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PEOPLE'S REPUBLIC OF CHINA**

GB/T 31405-2025

Replacing GB/T 31405-2015

**Test method for the cathodic disbonding of pipeline protection
coatings subjected to elevated temperatures**

管道防腐层高温阴极剥离试验方法

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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. This document supersedes GB/T 31405-2015 "High-Temperature Cathodic Disbondment Test Method for Corrosion-Resistant Coatings for Pipelines" and is consistent with GB/T 31405-2015. In comparison, aside from structural adjustments and editorial changes, the main technical changes are as follows:

- a) The scope has been changed (see Chapter 1, Chapter 1 of the.2015 edition);
- b) The method overview (see Chapter 3 of the.2015 edition) has been removed;
- c) Added terms and definitions (see Chapter 3);
- d) The principle has been added (see Chapter 4);
- e) Reagents and materials have been changed (see Chapter 5, Chapter 5 of the.2015 edition);
- f) The experimental setup was modified (see Chapter 6, Chapter 4 of the.2015 edition);
- g) The test specimen was modified (see Chapter 7, Chapter 6 in the.2015 edition);
- h) The experimental procedures have been changed (see Chapter 8, Chapter 7 of the.2015 edition);
- i) Added experimental results and data processing (see Chapter 9);
- j) The report has been amended (see Chapter 10, Chapter 8 of the.2015 edition);

k) Precision and bias have been removed (see Chapter 9 of the 2015 edition). 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 Petroleum and Chemical Industry Federation. This document is under the jurisdiction of the National Technical Committee on Corrosion Control Standardization (SAC/TC381). This document was drafted by: North China Electric Power Research Institute Co., Ltd., Zhejiang Gangxin Testing Technology Co., Ltd., and CNNC Nuclear Power Operation. Management Co., Ltd., Zhejiang Yuxi Corrosion Control Co., Ltd., Langfang Aigema Xinli Materials Technology Co., Ltd., Ningbo Institute of Technology, Chinese Academy of Sciences Institute of Materials Technology and Engineering, Changyuan Changtong New Materials Co., Ltd., Suzhou Thermal Power Research Institute Co., Ltd., China National Petroleum Corporation Southwest Oil and Gas Field Branch Safety, Environmental Protection and Technical Supervision Research Institute of [Company Name], Hunan Anguang Inspection and Testing Co., Ltd., Qingdao Shangyu Environment Technology Co., Ltd., Jiangsu Yihao Plastics Industry Co., Ltd., Hengyang Steel Pipe Keying Co., Ltd., Jiangsu Yulong Steel Pipe Technology Co., Ltd., China Railway 22nd Bureau Group Electrification Engineering Co., Ltd., China Corrosion International Corrosion Control Engineering Technology Research Institute (Beijing) Co., Ltd., Langfang Baichuan Wisdom Energy Technology Development Co., Ltd., Guanghan Huaqi Anticorrosion Engineering Co., Ltd., Hubei Keying New Material Technology Co., Ltd., Guangdong Special Equipment Maoming Testing Institute, China Corrosion Control Technology Association. The main drafters of this document are: Wang Xijun, Zhang Wei, Wang Guangyong, Wu Huacheng, Huang Jinguang, Wang Liping, Cui Zhigang, Zhao Wanxiang, Feng Shaoguang, and Li Jie. Wang Shuiyong, Xu Huanhui, Shu Ziqian, Li Jing, Zhang Peng, Ge Jie, Kong Quanxing, Tan Nanshu, Liu Shuan, Luo Zhongjiang, Yao Yuansheng, Chen Wenkui, Gao Jian, Zhang Tongsong, Wang Kai, Zhang Lihui, Wang Guiming, Xing Jun, Ren Zhifeng, Xu Keyu, Yang Jiahong, Wen Guosong, Guo Xiaoping, Qi Hongyang, Wang Long, Wang Wanyu, Liu Xuan. This document was first published in 2015, and this is its first revision. High-Temperature Cathodic Disbondment Test Method for Pipeline Corrosion Protection Coating

1 Scope

GB/T 31405-2025 is the Chinese national standard covering the hot cathodic disbondment test - a holiday drilled in the coating, the specimen polarised in electrolyte and held at temperature, and the radius of disbondment measured afterwards, which is the single most telling number about a buried coating. It replaces GB/T 31405-2015. It was issued on 2 December 2025 and has been in force since 1 July 2026, replacing GB/T 31405-2015. The document is under the responsibility of the China Petroleum and Chemical Industry Federation. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it

contains are those of the document itself, delivered in full with the English translation.

This document specifies the principle, test medium, test equipment, test specimens, test procedures, and test parameters for the high-temperature cathodic disbondment test of pipeline anti-corrosion coatings. Test results, data processing, and test reports. This document applies to the testing of the high-temperature cathodic disbondment resistance of the anti-corrosion coating of buried pipelines with cathodic protection and operating temperatures above 25°C.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 1266 Sodium Chloride Chemical Reagent

GB/T 6682 Specifications and test methods for water used in analytical laboratories

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Reference electrode An electrode with a stable, reproducible potential, used as a reference when measuring the potential of other electrodes. [Source: GB/T 33373-2016, 3.12]

3.2 auxiliary electrode When an external power source provides the applied protective current, the electrode is used to form a current-carrying circuit with the protected object. [Source: GB/T 33373-2016, 4.3.6, with modifications]

3.3 test temperature Temperature of the metal substrate during high-temperature cathode stripping tests on pipelines.

4.Principles In high-temperature environments, after cathodic protection is applied to anti-corrosion pipelines, cathodic current may occur at defects in the pipeline's anti-corrosion layer. The reduction reaction produces gases and OH⁻ ions, which peel off the anti-corrosion layer. By artificially creating defects in the pipeline's anti-corrosion layer, the corrosion can be simulated. Under high-temperature conditions and cathodic protection, a constant potential is applied to the pipeline for a specified time, causing a reduction reaction at the defect site, producing... Gases such as OH⁻ are used to peel off the anti-corrosion layer. After the test, eight evenly spaced radial scratches are made outward from the edge of the test hole to remove the anti-corrosion layer. Cut the line, pry off the anti-corrosion layer with a blade, measure the peeling area along the edge of the defect,

calculate the average radius, and characterize the cathodic stripping degree of the pipeline anti-corrosion layer.

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