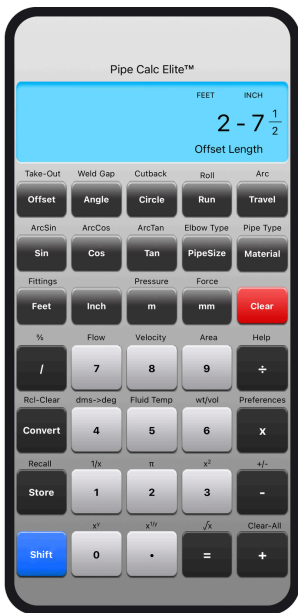


Pipe Calc Elite™

for iOS



CyberProdigy LLC

The Pipe Calc Elite™ is an advanced calculator designed specifically for pipe trade professionals. This app provides quick and reliable access to standard pipe data and dimensions for 7 different piping materials. In addition, Pipe Calc Elite™ makes solving complex pressure loss equations, linear and rolling offsets, cutbacks, and other calculations you might need on the jobsite a breeze. Pipe Calc Elite™ has a wide range of unit conversion capabilities and its ability to accept and manipulate fractions for all calculations is exceptional. Whether you're a plumber, pipe fabricator, or any other professional in the pipe trade you'll find this calculator a valuable tool to have on you at all times.

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Definitions of Basic Keys

[Clear] - Clear

Press once – clears display

Press twice – clears the calculation: offset, run, travel, take-out and fittings. Settings and stored values are kept.

[Shift] [+] - Clear All

Use to clear all register values, empty the stored values and restore the default settings. Haptic and audio feedback are kept.

[Shift] - Secondary Function

Use to access secondary functions of other keys

[Store] - Memory Store

Use to store a value from display into memory

[Shift][Store] - Memory Recall

Use to list values stored in memory and to select/recall them from memory to the display.

[Shift][Conv] - Memory Recall Clear

Use to clear every stored value from memory.

[Shift][/] - % operator

Use this key to calculate a given percentage of a number or for working add-on, discount, or division percentage calculations. For example:

$$255 \times 15\% = 38.25$$

$$150 + 6\% = 159$$

$$240 - 3\% = 232.8$$

$$150 \div 50\% = 300$$

This key can also be used to change percentages to decimals (i.e. $25\% = 0.25$). In addition, the % operator can be used with units (i.e. 150 gallons + 6% = 159 gallons).

[Sin] - Sine

Use to calculate the sine of an angle given in degrees

[Shift][Sin] - ArcSine

Use to calculate ArcSine (angle will be in degrees)

[Cos] - Cosine

Use to calculate the cosine of an angle given in degrees

[Shift][Cos] - ArcCosine

Use to calculate ArcCosine (angle will be in degrees)

[Tan] - Tangent

Use to calculate the tangent of an angle given in degrees

[Shift][Tan] - ArcTangent

Use to calculate ArcTangent (angle will be in degrees)

[Circle] - Circle

Use to enter diameter of a circle. Subsequent presses of the Circle button will calculate the area of the circle as well as the circumference.

Setting Preferences

[Shift][X] - (Preferences) Set Preferences

Use to set calculator preferences including fractional resolution and Haptic Feedback.

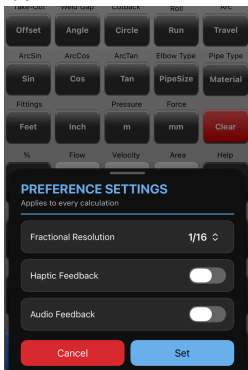
Setting fractional resolution affects what resolution fractional inch results are rounded to. An exact decimal inch result can always be obtained by pressing [Inch] a second time when a fractional result is produced.

Fractional resolutions include:

- 1/2
- 1/4
- 1/8
- 1/16
- 1/32
- 1/64

‘Haptic Feedback’ is an option that causes your iOS device to vibrate slightly when pressing keys within the application. Haptic feedback is not supported on some devices. ‘Audio Feedback’ provides a keyboard click sound each time a button is pushed.

When accessing preferences you will see this pop-up window:



Click the 'Set' button at the bottom to save and close the preferences window.

Default Settings

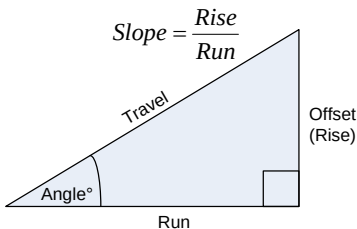
When the calculator is first loaded onto your iOS device, or when you hit 'Clear All'

[Shift][+], the following are default settings:

Description	Default Value
Weight/Volume (lbs/ft ³)	62.42796
Welder Gap	1/8"
Fraction Resolution	1/16"
Pipe Material	Steel
Pipe Type	Schedule 40
Elbow Type	Butt Weld Long

Pipefitting Functions

The Pipe Calc Elite™ allows users to solve a wide variety of pipefitting problems. These calculations include, angle, slope, grade, take-out, inner, center, and outer arc lengths, welders gap, offset, run, travel, cutback, and rolling offset.



Key Definitions:

[Offset] - Offset

Use to enter or calculate a pipe Offset (Rise).

[Shift][Offset] – Take-Out

Use to enter or calculate pipe cut length Take-Outs.

[Angle] - Angle

Use to enter or calculate the angle for a pipefitting equation. The angle can be entered as a slope angle (in degrees), linear slope (entered as offset height - assumes 12 inches of run), or % grade (entered as %).

[Shift][Run] – Rolling Offset - Roll

Use to calculate rolling offset pipe length.

[Circle] – Circle

Use to enter diameter of a circle. Subsequent presses of the Circle button will calculate the area of the circle as well as the circumference.

[Shift][Circle] - Cutback

Use to calculate pipe cutback after a bend angle and pipe offset are entered.

[Run] - Run

Use to enter or calculate a pipe run.

[Shift][Angle] – Welder Gap

Use to enter welder gap which is subtracted from end-to-end pipe length calculations. The default welder gap is 1/8".

[Travel] - Travel

Use to enter or calculate the travel for a pipefitting equation.

[Shift][5] - Fluid Temperature

Use to enter the water temperature of a run. Press once for Fahrenheit, twice to read it in Celsius. The temperature sets the viscosity used in the pressure loss calculations.

[Shift][Feet] - Valves and Fittings

Use to enter how many of a fitting the run has: type the count, press the key, and pick the fitting from the list. Their pressure loss is added to the loss of the run itself.

A dimension key that does nothing

[Offset], [Run], [Travel], [Angle] and Weld Gap will not read an entry while an operator is still pending. Press [=] first, then the key.

Entering a decimal inch

A decimal inch may be typed after [Feet]:

1 [Feet] 6.75 [Inch] is the same length as
1 [Feet] 6 [Inch] 3 [/] 4.

[Shift][0] - x to the Power of y

Use to raise a number to a power. Type the number, press the key, type the power and press [=]. 2 [Shift][0] 3 [=] reads 8.

[Shift][1] - 1 over x

Use to read the reciprocal of the number on the display. No [=] is needed. 4 [Shift][1] reads 0.25.

[Shift][2] - Pi

Use to enter Pi. It is an operand like any other: 2 [x] [Shift][2] [=] reads 6.28319.

[Shift][3] - x Squared

Use to square the number on the display. No [=] is needed. 3 [Shift][3] reads 9.

[Shift][.] - x to the Power of 1 over y

Use to read a root of a number. Type the number, press the key, type which root and press [=]. 8 [Shift][.] 3 [=] reads 2, the cube root of 8.

[Shift][÷] - Help

Use to open the Help screen. It is not a calculation and it leaves what you have entered on the display.

Error Messages

ERROR - Cannot Divide By Zero

[÷][0][=], a zero denominator and [Shift][1] on zero all read the same.

ERROR - Mismatched Units

The two entries cannot be combined -- an area plus a volume, for instance.

OVERFLOW - ERROR

The answer is larger than 999,999,999. The power keys are bounded the same way.

ERROR or NaN ERROR - Check Inputs

An angle over 90, a negative length, sides that cannot meet, or a mistyped number or fraction.

ERROR - Units Not Allowed

The key cannot use a reading in that unit: a Convert reading on [Offset], or [%] on a length.

ERROR - INVALID MATH

The square root of a negative number, tan 90 or 270, or a power or root the unit cannot take.

ERROR - INVALID

[PipeSize] on a size that is not in the pipe table, or [Arc] before a pipe size is set.

Clearing an error

The next key press clears it; nothing is kept.

More Keys

[Shift][-] - Change Sign (+/-)

Changes the sign of the number on the display. 5 [Shift][-] reads -5; press it again for 5. It works on a length too: 3 [Feet] [Shift][-] reads -3 feet.

[Shift][=] - Square Root

Reads the square root of the display. No [=] is needed. 16 [Shift][=] reads 4. On an area it returns the side: 16 [Inch][Inch] [Shift][=] reads 4 inches. A negative number reads ERROR.

[Shift][mm] - Force

Use to enter or calculate a force for the pressure and area functions. Enter a value and press the key; press again to read it as lbf, Newtons, gram-force or ounce-force.

Help, from any key

Hold a key for about a second to open this manual at that key's section ([Shift] first for a shifted key). Factory Reset, at the bottom of the Help screen, clears preferences and values.

What Clear All also resets

Besides the defaults on page 5, Clear All returns the fluid temperature to 68°F, clears a typed thread make-up and the valves and fittings entered, and empties the stored values.

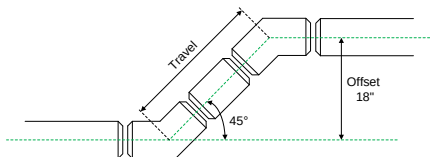
[Shift][Travel] - Arc

Use to calculate inner, center, and outer arc lengths to mark fittings for field cuts.

Sample Calculations:

Solving for Simple Offset with Known Angle

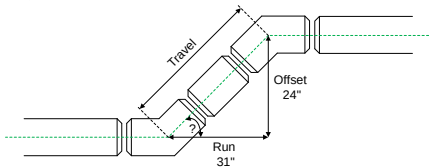
For an 18" pipe offset using 45° factory made short radius butt weld elbows, solve for center-to-center travel.



STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Offset	[1][8][Inch][Offset]	Inch 18 Offset Length
Input Bend Angle	[4][5][Angle]	45° Slope Angle
Solve for Travel	[Travel]	Inch 25 - 7/16 Travel

Solving for Simple Offset with Unknown Angle

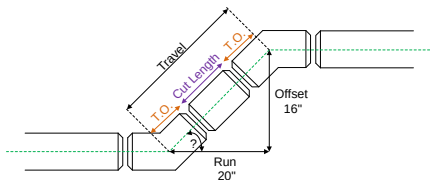
Solve for center-to-center pipe travel and bend angle if pipe has a 24" offset and 31" run.



STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Offset	[2][4][Inch][Offset]	Inch 24 Offset Length
Input Run	[3][1][Inch][Run]	Inch 31 Run
Solve for Travel	[Travel]	Inch 39 -3/16 Travel
Solve for Bend Angle	[Angle]	37.75° Slope Angle

Solving for Simple Offset Cut Length

A 4" Standard Brass pipe has an offset of 16" and a run of 20" and has an unknown bend angle. Long radius butt weld elbow fittings are used. Welders gap should be set to 1/8". Solve for the cut length of the pipe. Also, solve for fit angle, Take-Out, and arc lengths.

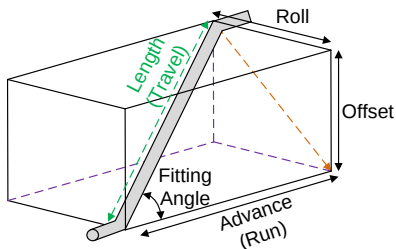


STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Pipe Material	[Material]	Brass Pipe Material
Input Pipe Size	[4][Inch][PipeSize]	Inch 4 Pipe Size
Input Offset	[1][6][Inch][Offset]	Inch 16 Offset Length
Input Run	[2][0][Inch][Run]	Inch 20 Run
Check Welders Gap	[Shift][Angle]	Inch 1/8

		Welder's Gap
Solve for Travel	[Travel]	Inch 25-5/8 Travel
Solve for Cut Length	[Travel]	Inch 21-1/8 Cut Length
Solve for fit angle (bend angle)	[Angle]	38.66° Slope Angle
Solve for Take-Out	[Shift][Offset]	Inch 2-1/8 Take-Out Length
Solve for Inside Arc Length	[Shift][Travel]	Inch 2-1/2 Inside Arc Length
Solve for Center Arc Length	[Travel]	Inch 4-1/16 Center Arc Length
Solve for Outside Arc Length	[Travel]	Inch 5-9/16 Outside Arc Length

Solving for Rolling Offset with Known Angle

A 4" pipe has an 18" offset and a 6" roll. The rolling offset utilizes 45° factory made long radius butt weld elbows. Solve for center-to-center travel.

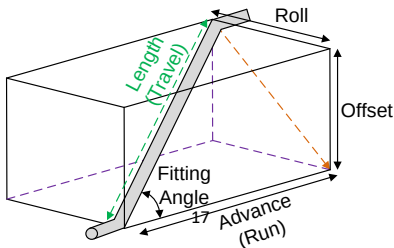


STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Pipe Size	[4][PipeSize]	Inch 4 Pipe Size
Input Offset	[1][8][Inch][Offset]	Inch 18 Offset Length
Input Bend Angle	[4][5][Angle]	45° Slope Angle
Input Roll	[6][Inch][Shift][Run]	Inch 6 Roll Length
Solve for Take-Out	[Run]	Inch 2-1/2 Take-Out Length
Solve for Centerline Length	[Run]	Inch 26 -13/16 Centerline Length

Solve for Cut Length	[Run]	Inch 21-9/16 Cut Length
Display fit angle (bend angle)	[Run]	Fitting Angle 45°
Display Welders Gap	[Run]	Inch 1/8 Welder's Gap
Solve for Advance	[Run]	Inch 19 Advance(Run) Length
Display Offset	[Run]	Inch 18 Offset Length
Display Roll	[Run]	Inch 6 Roll Length

Solving for Rolling Offset with Unknown Angle

A 4" pipe has a 12" offset, 6" roll, and 25" advance. The elbow bend angle is not known. Solve for center-to-center travel and fit angle assuming long radius BW elbows will be used.

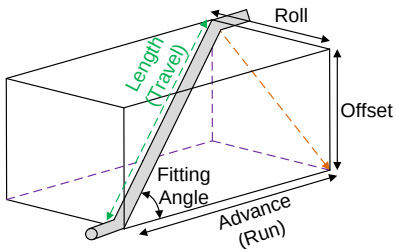


STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Pipe Size	[4][PipeSize]	Inch 4 Pipe Size
Input Offset	[1][2][Inch][Offset]	Inch 12 Offset Length
Input Advance (Run)	[2][5][Inch][Run]	Inch 25 Run
Input Roll and	[6][Inch][Shift][Run]	Inch 6 Roll Length
Solve for Take-Out Length	[Run]	Inch 1-1/2 Take-Out Length
Solve for Centerline Length	[Run]	Inch 28 -3/8 Centerline Length
Solve for Cut Length	[Run]	Inch 25-1/8 Cut Length
Solve for fit angle (bend angle)	[Run]	28.22° Fitting Angle
Display Welders Gap	[Run]	Inch 1/8 Welder's Gap
Display Advance (Run) Length	[Run]	Inch 25 Advance (Run) Length

Display Offset	[Run]	Inch 12 Offset Length
Display Roll Length	[Run]	Inch 6 Roll Length

Solving for Rolling Offset Cut Length

A 8" Stainless Steel pipe has an offset of 26", advance of 20", and roll of 9" and has an unknown bend angle. Long radius butt weld elbow fittings are used. Use welders gap of 3/16". Solve for the cut length of the pipe.



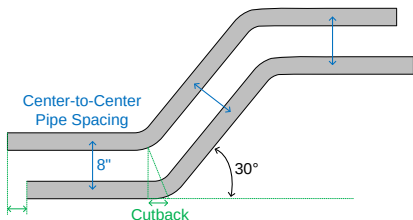
STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Pipe Material	[Material]	Stainless Steel Pipe Material

Input Pipe Type	[Shift][Material]	Schedule 40S Pipe Type
Input Pipe Size	[8][Inch][PipeSize]	Inch 8 Pipe Size
Input Welders Gap	[3][/][1][6][Shift][Angle]	Inch 3/16 Welder's Gap
Input Offset	[2][6][Inch][Offset]	Inch 26 Offset Length
Input Advance (Run)	[2][0][Inch][Run]	Inch 20 Run
Input Roll	[9][Inch][Shift][Run]	Inch 9 Roll Length
Solve for Take- Out	[Run]	Inch 6-1/8 Take-Out Length
Solve for Centerline Length	[Run]	Inch 34 Centerline Length
Solve for Cut Length	[Run]	Inch 21-7/16 Cut Length
Solve for fit angle (bend angle)	[Run]	53.99° Fitting Angle
Display Welders Gap	[Run]	Inch 3/16 Welder's Gap
Display Advance	[Run]	Inch 20

		Advance (Run) Length
Display Offset	[Run]	Inch 26 Offset Length
Display Roll	[Run]	Inch 9 Roll Length
Solve for Inside Arc Length	[Shift][Travel]	Inch 7-1/4 Inside Arc Length
Solve for Center Arc Length	[Travel]	Inch 11-5/16 Center Arc Length
Solve for Outside Arc Length	[Travel]	Inch 15-3/8 Outside Arc Length

Solving for Cutback (Concentric Pipes)

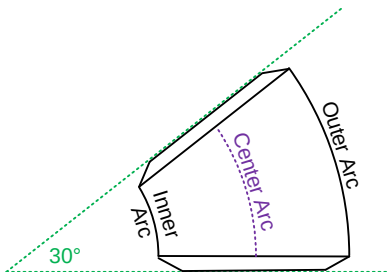
Concentric pipes are running with an 8" offset through a 30° bend. Solve for the pipe cutback.



STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input bend angle	[3][0][Angle]	30° Slope Angle
Input Offset	[8][Inch][Offset]	Inch 8 Offset Length
Solve for Cutback	[Shift][Circle]	Inch 2-1/8 Cutback Length

Solving for Take-Out and BW Cut Marks

Solve for inner, center, and outer arc lengths for a 16" steel pipe that needs cut to a bend angle of 30°. In addition, solve for Take-Out of the elbow fitting.

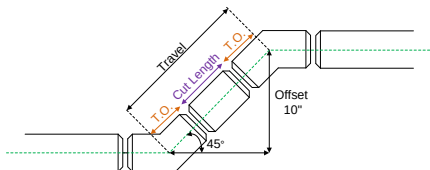


STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Pipe Material	[Material]	Steel Pipe Material
Input Pipe Size	[1][6][Inch][PipeSize]	Inch 16 Pipe Size
Input Elbow Type	[Shift][PipeSize]	Butt Weld – Long Elbow Type
Input bend angle	[3][0][Angle]	30° Slope Angle
Solve for Inside Arc Length	[Shift][Travel]	Inch 8-3/8 Inside Arc Length
Solve for Center Arc Length	[Travel]	Inch 12-9/16 Center Arc Length

Solve for Outside Arc Length	[Travel]	Inch 16-3/4 Outside Arc Length
Solve for Take-Out	[Shift][Offset]	Inch 6-7/16 Take-Out Length

Solving for Cut Length (with known Take-Out)

A 6" pipe has an offset of 10" and a bend angle of 45°. The pipe is Schedule 40 Aluminum with a known elbow Take-Out of 3-1/2". Override welder's gap and set to 0. Solve for the end-to-end cut length of the pipe.



STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Pipe Material	[Material]	Aluminum Pipe Material
Input Pipe Type	[Shift][Material]	Schedule 40 PipeType
Input Pipe Size	[6][Inch][PipeSize]	Inch 6 Pipe Size

Input Welders Gap	[0][Shift][Angle]	Inch 0 Welder's Gap
Input Offset	[1][0][Inch][Offset]	Inch 10 Offset Length
Input Bend Angle	[4][5][Angle]	45° Slope Angle
Input Known Take-Out	[3][Inch][1][/][2] [Shift][Offset]	Inch 3-1/2 Take-Out Length
Solve for Travel	[Travel]	Inch 14-1/8 Travel
Solve for Cut Length	[Travel]	Inch 7-1/8 Cut Length
Display Take-Out	[Shift][Offset]	Inch 3-1/2 Take-Out Length
Display Welders Gap	[Shift][Angle]	Inch 0 Welder's Gap
Display Fit Angle (bend angle)	[Angle]	45° Slope Angle

Solving for Slope

If a pipe drops 3 inches over 25 feet, solve for the slope of the pipe Run. In addition, solve for the slope angle and percentage grade.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Run	[2][5][Feet][Run]	Feet Inch 25 - 0 Run
Input Offset	[3][Inch][Offset]	Inch 3 Offset Length
Solve for Slope Angle	[Angle]	0.57° Slope Angle
Solve for % Grade	[Angle]	1 Grade %
Solve for Grade	[Angle]	0.01 Grade
Solve for Slope	[Angle]	Inch 1/8 Slope

Solving for Drop

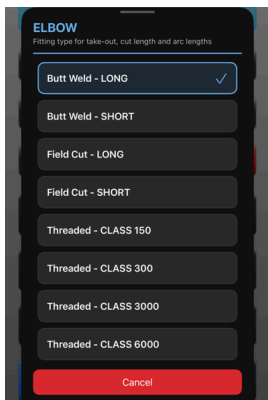
If a drain pipe requires 1/8" of drop per foot, how much drop is required over a 30 foot Run?

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Slope (drop)	[1][/][8][Angle]	Inch 1/8 Slope
Input Run	[3][0][Feet][Run]	Feet Inch 30 - 0 Run

Solve for Drop	[Offset]	Feet Inch 0 - 3-3/4 Offset Length
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Elbow Type

The Pipe Calc Elite™ allows users to select long or short radius butt weld elbows, or threaded elbows in Class 150, 300, 3000 or 6000. When the “Elbow Type” button is pressed, this screen pops up to allow the user to select elbow type:



“Butt Weld (BW) – Long” is the default elbow type. Elbow selection impacts Take-Out

calculations because long and short elbows have different radii. Also, factory cut 45° BW elbows have a different Take-Out than field cut 45° elbows.

Butt Weld - Long:

For 90° long radius BW elbow (or odd-angle fittings cut in the field from the 90°) or factory 45° long radius BW elbow.

Butt Weld - Short:

For 90° short radius BW elbow (or odd-angle fittings cut in the field from the 90°) or factory 45° short radius BW elbow (NPS 3 and larger). Below NPS 3, use Field Cut - Short.

Field Cut - Long:

For long radius BW elbow or odd-angle fittings cut in the field from the 90° (including 45°).

Field Cut - Short:

For short radius BW elbow or odd-angle fittings cut in the field from the 90° (including 45°).

Key Definitions:

[Shift][PipeSize] – Elbow Type

Use to select Elbow Type (additional screen will appear to make selection)

Threaded - CLASS 150:

For ASME B16.3 Class 150 malleable iron or B16.4 Class 125 cast iron elbows, 1/8" to 8" (45s to 6"). Take-Out is the fitting center-to-end dimension less the thread make-up, the length of pipe that screws into the fitting.

Threaded - CLASS 300:

For ASME B16.3 Class 300 malleable iron or B16.4 Class 250 cast iron threaded elbows, 1/4" to 3".

Threaded Take-Out and Cut Length:

Threaded elbows are made only at 45° and 90°. At any other fitting angle the Take-Out reads NO FITTING - 45 OR 90 ONLY. Cut length is the centerline length less two Take-Outs. The welder's gap is not subtracted. Arc lengths do not apply and read 0 with the label Arc N/A - Threaded. An unmade size reads NO FITTING.

[Shift][Angle] – Thread Make-Up

With a threaded elbow selected the Welder Gap key becomes Thread Make-Up. Press it with a clear display to show the make-up in use, or enter a value first to override it. The default is the normal NPT engagement for the pipe size, for example 3/4" for 2" pipe and 1" for 3" pipe. Changing the elbow type clears an entered value.

Threaded - CLASS 3000:

For ASME B16.11 forged steel threaded elbows, Class 3000, 1/8" to 4". Take-Out is the fitting center-to-end less the thread make-up, the same rule as the Class 150 and Class 300 rows, and the same 45° and 90° limit applies.

Threaded - CLASS 6000:

For ASME B16.11 forged steel threaded elbows, Class 6000, 1/8" to 4".

Street Elbows:

A Class 150 street elbow has the same center-to-end at its female end as the plain Class 150 elbow, so the Threaded - CLASS 150 row gives its Take-Out. The male end threads into the next fitting and takes no pipe, so it has no Take-Out.

Sample Calculations:

Solving for Threaded Cut Length

A 2" Class 150 threaded line has an 18" center-to-center offset at 90°. Solve for the cut length.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Select Elbow Type (tap the row)	[Shift][PipeSize]	Threaded - CLASS 150 Elbow Type
Input Pipe Size	[2][PipeSize]	Inch 2 Pipe Size
Input Offset	[1][8][Inch][Offset]	Inch 18 Offset Length
Input Fit Angle	[9][0][Angle]	90° Slope Angle
Solve for Take- Out	[Shift][Offset]	Inch 1-1/2 Take-Out Length
Solve for Travel	[Travel]	Inch 18 Travel
Solve for Cut Length	[Travel]	Inch 15 Cut Length
Display Thread Make-Up	[Shift][Angle]	Inch 3/4 Thread Make-Up

The cut length is the centerline less two Take-Outs, 18 less 2 x 1-1/2. No welder's gap is taken.

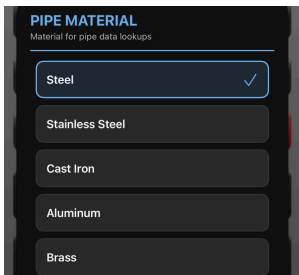
Pipe Data

The Pipe Calc Elite™ allows users to enter a pipe material, pipe type, and pipe size and the calculator will display a screen of useful pipe data related to those entries. The pipe data includes: outside diameter, inside diameter, wall thickness, dry/empty pipe weight per foot, filled pipe weight per foot, cross-sectional area, volume per foot, and the fill weight/volume.

Key Definitions:

[Material] – Pipe Material

Use to select pipe material for pipe data look-ups. Pipe material also defines which pipe types and sizes are available as well as sets the surface roughness factor for use in pressure loss calculations. When the Pipe Material button is pressed the following screen will appear to allow user to select the desired pipe material.



Pipe material selections include:

- Steel (default)
- Stainless Steel
- Cast Iron
- Aluminum
- Brass
- PVC
- Copper

[Shift][Material] – Pipe Type

Once pipe material is selected, use this button to select pipe type. The available pipe types are dependent on pipe material selected. When the Pipe Type button is pressed the following screen will appear to allow user to selected desired pipe type.

PIPE TYPE
Wall schedule for pipe size lookups

Schedule 10

Schedule 20

Schedule 30

Standard

Schedule 40 ✓

Pipe types available for each material:

Steel, Brass, Aluminum, Cast Iron

- Schedule 10
- Schedule 20
- Schedule 30
- Standard
- Schedule 40
- Schedule 60
- Extra Strong
- Schedule 80
- Schedule 100
- Schedule 120
- Schedule 140
- Schedule 160
- Extra Extra Strong

Stainless Steel

- Schedule 5S
- Schedule 10S
- Schedule 40S
- Schedule 80S

- Schedule 160S

PVC

- Schedule 40
- Schedule 80
- Schedule 120
- SDR 21 (Standard Dimension Ratio)
- SDR 26
- SDR 32.5
- SDR 41

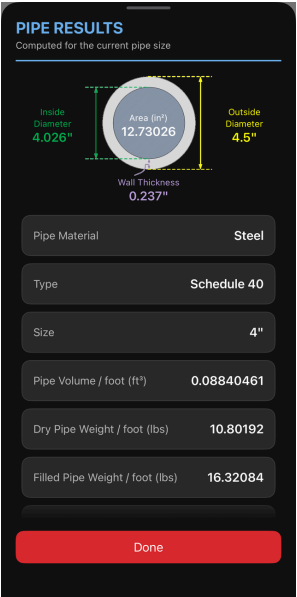
Copper

- Type L
- Type K
- Type M
- Type DWV (Drain-Waste-Vent)
- Medical Type L
- Medical Type K
- ACR Annealed (Air Conditioning & Refrig)
- ACR Drawn

[PipeSize] – Pipe Size

Once pipe material and pipe type are selected, use to enter a pipe size. Available pipe sizes are dependent on material and pipe type selected and are based on industry standards. Enter the pipe diameter (typically in inches) and press the pipe size button. The size will be shown on the main display if it is valid. Pressing the pipe size button a second time will bring up a pipe data screen showing a wide range of information on

the pipe configuration selected. An example is shown below.



Sample Calculations:

Solving for Pipe Data

Solve for the wall thickness and weight of a 12”
Schedule 40 Aluminum pipe.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Pipe Material	[Material]	Aluminum Pipe Material
Input Pipe Type	[Shift][Material]	Schedule 40 Pipe Type
Input Pipe Size	[1][2][Inch][PipeSize]	Inch 12 Pipe Size
Solve for pipe data	[PipeSize]	‘New screen will pop-up with data’ Thickness: 0.406” Weight: 18.7336 lb/ft Outside Diam: 12.75 Inside Diam: 11.938 Etc.

Unit Conversion Functions (and Entering Dimensions)

The Pipe Calc Elite™ allows users to convert units using the built-in convert function. In addition, users can enter dimensions such as length in

inches, feet, meters, or millimeters. The calculator supports arithmetic operations with the dimensions as well (i.e. 5 inches * 5 inches = 25 square inches). Arithmetic operations can also be performed on other units found in the conversion menus (i.e. 55 gallons + 3 cu ft = 77.4 gallons). The examples in this section illustrate the unit conversion capabilities of the Pipe Calc Elite™.

Operators chain: $5 + 3 \times 4$ is 32, not 17.

Key Definitions:

[Feet] - Feet

Use to enter length in feet. Subsequent presses of the button will change dimensions to square feet and cubic feet. If fractional feet and inches are entered, pressing the button will convert to decimal feet. Pressing the [feet] button when metric dimensions are on the display will convert values on the display to the feet and inch equivalent values.

[Inch] - Inch

Use to enter length in inches. Subsequent presses of the button will change dimensions to square inches and cubic inches. If fractional inches are entered, pressing the button will convert to decimal inches. Pressing the [inch]

button when metric dimensions are on the display will convert values on the display to the equivalent inch value.

[m] - Meters

Use to enter length in meters. Subsequent presses of the button will change dimensions to square meters and cubic meters. Pressing the meters button when feet or inch dimensions are on the display will convert values on the display to the metric equivalent values.

[mm] - Millimeters

Use to enter length in millimeters. Subsequent presses of the button will change dimensions to square millimeters and cubic millimeters. Pressing the millimeters button when feet or inch dimensions are on the display will convert values on the display to the metric equivalent values.

[/] - Fraction

Use this key to enter fractions in combination with inch and feet buttons.

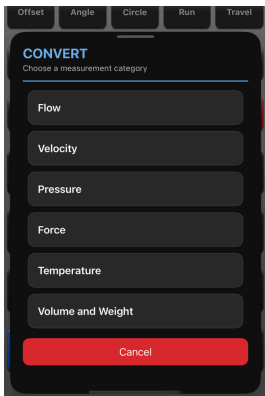
[Shift][6] – Weight/Volume

Use to enter weight per volume to be used in conversions between units of weight and volume and for use in pipe data results: weight of filled

pipe per foot. The default weight/volume is 62.42796 lbs/cubic foot (weight of water) and this value is restored whenever a clear all is pressed ([Shift][+]). To store a custom weight/volume, enter a value and then press [Shift][6]. Continue to press the [6] button to select desired unit. Available units, in the order the key shows them: lbs/gal, lbs/ft³, lbs/in³, Kg/m³ and Kg/L.

[Convert]- Convert or Enter Units

Use to add dimensional units to a value that has been entered or calculated. If dimensional units are already set, the convert button displays a list of dimensions that the current value can be converted to along with the associated values for each unit. A pop-up window similar to that shown below will be seen when the convert button is pressed.



Unit conversions are available for the following:

Flow:

- Gallons per Minute (gpm)
- Cubic Feet per Minute (cfm)
- Cubic Feet per Second (cfs)
- Cubic Meters per Second (cms)
- Liters per Second (lps)

Velocity:

- Feet per Second (fps)
- Feet per Minute (fpm)
- Meters per Second (mps)
- Centimeters per Second (cmps)

Pressure:

- Pounds per Square Inch (psi)
- Pounds per Square Foot (psf)
- Inches of Mercury (inHg)
- Feet of Head (fthd)
- Bars
- Kilopascals (kpa)

Force

- Pound-Force (lbf)
- Newtons
- Gram-Force (gf)
- Ounce-Force (ozf)

Temperature

- Celsius (C)
- Fahrenheit (F)
- Kelvin (K)

Volume and weight (uses wt/vol setting)

- Gallons (gal)
- Liters (L)
- Cubic Inch (in³)
- Cubic Feet (ft³)
- Cubic Meter (m³)
- Cubic Millimeter (mm³)
- Pound (lbs)
- Kilogram (kg)

Entries Without a Unit

A plain number takes the unit beside it.

Type 1 [Feet] 6 [Inch] [+] [1] [=] and the display reads 1 - 7. The 1 is one INCH: every length in the calculator is kept in inches, and the feet on the display are a reading of that.

Beside a metric entry it is that unit.

1 0 0 [mm] [+] [1] [=] reads 101 MILLIMETER, not 125.4. The [m] button behaves the same way with meters.

A plain multiplier keeps the unit.

[3] [x] 1 5 [Feet] [=] reads 45 - 0 FEET INCH -- three lengths end to end, not an area. Press [Inch] or [Feet] twice to enter an area.

A length divided by a length has no unit.

2 5 [Feet] [÷] [3] [Feet] [6] [Inch] [=] reads 7.14286, which is how many 3-foot 6-inch pieces fit in a 25-foot length.
[1][0] [÷] [3][.][5] [Feet] [=] is the same calculation and reads 0.238095.

The pipefitting keys follow the entry before.

After 1.5 [Feet] [Offset], 2 4 [Run] reads 24 - 0 FEET INCH. Typed first, it is inches.

Sample Calculations:

Converting Linear Units

Convert 6 feet 3-1/2 inches to decimal inches and also to meters and millimeters.

Note: Units should be entered in order from largest to smallest (ie enter feet, then inches, then fractional inch).

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input length	[6][Feet][3][Inch][1][÷][2]	Feet 6 Inch 3-1/2
Convert to decimal inches	[Inch][Inch]	Inch 75.5
Convert to meters	[m]	Meter 1.9177
Convert to mm	[mm]	Millimeter 1917.7

Converting Area and Volume

Convert 90 square inches to square meters.
Enter in 10 cubic feet.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Area	[9][0][Inch][Inch]	Square Inch 90

Convert to square meters	[m]	Square Meter 0.0580644
Input 10 cubic ft	[1][0][Feet][Feet][Feet]	Cubic Feet 10

Math using dimensional Units

Divide 25 feet 4 inches by 6.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Length	[2][5][Feet][4][Inch]	Feet 25 Inch 4
Divide by 6	[÷][6][=]	Feet 4 Inch 2-11/16

Multiply 25 feet 4 inches by 3 feet 3 inches.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input Length	[2][5][Feet][4][Inch]	Feet 25 Inch 4
Multiply by 3ft 3 in	[x][3][Feet][3][Inch][=]	Square Feet 82.3333

Add 3 cubic feet and 20 gallons.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	

Input 3 cuft	[3][Feet][Feet][Feet]	Cubic Feet 3
Add 20 gallons	[+][2][0][Convert] Select 'Gallons'	20 Gallons
Solve	[=]	Cubic Feet 5.67361

Converting Volume

Convert 55 gallons to cubic feet.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input 55 gallons	[5][5][Convert] Select 'Gallons'	55 Gallons
Convert to cubic ft	[Convert] Select 'Cubic Feet'	Cubic Feet 7.35243

Converting Weight

Convert 210 pounds to Kilograms.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input 210 pounds	[2][1][0][Convert] Select 'Pound'	210 Pound
Convert to Kilograms	[Convert] Select 'Kilogram'	95.2544 Kilogram

Converting Weight/Volume

How many pounds does 55 gallons of water weigh?

Note: Default weight/volume for water can be used at 62.42796 lbs/cubic foot

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input 55 gallons	[5][5][Convert] Select 'Gallons'	55 Gallons
Convert to pounds	[Convert] Select 'Pound'	458.997 Pound

How many pounds does 55 gallons of gasoline weigh?

Note: Weight/volume for gasoline is approximately 6.073 lbs/gallon.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Set weight/volume for gas	[6][.][0][7][3][Shift][6]	6.073 Pounds per Gallon
Input 55 gallons	[5][5][Convert] Select 'Gallons'	55 Gallons
Convert to pounds	[Convert] Select 'Pound'	334.015 Pound

Converting Temperature

Convert 200°F to C°.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input 200°F	[2][0][0][Convert] Select 'Fahrenheit'	200 Fahrenheit
Convert to °C	[Convert] Select 'Celsius'	93.3333 Celsius

Converting Flow Rates

Convert 50 cubic feet per second to gallons per minute.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input 50 cubic feet	[5][0][Convert] Select 'cfs'	50 Cubic Feet per Second
Convert to gallons per minutes	[Convert] Select 'gpm'	22441.6 Gallons per Minute

Converting Pressure

Convert 115psi to pounds per square foot.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	

Input 115 psi	[1][1][5][Convert] Select 'psi'	115 Pounds per Square Inch
Convert to pounds per square foot	[Convert] Select 'psf'	16560 Pounds per Square Foot

D:M:S Conversion

The Pipe Calc Elite™ allows users to convert between decimal degrees and degrees:minutes:seconds format.

Key Definitions:

[Shift][4] – D:M:S <-> Decimal Degrees

Press to convert between decimal degrees and degrees:minutes:seconds format.

Sample Calculations:

Converting from decimal degree to D:M:S

Convert 62.125° to degrees:minutes:seconds format.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	

Input decimal degrees and convert to DMS	[6][2][.][1][2][5] [Shift][4]	62.07.30 DMS
--	----------------------------------	-----------------

Converting from D:M:S to decimal degrees

Convert 42° 15' 30" to decimal degrees.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input DMS and convert to decimal degrees	[4][2][.][1][5][.][3][0] [Shift][4]	42.258333°

Circle Diameter, Area, Circumference Function

The Pipe Calc Elite™ allows users to enter a diameter and solve for area and circumference of a circle.

Key Definitions:

[Circle] – Circle

Use to enter diameter of a circle and then calculate the area and circumference.

Trig Functions

Key Definitions:

[Cos] – Cosine. [Sin] – Sine. [Tan] – Tangent.
Enter an angle in degrees and press the key to read the ratio for that angle.

[Shift][Cos] – ArcCosine, and the same shifted for [Sin] and [Tan]. Enter a ratio and press the key to read the angle back, in degrees.

Sample Calculations:

Solving for a Cosine and an ArcCosine

Find the cosine of 30° . Then find the angle whose cosine is 0.5.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input the angle	[3][0]	30
Solve for cosine	[Cos]	0.866025
Clear calculator	[Clear][Clear]	
Input the cosine	[.][5]	0.5
Solve for the angle	[Shift][Cos]	60

A trig key shows six digits. Cos of 90° reads 0, and an arc key refuses a ratio past 1.

Sample Calculations:

Solve for Area and Circumference of Circle

Solve for the area and circumference of a circle if the diameter of the circle is 0.5 meters.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input diameter	[0][.][5][m][Circle]	Meter 0.5 Diameter
Solve for Area	[Circle]	Square Meter 0.19635 Area of Circle
Solve for Circumference	[Circle]	Meter 1.5708 Circumference

Flow Rate Function

The Pipe Calc Elite™ allows users to calculate flow rate based on Area and Velocity. Area can be entered directly or be obtained by entering a pipe size which generates a cross-sectional area.

Key Definitions:

[Shift][7] – Flow

Use to enter or calculate volumetric flow rate through a pipe.

Sample Calculations:

Solve for Flow Rate in pipe

A 12" cast iron schedule 40 pipe has fluid moving at 3 feet per second. Solve for the flow rate in gallons per minute.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input pipe material	[Material] Select 'Cast Iron'	Cast Iron Pipe Material
Input pipe type	[Shift][Material] Select 'Schedule 40'	Schedule 40 Pipe Type
Input pipe size	[1][2][Inch][PipeSize]	Inch 12 Pipe Size
Input velocity	[3][Shift][8]	3 Feet per Second
Solve for flow	[Shift][7]	1046.63 Gallons per Minute

Solve for Flow Rate (with known area)

Given a velocity of 6 feet per minute and area of 4.3 square feet, solve for flow in gallons per minute.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input velocity	[6][Shift][8][8]	6 Feet per Minute
Input Area	[4][.][3][Feet][Feet] [Shift][9]	Square Feet 4.3 Area
Solve for flow	[Shift][7]	192.997 Gallons per Minute

Velocity Function

The Pipe Calc Elite™ allows users to calculate velocity based on Area and Flow Rate. Area can be entered directly or be obtained by entering a pipe size which generates a cross-sectional area.

Key Definitions:

[Shift][8] – Velocity

Use to enter or calculate velocity

Sample Calculations:

Solve for Velocity in pipe

An 8" steel schedule 40 pipe has a flow rate of 18 gpm. Solve for fluid velocity in feet per second.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input pipe material	[Material] Select 'Steel'	Steel Pipe Material
Input pipe type	[Shift][Material] Select 'Schedule 40'	Schedule 40 Pipe Type
Input pipe size	[8][Inch][PipeSize]	Inch 8 Pipe Size
Input flow	[1][8][Shift][7]	18 Gallons per minute
Solve for velocity	[Shift][8]	0.115438 Feet per Second

Pressure Loss Function

The Pipe Calc Elite™ allows users to calculate pressure loss in a pipe based on pipe material and size, flow/velocity, and length of the pipe. Cross-sectional area of the pipe can also be manually entered using the area button rather than defining the pipe size. If length is not

entered, pressure loss will be calculated as pressure loss per foot.

To accurately calculate pressure loss a Reynolds number is computed to determine which equation is appropriate for the flow type in the pipe. The Reynolds number is defined by:

$$Re_D = \frac{\rho v D}{\mu}$$

where v =velocity, D =internal pipe diameter, ρ =density (default is 1000 kg/m³ for water but can be set with wt/vol button), and μ =dynamic viscosity (0.001 Pascal-seconds for water at 68°F; it follows the fluid temperature, [Shift][5]).

The general equation used for pressure loss in a pipe is as follows (derived from the Darcy formula):

$$\Delta p = \frac{\rho f L v^2}{2D}$$

where ρ =density, f =friction coefficient, L =pipe length, v =velocity, D = internal pipe diameter

Laminar Flow Method

If the Reynolds number is below 2,300 the flow is laminar and the friction coefficient depends on the Reynolds number alone:

$$f = \frac{64}{Re}$$

Transition Method

Between 2,300 and 4,000 the flow is neither reliably laminar nor fully turbulent, and no one equation covers the band. The calculator takes the laminar value at 2,300 and the Colebrook value at 4,000 and reads between them, so the answer stays continuous. Treat a result in this range as an estimate.

Pipe roughness is dependent on pipe material and is defined as follows:

Material	Absolute Surface Roughness (inches)
Steel	0.0026520
Stainless Steel	0.0005904
Brass	0.0000588
Alum	0.0000588
Cast Iron	0.0102000
PVC	0.0001872
Copper	0.0000588

These are nominal values for clean, new pipe. Handbooks give a range, so a loss is an estimate.

METHOD is the last entry in the pressure readout. It names the regime that produced the answer, so a result can be read with the right amount of confidence. Water at the flow rates found in building services is almost always in the Colebrook regime. Laminar and transition results appear only at very low velocity.

Colebrook Method

At a Reynolds number of 4,000 and above the flow is turbulent and the friction coefficient is the value of f that satisfies the Colebrook-White equation. It cannot be rearranged for f , so it is solved by bisection:

$$\frac{1}{\sqrt{f}} = -2 \log \left[\frac{2.51}{Re * \sqrt{f}} + \frac{k}{D} * 0.27027 \right]$$

Where f =friction coefficient, Re =Reynolds number, k =Absolute Roughness (defined in previous table), D =internal pipe diameter

Density comes from the weight/volume setting, [Shift][6], and defaults to the weight of water, 62.42796 lbs per cubic foot.

Viscosity defaults to 0.001 Pascal-seconds, water at about 68 degrees Fahrenheit, and follows the fluid temperature set with [Shift][5].

Reading a Pressure Loss Answer

Fluid Temperature

Press [Shift][5]. The solver needs the water's viscosity, which defaults to 0.001 Pascal-seconds, water at about 68 degrees Fahrenheit. Enter a temperature and press the key to read it as Fahrenheit, or press again to read the same number as Celsius. Hot water is thinner and loses less: at 180 degrees the loss is about 8% below what the 68 degree default gives.

Valves and Fittings

Enter how many of a fitting the run has, then press [Shift][Feet] and pick the fitting from the list, which shows all ten and their losses. Ten fittings are covered: the 90 and 45 elbows, long radius 90, return bend, tee through the run or the branch, and the gate, globe, angle and swing check valves.

The loss coefficient is taken for the pipe size and the elbow type. Below 1" only threaded figures exist, and above 4" only welded ones. A threaded elbow costs about 3.5 times a welded one at 1", 2.6 times at 2" and 2.3 times at 4". Fittings count only when a Run is entered, and changes in elevation are never included. Every figure is for clean, new pipe.

Pressure loss is the friction loss of the pipe, plus any valves and fittings entered with [Shift][Feet]. Changes in elevation are not included. Enter a Run to get the loss over that length with its fittings, or leave Run empty for the loss per foot of bare pipe.

Key Definitions:

[Shift][m] – Pressure

Use to enter or calculate pressure or pressure loss.

Sample Calculations:

Solve for Pressure Loss

A ½” Schedule 40 PVC pipe has water moving at 0.25 feet per second. Solve for the pressure loss in 100 inches of pipe.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input pipe material	[Material] Select ‘PVC’	PVC Pipe Material
Input pipe type	[Shift][Material] Select ‘Schedule 40’	Schedule 40 Pipe Type
Input pipe size	[1][/][2][Inch][PipeSize]	Inch 0.5 Pipe Size

Input velocity	[0][.][2][5][Shift][8]	0.25 Feet per Second
Input run length	[1][0][0][Inch][Run]	Inch 100 Run
Solve for pressure loss	[Shift][m]	0.003599 Pounds per Square Inch
Solve for Square Foot	[m]	0.518244 Pounds per Square Foot
Solve for Feet of Head	[m]	0.008301 Feet of Head
Solve for Inches of Mercury	[m]	0.007327 Inches of Mercury
Solve for Kilopascals	[m]	0.024814 Kilopascals
Solve for bars	[m]	0.000248136 Bars
Display Reynolds number	[m]	1203.87 Reynolds Number
Display Friction Coefficient	[m]	0.053162 Friction Coefficient
Display Method for Calculating Pressure Loss	[m]	Laminar Flow Method

A 4" Schedule 40 Steel pipe has water flowing at 150 gpm. Solve for the pressure loss in 300 feet of pipe.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input pipe material	[Material] Select 'Steel'	Steel Pipe Material
Input pipe type	[Shift][Material] Select 'Schedule 40'	Schedule 40 Pipe Type
Input pipe size	[4][Inch][PipeSize]	Inch 4 Pipe Size
Input Flow	[150][Shift][7]	150 Gallons per minute
Input run length	[3][0][0][Feet][Run]	Feet Inch 300 - 0 Run
Solve for pressure loss	[Shift][m]	1.77113 Pounds per Square Inch
Solve for Pounds per Square Foot	[m]	255.042 Pounds per Square Foot
Solve for Feet of Head	[m]	4.08538 Feet of Head
Solve for Inches of Mercury	[m]	3.60605 Inches of Mercury
Solve for Kilopascals	[m]	12.2115 Kilopascals
Solve for bars	[m]	0.122115 Bars
Display Reynolds number	[m]	117830 Reynolds Number
Display Friction Coefficient	[m]	0.020572 Friction

		Coefficient
Display Method for Calculating Pressure Loss	[m]	Colebrook Method

A $\frac{3}{4}$ " Schedule 40 Steel pipe has water flowing at 22 gpm. Solve for the pressure loss per foot.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input pipe material	[Material] Select 'Steel'	Steel Pipe Material
Input pipe type	[Shift][Material] Select 'Schedule 40'	Schedule 40 Pipe Type
Input pipe size	[3][/][4][Inch][PipeSize]	Inch 0.75 Pipe Size
Input Flow	[2][2][Shift][7]	22 Gallons per minute
Solve for pressure loss	[Shift][m]	0.483888 Pounds per Square Inch per Foot
Solve for pressure loss	[m]	69.6799 Pounds per Square Foot per Foot
Solve for Feet of Head	[m]	1.11617 Feet of Head per Foot
Solve for Inches of Mercury	[m]	0.985207 Inches of

		Mercury per Foot
Solve for Kilopascals	[m]	3.33629 Kilopascals per Foot
Solve for bars	[m]	0.033363 Bars per Foot
Display Reynolds number	[m]	84437.2 Reynolds Number
Display Friction Coefficient	[m]	0.028151 Friction Coefficient
Display Method for Calculating Pressure Loss	[m]	Colebrook Method

A 6" Schedule 40 Steel pipe has water moving at 20 feet per second. Solve for the pressure loss in 100 feet of pipe.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input pipe material	[Material] Select 'Steel'	Steel Pipe Material
Input pipe type	[Shift][Material] Select 'Schedule 40'	Schedule 40 Pipe Type
Input pipe size	[6][Inch][PipeSize]	Inch 6 Pipe Size
Input velocity	[2][0][Shift][8]	20 Feet per second
Input run length	[1][0][0][Feet][Run]	Feet Inch 100 - 0

		Run
Solve for pressure loss	[Shift][m]	8.95766 Pounds per Square Inch
Solve for Pounds per Square Foot	[m]	1289.9 Pounds per Square Foot
Solve for Feet of Head	[m]	20.6623 Feet of Head
Solve for Inches of Mercury	[m]	18.238 Inches of Mercury
Solve for Kilopascals	[m]	61.7609 Kilopascals
Solve for bars	[m]	0.617609 Bars
Display Reynolds number	[m]	939095 Reynolds Number
Display Friction Coefficient	[m]	0.0168 Friction Coefficient
Display Method for Calculating Pressure Loss	[m]	Colebrook Method

Key Definitions:

[Shift][5] – Fluid Temperature. Enter a water temperature and press once, twice for Celsius.

[Shift][Feet] – Valves and Fittings. Enter how many, press the key, pick one from the list.

Sample Calculations:

Pressure Loss with Valves and Fittings

A 2 in. Schedule 40 steel line carries 40 gpm of 180 degree water through 100 feet, four 90 elbows and one globe valve.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input pipe size	[2][Inch][PipeSize]	2
Input fluid temp	[1][8][0][Shift][5]	180
Add four elbows	[4][Shift][Feet]	4
Add globe valve	[1][Shift][Feet]	5
Input flow	[4][0][Shift][7]	40
Input run length	[1][0][0][Feet][Run]	100 - 0
Solve for loss	[Shift][m]	2.30665

The same run with no fittings loses 1.27 psi.

Pressure/Force Function

The Pipe Calc Elite™ allows users to calculate pressure from a known force and area. Enter the area, or a pipe size for its cross-sectional area.

Key Definitions:

[Shift][m] – Pressure

Use to enter or calculate pressure or pressure loss.

Sample Calculations:

Solve for Pressure (with known force)

If 50 Newtons of force are applied to an area of 10 square inches, solve for pressure in pounds per square inch.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input force	[5][0][Shift][mm][mm]	50 Newtons
Input area	[1][0][Shift][9]	Square Inch 10 Area
Solve for pressure	[Shift][m]	1.12404 Pounds per Square Inch

Area Function

The Pipe Calc Elite™ allows users to calculate Area based on known force/pressure or flow/velocity. The area button can also be used to display the cross-sectional area of a pipe that has been defined.

Key Definitions:

[Shift][9] – Area

Use to enter for use in flow, velocity, pressure and force equations or calculate area based on known force/pressure or flow/velocity.

Sample Calculations:

Solve for Area (with known force/pressure)

If 60 Newtons of force are present and pressure is known to be 5 psi, solve for area in square inches.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input force	[6][0][Shift][mm][mm]	60 Newtons
Input pressure	[5][Shift][m]	5 Pounds per

		Square Inch
Solve for area	[Shift][9]	Square Inch 2.69771 Area

Solve for Area (with known flow/velocity)

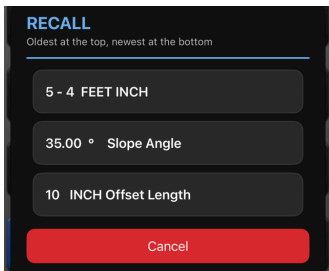
If water in a pipe has a flow of 10 cubic feet per minute and is moving at 60 feet per minute, solve for the cross-sectional area of the pipe in square inches.

STEPS	KEYSTROKES	DISPLAY
Clear calculator	[Clear][Clear]	
Input flow	[1][0][Shift][7][7]	10 Cubic Feet per Minute
Input velocity	[6][0][Shift][8][8]	60 Feet per minute
Solve for area	[Shift][9]	Square Inch 24 Area

Memory Storage

The Pipe Calc Elite™ allows users to store numbers or calculated results by pressing the [Store] button. You can store as many values/results as you like and the calculator will put them in a list. Values can be viewed and

recalled from a popup window by pressing the [Shift][Store] (Recall) button as shown below:



Values can be cleared from memory by pressing [Shift][Convert] (Rcl-Clear), which clears the whole list.

Values stored in memory are persistent and stay saved when the program is closed and reopened. The entire memory storage can be cleared with the clear all command, [Shift][+].

A recalled value works like a number you typed. It can start a calculation or finish one: [5][Feet][+], recall 56 - 0, then [=] gives 61 - 0. It can also be entered as an [Offset], [Run] or [Travel].

Technical Support:

Technical support is free. If you have questions, suggestions for improving this app, or find a bug, please email us and we will respond as soon as possible.

Email: techsupport@cyberprodigy.com

Legal:

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