

User Guide Addendum for PC-PUMP V2.66


Please refer also to the **PC-PUMP** User Guide (V2.63) , the V2.64 User Guide Addendum, and the V2.65 User Guide Addendum.

Wellhead Temperature

In earlier versions of **PC-PUMP**, the User had to enter the flowing temperature gradient; this was used along with the input bottomhole temperature to calculate the temperatures at all points in the well. It was assumed that the flowing temperature gradient would be linear with vertical depth.

In **PC-PUMP** V2.66, the User may now enter the flowing wellhead temperature instead of the temperature gradient. The temperature gradient will be calculated based on the bottomhole temperature, mid-perforation depth (using the wellbore geometry, if necessary, to determine the vertical depth at the perforations), and flowing wellhead temperature. As before, in determining the temperature at any point in the well, it is assumed that the flowing temperature gradient is linear with vertical depth.

The Flowing Wellhead Temperature input is located immediately below the Temperature Gradient input in the Inputs – Operating Conditions section of the *Analysis* window. One of the two inputs is always greyed-out, while the other is active. To switch between the input options, click on the button with the red arrow to the left.

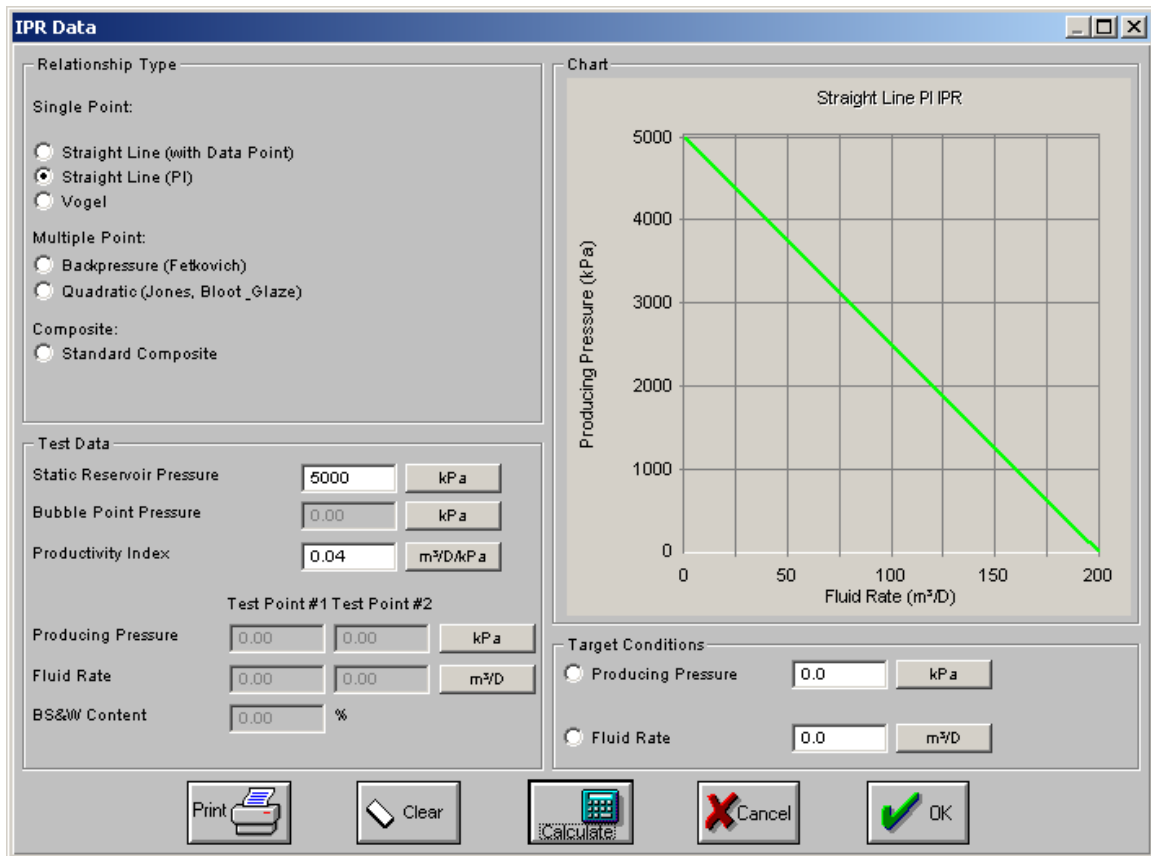
Bottomhole Temperature	20 °C
 Temperature Gradient	1.00 °C/100m
Flowing Wellhead Temperature	12.00 °C

If a bottomhole temperature and mid-perforation depth have been entered, the program will display the calculated result in the greyed out box.

NOTE: There are two cases in which this new feature does not work as might be expected. One case is if the option “Consider Heat Generated by Pump Friction” is turned on, and the second case is if the program is in downhole drive mode with the option “Perform Motor Heating Analysis” turned on. In both these cases, the program considers factors which change the fluid temperature downhole (i.e. heat generated by pump friction or a downhole motor). These factors are not considered in using the Flowing Wellhead Temperature option. A warning message will be displayed in all such cases.

IPR – Productivity Index

A new inflow performance relationship (IPR) has been added to **PC-PUMP**. This is the productivity index. In the IPR window, this is listed as “Straight Line (PI)” and the previous “Straight Line – Constant J” is now listed as “Straight Line (with Data Point).”



The two Straight Line options give the same result—in which the produced flow rate is linearly proportional to the difference between the producing pressure and the reservoir pressure—only the inputs differ. Both require the reservoir pressure. The “with data point” option requires one test point, which is a producing pressure and the flow rate at that pressure, while the “PI” option requires a productivity index (PI, or J in some literature), which relates the flow rate and producing pressure (expressed in m³/d/kPa, or bbls/d/psi).