How to calculate offset and slope

- Must have a pH meter that can be placed in mV mode
- Must use fresh buffers

The procedure below is based on calibration buffers at 25°C. At this temperature the theoretical 100% slope is 59.16 mV/pH change from pH 7.0. A pH electrode in calibration buffer at 50°C will generate 64 mV/pH, while at 0°C the response will be 54 mV/pH.

Step 1 measure mV of pH 7.01 buffer and record value
Step 2 measure mV value of pH 4.01 buffer and record value
Step 3 calculate the absolute mV difference (pH 4.01 value – pH 7.01 value)

Examples:
Electrode 1 pH 7.01 = -15 mV pH 4.01 = +160 mV
Absolute mV difference is +160 mV – (+15 mV) = +175 mV

Electrode 2 pH 7.01 = +15 mV pH 4.01 = +160 mV
Absolute mV difference is +160 mV – (-15 mV) = +145 mV

At 25°C pH 7.01 (offset) = ±30 mV. The absolute mV difference should be 150 mV (85% slope) to 186 mV (105% slope).

Conclusion: Electrode 1 is working properly while electrode 2 has an unacceptable slope. Try cleaning and if possible replace fill solution. If slope is still low then replace the pH electrode.

Important note: A pH 7.01 mV value outside ±30 mV is an indicator of a build up/coating on the pH bulb. The electrode should be cleaned.