SLOVENSKI STANDARD
SIST EN 12876:2009

01-maj-2009

Nadomešča:
SIST EN 12876:2001

Kemikalije, ki se uporabljajo za pripravo pitne vode - Kisik

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Sauerstoff

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

Ta slovenski standard je istoveten z: EN 12876:2009

ICS:

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

SIST EN 12876:2009 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12876

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ICS 71.100.80

Supersedes EN 12876:2000

English Version

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

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Sauerstoff

This European Standard was approved by CEN on 29 November 2008.

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

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Foreword

This document (EN 12876:2009) 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of an identical text or by endorsement, at the latest by July 2009, and conflicting national standards shall be withdrawn at the latest by July 2009.

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 12876:2000.

Significant technical difference between this edition and EN 12876:2000 is as follows:

a) deletion of reference to EU Directive 80/778/EEC of July 15, 1980 in order to take into account the latest Directive in force (see [1]).

Annex A is informative.

Annexes B and C are normative.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland 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 the 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 oxygen used for treatment of water intended for human consumption. It describes the characteristics of oxygen and specifies the requirements and the corresponding test methods for oxygen. It gives information on its use in water treatment.

2 Normative reference

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 1089-3, *Transportable gas cylinders – Gas Cylinder identification (excluding LPG) – Part 3: Colour coding*

3 Description

3.1 Identification

3.1.1 Chemical name

Oxygen.

3.1.2 Synonym or common name

None.

3.1.3 Relative molecular mass

32,00

3.1.4 Empirical formula

O_2

3.1.5 Chemical formula

O = O

3.1.6 CAS Registry Number[1)]

7782-44-7

3.1.7 EINECS reference[2)]

231-956-9

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1) Chemical Abstract Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

3.2 Commercial forms

Gas or cryogenic liquid.

3.3 Physical properties

3.3.1 Appearance, odour and taste

The product is a colourless, odourless, tasteless gas or a bluish liquid.

3.3.2 Density

Liquid: 1,141 g/ml at -183 °C.

Gas: 1,337 g/dm^3 at 15 °C and 101,3 kPa [3)].

3.3.3 Solubility of pure oxygen (in water)

The solubility of oxygen at a pressure of 101,3 kPa [3)] in pure water, depending on the temperature, is:

a) 61 mg/l at 5 °C;

b) 45 mg/l at 15 °C;

c) 36 mg/l at 25 °C.

3.3.4 Vapour pressure

Oxygen is a gas at 273,15 K and 101,3 kPa.

3.3.5 Boiling point at 100 kPa[3)]

182,97 °C

3.3.6 Melting point

Not applicable.

3.3.7 Specific heat

At a constant pressure 100 kPa:

- 919 J/(kgxK) at 15 °C;

- 920 J/(kgxK) at 25 °C.

3.3.8 Viscosity (dynamic)

2,0720 x 10^{-2} mPaxs at 100 kPa and 27 °C.

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3) 100 kPa = 1 bar.

3.3.9 Critical temperature

118,6 °C.

3.3.10 Critical pressure

5 043 kPa

3.3.11 Physical hardness

Not applicable.

3.4 Chemical properties

Oxygen is an oxidizing agent and a supporter of combustion. Dangerous reactions are possible with organic compounds and other combustible substances.

NOTE Oxygen-rich atmospheres (a volume fraction higher than 25 % of oxygen) increase the rate of combustion which can lead to explosive reactions.

4 Purity criteria

4.1 General

This European Standard specifies the minimum purity requirements for oxygen 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.

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

4.2 Composition of commercial product

Two grades of oxygen exist varying from the manufacturing process:

Grade A for cryogenically derived oxygen, the minimum concentration of oxygen shall be a volume fraction of 99,5 %.

Grade B for oxygen manufactured with non cryogenic methods, the minimum concentration of oxygen shall be a volume fraction of 90 %.

4.3 Impurities and main by-products

The hydrocarbons content (as Methane Index) shall not exceed a volume fraction of 50 ppm.

NOTE Depending on the production route, the product can contain quantities of water, nitrogen, argon, carbon dioxide and other rare gases which do not affect its use in water treatment.

4.4 Chemical parameters

NOTE For the purpose of this standard, "chemical parameters" are those defined in the EU Directive 98/83/EC of 03 November 1998 (see [2]).

Commercial oxygen does not contain significant levels of chemical parameters.

5 Test methods

5.1 Sampling

All or part of the gas flow is sent through the analyzer. Sample in a volumetric pipette of a few litres with a positive pressure from 150 kPa to 200 kPa or with an automatic sampler.

When sampling gaseous oxygen the following shall apply:

– sample lines and ancillary equipment shall be compatible with use with oxygen, be clean, leak tight and have the appropriate pressure rating to deliver the sample safely and without contamination to the analyzer;

– the sample taken shall be representative and apparatus shall be operated in accordance with the manufacturer's recommended operating procedures.

NOTE Flow rates to the analyzer can require precise control, following pressure regulation, if automatic flow control devices are not an integral part of the measurement system.

5.2 Analyses

5.2.1 Main product

5.2.1.1 General

The most commonly used method of oxygen content measurement is the paramagnetic method. This method has an accuracy of ± 0,01 % volume fraction.

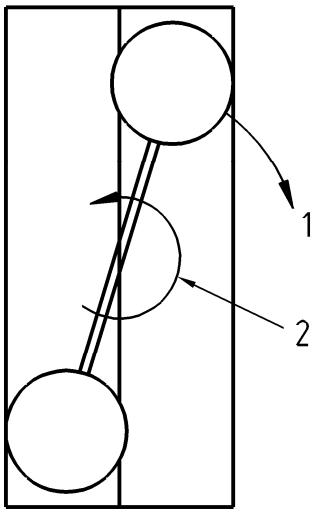
5.2.1.2 Principle

Magneto-dynamic oxygen analyzers are based on Faraday's principle of determining the magnetic susceptibility of a gas by measuring the force developed by a strong non-uniform magnetic field on a diamagnetic test body suspended in the sample gas. The test body of all measuring cells in paramagnetic oxygen analyzers consists of two nitrogen-filled quartz spheres arranged in the form of a dumb-bell, as shown in Figure 1. A single turn of fine platinum wire (the feedback coil) is secured in place around the dumb-bell. A rugged, taut band platinum ribbon suspension attached to the mid-point of the dumb-bell positions the dumb-bell in the strong non-uniform magnetic field existing between the specially shaped pole pieces of the permanent magnetic structure (see Figure 2).

5.2.1.3 Apparatus

A variety of analytical equipment suppliers provides simple, ready to run portable units for this purpose, which may be powered either by battery or mains electricity.

Figure 3 illustrates the configuration of a typical analyser designed for this purpose.



Key

1 Force in sphere
2 Restoring force of suspension

Figure 1 – Dumb-bell system: Forces within the cell

5.2.1.4 Calibration

Calibration of these analyzers shall be carried out using a calibration gas with a volume fraction greater than 99,95 % oxygen and the manufacturer's instructions, and conveyed to the analyser in accordance with 5.1.

5.2.1.5 Procedure

After calibrating the analyzer, introduce the sample of the product in accordance with the manufacturer's instructions, and 5.1. Record the oxygen content that is displayed by the analyzer.