SLOVENSKI STANDARD
SIST EN 937:2000

01-november-2000

Kemikalije, ki se uporabljajo za pripravo pitne vode - Klor

Chemicals used for treatment of water intended for human consumption - Chlorine

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Chlor

Produits chimiques utilisés pour le traitement de l'eau destinée a la consommation humaine - Chlore

Ta slovenski standard je istoveten z: **EN 937:1999**

ICS:

13.060.20	Pitna voda	Drinking water
71.100.80	Kemikalije za čiščenje vode	Chemicals for purification of water

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EN 937

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Descriptors: water, potable water, water treatment, chemical compounds, chlorine, description, physical properties, chemical properties, impurities, toxic substances, tests, labelling, marking, storage, utilization

English version

Chemicals used for treatment of water intended for human consumption - Chlorine

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Chlore

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Chlor

This European Standard was approved by CEN on 2 November 1998.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 164 "Water supply", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 1999, and conflicting national standards shall be withdrawn at the latest by July 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this Standard :

1) this Standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA ;

2) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

1 Scope

This European Standard is applicable to chlorine used for treatment of water intended for human consumption. It describes the characteristics of chlorine and specifies the requirements and the corresponding test methods for chlorine. It gives information on its use in water treatment.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN ISO 3696	Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)
ISO 1552	Liquid chlorine for industrial use - Method of sampling (for determining only the volumetric chlorine content)
ISO 2120	Liquid chlorine for industrial use - Determination of the content of chlorine by volume in the vaporized product
ISO 2121	Liquid chlorine for industrial use - Determination of water content - Gravimetric method
ISO 5666-1:1983	Water quality - Determination of total mercury by flameless atomic absorption spectrometry - Part 1 : Method after digestion with permanganate - peroxodisulfate
ISO 6206	Chemical products for industrial use - Sampling - Vocabulary

3 Description

3.1 Identification

3.1.1 Chemical name

Chlorine.

3.1.2 Synonym or common name

Liquid chlorine.

3.1.3 Relative molecular mass

70,91.

3.1.4 Empirical formula

Cl_2.

3.1.5 Chemical formula

Cl_2.

3.1.6 CAS Registry Number [1)]

7782-50-5.

3.1.7 EINECS reference [2)]

231-959-5.

3.2 Commercial form

Liquefied gas.

[1)] Chemical Abstracts Service Registry Number.

[2)] European Inventory of Existing Commercial Chemical Substances.

3.3 Physical properties

3.3.1 Appearance

Liquid chlorine is a clear, amber coloured liquid. Chlorine gas is greenish yellow, 2,5 times heavier than air. It has a suffocating and characteristic odour.

3.3.2 Density

Liquid : 1,409 g/ml at 20 °C.

Gas :

- 3,169 kg/m^3 at 100 kPa at 0 °C ;
- 2,945 kg/m^3 at 100 kPa at 20 °C.

3.3.3 Solubility (in water)

7,26 g/l at 20 °C and 100 kPa.

3.3.4 Vapour pressure

669 kPa at 20 °C.

3.3.5 Boiling point at 100 kPa[3)]

- 34 °C.

3.3.6 Liquefaction point

- 101 °C at 100 kPa.

3.3.7 Specific heat

Liquid : 920 J/(kg.K) at - 34 °C.

Gas : 475 J/(kg.K) at 0 °C.

[3)] 100 kPa = 1 bar.

3.3.8 Viscosity (dynamic)

Gas : 1 333 x 10^{-8} Pa.s at 20 °C.

Liquid : 4,78 x 10^{-4} Pa.s at - 34 °C.

3.3.9 Critical temperature

144 °C.

3.3.10 Critical pressure

7 710,83 kPa.

3.3.11 Physical hardness

Not applicable.

3.4 Chemical properties

Chlorine is a very strong oxidizing agent and can react violently with some gases such as hydrogen. Almost all metals form chlorides in the presence of chlorine. Organic compounds including mineral oils and greases react very quickly with chlorine.

Redox potential of chlorine at 25 °C :

$$Cl_2 \text{ (gas)} + 2e^- = 2\ Cl^- + 1{,}36\ V$$

4 Purity criteria

Limits have been given for impurities and toxic substances where these are likely to be present in significant quantities from the current production process and raw materials. If a change in the production process or raw materials leads to significant quantities of other impurities or by-products being present, this shall be notified to the user.

4.1 Composition of commercial product

The product shall contain at least 99,5 %(*m/m*) chlorine.

4.2 Impurities and main by-products

The product shall conform to the requirements specified in table 1.

Table 1 : Impurities

Impurities	Limit in mg/kg of product
Moisture (H_20)	20
Nitrogen trichloride (NCl_3)	20

4.3 Toxic substances

NOTE : For the purpose of this standard, "toxic substances" are those defined in the EU Directive 80/778/EEC of July 15, 1980 (see D.1).

The mercury content shall not exceed the limits specified in table 2.

Table 2 : Toxic substances

Parameter	Limit in mg/kg of product	
	Type 1	Type 2
Mercury (Hg) max.	0,1	1
NOTE : Except mercury, the inorganic toxic substances (in accordance with EU Directive 80/778/EEC) are not found in the gaseous phase. Pesticides and polycyclic aromatic hydrocarbons and cyanides are not by-products of the manufacturing process.		

5 Test methods

The composition of chorine is normally controlled and monitored at the point of manufacture. The methods given for sampling and analysis are intended for use in case of dispute, and shall be carried out by competent personnel.

The sampling and the analytical methods are those described in the annex C (normative).

NOTE : Due to the potential safety risks when performing the sampling and the analysis, it is strongly recommended to take advice of the chlorine producers.

6 Labelling - Transportation - Storage

6.1 Means of delivery

Pressure vessels (cylinders, drums, isocontainers, etc.), pressure rail tank car.

In order that the purity of the product is not affected, the means of delivery shall not have been used previously for any different product or it shall have been specially cleaned and prepared before use.

6.2 Risk and safety labelling in accordance with the EU directives [4)]

The following labelling requirements shall apply to chlorine :

- symbols and indications of danger :
  - T : Toxic.
  - N : Dangerous for the environment.
- nature of special risks attributed to dangerous substances :
  - R 23 : Toxic by inhalation ;
  - R 50 : Very toxic to aquatic organisms
  - R 36/37/38 : Irritating to eyes, respiratory system and skin ;
- safety advice concerning dangerous substances :
  - S 45 : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible) ;
  - S 61 : Avoid release to the environment - Refer to special instructions / Safety date sheet;
  - S 7/9 : Keep container tightly closed and in a well-ventilated place .

[4)] See D.2.