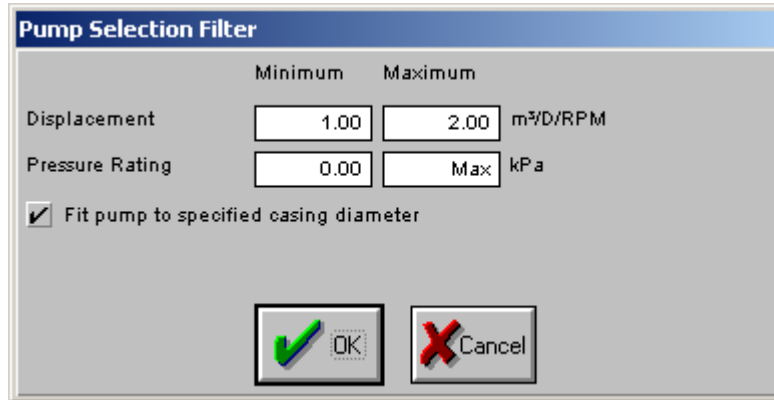


User Guide Addendum for PC-PUMP V2.65

Please refer also to the PC-PUMP User Guide (V2.63) and the V2.64 User Guide Addendum.

Pump Filtering

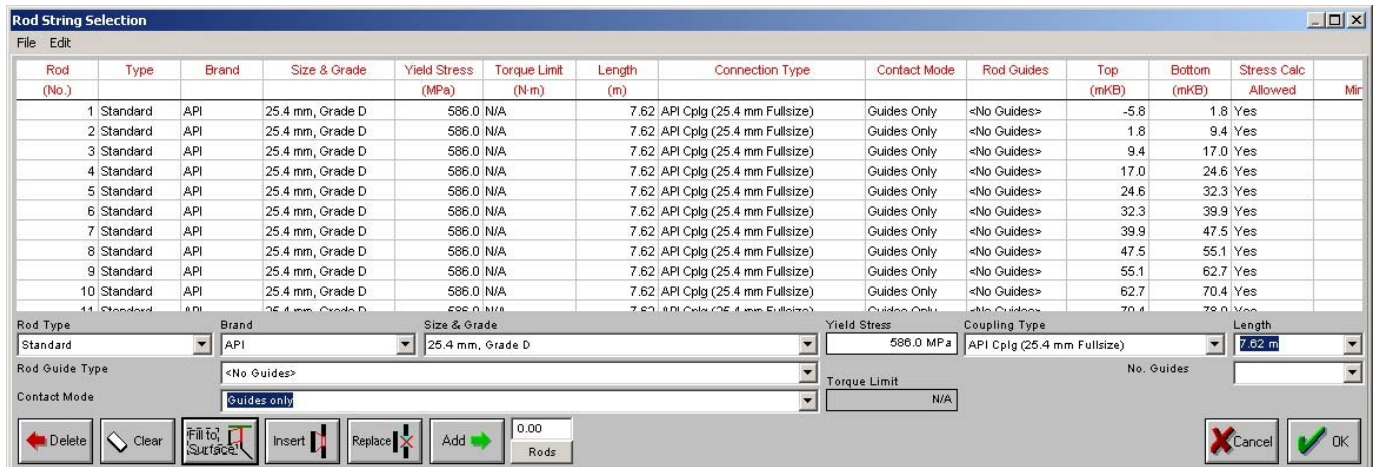
The Pump Filtering option was added to PC-PUMP a few years ago, but has two new features in V2.65. First, the computer will now remember the settings entered in the window. Second, there is now the option of filtering pumps to find only those pumps which will fit inside the selected casing. This option is activated using a *check box* in the filter window:



This option will only be available if a pump seating depth has been entered, and casing has been specified from surface down to the pump seating depth (or deeper). This will be useful for users who have to find pumps which will fit in limited-diameter wells.

Sucker Rods

There are three changes to the *Rod String Selection* window. The first change is that rods from different manufacturers are now available for selection (previously rods were all assumed to be API standard rods). There is now a drop-down box for selecting the “Brand” of Rod. In the *Brand* box, there is an “API” option for selecting a generic rod conforming to the API standard. There is also a “mod. API” option for selecting rods which meet API standards except with different-size pin connections. In addition, there are one or more specific manufacturers listed for all types of rod (standard, continuous, and hollow). If “API” or “mod. API” rods are selected, you can edit the default yield stress provided by the program. You cannot edit the yield stress provided for specific manufacturers’ rods.




The second change is how rods with off-size pins are selected. This is now selected in the **Size & Grade** drop down box. The nominal pin size will be listed in parentheses if it is different from the rod body size. Some manufacturers list these, but we have also included a variety of combinations in the “mod. API” brand. Note that yield stress calculations depend only on the rod body size, and not on the pin size.

The third change is the incorporation of a Torque Limit concept. Some manufacturers have provided torque limits for their rods. **PC-PUMP** will compare the maximum calculated operating torque to the specified torque limit, and provide this as an output in the **Rod Loads/Deflections** window (as well as in the Summary Output Parameters). This may not be available for all rods. In addition, manufacturers were given the freedom to decide whether the existing rod stress calculations in **PC-PUMP** (e.g. max. effective rod stress) should be applied to their rods. Therefore, for some rods, the comparison with torque limit or yield stress may not be available.

When using the torque ratings specified by the rod manufacturers, remember that this does not take into account any effects of axial loading. (The Effective Stress and EDF calculations do consider axial load.) Different manufacturers may provide torque ratings determined based on different levels of axial load, and these may be quite different from the axial load in your particular case. Different manufacturers may include different safety factors as well. **To C-FER’s knowledge, currently there is no standardized method for specifying the torque rating of a sucker rod.**

Gas Well Dewatering Applications and Coalbed Methane Wells

In earlier versions of **PC-PUMP**, the amount of gas produced from a well was entered by specifying the Gas-Oil Ratio (GOR). There was no way of specifying the amount of gas if there was no oil, as would be the case in a gas well dewatering application. In V2.65, you have the option of entering the GOR or Gas-Liquid Ratio (GLR). In the fluid properties section of the **Analysis Inputs** window (when multiphase flow is selected), you will see the following input:



The image shows a software interface element consisting of a button labeled "Producing GOR" and an adjacent input field. The input field contains the number "0" and the unit "m³/m³".

You can click on the button and the words will change to **“Producing GLR”**. In addition, the number in the input box will change as appropriate. (That is, if a GOR was entered, and then the button changed to GLR, the number will change to the calculated GLR.) If the BS&W is 0, then GOR and GLR are equal. If the BS&W is 100%, GOR cannot be calculated from GLR (as GOR has no meaning if there is no oil).

If you enter 100% for the BS&W, you still have to enter an API gravity, though this won’t substantially affect your calculations. (Theoretically it should not affect them at all, but due to the way some of the fluid property calculations work, there may be a small effect.).

Comparison Tables and Charts

The comparison tables and charts have the ability to display a large amount of information about different cases. In V2.65, several new parameters have been added to the list of information displayed (mostly related to drive equipment loading). Such a large number of columns (in the tables) or tabs (in the charts) can sometimes make it difficult to find the information which is important to you. A new feature has been added to assist you in focusing on the information that may be relevant to your analysis.

When either the **Comparison Table** or **Charts** window is open, you will see a menu heading **“Filter”** in the main window’s menu bar. Under this menu, there is an item: **“Change Filter Options”**. When this item is selected, the following window appears.

Columns Filter Definition

Instructions:
 The following spreadsheet will allow you to specify which columns will be shown and whether the columns should be filtered (not displayed) if no data exists. Click on the show checkbox for each of the columns that you want to show and then click on the filter checkbox to turn filtering on and off. The save changes check box at the bottom allows these selections to be stored in the ini file.

Column Name	Show	Filter
Equipment Case	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pump	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pump Speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Volumetric Efficiency	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Rate	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Fluid Level	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Producing Pressure	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Energy Costs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Prime Mover Output Power	<input type="checkbox"/>	N/A
System Input Power	<input type="checkbox"/>	N/A
Polish Rod Power	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pump Intake Pressure	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pump Discharge Pressure	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pump Pressure Loading	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Save changes to ini file

For each parameter (column in a table or tab in a chart), you have two check boxes: **Show** and **Filter**. If the **Show** option is turned off, the parameter (column or tab) will not be displayed. This way, you can determine which information you wish to have displayed. The **Filter** option is available only if the “**Show**” option is turned on. This option will show the parameter (column or tab) only if it contains some real data. If the parameter contains N/A for all cases, it will not be displayed if the **Filter** option is turned on.

The **Show All/None** and **Filter All/None** buttons at the bottom allow you to change all the options at once. Note that you must have at least one column/tab shown.

The options for charts and tables are independent of one another—changing the options for one does not affect the other.