# SLOVENSKI STANDARD
# SIST EN 16037:2012

**01-september-2012**

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**Kemikalije, ki se uporabljajo za pripravo pitne vode - Natrijev hidrogen sulfat**

Chemicals used for treatment of water intended for human consumption - Sodium hydrogen sulfate

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumhydrogensulfat



Produits chimiques uitilisés pour le traitement de l'eau destinée à la consommation humaine - Hydrogénosulfate de sodium



**Ta slovenski standard je istoveten z:** **EN 16037:2012**

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**ICS:**

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

**SIST EN 16037:2012** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 16037

July 2012

ICS 71.100.80

English Version

# Chemicals used for treatment of water intended for human consumption - Sodium hydrogen sulfate

Produits chimiques uitilisés pour le traitement de l'eau destinée à la consommation humaine - Hydrogénosulfate de sodium

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumhydrogensulfat

This European Standard was approved by CEN on 24 May 2012.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN 16037:2012: E

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## Foreword

This document (EN 16037:2012) 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of an identical text or by endorsement, at the latest by January 2013, and conflicting national standards shall be withdrawn at the latest by January 2013.

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.

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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.

# 1 Scope

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

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

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 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 6332, *Water quality — Determination of iron — Spectrometric method using 1,10-phenanthroline*

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

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

# 3 Description

## 3.1 Identification

### 3.1.1 Chemical name

Sodium hydrogen sulfate.

### 3.1.2 Synonym or common name

Sodium bisulfate.

### 3.1.3 Relative molecular mass

120,06 g/mol.

#### 3.1.4 Empirical formula

$NaHSO_4$ .

#### 3.1.5 CAS-Registry-Number[1)]

7681-38-1.

#### 3.1.6 EINECS-Number[2)]

231-665-7.

### 3.2 Commercial form

Powder or beads, free flowing.

### 3.3 Physical properties

#### 3.3.1 Appearance and odour

White to slightly yellow, odourless.

#### 3.3.2 Density



The bulk density of the product is approximately between 1 400 kg/m$^3$ and 1 450 kg/m$^3$.



#### 3.3.3 Solubility in water



Approximately 1 080 g/l at 25 °C.

#### 3.3.4 Vapour pressure

Not applicable.

#### 3.3.5 Boiling point

Not applicable.

#### 3.3.6 Melting point at 100 kPa[3)]

Approximately 180 °C.

Note 1 to entry: The product decomposes at higher temperatures to sodium disulfate and water.

#### 3.3.7 Specific heat

Not applicable.

#### 3.3.8 Viscosity (dynamic)

Not applicable.

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1) Chemical Abtracts Service Registry Number.
2) European Inventory of Existing Commercial Chemical Substances.
3) 100 kPa = 1 bar.

#### 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

Sodium hydrogen sulfate is hygroscopic.

Aqueous solutions of the product exhibit a acid reaction and are corrosive to metals:

— acid constant $pK_S$ = 1,99

— a solution with a mass fraction of 20 % has a pH value between 1 and 1,2 at 25 °C.

## 4 Purity criteria



### 4.1 General

This European Standard specifies the minimum purity requirements for sodium hydrogen sulfate 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 the relevant authorities.



NOTE 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 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

The commercial product shall contain a mass fraction of sodium hydrogen sulfate greater than 95,2 %.

### 4.3 Impurities and by-products

The content of impurities and by-products shall be in accordance with Table 1.

**Table 1 — Impurities and by-products**

| Parameter | | Limit in % (mass fraction) |
|---|---|---|
| Sodium sulfate | max. | 4,8 |
| Water | max. | 0,8 |
| Water insoluble substances | max. | 0,05 |
| Iron | max. | 0,01 |

## 4.4 Chemical Parameters

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

**Table 2 — Chemical parameters**

| Parameter | | Limit in mg/kg $NaHSO_4$ |
|---|---|---|
| Arsenic (As) | max. | 0,1 |
| Cadmium (Cd) | max. | 0,1 |
| Chromium (Cr) | max. | 1 |
| Mercury (Hg) | max. | 0,1 |
| Nickel (Ni) | max. | 1 |
| Lead (Pb) | max. | 1 |
| Antimony (Sb) | max. | 1 |
| Selenium (Se) | max. | 1 |
| NOTE Pesticides, polycyclic aromatic hydrocarbons and halogenated organic substances are not by-products of the manufacturing process. For parametric values on chemical parameters content in drinking water, see [1]. | | |



# 5 Test methods

## 5.1 Sampling

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

## 5.2 Analysis

### 5.2.1 Determination of sodium hydrogen sulfate

#### 5.2.1.1 Principle

Alkalimetric titration with sodium hydroxide solution.

#### 5.2.1.2 Reagents

**5.2.1.2.1** All reagents shall be of a recognized analytical grade. De-ionized water (conforming to grade 3 of EN ISO 3696) is sufficient.

**5.2.1.2.2** Sodium hydoxide solution, *c*(NaOH) = 0,1 mol/l

#### 5.2.1.3 Apparatus

Ordinary laboratory apparatus and glassware together with the following.

##### 5.2.1.3.1 Potentiometric titrimeter

##### 5.2.1.3.2 **Automatic burette**, volume 50 ml, equipped with an injection tip.

##### 5.2.1.3.3 Electromechanical stirrer

##### 5.2.1.3.4 **Glass beaker**, capacity 250 ml

#### 5.2.1.4 Procedure

##### 5.2.1.4.1 Test solution

Weigh, to the nearest 0,1 mg, a test portion of approximately 0,2 g into a dry, clean beaker (5.2.1.3.4).

##### 5.2.1.4.2 Determination

Input the calculation data in the titration microprocessor in accordance with the instruction manual.

Place the pH electrode in the titration beaker and titrate with the sodium hydroxide solution (5.2.1.2.2).

Record the titration curve and determine the inflection point as the equivalent point of the potentiometric titration.



#### 5.2.1.5 Expression of results



The sodium hydrogen sulfate content, $C_1$, expressed as a percentage by mass, is given by the following formula (1):

$$C_1 = \frac{V \times c \times 120}{m} \quad (1)$$

where

$V$ is the volume, expressed in millilitres, of the sodium hydroxide solution (5.2.1.2.2) used for the titration;

$c$ is the concentration, in moles per litre, of the sodium hydroxide solution (5.2.1.2.2);

$m$ is the mass of the test portion, expressed in grams.

120 is the mass equivalent of sodium hydrogen sulfate in grams corresponding to 1 000 ml of sodium hydroxide solution with $c$(NaOH) = 0,1 mol/l.

#### 5.2.1.6 Repeatability limit

The absolute difference between two single test results, obtained under repeatability conditions, shall not be greater than the repeatability value, $r$, as calculated from the following formula:

$r = 0{,}001\ z$

where