
Kemikalije, ki se uporabljajo za pripravo pitne vode - Natrijev klorid za pridobivanje klora po elektrokemijskem postopku brez uporabe membranske tehnologije

Chemicals used for treatment of water intended for human consumption - Sodium chloride for on site electrochlorination using non-membrane technology

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumchlorid zur elektrochemischen Erzeugung von Chlor vor Ort mittels membranloser Verfahren

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Chlorure de sodium pour la génération électrochimique de chlore utilisant des technologies non membranaires

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Chemicals used for treatment of water intended for human consumption - Sodium chloride for on site electrochlorination using non-membrane technology

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 164.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 14805:2020) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14805:2008.

In comparison with the previous edition, the following technical modifications have been made:

- a) Modification of 7.3 on transportation regulations and labelling, adding the sentence “The user must be aware of the incompatibilities between transported products.”;
- b) Modification of 7.4 on marking. The requirements of marking are also applied to the accompanying documents;
- c) Deletion of reference to EU Directive 67/548/EEC of June 27, 1967 in order to take into account the latest Regulation in force (see [2]);
- d) Modification of moisture content in Table 2, to be in line with EN 973 and EN 16401.

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prEN 14805:2020 (E)**Introduction**

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

- a) this document provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;
- b) 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.

NOTE Conformity with this document does not confer or imply acceptance or approval of the product in any of the Member States of the EU or EFTA. The use of the product covered by this document is subject to regulation or control by National Authorities.

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1 Scope

This document is applicable to sodium chloride intended for on site electrochlorination of water intended for human consumption using non-membrane technology. It describes the characteristics and specifies the requirements and the corresponding test methods for sodium chloride (see Annex B). It gives information on its use in water treatment.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 973:2009, *Chemicals used for treatment of water intended for human consumption — Sodium chloride for regeneration of ion exchangers*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

ISO 2479, *Sodium chloride for industrial use — Determination of matter insoluble in water or in acid and preparation of principal solutions for other determinations*

ISO 2480, *Sodium chloride for industrial use — Determination of sulphate content — Barium sulphate gravimetric method*

ISO 2482, *Sodium chloride for industrial use — Determination of calcium and magnesium contents — EDTA complexometric methods*

ISO 2483, *Sodium chloride for industrial use — Determination of the loss of mass at -110 degrees C*

ISO 3165, *Sampling of chemical products for industrial use — Safety in sampling*

ISO 6206, *Chemical products for industrial use — Sampling — Vocabulary*

ISO 6227, *Chemical products for industrial use — General method for determination of chloride ions — Potentiometric method*

ISO 8213, *Chemical products for industrial use — Sampling techniques — Solid chemical products in the form of particles varying from powders to coarse lumps*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

prEN 14805:2020 (E)**4 Description****4.1 Identification****4.1.1 Chemical name**

Sodium chloride

4.1.2 Synonym or common name

Salt

4.1.3 Relative molecular mass

58,45

4.1.4 Empirical formula

NaCl

4.1.5 Chemical formula

NaCl

4.1.6 CAS Registry Number¹⁾

7647-14-5

4.1.7 EINECS Reference²⁾

231-598-3

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4.2 Commercial forms

The product is available as rock salt, sea salt or evaporated salt, and it is supplied as free-flowing crystals or their compacted forms.

4.3 Physical properties**4.3.1 Appearance**

The product is white and crystalline.

4.3.2 Density

The density of the solid crystal is 2,16 g/cm³ at 20 °C.

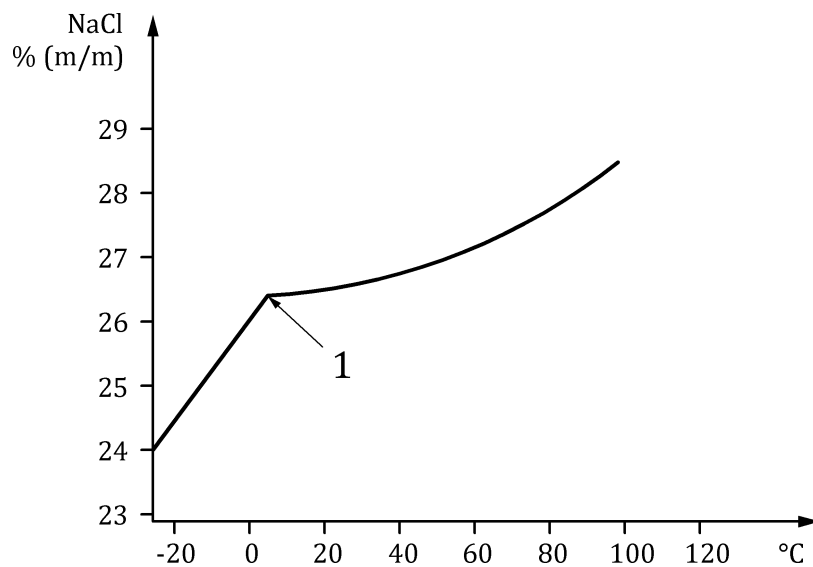
The bulk density depends on the particle size distribution.

4.3.3 Solubility (in water)

The solubility of the product depends on the temperature as given in Figure 1.

1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial chemical Substances Reference.



Temperature °C	NaCl solution Mass fraction in %
-10	25,0
0	26,34
10	26,35
20	26,43
30	26,56
40	26,71
50	26,89
60	27,09
70	27,30
80	27,53
90	27,80
100	28,12

Key

- 1 transition point
NaCl → NaCl · 2H₂O

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Figure 1 — Solubility curve for sodium chloride in water

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4.3.4 Vapour pressure

Not applicable.

4.3.5 Boiling point at 100 kPa³⁾

Not applicable.

4.3.6 Melting point

802 °C

4.3.7 Specific heat

Approximately 850 J/(kg·K) at 25 °C for the solid.

4.3.8 Viscosity (dynamic)

The viscosity of the saturated solution at 20 °C is approximately 1,9 mPa·s.

4.3.9 Critical temperature

Not applicable.

³⁾ 100 kPa = 1 bar

prEN 14805:2020 (E)**4.3.10 Critical pressure**

Not applicable.

4.3.11 Physical hardness

The hardness of solid salt is given as 2 to 2,5 on the Mohs' scale of hardness.

4.4 Chemical properties

Sodium chloride is stable and non-volatile, and aqueous solutions have good electrical conductivity.

Sodium chloride is decomposed by a number of acids. It reacts with sulfuric acid, phosphoric acid and strong oxidizing agents. The reactions are often complex and require heat for completion.

NOTE Under certain conditions a sodium chloride solution can cause corrosion of metallic surfaces.

5 Purity criteria**5.1 General**

This document specifies the minimum purity requirements for sodium chloride for on site electrochlorination of water intended for human consumption using non-membrane technology. As the treatment chemical produced by this process is sodium hypochlorite, limits have been calculated from the requirements of EN 901 [3] (sodium hypochlorite) for those impurities commonly present in the product and the chemical parameters. Consideration has also been given to the requirements of EN 973 (sodium chloride) for regeneration of ion exchangers. Depending on the raw material and the manufacturing process, other impurities may be present and, if so, this shall be notified to the user and, when necessary, to relevant authorities.

NOTE 1 The national regulations allow users to clarify whether the product is of appropriate purity for the treatment of water intended for human consumption, taking into account raw water quality, required dosage, contents of other impurities and additives used in the product and not stated in this product standard.

NOTE 2 This does not imply any real difference between the chemical purity between salt types meeting either specification.

Limits have been given for impurities and chemical parameters where these are likely to be present in significant quantities from the current production process and raw materials. If the production process or raw materials lead to significant quantities of impurities, by-products or additives being present, this shall be notified to the user.

5.2 Composition of commercial product**5.2.1 Sodium chloride content**

The content of sodium chloride in the dry product shall not be less than:

Type 1: mass fraction of 99,9 % of dry sodium chloride, NaCl;

Type 2: mass fraction of 98,5 % of dry sodium chloride, NaCl.

5.2.2 Anticaking agent

Subject to any local legislation in member states, an anticaking agent, sodium or potassium hexacyanoferrate, is allowed up to a maximum level in the final product of 15 mg/kg, expressed as the anhydrous hexacyanoferrate ion $[\text{Fe}(\text{CN}_6)]^{-4}$; for the determination, see EN 973:2009, B.3. If gaseous free

chlorine is produced as a stage in the electrochlorination process, the level of hexacyanoferrate ion present should be less than 3 mg/kg.

5.3 Impurities and main by-products

The product shall conform to the requirements specified in Table 1 and Table 2.

Table 1 — Impurities

Impurity	Limit in mass fraction in % of NaCl content		
		Type 1	Type 2
Water-insoluble matter			
	max.	0,05	0,35
Bromide	max.	0,025	0,05

Table 2 — Moisture content

Impurity	Limit in mass fraction in % of NaCl content		
		Dry salt	Un-dried salt
Moisture content			
	Max.	0,6	5

5.4 Chemical parameters

The product shall conform to the requirements specified in Table 3.

Table 3 — Chemical parameters

Parameter	Limits in mg/kg of commercial product		
		Type 1	Type 2
Arsenic (As)	max.	0,3	1,5
Cadmium (Cd)	max.	0,75	1,5
Chromium (Cr)	max.	0,75	1,5
Mercury (Hg)	max.	1,05	1,5
Nickel (Ni)	max.	0,75	3
Lead (Pb)	max.	3,5	4,5
Antimony (Sb)	max.	6	7,5
Selenium (Se)	max.	6	7,5

NOTE Other chemical parameters and indicator parameters are not relevant in sodium chloride, but there might be other parameter limits related to equipment performance, and some of these are listed in Annex A.

6 Test methods

6.1 Sampling

A test sample of about 500 g shall be taken for analysis, ensuring that it is representative of the whole batch, and taking account of ISO 3165 and also ISO 6206. Prepare the laboratory sample(s) required in accordance with ISO 8213.

prEN 14805:2020 (E)**6.2 Analyses****6.2.1 Main product**

The mass fraction in % of sodium chloride (NaCl) shall be determined by calculation, on the basis of the results of the determinations of sulfate according to ISO 2480, halogens according to ISO 6227, calcium and magnesium according to ISO 2482 and loss of mass on drying according to ISO 2483. Convert sulfate to calcium sulfate and unused calcium to calcium chloride, unless sulfate in sample exceeds the amount necessary to combine with calcium, in which case convert calcium to calcium sulfate and unused sulfate to first to magnesium sulfate and the remaining sulfate to sodium sulfate. Convert unused magnesium to magnesium chloride. Convert unused halogens to sodium chloride. Report the sodium chloride contents on a dry matter basis, multiplying the mass fraction in % of sodium chloride by $100/(100 - P)$, where P is the percentage of the loss of mass on drying (see 6.2.2.2).

6.2.2 Impurities**6.2.2.1 Water-insoluble matter**

The content of water-insoluble matter shall be determined in accordance with ISO 2479.

6.2.2.2 Moisture content

The loss of mass at 110 °C shall be determined in accordance with ISO 2483.

6.2.2.3 Bromide

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6.2.2.3.1 General

The present method describes a titrimetric method with sodium thiosulfate for the determination of total bromine and iodine in sodium chloride. The method is applicable to products of bromine and iodine content (expressed conventionally as bromide, Br) equal to or greater than 3 mg bromine per kilogram of salt. Bromine or bromide are equivalent for the expression of the results.

6.2.2.3.2 Principle

The sample is dissolved in water. Oxidation of iodide to iodate and bromide to bromate is achieved with hypochlorite in a buffered medium and the excess of oxidant is eliminated with formic acid. Free iodine, equivalent to the amount of the present iodate and bromate, is formed by addition of hydrochloric acid and potassium iodide. The free iodine is titrated with sodium thiosulfate using starch as indicator.

6.2.2.3.3 Reactions

Titration of the iodate and bromate follows the reactions:



NOTE Reactions (1) and (2) require for completion the presence of chloride ions that are added into the buffer solution.