

Chemical Oxygen Demand

Tips & Tricks No. 14



Chemical Oxygen Demand (COD)

The standard method for the COD-Test determines the oxygen equivalent of that quantity of organic matter which can be oxidized by potassium dichromate in 50% solution of sulphuric acid. In other words, the amount of oxygen that is necessary to bring about complete oxidation and using a photometric method of measurement. The basis for the evaluation is either the amount of dichromate used, or the amount of chromate released. The potassium dichromate functions as an oxygen donor or an oxidizing agent. It initially has an orange colour but changes to green with the formation of chromium-III ions and thus the release of oxygen. The reaction conditions consist of the presence of sulphuric acid with silver sulphate as a catalyst, a reaction temperature of 148° and a reaction period of 120 minutes. At the end of the reaction, the COD-value of the liquid in the vessel is determined by either the content of the residual dichromate in the waste liquor or by the amount of Chromium-III ions present.

If chloride is present in the sample, this must be removed or masked with mercury to avoid any possibility of the measurement being increased by oxidation to chlorine. In association with the biological oxygen demand, the COD provides information about the environmental loads presented by a sample.

Rapid Cuvette-Test

The rapid cuvette-test serves to monitor the COD in clarifying plants and other forms of treatment for water. The test-kits can be used without any training and require very little in the way of laboratory equipment. The

determination is made by a photometric procedure. The equipment already displays the result expressed in mg/l.

The provided cuvette has a diameter of 16 mm and contains 3 ml of reagent. To carry out the test 2ml of water are added to the cuvette followed by good mixing. The mixture changes in colour and can be measured with the provided photometric means, that are already included in commercially available rapid Cuvette-Tests.

BOD

While the COD test affects all organic compounds, BOD-values are only related to all degradable organic compounds. It identifies the amount of oxygen which is necessary to bring about the biotic degradation of compounds present in water under particular conditions and within a certain time. The difference between it and other measurement e.g. COD is that in this case, biological systems are being investigated rather than chemical or physical properties. The ratio of COD-values to BOD-values provides information about the biodegradability of the organic contents of a sample.

	Value	Biodegradeability
COD / BOD	<2	easily degradable
COD / BOD	2 < > 4	degradable
COD / BOD	>4	Very little degradable