
Lead

For water and wastewater

LeadTrak™ Method

Introduction

Lead is seldom found in ground water in more than trace quantities; it averages around 10 µg/L. Surface waters contain very low levels of lead because it is precipitated by a variety of substances. Lead may be found in potable water systems as a result of the corrosion of lead service lines, lead-based solder joints, or lead-based plumbing fixtures.

Lead and its compounds are poisonous and accumulate in the bone structure when ingested in amounts exceeding the natural elimination rate of about 300 micrograms per day. Accumulation of significant amounts of lead in the body may cause severe and permanent brain damage, convulsions and death. Environmental concern with lead poisoning has resulted in a national program to reduce the concentration of lead in consumer products.

Chemical reactions

LeadTrak method

The LeadTrak™ Method for determining soluble lead as Pb^{2+} in potable water first involves the acidification of the sample to keep all lead ions soluble and to prevent the lead from being lost by precipitation or absorption on the sample container walls. Complexing and buffering agents are then added to the sample to modify the lead ions into a form which allows them to be retained by the cellulose medium in the concentrator column. Other competing ions, such as iron, copper and zinc, pass through the column and are eliminated.

The lead ions are then eluted from the concentrator column with a nitric acid solution. The nitric acid eluant is neutralized and reacted with meso-tetra (4-N-methylpyridyl) porphine tetratosylate to form a faintly colored complex. The absorbance of the complex is measured at 477 nm. EDTA is then added to the complex. The EDTA complexes with the lead and removes the lead from the porphine complex. The absorbance of the sample is read again and the lead concentration is determined by the difference between the two readings.