

# Steam Turbine Calculations

**Version 2.3.0**

*By Process Ace Software*

## Installation and User Guide



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or visit our web page at:

<http://www.processacesoftware.com/>

### Product Support

Steam Turbine Calculations comes with free support and updates for the life of the product. We currently offer support via email or through our Yahoo! user-group. We try our best to answer all enquires within 24 hours.

For email support, please contact us at:

[contact@processacesoftware.com](mailto:contact@processacesoftware.com)

Or, join our Yahoo! user-group via the following link:

[http://www.processacesoftware.com/contact\\_process\\_ace\\_software.html](http://www.processacesoftware.com/contact_process_ace_software.html)

**Note that the email address you provided when purchasing the product is the one used to notify you of updates. Contact us if your email address has changed to ensure the accuracy of our client list.**

## INSTALLATION ONTO YOUR Palm OS® DEVICE

### Files:

The following files are included in the download file for both the demo and registered versions and you must HotSync® them onto your PDA for *Steam Turbine Calculations* to work correctly:

- MathLib.prc - Mathlib version 1.1
- NSBRuntime.prc - NS Basic Runtime version 4.1.2 (NOTE: This program requires version 4.1.2 or later to function properly)
- NSBSystemLib version 2.01 – Shared library for cut, copy, paste and undo commands (WARNING: Using an earlier version of NSBSystemLib will cause fatal errors on Palm Tungsten T3 devices)
- STEAM.prc – Steam properties calculation engine
- Turbine.prc – Steam Turbine Calculations application

### Installation Procedure:

1. Create a file folder then copy all of the files from *TurbineReg.zip* to this new folder.
2. Click the install icon within Palm Desktop, select “Add” then locate the new folder that you created.
3. Add Mathlib, NSBRuntime, NSBSystemLib, STEAM and Turbine to the installation list. Please note that MathLib, STEAM, NSBRuntime and NSBSystemLib **MUST** have “Handheld” specified as the “Install To:” destination. ***Installing MathLib, STEAM, NSBRuntime or NSBSystemLib to an expansion card will cause a fatal error when you attempt to use the application.***
4. After choosing “Done”, press the HotSync® button on your cradle to install the files.
5. An icon labelled *Turbine* will show up in the *All* and *Unfiled* categories.

## **PROGRAM INFORMATION AND LIMITATIONS**

This program has the following limitations:

1. Pressure must be between 0.0061 and 165.37 Bar (0.08865 and 2398.45 PSIA)
2. Temperature must be between 0.01 and 800 Deg. C (32.022 and 1472 Deg. F)

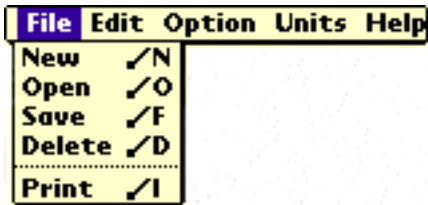
The ability to calculate outside of the above limits would add considerably to the size of the application (STEAM.prc).

## RUNNING THE APPLICATION

### Menu Bar

By tapping the form title at the top of the screen a number of menu selections appear. These are described below.

#### **File**



- New (clears all data to get ready for a new case)
- Open (takes you to a form to select a previously saved case)
- Save (takes you to a form to save your current case)
- Delete (takes you to a form to delete a previously saved case)
- Print (allows you to print your current case to a Bluetooth or IR enabled printer. Note: This requires PalmPrint™ to be installed on your device. PalmPrint™ is available from Stevens Creek Software at [www.stevenscreek.com](http://www.stevenscreek.com) )

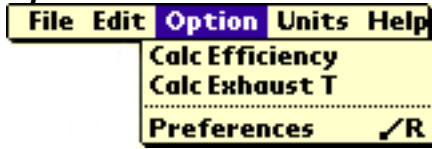
#### **Edit**



The following functions are available using the Edit menu item:

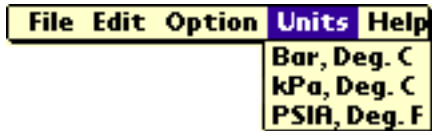
- Undo – undo the last cut or paste operation
- Cut – standard cut operation
- Copy – copy selection
- Paste – paste the “cut” or “copy” selection
- Select All – will select the entire field that currently has the focus (or has been “tapped”)
- Graffiti® Help
- Keyboard (note: must have a flashing cursor in a data entry field for this to work)

### Options



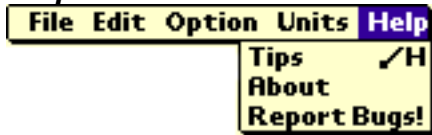
- Calculate Efficiency (enter exhaust temperature)
- Calculate Exhaust Temperature (enter efficiency)
- Preferences
  - Splash screen on or off on startup
  - Enable or disable saving your data on program exit

### Units



- Choose from three different unit slates

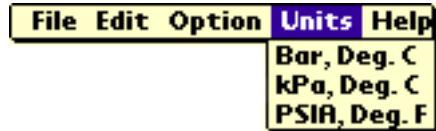
### Help



- Tips (built-in help)
- About
- Report Bugs!

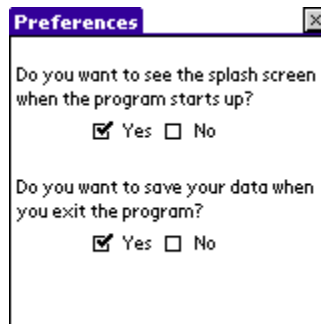
## Initial Program Set-up

If you need to change the default unit set, tap the menu-bar once and select "Units". Select the combination of units that you desire from the drop-down list.



In addition to the above, a Preferences form is provided which allows you to:

1. Enable or disable the splash screen on start-up
2. Enable or disable saving your data on program exit



Tapping the X button at the upper right corner of the screen will return you to the previous form.

Main Form (displayed after program start-up)

From the main form of the application you can calculate:

- The thermodynamic properties of the inlet and exhaust steam
- Turbine efficiency or exhaust temperature (depending on the calculation mode that you have selected)
- Theoretical and actual steam rates (water rates)
- Turbine power or steam consumption (depending on mode)

	Inlet	Exhaust	
Press	650.000	50	PSIA
Temp	700.000	300.634	DegF
SpecVol	0.98355	8.77771	ft <sup>3</sup> /lb
Enthalpy	1348.73	1184.45	BTU/lb
Entropy	1.57754	1.67241	BTU/lbR
Quality	1.00000	1.00000	☺
Eff.	70.00	%	▼ Flow 120000 lb/h
Theo. Rate	10.8421 lb/HP-hr		
Actual Rate	15.4887 lb/HP-hr		
Power	7747.56 BHP		

To change the calculation mode, tap the menu-bar, choose Option then make your selection:

File	Edit	Option	Units	Help
		In	Calc Efficiency	
			Calc Exhaust T	
			Preferences	✓R

	Inlet	Exhaust	
Press	65	50	PSIA
Temp	70	300.634	DegF
SpecVol	0.98355	8.77771	ft <sup>3</sup> /lb
Enthalpy	1348.73	1184.45	BTU/lb
Entropy	1.57754	1.67241	BTU/lbR
Quality	1.00000	1.00000	☺
Eff.	70.00	%	▼ Flow 120000 lb/h
Theo. Rate	10.8421 lb/HP-hr		
Actual Rate	15.4884 lb/HP-hr		
Power	7747.73 BHP		

As shown, there are two calculation modes available, i.e.,

1. Manually enter exhaust temperature and calculate efficiency
2. Manually enter efficiency and calculate exhaust temperature

After choosing a mode and entering your data, tap the CALC button for your calculations to proceed. Results are shown at the bottom of the screen.

### Calculate Power or Steam Flowrate (Optional Entry)

Using the drop-down list-box shown below, select if you want to enter steam flowrate or turbine power.

Steam Turbine Calculator			
	Inlet	Exhaust	
Press	650	50	PSIA
Temp	700	300.634	DegF
SpecVol	0.98355	8.77771	ft <sup>3</sup> /lb
Enthalpy	1348.73	1184.45	BTU/lb
Entropy	1.57754	1.67241	BTU/lbR
Quality	1.00000	1.00000	
Eff.	70.00 %		
		<b>Flow</b>	120000 lb/h
		<b>Power</b>	
Theo. Rate	10.		/HP-hr
Actual Rate	15.4887		lb/HP-hr
Power	7747.56		BHP
			<b>CALC</b>

Once you have made your selection and entered a value, tap the CALC button for your calculations to proceed.

### Saturation Conditions Form

Tap the (more information) button to take you to the Saturation Conditions form shown below:

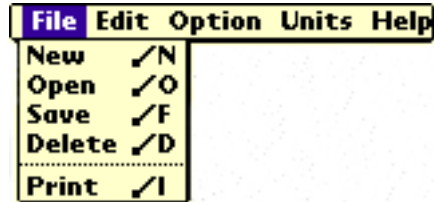
Saturation Conditions		
<b>Inlet Steam</b>		
Inlet temperature	371.111	Deg C
Tsat @ inlet press.	257.161	Deg C
Deg. of superheat	113.950	Deg C
Psat @ inlet temp.	SupHt'd	Bar
<b>Exhaust Steam</b>		
Exhaust temp.	149.241	Deg C
Tsat @ exh press.	138.342	Deg C
Deg. of superheat	10.8987	Deg C
Psat @ exh temp.	4.66389	Bar

This form provides you with details regarding the saturation conditions of the inlet and exhaust steam along with the amount of superheat that is available.

Tapping the menu bar will provide most of the selections found on the main form.

## File Operations

Tapping the menu-bar and selecting File will drop-down a list of file operation choices.

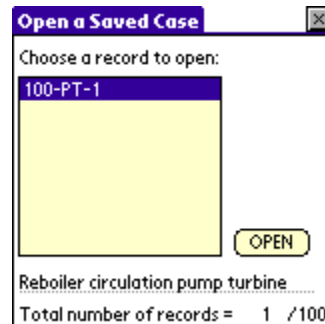


### 1. New

Select New if you would like to clear all entries from the active case (on all forms).

### 2. Open

On the Open a Saved Case form, previously saved cases appear in a list-box.

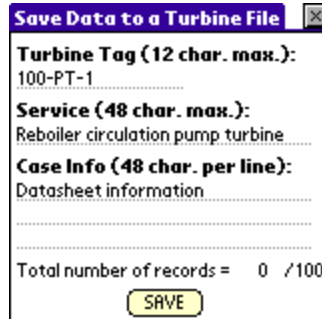


Select the case that you want to load by tapping the tag-name in the list-box. Note that the service description of the highlighted tag-name appears below the list-box.

Once you have selected the desired case, tap the OPEN button. You will be returned to the main form of the program and all data will be over-written with the data from the selected case.

### 3. Save

Using the Save Data to a Turbine File form you can save up to 100 turbine cases.



**Save Data to a Turbine File** [X]

**Turbine Tag (12 char. max.):**  
100-PT-1

**Service (48 char. max.):**  
Reboiler circulation pump turbine

**Case Info (48 char. per line):**  
Datasheet information

.....

.....

.....

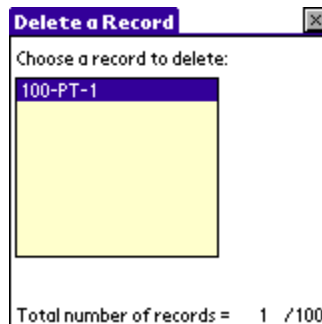
Total number of records = 0 /100

SAVE

In order to save your data to a turbine file, a Turbine Tag (tag-name) must be entered. Optional entries include entering a service description and three lines of case information.

### 4. Delete

Delete any previously saved case using the Delete a Record form.



**Delete a Record** [X]

Choose a record to delete:

100-PT-1

.....

.....

.....

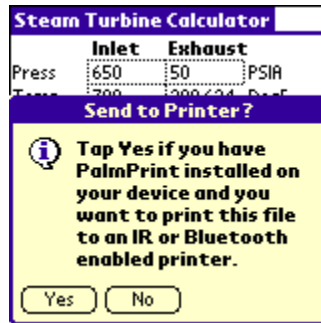
Total number of records = 1 /100

After selecting a record to delete, an alert box will appear asking you to confirm that you want to delete the selected record.

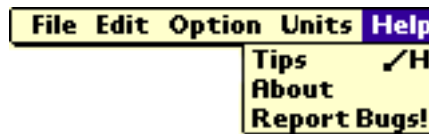
### 5. Print

If you have PalmPrint™ by Stevens Creek Software installed on your device and a Bluetooth or IR enabled printer, you can print out the results of an active case. Please note that Process Ace Software will not provide support for any third party applications such as PalmPrint™.

After tapping Print, an alert box will appear asking you to confirm that your system has been properly configured for printing. After selecting Yes, your data is formatted and sent to the printer.



## Program Help



## Tips

Tapping the menu-bar on each form and selecting Tips from the Help drop-down will take you to a help screen providing tips related to using your current form.

Please Note: A list of frequently asked questions (FAQ) for all of our applications can be found on our website:

[www.processacesoftware.com](http://www.processacesoftware.com)

We also offer free support for all licensed users for the life of the product at:

[contact@processacesoftware.com](mailto:contact@processacesoftware.com)

## About

Tapping About pops up the following information form:



Tap "OK" to return to the program.

## **Graffiti® Shortcuts**

The following menu shortcuts are available for this product:

- /C – Copy
- /D - Delete
- /F - Save
- /G - Graffiti® Help
- /H - Tips (built-in help files)
- /I - Print
- /K - Keyboard
- /N – New
- /O - Open
- /P - Paste
- /R – Preferences
- /S – Select All
- /U - Undo
- /X – Cut

## **Using Hacks on your Palm OS® Device**

Hacks are applications that modify the functionality of the operating system. All of our applications are fully compatible with unmodified Palm OS®. However, if you are running a hack, you may experience problems. If you do, you must disable the hack before running our application.

## Troubleshooting Guide

### Problem

My Tungsten T3 crashes with a “Fatal” error when my device powers down with Steam Turbine Calculations running.

### Solution

Verify that you have NSBSystemLib version 2.01 and NSBRuntime version 4.1.2 installed on your device.

---

I get a “Fatal” error:

- On start-up

or

- When the Splash Screen appears

or

- When I use a menu

These type of errors are due to one of the following:

1. A “hack” (i.e., some third party launcher programs) being installed on your device. These programs modify Palm OS, sometimes with unpredictable results.  
  
Steam Turbine Calculations will work properly with unmodified Palm OS. Disable the hack to verify if this is the problem.
2. NSBRuntime, NSBSystemLib, STEAM or MathLib being installed on a memory card instead of on the handheld itself. These files must be installed **ONLY** on the handheld.

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