



NSAI
Standards

Irish Standard
I.S. EN 17243:2020

Cathodic protection of internal surfaces of metallic tanks, structures, equipment, and piping containing seawater

I.S. EN 17243:2020

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 17243:2020

Published:

2020-03-11

This document was published under the authority of the NSAI and comes into effect on:

2020-03-29

ICS number:

47.020.30

77.060

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 17243:2020 is the adopted Irish version of the European Document EN 17243:2020, Cathodic protection of internal surfaces of metallic tanks, structures, equipment, and piping containing seawater

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN 17243

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2020

ICS 47.020.30; 77.060

English Version

Cathodic protection of internal surfaces of metallic tanks, structures, equipment, and piping containing seawater

Protection cathodique des surfaces internes des réservoirs, ouvrages, équipements et tuyauteries métalliques contenant de l'eau de mer

Kathodischer Schutz der inneren Oberflächen von metallischen Tanks, Strukturen, Ausrüstung und Rohrleitungen die Meerwasser enthalten

This European Standard was approved by CEN on 11 November 2019.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Competence of personnel	7
5 General considerations	7
6 Cathodic protection criteria	9
7 Design	11
8 Galvanic anodes system	18
9 Impressed current systems	26
10 Commissioning, operation and maintenance	30
Annex A (informative) Environmental checklist	36
Annex B (informative) Guidance on design values for internal cathodic protection for seawater containing equipment	38
B.1 Typical design cathodic current densities	38
B.2 Coating breakdown factor of protective paint systems	39
Annex C (informative) Calculation of potential distribution inside a pipe or tube	40
C.1 Potential distribution inside a pipe (ignoring anode resistance)	40
C.2 Potential distribution inside a pipe (with anode resistance)	40
C.3 Potential distribution inside a tube	41
Annex D (informative) Design of galvanic anode systems	42
D.1 Anode resistance formulae	42
D.2 Calculation of the anode resistance at the end of life	43
D.3 Electrolyte resistivity	44
D.4 Galvanic anode current output	46
D.5 Anode life	47
D.6 Minimum net weight requirement	47
Annex E (informative) Typical electrochemical characteristics of impressed current anodes	48
Annex F (informative) Design of impressed current systems	49
F.1 Internal cathodic protection of tanks	49
F.2 Evaluation of the maximum length of a rod anode projecting into the water flow for mechanical integrity	50
Bibliography	52

European foreword

This document (EN 17243:2020) 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 September 2020, and conflicting national standards shall be withdrawn at the latest by September 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 17243:2020 (E)

Introduction

Metallic structures containing seawater or brackish waters are exposed to the risk of corrosion. Even when a coating is applied to reduce this risk, cathodic protection (CP) is usually used to ensure corrosion control during the structure design life. This is especially important in the presence of galvanic couples between various metals and alloys because corrosion is then concentrated to the less noble material.

Cathodic protection works by supplying sufficient direct current to the internal surface of the structures in contact with water in order to change the structure to electrolyte potential to values where the corrosion rate is insignificant.

The general principles and theoretical aspects of cathodic protection in seawater are detailed in EN 12473.

1 Scope

This document specifies the requirements and recommendations for cathodic protection systems applied to the internal surfaces of metallic tanks, structures, equipment and piping containing natural or treated seawater or brackish waters to provide an efficient protection from corrosion.

Cathodic protection inside fresh water systems is excluded from this document. This is covered by EN 12499.

NOTE EN 12499 covers internal cathodic protection for any kind of waters, including general aspects for seawater but excluding industrial cooling water systems. This document specifically details applications in seawater and brackish waters.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 12473, *General principles of cathodic protection in seawater*

EN 12496, *Galvanic anodes for cathodic protection in seawater and saline mud*

EN 12499, *Internal cathodic protection of metallic structures*

EN 13509, *Cathodic protection measurement techniques*

EN ISO 8044, *Corrosion of metals and alloys — Basic terms and definitions (ISO 8044)*

EN ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1)*

EN ISO 15257, *Cathodic protection — Competence levels of cathodic protection persons — Basis for certification scheme (ISO 15257)*

EN ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules (ISO 15607)*

EN ISO 15609-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding (ISO 15609-1)*

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 12473 and EN ISO 8044 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp/ui>

3.1

anode redundancy factor

multiplier applied to the theoretical number of anodes to allow for anode damage and failures for ensuring that protection will continue to be achieved when one or more anodes are lost, without modifying the unit weight of anodes

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](#)
-