

SLOVENSKI STANDARD

SIST EN 939:2016

01-julij-2016

Nadomešča:
SIST EN 939:2009

Kemikalije, ki se uporabljajo za pripravo pitne vode - Klorovodikova kislina

Chemicals used for treatment of water intended for human consumption - Hydrochloric acid

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Salzsäure

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

[SIST EN 939:2016](https://standards.iteh.ai/catalog/standards/sist/4c3396fd-622d-4bf3-a228-6919f7194002/SIST-EN-939-2016)

<https://standards.iteh.ai/catalog/standards/sist/4c3396fd-622d-4bf3-a228-6919f7194002/SIST-EN-939-2016>

Ta slovenski standard je istoveten z: EN 939:2016

ICS:

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

SIST EN 939:2016

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 939:2016

<https://standards.iteh.ai/catalog/standards/sist/4c3396fd-622d-4bf3-a228-ec90db6919f7/sist-en-939-2016>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 939

May 2016

ICS 71.100.80

Supersedes EN 939:2009

English Version

**Chemicals used for treatment of water intended for human
consumption - Hydrochloric acid**

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

Produkte zur Aufbereitung von Wasser für den
menschlichen Gebrauch - Salzsäure

This European Standard was approved by CEN on 18 March 2016.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Description	6
3.1 Identification	6
3.1.1 Chemical name	6
3.1.2 Synonym or common names	6
3.1.3 Relative molecular mass	6
3.1.4 Empirical formula	6
3.1.5 Chemical formula	6
3.1.6 CAS Registry Number)	7
3.1.7 EINECS reference)	7
3.2 Commercial forms	7
3.3 Physical properties	7
3.3.1 Appearance.....	7
3.3.2 Density	7
3.3.3 Solubility	7
3.3.4 Vapour pressure.....	7
3.3.5 Boiling point at 100 kPa	7
3.3.6 Melting or freezing point.....	8
3.3.7 Specific heat	8
3.3.8 Viscosity (dynamic)	8
3.3.9 Critical temperature	8
3.3.10 Critical pressure	8
3.3.11 Physical hardness	8
3.4 Chemical properties.....	8
4 Purity criteria	8
4.1 General	8
4.2 Composition of commercial product.....	8
4.3 Impurities and main by-products	9
4.4 Chemical parameters.....	9
5 Test methods	9
5.1 Sampling.....	9
5.2 Analysis.....	9
5.2.1 Determination of hydrochloric acid content (main product).....	9
5.2.2 Impurities	10
5.2.3 Chemical parameters.....	14
6 Labelling – Transportation – Storage.....	16
6.1 Means of delivery	16
6.2 Labelling according to the EU legislation)	16
6.3 Transportation regulations and labelling.....	18
6.4 Marking.....	18
6.5 Storage	18

6.5.1	Containers	18
6.5.2	Long term stability	18
6.5.3	Storage incompatibilities.....	18
Annex A (informative) General information on hydrochloric acid		19
A.1	Origin	19
A.1.1	Raw materials	19
A.1.2	Manufacturing process	19
A.2	Use	19
A.2.1	Function	19
A.2.2	Form in which it is used.....	19
A.2.3	Treatment dose	19
A.2.4	Mean of application.....	19
A.2.5	Secondary effects	19
A.2.6	Removal of excess product.....	20
A.3	Routine analyses.....	20
Annex B (normative) General rules relating to safety.....		21
B.1	Rules for safe handling and use.....	21
B.2	Emergency procedures.....	21
B.2.1	First aid	21
B.2.2	Spillage	21
B.2.3	Fire	21
Annex C (normative) Determination of arsenic, antimony and selenium (atomic absorption spectrometry hydride technique)		22
C.1	Safety precautions	22
C.2	General principle	22
C.3	Interferences	22
C.4	Reagents.....	22
C.5	Apparatus	24
C.6	Procedure	26
C.6.1	Preparation of the apparatus.....	26
C.6.2	Preparation of calibration solutions	27
C.6.3	Preparation of test solutions and standard solutions.....	27
C.6.4	Determination of arsenic with sodium borohydride.....	27
C.6.5	Determination of selenium with sodium borohydride.....	27
C.6.6	Determination of antimony with sodium borohydride	28
C.7	Calculation.....	28
Bibliography		29

EN 939:2016 (E)**European foreword**

This document (EN 939:2016) 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 November 2016, and conflicting national standards shall be withdrawn at the latest by November 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 939:2009.

Significant technical differences between this edition and EN 939:2009 are as follows:

- a) 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]);
- b) use of the changed classification and labelling (see [2]).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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 European Standard:

- a) this European 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;
- 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 European Standard 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 European Standard is subject to regulation or control by National Authorities.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 939:2016

<https://standards.iteh.ai/catalog/standards/sist/4c3396fd-622d-4bf3-a228-ec90db6919f7/sist-en-939-2016>

1 Scope

This European Standard is applicable to hydrochloric acid used for treatment of water intended for human consumption. It describes the characteristics of hydrochloric acid and specifies the requirements and the corresponding test methods for hydrochloric acid. It gives information on its use in water treatment (see Annex A). It also determines the rules relating to safe handling and use of hydrochloric acid (see Annex B).

2 Normative references

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

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

EN ISO 12846, *Water quality — Determination of mercury — Method using atomic absorption spectrometry (AAS) with and without enrichment (ISO 12846)*

ISO 904, *Hydrochloric acid for industrial use — Determination of total acidity — Titrimetric method*

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

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

ISO 6685, *Chemical products for industrial use — General method for determination of iron content — 1,10-Phenanthroline spectrophotometric method*

ISO 8288, *Water quality — Determination of cobalt, nickel, copper, zinc, cadmium and lead — Flame atomic absorption spectrometric methods*

ISO 9174, *Water quality — Determination of chromium — Atomic absorption spectrometric methods*

3 Description

3.1 Identification

3.1.1 Chemical name

Hydrochloric acid.

3.1.2 Synonym or common names

Muriatic acid, hydrogen chloride.

3.1.3 Relative molecular mass

36,46.

3.1.4 Empirical formula

HCl.

3.1.5 Chemical formula

HCl.

3.1.6 CAS Registry Number¹⁾

7647-01-0.

3.1.7 EINECS reference²⁾

231-595-7.

3.2 Commercial forms

The product is supplied as aqueous solutions of hydrochloric acid with mass fraction of 25 % to 38 % (concentrated acid).

Dilutions of these solutions are also available.

3.3 Physical properties

3.3.1 Appearance

The solution is colourless to yellow and slightly fuming to strongly fuming, depending on concentration.

3.3.2 Density

The density is between 1,135 g/ml and 1,185 g/ml at 20 °C, depending on concentration.

3.3.3 Solubility

The product is miscible with water in any proportion.

3.3.4 Vapour pressure

The vapour pressure for HCl at mass fraction 30 % depending on temperature is given in Table 1.

Table 1 — Vapour pressure of hydrochloric acid solutions

Temperature °C	P_{total} kPa	P_{HCl} kPa	$P_{\text{H}_2\text{O}}$ kPa
20	2,13	1,41	0,72
50	13,73	9,46	4,27

3.3.5 Boiling point at 100 kPa

The boiling point of HCl depending on concentration is given in Table 2.

Table 2 — Boiling point of hydrochloric acid solutions

Concentration Mass fraction in %	Boiling point at 100 kPa ^a °C
25	104
30	90
38	50,5
^a 100 kPa = 1 bar.	

1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

EN 939:2016 (E)

3.3.6 Melting or freezing point

The melting or freezing point of HCl depending on concentration is given in Table 3.

Table 3 — Melting or freezing point

Concentration Mass fraction in %	Melting or freezing point °C
38	– 27
25	– 75

3.3.7 Specific heat

3,14 kJ/(kg · K) at 18 °C for HCl at mass fraction 16,83 %.

3.3.8 Viscosity (dynamic)

The viscosity of a HCl at mass fraction 30 %, solution at 15 °C, is 1,9 mPa.s.

3.3.9 Critical temperature

Not applicable.

3.3.10 Critical pressure

Not applicable.

3.3.11 Physical hardness

Not applicable.

3.4 Chemical properties

The solution of hydrochloric acid is a strong mineral acid.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 939:2016

<https://standards.iteh.ai/catalog/standards/sist/4c3396fd-622d-4bf3-a228-ec90db6919f7/sist-en-939-2016>

4 Purity criteria**4.1 General**

This European Standard specifies the minimum purity requirements for hydrochloric acid used for the treatment of water intended for human consumption. Limits are given for impurities commonly present in the product. 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.

Users of this product should check the national regulations in order to clarify whether it is of appropriate purity for 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 not stated in this product standard.

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 leads to significant quantities of impurities, by-products or additives being present, this shall be notified to the user.

4.2 Composition of commercial product

As concentrated acid the concentration of HCl solution shall be at least at mass fraction of 25 %.

More diluted solutions are commercially available; the concentration of hydrochloric acid shall be equal to or greater than the manufacturer specified value.

4.3 Impurities and main by-products

The product shall conform to the requirements specified in Table 4.

Table 4 — Impurities

Impurity	Limit mg/kg of HCl mass fraction 100 %
Iron (Fe) max.	170
Halogenated organic compounds (as Cl) max.	17

4.4 Chemical parameters

The product shall conform to the requirements specified in Table 5.

Table 5 — Chemical parameters

Parameter	Limit mg/kg of HCl mass fraction 100 %	
	Type 1	Type 2
Arsenic (As) max.	3	10
Cadmium (Cd) max.	1	5
Chromium (Cr) max.	3	10
Mercury (Hg) max.	0,5	3
Nickel (Ni) max.	3	10
Lead (Pb) max.	3	20
Antimony (Sb) max.	1	10
Selenium (Se) max.	5	10
NOTE Pesticides and polycyclic aromatic hydrocarbons are not relevant in HCl. Cyanide which does not exist in a very acidic media, such as hydrochloric acid, is not a relevant chemical parameter. For parametric values of hydrochloric acid on trace metal content in drinking water, see [1].		

5 Test methods

5.1 Sampling

Observe the general recommendations of ISO 3165 and take ISO 6206 into account.

5.2 Analysis

5.2.1 Determination of hydrochloric acid content (main product)

The determination of total acidity is carried out by titration in accordance with ISO 904.

EN 939:2016 (E)

5.2.2 Impurities

5.2.2.1 Determination of iron content

5.2.2.1.1 Preparation of the test solution

In accordance with ISO 6685.

5.2.2.1.2 Procedure

In accordance with ISO 6685.

5.2.2.2 Determination of content of halogenated organic compounds

5.2.2.2.1 General

Halogenated organic compounds are determined as the extractable organic halogens (EOX). This method applies to hydrochloric acid solutions with a content of EOX, expressed as chloride, exceeding 20 µg/l.

5.2.2.2.2 Principle

EOX are extracted from hydrochloric acid in two stages using heptane. The extract is burned in an oxy-hydrogen flame. The mineralization products occurring in the condensate are determined on the basis of an argentometric reaction or an equivalent method.

5.2.2.2.3 Reagents

iTeh STANDARD PREVIEW

All reagents shall be of a recognized analytical grade and the water used shall conform to grade 3 in accordance with EN ISO 3696.

5.2.2.2.3.1 Sulfuric acid, (H₂SO₄), density (ρ) = 1,84 g/ml.

<https://standards.iteh.ai/catalog/standards/sist/4c3396fd-622d-4bf3-a228-ec90db6919f7/sist-en-939-2016>

5.2.2.2.3.2 Hydrochloric acid (HCl) pure.

5.2.2.2.3.3 Sodium sulfate, (Na₂SO₄).

Heat for 1 h at 600 °C to remove organic halogen compounds.

5.2.2.2.3.4 Heptane.

5.2.2.2.3.5 Oxygen, (O₂).5.2.2.2.3.6 Hydrogen, (H₂).5.2.2.2.3.7 Pentachlorophenol, (C₆Cl₅OH).

5.2.2.2.3.8 Halogen stock solution, ρ(Cl) = 100 mg/l.

Weigh 15,0 mg of pentachlorophenol (5.2.2.2.3.7) into a 100 ml volumetric flask; make up to volume with heptane (5.2.2.2.3.4). This solution is stable for about one week.

5.2.2.2.3.9 Halogen standard solution, ρ(Cl) = 10 mg/l.

Pipette 10 ml of the halogen stock solution (5.2.2.2.3.8) into a 100 ml volumetric flask and make up to volume with heptane (5.2.2.2.3.4). This solution is stable for about one week.

5.2.2.2.3.10 Sodium chloride, (NaCl).