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Processkemikalier för beredning av dricksvatten – Kaliumpermanganat

**Chemicals used for treatment of water intended for human
consumption – Potassium permanganate**



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Denna standard ersätter SS-EN 12672:2008, utgåva 2.

The European Standard EN 12672:2016 has the status of a Swedish Standard. This document contains the official English version of EN 12672:2016.

This standard supersedes the Swedish Standard SS-EN 12672:2008, edition 2.

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Denna standard är framtagen av kommittén för Vattenförsörjning, SIS/TK 198/AG 164.

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EUROPEAN STANDARD

EN 12672

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2016

ICS 71.100.80

Supersedes EN 12672:2008

English Version

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

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Kaliumpermanganat

This European Standard was approved by CEN on 18 March 2016.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 12672:2016) 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of an identical text or by endorsement, at the latest by November 2016 and conflicting national standards shall be withdrawn at the latest by November 2016.

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 12672:2008.

The significant technical changes between this edition and EN 12672:2008 are as follows:

- deletion of reference to Directive 67/548/EEC of 27th June 1967 in order to take into account the latest Regulation in force (see [2]);
- amendment of subclause 6.2 according to [2].

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, 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 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 potassium permanganate used for treatment of water intended for human consumption. It describes the characteristics of potassium permanganate and specifies the requirements and the corresponding test methods for potassium permanganate. It gives information on its use in water treatment. It also provides general information on potassium permanganate (see Annex A) and determines the rules relating to its safe handling and use (see Annex B).

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

ISO 8288:1986, *Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead - Flame atomic absorption spectrometric methods*

ISO 17378-2, *Water quality - Determination of arsenic and antimony - Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS)*

ISO/TS 17379-2, *Water quality - Determination of selenium - Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS)*

3 Description

3.1 Identification

3.1.1 Chemical name

Potassium permanganate.

3.1.2 Synonym or common name

Permanganate of potash.

3.1.3 Relative molecular mass

158,04.

3.1.4 Empirical formula

KMnO₄.

3.1.5 Chemical formula

KMnO₄.

3.1.6 CAS Registry Number ¹⁾

7722-64-7.

3.1.7 EINECS reference ²⁾

231-760-3.

3.2 Commercial forms

Solid product, consisting of rhombic crystals. For water treatment the commercial forms normally used are:

- technical grade to be dosed in liquid form, dissolved in water;
- free-flowing grade to be dosed either in solid form or dissolved in water.

3.3 Physical properties

3.3.1 Appearance

Crystals of a dark purple or bronze-like colour; almost opaque by transmitted light and of a blue metallic lustre by reflected light.

The free-flowing grade can present a different colour, usually greyish.

3.3.2 Density

The density of the product is 2,70 g/cm³ at 20 °C.

The bulk density is between 1,45 g/cm³ and 1,60 g/cm³.

3.3.3 Solubility (in water)

The product is soluble in water.

The solubility in water is given in Table 1.

Aqueous solubility:

$$\text{KMnO}_4 \text{ (g/l)} = 30.55 + 0.796 \times (T, \text{ }^\circ\text{C}) + 0.0392 \times (T, \text{ }^\circ\text{C})^2$$

where

T is the solution temperature (°C).

1) Chemicals Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

Table 1 — Solubility in water

Temperature °C	KMnO ₄ g/l
5	35,51
10	42,43
15	51,31
20	62,15
25	74,95
30	89,71

3.3.4 Vapour pressure

Not applicable.

3.3.5 Boiling point at 100 kPa³⁾

Not applicable.

3.3.6 Melting point

Product decomposes at 240 °C with emission of oxygen.

3.3.7 Specific heat

744,2 kJ/kg.K at 20 °C.

3.3.8 Viscosity (dynamic)

Not applicable.

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

Potassium permanganate is a very strong oxidizing agent.

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

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

It hydrolyzes in contact with air, reducing to manganese dioxide (MnO₂), a solid, brown to black colour product.

3) 100 kPa = 1 bar.