



**SLOVENSKI STANDARD**  
**SIST EN 13194:2001**

**01-december-2001**

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**Kemikalije, ki se uporabljajo za pripravo pitne vode - Ocetna kislina**

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Essigsäure

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

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**Ta slovenski standard je istoveten z: EN 13194:2000**

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**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**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13194**

July 2000

ICS 71.100.80

English version

## Chemicals used for treatment of water intended for human consumption - Acetic acid

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Essigsäure

This European Standard was approved by CEN on 25 June 2000.

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

## Contents

	page
Foreword.....	3
Introduction .....	4
1 Scope .....	5
2 Normative references .....	5
3 Description .....	5
3.1 Identification.....	5
3.2 Commercial form.....	6
3.3 Physical properties.....	6
3.4 Chemical properties .....	7
4 Purity criteria.....	7
4.1 Composition of commercial product.....	7
4.2 Impurities and main by-products .....	7
4.3 Toxic substances .....	8
5 Test methods.....	8
5.1 Sampling .....	8
5.2 Analysis .....	9
6 Labelling - Transportation - Storage.....	16
6.1 Means of delivery .....	16
6.2 Risk and safety labelling according to the EU Directives ) .....	16
6.3 Transportation regulations and labelling .....	16
6.4 Marking .....	17
6.5 Storage.....	17
Annex A (informative) General information on acetic acid .....	18
Annex B (normative) General rules relating to safety .....	20
Bibliography .....	21

## 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 January 2001, and conflicting national standards shall be withdrawn at the latest by January 2001.

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.

Annex A is informative.

Annex B is normative.

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## Introduction

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

- a) 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 ;
- 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.

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## 1 Scope

This European Standard is applicable to acetic acid used for treatment of water intended for human consumption. It describes the characteristics of acetic acid and specifies the requirements and the corresponding test methods for acetic acid. 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 1483, *Water quality - Determination of mercury*.

EN 26595, *Water quality - Determination of total arsenic - Silver diethyldithiocarbamate spectrophotometric method (ISO 6595:1982)*.

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)*.

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

ISO 3856-2, *Paints and varnishes — Determination of "soluble" metal content — Part 2 : Determination of antimony content — Flame atomic absorption spectrometric method and Rhodamine B spectrophotometric method*.

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

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*.

ISO 9965, *Water quality — Determination of selenium — Atomic absorption spectrometric method (hydride technique)*.

## 3 Description

### 3.1 Identification

#### 3.1.1 Chemical name

Acetic acid, ethanoic acid.

#### 3.1.2 Synonym or common name

Glacial acetic acid.

#### 3.1.3 Relative molecular mass

60,05.

#### 3.1.4 Empirical formula

C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>.

Page 6  
EN 13194:2000

### 3.1.5 Chemical formula

CH<sub>3</sub>COOH.

### 3.1.6 CAS Registry Number <sup>1)</sup>

64-19-7.

### 3.1.7 EINECS reference <sup>2)</sup>

203-56-48.

## 3.2 Commercial form

The product is available as colourless liquid.

## 3.3 Physical properties

### 3.3.1 Appearance

The product is colourless liquid at 20 °C.

### 3.3.2 Density

The density at 20 °C is given in Table 1.

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Table 1 — Density

Concentration (m/m)	Density (g/ml)
80	1,068 to 1,072
99,85	1,049 to 1,050

### 3.3.3 Solubility in water

Miscible.

### 3.3.4 Vapour pressure (at 20 °C)

1,57 kPa (for pure acetic acid).

### 3.3.5 Boiling point at 100 kPa <sup>3)</sup>

118 °C (for pure acetic acid).

### 3.3.6 Melting point

16,2 °C (for pure acetic acid).

### 3.3.7 Specific heat

2,047 kJ/(kg.K) at 20 °C (for pure acetic acid).

<sup>1)</sup> Chemical Abstracts Service Registry Number.

<sup>2)</sup> European Inventory of Existing Commercial Chemical Substances.

<sup>3)</sup> 100 kPa = 1 bar.



**3.3.8 Viscosity, dynamic**

1,222 mPa.s at 20 °C (for pure acetic acid).

**3.3.9 Critical temperature (for gas)**

Not applicable.

**3.3.10 Critical pressure (for gas)**

Not applicable.

**3.3.11 Physical hardness**

Not applicable.

**3.4 Chemical properties**

Acetic acid is a weak acid.

**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 as liquid shall contain between 80 percent by mass % (m/m) and 99,85 % (m/m) acetic acid, the remainder being water.

**4.2 Impurities and main by-products**

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

**Table 2 — Impurities**

Impurity	Limit in 100 % (m/m) acetic acid (mg/kg)
Formic acid max.	500
Total aldehydes (as acetaldehyde) max.	50

### 4.3 Toxic substances

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

The content of toxic substances shall conform to the requirements specified in Table 3.

**Table 3 — Toxic substances**

Parameter		Limit in 100 % (m/m) acetic acid (mg/kg)
Arsenic (As)	max.	0,5
Cadmium (Cd)	max.	0,5
Chromium (Cr)	max.	0,5
Mercury (Hg)	max.	0,5
Nickel (Ni)	max.	0,5
Lead (Pb)	max.	0,5
Antimony (Sb)	max.	0,5
Selenium (Se)	max.	0,5
NOTE Cyanide does not exist in the acetic acid medium. Pesticides and polycyclic aromatic hydrocarbons are not by-products of the manufacturing process.		

## 5 Test methods

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### 5.1 Sampling

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

#### 5.1.1 Sampling from drums and bottles

##### 5.1.1.1 General

5.1.1.1.1 Mix the contents of the container to be sampled by shaking the container, by rolling it or by rocking it from side to side, taking care not to damage the container or spill any of the liquid.

5.1.1.1.2 If the design of the container is such (for example, a narrow-necked bottle) that it is impracticable to use a sampling implement, take a sample by pouring after the contents have been thoroughly mixed. Otherwise, proceed as described in 5.1.1.1.3.

5.1.1.1.3 Examine the surface of the liquid. If there are signs of surface contamination, take samples from the surface as described in 5.1.1.2 ; otherwise, take samples as described in 5.1.1.3.

##### 5.1.1.2 Surface sampling

Take a sample using a suitable ladle. Lower the ladle into the liquid until the rim is just below the surface, so that the surface layer runs into it. Withdraw the ladle just before it fills completely and allow any liquid adhering to the ladle to drain off. If necessary, repeat this operation so that, when the other selected containers have been sampled in a similar manner, the total volume of sample required for subsequent analysis is obtained.

### 5.1.1.3 Bottom sampling

Take a sample using an open sampling tube, or a bottom-valve sampling tube, suited to the size of container and the viscosity of the liquid.

When using an open sampling tube, close it at the top and then lower the bottom end to the bottom of the container. Open the tube and move it rapidly so that the bottom of the tube traverses the bottom of the container before the tube is filled. Close the tube, withdraw it from the container and allow any liquid adhering to the outside of the tube to drain off.

When using a bottom-valve sampling tube, close the valve before lowering the tube into the container and then proceed in a similar manner to that when using an open sampling tube.

### 5.1.2 Sampling from tanks and tankers

From each access point, take samples as follows :

- a) from the surface of the liquid, using a ladle as described in 5.1.1.2 ;
- b) from the bottom of the tank or tanker, using a sampling tube as described in 5.1.1.3 or using a specially designed bottom-sampling apparatus ;
- c) from one or more positions, depending on the overall depth, between the bottom and the surface using a weighted sampling can.

## 5.2 Analysis

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### 5.2.1 Acetic acid (main product) (standards.iteh.ai)

#### 5.2.1.1 Principle

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An accurately weighed quantity of the sample is diluted with water and then titrated with a standard volumetric sodium hydroxide solution using phenolphthalein as an indicator.

#### 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.

5.2.1.2.1 Sodium hydroxide solution  $c(\text{NaOH}) = 1,0 \text{ mol/l}$ .

5.2.1.2.2 Phenolphthalein indicator solution, 5 g/l.

#### 5.2.1.3 Apparatus

Ordinary laboratory apparatus and glassware.

#### 5.2.1.4 Procedure

Into a 100 ml conical flask accurately weigh 2,0 g of the sample and add 25 ml of water. Titrate with sodium hydroxide solution (5.2.1.2.1) using phenolphthalein indicator (5.2.1.2.2) to a pink colouration which persists for at least 15 s.