Technical Note 162

AlkaSense®

Background

Total alkalinity monitoring is used in a number of applications including:

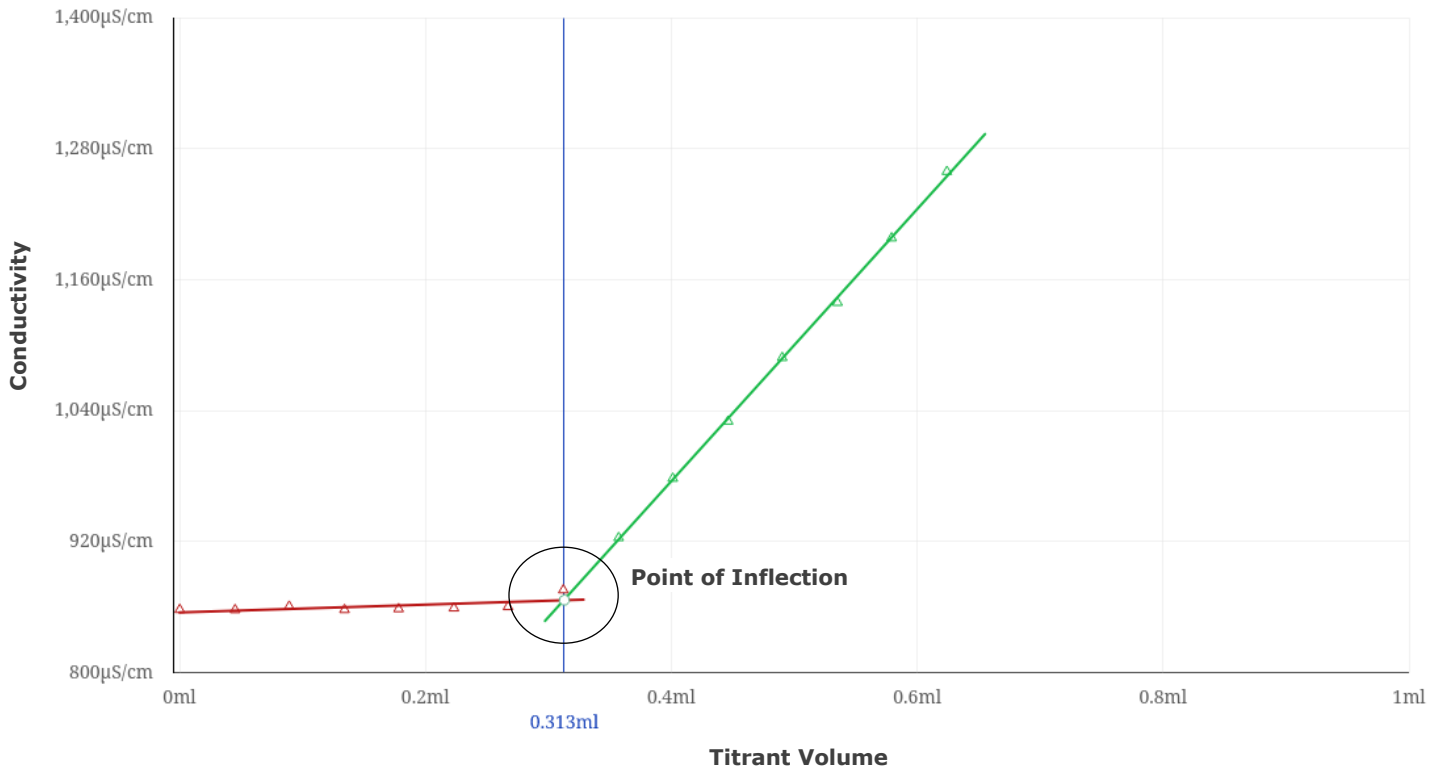
- Swimming pool control
- Drinking water raw water monitoring for coagulation control
- Distribution monitoring for corrosion prevention
- Cooling towers for blowdown control
- Wastewater denitrification processes

In the past there have been two main methods of measuring total alkalinity, both of which have serious drawbacks.

The first is by titrating a sample with a known acid to a pH of 4.3. At this pH it can be assumed that all the alkalinity has been consumed by the acid. Knowing the molarity and amount of acid used means that the total alkalinity can be calculated. The problem here is that the pH sensors have a short life, require frequent calibrations, and are slow to respond.

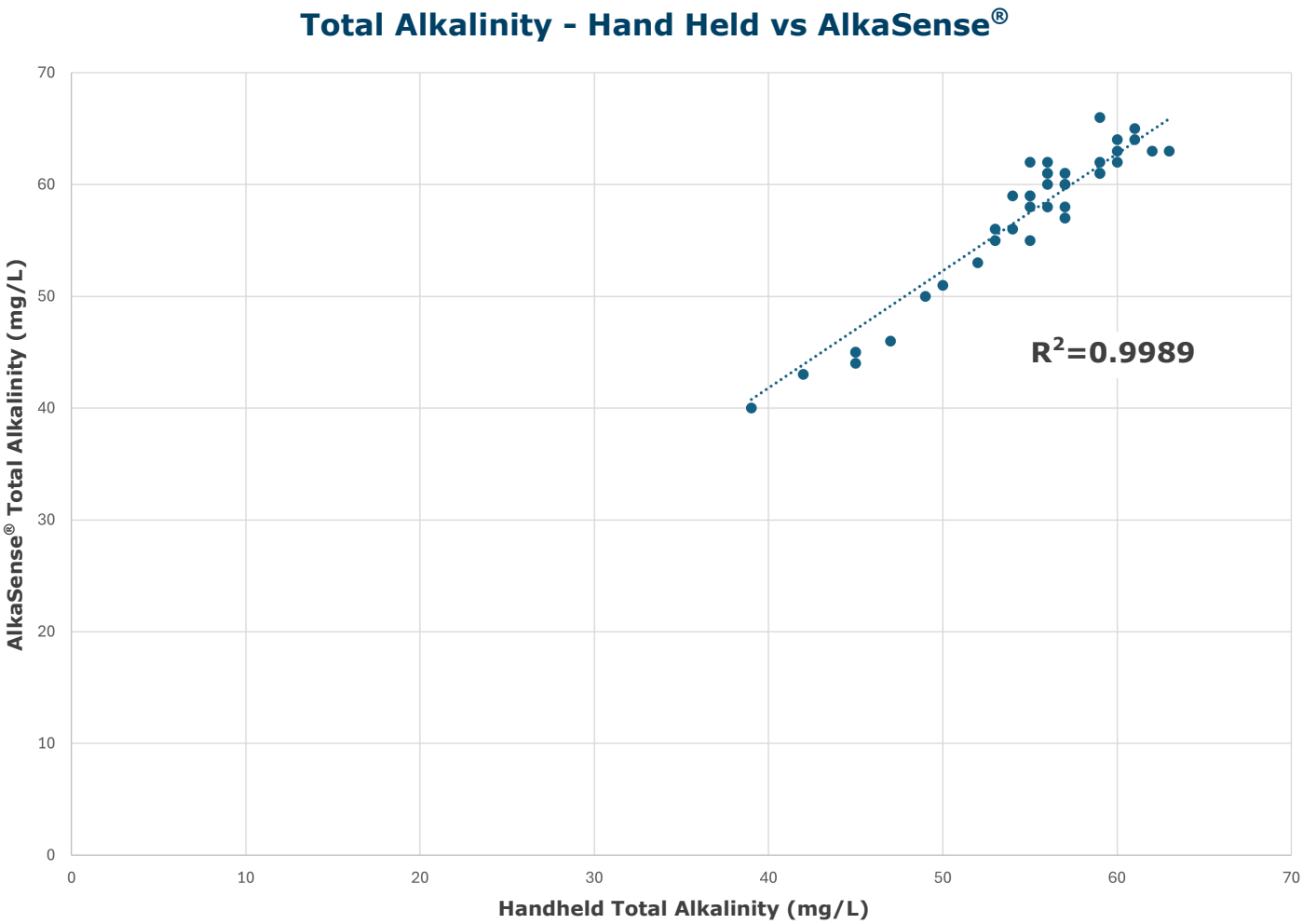
The second method is colorimetry whereby reagents are added to the sample and the resulting color absorption is related to the total alkalinity. The cost and complexity of the equipment make this a method of last resort for some users.

The Chemistry Behind AlkaSense®



The AlkaSense® from Pi operates in a unique way in that it titrates a water sample with an acid, but it finds the endpoint (and therefore the total alkalinity) by monitoring the conductivity of a sample as aliquots of acid are added. The point of inflection in the resulting graph indicates when all the alkalinity has been consumed.

The advantages of this technique are that conductivity sensors last a very long time, are very reliable , fast responding, and because we are looking for an inflection point as opposed to a set value, they need no calibration when used in an AlkaSense® .



The graph above shows alkalinity data taken from an extended AlkaSense® trial at a WTW. Readings from the AlkaSense® are compared with readings from a hand held alkalinity monitoring device. The near perfect R^2 value shows the AlkaSense® to be accurate and reliable.

Conclusion

For many years, the lack of low cost, reliable alkalinity analysers has meant that users have been stuck with expensive manual measurement testing.

The AlkaSense® now brings online total alkalinity monitoring to all the applications listed above; more accurate, and easier to maintain.