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**Energy consumption testing and calculation for chemical
absorption CO₂ capture systems in thermal power plants**

火力发电厂烟气二氧化碳捕集系统能耗测定技术规范

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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 for standardization documents" Drafting. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the China Electricity Council. This document was drafted by: China Energy Group New Energy Technology Research Institute Co., Ltd., China Guodian Power Development Co., Ltd., China Energy Jiangsu Electric Power Co., Ltd. of China Energy Group, China National Institute of Standardization, China Agenda

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1 Scope

China's national standard for testing and calculating the energy consumption of chemical absorption carbon dioxide capture systems at thermal power plants. Post-combustion capture with an amine solvent is the only technology that can be retrofitted to the existing coal fleet, and its whole economics reduce to one number: the energy it takes to regenerate the solvent. Stripping the CO₂ back out of the amine requires steam, and that steam is taken from the turbine, so capture costs the plant a substantial fraction of its output - historically a quarter or more, which is why the technology has advanced slowly. Every process improvement is measured against that figure, and every claim about a new solvent is a claim about it. So the measurement has to be defined precisely enough that claims can be compared. The standard specifies technical requirements, test items, test requirements and methods, calculation methods and reporting, and may be referenced for adsorption and membrane systems.

This document specifies the technical requirements, test items, test requirements, test Methods, calculation methods and test reports describe the verification approach. This document is applicable to the testing and calculation of energy consumption of flue gas chemical absorption carbon dioxide capture system in thermal power plants. The flue gas adsorption method, gas membrane separation method and other industries' flue gas carbon dioxide capture systems shall be implemented for reference.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the latest version (including all amendments) applies to this document. document.

GB/T 8170 Rules for rounding off values and expression and determination of limit values

GB/T 16157-1996 Determination of particulate matter in exhaust gas from stationary sources and sampling methods for gaseous pollutants

GB/T 34060-2017 Steam heat calculation method

GB/T 51316-2018 Flue gas carbon dioxide capture and purification engineering design standard GB J63-1990 Design specification for electrical measuring instruments for power installations DL/T 2376 Technical specification for continuous monitoring of flue gas carbon dioxide emissions from thermal power plants DL/T 5240 Technical specification for design

calculation of combustion system of thermal power plant

HJ870-2017 Determination of carbon dioxide in waste gas from stationary pollution sources
- Non-dispersive infrared absorption method

HJ1240-2021 Determination of gaseous pollutants (SO₂, NO, NO₂, CO, CO₂) in exhaust gas from stationary pollution sources Portable Fourier Transform Infrared Spectroscopy

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 CO₂ capture The process of separating carbon dioxide from the atmosphere, industry or energy facilities to produce high-concentration carbon dioxide that can be easily transported, stored or used.

3.2 CO₂sorbent Solutions that absorb carbon dioxide.

3.3 The chemical absorbent reacts chemically with the carbon dioxide in the flue gas in the absorption tower to generate compounds, which are then released in the regeneration tower after being heated. The absorbed carbon dioxide is released to complete the method of separating carbon dioxide from other gases. [Source: GB/T 51316-2018, 2.0.4]