Software Applications

FLOCALC™ User Manual

This document is the user manual for working with the KELTON™ Standard Calculation Package FLOCALC™

Contents

1. Revision Control

Rev	Issue date	Description	Prep.	App.
1	Jun 2013	Issued	MH	MH
1.1	Jul 2016	Reformatted	JON	MH
1.2	Jul 2016	Updated images	INB	JON
1.3	Nov 2017	Reformatted	KW	JON
1.4	Sep 2018	Updated in accordance with brand guidelines	KW	JON
2.3	20/05/2025	Updated as per release.	AP	JC

2. Introduction

FLOCALC is the KELTON calculation package designed for flow measurement engineers and technicians. FLOCALC is the fourth generation of this application redesigned to work with current operating systems. FloXL enables FLOCALC calculations to be executed as functions within Microsoft Excel workbooks.

3. Installation

FLOCALC is delivered with an installation manual to guide the installer through the process of installing the application and accessing your licensed calculations. The installation manual is available from the KELTON website here or from the KELTON support team at support@kelton.co.uk.

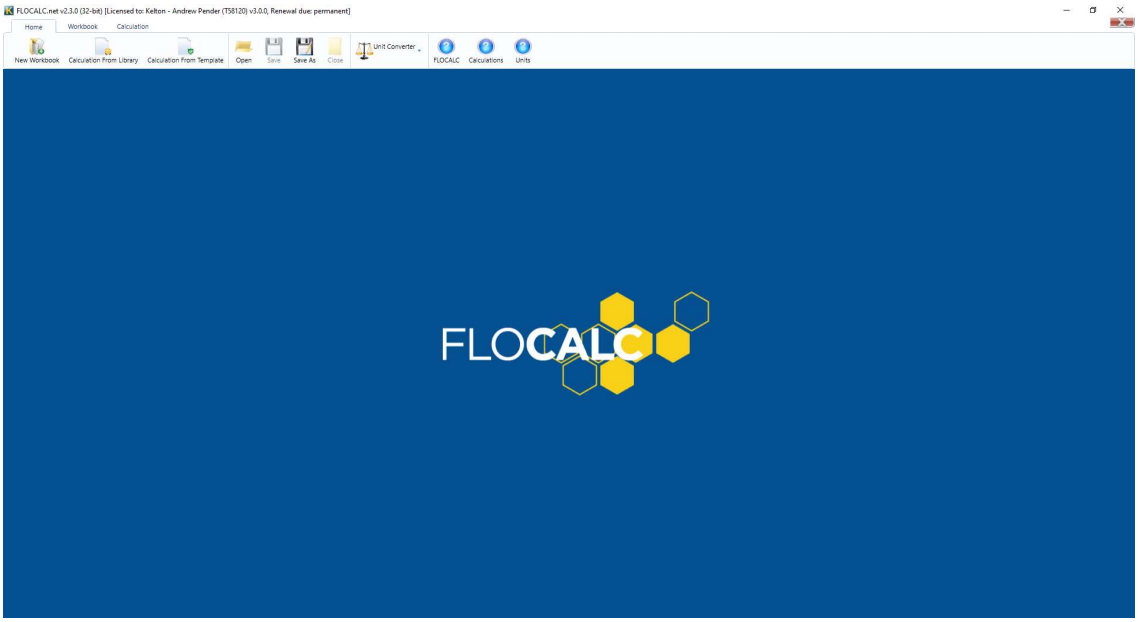
4. Getting Started

4.1. Running FLOCALC

FLOCALC can be started from the Windows start menu located under the KELTON drop-down list. Alternatively, a shortcut to the application is installed on the desktop.

4.2. The FLOCALC Workspace

FLOCALC will open to display the workspace, from which users can access all elements of the application. This workspace features a ribbon with three toolbar options that switch automatically as the application is used.



4.3. The Home Tab Toolbar

This toolbar contains buttons for creating and saving workbooks and calculations along with features such as viewing help files for the application and the unit converter utility.

4.4. The Workbook Tab Toolbar

This toolbar becomes visible when working in a workbook and contains buttons to action associated commands for manipulating workbooks.

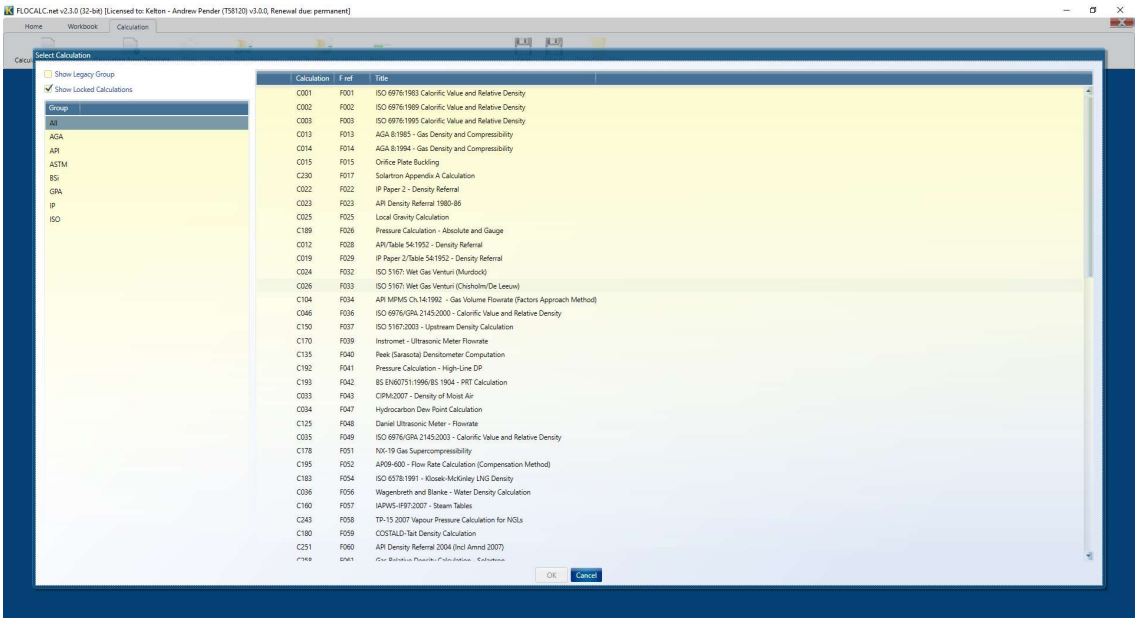
4.5. The Calculation Tab Toolbar

This toolbar becomes visible when working with a calculation and contains buttons to action associated commands.

5. Calculations

5.1. Selecting a Calculation

FLOCALC grants access to the KELTON Common Calculation Library (KCCL), a continuously updated collection of calculations incorporating the latest standards. To select a new calculation, select the Calculation from Library button on the Home toolbar, or use the same option on the Calculation toolbar.



In the KCCL, calculations are identified by a C reference, which serves as the base calculation number used by KELTON for management purposes. In FLOCALC, there is also the F reference which is the FLOCALC specific calculation reference number. Selecting either reference number will sort the calculations in numerical order. Alternatively, selecting the title will sort the calculations alphabetically. Several other options are also available to help find and select the desired calculation.

5.1.1. Group

Calculations are organised by the standard body they associate with. Selecting a standard body group from the left-hand pane will filter the KCCL to display the calculations which belong to that group. Selecting All will show all calculations, excluding those in the Legacy group which are only available in the 32-bit version of the application.

5.1.2. Show Legacy Group

Select this option to display Legacy calculations. These calculations are included in the KCCL to maintain compatibility with those created in previous versions of the application. Most Legacy calculations have been updated to newer versions, which may offer additional options or different calculation methods.

5.1.3. Show Locked Calculations

The KCCL will display all calculations by default. Calculations not included with the purchased license can be hidden by using this checkbox.

5.2. Opening a Calculation

Open a calculation by either double-clicking the desired calculation in the KCCL or by selecting it with one click and pressing OK.

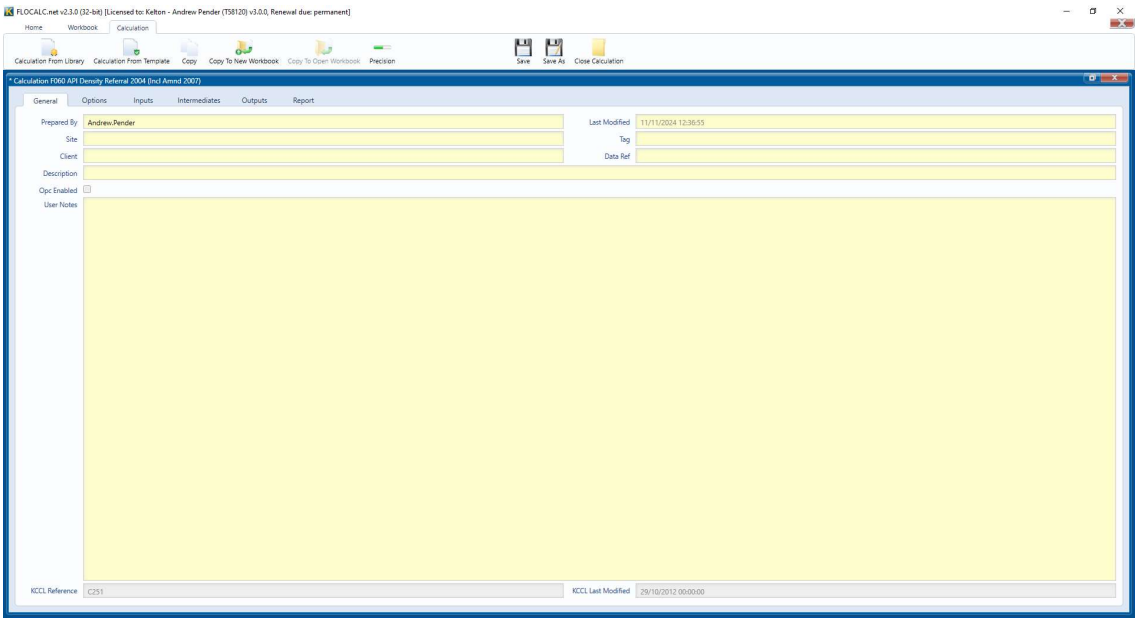
5.3. Executing Calculations

All calculations follow a similar structure and contain most of the following tabs.

5.3.1. General

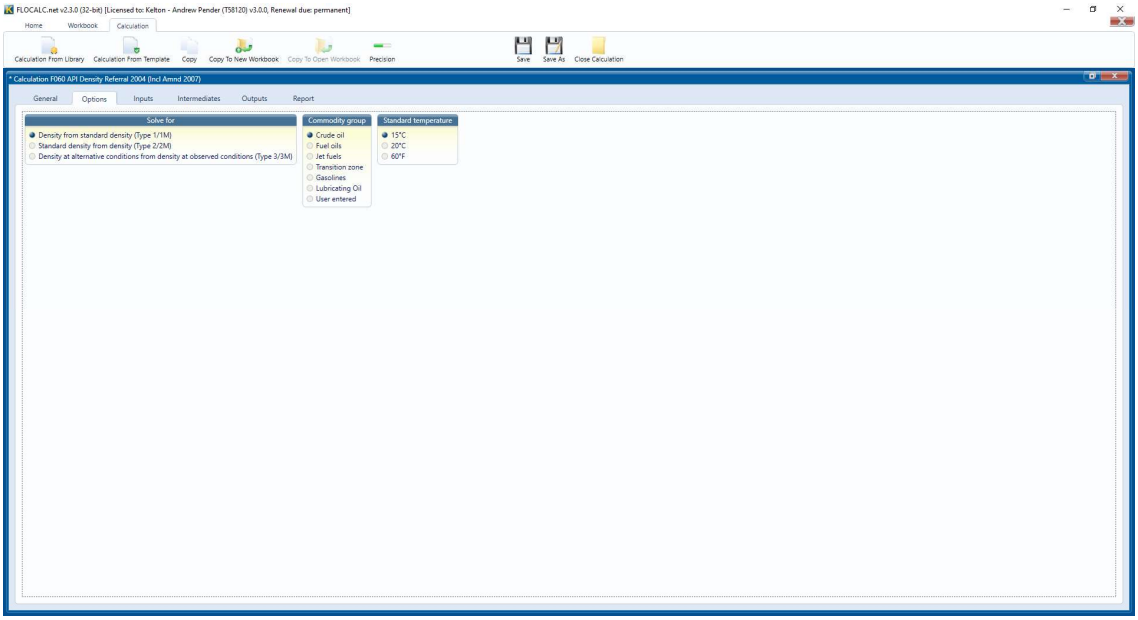
This tab includes header information that can be added to the calculation for traceability. Users can enter details into predefined fields such as Site, Tag, and Client, or add custom notes to provide additional context for the calculation. This is especially useful when saving a calculation report or sharing the calculation with other users.

The date the calculation was last modified, the KCCL reference and the date the calculation was last modified in KCCL is also included on this tab.



5.3.2. Options

This tab contains Options which determine how the calculation is performed and which parameters are required. In this example, users can choose to solve for Standard Density or Density, specify the Commodity Group, and set the Standard Temperature. In some cases, modifying the default options may reveal additional options to further define the inputs required for the calculations.

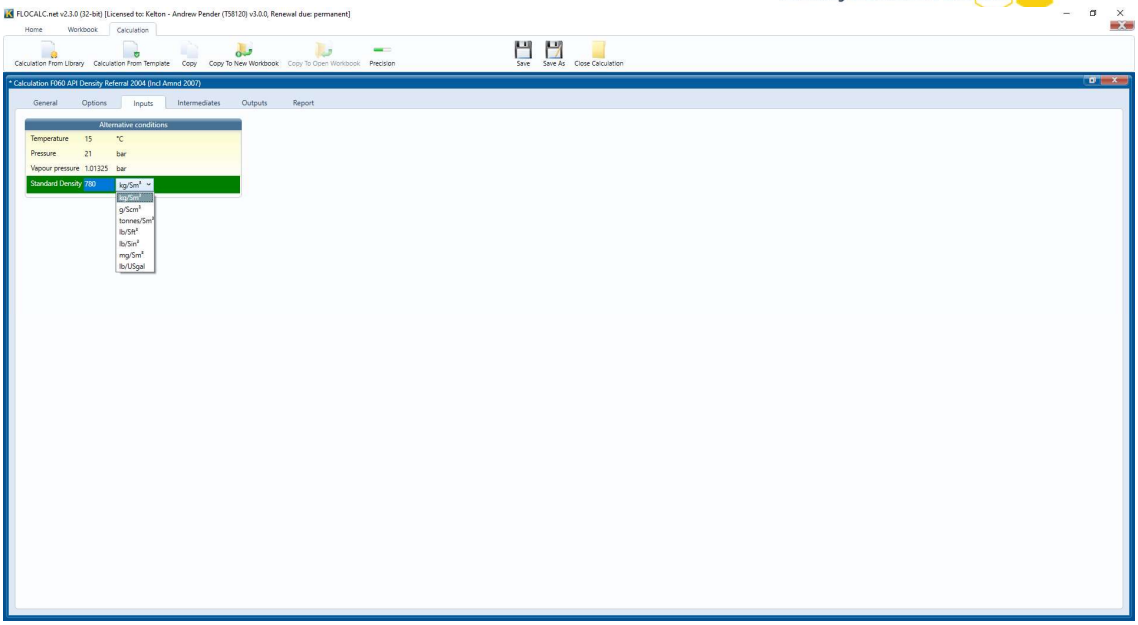


5.3.3. Inputs

This tab provides the Inputs for the calculation defined by the options selected.

The available inputs for a calculation may change based on the selected options. In this example, Standard Density appears as an input because the option to solve for Density from Standard Density was selected. If the option to solve for Standard Density from Density were chosen instead, the input required would be Density.

The engineering unit for each input can be altered by selecting the unit and picking from the drop-down options available.

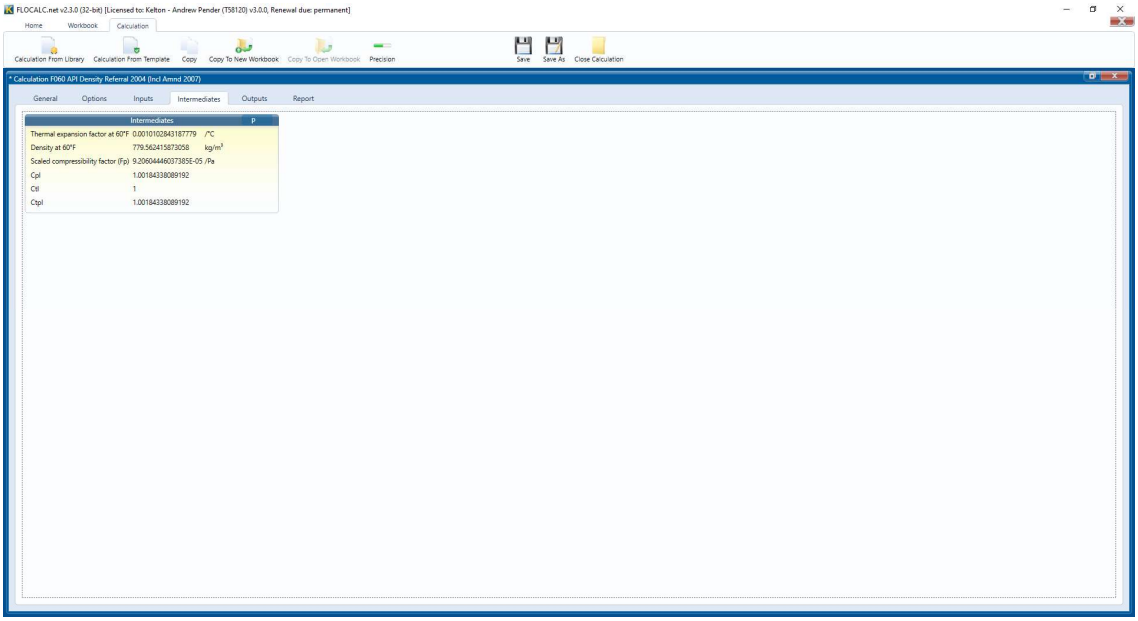


5.4. Constants

This tab defines any constants used in the calculation and appears only when applicable.

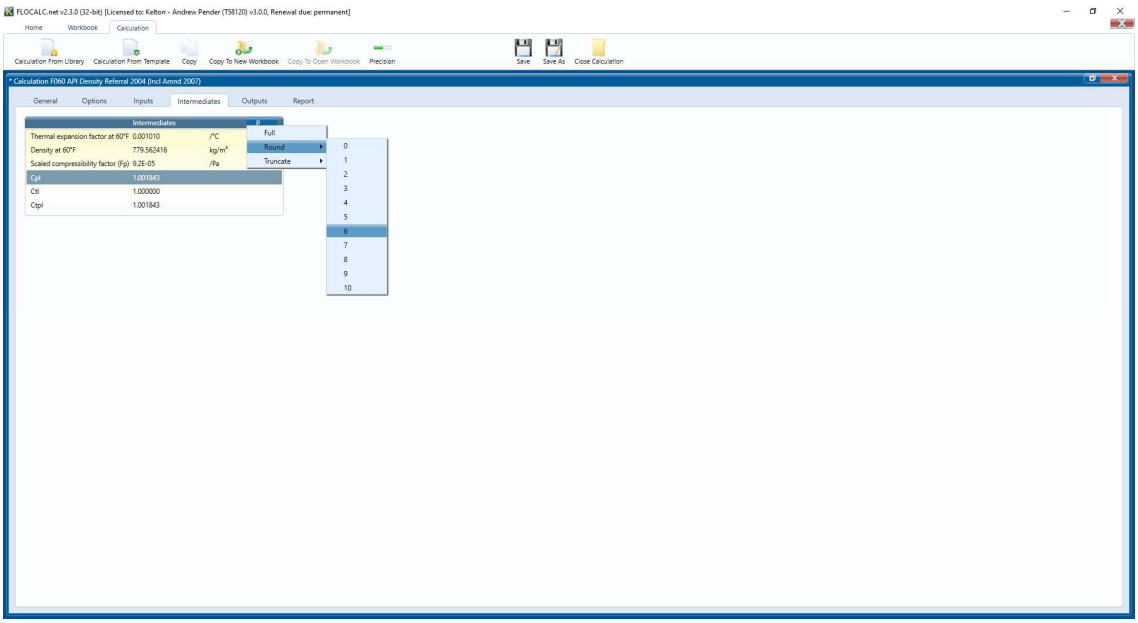
5.5. Intermediates

This tab displays intermediate values generated during the calculation of the required output(s), making it useful for troubleshooting errors or discrepancies.

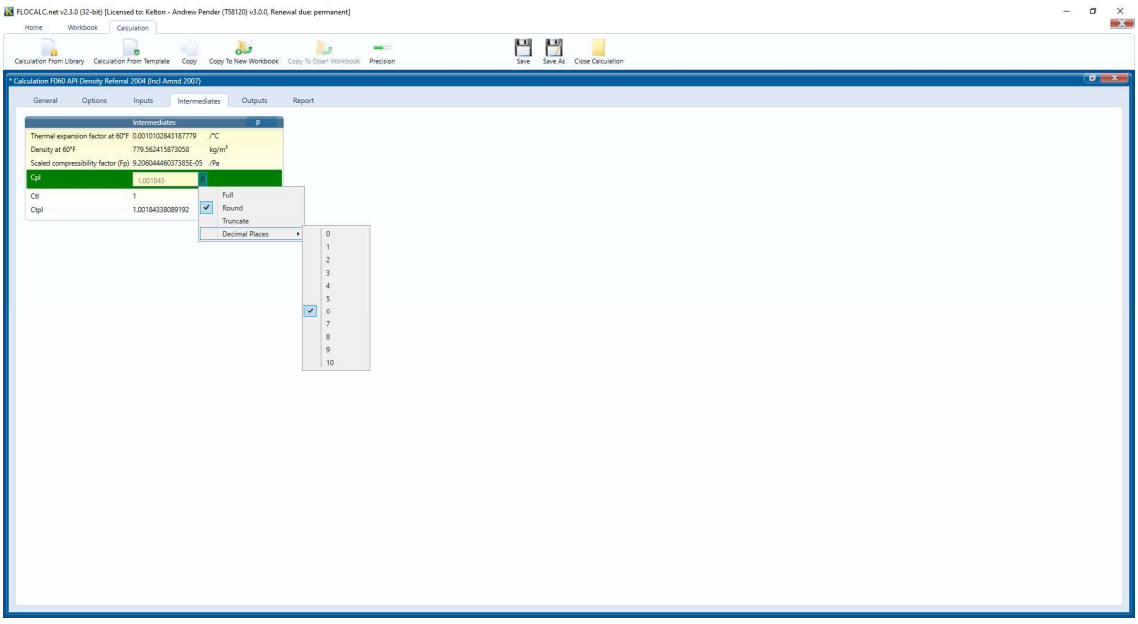


The intermediate results are shown at full precision as default but can be individually or collectively rounded or truncated to a specified number of decimal places.

To round all items in a group to the same precision, select the 'P' in the group header.

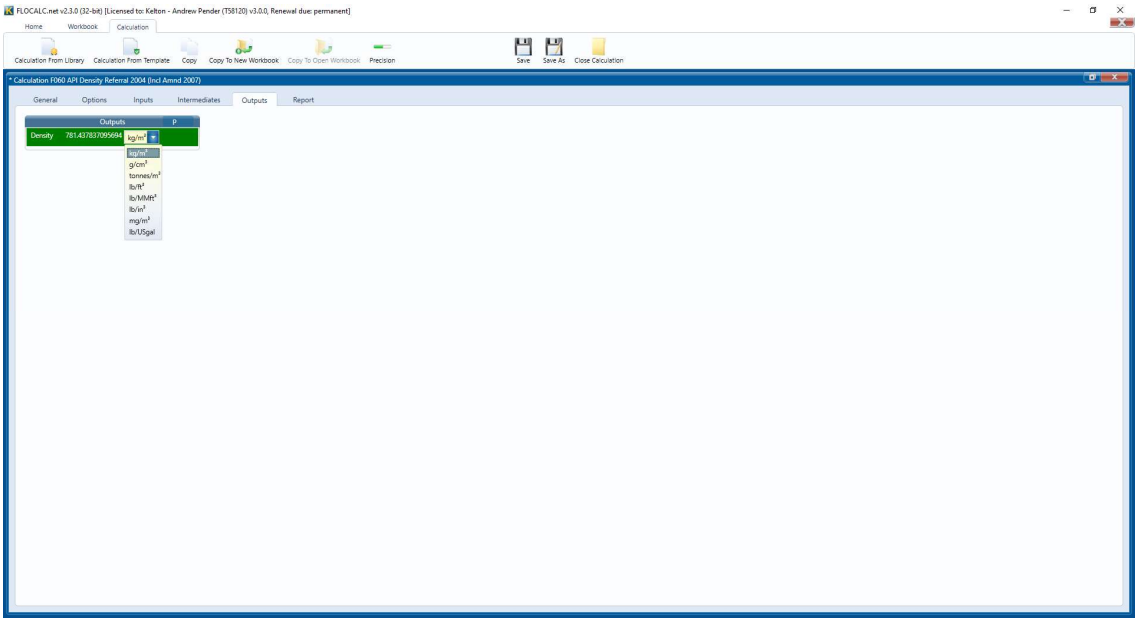


To round individual items to different levels of precision, select the value and select the ‘P’ to the right hand side.



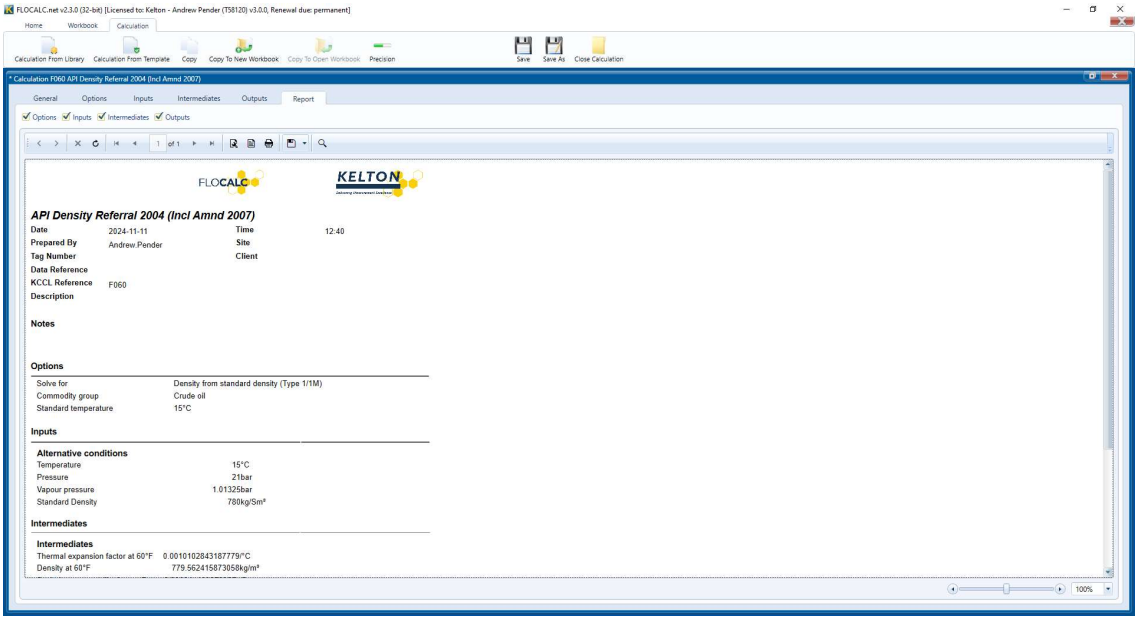
5.6. Outputs

This tab displays in the same way as the Intermediates. Both resolution and engineering units can be selected for intermediates and outputs.



5.7. Report

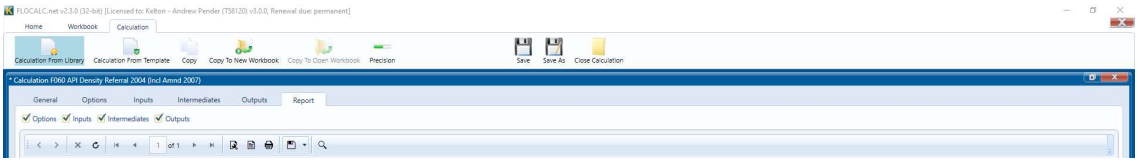
The tab presents the calculation in the form of a report.



5.7.1. Report Options

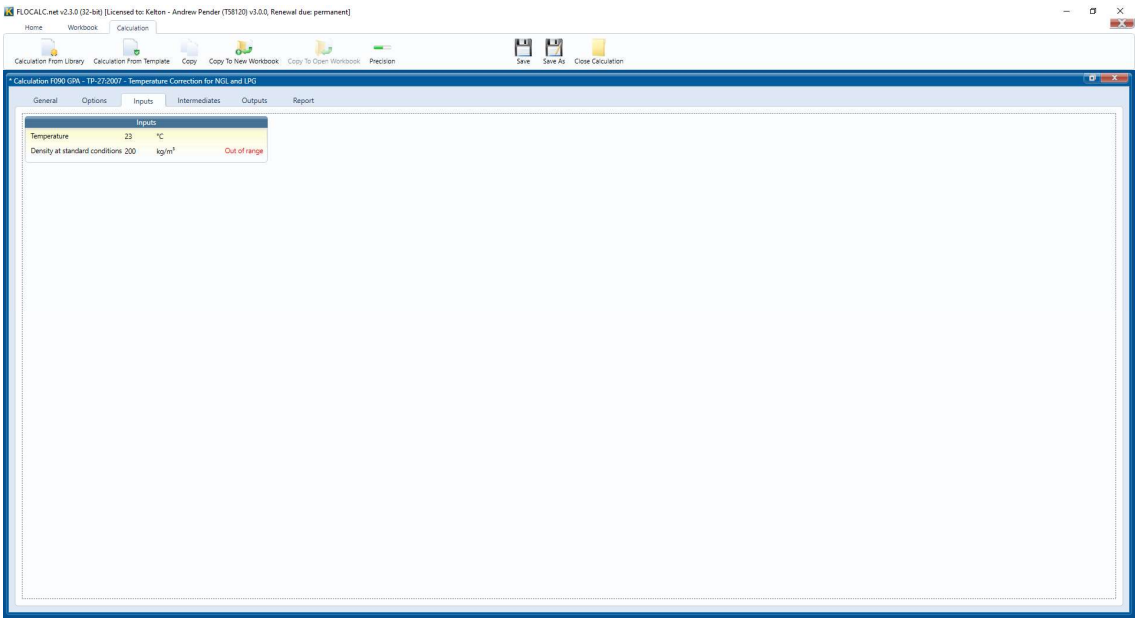
Tailor the report for generation by unchecking the tabs that are not required. All tabs will be included in the initial report preview by default..

The report toolbar contains buttons for navigating between pages, as well as options for printing and exporting the report in various formats.



5.8. Input Warnings

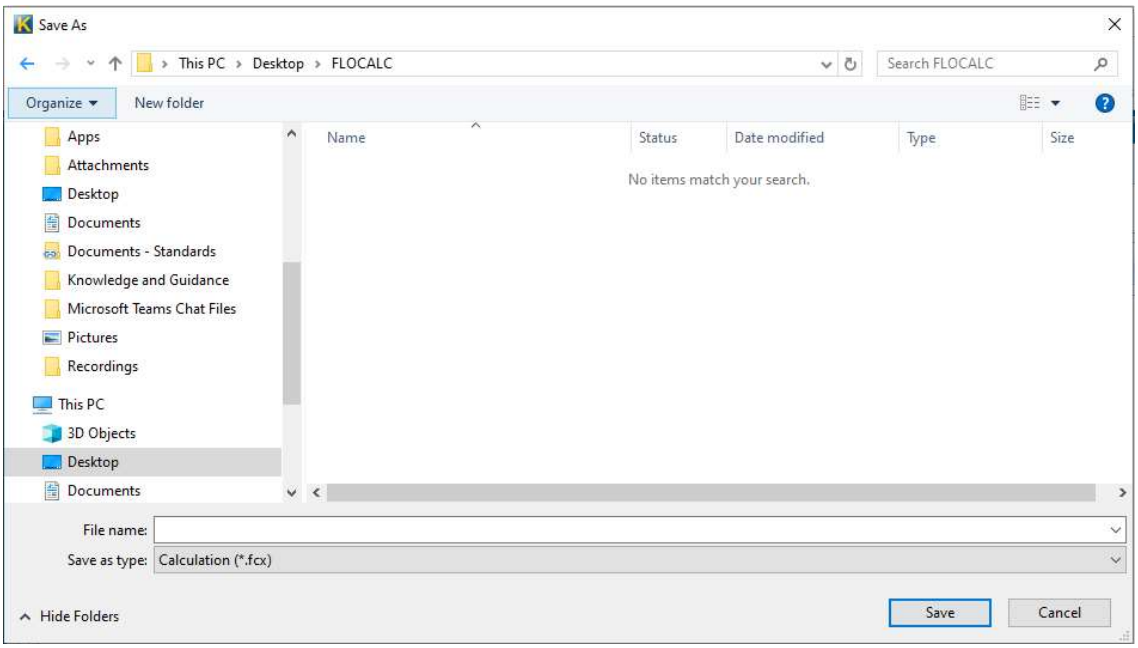
Some calculations include logic which displays warning messages based on the inputs entered. Any warnings will be displayed in red text next to the associated input.



5.9. Saving Calculations

To save a calculation, select the Save button on either the Home or Calculation toolbar. If the calculation has not been saved previously, the Save As button will be available, allowing you to save the file in any location with the .fcx calculation extension.

The Save button will be greyed out if the calculation is already saved, but will become available once the calculation is modified or information is added. An asterisk (*) at the start of the calculation title indicates that the calculation has been changed or edited since it was last saved.



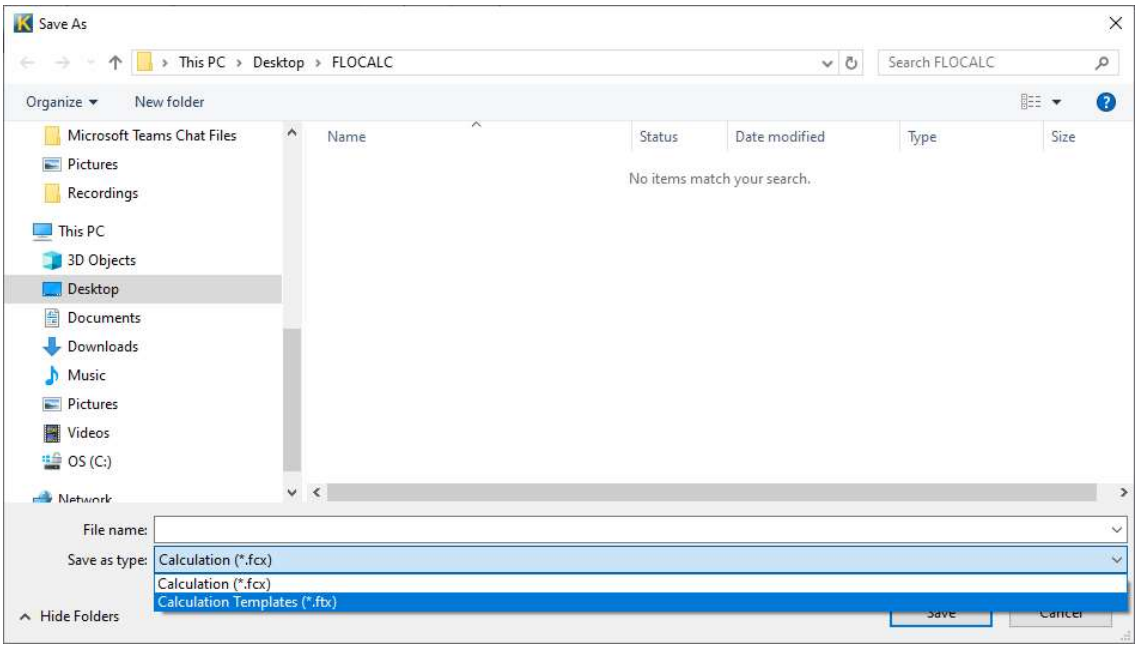
5.10. Opening Calculations

To open a previously saved calculation, select the Open button on the Home tab toolbar or use File Explorer to locate and open the saved file directly.

5.11. Calculation Templates

To create a calculation template, open a calculation and set the required options and units. Then, select the Save As button and save the file as a Calculation Template (*.ftx). The advantage of using a template is that it allows you to generate new calculations each time without altering the template itself.

To create a new calculation from a template, select the Calculation from Template button on the Home Tab Toolbar. The new calculation will appear with an asterisk next to the title, indicating it can be saved. Selecting the Save button will prompt you to save the calculation as a new file, while keeping the template intact.



The advantage of using a template as opposed to saving and editing a calculation file is that a template will create a new calculation each time it is used whilst leaving the template itself intact.

6. Workbooks

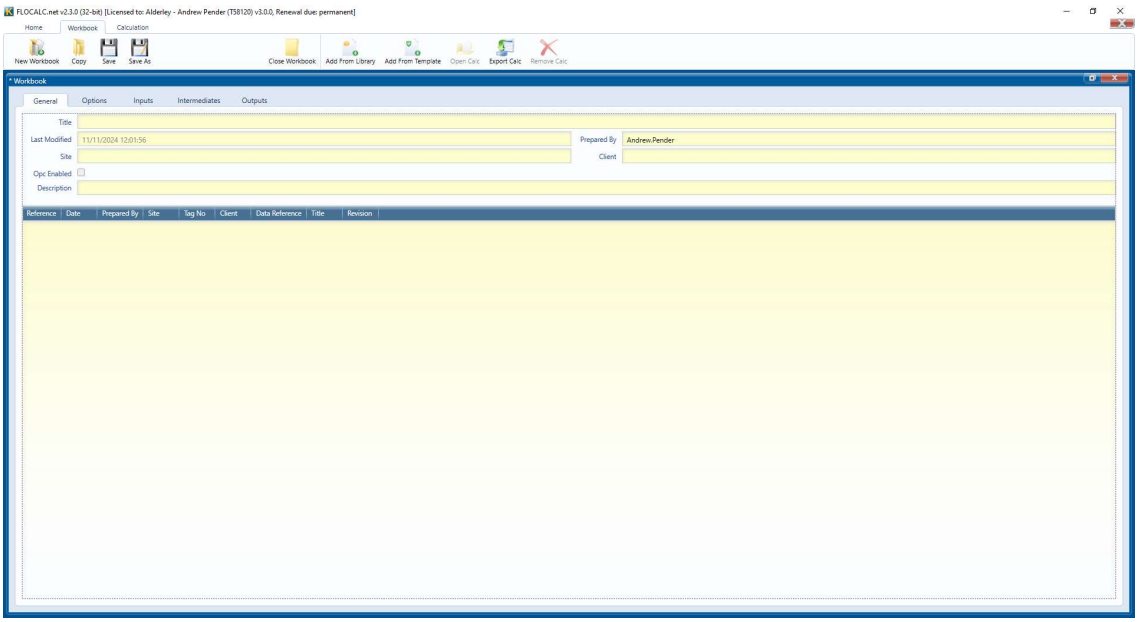
6.1. General

A workbook is a collection of calculations that are saved as one single file. The purpose of a workbook is to keep related calculations together and to enable passing data from one calculation to another or to share inputs.

Note there is no reporting capability with workbooks.

6.2. Creating a New Workbook

To create a workbook select the Workbook button on the Home toolbar or the New Workbook button on the Workbook toolbar. When the new workbook is created the Workbook button will be selected.



Header information can be entered into the Workbook as shown above.

6.2.1. Adding Calculations from the Library

To add a new calculation from the library, select the Add from Library button on the Workbook toolbar. This will open the same calculation selection window as described previously.

6.2.2. Adding Calculations from a Template

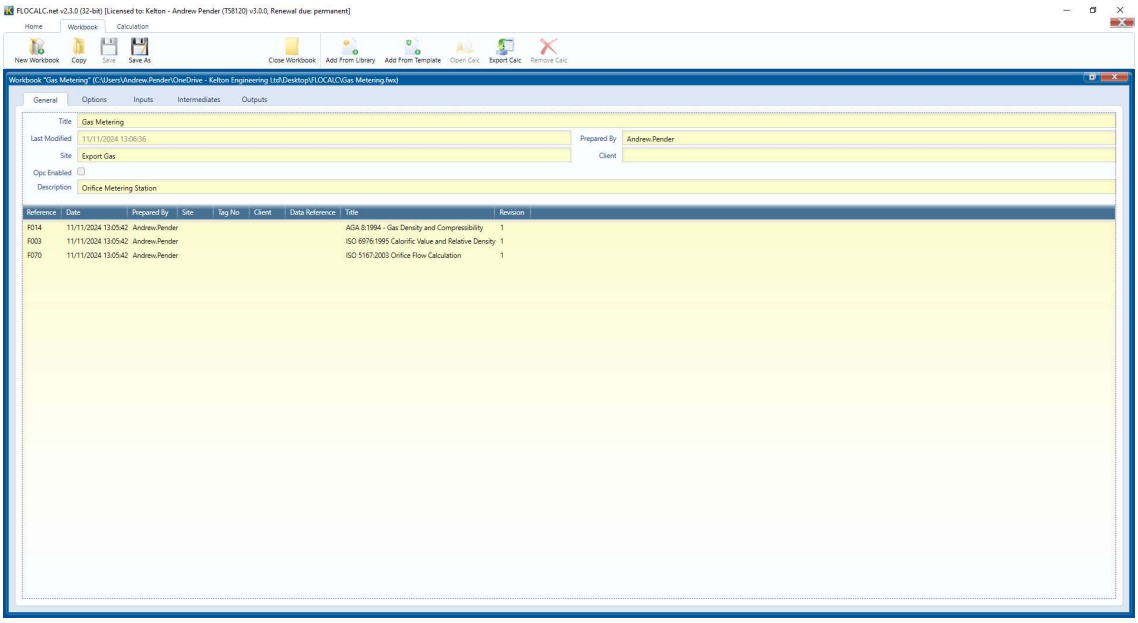
To add a new calculation based on a template, select the Add from Template button on the Workbook toolbar as outline in Chapter 0.

6.2.3. Adding saved Calculations

To import a calculation which has previously been created and saved, open the calculation as shown previously.

6.2.4. Using Workbooks

Once a workbook has been created and calculations have been added they will appear in a list:



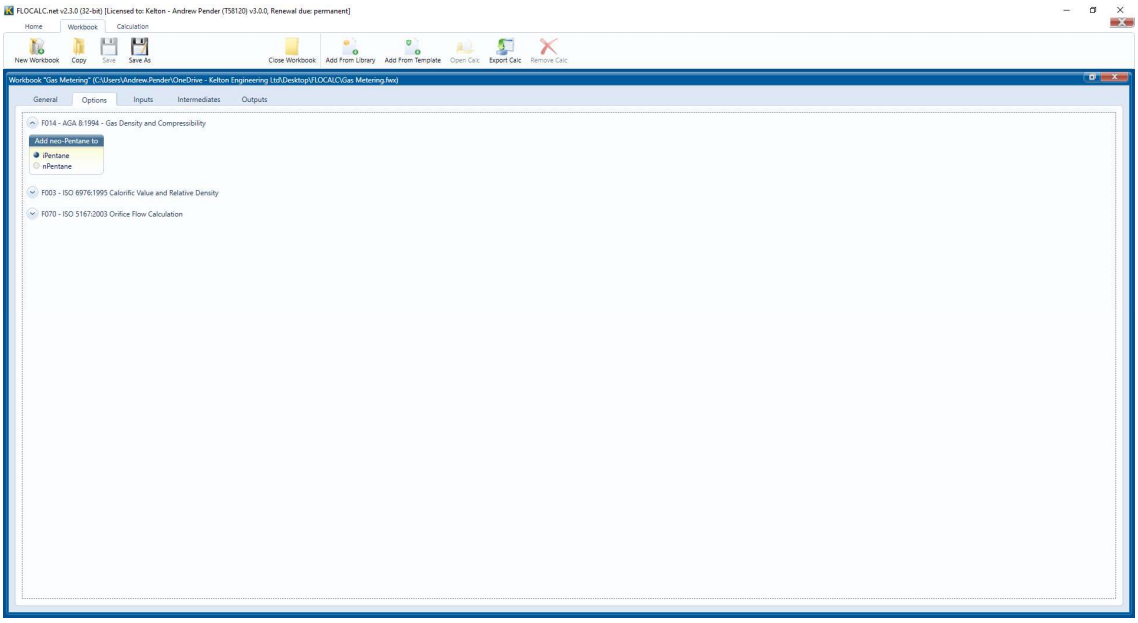
Calculations in the workbook can be opened and used in the same way as stand-alone calculations. Alternatively, the tabs at the top of the window can be used for setting options, entering inputs and viewing results from any calculation.

In this example, a workbook to calculate the mass and energy flow rate through an orifice meter has been created. The flow rate is calculated in accordance with ISO 5167, the density is calculated using AGA 8 and the calorific value is calculated using ISO 6976.

When adding calculations to a workbook the order is significant; calculations can only use values from other calculations if they appear before them in the list.

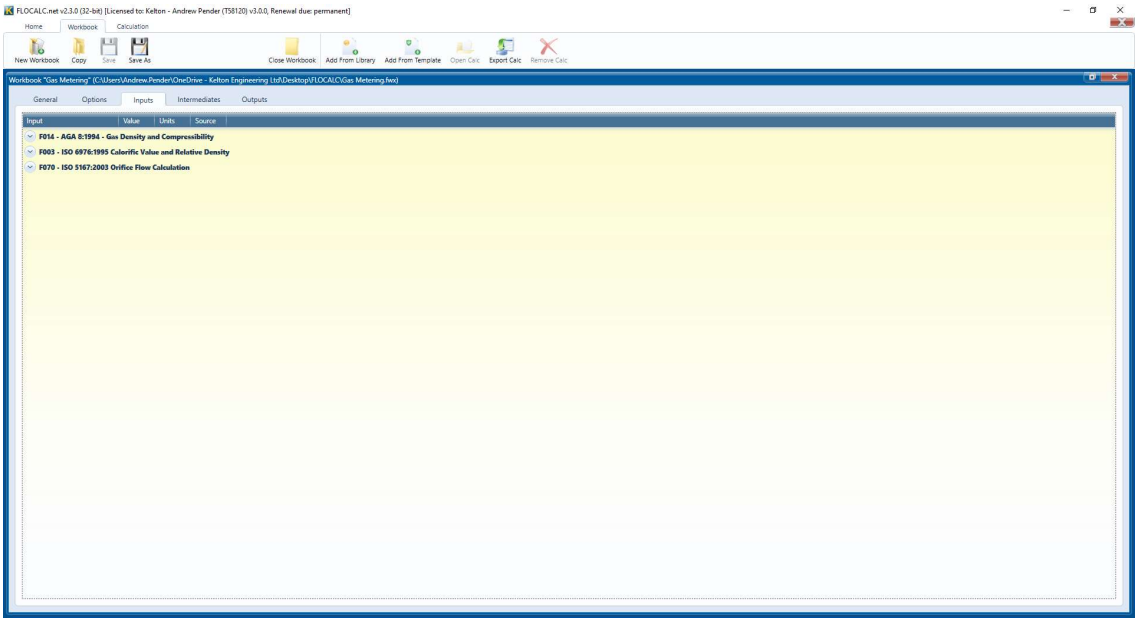
6.2.5. Setting Calculation Options

The Options tab will enable the expansion of each calculation in the workbook and set the options.



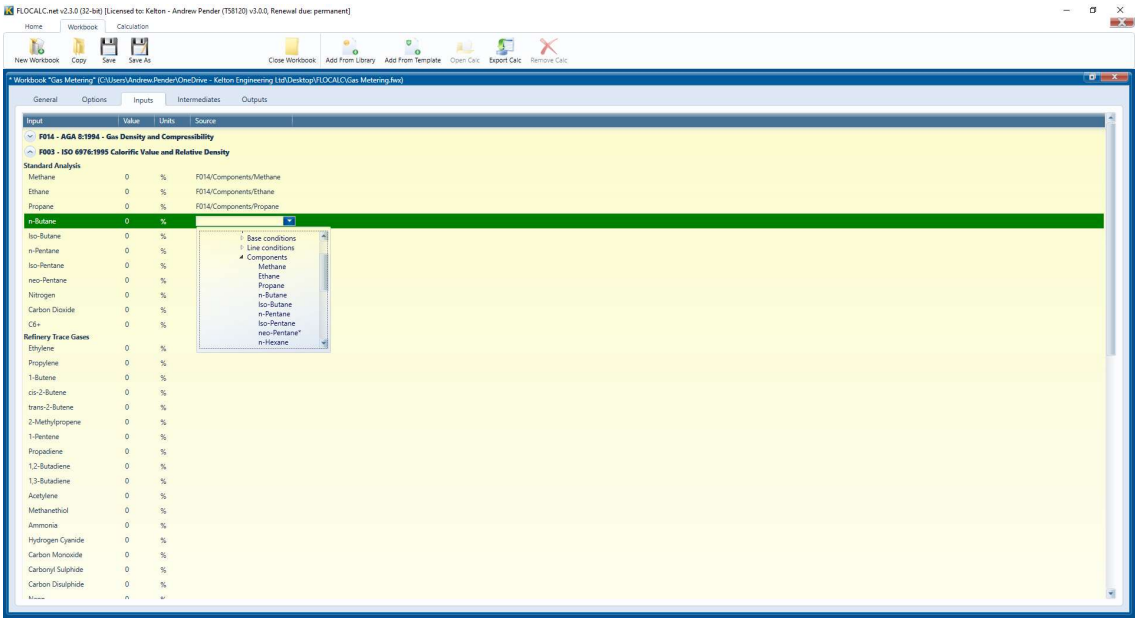
6.2.6. Inputs

The Inputs from for each calculation are grouped and can be expanded by selecting on the arrow to enter the values and select the engineering units.

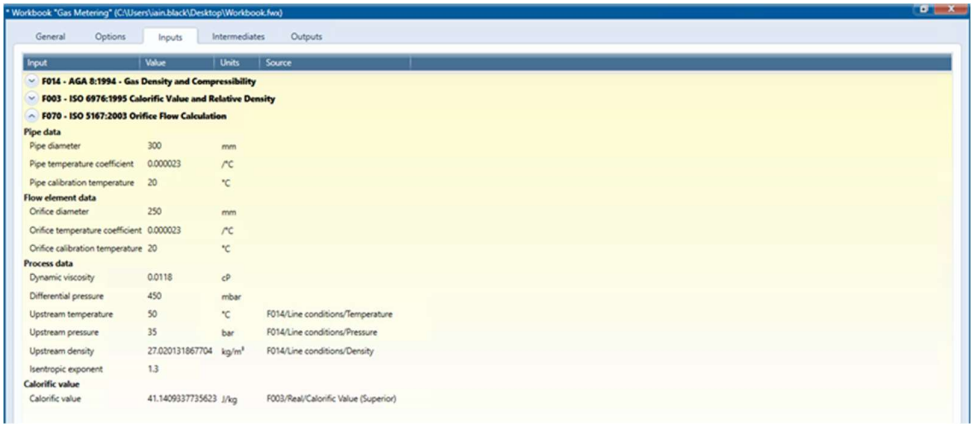


On the first calculation in the list the only option available for inputs is User Entered but on subsequent calculations the inputs may be taken from previous calculations in the list.

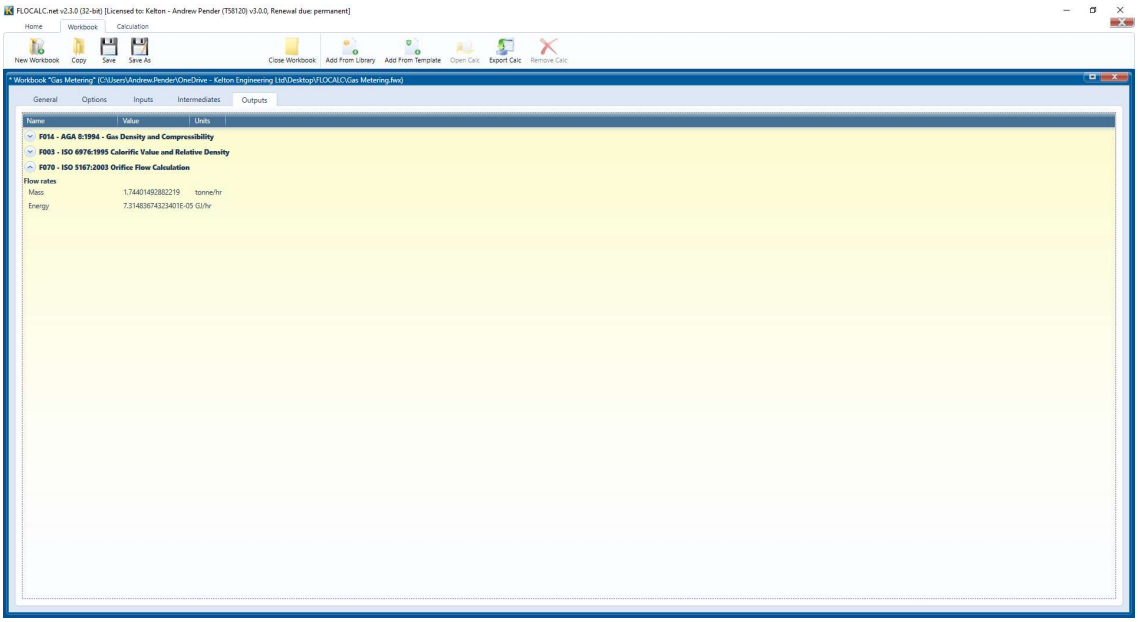
In this example the input composition for F003 is taken to be the same as the input composition for F014 preventing the composition from being entered twice.



The outputs from F014 and F003 are utilised in F070 as inputs. This example shows the input for the line density required to calculate flow being linked to the density calculated by AGA 8.



Intermediate and output values are displayed for each calculation:



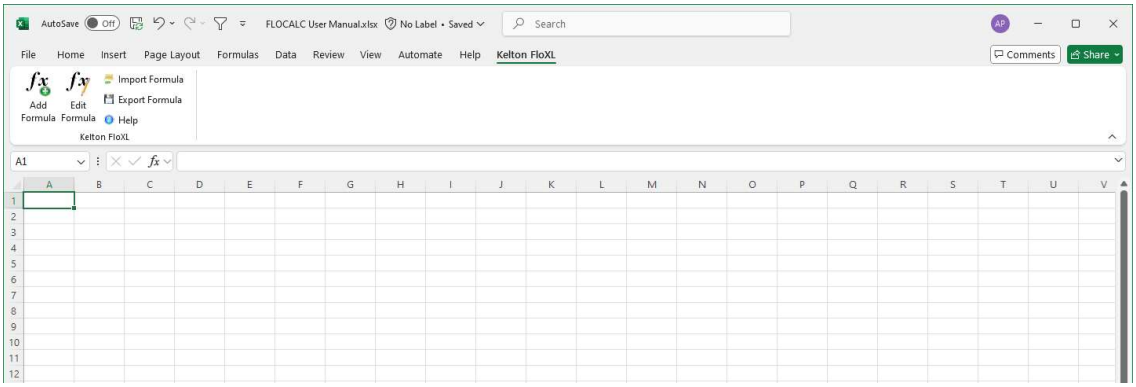
Once the links have been set up in a workbook it is recommended that the workbook be saved as a template so that similar calculations can be performed without having to go through the process of setting up links again.

7. FloXL

FloXL seamlessly integrates FLOCALC's calculation capabilities into Microsoft Excel, enabling users to access its functions directly within Excel without running FLOCALC separately. FloXL is however an add-on to FLOCALC and cannot be purchased separately. A valid FLOCALC license is required to utilise FloXL.

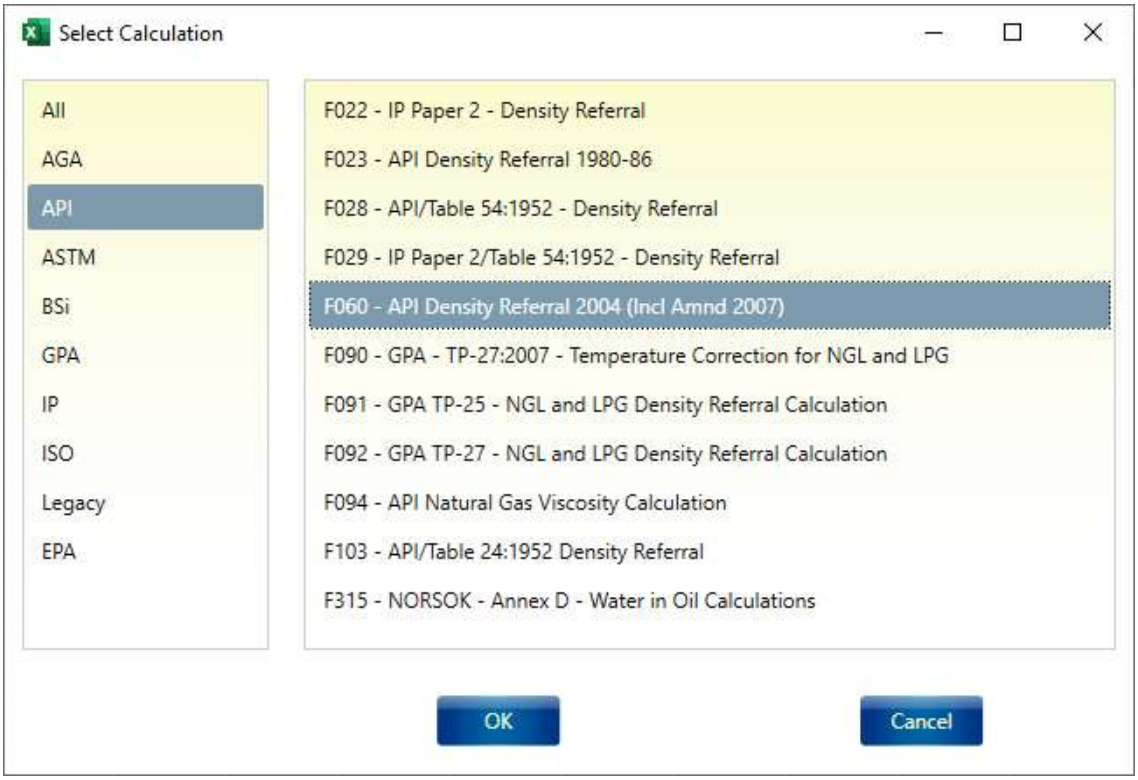
7.1. Adding a FloXL Function

To add a FloXL function, select the Add Formula button on the KELTON FloXL toolbar.



This opens a window where you can select the appropriate calculation from the KCCL. Similar to FLOCALC, calculations can be filtered based on the standard body they associate with.

In this example, a function for the 2004 API density referral calculation (F060) is selected.

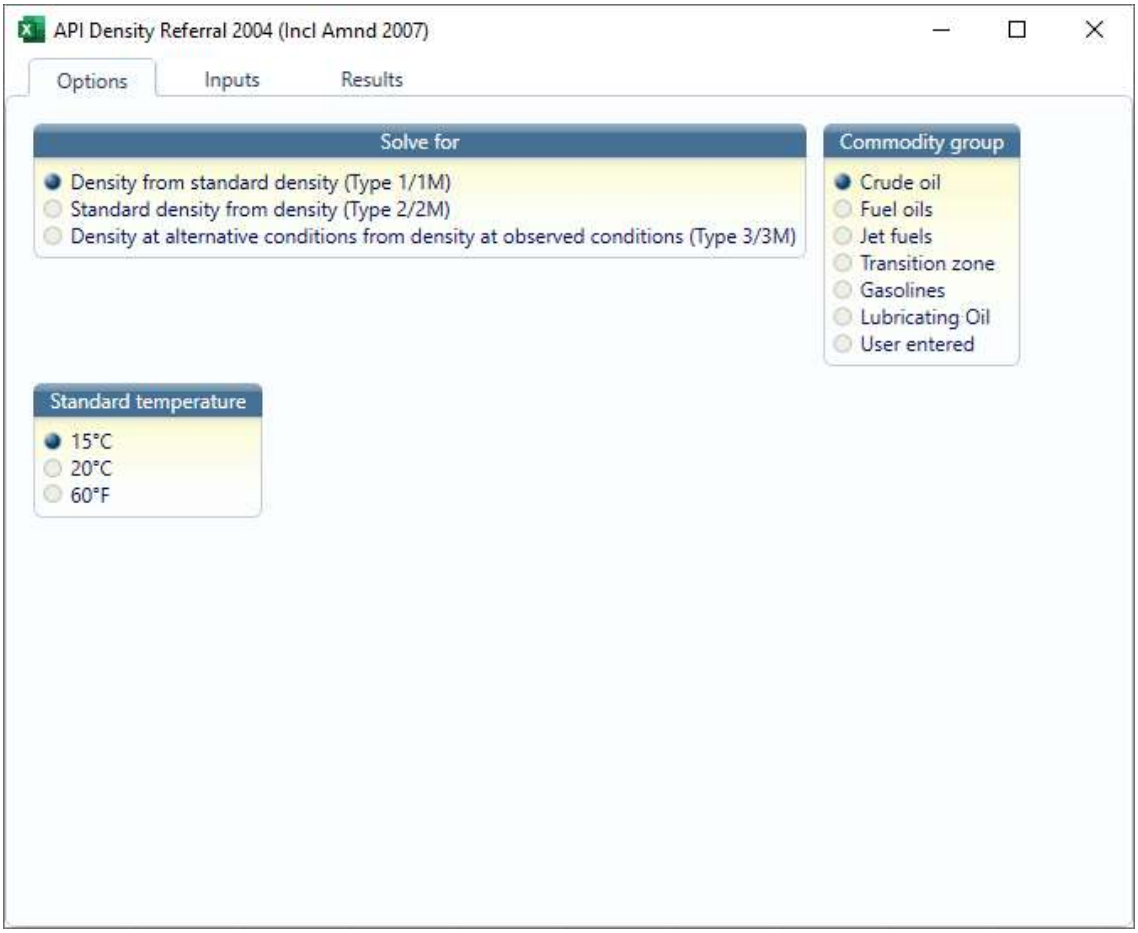


7.2. Configuring FloXL Function

The calculation will open in a window similar to the tabular structure found in FLOCALC.

7.3. Options

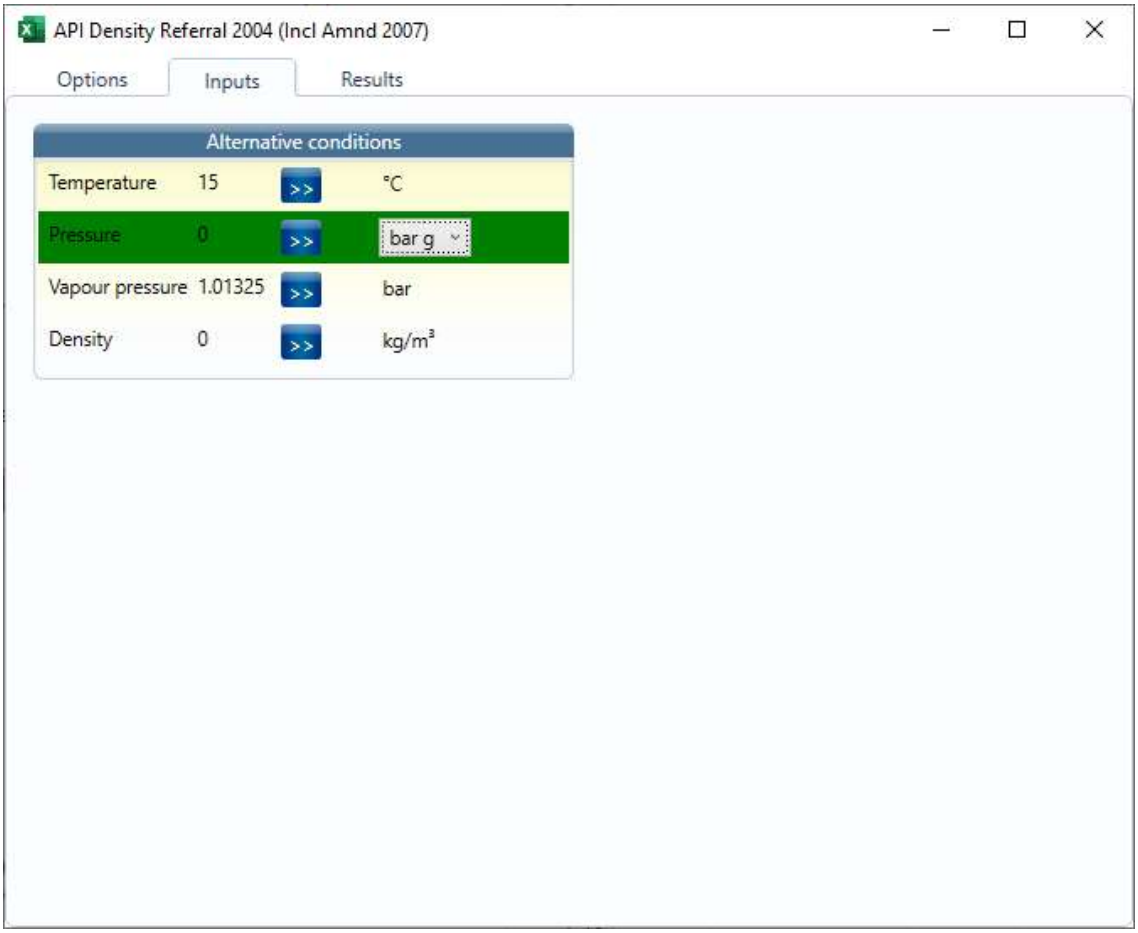
See FloXL equivalent window to FLOCALC calculation in Chapter 0.



7.4. Inputs

When configuring the inputs, ensure that the FloXL units match those used in the spreadsheet; otherwise, the calculation will not return the correct result. FloXL units are used for the calculations, while any units displayed in the spreadsheet are for reference only.

There are a number of ways in which the input can be referenced to a cell in Microsoft Excel.

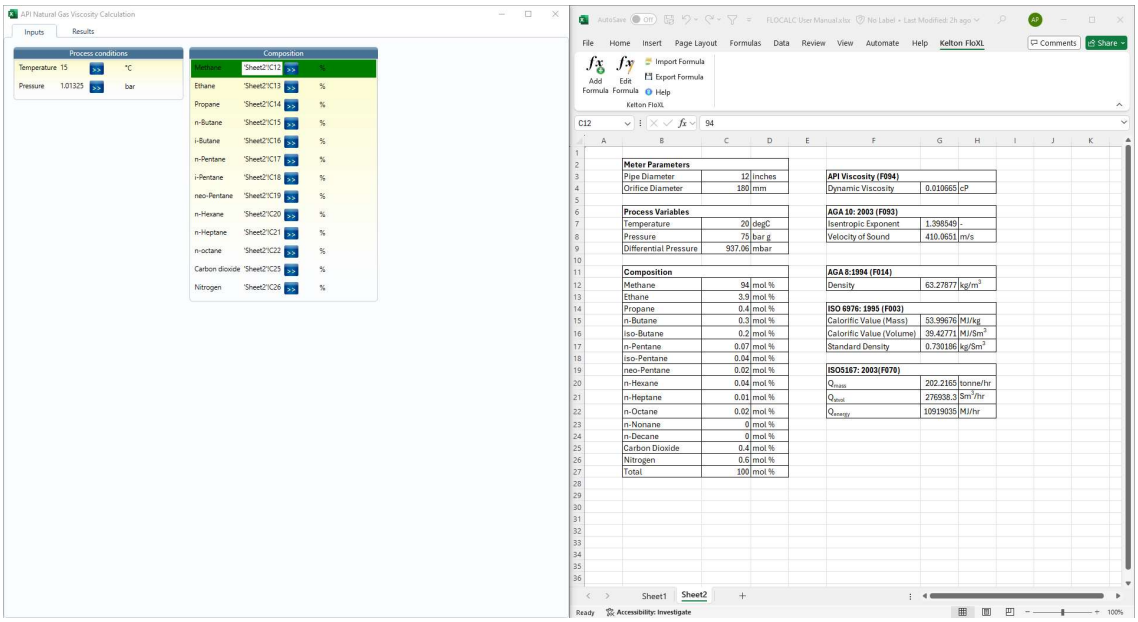


7.4.1. Cell Selection

To use this method, first select the desired cell within Microsoft Excel and then select the button next to the parameter to map the associated value from the worksheet.

This method works best when you arrange the windows on the screen to display the Microsoft Excel workbook and the FloXL calculation window side by side.

Switching between both windows is also possible.



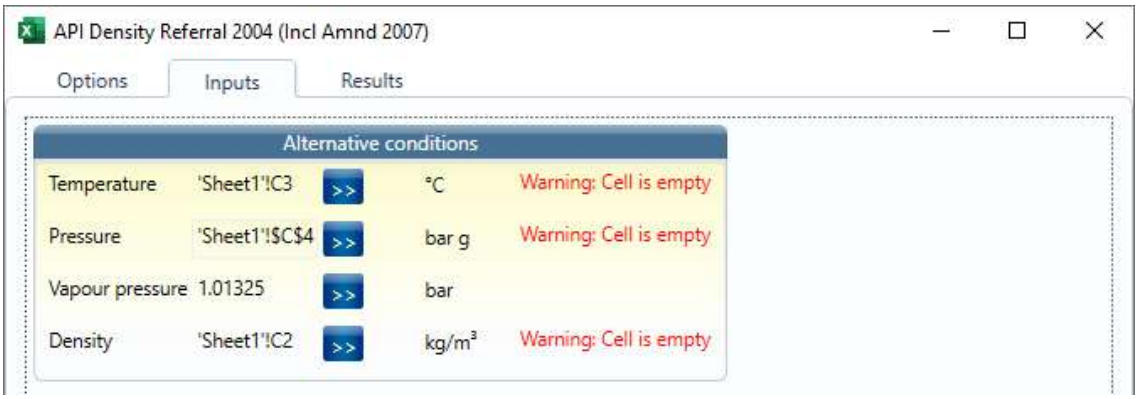
7.4.2. Typing

The cell reference can be typed directly in place of the FloXL input value. Once entered, the cell reference will be linked to the worksheet that is currently selected.

Named cells in Microsoft Excel also integrates with FloXL. Simply enter the cell name in place of the cell reference.

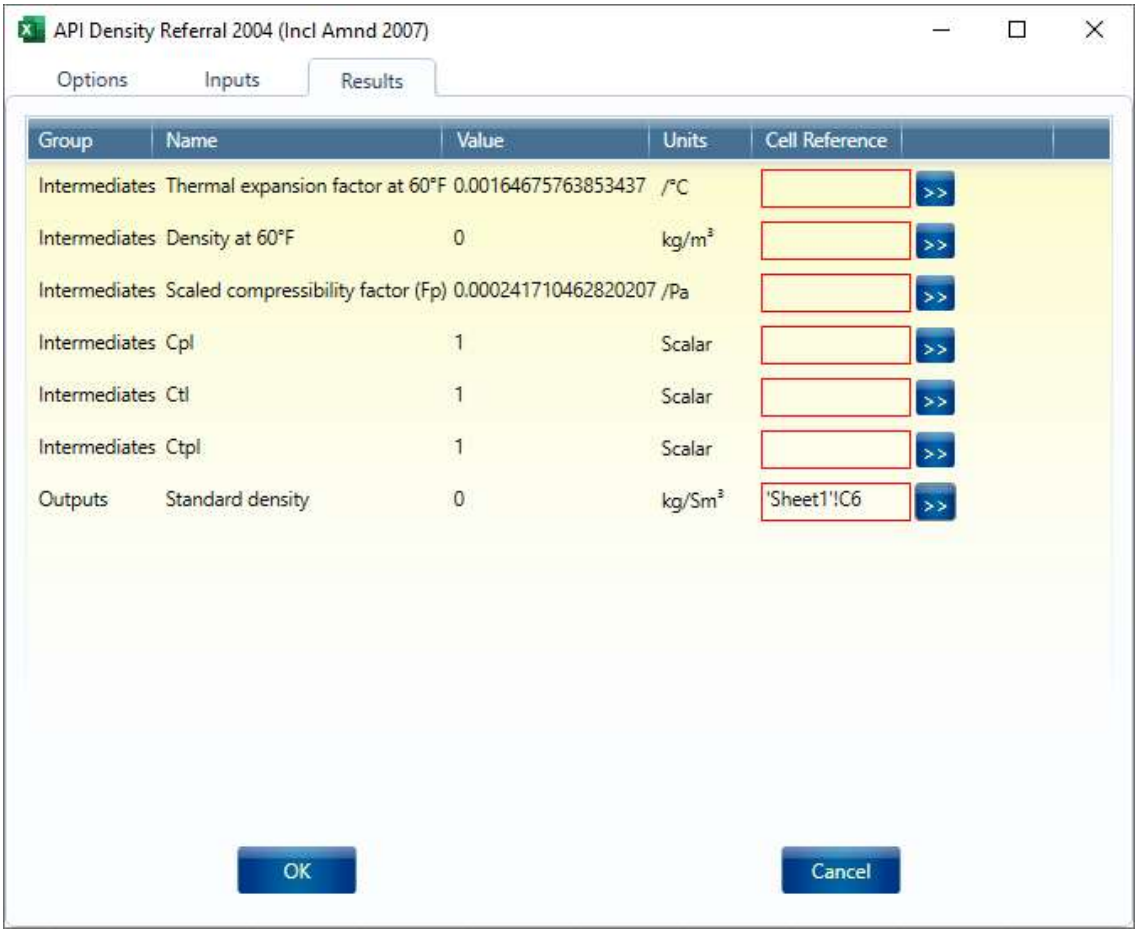
7.4.3. Cell References

As with any other Excel functions, absolute and relative cell references can be used by preceding the row numbers and column letters with the $ symbol. This ensures the reference behaves as desired when copying or moving the formula.



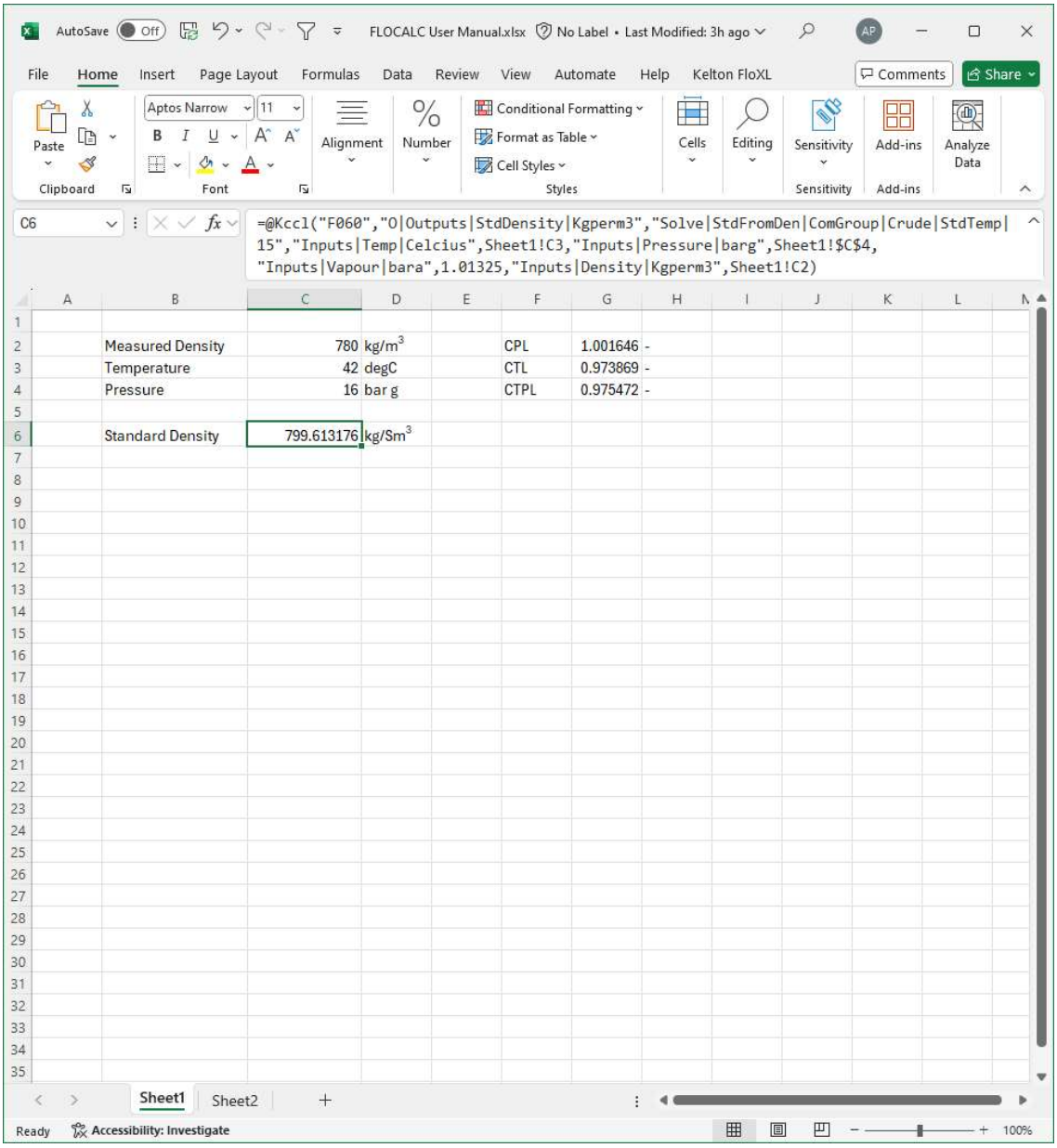
7.5. Results

Intermediates and Outputs all appear in the Results tab. The process of linking these values to Microsoft Excel is the same as when configuring inputs.



7.6. The Excel Function

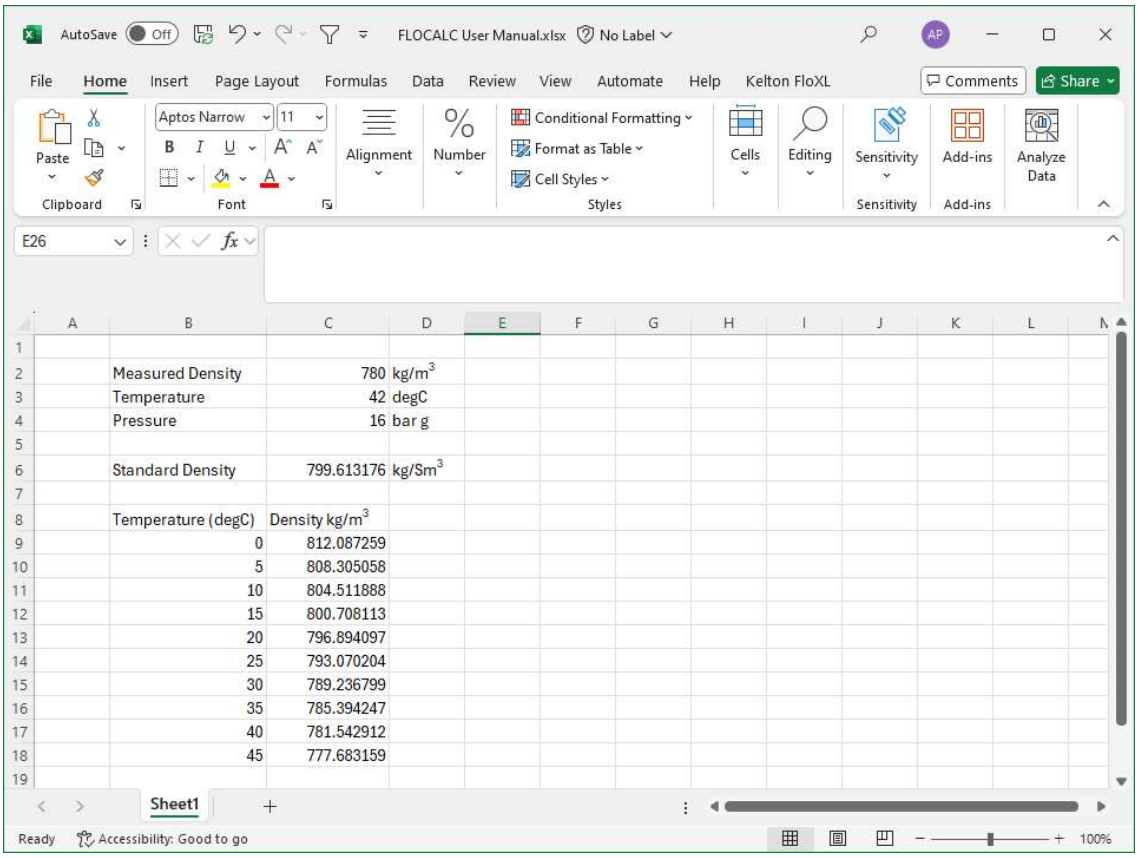
When the FloXL function is integrated into Microsoft Excel, it will be visible in the formula bar for the cell referenced in the Results tab.



7.6.1. Editing FloXL Function

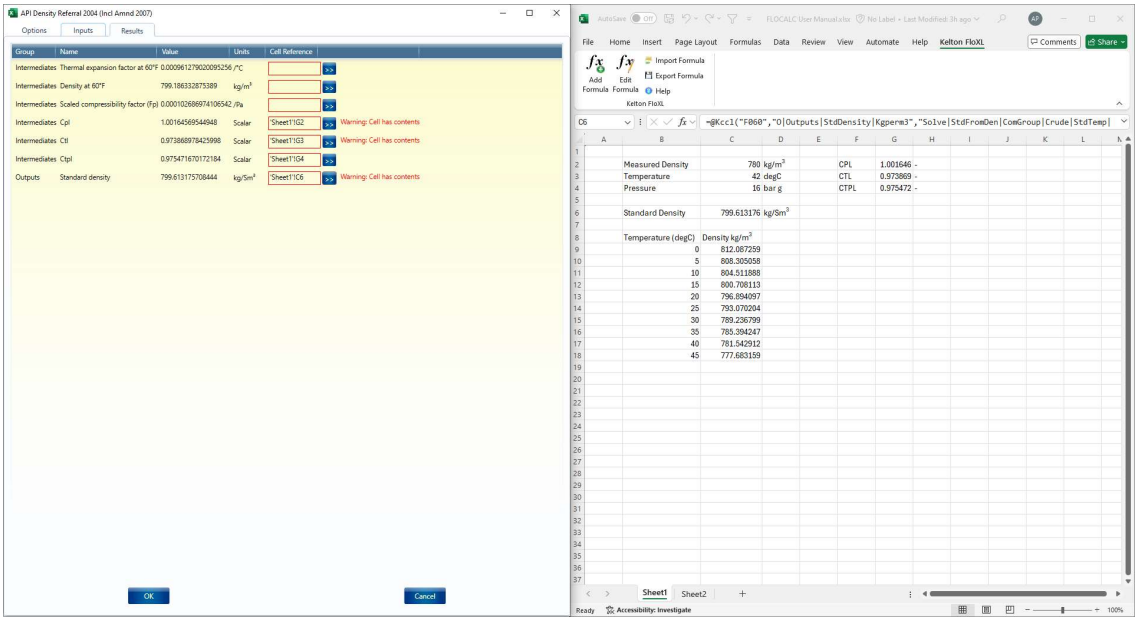
To edit a cell's function, select the Edit Formula button on the KELTON toolbar. This process is more convenient than editing the function manually which is also possible. Note any changes will initially apply to the function for the selected cell only.

FloXL functions behave like standard Microsoft Excel functions and can be copied, moved, dragged, and dropped. This example demonstrates how density changes when the temperature of the oil is altered.



7.7. Multiple Outputs

Some calculations generate several intermediate and output parameters. In this example, Cpl, Ctl, and Ctpl are provided as intermediate results. Linking multiple results to Microsoft Excel will create functions for each referenced cell.



7.8. Linking Calculations

Using FloXL is especially valuable when linking calculations. In this example, a workbook is set up to calculate Energy Flow Rate, with various sources linked for the calculation of Calorific Value, Density, Isentropic Exponent, and Dynamic Viscosity. All are connected to the same input composition, meaning that changing a single parameter will propagate through to the output.