**COD HR TT****M132****200 - 15000 mg/L COD^{b)}****Hr****Dichromate / H₂SO₄**

Instrument specific information

The test can be performed on the following devices. In addition, the required cuvette and the absorption range of the photometer are indicated.

Instrument Type	Cuvette	λ	Measuring Range
MD 100, MD 110, MD 200, MD 600, MD 610, MD 640, MultiDirect	ø 16 mm	610 nm	200 - 15000 mg/L COD ^{b)}
SpectroDirect, XD 7000, XD 7500	ø 16 mm	602 nm	200 - 15000 mg/L COD ^{b)}

Material

Required material (partly optional):

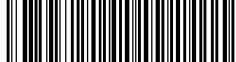
Reagents	Packaging Unit	Part Number
COD HR/25	25 pc.	2420722
COD HR/25, mercury free	25 pc.	2420712
COD HR/150	150 pc.	2420727

The following accessories are required.

Accessories	Packaging Unit	Part Number
Thermoreactor RD 125	1 pc.	2418940

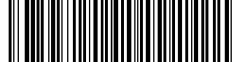
Application List

- Raw Water Treatment
- Waste Water Treatment



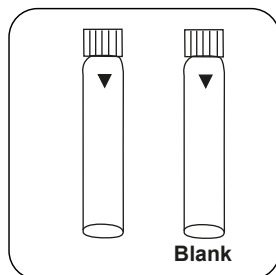
Notes

1. The blank is stable when stored in the dark. Blanks and test vials must be from the same batch.
2. Do not place hot vials in the sample chamber. The most stable measured values can be determined if the vials are left standing overnight.
3. For samples under 1 g/L COD it is recommended to repeat the test with the test kit for COD MR or for samples under 0.1 g/L COD to use the tube test COD LR if a higher degree of accuracy is required.

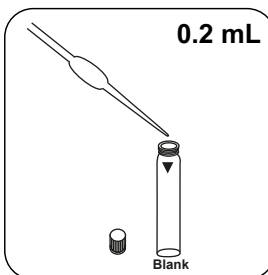


Determination of CSB HR with Vario Vial Test

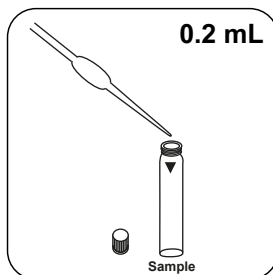
Select the method on the device.



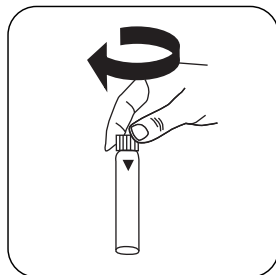
Prepare two **reaction vials**. Mark one as a blank.



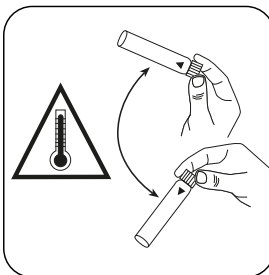
Put **0.2 mL deionised water** in the blank.



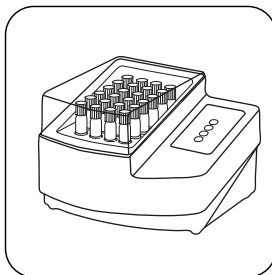
Put **0.2 mL sample** in the sample vial.



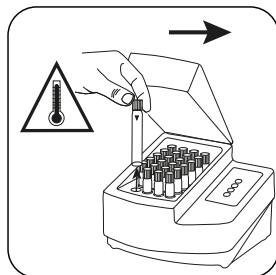
Close vial(s).



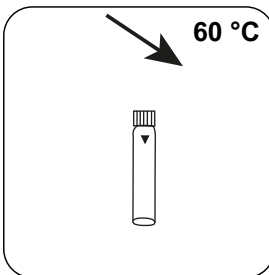
Carefully invert several times to mix the contents.
Note: Will get hot!



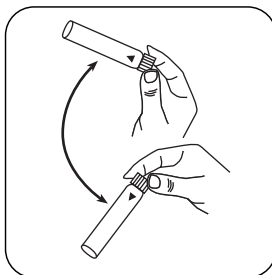
Seal the vials in the pre-heated thermoreactor for **120 minutes at 150 °C**.



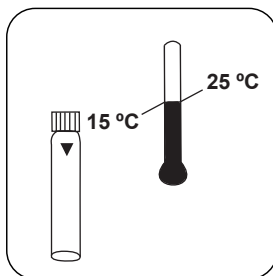
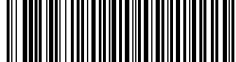
Remove the vial from the thermoreactor. (**Note: vial will be hot!**)



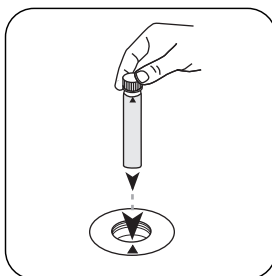
Allow vial(s) to cool to **60 °C**.



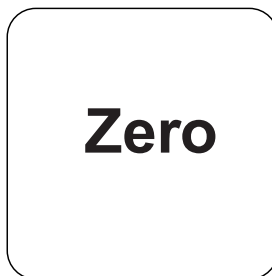
Invert several times to mix the contents.



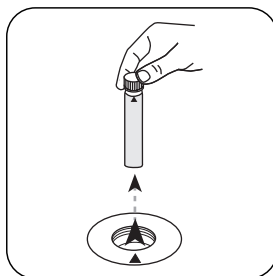
Allow the vial to cool to room temperature and then measure.



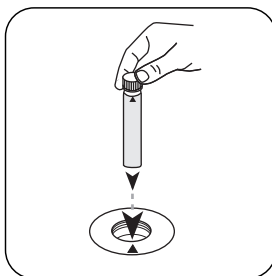
Place **blank** in the sample chamber. • Pay attention to the positioning.



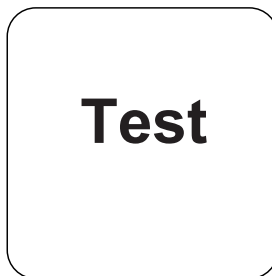
Press the **ZERO** button.



Remove **vial** from the sample chamber.

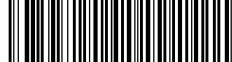


Place **sample vial** in the sample chamber. • Pay attention to the positioning.



Press the **TEST** (XD: **START**) button.

The result in g/L COD (XD: mg/L COD) appears on the display.



Chemical Method

Dichromate / H_2SO_4

Appendix

Calibration function for 3rd-party photometers

$$\text{Conc.} = a + b \cdot \text{Abs} + c \cdot \text{Abs}^2 + d \cdot \text{Abs}^3 + e \cdot \text{Abs}^4 + f \cdot \text{Abs}^5$$

	ø 16 mm
a	$-3.10235 \cdot 10^{-2}$
b	$2.1173 \cdot 10^{-4}$
c	$1.64139 \cdot 10^{-2}$
d	
e	
f	

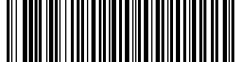
Interferences

Persistent Interferences

- In exceptional cases, contents, for which the oxidation capacity of the reagent is not sufficient, can lead to lower results.

Removeable Interferences

- Suspended solids in the vial can lead to incorrect measurements and so to avoid this, it is important to place the vials carefully in the sample chamber as the method necessitates a build-up of precipitate at the bottom of the vial.
- The outer walls of the vial must be clean and dry before the analysis is carried out. Fingerprints or water droplets on the vial lead to incorrect measurements.
- In the standard version, chloride interferes from a concentration of 10000 mg/L. In the mercury-free version, the disturbance depends on the chloride concentration and the COD. Concentrations from 100 mg/L chloride can lead to significant disturbances here. To remove high chloride concentrations in COD samples, see method M130 COD LR TT.



Method Validation

Limit of Detection	112.81 mg/L
Limit of Quantification	338.43 mg/L
End of Measuring Range	15 g/L
Sensitivity	21,164 mg/L / Abs
Confidence Intervall	70.48 mg/L
Standard Deviation	27.84 mg/L
Variation Coefficient	0.37 %

Conformity

ISO 15705:2002

According to

ISO 15705:2002

¹⁾ Reactor is necessary for COD (150 °C), TOC (120 °C) and total -chromium, - phosphate, -nitrogen, (100 °C)