



**SLOVENSKI STANDARD**  
**SIST EN 1409:2023**

**01-december-2023**

**Nadomešča:**  
**SIST EN 1409:2008**

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**Kemikalije, ki se uporabljajo za pripravo pitne vode - Poliamini**

Chemicals used for water treatment intended for human consumption - Polyamines

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Polyamine

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

**Ta slovenski standard je istoveten z: EN 1409:2023**

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**ICS:**

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71.100.80	Kemikalije za čiščenje vode	Chemicals for purification of water

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EUROPEAN STANDARD

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October 2023

ICS 71.100.80

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## Chemicals used for water treatment intended for human consumption - Polyamines

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

Produkte zur Aufbereitung von Wasser für den menschlichen Gebrauch - Polyamine

This European Standard was approved by CEN on 14 August 2023.

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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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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**EN 1409:2023 (E)****European foreword**

This document (EN 1409:2023) 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of an identical text or by endorsement, at the latest by April 2024, and conflicting national standards shall be withdrawn at the latest by April 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1409:2008.

In comparison with the previous edition EN 1409:2008, the following technical modifications have been made:

- a) updating in line with current legislation;
- b) modification of 8.3 on transportation regulations and labelling, adding the sentence “The user shall be aware of the incompatibilities between transported products.”;
- c) modification of 8.4 on marking. The requirements of marking are also applied to the accompanying documents.

Annex A is informative and gives information on origin, use and handling of polyamines.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye 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 document:

- 1) this document provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;
- 2) 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 document 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 document is subject to regulation or control by national authorities.

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**EN 1409:2023 (E)****1 Scope**

This document is applicable to polyamines used for treatment of water intended for human consumption. It describes the characteristics of polyamines and specifies the requirements and the corresponding test methods for polyamines. It gives information on their use in water treatment.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 3696:1995, *Water for analytical laboratory use — Specification and test methods (ISO 3696:1987)*

ISO 3165:1976, *Sampling of chemical products for industrial use — Safety in sampling*

ISO 6206:1979, *Chemical products for industrial use — Sampling — Vocabulary*

**3 Terms and definitions**

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp/>

— IEC Electropedia: available at <https://www.electropedia.org/>

**4 Description****4.1 Identification****4.1.1 Chemical name(s)**

(di)methylamine - epichlorohydrin resin.

**4.1.2 Synonym(s) or common name(s)**

- Polyamine;
- Polyalkylene amine;
- Polyquaternary salts.

NOTE The more general terms: “quaternary ammonium polyelectrolyte”, “cationic polymer”, “cationic polyelectrolyte”, “polymer coagulant” and “cationic flocculant” are used, but can also cover other chemicals referred to in other European standards.

**4.1.3 Relative molecular mass**

Typically in the range of 10 000 to 1 million Daltons.

**4.1.4 Empirical formula**

—  $-(C_aH_bN_cO_dCl_e)_n-$

where



$n$  is variable depending on the product;  
 $a, b, c, d$  and  $e$  are variable depending on the reactants used and on their molar ratios.

#### 4.1.5 Chemical formula

The following formula (Figure 1) illustrates typical structures formed when dimethylamine is reacted with epichlorohydrin.

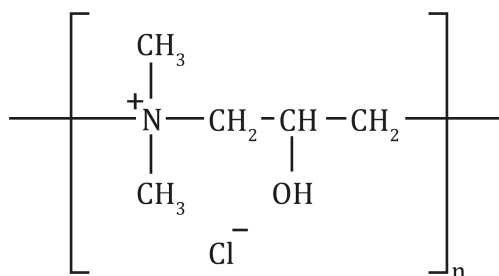


Figure 1 — Dimethylamine reaction with epichlorohydrin

where

$n$  is variable depending on the product.

#### 4.1.6 CAS Registry Numbers <sup>1)</sup>

- 25988-97-0
- 68583-79-1
- 42751-79-1
- 31568-35-1
- 52722-38-0
- 42751-81-5
- 68409-70-1

NOTE This list is not exhaustive: polyamines with other CAS numbers are also used for water treatment.

#### 4.1.7 EINECS reference <sup>2)</sup>

The conformity of polymers to EINECS is assessed on the basis of the monomers of which they are composed. Thus, EINECS reference numbers do not exist for polymers.

<sup>1)</sup> Chemical Abstracts Service Registry Number.

<sup>2)</sup> European Inventory of Existing Commercial Chemical Substances.

## EN 1409:2023 (E)

Polymers are exempt from registration according to EU Regulation 1907/2006/EC (see [3]), *REACH*.

Monomer substance(s) and any other substance(s) in the form of monomeric units and chemically bound substance(s) may have to be REACH registered according to Article 6 of EU Regulation 1907/2006/EC.

### 4.2 Commercial form

Polyamines as specified in this standard are aqueous solutions, the concentration (active content) of which is approximately 20 percent to 50 percent mass fraction (see 7.2.2.2).

## 5 Physical properties

### 5.1 Appearance

The product is a clear, colourless to amber-coloured liquid.

### 5.2 Density

The density of the solution depends on the concentration. A typical value is 1,16 g/ml for 50 % mass fraction polyamine at 20 °C.

### 5.3 Solubility

The product is miscible with water at all concentrations.

### 5.4 Vapour pressure

A typical value is 2,4 kPa for 50 % mass fraction polyamine at 20 °C.

### 5.5 Boiling point at 100 kPa <sup>3)</sup>

A typical value is 101 °C for 50 % mass fraction polyamine.

### 5.6 Freezing point

A typical value is - 7 °C for 50 % mass fraction polyamine.

### 5.7 Specific heat

A typical value is 3,13 kJ/kg K for 50 % mass fraction polyamine.

### 5.8 Viscosity dynamic

The viscosity is dependent on molecular mass and active content. A typical value is 400 mPa.s for 50 % mass fraction polyamine at 20 °C.

### 5.9 Critical temperature

Not applicable.

### 5.10 Critical pressure

Not applicable.

### 5.11 Physical hardness

Not applicable.

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<sup>3)</sup> 100 kPa = 1 bar.