



**National Standards Authority of Ireland**

**STANDARD**

**I.S. EN 50162:2004**

ICS 29.050  
77.060

National Standards  
Authority of Ireland  
Dublin 9  
Ireland

Tel: (01) 807 3800  
Fax: (01) 807 3838

**PROTECTION AGAINST CORROSION BY  
STRAY CURRENT FROM DIRECT CURRENT  
SYSTEMS**

*This Irish Standard was  
published under the  
authority of the National  
Standards Authority of  
Ireland  
and comes into effect on:  
August 31, 2004*

**NO COPYING WITHOUT NSAI  
PERMISSION EXCEPT AS  
PERMITTED BY COPYRIGHT  
LAW**

© NSAI 2004

**Price Code J**

Údarás um Chaighdeáin Náisiúnta na hÉireann



EUROPEAN STANDARD

**EN 50162**

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2004

---

ICS 29.020; 77.060

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

This European Standard was approved by CENELEC on 2004-05-01. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees 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.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

---

## 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

## Contents

|   |  |    |
|---|--|----|
| Introduction .....  |  | 5  |
| 1 Scope .....   |  | 6  |
| 2 Normative references .....  |  | 7  |
| 3 Definitions .....   |  | 7  |
| 4 Information exchange and co-operation .....   |  | 8  |
| 5 Identification and measurement of stray current interference .....                        |  | 8  |
| 5.1 Identification .....  |  | 8  |
| 5.2 Measurement .....   |  | 9  |
| 6 Criteria for stray-current interference .....   |  | 10 |
| 6.1 Anodic interference .....   |  | 10 |
| 6.2 Cathodic interference .....   |  | 10 |
| 7 Reduction of stray current interference – Modifications to current source .....           |  | 11 |
| 7.1 General .....   |  | 11 |
| 7.2 Principles .....  |  | 11 |
| 7.3 Direct current systems at industrial sites .....  |  | 11 |
| 7.4 Direct current systems at ports .....   |  | 11 |
| 7.5 Direct current communication systems .....  |  | 12 |
| 7.6 Direct current traction systems .....   |  | 12 |
| 7.7 High-voltage direct current transmission systems .....                                  |  | 12 |
| 7.8 Cathodic protection systems .....   |  | 13 |
| 7.9 Interference caused by electrical drainage (secondary interference) .....               |  | 14 |
| 8 Reduction of stray current interference – Modifications to the interfered structure ..... |  | 15 |
| 8.1 General .....   |  | 15 |
| 8.2 Design prerequisites .....  |  | 15 |
| 8.3 Installation of mitigation devices .....  |  | 15 |
| 9 Inspection and maintenance .....  |  | 18 |
| Annex A (informative) Stray current corrosion, potential measurements and IR-drop .....     |  | 19 |
| Annex B (informative) Principles of anodic and cathodic interference .....                  |  | 21 |

|  |    |
|--|----|
| Annex C (informative) Criteria for maximum acceptable levels of potential shift $\Delta U$ of anodic interference.....                       | 23 |
| Annex D (informative) The use of current probes to evaluate fluctuating stray current interference on cathodically protected structures..... | 24 |
| Annex E (informative) Interference situations and protection techniques.....   | 27 |
| Bibliography.....  | 29 |

## Figures

|  |    |
|--|----|
| Figure B.1 - Principle of interference due to d.c. operated railways .....   | 21 |
| Figure B.2 - Principle of interference due to cathodic potential gradients (anodic interference) .....   | 21 |
| Figure B.3 - Principle of interference due to anodic potential gradients (cathodic interference) .....   | 22 |
| Figure D.1 - Measuring method.....   | 24 |
| Figure D.2 - Example of the result of a probe current measurement („A“ indicates the period in which the reference level is measured; „B“ indicates the period with the highest reduction of the reference level). ..... | 25 |
| Figure D.3 - Graphical representation of Table D.1 .....   | 26 |
| Figure E.1 - Examples for secondary interference.....  | 27 |
| Figure E.2 - Mitigation of interference using a drainage bond .....  | 27 |
| Figure E.3 - Mitigation of interference using a unidirectional drainage bond.....  | 28 |
| Figure E.4 - Mitigation of interference using a forced drainage bond .....   | 28 |
| Figure E.5 - Mitigation of interference using an earthing electrode or a galvanic anode.....   | 29 |
| Figure E.6 - Mitigation of interference using an impressed current station.....  | 29 |

## Tables

|  |    |
|--|----|
| Table 1 – Acceptable positive potential shifts $\Delta U$ for buried or immersed metal structures which are not cathodically protected ..... | 10 |
| Table D.1 – Current criteria in case of interference due to d.c. traction systems .....  | 26 |

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-