

420 ACIDITY (L)

0.1 - 5 mmol/l CaCO₃ \ 75 Tests @ 1 mmol/l

421 ACIDITY (H)

1 - 50 mmol/l CaCO₃ \ 75 Tests @ 10 mmol/l

Alkalimetric Titration to pH 8.2 for Total Acidity

- Fill titration vessel with a fully extended (3.2ml) syringe of sample
- Add 1 drop of indicator **Ac-1**
- Close titration vessel with dual-thread adapter
- Insert inverted bottle of titrant **Ac-2N** (420) or **Ac-2H** (421) by screwing into the closed vessel to form a combined one-hand unit
- Titrate counting drops while mixing for a permanent grey intermediate tint in the sequence yellow → grey → violet
- Test **420**: 1 drop = 0.1mmol/l ≡ 0.2meq/l ≡ 10ppm CaCO₃
- Test **421**: 1 drop = 1 mmol/l ≡ 2 meq/l ≡ 100 ppm CaCO₃

The difference between an acid pH-value to one of high acidity in water is best illustrated by comparing 6% acetic acid (vinegar = 3%) with Cola-type drinks containing 0.01% phosphoric acid. Both exhibit a pH of ~2.4 and therefore the same H₃O⁺-concentration. Whereas the 0.01% mineral acid of the Cola is strongly ionized, this applies to only a small amount of the acetic acid. Its acid character at these concentrations is nevertheless very much greater with considerably more alkali needed for neutralization. This quantity corresponds to the acidity. Water acidity therefore depends on the type and quantities of dissolved acids and its effective buffering capacity, not the initial pH-value. To obtain a recordable figure it is nevertheless necessary to *fix a pH* at which the water is considered to be *neutralized* by its titration with sodium hydroxide (**Ac-2**). For total acidity this was set at 8.3, the point at which the first pink colour of *Phenolphthalein* appeared. Since then, mixtures based on *Metacresolpurple* with a bichromatic colour sequence from yellow to violet (**Ac-1**) for a more definite end-point have found use. This nominally corresponds to the pH at which the dissolved calcium bicarbonate is considered to have been eliminated:- NaOH + Ca(HCO₃)₂ → CaCO₃ + NaHCO₃ + H₂O. The calcium carbonate produced acts as a figure for quantification, visible by the turbidity obtained when adding alkali to hard water. © dr.bodart 0106