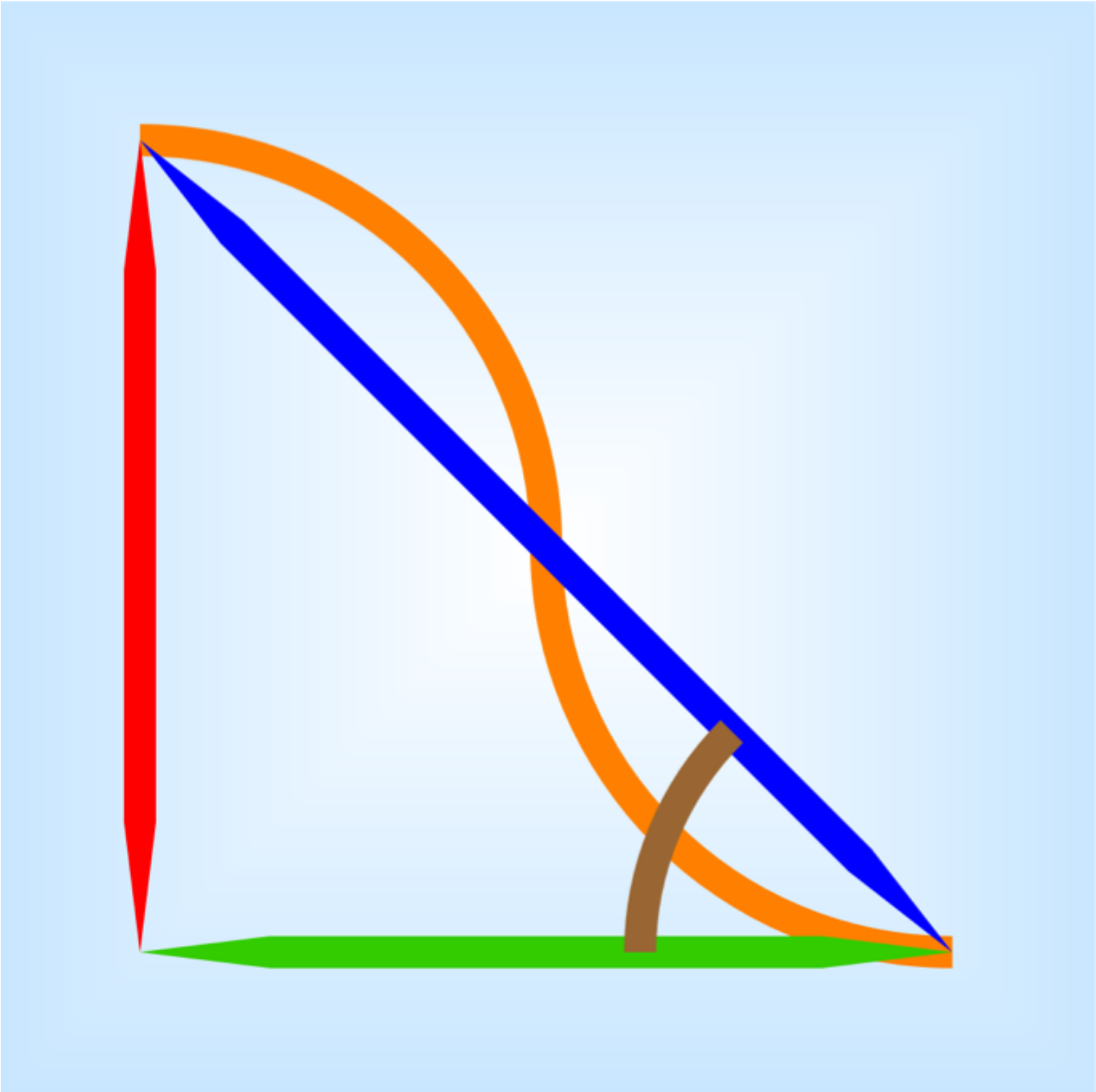


Bend Aid

Accurate Conduit Bending

User Guide



Version 4.0

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Main Menu

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Right Triangles



Offsets



Kicks



Nineties



Find Bend Radius



Chart Benders



Read the Help file at the top right of every screen.

[Visit our web site](#)

Main Menu About

Bend Aid is a professional conduit bending solver designed for precision calculations.

Whether you're working in construction, engineering, or education, Bend Aid provides accurate solutions with support for multiple measurement formats including decimal, fractions, and metric units.

Notice that the right triangle shown in the logo goes from the start of the first bend to the finish of the second bend, Bend Aid solves the whole offset.

This right triangle is what you measure for where the offset has to fit, you measure any two of the four variables of a right triangle and Bend Aid will solve for the missing ones.

THE MEASURED ANGLE IS NOT THE BEND ANGLE, the Bend Angle will be solved and will be given as an answer.

Bend Aid finds the smallest bend angle by starting with the entered or solved angle and adds one degree at a time until the finished length is less than the entered or solved length.

Features

Solve right triangles, offsets, and kicks with any two known right triangle values

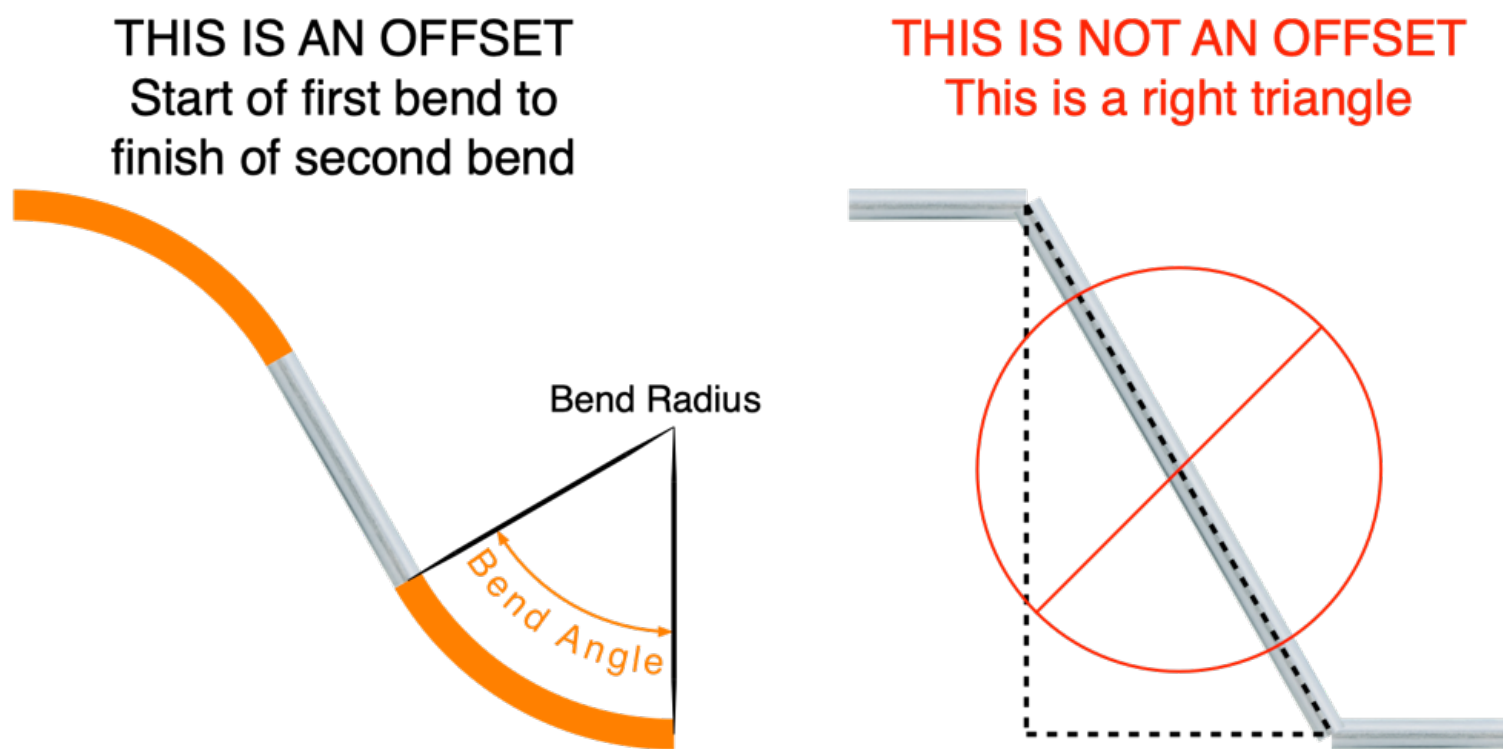
Multiple number formats (decimal, 1/16", 1/32", mm)

Real-time validation and error checking

Clean, intuitive interface

High-precision calculations

Conduit Bending



An offset is not a right triangle.

A right triangle has three straight lines.

Using the formulas for the cosecant solves a right triangle's hypotenuse.

An offset has two bends and one straight section of conduit.

Gain happens in offsets and kicks just like in nineties.

Conduit bends take completely different formulas to solve, but the correct math is too complicated to solve by hand.

Bend Aid was developed to make conduit bending faster, easier, and more accurate by using the correct mathematical formulas for the shapes that conduit is bent into.

The previous methods of bending conduit used "tricks of the trade" and mathematical formulas that are only "close enough most of the time".

The old methods of bending conduit do not provide you with all of the answers needed to see where the bends are going to be, what the total finished length is going to be, if you will be able to get the conduit into the bender to make the second bend for offsets, and many other details.

The old methods of bending conduit involve much guesswork, practice bending, aggravation, and unnecessary waste of time and material.

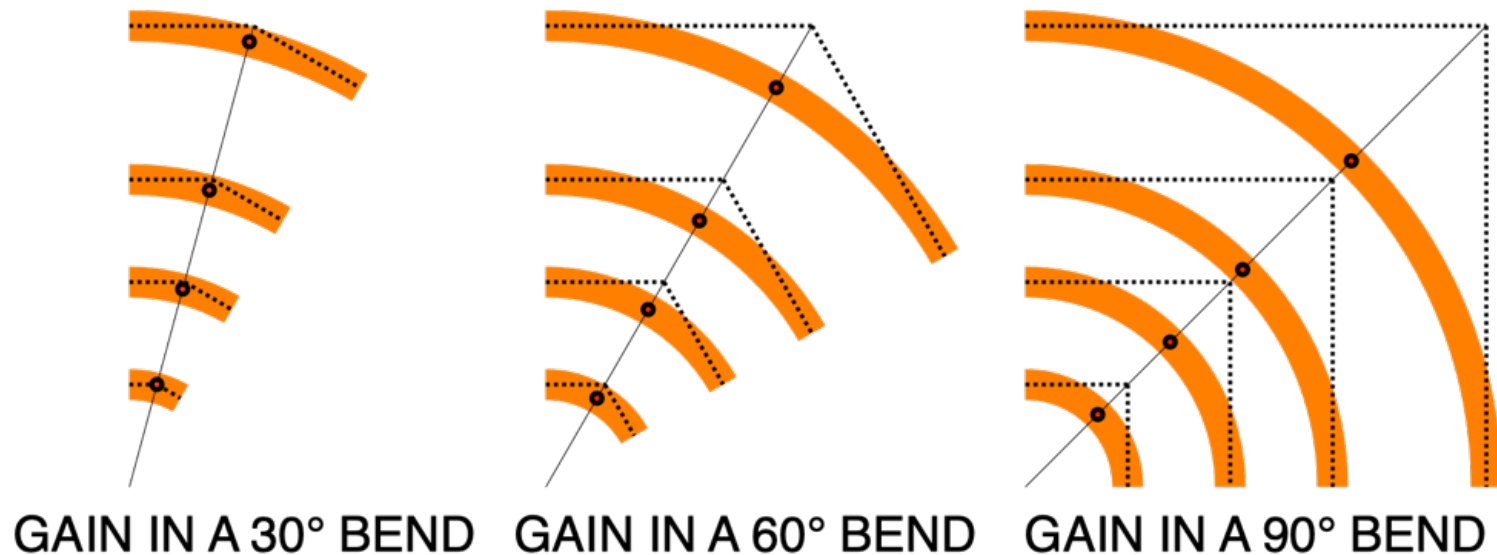
When you use Bend Aid as a tool to assist in bending conduit, you measure where you need to install the conduit, enter your dimensions into the app, and use the answers to lay out the conduit for bending.

Bend Aid will find the smallest bend angle that will fit between obstructions or supports, making wire pulling easier, reducing pull strain on conductors, and saving unnecessary fittings and the conduit nipples needed to install fittings.

Bend Aid allows you to measure and enter the finished length you need and then it finds the smallest bend angle that will fit in that length.

Bend Aid uses the correct math formulas to solve the shapes that conduit is bent into. It does not use the cosecant formulas, or any charts, tables, or correction factors.

Gain



Gain is the difference between the straight lines and the bend.

The bigger the bend radius the more the gain.

The bigger the bend angle the more the gain.

Only a small bend angle and bend radius are close to the actual center of the bends.

Bend Aid solves Offsets from the start of the first bend to the finish of the second bend, it solves the whole problem.

Finds the smallest bend angle for the variables entered.

Solves the centerline of bends so it works with any type of conduit or any size of conduit.

Gives all the answers needed to layout the conduit, and cut and thread it to length if needed.

Solves bends that were not possible before because the correct math formulas were not available.

The cosecant method of bending conduit solves a right triangle by picking 30° , 45° , 60° , or other angles to solve for the hypotenuse and mistakenly calling it the centers of the bends, but the hypotenuse is a straight line and the bend is a curve.

The bend takes the shortcut so Gain happens in every bend.

The cosecant method has been used for almost 100 years as a "Trick Of The Trade" because the correct math is too complicated to do by hand, but it is considered "Close Enough Most Of The Time".

That is why a small bend radius and small angle are close enough but a large bend radius or large bend angle will have to be fixed, it is not your fault that you have to fix bends, you were taught tricks instead of the correct math.

Developed with precision in mind

Main Menu Help

Overview

Bend Aid is a precision conduit bending calculator for electricians. Pick a bend type from the main menu, enter your dimensions, and Bend Aid solves the exact math — no "close enough" cosecant tricks.

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Main Menu

The main menu lists every calculator category. Tap a row to open it. Each category has its own sub-menu with the specific bend variants.

- Right Triangles — solves all four variables by entering any two of altitude, length, hypotenuse, or angle.
- Offsets — single, rack, concentric, simple, rolling, measure, and saddles.
- Kicks — single, rack, concentric, simple, plus rack/concentric to-horizontal and to-vertical variants.

- Nineties — single 90°, rack, concentric, back-to-back, and back-to-back rack/concentric.
- Find Bend Radius — solves for bend radius given travel and angle.
- Chart Benders — how to find what a bender will do.

Enter Screens

Every calculator starts with an Enter screen. Tap a field to bring up the appropriate input keypad — fractions, decimals, integers, or angle (angle is always entered as decimal degrees).

Required fields vary by calculator. For right triangles, enter any two of the four variables. For racks, enter the conduit count and center spacing. Bend Aid validates your input before calculating and shows an alert if anything is missing.

Use the Number Format picker at the top to switch between Decimal, 1/16", 1/32", and Metric. The format persists into the Answers screen.

Answers Screens

After tapping Answers, Bend Aid computes the smallest whole-degree bend angle that fits your run and displays every measurement you need to bend the conduit:

- Conduit Length — total material needed.
- Start Bend — where to make the first mark from the end of the conduit.
- Travel — arc length of each bend.
- Start To Start — distance from one bend mark to the next.
- Bend Angle — the angle Bend Aid finds so everything fits.

- Tail — the length of conduit from the finish of the second bend to the entered length.

Racks and Concentric Racks

Rack and concentric answers show one conduit at a time. Tap Next and Previous in the Answers section to step through each conduit in the set — the highlighted yellow rows update to show that conduit's measurements.

Rack: all conduits use the same bend radius; each is offset outward by one center spacing.

Concentric: each conduit uses a larger bend radius (bend radius + center to center spacing) than the previous one (bend radius for each step out), so the bends stay parallel.

Segments

Tap the Segments button on any Answers screen to break a single bend's travel into equal-degree shots. Enter how many degrees per shot you want, 1° to 9° , and Bend Aid lists the mark for every shot plus any leftover degrees at the end.

Help and About

Every screen has a Help button in the top-right of the toolbar with details specific to that calculator. Read the diagram at the top of each screen — colored labels in the inputs match the colored sides in the diagram.

The About screen, top-left of the main menu, explains why correct conduit math beats the older cosecant tricks.

Landscape Mode

Rotate iPhone to landscape to hide the navigation bar and see the diagram at full screen.

Navigation Bar Buttons

Top Left - Clears all entered values and returns to the Enter screen, allowing you to start a new calculation.

Top Right - Tap to see the help file for this screen.

Enter Right Triangle

Enter

Help

Right Triangle

Select Number Format

0.0

1/16

1/32

mm

Enter Any Two

Altitude

12.8

Length

0.0

Hypotenuse

0.0

Angle

30°

Answers

Enter Right Triangle Help

Overview

Bend Aid solves a right triangle by entering any two of the four variables and then displaying the answers.

1. Select the number format you want to use for entering values
2. Tap any two variables of the four variables, Altitude, Length, Hypotenuse, or Angle, to enter their values
3. Tap the 'Answers' button to see the solved triangle
4. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter Any Two

-  Altitude - The vertical side of the triangle
-  Length - The horizontal side of the triangle
- [ Hypotenuse - The longest side opposite the right angle

● Angle - The angle between length and hypotenuse in degrees, opposite of altitude

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- You must enter exactly two variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side
- A single variable may be entered to convert between number formats

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

Electrical Uses

Bend Aid solves right triangles quickly and accurately.

In electrical engineering, right angle triangles are primarily used to solve problems involving AC (Alternating Current) circuits.

This is due to the phase relationship between voltage, current, and resistance.

The relationship between voltage, current, and resistance is described by Ohm's Law.

Here are the four most common "triangles" used:

1. The Impedance Triangle

This helps you find the total opposition to current flow in a circuit containing both resistance and reactance.

- Horizontal (Adjacent): Resistance (R)
- Vertical (Opposite): Reactance (X_L or X_C)
- Hypotenuse: Impedance (Z)
- Formula: $Z = \sqrt{R^2 + X^2}$

2. The AC Power Triangle

Used to calculate how efficiently a system uses electricity (Power Factor).

- Horizontal (Adjacent): Real Power (P, measured in Watts)
- Vertical (Opposite): Reactive Power (Q, measured in VARs)
- Hypotenuse: Apparent Power (S, measured in VA)
- Formula: $S = \sqrt{P^2 + Q^2}$

3. The Voltage Triangle

Used in series circuits to find the total source voltage.

- Horizontal (Adjacent): Voltage across the resistor (V_R)
- Vertical (Opposite): Voltage across the inductor/capacitor (V_L or V_C)
- Hypotenuse: Total Voltage (V_t)
- Formula: $V_t = \sqrt{(V_R)^2 + (V_L - V_C)^2}$

Why it matters: The angle (θ) of these triangles tells you the Power Factor. A larger angle means the circuit is less efficient because the voltage and current are out of sync.

4. The Current Triangle

This helps you find the current in a circuit containing both resistance and reactance.

- Horizontal (Adjacent): Resistance (R)
- Vertical (Opposite): Reactance (X_L or X_C)
- Hypotenuse: Current (I)
- Formula: $I = V / \sqrt{R^2 + X^2}$

Answers Right Triangle

<

Answers

Help

Right Triangle

Select Number Format

0.0

1/16

1/32

mm

Answers

Altitude

12 ¹³/₁₆ "

Length

22 ³/₁₆ "

Hypotenuse

25 ⁵/₈ "

Angle

30 °

Return To Main Menu

Answers Right Triangle Help

Overview

The Answers screen displays the complete solution to your right triangle problem, showing all four variables calculated based on your inputs.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Answers

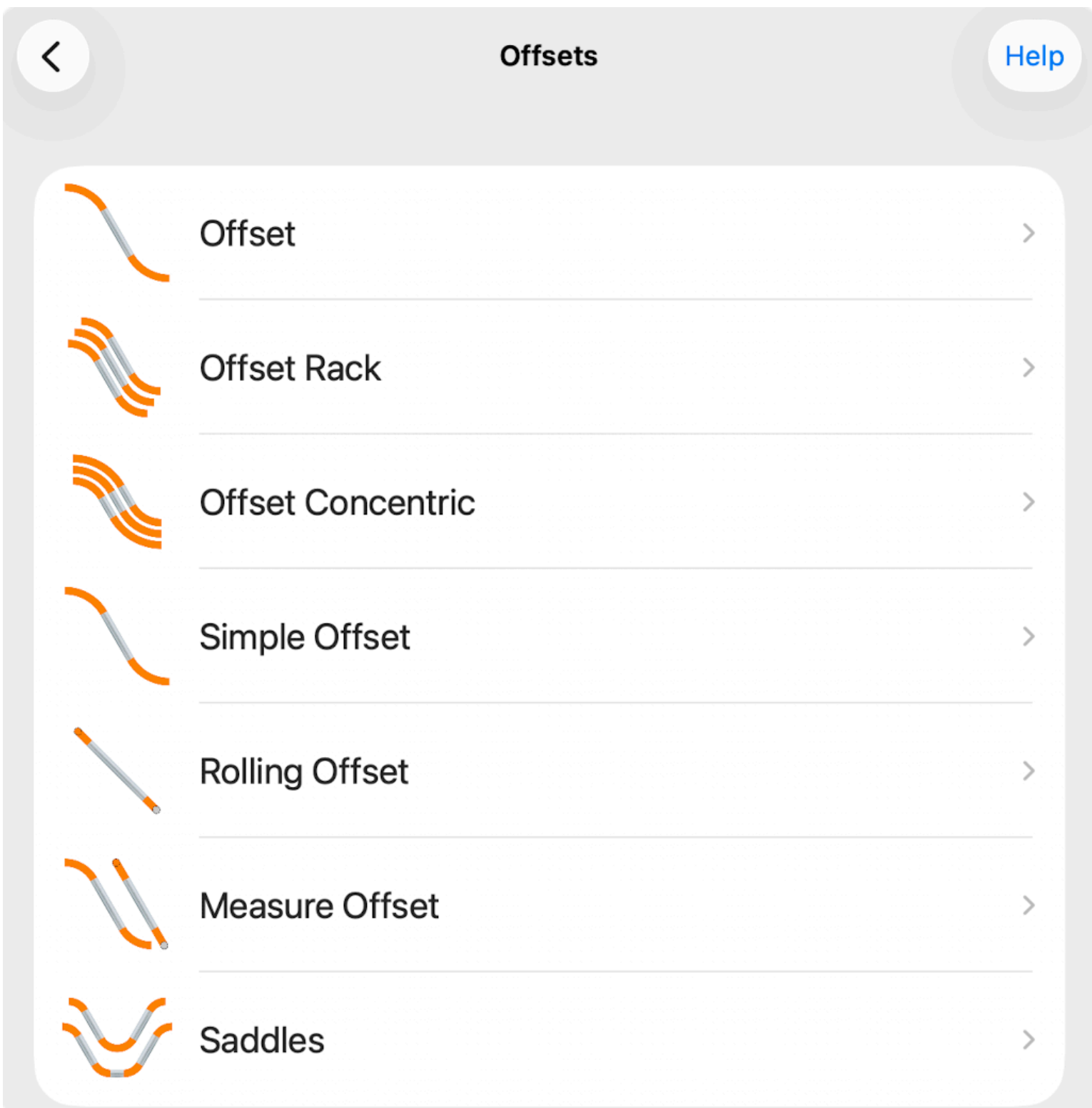
-  Altitude - The vertical side of the triangle
-  Length - The horizontal side of the triangle
-  Hypotenuse - The longest side opposite the right angle
-  Angle - The angle between length and hypotenuse, in degrees

Navigation Bar Buttons

Top Left - Clears all entered values and returns to the Enter screen, allowing you to start a new calculation.

Top Right - Tap to see the help file for this screen.

Offsets Menu



Offsets Menu Help

Overview

Offsets navigate conduit around obstructions or change its elevation.

Bend Aid solves the whole offset — from the start of the first bend to the finish of the second bend — and finds the smallest whole-degree bend angle that fits in the length available.

Bend-Aid solves the center line of the conduit and bends.

An offset has two bends and one straight section of conduit.

There is straight conduit between the two bends.

The conduit may be leaving a box or conduit body and will be supported.

If you plan on starting the offset at the far edge of the support you can measure the distance where the offset needs to start which will be entered as Start Bend.

There will be another support or obstruction where the offset will need to be finished and the measurement will be entered as the Length.

After the offset there will be a length of conduit that will either be the end of a full length or the conduit will be cut to fit and maybe threaded, which will be given as an answer called Tail.

The bends of each conduit in a rack may be bent on the same bend radius or they may be bent concentrically.

Offset

A single offset in a single piece of conduit. Enter Bend Radius, Start Bend, and any two of the four right-triangle variables (Offset, Length, Hypotenuse, or Angle) and Bend Aid solves the rest.

Offset Rack

Several conduits run side-by-side with the same bend radius. Each conduit is moved outward from the first by one center spacing.

Enter the conduit count and center spacing in addition to the standard offset variables. The Answers screen steps through each conduit with Previous and Next buttons.

Offset Concentric

Several conduits run side-by-side with the bends staying parallel — each conduit uses a progressively larger bend radius (bend radius + center to center spacing for each step out).

Enter the conduit count and concentric center spacing in addition to the standard offset variables. The Answers screen steps through each conduit with Previous and Next buttons.

Simple Offset

A streamlined offset entry for quick layouts when you don't need every variable. Use this when you want to enter the offset and bend angle and want a fast answer.

Rolling Offset

An offset that travels in two planes at once — both horizontal and vertical. Use Right Triangle to resolve the combined displacement into a single offset that can be bent into one piece of conduit.

Measure Offset

Lay out an offset by measuring an existing run. Use this when you need to match a conduit that's already in place, or when the only dimensions you have are field measurements.

Saddles

Opens the Saddles sub-menu — 3-point and 4-point saddles, with single, rack, and concentric variants.

A saddle wraps a conduit over an obstruction (typically another pipe) and returns to the original run. 3-point saddles are actually two offsets without any space between the first and second offsets; 4-point saddles are two offsets with a space between them.

Common Inputs

- Bend Radius — the centerline radius of your bender shoe or whatever bend radius you want, either to match existing larger conduit or to meet a certain wire bend radius.
- Start Bend — the distance from the end of the conduit to the start of the first bend.
- Number Format — pick Decimal, 1/16", 1/32", or Metric at the top of each Enter screen. The format carries through to Answers but can be changed at any time.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Enter Offset

[Enter](#)[Help](#)

Offset

The diagram illustrates the geometry of a pipe bend. A horizontal pipe on the left transitions into a curved section (bend) and then continues horizontally on the right. The bend is highlighted in orange. A blue line, labeled 'Hypotenuse', connects the 'Start Bend' point on the left to the end of the bend on the right. A red vertical line, labeled 'Offset', represents the distance from the original horizontal line to the end of the bend. A green horizontal line, labeled 'Length', represents the distance along the original horizontal axis from the 'Start Bend' to the end of the bend. A brown arc, labeled 'Angle', indicates the angle between the 'Length' line and the 'Hypotenuse'. A dashed line and a solid vertical line, labeled 'Bend Radius', define the curvature of the bend.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Bend Radius

15.5

Start Bend

18

Enter Any Two

Offset

12.5

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Offset Help

Overview

Bend Aid solves a conduit offset from the start of the first bend to the finish of the second bend — the whole offset.

An offset uses two bends to move the conduit to a parallel line, typically to navigate around an obstruction or to land at a different height while maintaining the same horizontal path.

Measure where the offset needs to fit. Usually you measure the offset height and the length between the supports or obstructions, but any two of the four right-triangle variables may be entered.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

1. Select the number format you want to use for entering values
2. Enter the Bend Radius (the centerline radius of your bender shoe or a required bend radius)
3. Enter the Start Bend (the distance from the end of the conduit to the start of the first bend)
4. Tap any two variables (Offset, Length, Hypotenuse, or Angle) to enter values
5. Tap the 'Answers' button to see the solved bends
6. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Bend Radius

Start Bend

Enter Any Two

-  Offset - The vertical measurement of the conduit
-  Length - The distance available between the supports or obstructions where the offset must fit
-  Hypotenuse - The straight-line distance from the start of the first bend to the finish of the second bend
-  Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Bend Radius is required
- Start Bend is optional but will be used to make the total conduit length more accurate
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

Answers Offset

<
Answers
Help

Offset

Conduit Length

Offset Length

Start Bend

Start To Start

Tail

Travel

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Offset Length

Start Bend

Tail

Start To Start

Travel

Travel

Length

Add Tail to Start Bend to finish offset at second support

Select Number Format

0.0
1/16
1/32
mm

Entered

Bend Radius	15 1/2"
Start Bend	18"
Offset	12 1/2"
Length	48"
Hypotenuse	49 19/32"
Angle	14.6 °

Answers

Conduit Length	67 11/16"
Offset Length	47 15/16"
Tail	1/16"
Start To Start	45 5/16"
Bend Angle	16 °
Travel	4 11/32"

Segments

Return To Main Menu

Answers Offset Help

Overview

The Answers screen displays the full solution to your offset — every measurement you need to lay out, bend, and (if needed) cut the conduit.

The answers given for an Offset allow the bends to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of both bends so you can see exactly where they will be. Find the center of the bend if needed for benders that bend from the middle of the bend.

The Entered section echoes the values you put in on the Enter screen so you can verify them at a glance. The Answers section is what Bend Aid calculated for you.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Bend Radius

Start Bend

- Offset - The vertical displacement of the conduit
- Length - The distance available between the supports or obstructions where the offset must fit
- Hypotenuse - The straight-line distance from the start of the first bend to the finish of the second bend
- Angle - The angle you entered, in degrees, not the bend angle

Answers

Conduit Length — The total length of conduit needed to make the offset including the start bend and tail

Offset Length — The straight-line length of the offset itself, from the start of the first bend to the finish of the second bend.

Tail — The length of conduit from the finish of the second bend to the entered length.

Start To Start — Distance from the start of the first bend to the start of the second bend, or the shoe marks. Start to start is given because the centers of concentric bends change.

Bend Angle — The whole-degree angle Bend Aid chose for both bends. Bend Aid starts at the entered angle and steps up one degree at a time until the offset fits.

Travel — Arc length of a single bend at this angle and bend radius.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Segments - Splits a single bend's travel into equal-degree shots. Enter how many degrees per shot you want (1° to 9°) and Bend Aid lists the mark for every shot plus any leftover degrees.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Bending An Offset

Lay out the answers dimensions on the straight conduit.

The answers are given to the second support, if you know how much farther the conduit goes then add that dimension, and cut and thread the conduit.

If you did not enter a Start Bend length then the Conduit Length is from the start of the first bend.

Shoe Marks may be put on either side of any bend and the bend may be bent from either direction, once you have charted the bender being used and know how far from the bend the Shoe Mark should be.

If a pull through bender is being used then the Travel answer may be used to measure the Bend Angle by putting the conduit in the bender and marking the Travel from the back of the roller support.

If an "Chicago" type bender is being used then the weight of the handle will allow you to check the spring-back of the

bend, pull the bend up to the Travel mark, let go of the handle and see if the conduit springs back, add more bend as needed.

If an electric chain driven bender is being used the spring-back must be guessed at because when you release the pressure it might not be the same pressure that you started the bend with like a Chicago type bender.

If a push through bender is being used with the centers of the bends, layout the bends and find the centers of the bends.

If the offset needs to end at the second support then add the Tail length to the Start Bend length.

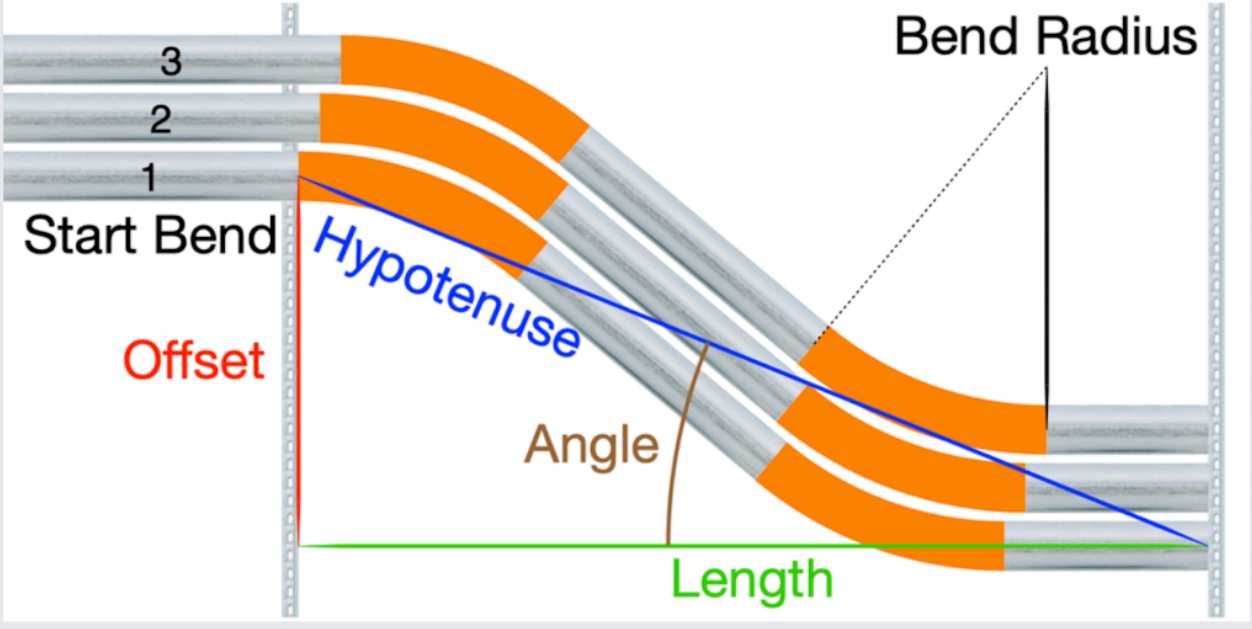
Enter Offset Rack

<

Enter

Help

Offset Rack



The diagram illustrates an offset rack bend for three conduits. The conduits are labeled 1, 2, and 3 from bottom to top. The bend is shown at an angle. Key dimensions and labels include: 'Bend Radius' for the arc of the bend, 'Start Bend' at the beginning of the offset, 'Offset' (red text) for the vertical distance between the original and new paths, 'Hypotenuse' (blue text) for the diagonal length of the offset, 'Angle' for the bend angle, and 'Length' (green text) for the horizontal distance of the offset.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

- | +

Bend Radius

15 1/2"

Start Bend

18"

Center Spacing

6"

Enter Any Two

Offset

12 1/2"

Length

48"

Hypotenuse

--' --' --'/16

Angle

0.0°

Answers

Enter Offset Rack Help

Overview

Bend Aid solves an offset rack — several conduits running side-by-side that all use the same bend radius, each offset outward from the first by one center spacing.

Measure where the offset rack needs to fit. Usually you measure the offset and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits using the + and - buttons
3. Enter the Bend Radius (the centerline radius of your bender shoe or a required bend radius)
4. Enter the Start Bend (the distance from the end of the conduit to the start of the first bend)
5. Enter the Center Spacing (the distance between conduit centers)
6. Tap any two variables (Offset, Length, Hypotenuse, or Angle) to enter values
7. Tap the 'Answers' button to see the solved bends for every conduit in the rack

8. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Start Bend

Center Spacing

Enter Any Two

 Offset - The vertical measurement of the inside conduit

 Length - The distance available between the supports or obstructions where the offset must fit

 Hypotenuse - The straight-line distance from the start of the first bend to the finish of the second bend on the inside conduit

● Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Start Bend is optional but will be used to make the total conduit length more accurate
- Center Spacing is required
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the rack.

Answers Offset Rack

Answers

Help

Offset Rack

Conduit Length

Offset Length

Start Bend

Start To Start

Tail

X

Travel

X

Travel

X

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Offset Length

Start To Start

Length

Start Bend

Tail

Travel

Travel

Add Tail to Start Bend to finish offset at second support

Select Number Format

0.0

1/16

1/32

mm

Entered

Number Of Conduits

3

Bend Radius

15 1/2"

Start Bend

18"

Center Spacing

6"

Offset

12 1/2"

Length

48"

Hypotenuse

49 5/8"

Angle

14.6 °

Answers

Conduit Number

1

Conduit Length

67 13/16"

Offset Length

45 1/2"

Tail

2 1/2"

Start Bend

18"

Start To Start

42 3/4"

Bend Angle

17 °

Travel

4 5/8"

Previous

Next

Segments

Return To Main Menu

Answers Offset Rack Help

Overview

The Answers screen displays the full solution to your offset rack. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

The answers given for an Offset Rack allow the bends to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of both bends so you can see exactly where they will be.

Find the center of the bends if needed for benders that bend from the middle of the bend.

As you go through the rack each conduit number may have different answers, for example, the Start Bend will increase so the center to center spacing will stay the same.

Use Previous and Next under the Answers section to step through every conduit in the rack.

The highlighted rows update to show that conduit's measurements.

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch

- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Entered

Number Of Conduits

Bend Radius

Start Bend

Center Spacing

 Offset - The vertical displacement of the inside conduit

 Length - The horizontal distance between the two bends on the inside conduit

 Hypotenuse - The straight-line distance from the start of the first bend to the finish of the second bend on the inside conduit

 Angle - The angle you entered, in degrees, not the bend angle

Answers

Conduit Number — Which conduit in the rack you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Offset Length — The straight-line length consumed by the offset itself, from the start of the first bend to the finish of the second bend. Same for every conduit in the rack.

Tail — The length of conduit from the finish of the second bend to the entered length, on this conduit.

Start Bend — Distance from the end of this conduit to the start of its first bend.

Start To Start — Distance from the start mark of the first bend to the start mark of the second bend.

Bend Angle — The whole-degree angle Bend Aid chose for both bends. Same for every conduit in a rack.

Travel — Arc length consumed by a single bend at this angle and bend radius.

Highlighted rows (Conduit Number, Conduit Length, Tail, Start Bend) are the values that change as you step through the rack with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the rack. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits a single bend's travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

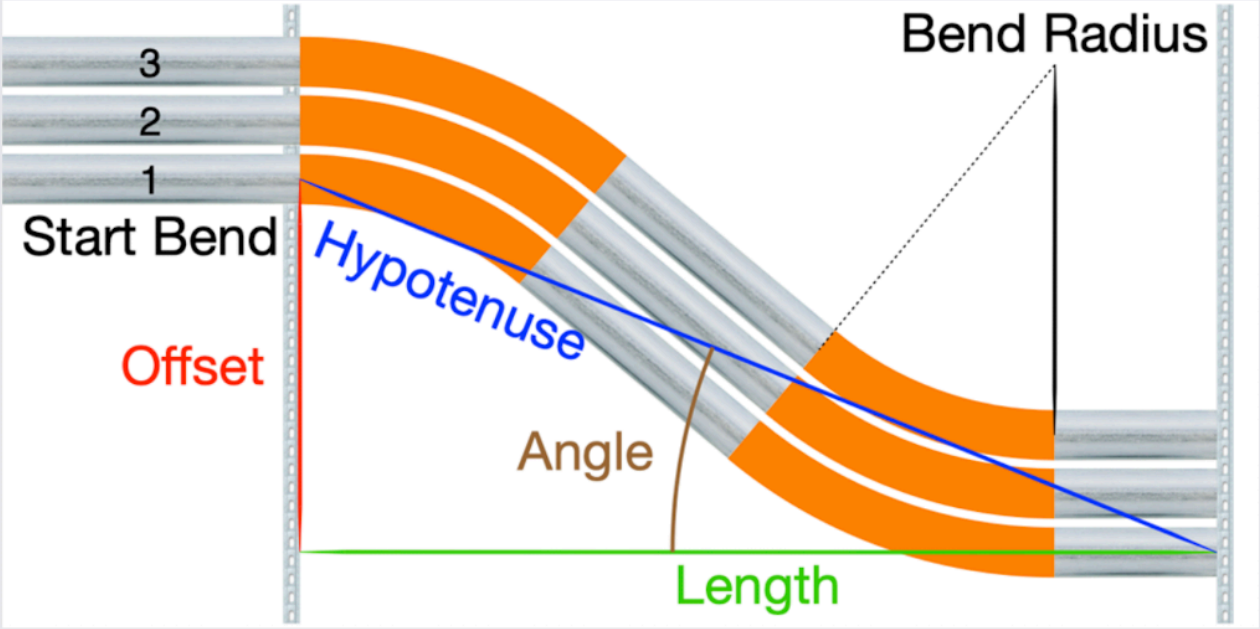
Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Offset Concentric

Enter

Help

Offset Concentric



Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits

3

-

+

Bend Radius

15.5

Start Bend

18

Center Spacing

6

Enter Any Two

Offset

12.5

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Offset Concentric Help

Overview

Bend Aid solves a concentric offset — several conduits running side-by-side with the bends staying parallel. Each conduit uses a progressively larger bend radius (the inside conduit's Bend Radius plus one Center Spacing for each step out), so the curves stay concentric instead of fanning apart.

Enter the number of conduits, the Bend Radius for the inside conduit, the Start Bend, and the Center Spacing. Then enter any two of the four right-triangle variables (Offset, Length, Hypotenuse, or Angle) for the inside conduit and Bend Aid solves the rest for every conduit in the set.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the set
3. Enter the Bend Radius for the inside conduit (the centerline radius of your bender shoe). Outer conduits use a larger radius automatically.
4. Enter the Start Bend (the distance from the end of the conduit to the start of the first bend on the inside conduit)
5. Enter the Center Spacing (the distance between adjacent conduit centerlines — this is also how much each outer bend radius grows)

6. Tap any two variables (Offset, Length, Hypotenuse, or Angle) to enter values for the inside conduit
7. Tap the 'Answers' button to see the solution for every conduit
8. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Start Bend

Center Spacing

Enter Any Two

 Offset - The vertical measurement of the inside conduit

 Length - The distance available between the supports or obstructions where the offset must fit

 Hypotenuse - The straight-line distance from the start of the first bend to the finish of the second bend on the inside conduit

 Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Start Bend is optional but will be used to make the total conduit length more accurate
- Center Spacing is required
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the concentric set.

Concentric vs. Rack

Rack - every conduit uses the same Bend Radius and is offset outward by one Center Spacing. Curves are parallel but not concentric.

Concentric - every conduit uses a larger Bend Radius (bend radius + center to center spacing for each step out) so the curves share a common center. The bends stay parallel through the offset, which matters for tight installations.

Answers Offset Concentric

<
Answers
Help

Offset Concentric

Conduit Length

Offset Length

Start Bend — Start To Start — Tail

Travel One Travel Two

Shoe Mark Shoe Mark Shoe Mark

Shoe Mark may be X distance on either side of bends

Offset Length

Start Bend — Tail — Start To Start

Travel One Travel Two

Length

Add Tail to Start Bend to finish offset at second support

Select Number Format

0.0
1/16
1/32
mm

Entered

Number Of Conduits	3
Bend Radius	15.5
Start Bend	18
Center Spacing	6
Offset	12.5
Length	48
Hypotenuse	49.600907249767
Angle	14.596575525494 °

Answers

Conduit Number	1
Conduit Length	67.773708232918
Offset Length	47.312050789064
Tail	0.68794921093575
Bend Angle	17 °
Bend Radius One	15.5
Travel One	4.5989425790051
Start To Start One	40.926344768908
Bend Radius Two	27.5
Travel Two	8.1594142530735

Previous
Next

[Travel One Segments](#)

[Travel Two Segments](#)

[Return To Main Menu](#)

Answers Offset Concentric Help

Overview

The Answers screen displays the full solution to your concentric offsets. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

Each conduit in a concentric set has two bends, and to keep the bends geometrically concentric with the inside conduit, the two bends use different bend radii. That's why the Answers section lists Bend Radius One / Two and Travel One / Two separately for each conduit.

Use Previous and Next under the Answers section to step through every conduit in the set. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Entered

Number Of Conduits

Bend Radius

Start Bend

Center Spacing

 Offset - The vertical displacement of the inside conduit

 Length - The horizontal distance between the two bends on the inside conduit

 Hypotenuse - The straight-line distance from the start of the first bend to the finish of the second bend on the inside conduit

 Angle - The angle you entered, in degrees, not the bend angle

Answers

Conduit Number — Which conduit in the set you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Offset Length — The straight-line length of the offset itself.

Tail — The length of conduit from the finish of the second bend to the entered length, on this conduit.

Bend Angle — The whole-degree angle Bend Aid calculated. Same for every conduit in a concentric set.

Bend Radius One — The bend radius used for the first bend on this conduit. Grows as you step outward.

Travel One — Arc length of the first bend on this conduit.

Start To Start One — Distance from the start mark of the first bend to the start mark of the second bend on this conduit.

Bend Radius Two — The bend radius used for the second bend on this conduit. Different from Bend Radius One because that's what keeps the curves concentric.

Travel Two — Arc length of the second bend on this conduit.

Highlighted rows are the values that change as you step through the set with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the concentric set. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Travel One Segments - Splits the first bend's travel into equal-degree shots. Use this for benders without a calibrated shoe.

Travel Two Segments - Splits the second bend's travel into equal-degree shots. The two travels can have different segment counts because the two bends use different radii.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

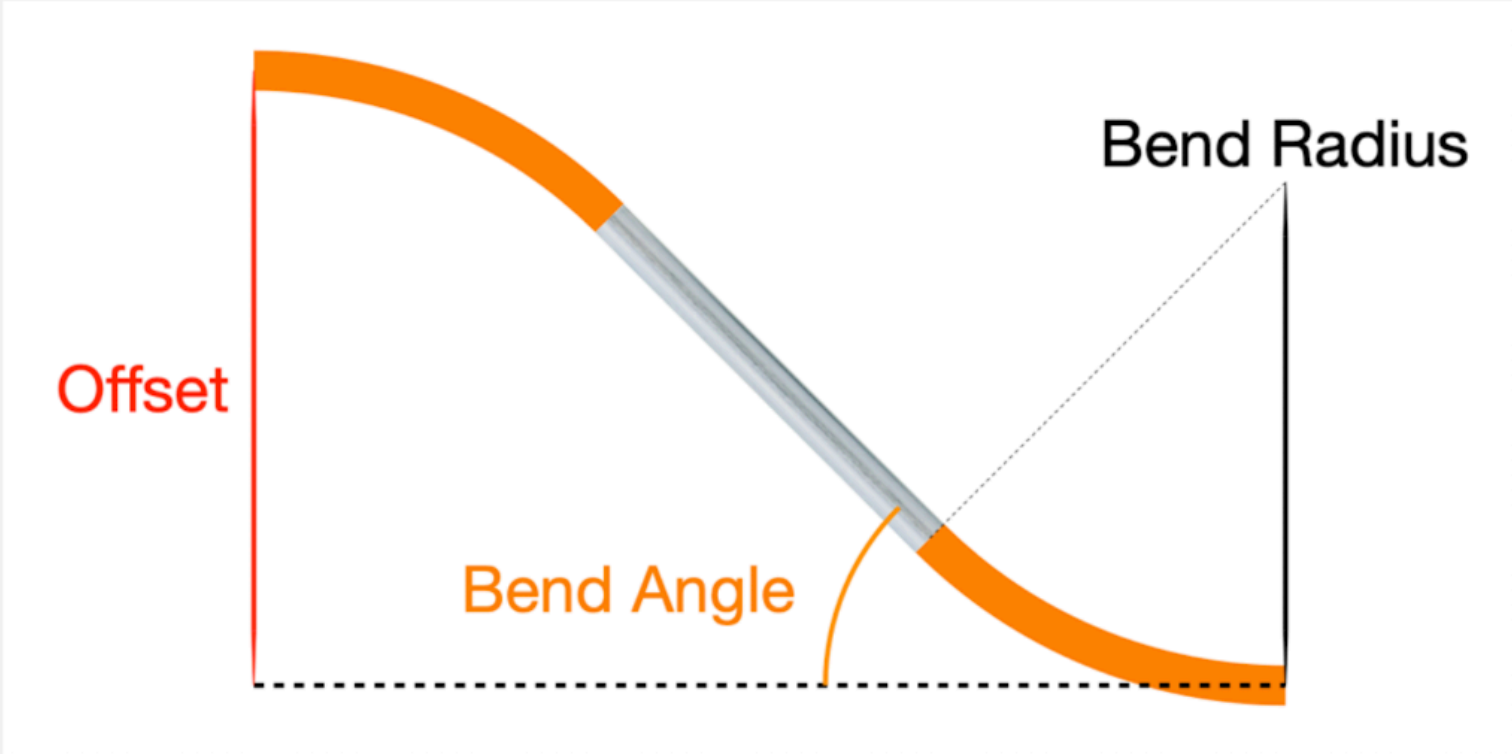
Enter Simple Offset

[<](#)

Enter

[Help](#)

Simple Offset



Select Number Format

0.0

1/16

1/32

mm

Enter All

Bend Radius	15.5
Bend Angle	30°
Offset	12.5

Answers

Enter Simple Offset Help

Overview

Simple Offset is the streamlined version of the offset calculator. Enter the Bend Radius, the exact Bend Angle you want to use, and the Offset — it solves the rest.

Unlike the regular Offset calculator, Simple Offset does not search for the smallest fitting angle. It uses the bend angle you give it exactly. Pick this when you know which angle you want to bend.

1. Select the number format you want to use for entering values
2. Enter the Bend Radius
3. Enter the Bend Angle you want to use
4. Enter the Offset you need
5. Tap the 'Answers' button to see the solved offset
6. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Bend Radius

Bend Angle

Offset

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Bend Radius is required
- Bend Angle is required and must be less than 90°
- Offset is required
- The result is exact for the angle you entered — Bend Aid does not adjust it

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

Simple Offset vs. Offset

Offset - enter any two of four right-triangle variables and Bend Aid finds the smallest whole-degree bend angle that fits the run.

Simple Offset - enter the bend angle you want to use directly. Bend Aid doesn't search; it uses your angle as-is. Faster, but you choose the angle instead of getting the smallest fitting one.

Answers Simple Offset

Answers

Help

Simple Offset

Conduit Length

Start To Start

Travel

Offset Length

Shrink

Select Number Format

0.0

1/16

1/32

mm

Entered

Bend Radius

15 1/2"

Bend Angle

30 °

Offset

12 1/2"

Answers

Conduit Length

32 15/16"

Offset Length

29 15/16"

Shrink

2 15/16"

Start To Start

24 13/16"

Travel

8 1/8"

Segments

Return To Main Menu

Answers Simple Offset Help

Overview

The Answers screen displays the full solution to your Simple Offset. The Entered section echoes the values you put in on the Enter screen; the Answers section is what Bend Aid calculated.

Simple Offset uses your Bend Angle exactly as entered — it does not search for the smallest fitting angle the way the regular Offset calculator does.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Bend Radius — The centerline radius of your bender shoe.

Bend Angle — The angle you chose for both bends.

Offset — The vertical displacement you need to clear.

Answers

Conduit Length — Total length of conduit you need for this offset.

Offset Length — The straight-line length consumed by the offset itself, from the start of the first bend to the finish of the second bend.

Shrink — How much horizontal run length the offset consumes compared to a straight piece of conduit. Subtract this from your overall run measurement when laying out the next mark.

Start To Start — Distance from the start mark of the first bend to the start mark of the second bend. This is the measurement you transfer to the conduit.

Travel — Arc length consumed by a single bend at the entered Bend Angle and Bend Radius.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

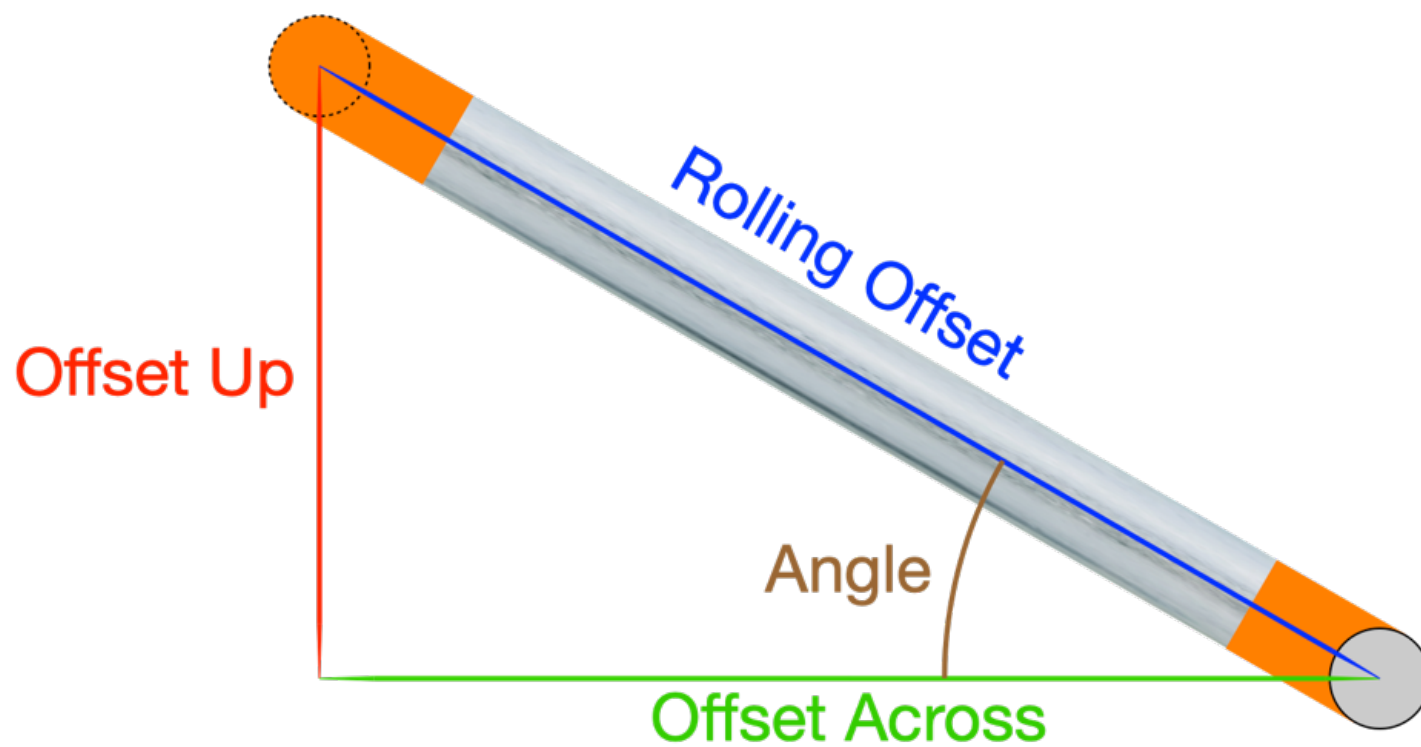
Top Right - Tap to see the help file for this screen.

Other Buttons

Segments - Splits a single bend's travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Rolling Offset



Overview

A rolling offset moves a conduit in two planes at the same time — both horizontal and vertical — so the run navigates around an obstacle that's offset diagonally rather than straight up, down, or to the side.

Use Right Triangle to solve a rolling offset.

Hypotenuse is the rolling offset.

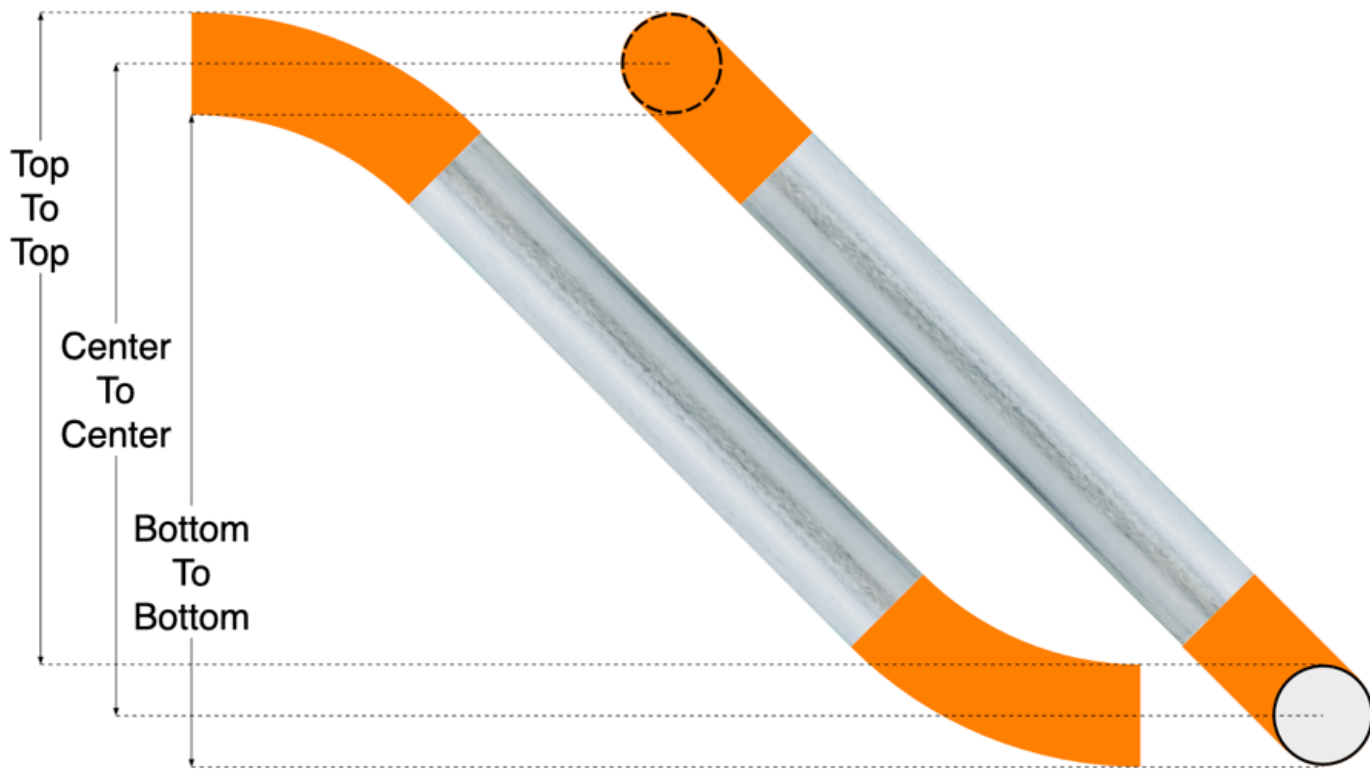
Altitude is how far up the offset is.

Length is how far over the offset is.

Angle is the angle that the offset will roll over.

Use Offset or Simple Offset to solve the rolling offset.

Measure Offset



Overview

Bend Aid always solves the center line of the conduit.

An offset can be measured

Top To Top

Center to Center

Bottom To Bottom

These measurements are all the same.

It is possible to measure Top To Bottom if you allow for the outside diameter (OD) of the conduit.

Saddles Menu

Saddles



3 Point

>



3 Point Rack

>



3 Point Concentric

>



4 Point

>



4 Point Rack

>



4 Point Concentric

>

Saddles Menu Help

Overview

Bend Aid does not solve saddles directly, use the other solutions and lay out two offsets on one section of conduit.

A saddle is two offsets, which means four bends.

The offsets may be different heights, lengths, radii, or bend angles depending on your needs.

Tips

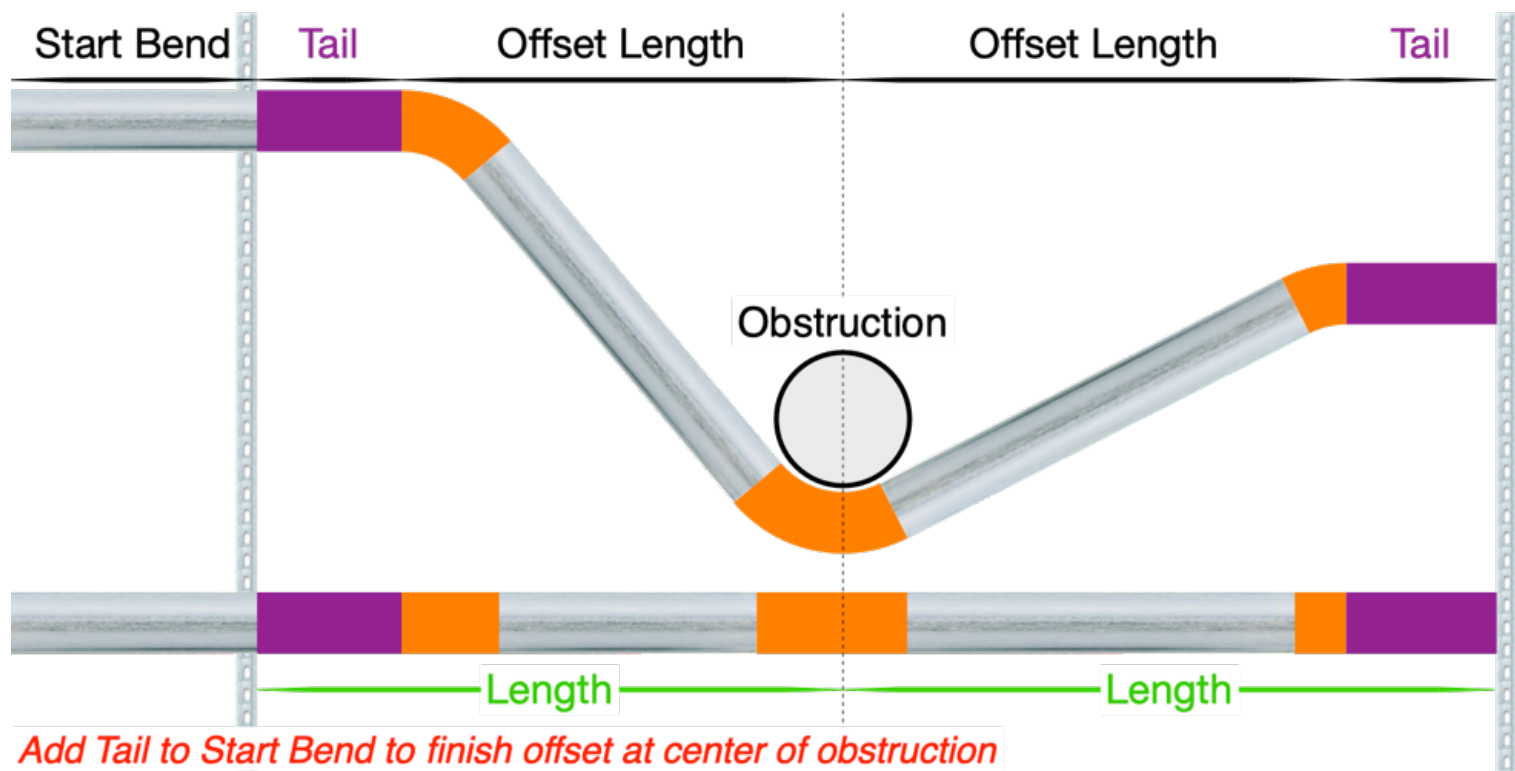
- Measure the height of the obstruction to determine your offset height.
- Use smaller bend angles for a gentler saddle that's easier to bend.
- Use steeper angles when you need to minimize the length consumed by the saddle.
- Remember: each offset in the saddle can have different parameters if needed.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen

3 Point Saddle



Overview

Bend Aid does not solve saddles directly, use the offset solution and lay out two offsets on one section of conduit.

A saddle is two offsets, which means four bends.

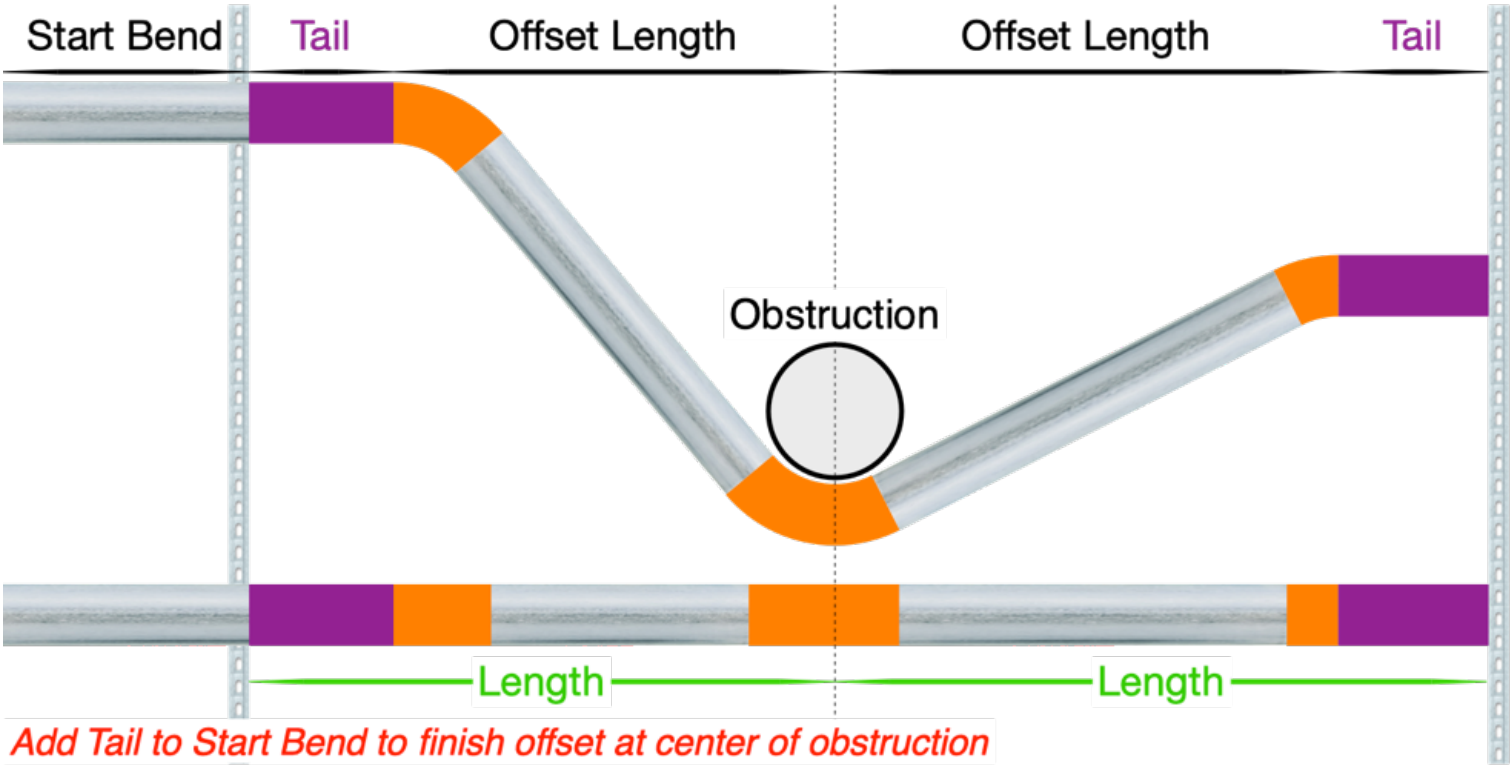
A 3 point saddle has no straight conduit between the second and third bends.

The offsets are usually the same but they can be different offsets, lengths, or bend angles.

Lay out the first offset to finish at the obstruction by adding the tail of the first offset to the start of the first bend.

Add the second bend to the third bend to bend them as one bend but remember not to go over 90 degrees in one bend, don't go over 45 degrees per bend on a 3 point saddle.

3 Point Rack



Overview

Bend Aid does not solve saddles directly, use the offset rack solution and lay out two offsets on one section of conduit.

A saddle is two offsets, ie. four bends.

A 3 point saddle has no straight conduit between the second and third bends.

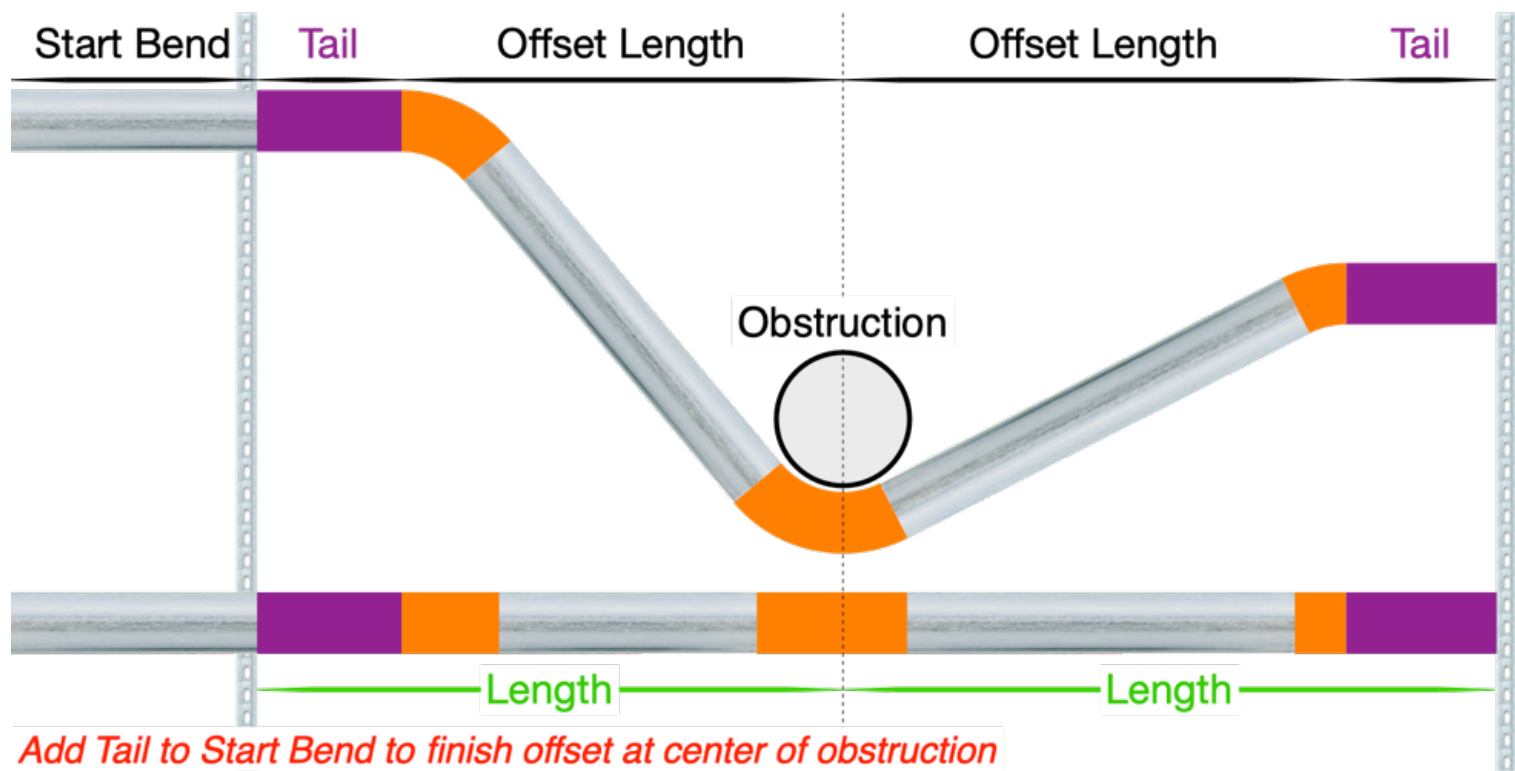
A rack of saddles has multiple conduits run side-by-side, each forming a 3-point saddle.

All conduits use the same bend radius.

Lay out the first offset to finish at the obstruction by adding the tail of the first offset to the start of the first bend.

Add the second bend to the third bend to bend them as one bend but remember not to go over 90 degrees in one bend, don't go over 45 degrees per bend on a 3 point saddle.

3 Point Concentric



Overview

Bend Aid does not solve saddles directly, use the offset concentric solution and lay out two offsets on one section of conduit.

A saddle is two offsets, or four bends.

A 3 point saddle has no straight conduit between the second and third bends.

The offsets are usually the same but they can be different offsets, lengths, radii, or bend angles.

Concentric saddles have multiple conduits run side-by-side, each forming a 3-point saddle.

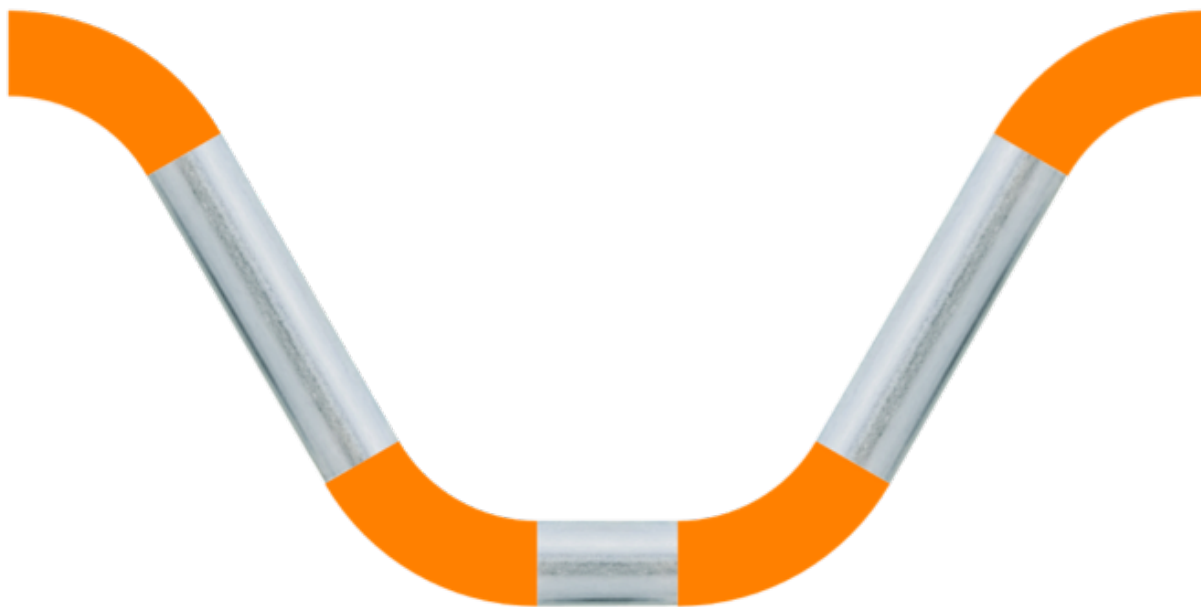
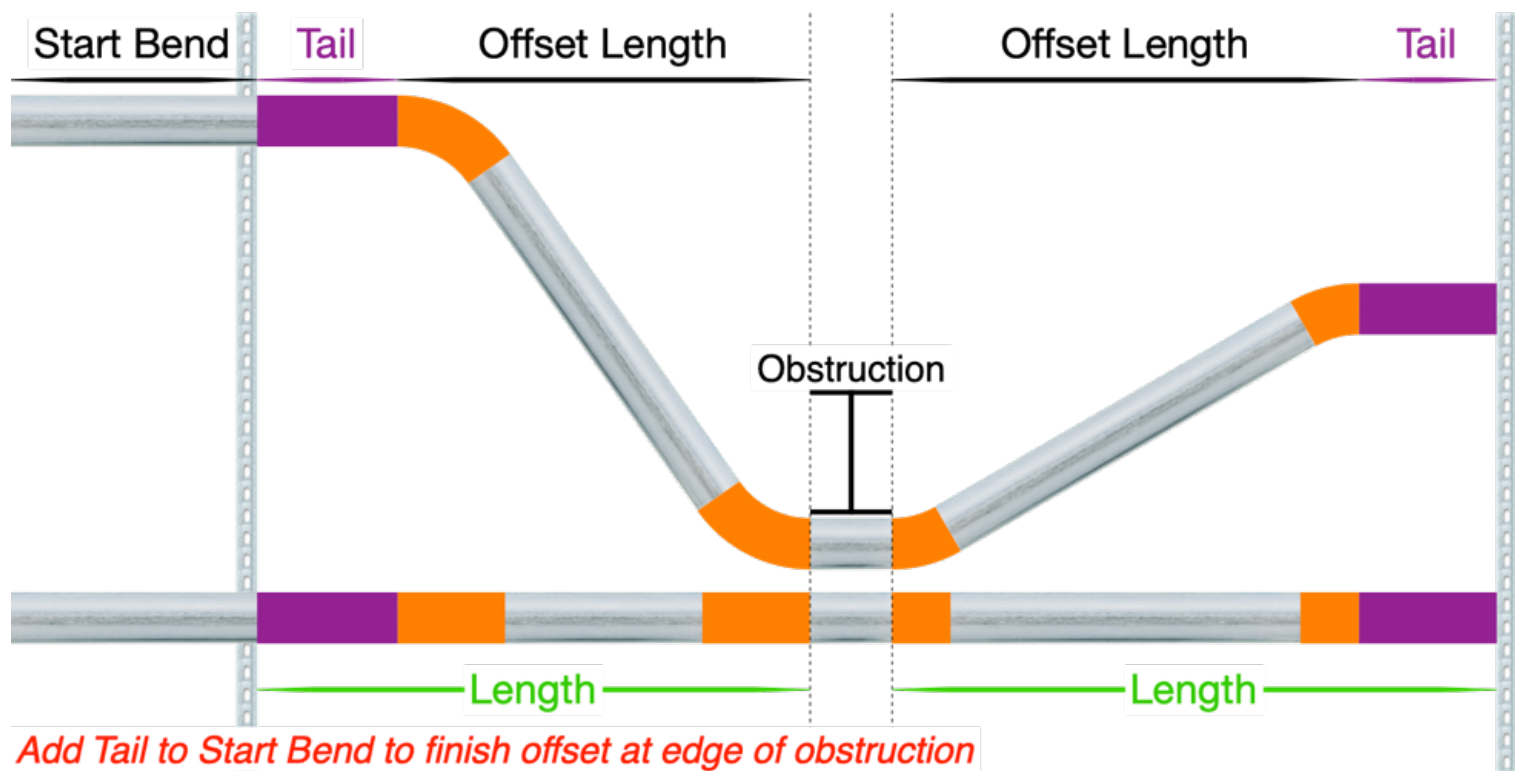
Each conduit uses a progressively larger bend radius to keep the bends parallel.

The bend radius increases by the center-to-center spacing for each conduit.

Lay out the first offset to finish at the obstruction by adding the tail of the first offset to the start of the first bend.

Add the second bend to the third bend to bend them as one bend but remember not to go over 90 degrees in one bend, don't go over 45 degrees per bend on a 3 point saddle.

4 Point Saddle



Overview

Bend Aid does not solve saddles directly, use the offset solution and lay out two offsets on one section of conduit.

A saddle is two offsets, or four bends.

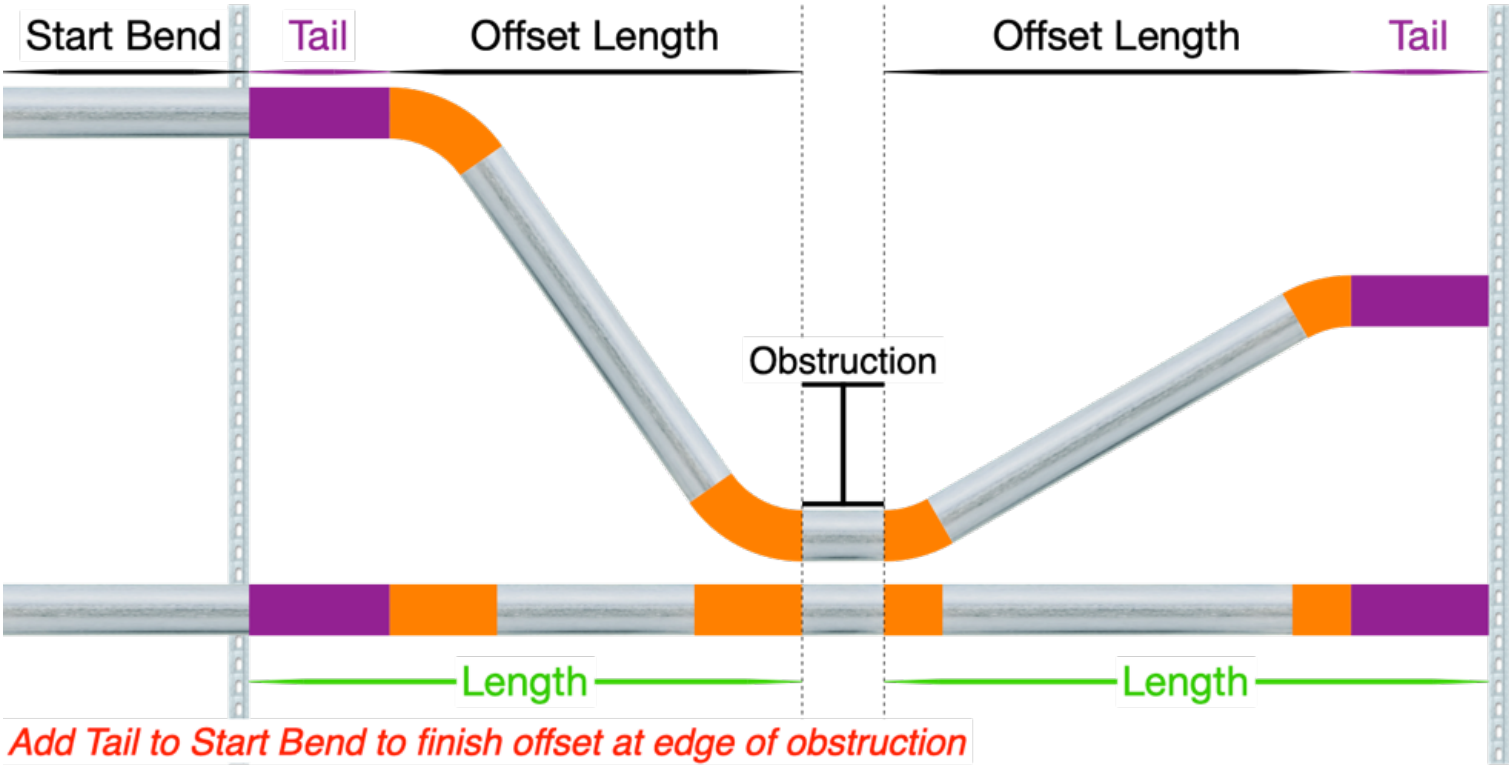
A 4 point saddle has straight conduit between the second and third bends.

The offsets are usually the same but they can be different offsets, lengths, radii, or bend angles.

Lay out the first offset to finish at the obstruction by adding the tail of the first offset to the start of the first bend.

Add the width of the obstruction so that it is between the two offsets, and then lay out the second offset.

4 Point Rack



Overview

Bend Aid does not solve saddles directly, use the offset rack solution and lay out two offsets on one section of conduit.

A 4 point saddle is two offsets with some straight conduit between the second and third bends.

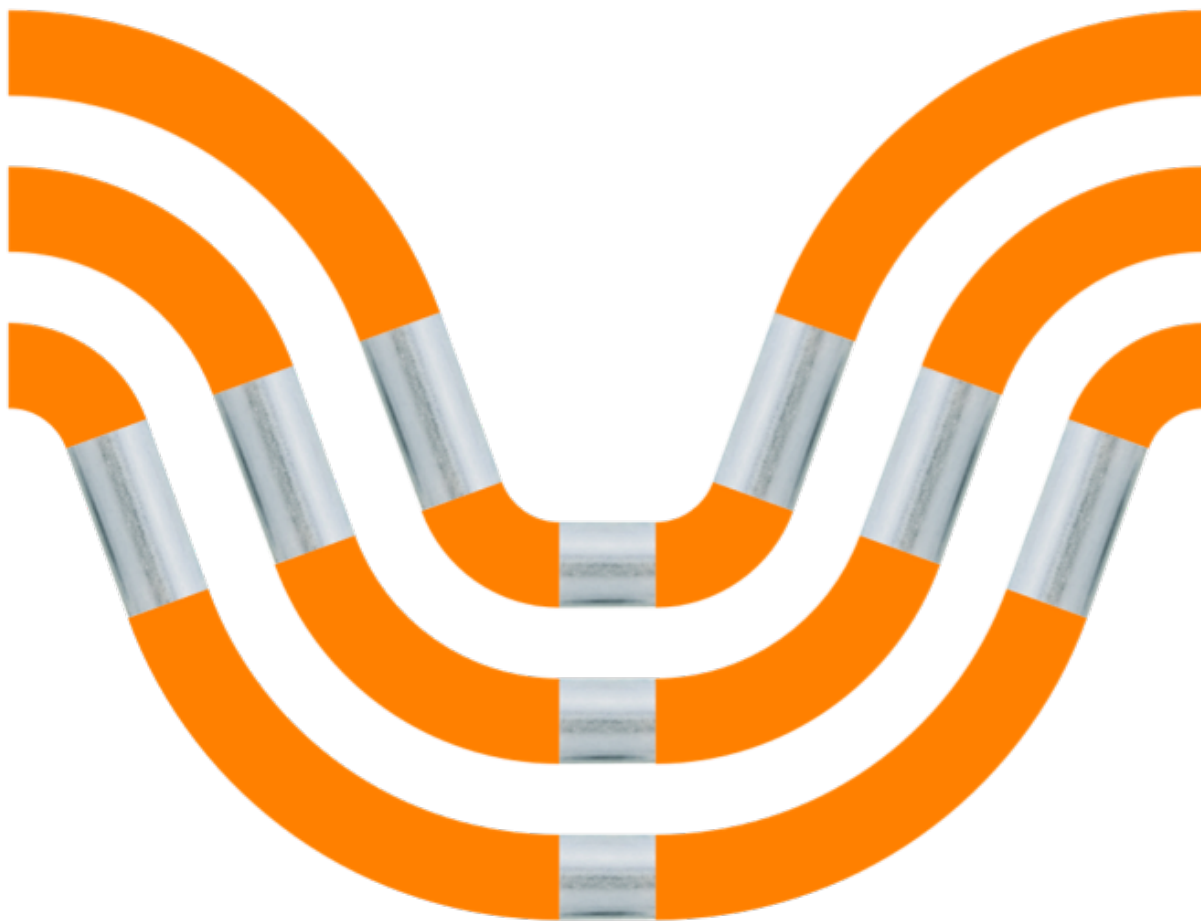
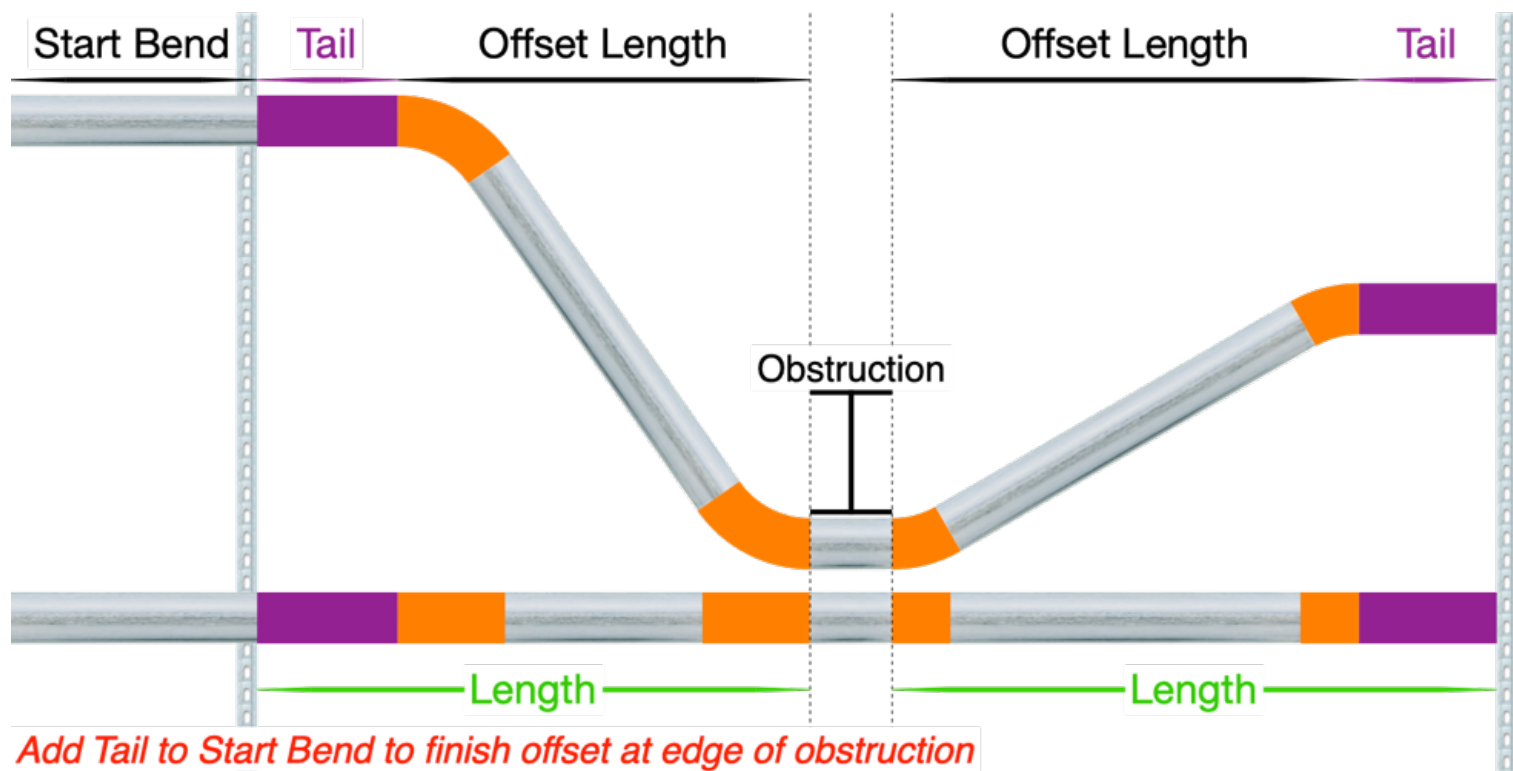
A rack of saddles has multiple conduits run side-by-side, each forming a 4-point saddle.

All conduits use the same bend radius.

Lay out the first offset to finish at the obstruction by adding the tail of the first offset to the start of the first bend.

Add the width of the obstruction so that it is between the two offsets, and then lay out the second offset.

4 Point Concentric



Overview

Bend Aid does not solve saddles directly, use the offset concentric solution and lay out two offsets on one section of conduit

Concentric saddles have multiple conduits run side-by-side, each forming a 4-point saddle.

Each conduit uses a progressively larger bend radius to keep the bends parallel.

The bend radius increases by the center-to-center spacing for each conduit.

Lay out the first offset to finish at the obstruction by adding the tail of the first offset to the start of the first bend.

Add the width of the obstruction so that it is between the two offsets, and then lay out the second offset.

Kicks Menu



Kicks

[Help](#)



Kick

>



Kick Rack

>



Kick Concentric

>



Simple Kick

>



Rack To Horizontal

>



Concentric To Horizontal

>



Rack To Vertical

>



Concentric To Vertical

>

Kicks Menu Help

Kicks are single bends used to shift a conduit to change its direction — typically to step off a panel, clear an obstruction, or transition between a vertical and a horizontal run. Bend Aid solves the kick from the end of the conduit through the bend and out to the finish dimension.

Kick

A single kick in a single piece of conduit. Enter Bend Radius, Start Bend, and any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle) and Bend Aid solves the rest.

Kick Rack

Several conduits run side-by-side with the same bend radius. Each conduit is kicked outward from the first by one center spacing.

Enter the conduit count and center spacing in addition to the standard kick variables. The Answers screen steps through each conduit with Previous and Next.

Kick Concentric

Several conduits run side-by-side with the bends staying parallel — each conduit uses a progressively larger bend radius (bend radius + center to center spacing for each step out).

Enter the conduit count and concentric center spacing in addition to the standard kick variables. The Answers screen steps through each conduit with Previous and Next.

Simple Kick

A streamlined kick entry for quick layouts when you don't need every variable broken out. Use this when you have the kick and bend angle and want a fast answer.

Rack To Horizontal

A rack of conduits transitioning from vertical to horizontal — each conduit shares the same bend radius and is offset outward by one center spacing.

Enter the conduit count and center spacing in addition to the standard kick variables. The Answers screen steps through each conduit with Previous and Next.

Concentric To Horizontal

A concentric group of conduits transitioning from vertical to horizontal — the bends stay parallel and each conduit uses a progressively larger bend radius.

Enter the conduit count and concentric center spacing in addition to the standard kick variables. The Answers screen steps through each conduit with Previous and Next.

Rack To Vertical

A rack of conduits transitioning from horizontal to vertical — each conduit shares the same bend radius and is offset outward by one center spacing.

Enter the conduit count and center spacing in addition to the standard kick variables. The Answers screen steps through each conduit with Previous and Next.

Concentric To Vertical

A concentric group of conduits transitioning from horizontal to vertical — the bends stay parallel and each conduit uses a progressively larger bend radius.

Enter the conduit count and concentric center spacing in addition to the standard kick variables. The Answers screen steps through each conduit with Previous and Next.

Common Inputs

- Bend Radius — the centerline radius of your bender shoe or whatever bend radius you want, either to match existing larger conduit or to meet a certain wire bend radius.
- Start Bend — the distance from the end of the conduit to the start of the bend.
- Number Format — pick Decimal, 1/16", 1/32", or Metric at the top of each Enter screen. The format carries through to Answers but can be changed at any time.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Enter Kick

Enter

Help

Kick

The diagram illustrates a bent pipe. A red vertical line on the left is labeled 'Kick'. A green horizontal line at the bottom is labeled 'Length'. A brown arc between the horizontal and the pipe is labeled 'Angle'. A blue line along the pipe's axis is labeled 'Hypotenuse'. A black line from the center of the bend to the pipe is labeled 'Bend Radius'. The bend itself is highlighted in orange.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Bend Radius

9

Enter Any Two

Kick

12

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Kick Help

Overview

A kick is a single bend that redirects the conduit at the end of a run — typically to drop into a panel or junction box. It's the simplest of the bend types: one bend, one angle.

Enter the Bend Radius and any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle), and Bend Aid solves the rest.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

1. Select the number format you want to use for entering values
2. Enter the Bend Radius (the centerline radius of your bender shoe)
3. Tap any two variables (Kick, Length, Hypotenuse, or Angle) to enter values
4. Tap the 'Answers' button to see the solved kick
5. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch

- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Bend Radius

Enter Any Two

-  Kick - The vertical displacement at the end of the run
-  Length - The horizontal distance from the start of the bend to where the conduit lands
-  Hypotenuse - The straight-line distance through the kick
-  Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Bend Radius is required
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

Kick vs. Offset

Offset - two bends that take the conduit to a parallel line and back. Used to navigate around an obstruction.

Kick - a single bend that redirects the conduit and leaves it at the new angle. Used at the end of a run, typically to land in a panel.

Answers Kick

<

Answers

Help

Kick

Conduit Length

Kick Length

Start Bend

Tail

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Select Number Format

0.0

1/16

1/32

mm

Entered

Bend Radius

9"

Kick

12"

Length

48"

Hypotenuse

49 1/2"

Angle

14.04 °

Answers

Conduit Length

49 9/16"

Kick Length

46"

Tail

2"

Start Bend

45 3/16"

Bend Angle

15 °

Travel

2 3/8"

Segments

Return To Main Menu

Answers Kick Help

Overview

The Answers screen displays the full solution to your kick — every measurement you need to lay out and bend the conduit.

The Entered section echoes the values you put in on the Enter screen so you can verify them at a glance. The Answers section is what Bend Aid calculated for you.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Bend Radius

-  Kick - The vertical displacement at the end of the run
-  Length - The horizontal distance from the start of the bend to where the conduit lands
-  Hypotenuse - The straight-line distance through the kick
-  Angle - The bend angle you entered (in degrees)

Answers

Conduit Length — Total length of conduit you need for this kick.

Kick Length — The straight-line length consumed by the kick itself, from the start of the bend to where the conduit lands.

Tail — The length of conduit from the finish of the bend to the entered length.

Start Bend — Where to make the bend mark from the end of the conduit.

Bend Angle — The whole-degree angle Bend Aid chose.

Bend Aid starts at the entered angle and steps up one degree at a time until the kick fits.

Travel — Arc length consumed by the bend at this angle and bend radius.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Segments - Splits the bend's travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

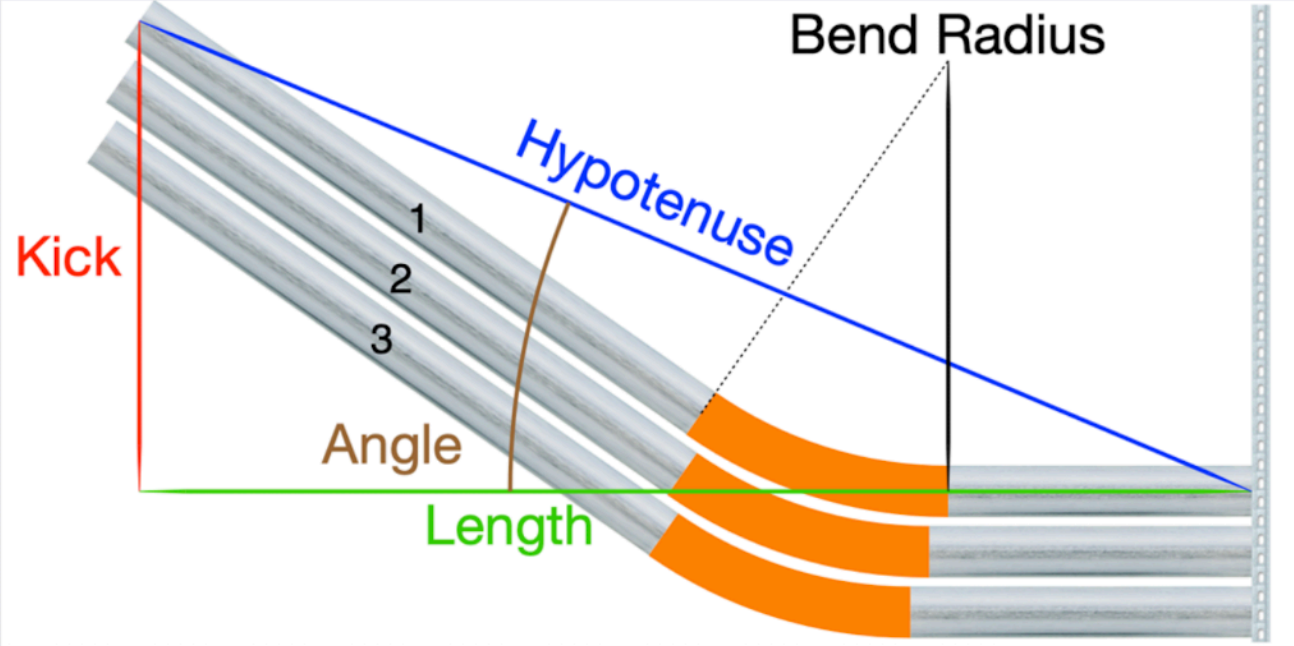
Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Kick Rack

Enter

Help

Kick Rack



Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

-

+

Bend Radius

9

Center Spacing

4

Enter Any Two

Kick

12

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Kick Rack Help

Overview

Bend Aid solves a kick rack — several conduits running side-by-side that all use the same bend radius, each offset outward from the first by one center spacing. Each conduit gets a single bend that redirects it at the end of the run.

Enter the number of conduits, the Bend Radius, and the Center Spacing. Then enter any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle) for the inside conduit and Bend Aid solves the rest for every conduit in the rack.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the rack
3. Enter the Bend Radius (the centerline radius of your bender shoe — same for every conduit in a rack)
4. Enter the Center Spacing (the distance between adjacent conduit centerlines)
5. Tap any two variables (Kick, Length, Hypotenuse, or Angle) to enter values for the inside conduit
6. Tap the 'Answers' button to see the solution for every conduit in the rack

7. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Center Spacing

Enter Any Two

 Kick - The vertical displacement at the end of the inside conduit

 Length - The horizontal distance from the start of the bend to where the inside conduit lands

 Hypotenuse - The straight-line distance through the kick on the inside conduit

 Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Center Spacing is required
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the rack.

Answers Kick Rack

Answers

Help

Kick Rack

Conduit Length

Kick Length

Start Bend

Tail

X

X

Travel

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Select Number Format

0.0

1/16

1/32

mm

Entered

Number Of Conduits

3

Bend Radius

9"

Center Spacing

4"

Kick

12"

Length

48"

Hypotenuse

49 1/2"

Angle

14.04 °

Answers

Conduit Number

1

Conduit Length

49 9/16"

Kick Length

46"

Tail

2"

Start Bend

45 3/16"

Bend Angle

15 °

Travel

2 3/8"

Previous

Next

Segments

Return To Main Menu

Answers Kick Rack Help

Overview

The Answers screen displays the full solution to your kick rack. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

Use Previous and Next under the Answers section to step through every conduit in the rack. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Entered

Number Of Conduits

Bend Radius

Center Spacing

 Kick - The vertical displacement at the end of the inside conduit

- Length - The horizontal distance from the start of the bend to where the inside conduit lands
- Hypotenuse - The straight-line distance through the kick on the inside conduit
- Angle - The angle you entered, in degrees, not the bend angle

Answers

Conduit Number — Which conduit in the rack you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Kick Length — The straight-line length consumed by the kick on this conduit, from the start of the bend to where the conduit lands.

Tail — The length of conduit from the finish of the bend to the entered length, on this conduit.

Start Bend — Where to make the bend mark from the end of the conduit. Same for every conduit in the rack.

Bend Angle — The whole-degree angle Bend Aid chose for the bend. Same for every conduit in a rack.

Travel — Arc length consumed by the bend at this angle and bend radius. Same for every conduit in the rack.

Highlighted rows (Conduit Number, Conduit Length, Kick Length, Tail) are the values that change as you step through the rack with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the rack. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the bend's travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Kick Concentric

Enter

Help

Kick Concentric

The diagram illustrates a kick concentric bend for three conduits. A red vertical line on the left is labeled 'Kick'. A green horizontal line from the kick point to the start of the bend is labeled 'Length'. A brown arc indicating the bend angle is labeled 'Angle'. A blue line connecting the kick point to the end of the bend is labeled 'Hypotenuse'. A black line from the center of the bend to the end of the bend is labeled 'Bend Radius'. The conduits are numbered 1, 2, and 3 from top to bottom. The bend area is highlighted in orange.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

-

+

Bend Radius

9

Center Spacing

4

Enter Any Two

Kick

12

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Kick Concentric Help

Overview

Bend Aid solves a concentric kick — several conduits running side-by-side with the bends staying parallel. Each conduit uses a progressively larger bend radius (the inside conduit's Bend Radius plus one Center Spacing for each step out), so the curves stay concentric instead of fanning apart.

Each conduit gets a single bend that redirects it at the end of the run. Enter the number of conduits, the Bend Radius for the inside conduit, and the Center Spacing. Then enter any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle) for the inside conduit and Bend Aid solves the rest for every conduit.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the set
3. Enter the Bend Radius for the inside conduit (the centerline radius of your bender shoe). Outer conduits use a larger radius automatically.
4. Enter the Center Spacing (the distance between adjacent conduit centerlines — this is also how much each outer bend radius grows)

5. Tap any two variables (Kick, Length, Hypotenuse, or Angle) to enter values for the inside conduit
6. Tap the 'Answers' button to see the solution for every conduit
7. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Center Spacing

Enter Any Two

 Kick - The vertical displacement at the end of the inside conduit

 Length - The horizontal distance from the start of the bend to where the inside conduit lands

● Hypotenuse - The straight-line distance through the kick on the inside conduit

● Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Center Spacing is required
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the concentric set.

Concentric vs. Rack

Rack - every conduit uses the same Bend Radius and is offset outward by one Center Spacing. Curves are parallel but not concentric.

Concentric - every conduit uses a larger Bend Radius (bend radius + center to center spacing for each step out) so the curves share a common center. The bends stay parallel through the kick, which matters for tight installations.

Answers Kick Concentric

Answers

Help

Kick Concentric

Conduit Length

Kick Length

Start Bend

Tail

X

Travel

X

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Select Number Format

0.0

1/16

1/32

mm

Entered

Number Of Conduits

3

Bend Radius

9"

Center Spacing

4"

Kick

12"

Length

48"

Hypotenuse

49 1/2"

Angle

14.04 °

Answers

Conduit Number

1

Conduit Length

49 9/16"

Kick Length

46"

Tail

2"

Start Bend

45 3/16"

Bend Angle

15 °

Bend Radius

9"

Travel

2 3/8"

Previous

Next

Segments

Return To Main Menu

Answers Kick Concentric Help

Overview

The Answers screen displays the full solution to your concentric kick. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

Each conduit in a concentric set uses a different bend radius (the inside conduit's radius plus one Center Spacing for each step out), which means each conduit also has a different travel. That's why Bend Radius and Travel are listed per conduit and change as you step through the set.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Number Of Conduits

Bend Radius

Center Spacing

 Kick - The vertical displacement at the end of the inside conduit

 Length - The horizontal distance from the start of the bend to where the inside conduit lands

 Hypotenuse - The straight-line distance through the kick on the inside conduit

 Angle - The bend angle you entered (in degrees)

Answers

Conduit Number — Which conduit in the set you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Kick Length — The straight-line length consumed by the kick on this conduit.

Tail — The length of conduit from the finish of the bend to the entered length. Same for every conduit in the set.

Start Bend — Where to make the bend mark from the end of the conduit. Same for every conduit in the set.

Bend Angle — The whole-degree angle Bend Aid chose. Same for every conduit in a concentric set.

Bend Radius — The bend radius for this specific conduit. Grows by one Center Spacing for each step outward from the inside conduit.

Travel — Arc length consumed by the bend on this conduit at its bend radius. Grows along with the bend radius.

Highlighted rows (Conduit Number, Conduit Length, Kick Length, Bend Radius, Travel) are the values that change as you step through the set with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the concentric set. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the current conduit's travel into equal-degree shots. Because each conduit has its own travel, the segment breakdown changes as you step through the set.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

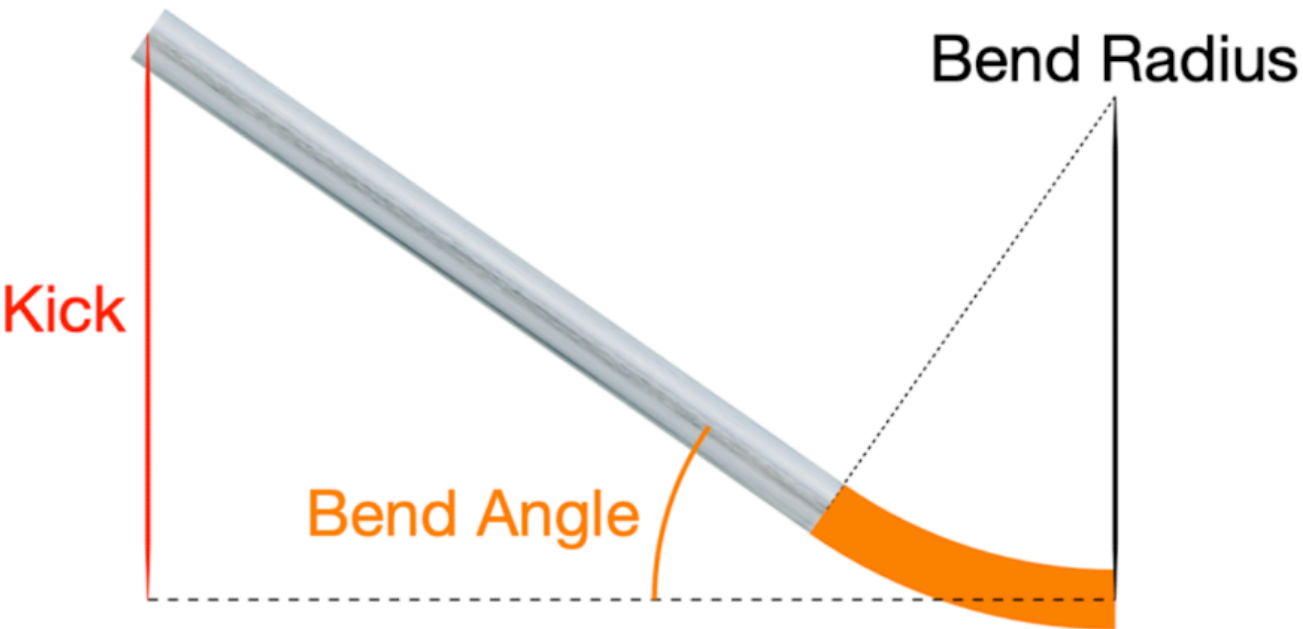
Enter Simple Kick

<

Enter

Help

Simple Kick



Select Number Format

0.0

1/16

1/32

mm

Enter All

Bend Radius	9
Bend Angle	30°
Kick	12

Answers

Enter Simple Kick Help

Overview

Simple Kick is the streamlined version of the kick calculator. Tell Bend Aid your Bend Radius, the exact Bend Angle you want to use, and the Kick — it solves the rest.

Unlike the regular Kick calculator, Simple Kick does not search for the smallest fitting angle. It uses the bend angle you give it exactly. Pick this when you know which angle you want to bend (for example, the calibrated mark on your shoe).

1. Select the number format you want to use for entering values
2. Enter the Bend Radius
3. Enter the Bend Angle you want to use
4. Enter the Kick you need at the end of the run
5. Tap the 'Answers' button to see the solved kick
6. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Bend Radius

Bend Angle

Kick

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Bend Radius is required
- Bend Angle is required and must be less than 90°
- Kick is required
- The result is exact for the angle you entered — Bend Aid does not adjust it

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

Simple Kick vs. Kick

Kick - enter any two of four right-triangle variables and Bend Aid finds the smallest whole-degree bend angle that fits.

Simple Kick - enter the bend angle you want to use directly. Bend Aid doesn't search; it uses your angle as-is. Faster, but you choose the angle instead of getting the smallest fitting one.

Answers Simple Kick

Answers

Help

Simple Kick

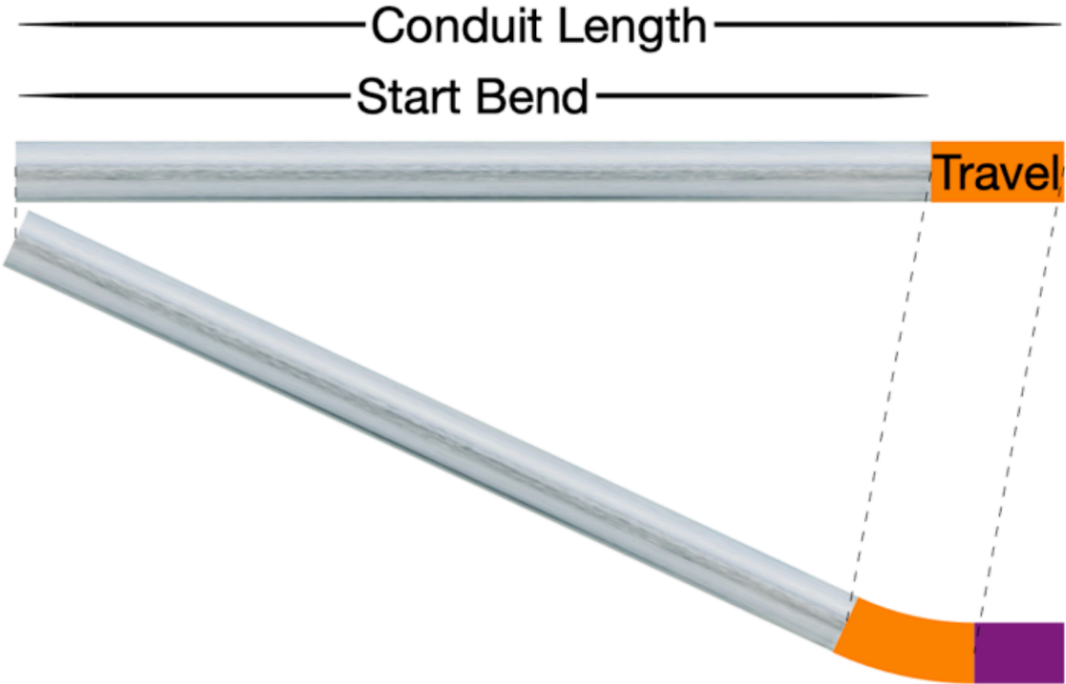
Conduit Length

Start Bend

Travel

Kick Length

Shrink



Select Number Format

0.0

1/16

1/32

mm

Entered

Bend Radius

9"

Bend Angle

30 °

Kick

12"

Answers

Conduit Length

26 ⁵/₁₆"

Kick Length

23 ³/₁₆"

Shrink

3 ¹/₈"

Start Bend

21 ⁹/₁₆"

Travel

4 ¹¹/₁₆"

Segments

Return To Main Menu

Answers Simple Kick Help

Overview

The Answers screen displays the full solution to your Simple Kick. The Entered section echoes the values you put in on the Enter screen; the Answers section is what Bend Aid calculated.

Simple Kick uses your Bend Angle exactly as entered — it does not search for the smallest fitting angle the way the regular Kick calculator does.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Bend Radius — The centerline radius of your bender shoe.

Bend Angle — The angle you chose for the kick.

Kick — The vertical displacement you needed at the end of the run.

Answers

Conduit Length — Total length of conduit you need for this kick.

Kick Length — The straight-line length consumed by the kick itself, from the start of the bend to where the conduit lands.

Shrink — How much horizontal run length the kick consumes compared to a straight piece of conduit. Subtract this from your overall run measurement when laying out the next mark.

Start Bend — Where to make the bend mark from the end of the conduit.

Travel — Arc length consumed by the bend at the entered Bend Angle and Bend Radius.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Segments - Splits the bend's travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

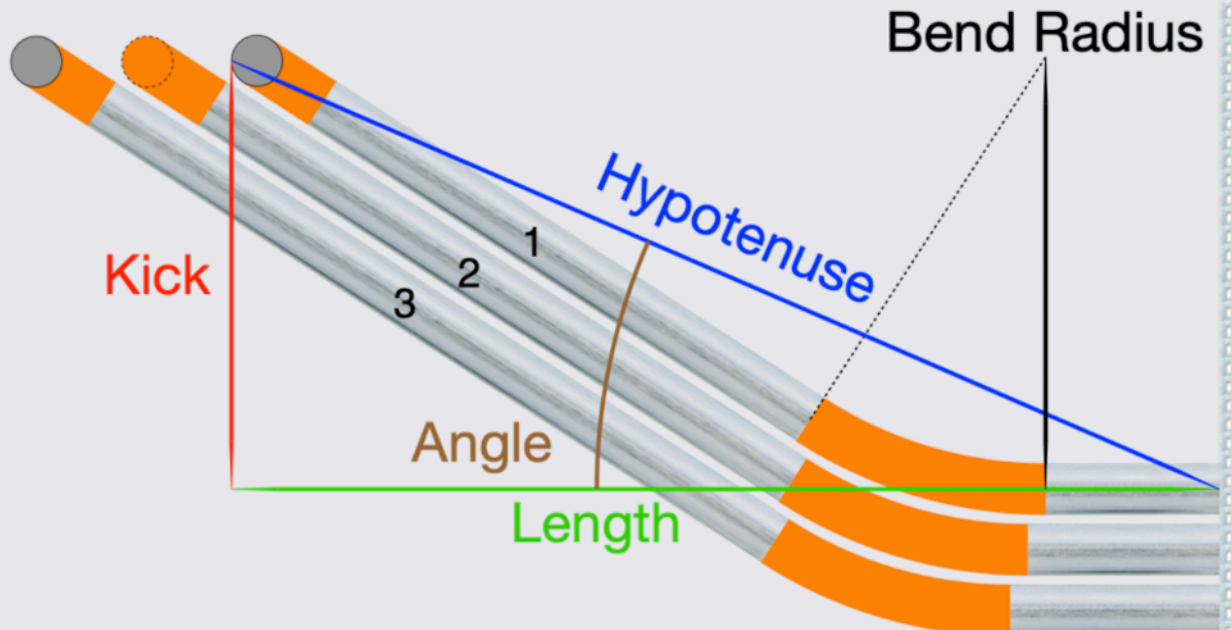
Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Kick Rack To Horizontal

Enter

Help

Rack To Horizontal



Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

— | +

Bend Radius

9

Center Spacing

4

Enter Any Two

Kick

12

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Kick Rack To Horizontal Help

Overview

Bend Aid solves a kick rack that lands horizontally — several conduits running side-by-side, each kicked at the end so the straight portion after the bend runs in a horizontal plane.

All conduits use the same bend radius and are offset outward from the first by one center spacing. The 'to horizontal' geometry adjusts each conduit's marks so the post-bend segments stay aligned in the horizontal plane (rather than fanning out the way they would in a plain kick rack).

Enter the number of conduits, the Bend Radius, and the Center Spacing. Then enter any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle) for the inside conduit and Bend Aid solves the rest for every conduit in the rack.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

Use Rack To Horizontal when a vertical rack of conduits has to kick out and land in a horizontal run — for example, conduits coming up a wall that need to turn and run along a ceiling at the same height.

For a rack where the kicks land at different points (no shared horizontal plane), use the regular Kick Rack instead.

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the rack

3. Enter the Bend Radius (the centerline radius of your bender shoe — same for every conduit in a rack)
4. Enter the Center Spacing (the distance between adjacent conduit centerlines)
5. Tap any two variables (Kick, Length, Hypotenuse, or Angle) to enter values for the inside conduit
6. Tap the 'Answers' button to see the solution for every conduit in the rack
7. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Center Spacing

Enter Any Two

-  Kick - The vertical displacement at the end of the inside conduit
-  Length - The horizontal distance from the start of the bend to where the inside conduit lands
-  Hypotenuse - The straight-line distance through the kick on the inside conduit
-  Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Center Spacing is required
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the rack.

Answers Kick Rack To Horizontal

Answers

Help

Rack To Horizontal

Conduit Length

Kick Length

Start Bend

Tail

X

X

Travel

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Select Number Format

0.0

1/16

1/32

mm

Entered

Number Of Conduits

3

Bend Radius

9"

Center Spacing

4"

Kick

12"

Length

48"

Hypotenuse

49 1/2"

Angle

14.04 °

Answers

Hole Spacing

4 1/16"

Conduit Number

1

Conduit Length

49 9/16"

Kick

12"

Kick Length

46"

Tail

2"

Start Bend

45 3/16"

Bend Angle

15 °

Travel

2 3/8"

Previous

Next

Segments

Return To Main Menu

Answers Kick Rack To Horizontal Help

Overview

The Answers screen displays the full solution to your kick rack that lands horizontally. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

Because each conduit's post-bend run lands in the same horizontal plane, each outer conduit gets a progressively larger Kick (the bend angle is fixed but the outer conduits have farther to go vertically). That's why Kick, Kick Length, Tail, and Start Bend are listed per conduit and change as you step through the rack.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Entered

Number Of Conduits

Bend Radius

Center Spacing

 Kick - The vertical displacement at the end of the inside conduit

 Length - The horizontal distance from the start of the bend to where the inside conduit lands

 Hypotenuse - The straight-line distance through the kick on the inside conduit

 Angle - The angle you entered, in degrees, not the bend angle

Answers

Hole Spacing — The spacing between the conduit holes on the entry side of the rack (before the kick). Same for the whole rack.

Conduit Number — Which conduit in the rack you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Kick — The vertical displacement this specific conduit travels through. Outer conduits have a larger Kick than the inside conduit by one Center Spacing per step out.

Kick Length — The straight-line length consumed by this conduit's kick.

Tail — The length of conduit from the finish of the bend to the entered length, on this conduit.

Start Bend — Where to make the bend mark on this conduit, measured from the end of the conduit.

Bend Angle — The whole-degree angle Bend Aid chose. Same for every conduit in the rack.

Travel — Arc length consumed by the bend at this angle and bend radius. Same for every conduit in the rack.

Highlighted rows (Conduit Number, Conduit Length, Kick, Kick Length, Tail, Start Bend) are the values that change as you step through the rack with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the rack. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the bend's travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Kick Concentric To Horizontal

Enter

Help

Concentric To Horizontal

The diagram illustrates a cable bend. Three parallel cables are shown, with the middle one being the focus. A red vertical line labeled 'Kick' represents the offset from the horizontal. A green horizontal line labeled 'Length' represents the distance from the kick to the bend. A brown arc labeled 'Angle' represents the bend angle. A blue line labeled 'Hypotenuse' connects the end of the kick to the end of the length. A black line labeled 'Bend Radius' represents the radius of the bend. The cables are numbered 1, 2, and 3 from top to bottom.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

-

+

Bend Radius

9

Center Spacing

4

Enter Any Two

Kick

12

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Kick Concentric To Horizontal Help

Overview

Bend Aid solves a concentric kick that lands horizontally — several conduits running side-by-side that get kicked at the end so the straight portion after the bend runs in a horizontal plane. Each conduit uses a progressively larger bend radius (the inside conduit's Bend Radius plus one Center Spacing for each step out), so the curves stay concentric.

This combines the two specialty patterns: concentric keeps the curves parallel through the bend, and 'to horizontal' adjusts each conduit's marks so the post-bend segments stay aligned in the same horizontal plane.

Enter the number of conduits, the Bend Radius for the inside conduit, and the Center Spacing. Then enter any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle) for the inside conduit and Bend Aid solves the rest for every conduit.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

Use Concentric To Horizontal when a rack of conduits has to kick out and land in the same horizontal plane AND you need the bends to stay geometrically concentric — for example, conduits coming up a wall in a tight chase where the bends have to nest, and they all turn out along a ceiling at the same height.

For a rack-to-horizontal where the bends don't need to be concentric (curves fan slightly), use Rack To Horizontal instead. For a concentric kick where the lands don't need to be coplanar, use Kick Concentric.

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the set
3. Enter the Bend Radius for the inside conduit (the centerline radius of your bender shoe). Outer conduits use a larger radius automatically.
4. Enter the Center Spacing (the distance between adjacent conduit centerlines — this is also how much each outer bend radius grows)
5. Tap any two variables (Kick, Length, Hypotenuse, or Angle) to enter values for the inside conduit
6. Tap the 'Answers' button to see the solution for every conduit
7. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Center Spacing

Enter Any Two

 Kick - The vertical displacement at the end of the inside conduit

 Length - The horizontal distance from the start of the bend to where the inside conduit lands

 Hypotenuse - The straight-line distance through the kick on the inside conduit

 Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Center Spacing is required

- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the set.

Answers Kick Concentric To Horizontal

<
Answers
Help

Concentric To Horizontal

Select Number Format

0.0
1/16
1/32
mm

Entered

Number Of Conduits	3
Bend Radius	9
Center Spacing	4
Kick	12
Length	48
Hypotenuse	49.4773
Angle	14.0362 °

Answers

Hole Spacing	4.1411
Conduit Number	1
Conduit Length	49.5663
Kick	12
Kick Length	45.9695
Tail	2.03052
Start Bend	45.1796
Bend Angle	15 °
Bend Radius	9
Travel	2.35619

Previous
Next

Segments

Return To Main Menu

Answers Kick Concentric To Horizontal Help

Overview

The Answers screen displays the full solution to your concentric kick that lands horizontally. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

Each conduit has two variables that change: each outer conduit uses a larger Bend Radius (so the curves stay concentric) AND each outer conduit's Kick grows by one Center Spacing (so the post-bend run lands in the same horizontal plane). That's why most of the per-conduit answers shift as you step through the set.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Number Of Conduits

Bend Radius

Center Spacing

 Kick - The vertical displacement at the end of the inside conduit

 Length - The horizontal distance from the start of the bend to where the inside conduit lands

 Hypotenuse - The straight-line distance through the kick on the inside conduit

 Angle - The angle you entered, in degrees, not the bend angle

Answers

Hole Spacing — The spacing between the conduit holes on the entry side of the rack (before the kick). Same for the whole set.

Conduit Number — Which conduit in the set you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Kick — The vertical displacement this specific conduit travels through. Outer conduits have a larger Kick than the inside conduit by one Center Spacing per step out.

Kick Length — The straight-line length consumed by this conduit's kick.

Tail — The length of conduit from the finish of the bend to the entered length. Same for every conduit in the set.

Start Bend — Where to make the bend mark on this conduit, measured from the end of the conduit.

Bend Angle — The whole-degree angle Bend Aid chose. Same for every conduit in the set.

Bend Radius — The bend radius for this specific conduit. Grows by one Center Spacing for each step outward from the inside conduit.

Travel — Arc length consumed by the bend on this conduit at its bend radius. Grows along with the bend radius.

Highlighted rows (Conduit Number, Conduit Length, Kick, Kick Length, Start Bend, Bend Radius, Travel) are the values that change as you step through the set with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the set. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the current conduit's travel into equal-degree shots. Because each conduit has its own travel, the segment breakdown changes as you step through the set.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Kick Rack To Vertical

<

Enter

Help

Rack To Vertical

The diagram illustrates a kick rack bend. A vertical red line on the left is labeled 'Kick'. A horizontal green line at the bottom is labeled 'Length'. A blue line representing the hypotenuse of the bend is labeled 'Hypotenuse'. A brown arc representing the angle of the bend is labeled 'Angle'. A vertical black line from the center of the bend to the horizontal line is labeled 'Bend Radius'. Three conduits are shown bending from the vertical to the horizontal. Orange curved segments highlight the bend area.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

- | +

Bend Radius

9

Center Spacing

4

Enter Any Two

Kick

12

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Kick Rack To Vertical Help

Overview

Bend Aid solves a kick rack that lands vertically — several conduits running side-by-side, each kicked at the end so the straight portion after the bend runs in a vertical plane.

All conduits use the same bend radius and are offset outward from the first by one center spacing. The 'to vertical' geometry adjusts each conduit's marks so the post-bend segments stay aligned in the vertical plane (rather than fanning out the way they would in a plain kick rack).

Enter the number of conduits, the Bend Radius, and the Center Spacing. Then enter any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle) for the inside conduit and Bend Aid solves the rest for every conduit in the rack.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

Use Rack To Vertical when a horizontal rack of conduits has to kick out and land in a vertical run — for example, conduits running along a ceiling that need to turn and drop down a wall at the same horizontal offset.

For a rack where the kicks land at different points (no shared vertical plane), use the regular Kick Rack instead. For a rack that lands horizontally, use Rack To Horizontal.

1. Select the number format you want to use for entering values

2. Enter the Number Of Conduits in the rack
3. Enter the Bend Radius (the centerline radius of your bender shoe — same for every conduit in a rack)
4. Enter the Center Spacing (the distance between adjacent conduit centerlines)
5. Tap any two variables (Kick, Length, Hypotenuse, or Angle) to enter values for the inside conduit
6. Tap the 'Answers' button to see the solution for every conduit in the rack
7. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Center Spacing

Enter Any Two

-  Kick - The displacement at the end of the inside conduit
-  Length - The distance from the start of the bend to where the inside conduit lands
-  Hypotenuse - The straight-line distance through the kick on the inside conduit
-  Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Center Spacing is required
- You must enter exactly two of the four right-triangle variables
- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the rack.

Answers Kick Rack To Vertical

Answers

Help

Rack To Vertical

Conduit Length

Kick Length

Start Bend

Tail

X

X

Travel

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Select Number Format

0.0

1/16

1/32

mm

Entered

Number Of Conduits

3

Bend Radius

9"

Center Spacing

4"

Kick

12"

Length

48"

Hypotenuse

49 1/2"

Angle

14.04 °

Answers

Hole Spacing

4 1/8"

Conduit Number

1

Conduit Length

49 9/16"

Kick

12"

Kick Length

46"

Tail

2"

Start Bend

45 3/16"

Bend Angle

15 °

Travel

2 3/8"

Previous

Next

Segments

Return To Main Menu

Answers Kick Rack To Vertical Help

Overview

The Answers screen displays the full solution to your kick rack that lands vertically. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

Because each conduit's post-bend run lands in the same vertical plane, each outer conduit's Kick is offset from the inside conduit's Kick by one Center Spacing per step out. That's why Kick, Kick Length, Tail, and Start Bend are listed per conduit and change as you step through the rack.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Number Of Conduits

Bend Radius

Center Spacing

- Kick - The displacement at the end of the inside conduit
- Length - The distance from the start of the bend to where the inside conduit lands
- Hypotenuse - The straight-line distance through the kick on the inside conduit
- Angle - The angle you entered, in degrees, not the bend angle

Answers

Hole Spacing — The spacing between the conduit holes on the entry side of the rack (before the kick). Same for the whole rack.

Conduit Number — Which conduit in the rack you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Kick — The displacement this specific conduit travels through. Outer conduits' Kick values shift from the inside conduit's by one Center Spacing per step out.

Kick Length — The straight-line length consumed by this conduit's kick.

Tail — The length of conduit from the finish of the bend to the entered length, on this conduit.

Start Bend — Where to make the bend mark on this conduit, measured from the end of the conduit.

Bend Angle — The whole-degree angle Bend Aid chose. Same for every conduit in the rack.

Travel — Arc length consumed by the bend at this angle and bend radius. Same for every conduit in the rack.

Highlighted rows (Conduit Number, Conduit Length, Kick, Kick Length, Tail, Start Bend) are the values that change as you step through the rack with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the rack. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the bend's travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

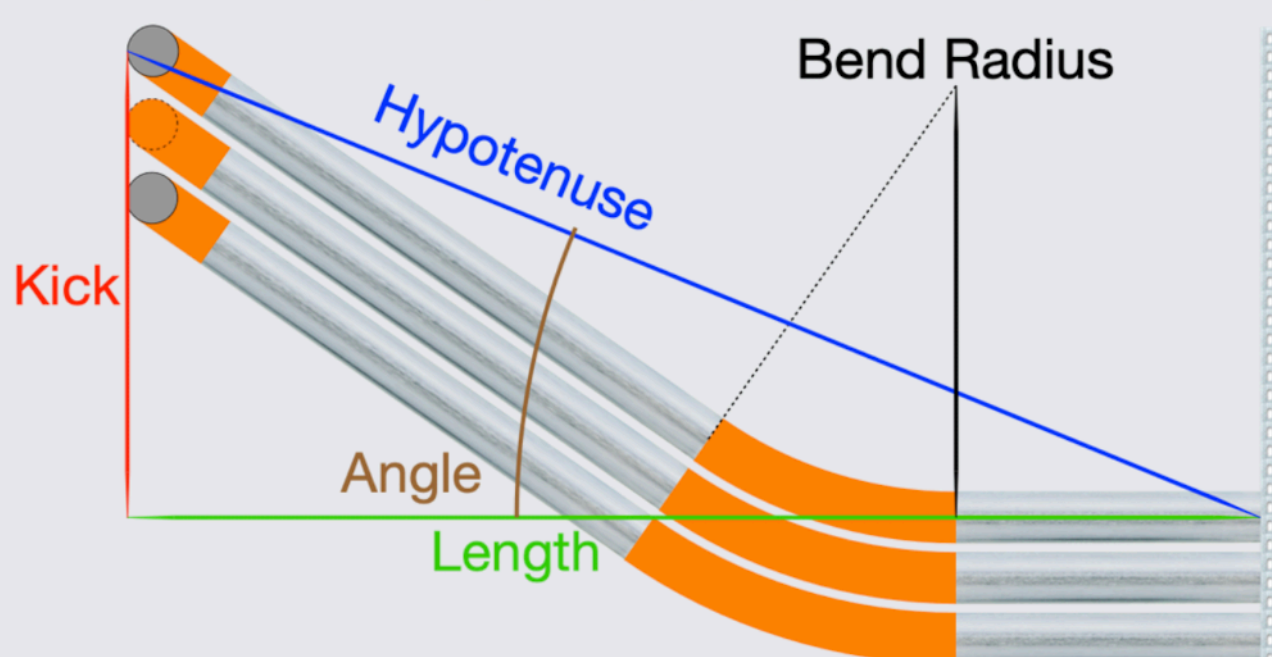
Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Kick Concentric To Vertical

Enter

Help

Concentric To Vertical



Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

-

+

Bend Radius

9

Center Spacing

4

Enter Any Two

Kick

12

Length

48

Hypotenuse

0.0

Angle

0.0°

Answers

Enter Kick Concentric To Vertical Help

Overview

Bend Aid solves a concentric kick that lands vertically — several conduits running side-by-side that get kicked at the end so the straight portion after the bend runs in a vertical plane. Each conduit uses a progressively larger bend radius (the inside conduit's Bend Radius plus one Center Spacing for each step out), so the curves stay concentric.

This combines the two specialty patterns: concentric keeps the curves parallel through the bend, and 'to vertical' adjusts each conduit's marks so the post-bend segments stay aligned in the same vertical plane.

Enter the number of conduits, the Bend Radius for the inside conduit, and the Center Spacing. Then enter any two of the four right-triangle variables (Kick, Length, Hypotenuse, or Angle) for the inside conduit and Bend Aid solves the rest for every conduit.

Bend Aid starts with the measured angle or solved angle and adds one degree at a time until the finished length is less than the entered length, so you always get the smallest bend angle that will fit

Use Concentric To Vertical when a horizontal rack of conduits has to drop down into a vertical run AND you need the bends to stay geometrically concentric — for example, conduits running along a ceiling that turn down a wall in a tight chase where the bends have to nest.

For a rack-to-vertical where the bends don't need to be concentric, use Rack To Vertical instead. For a concentric

kick that lands horizontally, use Kick Concentric To Horizontal. For a concentric kick where the lands don't need to be coplanar, use Kick Concentric.

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the set
3. Enter the Bend Radius for the inside conduit (the centerline radius of your bender shoe). Outer conduits use a larger radius automatically.
4. Enter the Center Spacing (the distance between adjacent conduit centerlines — this is also how much each outer bend radius grows)
5. Tap any two variables (Kick, Length, Hypotenuse, or Angle) to enter values for the inside conduit
6. Tap the 'Answers' button to see the solution for every conduit
7. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Center Spacing

Enter Any Two

-  Kick - The displacement at the end of the inside conduit
-  Length - The distance from the start of the bend to where the inside conduit lands
-  Hypotenuse - The straight-line distance through the kick on the inside conduit
-  Angle - The angle between length and hypotenuse in degrees, opposite of altitude

The measured angle, in degrees, NOT the bend angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Center Spacing is required
- You must enter exactly two of the four right-triangle variables

- The angle must be less than 90°
- The hypotenuse must be greater than either side

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the set.

Answers Kick Concentric To Vertical

<
Answers
Help

Concentric To Vertical

Shoe Mark may be X distance on either side of bends

Select Number Format

0.0
1/16
1/32
mm

Entered

Number Of Conduits	3
Bend Radius	9"
Center Spacing	4"
Kick	12"
Length	48"
Hypotenuse	49 1/2"
Angle	14.04 °

Answers

Hole Spacing	4 1/8"
Conduit Number	1
Conduit Length	49 9/16"
Kick	12"
Kick Length	46"
Tail	2"
Start Bend	45 3/16"
Bend Angle	15 °
Bend Radius	9"
Travel	2 3/8"

Previous
Next

Segments

Return To Main Menu

Answers Kick Concentric To Vertical Help

Overview

The Answers screen displays the full solution to your concentric kick that lands vertically. The Entered section echoes what you put in on the Enter screen; the Answers section is what Bend Aid calculated for the currently selected conduit.

Two things vary per conduit at the same time: each outer conduit uses a larger Bend Radius (so the curves stay concentric) AND each outer conduit's Kick shifts so the post-bend run lands in the same vertical plane.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Entered

Number Of Conduits

Bend Radius

Center Spacing

- Kick - The displacement at the end of the inside conduit
- Length - The distance from the start of the bend to where the inside conduit lands
- Hypotenuse - The straight-line distance through the kick on the inside conduit
- Angle - The angle you entered, in degrees, not the bend angle

Answers

Hole Spacing — The spacing between the conduit holes on the entry side of the rack (before the kick). Same for the whole set.

Conduit Number — Which conduit in the set you're currently viewing (1 is the inside conduit).

Conduit Length — Total length of conduit you need for this specific conduit.

Kick — The displacement this specific conduit travels through. Outer conduits' Kick values shift so the post-bend run lands in the same vertical plane.

Kick Length — The straight-line length consumed by the kick. Same for every conduit in the set.

Tail — The length of conduit from the finish of the bend to the entered length. Same for every conduit in the set.

Start Bend — Where to make the bend mark on this conduit, measured from the end of the conduit.

Bend Angle — The whole-degree angle Bend Aid chose. Same for every conduit in the set.

Bend Radius — The bend radius for this specific conduit. Grows by one Center Spacing for each step outward from the inside conduit.

Travel — Arc length consumed by the bend on this conduit at its bend radius. Grows along with the bend radius.

Highlighted rows (Conduit Number, Conduit Length, Kick, Start Bend, Bend Radius, Travel) are the values that change as you step through the set with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the set. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the current conduit's travel into equal-degree shots. Because each conduit has its own travel, the segment breakdown changes as you step through the set.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Nineties Menu



Nineties

[Help](#)



Ninety

>



Ninety Rack

>



Ninety Concentric

>



Ninety Back to Back

>



Ninety Back to Back Rack

>



Ninety Back to Back Concentric

>

Nineties Menu Help

Ninety-degree bends turn a conduit run a quarter turn — typically taking it from horizontal to vertical (a stub-up) or vice versa. Because the angle is fixed at 90° , every calculator on this menu skips the right-triangle entry and asks only for the Bend Radius, Conduit OD, and the riser heights. Bend Aid accounts for the conduit's outside diameter so the finished riser measures to the top of the conduit, not the centerline.

Ninety

A single 90° bend in a single piece of conduit. Enter Bend Radius, Conduit OD, and the Riser height; optionally add a Length for the long end of the bend.

Ninety Rack

Several conduits run side-by-side, all bent with the same bend radius. Each conduit is moved outward from the first by one center spacing, which also lengthens its riser by one spacing per step out.

Enter the conduit count and center spacing in addition to the standard 90° variables. The Answers screen steps through each conduit with Previous and Next buttons.

Ninety Concentric

Several conduits run side-by-side with the bends staying parallel — each outer conduit uses a progressively larger bend radius (bend radius + center to center spacing for each step out) and a taller riser.

Enter the conduit count and concentric center spacing in addition to the standard 90° variables. The Answers screen steps through each conduit with Previous and Next buttons.

Ninety Back to Back

Two 90° bends in one piece of conduit — typically a U-shape with two risers separated by a known straight section. The classic case is a conduit that goes up a wall, across a fixed distance, and back down without splicing.

Enter Bend Radius, Conduit OD, Riser One, Length Back To Back, and Riser Two. The two risers don't have to match.

Ninety Back to Back Rack

A rack of back-to-back nineties — several U-shaped conduits run side-by-side with the same bend radius. Each outer conduit's risers shift by one center spacing per step out.

Enter the conduit count and center spacing in addition to the standard back-to-back variables. The Answers screen steps through each conduit with Previous and Next buttons.

Ninety Back to Back Concentric

A concentric set of back-to-back nineties — each outer conduit uses a progressively larger bend radius and taller risers so the U-shapes stay parallel.

Enter the conduit count and concentric center spacing in addition to the standard back-to-back variables. The Answers screen steps through each conduit with Previous and Next buttons.

Common Inputs

- Bend Radius — the centerline radius of your bender shoe or whatever bend radius you want, either to match existing larger conduit or to meet a certain wire bend radius.

- Conduit OD — the outside diameter of the conduit. Bend Aid uses this so the finished riser height measures to the top of the conduit, not the centerline.
- Riser — the height of the upturn, measured from the working surface to the top of the conduit.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Enter Ninety

<

Enter
Ninety

Help

Riser

Bend Radius

OD

Length

Select Number Format

0.0

1/16

1/32

mm

Enter All

Bend Radius	15.5
Conduit OD	3.5
Riser	24
Length (Optional)	36

Answers

Enter Ninety Help

Overview

A Ninety bends the conduit 90° .

The Riser is the dimension the conduit will be to fit where it will be installed.

The Length will be the long end after the bend is made.

Nineties are measured to the backs of the bends, the outside of the conduit.

Bend Aid solves the marks for a single 90° in one piece of conduit, including the long side of the bend if you need one.

Because the bend angle is fixed at 90° , there are no right triangle measurements.

Enter the Bend Radius, the Conduit OD, the Riser, and (optionally) the Length, and Bend Aid solves the rest.

1. Select the number format you want to use for entering values
2. Enter the Bend Radius (the centerline radius of your bender shoe)
3. Enter the Conduit OD (the outside diameter of the conduit you're bending)
4. Enter the Riser (the height of the ninety — top of the bend to the floor or working surface)
5. Optional: Enter a Length for the long end past the bend. Leave it blank if you don't need one.
6. Tap the 'Answers' button to see the solved 90°

7. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Bend Radius

Conduit OD

Riser

Length (optional)

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Bend Radius is required
- Conduit OD is required
- Riser is required

- Length is optional — leave it blank for a bend without a required long end
- The bend angle is always 90°
- Bend Aid accounts for the conduit's outside diameter so the riser height measures to the top of the conduit, not the centerline

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

Answers Ninety

Answers

Help

Ninety

Conduit Length

Start Bend

Tail

X

Travel

X

Shoe MarkShoe Mark

Shoe Mark may be X distance on either side of bends

Conduit Length

Travel

If Length is not entered then Conduit Length is to the end of the Travel

Select Number Format

0.01/161/32mm

Entered

Bend Radius15 1/2"

Conduit OD3 1/2"

Riser24"

Length (Optional)36"

Answers

Conduit Length49 27/32"

Tail18 3/4"

Start Bend6 3/4"

Travel24 11/32"

Segments

Return To Main Menu

Answers Ninety Help

Overview

The Answers screen displays the full solution to your 90° bend — every measurement you need to lay out, bend, and cut the conduit.

The Entered section echoes the values you put in on the Enter screen.

The Answers section is what Bend Aid calculated for you, including the tail if you entered an optional Length.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Bend Radius

Conduit OD

 Riser - The height of the 90°

 Length - The horizontal tail past the bend (optional)

Answers

Conduit Length — Total length of conduit you need for this 90°, from end to end.

Tail — The length of conduit from the finish of the bend to the entered length when you entered an optional Length.

Start Bend — Where to make the Start Bend mark from the end of the conduit.

Travel — Arc length consumed by the 90° at this bend radius.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Segments - Splits the 90°'s travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Ninety Rack

<

Enter

Help

Ninety Rack

The diagram illustrates a Ninety Rack configuration with three conduits, labeled 1, 2, and 3. Conduit 1 is the topmost, followed by 2 and then 3. Each conduit has a 90-degree bend. The 'Center Spacing' is the distance between the centers of the conduits. The 'Bend Radius' is the radius of the 90-degree bend. The 'Riser' is the vertical distance from the horizontal centerline of the rack to the center of the bend. The 'Length' is the horizontal distance from the start of the bend to the end of the rack. The 'OD' (Outside Diameter) is the diameter of the conduit. The conduits are shown in grey, and the bends are highlighted in orange.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

- | +

Bend Radius

15.5

Conduit OD

3.5

Center Spacing

6

Riser

24

Length (Optional)

36

Answers

Enter Ninety Rack Help

Overview

A ninety rack is several conduits running side-by-side that all turn the same 90° at the end of the run.

All conduits use the same bend radius and are offset outward from the first by one center spacing.

Because the bend angle is fixed at 90° , there are no right triangle measurements.

Enter the Bend Radius, Conduit OD, Center Spacing, Riser, and (optionally) Length, and Bend Aid solves the rest for every conduit in the rack.

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the rack
3. Enter the Bend Radius (the centerline radius of your bender shoe — same for every conduit in a rack)
4. Enter the Conduit OD (the outside diameter of the conduit you're bending)
5. Enter the Center Spacing (the distance between adjacent conduit centerlines)
6. Enter the Riser (the height of the upturn for the inside conduit)
7. Optional: Enter a Length for the long end past the bend. Leave it blank if you don't need one.
8. Tap the 'Answers' button to see the solution for every conduit in the rack

9. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

Riser

Length (optional)

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required

- Conduit OD is required
- Center Spacing is required
- Riser is required
- Length is optional — leave it blank for a bend with no required long end
- The bend angle is always 90°
- Bend Aid accounts for the conduit's outside diameter so the riser height measures to the top of the conduit, not the centerline

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the rack.

Answers Ninety Rack

Answers

Help

Ninety Rack

Conduit Length

Start Bend

Tail

X

Travel

X

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Conduit Length

Travel

If Length is not entered then Conduit Length is to the end of the Travel

Select Number Format

0.01/161/32mm

Entered

Number Of Conduits3

Bend Radius15 1/2"

Conduit OD3 1/2"

Center Spacing6"

Riser24"

Length (Optional)36"

Answers

Conduit Number1

Riser24"

Length36"

Conduit Length49 27/32"

Tail18 3/4"

Start Bend6 3/4"

Travel24 11/32"

Previous

Next

Segments

Return To Main Menu

Answers Ninety Rack Help

Overview

The Answers screen displays the full solution to your ninety rack.

The Entered section echoes what you put in on the Enter screen.

The Answers section is what Bend Aid calculated for the currently selected conduit.

Each outer conduit's Riser grows by one Center Spacing per step out so the bends end up at the same height, which is why Riser, Length, Conduit Length, Tail, and Start Bend all shift as you step through the rack.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

 Riser - The height of the 90° for the inside conduit

 Length - The tail past the bend (optional)

Answers

Conduit Number — Which conduit in the rack you're currently viewing (1 is the inside conduit).

Riser — The height of the 90° for this specific conduit. Outer conduits grow by one Center Spacing per step out.

Length — The stub-up tail past the bend for this specific conduit, if you entered an optional Length on the Enter screen. Grows along with the Riser.

Conduit Length — Total length of conduit you need for this specific conduit.

Tail — The length of conduit from the finish of the bend to the entered length, on this conduit.

Start Bend — Where to make the bend mark on this conduit, measured from the end of the conduit.

Travel — Arc length consumed by the 90° at this bend radius. Same for every conduit in the rack.

Highlighted rows (Conduit Number, Riser, Length, Conduit Length, Tail, Start Bend) are the values that change as you step through the rack with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the rack. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the 90°'s travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

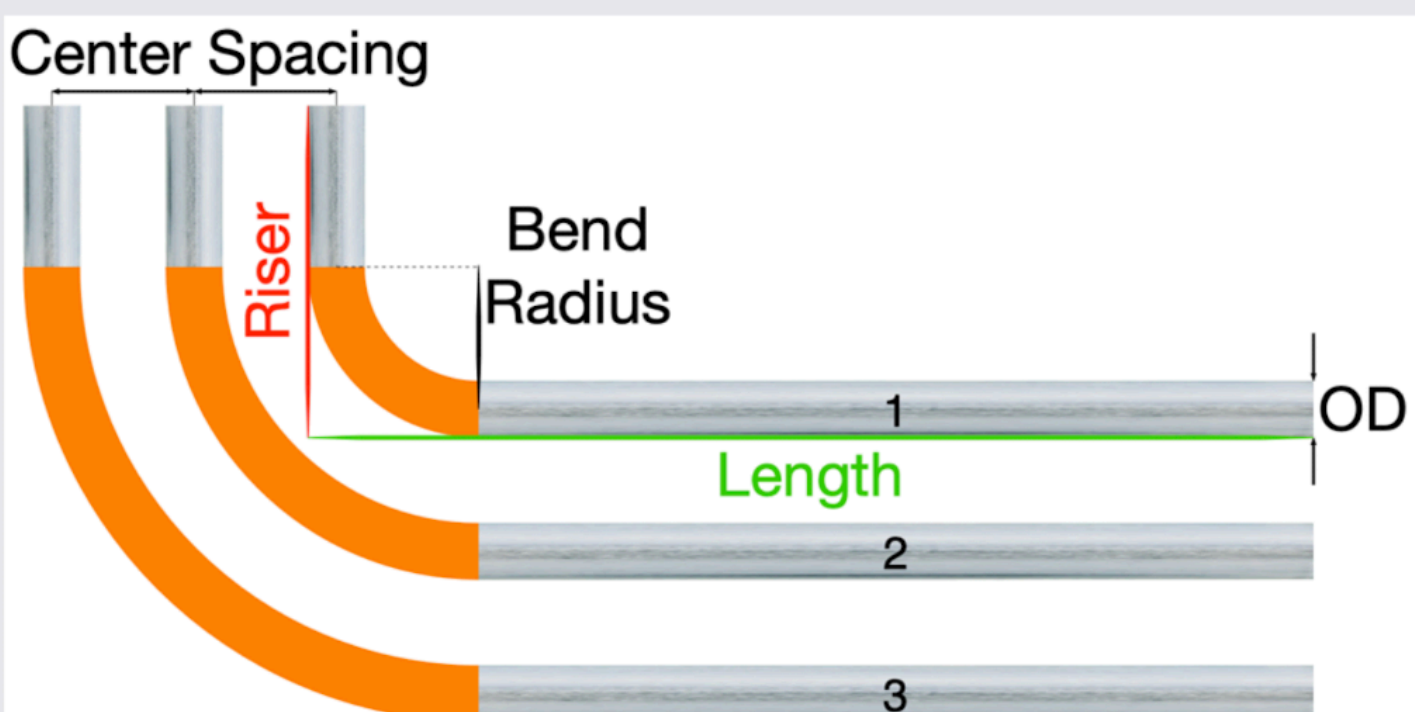
Enter Ninety Concentric

Enter

Help

Ninety Concentric

Center Spacing



Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

-

+

Bend Radius

15.5

Conduit OD

3.5

Center Spacing

6

Riser

24

Length (Optional)

36

Answers

Enter Ninety Concentric Help

Overview

A concentric ninety is several conduits running side-by-side that all turn 90° with the bends staying parallel.

Each conduit uses a progressively larger bend radius (the inside conduit's Bend Radius plus one Center Spacing for each step out), so the bends stay concentric instead of fanning apart.

Because the bend angle is fixed at 90° , there are no right triangle measurements.

Enter the Bend Radius (inside conduit), Conduit OD, Center Spacing, Riser, and (optionally) Length.

Bend Aid solves the rest for every conduit.

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the set
3. Enter the Bend Radius for the inside conduit (the centerline radius of your bender shoe). Outer conduits use a larger radius automatically.
4. Enter the Conduit OD (the outside diameter of the conduit you're bending)
5. Enter the Center Spacing (the distance between adjacent conduit centerlines — this is also how much each outer bend radius grows)
6. Enter the Riser (the height of the upturn for the inside conduit)

7. Optional: Enter a Length for the long end past the bend. Leave it blank if you don't need one.

8. Tap the 'Answers' button to see the solution for every conduit

9. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

Riser

Length (optional)

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Conduit OD is required
- Center Spacing is required
- Riser is required
- Length is optional — leave it blank for a bend with no required long end
- The bend angle is always 90°
- Bend Aid accounts for the conduit's outside diameter so the riser height measures to the top of the conduit, not the centerline

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the concentric set.

Concentric vs. Rack

Rack - every conduit uses the same Bend Radius and is offset outward by one Center Spacing. Curves are parallel but not concentric.

Concentric - every conduit uses a larger Bend Radius (bend radius + center to center spacing for each step out) so the curves share a common center. The bends stay parallel through the 90°, which matters for tight installations.

Answers Ninety Concentric

<
Answers
Help

Ninety Concentric

Conduit Length

Start Bend Tail

Shoe Mark Shoe Mark

Shoe Mark may be X distance on either side of bends

Conduit Length

Travel

If Length is not entered then Conduit Length is to the end of the Travel

Select Number Format

0.0
1/16
1/32
mm

Entered

Number Of Conduits	3
Bend Radius	15 1/2"
Conduit OD	3 1/2"
Center Spacing	6"
Riser	24"
Length (Optional)	36"

Answers

Conduit Number	1
Bend Radius	15 1/2"
Riser	24"
Length	36"
Conduit Length	49 27/32"
Tail	18 3/4"
Start Bend	6 3/4"
Travel	24 11/32"

Previous
Next

Segments

Return To Main Menu

Answers Ninety Concentric Help

Overview

The Answers screen displays the full solution to your concentric ninety.

The Entered section echoes what you put in on the Enter screen.

The Answers section is what Bend Aid calculated for the currently selected conduit.

Each conduit uses a different bend radius (the inside conduit's radius plus one Center Spacing for each step out), which means each conduit also has a different travel.

The Riser also grows per step so the bends end up at the same height across the set.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Entered

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

 Riser - The height of the 90° for the inside conduit

 Length - The horizontal tail past the bend (optional)

Answers

Conduit Number — Which conduit in the set you're currently viewing (1 is the inside conduit).

Bend Radius — The bend radius for this specific conduit. Grows by one Center Spacing for each step outward from the inside conduit.

Riser — The height of the 90° for this specific conduit. Outer conduits grow by one Center Spacing per step out.

Length — The tail past the bend for this specific conduit, if you entered an optional Length on the Enter screen.

Conduit Length — Total length of conduit you need for this specific conduit.

Tail — The length of conduit from the finish of the bend to the entered length.

Same for every conduit in the set.

Start Bend — Where to make the bend mark from the end of the conduit. Same for every conduit in the set.

Travel — Arc length consumed by the 90° on this conduit at its bend radius. Grows along with the bend radius.

Highlighted rows (Conduit Number, Bend Radius, Riser, Length, Conduit Length, Travel) are the values that change as you step through the set with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the concentric set. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits the current conduit's travel into equal-degree shots. Because each conduit has its own travel, the segment breakdown changes as you step through the set.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

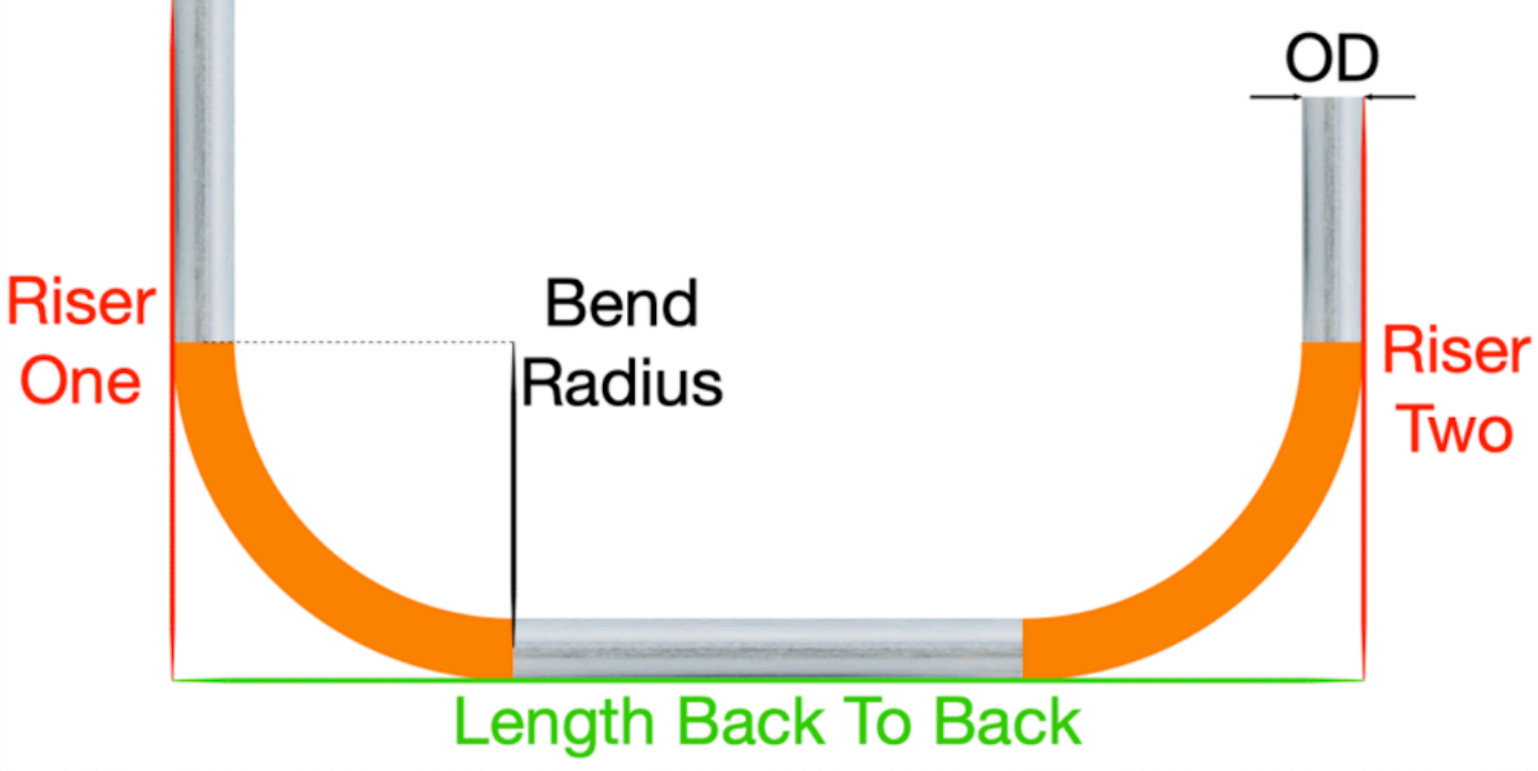
Enter Ninety Back To Back

<

Enter

Help

Ninety Back to Back



Select Number Format

0.0

1/16

1/32

mm

Enter All

Bend Radius	15.5
Conduit OD	3.5
Riser One	24
Length Back To Back	36
Riser Two	24

Answers

Enter Ninety Back To Back Help

Overview

A back-to-back ninety is two 90° bends in one piece of conduit — typically a U-shape with two risers separated by a known straight section.

The classic case is a conduit that goes up a wall, across a fixed distance, and back down (or down and back up) without couplings.

Because both bend angles are fixed at 90°, there are no right triangle measurements.

Enter the Bend Radius, Conduit OD, Riser One, Length Back To Back, and Riser Two, and Bend Aid solves the rest.

1. Select the number format you want to use for entering values
2. Enter the Bend Radius (the centerline radius of your bender shoe)
3. Enter the Conduit OD (the outside diameter of the conduit you're bending)
4. Enter Riser One (the height of the first 90° on one end)
5. Enter Length Back To Back (the straight distance between the two 90° bends, measured along the conduit's run)
6. Enter Riser Two (the height of the second 90° on the other end)
7. Tap the 'Answers' button to see the solved back-to-back
8. In the answers screen, you can change the number format to see results in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Bend Radius

Conduit OD

Riser One

Length Back To Back

Riser Two

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Bend Radius is required
- Conduit OD is required
- Riser One is required
- Length Back To Back is required
- Riser Two is required

- Both bend angles are always 90°
- Riser One and Riser Two can be different — they don't have to match
- Bend Aid accounts for the conduit's outside diameter so the riser heights measure to the top of the conduit, not the centerline

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

Answers Ninety Back To Back

Answers

Help

Ninety Back to Back

Conduit Length

Start Bend OneStart To Start One

X

Travel One

X

X

Travel Two

X

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Start To Start TwoStart Bend Two

X

Travel One

X

X

Travel Two

X

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Select Number Format

0.01/161/32mm

Entered

Bend Radius15 1/2"

Conduit OD3 1/2"

Riser One24"

Length Back To Back36"

Riser Two24"

Answers

Conduit Length63 11/16"

Start Bend One6 3/4"

Start To Start One32 19/32"

Start Bend Two6 3/4"

Start To Start Two32 19/32"

Travel24 11/32"

Segments

Return To Main Menu

181

Answers Ninety Back To Back Help

Overview

The Answers screen displays the full solution to your back-to-back ninety.

The Entered section echoes the values you put in on the Enter screen.

The Answers section is what Bend Aid calculated for you.

Because a back-to-back has two bends in one piece of conduit, the Answers section lists Start Bend and Start To Start separately for each bend — Start Bend One and Start To Start One for the first bend (Riser One end), Start Bend Two and Start To Start Two for the second.

This is so you can cut and thread before the bends are made and you can bend the second Ninety from either direction

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Bend Radius

Conduit OD

● Riser One - The height of the first 90°

● Length Back To Back - The straight distance between the two 90° bends

● Riser Two - The height of the second 90°

Answers

Conduit Length — Total length of conduit you need for the whole back-to-back, from end to end.

Start Bend One — Where to make the first bend's mark, measured from the Riser One end of the conduit.

Start To Start One — Distance from the start mark of the first bend to a reference point on the conduit. Use this to lay out the first bend.

Start Bend Two — Where to make the second bend's mark, measured from the Riser Two end of the conduit.

Start To Start Two — Distance from the start mark of the second bend to a reference point on the conduit. Use this to lay out the second bend.

Travel — Arc length consumed by each 90° at this bend radius. Same for both bends since they're both 90° at the same radius.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Segments - Splits a single 90°'s travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

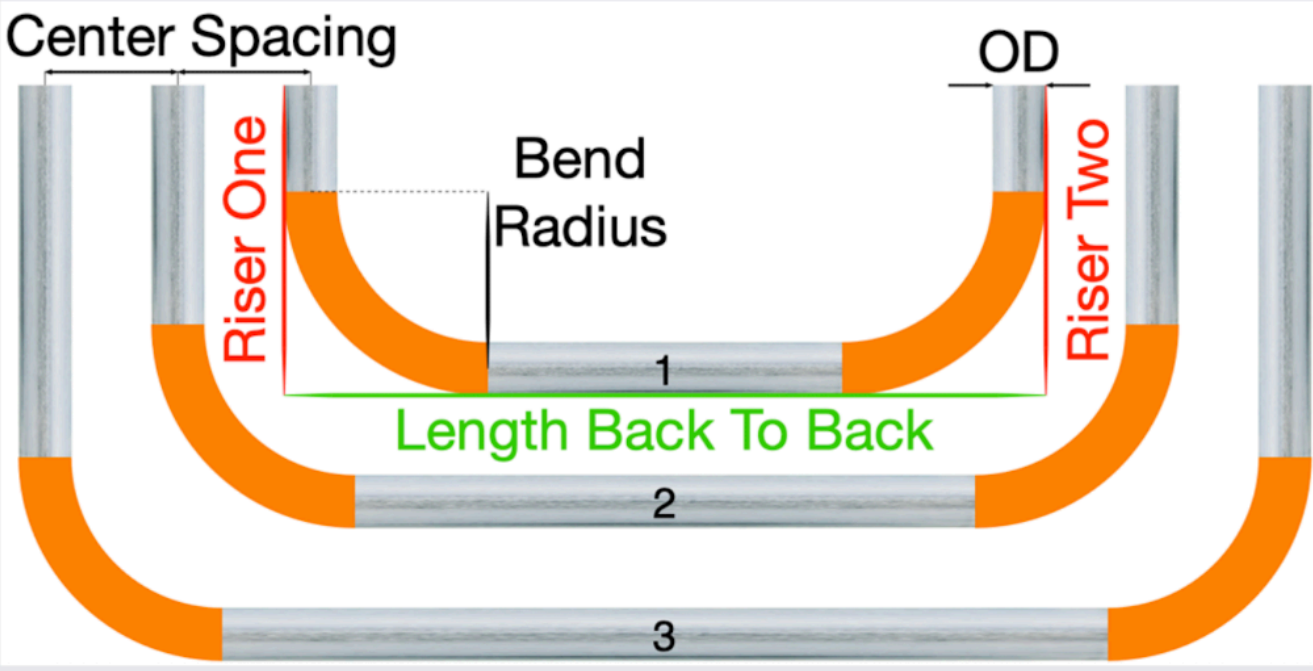
Enter Ninety Back To Back Rack

<

Enter

Help

Ninety Back to Back Rack



Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

- | +

Bend Radius

15.5

Conduit OD

3.5

Center Spacing

6

Riser One

24

Length Back To Back

36

Riser Two

24

Answers

Enter Ninety Back To Back Rack Help

Overview

A back-to-back ninety rack is several conduits running side-by-side, each containing two 90° bends — typically a U-shape with two risers separated by a known straight section.

All conduits use the same bend radius and are offset outward from the first by one center spacing.

Because both bend angles in every conduit are fixed at 90°, there are no right triangle measurements.

Enter the Number Of Conduits, Bend Radius, Conduit OD, Center Spacing, Riser One, Length Back To Back, and Riser Two, and Bend Aid solves the rest for every conduit in the rack.

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the rack
3. Enter the Bend Radius (the centerline radius of your bender shoe — same for every conduit in a rack)
4. Enter the Conduit OD (the outside diameter of the conduit you're bending)
5. Enter the Center Spacing (the distance between adjacent conduit centerlines)
6. Enter Riser One for the inside conduit (the height of the first 90° on one end)
7. Enter Length Back To Back (the straight distance between the two 90° bends on the inside conduit)

8. Enter Riser Two for the inside conduit (the height of the second 90° on the other end)
9. Tap the 'Answers' button to see the solution for every conduit in the rack
10. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

Riser One

Length Back To Back

Riser Two

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Conduit OD is required
- Center Spacing is required
- Riser One is required
- Length Back To Back is required
- Riser Two is required
- Both bend angles are always 90°
- Riser One and Riser Two can be different — they don't have to match
- Bend Aid accounts for the conduit's outside diameter so the riser heights measure to the top of the conduit, not the centerline

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the rack.

Answers Ninety Back To Back Rack

Answers

Help

Ninety Back to Back Rack

Conduit Length

Start Bend One

Start To Start One

X

Travel One

X

X

Travel Two

X

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Start To Start Two

Start Bend Two

X

Travel One

X

X

Travel Two

X

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Select Number Format

0.0

1/16

1/32

mm

Entered

Number Of Conduits

3

Bend Radius

15 1/2"

Conduit OD

3 1/2"

Center Spacing

6"

Riser One

24"

Length Back To Back

36"

Riser Two

24"

Answers

Conduit Number

1

Riser One

24"

Length Back To Back

36"

Riser Two

24"

Conduit Length

63 11/16"

Start Bend One

6 3/4"

Start To Start One

32 19/32"

Start Bend Two

6 3/4"

Start To Start Two

32 19/32"

Travel

24 11/32"

Previous

Next

Segments

Return To Main Menu

Answers Ninety Back To Back Rack Help

Overview

The Answers screen displays the full solution to your back-to-back ninety rack.

The Entered section echoes what you put in on the Enter screen.

The Answers section is what Bend Aid calculated for the currently selected conduit.

Each outer conduit is offset outward by one Center Spacing, so Riser One, Length Back To Back, and Riser Two all increase per step. The Start Bend and Start To Start values for both bends increase with them, which is why most of the per-conduit rows are highlighted.

Use Previous and Next under the Answers section to step through every conduit. The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

● Riser One - The height of the first 90° for the inside conduit

● Length Back To Back - The straight distance between the two 90° bends

● Riser Two - The height of the second 90° for the inside conduit

Answers

Conduit Number — Which conduit in the rack you're currently viewing (1 is the inside conduit).

Riser One — The height of the first 90° for this specific conduit. Outer conduits increase by one Center Spacing per step out.

Length Back To Back — The straight distance between the two 90° bends for this specific conduit. Outer conduits increase per step.

Riser Two — The height of the second 90° for this specific conduit.

Outer conduits increase per step out.

Conduit Length — Total length of conduit you need for this specific conduit, from end to end.

Start Bend One — Where to make the first bend's mark on this conduit, measured from the Riser One end.

Start To Start One — Distance from the start mark of the first bend to a reference point on this conduit.

Use this to lay out the first bend.

Start Bend Two — Where to make the second bend's mark on this conduit, measured from the Riser Two end.

Start To Start Two — Distance from the start mark of the second bend to a reference point on this conduit.

Use this to lay out the second bend.

Travel — Arc length consumed by each 90° at this bend radius.

Same for both bends and every conduit in the rack.

Highlighted rows (Conduit Number, Riser One, Length Back To Back, Riser Two, Conduit Length, Start Bend One, Start To Start One, Start Bend Two, Start To Start Two) are the values that change as you step through the rack with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the rack. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments - Splits a single 90°'s travel into equal-degree shots. Enter how many degrees per shot you want (5°, 10°, etc.) and Bend Aid lists the mark for every shot plus any leftover degrees. Use this for benders without a calibrated shoe.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Ninety Back To Back Concentric

<

Enter

Help

Ninety Back to Back Concentric

Center Spacing

OD

Riser One

Bend Radius

Length Back To Back

Riser Two

1

2

3

Select Number Format

0.0

1/16

1/32

mm

Enter All

Number Of Conduits 3

-

+

Bend Radius

15.5

Conduit OD

3.5

Center Spacing

6

Riser One

24

Length Back To Back

36

Riser Two

24

Answers

Enter Ninety Back To Back Concentric Help

Overview

A back-to-back concentric ninety is several conduits running side-by-side, each containing two 90° bends with the bends staying parallel across the whole set.

Each conduit uses a progressively larger bend radius (the inside conduit's Bend Radius plus one Center Spacing for each step out), so the bends stay concentric instead of fanning apart.

Because both bend angles in every conduit are fixed at 90°, there are no right triangle measurements.

Enter the Number Of Conduits, Bend Radius (inside conduit), Conduit OD, Center Spacing, Riser One, Length Back To Back, and Riser Two, and Bend Aid solves the rest for every conduit.

1. Select the number format you want to use for entering values
2. Enter the Number Of Conduits in the set
3. Enter the Bend Radius for the inside conduit (the centerline radius of your bender shoe).

Outer conduits use a larger radius automatically.

4. Enter the Conduit OD (the outside diameter of the conduit you're bending)
5. Enter the Center Spacing (the distance between adjacent conduit centerlines — this is also how much each outer bend radius increases)

6. Enter Riser One for the inside conduit (the height of the first 90° on one end)
7. Enter Length Back To Back (the straight distance between the two 90° bends on the inside conduit)
8. Enter Riser Two for the inside conduit (the height of the second 90° on the other end)
9. Tap the 'Answers' button to see the solution for every conduit
10. In the answers screen, step through each conduit with Previous and Next

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

Riser One

Length Back To Back

Riser Two

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Number Of Conduits must be at least 1
- Bend Radius is required
- Conduit OD is required
- Center Spacing is required
- Riser One is required
- Length Back To Back is required
- Riser Two is required
- Both bend angles are always 90°
- Riser One and Riser Two can be different — they don't have to match
- Bend Aid accounts for the conduit's outside diameter so the riser heights measure to the top of the conduit, not the centerline

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers for every conduit in the concentric set.

Concentric vs. Rack

Rack - every conduit uses the same Bend Radius and is offset outward by one Center Spacing. Curves are parallel but not concentric.

Concentric - every conduit uses a larger Bend Radius (bend radius + center to center spacing for each step out) so the curves share a common center. The bends stay parallel through both 90s, which matters for tight installations.

Answers Ninety Back To Back Concentric

Answers

Help

Ninety Back to Back Concentric

Conduit Length

Start Bend OneStart To Start One

X

Travel One

X

X

Travel Two

X

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark may be X distance on either side of bends

Start To Start TwoStart Bend Two

X

Travel One

X

X

Travel Two

X

Shoe Mark

Shoe Mark

Shoe Mark

Shoe Mark

Select Number Format

0.0

1/16

1/32

mm

Entered

Number Of Conduits

3

Bend Radius

15 1/2"

Conduit OD

3 1/2"

Center Spacing

6"

Riser One

24"

Length Back To Back

36"

Riser Two

24"

Answers

Conduit Number

1

Bend Radius

15 1/2"

Riser One

24"

Length Back To Back

36"

Riser Two

24"

Conduit Length

63 11/16"

Start Bend One

6 3/4"

Start To Start One

32 19/32"

Travel

24 11/32"

Start Bend Two

6 3/4"

Start To Start Two

32 19/32"

Previous

Next

Segments Travel One

Segments Travel Two

Return To Main Menu

Answers Ninety Back To Back Concentric Help

Overview

The Answers screen displays the full solution to your concentric back-to-back ninety.

The Entered section echoes what you put in on the Enter screen.

The Answers section is what Bend Aid calculated for the currently selected conduit.

Each conduit uses a different bend radius (the inside conduit's plus one Center Spacing per step out), which makes the Travel increase per conduit too. The Risers and Length Back To Back also increase per step so the bends are concentric.

Use Previous and Next under the Answers section to step through every conduit.

The highlighted rows update to show that conduit's measurements.

Select Number Format

Use the segmented control at the top to change how the answers are displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers update automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Entered

Number Of Conduits

Bend Radius

Conduit OD

Center Spacing

 Riser One - The height of the first 90° for the inside conduit

 Length Back To Back - The straight distance between the two 90° bends

 Riser Two - The height of the second 90° for the inside conduit

Answers

Conduit Number — Which conduit in the set you're currently viewing (1 is the inside conduit).

Bend Radius — The bend radius for this specific conduit.

Increases by one Center Spacing for each step outward from the inside conduit.

Riser One — The height of the first 90° for this specific conduit.

Increases per step out.

Length Back To Back — The straight distance between the two 90° bends for this specific conduit.

Increases per step out.

Riser Two — The height of the second 90° for this specific conduit.

Increases per step out.

Conduit Length — Total length of conduit you need for this specific conduit, from end to end.

Start Bend One — Where to make the first start bend mark, measured from the Riser One end of the conduit.

Same for every conduit in the set.

Start To Start One — Distance from the start mark of the first bend to a reference point on this conduit.

Increase per step out along with Length Back To Back.

Travel — Arc length consumed by each 90° on this conduit at its bend radius.

Increase along with the bend radius.

Start Bend Two — Where to make the second bend's mark, measured from the Riser Two end of the conduit.

Same for every conduit in the set.

Start To Start Two — Distance from the start mark of the second bend to a reference point on this conduit.

Increases per step out.

Highlighted rows (Conduit Number, Bend Radius, Riser One, Length Back To Back, Riser Two, Conduit Length, Start To Start One, Travel, Start To Start Two) are the values that change as you step through the set with Previous and Next.

Navigation Bar Buttons

Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Previous / Next - Step through the conduits in the concentric set. The highlighted rows update to show that conduit's measurements. Buttons turn gray when you reach the first or last conduit.

Segments Travel One - Splits the first bend's travel into equal-degree shots, anchored at Start Bend One. Use this for benders without a calibrated shoe.

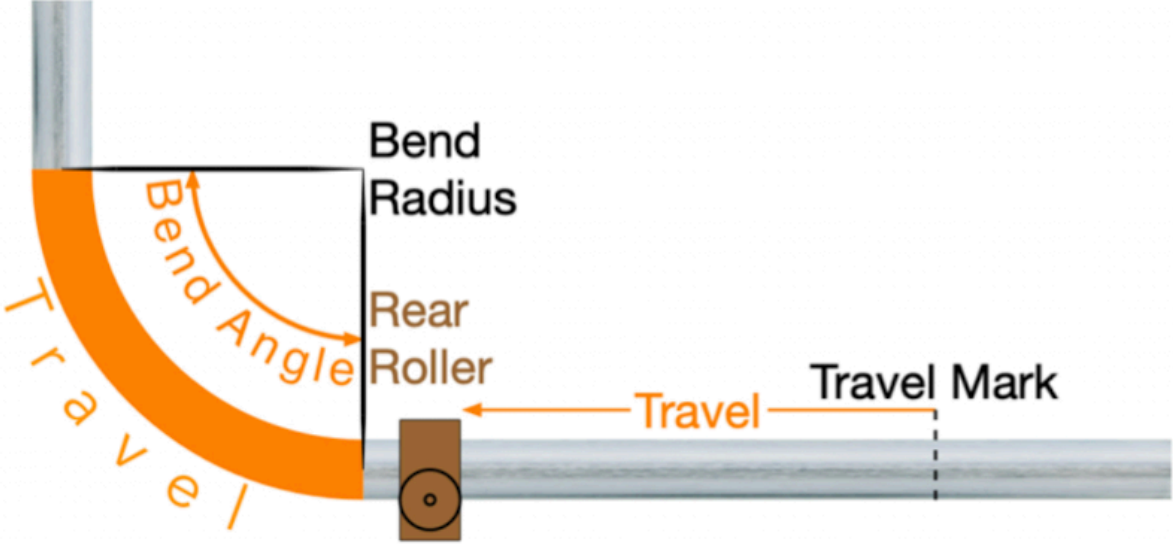
Segments Travel Two - Splits the second bend's travel into equal-degree shots, anchored at Start Bend Two. Both bends have the same travel on a given conduit, but the segment layout reference is each bend's own start mark.

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Enter Find Bend Radius

[Enter](#)[Help](#)

Find Bend Radius



Place a travel mark farther than what the travel might be.
When ninety is finished find the actual Travel.

Select Number Format

0.0

1/16

1/32

mm

Enter All

Travel

24 ¹¹/₃₂"

Bend Angle

90°

Answers

Enter Find Bend Radius Help

Overview

Find Bend Radius solves for the centerline radius of a bender shoe when you already have a known travel and bend angle. This is useful when you're working from a sample bend, a chart, or a shoe whose radius isn't marked.

Once Bend Aid knows the radius, you can use it as the Bend Radius input on any of the other calculators (Nineties, Offsets, Kicks, Saddles, etc.) for the same shoe.

1. Select the number format you want to use for entering values
2. Enter the Travel — the centerline distance through the bend from the start of the bend to the end of the bend
3. Enter the Bend Angle in decimal degrees
4. Tap the 'Answers' button to see the calculated Bend Radius
5. In the answers screen, you can change the number format to see the radius in different units

Select Number Format

Select the number format to be used to enter values and display answers

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Enter All

Travel

Bend Angle

Alerts

Alerts are shown after the Answers button is tapped if there is a problem with the entered variables or if the answers will not work.

- Travel is required
- Bend Angle is required
- Bend Angle is always entered in decimal degrees
- Travel is measured along the centerline of the conduit, not the outside or inside of the bend
- The calculated radius is a centerline radius — the same convention used everywhere else in Bend Aid

Tap OK to dismiss an alert.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to calculate the answers.

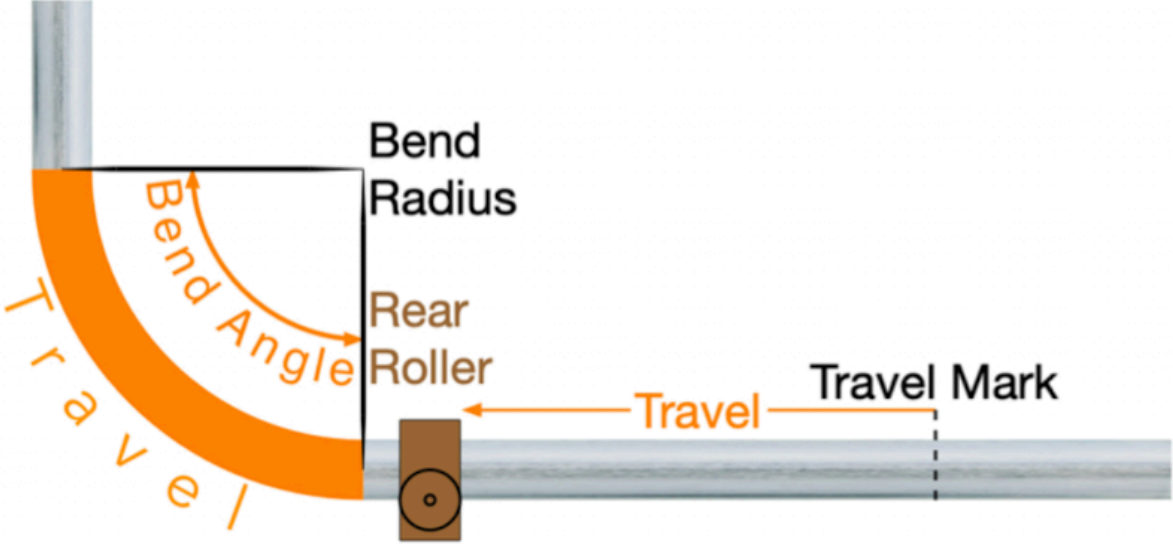
Answers Find Bend Radius

[<](#)

Answers

[Help](#)

Find Bend Radius



Place a travel mark farther than what the travel might be.
When ninety is finished find the actual Travel.

Select Number Format

0.0

1/16

1/32

mm

Entered

Travel

24 ¹¹/₃₂"

Bend Angle

90 °

Answers

Bend Radius

15 ¹/₂"

[Return To Main Menu](#)

Answers Find Bend Radius Help

Overview

The Answers screen shows the centerline Bend Radius that was solved from the Travel and Bend Angle you entered.

The Entered section echoes the values you put in on the Enter screen. The Answers section is the value Bend Aid calculated — the radius you can plug into any of the other calculators for this same shoe.

Select Number Format

Use the segmented control at the top to change how the answer is displayed:

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answer updates automatically when you change the format, so you can see the same solution in different units without re-entering anything.

Bend Angle is always shown in decimal degrees regardless of the selected number format.

Entered

Travel

Bend Angle

Answers

Bend Radius — The centerline radius of the bender shoe that produced the entered Travel at the entered Bend Angle. Use this value as the Bend Radius input on any other Bend Aid calculator for the same shoe.

Navigation Bar Buttons

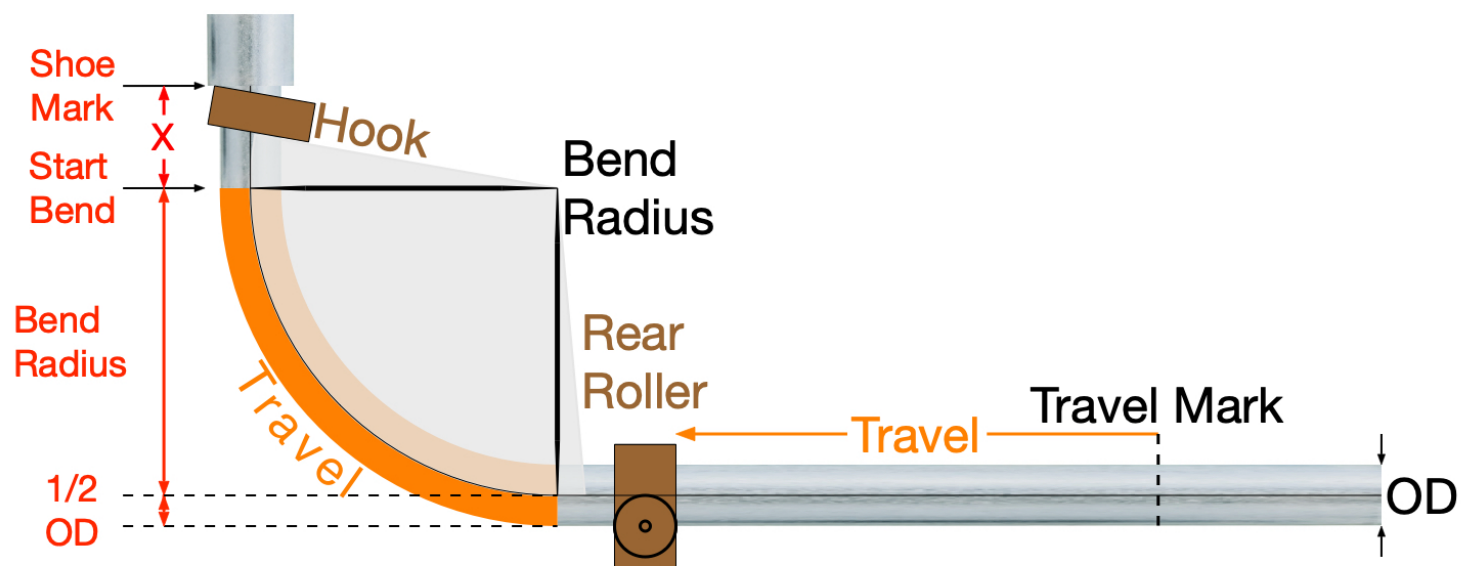
Top Left - Returns to the Enter screen with your entered values still in place so you can adjust them.

Top Right - Tap to see the help file for this screen.

Other Buttons

Return To Main Menu - Clears the navigation stack and goes back to the top-level menu.

Chart Benders



$X = \text{Distance between Shoe Mark and Start Bend}$
 $\text{Start Bend} = \text{Bend Radius} + 1/2 \text{ OD}$

Overview

Charting a bender is the process of measuring and documenting the specific dimensions and characteristics of a particular bender so it can be used accurately with the Bend Aid calculations.

Bend a 90° bend and measure the results.

Any angle may be bent but a short ninety should be useable somewhere.

Shortest Ninety

Measure the minimum ninety that can be bent to the Shoe Mark from the back of the ninety.

X is the Shoe Mark to Start Bend distance

When the conduit is in the bender but before bending, mark the conduit where the shoe mark is, it could be an arrow, or the end of the hook, or a roller.

Once X is known any bend can be started at the Start Bend.

When using a push through bender layout where the bends will be on the straight conduit and find the center of any bend.

Start Bend

Is from the back of the ninety to where the ninety actually starts to bend.

Start Bend = radius + 1/2 the conduit OD

Bend Radius

Most bender shoes will have their centerline bend radius marked somewhere, maybe on the back side of the shoe, or on a chart on the bender, or in the storage box.

Travel

On a pull through bender measure how far the conduit is pulled through, or travels, when bending a 90°, or estimate what the travel will be and place a mark so the travel can be found.

Use the Rear Roller on the bender, or some other stationary place, as a standard point when using the Travel answers to make bends.

Since the Start Bend to Shoe Mark is a constant on a pull through bender the Travel for any Bend Angle can be used to make the bend.

Use the Travel answer, for whatever Bend Angle, and put a Travel Mark on the conduit.

Make the bend until the Travel Mark reaches the roller or stationary point.

Check for spring-back.

On a “Chicago” type bender when the pressure on the handle is released the conduit might spring-back, add more bend until the Travel Mark is at the Rear Roller.

Enter Segments

<

Segments

Help

Segments are equal sections of the Travel bent on small angles plus a smaller segment to complete the total bend angle

	01	02	03	04	05	06	07	Plus X°	
Start Bend									
Travel									

Select Number Format

0.0

1/16

1/32

mm

Current Values

Bend Radius

9"

Start Bend

18"

Travel

2 11/16"

Select Degrees Per Segment

1°

2°

3°

4°

5°

6°

7°

8°

9°

Answers

Enter Segments Help

Overview

When the Bend Radius is larger than the bend radius of a standard bending shoe then the bend can be made by putting an equal number of smaller bends, or segments, until the whole bend angle is completed.

The travel is divided into a number of segments with any left over degrees added to the end of the bend.

For example a twenty-five degree bend angle could be made with seven three degree bends plus a four degree bend or three six degree bends plus a one degree bend.

$$7 \times 3^{\circ} = 21^{\circ} + 4^{\circ} = 25^{\circ}$$

or

$$3 \times 6^{\circ} = 24^{\circ} + 1^{\circ} = 25^{\circ}$$

After the Answers button is tapped and the answers screen is displayed the length of each segment can be checked to see if it will work.

Go back to the enter segment bend angle screen to change the segment bend angle until an acceptable segment bend angle is found.

Select Number Format

Select the number format to be used to display answers.

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Current Values

Displays the current Bend Radius, Start Bend, and Travel values calculated from the Nineties, Kicks, or Offsets calculator.

These values are used to calculate the segment measurements.

Select Degrees Per Segment

The segment bend angle is the small angle that each segment will be bent on.

The smaller the segment bend angle the smoother the bend will look.

The selected segment bend angle will depend on how big the bend radius is and how close the segments will be.

Navigation Bar Buttons

Top Left - Returns to the previous screen.

Top Right - Tap to see the help file for this screen.

Other Buttons

Answers - Tap to show the answers screen.

Answers Segment

Answers

Help

Segments

Start Of Each Segment From Shoe Mark

Shoe Mark

x

01

02

03

04

05

06

07

Plus X°

Start Bend

Center Of Each Segment From Start Bend

Travel

Select Number Format

0.0

1/16

1/32

mm

Degrees Per Segment3°

Answers

Start Bend18"

Segment 011/2"

Segment 0215/16"

Segment 031 7/16"

Segment 041 7/8"

Segment 052 3/8"

Plus 2°5/16"

Return To Main Menu

Answers Segment Help

Overview

The answers given for segments allow the bend to be laid out and bent, or checked to make sure the bends will fit in the bender or the segment bends will not run into each other.

The answer for each segment is measured from the start bend.

Laying out the first shoe mark may make it easier to measure to each segment's shoe mark.

If the bender bends from the middle of the bend then lay out the center of the first segment and then use the answer segments to measure to each segment center.

As you layout each conduit in a rack each of the conduit numbers may have different answers, the Bend Radius and the Travel may increase or decrease.

The answers are given in the number format that was selected in the answers screen.

Select Number Format

Select the number format to be used to display answers.

- 0.0 - Decimal format
- 1/16 - Sixteenths of an inch
- 1/32 - Thirty-seconds of an inch
- mm - Metric (millimeters)

The answers will automatically update when you change the format, allowing you to see the same solution in different units.

Answers

Start Bend

The start bend that was entered or solved.

Each Segment Length

The length of each segment, or the travel of each segment if the travel method is used to make the bends.

The segment lengths are from the start bend, or the first shoe mark, or the center of the first bend.

Measuring from one point allows accurate measurements to all the segments.

Plus

The extra degrees needed to complete the total bend angle.

Navigation Bar Buttons

Top Left - Tap to return to the enter screen to change the segment bend angle.

Top Right - Tap to see the help file for this screen.

Other Buttons

Return To Main Menu - Tap to go to the Bend Aid main menu.