SLOVENSKI STANDARD
SIST EN 15482:2013

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Nadomešča:
SIST EN 15482:2008

Kemikalije, ki se uporabljajo za pripravo pitne vode - Natrijev permanganat

Chemicals used for treatment of water intended for human consumption - Sodium permanganate

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumpermanganat

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

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ICS:

13.060.20	Pitna voda	Drinking water
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EUROPEAN STANDARD

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English Version

Chemicals used for treatment of water intended for human consumption - Sodium permanganate

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Natriumpermanganat

This European Standard was approved by CEN on 16 September 2012.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 15482:2012) 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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.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.

This document supersedes EN 15482:2007.

Significant technical differences between this edition and EN 15482:2007 are as follows:

a) Modification of Table 2 to show consistent limits for chemical parameters.

b) Modification of 6.2 on labelling, deletion of the reference to EU Directive 80/778/EEC of 15 July 1980 in order to take account of the latest Directive in force.

This document is largely based on EN 12672:2008 [3].

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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.

Introduction

In respect of the 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 permanganate used for the treatment of water intended for human consumption. It describes the characteristics of sodium permanganate and specifies the requirements and the corresponding test methods for sodium permanganate. It provides 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 ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

EN ISO 11885*, Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (ISO 11885)*

EN ISO 11969*, Water quality — Determination of arsenic — Atomic absorption spectrometric method (hydride technique (ISO 11969)*

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

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

3 Description

3.1 Identification

3.1.1 Chemical name

Sodium permanganate

3.1.2 Synonym or common name

Permanganate acid sodium salt

3.1.3 Relative molecular mass

141,93

3.1.4 Empirical formula

$NaMnO_4$

3.1.5 Chemical formula

$NaMnO_4$

3.1.6 CAS Registry Number [1)]

10101-50-5

3.1.7 EINECS reference [2)]

233-251-1

3.2 Commercial forms

The sodium permanganate is usually available as a concentrated solution with a concentration within the range of mass fraction of 20 % to 40 %.

The density of sodium permanganate solutions is given in Table 1.

Table 1

Solution concentration Mass fraction in %	**Density** g/ml at 22 °C
10	1,076
15	1,116
20	1,164
25	1,216
30	1,266
35	1,316
40	1,374

3.3 Physical properties

3.3.1 Appearance

Sodium permanganate solution is a dark purple coloured solution.

3.3.2 Density

The density of 40,00 % sodium permanganate solution is 1,37 g/cm^3 at 20 °C.

1) Chemicals Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

3.3.3 Solubility (in water)

Sodium permanganate solution is soluble up to 40 % and miscible with water in all proportions.

3.3.4 Vapour pressure

Not determined for sodium permanganate solution, however, very similar to water.

3.3.5 Boiling point at 100 kPa[3)]

Greater than 101 °C.

3.3.6 Melting point

Not applicable.

3.3.7 Specific heat

Not determined.

3.3.8 Viscosity (dynamic)

Less than 0,005 Pa·s for concentrations of 40 % or less.

3.3.9 Critical temperature

Not determined.

3.3.10 Critical pressure

Not determined.

3.3.11 Physical hardness

Not applicable.

3.4 Chemical properties

Sodium permanganate is a very strong oxidising agent.

It is soluble in water and dissolves in various organic solvents (methanol, ethanol).

NOTE The reaction with organics can be violent and is not recommended.

It decomposes at a high temperature and also in the presence of concentrated acids, hydrogen peroxide and organic compounds in general.

It hydrolyses very slowly in contact with air, reducing to manganese dioxide (MnO_2), a solid, brown to black colour product.

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3) 100 kPa = 1 bar.

4 Purity criteria

4.1 General

This European Standard specifies the minimum purity requirements for sodium permanganate 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, the user and when necessary relevant authorities shall be notified.

Users of this product should check the national regulations 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 leads to significant quantities of impurities, by-products or additives being present, the user shall be notified.

4.2 Composition of commercial product

The sodium permanganate is usually available in a concentrated solution with a concentration within the range of mass fraction of 20 % to 40 %.

The concentration of sodium permanganate solution shall be equal to or greater than the manufacturer specified value.

4.3 Impurities and main by-products

The content of manganese dioxide (insoluble matter) shall be no more than a mass fraction of 0,055 %.

NOTE The product can contain fluoride or hexafluorosilicate. At typical levels of dosing, the added fluoride would be less than 40 µg/l.

4.4 Chemical parameters

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

Table 2 — Chemical parameters

Parameter		Limit mg/kg of $NaMnO_4$ (mass fraction 100 %)
Arsenic (As)	max.	20
Cadmium (Cd)	max.	50
Chromium (Cr)	max.	50
Mercury (Hg)	max.	10
Nickel (Ni)	max.	50
Lead (Pb)	max.	50
Antimony (Sb)	max.	50
Selenium (Se)	max.	50

5 Test methods

5.1 Sampling

5.1.1 General

Observe the general recommendations of ISO 3165 and take account those 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 each 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.