



**SLOVENSKI STANDARD**  
**kSIST FprEN 13176:2014**  
**01-september-2014**

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**Kemikalije, ki se uporabljajo za pripravo pitne vode - Etanol**

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Ethanol

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

**Ta slovenski standard je istoveten z: FprEN 13176**

**ICS:**

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

**kSIST FprEN 13176:2014**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**FINAL DRAFT**  
**FprEN 13176**

June 2014

ICS 71.100.80

Will supersede EN 13176:2008

English Version

## Chemicals used for treatment of water intended for human consumption - Ethanol

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Ethanol

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

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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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## Foreword

This document (FprEN 13176:2014) 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 Unique Acceptance Procedure.

This document will supersede EN 13176:2008.

Significant technical difference between this edition and EN 13176:2008 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) clause 6.2 – updating of risk and safety labelling according to EU Regulation [2] and its latest Adaptations to Technical Progress).

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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 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.

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## 1 Scope

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

NOTE This European Standard does not apply to anhydrous ethanol which is not used for drinking 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 1233, *Water quality — Determination of chromium — Atomic absorption spectrometric methods*

EN 1483, *Water quality — Determination of mercury — Method using atomic absorption spectrometry*

EN 26595, *Water quality — Determination of total arsenic — Silver diethyldithiocarbamate spectrophotometric method (ISO 6595)*

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 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 8288:1986, *Water quality — Determination of cobalt, nickel, copper, zinc, cadmium and lead — Flame 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

Ethanol.

#### 3.1.2 Synonym or common name

Ethyl alcohol.

#### 3.1.3 Relative molecular mass

46,07

#### 3.1.4 Empirical formula

C<sub>2</sub>H<sub>6</sub>O

**FprEN 13176:2014 (E)****3.1.5 Chemical formula**C<sub>2</sub>H<sub>5</sub>OH**3.1.6 CAS Registry Number <sup>1)</sup>**

64-17-5

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

200-57-86

**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 (see [3] and [4]).

**Table 1 — Density**

<b>Concentration Mass fraction %</b>	<b>Density g/ml</b>
95	0,8114
95,1	0,8110
95,2	0,8106
95,3	0,8104
95,4	0,8100
95,5	0,8096
95,6	0,8092
95,7	0,8088
95,8	0,8084
95,9	0,8080
96	0,8076

**3.3.3 Solubility in water**

Miscible.

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

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



**3.3.4 Vapour pressure (at 20 °C)**

5,81 kPa (for pure ethanol)

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

78,2 °C (for pure ethanol)

**3.3.6 Melting point**

- 112,3 °C (for pure ethanol)

**3.3.7 Specific heat**

2,399 kJ/(kg K) at 20 °C (for pure ethanol)

**3.3.8 Viscosity, dynamic**

1,2 mPa.s at 20 °C (for pure ethanol)

**3.3.9 Critical temperature (for gas)**

240,77 °C

**3.3.10 Critical pressure (for gas)**

6 400 kPa

**3.3.11 Physical hardness**

Not applicable.

**3.4 Chemical properties**

Ethanol is a polar and protic organic solvent.

**4 Purity criteria****4.1 General**

This European Standard specifies the minimum purity requirements for Ethanol 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 the product standard.

Limits have been given for impurities and chemicals 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(s) to significant quantities of impurities, by-products or additives being present, this shall be notified to the user.

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

**FprEN 13176:2014 (E)****4.2 Composition of commercial product**

The product shall contain a mass fraction of at least 95 % synthetic ethanol.

NOTE The commercial product may contain up to a mass fraction of 5 % water.

**4.3 Impurities and main by-products**

The acetaldehyde content shall not exceed 100 mg/kg of pure ethanol.

**4.4 Chemical parameters**

NOTE For the purpose of this European Standard, "chemical parameters" are those defined in the EU Directive 98/83/EC of 3 November 1998 (see [1]).

The content of chemical parameters shall conform to the requirements specified in Table 2.

**Table 2 — Chemical parameters**

Parameter		Limit in mg/kg of pure ethanol
Arsenic (As)	max.	1
Cadmium (Cd)	max.	2
Chromium (Cr)	max.	5
Mercury (Hg)	max.	2
Nickel (Ni)	max.	1
Lead (Pb)	max.	2
Antimony (Sb)	max.	1
Selenium (Se)	max.	1
NOTE Cyanide does not exist in ethanol solvent medium. Pesticides and polycyclic aromatic hydrocarbons are not by-products of the manufacturing process.		

**5 Test methods****5.1 Sampling****5.1.1 Relevant standards**

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

**5.1.2 Sampling from drums and bottles****5.1.2.1 General**

**5.1.2.1.1** 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.

**5.1.2.1.2** 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 5.1.2.1.3.

**5.1.2.1.3** Examine the surface of the liquid. If there are signs of surface contamination, take samples from the surface as described in 5.1.2.2; otherwise, take samples as described in 5.1.2.3.

#### **5.1.2.2 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.

#### **5.1.2.3 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.

#### **5.1.3 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 5.1.2.2;
- b) from the bottom of the tank or tanker, using a sampling tube as described in 5.1.2.3 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**

#### **5.2.1 Ethanol (main product)**

##### **5.2.1.1 Principle**

The ethanol content is determined by measuring the density using a digital density meter.

The measuring principle of the digital density meter is based on the change of the frequency of a hollow oscillator when filled with different liquids. The mass, and thus the density of the liquid, changes this frequency due to a gross mass change of the oscillator caused by the introduction of the liquid.

The oscillator consists of a hollow elastic glass tube which is electronically excited in an undamped harmonic fashion. The density meter gives a direct read-out of the density result.

##### **5.2.1.2 Apparatus**

**5.2.1.2.1 Digital density meter** capable of measuring at  $(20 \pm 0,1) ^\circ\text{C}$ .

**5.2.1.2.2 Glass syringe**, capacity 2 ml.