SLOVENSKI STANDARD
SIST EN ISO 18086:2017

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Nadomešča:

SIST EN 15280:2013

Korozija kovin in zlitin - Ugotavljanje nastanka AC korozije - Merila zaščite (ISO 18086:2015)

Corrosion of metals and alloys - Determination of AC corrosion - Protection criteria (ISO 18086:2015)

Korrosion von Metallen und Legierungen - Bestimmung der Wechselstromkorrosion - Schutzkriterien (ISO 18086:2015)

Corrosion des métaux et alliages - Détermination de la corrosion occasionnée par les courants alternatifs - Critères de protection (ISO 18086:2015)

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EUROPEAN STANDARD

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English Version

Corrosion of metals and alloys - Determination of AC corrosion - Protection criteria (ISO 18086:2015)

Corrosion des métaux et alliages - Détermination de la corrosion occasionnée par les courants alternatifs - Critères de protection (ISO 18086:2015)

Korrosion von Metallen und Legierungen - Bestimmung der Wechselstromkorrosion - Schutzkriterien (ISO 18086:2015)

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

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European foreword

The text of ISO 18086:2015 has been prepared by Technical Committee ISO/TC 156“Corrosion of metals and alloys” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 18086:2017 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of an identical text or by endorsement, at the latest by March 2018, and conflicting national standards shall be withdrawn at the latest by March 2018.

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Endorsement notice

The text of ISO 18086:2015 has been approved by CEN as EN ISO 18086:2017 without any modification.

INTERNATIONAL STANDARD

ISO 18086

First edition
2015-06-01

Corrosion of metals and alloys — Determination of AC corrosion — Protection criteria

Corrosion des métaux et alliages — Détermination de la corrosion occasionnée par les courants alternatifs — Critères de protection

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 156, *Corrosion of metal and alloys*.

Introduction

This International Standard has incorporated criteria and thresholds together with experience gained from the most recent data. Various countries have a very different approach to the prevention of AC corrosion depending primarily on the DC interference situation. These different approaches are taken into account in two different ways

— either in presence of “low” on-potentials, which allows a certain level of AC voltage (up to 15 V), or

— in presence of “high” on-potentials (with DC stray current interference on the pipeline for instance) which requires the reduction of the AC voltage towards the lowest possible levels.

This International Standard also gives some parameters to consider when evaluating the AC corrosion likelihood, as well as detailed measurement techniques, mitigation measures, and measurements to carry out for commissioning of any AC corrosion mitigation system. Note that Annex E proposes other parameters and thresholds that require further validation based on practical experiences.

Corrosion of metals and alloys — Determination of AC corrosion — Protection criteria

1 Scope

This International Standard is applicable to buried cathodically-protected pipeline that is influenced by AC traction systems and/or AC power lines.

In the presence of AC interference, the protection criteria given in ISO 15589-1 are not sufficient to demonstrate that the steel is being protected against corrosion.

This International Standard provides limits, measurement procedures, mitigation measures, and information to deal with long term AC interference for AC voltages at frequencies between 16,7 and 60 Hz and the evaluation of AC corrosion likelihood.

This International Standard deals with the possibility of AC corrosion of metallic pipelines due to AC interferences caused by inductive, conductive or capacitive coupling with AC power systems and the maximum tolerable limits of these interference effects. It takes into account the fact that this is a long-term effect, which occurs during normal operating conditions of the AC power system.

This International Standard does not cover the safety issues associated with AC voltages on pipelines. These are covered in national standards and regulations (see e.g. EN 50443).

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.

ISO 15589-1, *Petroleum, petrochemical and natural gas industries — Cathodic protection of pipeline systems — Part 1: On-land pipelines*

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

IEC 61010-1, *Safety requirements for electrical equipment for measurements, control, and laboratory use — Part 1: General requirements*

EN 13509, *Cathodic protection measurement techniques*

EN 15257, *Cathodic protection — Competence levels and certification of cathodic protection personnel*

EN 50443, *Effects of electromagnetic interference on pipelines caused by high voltage AC electric traction systems and/or high voltage AC power supply systems*

3 Terms and definitions

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

3.1
AC electric traction system
AC railway electrical distribution network used to provide energy for rolling stock

Note 1 to entry: The system can comprise the following:

— contact line systems;

— return circuit of electric railway systems;

— running rails of non-electric railway systems, which are in the vicinity of and conductively connected to the running rails of an electric railway system.

3.2
AC power supply system
AC electrical system devoted to electrical energy transmission and includes overhead lines, cables, substations and all apparatus associated with them

3.3
AC power system
AC electric traction system or AC power supply system

Note 1 to entry: Where it is necessary to differentiate, each interfering system is clearly indicated with its proper term.

3.4
copper/copper sulfate reference electrode
CSE
reference electrode consisting of copper in a saturated solution of copper sulfate

3.5
AC voltage
voltage measured to earth between a metallic structure and a reference electrode

3.6
interfering system
general expression encompassing an interfering high voltage AC electric traction system and/or high voltage AC power supply system

3.7
interfered system
system on which the interference effects appear

Note 1 to entry: In this International Standard, it is the pipeline system.

3.8
pipeline system
system of pipe network with all associated equipment and stations

Note 1 to entry: In this International Standard, pipeline system refers only to metallic pipeline system.

Note 2 to entry: The associated equipment is the equipment electrically connected to the pipeline.

3.9
earth
conductive mass of the earth, whose electric potential at any point is conventionally taken as equal to zero

[SOURCE: IEC 60050 826]

3.10
operating condition
fault-free operation of any system

Note 1 to entry: Transients are not to be considered as an operating condition.

3.11
fault condition
non-intended condition caused by short-circuit to earth, the fault duration being the normal clearing time of the protection devices and switches

Note 1 to entry: The short circuit is an unintentional connection of an energized conductor to earth or to any metallic part in contact with earth.

3.12
conductive coupling
coupling which occurs when a proportion of the current belonging to the interfering system returns to the system earth via the interfered system or when the voltage to the reference earth of the ground in the vicinity of the influenced object rises because of a fault in the interfering system and the results of which are conductive voltages and currents

3.13
inductive coupling
phenomenon whereby the magnetic field produced by a current carrying circuit influences another circuit

Note 1 to entry: The coupling being quantified by the mutual impedance of the two circuits, and the results of which are induced voltages and hence currents that depend on, for example, the distances, length, inducing current, circuit arrangement, and frequency.

3.14
capacitive coupling
phenomenon whereby the electric field produced by an energized conductor influences another conductor

Note 1 to entry: The coupling being quantified by the capacitance between the conductors and the capacitances between each conductor and earth, and the results of which are interference voltages into conductive parts or conductors insulated from earth, these voltages depend, for example on the voltage of the influencing system, distances, and circuit arrangement.

3.15
interference
phenomenon resulting from conductive, capacitive, inductive coupling between systems and which can cause malfunction, dangerous voltages, damage, etc.

3.16
disturbance
malfunction of an equipment losing its capability to work properly for the duration of the interference

Note 1 to entry: When the interference disappears, the interfered system starts working properly again without any external intervention.

3.17
damage
permanent reduction in the quality of service which can be suffered by the interfered system

Note 1 to entry: A reduction in the quality of service could also be the complete cancellation of service.

EXAMPLE Coating perforation, pipe pitting, pipe perforation, permanent malfunction of the equipment connected to the pipes, etc.

3.18
danger
state of the influenced system which is able to produce a threat to human life

