



# SLOVENSKI STANDARD

## SIST EN 15039:2006

01-oktober-2006

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### Kemikalije, ki se uporabljajo za pripravo pitne vode - Sredstva proti apnencu na membranah - Polikarboksilne kisline in soli

Chemicals used for treatment of water intended for human consumption - Antiscalants for membranes - Polycarboxylic acids and salts

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Antiscalants für Membranen - Polycarbonsäuren und deren Salze

Produits chimiques pour le traitement de l'eau destinée à la consommation humaine - Produits antitartres pour membranes - Acides polycarboxyliques et leurs sels

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Ta slovenski standard je istoveten z: **EN 15039:2006**

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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 15039:2006**

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EUROPEAN STANDARD

EN 15039

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2006

ICS 71.100.80

English Version

## Chemicals used for treatment of water intended for human consumption - Antiscalants for membranes - Polycarboxilic acids and salts

Produits chimiques pour le traitement de l'eau destinée à la consommation humaine - Produits antitartres pour membranes - Acides polycarboxyliques et sels

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Antiscalants für Membranen - Polycarbonsäuren und deren Salze

This European Standard was approved by CEN on 5 June 2006.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, 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 United Kingdom.

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<b>Contents</b>	<b>Page</b>
Foreword .....	3
Introduction.....	4
1 Scope.....	5
2 Normative references.....	5
3 Description.....	6
4 Purity criteria .....	9
5 Test methods .....	10
6 Labelling - Transportation - Storage .....	15
Annex A (informative) General information on polycarboxylic acids and salts .....	17
Annex B (normative) Analytical methods for polycarboxylic acids and salts .....	19
Annex C (informative) Environmental, health and safety precautions within chemical laboratory .....	24
Bibliography.....	25

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[SIST EN 15039:2006](https://standards.iteh.ai/catalog/standards/sist/d67ae407-fc5c-4e4c-be2f-f940f485e7c2/sist-en-15039-2006)

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## Foreword

This document (EN 15039:2006) 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 2007, and conflicting national standards shall be withdrawn at the latest by January 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

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**EN 15039:2006 (E)****Introduction**

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the products covered by this European Standard:

- a) this European Standard provides no information as to whether the products 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 these products remain in force.

NOTE Conformity with this European Standard does not confer or imply acceptance or approval of the products in any of the Member States of the EU or EFTA. The use of the products 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 polycarboxylic acids and salts used as antiscalants for membranes for the treatment of water intended for human consumption. It describes the characteristics and specifies the requirements and the corresponding analytical methods for polycarboxylic acids and salts. It gives information on their use as antiscalants for membranes in 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 1483, *Water quality — Determination of mercury*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696:1987)*

EN ISO 5961, *Water quality — Determination of cadmium by atomic absorption spectrometry (ISO 5961:1994)*

EN ISO 11885, *Water quality — Determination of 33 elements by inductively coupled plasma atomic emission spectroscopy (ISO 11885:1996)*

EN ISO 11969, *Water quality — Determination of arsenic — Atomic absorption spectrometric method (hydride technique) (ISO 11969:1996)*

ISO 3165, *Sampling of chemical products for industrial use — Safety in sampling*

ISO 6206, *Chemical products for industrial use — Sampling — Vocabulary*

ISO 6703-1, *Water quality — Determination of cyanide — Part 1: Determination of total cyanide*

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 9174, *Water quality — Determination of chromium — Atomic absorption spectrometric methods*

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

**EN 15039:2006 (E)****3 Description****3.1 Identification****3.1.1 Chemical name**

Homopolymers:

- a) polyacrylic acid;
- b) polymethacrylic acid;
- c) poly maleic acid;
- d) poly aspartic acid.

These acids can also be used as sodium, potassium, and ammonium salts.

Copolymers of acrylic acid, methacrylic acid, maleic acid, vinylsulfonic acid, allyl sulfonic acid, methylallyl sulfonic acid, 2-acrylamido-2-methyl-1-propanesulfonic acid, vinyl phosphonic acid and acrylamide.

The acid monomers can also be used as sodium, potassium, and ammonium salts.

Monomers:

e) benzene sulfonic acid, 4-[(2-methyl-2-propenyl)oxy]-, sodium salt.

f) benzene sulfonic acid, 4-vinyl-, sodium salt;

g) 1-propanesulfonic acid, 2-hydroxy-3-(2-propenyloxy)-, monosodium salt.

**3.1.2 Synonym or common names**

Nil.

**3.1.3 Relative molecular mass**

< 100 000 g/mol.

**3.1.4 Empirical formula**

Nil.

**3.1.5 Chemical formula**

Homopolymers:

- a)  $(C_2H_3COOH)_n$ ;
- b)  $(C_3H_5COOH)_n$ ;
- c)  $(HOCC_2H_2COOH)_n$ ;
- d)  $(C_4H_5NO_4)_n$ .



Monomers for the copolymers:  $C_2H_3COOH$ ,  $C_3H_5COOH$ ,  $HOCC_2H_2COOH$ ,  $C_2H_4O_3S$ ,  $C_3H_6O_3S$ ,  $C_4H_8O_3S$ ,  $C_7H_{13}NO_4S$ ,  $C_2H_4O_3P$ ,  $C_3H_5NO$ .

Monomers:

e)  $C_{10}H_{12}O_4SNa$ ;

f)  $C_8H_8O_3SNa$ ;

g)  $C_6H_{12}O_5SNa$ .

### 3.1.6 CAS Registry Number<sup>1)</sup>

Homopolymers (acids):

a) 9003-01-4;

b) 25087-26-7 ;

c) 26099-09-2;

d) 25608-40-6.

Table 1 — Salts

	Na <sup>+</sup>	K <sup>+</sup>	NH <sub>4</sub> <sup>+</sup>
Acrylic acid	9003-04-7 (part. neutralized)	25608-12-2	9003-03-6 (part. neutralized)
Methacrylic acid	54193-36-1	29297-93-6	28214-57-6 28805-15-4
Maleic acid	30915-61-8		

Copolymers :

Poly acrylic acid-acrylamide: 9003-06-9;

Acrylic acid-methacrylic acid: 25751-21-7;

Acrylic acid-itaconic acid: 258948-33-8;

Acrylic acid-maleic acid: 29132-58-9.

Monomers:

Benzene sulfonic acid, 4-[(2-methyl-2-propenyl)oxy]-, sodium salt : 1208-67-9

1) Chemical Abstracts Service Registry Number.

**EN 15039:2006 (E)**

Benzene sulfonic acid, 4-ethenyl-, sodium salt: 2695-37-6

1-Propanesulfonic acid, 2-hydroxy-3-(2-propenyloxy)-, monosodium salt : 52556-42-0

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

The EINECS-declarations for all mentioned polymers are: POLYMER (All used monomers are listed on the EINECS inventory).

**3.2 Commercial forms**

The polycarboxylic acids and polyacrylates are available as aqueous solutions and as in granular and powder form. All concentrations mentioned refer to the active matter and shall be calculated accordingly.

**3.3 Physical properties****3.3.1 Appearance**

The products in solution are a colourless to amber solution and in solid form are white to yellow particles.

**3.3.2 Density**

The density of solid in granular and powder form has typical values between 400 g/dm<sup>3</sup> to 600 g/dm<sup>3</sup>.

The density of solution is 1,00 g/ml to 1,40 g/ml for a product concentration from mass fraction 20 % to 50 % of active matter at 20 °C.

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**3.3.3 Solubility in water**

Solid: it is soluble in all portions of water,  
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Liquid: it is miscible in all proportions of water.

**3.3.4 Vapour pressure**

Not applicable.

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

Solid: not applicable;

Liquid: approximately 100 °C .

**3.3.6 Melting point**

Solid: not applicable;

Liquid: within -25 °C and 0 °C (aqueous product solution).

**3.3.7 Specific heat**

Not known.

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2) European Inventory of Existing Commercial Chemical Substances.

3) 100 kPa = 1 bar.

### 3.3.8 Viscosity (dynamic)

For the liquid the viscosity is equal from 1 mPa.s to 25 mPa.s for a product concentration of 50 g/l.

### 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

The polycarboxylic acids and solutions of polycarboxylic acid salts have acidic to alkaline reactions. The pH value of an aqueous solution of a mass fraction of 1 % is approximately between 2 to 11.

## 4 Purity criteria

### 4.1 General

This European Standard specifies the minimum purity requirements for polycarboxylic acids and salts used as antiscalants for the membranes in the treatment of water intended for human consumption. Limits are given for impurities commonly present in the products. 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 these products 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 products not stated in this 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 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 product in solid form shall have a polymer content in mass fraction between 85 % to 100%.

The product in aqueous solution shall conform to the following requirements on a dry mass basis :

— polymer content : mass fraction of (20 to 50) %.

NOTE If additional requirements are agreed between the customer and the manufacturer/supplier, the latter should provide the necessary test methods, if requested, so that the customer can carry out his own quality checks. A certificate of analysis should be provided by the manufacturer/supplier if requested.

### 4.3 Impurities and main by-products

The content of acrylic acid in polycarboxylic acids and salts shall not exceed 1 500 mg/kg of dry product.