

## Selecting Water Testing Equipment.

Onsite testing provides an easy way of determining water quality, so that timely corrections can be made. A keystone to achieving this is the suitability of the testing equipment used. Onsite testing is a much cheaper option overall than laboratory testing and, in some cases, is the only practical way of testing for some parameters e.g. chlorine testing for water treatment.

To select the best piece of testing equipment for a given situation, consideration needs to be given to the accuracy, resolution and range of the different equipment types. The accuracy of testing equipment is how close the result obtained is to the true amount of the parameter being tested, and the resolution is how many decimal places the equipment will give a result down to. The range that some types of equipment test over may also be a consideration, as some only test between restricted ranges of values that may not be sufficient to measure all possible results. Generally speaking, units that have better accuracy and resolution cost more, but it should also be kept in mind that the highest level of accuracy and resolution is not always necessary for on-site testing.

Water testing can be performed using 3 different types of equipment:

**Test Strips** - Test strips consist of an indicator pad on a plastic strip, and can test for pH, alkalinity, chlorine, nitrate and phosphate. These strips are dipped in the water sample, and the colour change of the strip is then compared against a standard. They are robust and simple to use, but generally do not have a high level of resolution, and their accuracy depends on the ability of the user to match colours, i.e. colours may be difficult to match for people who are colour blind, and sometimes the colour that develops may not be an exact match to the standard. Also, depending on the water source, some pH strips may not have an adequate range to measure the pH of all water sources. The cost of test strips varies from around \$0.60 to over \$2.00 per test depending on the quality of the strip, and the parameter being tested.

**Colorimetric** – These tests require a chemical (reagent) to be added to the water being tested, and the colour change that occurs is then compared against a standard. These test kits can be used for pH, alkalinity, bromine, chlorine and chlorine dioxide, with swimming pool test kits being an example of this type of equipment. They are robust and reasonably accurate, but may not have the range necessary for pH testing of water samples found in nurseries and, as with test strips, matching colours may be a problem. A swimming pool test kit with the full range of parameters can be purchased for approximately \$30, but will require additional reagents to be purchased periodically.

**Electronic** – Electronic meters can be used to test for pH, electrical conductivity (EC) and some nutrients. These units are the most expensive option but, if a large number of samples are to be tested, can be a cost effective way of doing onsite testing. These meters are the most accurate, with good range and resolution, and come in two types; pocket type meters (around \$200 per parameter), and the more expensive portable or bench top meters starting at around \$600 for a pH/EC combination meter. For pH and conductivity, pocket type meters have a resolution to 1 decimal place, which is sufficient for on-site testing, while the portable and bench top types have resolution to 2 decimal places. To maintain accuracy, electronic meters require regular calibration, maintenance and careful treatment e.g. avoid scratching the glass on pH probes. However, even with careful treatment, pH probes have an average life of around 18 months to 2 years depending on probe construction and use. Electronic meters can also be used for nutrient testing, but their maintenance costs are high, and purchasing this test equipment would only be warranted if a large number of nutrient tests were to be done. Electronic meters are also available that convert a colorimetric test into a digital reading for a higher degree of accuracy.

Some types of equipment are not suitable for testing growing media, and generally only the electronic types can be used for this application. If the unit is to be used for media testing, some investigation of the pH probe types that are suitable for use in solutions with large amounts of suspended material should be made before purchasing a unit. Many pH probes are only designed for testing clear water, and using these in samples with large amounts of suspended material will reduce their operating life.

In practice, it may be necessary to purchase more than one of piece of equipment depending on the parameters that need to be measured e.g. electronic meters for pH and EC, and a pool test kit for chlorine and alkalinity but, time spent in considering options will lead to the selection of the most appropriate piece of equipment for your situation.

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