

BENDING MACHINERY | BEND TOOLING | END FORMING | SPARE PARTS | REBUILDS



**Delivering
Quality Bending Solutions
Since 1940**

TESTED TRUSTED TOUGH

**Model 3/4 - 8 Hydraulic Rotary Benders
With Capacities Ranging from 1/8" through 12" O.D.**

Model 3/4 and Model I

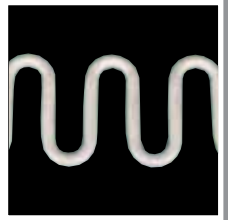


| MACHINE SPECIFICATIONS | MODEL 3/4 | MODEL I |
|--|---------------------------------------|--|
| MAXIMUM RADIUS STANDARD | 8" | 8" |
| MAXIMUM RADIUS OPTIONAL | 16" | 16" |
| MAXIMUM BEND ANGLE | 180 deg.+ over bend for springback | 180 deg. + over bend for springback |
| BEND ANGLE ACCURACY | ± 0.1 deg. | ± 0.1 deg. |
| MAXIMUM TUBE LENGTH OVER MANDREL | 9' 11" | 9' 11" |
| TUBE LENGTH OVER MANDREL | Any Length | Any Length |
| BENDING ARM SPEED (AVG.) | 27 R.P.M. | 17 R.P.M. |
| MOTOR HORSEPOWER | 7.5 H.P. | 7.5 H.P. |
| OPERATING PRESSURE | 1000 P.S.I. | 1000 P.S.I. |
| RESERVOIR CAPACITY | 41 Gallons, U.S. | 41 Gallons, U.S. |
| WEIGHT | 2600 lbs. | 2750 lbs. |
| MAXIMUM BENDING CAPACITY | | |
| ROUND TUBING, MILD STEEL, Y.P. TO 40,000 p.s.i., | 1 3/8" x .065 | 1 1/2" x .109 |
| STEEL PIPE, SCHEDULE 80 | 3/4" | 1" |
| SQUARE TUBING, MILD STEEL | 1" x .065 | 1 1/8" x .120 |

Typical Industry Applications:

All Pines Rotary Hydraulic benders are capable of 1D radius bending. Pines Model 3/4 and Model 1 benders are the first choice of a wide variety of manufactures requiring a high production capacity. Providing fast repeatable bends over a broad range of parts, thousands of Pines Model 3/4 and Model 1 benders are used in many industries including heating and air conditioning, plumbing and furniture.

* For complete capacity chart, see page 13.



Heating &
Air Conditioning



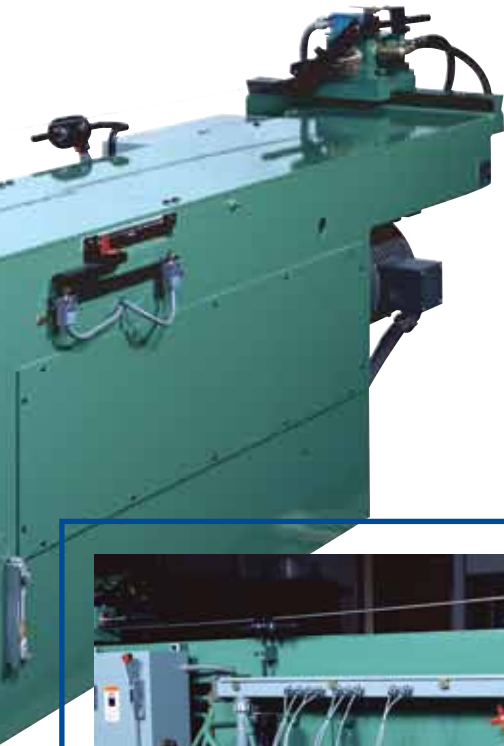
Plumbing
Water Faucet



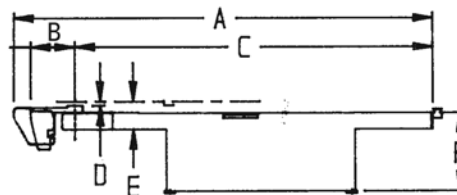
Shower Head



Sink Trap



Outside hydraulics provide ease of maintenance.



Machine Dimensions:

| | |
|------------------------|---------|
| A. Overall Length | 162.25" |
| B. Length of Arm | 17.00" |
| C. Bed Length | 137.75" |
| D. Centerline Height | 1.625" |
| E. Undernose Clearance | 10.81" |
| F. Working Height | 30.75" |

Features:

- Manifold Style Hydraulics with High Pressure Filter
- Repeatability of ± 0.1 degree
- Improved Safety Features
- Electronic Self Diagnostics
- Precision Tool Holders
- Quick Disconnect Control
- Springback Calculation & Compensation

Typical Industry Applications:



Plumbing



Heat Exchange



Structural



Boiler



| MACHINE SPECIFICATIONS | MODEL 1 1/4 | MODEL 2 |
|--|------------------------------------|-------------------------------------|
| MAXIMUM RADIUS STANDARD | 12" | 12" |
| MAXIMUM RADIUS OPTIONAL | 20 1/4" | 20 1/4" |
| MAXIMUM BEND ANGLE | 180 deg.+ over bend for springback | 180 deg. + over bend for springback |
| BEND ANGLE ACCURACY | ± 0.1 deg. | ± 0.1 deg. |
| MAXIMUM TUBE LENGTH OVER MANDREL | 7' 5" | 7' 5" |
| MAX. TUBE LENGTH OVER MANDREL | Any Length | Any Length |
| BENDING ARM SPEED (AVG. MAX.) STANDARD | 13.5 R.P.M. | 6 R.P.M. |
| BENDING ARM SPEED (OPTIONAL) EXTRA | 22 R.P.M. | 11 R.P.M. |
| MOTOR HORSEPOWER STANDARD | 15 H.P. | 15 H.P. |
| MOTOR HORSEPOWER OPTIONAL | 25 H.P. | 25 H.P. |
| OPERATING PRESSURE | 2000 P.S.I. | 2000 P.S.I. |
| RESERVOIR CAPACITY | 55 Gallons, U.S. | 55 Gallons, U.S. |
| WEIGHT | 4500 lbs. | 4600 lbs. |
| MAXIMUM BENDING CAPACITY | | |
| ROUND TUBING, MILD STEEL, Y.P. TO 40,000 p.s.i., | 2 1/2" x .065 | 3" x .109 |
| STEEL PIPE, SCHEDULE 80 | 1 1/4" | 2" |
| SQUARE TUBING, MILD STEEL | 1 3/4" x .065 | 2 1/2" x .083 |

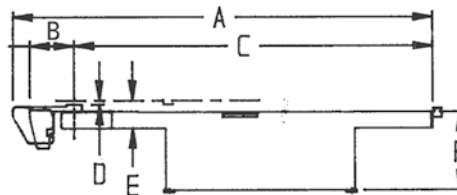


The Pines Model 1 1/4 and Model 2 benders have set the standard for durability in the industry, offering the highest level of flexibility in bending applications. Thousands of these benders have been sold to a variety of industries throughout the world. Popular in the automotive, aerospace and plumbing industries, these machines have a reputation for engineering excellence and quality.

* For complete capacity chart, see page 13.

Machine Dimensions:

| | |
|------------------------|---------|
| A. Overall Length | 147.25" |
| B. Length of Arm | 22.50" |
| C. Bed Length | 137.75" |
| D. Centerline Height | 2.00" |
| E. Undernose Clearance | 15.25" |
| F. Working Height | 30.75" |



Features:

- Manifold Style Hydraulics with High Pressure Filter
- Repeatability of ± 0.1 degree
- Improved Safety Features
- Electronic Self Diagnostics
- Precision Tool Holders
- Quick Disconnect Control
- Springback Calculation & Compensation
- Booster Capabilities

Accessories Available for Most Job Requirements

Model 3 & Model 4



| MACHINE SPECIFICATIONS | MODEL 3 | MODEL 4 |
|--|--|--|
| MAXIMUM RADIUS STANDARD MAXIMUM RADIUS OPTIONAL MAXIMUM BEND ANGLE | 24" 48" 180 deg.+ over bend for springback | 24" 48" 180 deg. + over bend for springback |
| BEND ANGLE ACCURACY MAXIMUM TUBE LENGTH OVER MANDREL MAX. TUBE LENGTH OVER MANDREL BENDING ARM SPEED (AVG.) MOTOR HORSEPOWER OPERATING PRESSURE RESERVOIR CAPACITY WEIGHT | ± 0.1 deg. 13' 6" Any Length 5 R.P.M. 20 H.P. 2000 P.S.I. 122 Gallons, U.S. 12,300 lbs. | ± 0.1 deg. 13' 6" Any Length 3 R.P.M. 20 H.P. 2000 P.S.I. 122 Gallons, U.S. 12,600 lbs. |
| MAXIMUM BENDING CAPACITY ROUND TUBING, MILD STEEL, Y.P. TO 40,000 p.s.i., STEEL PIPE, SCHEDULE 80 SQUARE TUBING, MILD STEEL | 5 1/2" x .095 3" 3 1/2" x .144 | 6" x .165 4" 4" x .250 |

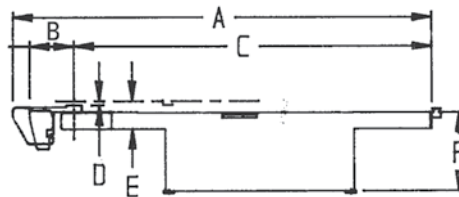
Typical Industry Applications:

Pines Model 3 and Model 4 benders have the power and versatility to bend materials ranging from 3 1/2" solid bar to 6" round tubing. With their rugged reputation, these benders are the preferred choice in a wide variety of industries including aerospace, boiler and truck exhaust.

* For complete capacity chart, see page 13.

Machine Dimensions:

| | |
|------------------------|---------|
| A. Overall Length | 254.38" |
| B. Length of Arm | 48.00" |
| C. Bed Length | 191.50" |
| D. Centerline Height | 3.75" |
| E. Undermose Clearance | 23.38" |
| F. Working Height | 36.75" |



Features:

- Manifold Style Hydraulics with High Pressure Filter
- Repeatability of ± 0.1 degree
- Improved Safety Features
- Electronic Self Diagnostics
- Precision Tool Holders
- Quick Disconnect Control
- Springback Calculation & Compensation
- Durable, Rugged Design
- Cast Steel Nose and Arms
- Easy Access to Routinely Adjusted Parts



Aircraft



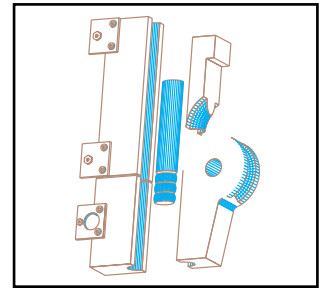
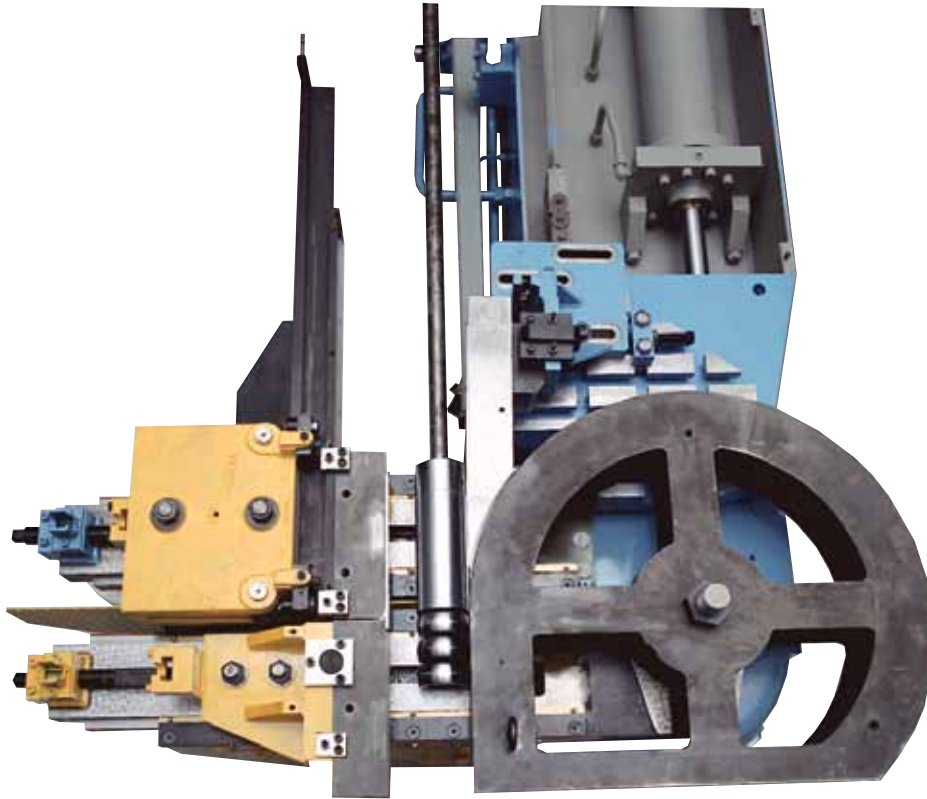
Automotive



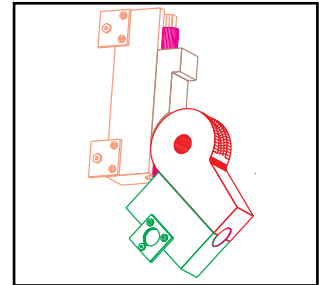
Boiler



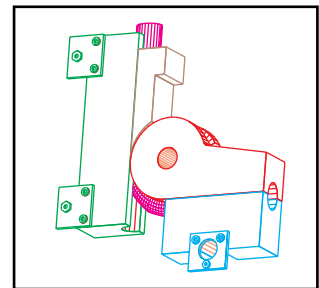
Structural



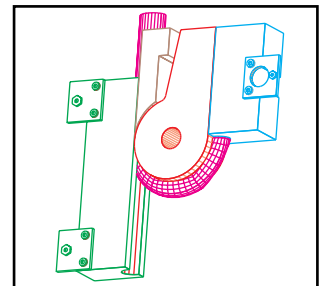
Start of Bend



45 degrees



90 degrees



180 degrees

Optional Accessory Equipment:



Overhead Tie Bar Support



Direct Acting Pressure Die



Mandrel Lubricator

Load Cells - Pressure sensing gauges which can be added to both clamp and pressure die slides to measure the clamping force on to the tube and aid in reducing set-up times.

Slide Hold Downs - Ensures a more positive lock up position for clamp and pressure die slides. Usually used for thin wall, tight bend radius applications.

Direct Acting Clamp and Pressure Die Cylinders - Applies pressure directly to the centerline of the tube versus pin and toggle link clamp action. Also aids in reducing set-up times.

Overhead Tie Bar Support - For use in countering the extreme clamp forces being applied by the clamp and pressure dies. This option will help prevent the machine from losing containment of the part during the bend cycle.

Extended Centerline Radius - Special longer swinging and stationary arms can be added to the machine to permit the use of larger radius bend dies.

Base Extension - Used when the part to be bent is longer than the standard length of the machine. A base extension increases the length of the mandrel to accommodate the longer part length.

Split Die Actuator - Actuator will open and close a split bend die to assist in part removal after completion of bend cycle. Used primarily on square, rectangular, and various other shapes.

Adjustable Wiper Die Holder - Used to hold wiper die in proper position to the bend die. Aids in preventing wrinkles from forming in the part during the bend cycle.

Automatic Wiper Die and Mandrel Lubricator - Automatically pumps proper amounts of lubricant to high wear areas reducing amount of friction in draw bending.

Right Hand or Clockwise Rotation - Standard rotation of swinging arm is Left Hand or Counter Clockwise. Opposite rotation can be provided.

Distance Between Bend Stops - Adjustable finger style stops for gauging the distance between bends.

Plane of Bend Stops - Adjustable locators for gauging the plane of bend rotation for the part to be bent.

Automatic/Manual Indexing Degree of Bend Selector - Control option in place of the Digital Dial-A-Bend control. 8 Station rotating turret design. Can be indexed manually or automatically.

3-Axis Electronic Digital Dial-A-Bend Carriage - Provides full 3-Axis control to the semiautomatic bender. Carriage position and rotation is manual and controlled electronically through the Digital Dial-A-Bend control.

Remote Operator Control Stand - Provides the operator with a smaller control stand for running production. Used with Digital Dial-A-Bend control.

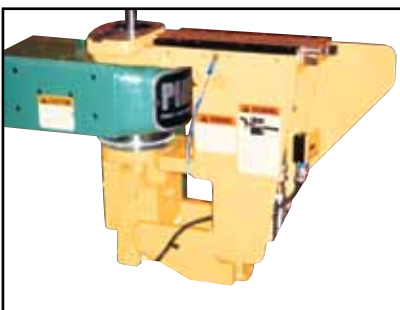
High Speed Machine Circuit - Hydraulic and electrical modifications to increase the speed of the machine.
(Applies to Models 1, 2, and 4 Only)

Hot Bending Arrangement - A special machine arrangement designed to apply heat to the bend tools for very difficult bending applications.

Pressure Die Assist - Hydraulic cylinder and master bar assembly mounted to pressure die holder. Used to apply pressure to the pressure die to assist in overcoming the friction draw bending produces when using a mandrel. This also reduces clamp die length.

M-21 Manual Carriage - Manually controls the distance between bends and the plane of bend for various part configurations. Carriage position and rotation is controlled through manually adjusted gauge stops.

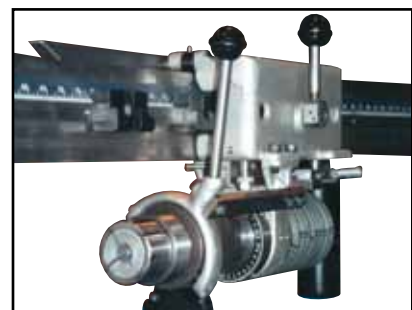
Quick Disconnect Mandrel Rod - Reduces tooling set-up and change over times.



Undemose Split Die Actuator



Wiper Die Holder



M-21 Carriage

With 75 patents issued and patents pending on new designs, Pines is dedicated to a continuing program of improving the quality and technological superiority of our products. Pines engineers are committed to ongoing research and development programs to continuously provide our customers with the latest technological advances and state of the art controls. Our goal is to bring you the most technically advanced, rugged and dependable machines on the market.

Digital Dial-A-Bend® VII PLC



Pines is pleased to offer the most advanced version of the patented Digital Dial-A-Bend® Control VII PLC. This state-of-the-art Programmable Logic Controller has been completely updated with enhanced user interface capabilities and an advanced color touch screen display.

With features including bending program storage and recall, electronic self diagnostics, and programmable springback capabilities, the Dial-A-Bend® Control VII PLC provides high productivity and efficiency in bending operations.

Feature Highlights:

- Enhanced User Interface
- Advanced Color Touch Screen Display
- Bending Program Storage & Recall
- Programs Up To 32 Bends Per Part
- Electronic Self Diagnostics Program
- Programmable Springback Calculations
- Additional Safety Features Available
- Programmable Early Mandrel Extract
- Easy Setup & Operation
- Additional Options Available Based On Application Requirements

Chart indicates maximum bending capacities under average conditions with standard tool holders. See machine specifications or consult Pines Manufacturing for confirmation on specific applications or custom made shapes.

| MAX. BENDING CAPACITY AND SPECIFICATIONS | Unit of Measures | MACHINE MODEL | | | | | | | | |
|--|------------------|--------------------|---------------------|-------------------|-----------------------|----------------------|------------------|------------------|-------------------|-------------------|
| | | 1400 | 3/4 | 1 | 1-1/4 | 2 | 3 | 4 | 6 | 8 |
| Round Tubing Non-Ferrous Y.P. to 25,000 psi OD X Wall | Inches | 1 1/4 x .065 | 1 1/2 x .065 | 1 1/2 x .188 | 3 x .065 | 3 x .188 | 5 1/2 x .148 | 6 x .250 | 8 x .375 | 10 x .375 |
| | Metric | 31 x 1.65 | 38 x 1.65 | 38 x 4.75 | 76 x 1.65 | 76 x 4.75 | 140 x 3.75 | 152 x 6.3 | 203 x 9.5 | 254 x 9.5 |
| Round Tubing Mild Steel Y.P. to 40,000 psi OD X Wall | Inches | 1 1/8 x .065 | 1 3/8 x .065 | 1 1/2 x .109 | 2 1/2 x .065 | 3 x .109 | 5 1/2 x .095 | 6 x .165 | 8 x .250 | 10 x .250 |
| | Metric | 28.6 x 1.6 | 35 x 1.6 | 38 x 2.8 | 63.5 x 1.6 | 76 x 2.8 | 140 x 2.4 | 152 x 4.2 | 203 x 6.3 | 254 x 6.3 |
| Round Tubing Stainless Y.P. to 60,000 psi OD X Wall | Inches | 7/8 x .065 | 1 1/8 x .065 | 1 3/8 x .065 | 1 3/4 x .065 | 3 x .065 | 4 1/2 x .083 | 4 1/2 x .250 | 8 x .172 | 10 x .165 |
| | Metric | 22.2 x 1.6 | 28.6 x 1.6 | 35 x 1.6 | 44.4 x 1.6 | 76 x 1.6 | 114 x 2.1 | 114 x 6.3 | 203 x 4.3 | 254 x 4.2 |
| Steel Pipe Schedule 80 | Inches | 1/2 (.840x.147) | 3/4 (1.050x.154) | 1 (1.315x.179) | 1 1/4 (1.660x.191) | 2 (2.375x.218) | 3 (3.50x.300) | 4 (4.50x.337) | 6 (6.625x.432) | 8 (8.625x.500) |
| | Metric | 21.3 x 3.7 | 26.6 x 3.9 | 33.3 x 4.5 | 42.1 x 4.8 | 60.3 x 5.5 | 88.9 x 7.6 | 114.3x8.5 | 168.2x10.9 | 219x12.7 |
| Square Tubing Mild Steel | Inches | 3/4 x .083 | 1 x .065 | 1 1/8 x .120 | 1 3/4 x .065 | 2 1/2 x .083 | 3 1/2 x .144 | 4 x .250 | 6 x .250 | 8 x .250 |
| | Metric | 19 x 2.1 | 25.4 x 1.6 | 28.6 x 3 | 44.4 x 1.6 | 63.5 x 2.1 | 88.9 x 3.6 | 131.6x6.3 | 152.4x6.3 | 203.2x6.3 |
| Rectangular Tubing Mild Steel E-Plane | Inches | 3/4 x 1 x .065 | 1 x 1 1/4 x .065 | 1 x 1 1/2 x .120 | 1 1/2 x 2 1/2 x .065 | 1 1/2 x 3 x .148 | 2 x 5 x .250 | 3 x 6 x .250 | 4 x 8 x .380 | 6 x 10 x .380 |
| | Metric | 19 x 25.4 x 1.6 | 25.4 x 31.7 x 1.6 | 25.4 x 38 x 3 | 38 x 63.5 x 1.6 | 38 x 76 x 3.7 | 50.8x127x6.3 | 76.2x152.4x6.3 | 101.6x203.2x9.6 | 152.4x254x9.6 |
| Rectangular Tubing Mild Steel H-Plane | Inches | 3/4 x 1 x .049 | 1 x 1 1/4 x .049 | 1 x 1 1/2 x .083 | 1 1/4 x 2 x .083 | 1 1/2 x 2 1/2 x .120 | 2 x 4 x .180 | 3 x 5 x .250 | 4 x 8 x .250 | 6 x 10 x .250 |
| | Metric | 19 x 25.4 x 1.2 | 25.4 x 31.7 x 1.2 | 25.4 x 38 x 2.1 | 31.7 x 50.8 x 2.1 | 38 x 63.5 x 3 | 50.8x101.6x4.6 | 76.2x127x6.3 | 101.6x203.2x6.3 | 152.4x254x6.3 |
| Round Bar Mild Steel | Inches | 3/4 | 7/8 | 1 1/8 | 1 3/8 | 1 7/8 | 2 3/4 | 3 1/2 | 4 7/8 | 6 1/4 |
| | Metric | 19 | 22.2 | 28.6 | 34.9 | 47.6 | 69.8 | 88.9 | 123.8 | 158.7 |
| Square Bar Mild Steel | Inches | 9/16 | 1 1/16 | 3/4 | 1 1/8 | 1 11/16 | 2 1/2 | 3 1/8 | 4 1/8 | 5 1/4 |
| | Metric | 14.3 | 17.4 | 19 | 28.6 | 42.8 | 63.5 | 79.4 | 104.7 | 133.3 |
| Section Modulus (z)* Max., Mild Steel | Inches | .054 | .087 | .157 | .288 | .716 | 2.200 | 4.266 | 12.200 | 24.88 |
| | | | | | | | | | | |
| Max. Horizontal & Vertical Dimensions** | Inches | 1 3/8 | 1 5/8 | 1 5/8 | 3 1/4 | 3 1/4 | 6 | 6 | 9 | 10 |
| | Metric | 34.9 | 41.3 | 41.3 | 82.5 | 82.5 | 152.4 | 152.4 | 228.6 | 254 |

* Section modulus (z) is a measure of comparative section strength. To determine a machine's capacity to bend mild steel work not listed, section modulus for machine must be greater than z for shape under consideration. For other strength metals, 60,000 psi x z for machine model must be equal to or greater than ultimate strength of proposed metal x its section modulus.

** Dimensions listed can be exceeded in some cases by use of special tool holders and accessories, providing larger work does not exceed machine maximum bending power capacity.



Quality Products

Pines is committed to manufacturing quality machine tools that deliver a high level of safe and reliable performance in normal use and operation.

Every Pines bender passes a four step quality control and inspection process prior to shipment which includes:

- 5-10 Hour Test Run
- 50-100 Test Bends
- Repeatability Test
- Final Inspection

Customer Service

Pines highly skilled service engineers are on call to provide training and installation assistance as well as engineering and maintenance support. With the aid of an on-site machine shop and an extensive parts inventory, our Spare Parts Division can supply replacement parts quickly.

Drawing from over 70 years of industry experience Pines services and supplies parts for benders worldwide. You can trust Pines to provide the very best quality service on both new machines and those that have been in operation since the 1940's.

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