



# Technical Report

**ISO/TR 23583**

## **Sulfur corrosion test method of copper winding in electric field for power equipment**

*Méthode d'essai de corrosion par le soufre des enroulements en  
cuivre dans un champ électrique pour les équipements électriques*

**First edition  
2026-10**

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Published in Switzerland

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## Foreword

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This document was prepared by Technical Committee ISO/TC 156, *Corrosion of metals and alloys*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Many factors affect the sulfur corrosion of copper windings in power equipment in the power industry. These include:

- temperature;
- corrosive sulfide concentration in oil;
- acid products derived from oil-paper insulation aging;
- moisture;
- the type of electric field (AC or DC electric field);
- electric field strength;
- the contact state between the copper winding and the insulating paper;
- the quality of the copper winding.

These have a significant influence on the occurrence of sulfur corrosion and the generation of corrosion products. The current assessment methods of sulfur corrosion of copper windings do not sufficiently consider these factors. Existing standards (e.g. ASTM D 1275A, ASTM D 1275B, IEC 62535, GB/T 25961) test specifications or methods for testing whether the quality of insulating oil meets the requirements.

As for the corrosion of copper, the existing standards are test methods for the corrosion of copper metal in the atmospheric environment, petroleum products, etc. Standards such as GB/T 38265.15, ASTM D 130 and ISO 6251 specify special testing or assessment methods for lubricants, oil and copper parts in atmospheric environments (e.g. pipelines, tower parts and other structures), which does not fully apply to power equipment.

Therefore, with reference to the existing standards for corrosive sulfur detection in insulating oil, this document proposes a sulfur corrosion test method for copper winding in electric field for power equipment. The method includes pre-treatment, model construction, the corrosion test method and corrosion level judgments for copper windings.

This document contributes to controlling the quality of copper windings in electric power equipment, reducing the failure of electric power equipment due to sulfur corrosion and prolonging the service life of power equipment, which has great significance in improving the safe operation of power grids.

This document considers the effects of actual working conditions (e.g. electric field, the contact state between the copper winding and the insulating paper) and the quality of the copper winding on the sulfur corrosion of copper windings in power equipment. It considers the influencing factors listed in this Introduction to avoid the assessment deviation of sulfur corrosion resistance of copper windings in the existing standards.