POCKET REFERENCE GUIDE

PIPE TRADES PRO™

Advanced Pipe Trades Math Calculator

Model 4095

CALCULATED INDUSTRIES®

FAST. ACCURATE. RELIABLE.

Pipe Trades Pro™

The *Pipe Trades Pro*™ Advanced Pipe Trades Math Calculator has been specifically designed for today's pipe trade professionals. No matter what Pipe Trade you work in, you'll find it easy to use, fast, accurate, and reliable. Quickly calculate Offsets, Rolling Offsets, and Cutbacks. Immediately access Pipe Material and Type data, and Pipe Size dimensions. The Pipe Trades Pro will help you on the jobsite or in the office.

- *Built-in data and Pipe Sizing for 7 different Piping Materials*
- *Linear and Rolling Offset Solutions*
- *Cutback Solutions*
- *Trigonometric Solutions*
- *Circle, Circumference and Area Solutions*
- *Fractional Feet-Inch Input/Output*
- *Simple US/Metric and Flow Conversions and Solutions*
- *Problems Involving All Architectural Fractions — 1/2-1/64ths*
- *And more!*

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GETTING STARTED

You may want to practice getting a feel for your calculator keys by reading through the key definitions and learning how to enter basic feet-inch-fractions and metric values, how to store values in Memory, etc., before proceeding to the examples.

Also review specific default settings or preference settings.

Order of Operations

Unlike other Calculated Industries calculators,

which use the Chaining Method of Operations, this calculator uses the Order of Operation Method.

- Chaining Method ("as entered"):
  10 + 4 x 5 = 70
- Order of Operations: 10 + 4 x 5 = 30

The Order of Operations method of computing is based on the following order of precedence:

1) Expressions inside of parentheses
2) Single-variable functions that perform the calculation and display the result immediately (trig functions, square, square root, x^y, percent, reciprocal, angle conversions)
3) Multiplication and division
4) Addition and subtraction
5) Equals (completes all operations)

If you need to calculate using the Chaining Method, you can change this in your calculator Preference Settings.

Using Parentheses

Your calculator has parenthesis keys (and) for performing mathematical operations. In the Order of Operations method, expressions inside of parentheses are performed first.

The calculator offers up to 21 levels of parentheses:

1) First parenthesis level opened – press (for one right-sided parenthesis.
2) Second level opened – press (a second time for two right-sided parentheses ((.
3) Third level opened – press (a third time for three right-sided parentheses (((.
4) Fourth level opened – press (a fourth time for four right-sided parentheses ((((.

Numbers of levels greater than four are shown in the upper left corner of the display.

KEY DEFINITIONS

Basic Function Keys

On/C ***On/Clear Key –*** Turns on power. Pressing once clears the last entry and the display. Pressing twice clears all non-permanent values.

Off ***Off –*** Turns all power off. Clears all non-permanent memory.

+ − × ÷ = ***Arithmetic operation keys***

0 – **9** and **•** ***Keys used for entering numbers.***

Conv ***Convert –*** Used with the dimensional keys to convert between dimensions or with other keys to access special functions.

Stor ***Store –*** Used for storing values.

Rcl ***Recall –*** Used with other keys to recall stored values and settings.

Conv **Rcl** ***Memory Clear (M-R/C) –*** Clears Memory without changing current display.

M+ ***Accumulative Memory –*** Adds value to Accumulative Memory.

Conv **M+** **[M-] –** Subtracts value from Accumulative Memory.

Dimensional Function Keys

Feet **Feet –** Enters or converts to feet as whole or decimal numbers. Also used with **Inch** and **/** keys for entering feet-inch values (e.g., **6** **Feet** **9** **Inch** **1** **/** **2**). *Repeated presses during conversions toggle between fractional feet-inch and decimal feet.*

Inch ***Inch –*** Enters or converts to Inches.

Entry can be whole or decimal numbers. Also used with **/** for entering fractional inch values (e.g., **9** **Inch** **1** **/** **2**). *Repeated presses during conversions toggle between fractional and decimal inches.*

/ ***Fraction Bar –*** Used to enter fractions. Fractions can be entered as proper (1/2, 1/8, 1/16) or improper (3/2, 9/8). If the denominator (bottom) is not entered, the calculator's fractional accuracy setting is automatically used. Results are always shown in typical building fractional format.

Conv **1** Identifies/Converts to gallons per minute (GPM)

Conv **2** Identifies/Converts to liters per second (l/s)

Conv **4** Identifies/Converts to cubic feet per minute (CFM)

Conv **5** Identifies/Converts to cubic feet per second (CFS)

Conv **3** Identifies/Converts to ºC

Conv **6** Identifies/Converts to ºF

m ***Meters –*** Enters or converts to meters.

Conv **m** ***Millimeters* –** Enters or converts to millimeters.

Conv **8** ***Gallons* –** Enters or converts to gallons.

Conv **9** **Liters –** Enters or converts to liters.

Weight/Volume Functions

Conv **/** ***Weight/Volume* –** Stores a new weight volume as pounds per cubic feet or other format as shown below. Default value is 62.42796 pounds per cubic foot (1000 kG/m^3).

- LB per CU FEET
- LB Per CU INCH
- LB per GAL
- Kg PER CU M
- kG per liter

Conv **7** ***Pounds (lbs)* –** Enters or converts a weight or volume value to pounds.

Conv **•** ***Kilograms (kg)* –** Enters or converts a weight or volume value to kilograms.

Circle Key

Circle Enters diameter and calculates circle area and circumference.

Trigonometric Keys

Sine Finds the sine of a degree or undimensioned value.

Conv **Sine** ***Arcsine (sin^{-1})*** **–** Gives the angle degrees for the Sine value.

Cos Finds the Cosine.

Conv **Cos** ***Arccosine (cos^{-1})*** **–** Gives the angle in degrees for the Cosine value.

Tan Finds the Tangent.

Conv **Tan** ***Arctangent (tan^{-1})*** **–** Gives the angle in degrees for the Tangent value.

Pipefitting Project Keys

Angle/ Slope Enters or calculates a linear Slope, Slope Angle or Percent Grade.

Conv **Angle/ Slope** (%Grade) Used to enter or solve Percent Grade. Calculates Percent Grade based on entered Offset and Run or Slope.

Offset Enters, calculates or stores the Offset (Rise).

Run Enters or calculates the Run.

Travel Enters or calculates the Travel (Diagonal).

Pipe Mat'l	Defines the Pipe Material. (Steel, Stainless Steel, Brass, Aluminum, Cast Iron, PVC or Copper).
Pipe Size	Enters the nominal Pipe Size and provides data pertaining to the entered size.
Conv Pipe Size	Defines the Pipe Type based on Pipe Material.
Conv Run	Calculates pipe Cutback after Bend Angle and Offset are entered.
Conv Travel	Calculates Rolling Offset pipe length.
Conv (	**(Flow)** Enter or calculate volumetric Flow Rate through a pipe.
Conv)	**(Velocity)** Enter or calculate Velocity and convert between feet per second, feet per minute, and meters per second.
Conv Circle	**(Pressure)** Enter Pressure value. Calculate Pressure loss. Convert between units of pressure.
Conv x^2	**(Force)** Enter or calculate Force and convert between lbf, newton.
Conv $\sqrt{x}$	**(Area)** Enter for pipe area for use in Flow, Velocity, Pressure, and

Force calculations. Calculate Area given values for Flow/Velocity or Force/Area.

Miscellaneous Functions

(Open parenthesis key

) Close parenthesis key

x^y Enters an exponential value other than x^2 or Square Root

Conv x^y Enters the exponential root value ($x^{1/y}$)

Conv + Displays value of π

Conv ÷ ***(1/x) Reciprocal –*** Finds the reciprocal of a number (e.g., 8 Conv ÷ 0.125).

Conv − (+/–) Toggle displayed value between minus and plus value

Conv × ***Clear All –*** Returns all stored values to the default settings. (Does not affect Preference settings.)

x^2 Squares the value in the display

$\sqrt{x}$ Square root function

Conv 0 Cost function

Conv = Paperless tape

Conv Stor Preference settings

← ***Backspace Function –*** Used to delete entries one keystroke at a time (unlike the On/C function, which deletes the entire entry).

Conv ← Percent function

Stor 1 - 9 Used to store values in Memory, registers 1-9

PREFERENCE SETTINGS

Press Conv, then Stor to access the Preferences menu. Continue pressing Stor to toggle through different Preferences. Press + or − keys to toggle between options of the different Preferences. Press On/C to exit Preferences. Your calculator will keep Preference settings until a full reset alters your settings to the default values.

KEYSTROKES	DISPLAY
Conv Stor	
(Fractional Resolution)	**FRAC 0 1/16 INCH**
+	**FRAC 0 1/32 INCH**
+	**FRAC 0 1/64 INCH**
+	**FRAC 0 1/2 INCH**
+	**FRAC 0 1/4 INCH**
+	**FRAC 0 1/8 INCH**

➕ (repeats options)	**FRAC 0 1/16 INCH**
Second press of **Stor**:	
(Area displays)	**AREA Std.**
➕	**AREA 0. SQ FEET**
➕	**AREA 0. SQ INCH**
➕	**AREA 0. SQ M**
➕ (repeats options)	**Std.**
Third press of **Stor**:	
(Volume displays)	**VOL Std.**
➕	**VOL 0. CU FEET**
➕	**VOL 0. CU M**
➕ (repeats options)	**VOL Std.**
Fourth press of **Stor**:	
(Meter linear displays)	**METR 0.000 M**
➕ (floating point)	**METR FLOAt M**
➕ (repeats options)	**METR 0.000 M**
Fifth press of **Stor**:	
(Decimal degree displays)	**DEG 0.00º**
➕ (floating point)	**DEG FLOAt**
➕ (repeats options)	**DEG 0.00º**
Sixth press of **Stor**:	
(Fractional mode)	**FRAC Std.**
➕ (Lowest denominator) (floating point)	**FRAC COnSt.**
➕ (Repeats options)	**FRAC Std.**
Seventh press of **Stor**:	
(Mathematical Operation)	**MATH OrdEr**

ENTERING DIMENSIONS

Linear Dimensions

When entering feet-inch values, enter dimensions from largest to smallest — feet before inches, inches before fractions. Enter fractions by entering the numerator (top number), pressing / (Fraction Bar key) and then the denominator (bottom number).

Note: *If a denominator is not entered, the fractional setting value is used.*

Examples of how linear dimensions are entered (press On/C after each entry):

DIMENSIONS	KEYSTROKES
5 feet	5 Feet
5 feet, 1 ½ inches	5 Feet 1 Inch 1 / 2
17.5 meters	1 7 • 5 m
1250 millimeters	1 2 5 0 Conv m

Square and Cubic Dimensions

Examples of how square and cubic dimensions are entered (press On/C after each entry):

DIMENSIONS	KEYSTROKES
14 square inches	1 4 Inch Inch
11 square feet	1 1 Feet Feet

3.3 square meters — 3 • 3 m m

3 cubic feet — 3 Feet Feet Feet

ENTERING CONVERSIONS

Linear Conversions

Convert 10 feet 6 inches to other dimensions, including metric:

KEYSTROKES	DISPLAY
1 0 Feet 6 Inch	10 FEET 6 INCH
Conv Feet *	10.5 FEET
Conv Inch *	126. INCH
m	3.200 M
Conv m (mm)	3200.4 MM

*Repeated presses of Feet or Inch will toggle between feet-inch-fractions and decimal feet or inches.

Volume Conversions

Enter 8.5 gallons and convert to liters.

KEYSTROKES	DISPLAY
On/C On/C	0.
8 • 5 Conv 8	GAL 8.5
Conv 9	LITR 32.176

Temperature Conversions

Enter a temperature value, then Conv followed by 6 or 3 for Fahrenheit or Celsius, respectively.

Convert 78 °F to a °C temperature.

KEYSTROKES	DISPLAY
On/C On/C	**0.**
7 8 Conv 6 (°F)	**78 ºF**
Conv 3 (ºC)	**25.55556 ºC**

Convert 11 °C to a °F temperature.

KEYSTROKES	DISPLAY
On/C On/C	**0.**
1 1 Conv 3 (°C)	**11 ºC**
Conv 6 (ºF)	**51.8 ºF**

Flow Rate Conversions

You can enter a Flow value in cubic feet per second, liters per second, cubic feet per minute, or gallons per minute, and then convert to other units.

Enter 47 cfs, then convert to other units.

KEYSTROKES	DISPLAY
On/C On/C	**0.**
4 7 Conv 5 (cfs)	**CFS 47**
Conv 2 (l/s)	**L/S 1330.892**
Conv 4 (cfm)	**CFM 2820.**
Conv 1 (gpm)	**GPM 21095.07**

BASIC MATH OPERATIONS

Adding and Subtracting Strings of Dimensions

Add the following measurements:

- 6 feet 2-1/2 inches
- 11 feet 5-1/4 inches
- 18.25 inches

Then subtract 2-1/8 inches.

KEYSTROKES	DISPLAY
6 Feet 2 Inch 1 / 2 +	
1 1 Feet 5 Inch 1 / 4 +	
1 8 • 2 5 Inch =	**19 FEET 2 INCH**
− 2 Inch 1 / 8 =	**18 FEET 11-7/8 INCH**

Multiplying Dimensions

Multiply 5 feet 3 inches by 11 feet 6-1/2 inches:

KEYSTROKES	DISPLAY
5 Feet 3 Inch × 1 1 Feet	
6 Inch 1 / 2 =	**60.59375 SQ FEET**

Dividing Dimensions

Divide 30 feet 4 inches by 7 inches:

KEYSTROKES	DISPLAY
3 0 Feet 4 Inch ÷ 7 Inch =	**52.**

Divide 20 Feet 3 Inches by 9:

KEYSTROKES	DISPLAY
2 0 Feet 3 Inch ÷ 9 =	**2 FEET 3 INCH**

PERCENTAGE CALCULATIONS

The Conv ← keys can be used for finding a given percent of a number or for working add-on, discount or division percentage calculations. It can be used with any type of number, in any dimension (feet, inch, millimeter, etc.) and any type of convention (non-dimensioned, linear, square or cubic).

Calculating Percentages

Find 18% of 500 feet:

KEYSTROKES	DISPLAY
On/C On/C	0.
5 0 0 Feet × 1 8	
Conv ←	**90 FEET 0 INCH**

Take 20% from 286 feet 6 inches:

KEYSTROKES	DISPLAY
On/C On/C	0.
2 8 6 Feet 6 Inch − 2 0	
Conv ←	**229 FEET 2 3/8 INCH**

Add a 10% waste allowance to 275 feet of pipe:

KEYSTROKES	DISPLAY
On/C On/C	**0.**
2 7 5 Feet + 1 0 Conv ←	**302 FEET 6 INCH**

MEMORY OPERATION

Whenever the M+ key is pressed, the displayed value will be added to the memory. Other memory functions:

FUNCTION	KEYSTROKES
Add to memory	M+
Subtract from memory	Conv M+
Recall total in memory	Rcl M+
Display/clear memory	Rcl Rcl
Clear memory	Conv Rcl

Memory is semi-permanent, clearing only when you:

1) turn off the calculator;
2) press Rcl Rcl ;
3) press Conv Rcl ;
4) press Conv ✕ (Clear All).

When memory is recalled (Rcl M+), consecutive presses of M+ will display the calculated average and total count of the accumulated values.

Using M+

KEYSTROKES	DISPLAY
3 5 5 M+	M+ 355. M
2 5 5 M+	M+ 255. M
7 4 5 Conv M+ (M-)	M- 745. M
Rcl M+	TTL – 135. M
M+	AVG – 45. M
M+	CNT 3. M
Rcl Rcl	M+ – 135.

Using Memory Storage Keys (M1 - M9)

In addition to the standard cumulative memory (as previously described), your calculator has nine independent storage registers – M1 through M9 – that can be used to permanently store single, noncumulative values. The following example shows the use of M1 (Stor 1). To use M2 - M9, replace the presses of the 1 key with presses of the corresponding number key (2 - 9).

You can replace a value in one of these memory registers by storing a new value in place of the stored value.

FUNCTION	KEYSTROKES
Store single value in M1	
Stor 1	
Clear M1	0 Stor 1
Recall M1	Rcl 1

Example: *Store 175 into M1, recall the value, and then clear the value.*

KEYSTROKES	DISPLAY
1 7 5 Stor 1	**M-1 175.**
Off On/C	**0.**
Rcl 1	**M-1 175.**
0 Stor 1	**M-1 0.**

PAPERLESS TAPE

The Paperless Tape allows you to display and review the last 30 entries of a calculation.

Conv = accesses the tape mode and + or − scrolls forward or backward through the entries. Note: The Paperless Tape is cleared each time On/C is pressed twice, the unit is shut off, or an All Clear (Conv ×) is performed.

Paperless Tape Function — Normal Mathematics

1. *Enter a string of numbers:*

KEYSTROKES	DISPLAY
On/C On/C	0.
4 Feet +	4 FEET 0 INCH
5 Feet +	9 FEET 0 INCH
6 Feet +	15 FEET 0 INCH
7 Feet =	22 FEET 0 INCH

2. *Access the Tape function:*

Conv =	TTL= 22 FEET 0 INCH

3. *Scroll from first value and total:*

+	01 4 FEET 0 INCH
+	02+ 5 FEET 0 INCH
+	03+ 6 FEET 0 INCH
+	04+ 7 FEET 0 INCH
+	TTL= 22 FEET 0 INCH

4. *Scroll to last two values:*

−	04+ 7 FEET 0 INCH
−	03+ 6 FEET 0 INCH

5. *Exit Tape function and continue:*

[=]*	**TTL= 22 FEET 0 INCH**
[+]	**22 FEET 0 INCH**
[2] [Feet] [=]	**24 FEET 0 INCH**

**Displays total before exiting*.

CALCULATE COSTS

The Cost function provides the total cost of material, based on a stored unit cost and an entered quantity of material. This is convenient for quickly calculating costs on a job that requires many of the same kind of items.

Example

You are doing an installation that includes 120 feet of pipe that comes in 10' lengths at $3.21 per 10' pipe.

KEYSTROKES	DISPLAY
Store the unit cost of the pipes needed:	
[On/C] [On/C]	**0.**
[3] [•] [2] [1] [Stor] [0]	**COST Per 3.21**
Enter the number required:	
[1] [2]	**12**
Calculate total cost:	
[Conv] [0] *(Cost)*	**TTL$ 38.52**

You can then quickly calculate costs for a different number of the same item.

KEYSTROKES	DISPLAY
On/C On/C	0.
1 7	17.
Conv 0 *(Cost)*	TTL$ 54.57

You can also find costs of different items on the fly without overwriting your stored unit cost.

Determine the cost of 17 fittings at $2.89 each:

KEYSTROKES	DISPLAY
Enter number of Pipes needed:	
On/C On/C	0.
1 7	17.
Multiply by the cost:	
× 2 • 8 9	2.89
Conv 0 *(Cost)*	TTL$ 49.13

USING THE PIPE TRADES PRO

Note: *The Pipe Trades Pro's built-in right-angle functions, including Offset, Run, and Travel, are designed to calculate centerline lengths only and do not account for take outs or welder's gaps. Refer to your calculator's User's Guide for examples using these functions in conjunction with take outs and welder's gaps.*

Pipe Material Key

The Pipe Material key lets you choose a pipe material, which defines the available sizes and surface roughness used by the calculator. See

the Users Guide for more information. The default material for the Pipe Trades Pro is Steel, but the user can choose from material types as shown.

KEYSTROKES		DISPLAY
On/C On/C		0.
Pipe Mat'l	(Steel)	MATL STEEL
Pipe Mat'l	(Stainless Steel)	MATL S.STEEL
Pipe Mat'l	(Brass)	MATL BRASS
Pipe Mat'l	(Aluminum)	MATL AL
Pipe Mat'l	(Cast Iron)	MATL CAST
Pipe Mat'l	Plastic)	MATL PLASTIC
Pipe Mat'l	(Copper)	MATL COPPER

The last material setting displayed is selected, and the calculator will retain your setting even after the power has been turned off. Once a material is selected, you can easily toggle through the available types (Schedules, etc.) using the Pipe Type function. (Conv Pipe Size) Available types of pipe are dependent upon the material setting.

Keystrokes below show the pipe types available for Plastic (press Pipe Mat'l until “PLASTIC” is shown in the display).

KEYSTROKES		DISPLAY
On/C On/C		0.
Rcl	Pipe Mat'l	MATL PLASTIC
Conv	Pipe Size (Schedule 40)	Type 40 PLASTIC

Pipe Size (Schedule 80)	**Type 80 PLASTIC**
Pipe Size (Schedule 120)	**Type 120 PLASTIC**
Pipe Size (SDR 21)	**Type SD21 PLASTIC**
Pipe Size (SDR 26)	**Type SD26 PLASTIC**
Pipe Size (SDR 32.5)	**Type SD32 PLASTIC**
Pipe Size (SDR 41)	**Type SD41 PLASTIC**

You can also directly enter a Pipe Type, e.g., Schedule 80, by entering a number corresponding to the pipe type.

KEYSTROKES	DISPLAY
On/C On/C	**0.**
Pipe Mat'l	**MATL PLASTIC**
8 0 Conv Pipe Size	**Type 80 PLASTIC**

Pipe Size Key

When you have chosen a Pipe Material and Type and then enter Pipe Size, the following data will be displayed.

For this example we are using 3" Steel, Schedule 80 pipe.

KEYSTROKES	DISPLAY
On/C On/C	**0.**
Pipe Mat'l	**MATL STEEL**
8 0 Conv Pipe Size	**Type 80 STEEL**
3 Inch	**3 INCH**
Pipe Size	**80 - SIZE 3 INCH**
Pipe Size (Outside Diameter)	**OD SIZE 3.5 INCH**
Pipe Size (Internal Diameter)	**ID SIZE 2.9 INCH**
Pipe Size (Wall Thickness)	**THK SIZE 0.3 INCH**

Pipe Size (Material)	**MATL SIZE STEEL**
Pipe Size (Weight per Foot)	**PIPE SIZE 10.2528 LB Per FEET**
Pipe Size (Filled Weight/Foot)	**FILL SIZE 13.11634 LB Per FEET**
Pipe Size (Internal Area)	**AREA SIZE 6.605199 SQ INCH**

Finding Pipe Lengths

The components of rolling offset calculations sometimes have different names in different geographic regions and in different trades.

- **Roll** – the horizontal component of a rolling offset. May also be known as “offset”.
- **Offset** – the vertical component of a rolling offset. May also be known as “rise” or “set”.
- **Bend** – the bend angle, also known as “fitting angle” or “angle of turn”.

Note: *If an angle is not entered, or if the angle is set to 0 degrees, the fitting angle is assumed to be 90º.*

Find the pipe Cutback when you are running pipes through a 45º bend with a 10” offset.

KEYSTROKES	DISPLAY
On/C On/C	0.
4 5 Angle/Slope	/0 45.00 º
1 0 Inch Offset	OFST 10 INCH
Conv Run	CUT 4 1/8 INCH

Find the slope of a pipe Run if it drops 6 Inches over 50 Feet. What is its Angle and Percent Grade?

KEYSTROKES	DISPLAY
On/C On/C	0.
5 0 Feet Run	RUN 50 FEET 0 INCH
6 Inch Offset	OFST 6 INCH
Conv Angle/Slope	% GRD 1.
Angle/Slope	GRD 0.01
Angle/Slope	SLP 0 FEET 1/8 INCH
Angle/Slope	/Ø 0.57º

Calculate Pipe Length for a Rolling Offset with a 4” Roll, 5” Offset and a 45º Fitting Angle.

KEYSTROKES	DISPLAY
On/C On/C	0.
4 5 Angle/Slope	/Ø 45.00 º
5 Inch Offset	OFST 5 INCH
4 Inch Conv Travel	LNTH 9 1/16 INCH
Continue pressing the Travel key to view all related values.	
Travel *(setback)*	STBK 0 FEET 6-3/8 INCH
Travel	BEND 45.00 º
Travel	OFST 5 INCH
Travel	ROLL 4 INCH

If a pipe Run requires 1/8” drop per foot for drainage, how much total drop is required for a 25’ Run?

KEYSTROKES	DISPLAY
On/C On/C	0.
1 / 8 Angle/Slope	SLP 0 1/8 INCH
2 5 Feet Run Offset	OFST 3 - 1/8 INCH

Calculating Flow Rate

If you know the Area and Velocity, you can calculate the Flow Rate. For this example, the velocity is 5 feet per second, and the Area is 1.8 square inches.

KEYSTROKES	DISPLAY
Conv ⊠	ALL CLEARED
Store known data	
5 Conv) *(Velocity)*	FPS 5
1 • 8 Inch Inch Conv √x (*Area*)	AREA 1.8 SQ INCH
Calculate Flow Rate (default is Gallons per Minute):	
Conv (*(Flow)*	GPM 28.05195
Convert to different units of flow rates:	
(*(Cubic Feet per Minute)*	CFM 3.75
(*(Cubic Feet per Second)*	CFS 0.0625
(*(Liters per Second)*	L/S 1.769803
(*(Cubic Meters per Second)*	M3/S 0.00177
(*(Gallons per Minute)*	GPM 28.05195

If you clear the display, you can recall the last Flow Rate shown.

KEYSTROKES	DISPLAY
On/C	0.
Rcl Conv (	GPM 28.05195

If you clear the calculator, you will only recall the last unit shown.

KEYSTROKES	DISPLAY
On/C On/C	0.
Rcl Conv (	GPM 0.

If you know the Flow Rate, you can convert to other dimensional units.

KEYSTROKES	DISPLAY
Conv ⊠	ALL CLEARED
5 Conv 1 *(Gallons per Minute)*	GPM 5
Conv 4 *(Cubic Feet per Minute)*	CFM 0.668403
Conv 5 *(Cubic Feet per Second)*	CFS 0.01114
Conv 2 *(Liters per Second)*	L/S 0.315451

Velocity

You can enter a known Velocity, calculate Velocity and convert between different units of Velocity.

If you know the Flow and Area, you can calculate Velocity and then convert to other Velocity units. The default is feet per second (FPS). For this example, we know that the Flow is 5 gallons per minute, and the Area is 1.8 square inches.

KEYSTROKES	DISPLAY
Conv ⊠	ALL CLEARED

Store known data:

5 Conv ((Flow)	**GPM 5**
1 • 8 Inch Inch Conv $\sqrt{x}$ (Area)	**AREA 1.8 SQ INCH**

Calculate Velocity:

Conv) (feet per second)	**FPS 0.891204**
) (feet per minute)	**FPM 53.47222**
) (meters per second)	**M/S 0.271639**

If you clear the display, you can recall the last velocity shown.

KEYSTROKES	DISPLAY
On/C	**0.**
Rcl Conv)	**M/S 0.271639**

If you clear the calculator, you will only recall the last unit shown.

KEYSTROKES	DISPLAY
On/C On/C	**0.**
Rcl Conv)	**M/S 0.**

If you know the velocity, you can convert to other dimensional units.

KEYSTROKES	DISPLAY
Conv ×	**ALL CLEARED**
5 Conv)	**FPS 5.**
= Conv) (feet per second)	**FPS 5.**
) (feet per minute)	**FPM 300.**
) (meters per second)	**M/S 1.524**

Pressure Loss

If you know Flow/Velocity, Pipe Size and Length, you can calculate Pressure Loss. If no Run (Length) is entered, Pressure Loss per foot is calculated. For this example we will use the default Material, Steel. Calculate for 2" Pipe with a Flow Rate of 4 gallons per minute and then convert to different dimensional units.

KEYSTROKES	DISPLAY
Conv ⊠	ALL CLEARED
2 Inch Pipe Size	STD SIZE 2 INCH
Conv √x (Area)	AREA 3.355605 SQ INCH
Enter Flow Rate	
4 Conv (	GPM 4.
Calculate Pressure Loss	
Conv Circle	PSI PER FEET 0.000205
Circle	REY 6120.09
Circle	PSF PER FEET 0.029469
Circle	inHG PER FEET 0.000417
Circle	HEAD PER FEET 0.000472
Circle	BAR PER FEET 0.000014
Circle	KPA PER FEET 0.001411
Circle	PSI PER FEET 0.000205

Using values above, add the Run (Length) to calculate the Pressure Loss over the length of the pipe.

KEYSTROKES	DISPLAY
5 0 Feet Run	RUN 50 FEET 0 INCH
Calculate Pressure Loss	

Conv Circle	PSI 0.010232
Circle	REY 6120.09
Circle	PSF 1.47346
Circle	inHG 0.020833
Circle	HEAD 0.023603
Circle	BAR 0.000705
Circle	KPA 0.07055
Circle	PSI 0.010232

You can also change the Flow Rate and recalculate the Pressure Loss.

KEYSTROKES	DISPLAY
4 0 Conv (	GPM 40.
Conv Circle	PSI 0.575408
Circle	REY 61200.9
Circle	PSF 82.85877
Circle	inHG 1.171543
Circle	HEAD 1.32727
Circle	BAR 0.039673
Circle	KPA 3.9673
Circle	PSI 0.575408

Pressure/Force

If you know the Force and Area, you can calculate Pressure and convert the solution to different units of Pressure. For this example the Force is 100 lbf and the Area is 2 square inches.

KEYSTROKES	DISPLAY
Conv ⊠	ALL CLEARED

Enter Force and Area

1 0 0 Conv x^2 (Force)	**LBF 100.**
2 Inch Inch Conv $\sqrt{x}$ (Area)	**AREA 2 SQ INCH**

Calculate Pressure

Conv Circle	**PSI 50.**
Circle	**PSF 7200.**
Circle	**inHG 101.801**
Circle	**HEAD 115.3329**
Circle	**BAR 3.447379**
Circle	**KPA 344.7379**
Circle	**PSI 50.**

Area

If you know the Force and Pressure, you can calculate Area. For this example the Force is 85 lbf and the Pressure is 15 psi.

KEYSTROKES	DISPLAY
Conv ⊠	**ALL CLEARED**
8 5 Conv x^2 (Force)	**LBF 85.**
1 5 Conv Circle (Pressure)	**PSI 15.**
Conv $\sqrt{x}$ (Area)	**AREA 5.666667 SQ INCH**

Force

Given Pressure and Area, you can calculate Force and convert between newtons and pound-force. For this example the Pressure is 100 PSI and the Area is 1 square inch.

KEYSTROKES	DISPLAY
Conv ⊠	ALL CLEARED
Enter Pressure and Area	
1 0 0 Conv Circle	PSI 100.
2 Inch Inch Conv $\sqrt{x}$	AREA 2. SQ INCH
Calculate Force	
Conv x^2	LBF 200.
x^2	NEWT 889.6443

Circle Area and Circumference

Find the area and circumference of a circle with a diameter of 25 Inches:

KEYSTROKES	DISPLAY
On/C On/C	0.
2 5 Inch Circle	DIA 25 INCH
Circle	AREA 490.8739 SQ INCH
Circle	CIRC 78-9/16 INCH

APPENDIX

Auto-Shut Off

Your calculator will shut itself off after about 8-12 minutes of non-use.

Reset

If your calculator should ever “lock up,” press Reset — a small hole located above the [Angle/ Slope] key— to perform a total reset.

Batteries

This model uses two (2) LR44 batteries (included). Should your calculator display become very dim or erratic, replace the batteries.

Note: Please use caution when disposing of your old battery, as it contains hazardous chemicals.

Replacement batteries are available at most discount or electronics stores. You may also call Calculated Industries at 1-775-885-4900.

Replacing the Batteries

To replace the batteries, slide open the battery door (at top backside of unit) and replace with new batteries. Make sure the batteries are facing positive side up.

CALCULATED INDUSTRIES®

Putting answers at your fingertips since 1978

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules.

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