

FloCalc™ and FloXL

User Manual

This document is the user manual for FloCalc™ and FloXL.

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1 Revision Control

Rev	Issue date	Description	Prepared	Approved
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	20/05/25	Updated as per release.	AP	JC
2.4.0	29/07/26	Updated as per release with new branding.	AP	JC

2 Installation

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

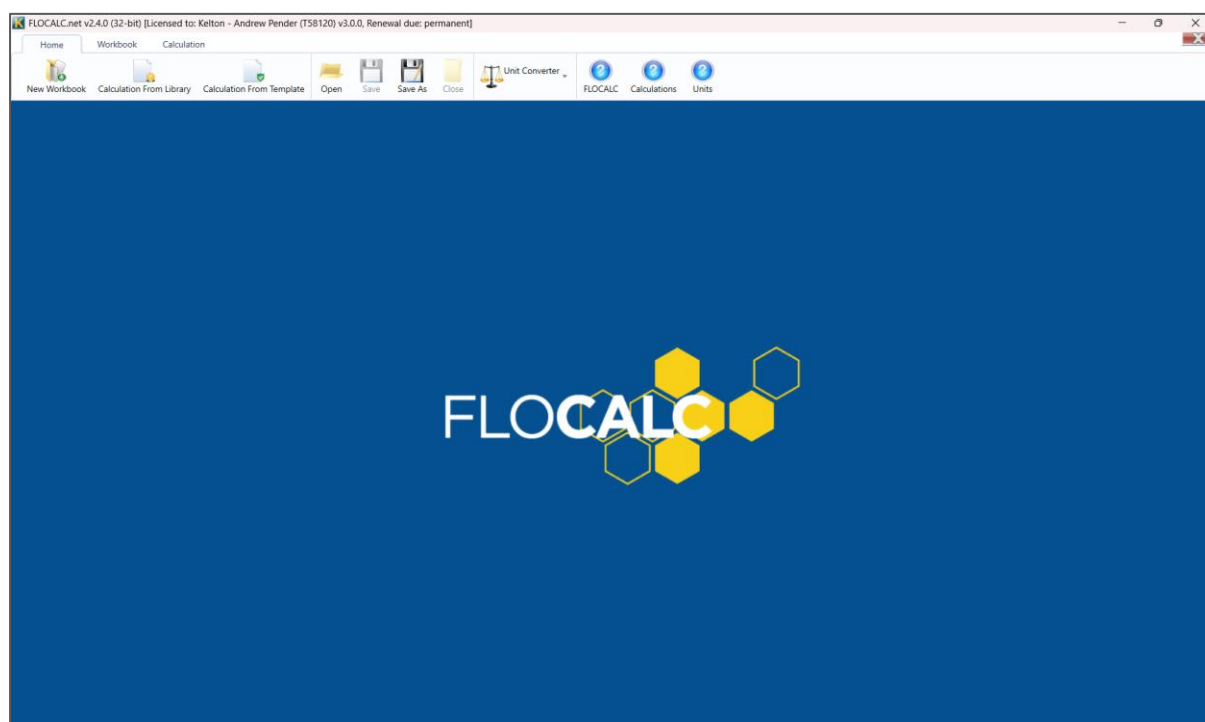
3 Getting Started

3.1 Running FloCalc

FloCalc can be started from the Windows start menu located under the KELTON dropdown list. Alternatively, a shortcut to the application is installed on the desktop.

3.2 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.



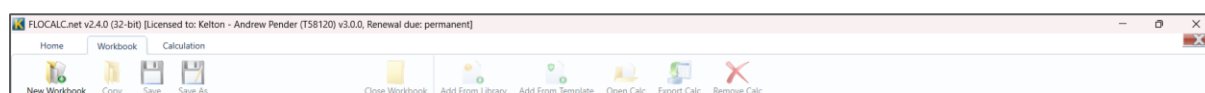
3.3 Home Toolbar

This toolbar contains options for creating and saving calculations and workbooks, as well as accessing the Unit Converter utility and the associated web help files.



3.4 Workbook Toolbar

This toolbar is automatically selected when working in a workbook and provides options to assist with workbook related tasks.



3.5 Calculation Toolbar

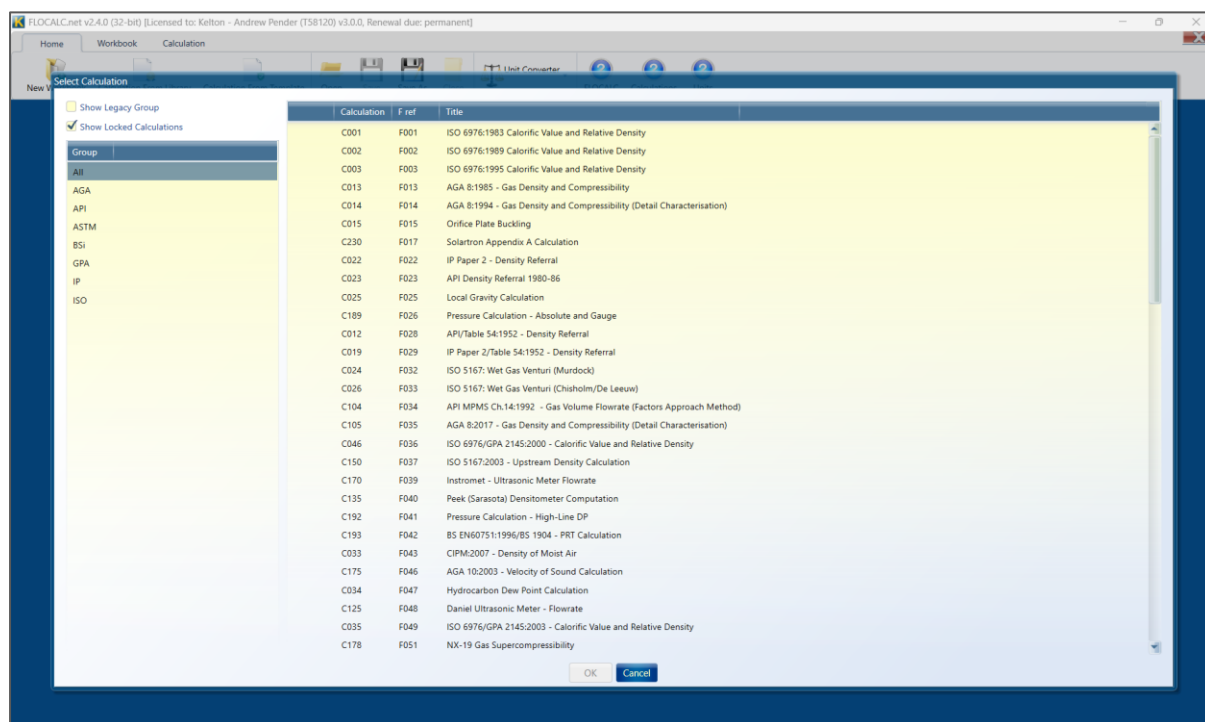
This toolbar is automatically selected when working with calculations and provides options to assist with calculation related tasks.



4 Calculations

4.1 Kelton Common Calculation Library

FloCalc grants access to the KELTON Common Calculation Library (KCCL), a continuously updated set of calculations incorporating the latest standards. To choose a new calculation, select *Calculation from Library* 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. Select either the *Calculation* or *F ref* header to sort the calculations in numerical order. Alternatively, select *Title* to sort the calculations alphabetically. Several other options are also available to help find and select the desired calculation.

4.1.1 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. Select *All* to show all calculations, excluding those in the Legacy group which are only available in the 32-bit version of the application.

4.1.2 Show Legacy Group

Enable 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.

4.1.3 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.

4.2 Opening a Calculation

To open a calculation, highlight the desired calculation and select **OK**, or double-click the calculation in the KCCL.

4.3 Executing Calculations

All calculations follow a similar structure and contain most of the following displays within the calculation environment.

4.3.1 General

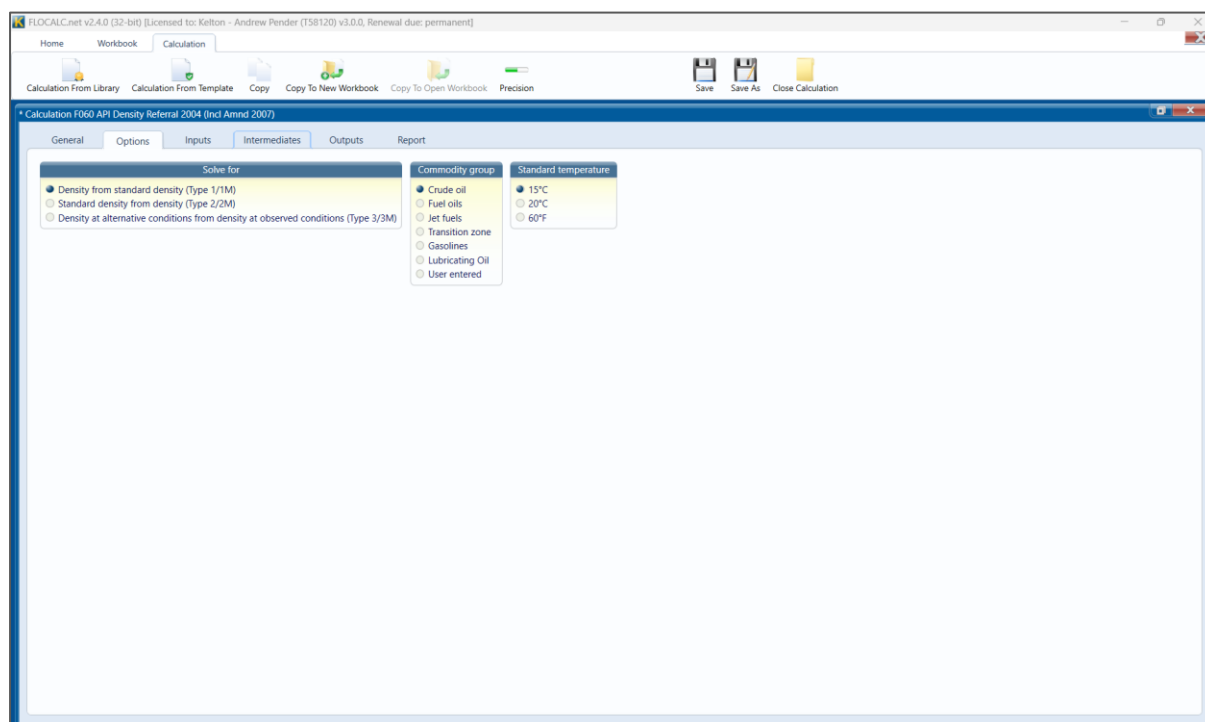
This display is shown by default and includes header information that can be included in the calculation report for traceability. Information can be entered into predefined fields such as Site, Tag, and Client, or custom notes can be added providing additional context for the calculation. This is especially useful when saving a calculation report or sharing the calculation with others.

The user and date the calculation was last modified are also included on this display.

The screenshot displays the FLOCALC.net v2.4.0 (32-bit) application window. The title bar indicates the license is for Kelton - Andrew Pender (TS8120) v3.0.0, with a permanent renewal due. The interface features a ribbon menu with tabs: Home, Workbook, and Calculation. The Calculation tab is active, showing options like 'Calculation From Library', 'Calculation From Template', 'Copy', 'Copy To New Workbook', 'Copy To Open Workbook', 'Precision', 'Save', 'Save As', and 'Close Calculation'. Below the ribbon, the main window is titled 'Calculation F060 API Density Referral 2004 (Incl Amnd 2007)'. The 'General' tab is selected, showing a form with fields for 'Prepared By' (Andrew Pender), 'Last Modified' (30/07/2026 17:31:00), 'Site', 'Tag', 'Client', 'Data Ref', 'Description', 'Opic Enabled' (unchecked), and 'User Notes'. At the bottom, the 'KCCL Reference' is C251 and the 'KCCL Last Modified' is 29/10/2012 00:00:00.

4.3.2 Options

The display provides the options which determine how the calculation is executed, and which inputs are required as a result. 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 calculation.

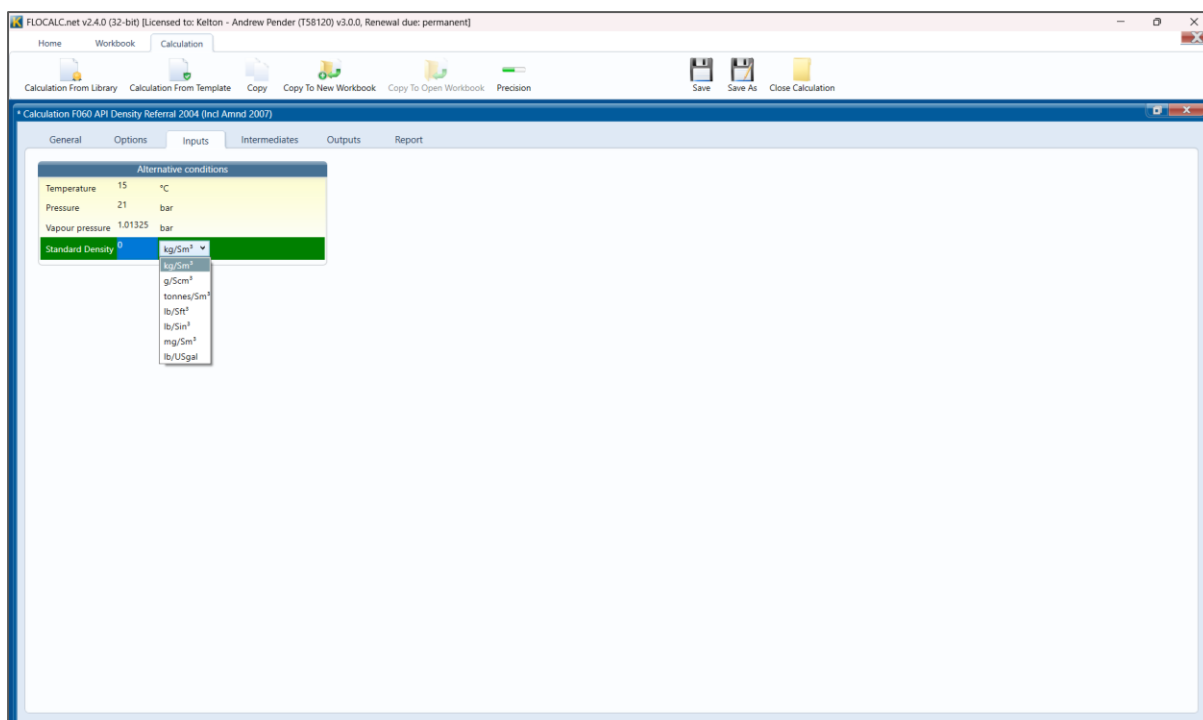


4.3.3 Inputs

This display 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 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.

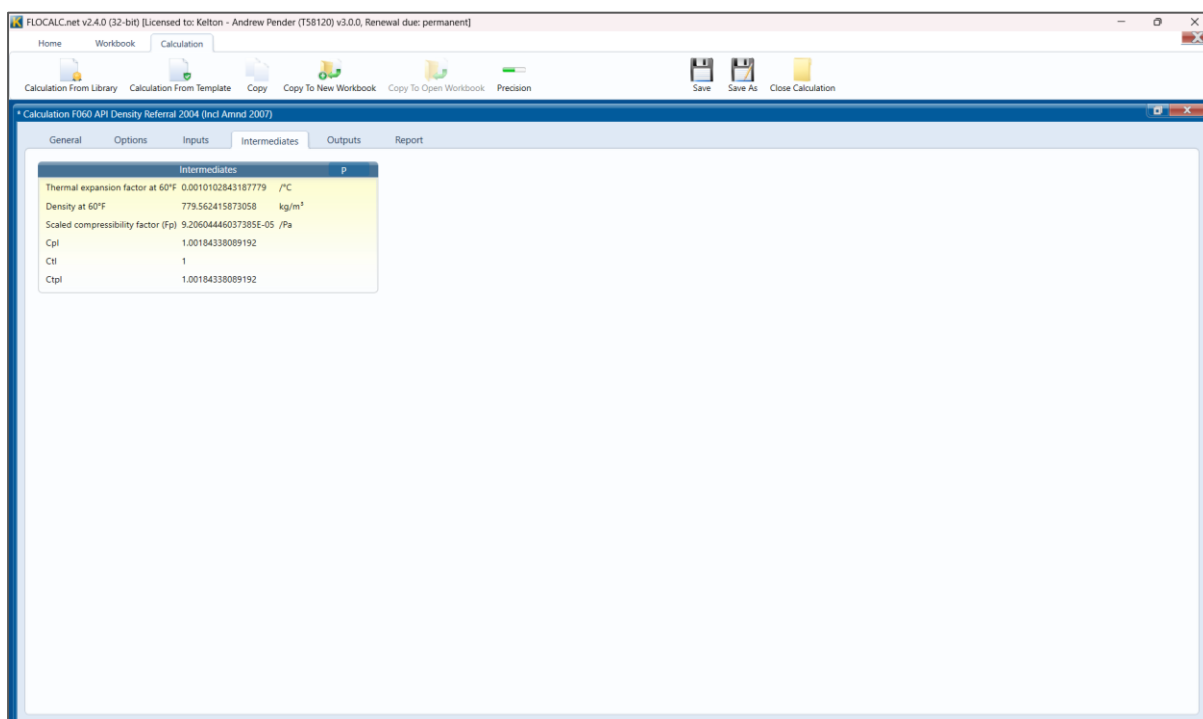


4.4 Constants

This display defines the constants used in the calculation and is shown only when applicable.

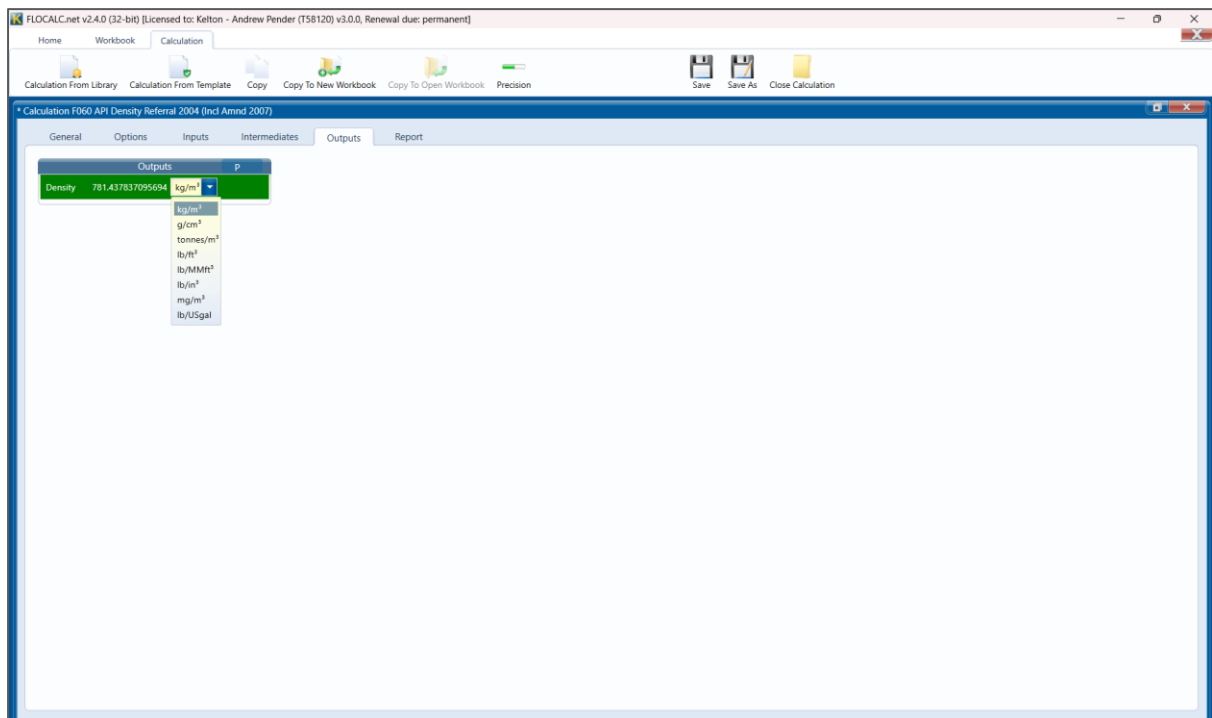
4.5 Intermediates

This display shows the intermediate values generated during the calculation of the output parameters, providing information to assist with troubleshooting and investigating discrepancies.



4.6 Outputs

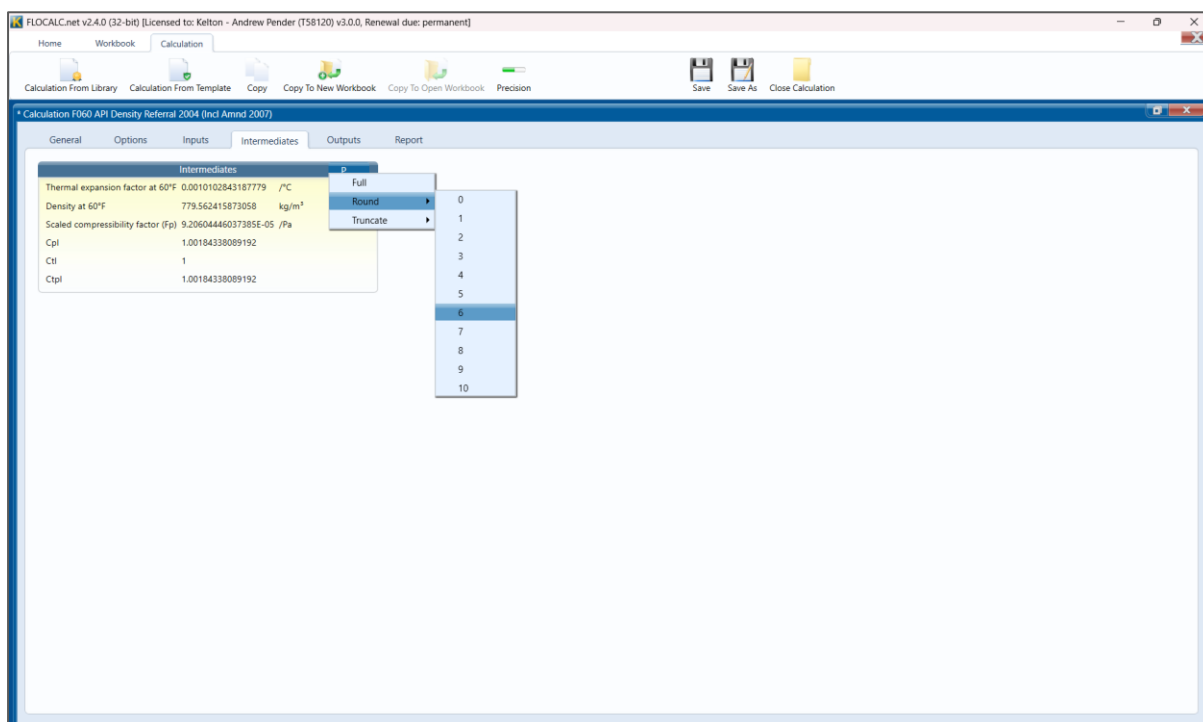
This display shows the output values in the same way as the Intermediates display. Both resolution and engineering units can be selected for intermediates and outputs.



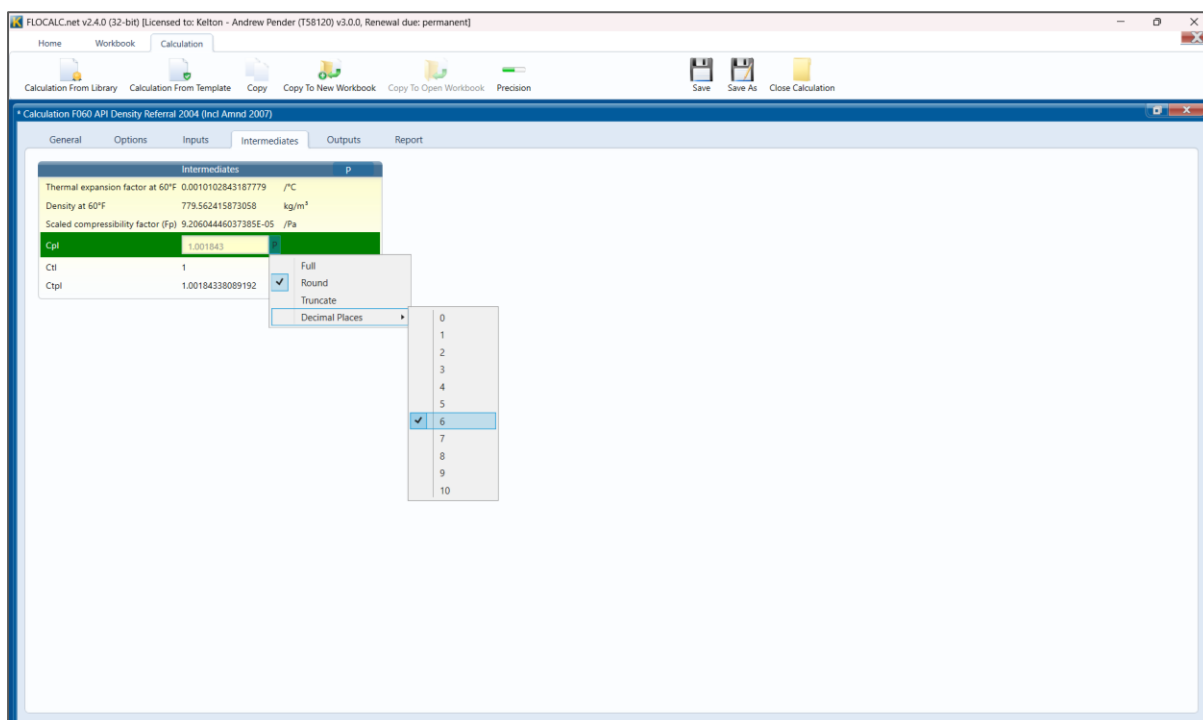
4.6.1 Precision

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

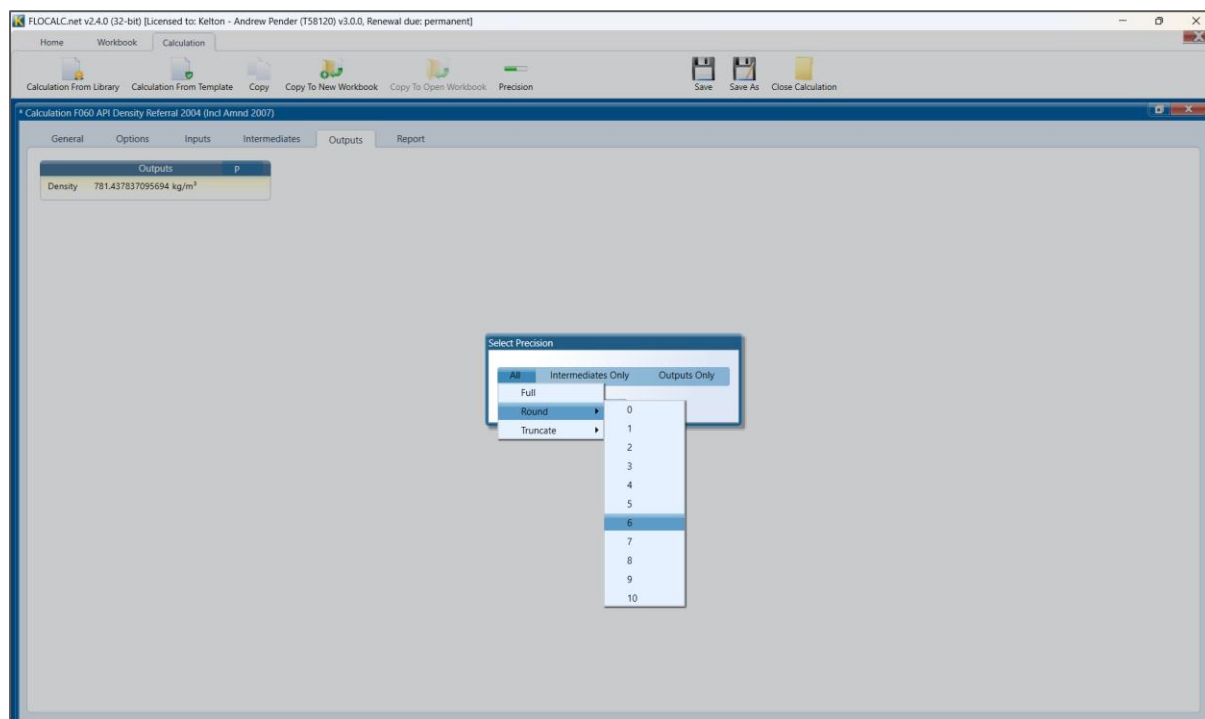
To configure all parameters in a group, select *P* in the group header.



To configure individual parameters, select parameter then select *P* to the right-hand side.

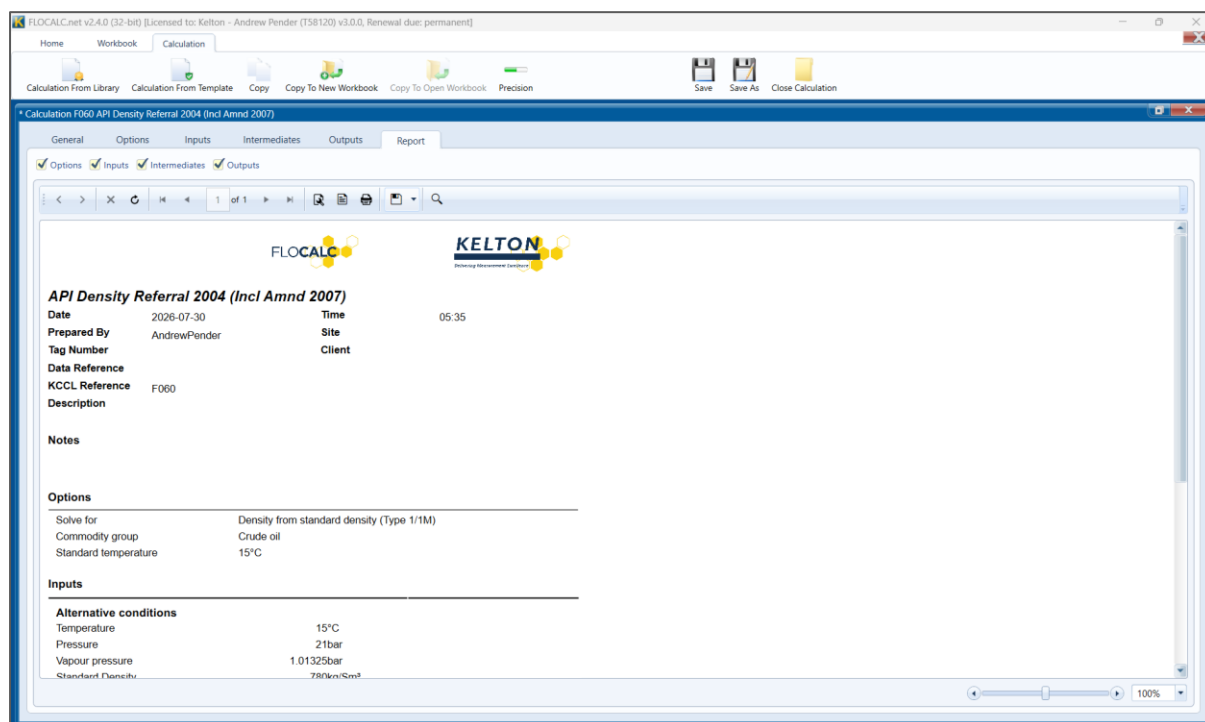


To configure all intermediates and/or outputs, select **Precision** in the Calculation toolbar.



4.7 Report

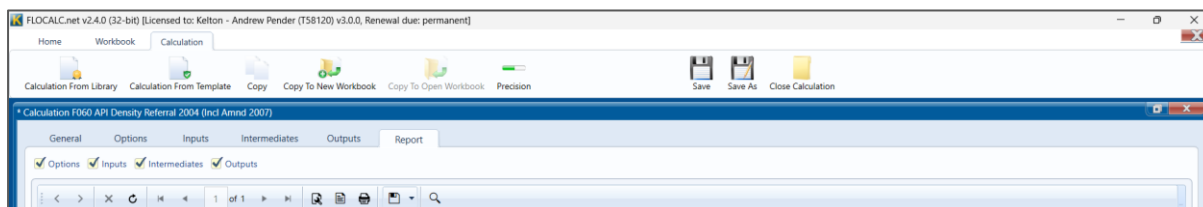
This display presents the calculation in the form of a report.



4.7.1 Report Options

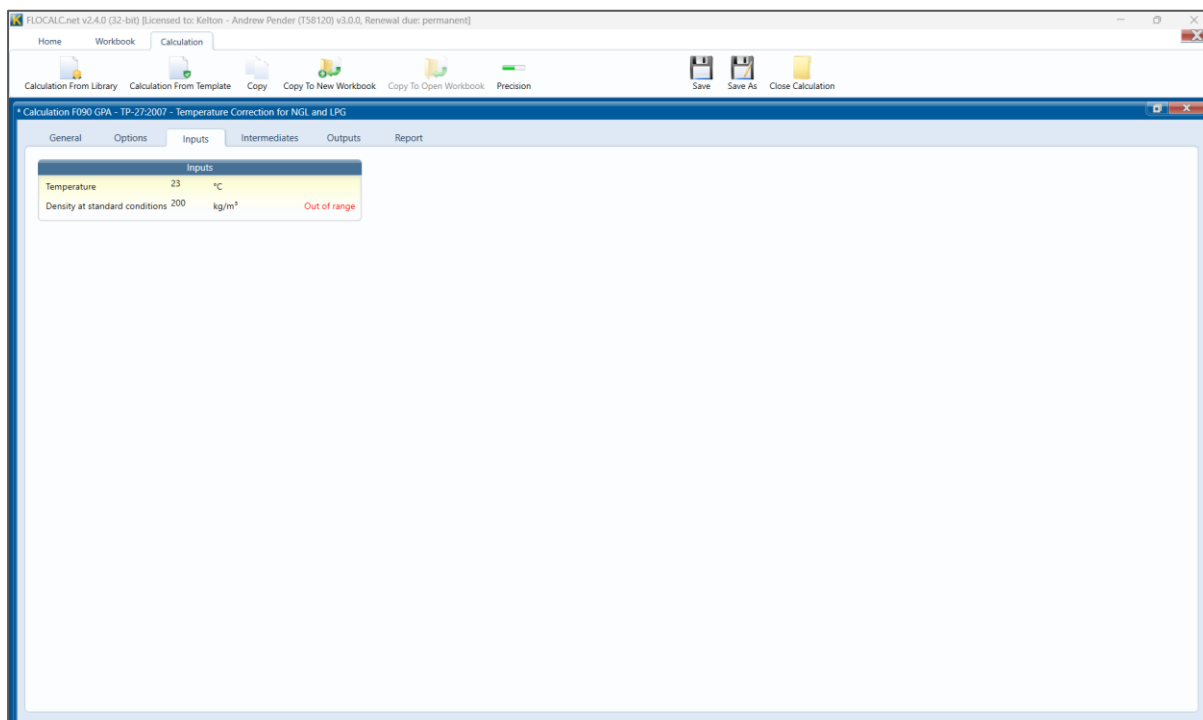
Tailor the report by refining the display options to include only the required information. All displays will be included in the initial report preview by default.

The report toolbar contains options for navigating between pages, as well as options for printing and exporting the report in pdf or xps.



4.8 Input Warnings

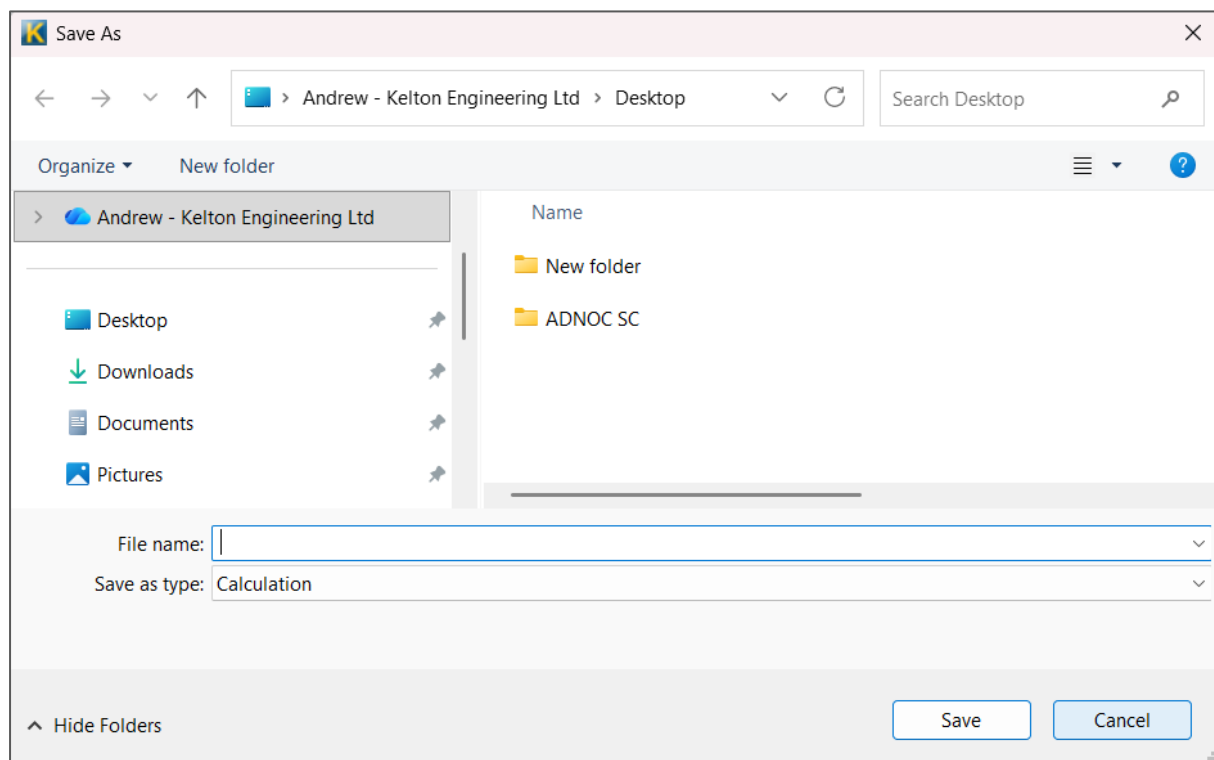
Some calculations include logic which displays warning messages based on the inputs entered. Any warnings will be displayed in red text next to the associated input.



4.9 Saving Calculations

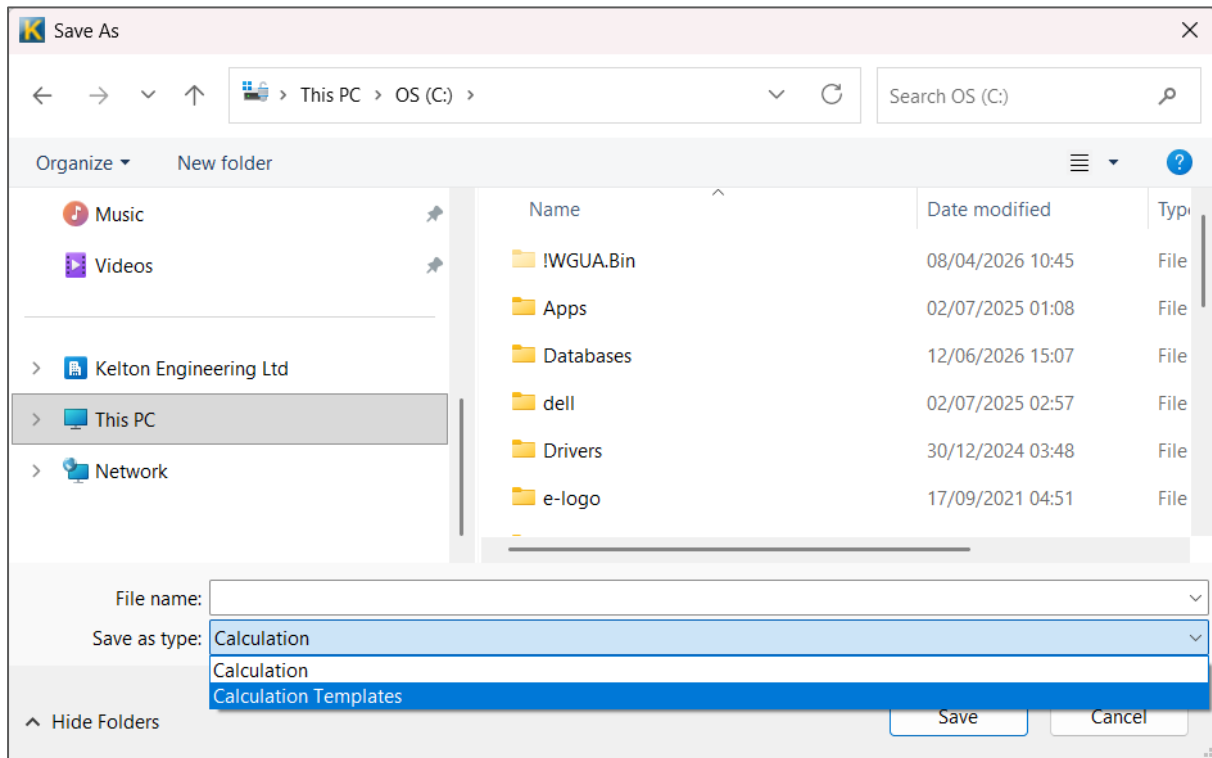
To save a calculation, select **Save** on either the Home or Calculation toolbar. If the calculation has not been saved previously, select **Save As** to save the file to any location with the .fcx extension.

After a calculation has been saved, it cannot be saved again until it has been modified, or additional information has been added. When unsaved changes exist, an asterisk (*) is displayed at the beginning of the calculation header.



4.10 Calculation Templates

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



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.

4.11 Closing Calculations

To close a calculation, select **Close** on the Home toolbar or select the **red X** from the calculation environment.



5 Workbooks

5.1 General

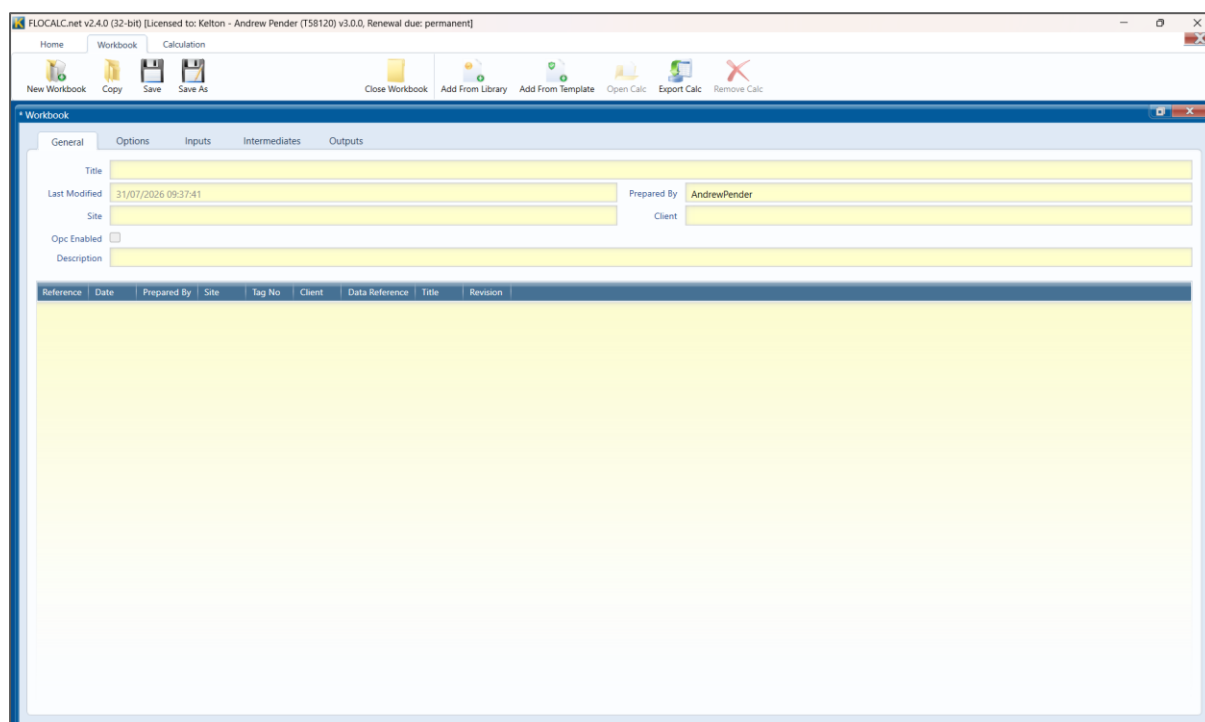
A workbook is a collection of calculations that are saved as one single file. The purpose of a workbook is to keep related calculations together and to enable passing data from one calculation to another or to share inputs.

Note there is no reporting capability with workbooks.

5.2 Creating a New Workbook

To create a workbook, select **New Workbook** on the Home or Workbook toolbar.

When the new workbook is created, the Workbook toolbar is automatically selected and provides options to assist with workbook related tasks.



5.2.1 Adding Calculations from Library

To add a new calculation from the library, select **Add from Library** on the Workbook toolbar.

5.2.2 Adding Calculations from Template

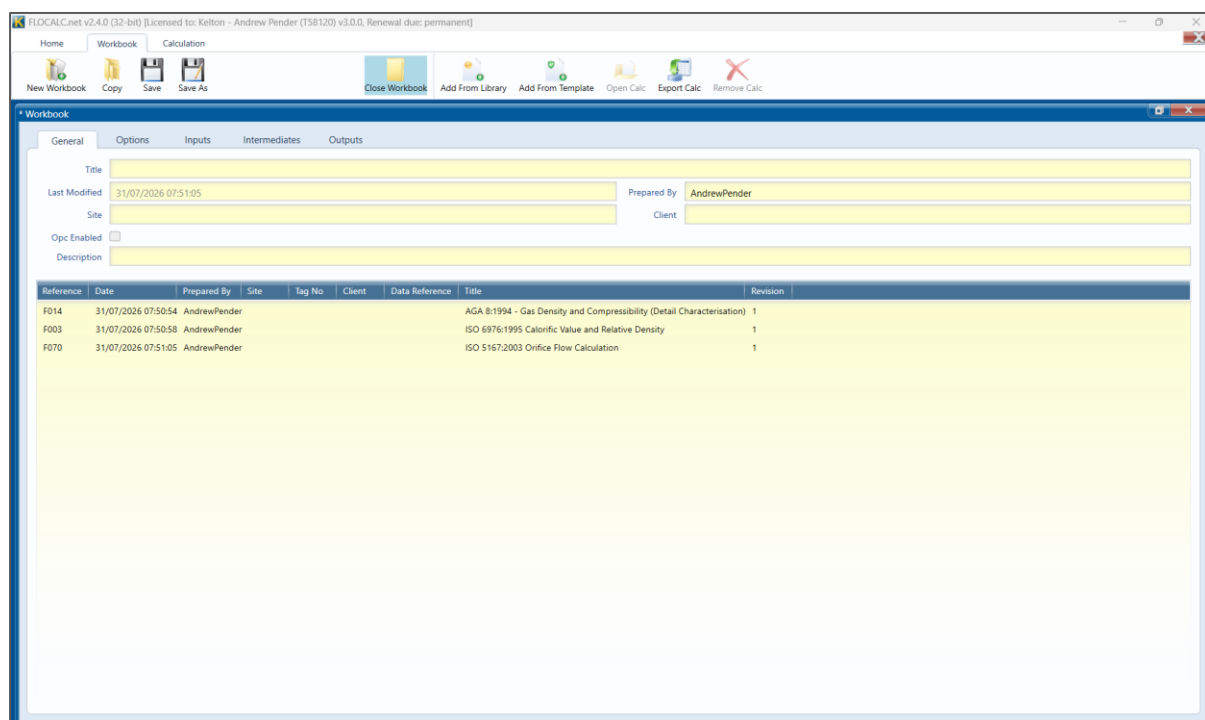
To add a new calculation based on a template, select **Add from Template** on the Workbook toolbar.

5.2.3 Adding Saved Calculations

To import an existing calculation, select **Open** from the Home toolbar, then **Copy to New Workbook** or **Copy to Open Workbook from the Workbook** toolbar. A dropdown menu with the available workbooks is displayed when the latter option is selected.

5.2.4 Using Workbooks

Once a workbook has been created, calculations added will be listed on the General display.

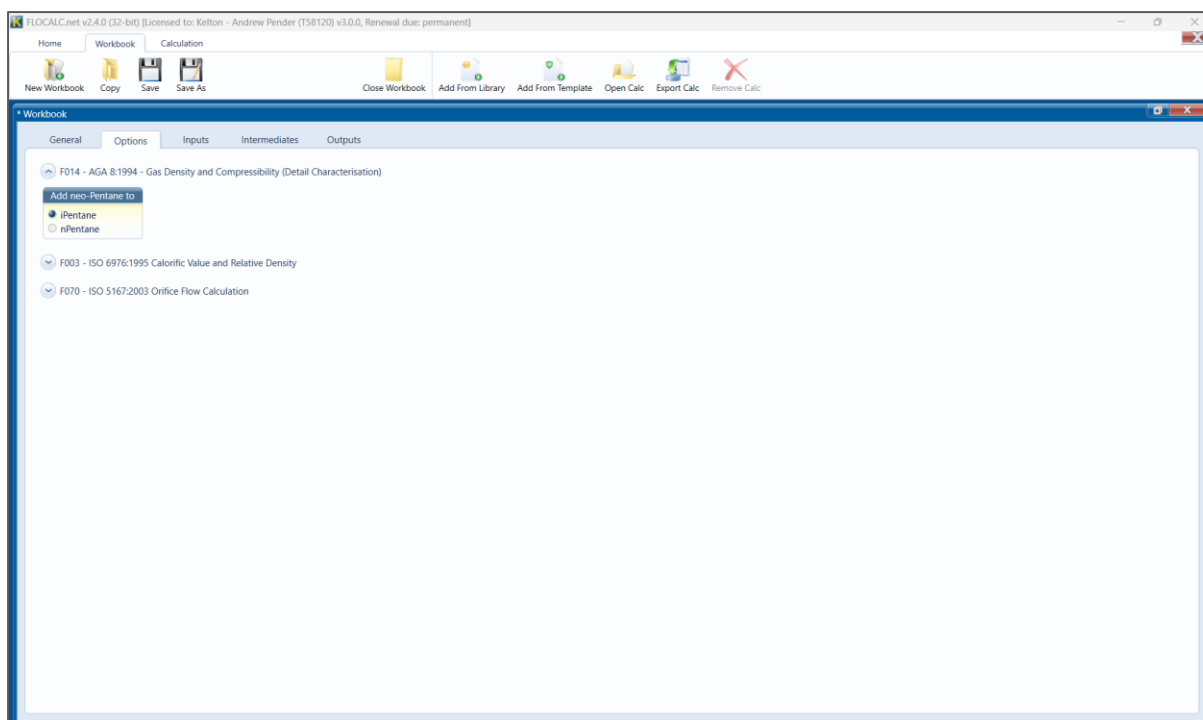


Calculations in the workbook function in the same way as stand-alone calculations. Calculations can be configured collectively using the displays within the workbook, or individually. To configure an individual calculation, select **Open Calc** on the Workbook toolbar. Changes made to an individual calculation are automatically saved to the workbook when the calculation is closed.

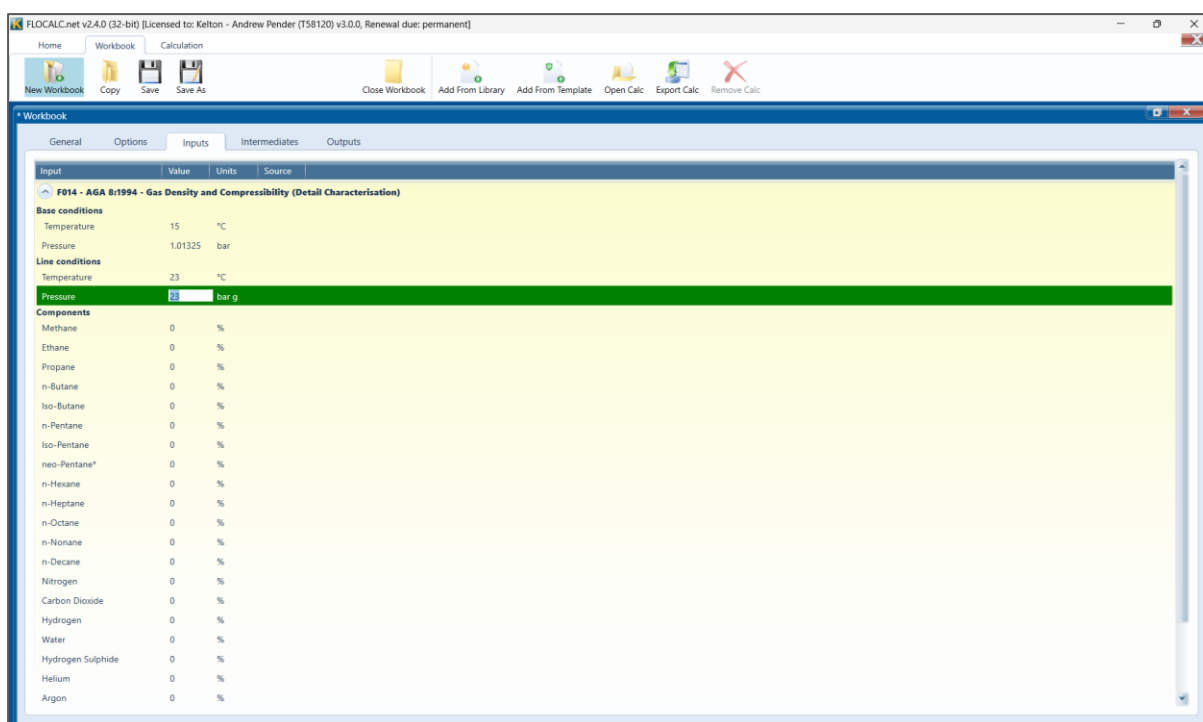
In this example, a workbook to calculate the mass and energy flow rate through an orifice meter has been created. The flow rate is calculated in accordance with ISO 5167, the density is calculated using AGA 8 and the calorific value is calculated using ISO 6976.

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.

Unless working with an individual calculation, expand each calculation in the relevant displays as required.

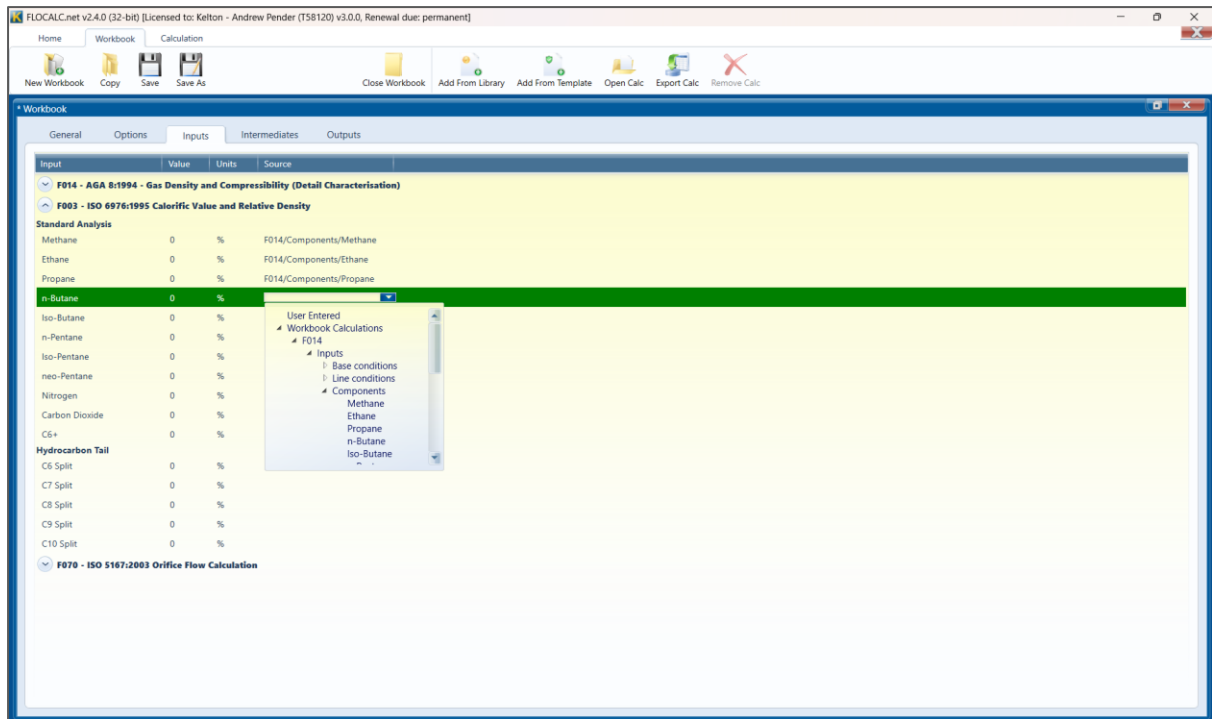


The only available input option is User Entered for the first calculation on the list.

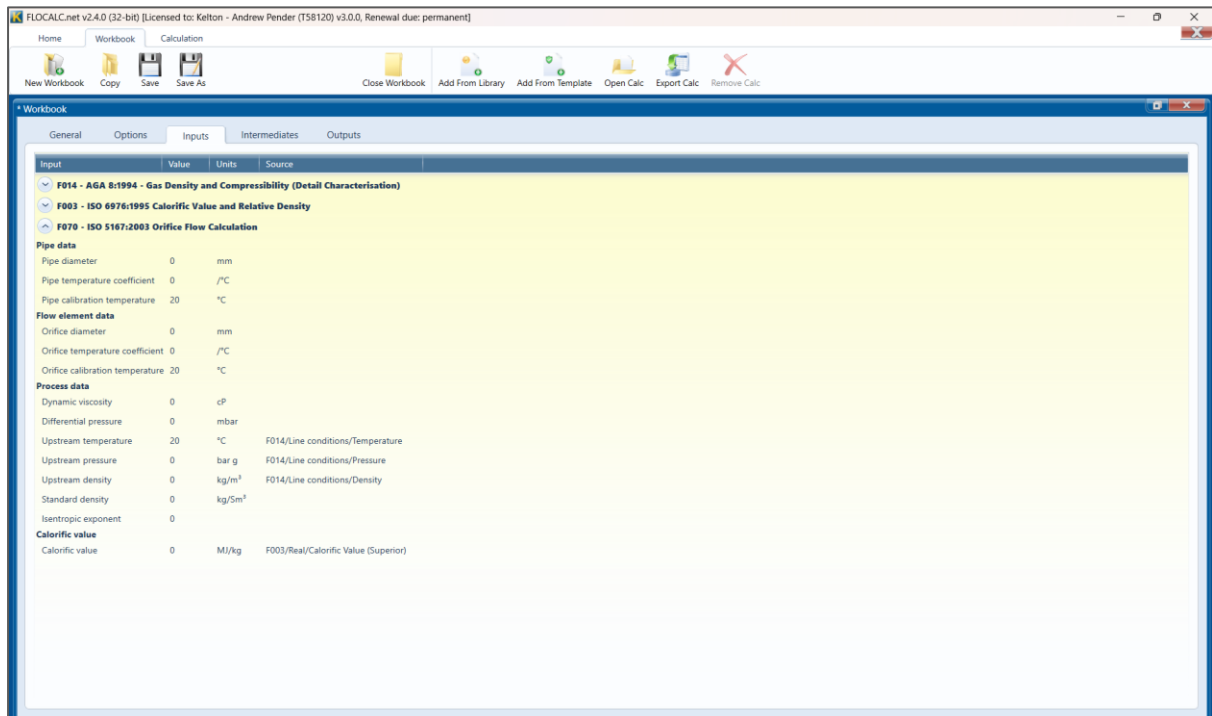


On subsequent calculations, the inputs may be taken from previous calculations.

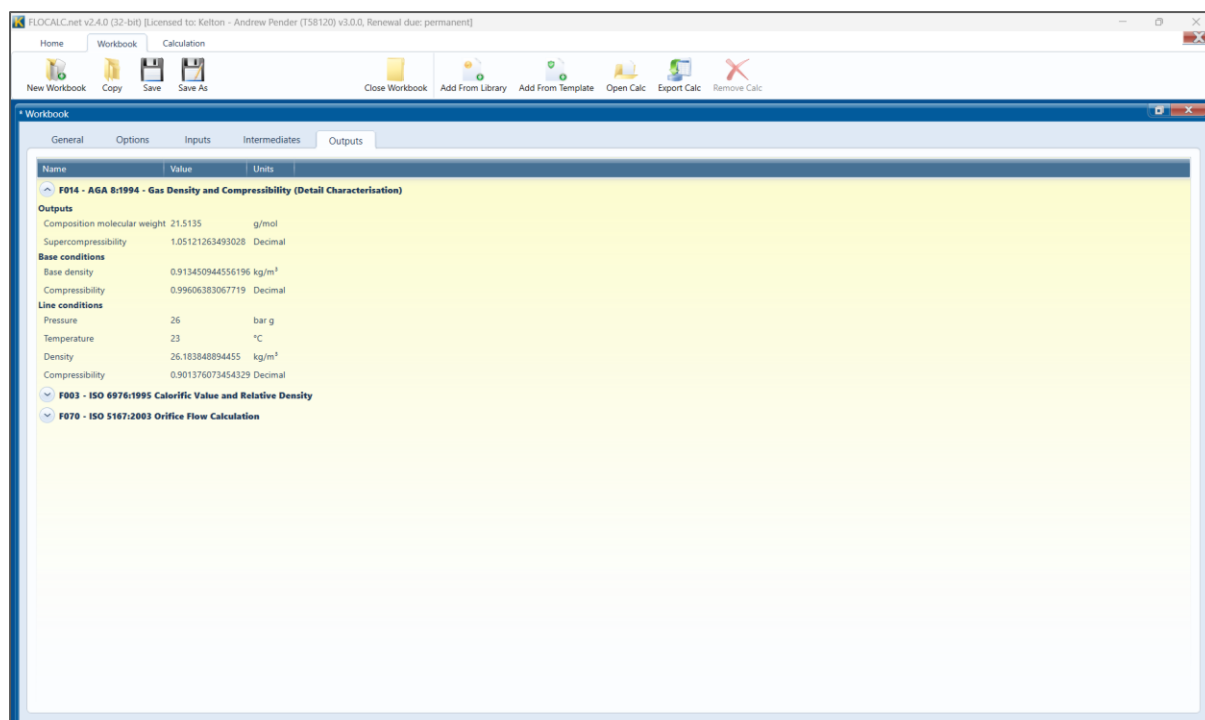
In this example the input composition for F003 is taken to be the same as the input composition for F014 preventing the composition from being entered twice.



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.



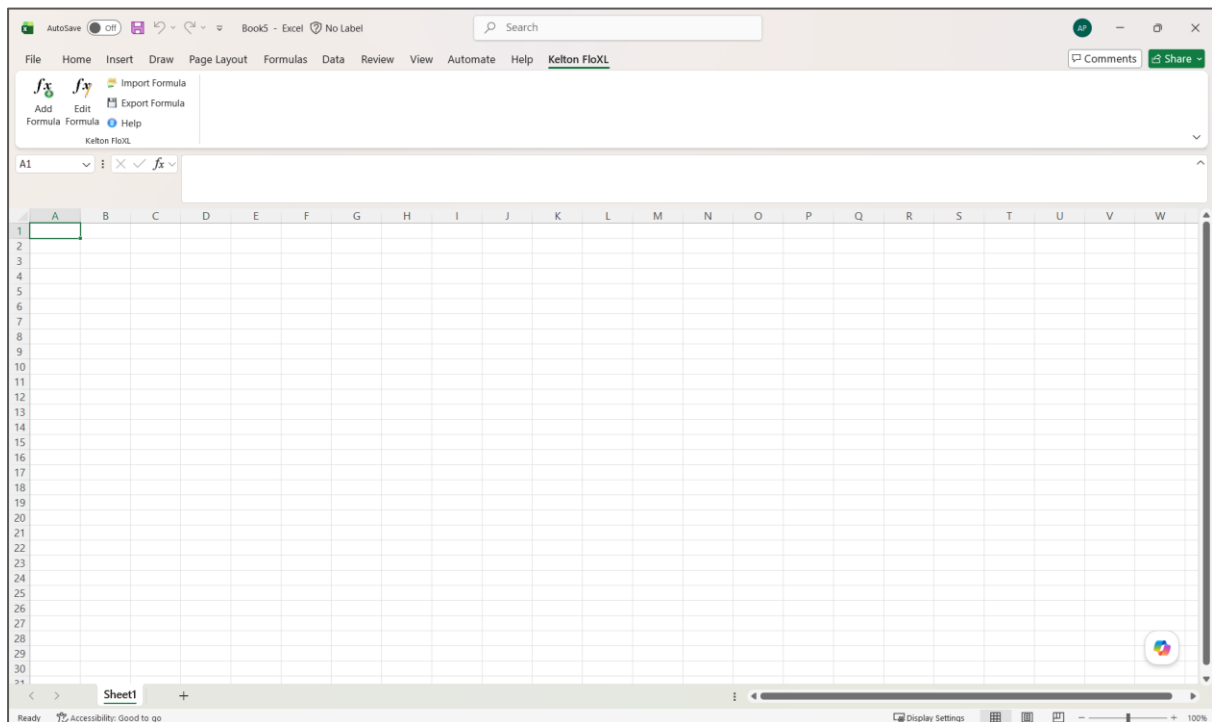
Once fully configured, save the workbook to avoid having to configure the links again.

6 FloXL

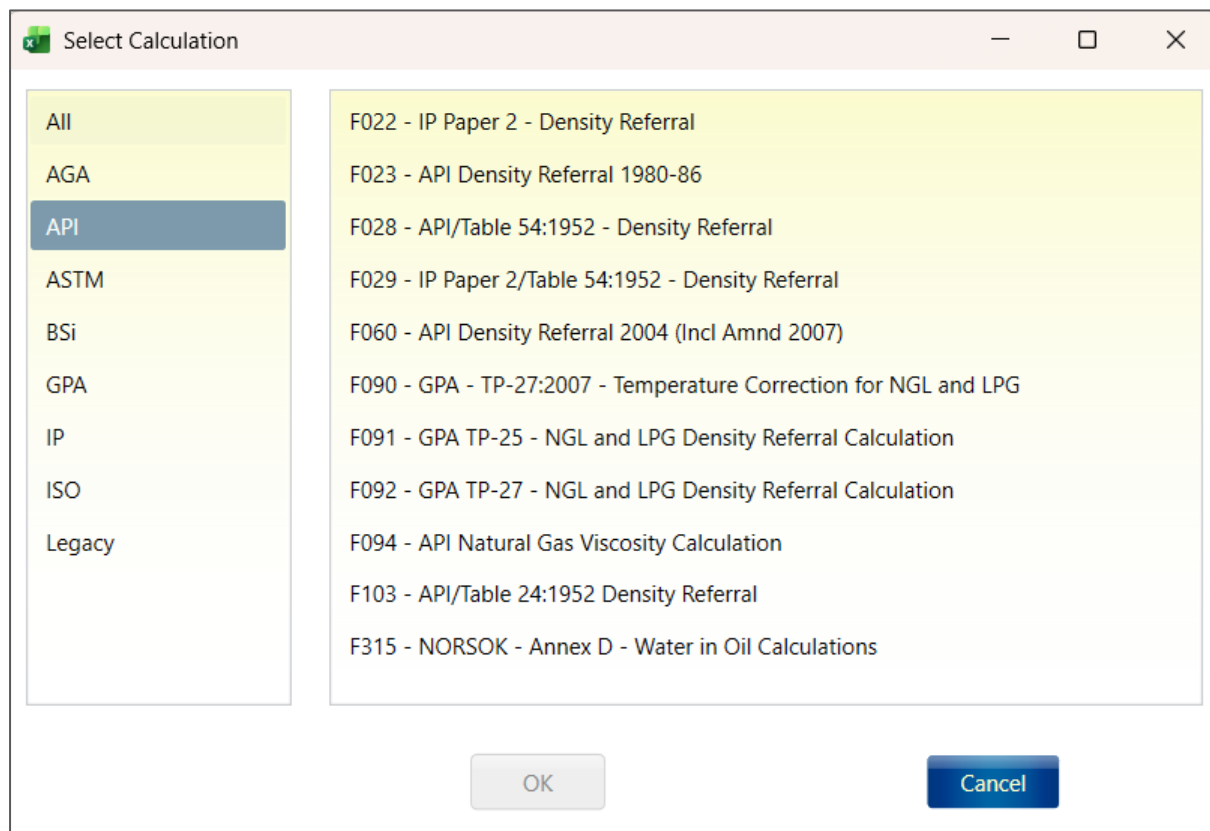
FloXL seamlessly integrates the FloCalc calculation capability with Microsoft Excel, enabling users to access its functions directly within Excel without running FloCalc separately. FloXL is however an add-on to FloCalc and cannot be purchased separately. A valid FloCalc license is a pre-requisite for obtaining FloXL.

6.1 Adding a FloXL Function

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



This opens the KCCL where calculations can be filtered based on the standard body they associate with. To open a calculation, highlight the desired calculation and select **OK**.



6.2 Options

The calculation will open in the FloXL equivalent to the FloCalc calculation environment, showing this display by default.

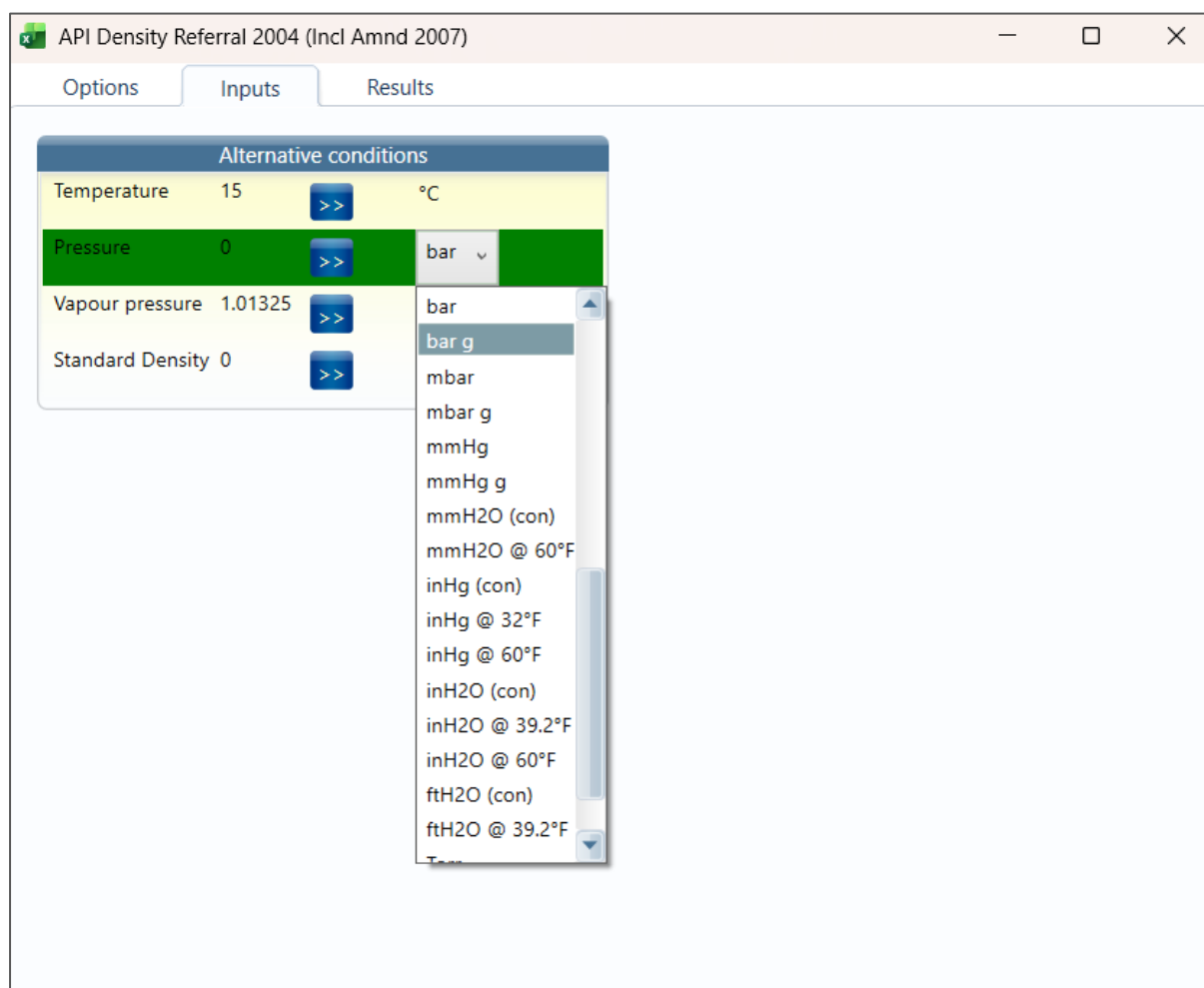
The screenshot shows a software window titled "API Density Referral 2004 (Incl Amnd 2007)" with three tabs: "Options", "Inputs", and "Results". The "Options" tab is active and contains three main sections:

- Solve for:** A list of three radio button options:
 - ☒ Density from standard density (Type 1/1M)
 - ☐ Standard density from density (Type 2/2M)
 - ☐ Density at alternative conditions from density at observed conditions (Type 3/3M)
- Standard temperature:** A list of three radio button options:
 - ☒ 15°C
 - ☐ 20°C
 - ☐ 60°F
- Commodity group:** A list of seven radio button options:
 - ☒ Crude oil
 - ☐ Fuel oils
 - ☐ Jet fuels
 - ☐ Transition zone
 - ☐ Gasolines
 - ☐ Lubricating Oil
 - ☐ User entered

6.3 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 several ways in which the input can be referenced to a cell in Microsoft Excel.

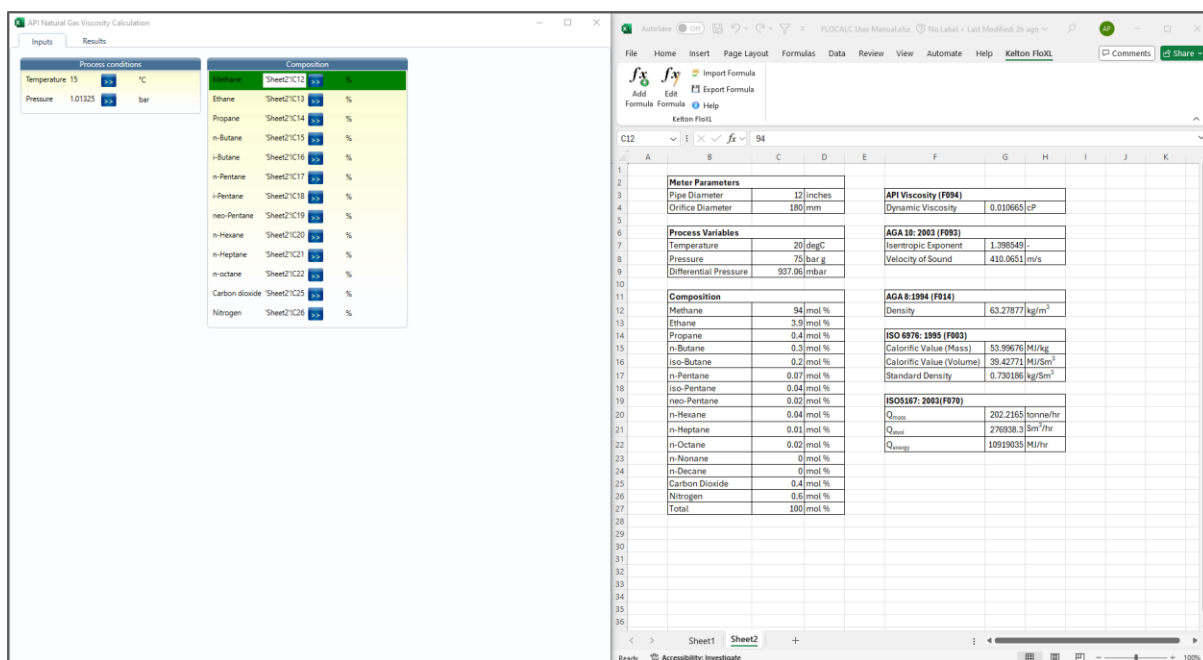


6.3.1 Cell Selection

To use this method, first select the desired cell within Microsoft Excel and then select >> 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.



6.3.2 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.

6.3.3 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.

The screenshot shows a software window titled "API Density Referral 2004 (Incl Amnd 2007)". The window has three tabs: "Options", "Inputs", and "Results". The "Inputs" tab is selected. Inside the "Inputs" tab, there is a table titled "Alternative conditions". The table has four rows, each representing a different condition. Each row contains the condition name, a cell reference, a button with ">>" text, and a unit. The conditions are Temperature, Pressure, Vapour pressure, and Density.

Alternative conditions			
Temperature	'Sheet1'!C3	>>	°C
Pressure	'Sheet1'!\$C\$4	>>	bar g
Vapour pressure	1.01325	>>	bar
Density	'Sheet1'!C2	>>	kg/m ³

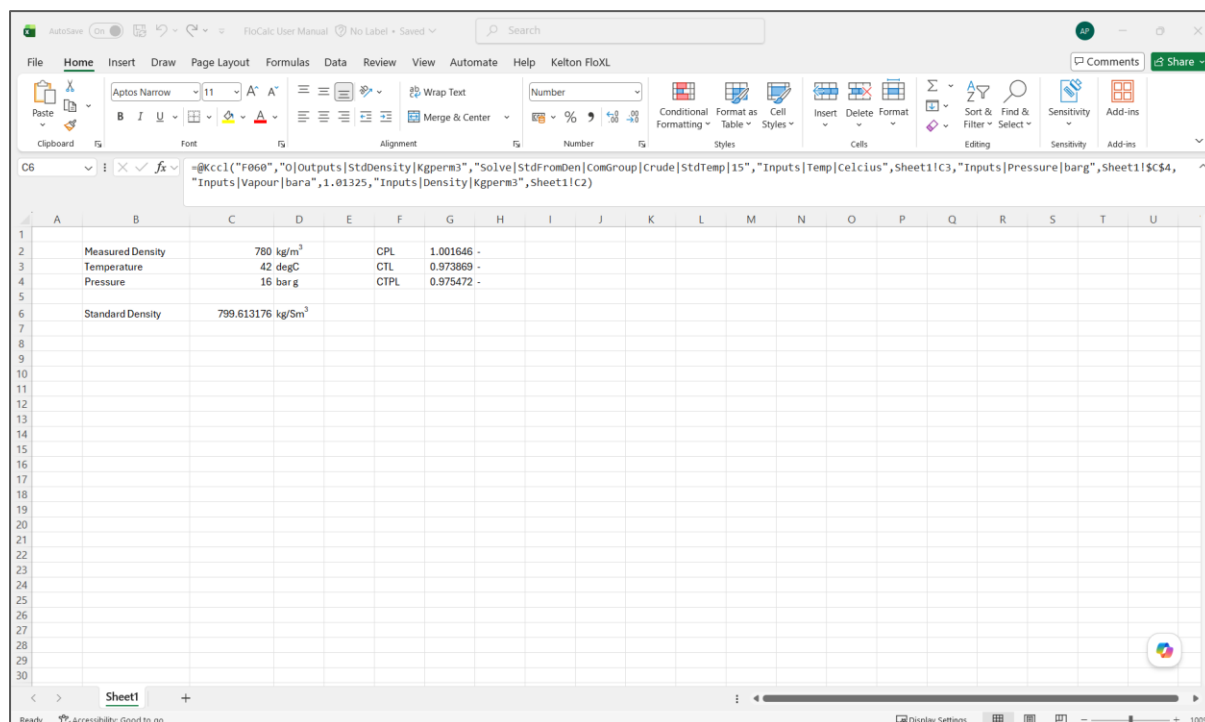
6.4 Results

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

Group	Name	Value	Units	Cell Reference
Intermediates	Thermal expansion factor at 60°F	0.000961279020095256	/°C	
Intermediates	Density at 60°F	799.186332875389	kg/m ³	
Intermediates	Scaled compressibility factor (Fp)	0.000102686974106542	/Pa	
Intermediates	Cpl	1.00164569544948	Scalar	
Intermediates	Ctl	0.973868978425998	Scalar	
Intermediates	Ctpl	0.975471670172184	Scalar	
Outputs	Standard density	799.613175708444	kg/Sm ³	'Sheet1'!C6

6.5 The Excel Function

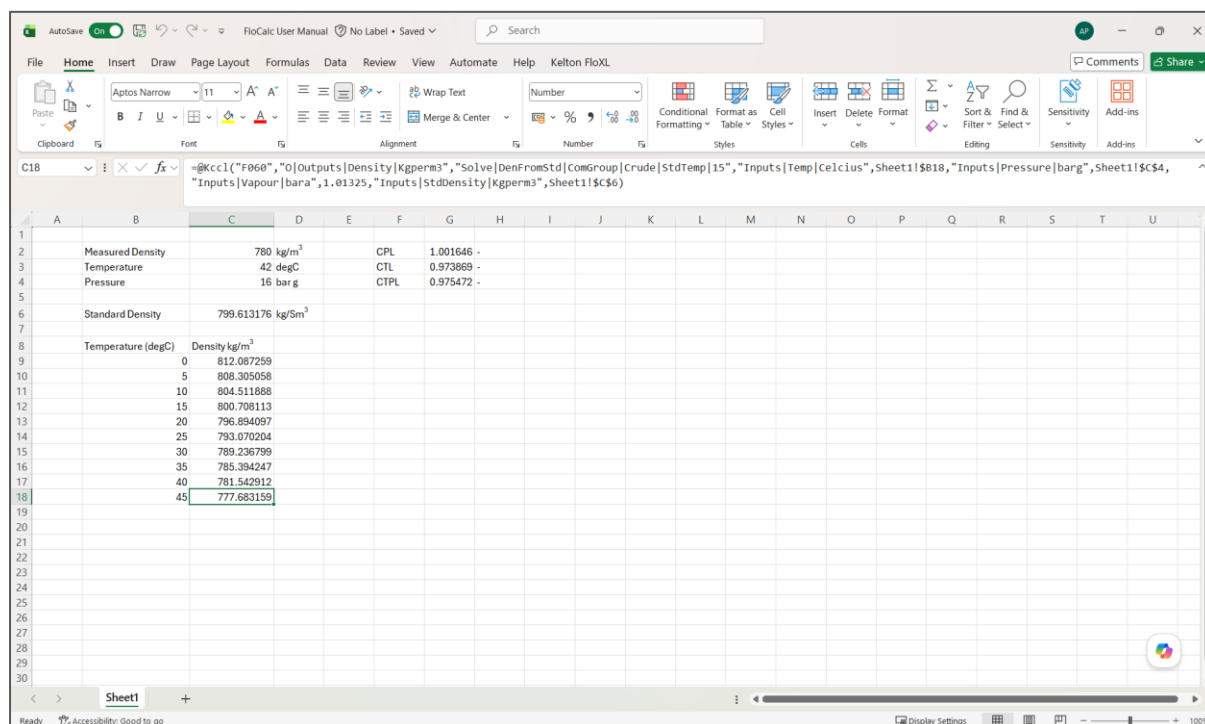
When the FloXL function is integrated with Microsoft Excel, it will be visible in the formula bar for the cell selected.



6.5.1 Editing FloXL Function

To edit a cell's function, select **Edit Formula** 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.



6.6 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.

The screenshot displays the 'API Density Referral 2004 (Incl Ammd 2007)' dialog box on the left and the Kelton FloXL spreadsheet interface on the right.

API Density Referral 2004 (Incl Ammd 2007) Dialog Box:

Group	Name	Value	Units	Cell Reference
Intermediates	Thermal expansion factor at 60°F	0.000961279019750111	1/°C	
Intermediates	Density at 60°F	799.186332875542	kg/m³	
Intermediates	Scaled compressibility factor (Fp)	0.00010480288142545	/Pa	
Intermediates	Cpl	1.00167966263856	Scalar	Sheet1!G2
Intermediates	Ctl	0.970943360072581	Scalar	Sheet1!G3
Intermediates	Ctpl	0.972574217358649	Scalar	Sheet1!G4
Outputs	Density	777.68315854304	kg/m³	Sheet1!C9

Kelton FloXL Spreadsheet:

The spreadsheet shows the following data in Sheet1:

	A	B	C	D	E	F	G	H	I
1									
2		Measured Density	780	kg/m³		CPL	1.001646	-	
3		Temperature	42	degC		CTL	0.973869	-	
4		Pressure	16	bar g		CTPL	0.975472	-	
5									
6		Standard Density	799.613176	kg/Sm³					
7									
8		Temperature (degC)	Density kg/m³						
9		0	812.087259						
10		5	808.305058						
11		10	804.511888						
12		15	800.708113						
13		20	796.894097						
14		25	793.070204						
15		30	789.236799						
16		35	785.394247						
17		40	781.542912						
18		45	777.683159						
19									
20									
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23									
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30									

6.7 Linking Calculations

Using FloXL is especially valuable when linking calculations. In this example, an excel 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.

