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GB/T 5751-2009

Replacing GB 5751-1996

Chinese Classification of Coals

中国煤炭分类

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Foreword

This Standard replaces GB 5751-1986 “Classification of Chinese Coals”.

Compared with GB 5751-1986, this Standard has the following changes:

- The property of the standard was changed from recommendatory to mandatory;
- The compiling format and writing form of symbol and reference were modified in accordance with the requirements of GB/T 1.1 and GB/T 3715;
- Chapters and sections of this Standard are rearranged; sorting parameter AND its expression and determination method were put into one chapter (namely, 4.3.1);
- Description of the term "coal" and its definition were added (Chapter 3);
- 4.1 was added to demonstrate nature and purpose of this classification system;
- 4.2 “Requirements of Coal Samples for Coal Classification” was added.

This Standard was proposed by the China National Coal Association.

This Standard shall be under the jurisdiction of National Technical Committee on Coal Chemical Industry of Standardization Administration of China.

Drafting organizations of this Standard: Beijing Research Institute of Coal Chemistry, CCRI, Sinosteel Anshan Research Institute of Thermo-Energy Co., Ltd. AND Xi'an Research Institute, CCRI.

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The previous edition replaced by this Standard is:

- GB 5751-1986.

Classification of Chinese Coals

1 Scope

This Standard specifies classification system of Chinese coals based on application.

This Standard is applicable to the coals explored, produced, processed, utilized and sold within the territory of the People's Republic of China.

2 Normative References

The following referenced documents are indispensable for the application of this Standard. For the dated references, the subsequent amendments (excluding corrigendum) or revisions of these publications do not apply. However, all parties who enter into an agreement according to this Standard are encouraged to study whether the latest edition of these documents applies. For the dated normative references, the latest edition of the document referred to apply.

GB/T 212 Proximate Analysis of Coal (GB/T 212-2008, ISO 11722:1999, Solid mineral fuels-Hard coal - Determination of moisture in the general analysis test sample by drying in nitrogen, ISO 1171:1997, Solid mineral fuels - Determination of ash, ISO 562:1998, Hard coal and coke - Determination of volatile matter, NEQ)

GB/T 213 Determination of Calorific Value of Coal (GB/T 213-2008, ISO 1928:1995, Solid mineral fuels - Determination of gross calorific value by the bomb calorimetric method and calculation of net calorific value, MOD)

GB 474 Method for Preparation of Coal Sample (GB 474-2008, ISO 18283:2006, Hard coal and coke - Manual sampling, MOD)

GB 475 Method for Manual Sampling of Commercial Coal (GB 475-2008, ISO 18283:2006, Hard Coal and Coke - Manual Sampling, MOD)

GB/T 476 Determination of Carbon and Hydrogen in Coal (GB/T 476-2008, ISO 625 Solid mineral fuels - Determination of carbon and hydrogen-Liebig method, MOD)

GB/T 479 Determination of Plastometric Indices of Bituminous Coal

GB/T 482 Sampling of Coal Seams

GB/T 2566 Determination of Transmittance for Low Rank Coal

GB/T 4632 Determination of Moisture-holding Capacity of Coal (GB/T 4632-2008, ISO 1018:1975, Hard coal - Determination of moisture-holding capacity, MOD)

GB/T 5447 Determination of Caking Index for Bituminous Coal

GB/T 5450 Audibert-Arnu Dilatometer Test of Bituminous coal (GB/T 5450-1997, eqv ISO 349:1989)

GB/T 19494.1 Mechanical Sampling of Coal - Part 1: Method for Sampling (GB/T 19494.1-2004, ISO 13909-1:2001 Hard coal and coke - Mechanical sampling - Part 1: General introduction, ISO 13909-2:2001 Hard coal and coke - Mechanical sampling - Part 2: Coal - Sampling from moving streams, ISO 13909-3:2001 Hard coal and coke - Mechanical sampling - Part 3: Coal-Sampling from stationary lots, NEQ)

GB/T 19494.2 Mechanical Sampling of Coal - Part 2: Method for Sample Preparation (GB/T 19494.2-2004, ISO 13909-1:2001 Hard coal and coke - Mechanical sampling - Part 1: General introduction, ISO 13909-4:2001 Hard coal and coke - Mechanical sampling - Part 4: Coal - Preparation of test samples, NEQ)

MT/T 998 Method of Sampling Run-of-mine Coal

Regulation on Coal sampling for Coal Resources Exploration (issued by former Ministry of Coal Industry in 1979)

3 Terms and Definitions

The following terms and definitions are applicable to this Standard.

Coal

It refers to the combustible solid organic sedimentary rock that is transformed from plant remains through coalification and is rich in carbon, which contains a certain amount of mineral substance; its corresponding ash content is less than or equal to 50% (dry mass fraction).

Note 1: In general geological coalification progress, when total moisture drops to 75% (mass fraction), peat becomes coal; however, in normal coalification progress, the upper limit of the transformation from non-interfering coal seam to half graphite is set as average random reflectance of vitrinite R_{ran} = 6.0%, or, it is better that the average maximum reflectance of

4.2.4 Preparation for coal sample used for coal classification

Preparation for coal sample used for coal classification shall be in accordance with the requirements of GB 474 and GB/T 19494.2.

4.2.5 Ash content of coal samples for coal classification

4.2.5.1 Dry-basis ash content productivity rate of coal samples for coal classification shall be less than or equal to 10%. For coal samples with dry-basis ash content productivity rate that is greater than 10%, they shall be ash-reduced with heavy-liquid method and then reclassified before sorting parameters (4.3) are tested. The density of heavy-liquid should be able to let the coal samples to obtain the highest recovery rate, and make the ash content of coal samples to be between 5%~10% after ash reduction. Ash reduction methods can be chosen according to Appendix B of GB 474.

4.2.5.2 Raw coal with minimal ash content can be adopted for easy-muddy lignite with low degree of coalification.

4.3 Classification Parameters

4.3.1 There are two types of classification parameters – that is, the parameters used to represent coalification degree AND the parameters used to represent coal processing property:

a) Parameters used to represent coalification degree:

- Volatiles of dry ash-free basis: symbol is V_{daf}, expressed by mass fraction; its determination method is detailed in GB/T 212;

- Hydrogen content of dry ash-free basis: symbol is H_{daf}, expressed by mass fraction; its determination method is detailed in GB/T 476;

- Gross calorific value of moist ash-free basis: symbol is $Q_{gr, maf}$, the unit is MJ/kg; its determination method is detailed in GB/T 213;

- Light transmittance of low-rank coal: symbol is PM, expressed by percentage; its determination method is detailed in GB/T 2566.

b) Parameters used to present coal processing property:

- Cementation index of bituminous coal: symbol is $G_{R.I}$ (simplified as G); its determination method is detailed in GB/T 5447;

- Maximum thickness of gelatine layer of bituminous coal: symbol is Y, unit is millimetre (mm); its determination method is detailed in GB/T 479;

- Arnu-Audibert dilatometer of bituminous coal: symbol is b, expressed by percentage; its determination method is detailed in GB/T 5450.

4.3.2 Coal is divided into anthracite, bituminous coal and lignite according to coalification degree parameters (mainly of volatiles of dry ash-free basis).

Note: The division of lignite and bituminous coal takes light transmittance as main indicator and gross calorific value of moist ash-free basis as assistant indicator.

4.3.3 The division of anthracite's subclasses takes volatiles of dry ash-free basis and hydrogen content of dry ash-free basis as indicators. However, if the results of the two indicators are in conflict, hydrogen content of dry ash-free basis shall be taken as the indicator.

4.3.4 Classification of bituminous coal shall take coalification degree and processing property (mainly of cohesiveness) of bituminous coal into consideration at the same time. Bituminous coal's parameters of coalification degree take volatiles of dry ash-free basis as indicator; the parameters of bituminous coal's cohesiveness take caking index as main indicator and maximum thickness of gelatine layer (or Arnu-Audibert dilatometer) as assistant indicator. However, when the results of the two indicators are in conflict, maximum thickness of gelatine layer is adopted as indicator.

4.3.5 Classification of lignite's subclasses takes light transmittance as indicator.

5 Classification

5.1 Coal Classification and Code

In this classification system, at first, coal is divided into anthracite, bituminous coal and lignite according to indicators like volatiles of dry ash-free basis; then, bituminous coal is divided into meagre coal, meagre lean coal, lean coal, coke, fat coal, 1/3 coke, gas-fat coal, gas coal, 1/2 medium caking coal, weakly caking coal, non-caking coal and long flame coal according to indicators such as volatiles of dry ash-free basis and caking index. Various coal names can be code-designated as the following Chinese phonetic letters:

WY - Anthracite; YM - bituminous coal; HM - lignite.

PM - meagre coal; PS - meagre lean coal; SM - lean coal; JM - coke; FM - fat coal; 3/1 JM - 1/3 coke; QF - gas - fat coal; QM - gas coal; 2/1 ZN - medium caking coal; RN - weakly caking coal; BN - non-caking coal; CY - long flame coal.

5.2 Coding

Various coals are expressed by Arabian numerals. Tens-digit is divided in accordance with the coal's volatiles, anthracite is 0 (V_{daf}≤10.0%), bituminous coal is 1~4 (namely, V_{daf}>10.0%~20.0%, >20.0%~28.0%, >28.0%~37.0% and >37.0%), lignite is 5 (V_{daf}>37.0%). For single-digit, anthracite is 1~3, representing degree of coalification;

Bibliography

[1] GB/T 6948 Method of determining microscopically the reflectance of vitrinite in coal (GB/T 6948-2008, ISO 7404-5:1994, Methods for the petrographic analysis of bituminous coal and anthracite - Part 5: Method of determining microscopically the reflectance of vitrinite, MOD)

[2] GB/T 15591 Judging method for reflectogram of commercial coal

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