



Hardness total T	200
2 - 50 mg/l CaCO₃	tH1
Metallphthaleine	

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 600, MD 610, MD 640, MultiDirect, PM 620, PM 630	ø 24 mm	560 nm	2 - 50 mg/l CaCO ₃
SpectroDirect, XD 7000, XD 7500	ø 24 mm	571 nm	2 - 50 mg/l CaCO ₃

Material

Required material (partly optional):

Reagents	Packaging Unit	Part Number
Hardcheck P	Tablet / 100	515660BT
Hardcheck P	Tablet / 250	515661BT

Application List

- Cooling Water
- Boiler Water
- Pool Water Treatment
- Drinking Water Treatment
- Raw Water Treatment

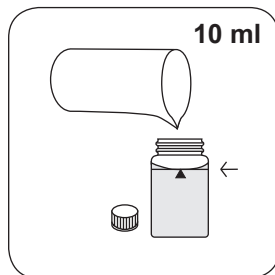
Preparation

1. Strong alkaline or acidic water samples should be adjusted between pH 4 and pH 10 before the analysis (use 1 mol/l Sulphuric acid or 1 mol/l Sodium hydroxide).

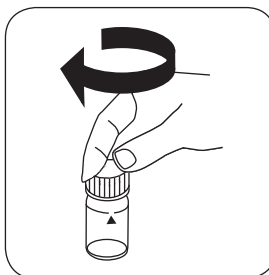
Implementation of the provision Hardness Calcium, Total with Tablet

Select the method on the device

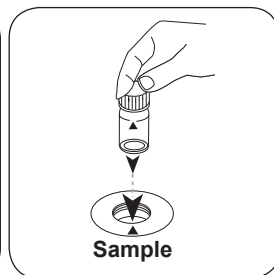
For this method, no ZERO measurements are to be carried out with the following devices: XD 7000, XD 7500



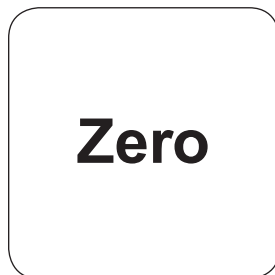
Fill 24 mm vial with **10 ml sample**.



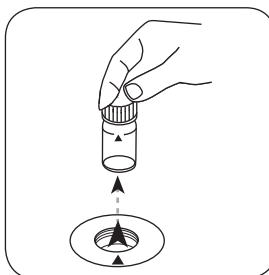
Close vial(s).



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

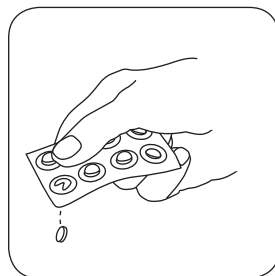


Press the **ZERO** button.

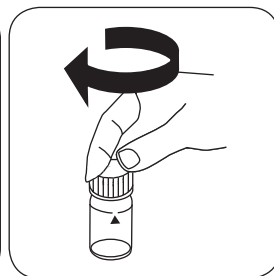
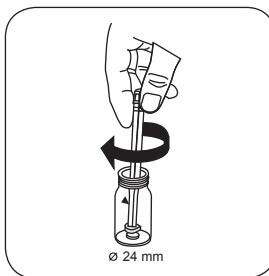


Remove the vial from the sample chamber.

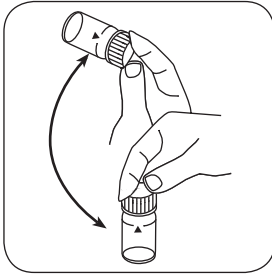
For devices that require **no ZERO measurement**, start here.



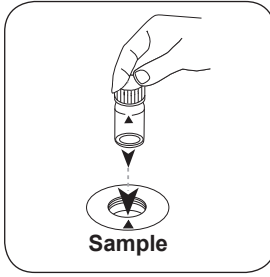
Add **HARDCHECK P tablet**. Crush tablet(s) by rotating slightly.



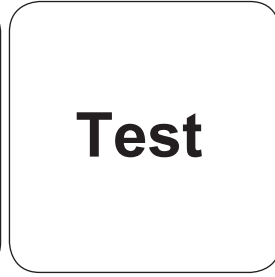
Close vial(s).



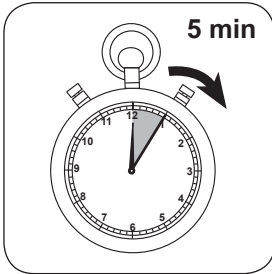
Dissolve tablet(s) by inverting.



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



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



Wait for **5 minute(s) reaction time**.

Once the reaction period is finished, the measurement takes place automatically. The result in total Hardness appears on the display.

Analyses

The following table identifies the output values can be converted into other citation forms.

Unit	Cite form	Scale Factor
mg/l	CaCO ₃	1
	°dH	0.056
	°eH	0.07
	°fH	0.1
	°aH	1
mg/l	Ca	0.40043

Chemical Method

Metallphthaleine

Appendix

Interferences

Removeable Interferences

1. Interference from zinc and magnesium can be eliminated by the addition of 8-hydroxyquinoline.
2. Concentrations of strontium and barium that occur in waters and soils do not interfere.

Method Validation

Limit of Detection	17.552 mg/l
Limit of Determination	52.657 mg/l
End of Measuring Range	50 mg/l
Sensitivity	0.007 mg/l
Standard Deviation	0.043 µg

Bibliography

Photometrische Analyseverfahren, Schwendt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989

^{a)} determination of free, combined and total | ^{b)} Reactor is necessary for COD (150 °C), TOC (120 °C) and total -chromium, - phosphate, -nitrogen, (100 °C) | ^{c)} MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75) | ^{d)} Spectroquant® is a Merck KGaA Trademark | ^{e)} alternative reagent, used instead of DPD No.1/No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity | ^{f)} additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine | ^{g)} Reagent recovers most insoluble iron oxides without digestion | ^{h)} additionally required for samples with hardness values above 300 mg/l CaCO₃ | ⁱ⁾ high range by dilution | * including stirring rod, 10 cm