Hardness total HR T

20 - 500 mg/l CaCO$_3$

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.

<table>
<thead>
<tr>
<th>Instrument Type</th>
<th>Cuvette</th>
<th>$\lambda$</th>
<th>Measuring Range</th>
</tr>
</thead>
</table>
| MD 100, MD 110, MD 600, MD 610, MD 640, MultiDirect, PM 620, PM 630 | $\varnothing$ 24 mm | 560 nm | 20 - 500 mg/l CaCO$_3$

| SpectroDirect, XD 7000, XD 7500 | $\varnothing$ 24 mm | 571 nm | 20 - 500 mg/l CaCO$_3$

**Material**

Required material (partly optional):

<table>
<thead>
<tr>
<th>Reagents</th>
<th>Packaging Unit</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardcheck P</td>
<td>Tablet / 100</td>
<td>515660BT</td>
</tr>
<tr>
<td>Hardcheck P</td>
<td>Tablet / 250</td>
<td>515661BT</td>
</tr>
</tbody>
</table>

**Application List**

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

**Preperation**

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 total HR 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 9 ml deionised water.

Put 1 ml sample in the vial.

Close vial(s).

Place sample vial in the sample chamber. • Pay attention to the positioning.
For devices that require no ZERO measurement, start here.

Add HARDCHECK P tablet.

Crush tablet(s) by rotating slightly.

Close vial(s).

Zero
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.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Cite form</th>
<th>Scale Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>mg/l</td>
<td>CaCO₃</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>°dH</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>°eH</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>°fH</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>°aH</td>
<td>1</td>
</tr>
<tr>
<td>mg/l</td>
<td>Ca</td>
<td>0.40043</td>
</tr>
</tbody>
</table>

Chemical Method

Metallphthaleine

Appendix

Calibration function for 3rd-party photometers

Conc. = a + b\cdot Abs + c\cdot Abs² + d\cdot Abs³ + e\cdot Abs⁴ + f\cdot Abs⁵

<table>
<thead>
<tr>
<th>ø 24 mm</th>
<th>□ 10 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>-3.06466 \cdot 10⁻¹</td>
</tr>
<tr>
<td>b</td>
<td>5.0694 \cdot 10⁻²</td>
</tr>
<tr>
<td>c</td>
<td>-6.33317 \cdot 10⁻¹</td>
</tr>
<tr>
<td>d</td>
<td>e</td>
</tr>
</tbody>
</table>

Interferences

Removeable Interferences

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

Bibliography

Photometrische Analyseverfahren, Schwendt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart 1989
6 high range by dilution