



## QuickCOD<sub>lab</sub>

COD-ANALYSIS

The clean COD determination in the laboratory.  
Chemical-free.

Clean. Fast. Accurate.



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# THE ENVIRONMENTALLY - FRIENDLY COD ANALYSIS.

You can now determine chemical oxygen demand quickly, cleanly and safely with the right measurement procedure – without any chemicals.

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**Chemical oxygen demand (COD) is one of the most important sum parameters in water analysis. It is considered as a reference for the organic load of waste water, both in the industrial and municipal sectors. In general, analytical processes are based on the use of different reagents. However, the safe and environmentally friendly procedure is thermal oxidation.**

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## What COD means. r elevance and versatility.

Chemical oxygen demand (COD) describes the amount of oxygen that is needed to chemically oxidise organic compounds in water, using an (often environmentally dubious) oxidant. The aim is to determine the demand for oxygen, which is primarily required to oxidise organic matter.

This oxygen demand is relevant for the planning, control and cleaning efficiency of waste water

treatment plants, as well as a basis for the calculation of sewage charges.

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## COD measurement methods. Still up-to-date?

The standard potassium dichromate method (DIN 38409 H41-H44) dominates the market. It is also available in a modified form as cuvette tests (DIN ISO 15705:2003). Here, potassium dichromate is used as an oxidising agent, silver sulphate as a catalyst, as well as sulphuric acid. Mercuric chloride is also used to mask chloride interferences. This risky chemical cocktail is heated after the aqueous sample has been added, and then simmered for approx. two hours. The oxygen demand is calculated from the concentration of residual dichromate.

The high consumption of hazardous substances has long been the subject of lively debate.

At 1,200°C

Analyse water  
samples completely  
and accurately.

#### economic efficiency and results in comparison.

The cost-effectiveness of both wet chemical COD procedures needs to be assessed, due to the difficulty of automating them and because of the staff costs involved. With a larger sample throughput, the personnel costs for non-automated procedures take up a typically disproportionate proportion of the annual costs.

The cuvette tests are cheaper, due to the low procurement costs, if the annual throughput remains less than around 250 samples. Automated procedures (such as the LAR QuickCOD<sub>ultra</sub> or QuickTOC<sub>ultra</sub>) are preferable with increasing numbers of samples.

Until now, no reagent-free and rapid method has been used to determine the oxygen demand in the laboratory.

#### LAR's solution: The QuickCOD<sub>lab</sub>.

The COD procedure from LAR Process Analysers AG is based on the thermal oxidation of the sample at 1,200°C, with subsequent detection of the oxygen consumption. This method (ASTM D6238-98) has been employed hundreds of times in the field of online monitoring and has been specially developed for use in the laboratory.

The crucial point with QuickCOD<sub>lab</sub>: The high-temperature procedure developed by LAR enables the reliable oxidization of all the organic compounds in the sample at a temperature of 1,200°C. The procedure does not need any catalysts or other hazardous or corrosive reagents. Furthermore, the measurement results are free of chloride interference due to the unique process management.

The homogenized sample is injected directly into the reactor (→Fig.1), where it is completely oxidised and accurately analysed with an O<sub>2</sub> detector.

#### fast. Clean. Precise.

##### Determining the COD within minutes.

The QuickCOD<sub>lab</sub> ensures a high operational reliability and is easy to use. The measured values are output directly to a standard computer and can be quickly and easily processed. The COD measurement is available in just a few minutes.



Fig. 1

The sample is injected into the reactor using the precision syringe supplied. This is easy to use and allows different sample volumes to be dosed exactly.

#### AT A GLANCE

The COD value indicates the amount of oxygen consumed during the oxidation of organic substances of a water sample.

Standard COD procedures are subject to criticism, due to their high consumption of hazardous chemicals.

A reliable measurement system needs to be environmentally friendly and free of chloride interference.

A temperature of 1,200°C guarantees complete combustion and eliminates the need for chemicals.

The QuickCOD<sub>lab</sub> precisely determines the COD within minutes.

# THE COD-ANALYSER.

A hot oven. The high temperature makes the difference.

## Warm, warmer, hot.

### Tracking organic loads at 1,200°C.

The catalyst-free ceramic oven forms the heart of the QuickCOD<sub>lab</sub>. It reliably decomposes all the constituents of the sample at 1,200°C, so permitting a complete analysis of the oxygen that is required – without any chloride interference. Because of this high oxidation potential, the use of chemicals and/or catalysts is unnecessary.

### COD analysis. fast and reliable.

The sample is injected directly into the reactor with a precision syringe. Due to the predefined injection volumes, any possible handling errors are minimized during pipetting. The measurements are fed directly to the computing device present, where they are quickly and easily further processed.

### The real oxygen demand.

#### even with changing sample matrices.

The process management of the QuickCOD<sub>lab</sub> also makes filtration of the sample unnecessary. The homogenised waste water sample is injected directly into the oven. The measuring device provides accurate and reliable results, even with varying sample matrices.

## The QuickCOD<sub>lab</sub>. Ultrafast measurement.

COD measurement is accomplished in less than 3 minutes. Thus, 3 replication measurements per sample can be determined within just 10 minutes. The QuickCOD<sub>lab</sub> offers enormous time and cost savings in comparison to standard procedures.

### O<sub>2</sub> detection. Simple and reliable.

An O<sub>2</sub> detector determines the oxygen used to digest all the constituents. The determination of the oxygen demand is performed over a wide variety of measurement ranges. The QuickCOD<sub>lab</sub> also reliably measures the real COD in relevant measurement ranges from 5 to 100 mg/l.

### very high salt concentrations. No problem.

The QuickCOD<sub>lab</sub> easily masters salt concentrations of up to 10 g/l, and even up to 300 g/l of sodium chloride (NaCl) with the additional high-salt option. The salts move through the oven, are taken from the system with the condensate and are then collected as solids in a special retaining device. This means that no salt residues can form in the oven and the sample does not have to be diluted, even at the highest salt concentrations. This, in turn, has a positive effect on the accuracy of the measurements.

### Thermal oxidation. The clean solution.

The QuickCOD<sub>lab</sub> meets the high requirements of occupational safety and environmental protection. This not only means a very high level of operational reliability and ease of use for the staff, but also the avoidance of any additional pollution of the environment from using chemicals.

With the QuickCOD<sub>lab</sub>, the analytical compartment is separated from the electronics.

All areas can be accessed with just a few hand movements.





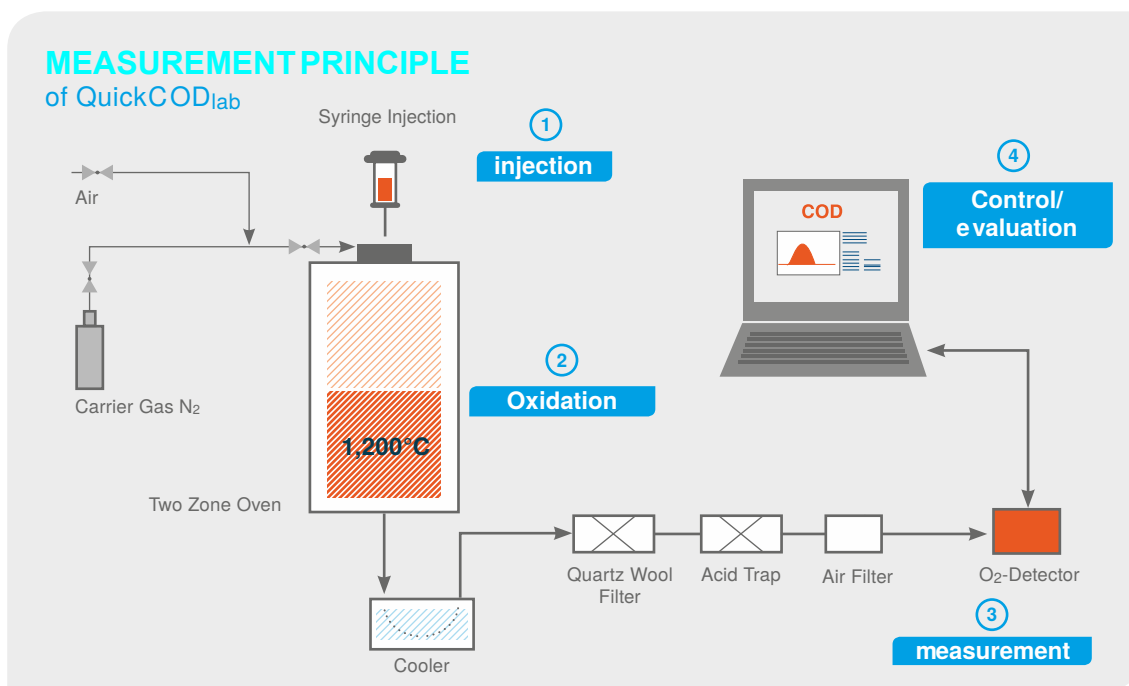


Fig. 2

- 1) Manual injection of the sample
- 2) Combustion and oxygen consumption
- 3) Measurement of the O<sub>2</sub> required
- 4) Control and evaluation using the EDP unit

## THE PRINCIPLE.

Even if the water is dirty –  
the measurements are clean!

### The LAR procedure. Better than the standard.

The QuickCODlab works analogously to the American standard method for determining Total Oxygen Demand (ASTM D6238-98). The procedure has been recognised for years and is already widely in use. Instead of the standardised 900°C, LAR uses 1,200°C. Thus, the catalyst-free measurement of the COD can also be optimized for measuring ranges from 5 to 100 mg/l.

### injection by precision syringe.

No more inaccuracies while pipetting. The precision syringe can hold exactly set quantities of 1-200 µg/l, is easy to use and allows the optimal injection into the oven.

### measurement. fast and reliable.

The automatic supply of carrier gas ensures a sufficient, accurately determined O<sub>2</sub> concentration for complete oxidation (↗Fig. 2). This is closely related to the expected oxygen demand and is

adjusted by individual selection of the appropriate measuring range via the software. A special oven valve prevents gas exchange, so that the O<sub>2</sub> detector can securely determine the oxygen consumption.

### The software. easy to use.

The software is very easy to use by means of tabs. It includes an extensive selection of measuring ranges, as well as calibration and parameter settings, which permit a quick and accurate analysis of the sample. The measurement series, which can be exported for further processing, are automatically evaluated, internally stored and displayed in the form of data tables and measuring curves (↓Fig. 3).

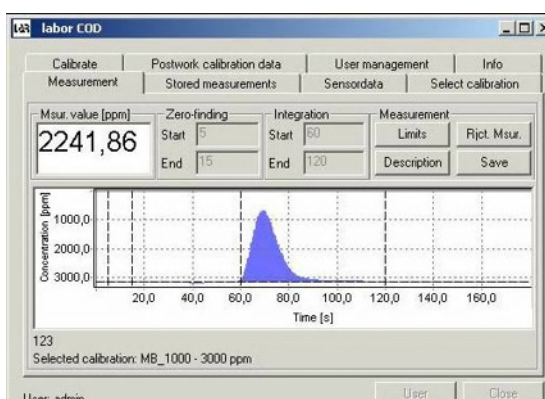


Fig. 3

View of a  
measuring  
curve.

# QuickCOD<sub>lab</sub> AN OVERVIEW

## Laboratory COD measurement for all water samples – even the rough stuff.

QuickCOD<sub>lab</sub> analyses water samples for their COD content. Neither chemicals nor catalysts are required thanks to the process management involved. The samples are oxidised completely at 1,200°C – the actual COD is determined in just three minutes.



Fast and precise –  
you can rely on the  
QuickCOD<sub>lab</sub>.

## TECHNICAL DATA

### Measurement Technique

Measuring technique	Thermal combustion
Measuring ranges	1 - 100 mg/l, 10 - 200 mg/l, 100 - 1,000 mg/l, 1.000 - 3,000 mg/l, 2,000 - 10,000 mg/l Further available
Response time	3 minutes
Sample injection	Manual sample injection using a precision syringe

### Dimensions and weight

Housing	Steel, IP 54, powder-coated
Dimensions (WxHxD)	500 x 450 x 450 mm
Weight	37 kg

### Electrical connection data

Power supply	230 VAC, 50/60 Hz
Safety	Internal 2/6 A, external 16 A

### Device handling and data output

Software	LAR QuickCOD <sub>lab</sub>
Operating Systems	Microsoft Windows 7 or higher
Data interface	USB 2.0, LAN (optional)
Data output:	Export as CSV-file

### Installation requirements

Gas Supply	Nitrogen (N <sub>2</sub> ) as carrier gas (via pressure bottle), Clean, oil-free air
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## ADVANTAGES & FEATURES

- ✓ Accurate determination of the real COD
- ✓ Measurements in just three minutes
- ✓ Extensive measuring ranges
- ✓ Proven thermal oxidation principle at 1,200°C
- ✓ No catalyst needed
- ✓ Reliable measurement without reagents
- ✓ Easy to operate
- ✓ Predefined injection volumes
- ✓ Excellent chloride acceptance
- ✓ Very low measurement costs
- ✓ High operational reliability
- ✓ Very low operating and maintenance costs

# ALL cLeAR?

LAR Process Analysers AG: Water is our Element.  
We do everything for its protection.

We are one of the leading manufacturers of water analysers in industrial and communal waste water technology, process monitoring, as well as in pure water analysis. Further products in the areas of industrial processing and environmental technology complete our range.

## We can take the heat, when the rest have left kitchen. Up to 1,200°C!

The LAR Process Analysers AG, formed in 1986, gained prominence through their TOC and COD analysers. LAR is the only company worldwide that, using a high temperature method of 1,200°C, can completely oxidise a sample to accurately determine sum parameters. Particularly when measuring the TRUE TOC with differing of concentrations.

## LAR is only satisfied once the customer is.

We offer application specific analysers developed by our own research and development team. Additionally, we maintain close contact with our clients and continually analyse the exact problem areas of every application. Because the availability of our machines is a deciding criteria, they are constructed in a very user-friendly way. All

important areas require little effort to be accessed and the protective housing offers additional safety.

## After Sales. A familiar word to us.

Servicing is carried out by our qualified partners worldwide. Technical support, via telephone or e-mail is available at all times. Additionally, we offer practically orientated seminars and trainings, operator meetings and workshops, that leave no questions unanswered.

## We always take a closer look.

LAR has established its own system for guaranteeing its standards of quality. Not only do we fulfill the requirements of the ISO 9001 Norm, but we also work continually on improving our standards of quality. To enable this, we collect information about all incidents in our database, that are subsequently analysed and evaluated. Regular meetings are held to address every issue.

Setting ourselves the highest quality standards, we naturally expect our distributors to fulfill these as well. Thus, we regularly evaluate our distributors and when necessary, introduce measures to improve our collaboration with them.

### TOC-ANALYSIS



From complex industry wastewater to pharmaceutical pure water, our TOC analysers determine the parameter quickly and precisely.

### COD-ANALYSIS



With our analysers, the chemical oxygen demand is cleanly and safely determined online, without using hazardous chemicals.

### BOD/TOXICITY



We detect the BOD with the plant's own biomass and determine the toxicity with highly sensitive bacteria, fast and reliably.

### TN<sub>b</sub>/TP-ANALYSIS



TN<sub>b</sub> and TP are important parameters for wastewater treatment. We are the only ones who offer a combination of these with TOC and COD in one system.

### Further Products



LAR offers a specific solution for nearly all applications. With our protective housings, you are always on the safer side. Learn more about our product range at [www.lar.com](http://www.lar.com).

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TÜV-certified Company

## COD - ANALYSIS

# QuickCOD<sub>lab</sub>

## AREAS OF APPLICATION

ENVIRONMENT / **municipal FACILITIES** / Industry

industries

**ENVIRONMENTAL MONITORING** / waste water treatment /  
**WASTE PROCESSING** / PHARMACEUTICAL / LABORATORY /  
**PETROCHEMICAL** / REFINERIES / **CHEMICAL** / COAL AND STEEL /  
**POWER** / AIRPORTS / AUTOMOBILE / **PAPER MANUFACTURE** /  
**BREWERIES** / **FOOD MANUFACTURE** / **DRINK MANUFACTURE** / **MILK PROCESSING**

## TYPES OF WATER

groundwater / surface water / drinking water / **WATER INFLUENT** /  
**WATER EFFLUENT** / **DISCHARGE CONTROL** / **INDUSTRIAL WASTE WATER** / **DE-ICING WATER** / **PROCESS WATER** / **HIGH SALT CONCENTRATION** / oil-in-water / **COOLING WATER** / **PURE WATER** / **BOILER FEED WATER** / **CONDENSATE RETURN** /

PHARMA HPW / PHARMA WFI



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