

Protection against corrosion by stray current from direct current systems

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 50162:2004 sisaldab Euroopa standardi EN 50162:2004 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 16.11.2004 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 50162:2004 consists of the English text of the European standard EN 50162:2004.</p> <p>This document is endorsed on 16.11.2004 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 standard establishes the general principles to be adopted to minimize the effects of stray current corrosion caused by direct-current (d.c.) on buried or immersed metal structures</p>	<p>Scope: This standard establishes the general principles to be adopted to minimize the effects of stray current corrosion caused by direct-current (d.c.) on buried or immersed metal structures</p>
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English version

**Protection against corrosion by stray current
from direct current systems**

Protection contre la corrosion
due aux courants vagabonds
des systèmes à courant continu

Schutz gegen Korrosion
durch Streuströme aus
Gleichstromanlagen

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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Foreword

This European Standard has been prepared by CENELEC BTTF 114-1, Protection against corrosion by stray current from direct current systems.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50162 on 2004-05-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-05-01

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Introduction

Stray currents originating from direct current systems may cause severe material damage by corrosion, stray current corrosion, on buried or immersed metal structures (see Annex A). Particularly, long buried horizontal structures, e.g. pipelines and metal sheathed cables, may be in danger of this type of corrosion. Since corrosion damage can appear after only a short time of exposure to stray current it is important to make provisions for protective measures at an early stage and also to check the effect of these measures regularly.

This standard describes appropriate measures that can be applied to interfering d.c. systems and, if necessary, to structures which are, or which can be, exposed to stray current corrosion. The standard also gives measurement criteria for determining when these measures must be applied. Measurement techniques used on d.c. interfered structures are described in EN 13509.

The measures described in this standard are aimed for protection against stray current corrosion. For effective protection against other types of corrosion other measures have to be applied.

1 Scope

This standard establishes the general principles to be adopted to minimize the effects of stray current corrosion caused by direct-current (d.c.) on buried or immersed metal structures.

The standard is intended to offer guidance for:

- the design of direct current systems which may produce stray currents;
- the design of metal structures, which are to be buried or immersed and
- which may be subject to stray current corrosion;
- the selection of appropriate protection measures.

The standard mainly deals with external stray current corrosion on buried or immersed structures.

However stray current corrosion may also occur internally in systems containing an electrolyte e.g. near insulating joints or high resistance pipe joints in a water pipeline.

These situations are not dealt with in detail in this standard but principles and measures described here are generally applicable for minimizing the interference effects.

Stray currents may also cause other effects such as overheating. These are not covered in this standard.

D.C. systems that can cause currents to flow in the earth or any other electrolyte, whether intentional or unintentional, include:

- d.c. traction systems;
- trolley bus systems;
- d.c. power systems;
- d.c. equipment at industrial sites;
- d.c. communication systems;
- cathodic protection systems;
- high voltage d.c. (HVDC) transmission systems;
- d.c. track circuit signalling systems. For stray currents from traction systems EN 50122-2 gives requirements for minimizing their production and for the effects within the railroad.

Systems which may be affected by stray currents include buried or immersed metal structures such as:

- a) pipelines;
- b) metal sheathed cables;
- c) tanks and vessels;
- d) earthing systems;
- e) steel reinforcement in concrete;
- f) steel piling.

An affected structure carrying stray currents, e.g. a pipeline or cable may itself affect other nearby structures (see Clause 8).

This standard does not address the effect of a.c. stray current. Where a.c. stray current is suspected, care should be taken when taking measurements on any components due to risk of large induced voltages. If a.c. stray current interference is present the criteria described in this standard will not apply.

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 50122-2:1998, *Railway applications - Fixed installations - Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems*

EN 12954:2001, *Cathodic protection of buried or immersed metallic structures – General principles and application for pipelines*

EN 13509:2003, *Cathodic protection measurement techniques*

3 Definitions

For the purposes of this European Standard, the terms and definitions given in EN 12954, EN 50122-2 and the following apply.

3.1

coating

electrically insulating covering bonded to a metal surface for protection against corrosion by preventing contact between the electrolyte and the metal surface

3.2

drainage (electrical drainage)

transfer of stray current from an affected structure to the current source by means of a deliberate bond

NOTE For drainage devices see direct drainage bond, unidirectional drainage bond and forced drainage bond

3.3

direct drainage bond

device that provides electrical drainage by means of a direct bond between an affected structure and the stray current source. The bond may include a series resistor to limit current

3.4

forced drainage bond

device that provides electrical drainage by means of a bond between an affected structure and the stray current source. The bond includes a separate source of d.c. power to augment the transfer of current

3.5

unidirectional drainage bond

device that provides electrical drainage by means of a unidirectional bond between the affected structure and the stray current source. The bond includes a device such as a diode to ensure that current can only flow in one direction