

This is a preview of "ISO 18086:2015". [Click here to purchase the full version from the ANSI store.](#)

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*



Reference number  
ISO 18086:2015(E)

© ISO 2015

This is a preview of "ISO 18086:2015". Click here to purchase the full version from the ANSI store.



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

This is a preview of "ISO 18086:2015". [Click here to purchase the full version from the ANSI store.](#)

## Contents

	Page
Foreword .....	v
Introduction .....	vi
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 Cathodic protection persons competence .....</b>	<b>4</b>
<b>5 Assessment of the AC influence .....</b>	<b>5</b>
5.1 General .....	5
5.2 Assessment of the level of interference .....	5
<b>6 Evaluation of the AC corrosion likelihood .....</b>	<b>6</b>
6.1 Prerequisite .....	6
6.1.1 General .....	6
6.1.2 AC voltage on the structure .....	6
6.2 AC and DC current density .....	7
6.2.1 General .....	7
6.2.2 AC current density .....	7
6.2.3 High cathodic DC current density .....	7
6.2.4 Low cathodic DC current density .....	7
6.2.5 Current ratio " $I_{a.c.}/I_{d.c.}$ " .....	8
6.2.6 Soil resistivity .....	8
6.3 Corrosion rate .....	8
6.4 Pipeline coatings .....	8
6.5 Evaluation of the metal loss .....	8
<b>7 Acceptable interference levels .....</b>	<b>8</b>
<b>8 Measurement techniques .....</b>	<b>9</b>
8.1 Measurements .....	9
8.1.1 General .....	9
8.1.2 Selection of test sites .....	9
8.1.3 Selection of measurement parameter .....	10
8.1.4 Sampling rate for the recording of interference levels .....	10
8.1.5 Accuracy of measuring equipment .....	10
8.1.6 Installation of coupons or probes to calculate current densities .....	10
8.2 DC potential measurements .....	10
8.3 AC voltage measurements .....	10
8.4 Measurements on coupons and probes .....	11
8.4.1 Installation of coupons or probes .....	11
8.4.2 Current measurements .....	11
8.4.3 Corrosion rate measurements .....	12
8.5 Pipeline metal loss techniques .....	13
<b>9 Mitigation measures .....</b>	<b>13</b>
9.1 General .....	13
9.2 Construction measures .....	13
9.2.1 Modification of bedding material .....	13
9.2.2 Installation of isolating joints .....	13
9.2.3 Installation of mitigation wires .....	13
9.2.4 Optimization of pipeline and/or powerline route .....	14
9.2.5 Power line or pipeline construction .....	14
9.3 Operation measures .....	14
9.3.1 Earthing .....	14
9.3.2 Adjustment of cathodic protection level .....	15
9.3.3 Repair of coating defects .....	15

This is a preview of "ISO 18086:2015". [Click here to purchase the full version from the ANSI store.](#)

<b>10</b>	<b>Commissioning</b> .....	<b>16</b>
10.1	Commissioning.....	16
10.2	Preliminary checking.....	16
10.2.1	General.....	16
10.2.2	Coupon AC voltage and current startup.....	17
10.2.3	Verification of effectiveness.....	17
10.2.4	Installation and commissioning documents.....	17
<b>11</b>	<b>Monitoring and maintenance</b> .....	<b>17</b>
<b>Annex A</b>	<b>(informative) Simplified description of the AC corrosion phenomenon</b> .....	<b>19</b>
<b>Annex B</b>	<b>(informative) Coupons and probes</b> .....	<b>21</b>
<b>Annex C</b>	<b>(informative) Coulometric oxidation</b> .....	<b>26</b>
<b>Annex D</b>	<b>(informative) Influence of soil characteristics on the AC corrosion process</b> .....	<b>27</b>
<b>Annex E</b>	<b>(informative) Other criteria that have been used in the presence of AC influence</b> .....	<b>28</b>
<b>Annex F</b>	<b>(informative) Parameters to take into account to choose a DC decoupling device</b> .....	<b>32</b>
<b>Annex G</b>	<b>(informative) Method to determine the reference electrode location to remote earth</b> .....	<b>34</b>
<b>Annex H</b>	<b>(informative) Simultaneous measurement on coupon current densities with high rate</b> .....	<b>36</b>
<b>Bibliography</b>	.....	<b>38</b>

This is a preview of "ISO 18086:2015". [Click here to purchase the full version from the ANSI store.](#)

## 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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.