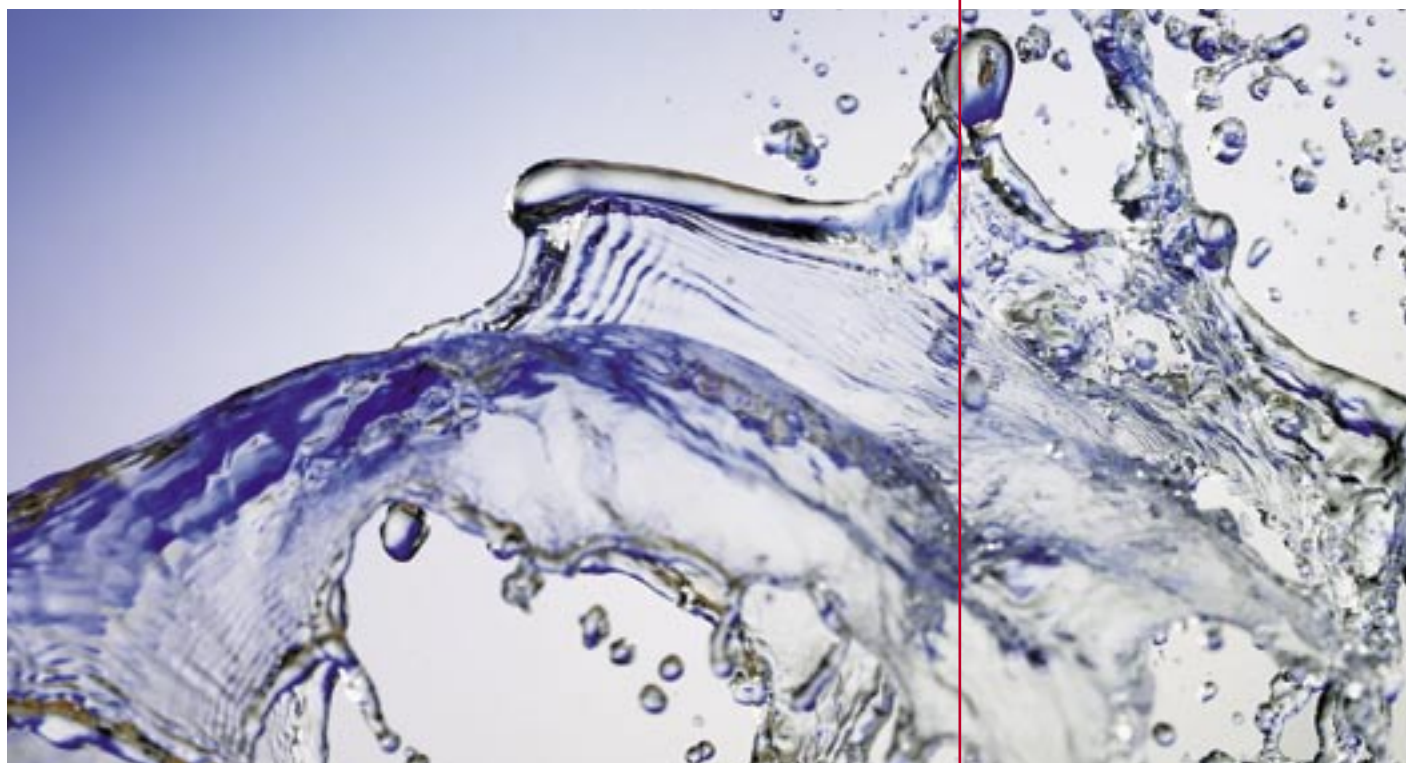


Analytix *LabInfo*



AQUANAL®-EduCase

AQUANAL®-EduCase was designed as an instructional tool to teach water titration techniques in the classroom. The EduCase contains reagents for titrimetric determination of five typical water parameters using four different types of titration:

- Complexometric titration - for Calcium and Total Hardness
- Argentometric Titration - for Chloride
- Acid-Base Titration - for Carbonate Hardness
- Redox Titration - for Oxygen



Picture AQUANAL®-EduCase

AQUANAL®-EduCase was designed as an instructional tool to teach water titration techniques in the classroom. The EduCase contains reagents for titrimetric determination of five typical water parameters using four different types of titration:

- Complexometric Titration - for Calcium and Total Hardness
- Argentometric Titration - for Chloride
- Acid-Base Titration - for Carbonate Hardness
- Redox Titration - for Oxygen

Students and their educators can use the AQUANAL®-EduCase to sample water from a wide range of sources – rivers, aquariums, tap water, bottled water, etc. Experiments can be designed to show the importance of water quality (at what chloride level do plants show optimum growth?), compare levels of impurities as a function of source (is tap water or bottled water purer?), make consumer decisions (are there differences between brands of bottled water?) or show effects of environmental conditions (does increased rainfall increase or decrease hardness of river water?). Many such experiments can be designed to teach important aspects both environmental and analytical chemistry. The case comes complete with the entire equipment required for the determinations. Titrations are carried out on a micro scale (5 mL-10 mL test solution) so that both the amounts of reagents consumed and the volume of waste produced are kept small.

Cat. No.	Product
37518	AQUANAL®-EduCase
37519	Refill pack for EduCase

Table AQUANAL®-EduCase Product Information

The AQUANAL®-EduCase can be used to determine the following constituents in the water:

Total Hardness (complexometric titration)

Total hardness is the sum of the calcium and magnesium ions in the water; it is measured in German degrees of hardness (°dH) or else in mg/l CaO. Total hardness is determined by titration with EDTA; for end-point indication, use is made of a mixed indicator of eriochrome black T and methyl orange. Total hardness is of significance, for example, in assessment of water for aquarium and fish breeding purposes as well as for dosing of detergents.

Calcium (complexometric titration)

Calcium is the main hardness constituent; its concentration is about four to five times as high as that of magnesium. Calcium determination is effected by titration with EDTA; the indicator used is a calconcarboxylic acid trituration. Subtracting calcium concentration from total hardness yields magnesium concentration.

Carbonate hardness (acid-base titration)

Carbonate hardness is part of total hardness; it denotes the proportion of calcium and magnesium ions which is present in solution as carbonate and hydrogen carbonate. Carbonate hardness is also known as temporary hardness.

It is determined by titration with hydrochloric acid; the end point of titration is indicated by the Cooper's indicator.

Carbonate hardness is a measure of the sensitivity of the water to pH variations and is used in aquarium management and fish breeding in particular.

Chloride (argentometric titration)

Chloride gets into the ground waters and surface waters when salts contained in the soil and rocks are washed out.

It is determined by means of a precipitation titration with silver nitrate, the indicator used is a dichlorofluorescein solution.

Oxygen (redox titration)

Oxygen gets into the water by way of diffusion from the air, for the most part however through photosynthesis of green aquatic plants.

It is indispensable for respiration of the aquatic organisms.

The maximum concentration of oxygen dissolved in water varies greatly with temperature. Oxygen concentration is determined by titration with sodium thiosulphate solution against starch solution.

Should you have questions regarding the AQUANAL®-EduCase or any of the other AQUANAL® products please contact:

Ms. Petra Haubold
AQUANAL®-Application lab
Tel.: ++49 (0)5137 8238-643
Fax: ++49 (0)5137 8238-843

Mr. Michael Jeitziner
Product Management
Tel.: ++41 (0)81 755-2805
Fax: ++41 (0)81 755-2848

e-mail: aquanal@sial.com