



May 2007

Basic Principles: pH & Conductivity

Historical May



11th May 1988

Harold Adrian Russell "Kim" Philby, spy for the Soviet Union's NKVD & KGB and member of the famous 'Cambridge Five' spy ring dies in Moscow aged 76.



21st May 1927 & 1931

Charles Lindbergh makes the first solo transatlantic flight. Amelia Earhart is the first woman to do so exactly five years later.



29th May 1953

At 11.30AM Sir Edmund Hillary & Sherpa Tenzing Norgay become the first explorers to reach the summit of Mt. Everest, 29,035 feet above sea level.

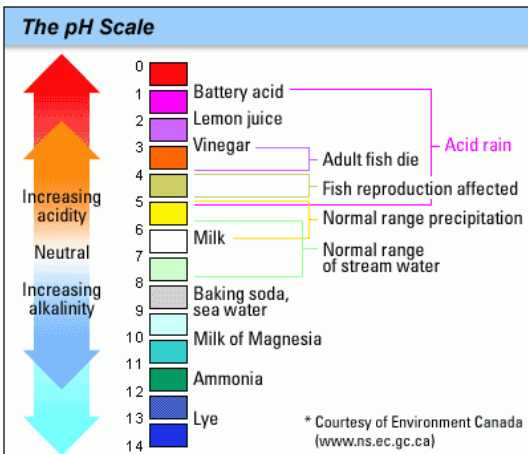
Many plants now require waste water analysis to ensure that toxins are prevented from making their way into our waterways, polluting the ecosystem.

There are various methods to 'clean' up waste water discharged from process plants - both chemical and biological. Either way some of the most commonly known measurements are pH & conductivity.

What is pH?

'p' (lower case) is the shorthand version for the mathematical term '-log₁₀' (negative log to the base 10). The 'H' refers to the Hydrogen Ion, H⁺ which should more correctly be written as [H⁺] standing for the 'concentration of Hydrogen ions'.

In easy to understand terms, the greater the hydrogen ion concentration [H⁺], the lower the pH.



- pH is a temperature dependant. As temperature increases, the measured pH of any solution will decrease meaning it will become more 'acidic'.
- A shift in value on the pH scale represents a ten-fold difference in [H⁺]. For example, a shift in pH from 2 to 3 represents a 10-fold decrease in [H⁺], and a shift from pH 2 to pH 4 represents a one-hundred (10 × 10)-fold decrease in [H⁺].



Pure Water Contains Few Ions & Strictly No Irons

Conductivity

pH alone cannot provide all information regarding the cleanliness of water. There are several other methods of analysis that may be referred to.

Typically, conductivity is one of the most popular of the measurements used along with an analysis of the Total Dissolved Solids (TDS).

The electrical conductivity of water is directly related to the concentration of dissolved ionized solids in the water. Ions from the dissolved solids in water create the ability for that water to conduct an electrical current, which can be measured using a conventional conductivity meter.



Jumo Lf series Conductivity Transmitters

When correlated with laboratory TDS measurements, electrical conductivity provides an approximate value for the TDS concentration, usually to within ten percent accuracy.

Conductivity is the reciprocal (inverse) of electrical resistivity and has the SI units of siemens per metre (Sm⁻¹). Measuring conductivity can provide a guide to the contamination of water. The higher the purity of water, the lower its conductivity



Intech LPI-pH Transmitter

Intech Instruments Ltd
59 Mandeville Street
Riccanton
Christchurch 8011
New Zealand
Phone: +64 (3) 343 0646
Fax: +64 (3) 343 0649

Intech Instruments Ltd
209 Karamu Road North
Hastings
Phone: +64 (6) 876 0034
Fax: +64 (6) 876 0036

E-mail: sales@intech.co.nz
www.intech.co.nz



Team New Zealand use
Intech hardware & software



Take a break:
Contact Intech Instruments.

For almost 25 years Intech Instruments have been operating throughout New Zealand, servicing a variety of industries. Our product range is made up of both our own high quality manufactured products plus a range of first class imported items.

Our core business is concerned with supervisory, monitoring and control – utilising hardware and software facilities to provide a host of solutions for end users.

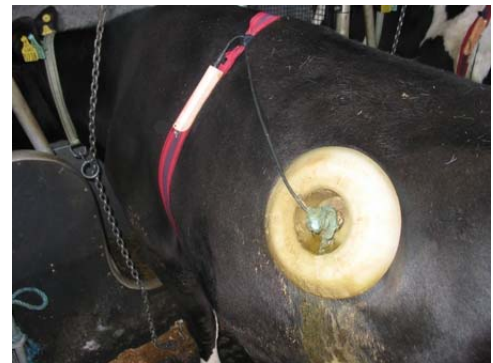
Based in Christchurch, where we have both a sales and service operation, Intech Instruments also have offices in Auckland and Hawkes Bay.

With a combination of industrial experiences and technical skills, Intech are able to provide customers with the best possible solutions for a variety of applications.

Feature - Intech Instruments & Dairy Research

The contents of a cow's rumen can provide Dairy research organizations with key information. Intech Instruments have been successful in providing logging equipment for this astonishing purpose. Using [M-11 pH probes](#) and the [pH-HR logger](#) unit, data can be collected for months at a time before being downloaded for further analysis and using the capable OmniLog software. Intech are assured that the cows are unaffected by what would appear to be a rather barbaric method.

If you've a slightly unusual application, contact Intech - we may just have a solution for you!



Holy Cow: Intech's HR Series Loggers in the Field (Literally)

Recent New Products

JUMO Data logging thermometer

- TDA-300 & TDA 3000
- Pt-100 & thermocouple input
- MS Excel logging direct to CSV files
- 0.5 Second sample rate
- IP67 Weather Protection
- Easy to use / configure



Shimaden SR23 & FP23 Digital Controller



- Dual Channel Control
- Parameter Setting Software
- Highly Accurate (0.1% of Full Scale)
- MODBUS & Shimaden protocols
- Infrared Communication
- 10 Digital Input Points
- 13 Digital Output Points
- Shimaden 'Expert' PID Control Loop