



Enhancing the Quality of Global Water Resources

Drinking water quality is a universal health concern with global impact. Protecting the safety of environmental waters (ground and surface waters) is also critical to ensure sustainable drinking water resources. The water discharged by municipal wastewater treatment plants and industrial facilities must be monitored to ensure strict compliance with global regulatory requirements. Both industry and water treatment facilities typically discharge wastewater into ground and/or surface waters. These wastewaters carry a variety of toxic pollutants including heavy metals and organic toxins, which must be monitored.

The determination of common inorganic anions in drinking water is one of the most important applications of ion chromatography (IC) worldwide. IC has been approved for compliance monitoring of common inorganic anions in U.S. drinking water since the mid-1980s, as described in U.S. EPA Method 300.0.1. A considerable number of regulatory IC methods have been published in many other industrialized countries (e.g., Germany, France, Italy, and Japan). In addition, many standard organizations (including ISO, ASTM, and AWWA) have validated IC methods for the determination of inorganic anions in drinking water.

Chromium (VI)

All hexavalent chromium Cr(VI) compounds are strong oxidizing agents and considered toxic and potentially carcinogenic. They are regulated as a primary drinking water contaminant in the United States. For example, the State of California established a public health goal (PHG) of 10 µg/L (ppb) for Cr(VI).

Bromate

Ozonation of drinking water containing bromide can result in the formation of the disinfection byproduct bromate, a potential human carcinogen even at low µg/L concentrations. The U.S. Environmental Protection Agency (EPA) and the European Commission have both established a regulatory maximum contaminant level (MCL) of 10 ppb bromate in drinking waters.

Perchlorate

Ammonium perchlorate is a key ingredient in solid rocket propellants. Perchlorate has recently been found in drinking water wells in regions of the U.S. where aerospace material, munitions, or fireworks were developed, tested, or manufactured. Current data suggest that 4 to 18 ppb is an acceptable exposure level. The State of California requires remedial action for drinking water sources containing more than 18 ppb perchlorate. The determination of perchlorate at trace levels is a difficult analytical task and ion chromatography (IC) represents the only viable means for the quantification of such low concentrations of perchlorate.

Cations

Common cations, though not considered contaminants, are monitored and reported by many public water suppliers in the United States. Cations, particularly calcium and magnesium, are measured to determine water hardness. In addition to calcium and magnesium, ammonium is measured and regulated in public water supplies in EU countries and Japan.

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Global Regulations

United States

- U.S. Clean Water Act
- National Pollutant Discharge Elimination System (NPDES)
Regulates point sources (ditches, pipes, etc.) that discharge pollutants into wastewaters
- Safe Drinking Water Act (SDWA) - National Primary Drinking Water Regulations (NPDWRS)
 - A U.S. federal law that sets legal limits on the levels of certain contaminants in drinking water
 - United States Environmental Protection Agency (U.S. EPA) also provides a list of acceptable techniques for water treatment

Europe

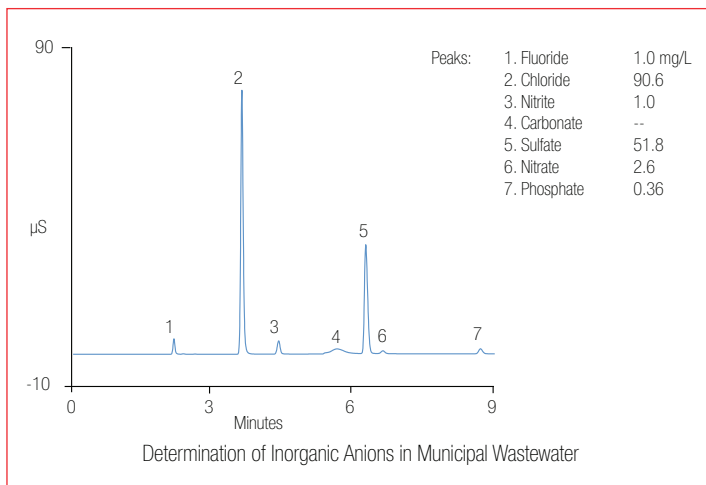
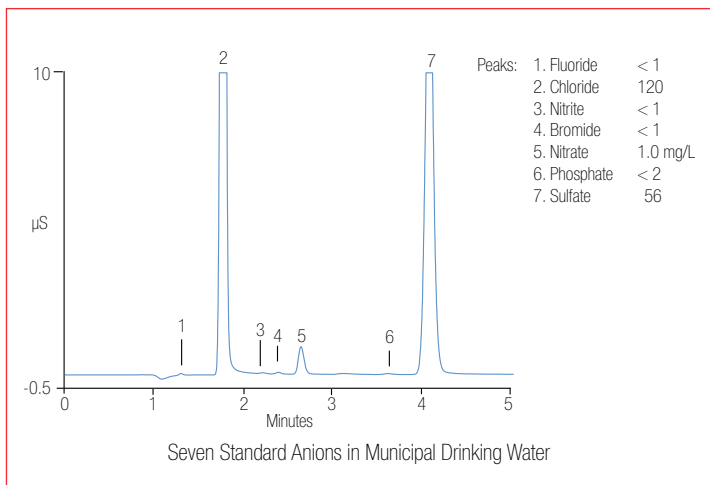
- Drinking Water Directive Quality standards developing from the World Health Organization (WHO) and the European Commission Scientific Advisory Committee
- European Commission – EC Council Directive 91/271/EEC
Regulates urban wastewater discharges as well as discharges from certain industrial sectors

Thermo Scientific™ Dionex™ Integriion™ HPIC™ System

As your lab is challenged to meet more stringent levels of detection, the Dionex Integriion IC system can be used to test environmental water for a wide range of regulated and emerging inorganic elements and organic compounds to obtain consistently reliable results.

- A detector compartment that creates a thermally regulated environment for reproducible, sensitive detection
- Better method reproducibility using automated Eluent Generation technology
- A forced air column oven, enabling precise temperature control
- High-pressure capabilities up to 5000 psi – faster run times without compromising data resolution when using 4 μm particle-sized columns

The following figures illustrate the performance of the Dionex Integriion HPIC system for a broad range of environmental analytical applications.



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