

This pH calibration is quite quick and easy. You will need the following materials:

- The MicroLab interface
- A pH electrode
- pH buffer solutions: pH 4, 7, and 10

Calibration Procedure

Use the Select Sensor screen to select the pH electrode. Click on the red-circled BNC input to let the software know that this is where the pH electrode will be connected, and select pH from the pH/Dissolved Oxygen choice.

Now choose “Perform New Calibration.”

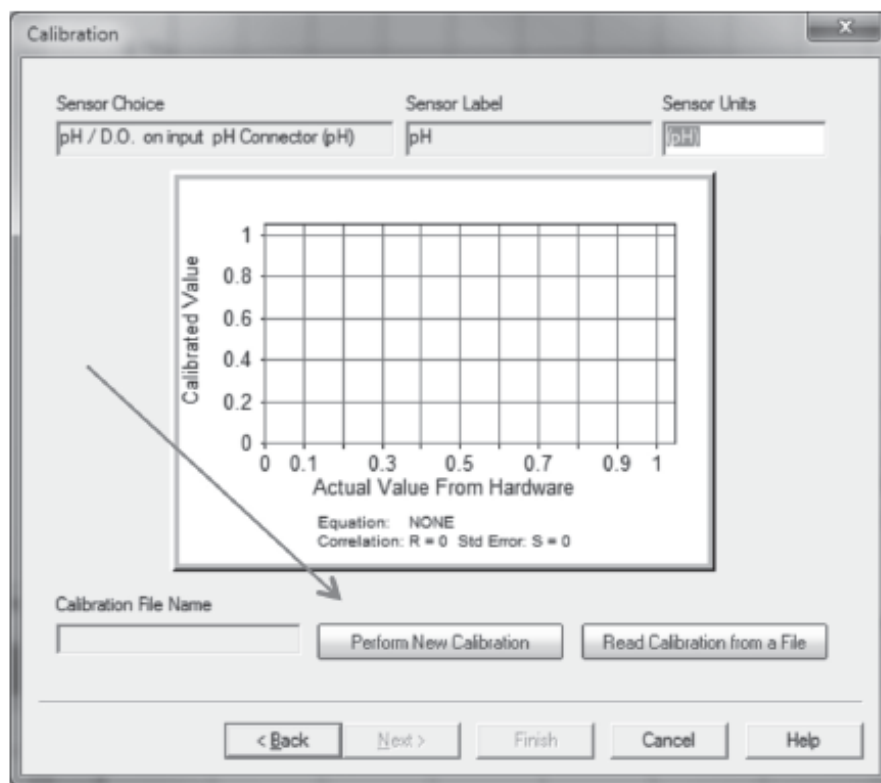


Figure 27. To calibrate the pH electrode, choose “Perform New Calibration.”

The following calibration screen (Figure 28) will then come up. This screen does several tasks for us:

- It allows you to add a calibration point.
- After you have some calibration points, you can select a curve fit.

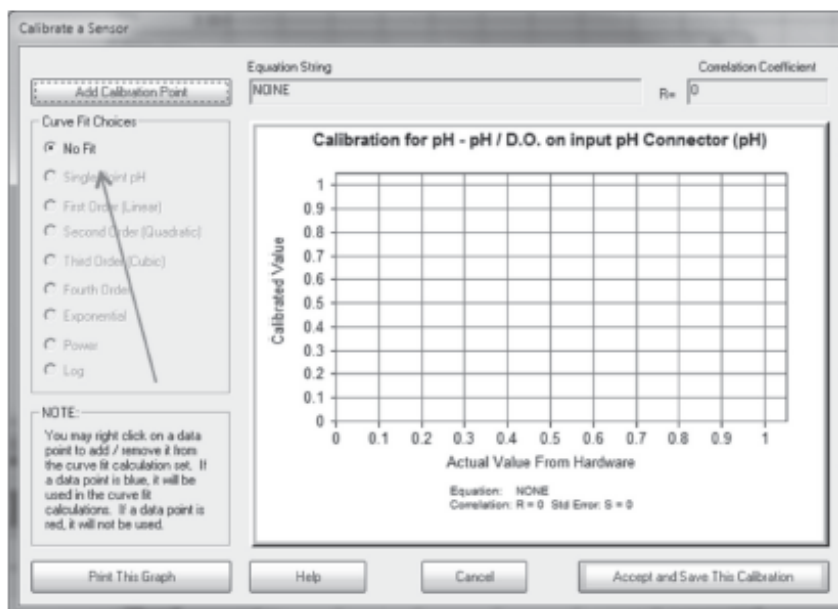


Figure 28. Use this screen to add a calibration point. The program will move to the sensor equilibrium screen (Figure 29) and then will revert back to this screen after each calibration point is entered. You then use this screen to select the curve fit you wish to use.

The sensor equilibrium screen does several tasks for us:

1. It displays the current output (a voltage or a current) from the sensor.
2. It provides the operator a chance to enter the true value of the standard.
3. It demonstrates when the sensor comes to equilibrium with the standard solution. The display with the green bar shows the rate of change. As the sensor comes to equilibrium, the rate of change will fall to zero and the red line will center on the green. The second display presents a "history" of the sensor output. You can see the sensor stabilize on this display.

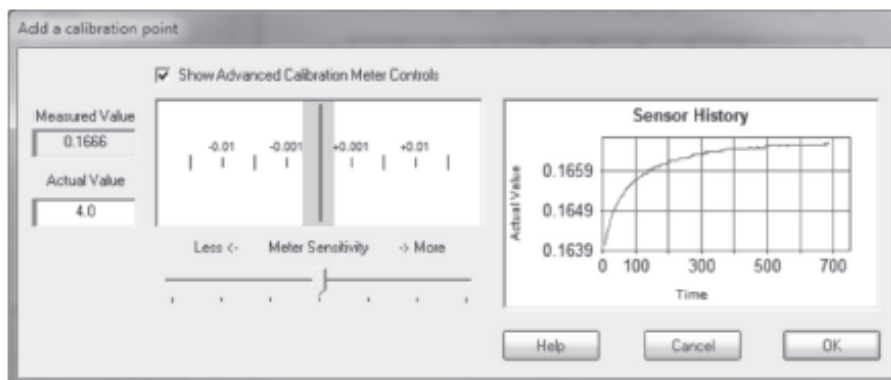


Figure 29. This screen allows the operator to watch the sensor come to equilibrium with its standard solution. The rate-of-change meter will center and the sensor history display will flatten out at equilibrium. If you check the "Show Advanced Meter Controls" box, you can change the rate of change meter sensitivity. Some sensors need more or less sensitivity on this meter than others.

It takes two calibration points to make a straight line and to define a calibration equation. However, there is no room for error. A wise choice is to use pH standards at opposite ends of the range—pH 4 (acid) and pH 10 (base), and then draw the calibration line. Then use an intermediate pH standard to “prove” that your line is correct.

For each of your pH buffer standards:

- Rinse the pH electrode well in distilled water.
- Place it in a small (10 mL) amount of new buffer solution.
- Enter the buffer pH in the calibration screen.
- Watch your equilibrium indicators, and stir carefully with the pH electrode until the sensor reaches equilibrium.
- Press “OK” when the sensor is at equilibrium. Your calibration point will be recorded on the graph, and you can start another calibration point or do the curve fit and accept the calibration.

When you have enough calibration points, choose a curve fit (see Figure 28). If the line is straight you have a good calibration. You may wish to use different curve fits if linear does not work. If one of the points looks “bad,” you can remove it from the calculation by right-clicking on it. The point turns into an “X” and is not counted, but it is not lost, either. You can return it to the data set with another right click.

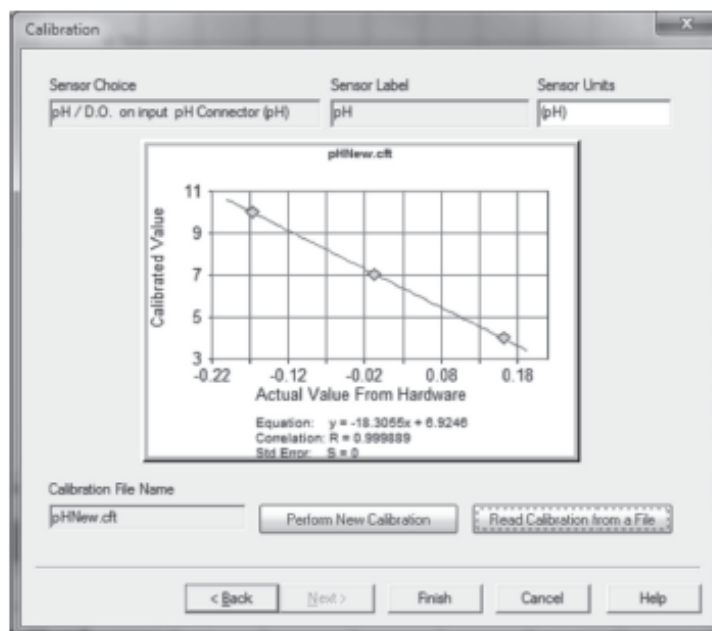


Figure 30. Here is a good pH calibration graph. The correlation coefficient is 0.99989—very close to the perfect straight line (1.000).

When you click “Finish,” you will be given an opportunity to name the calibration file, which will then be saved.