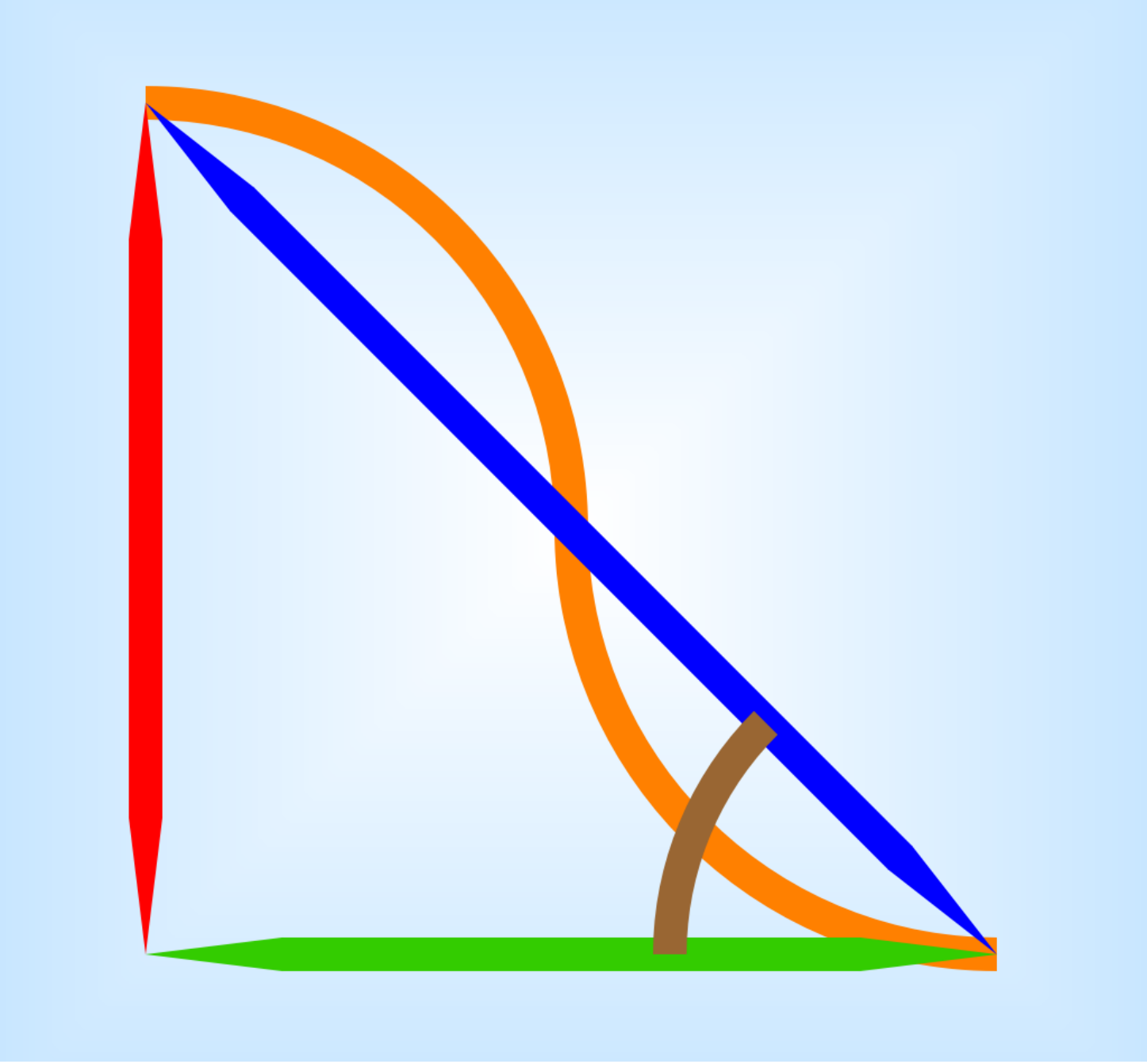
Bend Aid

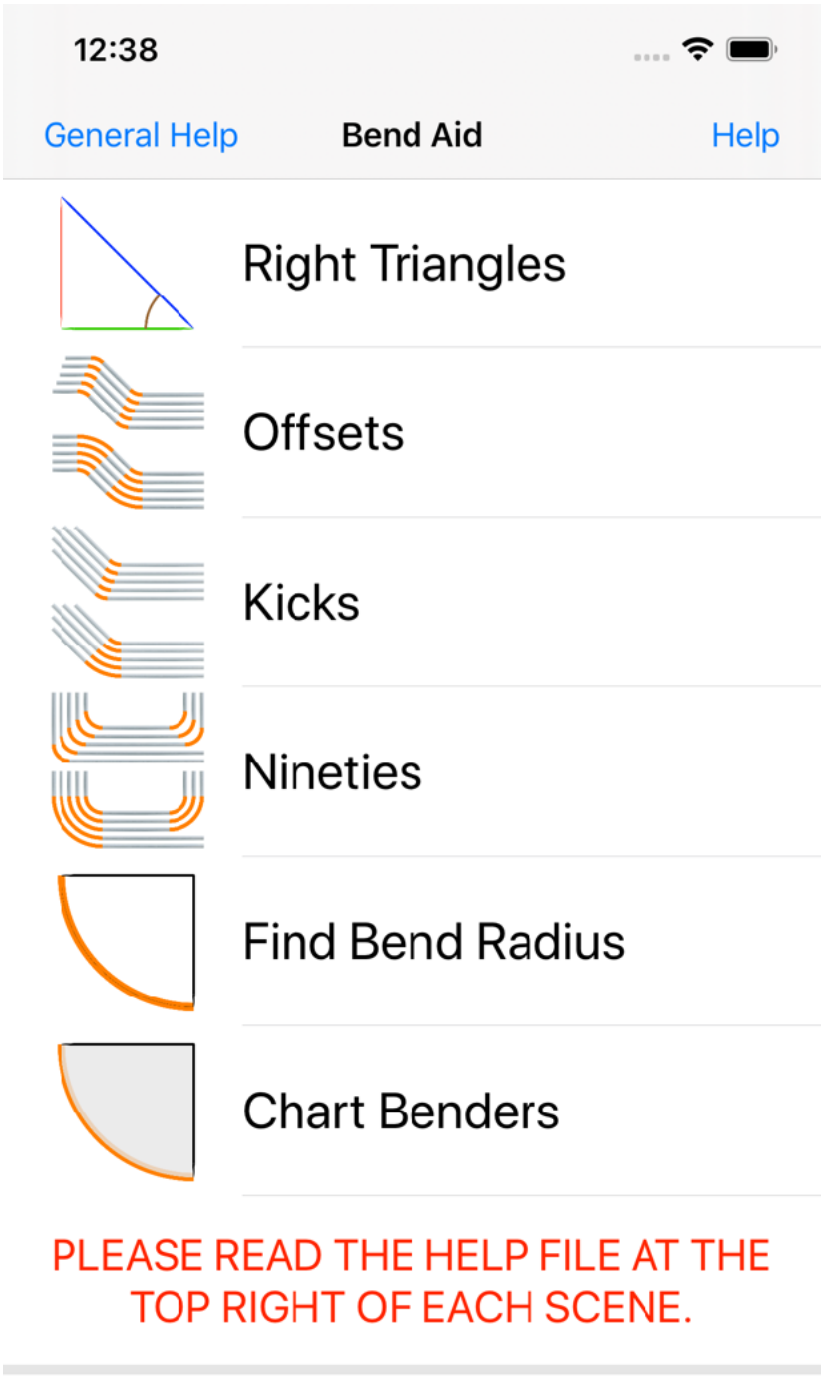
User Guide v 2.2

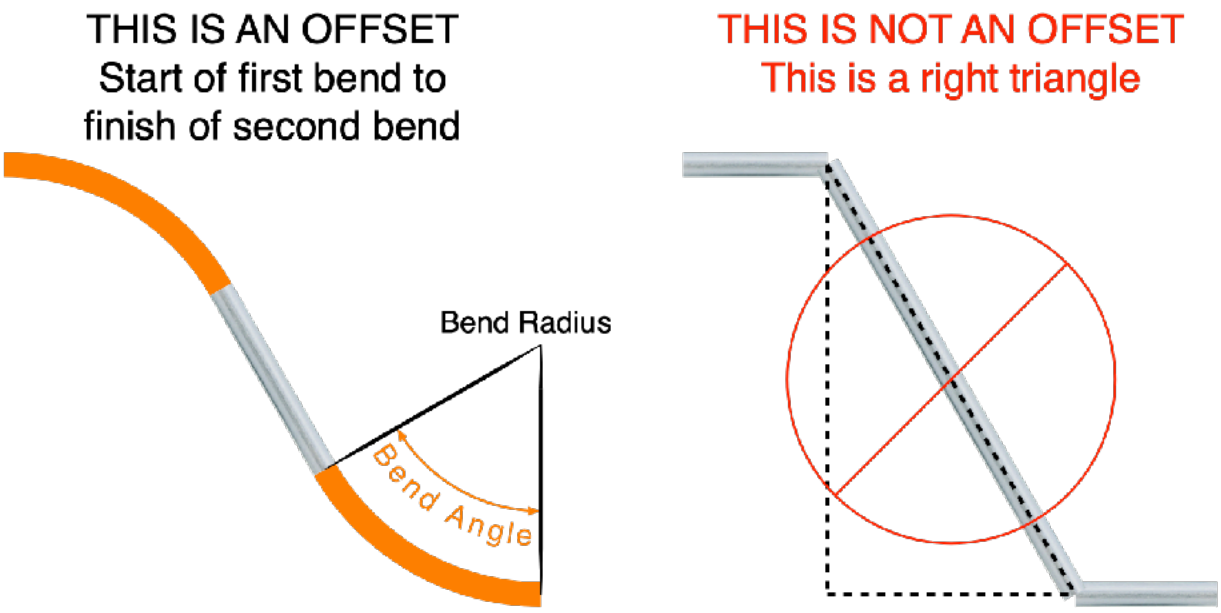
Accurate Conduit Bending



P. D. Stroney

Bend Aid Menu





Bend Aid Help

An offset is not a right triangle.

Gain happens in offsets and kicks just like in nineties.

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

A right triangle has three straight lines.

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

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 shrink is 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.

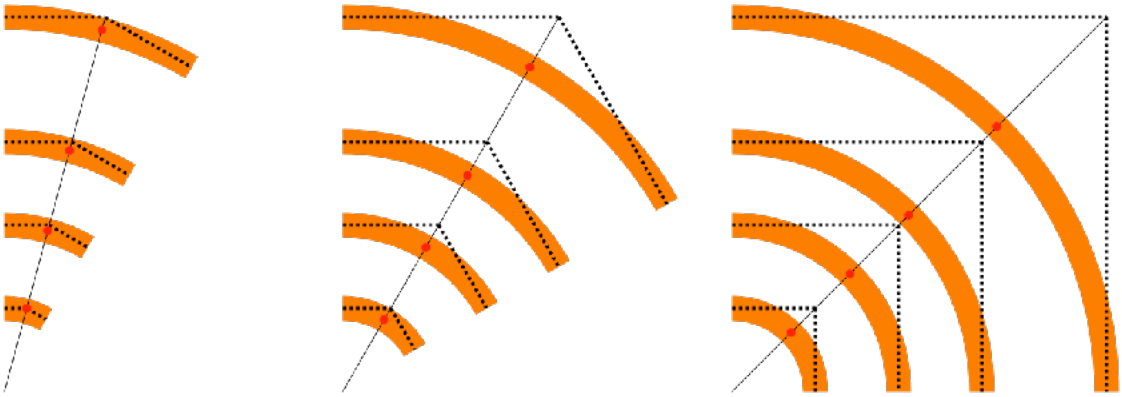
The old methods of bending conduit involve much guesswork, practice bending, aggravation, and unnecessary waste of time and material.

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 program, 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 is a tool to save time and material by eliminating the guesswork that has been used to bend conduit in the past.



Bend Aid General Help

The cosecant method of bending conduit is not correct because it solves a right triangle, which is three straight lines.

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.

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.

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.

Bend Aid uses tableviews so you tap on a row to go to the type of bend to solve or to enter the variables.

Top Corners Of Scenes

Back

Top left corner, tap to go back to previous scene.

Help

Top right corner, tap to go to the help scene.

Select Number Format

Tap a segment to select the number format.

Decimals - 0.0

If the decimal number format was selected a number pad will be displayed to enter the dimension, and then tap the Save button.

1/16 - Feet, Inches, Sixteenths
1/32 - Feet, Inches, Thirty-seconds
Metric - Meters, Centimeters, Millimeters

If a fraction or metric number format was selected a picker-view will be displayed to enter the dimension, and then tap the Save button.

Scroll each column of the picker view up or down to select, and then tap the Save button.

Angle always uses the decimal pad and the answers are always shown as decimals, but when fractions or metric is selected then the angle answer is shown to 2 decimal places.

In answer scenes selecting a different number format will convert the answer to that format.

If feet were entered in any of the variables then the answers will be displayed in feet.

Enter All

Required variables that must be entered.

Enter Any Two

Enter any two of the four variables of a right triangle.

Altitude, Offset, Kick

Length

Hypotenuse

Angle **(Measured Angle, NOT Bend Angle)**

Alerts

Alert boxes are displayed when any variable has not been entered or if the problem cannot be solved.

Bottom Of Scenes

Answers

Bottom row of enter scenes, tap to display the answers.

Bend Aid

Bottom row of answer scenes, tap to display the main menu.

Enter Decimals

Title Row

The name of the variable being entered.

Number Row

The decimal number that will be entered.

Keypad

The number keys are tapped one at a time to enter the desired number, or the decimal point.

Clear key is to reset the number back to 0.0.

Angle always uses the decimal keypad.

Bottom Of Number Pads and PickerViews

Save

The Save button saves the variable and returns you to the previous Enter scene.

Enter Fractions Or Metric Picker

Title Row

The name of the variable that will be entered.

Number Row

The Feet, Inches, and Fraction, or Meters, Centimeters, and Millimeters that will be entered.

PickerView

The columns are scrolled up or down one at a time to enter the desired feet, inches, and fraction, or meter, centimeter, and millimeter.

Up to 50 feet may be entered,
44 Feet, 71 Inches, 15/16” or 31/32”.
Up to 15 meters may be entered,
14 Meters, 99 Centimeters, 9 Millimeters.

Enter Number Of Conduit

Number Row

The number of conduit to be solved.

Keypad

The number keys are tapped one at a time to enter the desired number.

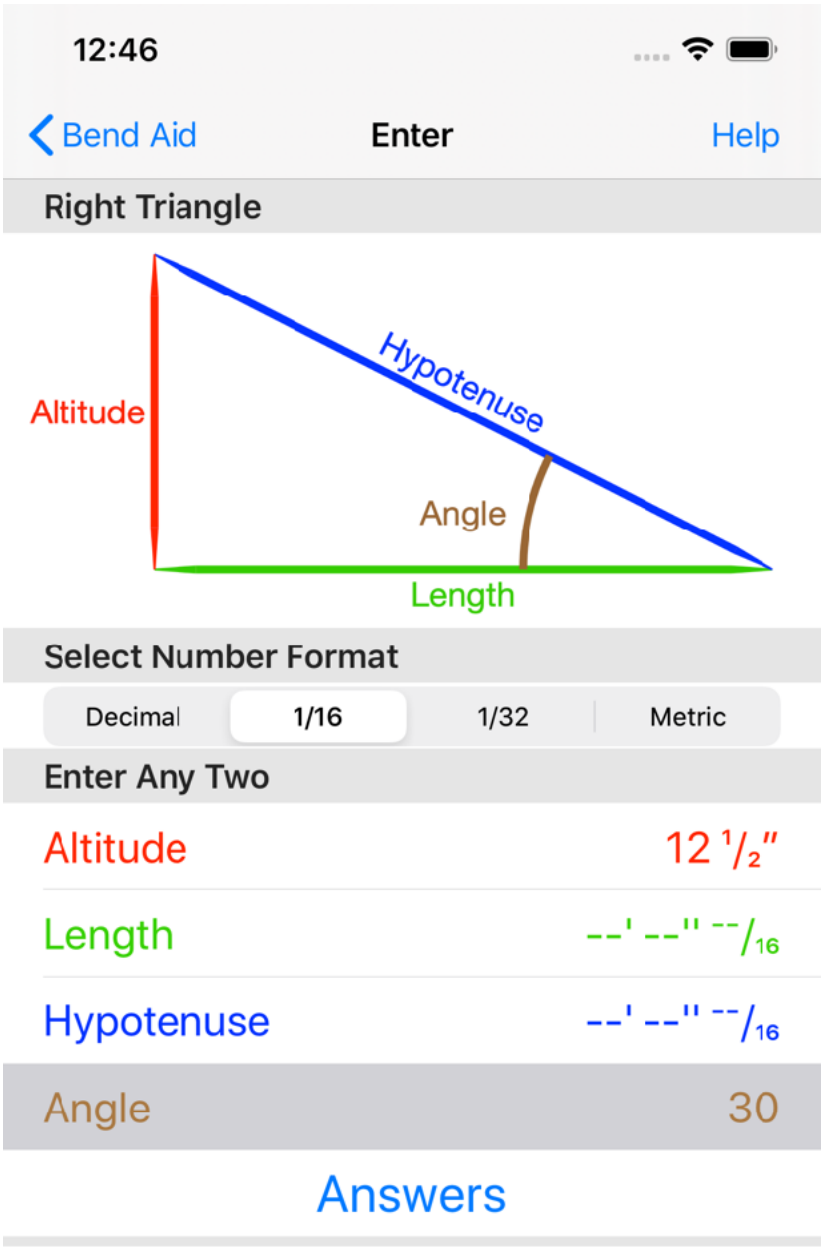
Clear key is to reset the number back to 0.

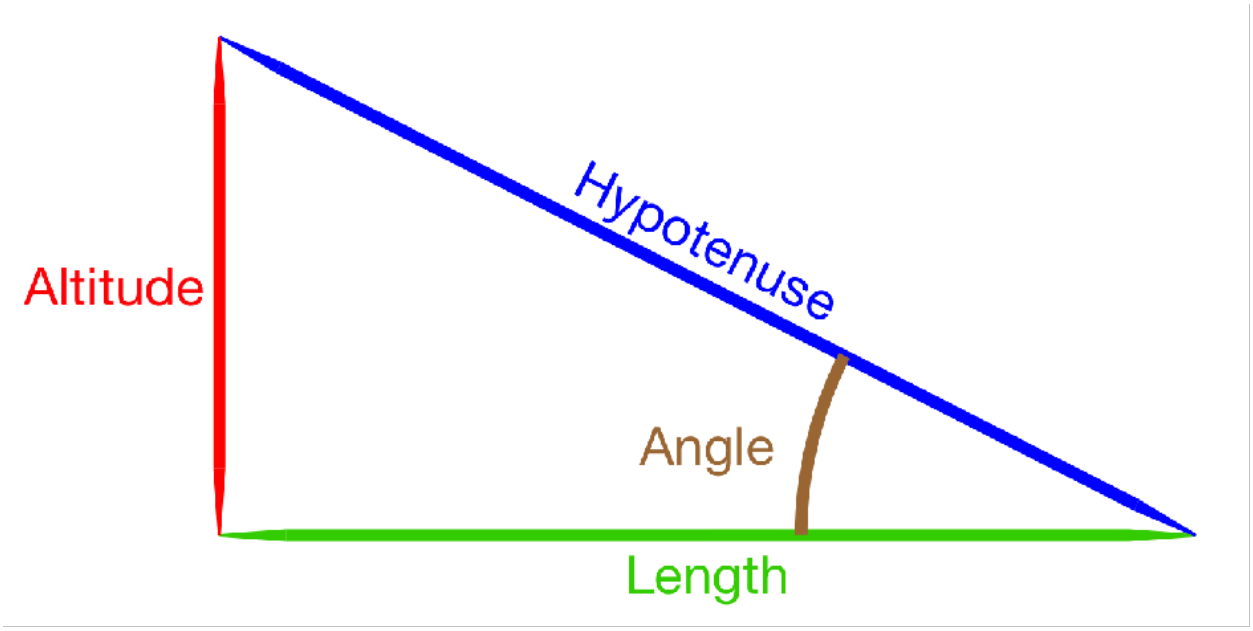
Bottom Row

Save

The Save button saves the variable and returns you to the previous Enter scene.

Enter Right Triangle





Enter Right Triangle Help

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

Select Number Format

Tap a segment to select the number format.

Enter Any Two

Enter two variables and then tap Answers.

Offset

Length

Hypotenuse

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.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

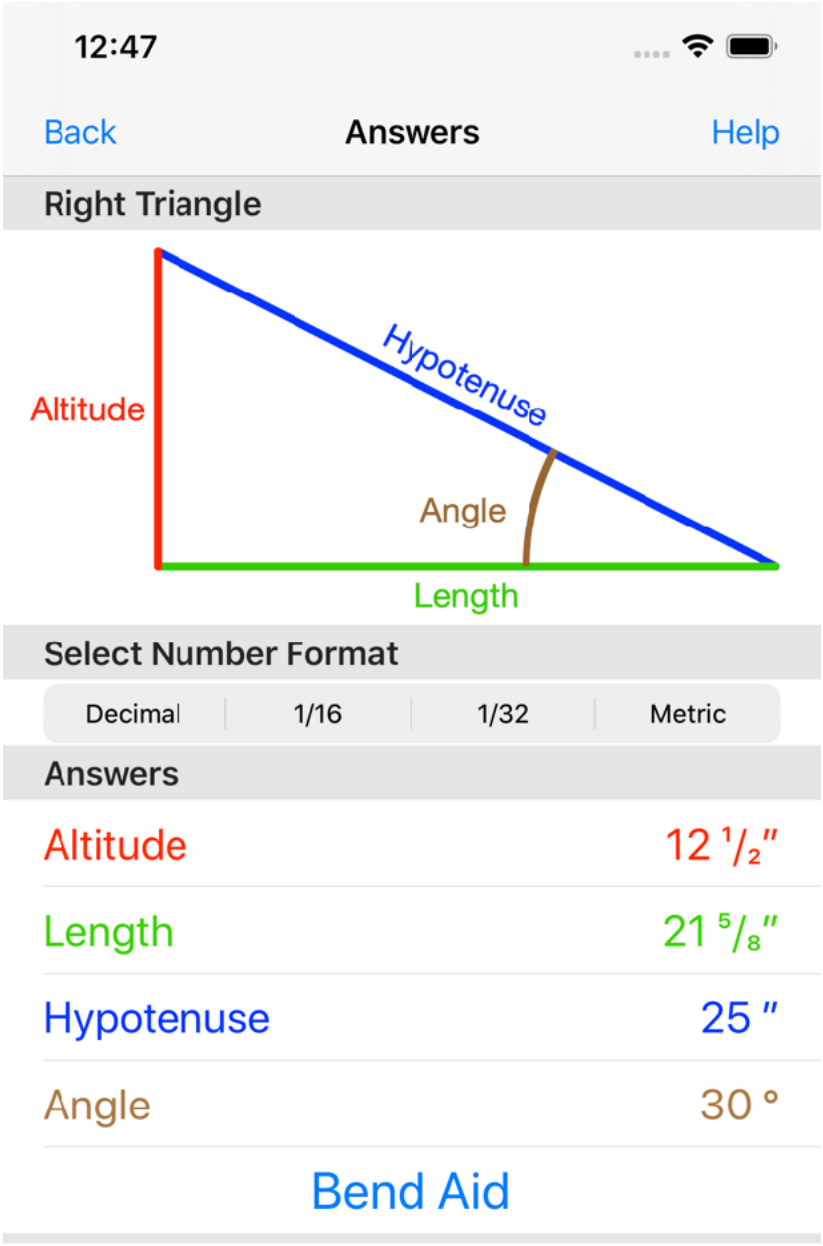
Tap OK to dismiss an alert.

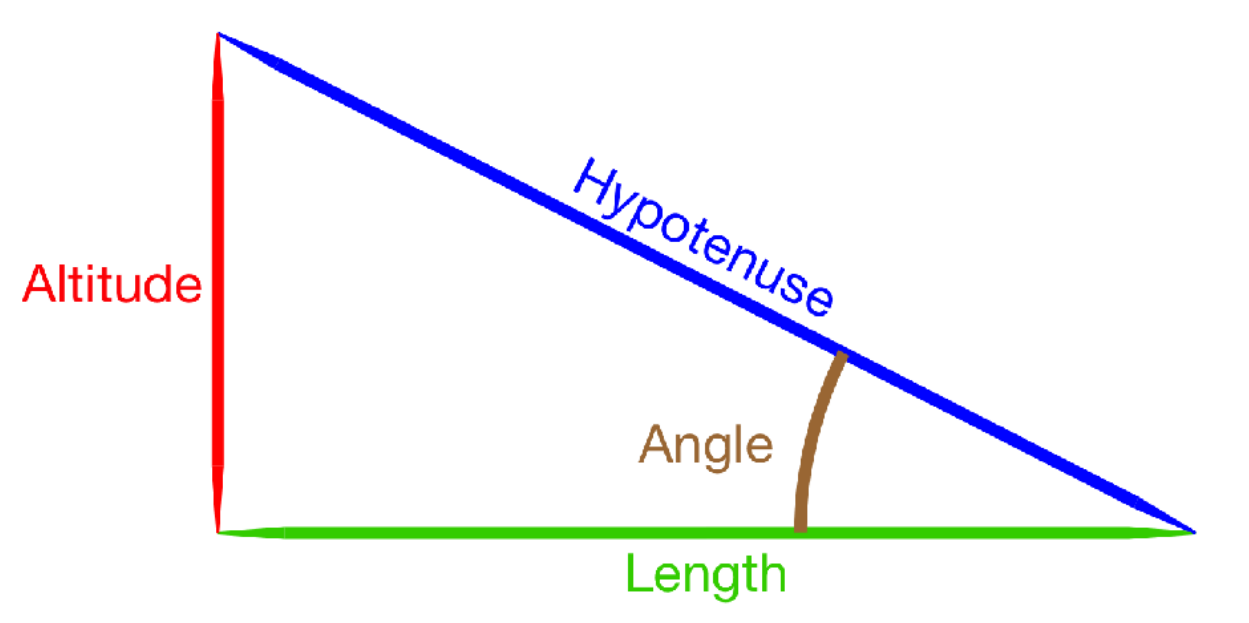
Bottom Row

Answers

Tap to show the answers view.

Answer Right Triangle





Answer Right Triangle Help

The answers are displayed in the number format that the variables were entered in.

If feet were entered in any of the variables then the answers will be displayed with feet.

Select Number Format

Tap a segment to change the format of the answers.

The number format may be changed at any time which allows the different formats to be converted.

Answers

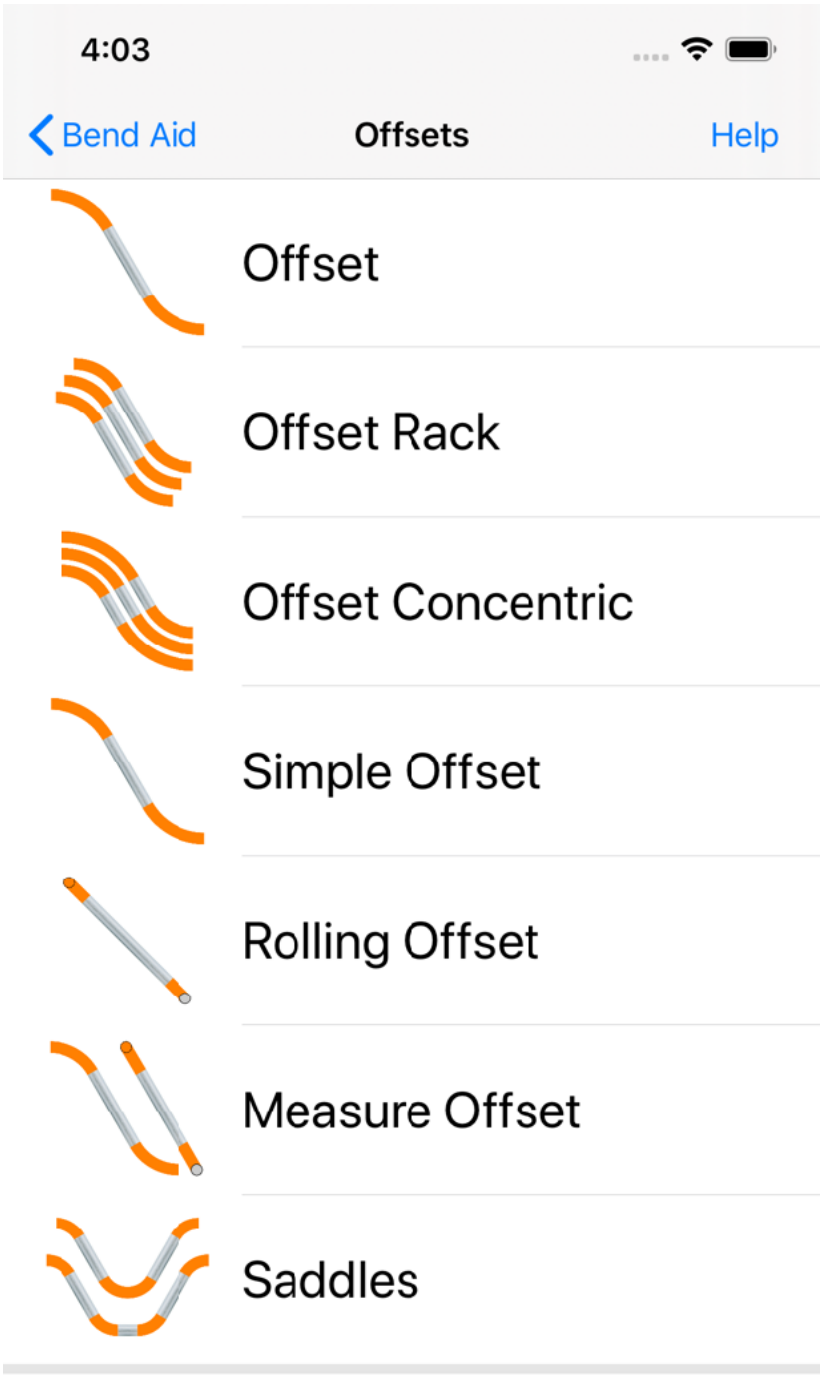
Altitude
Length
Hypotenuse
Angle

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.

Offsets Menu



Offsets Menu Help

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 in front of and behind the offset.

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

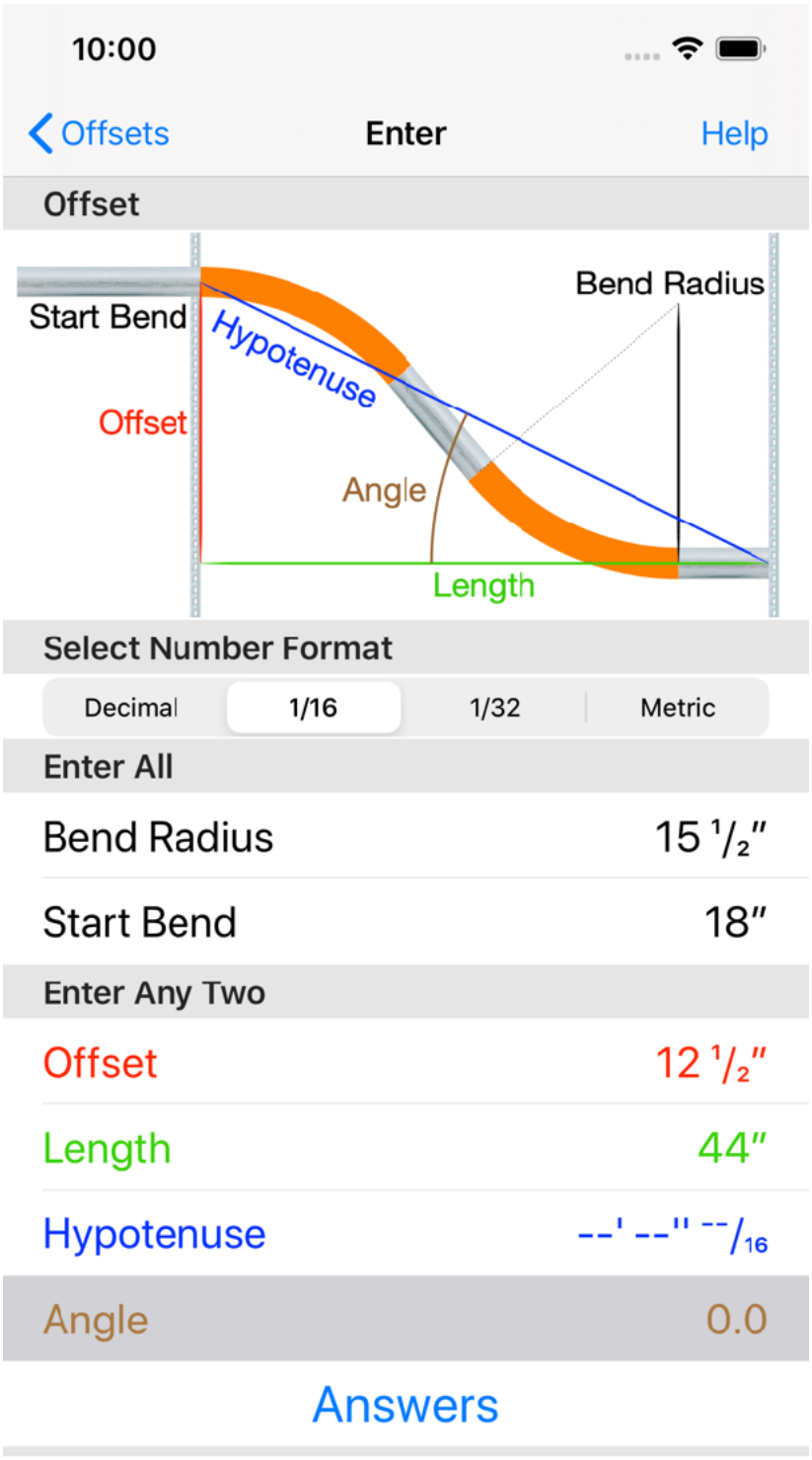
If you plan on starting the offset at the far edge of the support you can measure the distance where the offset needs to start which be entered as Start Bend.

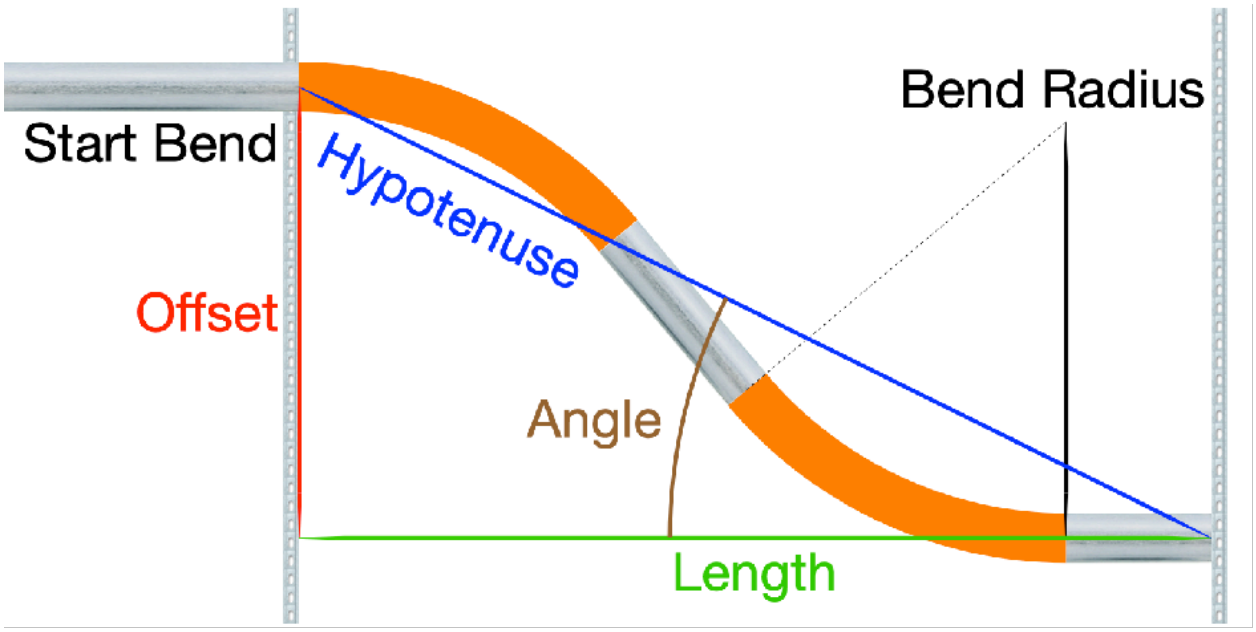
There will be another support or obstruction where the offset needs to be finished and the measurement will be entered as the Length.

After the offset there will be a length of conduit that will either be the end of a full length or the conduit willed to 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.

Enter Offset





Enter Offset Help

Bend Aid solves an offset by entering the required variables and any two of the four right triangle variables.

Measure where the offset 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 finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Start Bend

Is where the first bend should start.

If Start Bend is not entered then that dimension will not be included in the answers.

Enter Any Two

Offset

Length
Hypotenuse
Angle **(Measured Angle, NOT 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.

Enter

Bend Radius
Must be entered.
Enter Any Two
Enter two variables and then tap Answers.
Hypotenuse
Must be greater than either side.
Angle
Must be less than 90°.

Answers

Bend Angle over 90°
Length may be too short for the Angle or Radius.
No Conduit Between Bends
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

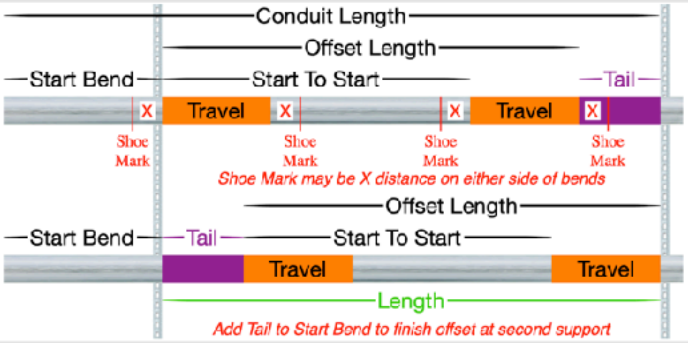
Answers

Tap to show the answers view.

Answer Offset

Back | Answers | Help

Offset



Select Number Format

Decimal | 1/16 | 1/32 | Metric

Entered

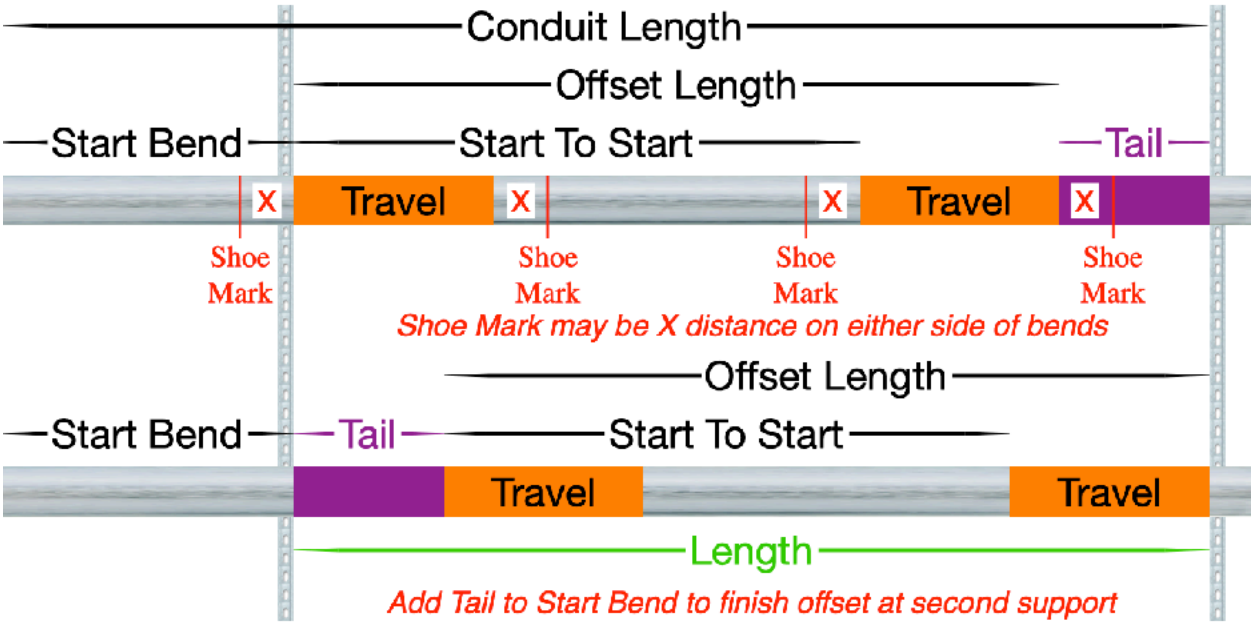
Bend Radius	15 1/2"
Start Bend	18 "
Offset	12 1/2"
Length	44 "
Hypotenuse	45 3/4"
Angle	15.86 °

Answers

Conduit Length	63 7/8"
Offset Length	43 3/8"
Tail	5/8"
Start To Start	40 7/16"
Bend Angle	18 °
Travel	4 7/8"

Segments

Bend Aid



Answer Offset Help

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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Conduit Length

The total length of conduit needed to make the offset including the start bend and tail.

Offset Length

The length of the offset from the start of the first bend to the finish of the last bend

Tail

The length of conduit from the finish of the offset's second bend to the length that was entered.

Start To Start

The length from the start of the first bend to the start of the second bend.

Start to start is given because the centers of concentric bends change

Bend Angle

The angle that the bend will be.

Bend Aid finds the smallest whole bend angle that will allow the offset to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending An Offset

Lay out the 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 old "Chicago" 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.

If a push through bender is being used then 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.

Segments

Tap to go to the enter segment bend angle view.

Top Left of Scene

Back

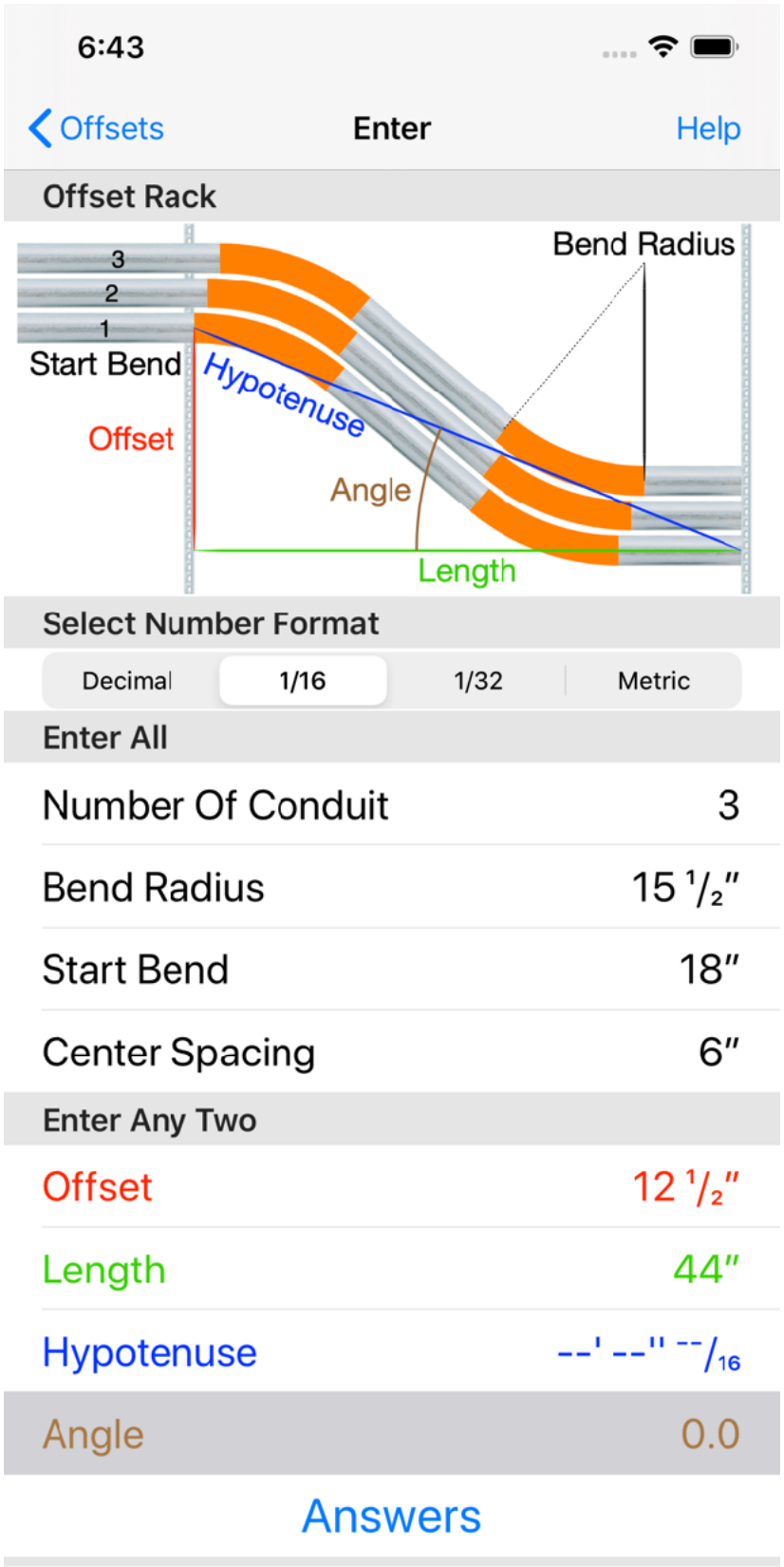
Tap to go back to the enter scene to change variables.

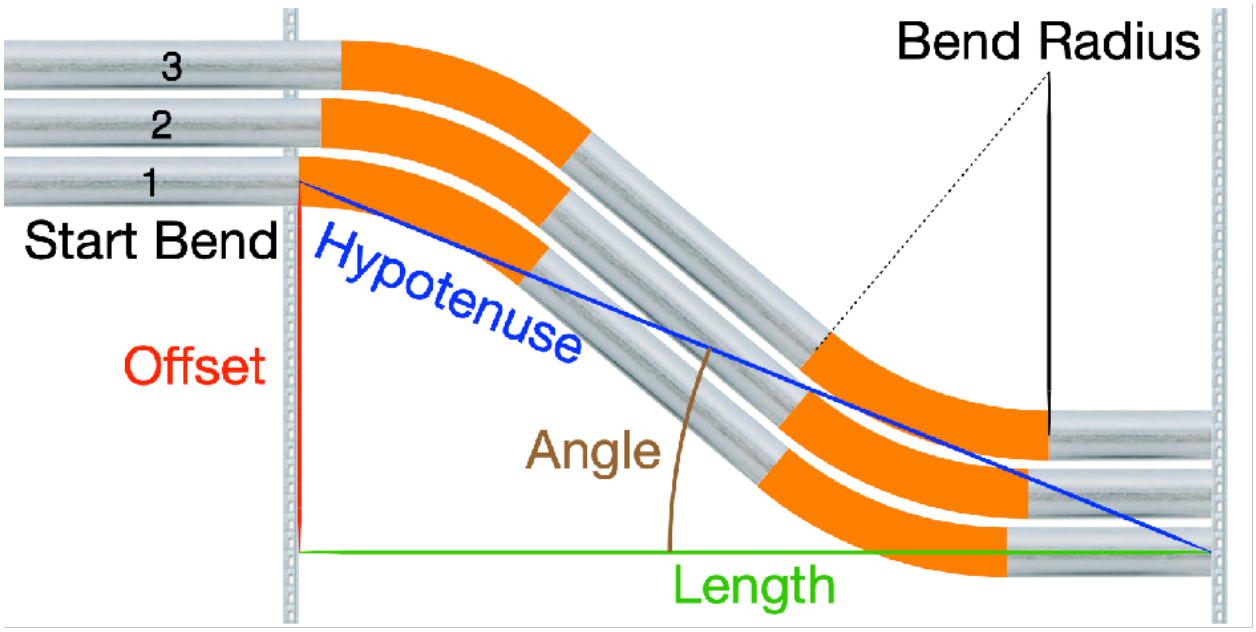
Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.

Enter Offset Rack





Enter Offset Rack Help

Bend Aid solves a rack of offsets by entering the required variables and any two of the four right triangle variables.

Measure where the offset needs to fit.

Measure the right triangle for the first offset and the rest of the start bends will be solved.

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 finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The center line radius of the bends.

Start Bend

Is where the first bend should start.

If Start Bend is not entered then that dimension will not be included in the answers.

Center Spacing

The center to center spacing of the conduit in the rack.

Enter Any Two

Offset

Length

Hypotenuse

Angle **(Measured Angle, NOT 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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Center Spacing

Must be entered.

Enter Any Two

Enter two variables and then tap Answers.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

Answers

Bend Angle over 90°

Length may be too short for the Angle or Radius.

No Conduit Between Bends

Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

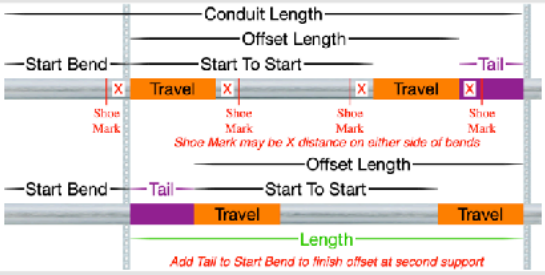
Tap to show the answers view.

Answer Offset Rack

6:43

Back | Answers | Help

Offset Rack



Select Number Format

Decimal | 1/16 | 1/32 | Metric

Entered

Number Of Conduit	3
Bend Radius	15 1/2"
Start Bend	18 "
Center Spacing	6 "
Offset	12 1/2"
Length	44 "
Hypotenuse	45 3/4"
Angle	15.86 °

Answers

Conduit Number	1
Conduit Length	64 "
Offset Length	41 1/2"
Tail	2 1/2"
Start Bend	18 "
Start To Start	38 3/8"
Bend Angle	19 °
Travel	5 1/8"

Previous | Next

Segments

Bend Aid

Conduit Number	2
Conduit Length	65 "
Offset Length	41 1/2"
Tail	1 1/2"
Start Bend	19 "
Start To Start	38 3/8"
Bend Angle	19 °
Travel	5 1/8"

Previous | Next

Segments

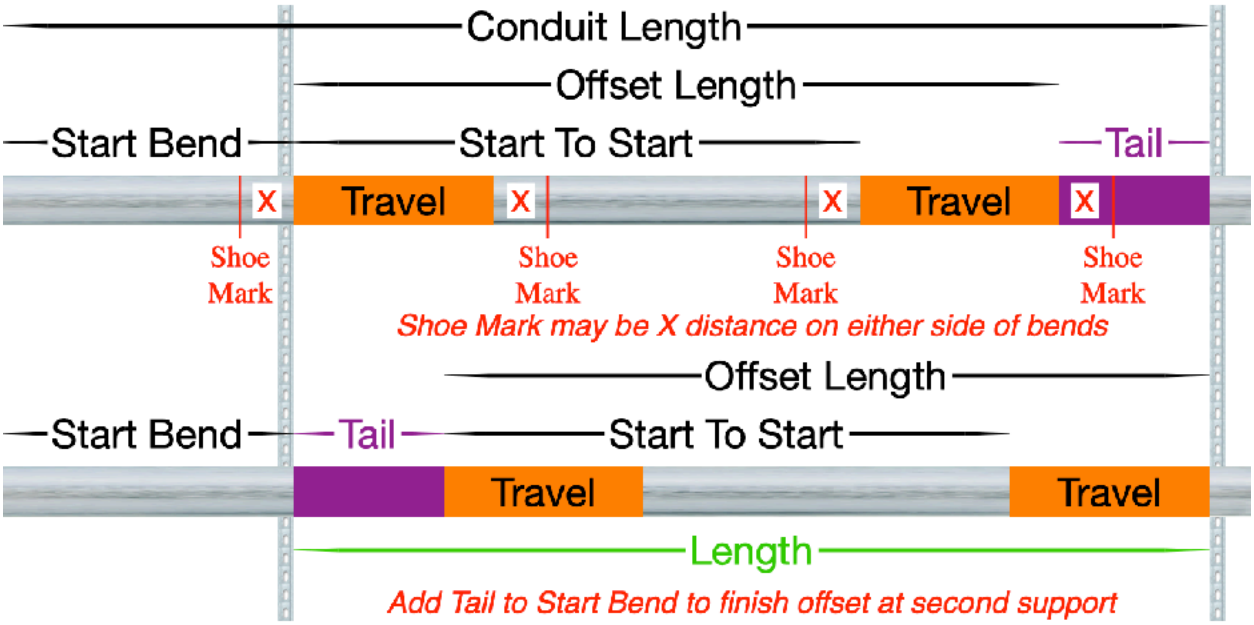
Bend Aid

Conduit Number	3
Conduit Length	66 "
Offset Length	41 1/2"
Tail	1/2"
Start Bend	20 "
Start To Start	38 3/8"
Bend Angle	19 °
Travel	5 1/8"

Previous | Next

Segments

Bend Aid



Answer Offset Rack Help

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 bend 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 like the Start Bend will increase so the center to center spacing will stay the same.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Conduit Number

The number of the conduit in the rack that the answers are being displayed for.

The Next and Previous buttons will step you through each set of answers.

Conduit Length

The total length of conduit needed to make the offset including the start bend and tail.

Offset Length

The length of the offset from the start of the first bend to the finish of the last bend

Tail

The length of conduit from the finish of the offset's second bend to the length that was entered.

Start Bend

Where the first bend will start for each of the conduit in the rack.

Start To Start

The length from the start of the first bend to the start of the second bend.

Start to start is given because the centers of concentric bends change

Bend Angle

The angle that the bend will be.

Bend Aid finds the smallest whole bend angle that will allow the offset to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Offsets

Lay out the dimensions on the straight conduit for each 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 old “Chicago” 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 a guess.

If a push through bender is being used 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.

Segments

Tap to go to the enter segment bend angle view.

Top Left of Scene

Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

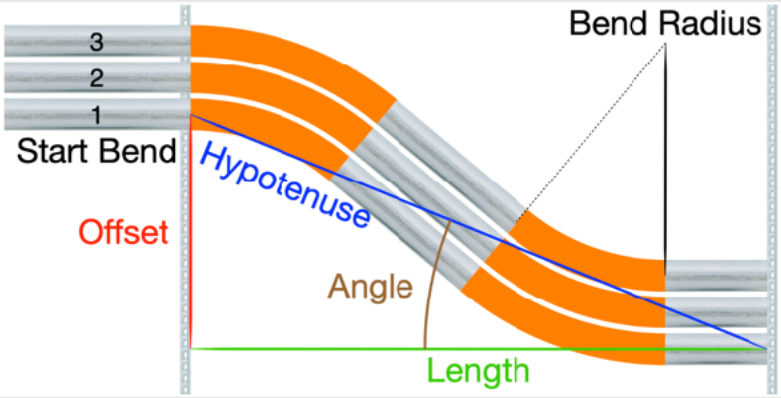
Tap to go to the Bend Aid main menu.

Enter Offset Concentric

6:49

Offsets | Enter | Help

Offset Concentric



Select Number Format

Decimal | 1/16 | 1/32 | Metric

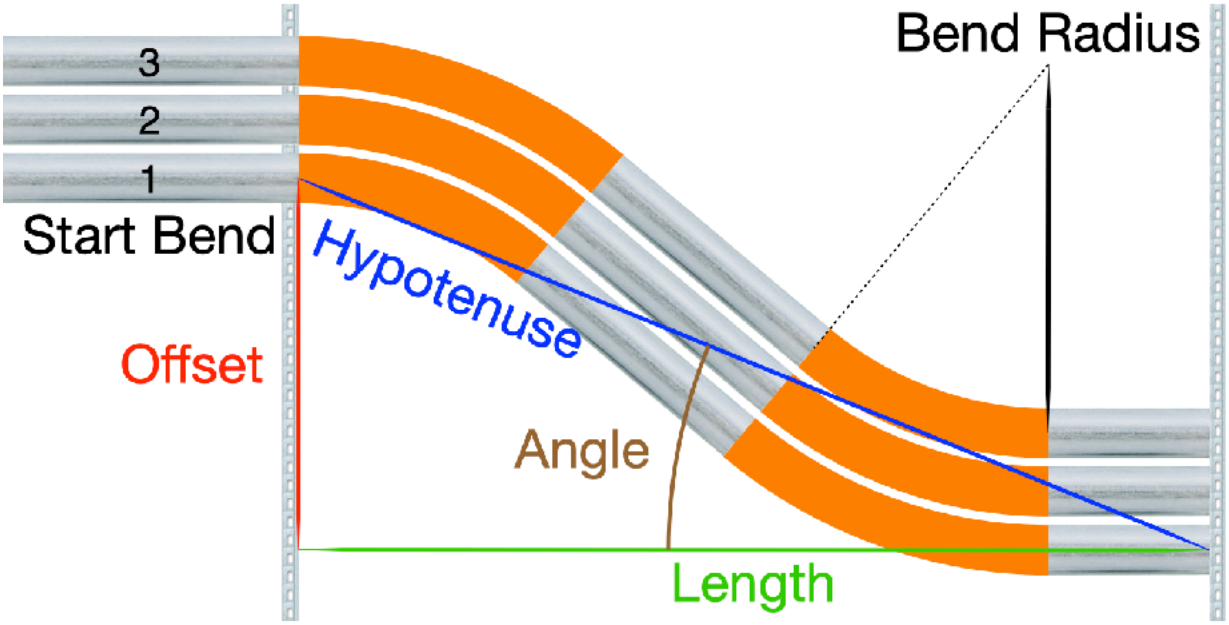
Enter All

Number Of Conduit	3
Bend Radius	15 1/2"
Start Bend	18"
Center Spacing	6"

Enter Any Two

Offset	12 1/2"
Length	44"
Hypotenuse	--' --" --/16
Angle	0.0

Answers



Enter Offset Concentric Help

Bend Aid solves a rack of concentric offsets by entering the required variables and any two of the four right triangle variables.

Measure where the offset needs to fit.

Measure the right triangle for the first offset and the rest of the bend radii will be solved.

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 finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The smallest center line radius of the bends.

Each bend radius will be solved and all bends will be bent using segments unless the smallest bend radius is a standard bending shoe radius.

Start Bend

Is where the bends should start.

If Start Bend is not entered then that dimension will not be included in the answers.

Center Spacing

The center to center spacing of the conduit in the rack.

Enter Any Two

Offset

Length

Hypotenuse

Angle **(Measured Angle, NOT 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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Center Spacing

Must be entered.

Enter Any Two

Enter two variables and then tap Answers.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

Answers

Bend Angle over 90°

Length may be too short for the Angle or Radius.

No Conduit Between Bends

Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

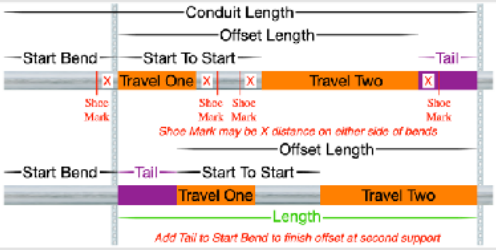
Tap to show the answers view.

Answer Offset Concentric

6:49

Back | Answers | Help

Offset Concentric



Select Number Format

Decimal | 1/16 | 1/32 | Metric

Entered

Number Of Conduit	3
Bend Radius	15 1/2"
Start Bend	18 "
Center Spacing	6 "
Offset	12 1/2"
Length	44 "
Hypotenuse	45 3/4"
Angle	15.86 °

Answers

Conduit Number	1
Conduit Length	63 15/16"
Offset Length	43 1/2"
Tail	1/2"
Bend Angle	19 °
Bend Radius One	15 1/2"
Travel One	5 1/8"
Start To Start	36 5/16"
Bend Radius Two	27 1/2"
Travel Two	9 1/8"

Previous Next

Segments Travel One

Segments Travel Two

Bend Aid

Conduit Number	2
Conduit Length	63 15/16"
Offset Length	43 1/2"
Tail	1/2"
Bend Angle	19 °
Bend Radius One	21 1/2"
Travel One	7 1/8"
Start To Start	38 5/16"
Bend Radius Two	21 1/2"
Travel Two	7 1/8"

Previous Next

Segments Travel One

Segments Travel Two

Bend Aid

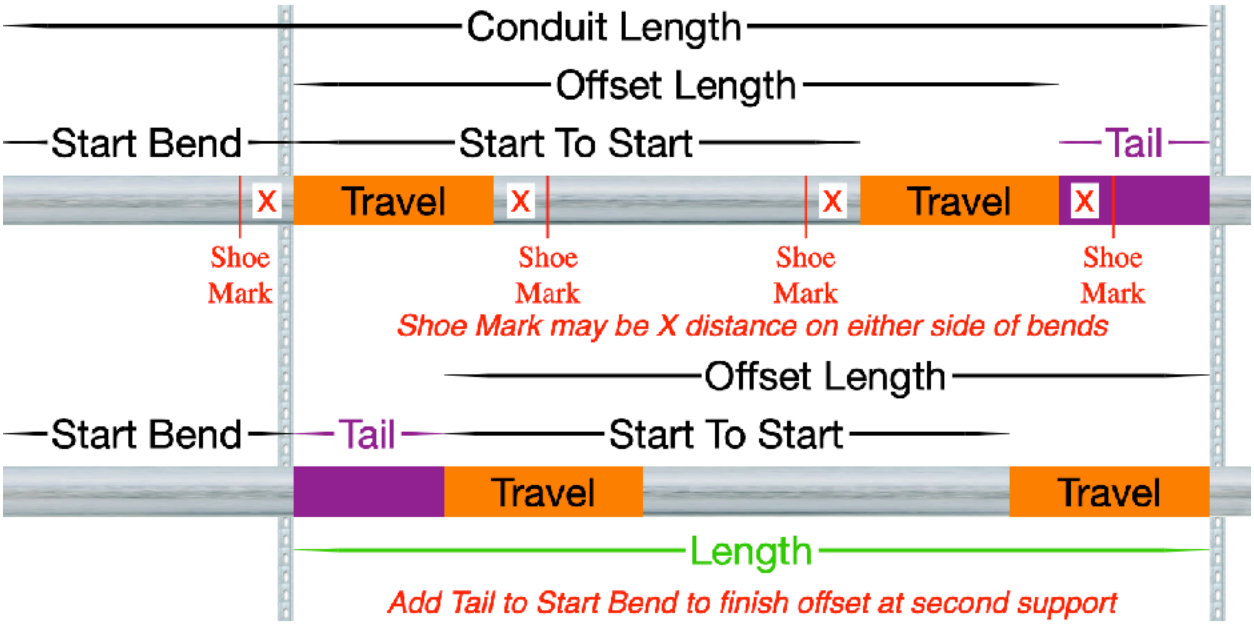
Conduit Number	3
Conduit Length	63 15/16"
Offset Length	43 1/2"
Tail	1/2"
Bend Angle	19 °
Bend Radius One	27 1/2"
Travel One	9 1/8"
Start To Start	40 5/16"
Bend Radius Two	15 1/2"
Travel Two	5 1/8"

Previous Next

Segments Travel One

Segments Travel Two

Bend Aid



Answer Offset Concentric Help

The answers given for an Offset Concentric 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 bend 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 like the Bend Radius and the Travel will increase.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Conduit Number

The number of the conduit in the rack that the answers are being displayed for.

The Next and Previous buttons will step you through each set of answers.

The Segments Travel One and Segments Travel Two buttons will take you to the enter segments view.

Conduit Length

The total length of conduit needed to make the offset including the start bend and tail.

Offset Length

The length of the offset from the start of the first bend to the finish of the last bend

Tail

The length of conduit from the finish of the offset's second bend to the length that was entered.

Start Bend

Where the first bend will start for each of the conduit in the rack.

Start To Start

The length from the start of the first bend to the start of the second bend.

Start to start is given because the centers of concentric bends change

Bend Angle

The angle that the bend will be.

Bend Aid finds the smallest whole bend angle that will allow the offset to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Offsets

Lay out the dimensions on the straight conduit for each 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 old “Chicago” 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 a guess.

If a push through bender is being used then lay out 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.

Segments

Tap to go to the enter segment bend angle view.

Top Left of Scene

Back

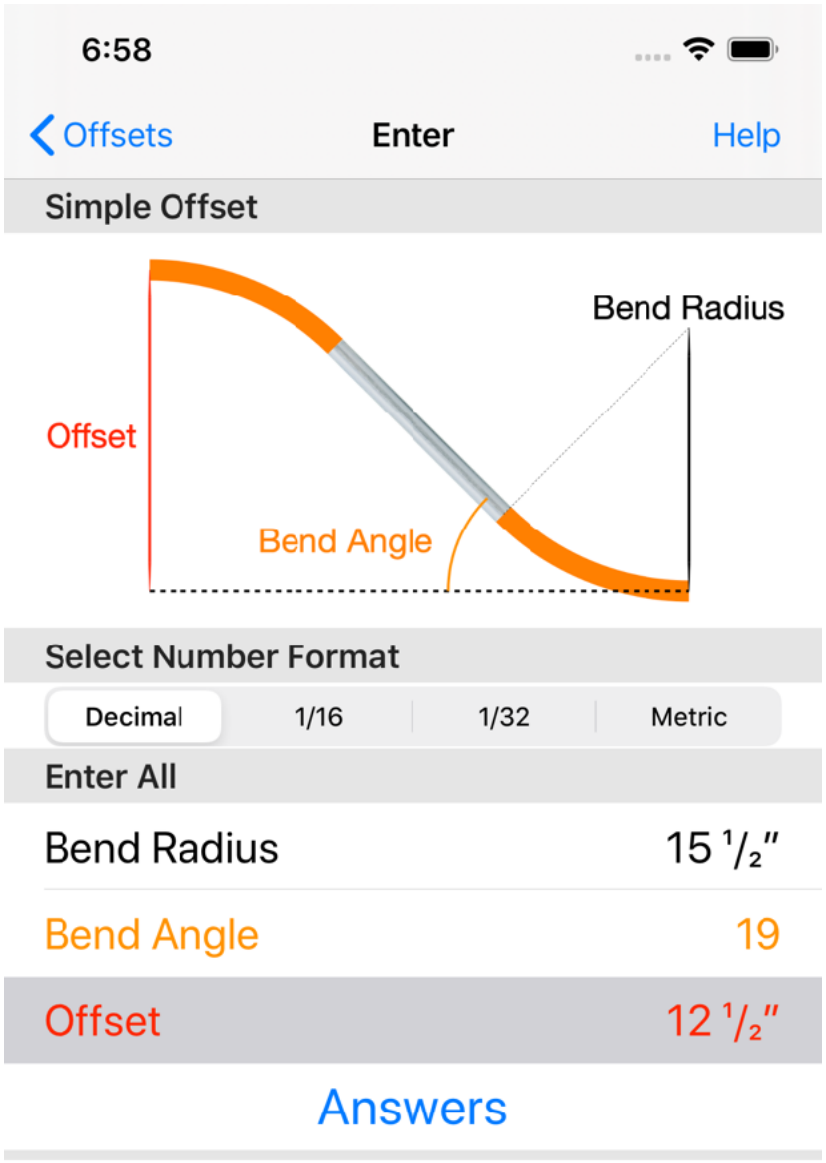
Tap to go back to the enter scene to change variables.

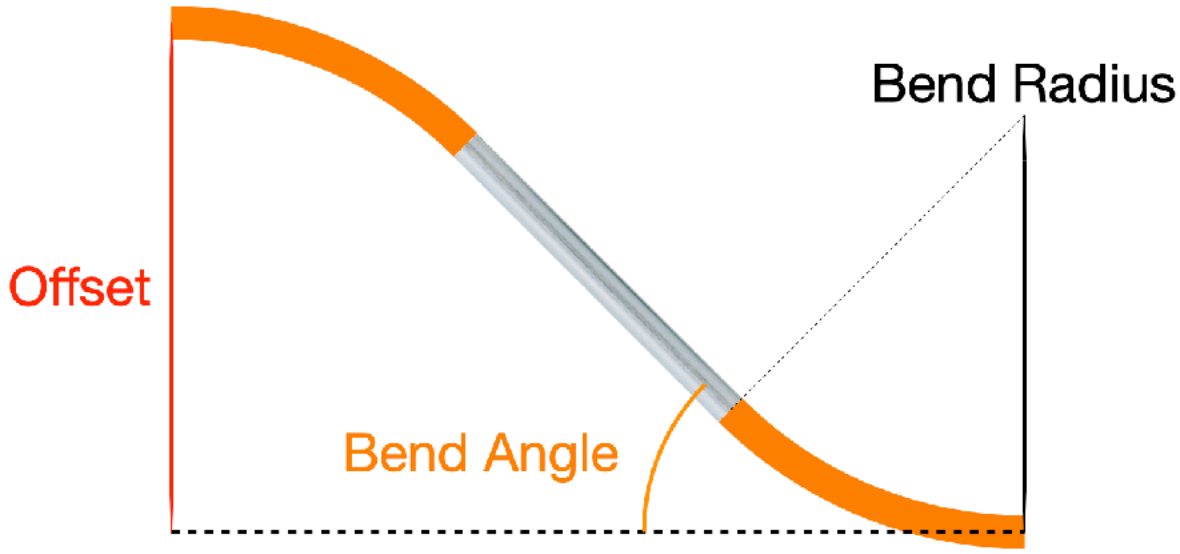
Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.

Enter Simple Offset





Enter Simple Offset Help

Bend Aid solves for a simple offset by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Bend Angle

The bend angle to be used.

Offset

The 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.

Enter

Bend Radius

Must be entered.

Bend Angle

Must be less than 90°.

Offset

Must be entered.

Answers

Bend Angle over 90°

Length may be too short for the Angle or Radius.

No Conduit Between Bends

Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

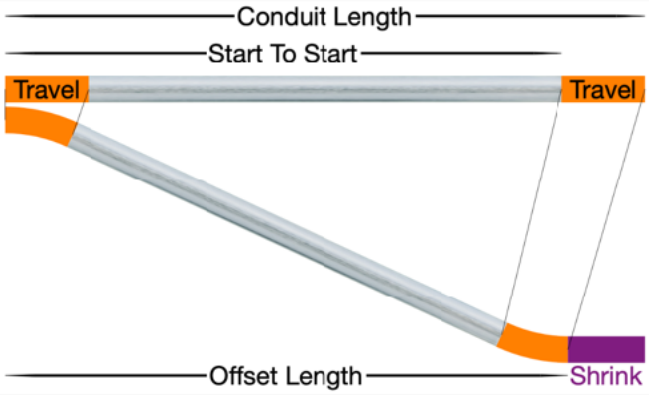
Tap to show the answers view.

Answer Simple Offset

6:58

Back | Answers | Help

Simple Offset



Select Number Format

Decimal | 1/16 | 1/32 | Metric

Entered

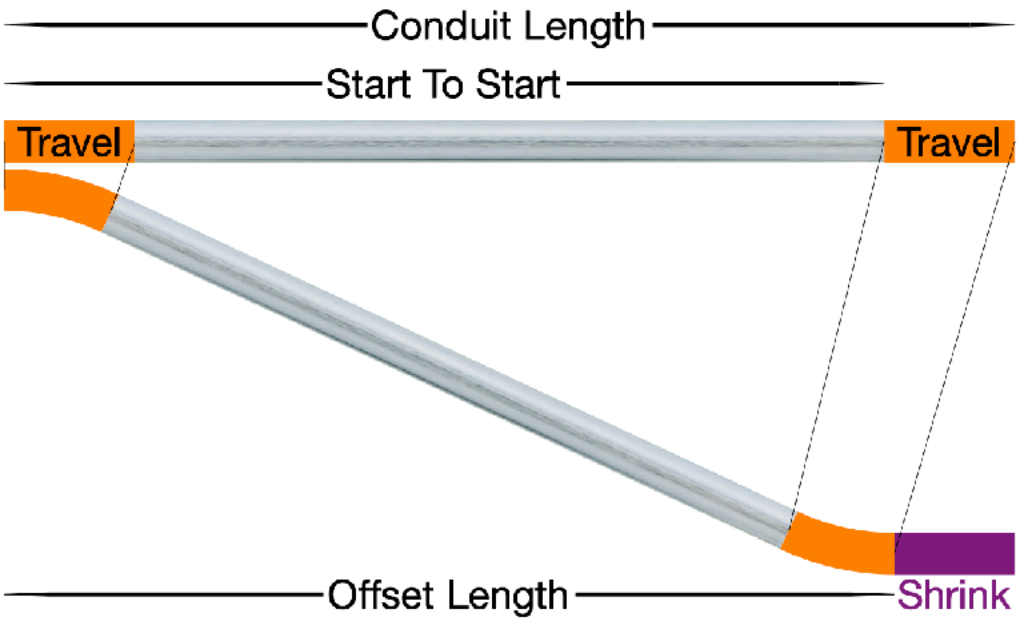
Bend Radius	15 1/2"
Bend Angle	19 °
Offset	12 1/2"

Answers

Conduit Length	43 1/2"
Offset Length	41 1/2"
Shrink	2 "
Start To Start	38 3/8"
Travel	5 1/8"

Segments

Bend Aid



Answer Simple Offset Help

The answers given for a Simple Offset allow the bends to be laid out 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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Length

The length of conduit needed to make the offset.

Offset Length

The length of the offset from the start of the first bend to the finish of the last bend

Shrink

The difference between the conduit length and the offset length after the offset is bent.

Start To Start

The length from the start of the first bend to the start of the second bend.

Start to start is given because the centers of concentric bends change

Bend Angle

The angle that the bend will be.

Bend Aid finds the smallest whole bend angle that will allow the offset to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending An Offset

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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 a guess.

If a push through bender is being used 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.

Segments

Tap to go to the enter segment bend angle view.

Top Left of Scene

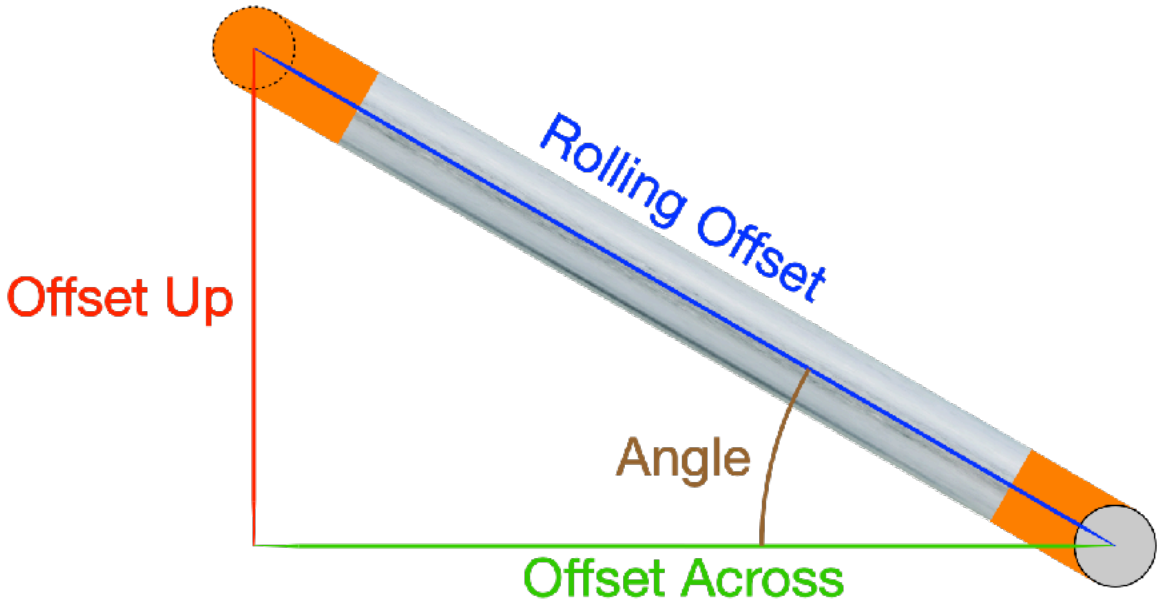
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.

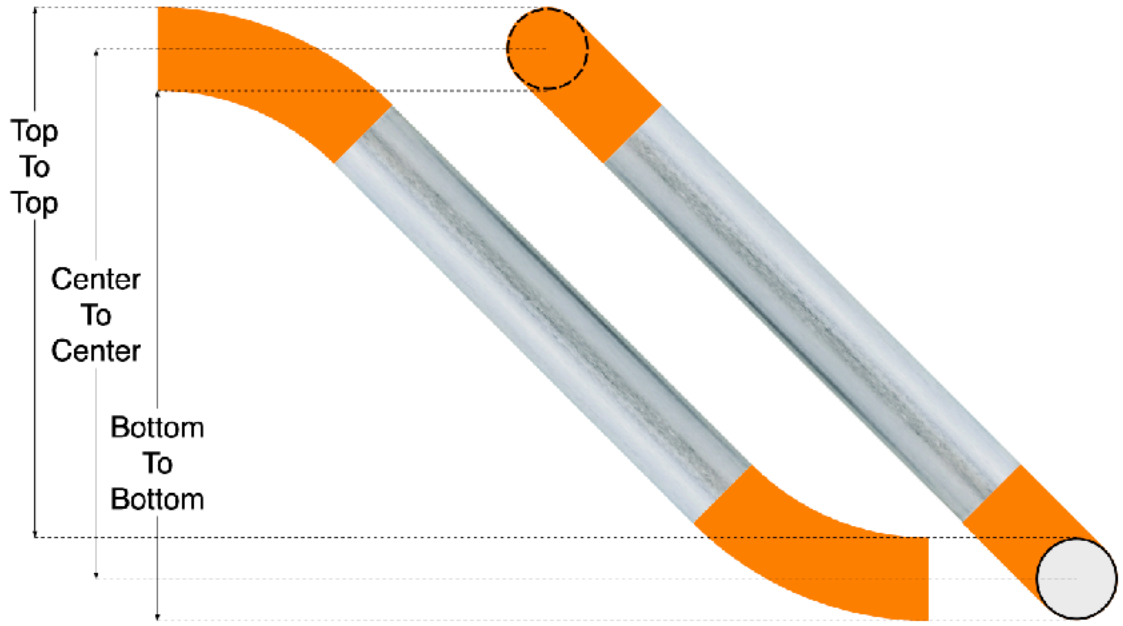


Rolling Offset

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

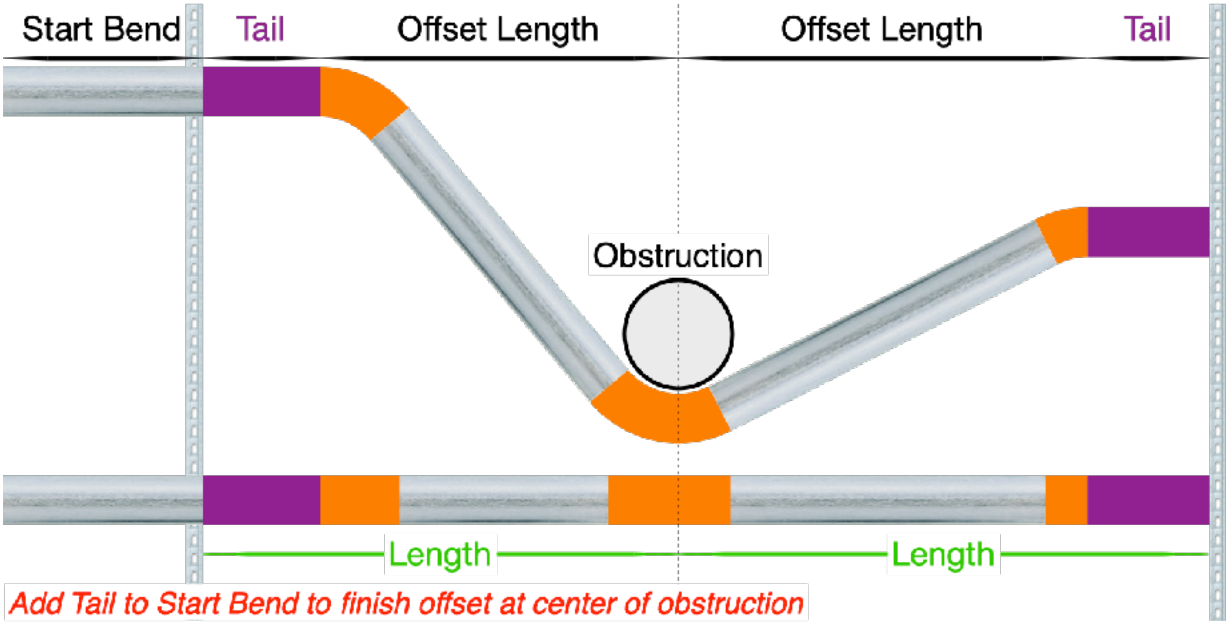
Bend Aid always solves the center line of the conduit.

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.



3 Point Saddle

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

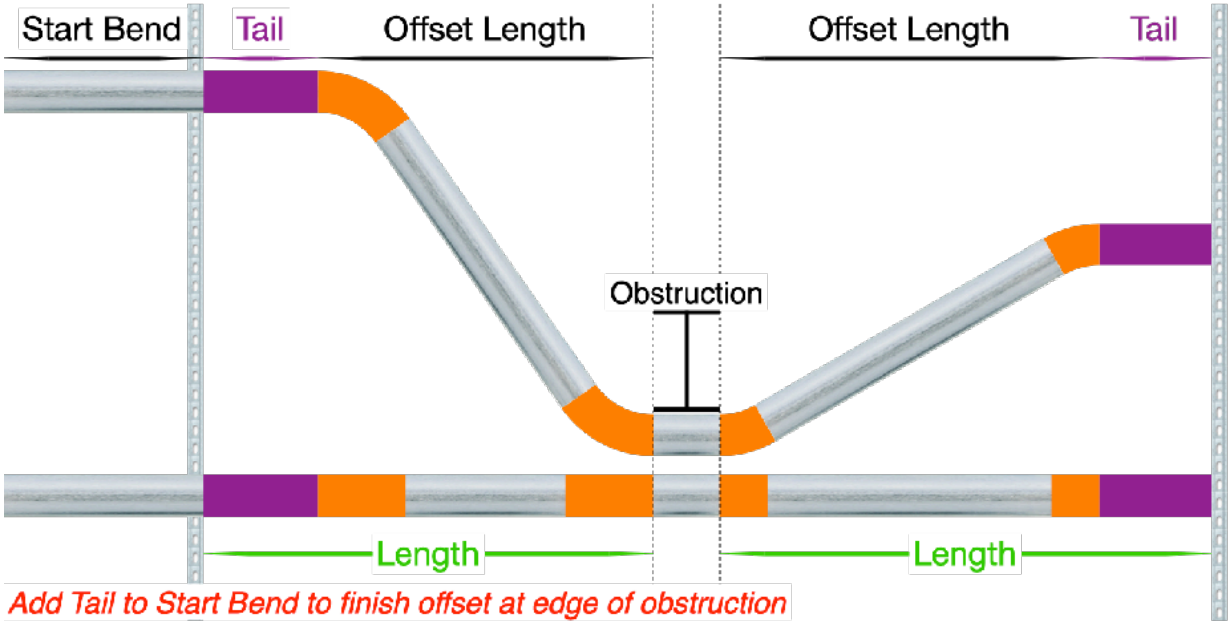
A saddle is two offsets, ie. four bends.

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

The offsets may be different offsets, radii, or 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.



4 Point Saddle

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

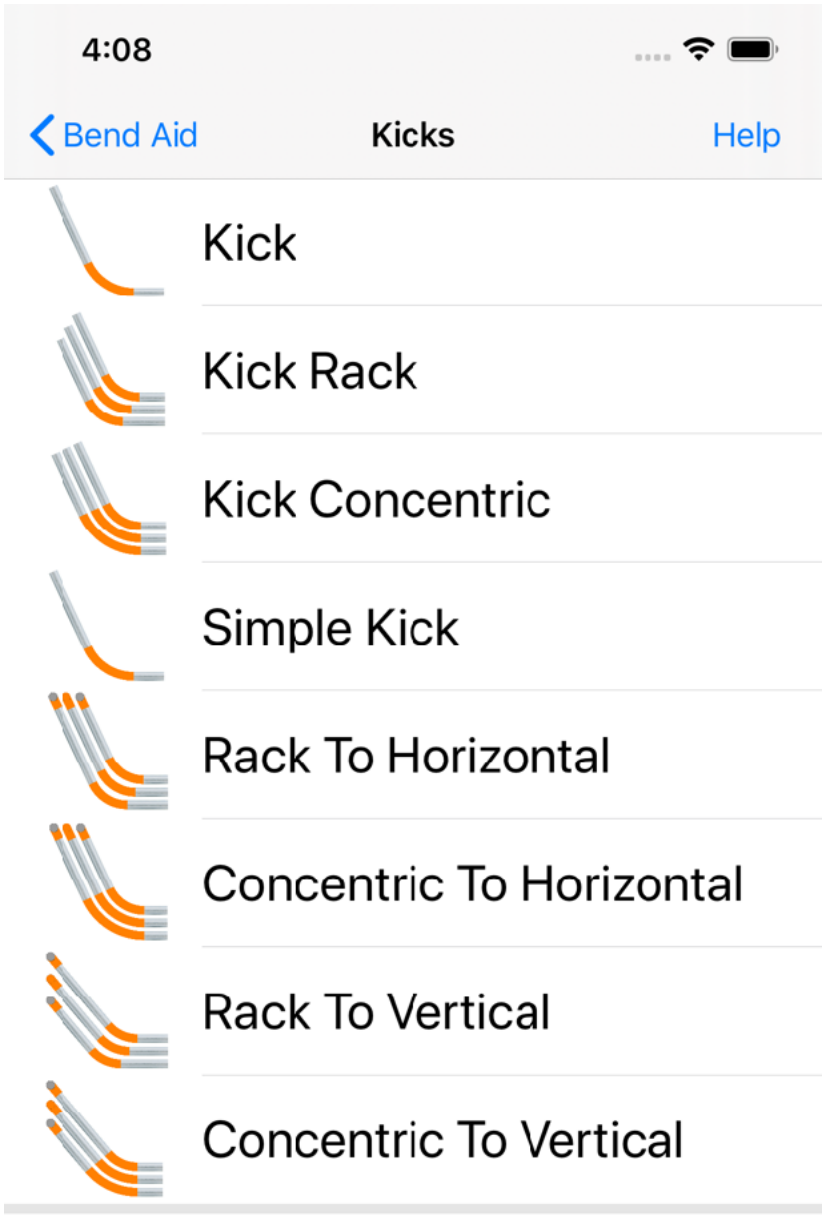
A 4 point saddle is two offsets with some straight conduit between the second and third bends.

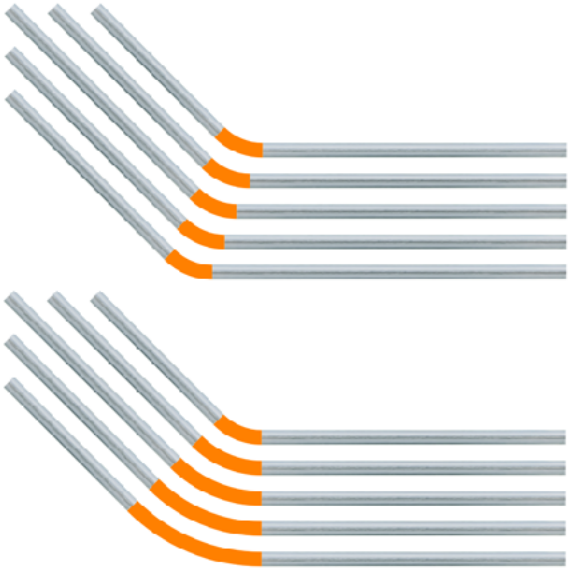
The offsets may be different offsets, radius, or angles.

Lay out the first offset to finish at the obstruction by adding the tail 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


4:08
Bend Aid
Kicks
Help
Kick
Kick Rack
Kick Concentric
Simple Kick
Rack To Horizontal
Concentric To Horizontal
Rack To Vertical
Concentric To Vertical



Kicks Menu Help

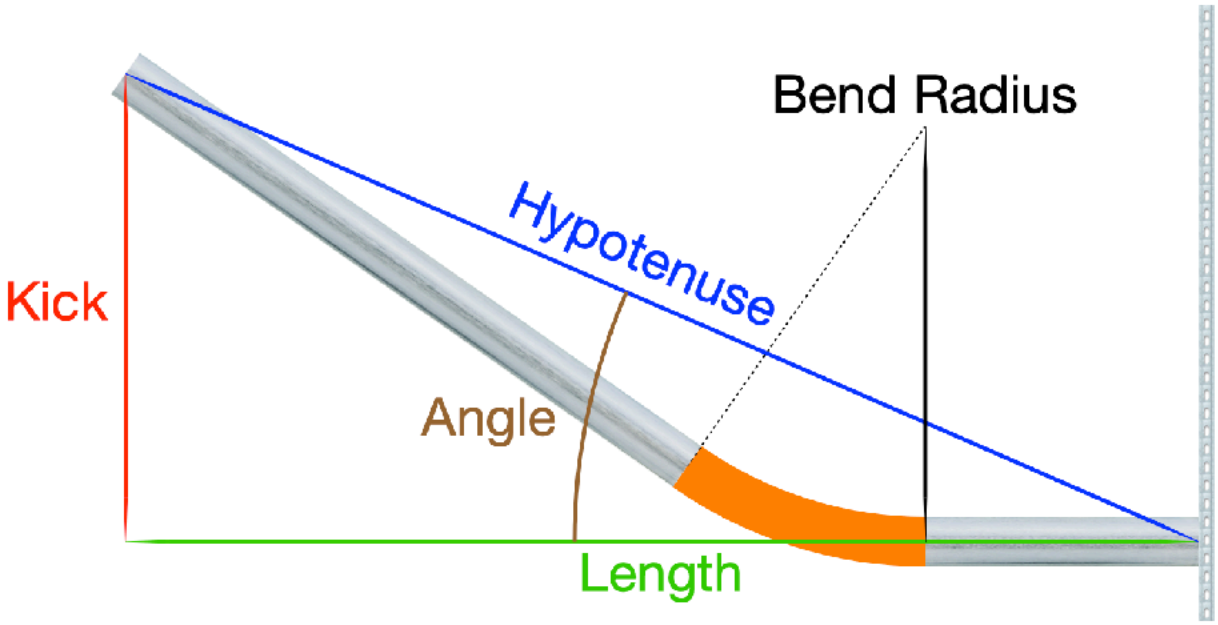
Bend-Aid solves the center line of the conduit and bends.

A kick has one bend that changes the direction of the conduit.

There is straight conduit in front of and behind the kick.

After the kick there will be a length of conduit that will either be the end of a full length or the conduit willed to 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.



Enter Kick Help

Bend Aid solves a kick by entering the required variables and any two of the four right triangle variables.

Measure where the kick needs to fit.

Usually you measure the kick and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Enter Any Two

Kick

Length

Hypotenuse

Angle **(Measured Angle, NOT 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.

Enter

Bend Radius

Must be entered.

Enter Any Two

Enter two variables and then tap Answers.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

Answers

Bend Angle over 90°

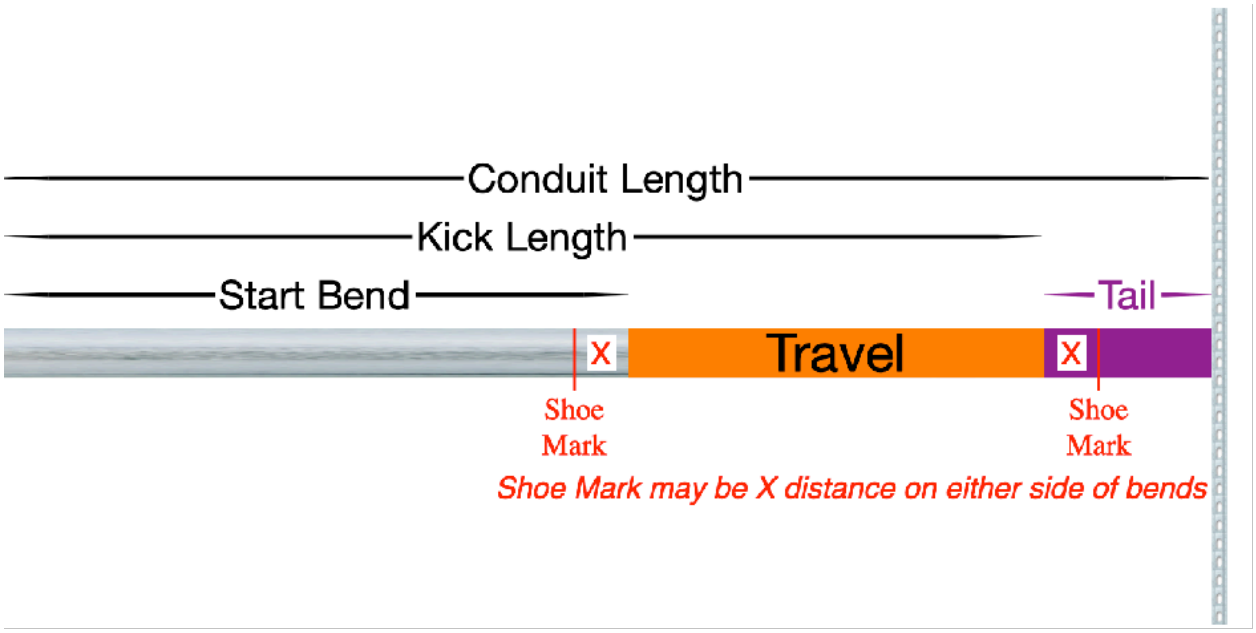
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers view.



Answer Kick Help

The answers given for a kick allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Conduit Length

The total length of conduit needed to make the kick including the start bend and tail.

Kick Length

The length of the kick to the finish of the bend

Tail

The length of conduit from the finish of the kick's bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Kick

Lay out the dimensions on the straight conduit.

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 old "Chicago" 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 a guess.

If a push through bender is being used then lay out the bends and find the centers of the bends.

Segments

Tap to go to the enter segment bend angle view.

Top Left of Scene

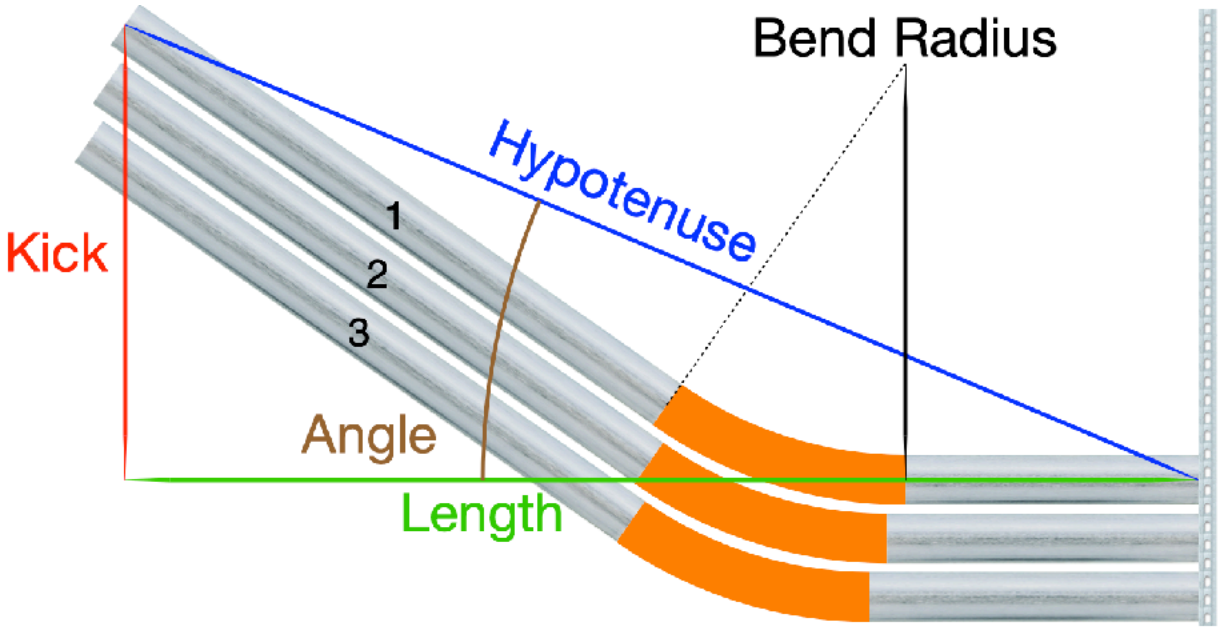
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Kick Rack Help

Bend Aid solves a rack of kicks by entering the required variables and any two of the four right triangle variables.

Measure where the kick needs to fit.

Measure the right triangle for the first kick and the rest of the start bends will be solved.

Usually you measure the kick and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Enter Any Two

Kick

Length

Hypotenuse

Angle (Measured Angle, NOT 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.

Enter

Number Of Conduit
Must be entered.
Bend Radius
Must be entered.
Center Spacing
Must be entered.
Enter Any Two
Enter two variables and then tap Answers.
Hypotenuse
Must be greater than either side.
Angle
Must be less than 90°.

Answers

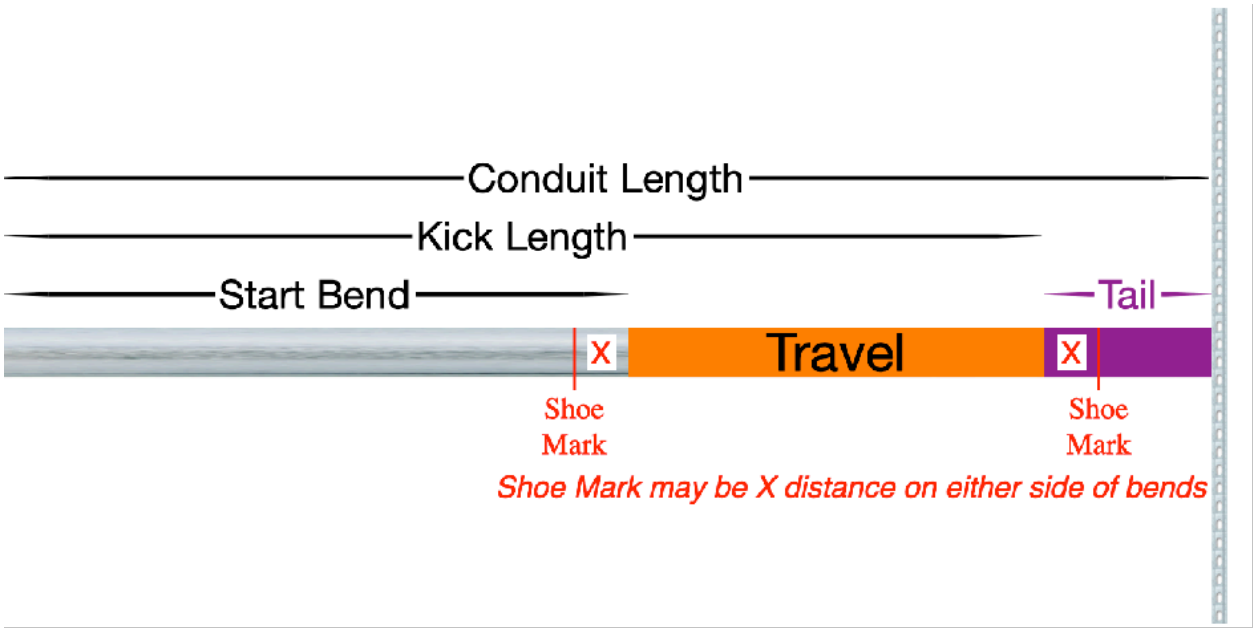
Bend Angle over 90°
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers view.



Answer Kick Rack Help

The answers given for a rack of kicks allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Hole Spacing

The distance between centers of the kicks in a straight row.

If the conduit are being bent down into holes this is the center to center spacing of the holes.

If the holes are too far apart then increases the bend angle.

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Conduit Length

The total length of conduit needed to make the kick including the start bend and tail.

Kick

The new kick from the rack to the row.

Kick Length

The length of the kick to the finish of the bend

Tail

The length of conduit from the finish of the kick's bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Kicks

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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 a guess.

If a push through bender is being used then lay out the bends and find the centers of the bends.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

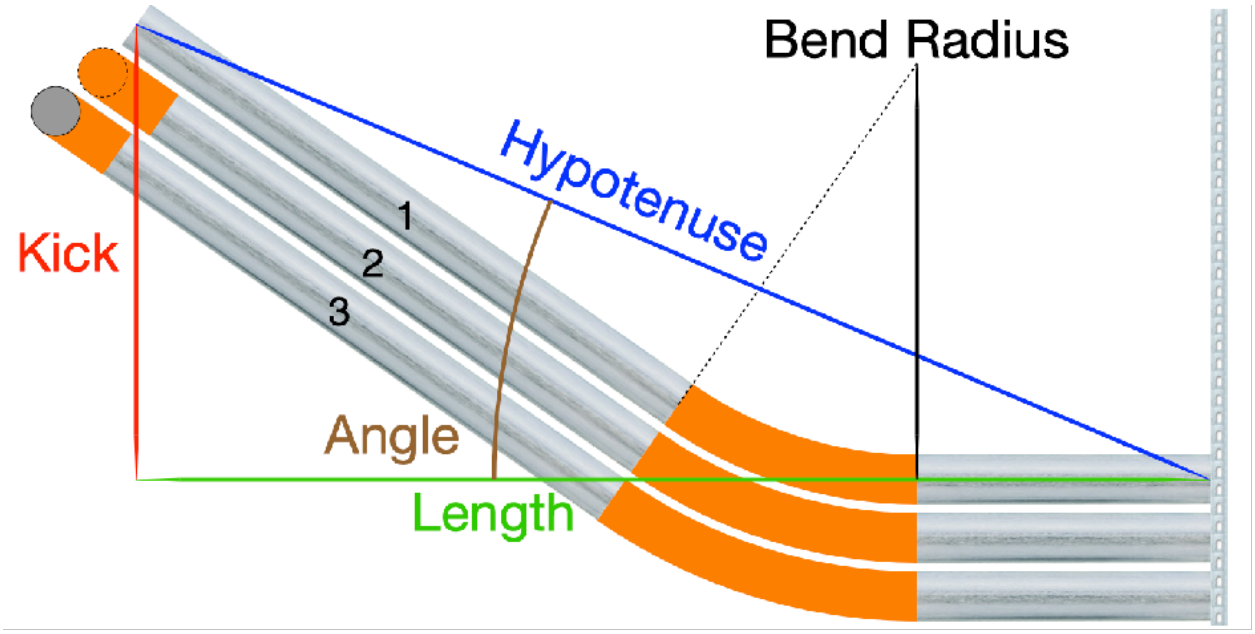
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Kick Concentric Help

Bend Aid solves a rack of concentric kicks by entering the required variables and any two of the four right triangle variables.

Measure where the kick needs to fit.

Measure the right triangle for the first kick and the rest of the start bends and bend radii will be solved.

Usually you measure the kick and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Enter Any Two

Kick

Length

Hypotenuse

Angle (Measured Angle, NOT 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.

Enter

Number Of Conduit
Must be entered.
Bend Radius
Must be entered.
Center Spacing
Must be entered.
Enter Any Two
Enter two variables and then tap Answers.
Hypotenuse
Must be greater than either side.
Angle
Must be less than 90°.

Answers

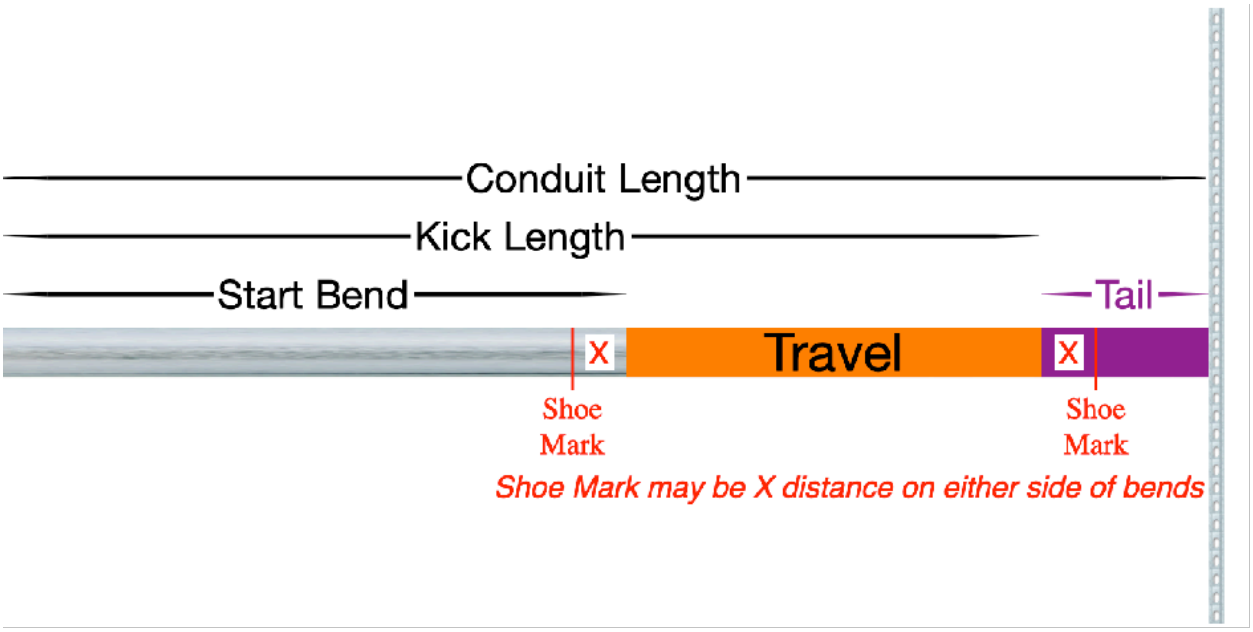
Bend Angle over 90°
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers view.



Answer Kick Concentric Help

The answers given for a rack of concentric kicks allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Hole Spacing

The distance between centers of the kicks in a straight row.

If the conduit are being bent down into holes this is the center to center spacing of the holes.

If the holes are too far apart then increases the bend angle.

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Conduit Length

The total length of conduit needed to make the kick including the start bend and tail.

Kick

The new kick from the rack to the row.

Kick Length

The length of the kick to the finish of the bend

Tail

The length of conduit from the finish of the kick's bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Concentric Kicks

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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 a guess.

If a push through bender is being used then lay out the bends and find the centers of the bends.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

Back

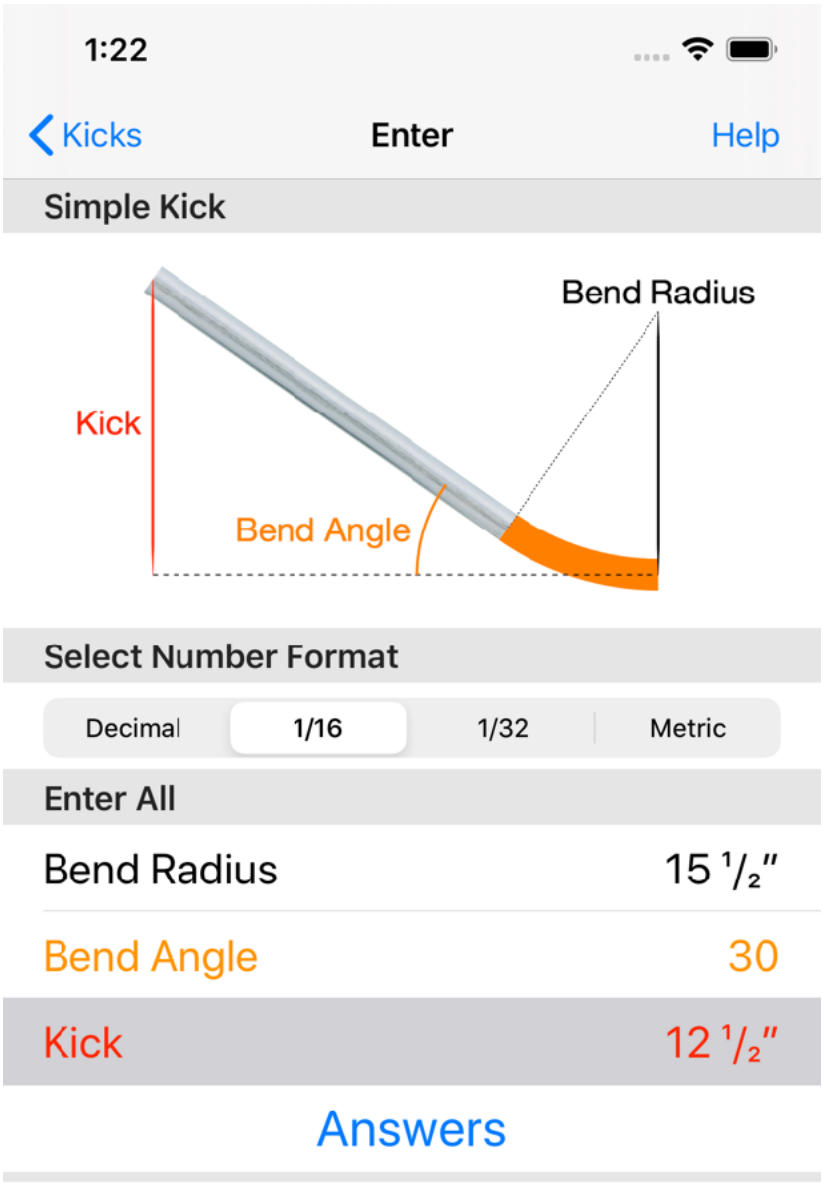
Tap to go back to the enter scene to change variables.

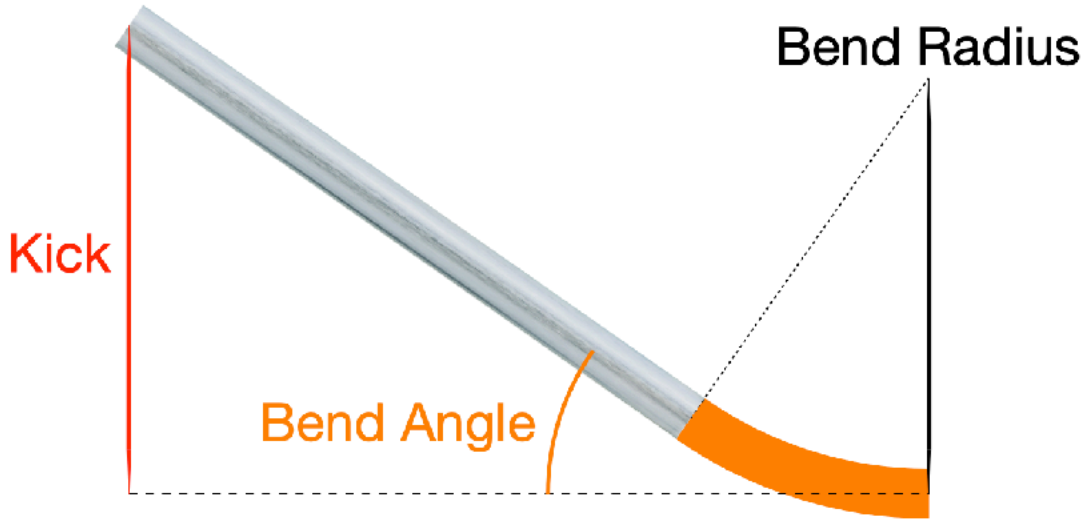
Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.

Enter Simple Kick





Enter Simple Kick Help

Bend Aid solves a simple kick by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Bend Angle

The bend angle to be used.

Kick

The 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.

Enter

Bend Radius

Must be entered.

Bend Angle

Must be entered.

Entered Bend Angle

Must be less than 90°.

Kick

Must be entered.

Answers

Bend Angle over 90°

Length may be too short for the Angle or Radius.

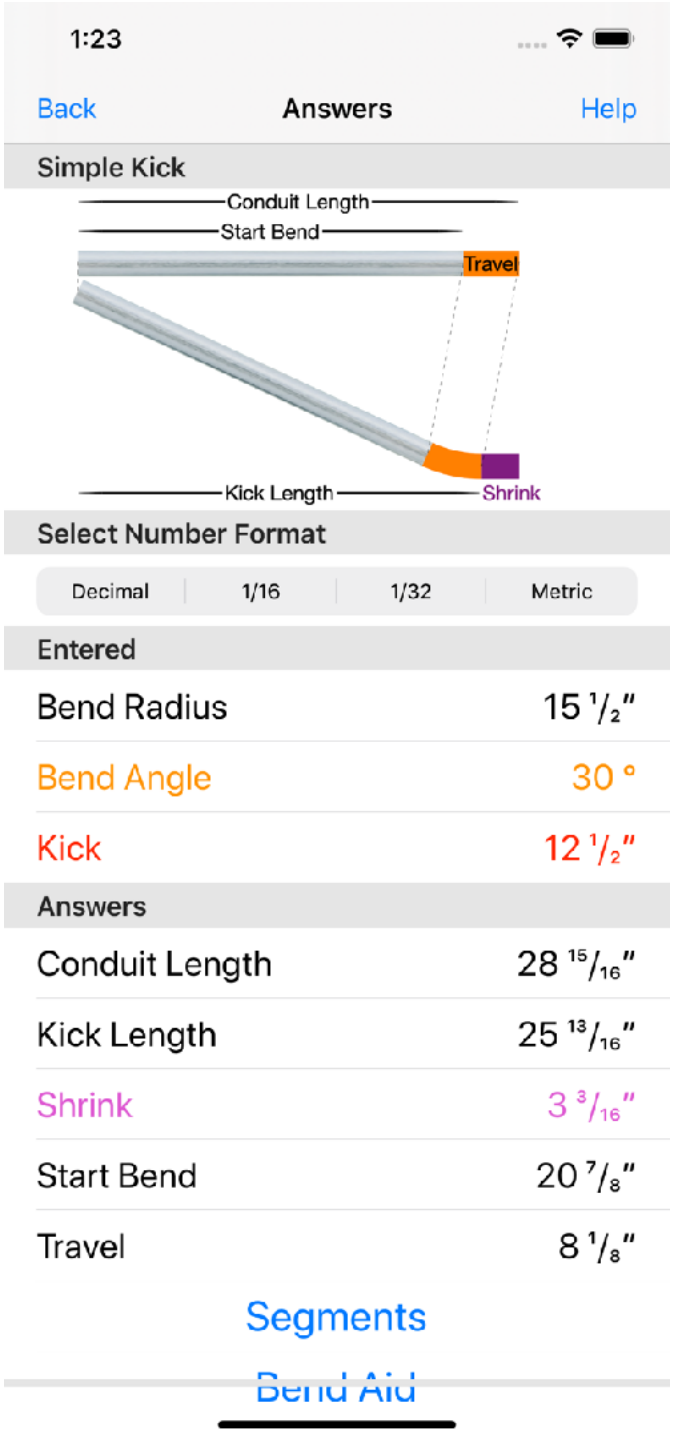
Tap OK to dismiss an alert.

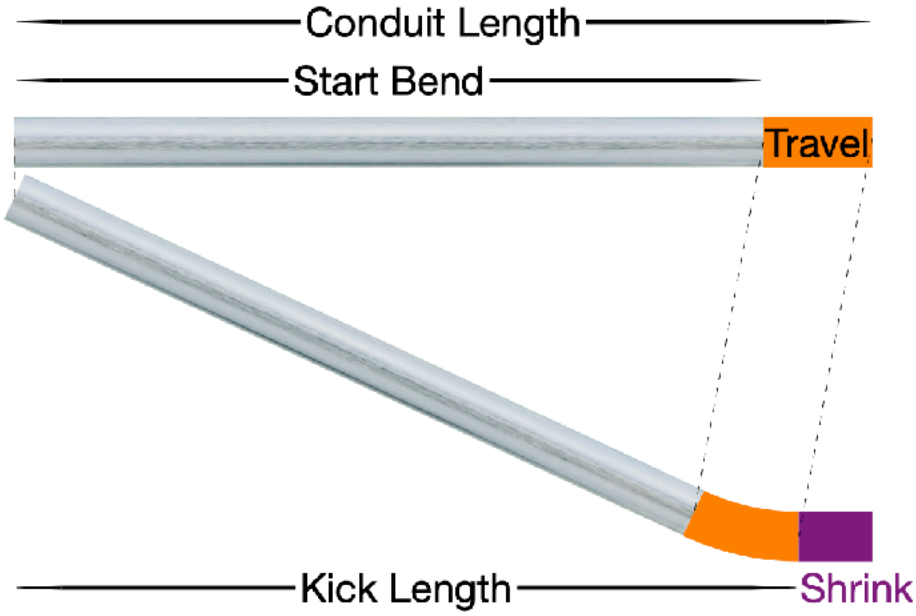
Bottom Row

Answers

Tap to show the answers scene.

Answer Simple Kick





Answer Simple Kick Help

The answers given for a simple kick allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Length

The total length of conduit needed to make the offset including the start bend and tail.

Kick Length

The length of the offset from the start of the first bend to the finish of the last bend

Shrink

The difference between the conduit length and the kick length after the kick is bent.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Kick

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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.

If a push through bender is being used then 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.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

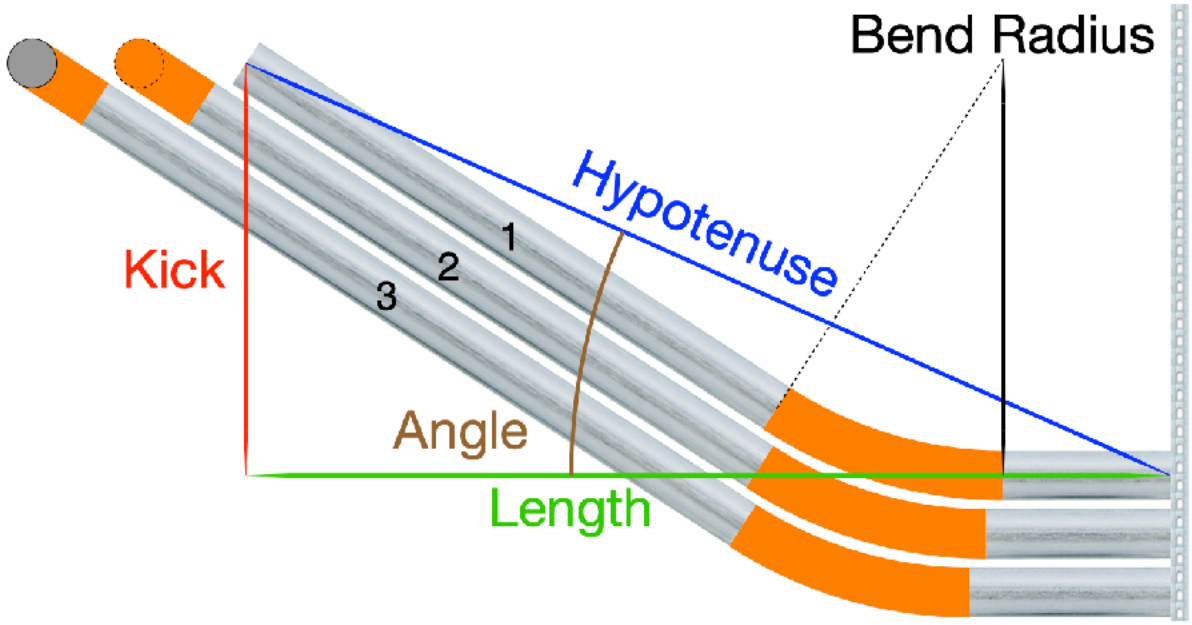
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Kick Rack To Horizontal Help

Bend Aid solves a rack of kicks to a horizontal row by entering the required variables and any two of the four right triangle variables.

Measure where the kick needs to fit.

Measure the right triangle for the first kick and the rest of the start bends and bend radii will be solved.

Usually you measure the kick and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The center line radius of the bends.

Center Spacing

The center to center spacing of the conduit in the rack.

Enter Any Two

Kick

Length

Hypotenuse

Angle **(Measured Angle, NOT 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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Center Spacing

Must be entered.

Enter Any Two

Enter two variables and then tap Answers.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

Answers

Bend Angle over 90°

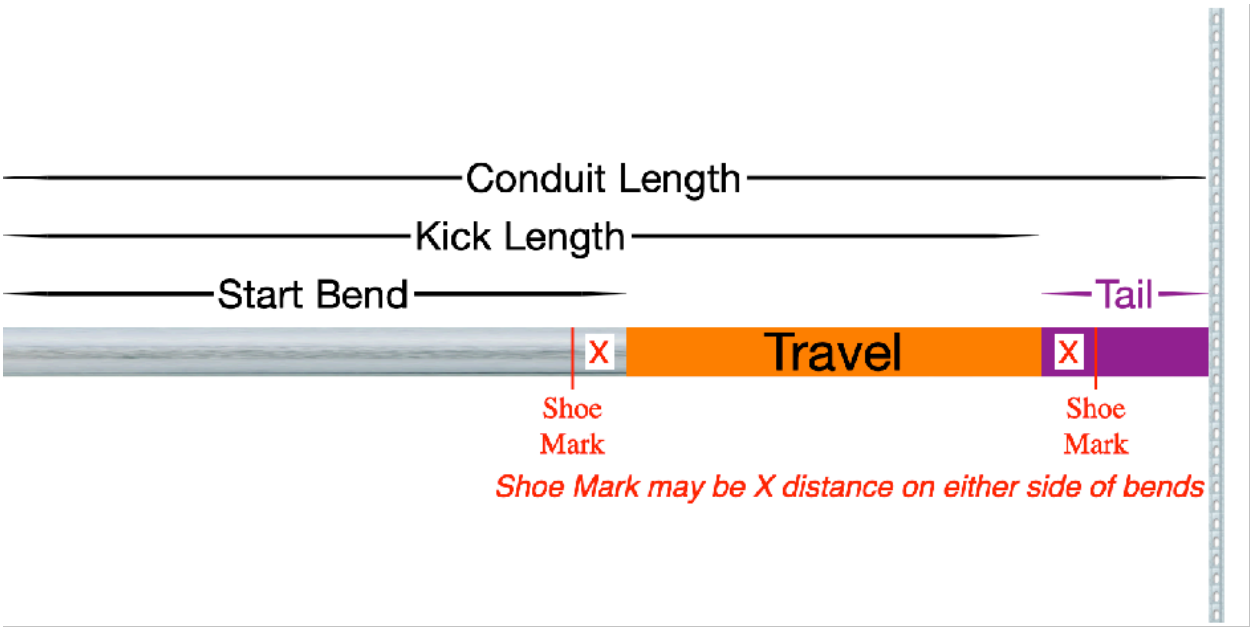
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Kick Rack To Horizontal Help

The answers given for a rack of kicks to a horizontal row allows the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Hole Spacing

The distance between centers of the kicks in a straight row.

If the conduit are being bent down into holes this is the center to center spacing of the holes.

If the holes are too far apart then increases the bend angle.

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Conduit Length

The total length of conduit needed to make the kick including the start bend and tail.

Kick

The new kick from the rack to the row.

Kick Length

The length of the kick to the finish of the bend

Tail

The length of conduit from the finish of the kick's bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Kicks To A Horizontal Row

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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 a guess.

If a push through bender is being used then lay out the bends and find the centers of the bends.

Segments

Tap to go to the enter segment bend angle view.

Top Left of Scene

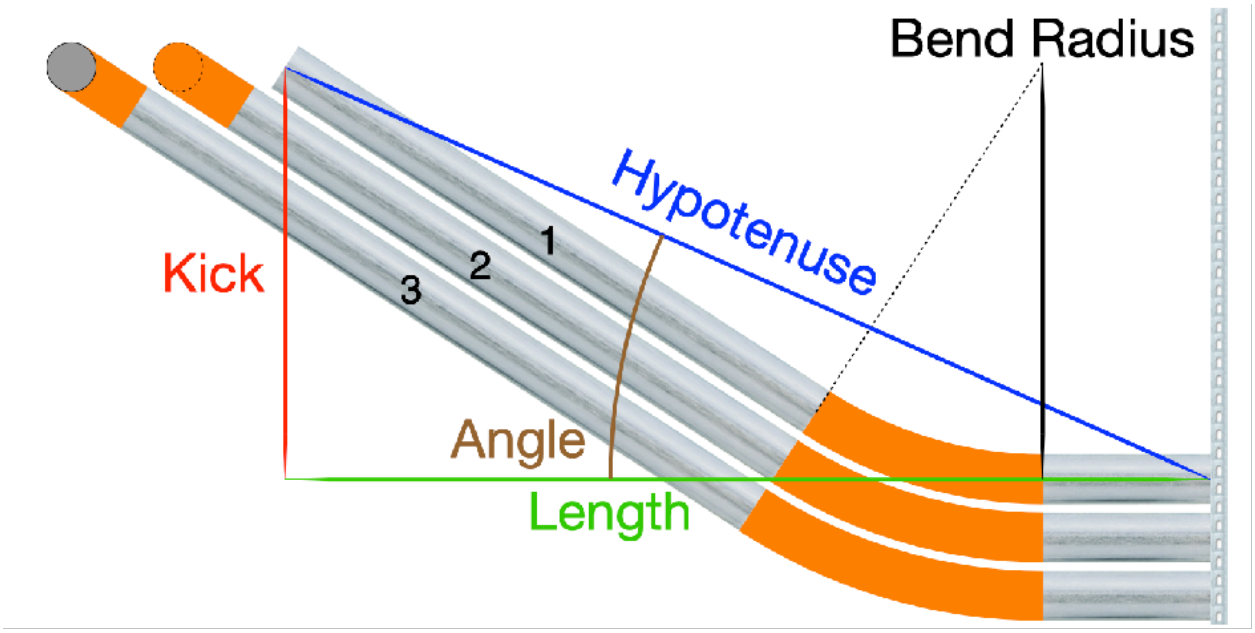
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Kick Concentric To Horizontal Help

Bend Aid solves a rack of concentric kicks to a horizontal row by entering the required variables and any two of the four right triangle variables.

Measure where the kick needs to fit.

Measure the right triangle for the first kick and the rest of the start bends and bend radii will be solved.

Usually you measure the kick and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The smallest center line radius of the bends.

Each bend radius will be solved and all bends will be bent using segments unless the smallest bend radius is a standard bending shoe radius.

Start Bend

Is where the bends should start.

If Start Bend is not entered then that dimension will not be included in the answers.

Center Spacing

The center to center spacing of the conduits in the rack.

Enter Any Two

Kick

Length

Hypotenuse

Angle **(Measured Angle, NOT 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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Center Spacing

Must be entered.

Enter Any Two

Enter two variables and then tap Answers.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

Answers

Bend Angle over 90°

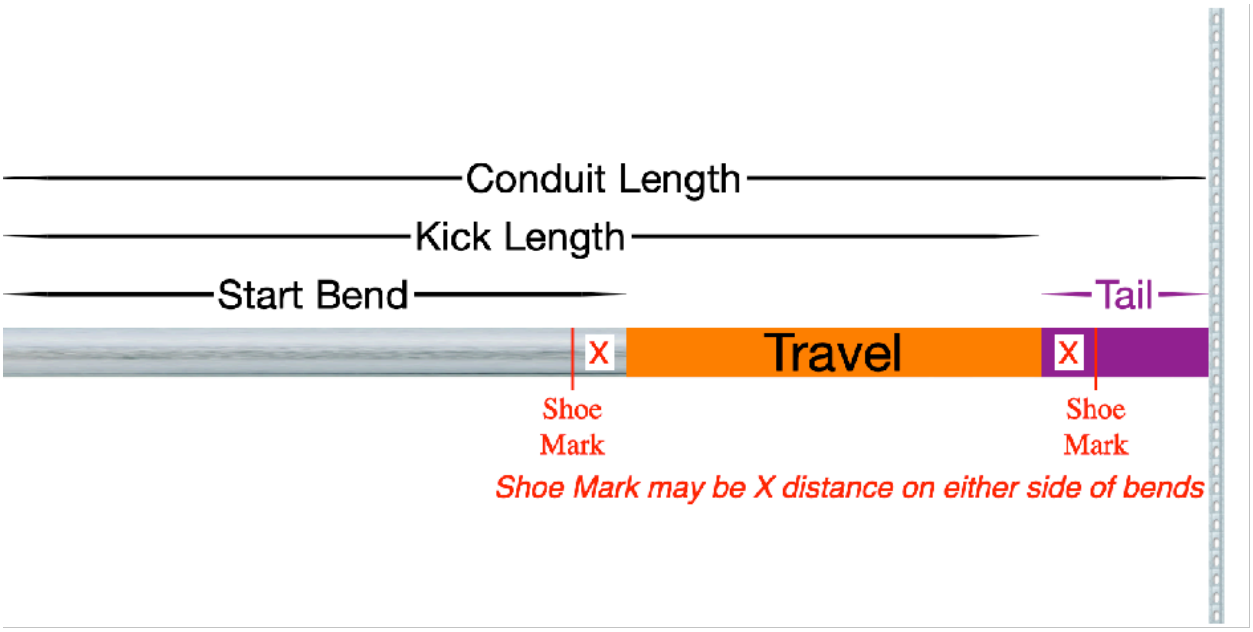
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Kick Concentric To Horizontal Help

The answers given for a rack of concentric kicks to a horizontal row allows the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Hole Spacing

The distance between centers of the kicks in a straight row.

If the conduit are being bent down into holes this is the center to center spacing of the holes.

If the holes are too far apart then increases the bend angle.

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Conduit Length

The total length of conduit needed to make the kick including the start bend and tail.

Kick

The new kick from the rack to the row.

Kick Length

The length of the kick to the finish of the bend

Tail

The length of conduit from the finish of the kick's bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending Concentric Kicks To A Horizontal Row

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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 a guess.

If a push through bender is being used then lay out the bends and find the centers of the bends.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

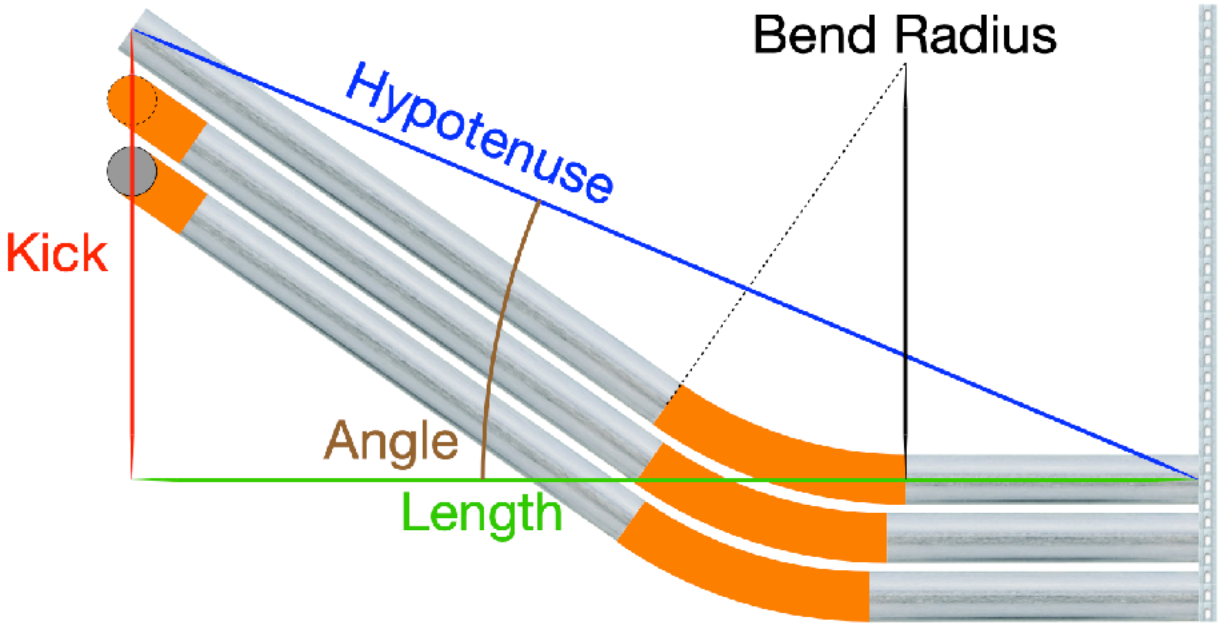
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Kick Rack To Vertical Help

Bend Aid solves a rack of kicks to a vertical row by entering the required variables and any two of the four right triangle variables.

Measure where the kick needs to fit.

Measure the right triangle for the first kick and the rest of the start bends and bend radii will be solved.

Usually you measure the kick and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The smallest center line radius of the bends.

Each bend radius will be solved and all bends will be bent using segments unless the smallest bend radius is a standard bending shoe radius.

Center Spacing

The center to center spacing of the conduits in the rack.

Enter Any Two

Kick

Length

Hypotenuse

Angle **(Measured Angle, NOT 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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Center Spacing

Must be entered.

Enter Any Two

Enter two variables and then tap Answers.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

Answers

Bend Angle over 90°

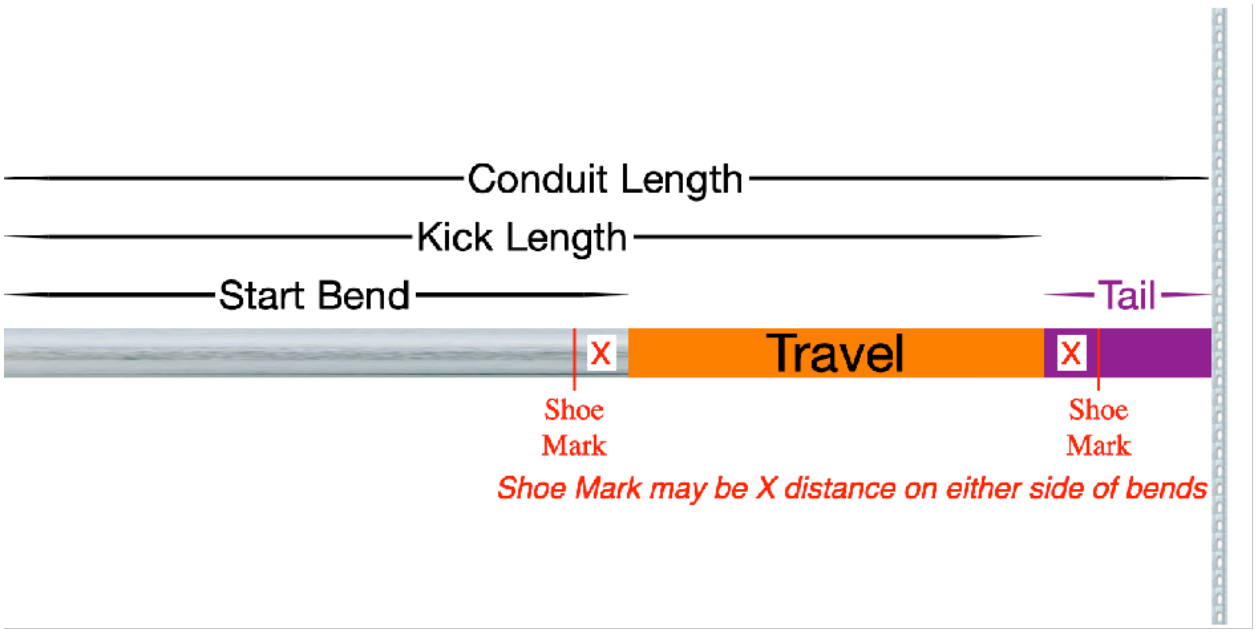
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Kick Rack To Vertical Help

The answers given for a rack to vertical row of kicks allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Hole Spacing

The distance between centers of the kicks in a straight row.

If the conduit are being bent down into holes this is the center to center spacing of the holes.

If the holes are too far apart then increases the bend angle.

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Conduit Length

The total length of conduit needed to make the kick including the start bend and tail.

Kick

The new kick from the rack to the row.

Kick Length

The length of the kick to the finish of the bend

Tail

The length of conduit from the finish of the kick's bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Kicks To A Vertical Row

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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 a guess.

If a push through bender is being used then lay out the bends and find the centers of the bends.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

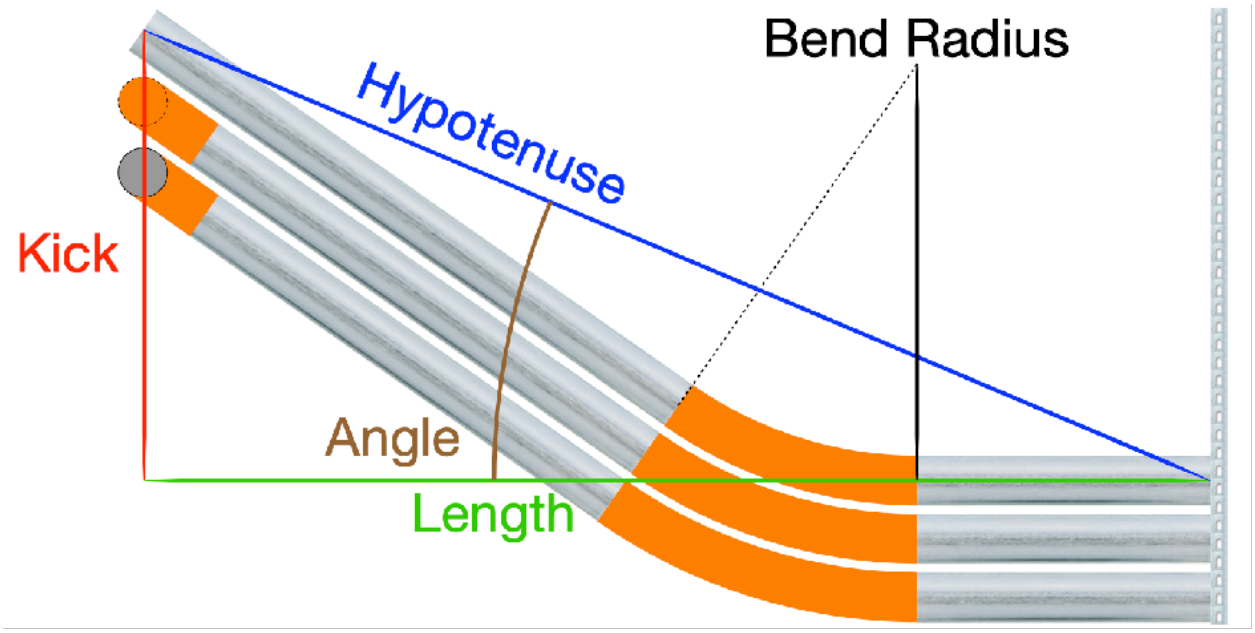
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Kick Concentric To Vertical Help

Bend Aid solves a rack of concentric kicks to a vertical row by entering the required variables and any two of the four right triangle variables.

Measure where the kick needs to fit.

Measure the right triangle for the first kick and the rest of the start bends and bend radii will be solved.

Usually you measure the kick and the length between the supports or obstructions, but any two of the four variables of the right triangle may be entered.

Bend Aid finds the smallest bend angle that will fit.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The smallest center line radius of the bends.

Each bend radius will be solved and all bends will be bent using segments unless the smallest bend radius is a standard bending shoe radius.

Center Spacing

The center to center spacing of the conduits in the rack.

Enter Any Two

Kick

Length

Hypotenuse

Angle **(Measured Angle, NOT 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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Center Spacing

Must be entered.

Enter Any Two

Enter two variables and then tap Answers.

Hypotenuse

Must be greater than either side.

Angle

Must be less than 90°.

Answers

Bend Angle over 90°

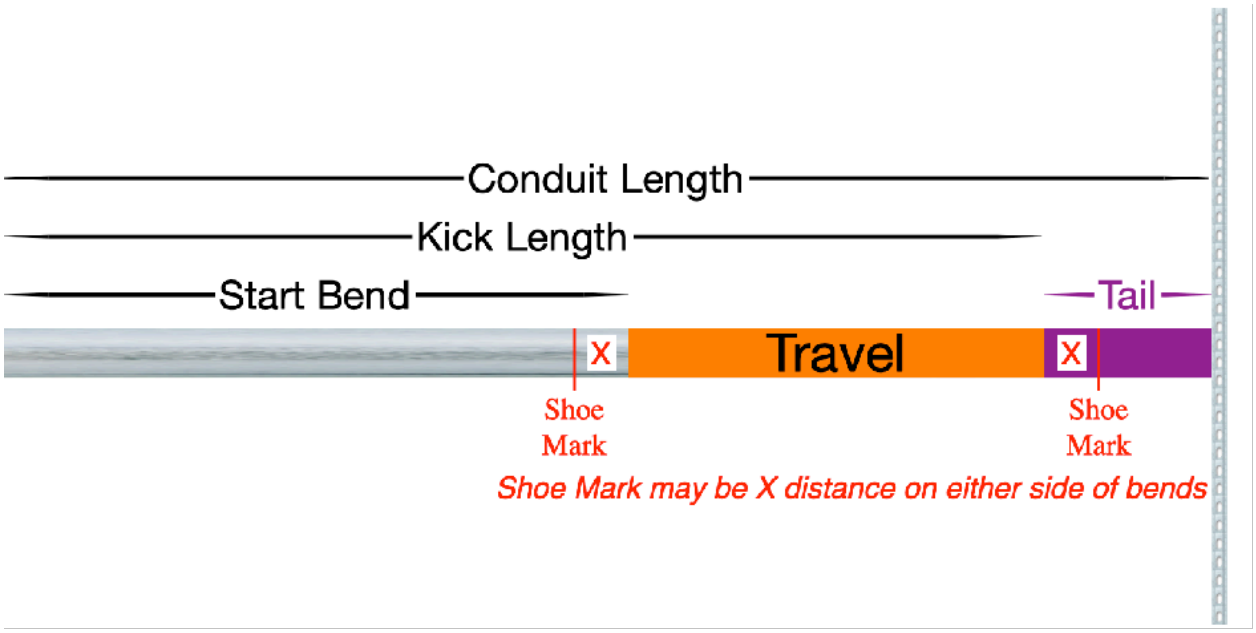
Length may be too short for the Angle or Radius.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Kick Concentric To Vertical Help

The answers given for a rack of concentric kicks to a vertical row allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend so you can see exactly where the bend will be.

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

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

The variables of the right triangle are displayed and whichever answers were solved.

Answers

Hole Spacing

The distance between centers of the kicks in a straight row.

If the conduit are being bent down into holes this is the center to center spacing of the holes.

If the holes are too far apart then increases the bend angle.

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Conduit Length

The total length of conduit needed to make the kick including the start bend and tail.

Kick

The new kick from the rack to the row.

Kick Length

The length of the kick to the finish of the bend

Tail

The length of conduit from the finish of the kick's bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Bend Angle

The angle of the bend.

Bend Aid finds the smallest whole bend angle that will allow the kick to fit between the supports or obstructions.

Travel

The center line length of the arc of the bend.

Bending Concentric Kicks To A Vertical Row

Lay out the dimensions on the straight conduit.

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 old “Chicago” 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 a guess.

If a push through bender is being used then lay out the bends and find the centers of the bends.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

Back

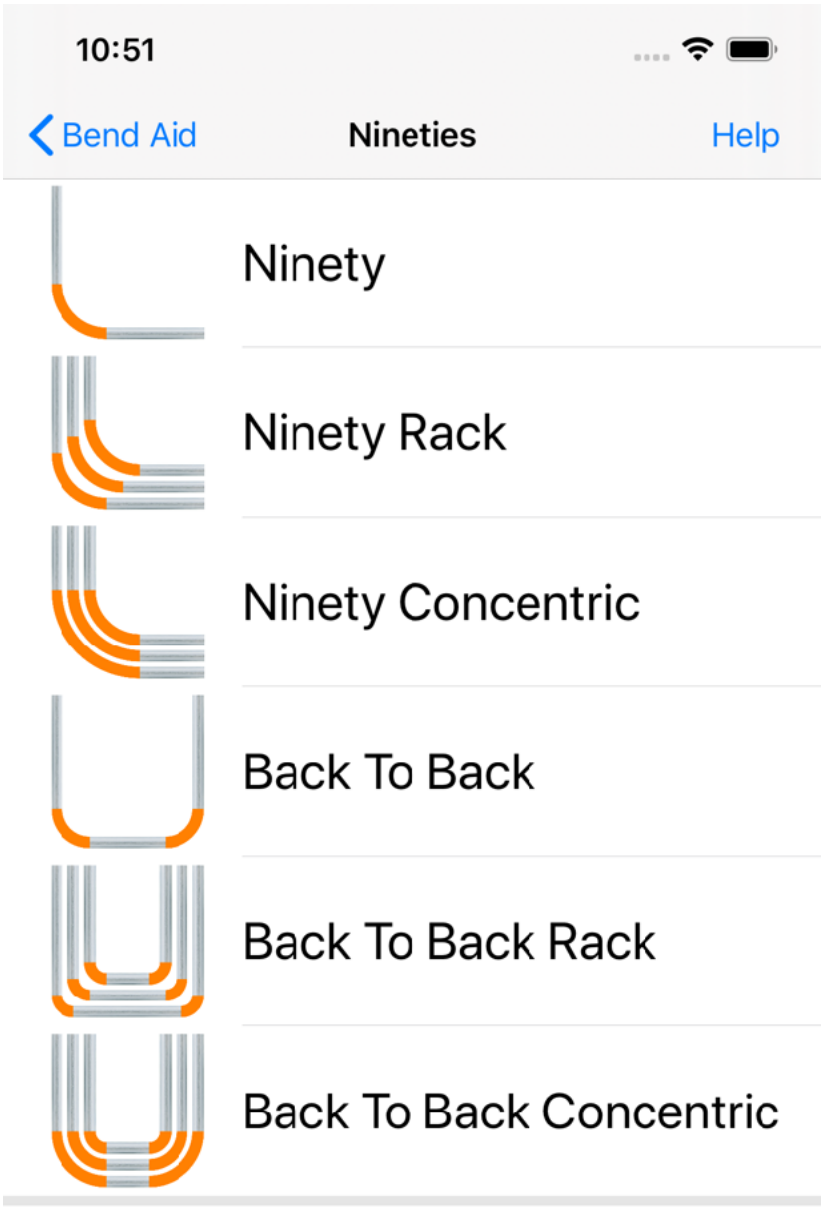
Tap to go back to the enter scene to change variables.

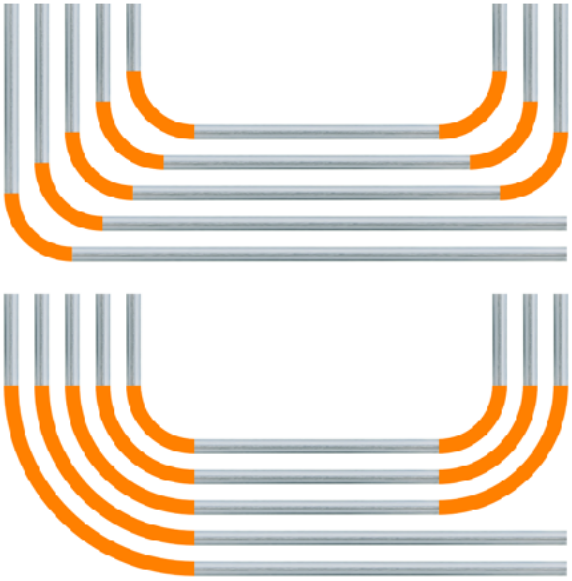
Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.

Nineties Menu





Nineties Menu Help

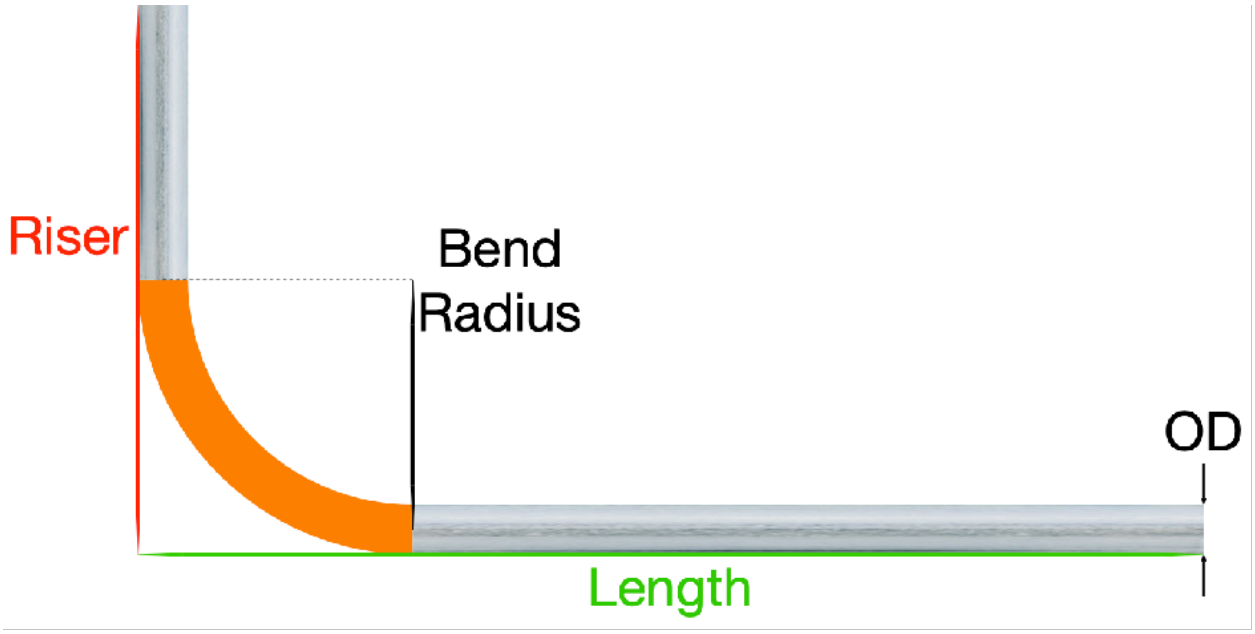
Bend-Aid solves the center line of the conduit and bends.

Nineties are bends that change the direction of the conduit.

There is straight conduit in front of and behind the ninety, the riser and the length.

After the ninety there will be a length of conduit that will either be the end of a full length or the conduit willed to 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.



Enter Ninety Help

Bend Aid solves a ninety by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Conduit OD

The outside diameter of the conduit.

Riser

The height of the ninety from the back of the bend.

Length

The length of the ninety from the back of the bend.

If length is not entered the answers will be to the finish of the bend.

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.

Enter

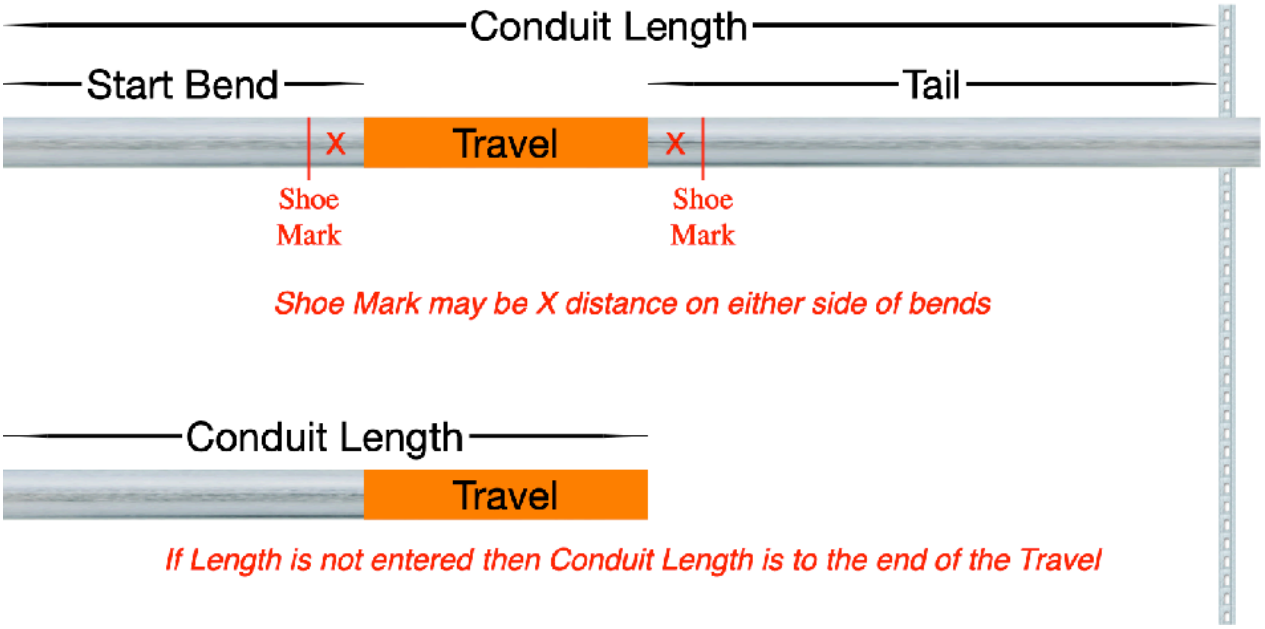
Bend Radius
Must be entered.
Conduit OD
Must be entered.
Riser
Must be entered.
Entered Riser
Must be greater than the Bend Radius plus 1/2 Conduit OD.
Entered Length
Must be greater than the Bend Radius plus 1/2 Conduit OD.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Ninety Help

The answers given for a ninety allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend 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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Length

The total length of conduit needed to make the ninety.

Tail

The length of conduit from the finish of the bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Travel

The center line length of the arc of the bend.

Bending A Ninety

Layout the dimensions on the straight conduit.

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 old “Chicago” 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.

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

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

Segments

Tap to go to the enter segment bend angle view.

Top Left of View

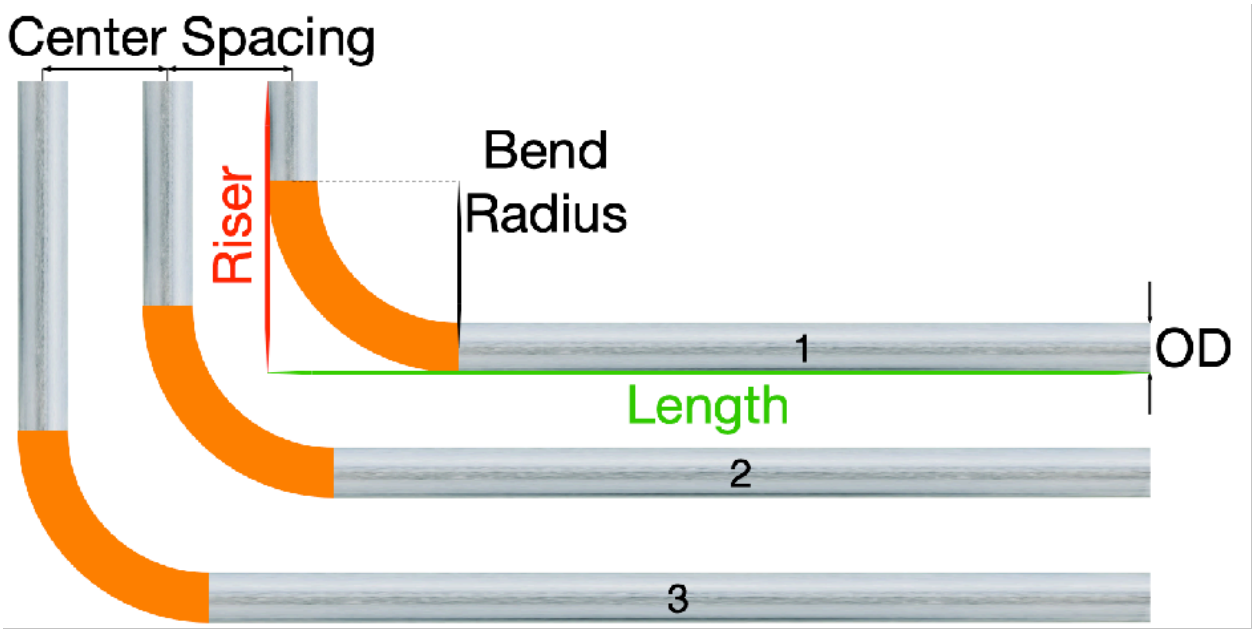
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Ninety Rack Help

Bend Aid solves a rack of nineties by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The center line radius of the bends.

Conduit OD

The outside diameter of the conduit.

Center Spacing

The center to center spacing of the conduit in the rack.

Riser

The height of the ninety from the back of the bend.

Length

The length of the ninety from the back of the bend.

If length is not entered the answers will be to the finish of the bend.

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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Conduit OD

Must be entered.

Center Spacing

The center to center spacing of the conduit in the rack.

Entered Center Spacing

The center to center spacing must be greater than the Conduit OD.

Riser

Must be entered.

Entered Riser

Must be greater than the Bend Radius plus 1/2 Conduit OD.

Entered Length

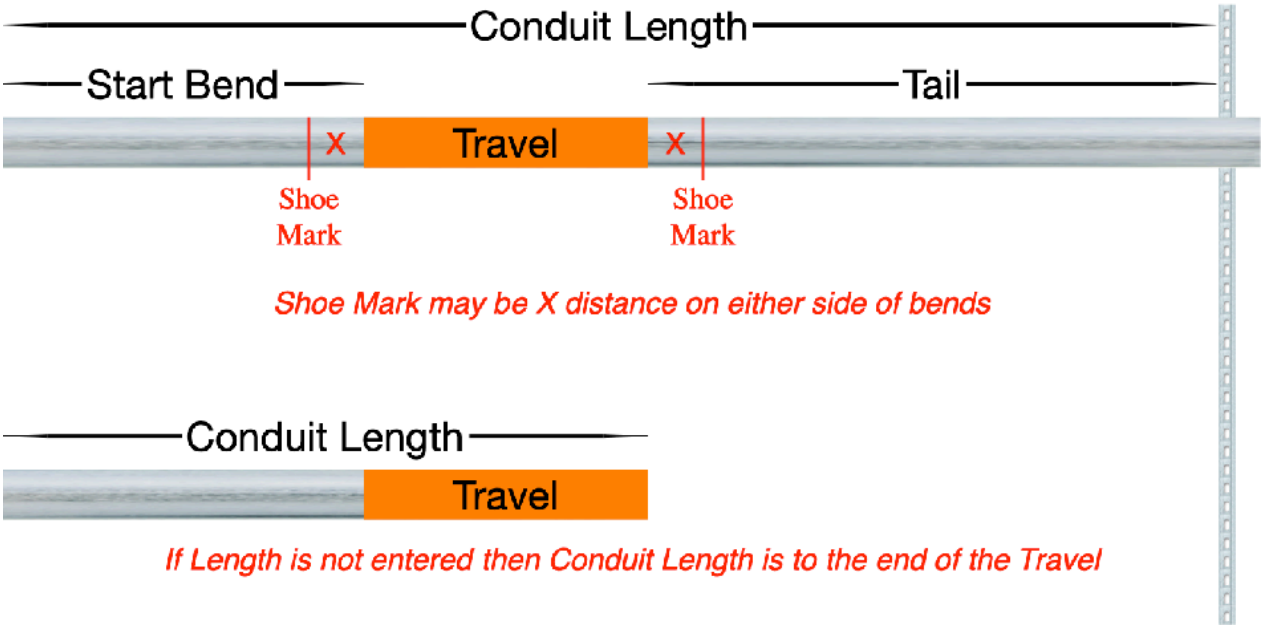
Must be greater than the Bend Radius plus 1/2 Conduit OD.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Ninety Rack Help

The answers given for a rack of nineties allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend 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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Riser

The new riser in the rack.

Length

The new length in the rack.

Conduit Length

The total length of conduit needed to make the ninety.

Tail

The length of conduit from the finish of the bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Nineties

Layout the dimensions on the straight conduit.

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 old “Chicago” 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.

If a push through bender is being used then 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.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

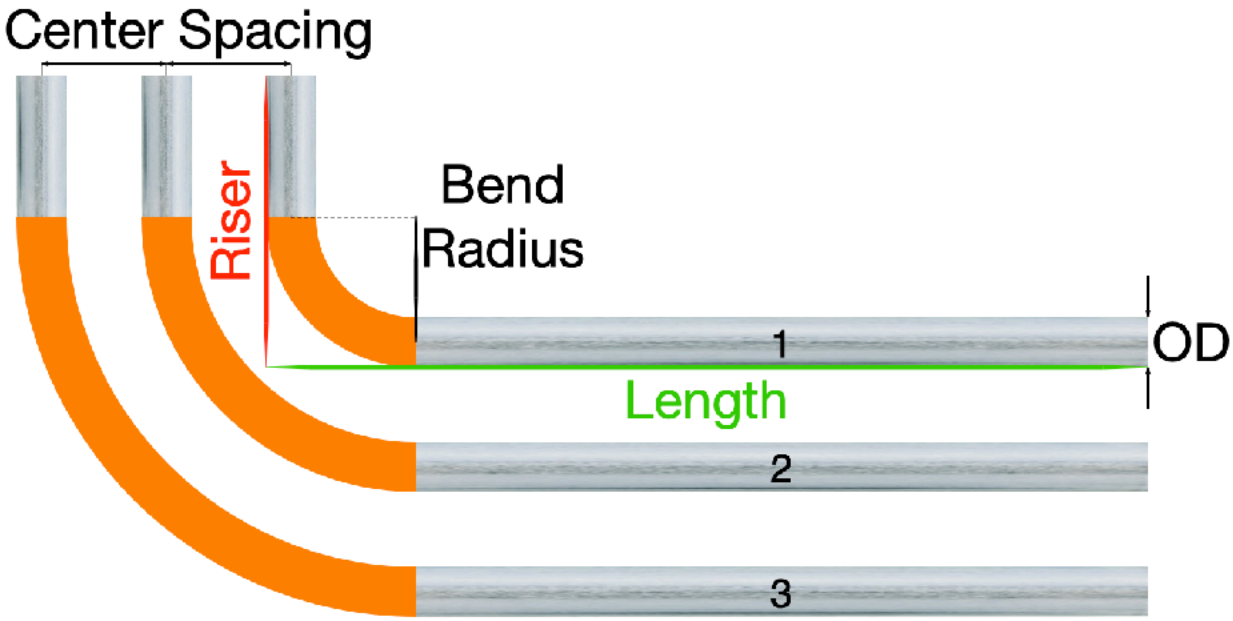
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Ninety Concentric Help

Bend Aid solves a rack of concentric nineties by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The center line radius of the bends.

Conduit OD

The outside diameter of the conduit.

Center Spacing

The center to center spacing of the conduit in the rack.

Riser

The height of the ninety from the back of the bend.

Length

The length of the ninety from the back of the bend.

If length is not entered the answers will be to the finish of the bend.

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.

Enter

Number Of Conduit

Must be entered.

Bend Radius

Must be entered.

Conduit OD

Must be entered.

Center Spacing

The center to center spacing of the conduit in the rack.

Entered Center Spacing

The center to center spacing must be greater than the Conduit OD.

Riser

Must be entered.

Entered Riser

Must be greater than the Bend Radius plus 1/2 Conduit OD.

Entered Length

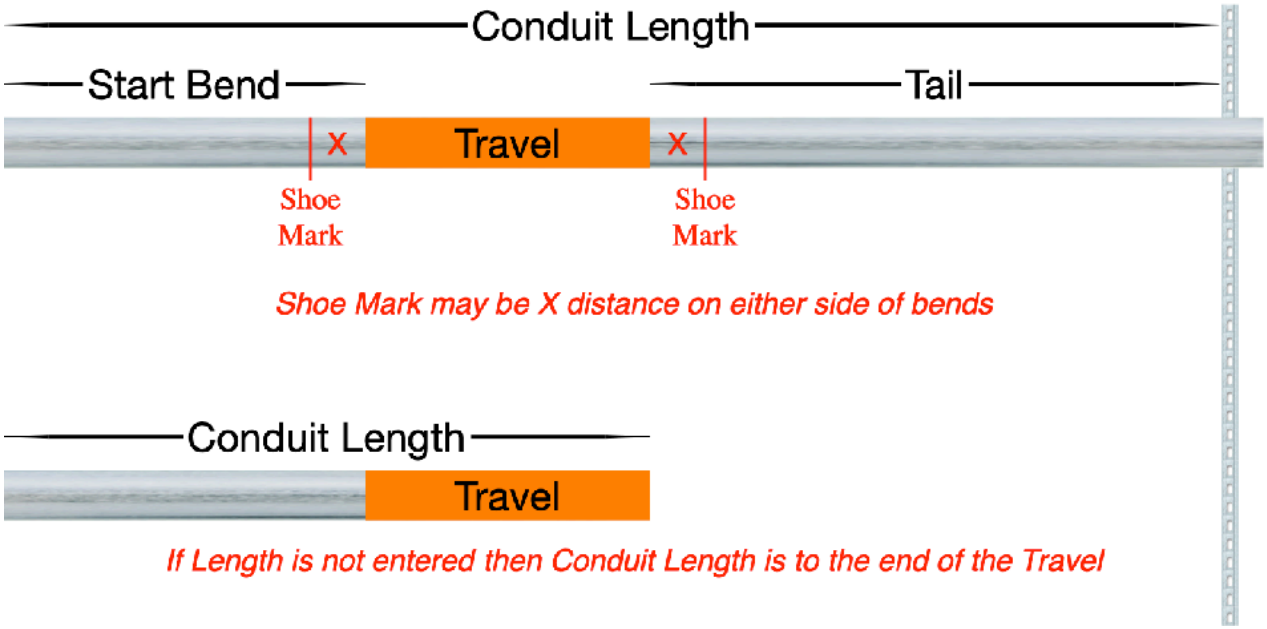
Must be greater than the Bend Radius plus 1/2 Conduit OD.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Ninety Concentric Help

The answers given for a ninety allow the bend to be laid out and the conduit cut and threaded before the conduit is bent.

Mark the beginning and end of the bend 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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Riser

The new riser in the rack.

Length

The new length in the rack.

Conduit Length

The total length of conduit needed to make the ninety.

Tail

The length of conduit from the finish of the bend to the length that was entered.

Start Bend

The length from the end of the conduit to the start of the bend.

Travel

The center line length of the arc of the bend.

Bending A Ninety

Layout the dimensions on the straight conduit.

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 old “Chicago” 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.

If a push through bender is being used then 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.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

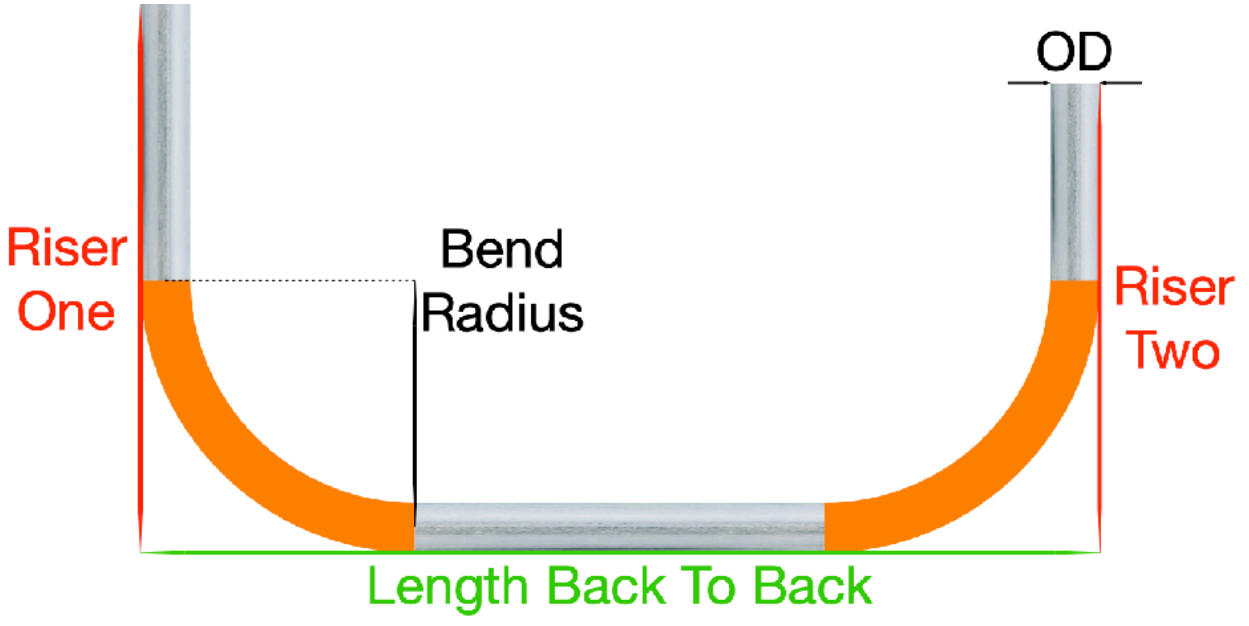
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Ninety Back To Back Help

Bend Aid solves back to back nineties by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Bend Radius

The center line radius of the bends.

Conduit OD

The outside diameter of the conduit.

Riser One

The height of the first ninety from the back of the bend.

Length Back To Back

The length of the ninety from the back of the first bend to the back of the second bend.

Riser two

The height of the second ninety from the back of the bend.

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.

Enter

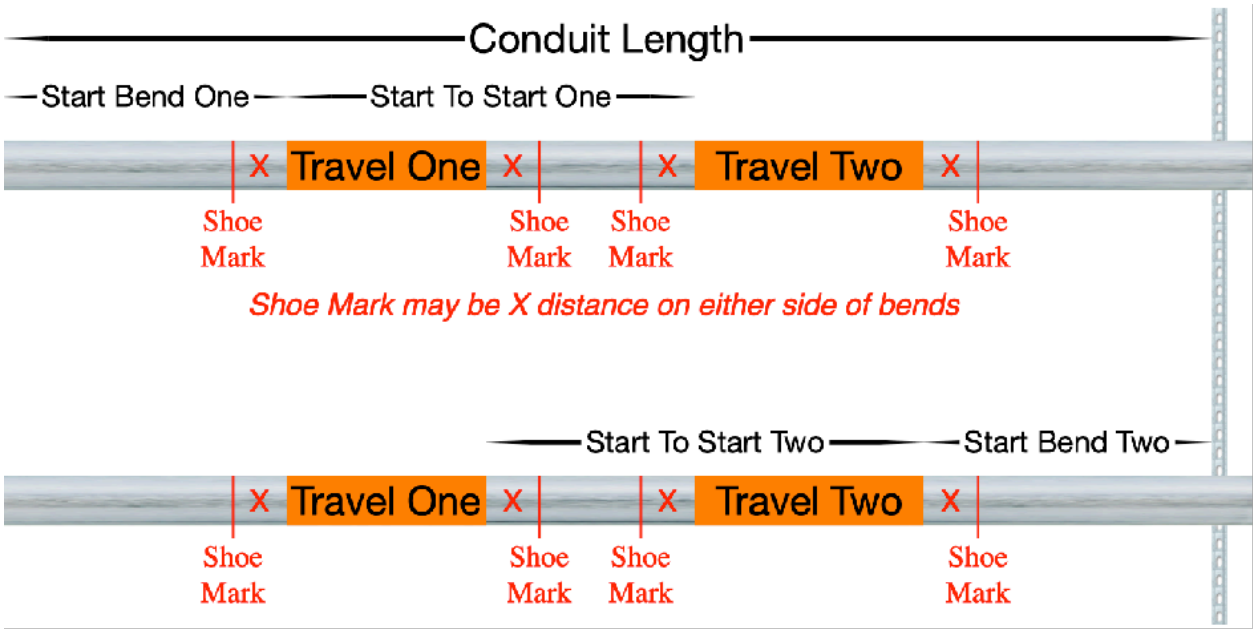
Bend Radius
Must be entered.
Conduit OD
Must be entered.
Riser One
Must be entered.
Entered Riser One
Must be greater than the Bend Radius plus 1/2 Conduit OD.
Length Back To Back
Must be entered
Entered Length Back To Back
Must be greater than two times the Bend Radius plus the Conduit OD.
Riser Two
Must be entered.
Entered Riser Two
Must be greater than the Bend Radius plus 1/2 Conduit OD.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Answer Ninety Back To Back Help

The answers given for a ninety back to back 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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Length

The total length of conduit needed to make the nineties.

Start Bend One

The length from the end of the conduit to the start of the bend.

Start To Start One

The length from the start bend one to the start bend two.

Start Bend Two

The length from the other end of the conduit to the start of the bend .

Start To Start Two

The length from the start bend two to the start bend one.

Travel

The center line length of the arc of the bend.

Bending Back To Back Nineties

Layout the 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 old “Chicago” 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.

If a push through bender is being used then 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.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

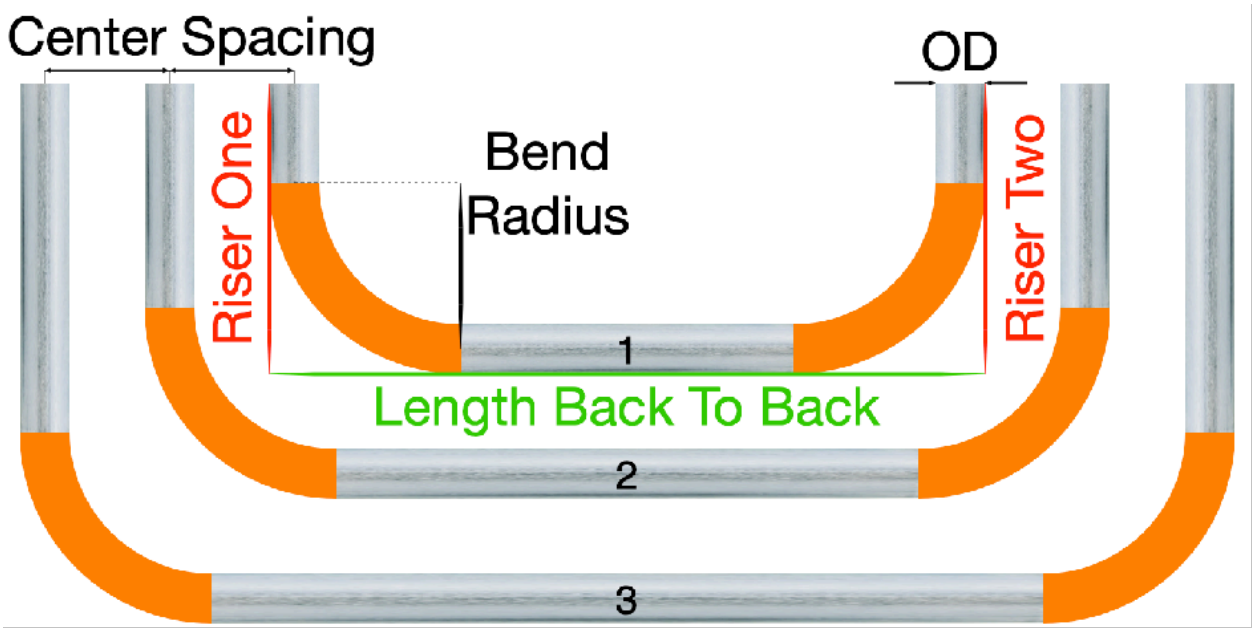
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Ninety Back To Back Rack

Bend Aid solves a rack of back to back nineties by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The center line radius of the bends.

Conduit OD

The outside diameter of the conduit.

Center Spacing

The center to center spacing of the conduit in the rack.

Riser One

The height of the first ninety from the back of the bend.

Length Back To Back

The length of the ninety from the back of the first bend to the back of the second bend.

Riser two

The height of the second ninety from the back of the bend.

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.

Enter

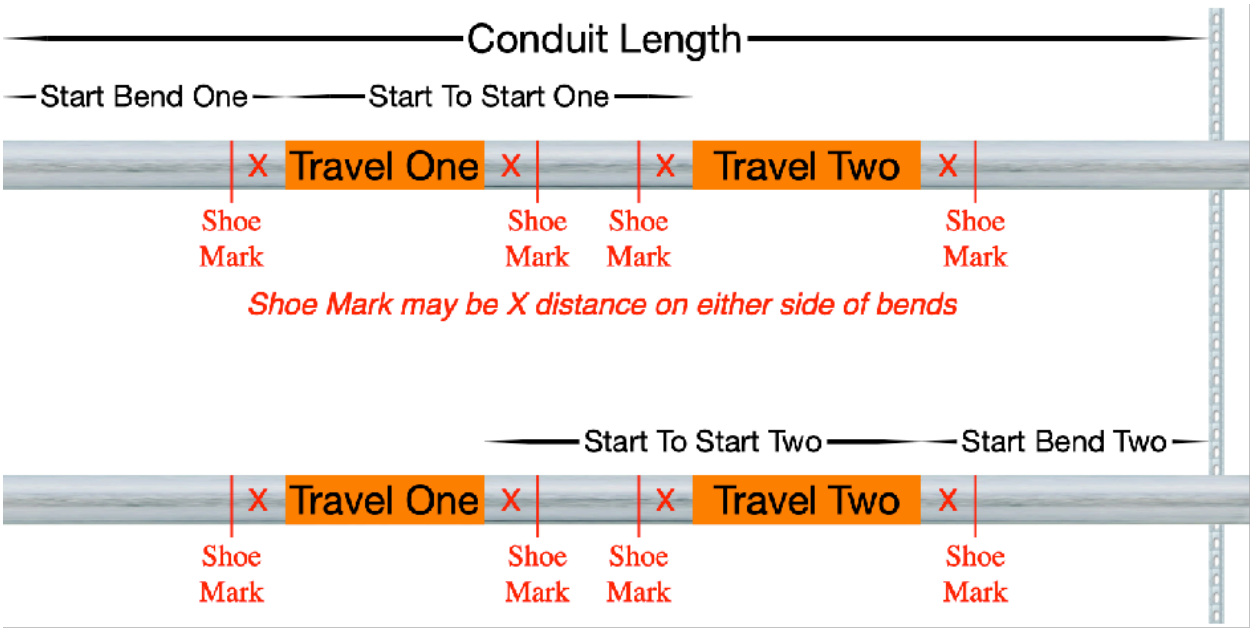
Number Of Conduit
Must be entered.
Bend Radius
Must be entered.
Conduit OD
Must be entered.
Center Spacing
Must be entered.
Entered Center Spacing
Must be greater than the Conduit OD.
Riser One
Must be entered.
Entered Riser One
Must be greater than the Bend Radius plus 1/2 Conduit OD.
Length Back To Back
Must be entered
Entered Length Back To Back
Must be greater than two times the Bend Radius plus the OD.
Riser Two
Must be entered.
Entered Riser Two
Must be greater than the Bend Radius plus 1/2 Conduit OD.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers.



Answer Ninety Back To Back Rack Help

The answers given for a rack of nineties back to back 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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Riser One

The new riser in the rack.

Length Back To Back

The new length in the rack.

Riser Two

The new riser in the rack.

Conduit Length

The total length of conduit needed to make the nineties.

Start Bend One

The length from the end of the conduit to the start of the bend.

Start To Start One

The length from the start bend one to the start bend two.

Start Bend Two

The length from the other end of the conduit to the start of the bend .

Start To Start Two

The length from the start bend two to the start bend one.

Travel

The center line length of the arc of the bend.

Bending A Rack Of Back To Back Nineties

Layout the 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 old “Chicago” 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.

If a push through bender is being used 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.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

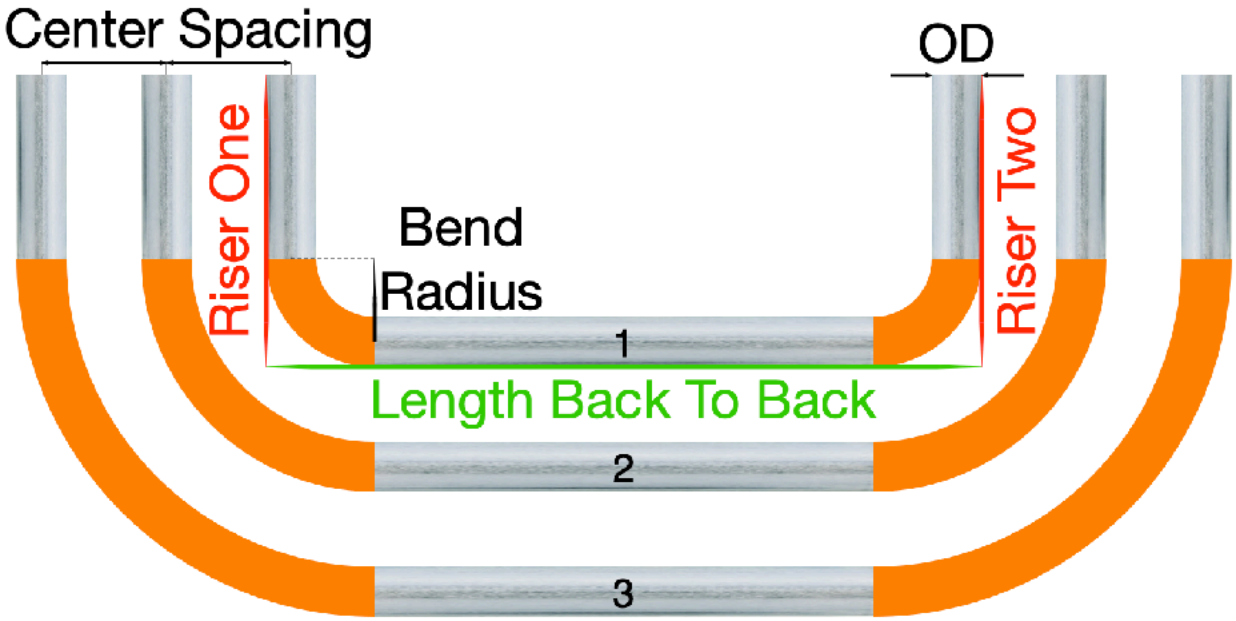
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Enter Ninety Back To Back Concentric Help

Bend Aid solves a rack of concentric back to back nineties by entering the required variables.

Select Number Format

Tap a segment to select the number format.

Enter All

Number Of Conduit

The number of conduit in the rack.

Bend Radius

The center line radius of the bends.

Conduit OD

The outside diameter of the conduit.

Center Spacing

The center to center spacing of the conduit in the rack.

Riser One

The height of the first ninety from the back of the bend.

Length Back To Back

The length of the ninety from the back of the first bend to the back of the second bend.

Riser Two

The height of the second ninety from the back of the bend.

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.

Enter

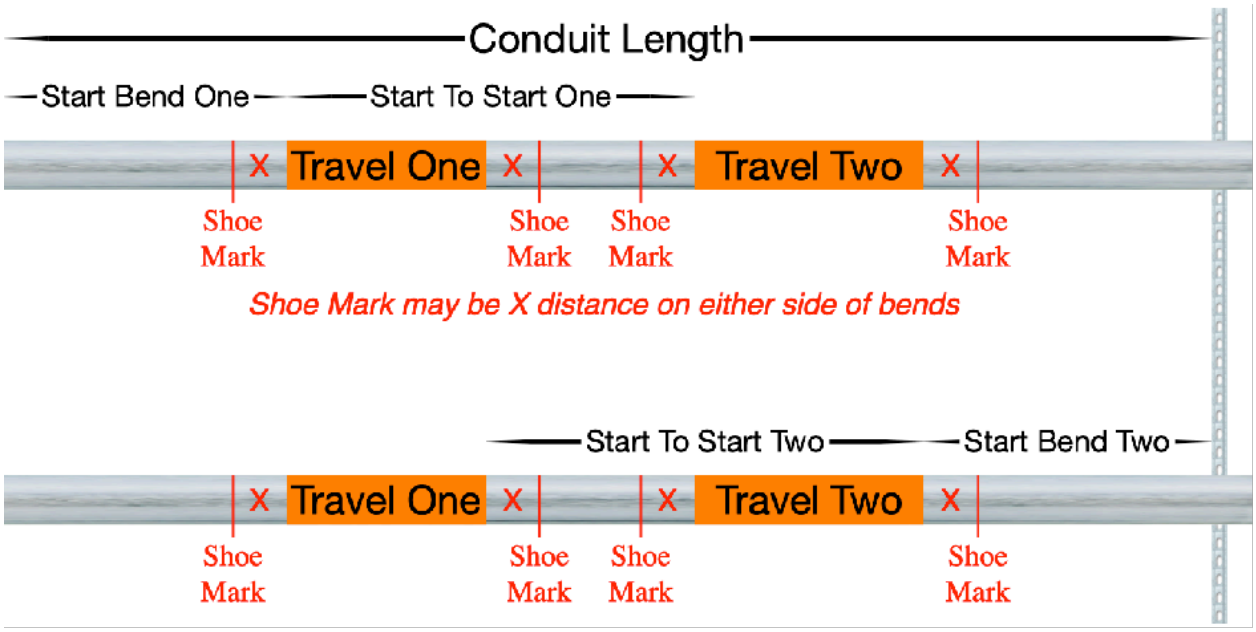
Number Of Conduit
Must be entered.
Bend Radius
Must be entered.
Conduit OD
Must be entered.
Center Spacing
Must be entered.
Entered Center Spacing
Must be greater than the Conduit OD.
Riser One
Must be entered.
Entered Riser One
Must be greater than the Bend Radius plus 1/2 Conduit OD.
Length Back To Back
Must be entered
Entered Length Back To Back
Must be greater than two times the Bend Radius plus the Conduit OD.
Riser Two
Must be entered.
Entered Riser Two
Must be greater than the Bend Radius plus 1/2 Conduit OD.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers.



Answer Ninety Back To Back Concentric Help

The answers given for a ninety 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.

Select Number Format

Tap a segment to select the format to display the answers.

The number format may be changed at any time which allows the different formats to be converted.

Entered

The variables entered are displayed so they can be verified.

Answers

Conduit Number

The number of the conduit in the rack that the answers are being shown for.

Bend Radius

The radius of the conduit in the rack.

Riser One

The new riser in the rack.

Length Back To Back

The new length in the rack.

Riser Two

The new riser in the rack.

Conduit Length

The total length of conduit needed to make the nineties.

Start Bend One

The length from the end of the conduit to the start of the bend.

Start To Start One

The length from the start bend one to the start bend two.

Start Bend Two

The length from the other end of the conduit to the start of the bend .

Start To Start Two

The length from the start bend two to the start bend one.

Travel

The center line length of the arc of the bend.

Bending Concentric Back To Back Nineties

Layout the 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 old “Chicago” 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.

If a push through bender is being used then 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.

Segments

Tap to go to the enter segment bend angle scene.

Top Left of Scene

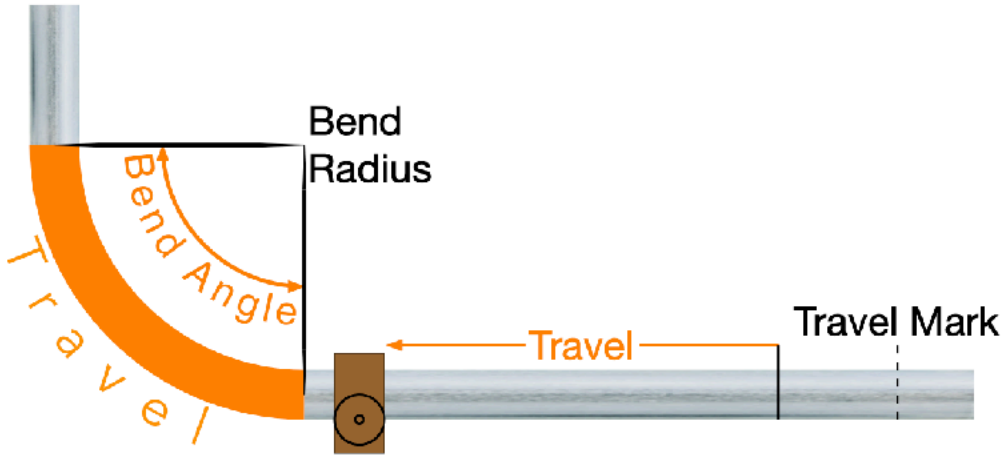
Back

Tap to go back to the enter scene to change variables.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



Place a travel mark farther than what the travel might be.
When ninety is finished find the actual Travel.

Enter Find Bend Radius Help

Bend Aid will find an unknown Bend Radius by bending a 90° bend and measuring the travel it took to bend.

Any angle may be bent but a ninety is more accurate and a short ninety should be useable some where.

Select Number Format

Tap a segment to select the number format.

Enter All

Travel

Travel is the length of the bend arc, some people call it developed length.

Bend Angle

Is the degrees of bend for the travel entered.

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.

Enter

Travel

Must be entered.

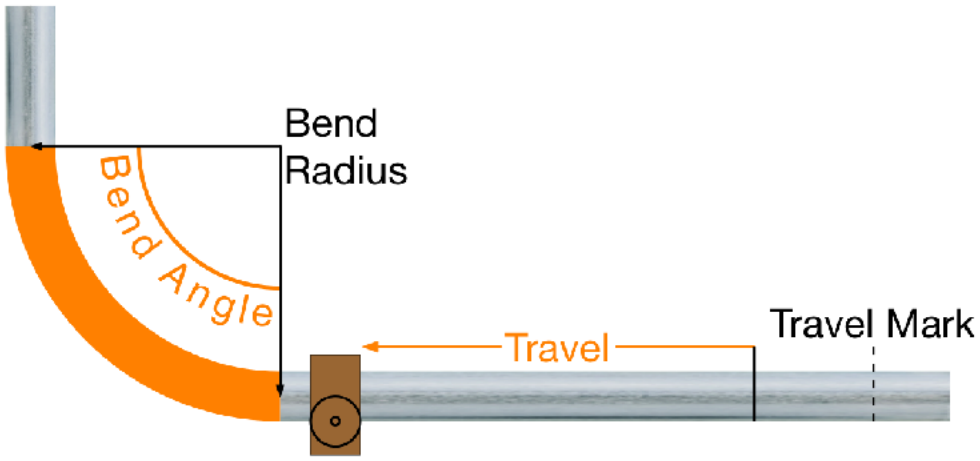
Bend Angle
Must be entered.
Entered Bend Angle
Must be less than 90°.

Tap OK to dismiss an alert.

Bottom Row

Answers

Tap to show the answers scene.



Place a travel mark farther than what the travel might be.
When ninety is finished find the actual Travel.

Answer Find Bend Radius Help

The answer given is the center line radius of the bender shoe.

Select Number Format

Tap a segment to select the desired number format.

Entered

Travel

Travel is the length of the bend arc, some people call it developed length.

Bend Angle

Is the degrees of bend for the travel entered.

Answer

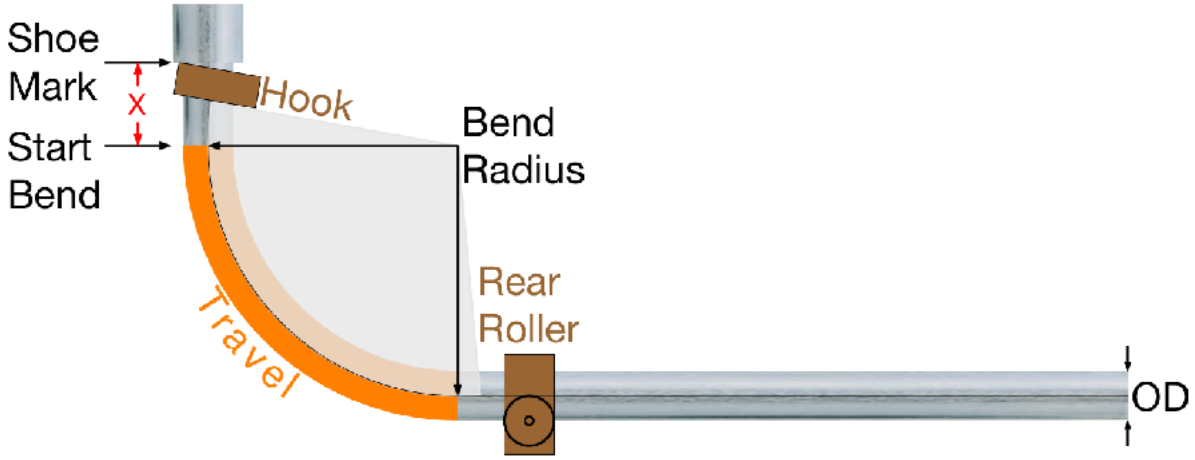
Bend Radius

The center line radius of the bender shoe.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.



X = Distance between Shoe Mark and Start Bend
Start Bend = Bend Radius + 1/2 OD

Chart Benders Help

Charting a bender means to find the dimensions that the bender uses.

Bend a 90° bend and measure the results.

Any angle may be bent but a short ninety should be useable some where.

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.

If a push through bender is being used then 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.

Segments are equal sections of the travel bent on small angles,
plus a smaller segment angle to complete the bend angle

Enter Segments Help

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 x 3° = 21° + 4° = 25°

or

3 x 6° = 24° + 1° = 25°

Select Segment Bend Angle

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.

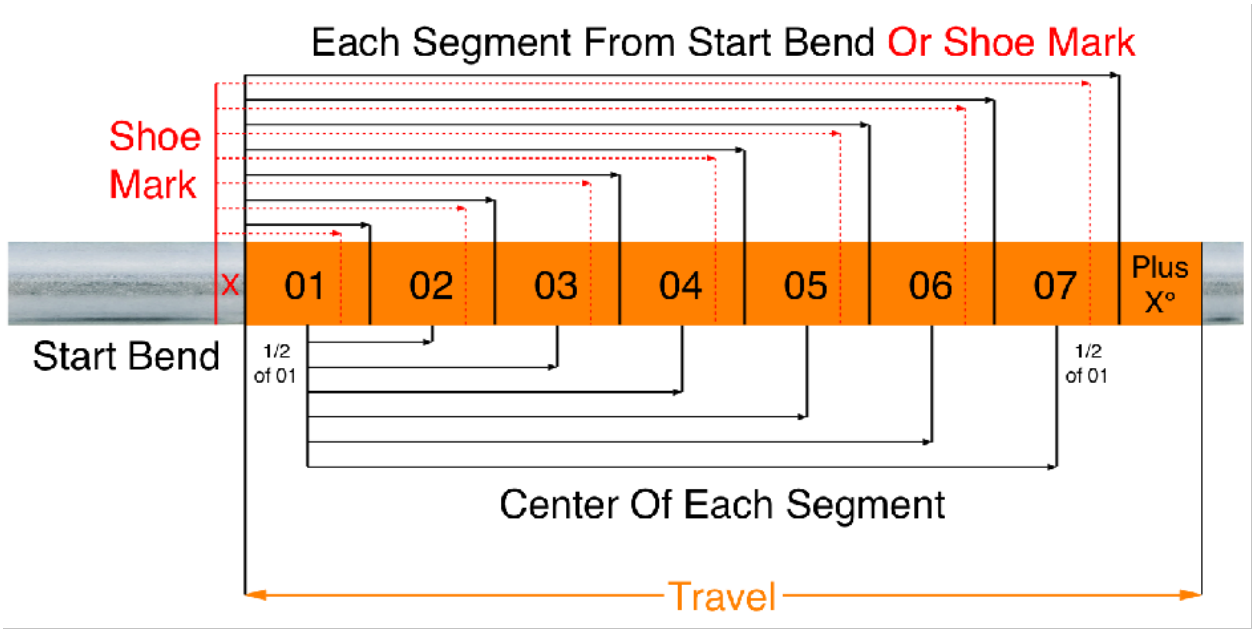
Bottom Row

Answers

Tap to show the answers scene.

After the Answers button is tapped and the answers view is displayed the length of each segment can be checked to see if it will work.

Go back to the enter segment bend angle scene to change the segment bend angle until an acceptable segment bend angle is found.



Answer Segments Help

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 segments 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 answer view.

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.

The Plus answer is the extra degrees needed to complete the total bend angle.

Top Left of Scene

Segments

Tap to go back to the enter scene to change the segment bend angle.

Bottom Row

Bend Aid

Tap to go to the Bend Aid main menu.