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Coal — Determination of the thermal stability and thermal fragmentation

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National foreword

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 27, *Coal and coke*, Subcommittee SC 5, *Methods of analysis*.

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.

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Introduction

Coal gasification is an important technology for clean coal conversion, which involves many factors. The thermal stability of coal is one of the essential parameters for the gasification industry and its relevant coal trade.

The thermal stability of coal is a measure of how much a coal retains its original size under high-temperature reaction during the process of gasification or high-temperature combustion. The coal with a better thermal stability can be gasified or burnt in its original size without being broken, or while being only a little bit broken, during the process of gasification or combustion, while the coal with a poor thermal stability will be broken into smaller piece or into powder. When using a coal with poor thermal stability for the gasification or combustion, the materials being taken from the furnace will increase, causing the resistance to increase, which in turn, affects the gasification or combustion and decreases the efficiency of the gasification. So, the thermal stability of coal is a very important property highly concerned by the gasification or combustion industry of utilizing the sized coal for gasification or combustion.

The opposite property of thermal stability of coal is the thermal fragmentation. Thermal fragmentation has a highly significant negative linear correlation with thermal stability.

This document is based on GB/T1573 and on an alternative laboratory method to determine thermal fragmentation of coal sources during pyrolysis in the gasification process given in Reference [3] including two parameters of thermal stability (TS_{+6}) and thermal fragmentation (TF), both of which can be used for guiding the coal gasification of fixed bed.

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TECHNICAL SPECIFICATION **ISO/TS 4667:2022**

Coal — Determination of the thermal stability and thermal fragmentation

1 Scope

This document specifies methods for the determination of thermal stability and thermal fragmentation of coal. It is applicable to brown coal and lignites, anthracites and bituminous coal with a caking index of zero (determined by ISO 15585).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1213-2, *Solid mineral fuels — Vocabulary — Part 2: Terms relating to sampling, testing and analysis*

ISO 18283, *Coal and coke — Manual sampling*

ISO 13909-4, *Hard coal and coke — Mechanical sampling — Part 4: Coal — Preparation of test samples*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1213-2 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
thermal stability
TS_{+6}
dimensional stability of a solid mineral fuel heated under specified conditions

[SOURCE: ISO 1213-2:2016, 3.227]

3.2
thermal fragmentation
TF
dimensional fragmentation of coal heated under specified conditions

3.3
Ergun index
Sauter mean diameter
SMD
diameter of a sphere that has the same volume/surface area ratio as a particle of interest

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