



SLOVENSKI STANDARD SIST EN 12502-1:2005

01-marec-2005

Dfch]_cfcn]g_ UnUy]HU_cj]bg_] 'a UYf]Ucj `E`BUj cX]`c`nUcWb^Yj Ub^Yj Yf^Yfbcg] bUghUb_U_cfcn]^j`dcfUnXY^b]^j cX]]b`g_`UX]y b]]g]ghYa]]`!`%`XY.`Gd`cybc

Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in water distribution and storage systems - Part 1: General

Korrosionsschutz metallischer Werkstoffe - Hinweise zur Abschätzung der Korrosionswahrscheinlichkeit in Wasserverteilungs- und Speichersystemen - Teil 1: Allgemeines

(standards.iteh.ai)

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 1: Généralités

Ta slovenski standard je istoveten z: EN 12502-1:2004

ICS:

23.040.99	Drugi sestavni deli za cevovode	Other pipeline components
77.060	Korozija kovin	Corrosion of metals
91.140.60	Sistemi za oskrbo z vodo	Water supply systems

SIST EN 12502-1:2005

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12502-1:2005

<https://standards.iteh.ai/catalog/standards/sist/360f448a-246e-45d7-a980-34cc979fbc28/sist-en-12502-1-2005>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12502-1

December 2004

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 1: General**

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 1: Généralités

Korrosionsschutz metallischer Werkstoffe - Hinweise zur
Abschätzung der Korrosionswahrscheinlichkeit in
Wasserverteilungs- und speichersystemen - Teil 1:
Allgemeines

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 and definitions	5
3.1 Terms and definitions	5
4 Types of corrosion.....	6
5 Factors influencing corrosion likelihood	6
5.1 General.....	6
5.2 Characteristics of the metallic material.....	7
5.3 Characteristics of the water.....	7
5.4 Design and construction.....	8
5.5 Pressure testing and commissioning.....	9
5.6 Operating conditions.....	10
6 Assessment of corrosion likelihood.....	10
Bibliography.....	11

SIST EN 12502-1:2005

<https://standards.iteh.ai/catalog/standards/sist/360f448a-246e-45d7-a980-34cc979fbc28/sist-en-12502-1-2005>

Foreword

This document (EN 12502-1:2004) 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

The water distribution and storage systems under consideration consist of a variety of metals and alloys in pipework and in other components, i.e. pumps, valves and heat exchangers. Corrosion on the water-side of these systems generally leads to a build-up of surface corrosion product layers, which, depending on the circumstances, can or cannot be protective. In some cases, corrosion leads to the impairment of the function of the system, i.e. corrosion damage.

This impairment can manifest itself in:

- perforation (leakage);
- blockage of system components;
- detrimental changes of water composition.

The type and rate of corrosion for any particular alloy system can depend on:

- characteristics of the metallic material;
- characteristics of the water;
- design and construction;
- pressure testing and commissioning;
- operating conditions.

ITeH STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 12502-1:2005](https://standards.iteh.ai/catalog/standards/sist/360f448a-246e-45d7-a980-34cc979fbc28/sist-en-12502-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/360f448a-246e-45d7-a980-34cc979fbc28/sist-en-12502-1-2005>

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 therefore is a guidance document and does not set explicit rules for the use of metallic 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 a correct assessment of corrosion likelihood or failure analysis.

1 Scope

This document gives guidance for the assessment of the corrosion likelihood of metallic materials in water distribution and storage systems, as a result of corrosion on the water-side.

NOTE This document lists the different types of corrosion and describes in general terms the factors influencing corrosion likelihood.

Water distribution and storage systems considered in this document are used for waters intended for human consumption according to EC directive 98/83/EEC and for waters of similar chemical composition.

This document does not cover systems that convey the following types of water.

- sea water;
- brackish water;
- geothermal water;
- sewage water;
- swimming pool water;
- open cooling tower water;
- recirculating heating and cooling water;
- demineralized water.

ITeH STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12502-1:2005

Parts 2 to 5 of this document cover the factors influencing the corrosion likelihood for copper and copper alloys, hot-dip galvanized ferrous materials, stainless steels and cast iron, unalloyed and low alloyed steels in detail.

This document does not cover lead.

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)*.

3 Terms and definitions

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions and those given in EN ISO 8044 apply.

3.1.1

water system

system, including every metallic and non-metallic component (e.g. pipes, valves, fittings), constituting the water distribution and storage system, which can be in contact with the water

EN 12502-1:2004 (E)**3.1.2****uniform corrosion attack**

corrosion effect caused by uniform corrosion

3.1.3**pitting attack**

corrosion effect caused by pitting corrosion

4 Types of corrosion

When assessing the corrosion likelihood for a given system, all types of corrosion are to be taken into consideration.

The following types of corrosion can occur in water distribution and storage systems, depending on the corrosion system:

- uniform corrosion;
- localized corrosion:
 - pitting corrosion;
 - crevice corrosion;
 - selective corrosion;
 - knife-line corrosion;
 - bimetallic corrosion;
 - erosion corrosion;
 - stress corrosion;
 - corrosion fatigue.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 12502-1:2005](https://standards.iteh.ai/catalog/standards/sist/360f448a-246e-45d7-a980-34cc979fbc28/sist-en-12502-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/360f448a-246e-45d7-a980-34cc979fbc28/sist-en-12502-1-2005>

These types of corrosion can lead to different types of corrosion damage:

- wall perforation;
- blockage of system components;
- detrimental changes of water composition.

5 Factors influencing corrosion likelihood**5.1 General**

Table 1 lists the factors that can influence the corrosion likelihood of a particular metallic material in a water distribution and storage system, not in order of importance.

In order to minimize corrosion damage, special care should be taken during design, construction, pressure testing, commissioning and operation of a water distribution and storage system.

The behaviour of some metallic materials depends on the initial stage of formation of protective layers. When protective layers are formed under suitable conditions, subsequent adverse variations of the quality of water and/or service conditions have, in general, a reduced influence.

Table 1 — Factors influencing the corrosion likelihood

Characteristics of the metallic material	Characteristics of the water	Design and construction	Pressure testing and commissioning	Operating conditions
<ul style="list-style-type: none"> — Chemical composition/ Microstructure — Surface condition 	<ul style="list-style-type: none"> — Physico-chemical composition (see Table 2) — Solid particles 	<ul style="list-style-type: none"> — Geometry — Multi-metal systems — Joints — Tensile stress 	<ul style="list-style-type: none"> — Flushing — Draining — Disinfection/ Rinsing 	<ul style="list-style-type: none"> — Temperature/ Temperature variations — Flow conditions — Disinfection

5.2 Characteristics of the metallic material

5.2.1 Chemical composition/Microstructure

The effect of chemical composition and microstructure on the corrosion likelihood for various metals is more or less dependent on the type of alloy. For some metals, a small change in the alloy composition has no significant effect, whereas for others a small change markedly alters the corrosion likelihood.

NOTE Detailed information is given in Parts 2 to 5 of this document.

5.2.2 Surface conditions

Surface conditions (e.g. roughness, cleanliness, contamination with deposits) can influence the corrosion likelihood, especially with respect to the initial formation of corrosion cells.

5.3 Characteristics of the water

Table 2 lists some of the principal physical and chemical parameters of water that can influence corrosion in a water distribution and storage system.