

## Based on ISO standards:

ISO 10523:2008 for pH

ISO 7888:1985 for conductivity

ISO 9963-1:1994 for pH-metric Titration Total Alkalinity - range: 0.4 to 20 mmol/L

### 1. Introduction and principle

These applications allow successive measurements in the same beaker of conductivity, pH and alkalinities of a sample (phenolphthalein alkalinity at 8.3 pH and Total Alkalinity at 4.5 pH).

Three applications are available with different titrants and standard regarding titrant calibration (and Autoleveling calibration - optional).

Application name	Titrant	Standard for calibrations
Cond. pH Alk. HCl(Borax)	HCl	Borax
Cond. pH Alk. HCl(NaOH)	HCl	NaOH
Cond. pH Alk. H2SO4(NaOH)	H2SO4	NaOH

### 2. Electrode and reagents

**Conductivity sensor:** CDC401, Intellical™

**pH Electrode:** PHC805, Intellical combined pH electrode with temperature sensor

**Titrant:** HCl or H<sub>2</sub>SO<sub>4</sub> 0.1 eq/L solution in deionized water

**Solvent:** Deionized water

### 3. Settings

Applications "conductivity pH alkalinity" have been developed and optimized using a 10 mL-syringe, an acidic solution at 0.1 eq/L (HCl: 0.1 mol/L or H<sub>2</sub>SO<sub>4</sub>: 0.05 mol/L) as titrant, with an incremental addition mode and End Point detections for alkalinity determinations with a 100 mL-sample.

For additional information on settings, calculations, reagents preparations, recommendations, and calibrations specific to conductivity, pH measurement and alkalinities titration please refer respectively to the following three application notes:

1. DOC316.52.93084 - Conductivity of water
2. DOC316.52.93083 - pH determination in water
3. DOC316.52.93085 - pH Alkalinity of water

### 4. Results

At the end of the titration the following results are available:

1. Value of initial conductivity in uS/cm
2. Value of initial pH (pHi) in pH
3. Value of phenolphthalein alkalinity, p, in mg/L as CaCO<sub>3</sub> (volume of titrant in mL to reach defined pH, 8.3 pH by default)
4. Value of Total Alkalinity in mg/L as CaCO<sub>3</sub> (volume in mL to reach defined pH, 4.5 pH by default)

**Note:** Results in mmol/L are calculated but, by default, are hidden in the result screen but they are available in the Data Log (refer to the User Manual for additional information).

### 5. Bibliography

- *Water quality - Determination of electrical conductivity*, International standard ISO 7888 (1985).
- User manual for conductivity probe models CDC40101, CDC40103, CDC40105, CDC40110, CDC40115 and CDC40130, DOC022.53.80022, Hach Company (2010)
- *Water quality - Determination of pH*, International standard ISO 10523 (2008)
- *Water quality - Determination of total and composite alkalinity*, International standard ISO 9963-1 (1994)
- EPA method number 310.1
- *Standard Methods For the Examination of Water and Wastewater*, 22nd edition (2012) 2-34 part 2320