

Wagner can bend most pipe schedules and tube gauges. Please contact **Wagner** with your special requirements. For custom bending, quotes will indicate the **Wagner Tolerance Class** used for each quote. Please indicate if dimensions have critical tolerances. Quotes can be based on a tighter tolerance class.

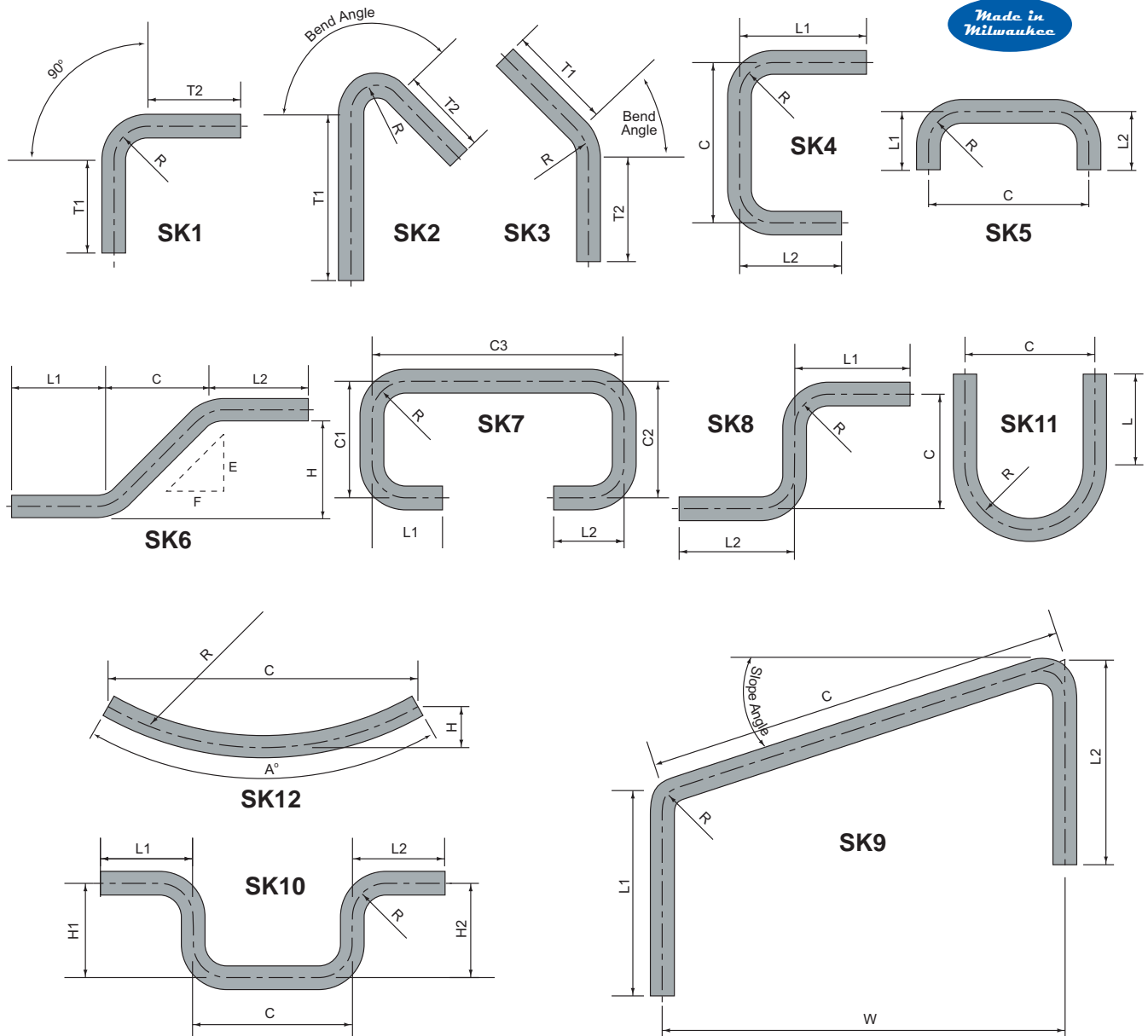
The details on these pages are common shapes for pipe and tube that may be bent from existing tooling. When describing your bend

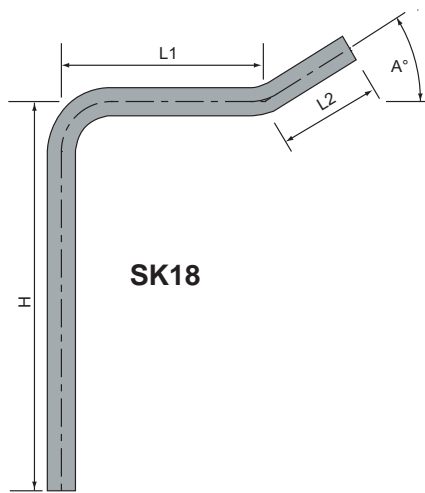
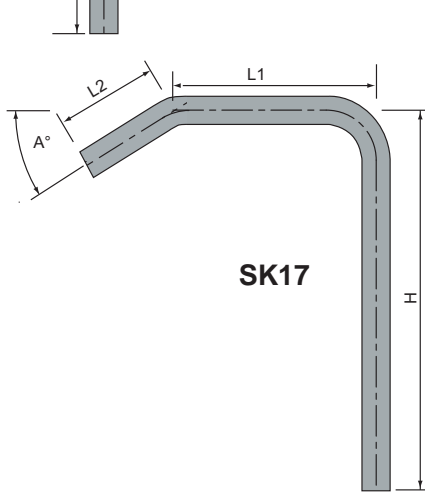
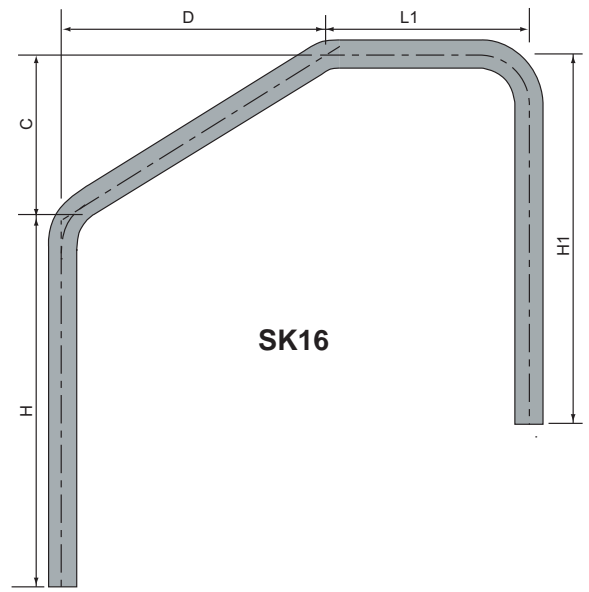
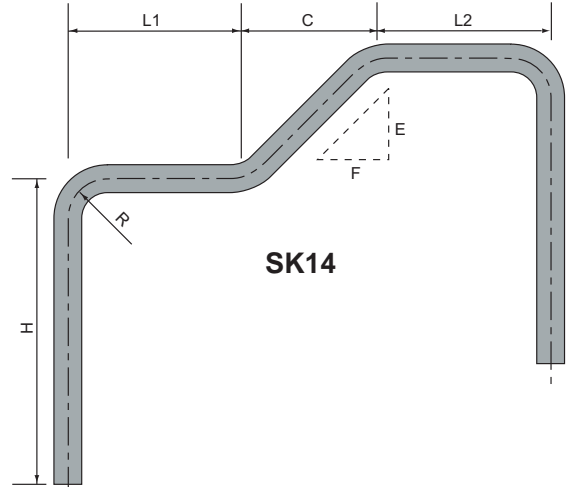
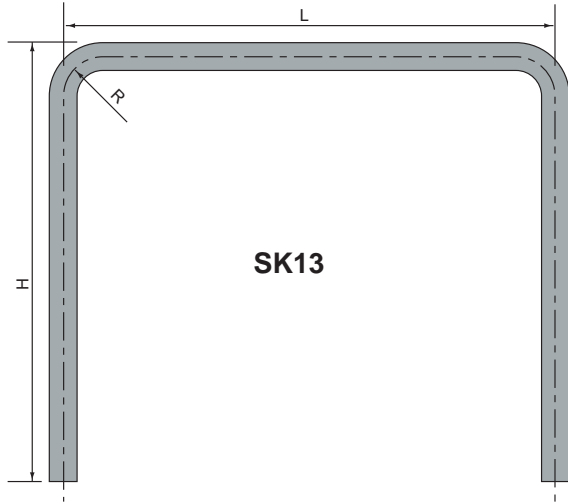
requirements, provide **Wagner** with the noted dimensions and the **SK** style number for pricing.

These configurations are available in most pipe and tube sizes, all materials and most standard radii. See pages 247 for a partial list of available tooling.

Wagner Class C Bending Tolerances

- Bend Angles
 - ± 1.5° thru 2.500" OD
 - ± 2.0° above 2.500" OD
- Center-to-center
 - ± 0.125" thru 2.500" OD
 - ± 0.250" above 2.500" OD
- Cutting
 - ± 0.062"





CUSTOM BENDING

INDUSTRIAL PRODUCTS

ARCH SHAPES

CUSTOM BENDING

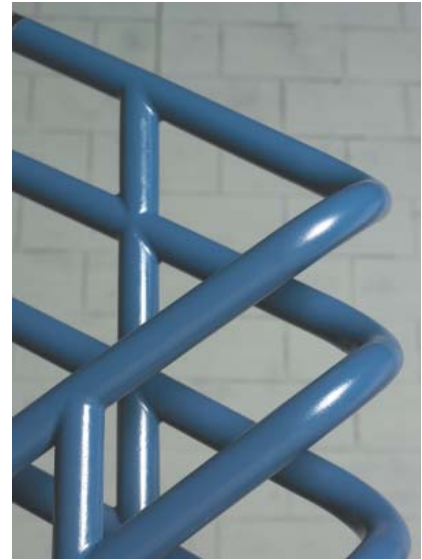
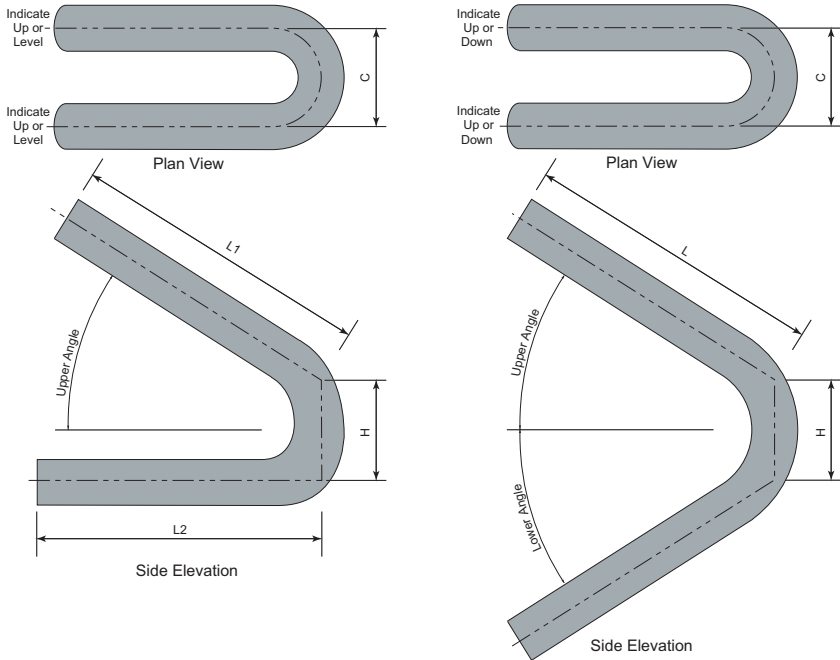
INDUSTRIAL PRODUCTS

ARCH SHAPES

Wagner can produce sweeping rail returns – sweeps – to your specifications. These sweeps greatly reduce the time spent by fabricators in the field while providing the quality look of a true sweeping elbow. Such elbows are recommended by ICC/ANSI A117.1 and the ADAAG which state that . . . continuous, inside

handrails on switchback or dogleg stairs can indicate to the person with a visual impairment that another stair flight begins immediately after the turn.

When specifying these sweeps, use the templates shown below and submit the pipe or tube size and the dimensions as noted.

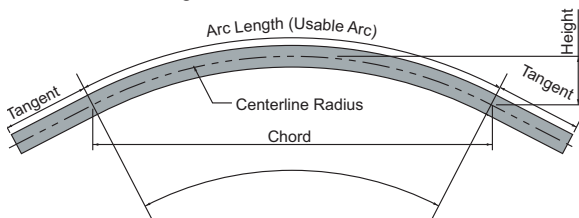


ROLL BENDING

- Pipe sizes: ¾", 1", 1¼", 1½", 2", 3" and 4".
- OD tubing sizes: 1.250", 2.000", 2.500", 3.000", 3.500", 4.000", 4.500" and 5.000".
- Square and rectangular tubing sizes: ¾" through 3" – Easy Way or Hard Way – refer to page 241.
- Structural angles and channel.

When specifying roll bending, the following information is required:

- Center Line Radius (CLR) and Angle or
- Center Line Radius (CLR) and Arc Length or
- Chord and Height



The dimensions listed above all reference the centerline of the bend. You may also provide dimensions based on the inside or outside radii as long as the reference radii are consistently used.

Minimum tangent lengths required are:

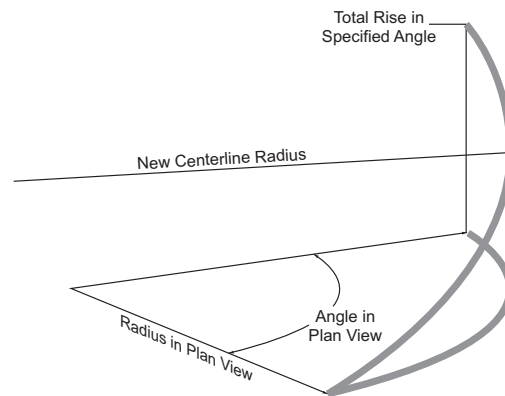
- 8" each end up through 2" pipe size – 2.375" OD
- 18" each end for material larger than 2" pipe.

The arc length is limited by the stock length of material less the minimum tangent lengths.

When possible, all like radii bends are combined and rolled as one larger length then split after rolling.

ROLLING A HELIX

In a true helix, the material is twisted. **Roll Bending** operates only in one plane and therefore **Wagner** cannot actually roll a helical bend. However, we have found that on larger centerline radii – 15' and above – we can calculate a radius bend that will lay flat on the floor but that can be tilted up into place to meet the requirement.



Required Information:

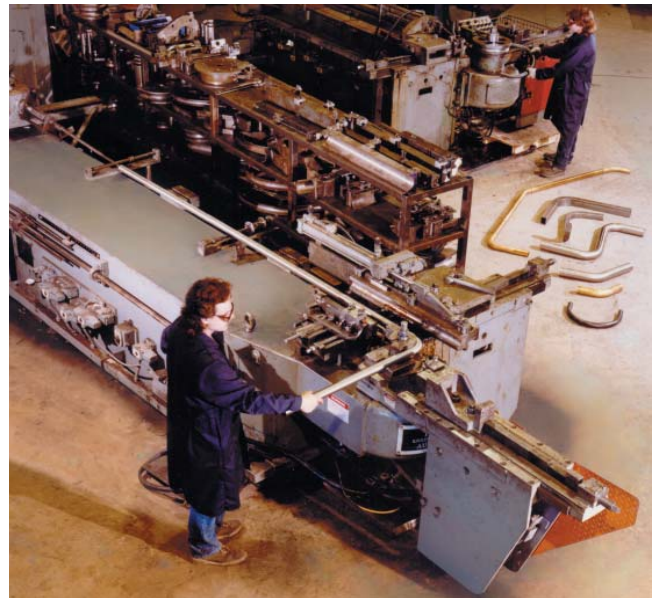
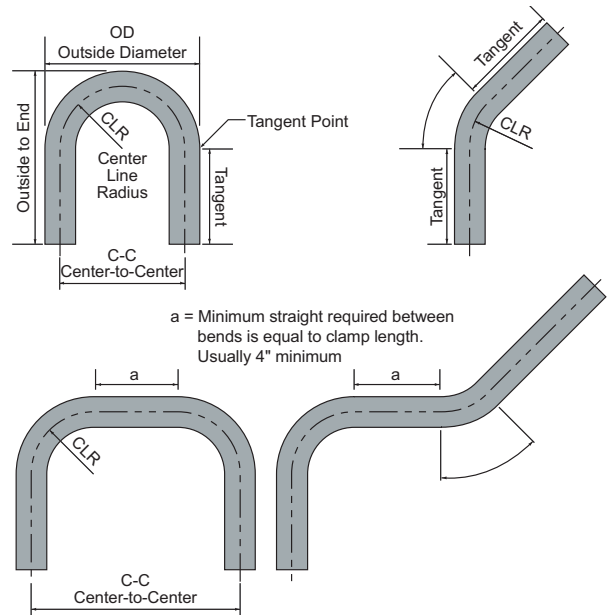
- Center Line Radius (CLR) in the plan view
- Angle in the plan view
- The total rise in the above specified angle
OR
- Center Line Radius in the plan view
- Slope angle of stair
- The total usable arc length required

Rotary Bending is accomplished by bending the pipe or tube on a fixed die set machined to fit the exact outside diameter. A mandrel is inserted inside the pipe or tube to prevent collapse during the bending process.

Wagner can rotary bend most materials up to 4.500" OD to a maximum of 180 degrees of bend. Square and rectangular materials can also be bent. Our CNC bending equipment allows for high quality repeatability. Multiple bend configurations can be produced greatly reducing the amount of welding and polishing required.

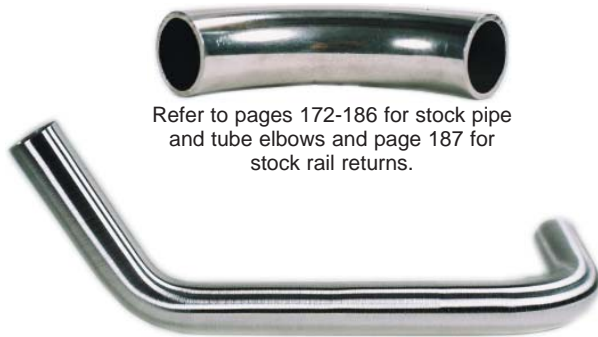
ROTARY BEND TOOLING FOR PIPE AND TUBE

Pipe Size	Tube OD	Available Center Line Radius – all dimensions in inches.
	.500"	.75, .93, 1.00, 1.12, 1.25, 1.50, 2.25, 2.75, 3.00, 4.25
	.750"	1.00, 1.12, 1.22, 1.37, 1.50, 1.75, 2.00, 2.50, 2.75, 3.00, 3.12, 4.00, 6.25
	.840"	1.50, 2.50, 3.00, 5.81
	1.000"	1.31, 1.50, 1.87, 2.00, 2.50, 2.75, 3.00, 4.00, 4.25, 5.00, 5.50
	1.050"	1.50, 2.15, 3.00, 3.52, 4.53, 5.45
	1.250"	1.43, 2.12, 2.25, 2.65, 3.00, 3.62, 4.00, 5.00, 5.50, 6.00, 6.63, 10.69, 11.63, 14.00
	1.315"	2.00, 2.28, 2.50, 2.65, 3.00, 3.65, 4.00, 4.65, 5.65, 5.75, 6.65
	1.500"	2.37, 2.75, 3.00, 3.50, 3.75, 3.95, 5.00, 6.00, 7.75, 12.00
	1.625"	2.43, 2.81, 3.50, 4.00, 5.00, 5.90, 7.50
1¼"	1.660"	1.83, 2.45, 2.83, 3.17, 3.83, 4.50, 4.83, 5.00, 5.83, 6.83, 7.83, 8.83, 10.83, 11.75
	1.750"	2.50, 3.00, 4.00, 5.00, 6.75, 8.00, 12.00
	1.875"	4.00, 7.00
1½"	1.900"	1.95, 2.56, 2.95, 3.55, 3.95, 4.44, 4.95, 5.40, 5.95, 6.95, 7.37, 8.95, 10.95, 11.7
	2.000"	2.62, 3.00, 4.00, 5.00, 6.00, 7.75, 8.75, 9.38, 12.00, 14.25, 17.00
	2.250"	3.88, 4.50, 6.02
2"	2.375"	4.18, 5.50, 5.18, 6.00, 7.18, 9.00, 9.75, 11.18, 11.75,
	2.500"	4.75, 5.00, 6.00, 7.75, 11.75, 12.50, 18.00
	2.875"	4.00, 5.00, 5.93, 6.63, 7.25, 8.00, 9.40, 11.69
	3.000"	6.00, 9.00, 12.00, 18.00
3"	3.500"	6.00, 7.00, 7.31, 8.73, 8.88, 12.00
	4.000"	5.25, 7.87, 8.00, 9.00, 9.58, 10.00, 18.00, 24.00
4"	4.500"	8.00, 11.67, 13.50



FIXED DIES FOR SQUARE AND RECTANGULAR TUBE

Tube OD	Available Center Line Radius – all dimensions in inches.
.750" x .750"	1.88, 2.97, 3.97, 4.97
1.000" x 1.000"	2.00, 2.50, 3.00, 3.75, 4.00, 10.00, 13.00
1.500" x 1.500"	3.00, 3.50, 4.00, 4.75, 5.75, 10.00, 13.00
2.000" x 2.000"	4.00, 4.75, 5.84, 7.00, 9.00, 14.00
2.500" x 2.500"	7.06, 8.00, 11.00, 15.00
3.000" x 3.000"	7.06, 8.00, 11.00, 15.00
1.500" x 2.000"	4.00, 4.75, 5.84, 7.00, 9.00, 14.00
2.000" x 2.500"	7.06, 8.00, 11.00, 15.00



CUSTOM BENDING

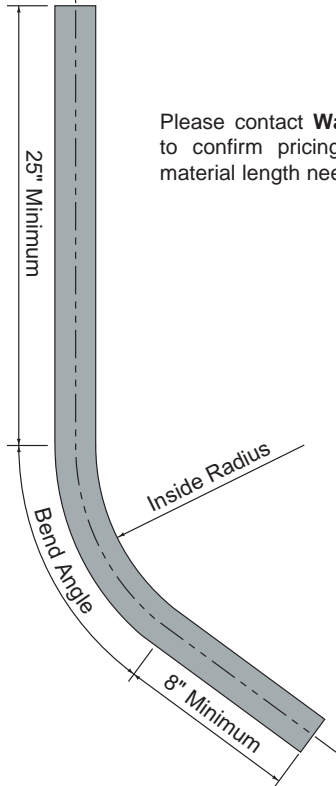
INDUSTRIAL PRODUCTS

ARCH SHAPES

Induction Bending is accomplished by heating the material and forcing the bend to a preset radius.

Since no special tooling is required, induction bending is a precise and cost-effective method of custom bending pipe or tube for architectural, industrial, commercial and specialty applications in small or large quantities.

- Bend any center line radius between 12" and 48".
- For tube sizes from 1.500" through 5.000" OD.
- Wall thicknesses of .120" or greater work best.
- Can be bent up to 180 degrees.



Please contact **Wagner** to confirm pricing and material length needed.

ONE-PASS BENDING

Open-end feeding systems allow for one-pass bending of short sections or lengths to 21 feet. High accuracy in bending produces radii and degree of bend within 1/8" tolerance for the overall length.

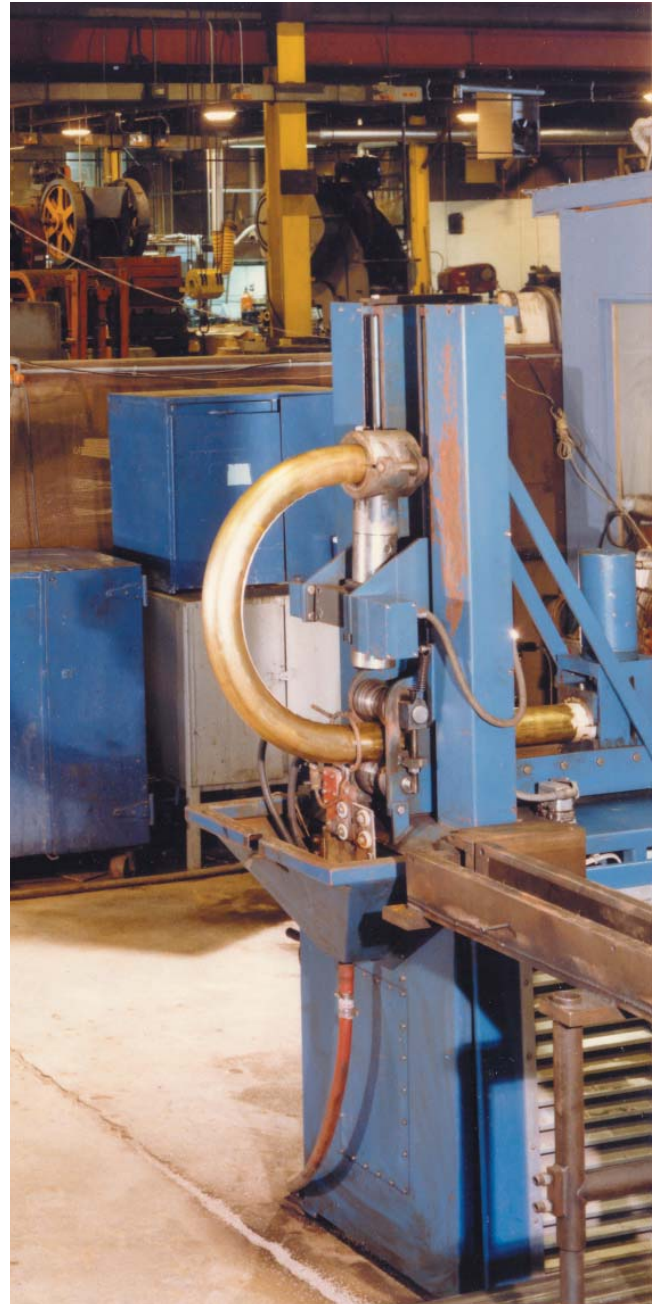
MULTIPLE BENDS

Wagner can perform successive or a series of bends with changes of plane in one pass on a single section of pipe or tube. Tolerances in radii may be as little as .10". Unlike cold bending, our induction method does not require the use of costly dies, clamps, wipers and mandrels.

ALMOST ANY MATERIAL – MANY SHAPES

Wagner is equipped to bend steel, stainless steel, brass alloys and aluminum to standard or customized shapes as you require. Contact **Wagner** early in your design process so that we can discuss how our induction bending technology can save you money and material.

Wagner offers you custom bending in small quantities and in any radius between 8.5" and 48" centerline without tooling charges. Our unique bending capabilities hold sizes within 5%.



Specifications

Material Dimensions

Maximum OD	5.000"
Maximum Wall Thickness	1.000"
Minimum Wall Thickness	.095"
Maximum Material Length	21'-0"

Bending Radius

Maximum	48.00"
Minimum	8.50" CLR

Bending Angle

	0° - 180°
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Straight Start

	8.00"
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FAX: (414) 355-3576 Custom Bending Quote Form

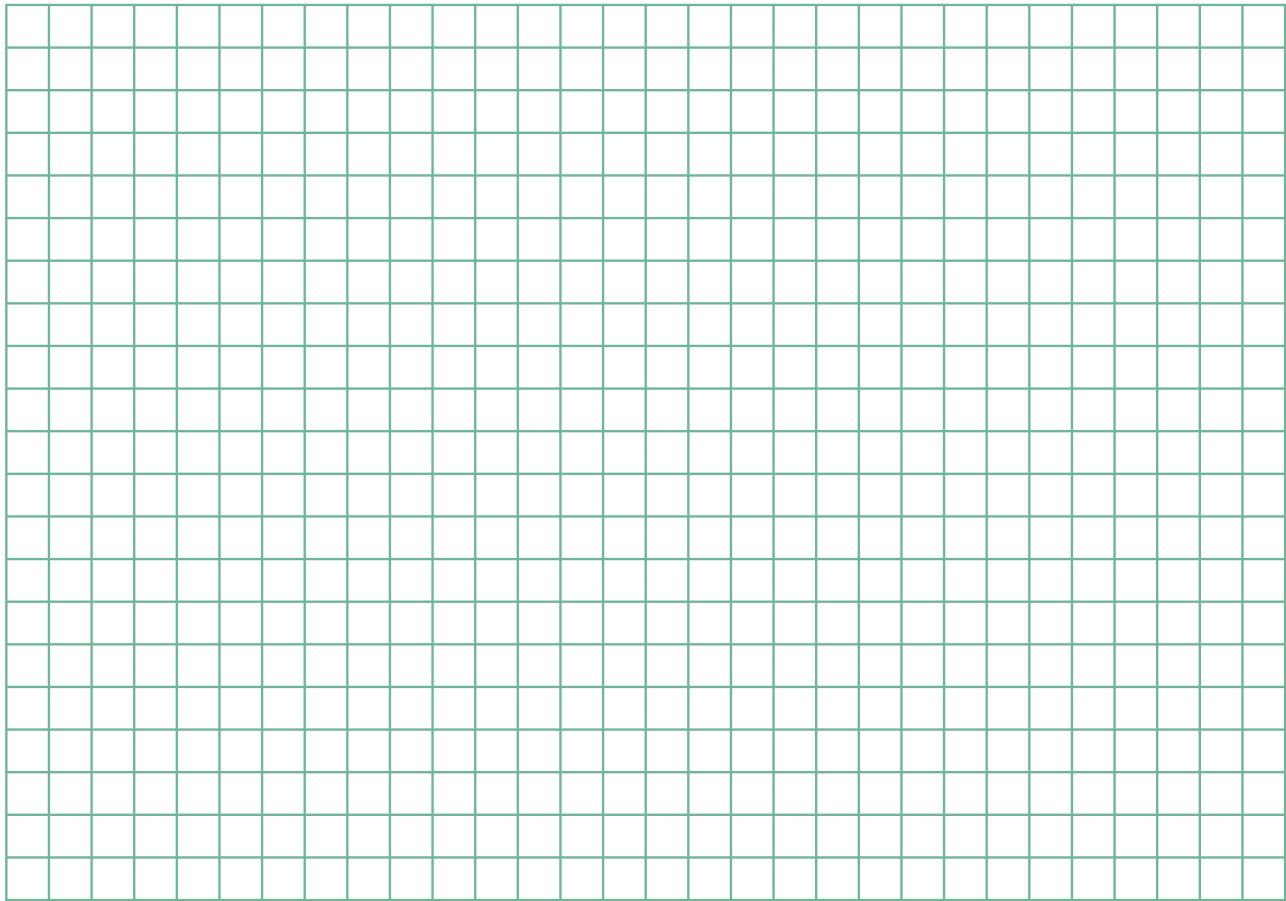
Use this worksheet and the templates on the previous pages to provide **Wagner** with your custom bending requirements.

Pipe or Tube Size: _____ Outside Diameter: _____ Wall Thickness: _____ Material: _____

Centerline Radius of Bend: _____ Angle of Bend: _____

Tangent Length (if any): _____ Finish (other than mill finish): _____

Quantity: _____



Name: _____

Company: _____ Fax Number: _____

Street: _____ Phone: _____

City: _____ State: _____ Zip Code: _____

E-mail Address: _____

CUSTOM BENDING

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ARCH SHAPES