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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 40377-2021

**Corrosion of metals and alloys - Determination of AC corrosion
- Protection criteria**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document uses the redrafting method to amend and adopt ISO 18086.2019

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but".

Compared with ISO 18086.2019, this document has structural adjustments.

---Informative appendix A "Technical differences between this document and ISO 18086.2019 and their reasons" and informative appendix G "communication

Atlas of Flow Corrosion Data";

---Adjust the original Appendix A, Appendix B, Appendix C, Appendix E, Appendix F, Appendix G to Appendix F, Appendix D, Appendix E, Appendix B, Appendix

Record C, Appendix J, Appendix I.

Compared with ISO 18086.2019, this document has technical differences.

The set vertical single line (I) is marked, and Appendix A gives a list of the corresponding technical differences and their reasons.

This document has made the following editorial changes.

---Added the description of the symbols in the formula;

---Added references [9]~[28].

Introduction

This document integrates the guidelines, thresholds, and experience from the latest data. The methods of communicating corrosion protection vary from country to country.

This mainly depends on the situation of DC interference. These different methods are considered from two different situations.

--- In the case of "positive" energization potential, allow a certain level of AC voltage (up to 15V);

---In the case of "negative" power-on potential (for example, there is DC stray current interference on the pipeline), the AC voltage needs to be reduced to the limit

Low volume level.

This document also gives the parameters that need to be considered when evaluating the possibility of communication corrosion, as well as detailed test techniques, mitigation measures, and communication corrosion.

Tests that should be carried out during the commissioning of the erosion mitigation system. Note that other parameters and thresholds suggested in Appendix C need to be further based on practical experience

confirm.

Corrosion of metals and alloys

Determination of protection criteria for AC corrosion

1 Scope

This document specifies the limits, test procedures, mitigation measures and related information to evaluate the AC voltage between 16.7 Hz and 60 Hz.

The possibility of long-term interference and AC corrosion.

This document applies to buried cathodic protection pipelines affected by AC traction systems and/or AC transmission lines.

This document does not apply to safety issues related to pipeline AC voltage. These safety issues are covered in other relevant standards and regulations

(Such as EN50443).

Note 1. This document discusses the possibility of AC corrosion of metal pipes caused by AC interference caused by resistive, inductive or capacitive coupling of AC transmission systems, and

The maximum allowable limit for the influence of these disturbances. Mainly consider the long-term influence factors under the normal operation of the AC power system.

Note 2. In the presence of AC interference, the protection criteria given in ISO 15589-1 are not sufficient to prove that the steel is effectively protected from corrosion.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations

Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

This document.

GB 4793.1 Safety requirements for electrical equipment for measurement, control and laboratory use Part 1. General requirements (GB 4793.1-2007,

IEC 61010-1.2001, IDT)

GB/T 10123 Corrosion basic terms and definitions of metals and alloys (GB/T 10123-2001, eqv ISO 8044.1999)

ISO 15589-1 Petroleum, petrochemical and natural gas industry pipeline system cathodic

protection Part 1. Onshore pipelines (Petroleum, petrochemical and natural gas industries-Cathodic protection of pipeline systems-Part 1. On-land pipelines)

EN50443 The influence of high-voltage AC traction system and/or high-voltage AC transmission system on pipeline electromagnetic interference (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

The following terms and definitions defined in GB/T 10123 apply to this document.

3.1

AC electric traction system AC electric traction system

AC railway distribution network used to provide energy for rail vehicles.

Note: The system can include the following parts.

--- Catenary system;

--- Return line of electrified railway system;

--- The running track of the non-electrified railway system is near and electrically connected to the running track of the electrified railway system.