ICS 23.040.99, 77.060 SLOVENSKÁ TECHNICKÁ NORMA August 2022

STN	Vonkajšia katódová ochrana pažníc vystužujúcich vrt	STN EN 15112 03 8357

External cathodic protection of well casings

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/22

Obsahuje: EN 15112:2022

Oznámením tejto normy sa ruší
STN EN 15112 (03 8357) z decembra 2006

135204

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15112

May 2022

ICS 23.040.99; 77.060 Supersedes EN 15112:2006

English Version

External cathodic protection of well casings

Protection cathodique externe des cuvelages de puits

Äußerer kathodischer Korrosionsschutz von Bohrlochverrohrungen

This European Standard was approved by CEN on 13 March 2022.

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.

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

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Ref. No. EN 15112:2022 E

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European foreword

This document (EN 15112:2022) 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of an identical text or by endorsement, at the latest by November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

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.

This document supersedes EN 15112:2006.

In comparison with the previous edition, the following technical modifications have been made:

— Requirements for CP personnel competences have been included.

— Additional requirements for insulation between the casing and other pipelines or well casings.

— In Annex A, the method to determine the CP current need has been simplified.

— Annex C (Calculation of the potential shift at the bottom of the well casing and the well casing to soil resistance) has been revised.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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.

Introduction

Gas, oil and water well casings are usually cemented for the purpose of anchoring the pipes in the borehole and isolating the various geological layers from each other. This is necessary to avoid liquid exchanges between these.

Steels in contact with the cement are generally passivated, and thus, protected from external corrosion, except if the cement contains chloride ions. However, it is not always possible to obtain a continuous cementation on all the external steel surfaces. These bare residual surfaces can be in contact with more or less aggressive layers. Furthermore, these surfaces can constitute electrochemical cells with the cemented metallic parts. The anodic areas, which are the poorly cemented parts, correspond to corrosion areas.

In general, external corrosion effects are rare, particularly on recent wells, since most of them are well cemented. However, cementation failures sometimes occur during the execution of borehole cementation programmes, and studies have shown that, corrosion phenomena being progressive, the mean time for the appearance of leaks is dependent on different factors such as geological formation, thickness of the layers and of the steel casing.

Experience has also shown that the situation can be significantly improved by applying external cathodic protection to the well casings.

Environmental aspects with regard to gas, oil or water wells should be considered when deciding on whether or not to apply cathodic protection.

1 Scope

This document provides information on methods suitable for assessing the likelihood of leakage due to external corrosion of well casings and to evaluate the need for cathodic protection, as well as methods of providing cathodic protection to the external part of these wells in contact with the soil. It also defines requirements for monitoring of performance of CP systems.

Onshore and offshore wells are included in the scope. However, for offshore wells where protection is provided by anodes on the wellhead structure, it is recognized that it might not be practical to achieve full protection of well casings.

This document applies to any gas, oil or water well with metallic casing, whether cemented or not.

However, in special conditions (shallow casings: e.g. 50 m, and homogeneous soil), EN 12954 can be used to achieve the cathodic protection and assess its efficiency.

The general requirements of EN 12954 apply; this document details additional, specific, requirements for CP of well casings.

This document applies to production and injection wells. References later in this document to production also apply to injection.

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 12954, *General principles of cathodic protection of buried or immersed onshore metallic structures*