SLOVENSKI STANDARD
SIST EN 12933:2015

01-junij-2015

Nadomešča:
SIST EN 12933:2008

Kemikalije, ki se uporabljajo za pripravo pitne vode - Kemikalije za uporabo v izrednih razmerah - Trikloroizocianova kislina

Chemicals used for treatment of water intended for human consumption - Chemicals for emergency use - Trichloroisocyanuric acid

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Produkte für den Notfall - Trichlorisocyanursäure

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Produits chimiques utilisés en cas d'urgence - Acide trichloroisocyanurique

SIST Preview
(https://ecommerce.sist.si)
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015
SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

Ta slovenski standard je istoveten z: **EN 12933:2015**

ICS:

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

SIST EN 12933:2015 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

SIST EN 12933:2015

SIST Preview
(https://ecommerce.sist.si)

SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

SIST EN 12933:2015

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12933

March 2015

ICS 71.100.80

Supersedes EN 12933:2008

English Version

Chemicals used for treatment of water intended for human consumption - Chemicals for emergency use - Trichloroisocyanuric acid

Produits chimiques utilisés pour le traitement de l'eau destinée à la consommation humaine - Produits chimiques utilisés en cas d'urgence - Acide trichloroisocyanurique

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Produkte für den Notfall - Trichlorisocyanursäure

This European Standard was approved by CEN on 20 December 2014.

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.

SIST Preview
(https://ecommerce.sist.si)
SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015



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

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

© 2015 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

SIST EN 12933:2015

Contents

Page

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 7
3.1.6 CAS Registry Number 7
3.1.7 EINECS reference 7
3.2 Commercial form 7
3.3 Physical properties 7
3.3.1 Appearance and odour 7
3.3.2 Density 7
3.3.3 Solubility in water 7
3.3.4 Vapour pressure 7
3.3.5 Boiling point at 100 kPa 7
3.3.6 Melting 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 8
4.4 Chemical parameters 9

5 Test methods 9
5.1 Sampling 9
5.2 Analysis 9
5.2.1 Determination of available chlorine (main product) 9
5.2.2 Impurities 11
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 17
6.3 Transportation regulations and labelling 18
6.4 Marking 18
6.5 Storage 19
6.5.1 General 19
6.5.2 Long term stability 19
6.5.3 Storage incompatibilities 19

SIST Preview
(https://ecommerce.sist.si)
SIST EN 12933:2015
https://standards.iteh.ai/catalog/standards/sist/2d515302-07a2-46a1-9b0e-1107577c450e/sist-en-12933-2015

SIST EN 12933:2015

Annex A (informative) **General information on trichloroisocyanuric acid** **20**
A.1 Origin **20**
A.1.1 Raw materials **20**
A.1.2 Manufacturing process **20**
A.2 Use **20**
A.2.1 Function **20**
A.2.2 Form in which it is used **20**
A.2.3 Treatment dose **20**
A.2.4 Means of application **20**
A.2.5 Secondary effects **20**
A.2.6 Removal of excess product **21**
Annex B (normative) **General rules relating to safety** **22**
B.1 Rules for safe handling and use **22**
B.2 Emergency procedures **22**
B.2.1 First aid **22**
B.2.2 Spillage **22**
B.2.3 Fire **23**
Annex C (normative) **Determination of arsenic, antimony and selenium (atomic absorption spectrometry hydride technique)** **24**
C.1 General principle **24**
C.2 Interferences **24**
C.3 Reagents **24**
C.4 Apparatus **26**
C.5 Procedure **27**
C.5.1 Preparation of the apparatus **27**
C.5.2 Preparation of calibration solutions **28**
C.5.3 Preparation of test solutions and standard solutions **28**
C.5.4 Determination of arsenic with sodium borohydride **28**
C.5.5 Determination of selenium with sodium borohydride **28**
C.5.6 Determination of antimony with sodium borohydride **29**
C.6 Calculation **29**
Bibliography **30**

SIST Preview
(https://ecommerce.sist.si)
SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

SIST EN 12933:2015

Foreword

This document (EN 12933:2015) 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 September 2015, and conflicting national standards shall be withdrawn at the latest by September 2015.

This document supersedes EN 12933:2008.

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.

Significant technical difference between this edition and EN 12933:2008 is 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) 6.2 – updating of risk and safety labelling according to EU Regulation [2] and its latest Adaptations to Technical Progress.

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.

SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

SIST EN 12933:2015

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.

SIST Preview
(https://ecommerce.sist.si)

SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

SIST EN 12933:2015

1 Scope

This European Standard is applicable to trichloroisocyanuric acid used for emergency treatment of water intended for human consumption. It describes the characteristics of trichloroisocyanuric acid and specifies the requirements and the corresponding test methods for trichloroisocyanuric acid. It gives information on its use in water treatment. It also determines the rules relating to safe handling and use of trichloroisocyanuric 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 1233, *Water quality - Determination of chromium - Atomic absorption spectrometric methods*

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

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

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

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

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

SIST Preview
(https://ecommerce.sist.si)

ISO 8288:1986, *Water quality — Determination of cobalt, nickel, copper, zinc, cadmium and lead — Flame atomic absorption spectrometric methods*

SIST EN 12933:2015
https://standards.iteh.ai/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

3 Description

3.1 Identification

3.1.1 Chemical name

1,3,5-trichloro - 1,3,5 triazine - 2,4,6-trione.

3.1.2 Synonym or common names

Trichloroisocyanuric acid, TCCA.

Symclosene.

3.1.3 Relative molecular mass

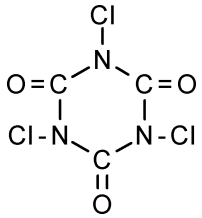
232,42.

3.1.4 Empirical formula

$C_3N_3O_3Cl_3$.

SIST EN 12933:2015

3.1.5 Chemical formula



3.1.6 CAS Registry Number [1)]

87-90-01.

3.1.7 EINECS reference [2)]

201-782-8.

3.2 Commercial form

The product is available in various forms: powder, granules or tablets.

3.3 Physical properties

3.3.1 Appearance and odour

The product is white free-flowing powder, granules or tablets with chlorinous odour.

SIST Preview
(https://ecommerce.sist.si)

3.3.2 Density

The bulk density of the product is approximately:

SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

- 1 g/cm^3;
- 1,2 g/cm^3 for powder and granules;
- 1,9 g/cm^3 for tablets.

3.3.3 Solubility in water

The solubility of the product in water is 12 g/l at 25 °C.

3.3.4 Vapour pressure

Not applicable.

3.3.5 Boiling point at 100 kPa [3)]

Not applicable, the product decomposes before fusion.

---

1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

3) 100 kPa = 1 bar

SIST EN 12933:2015

3.3.6 Melting point

Not applicable.

3.3.7 Specific heat

(880 ± 40) kJ/kg.K at 20 °C.

3.3.8 Viscosity (dynamic)

Not applicable.

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 product is a strong oxidant, it is corrosive and hygroscopic; trichloroisocyanuric acid decomposes into hydrochloric acid and cyanuric acid. When dissolved in an excess of water it liberates chlorine by hydrolysis.

SIST Preview
(https://ecommerce.sist.si)

4 Purity criteria

4.1 General

SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

This European Standard specifies the minimum purity requirements for trichloroisocyanuric 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 lead to significant quantities of impurities, by-products or additives being present, this shall be notified to the user.

4.2 Composition of commercial product

The commercial product shall contain at least a mass fraction of 89 % of available chlorine as calculated in accordance with the corresponding method given in 5.2.1.

4.3 Impurities and main by-products

The water content shall be less than a mass fraction of 0,15 % of product.

SIST EN 12933:2015

The sodium chloride content shall be less than a mass fraction of 0,05 % of product.

4.4 Chemical parameters

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

Table 1 — Chemical parameters

Element		Limit mg/kg of product	
		Type 1	Type 2
Arsenic (As)	max.	10	10
Cadmium (Cd)	max.	1	1
Chromium (Cr)	max.	6	10
Mercury (Hg)	max.	0,02	0,02
Nickel (Ni)	max.	3	5
Lead (Pb)	max.	4	15
Antimony (Sb)	max.	5	5
Selenium (Se)	max.	1	1
NOTE Cyanide, which does not exist in a strong oxidizing medium such as trichloroisocyanuric acid, is not a relevant chemical parameter. Pesticides and polycyclic aromatic hydrocarbons are not by-products of the manufacturing process. For parametric values of trichloroisocyanuric acid on trace metal content in drinking water, see [1].			

iTeh STANDARD PREVIEW
(https://ecommerce.sist.si)

5 Test methods

5.1 Sampling

SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5502-67a2-48a1-9f6c-f107576e43be/sist-en-12933-2015

Observe the general recommendations of ISO 3165 and take account of ISO 6206. Prepare the laboratory sample(s) required by the relevant procedure described in ISO 8213.

5.2 Analysis

5.2.1 Determination of available chlorine (main product)

5.2.1.1 Principle

The available chlorine is determined by measuring active chlorine in the sample. The oxidizing chlorine reacts with potassium iodide releasing iodine which is then titrated with sodium thiosulfate standard volumetric solution in the presence of starch indicator solution.

5.2.1.2 Reagents

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

SIST EN 12933:2015

5.2.1.2.1 Potassium iodide crystals (KI).

5.2.1.2.2 Glacial acetic acid.

5.2.1.2.3 Sodium thiosulfate standard volumetric solution, $c(Na_2S_2O_3.5H_2O)$ = 0,1 mol/l.

Standard volumetric solutions of sodium thiosulfate are commercially available; eventually they have to be diluted.

Alternatively a standard volumetric solution may be prepared by the following procedure:

Dissolve 24,8 g $Na_2S_2O_3.5H_2O$ in a 1 000 ml one-mark volumetric flask in about 0,75 l water. After the temperature has equalized make up to the mark with water and mix thoroughly.

To standardize: Weigh, to the nearest 0,1 mg, 3,600 g (m) of dry potassium iodate. Dissolve in water in a 1 000 ml one-mark volumetric flask, make up to the mark with water and mix (standard reference solution $c(1/6KIO_3)$ = 0,1 mol/l). Place 200 ml of water in a 500 ml stoppered conical flask, add (2 ± 0,5) g of potassium iodide and stir to dissolve. Then introduce, by means of a pipette, 10,0 ml of sodium thiosulfate solution for standardization, add (15 ± 1) ml of hydrochloric acid solution (diluted 1 + 1 by volume) and (5 ± 1) ml of starch solution (5.2.1.2.4).

Titrate immediately with the potassium iodate standard reference solution until the appearance of a blue coloration persisting for at least 30 s occurs. Record the volume (V_1) of iodate used.

The actual concentration, c, of the sodium thiosulfate standard volumetric solution ($Na_2S_2O_3.5H_2O$), expressed in moles per litre is given by the following formula:

$$c = \frac{V_1 \times c_1}{V} \quad (1)$$

SIST Preview
(https://ecommerce.sist.si)

where

SIST EN 12933:2015
https://ecommerce.sist.si/catalog/standards/sist/2d5f5503-67a2-48e1-9f5e-f10255f6c43b/sist-en-12933-2015

c_1 is the concentration, expressed in moles per litre, of the potassium iodate standard reference solution [$c(1/6\ KIO_3)$ = 0,1 mol/l];

V is the volume, in millilitres, of the sodium thiosulfate standard volumetric solution used for the standardization (V = 10 ml);

V_1 is the volume, in millilitres, of potassium iodate standard reference solution used in the titration.

5.2.1.2.4 Starch solution, mass fraction 1 %.

Make a slurry with (1 ± 0,1) g starch and (5 ± 1) ml water. Add (90 ± 5) ml boiling water to the slurry. Stir to dissolve it and cool the solution. This solution needs refrigeration to avoid the decomposition of the starch which results in a vague end point. Keep the solution cool and use it within one week.

NOTE Commercial indicators for iodine titration exist and may be used in place of the specified starch solution provided that their efficiency has been previously tested.

5.2.1.3 Apparatus

Ordinary laboratory apparatus and glassware