

Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in water distribution and storage systems - Part 4: Influencing factors for stainless steels

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 12502-4:2005 sisaldab Euroopa standardi EN 12502-4:2004 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 12502-4:2005 consists of the English text of the European standard EN 12502-4:2004.</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>
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<p>Käsitlusala: This document gives a review of influencing factors of the corrosion likelihood of stainless steels used as tubes, tanks and equipment in water distribution and storage systems as defined in EN 12502-1.</p>	<p>Scope: This document gives a review of influencing factors of the corrosion likelihood of stainless steels used as tubes, tanks and equipment in water distribution and storage systems as defined in EN 12502-1.</p>
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ICS 23.040.99, 77.060, 91.140.60

Võtmesõnad: iron alloys, materials, materials testing, metallic materials, metals, pipelines, piping, probability, protective coatings, specification (approval), specifications, stainless steels, steels, surveys, testing, unalloyed, 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 4: Influencing factors for stainless steels

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 4 : Facteurs à considérer pour les aciers inoxydables

Korrosionsschutz metallischer Werkstoffe - Hinweise zur
Abschätzung der Korrosionswahrscheinlichkeit in
Wasserverteilungs- und speichersystemen - Teil 4:
Einflussfaktoren für nichtrostende 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.

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Foreword

This document (EN 12502-4:2004) 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 inter-related 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 experience gained of the corrosion of stainless steel materials used as tubes, fittings or vessels in drinking water distribution systems in buildings. However, it can be applied analogously to other supply water systems.

The corrosion resistance of products made of stainless steel immersed in waters exists because of the presence of a very thin passive layer. Stainless steels in water systems are, in general, resistant to corrosion, although there are certain conditions under which they can 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 stainless steels 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.

NOTE Stainless steels are used for domestic pipework, in the food industry and, more importantly, in the chemical industry covering a variety of aggressive environments and service conditions. This explains the existence of a significant number of steel grades each with specific corrosion resistance and also specific mechanical properties.

1 Scope

This document gives a review of influencing factors of the corrosion likelihood of stainless steels 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 ISO 8044:1999, *Corrosion of metals and alloys — Basic terms and definitions (ISO 8044:1999)*.

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*.

3 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.

4 Materials

For the purpose of this document, the term “stainless steel” includes all martensitic, ferritic, austenitic-ferritic and austenitic steels conforming to the requirements of EN 10088-1 [2], EN 10088-2 [3] and EN 10088-3 [4].

Examples of steel grades that are used or that can be considered as candidate materials for supply water installations are listed in EN 10312 [5].

This document also applies to stainless casting alloys, which are commonly used for the production of valves and fittings and which are of the same composition type as the steels listed in EN 10088, Parts 1 to 3. The casting alloys can be considered as equivalent to their wrought counter parts, provided that no sensitization of the material remains after manufacturing (to be checked by testing the resistance against intergranular corrosion).

5 Types of corrosion

5.1 General

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

The rate of uniform corrosion of stainless steels in water distribution and storage systems is negligible because of their passive state.

Under the conditions prevailing in water systems stainless steels are usually the more noble materials and hence are not endangered by bimetallic corrosion.

The likelihood of intergranular corrosion is negligible in the systems under consideration.

Discoloration of the material's surface resulting from deposition of foreign corrosion products is not indicative of corrosion of the stainless steel.