



National Standards Authority of Ireland

STANDARD

**I.S. EN 13509:2003**

ICS 25.220.40

77.060

National Standards  
Authority of Ireland  
Dublin 9  
Ireland

Tel: (01) 807 3800

Fax: (01) 807 3838

## **CATHODIC PROTECTION MEASUREMENT TECHNIQUES**

*This Irish Standard was  
published under the  
authority of the National  
Standards Authority of  
Ireland  
and comes into effect on:  
September 12, 2003*

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

© NSAI 2003

**Price Code L**

Údarás um Chaighdeáin Náisiúnta na hÉireann



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13509**

May 2003

ICS 25.220.40; 77.060

English version

## Cathodic protection measurement techniques

Techniques de mesures applicables en protection  
cathodique

Messverfahren für den kathodischen Korrosionsschutz

This European Standard was approved by CEN on 27 December 2002.

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 Management Centre 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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 .....	9
4 Buried structure to electrolyte potential .....	10
4.1 Electrical equipment .....	10
4.2 Potential measurement .....	10
4.3 Factors influencing the potential measurement .....	11
4.4 Potential measurement techniques .....	13
4.4.1 Measuring technique including IR drop (on potential measurement) .....	13
4.4.2 Measuring techniques to determine IR free potentials ( $E_{ir\ free}$ ) .....	13
5 Immersed structure to electrolyte potential .....	16
5.1 Electrical equipment .....	16
5.2 Potential measurements .....	16
5.2.1 Direct potential measurement methods .....	16
5.2.2 Indirect potential measurement method .....	17
6 Other measurements .....	17
6.1 Current measurements (d.c.) .....	17
6.2 Isolating joints .....	17
6.3 Foreign structures .....	18
6.4 Coating .....	18
Annex A (informative) Table A.1 - Electrodes for Potential Measurements in Soil and/or Aqueous Media .....	19
Annex B (informative) Current reduction technique .....	20
Annex C (informative) Above ground surveys used to measure pipe to soil potential along a buried pipeline .....	22
Annex D (informative) Above ground surveys used to assess the coating condition and to locate coating defects .....	23
Annex E (informative) Special off potential measurements in stray currents areas .....	25
Annex F (informative) Explanatory note on the use of the intensive measurement technique and the calculation of the IR free potential ( $E_{ir\ free}$ ) .....	26
Annex G (informative) Examples of typical coupons and external potential test probe for pipe .....	28
Annex H (normative) Accuracy of potential measuring equipment .....	29
Annex I (informative) Accuracy of current measurement .....	31
Annex J (informative) Evaluation of the resistance of isolating joints .....	33
Annex K (informative) Current injection test on isolating joints .....	35
Bibliography .....	37

## Foreword

This document (EN 13509:2003) has been prepared by Technical Committee CEN/TC 219 "*Cathodic protection*", 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 November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

This European Standard should be considered as a basic document developing general measurement techniques applicable for the protection of buried or immersed metallic structures.

Annexes A, B, C, D, E, F, G, I, J and K are informative.

Annex H is normative.

This document includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

## **Introduction**

This European Standard describes the principles of the different methods of measurement used to assist in the design of the cathodic protection system of a buried or immersed metallic structure, for the verification of its effectiveness and finally for its optimum operational conditions.

It deals in particular with the measurement of the structure to electrolyte potential, which indicates whether or not the cathodic protection criterion for the structure is met.

Apart from specifying the factors, which may influence the measurement of the potential, this European Standard describes the different techniques possible and their suitability in various situations.

Further, this European Standard provides parameters to be controlled and measurements to be carried out (potential, potential gradient, current and resistance measurements) to ensure the correct functioning of the cathodic protection system and its effectiveness for the entire structure.

Several measurement methods described in general terms in the body of the standard are explained in more detail in annexes. These methods differ from one another to account for differences in type or state of the structure, the local environment and the degree of accuracy selected.

Measurements on buried structures that are not easily accessible e.g. pipe networks in urban areas are difficult to implement and interpret. To take measurements without the full knowledge of the problems associated with the measurement technique renders the interpretation of the measurements difficult and leads to incorrect decisions.

One of the clauses of this European Standard therefore outlines the difficulties encountered when measuring structure to electrolyte potentials, and suggests several methods of measurement that take into account, or avoid, these difficulties.

Based on knowledge and experience, the most suitable measurement techniques can be selected as described in this European Standard.

In order to achieve effective and efficient cathodic protection, measurements should be performed by trained, experienced and responsible personnel.

Instrumentation used for measurement should be kept in good working order and should be subjected to periodical calibration and safety checks.

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
-