

FAQ- How do I measure pH of oil based samples?

Measuring pH of samples that are mostly oil can be quite challenging. Even the best electrodes will be coated and require frequent cleaning.

- No electrodes can directly measure samples with high oil content well
- Refillable, glass, double-junction pH electrodes are generally best
- Measuring, recording, and compensating for temperature is always important
- Cleaning/storage/conditioning any pH electrode used is critical. A good rule of thumb--whatever you use to clean your glass beakers (acetone, alcohol, detergent, warm water, etc) is usually going to work best on cleaning the electrode as well.

Repeatable pH measurements have little/nothing to do with the pH meter, much to do with the pH electrode, and everything to do with the technique used. Oil will coat the glass measuring bulb and the reference junction of all pH electrodes. If measured directly, you will get an initial reading then shortly afterwards the electrode won't respond much until it was cleaned then re-conditioned. Although some electrodes are flushable and clog-resistant...clogging isn't the problem—**coating** of the glass bulb is the main issue. If the oil levels are low enough this can be addressed by diluting with DI water, proper cleaning and re-conditioning/hydration glass bulb. It may also be useful to use multiple electrodes; as one electrode recovers and hydrates after cleaning; another electrode one is put into service.

If the oil levels are too high, a useful method for measuring pH of oily solutions is to add very clean water-like deionized (DI) water. DI water has a very weak pH, so it will assume whatever the pH of the sample is.

- 1) Mix the oily sample with DI water in a separatory funnel as pictured below. Start with an excess of DI water (maybe 20 parts DI water to 1 part sample) and add more sample to subsequent trials to determine the ideal ratio of DI water to sample. Note that mixing in the separatory funnel can produce gas, so it is important to use it properly so it is vented periodically during mixing.
- 2) Allow the oil to float and separate from the water
- 3) Drain the water out the bottom, and measure the pH of the DI water

The pH of everything (even pH buffers) changes with temperature—you need to compensate, measure, and record the temperature with every pH reading.

