

Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in water distribution and storage systems - Part 5: Influencing factors for cast iron, unalloyed and low alloyed steels

Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in water distribution and storage systems - Part 5: Influencing factors for cast iron, unalloyed and low alloyed steels

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 12502-5:2005 sisaldab Euroopa standardi EN 12502-5:2004 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 22.02.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 12502-5:2005 consists of the English text of the European standard EN 12502-5:2004.</p> <p>This document is endorsed on 22.02.2005 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

<p>Käsitlusala:</p> <p>This document reviews the influencing factors for the corrosion likelihood of bare unalloyed or low alloyed ferrous materials (mild steels and cast irons) used as tubes, tanks and equipment in water distribution and storage systems, except for water intended for human consumption.</p>	<p>Scope:</p> <p>This document reviews the influencing factors for the corrosion likelihood of bare unalloyed or low alloyed ferrous materials (mild steels and cast irons) used as tubes, tanks and equipment in water distribution and storage systems, except for water intended for human consumption.</p>
---	---

ICS 23.040.99, 77.060, 91.140.60

Võtmesõnad: cast iron, iron alloys, materials, materials testing, metallic materials, metals, pipelines, piping, probability, specification (approval), specifications, steels, surveys, testing, unalloyed, unalloyed steels, water pipelines, water practice

ICS 77.060; 23.040.99; 91.140.60

English version

**Protection of metallic materials against corrosion - Guidance on
the assessment of corrosion likelihood in water distribution and
storage systems - Part 5: Influencing factors for cast iron,
unalloyed and low alloyed steels**

Protection des matériaux métalliques contre la corrosion -
Recommandations pour l'évaluation du risque de corrosion
dans les installations de distribution et stockage d'eau -
Partie 5 : Facteurs à considérer pour la fonte, les aciers
non alliés et faiblement alliés

Korrosionsschutz metallischer Werkstoffe - Hinweise zur
Abschätzung der Korrosionswahrscheinlichkeit in
Wasserverteilungs- und speichersystemen - Teil 5:
Einflussfaktoren für Gusseisen, unlegierte und
niedriglegierte Stähle

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms, definitions, and symbols	5
3.1 Terms and definitions	5
3.2 Symbols	5
4 Types of corrosion.....	5
4.1 General.....	5
4.2 Uniform corrosion.....	6
4.3 Pitting corrosion	7
4.4 Selective corrosion.....	8
4.5 Bimetallic corrosion	9
4.6 Erosion corrosion.....	10
5 Assessment of corrosion likelihood.....	11
Bibliography	12

Foreword

This document (EN 12502-5:2004) 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 galvanised 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 mainly results from investigations into and experiences gained of the corrosion of unalloyed and low alloyed ferrous materials (steels and cast irons) in contact with supply waters and raw waters in once-through flow systems.

The corrosion likelihood of unalloyed and low alloy ferrous materials (steels and cast irons) in contact with water depends on the layers built up from corrosion products that might or might not be protective.

When layers are present that are not protective, tuberculation can appear on the walls of the components and can lead to corrosion effects such as: sludge in water, colouring (red or black water), reduction of free section of pipes or even wall perforation.

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 unalloyed and low alloy ferrous materials 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 reviews the influencing factors for the corrosion likelihood of bare unalloyed or low alloyed ferrous materials (mild steels and cast irons) used as tubes, tanks and equipment in water distribution and storage systems, except for water intended for human consumption.

NOTE See 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

$c(\text{O}_2)$ concentration of oxygen in mmol/l

$c(\text{HCO}_3^-)$ concentration of hydrogen carbonate ions in mmol/l

$c(\text{Ca}^{2+})$ concentration of calcium ions in mmol/l

4 Types of corrosion

4.1 General

The most common types of corrosion are described in EN 12502-1:2004, Clause 4.

The types of corrosion considered for steels and cast irons are the following:

- uniform corrosion;
- pitting corrosion;
- selective corrosion;
- bimetallic corrosion;
- erosion corrosion.