

1.14690.0001

# Spectroquant® COD Cell Test

# COD

USEPA approved for wastewater

## 1. Definition

The COD (chemical oxygen demand) expresses the amount of oxygen originating from potassium dichromate that reacts with the oxidizable substances contained in 1 l of water under the working conditions of the specified procedure.

1 mol  $K_2Cr_2O_7$  is equivalent to 1.5 mol  $O_2$   
Results are expressed as mg/l COD (= mg/l  $O_2$ )

## 2. Method

The water sample is oxidized with a hot sulfuric solution of potassium dichromate, with silver sulfate as the catalyst. Chloride is masked with mercury sulfate. The concentration of unconsumed yellow  $Cr_2O_7^{2-}$  ions is then determined photometrically.

**The method corresponds to DIN ISO 15705 and is analogous to EPA 410.4, APHA 5220 D, and ASTM D1252-06 B.**

## 3. Measuring range and number of determinations

Measuring range	Number of determinations
50 - 500 mg/l COD	25

For programming data for selected photometers / spectrophotometers see [www.service-test-kits.com](http://www.service-test-kits.com).

## 4. Applications

This test measures organic and inorganic compounds oxidizable by dichromate. Exceptions: some heterocyclic compounds (e.g. pyridine), quaternary nitrogen compounds, and readily volatile hydrocarbons.

### Sample material:

Groundwater and surface water  
In-process controls  
Wastewater

## 5. Influence of foreign substances

This was checked in solutions with a COD of 250 mg/l. The determination is not yet interfered with up to the concentrations of foreign substances given in the table.

Concentrations of foreign substances in mg/l or %			
Cl <sup>-</sup>	2500	SO <sub>3</sub> <sup>2-</sup>	50
Cr <sup>3+</sup>	100	H <sub>2</sub> O <sub>2</sub>	10
CrO <sub>4</sub> <sup>2-</sup>	10	NaNO <sub>3</sub>	20 %
NO <sub>2</sub> <sup>-</sup>	25	Na <sub>2</sub> SO <sub>4</sub>	20 %
		Na <sub>3</sub> PO <sub>4</sub>	20 %

## 6. Reagents and auxiliaries

Please note the warnings on the packaging materials!

### Store the pack protected from light!

The test reagents are stable up to the date stated on the pack when stored closed at +15 to +25 °C.

### Package contents:

25 reaction cells  
1 sheet of round stickers for numbering the cells

### Other reagents and accessories:

MQuant™ Chloride Test, Cat. No. 110079,  
measuring range 500 - >3000 mg/l Cl<sup>-</sup>  
Spectroquant® CombiCheck 60, Cat. No. 114696  
COD standard solution CRM, 100 mg/l COD, Cat. No. 125029  
COD standard solution CRM, 200 mg/l COD, Cat. No. 125030  
COD standard solution CRM, 400 mg/l COD, Cat. No. 125031

Pipette for a pipetting volume of 2.0 ml  
Thermoreactor

## 7. Preparation

- Analyze immediately after sampling.
- Homogenize the samples.
- Check the chloride content with the MQuant™ Chloride Test. Samples containing more than 2500 mg/l Cl<sup>-</sup> must be diluted with distilled water **prior to** determining the COD.

## 8. Procedure

Suspend the bottom sediment in the reaction cell by swirling.		
Pretreated sample	2.0 ml	<b>Carefully</b> allow to run from the pipette down the inside of the tilted reaction cell onto the reagent ( <b>Wear eye protection! The cell becomes hot!</b> ).
Tightly attach the screw cap to the cell. <b>In all subsequent steps the cell must be held only by the screw cap!</b> <b>Vigorously</b> mix the contents of the cell. Heat the cell at 148 °C in the preheated thermoreactor for 120 min. Remove the hot cell from the thermoreactor and allow to cool in a test-tube rack. <b>Do not cool with cold water!</b> Wait 10 min, swirl the cell, and return to the rack for complete cooling to room temperature (cooling time at least 30 min). Measure in the photometer.		

### Notes on the measurement:

- For photometric measurement the cells must be clean. Wipe, if necessary, with a clean dry cloth.
- Measurement of turbid solutions yields false-low readings.
- The measurement value remains stable over a long term.

## 9. Analytical quality assurance

recommended before each measurement series  
To check the photometric measurement system (test reagent, measurement device, handling) and the mode of working, the COD standard solutions CRM, 100 mg/l COD (Cat. No. 125029), 200 mg/l COD (Cat. No. 125030), and 400 mg/l COD (Cat. No. 125031) or Spectroquant® CombiCheck 60 can be used. Besides a **standard solution** with 250 mg/l COD, CombiCheck 60 also contains an **addition solution** for determining sample-dependent interferences (matrix effects). Additional notes see under [www.qa-test-kits.com](http://www.qa-test-kits.com).

### Characteristic quality data:

In the production control, the following data were determined in accordance with ISO 8466-1 and DIN 38402 A51:

Standard deviation of the method (mg/l COD)	± 2.0
Coefficient of variation of the method (%)	± 0.71
Confidence interval (mg/l COD)	± 4
Number of lots	39

### Characteristic data of the procedure:

Sensitivity: Absorbance 0.010 A corresponds to (mg/l COD)	4
Accuracy of a measurement value (mg/l COD)	max. ± 12

For quality and batch certificates for test kits see the website.

## 10. Note

**The test reagents must not be run off with the wastewater!**  
Information on disposal can be obtained at [www.disposal-test-kits.com](http://www.disposal-test-kits.com).

Merck KGaA, 64271 Darmstadt, Germany,  
Tel. +49(0)6151 72-2440  
[www.analytical-test-kits.com](http://www.analytical-test-kits.com)

EMD Millipore Corporation, 290 Concord Road,  
Billerica, MA 01821, USA, Tel. +1-978-715-4321

