Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in water distribution and storage systems - Part 2: Influencing factors for copper and copper alloys

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 12502-2:2005 sisaldab Euroopa standardi EN 12502-2:2004 ingliskeelset teksti. Käesolev dokument on jõustatud 22.02.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 12502-2:2005 consists of the English text of the European standard EN 12502-2:2004. This document is endorsed on 22.02.2005 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This document gives a review of influencing factors of the corrosion likelihood of copper and copper alloys used as tubes, tanks and equipment in water distribution and storage systems as defined in EN 12502-1.	**Scope:** This document gives a review of influencing factors of the corrosion likelihood of copper and copper alloys used as tubes, tanks and equipment in water distribution and storage systems as defined in EN 12502-1.

ICS 23.040.99, 77.060, 91.140.60

Võtmesõnad: alliage de cuivre, conception, corrosion, cuivre, definition, eau, eau potable, interieur, materiau, metal, pr, prevention de la corrosion, resistance a la corrosion, terminologie, terminology, water, water pipelines, water quality descriptors (french) corrosion atmo

EUROPEAN STANDARD

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English version

Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in water distribution and storage systems - Part 2: Influencing factors for copper and copper alloys

Protection des matériaux métalliques contre la corrosion - Recommandations pour l'évaluation du risque de corrosion dans les installations de distribution et de stockage d'eau - Partie 2 : Facteurs à considérer pour le cuivre et les alliages de cuivre

Korrosionsschutz metallischer Werkstoffe - Hinweise zur Abschätzung der Korrosionswahrscheinlichkeit in Wasserverteilungs- und speichersystemen - Teil 2: Einflussfaktoren für Kupfer und Kupferlegierungen

This European Standard was approved by CEN on 22 November 2004.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

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Contents

Foreword

This document (EN 12502-2:2004) has been prepared by Technical Committee CEN/TC 262 “Metallic and other inorganic coatings”, the secretariat of which is held by BSI.

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 June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

This standard is in five parts:

— *Part 1: General;*

— *Part 2: Influencing factors for copper and copper alloys;*

— *Part 3: Influencing factors for hot dip galvanized ferrous materials*;

— *Part 4: Influencing factors for stainless steels;*

— *Part 5: Influencing factors for cast iron, unalloyed and low alloyed steels.*

Together these five parts constitute a package of interrelated European Standards with a common date of withdrawal (dow) of 2005-06.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This document results mainly from investigations into and experience gained of the corrosion of copper materials in drinking water distribution systems in buildings. However, it can be applied analogously to other water systems.

The corrosion likelihood of copper and copper alloys depends on the formation of a corrosion product layer that begins to form as soon as these materials come in contact with water. The more this layer prevents ionic and electronic exchanges between the metal and water, the more protective it is and the higher the durability of the metal.

Copper and copper alloy drinking water systems are, in general, resistant to corrosion damage in normal use. However, there are certain conditions under which they will sustain corrosion damage.

As a result of the complex interactions between the various influencing factors, the extent of corrosion can only be expressed in terms of likelihood. This document is a guidance document and does not set explicit rules for the use of copper and copper alloys in water systems. It can be used to minimize the likelihood of corrosion damages occurring by:

— assisting in designing, installing and operating systems from an anti-corrosion point of view;

— evaluating the need for additional corrosion protection methods for a new or existing system;

— assisting in failure analysis, when failures occur in order to prevent repeat failures occurring.

However, a corrosion expert, or at least a person with technical training and experience in the corrosion field is required to give an accurate assessment of corrosion likelihood or failure analysis.

1 Scope

This document gives a review of influencing factors of the corrosion likelihood of copper and copper alloys used as tubes, tanks and equipment in water distribution and storage systems as defined in EN 12502-1.

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 12502-1:2004, *Protection of metallic materials against corrosion — Guidance on the assessment of corrosion likelihood in water distribution and storage systems — Part 1: General.*

EN ISO 8044:1999, *Corrosion of metals and alloys — Basic terms and definitions (ISO 8044:1999).*

3 Terms, definitions, and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 8044:1999 and EN 12502-1:2004 apply.

3.2 Symbols

$c(HCO_3^-)$ concentration of hydrogen carbonate ions in mmol/l

$c(SO_4^{2-})$ concentration of sulphate ions in mmol/l

$c(O_2)$ concentration of oxygen in mmol/l

4 Types of corrosion

4.1 General

The most common types of corrosion are listed in EN 12502-1.

Internal corrosion of copper and copper alloys in water distribution and storage systems generally leads to the build-up of layers formed by corrosion products, which can or cannot be protective. In some cases corrosion can lead to the impairment of the function of the system or failure because of corrosion damage (see Table 1).