400	9.5	52	100	90	127	135	217	400	15.75	37.1	1440
MB-115-500	(0.37)	(2.04)	(3.93)	(3.54)	(5.00)	(5.31)	(8.54)	500	19.69	(1.46)	M12
MB-115-600								600	23.62		
MB-115-700								700	27.56	-	
MB-115-800								800	31.50		
MB-115-900					l			900	35.43		

- Dimension A is to center of rocker. Saddle is 0.10 0.15mm above.
   The MB-20 and MB-25 series benders have an S7 rocker that sits in a self-lubricating, bronze saddle.
- Material thickness capacity is based on 50KSI yield strength.
- ◆ All Accu-Bend<sup>™</sup> units are made-to-order

## **Standard Bender Specifications** (continued)

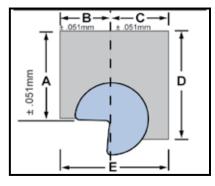
#### **Bender Load Capacity**

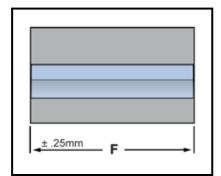
Bender	LBS. per	KGS per
Diameter	Inch	25mm
mm	Length	Length
20	750	340
25	1450	660
35	2300	1050
40	2750	1250
50	3600	1650
65	4800	2200
80	6000	2750
100	6400	2860
115	7100	3170

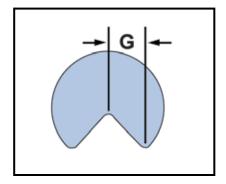
#### NOTES:

• Use formula on pg.7 to match bender size to other material strength and thickness.

## **Compact Bender Specifications**







Model Number	Max. Part Thickness mm (in)	Minimum Part Height mm <i>(in)</i>	A mm (in)	B mm (in)	C mm (in)	D mm <i>(in)</i>	E mm (in)	F mm	F (in)	G mm (in)	Bolt for Mounting
CMB-20-50	1.2	8.5	48	18	18	54	36	50	1.97	6.5	M6
CMB-20-100	(0.05)	(0.33)	(1.89)	(0.71)	(0.71)	(2.13)	(1.42)	100	3.94	(0.26)	IVIO
CMB-20-150	(0.00)	(0.00)	(1.00)	(0.7 1)	(0.7 1)	(2.70)	(1.12)	150	5.91	(0.20)	
CMB-25-50	2	10	60	20	20	68	40	50	1.97	8.5	M6
CMB-25-100	(0.08)	(0.39)	(2.36)	(0.79)	(0.79)	(2.68)	(1.57)	100	6.94	(0.33)	IVIO
CMB-25-150	(0.00)	(0.00)	(2.00)	(0.70)				150	5.91		
CMB-35-50	0	4.4	7.4	25	0.5	0.5	50	50	1.97	44.5	N40
CMB-35-100	3 (0.12)	14 (0.55)	74 (2.91)		25 (0.98)	85 (3.35)	1 -	100	3.94	11.5 (0.45)	M8
CMB-35-150	(0.12)	(0.33)	(2.91)	(0.90)	(0.90)	(5.55)	(1.31)	150	5.91	(0.43)	
CMB-50-50	4.5	20	85	35	35	100	70	50	1.97	16.5	M10
CMB-50-100	(0.18)	(0.79)	(3.35)	(1.38)	(1.38)	(3.94)	(2.76)	100	3.94	(0.65)	IVITO
CMB-50-150	(0.70)	(0.70)	(0.00)	(1.00)	(1.00)	(0.0.7)	(2.70)	150	5.91	(0.00)	
CMB-65-50	_							50	1.97		
CMB-65-100	6	26	100	45	45	120	90	100	3.94	21.5	M12
CMB-65-150	(0.24)	(1.02)	(3.94)	(1.77)	(1.77)	(4.72)	(3.54)	150	5.91	(0.85)	

#### NOTES:

- ♦ Dimension A is to center of rocker. Saddle is 0.10 0.15mm above.
- All compact (CMB) series benders have an S7 rocker that sits in a self-lubricating, bronze saddle.
- Material thickness capacity is based on 50KSI yield strength.
- ◆ All Accu-Bend<sup>™</sup> units are made-to-order

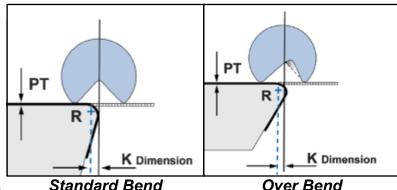
## **Bender Design Information**

#### **Bender Location**

Use the formula for setting the "K" dimension for a 90° bend using a standard 87° rocker. Proper setting of the rocker centerline in relation to the anvil radius centerline is important for dimensioning the key slots needed to hold the backup key.

$$K = \frac{(PT + R)}{Tan (43.5^{\circ})}$$

The "K" dimension for over bend or under bend applications is best determined by doing a CAD layout.



#### Force Formula for the Accu-Bend™

**F** = Force Required (Pounds)

**UTS** = Ultimate Tensile Strength

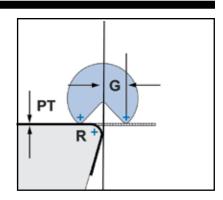
W = Width of Bend, inch

PT = Part Thickness, inch

**G** = Rocker Dimension, inch

**R** = Part Radius (inside), inch

$$F = 2.25 \times \frac{UTS \times W \times (PT)^2}{G + PT + R}$$

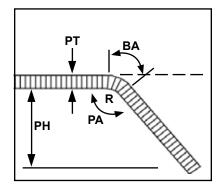


#### **General Bend Allowance**

The smooth rotary action of a bender requires a greater bend allowance than is typical with a coining or wipe bending operation. The formula for the bend allowance is:

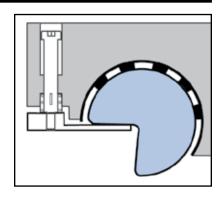
$$BA = 0.01745 \times (180 - PA) \times [R + (PT \times .43)]$$

**Important:** Variances in material specifications and tolerances may require a change in the bend allowance when changing coils of the same material or changing material type altogether.



#### **Pad Functions**

- ♦ Eliminates contact marks on clamped surfaces.
- Protects cutout or hole from distortion.
- Matches preformed shape.
- ♦ Used for extreme overbend.
- Prevents humping of material when using an over sized bender.
- Used to match a standard rocker radius to Zee Bend dimension.
- ♦ Pad can usually be integral to the bender.

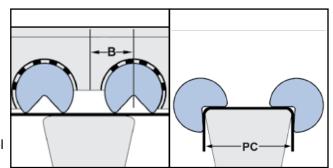


#### **Modified Bends**

#### **Channel Bend and Hat Bends**

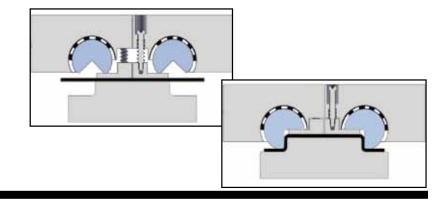
#### - Paired Units

- ♦ Channel bends can be accomplished in one press stroke by pairing two benders face-to-face.
- ♦ In order to use standard benders, the spread or part channel must be greater than 2 times the (B) dimension.
- ◆ The rocker inside radius can be specially matched if required. Use a set of interlaced benders for a channel less than 2 x B.
- ♦ A pressure pad may be required to hold the part to keep the material from humping at the bend radius and in place.
- ♦ Hat bends can be handled with a two Zee Bend setup.



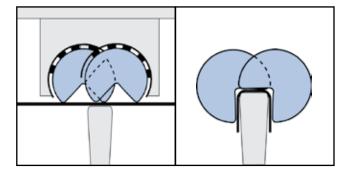
#### **Channel Bend and Hat Bends**

- For narrow channel and hat bends in one hit.
- ♦ Each unit has an integral pad.



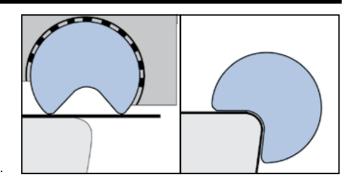
#### **Interlaced Bends**

- ♦ Custom interlacing to channel dimension.
- ♦ Forms a narrow channel in one hit.



#### Large Radius

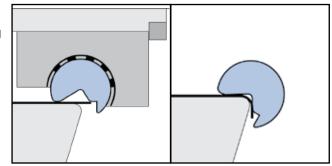
- ♦ A bend radius exceeding 3 times part thickness is considered a large radius bend.
- Large radius bends can be accomplished by using a larger size rocker.
- ♦ Adding a few extra degrees of over bend is required to compensate for material spring back.
- ♦ Under certain circumstances, the rocker's inside radius can be specifically matched to the part radius.



## Modified Bends (continued)

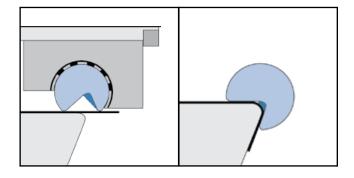
#### **Short Leg**

- Short leg bends require a recessed step in the bending lobe of the rocker to accommodate the shorter part height.
- ♦ Tonnage requirements will increase as compared to a standard bend.
- ♦ The formula to determine the shortest leg possible is:
  - 2.6 x (part thickness) + (part radius).



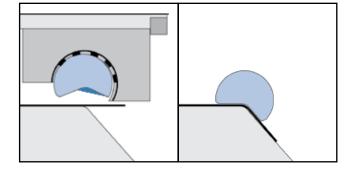
#### Over Square (up to 120°)

- Over square bends require a modification of the rocker angle while maintaining a constant bending lobe radius.
- ♦ The use of a pressure pad is suggested for over square bends over 110° to keep the rocker from sticking to the part.



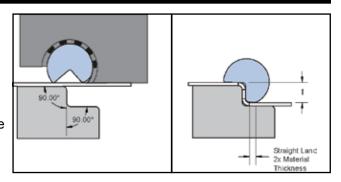
#### **Under Square**

- ♦ Part angle over 105°, bender centerline above part.
- ♦ Part angle up to 105°, bender centerline on part.



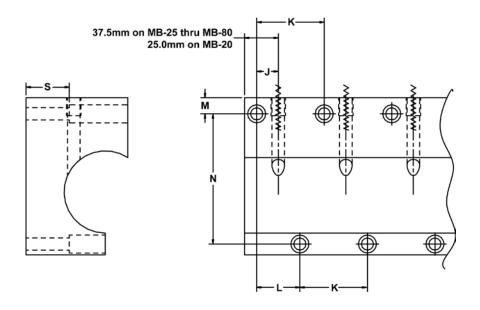
#### Zee Bend

- ♦ A true 90° rocker is used in Zee Bend applications.
- ◆ A pressure pad is usually required to make up the difference between the part height and the (I) dimension of the rocker.
- ♦ A slight modification to the bending lobe at the time of production of the bender may be required to obtain the desired part radius on the lower bend.



## **Available Options**

## Counter Bored Mounting Holes – Standard



#### **COUNTER BORED MOUNTING HOLES**

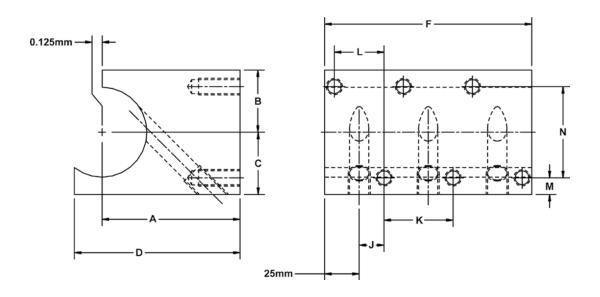
	Model Number	Bolt	S mm in	J mm <i>in</i>	K mm <i>in</i>	L mm <i>in</i>	M mm <i>in</i>	N mm <i>in</i>
	MB-20	M6	16	16	50	32	9	45
	MB-25	M6	24	18	75	36	9	59
	MB-35	M8	30	22	75	44	12	78
ပ္	MB-40	M8	38	22	75	44	12	78
METRIC	MB-50	M10	40	22	75	44	15	101
Σ	MB-65	M12	25	24	75	48	18	123
	MB-80	M12	40	24	75	48	18	145
	MB- 100	M12	82.5	30	100	60	20	170
	MB-115	M12	86.5	30	100	60	20	185
	MB-20	1/4	0.625	0.75	2	1.5	0.25	1.875
	MB-25	1/4	.75	0.75	2.875	1.5	0.3125	2.375
	MB-35	5/16	1.125	0.875	2.875	1.75	0.5	3.0
7	MB-40	5/16	1.5	0.875	2.875	1.75	0.55	3.0
INCH	MB-50	3/8	1.5	0.875	2.875	1.75	0.6875	3.875
1	MB-65	1/2	1.0	1.0	2.875	2.0	0.8	4.75
	MB-80	1/2	1.5	1.0	2.875	2.0	0.75	5.625
	MB-100	1/2	3.875	1.25	3.875	2.5	0.75	6.75
	MB-115	1/2	3.375	1.25	3.875	2.5	0.75	7.25

#### NOTES:

 When ordering with mounting holes, specify Metric, Inch or Customer specified on the Accu-Bend™ quotation form, located in the back of the catalog.

## Available Options (continued)

## Threaded Mounting Holes – Compact



#### **THREADED MOUNTING HOLES**

	Model Number	Bolt	Depth of Tap mm <i>in</i>	J mm <i>in</i>	K mm <i>in</i>	L mm <i>in</i>	M mm <i>in</i>	N mm in	Bolts for Mounting
	CMB-20	M6	15	15	50	30	6	24	M6 x 1
<u> </u>	CMB-25	M6	15	15	50	30	6	28	M6 x 1
METRIC	CMB-35	M8	20	18	50	36	8	34	M8 x 1.25
Σ	CMB-50	M10	25	18	50	36	10	50	M10 x 1.5
	CMB-65	M12	30	18	50	36	12	66	M12 x 1.75
	CMB-20	1/4	0.625	0.5	2	1.125	0.25	0.875	1/4 – 20
	CMB-25	1/4	0.625	0.5	2	1.125	0.25	1.125	1/4 – 20
INCH	CMB-35	5/16	0.75	0.5	2	1.125	0.375	1.375	5/16 – 18
=	CMB-50	3/8	1	0.5	2	1.125	0.4	2	3/8 – 16
	CMB-65	1/2	1.125	0.5	2	1.125	0.5	2.625	1/2 – 13

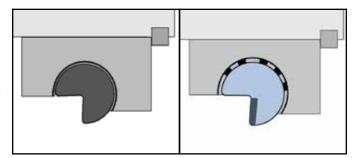
#### NOTES:

 When ordering with mounting holes, specify Metric, Inch or Customer specified on the Accu-Bend™ quotation form, located in the back of the catalog.

## Available Options (continued)

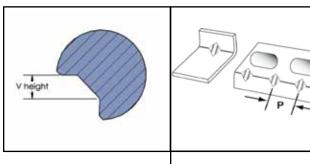
#### **Composite Insert**

- ♦ The composite material is a hard, low-friction polymer used as a contact material for stainless or pre-painted steel where slight tool marks are not acceptable.
- Tool marks can be eliminated by using a composite insert in combination with a pressure pad positioned between the part surface and the bending lobe of the rocker.
- ♦ Composite inserts are not available in the MB-20 and CMB-20 models.



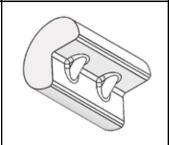
#### **Dart Stiffener**

- ◆ Dart Stiffeners are an easy way to add strength to any part and are formed using less tonnage with the rotary action of the Accu-Bend™.
- You can specify the size of the dart and a rocker with built-in dowel(s) will be made to fit your application.
- A relief in the anvil is necessary to accommodate each dart.



#### Standard "V"

Bender Diameter	Dowel Diameter	Gusset Height
mm	mm	mm
20	3	5
25	4	8
35	6	10
40	7	11
50	8	12
65	10	12
80	12	12



## ACCU-BEND™ QUOTATION FORM

	COMPANYI	NFORMATION	Date:				
Company Name:							
Contact:							
Address:			· · · · · · · · · · · · · · · · · · ·				
City:		State:	Zip:				
Phone:							
E-mail Address:							
	APPLICATION	INFORMATION					
End use Method: Stamping Press	Press Brake 🗌	Preferred Product: Posi-Be	nd ☐ Accu-Bend ☐				
Order Quantity:		Material Type & Grade:	<del></del>				
Material Tensile Strength:		Annual Production Volume	:				
L = Length of Bend (bender length):		PT = Part Material Thickne	ss:				
PH = Part Height (bent leg):		PR = Part Radius (inside):					
PC = Part Channel (inside):		PA = Part Angle (inside):					
Over Bend required (30° max):		Check here if tool marks ar	e not acceptable $\square$				
		No. of drawings attached:					
PT PA PH PH		Comments:					
	TYPE OF BEN	ND (check one)					
Square □	l	Jnder Square □	\ _				
Over Square		"Z" Bend ☐	Note: For "Z", "Hat"				
Channel □		"Hat" Bend ☐	or "J" bends, please specify top of part to top of flange dimension in notes				
Short Leg □	(r	"J" Bend ☐ requires two hits)					

- 1 Press Brake application may require special mounting plate to secure the Benders
- 2 Annual production volume will be assumed as 8W0,000, if it is not specified.
- 3 If the over bend angle is not specified by the customer, we will make a recommendation. However, this recommendation is not a guarantee and we make no warranty in final forming of material.
- 4 Due to material characteristics we recommend the part radius should be at least equal to material thickness. The final part radius is a result of anvil geometry and material behavior.

Phone: 800-652-6462 Fax: 800-406-4410



Dayton Lamina is a leading manufacturer of tool, die and mold components for the metal-working and plastics industries. As a customer-focused, world-class supplier of choice, we provide the brands, product breadth, distribution network and technical support for all your metal forming needs.

Our goal is to give our customers the most innovative and valueadded products and services.











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