EngCalc

for Palm OS

Version 2.0
User Guide

Product of:-

3GR Technologies

For Installation information & Sales/Support contacts refer the Read Me file.

Contents

1. Introduction:

EngCalc is a Powerful calculator tool for Engineering professionals. It combines performance & accuracy which enables to perform complex engineering calculations. Embedded is another great tool - MxCalc SE, for Converting Units (Most comprehensive converter available) & Evaluating Expressions.

New Features: 🆕

 ➢ Supports High Resolution (320x320)
 ➢ Search feature to quickly access the calculators.
 ➢ Calculations in **US units** or **Metric units**. Apply settings for all the calculators.
 ➢ Includes large input panel to enter values.
 ➢ Mostly operated with finger, no need of stylus.
 ➢ Uniquely designed Calculator display for accepting Inputs.
 ➢ In-place Unit Conversion to switch between **US-Metric units for single Input/Output**.

1.1 Installation/Uninstallation

Installation

The EngCalc program package is packaged separately for PalmOS 3.x to 4.x and PalmOS 5.x & HiResolution devices. To know the version of PalmOS running on the device go to the Main Application screen where you see all the application in the device. Please go to Menu - > Info -> Version (tab). The version is mentioned on the top of the screen as PalmOS Software vx.x. To know the Resolution information, see the device manual.

 ➢ For Palm OS 5.x loaded devices with resolution 160x160 (e.g. Treo 600) install the EngCalc-Full-5x-Install.prc
 ➢ For Palm OS 3.0 to 4.x loaded devices with resolution 320x320 & True HiRes (e.g. Treo 650 & later)install the EngCalc-Full-3x-Install.prc
 ➢ For Palm OS 5.x loaded devices with resolution 320x320 & True HiRes (e.g. Treo 650 & later) EngCalc-Full-HR-5x-Install.prc
 ➢ The following message will appear in case you have installed a wrong file. "This version of the Booster is not valid for your device. Please visit .... "
 ➢ You need to then reinstall the program. For this delete the following files from the device & install the correct PRC file.

    ASFXfix
    BasicIngots - BASI
    Booster
    ConstUnitConverter.

DataCommIngots - DTCI
EnhancedIngots - ENHI
GameIngots-GAMI
MultimediaIngots-Ml
OwnerDrawIngots-O

Steps to Install EngCalc program.

➢ First decompress the downloaded file onto the hard drive of your desktop computer.
➢ You will use the Install Tool application included with the Palm Desktop software to transfer the EngCalc program onto your handheld.
➢ Start the Install Tool program.
➢ In the User drop down list, select the user name that corresponds to your handheld.
➢ Click the Add button.
➢ Navigate to the directory where you decompressed the EngCalc files (c:\EngCalc).
➢ Select the .PRC file (**Specific to your device**) file, and then click the Open button.
➢ Click the Done button.
➢ Synchronize your handheld with the desktop to transfer the files onto your handheld.

Steps to Uninstall EngCalc program.

➢ Load the programs Menu in the device
➢ Select 'Delete' from the menu.
➢ Select the 'EngCalc' program from the list & tap on 'Delete' button.

2. Application Overview

Tap here to select group
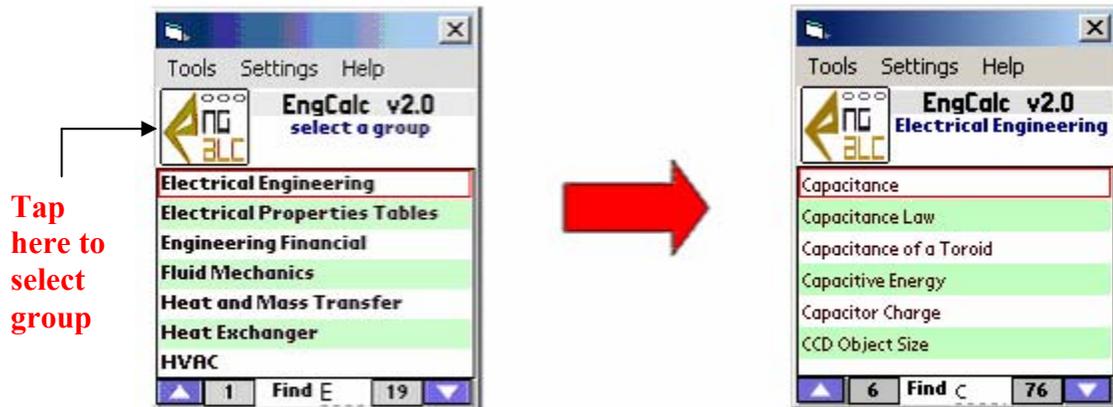
How to start……..

➢ To start with, select the group from the list of 16 Groups.
➢ As shown in the above figure tap the button shown to select the group.

➢ Select Group from the list of groups. **(E.g. In the above figure Electrical is selected.)**
➢ After that select calculator **(E.g. after selecting Electrical group, Capacitance calculator is selected.)**
➢ Tap on the selected area, respective calculator will launch.
➢ Use this advance Calculator for further calculations.
➢ The calculator consists of Inputs and Outputs. After entering the values in all the Inputs (**Mandatory**) tap on **Calculate** 📅 button.
➢ To search the group, enter the letter with which the required group name starts and all the groups starting with that letter are shown.
➢ To load the MxCalc go to Menu -> Tools -> MxCalc.
➢ Options module helps you to customize Properties, Units, Calculator(s), and Group(s) by making them visible or hidden thereby saving the time to load.
➢ To add a New Property in the MxCalc Unit Converter module go to Menu-> Tools -> New.

2.1 List of Calculators:

Automotive

Airflow Alternate Depression
CFM of Carburetor (Displacement in³)
Circle Surface Area
Coil Spring Rate
Cone Surface Area
Coolant Percentage
Coolant Volume
Crawl Ratio
Crawl Speed
Cube Surface Area
Cylinder Surface Area
Dew Point And Relative Humidity
Differential Gear Ratio
Drag Performance
Dyno Correction
Ellipse Surface Area
Engine Compression Distance
Engine Compression Ratio
Engine RPM1
Engine RPM2
Engine Size
Engine Size and Compression
Fuel Consumption
Fuel Estimation per Capacity
Fuel Injector Flow
Fuel Required For Trip
Gas Oil Mixture Ratio (Metric Values)
Gas Oil Mixture Ratio (US Values)
Gear Ratio Tire size
Gear Selector
Header Tube
Highway costs with energy track
Horse power Gain
Horsepower (ET method)
Horsepower (Trap-speed method)
Incline Downgrade Grade Percent
Inlet Runner Area to Engine Size Match
Irregular Triangle Surface Area
Metric Grade Percent1
Metric Grade Percent2
Metric Vertical Climb Index
Mileage Compensation
MPH
Oblong Cylindrical Tank Volume
Octane Rating

Electrical Engineering

Ammeter Shunts
Cap. of a Sphere in Space (Capacitance)
Cap. of a Sphere in Space (Radius)
Capacitance
Capacitance Law
Capacitance of a Toroid
Capacitive Energy
Capacitor Charge
Cap-Freq-Ind (Capacitance)
Cap-Freq-Ind (Frequency)
Cap-Freq-Ind (Inductance)
CCD Object Size
Coulombs Law
Cylindrical Capacitor
DC Inductor Voltage
Electrical Harmonics
Helical Coil Inductance
Helical Primary Turns for Coils
Horsepower Created by a hydraulic motor
H-Pad Resistance
Impedance & Resonant Capacitor for Coils
Impedance & Resonant Capacitor for Coils
Inductance For Spiral Flat Coils
Inductive Energy
Inverting Amplifier
Jar Capacitance For Coils
L / C Reactance (Capacitive Reactance)
L / C Reactance (Inductive Reactance)
Len of Wire AND Freq. of Coil (Freq.of Coil)
Len of Wire AND Freq. of Coil (Len of Wire)
Motor calculation (Fan - compressor motors)
Motor calculation (Lifts, elevators and cranes)
Motor calculation (Pump motor)
Motor Estimators (Find Amps)
Motor Estimators (Find HP)
Motor Estimators (Kva (3 Phase))

Optimum Runner Size
Parabola Surface Area
Parallelogram Surface Area
Peak Torque RPM
Piston Speed
Post Trip Fuel Remaining
Potential Driving Time
Potential Speed
Propane Fumigation
Pump Pounds Per Square Inch
Pyramid Surface Area
Ramp Travel Index (RTI)
Rectangle Surface Area
Rectangular Prism Surface Area
Refrigerant Pressure Temperature
Regular Polygon Surface Area
Regular Triangle Surface Area
Rhombus Surface Area
RPM
Speed Potential
Sphere Surface Area
Spring Rate for Indep. Suspension
Spring rate for steel coil springs
Square Surface Area
Tire Height
Total Fuel Weight
Trapezoid Surface Area
Two-Stroke Premix Ratio1
Two-Stroke Premix Ratio2
US Fuel Mileage
Vehicle Stopping Distance
Vertical Change
Weight and Percentage
Wheel And Tire Motion

Engineering Financial

Annual Compound Interest
Direct/Distributor Commission
Distributor Gross Profit Margin
Loan Amortization
Sales Price Discount and Profit
Special Distributor Discounts

Heat and Mass Transfer

Avg FlatPlate Nusselt(laminar)
Black Body Radiation
Contact Heat Xfer Coeff
Convection-Conduction Network
Critical Radius of Insulation

Non-inverting Amplifier
Operation Amplifier (Differential Amplifier)
Operation Amplifier (Inverting Amplifier)
Operation Amplifier (Non-inverting Amplifier)
Parallel Capacitance
Parallel Inductance
Parallel Resistance
PCB Trace Width (External Layer Results)
PCB Trace Width (Internal Layer Results)
Plate Capacitor
Plate Type or Rolled Capacitor
Potential Divider (R1)
Potential Divider (R2)
Potential Divider (Resistors)
Potential Divider (Voltage Out)
Power Calculation
Power Calculation-Current
Power Calculation-Power
Power Calculation-Voltage
Power Factor from Power Factor Angle
Power Factor from Real Power
RC Transient
Reactance of Capacitor
Res-Freq-Cap (Capacitance)
Res-Freq-Cap (Frequency)
Res-Freq-Cap (Resistance)
Resistively
Resonant LC Freq
RL Transient
RMS Calculations (Pulse Waveform)
RMS Calculations (Trapezoidal Waveform)
RMS Calculations (Triangle Waveform)
Series Capacitance
Series Inductance
Series Resistance
Solenoid Magnetic Field
Speaker 70 Volt Powered Line
Star/Delta Transformation (Delta to Star)
Star/Delta Transformation (Star to Delta)
Straight Wire Magnetic Field
Temperature Coefficient
Toroid Magnetic Field
T-Pad Resistance

Entropy Exchange in HeatXfer
Film Temperature
Gray-body Radiation
Heat Conduction in Hollow Cylinder
Heat conduction in hollow sphere
Heat conduction in plane wall
Heat convection
Local FlatPlate Nusselt(laminar)
Nusselt for cylinder in cross-flow
Single-lump transient temperature evolution
Tube Flow Nusselt (turbulent)

Heat Exchanger

Effectiveness of CounterFlow Double Pipe Exchanger
Effectiveness of Parallel Flow Double Pipe Exchanger
Fouling Factor
Heat Capacity Rate
Heat Capacity Rate Ratio
Heat Exchange-LMTD Relation (Dbl Pipe Exchanger)
Heat exchange-LMTD Relation (Non-Double Pipe Exch)
Heat Exchanger Enthalpy Flow
Heat Xfer Coeff Inside Smooth Tube Laminar Flow
Heat Xfer Coeff Inside Smooth Tube Turbulent Flow
LMTD (Log-mean Temp Difference)
no. of Xfer Units
Plate Heat Exchanger OHT Coeff
Thermal Effectiveness
Thermal Efficiency
Thermal efficiency-F-NTU Relation (R equal to 1)
Thermal Efficiency-F-NTU-R Relation (R not equal to 1

HVAC

Humidity Ratio
Mixture Density
Moist Air Density
Moist Air Enthalpy
Relative Humidity
Water Vapor Density

Transformer Impedence
Transformer KVA Quick Calc (1 ph)
Transformer KVA Quick Calc(3 ph)
Wheatstone Bridge

Fluid Mechanics

Andrades equation
Atm Press variation in troposphere
Bernouillis equation
Biot
Capillary Pressure in Liquid Drop
Cavitation
Circular Disk in Normal, Creeping Flow Cd
Circular Disk in Parallel, Creeping Flow Cd
Critical pressure ratio
Drag Coefficient
Eckert
Fourier heat Xfer
Fourier mass Xfer
Froude
Grashof
Hydrostatic Pressure
Isentropic density-Mach relation
Isentropic pressure-Mach relation
Isentropic Temp-Mach relation
Isothermal Gas Layer Press-Elevation Relation
Kinematic Viscosity
Laminar b.l. displacement thickness
Laminar b.l. momentum thickness
Laminar b.l. thickness
Laminar BL Friction Drag Coeffi
Laminar BL Local Friction Coeff
Lewis
Lift Coefficient
Linear Thermal Expansion
Mach
Newtons Viscosity Law
Nusselt
Peclet heat Xfer
Peclet Mass Xfer
Prandtl
Pressure Coefficient
Reynolds
Roughness Ratio
Schmidt
Sherwood
Specific Heat Ratio

Hydraulic Engineering

BHP Req. to Pump any Fluid
Centrifugal Pump Head
Concrete Pipe (Gravity Flow Through Pipe)
Discharge From Open Horizontal Pipes
Discharge Time between Communicating Vessels
Flow Rate of Steam
Flow Rate of Water
Fluid Pressure on a Piston
Friction Head Loss in Pipes
Full Flow in Round Pipes
Horse Power
Hydraulic Flow Through Tubes
Hydraulic Systems
Ind. Waste Water Flow Rates (Parshall Flume)
Ind. Waste Water Flow Rates (Rectangular Weirs)
Ind. Waste Water Flow Rates (Triangular Weirs)
Liq. Vol. in Conical Bott. Vessels (Liq. Depth>Cone Depth)
Liquid Vol. in Conical Bottomed Vessels
Min. Req. Flow through Pumps
Pipe Size Requirements (For Dia. Of Pipe)
Pressure Loss Through Valves
Pumping Cost (Ductile Iron pipe)
Relative Capacities of Pipes
Reynolds Number and Laminar Flow Speed
Speed of an Actuator
Tank Capacity, Surface Area and Metal Wt.
Tank Overflow and Vent Nozzle Sizes
Time Req. to Empty a Cone (Rounded Orifice)
Time Req. to Empty a Cone (Sharp Edged Orifice)
Time Req. to Empty a Cone (Short Flush-Mounted Tube)
Time Req. to Empty a Horiz. Cyl. (Rounded Orifice)
Time Req. to Empty a Horiz. Cyl. (Sharp Edged Orifice)
Time Req. to Empty a Horiz. Cyl. (Short Flush-Mounted Tube)
Time Req. to Empty a Sphere (Rounded Orifice)
Time Req. to Empty a Sphere (Sharp Edged Orifice)
Time Req. to Empty a Sphere (Short Flush-

Speed of Sound
Stanton
Strouhal
Sutherlands Equation
Temp Ratio
Tensile Pipe Stress
Tensile Stress in Spherical Vessel
Transitional BL Friction Drag Coefficient
Weber

Machine Design

Bridge Brakes
Capacities of Apron and Pan Conveyors
Capacity of Flat Belt
Capacity of Troughed Belts
Convert Belt Speed into RPM
Conveyor Capacity of a Screw Conveyor
Developed Length of Pipe Bends
Discharge Angle for Belt Leaving Pulley
Force on Chain or Belt
Gear Outside Diameter
Gravity Roller Capacity
Helical Gear Forces
HP of a Screw Conveyor
Length of a Helix
Length of a Spiral
Power Requirements in Turning
Presswork Force for Bending Material
Sizing Drive Pulleys Driven Pulley Speed
Sizing Drive Pulleys Driven Pulley Speed
Sizing Drive Pulleys Pitch Dia.
Sizing Drive Pulleys Speed
Spiral Wire Weight
Three Gear Drives
V-Belt Length
Worm Lead

Mathematical

Area of a Circle
Area of a Fillet
Area of a Parabola
Area of a Parallelogram
Area of a Rectangle
Area of a Square
Area of a Trapezium

Mounted Tube)
Time Req. to Empty a Vert. Cyl. (Rounded Orifice)
Time Req. to Empty a Vert. Cyl. (Sharp Edged Orifice)
Time Req. to Empty a Vert. Cyl. (Short Flush-Mounted Tube)
Torque
Vertical Pipe Discharge
Water Flow
Work and Power

Mechanical Engineering

Angular Motion
Avg Concrete Pipe Weight
Bevel Gear Forces
Blanking (Capacity of Press)
Blanking (material thickness < 0.25)
Capacity of Conical Storage Piles
Capacity of Triangular Storage Piles
Centrifugal force
Centrifugal Tension (Belt Or Chain)
Classical Kinetic Energy
Curling Punches for Rivets
Damped Sinusoidal Motion
Drums and Reels (Completely Filled)
Drums and Reels (Partially Filled)
Earth's Escape Velocity
Earths Gravitational Attraction
Estimating Air Consumption
Freq of Conical Pendulum
Frequency of mass-spring oscillator
Frustum of a Cone
Gravitational Free Fall
HeatLoss From Insulated Piping
Hollow Sphere OutsideRadius
Impact Force of Drop Hammer
Inclined plane
Linear Motion
Moment of Inertia
Newton's Second Law
Pipe Setback Length
Power Requirements of Drilling
Power Requirements of Milling
Rect. Duct Circular Equiv
Relativistic Energy
Sheet Metal Bend Allowance
SheetMetal BendAllowance(Radius < 2 * thickness)

Area of an Ellipse (0.12
Area of an Ellipse (0.36
Area of an Triangle
Calculate Dia. of Circle,Given side of a square
Calculate side of a square ,Given Dia. of Circle
Hollow Circle Sector
Quadratic Equation
Trigonometric Functions
Vol of a Cone
Vol of a Cube
Vol of a Cylinder
Vol of a Pyramid
Vol of a sphere
Vol of a Sphere Segment
Vol of a Torus
Vol of Annulus
Vol of Triangular Prism

Pipe Flow

Darcy Equation
Darcy pipe flow
Flow from Side Orifice of a Tank
Flow Over a Rectangular Weir
Flow Over a Triangular Weir
Flow Under a Sluice Gate
Fluid flow with friction
Hagen-Poiseuille Equation
HeadLoss in Sudden Pipe Expansion
Laminar pipe flow friction factor
NPSH
Pipe Discharge
Pressure Drop
Swamee-Jain Equation

Pneumatic Engineering

Air Compressor Input Power (Eff 50 %)
Air Cylinder Cushioning
Air Receiver Sizing
Air Valve Sizing, Cv
Pneumatic Valve Sizing, CV Method
Valve CV, Gases

SheetMetal BendAllowance(Radius >= 2 * thickness)
Simple Harmonic Motion
Speed
Sphere weight reduction by drilling a hole
Tonnage Req. for Dbl Right Angle Bends
Tubing Wall Thickness(Barlow's)
Tubing Wall Thickness(Clavarino's)
U-Bent Tubes Min. Allowable Thickness
Universal Gravitation
Velocity and Time (Freely Falling Body)
Volume
Volume and Surface Area of a Circular Ring
Volume and Weight of Pipe Insulation
Weight
Weight of Round Tubing

Thermodynamics

Antoine Vapor Pressure
Black Body Radiation
Celsius-to-Kelvin conversion
Coeff of Performance
Efficiency of Carnot Cycle
Energy Conversion Efficiency
Enthalpy
Enthalpy-temp relation
Entropy of Liquid-Vapor Mixture
Entropy-temp-pressure relation
Entropy-temp-volume relation
Entropy-volume-pressure relation
Exergy
Flow Work
Gibbs Free Energy
Internal energy-temperature relation
Isentropic Efficiency
Liquid-Vapor Mixture (Enthalpy)
Liquid-Vapor Mixture (Internal Energy)
Liquid-Vapor Mixture (Specific Vol.)
Perfect gas isentropic transformation
Perfect gas isobaric transformation
Perfect gas isochoric transformation
Perfect gas isothermal transformation
Perfect gas law

Pulp and Paper

Bond's Correlation - WaterVapor Pressure in Paper
Conversion Efficiency
Dewatering Ratio
Drying Rate
Permeability Coeff
Permeability Factor
Pressing Equation
Reduced Time
Residence Time
Unsteady-state Integration Constant
Unsteady-state solution
WaterVapor Pressure in Paper - Moisture < 0.07
WaterVapor Pressure in Paper - Moisture > 0.07

Structural Engineering

Average Pipe Weight
Cantilever with End Load
Cantilever with End Moment
Cantilever with Intermediate Load (x<a)
Cantilever with Triangular Load Distribution
Cantilever with Uniform Load Distribution
Mixed Support with Uniform Load
Mixed Supported with Intermediate Load (x <=a)
Mixed Supported with Intermediate Load (x >a)
React., Mom, Defl for Cantilever (load at free end)
React., Mom, Defl for Cantilever (uniform Load)
React., Mom, Defl for fixed beam (conc. center load)
React., Mom, Defl for fixed beam (uniform load)
React., Mom, Defl for one end fixed beam (uniform load)
React., Mom, Defl for supported beam (center load)
React., Mom, Defl for supported beam (uniform load)
Simply Supported with Center Load(x <= L/2)

Perfect gas polytropic transformation	
Plancks Spectral Distribution Law	
Pressure	
Specific HeatCapacity Relationship	
Thermal Capacity	
Van der Waals	
Wiens displacement law	

Simply Supported with Center Load(x > L/2)
Simply Supported with Two Equidistant Loads(a < x <= L-a)
Simply Supported with Two Equidistant Loads(x<=a)
Simply Supported with Two Equidistant Loads(x>L-a)
Simply Supported With Uniform Load Distribution
Torsion Bars(Steel Torsion)
Torsional Stress on a Shaft

2.2 List of Property Tables:

Electrical Properties Table

IEC Frame Dimensions-AC Motors
IEC vs. NEMA Frame Comparison
Motor Ampere Rating
NEMA Standard Frame size For AC Motors
NEMA Starter Sizes For AC Motors
Ohm's Law
Properties Of Bare Aluminum Wire(Met)
Properties Of Bare Aluminum Wire(US)
Properties Of Bare Copper Wire(Met)
Properties Of Bare Aluminum Wire(US)
Resistor Color Codes
Three – Phase AC Motors
Three – Phase AC Motors – 50 Hz

HVAC Properties Table

Air Flow Through DN Pipe-Pressure Drop
Air Flow Through Schedule 40 Pipe
Clean Room Standard – BS- 5259
Clean Room Standard – FS- 209 - D
Clean Room Standard – FS- 209 - E

Structural Properties Table

Association Channels(AI)
Association I (AI)-Beams
Std. Channels(AI) (Met)
Std. Channels(AI) (US)
Std. W(AI) - Beams
Steel Channels (Met)
Steel Channels (US)
Steel I – Beams (S Section) (Met)
Steel I – Beams (S Section) (US)
Steel I – Beams (W Section) (Met)
Steel I – Beams (W Section) (US)

Material Properties Table

Aluminum Temper Designation
Box Nails
Coefficient of Fiction
Common Nails – Ring Barb Shank
Common Nails – Smooth Shank
Cryogen Data
Dielectric Constants

Natural Gas Flow through SCH 40 Pipe-Properties of Air	Emissivity (Typical Values)
	Fishing Nails
Properties Of Saturated Steam Liquid	Fuel Gases
Saturation Properties Of Water Liquid	Galvanic List(Sea Water)
	Index of Refraction
Saturation Properties Of Water Vapor	Mechanical Properties Metals (Met)
Saturation Properties Of Water vapor	Mechanical Properties Metals (US)
	Mechanical Properties Non Metals (Met)
Solar radiation Data	Mechanical Properties Non Metals (US)
Std. Atmosphere Table (Met)	
Std Atmosphere Table (US)	NPS to BSP Pipe Size Comparison
Vapor Pressure-Auto AC Type (Met)	NPS to DN Pipe Size Comparison
	O-Ring Standard Sizes
Vapor Pressure-Auto AC Type (US)	Periodic Chart
Vapor Pressure-Centrifugal AC Type (Met)	Physical Properties – Metals(US)
	Plastic Properties (Met)
Vapor Pressure-Centrifugal AC Type (US)	Plastic Properties (US)
Vapor Pressure – R-12 Type(Met)	Roofing Nails – Ring Barb Shank
Vapor Pressure – R-12 Type(US)	Roofing Nails – Smooth Shank
Vapor Pressure – R-22 Type(Met)	
Vapor Pressure – R-22 Type(US)	Standard Sheet Gauges (Met)
Vapor Pressure – R-502 Type(Met)	Standard Sheet Gauges M
Vapor Pressure – R-502 Type(US)	Standard Wire Gauges (Met)
Vapor Pressure – Ultra Low Temp(Met)	Standard Wire Gauges M
Vapor Pressure –Ultra Low Temp(US)	Thermal Conductivity
	Thermal Properties – Gases(Met)

Mechanical Properties Table	Thermal Properties – Gases(US)
Drill Sizes	Thermal Properties – Liquids(Met)
Fiber Ropes-Braided(Met)	Thermal Properties – Liquids(US)
Fiber Ropes-Braided(US)	Thermal Properties – Metals(Met)
Fiber Ropes-Twisted(Met)	Thermal Properties – Metals(US)
Fiber Ropes-Twisted(US)	Thermal Properties – Non Metallic Solids(Met)
Key and Keyways	Thermal Properties –Non Metallic Solids(US)
Roller Chain Dimensions – e	
Roller Chain Dimensions – m	
Sleeve Bearing PV Limits	
Typical Breaking Strength of 6*19 Wire	
Wire Ropes 6*19 Fiber Core –IPS	
Wire Ropes 6*37 Fiber Core-IPS	
Wire Ropes 6*37 IWRC-XIPS	
Wire Ropes 6*37 IWRC-XXIPS	
Wire Ropes 8*19 Spin Resistant-Fiber Core	
Wood Screw Pilot Holes	

Property Tables

Sample 1: Mechanical Properties Metals (Met)

Select Material and Type from the drop down list.

Sample 2: Periodic Chart
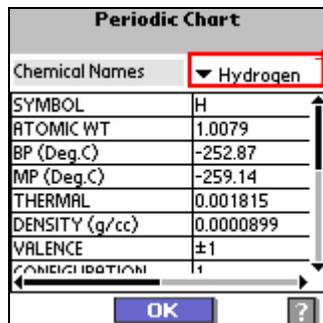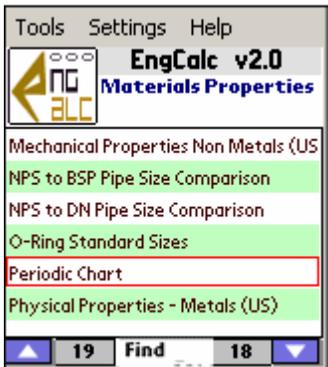
Select Chemical Names from the dropdown list

Sample 3: Plastic Properties
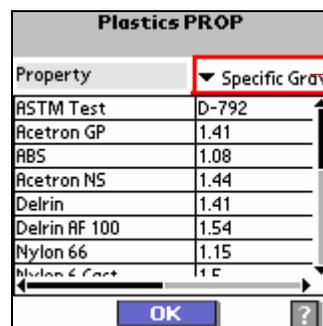
Select Property from the drop down list

Sample 4: Galvanic List
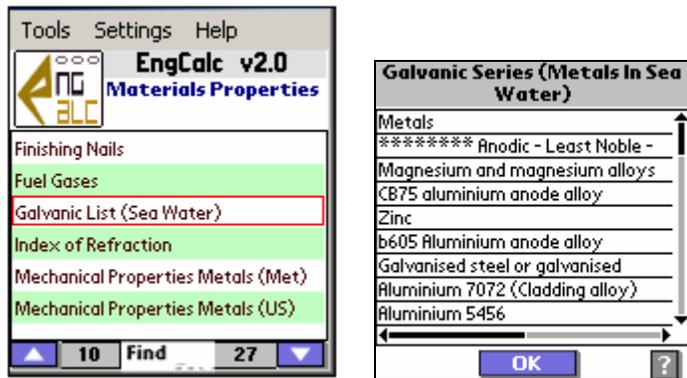
2.3 To Start with Calculator Functions:

- ➤ The Calculator consists of Inputs and Outputs.
- ➤ For E.g.: Name of the Calculator: Area of a circle.

Inputs: Radius (in)

Outputs: Circumference (in), Area
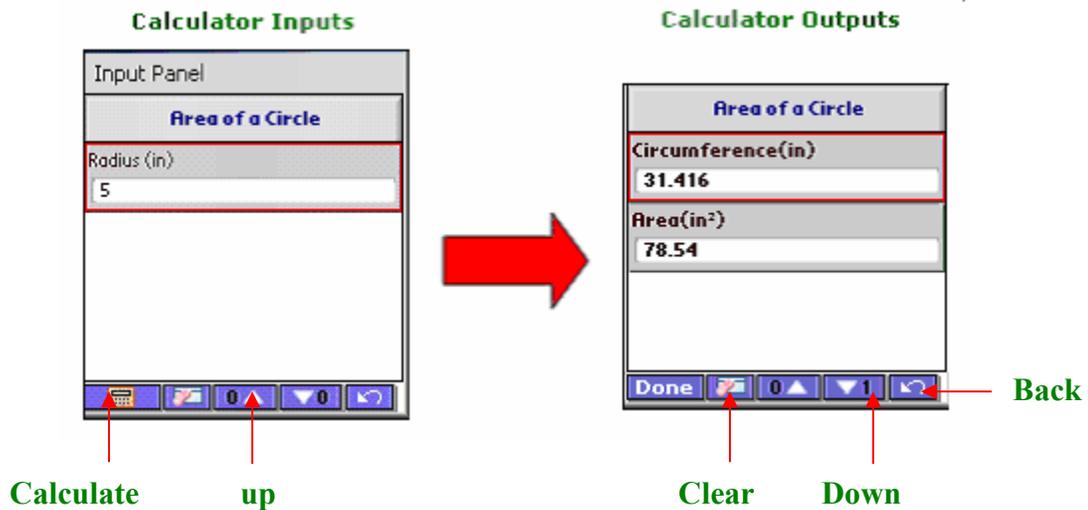
- ➤ After entering values in the Inputs, Tap on **Calculate** 🖩 button at the bottom of the screen, the output will be displayed.
- ➤ By Tapping on **Back** button, you will get the previous form.
- ➤ Tap on **up and down arrow** button to move up and down.
- ➤ Tap **Clear** to clear values.
- ➤ Tap on **Done** to return to the main screen.

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3. Input Panel:

➢ The inputs Panel will pop-up as soon as you tap the input Area. You can see the complete input at the top of the screen.
➢ It is used to enter values for inputs; the Input Panel is a very smartly designed Number Pad.
➢ Tap on any Input Box and tap on any number pad item to enter the data
➢ You can also hide the input panel.
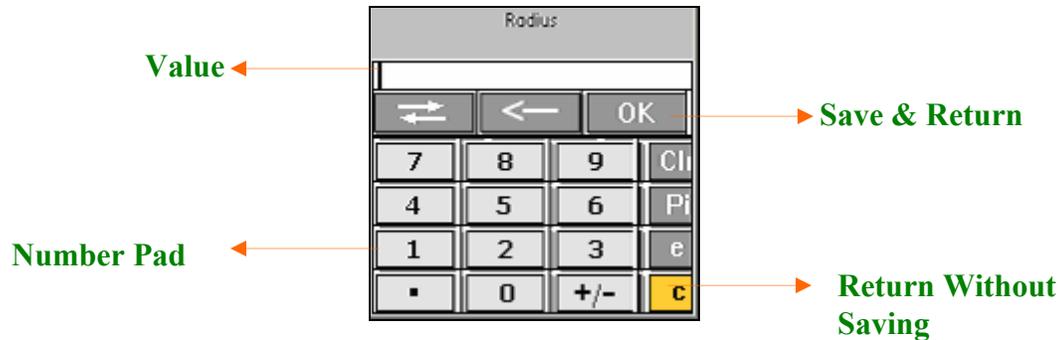
4. In-place Unit Converter:

You can now convert units with the help of In-place unit converter utility which is strongly integrated with calculator in a manner by which you can enter the inputs in the Unit you have acquired the value. This is useful at the time of changing between **US units-Metric units without changing the preferences**. To select the Unit tap on the button highlighted in the fig. given below. Before tapping on the conversion button you will need to enter the value in the Inputs Box

> For example if you have the acquired the value in Centimeters & the Inputs requires in Inches, in such case enter the Values Acquired then you need to select Centimeters from the list of Units that you see after tapping on the Conversion button
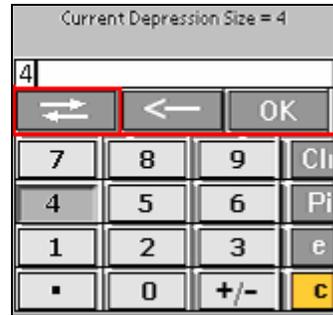
Tap here to load the In-place Unit Converter

> If you want to calculate the input entered in the given textbox with another unit, Tap to get In-place Unit Converter as shown in the figure.
> After clicking In-place Unit Converter you will get the screen as below,
> Select the unit in which you want to convert.

5. Preferences:

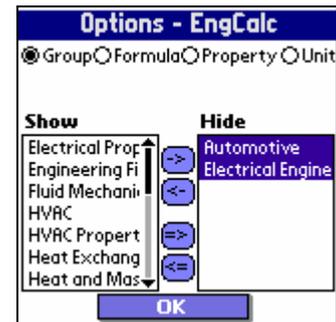## 5.1 Customize

You can hide the Groups or properties.
- ➢ Select an option from top of the screen. Selecting a Group or Property will display the Formulas or Units respectively
- ➢ Select items from the list (**multiple selection supported**) and then tap on ' - >' Button to hide or '< - ' Button to show. Tapping on '=>'   Button will make all the items in the Left list Hidden and tapping on '<=' Button will make all the items in the Right list Visible

Note: Properties and Groups marked, as Hidden will not be displayed in the List

The options module allows you to hide/show items in the list of Groups, Properties, and Formulas & Units. The items which are very rarely used can be hidden. Those items which are marked as hidden are not populated in the list and hence making the list short and easy to scroll.

Following are the steps for Hiding/Showing any Group or Property:-
- ➢ Select an option from top of the screen. This will load the lists with visible items (**left**) and Hidden items (**right**).
- ➢ Select items from the list (**multiple selection supported**), then tap on'->' Button to hide or '<-' Button to show. Tapping on '=>' Button will make all the items in the Left list Hidden and tapping on '<=' Button will make all the items in the Right list Visible
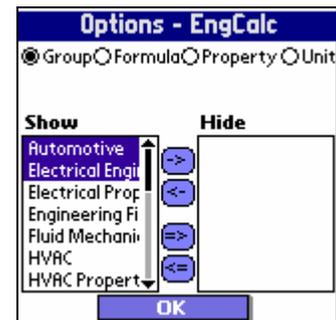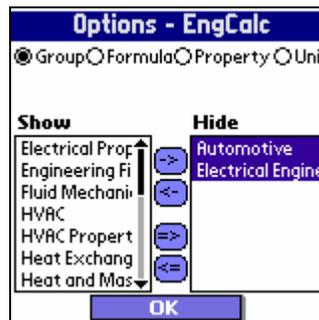
Following are the steps for Hiding/Showing any Formula or Unit:-
- ➢ Select an option from top of the screen. Selecting a Group or Property will display the Formulas or Units respectively.
- ➢ Select items from the list (**multiple selection supported**), then tap on '->' Button to hide or '<-' Button to show. Tapping on '=>' Button will make all the items in the Left list Hidden and

Note: Properties and Groups marked as Hidden will not be displayed in the List.


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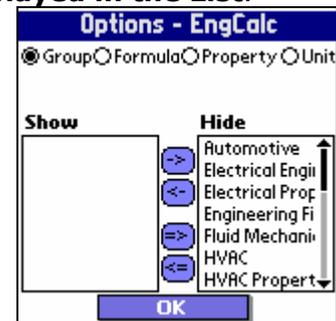
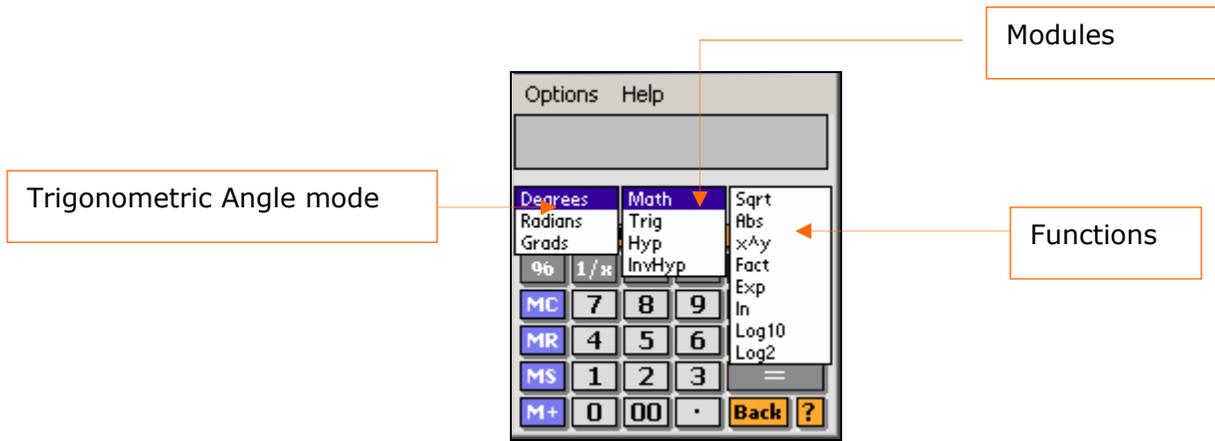tapping on '<=' Button will make all the items in the Right list Visible
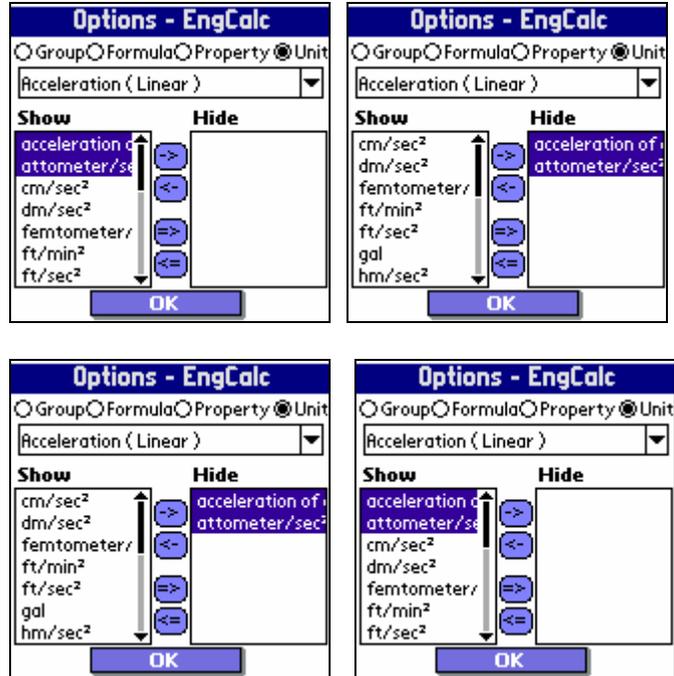
5.2 Settings

- ➢ Tap On **Settings** in Menu bar.
- ➢ Select **Preferences**
- ➢ Select **US unit** or **Metric unit** standard. This will become the units standard across all the calculators
- ➢ You can also change the units from the calculator with the help of In Place unit conversion which is discussed in this document in a separate topic.
- ➢ Select Numeric Display from the drop down list. 3 modes are there. Fix, Scientific and Normal
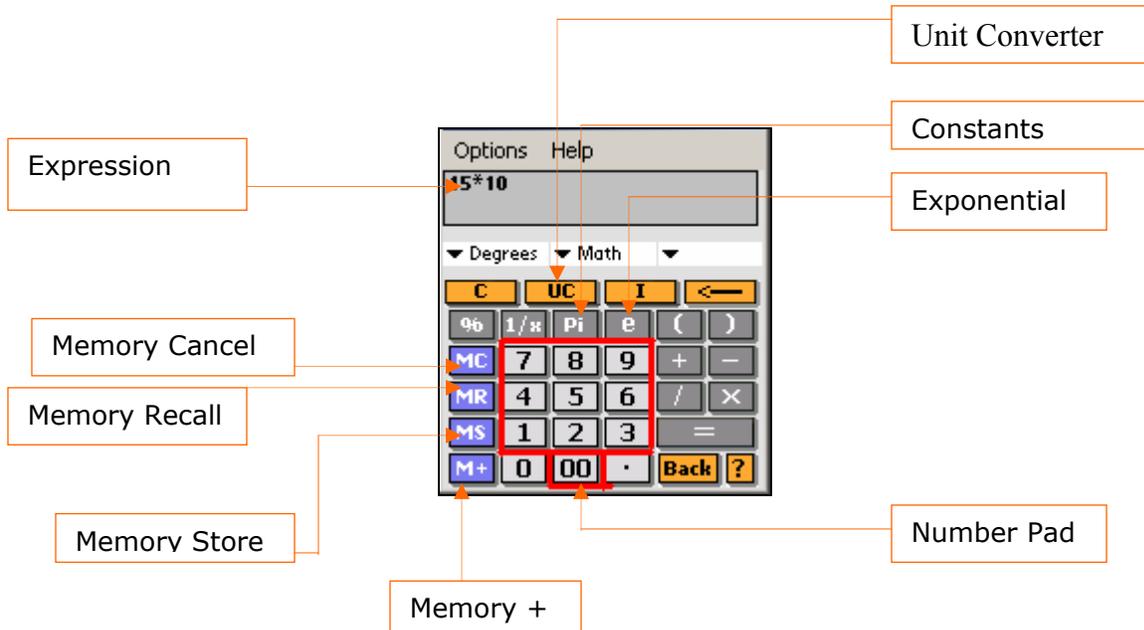- ➢ Select the Decimal Places.
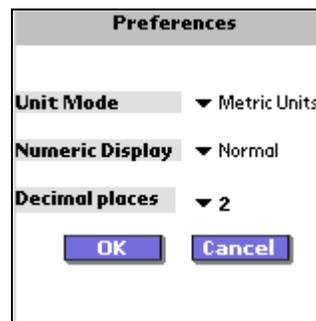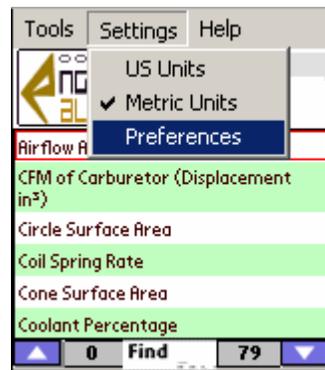
6. MxCalc

- ➢ To load the MxCalc go to Menu -> Tools -> MxCalc.
- ➢ The different Calculation Modes are Degree mode, Radians mode and Grade mode.
- ➢ Tap on Functions Menu and it will display the list of Mathematic Category, Trigonometric Category, Hyperbolic Category and Inverse Hyperbolic Category.
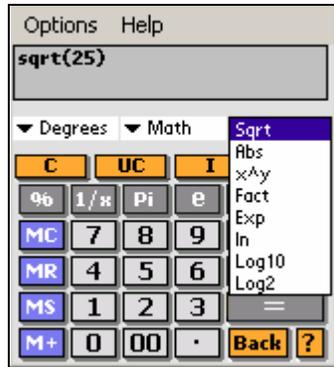
Modules

Trigonometric Angle mode

Functions

General Usage

Unit Converter

Constants

Exponential

Expression

Memory Cancel

Memory Recall

Memory Store

Memory +

Number Pad

6.1 Supported Functions:

6.1.1 Mathematical Functions:

- ➢ Select **Math**
- ➢ **1/x** - Returns the inverse of a number.
- ➢ **Sqrt**- Returns the square root of number
- ➢ **Exp** – Returns e to the power of the number.
- ➢ **ln** - Returns the logarithm of a number to the natural base 'e'.
- ➢ **log10** - Returns the logarithm of a number to the base 10.
- ➢ **log2** - Returns the logarithm of a number to the base 2.
- ➢ **%**- Returns Percentage.
- ➢ **X^y –** Returns the yth power of the number.

6.1.2 Trigonometric Functions:
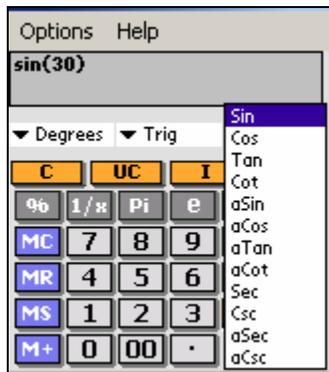
- ➢ Select **Trig.**
- ➢ **Sin** - Returns the sine of the given angle.
- ➢ **Cos** - Returns the cosine of the given angle
- ➢ **Tan** - Returns the tangent of the given angle.
- ➢ **Cot** – Returns the cotangent of the given angle.
- ➢ **Sec** – Returns the secant of the given angle.
- ➢ **Cosec** – Returns the cosecant of the given angle.
- ➢ **asin** - Returns the arcsine of the given number.
- ➢ **acos** - Returns the inverse hyperbolic cosine of any real number. Number must be Greater than or equal to 1. The inverse hyperbolic cosine is the value whose Hyperbolic cosine is number, so ACOSH(COSH(number)) equals number.
- ➢ **atan** - Returns the arctangent of a number. The arctangent is the angle whose tangent is number.
- ➢ **acot** - Returns the arccotangent of a number. The arccotangent is the angle whose tangent is number.
- ➢ **asec** – Returns the arcsecant of the given angle.
- ➢ **acosec**- Returns the arccosecant of the given angle.

6.1.3 Hyperbolic Functions:
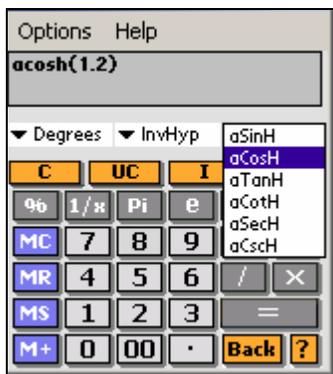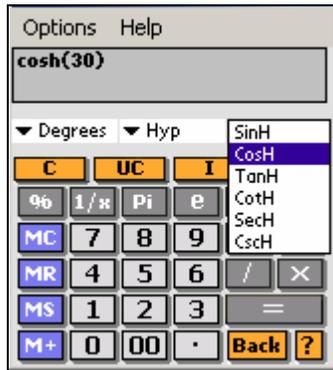
- ➢ Tap on **Hyp**
- ➢ **sinh** - Returns the hyperbolic sine of a real number.
- ➢ **cosh** - Returns the hyperbolic cosine of a real number
- ➢ **tanh** - Returns the hyperbolic tangent of a real number
- ➢ **Sech**– Returns the hyperbolic secant of the given angle.
- ➢ **cosech** – Returns the hyperbolic cosecant of the given angle.
- ➢ **coth**-Returns the cotangent of the given
- ➢ **asinh** - Returns the inverse hyperbolic sine of a real number. The inverse hyperbolic sine is the value whose hyperbolic sine is number, so ASINH (SINH (number)) equals number.
- ➢ **acosh** - Returns the inverse hyperbolic cosine of a number. Number must be greater than or equal to 1. The inverse hyperbolic cosine is the value whose hyperbolic cosine is number, so ACOSH (COSH (number)) equals number.
- ➢ **atanh** - Returns the inverse hyperbolic tangent of a number. Number must be between - 1 and 1 (excluding - 1 and 1). The inverse hyperbolic tangent is the value whose hyperbolic tangent is number, so ATANH (TANH (number)) equals number.
- ➢ **acot** - Returns the arccotangent of a number. The arccotangent is the angle whose tangent is number.
- ➢ **asec** – Returns the arcsecant of the given angle
- ➢ **acosec**- Returns the arccosecant of the given angle.

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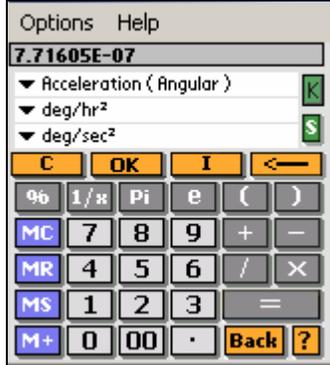
6.2 Unit Converter:

After Swap

➢ Tap on **UC** UC button.
➢ This module of unit converter offers a very comprehensive collection of properties with respective units. A very useful utility to Convert Values from one unit to another. Following are the steps for Converting Values.

➢ Choose a property from the list.
➢ Enter the value and Choose a unit from the 'From Value'
➢ Choose a unit from the 'To Value' and tap Calculate to see the conversion.
➢ You can use the Swap button to swap the value entered in 'From Value' with the value entered in 'To Value'**.** Shown in the figure.
➢ Tap on clear button to clear Input values.

Note: Properties marked as Hidden will not be displayed in the List. Same goes with the Units.

6.2.1 List of Properties:

Absolute Zero	Enthalpy
Acceleration (Angular)	Feed
Acceleration (Linear)	Feet of Pipe
Activation Energy	Flow Rate(Mass)
Angle	Flow Rate(Volume)
Angular Momentum	Force
Area	Force (Body)
Area per unit Volume	Force Per Unit Mass
Boltzmann Constant	Fouling Factor
Charge / Mole	Frequency
Concentration	Fuel Efficiency
Conductivity	Geometric Displacement
Cost of Power	Heat of Combustion
Cp	Heat of Fusion
Cutting Tools	Heat of Vaporization
Data Rate	Heat Transfer Co-efficient
Data Storage	Height
Density	Henry's Law Constant
Depth	Illuminance
Dimensionless	Inductance
Displacement	Integration Constant
Distance	Intensity of Ionizing Radiation
Dynamic Fluidity (1/viscosity)	Kinetic Energy of Turbulence
Electric Dipole Moment	Length
Electric Field Strength	Linear Momentum
Electrical Capacitance	Linear Thermal expansion coefficient
Electrical Charge	Luminance
Electrical Conductivity	Magnetic Field Strength
Electrical Current	Magnetic Flux
Electrical Inductance	Magnetic Flux Density
Electrical Potential	Magnetic Moment
Electrical Resistance	Magnetomotive Force
Electrical Resistivity	Mass
Energy	Mass Density
Energy Flux	Mass Flowrate
Energy per unit Area	Mass Flux
Mass Per Unit Length	Mass Per Unit Area
Mass Transfer Co-efficient	Viscosity (Kinematic)
Molar Concentration	Voltage (emf)
Molar Flow Rate	Voltage Ratio / Frequency
Molar Heat Capacity	Volume
Molecular Weight	Volumetric Calorific Value
Moment of Inertia	Volumetric Coefficient of Expansion
Moment of Inertia (Area)	Volumetric Flow
Momentum	Volumetric Mass Flow rate
Momentum Flow Rate	Wave Number
Momentum Flux	Wavelength of max. Radiation Intensity
Number	Width
Permeability	Work
Permeability Factor	Temperature (Boiling pt. At 1 atm)
Photon Emission Rate	Torque Conversion

Population	Cooking
Power	Butter
Power / Unit Mass	Metric Conversion for Length
Power / Unit Volume	Mass(metric)
Press Impulse	flow rate (mole) conversion
Pressure	Electric Power
Pressure Gradient	Currency
Radioactive Dose	
Radioactive Exposure	
Radioactivity	
Rate of Expenditure	
Slope	
Solid Angle	
Specific Enthalpy	
Specific Gravity	
Specific Heat	
Specific Heat Capacity	
Specific Surface	
Specific Volume	
Speed	
Surface Tension	
Temperature Difference	
Thermal Conductance	
Thermal Conductivity	
Thermal Resistance	
Time	
Torque	
Total Head	
Turbulence Energy Dissipation Rate	
U Value	
Unit Power	
Velocity	
Velocity (Angular)	
Velocity (Linear)	
Viscosity (Dynamic)	
Viscosity (Kinematic)	

7. How to Register……..

Trial version of EngCalc i.e. version 2.0 is available. You can use the trial this version up to 15 uses. After that you will have to register the product. Registration process is simple.

> ➢ Tap on **Help → Register**
> ➢ Enter Serial number.
> ➢ Tap 'Enter Key' button.

> ➢ To register you will need the HotSync ID. You can locate the HotSync ID as shown below in the figure.
> ➢ Select 'Custom' by clicking on the HotSync Icon in the System Tray. In the example given below **'John Cruz'** is the HotSync ID.
> ➢ Enter the key provided with your purchase (or later via email) in the input area below the serial # and tap on **'Enter Key'** button.