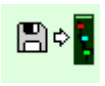
D08 • Survey panel

Accessed in the control panel with 


Infos/New: Create a new survey and/or enter survey name and surface flowrates if available


Load: Load Log Data in the active survey


Load Station: Load Stationary data in the active survey

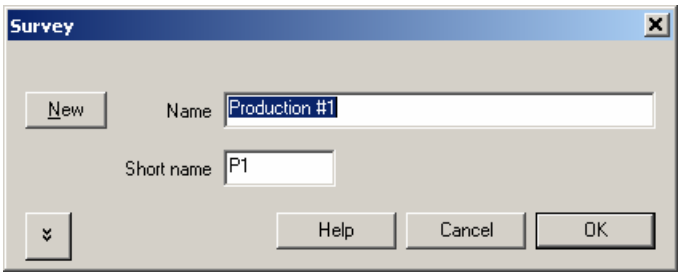

Tool Info: Enter/review characteristics of the tools used in all surveys


Stretch: Interactive depth stretch definition for passes in the survey


Interactive stretch definition on a selected zone only. The definition is done using a channel of the active pass. The resulting modification is applied to all channels of that pass.


Spinner Reversal: Interactive definition of reversal depth for unsigned spinners

D08.1 • Info/New



The first time this option is opened in a session Emeraude automatically creates a first survey, called “Survey#1”. When a survey already exists, a dialog is displayed where the following information can be viewed/edited:

Name

Used in the data browser and the survey selection drop list of the main toolbar.

Short name

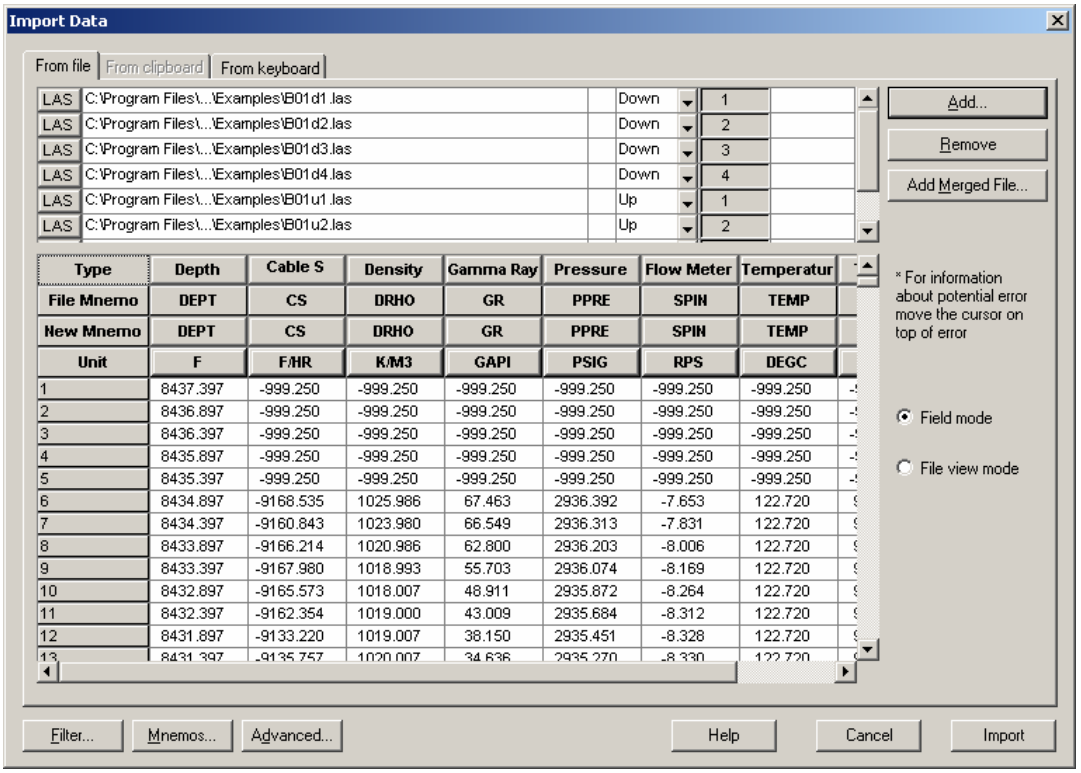
Used in some options such as user views, in order to construct a name for the survey channels that indicates their origin (see Data naming convention, section D02.3).

Surface rates

A click on the  icon gives access to the surface conditions and rates allowing you to enter the value of the surface rates at their corresponding temperature & pressure conditions (see Chapter D09.16).

D08.2 • Load

The Load option uses the same generic dialog as the General well data (see chapter D04 for details).



For each pass (except stations), the type and index in the type are defined.

For each channel, the type and mnemonic are defined. Loaded data will be added to automatic plots and will be found in the data browser, gathered below the “Log Data” icon in the active survey.

D08.3 • Load Stations

Stations can be loaded in the same manner as Up/Dow passes. The expected format is one station per file (ASCII, LAS) or per logical file (LIS). The station depth may either be imported from the data file, or manually specified by the user at load time. A time channel, if present in the file, can be loaded and later visualized in the data browser. Station data vs Time can be visualized in the Plot vs Time tab of the Data browser.
When loaded, stations appear in the data browser with a particular symbol: ↔ Loaded data are added to automatic plots and will be found in the data browser, gathered below the “Log Data” icon in the active survey. Stations appear with a particular icon, and their channels are plotted with a particular aspect.

Plotting

The default aspect for a station uses symbols (circles) with a size of 4 pixels. This aspect is used when a station channel is plotted on an automatic plot, or dropped onto a user view. The symbol aspect is given as long as Emeraude knows a particular channel belongs to a station. If one copies a station channel to the Data Store, and then drops that copy onto a user view, the default aspect will revert to that of the Data Store (plain red line) and it will be necessary to manually change this aspect in order to see the curve on the plot. *All measurements are plotted for the same depth even though they should be set in agreement with the tool string geometry. Stations however are only relevant in zonal calculation, which attribute the same depth value for any channel, across the zone. In other words, once in a calculation/calibration zone, the exact position of the measurement within that zone does not matter.*

Calibration using stations

When stationary spinner measurements fall within a spinner calibration zone, they will be used for the calibration. Emeraude automatically assigns a 0 cable speed velocity for those points.

Rate calculation using stations

A particular measurement, available only within stations, can be used in the interpretation provided that a merge is first constructed. For instance if an oil velocity Vo is found in stations 1, 2, 3, one must construct a single channel gathering the three depths using the Merge option. In the data browser, similar options to those of the Lateral average have been added for the Merge: compute from list, compute from object.
The Merge is also accessible directly via the “Define” button of the interpretation Infos/New dialog. When at least a station channel is selected in this dialog, Emeraude calls the Merge. If all selected channels belong to either Up or Down passes, the Average is executed instead.

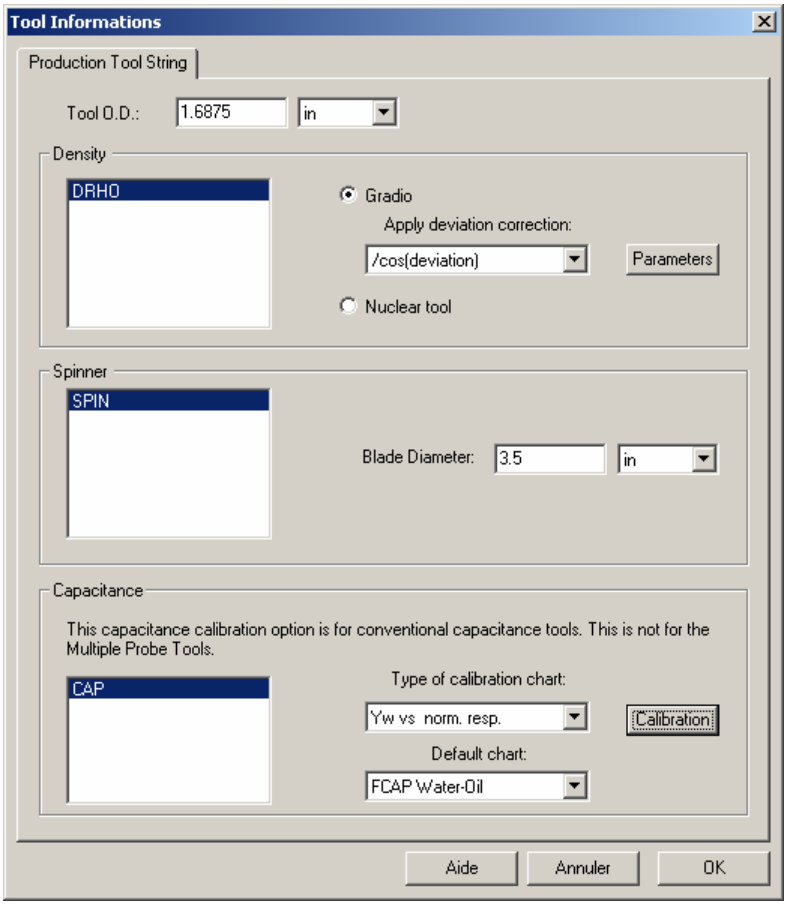
D08.4a • Tool info

An Emeraude session contains the list of tools from which data has been loaded. Tools are defined only when needed in the interpretation (spinner, temperature, pressure, density, capacitance). Those tools do not constitute all the possible interpretation inputs. Emeraude can also handle and regress on:

- Any phase holdup measurement

- Any phase velocity measurement, or mixture velocity
- Any phase rate measurement, or mixture rate

A tool object is defined by a data type and a mnemonic. It stores specific information such as the blade diameter for a spinner, the required deviation correction for a gradio, etc. As the tool list is stored at the level of the session, and not the survey, all channels with the same mnemonic are considered to be acquired with the same tool. So tool properties need to be defined only once, no matter how many surveys use a given tool.
The tool info dialog contains also a second tab for Multiple Probe Tool. Target tools include the Schlumberger DEFT, GHOST, and Sondex CAT (see section D08.4b below).



Properties entered in this dialog are:

Tool O.D.

Used friction calculations when the density measurement does not come from a nuclear tool.

Density

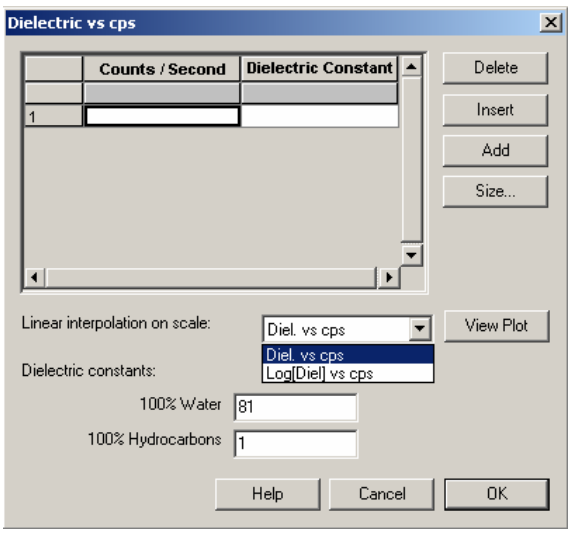
The list shows all available density mnemonics in the survey. The density section is used to characterize the type of density tool(s) used. For a gradio, a drop list indicates the applied correction. The default is based on the mnemonic and should always be checked. *See section E01.1 for details on density handling.*

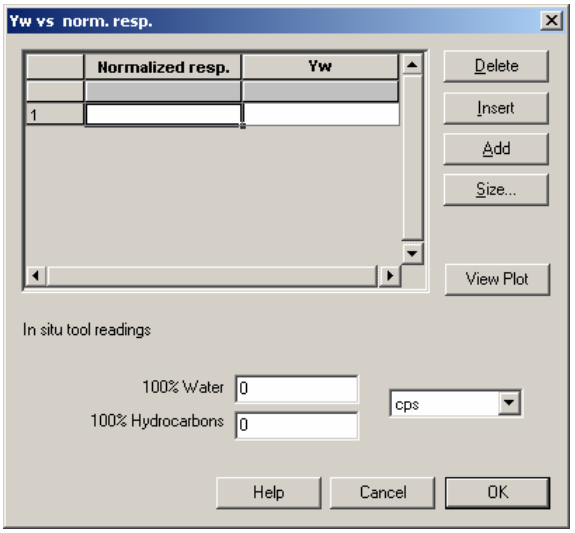
Spinner

Spinner blade diameter: the ratio of this diameter with the pipe I.D. is used in the determination of the average mixture velocity.

Capacitance

A capacitance calibration is defined by a calibration chart together with in-situ measurements in 100%water and 100%Hydrocarbons. There are two possible calibration modes in Emeraude:
- Chart is counts/sec vs. the dielectric values ; in-situ values are dielectric
- Chart is Water holdup vs normalized tool response; in-situ values are count/sec.

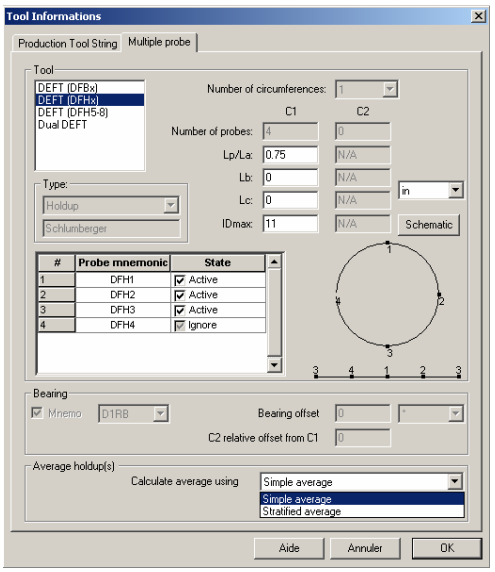




The “View Plot” button displays the calibration chart graphically.

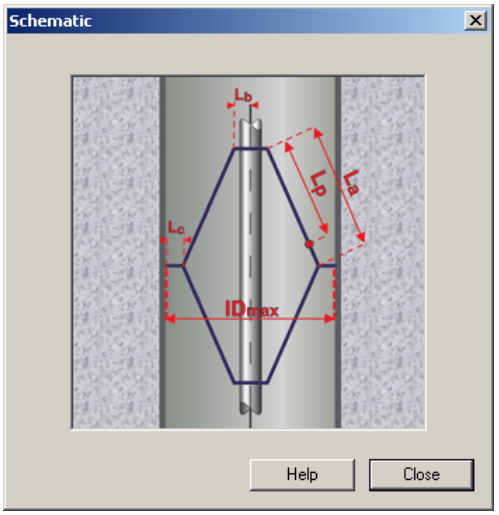
D08.4b • Multiple Probe Tool (MPT)

A new tab in this dialog, labeled “Multiple probe”, is dedicated to MPT. It shows the list of MPT loaded in the current survey, as identified on the basis of the tool definitions available under the application settings (see D06.6).



For each tool the dialog shows a summary of the associated configuration (Type, Company name, Number of circumference, Number of probes, and Bearing parameters). No edition is allowed at this level, but changes can be made inside the Settings panel.

Geometric parameters are entered at this level: Lp/La and Idmax; they are defined in the “Schematic” dialog opposite.

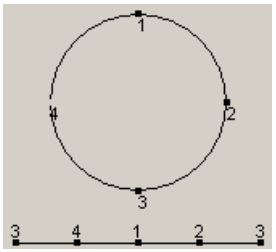


The tool geometry is not required for:

- the creation of image views
- the calculation of holdups using a simple (or arithmetic) average or the CAT specific processing.

The geometry must be defined:

- To access the “stratified average” holdup calculation
- To visualize cross-sections of the wellbore



This schematic shows at the top, the probe configuration, and below the logic for image display. An image is obtained by treating the top circumference as a ribbon that is opened at the bottom, and then laid flat. When there is no rotation, or when it is ignored, probe 1 is at the middle of the track as illustrated here, and both edges correspond to probe 3 where the circle was opened. With rotation, the center of the image track is the top of the pipe and edges are the bottom.

The user can change each probe status between Active, Ignore, or Disable, which will impact images created for that tool, and also reference channel processing.

The probe status works as follows (see D05.7: ”Image View” for examples)

- Active: the probe reading is used for images and reference channel processing.
- Ignore: the probe reading is ignored on images; interpolation between the two neighbor probes is done instead. For reference channel processing, that particular probe reading is also ignored.
- Disable: show a black track for the corresponding probe on images. Same as above for the reference channel processing.

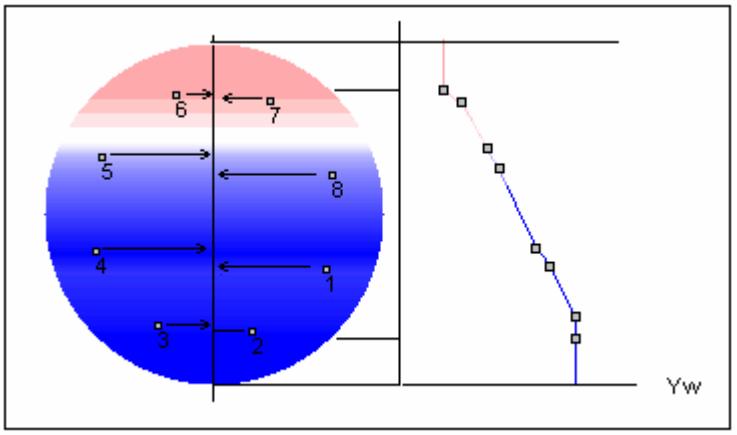
Reference channel processing

When a MPT is present in the survey, you will be able to generate corresponding reference channels directly from the Interpretation Infos/New dialog (see section D09.4). How to get reference channels lies on the ability to calculate for each pass, a representative average holdup. The following options are selected in Tool/Infos:

Simple average (all tools)
When simple average is selected the average holdup(s) for a given pass is(are) defined as an arithmetic average of the holdup(s) at the active probes.

Stratified average (all tools except the built-in CAT tool for which a dedicated processing exists - see below)

A projection of the probe readings is done on the vertical axis. A linear interpolation is used on this axis up to the top and bottom values. Outside, the last value is extrapolated.



At every depth the average holdup is calculated based on the cross-section map. The simple stratified average option requires the definition of the tool geometric dimensions, Lp/La, IDmax (see previous page), and the internal diameter. The internal diameter is read in the pass, if found, or else in the General Well Data.

Sondex stratified average (CAT only)
With segregated flow, a simple average will not give a realistic holdup value. For the CAT, Emeraude connects to a tailored processing developed by Sondex. For the CAT, it is assumed that the supplied probe data must be normalized readings, between 0, corresponding to gas, and 1 corresponding to water.

Furthermore, the normalization which will have been done beforehand should have been made is such a way that the oil point has a fixed value between 0 and 1.

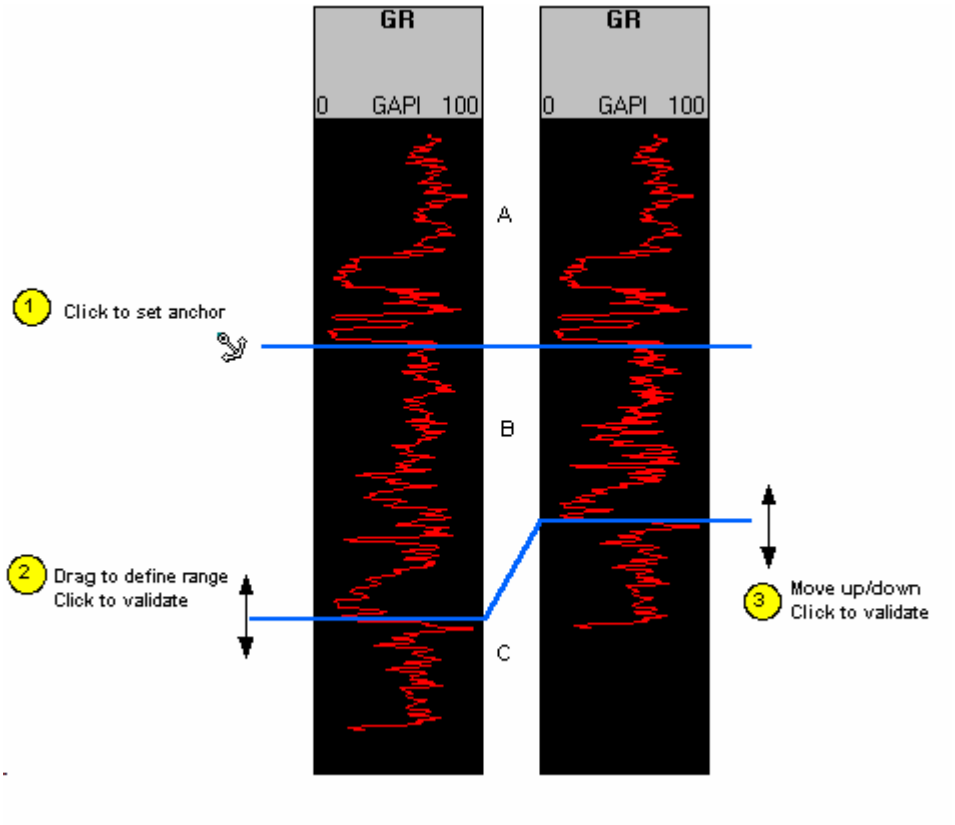
For tools other than the CAT you should use the average holdup provided by the Service Company when segregated flow is encountered if this curve includes specific corrections taking into account the flow geometry.

D08.5a • Stretch - Interactive definition

The stretch is global and applies to all Log Data in the survey (up or down passes). It is defined by a fixed depth **d0** and a stretch coefficient **a**. A given *Depth* is then changed into: **d0 + a (*Depth* - d0)**
After clicking the Stretch button of the Survey panel, click and drag the mouse in one of the automatic plots. The point where the mouse is clicked is fixed; the depth is changed around this position, squeezed or stretched depending on the mouse direction. The change is illustrated in real time with the channel of the active pass.
The stretch values can be viewed/edited in the Depth stretch dialog, accessed in the Log popup menu or the button of the Scale toolbar – section D03.5.

D08.5b • Zone Stretch - Interactive definition

The “zone stretch” option is used to stretch a specific zone only. The operation is defined on a curve of the active pass. Changes apply to all the channels of that pass. On the figure next page, it is assumed that the plotted Gamma Ray curve belongs to the active pass. After selecting the Zone strecth option, the operation is executed in 3 steps:



On the previous example:

- Zone A remains unchanged
- Zone B is “squeezed”
- Zone C is shifted

Zone stretch can also be defined of a user view. The channel modified is the one currently active on that view, and it must belong to the active pass.

The zone stretch is applied dynamically to the pass data. The parameters of the operation, namely the depths corresponding to points 1,2, and 3 on the figure, can be viewed/edited in the Pass Information dialog.

Emeraude supports only one dynamic operation of this kind. If you apply a second zone stretch, the raw data is first modified to represent the operation of the first zone stretch.

D08.6 • Spinner reversal

Some spinners do not recognize their direction of rotation and always produce a positive output. In this situation, it is the interpreter's task to correct the spinner sign.

In the pass toolbar:

Activate the pass where you want to reverse the spinner using the active pass drop list or select the "Nearest Curve" button and click on or close to the spinner to be reversed.

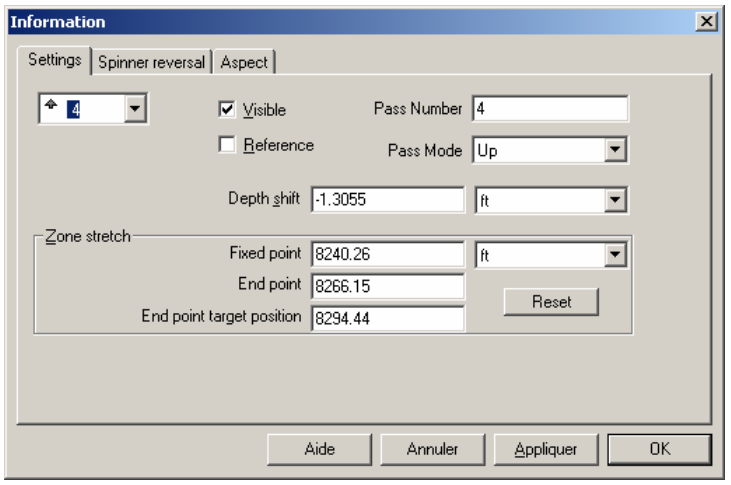
Selecting the spinner reversal icon, click at the depth required for spinner reversal to take place in the flowmeter log. This opens a dialog and the decision to reverse above or below this point must be made. Validate as appropriate. Different spinners must have different mnemonics and are thus plotted on different automatic plots. The reversal applies based on the plot where the definition is made.

The spinner reversal depths can be deleted or edited by clicking on the button in the Pass Toolbar, and choosing the "Spinner Reversal" Tab. A table is displayed with the usual grid editing facilities. The spinner values are unchanged above the first reversal depth. The subsequent reversals are cumulative. Below is an example with two reversal depths indicating how the reversal takes place:

100	Original spinner value above 100 ft
200	Values reversed between 100 and 200 ft
	Original values below 200 ft

D08.7 • Pass Settings

in the pass toolbar or in the data browser (see browser options, section D05.2)



The pass settings are listed on the next page. Some of them may also be defined/changed in the pass toolbar as indicated by the second table column:

Setting	Pass toolbar option	Remark
Visible / invisible		An invisible pass is ignored in all calculations
Reference		A reference pass is displayed in white.
Pass		Not editable is the toolbar
Depth shift		The toolbar option is interactive (Depth match)
Tool shift		View/edit specific tool (i.e. mnemo) shift

In addition, the dialog shows the settings of the last zone stretch operation (see D08.5.1). Only the last operation of this kind is reversible.

D08.8 • Depth Match

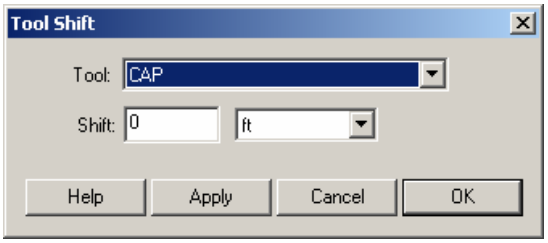
Depth shifting can be defines for an entire pass or for a given tool.

Depth match for an entire pass:  option of the pass toolbar
A reference log (e.g. a gamma ray log) can be loaded using the “Load Well Data” option of the Job/Well mode. This reference log appears on the automatic plot showing the gamma ray logs in the active survey if the loaded channels have the same mnemonic (this can be ensured at load time). If the mnemonics are different a user view can be created showing the desired channels.

After selecting a depth interval with well correlated features, and possibly after maximizing the gamma ray plot by a double click on its title bar, the depth matching proceeds as follows (all referenced icons are found in the pass toolbar):

• Select a pass by using the pass drop list  or by using the “Nearest Curve” option 
• Highlighted  the active pass for a better view
• Click the shift button 
• Drag in the GR plot
The value of the shift can also be set in the Pass Settings dialog.

Depth match for a given tool: **“TS”** option of the pass toolbar Allows a depth shift to be defined for a particular mnemonic inside the current survey. The corresponding option of the pass toolbar opens a dialog listing the possible mnemonics and the associated shift value.



A given depth “d” is modified by the shifts and stretch in the following order: d0 + a.[(d + TS) - d0] + S where:
• d0 and a define the stretch fixed depth and factor
• TS is the tool shift
• S is the pass shift

An eventual zone stretch is applied last.