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Corrosion of metals and alloys - Accelerated test method for soil corrosion

金属和合金的腐蚀 土壤加速试验

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Foreword

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

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Iron and Steel Association.

This document is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC183).

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Introduction

Many metal structures serve in the soil, either fully or partially buried, such as pipelines, storage tanks, infrastructure, and grounding systems. Materials This involves carbon steel, stainless steel, copper, aluminum, and metal coatings. Metals and their alloys buried in soil are susceptible to corrosion, which is caused by In soil, these materials are not directly visible and are highly concealed; severe corrosion can threaten operational safety. Therefore, understanding the properties of materials in soil is crucial.

Medium corrosion resistance is of great significance for the rational selection of materials and anti-corrosion design in underground engineering construction, and for improving the quality of the project.

Soil is a complex multiphase medium composed of solid, liquid, and gaseous substances. The electrolytes that make up soil exhibit multiphase, porosity, and...

Uniformity makes soil corrosion a complex reaction process. The main factors influencing soil corrosivity include soil porosity, water content, and...

Oxygen content, salt content, pH value, soil texture, soil resistivity, and redox potential, etc. Among the many influencing factors, the effects of various factors...

The impact varies in magnitude, and the corrosivity of different soils varies greatly.

This document uses actual environmental soil or non-metallic minerals and solution media to design a decomposition system that approximates the coexistence of gas, liquid, and solid phases in soil.

A corrosion environment in which the soil corrosion mechanism is not altered and the corrosion process is accelerated, while the physical and chemical properties of the soil are well maintained or simulated.

Because the corrosion of metallic materials in soil is complex and influenced by many factors, the experimental results obtained in this document cannot be used as a definitive conclusion.

It provides a direct guide to the corrosion resistance of tested materials in service, but also offers a means of comparing the ability of metallic materials to resist corrosion in soil.

Accelerated testing of corrosive soils for metals and alloys

1 Scope

This document describes the test method for accelerated corrosion of metals and alloys in soil, including reagents, test apparatus, preparation of test soil, sample preparation, and test...

Test procedures, test result evaluation, and test report.

This document applies to accelerated corrosion testing of metals and their alloys, and metal coatings in soil, but not to stray current corrosion in soil.

Microbial corrosion tests. Accelerated soil corrosion tests on metal components should be conducted in accordance with this document.

2 Normative references

GB/T 10123

GB/T 16545

GB/T 18590

3 Terms and Definitions

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

3.1 soil texture

The percentage combination of each particle size in the soil by mass.

Note. Also known as soil mechanical composition.

3.2 soil water content

The amount of water contained in soil generally refers to the absolute water content of the soil, that is, the mass of water contained in 100g of dried soil.

Note. Also known as soil moisture content. Soil moisture content can be expressed in two ways. weight moisture content and volume moisture content. The soil moisture content in this document refers to weight moisture content. Water content.

4 General Principles

4.1 This method evaluates the corrosion performance of metallic materials in soil by burying them in test soil under set test conditions.

4.2 The test soil consisted of actual soil and simulated soil. Actual soil was collected from the field. Simulated soil was prepared in the laboratory using non-metallic materials.

Soil is a mixture of mineral soil or sand, or acidic or alkaline salt solutions.

4.3 When examining the corrosion resistance of metallic materials in a specific soil environment, it is advisable to collect actual soil samples from that location for testing.

4.4 Simulated soil tests are generally used for material corrosion resistance testing or comparison.