

## Overview

This guide provides an introduction to the basic operation of Data Analysis v4.0 (DA4) and an overview of the main features. It is not intended to provide a complete description of all of the available functions. The software has been written so that a “right mouse click” in the appropriate area will reveal a context sensitive menu so that users can manipulate and display data as desired.

There are a number of significant improvements over DA3 including

- A clearer user interface with intuitive, context sensitive menu system
- The ability to analyse results from different test methodologies in a single session
- More display options and greater flexibility

If you have any questions or would like more detailed advice on specific aspects of Data Analysis, please contact Freeman Technology on +44 (0)1684 851 551 or via [support@freemantech.co.uk](mailto:support@freemantech.co.uk).

## 1 Importing Test Files

When starting DA4, the window shown in Figure 1 will appear. If a DA4 session is already running, select ‘Import Files’ from the ‘File’ menu.

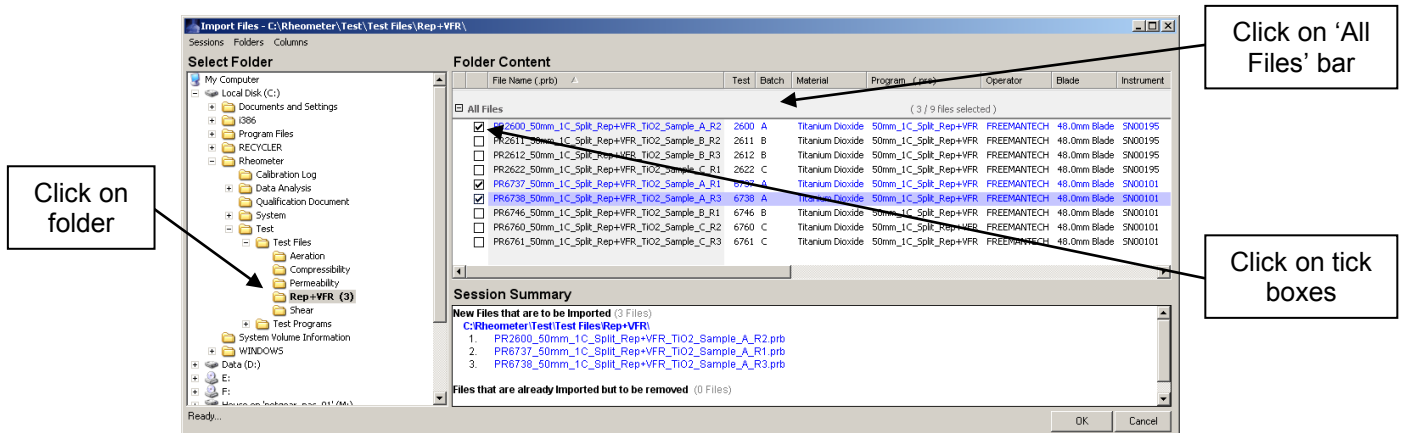


Figure 1: DA4 File Import Screen

Use the left hand column to navigate through the directory structure and find the required folder. Any Powder Rheometer (xxx.prb) files that exist in the selected folder will appear in the upper right-hand window. Several options are then available:

1. Right-click on a folder to import all files in that folder and/or sub-folders.
2. Right-click in the “All Files” border of the upper right-hand window to select files in groups.
3. Select individual files from the list by ticking the associated box in the upper right-hand window. Please note that you can use SHIFT and CTRL to create multiple selections.

Any files that have been selected will appear in the Session Summary. To import these files for analysis, click “Open Selected Files”.

To remove files, go to the File Overview tab in Overview (see **Reviewing Test Data**) and right-click on the file to be removed. To remove all files and start a new session, click Clear Session from the File menu.

## 2 Reviewing Test Data

The selected test data will be imported and sorted according to test methodology. The default display setting shows an Overview tab alongside a tab for each methodology. Each tab is then broken down into sub-tabs as described below.

### 2.1 Overview Tab

No	Program Type	Analysis Type	Graph Name	Data Files
1	Dynamic	Standard	50mm_1C_Split_Rep+VFR	2
2	Dynamic	Aeration	50mm_Aeration_3Rep_7(C+T)_0p5-22mm_s_+20up	2
3	Compressibility	Standard	50mm_Compressibility_0p5-15kPa	2

- **Graphs** – provides a summary of the type and number of test methodologies used in the imported test files.
- **File Overview** – provides data on each individual test file including variables entered by the operator and parameters derived from the test.
- **Index Overview** – shows derived parameters grouped by Material and Batch Code. Includes the option to display error values.
- **Hopper Design** – allows the user to generate Hopper Half Angle and Outlet Size of an axisymmetric and plane flow hopper if suitable test files have been imported.

Key Features of the Overview Tab:

- In File Overview and Index Overview, right-click on the table to open the data in Microsoft Excel or to export the data to the clipboard to paste into other applications.
- In Index Overview, right-clicking on the data will allow you to show the Standard Deviation and select how this is displayed.

### 2.2 Test Methodology Tabs

- **Main Graph** – shows the test points plotted in their familiar format as described in the various methodology help files. For further information see Working with the Main Graph
- **Index Graphs** – provides a flexible method for plotting information derived from the test files. Graphs can be configured to a user's specific requirements. See **Creating Index Graphs** for more detail.
- **Report** – allows the user to create a report for printing purposes which contains all of the information relevant to a group of tests.
- **Raw Data** – provides a method of further analysing the raw measurements made during a test. See **Reviewing Raw Data** for additional information.
- **Series Value Table** – displays the parameters derived from a test. Right-clicking on the table allows you to select the required parameters and export data.

### 3 Working with the Main Graph

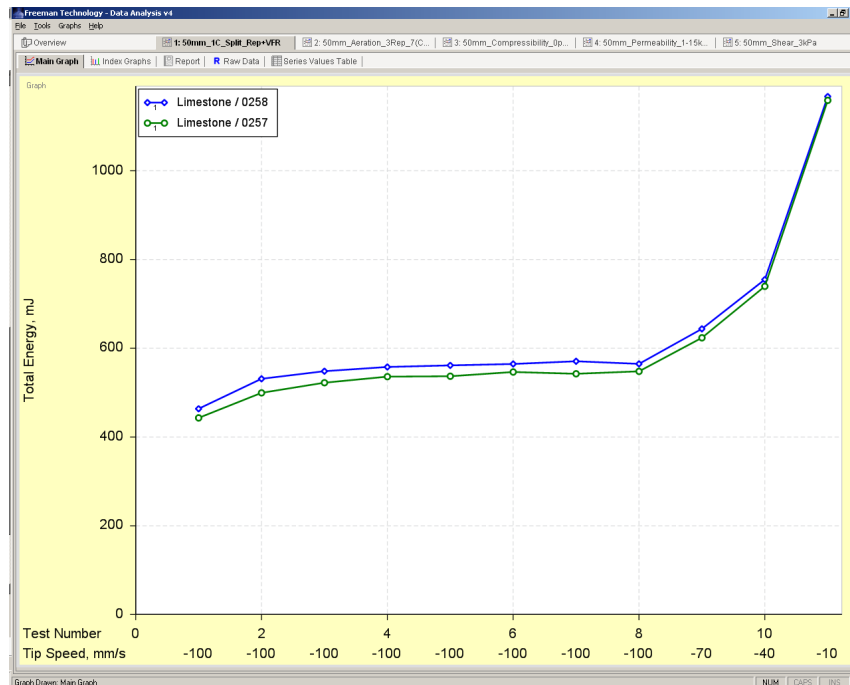


Figure 2: DA4 Main Graph

When reviewing data on the Main Graph, holding the mouse cursor over a data point will generate a window containing detailed information. Simultaneously pressing the 'D' key will also display the raw data plots for those data points. Holding the cursor between two data points and simultaneously pressing the 'D' key will display both the raw data plots allow direct comparison of the data. If the cursor is held on a specific data point, pressing the 'M' key will reveal additional information that was collected during the test.

As with most areas of DA4, context sensitive menus are available by clicking with the right mouse button. In the Main Graph, the key features can be accessed by right-clicking the main body of the chart, (shown in white in Figure 2). The main features are described below.

- **Manage Graph** – this is a key feature of the Main Graph and allows users to describe how the test data is displayed.
  - **Variables** – select the values to be displayed on the x- and y-axes.
  - **Data/Groupings** – define how the test data is grouped and displayed. Also allows features such as error bars, data cluster and Mohr Circles to be toggled.
  - **Legends** – provides the option for user defined legends and colour schemes.
- **Add or Remove Data** – this feature allows the user to show files generated from different test methodologies on the same graph by ticking the box next to the required file name. By expanding the information (click on the plus sign) specific data points or groups of data points can also be included or removed.
- **Add New Object** – select this option to add a text label, a line or arrow or a data table. The data table can be configured by the user to show the required data. Once in place, right-click on the table to amend or to remove it.
- **Export Image or Data** – provides options for exporting data to other applications.

## 4 Creating Index Graphs

By following the steps below, the Index Graphs feature allows users to create a customisable series of graphs displaying a range of application relevant test parameters.

1. Select the relevant test methodology tab and click on the Index Graphs tab.
2. Click the Create Index Graphs button to display the window shown below.

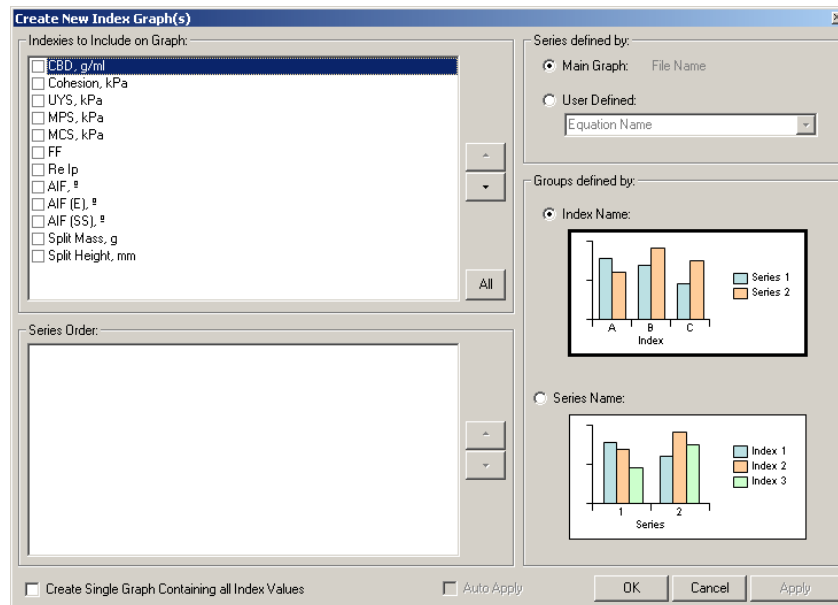


Figure 3: Index Graphs Menu

3. Tick the indices that are to be displayed in graphical format.
4. Use the “Groups defined by” box to select if the indices are grouped by parameter or by series name.

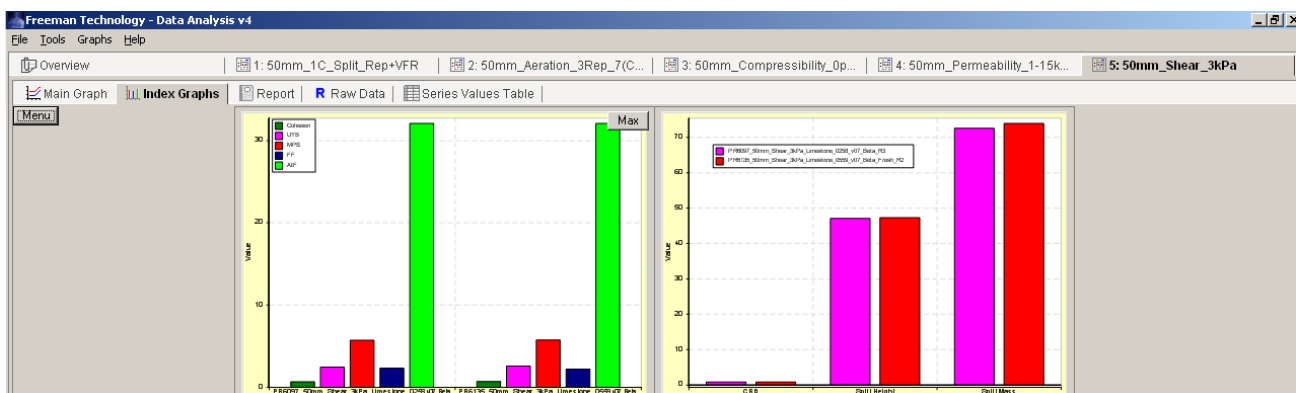


Figure 4: Example of Index Graphs

Each individual graph can then be maximised by clicking the **Max** button that appears in the top right-hand corner. Right-clicking on a graph in its maximised or minimised state will bring up a menu of relevant operations.

The **Menu** button in the top left-hand corner provides overall management of the Index Graphs.

## 5 Reviewing Raw Data

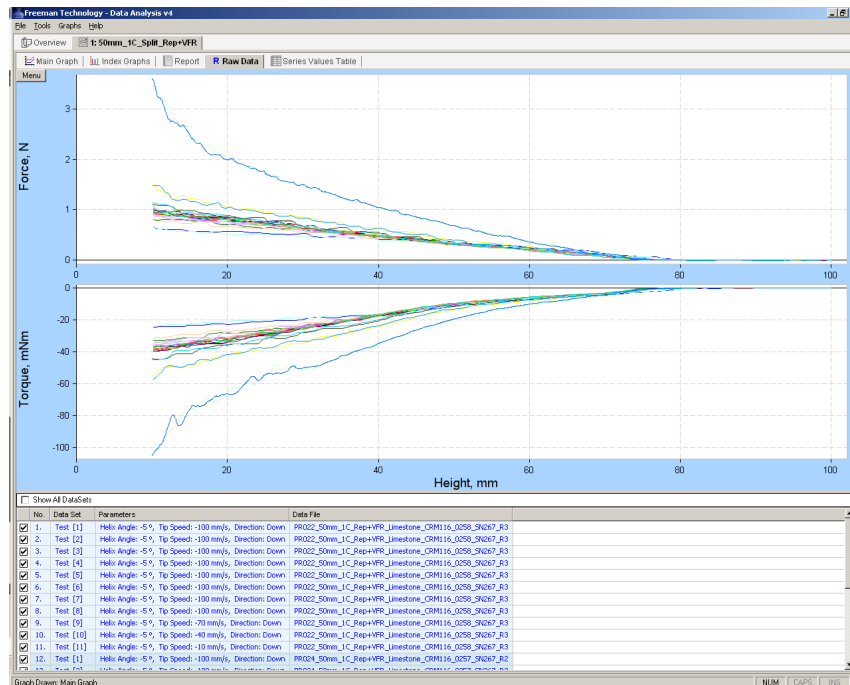


Figure 5: Raw Data Display

Operations for reviewing and analysing raw data are mostly available via location specific menus which are accessed by right-clicking on the relevant area of the screen. Some of the key functions are highlighted below.

- **Managing the Display** – the main graph area is managed by clicking the **Menu** button in the top left-hand corner. This menu allows users to select how many graphs are displayed and how. There is also the option to export the raw data graph as a range of image files.
- **Changing X and Y Axes** – right-clicking on the axis variable name, e.g. Force, Torque, Height, etc. brings up a list of other variables available to display.
- **Viewing Detailed Information** – hovering the mouse cursor over a specific trace will highlight that data set and display any relevant information. Double-clicking on the trace will zoom into that data set.
- **Zoom Function** – to zoom in on a specific area of the graph, drag the mouse cursor to create a rectangle over the area of interest and select the required option from the list that appears.
- **Selecting Data** – the list below the graphs allows users to select which data sets are displayed. Simply toggle the corresponding tick box to add or remove a data set. The tick box above the list allows additional data sets to be selected, e.g. Conditioning cycles or upward traverses. Further options are available by right-clicking on a data set.

## 6 Additional Information

### 6.1 Session Files

DA4 Sessions (xxx.da4) can be saved to prevent the user having to manipulate the data each time the same files are imported for analysis. Please note that Session files only record information on which files were used and how data was displayed and not raw test data. Subsequently moving the original test files (xxx.prb) to a different location will prevent the Session File from loading.. The **Save Session** and **Open Session** functions are available from the **File** menu.

### 6.2 Options

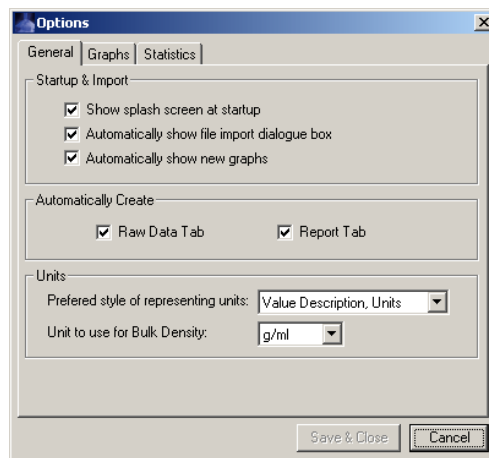


Figure 6: DA4 Options Menu

DA4 **Options** can be accessed via the **Tools** menu and allows the user to define preferences for features such as the start-up screen, how units are displayed, default colours and error calculations.

### 6.3 Create New Main Graph

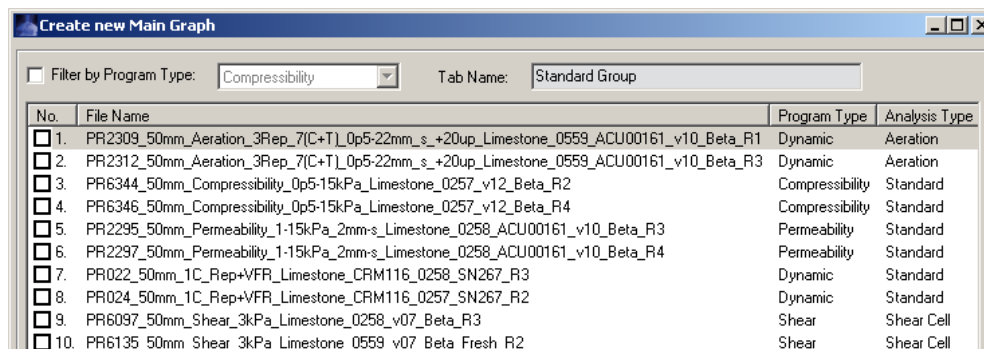


Figure 7: Create New Main Graph Menu

The **Create New Main Graph** function in the **Graphs** menu provides another method of creating a user defined graph. By ticking the relevant box, the results of different test methodologies can be displayed and analysed together.

## 6.4 Help

The **Help** menu provides quick access to this user guide and allows the preferred language to be selected. Information is also provided on the current installed version and allows the user to check for and download updates.