

Test Instruction KO-22

Determination of the content of free chlorine (% G/G)

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KURITA

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1 Revisions

1.1	**New/Creation**	**23.03.2021**
1.2	**Adaptation to new format**	**08.11.2021**

2 Scope

The iodometric method used here is based on the oxidizing effect of free chlorine. All substances that also have an oxidizing effect under these conditions are co-determined.

3 Type/Type/Test Equipment

This titration method for the determination of free chlorine is based on the standards APHA 4500-Cl Method B and DIN EN ISO 7393-3, with minor modifications.

4 Sample:

The following quantities of substance are used:
Specification in %:

free chlorine	Weighing
approx. 0.5 %	approx. 5 g
approx. 3 %	approx. 2 g
approx. 7 %	approx. 1 g
approx. 19 %	approx. 2.5 g

The specified amount is weighed exactly into an Erlenmeyer flask with grinding and converted into approx. 100 ml demin. Water dissolved. Exception for approx. 19 % free chlorine: the specified amount is reduced in a volumetric flask to 500 ml with demin. Water dissolved. 50 ml are removed and placed in an Erlenmeyer flask with grinding with demin. Water topped up to 100 ml.

Specification in g/l:

free chlorine	volume to be pipetted
120 – 180 g/l	5 ml

It is diluted to 500 ml in a volumetric flask. 25 ml are taken and placed in an Erlenmeyer flask with grinding with demin. Water topped up to 100 ml.

Alternative:
250µl are pipetted directly into an Erlenmeyer flask.

5 Preparation of the measurement

Approx. 6 ml of 33% sulfuric acid (RG-23) and 1 g of potassium iodide are added.
The flask is closed and left in the dark for 10 minutes.

5.1 Blank value

Under the same conditions, a blank value is determined.

6 Measurement:

The iodine released is then titrated back with 0.1 N sodium thiosulfate solution (RG-28), with starch (RI027) added as an indicator towards the end of titration.

7 Result calculation:

free chlorine in the titrated solution

Cl (mg) = 3,546 x [V (ml) - VB (ml)] x f

than Br (mg) = 7,992 x [V (ml) - VB (ml)] x f

Indication in percentage:

$$\text{Cl (\%)} = \frac{0.3546 \times [V\,(ml) - VB\,(ml)] \times f}{E\,(g)}$$

$$\text{than Br (\%)} = \frac{0.7992 \times [V\,(ml) - VB\,(ml)] \times f}{E\,(g)}$$

Specification in g/l:

$$\text{Cl (g/l)} = \frac{3{,}546 \times [V\,(ml) - VB\,(ml)] \times f \times 20}{E\,(ml)}$$

$$\text{than Br (g/l)} = \frac{7{,}992 \times [V\,(ml) - VB\,(ml)] \times f \times 20}{E\,(ml)}$$

Cl (mg)	Free chlorine content in mg in the titrated solution
Cl (%)	Free chlorine content in %
Cl /g/ml)	Free chlorine content in g/l
Br (mg)	Content of free bromine in mg in the titrated solution
Br (%)	Free bromine content in %
Br /g/ml)	Free bromine content in g/l
V (ml)	Consumption of 0.1 N sodium thiosulfate solution in ml
VB (ml)	Consumption of 0.1 N sodium thiosulfate solution in ml for the blank value
f	Factor of 0.1 N Sodium Thiosulfate Solution
E (g)	Weight in g
E (ml)	Weight in ml

8 Reagents

33% sulfuric acid (RG-23)
666 ml dest. Water are **carefully** and stirred with 333 ml conc. sulphuric acid (p.a.). (rubber gloves, **safety goggles).**

0.1 N Sodium Thiosulfate Solution (RG-28)
Durability: 6 months
Review: 1 / month
A commercially available dimensional solution is used, which is adjusted to the specified concentration if necessary by dilution in a calibrated volumetric flask.

Starch Solution (RG-27)
Durability: 6 months
Grate 1.0 g of soluble starch in 5 ml of water and add the mixture to 100 ml of boiling water while stirring.