

Supelco®

1.14801.0001

MQuant®

Chlorine Test with liquid reagent

Cl₂

for the determination of free chlorine and total chlorine

1. Method

Determination with color-disk comparator

In weakly acidic solution free chlorine reacts with diethyl-p-phenylenediamine (DPD) to form a red-violet dye. In the presence of potassium iodide, also combined chlorine is measured in this reaction. The chlorine concentration is measured **semiquantitatively** by visual comparison of the color of the measurement solution with the color fields of a color disk.

2. Measuring range and number of determinations

Measuring range / color-scale graduation	Number of determinations
0.1 - 0.2 - 0.3 - 0.4 - 0.6 - 0.8 - 1.0 - 1.5 - 2.0 mg/l Cl ₂	400 free Cl ₂ + 400 total Cl ₂

3. Applications

Sample material:

Swimming-pool water
Groundwater and surface water
Drinking water and mineral water
Waters from aquaculture
Wastewater
Electroplating wastewater
Disinfectant solutions
This test is **not suited** for seawater.

4. Influence of foreign substances

This was checked individually in solutions containing 1 mg/l Cl₂. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. Cumulative effects were not checked; such effects can, however, not be excluded.

Concentrations of foreign substances in mg/l or %					
Al ³⁺	250	Mn ²⁺	100	Br ₂	0.2
Ca ²⁺	1000	NO ₂ ⁻	0.1	ClO ₂	0.2
CN ⁻	0.1	S ²⁻	0.1	I ₂	0.4
CO ₃ ²⁻	1000			H ₂ O ₂	0.05
Cr ³⁺	250			O ₃	0.05
Cr ₂ O ₇ ²⁻	0.1			NaCl	10 %
Cu ²⁺	100			NaNO ₃	10 %
Fe ³⁺	100			Na ₂ SO ₄	10 %

5. Reagents and auxiliaries

Please note the warnings on the packaging materials!

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

Package contents:

2 bottles of reagent Cl₂-1
1 bottle of reagent Cl₂-2
2 bottles of reagent Cl₂-3
1 graduated 6-ml plastic syringe
2 test tubes with screw caps
1 color-disk comparator

Other reagents and accessories:

MQuant® Chlorine Test, Cat. No. 117925
measuring range 0.5 - 20 mg/l Cl₂
MQuant® Universal indicator strips pH 0 - 14, Cat. No. 109535
Sodium hydroxide solution 1 mol/l Titipur®, Cat. No. 109137
Sulfuric acid 0.5 mol/l Titipur®, Cat. No. 109072

MQuant® Flat-bottomed tubes with screw caps for MQuant® tests with color-disk comparator (12 pcs), Cat. No. 117988

Refill pack:

Cat. No. 114803

Chlorine Test with liquid reagent

Refill pack for 114801

(Reagents **without technical accessories** for the number of determinations stated in section 2)

6. Preparation

- Analyze immediately after sampling!**
- Check the chlorine content with the MQuant® Chlorine Test. Samples containing more than 2.0 mg/l Cl₂ must be diluted with distilled water.
- The pH must be within the range 4 - 8.**
Adjust, if necessary, with sodium hydroxide solution or sulfuric acid.
- Filter strongly turbid samples.

7. Procedure

As described below, the procedure for the determination of free chlorine and the determination of total chlorine can be employed in **one and the same** sample.

The content of combined chlorine can be calculated from the results of these two determinations.

	Measurement sample right-hand tube (A) behind the color disk	Blank left-hand tube (B) behind the color disk	
Reagent Cl ₂ -1	3 drops ¹⁾	-	Place into the test tube.
Reagent Cl ₂ -2	1 drop ¹⁾	-	Add and mix.
Pretreated sample (5 - 40 °C)	6 ml	6 ml	Add with the syringe, close the tube, and mix: measurement solution 1

Immediately hold the comparator to the light, keeping it upright, and rotate the disk until the closest possible color match is achieved between the two large windows.

Read off the result in mg/l Cl₂ shown in the small window or, if necessary, estimate an intermediate value: **result 1 (free chlorine)**

Reagent Cl ₂ -3	2 drops ¹⁾	-	Add to measurement solution 1 , close the tube, and mix.
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Leave to stand for 1 min (reaction time): measurement solution 2

Hold the comparator to the light, keeping it upright, and rotate the disk until the closest possible color match is achieved between the two large windows.

Read off the result in mg/l Cl₂ shown in the small window: **result 2 (total chlorine)**

¹⁾ Hold the bottle vertically while adding the reagent!

Calculation of the content of combined chlorine:

$$\text{mg/l combined chlorine} = \text{result 2} - \text{result 1}$$

Notes on the measurement:

- The color of both measurement solutions 1 and 2 remains stable for only a short time.
- Turbidity in the measurement solution makes the color comparison more difficult.
- If the color of the measurement solution is equal to or more intense than the darkest color on the scale, repeat the measurement using **fresh**, diluted samples until a value of less than 2.0 mg/l Cl₂ is obtained.
- In the event of chlorine concentrations exceeding 25 mg/l, other reaction products are formed and false-low readings are yielded. In such cases it is advisable to conduct a plausibility check of the measurement results by diluting the sample (1:10, 1:100).
- Concerning the result of the analysis, the dilution (see also section 6) must be taken into account:

$$\text{Result of analysis} = \text{measurement value} \times \text{dilution factor}$$

8. Method control

To check test reagents, measurement device, and handling: Freshly prepare a chlorine standard solution containing 1.0 mg/l Cl₂ (application see the website) and **immediately** analyze as described in section 7.

Additional notes see under **www.qa-test-kits.com**.

9. Notes

- Reclose the reagent bottles immediately after use.
- Rinse the test tubes and the syringe **with distilled water only**.
- Information on disposal can be obtained at www.disposal-test-kits.com.**

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