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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

DL/T 681.1-2019

Replacing DL/T 681-2012

**Specification for wear-resistant parts of coal mill in coal-fired
power plants - Part 1: Ball grinding mill, grinding balls and liner**

燃煤电厂磨煤机耐磨件技术条件 第1部分：球磨机磨球和衬板

(English Translation)

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Foreword

This standard DL/T 681 "Technical Conditions for Wear Parts of Coal Mills in Coal-fired Power Plants" is divided into the following three parts.

--Part 1: Ball mill ball and liner;

--Part 2: Medium-speed grinding roller, sleeve grinding disc liner grinding ring and hollow grinding ball;

--Part 3: Fan grind impact plate guard hook and armor.

This part is part 1 of DL/T 681. ball mill ball and liner.

This part of this standard is in accordance with the rules given in GB/T 1.1-2009 "Guidelines for Standardization Part 1: Standard Structure and Compilation" Drafting.

This part of this standard replaces DL/T 681-2012 "Technical Conditions for Wear-resistant Parts of Coal-fired Power Plant Coal Mills", compared with DL/T 681-2012, the main

technical content changes are as follows.

--Keep the original serial number DL/T 681 of the independent power industry standard unchanged, and the general name in the "Technical Conditions for Wear Parts of Coal-fired Power Plants" it is referred to as Part 1 of DL/T 681.

--Modified and added some terms and definitions.

-Increased the small diameter specifications of 20mm and 25mm grinding balls and diameter tolerances.

--Added ZQCr26Mn2W, ZQCr18Mn2W, ZQCr12Mn2W cast grinding balls, and added D(Z)Q60CrMn Brand forging (rolling) grinding balls.

--Added ZGM40Mn2SiCrMo, ZGM50SiCrNiMo, ZGM120Mn13VTi and ZGM120Mn18Cr2 grades Liner.

-Increased the weight tolerance and shape tolerance requirements.

-Adjusted the chemical composition and mechanical properties of some cast grinding balls, forging (rolling) grinding balls and liners.

--Updated the wear-resistant cast steel grade ZGM.

--Added some notes.

--Some paragraphs have been edited.

--- Added appendix A (normative appendix) the determination and calculation method of grinding ball crushing rate.

--- Added appendix B (normative appendix) impact fatigue life test method and requirements of grinding ball falling ball method.

--- Added appendix C (normative appendix) ball loss calculation method for grinding balls.

--- Added appendix D (normative appendix) the calculation method of out-of-round rate of the grinding ball.

--- Added appendix F (informative appendix) approximate conversion relationship table between Brinell hardness and Rockwell hardness value.

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the Power Station Metal Materials Standardization Technical Committee.

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1 Scope

This part of DL/T 681 specifies the technical requirements, test methods, inspection rules and marking, packaging, and packaging of wear parts for ball mills in coal-fired power plants.

Storage and transportation.

This section applies to ball mill balls and liners of coal-fired power plants; other wear-resistant parts of similar working conditions can be used as reference.

2 Normative references

The following documents are essential for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 223.4 Determination of manganese content in iron, steel and alloy by potentiometric titration or visual titration GB/T 223.5 Determination of acid-soluble silicon and total silicon content of steel GB/T 223.11 Determination of chromium content in steel and alloy by visual titration or potentiometric titration (GB/T 223.11-2008, ISO 4937:1986, MOD) GB/T 223.18 Methods for chemical analysis of iron, steel and alloy-The sodium thiosulfate separation-iodometric method for the determination of copper content GB/T 223.23 Iron, steel and alloy-Determination of nickel content-Dimethylglyoxime spectrophotometric method GB/T 223.25 Methods for chemical analysis of iron, steel and alloy-The dimethylglyoxime gravimetric method for the determination of nickel content GB/T 223.26 Steel and alloy determination of molybdenum content-Thiocyanate spectrophotometric method GB/T 223.43 Determination of tungsten content in iron, steel and alloy by

gravimetric method and spectrophotometric method GB/T 223.59 Steel and alloy determination of phosphorus content-Bismuth phosphomolybdenum blue spectrophotometric method and antimony phosphomolybdenum blue spectrophotometric method GB/T 223.60 Methods for chemical analysis of iron, steel and alloy-The perchloric acid dehydration gravimetric method for the determination of silicon content GB/T 223.63 Methods for chemical analysis of iron, steel and alloy. The sodium (potassium) periodate photometric method for the determination of manganese content GB/T 223.64 Determination of manganese content in iron, steel and alloy by flame atomic absorption spectrometry GB/T 223.67 Steel and alloy determination of sulfur content-Methylene blue spectrophotometric method (GB/T 223.67-2008, ISO 10701.

1994, IDT)

GB/T 223.68 Methods for chemical analysis of iron, steel and alloy, the determination of sulfur content by potassium iodate titration after combustion in a tube furnace GB/T 223.69 Steel and alloy carbon content determination after combustion in tube furnace gas volume method GB/T 223.71 Methods for chemical analysis of iron, steel and alloy, the determination of carbon content by gravimetric method after combustion in a tube furnace GB/T 223.72 Determination of Sulfur Content in Steel and Alloy by Gravimetric Method GB/T 228.1 Tensile test of metallic materials Part 1: Room temperature test method (GB/T 228.1-2010, ISO 6892-1.

2009, MOD)

GB/T 229 Charpy Pendulum Impact Test Method for Metallic Materials (GB/T 229-2007, ISO 148-1:2006, MOD) GB/T 230.1 Rockwell hardness test of metallic materials Part 1: Test method (A, B, C, D, E, F, G, H, K, N, T scale) (GB/T 230.1-2009, ISO 6508-1:2005, MOD) GB/T 230.2 Rockwell hardness test of metallic materials Part 2: Hardness tester (A, B, C, D, E, F, G, H, K, N, T scale) inspection and calibration GB/T 230.3 Rockwell hardness test of metallic materials Part 3: Standard hardness blocks (A, B, C, D, E, F, G, H, K, N, T scale) calibration GB/T 231.1 Brinell hardness test of metallic materials Part 1: Test method (GB/T 231.1-2009, ISO 6506-1.

2005, MOD)

GB/T 1184 shape and position tolerance without tolerance value GB/T 2828.1 Sampling inspection procedure by attributes Part 1: Batch inspection sampling plan retrieved by acceptance quality limit (AQL) (GB/T 2828.1-2003, ISO 2859-1:1999, IDT) GB/T 4336 Carbon steel and low alloy steel spark source atomic emission spectrometry method (conventional method) GB/T 5611 Casting terminology GB/T 5677 Radiographic testing of steel castings (GB/T 5677-2007, ISO 4993:1987, IDT) GB/T 5680 Austenitic manganese steel castings (GB/T 5680-2010, ISO 13521:1999, MOD) GB/T 6060.1 Surface roughness comparison sample casting surface GB/T 6402 Steel Forgings Ultrasonic Testing Method (GB/T 6402-2008, EN 10228-3:1998, EN 10228-4:1999, MOD) GB/T 6414 Casting