

## ***Viscous Samples - Too Hard To Handle?***

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### ***The problem***

If you commonly measure the pH of viscous solutions such as food samples, paint, cosmetics or pastes, you probably find that it is hard to get a stable reading from the meter. Some commonly measured viscous samples are tomato sauce, chili sauce, meat extracts, shampoo, paint, etc. The typical complaint in these applications is that the reading never stabilizes at any point for a reasonable length of time and the variations in the pH can be quite substantial.

### ***Why is the meter reading unstable?***

The reason usually is the electrode that you are using is unsuitable for measuring viscous samples (assuming that your meter is working perfectly well). It is not uncommon to find that one pH electrode is used for all kinds of samples in a laboratory. However, pH electrodes have their own specialties and in areas outside these specialties, the electrodes take time to stabilize, and even worse, can be totally unreliable.

### ***What's Wrong?***

There's nothing really wrong with the electrode, except that it is probably being used in an application which it is not suited for. For electrodes to work properly, there must be sufficient flow (or a steady leak rate) of the internal solutions into the sample to enable the formation of a complete electrode chain (which in simple terms, enables pH to be measured). Most electrodes are designed to work with very fluid samples, such as water-based solutions. The flow of the internal solutions is designed to be just sufficient for these type of samples. However, when these same electrodes are placed into viscous samples, this flow becomes insufficient to maintain the required electrode chain. This often leads to wild fluctuations in observed readings.

### ***How Can This Problem Be Solved?***

The solution is to use an electrode that will allow a higher flowrate of the internal solution without letting it affect the sample reading itself. Two electrodes designed for this application are listed on the following page.

## Why This Design?

The design of these electrodes offered below are unique in that:

- These liquid-filled electrodes allow for higher electrolyte flow than gel filled electrodes.
- The junctions are designed for a higher flow rate of liquid than typical annular or pin-type junctions.
- Both electrodes allow the user to quickly refresh the junction, which removes build-up of viscous fluid. Fast, easy cleaning of the reference port is especially useful for dealing with samples like adhesives or paints where the cleaning of the reference junction is often a problem.

## What Are My Options?

The options you have depend largely on the type of samples and also the temperature range that you have. Generally the OAKTON single junction electrode (WD-35805-19) is sufficient for most applications. However, for samples where the contamination of the reference junction is a problem (such as those containing sulphides, cyanides and bromides) use our double junction electrode (WD-35805-09). A more detailed description of these electrodes is provided below.

## Specifications:

Electrode	WD-35805-19	WD-35805-09
Characteristics	Spring loaded, flushable junction, epoxy body pH electrode	Sleeve-type, glass body pH electrode
Junction	single	double
pH Range	0 to 13 pH	0 to 12 pH
Temperature Range	0 to 100°C	0 to 80°C
Length	110 mm	110 mm
Diameter	12 mm	12 mm
Reference cell	KCl/AgCl refillable	KCl refillable

## Applications

**Single junction:** High viscosity solutions such as emulsions, suspensions, paints, varnishes, sauces, shampoos and varnishes where frequent cleaning of the reference junction is necessary.

**Double junction:** Reference contamination problems such as media containing sulfides, bromides, iodides and cyanides.

The electrodes described on page 2 can be used together with the following products from OAKTON Instruments.

Please contact your OAKTON distributor for more detailed information on any of these products.

<b>Product</b>	<b>pH Accuracy</b>	<b>Also reads</b>
<b>Testrs</b>		
pHTestr BNC	±0.1 pH	—
<b>Portable meters</b>		
pH 5 meter (Acorn Series)	±0.01 pH	°C
pH 6 meter (Acorn Series)	±0.01 pH	mV, °C
pH 10 meter (Economy series)	±0.01 pH	°C
pH 20 meter (Economy series)	±0.01 pH	mV, °C
pH 100 meter (Standard series)	±0.01 pH	mV, Relative mV, °C
pH 200 meter with RS-232 (Standard series)	±0.01 pH	mV, Relative mV, °C
pH 300 meter (waterproof series)	±0.01 pH	mV, Relative mV, °C
pH 310 meter (waterproof series)	±0.01 pH	mV, Relative mV, °C
<b>Benchtop meters</b>		
pH 500 economy benchtop meter	±0.01 pH	mV, °C
pH 1000 benchtop meter	±0.01 pH	mV, Relative mV, °C
pH 2000 benchtop meter with RS-232	±0.01 pH	mV, Relative mV, °C
pH 2500 benchtop meter with RS-232	±0.01 pH	mV, Relative mV, ion, °C