

Data entry errors will inevitably occur when developing a model. Simple keystroke mistakes may result in a pipe length of 10mm instead of 10m, a set flow of 10 l/s instead of 10 m<sup>3</sup>/s or an elevation at 0.0m when the real value should have been reset to 10m.

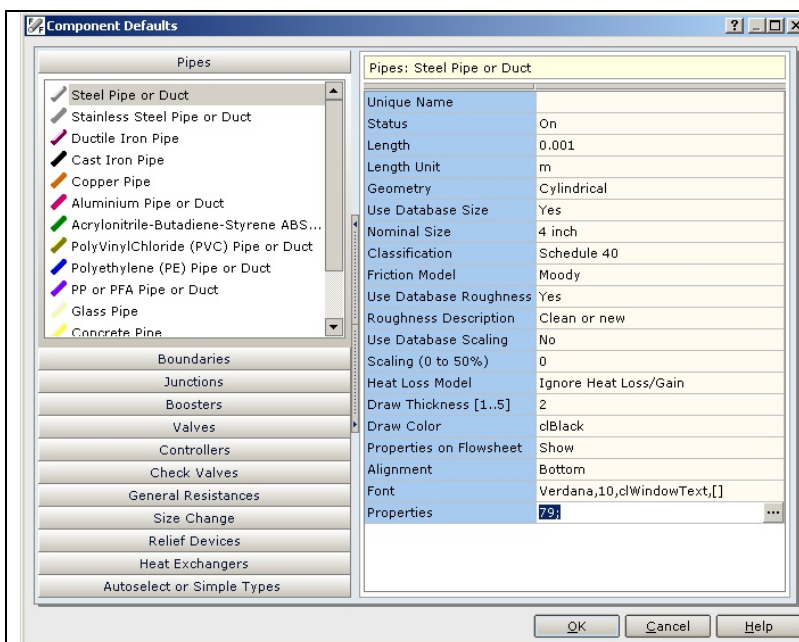
FluidFlow3 provides a number of options that enable you to quickly and efficiently check your data. These are:

- Setting the Default Values for each component.
- Displaying visible properties on the flowsheet.
- Using the FlyBys.
- Using the multi-selection and/or Lists Inspector with the Reporting facility.
- Using the multi-selection and/or Lists Inspector with export to Excel.
- Using Scripts.

## SETTING DEFAULTS

Whenever a component (element or component toolbar icon) is added to a model, *FluidFlow3* uses the pre-set default values or characteristics for that component. The default values can always be overwritten via the Input Inspector but pre-setting the default values makes the entering of data quicker and less likely to error. For instance, if the next five pipes to be added to the flowsheet are all to be 4" schedule 40, then prior to adding these pipes the default should be set accordingly. Existing pipe values will remain unchanged, but new pipes will reflect the default values.

[Options][Environment][Component Defaults] or **F4** brings up the dialog shown below:



The left-hand column lists the component groups available in *FluidFlow3* (same as the Tabs on the Component Toolbar).

Select any component group and the underlying elements are displayed.

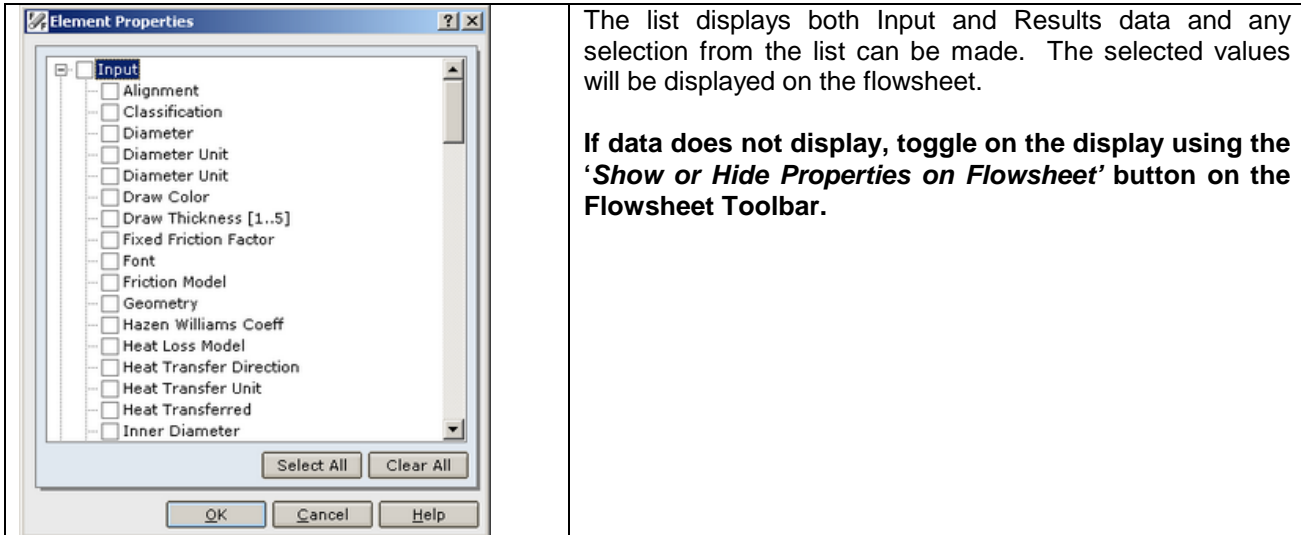
Select an element and its defaults can be set in the right hand column.

## VISIBLE PROPERTIES ON THE FLOWSHEET

Any input and output (results) data associated with an element can be displayed on the flowsheet. This is activated from the 'Properties on Flowsheet' field of the Input Inspector by selecting the option 'Show'. This activates three choices:

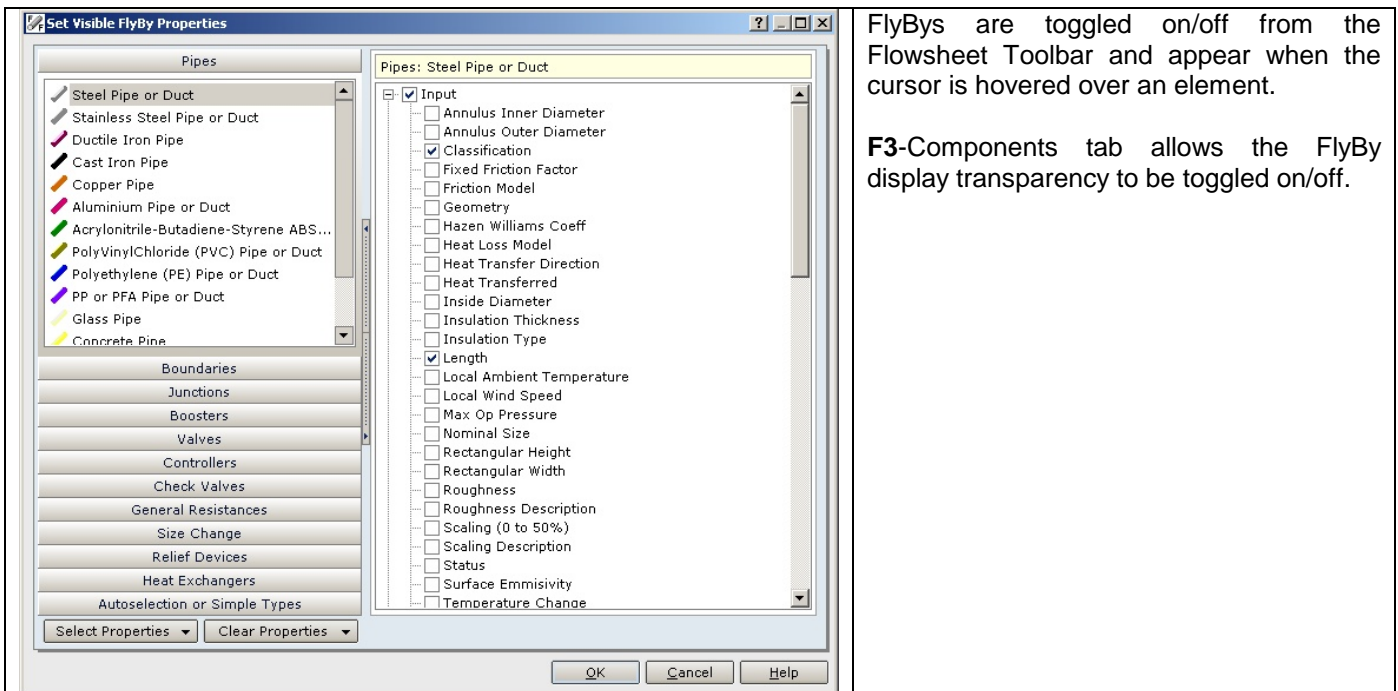
1. Alignment of the text on the flowsheet in relation to the element.
2. The font.
3. The Properties to be displayed.

Selecting 'Properties' will display the following dialog ...



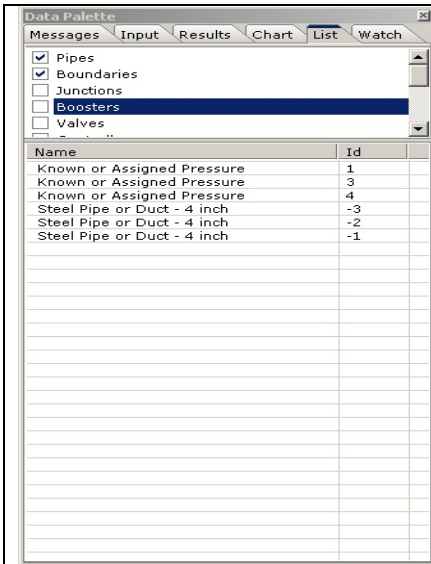
## FLYBYS

[Options][Environment][Fly By Options] or **F6** brings up the dialog show below (similar to Default Settings). You can select those properties you want displayed by FlyBys.



## LIST INSPECTOR AND REPORTS

The List Inspector provides a very powerful method of selecting particular groups of elements.



The image left shows the two List Inspector windows, the upper window showing tick boxes for groups of elements (mirroring the Component Toolbar tabs) and the lower window showing the selected groups of elements.

Hover over the lower window and right-click. Sorting and Name display options are available. Hover over the upper window and /right click/ and the Pop-up displays.

Selections from the list in the lower window can be made utilising the normal Windows techniques of <Shift>-click and <Ctrl>-click.

***The List Inspector is synchronised with the flowsheet so that selected items in the list will be highlighted on the flowsheet and vice-versa.***

Instead of using the List Inspector the usual multi-selection capabilities of FluidFlow3 (<Shift>-click on elements on the flowsheet) can be used to select groups of elements.

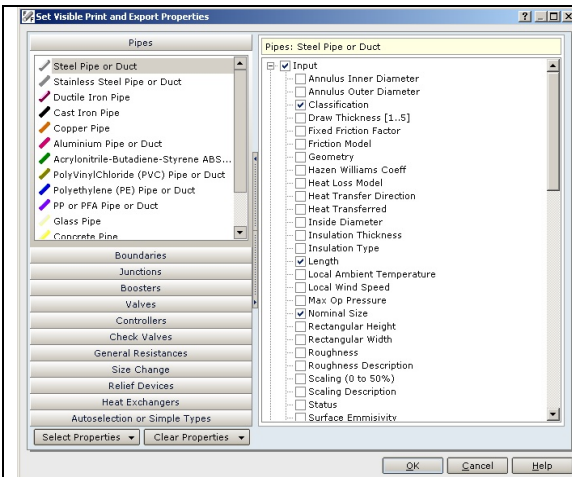
***Having selected groups of elements, selected properties can be displayed in a report for checking.***

## REPORTS

FluidFlow3 has two reporting capabilities:

- FluidFlow3's internal report writer.
- Export to Excel

Data to be included in each type of report are set in an identical manner as shown in the image below accessed from [Options][Environment] or **F7** for FluidFlow's own report or **F5** for an export to Excel.



For each individual component - Input and Results - data can be user-selected for inclusion in the report. These settings are specific to each component. The selections represent the **column headings** of a table-type report.

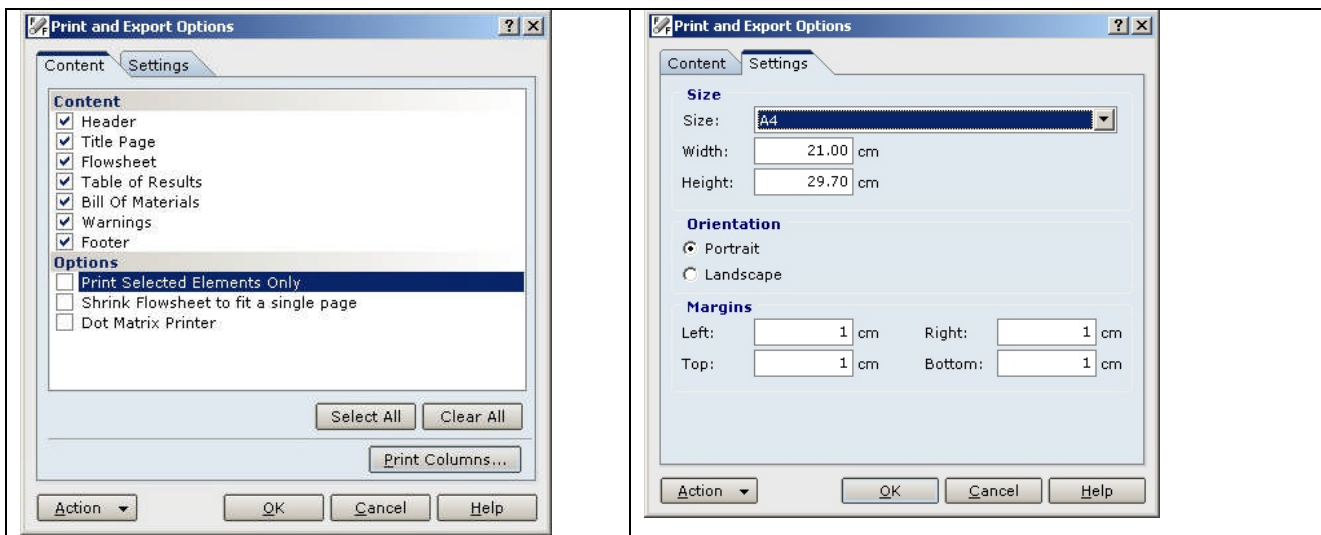
Example: for a report comprising the Classification, nominal size and length of all steel pipes in a model, select only these properties. (Initially you should clear all element properties from the Clear Properties button).

The report will then display only this data – allowing a visual check.

## REPORT PRINTING

### Report Content

To print a report (or for preview) the **Print Content** must be set from [File][Print Content]. For a checking table, select only **Table of Results** from the dialogs below.



[File][Export][Excel Content] brings similar dialogs.

## Creating a Check Report

Checking pipe lengths:

1. Create either a FluidFlow3 or Excel report comprising simply the Pipe Length property (for the pipe material in question).
2. Multi-select the relevant pipes either from the List Inspector or direct from the flowsheet.
3. Set up the report to shown only *Table of Results*.
4. Set the report options to *Print Selected Elements Only*.
5. Print Preview or Export to Excel.

From Print Preview you can check data by eye. From Excel you can sum data for overall lengths.

## SCRIPTS

Scripts allow 'Goal-Seek and Control' and 'Extended Time' simulations to be programmed using Fluidflow3's own programming language. A Script could be developed to check data.

For example the Button Bar displays a Script List Button.

Multi-select the pipes along a pipe run. Then from the Script Lists button select *Get Highlighted Pipe Lengths*. The total of the selected pipe lengths will be displayed.

## CONCLUSION

The various techniques described above allow the design engineer or reviewer to check the data input and performance of a model. Using FlyBys you can quickly roam the model to check crucial data, or perhaps search for the hydraulically most remote sprinkler in a large deluge system.

A tabular FluidFlow3 report allows you to inspect data while export to Excel allows for more sophisticated checking – say ordering data to observe physical properties that are out of kilter with expectations – for instance pipe lengths of mm instead of m.

The script pipe length capability is ideal for checking overall lengths between locations – say the total length of pipe along a pipe rack.

## Other Checking Capabilities

FluidFlow3 has other features to provide feedback to the design engineer, for example:

- Desired operational or performance ranges can be user-defined for many components and if the model solves with the component performing outside the range a warning is enunciated. For instance maximum and minimum pipe velocities can be set, or maximum and minimum flows for a pump.
- Control valves are flagged if they perform outside user-defined limits.
- Absolute negative pressure is detected.
- Sonic conditions are detected.
- The pump chart provides a quick check on system performance.
- If a pipe length is less than the elevation difference between its ends a warning will be enunciated

Activate the Warnings and Hints button for a full list.

Finally, the Message Inspector lists all the messages and warnings associated with the settings made in Warnings and Hints and the flowsheet will flag red any element that has an associated message.

**Data checking and equipment performance feedback are in-built capabilities of FluidFlow3.**

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