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safety regulations for the high-temperature metal lifti

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(English Translation)

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Foreword

All technical contents of this standard are mandatory.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by the Fourth Department of Supervision and Administration of the former State Administration of Work Safety.

This standard is under the jurisdiction of the Metallurgy and Non-ferrous Metals Safety Subcommittee of the National Technical Committee for Standardization of Work Safety (SAC/TC 288/SC 8).

Drafting organizations of this standard: Sinosteel Wuhan Safety & Environmental Protection Research Institute Co., Ltd., Hunan Valin Xiangtan Iron and Steel Co., Ltd., China Baowu Steel Group Co., Ltd., Shanxi Huaze Aluminum & Power Co., Ltd. and Inner Mongolia Erdos Electric Power & Metallurgy Group Co., Ltd.

1 Scope

This standard specifies the technical requirements and safety management requirements for safe production in the lifting and transporting of high-temperature molten metal in industrial enterprises.

This standard is applicable to the design, operation, maintenance and safety management of equipment and facilities for lifting and transporting high-temperature molten metal and

molten slag in metal smelting enterprises.

2 Normative references

The following documents are indispensable for the application 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.

GB/T 3811 Design rules for cranes

GB 4387 Safety regulations for railway and road transportation in industrial enterprises

GB/T 5082 Command signals for lifting operations

GB/T 5972 Cranes - Wire ropes - Care, maintenance, installation, examination and discard

GB/T 6067.1 Safety rules for lifting appliances - Part 1: General

GB/T 8918 Steel wire ropes for important purposes

GB/T 11352 Carbon steel castings for general engineering purposes

GB/T 12265.3 Safety of machinery - Minimum gaps to avoid crushing of parts of the human body

GB/T 23583.1 Steel ladles - Part 1: Types and basic parameters

GB/T 23583.2 Steel ladles - Part 2: Technical requirements

GB 25683 Safety requirements for steel ladles

GB/T 25714.1 Iron ladles - Part 1: Types and basic parameters

GB/T 25714.2 Iron ladles - Part 2: Technical requirements

GB 50034 Standard for lighting design of buildings

JB/T 2450 Slag pot cars - Types, basic parameters and dimensions

JB/T 3260 Types and basic parameters of LT series hot metal ladles

JB/T 5000 General technical specifications for heavy machinery

JB/T 7688.5 Technical specifications for metallurgical cranes - Ladle cranes

TSG Q0002 Supervision regulation on safety technology for lifting appliances - Overhead travelling cranes

YB/T 061 Technical specifications for metallurgical slag pots

YB/T 4175 Steel ladles for metallurgy

YB/T 4224 Technical specifications for steel ladle cars and hot metal ladle cars for metallurgy

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 high-temperature molten metal

Metal in a molten state, and its molten slag, produced in the production process of metal smelting enterprises.

3.2 metallurgy crane

Special crane for enterprises engaged in metal smelting, rolling, hot working, etc., including ladle cranes, charging box cranes, slab handling cranes, rake cranes, forging cranes and quenching cranes.

3.3 ladle crane

Crane for lifting and transporting molten metal and molten slag, having mechanisms for raising, lowering and tilting the molten metal tank (ladle).

3.4 molten metal tank

Container used by metal smelting enterprises to hold high-temperature molten metal, including hot metal tanks, molten steel tanks, slag tanks and tundishes of metallurgical enterprises, and containers for non-ferrous metals such as copper ladles and aluminium ladles of non-ferrous enterprises.

3.5 ladle

Specific assembly of devices used in the foundry production process to hold high-temperature molten metal such as molten iron, molten steel or molten copper and to complete pouring operations.

4 Safety management

4.1

Metal smelting enterprises shall establish and improve safety management rules and safe operating procedures for the lifting and transporting of high-temperature molten metal, and shall strictly implement them. Special safety education and training shall be given to the managers, post operators and inspection and maintenance personnel engaged in lifting and transporting high-temperature molten metal. Operators of special equipment shall obtain the corresponding qualification certificates in accordance with the relevant regulations.

4.2

Metal smelting enterprises shall regularly inspect and examine the workshops in which high-temperature molten metal is lifted and transported. When technical transformation is carried out in molten metal lifting areas, the safety requirements for lifting and transporting high-temperature molten metal shall be met, and the running passages and spaces of cranes, lifted loads, etc. shall not be occupied.

4.3

The lifting and transporting of high-temperature molten metal shall meet the safety requirements of GB/T 3811, GB/T 6067.1, TSG Q0002, JB/T 7688.5 and GB 4387.

4.4

When a crane is modified, if the rated lifting capacity of the crane is increased and its work duty classification is raised, the load-bearing capacity of the crane runway girders, columns, foundations, etc. shall be checked, and reinforcement measures shall be taken when necessary.

4.5

Cranes lifting and transporting high-temperature molten metal shall be subject to a strict spot inspection system and management records. The spot inspection system shall include post spot inspection and professional periodic spot inspection, to ensure that all mechanisms operate well and that the audible and light signals and all safety protection devices function properly. The key inspection points are wire ropes, clamping plate bolts, drums, sheaves, hook crossbeams, pins and pressure plates, wire rope equalizer arms, double brakes, position limiters, overload limiters, couplings, and the mechanical and electrical limit positions of all mechanisms. Faults and hidden hazards found in inspection shall be rectified and recorded in time.

4.6

Lifting machinery shall be periodically tested and inspected in accordance with GB/T 6067.1 and the relevant regulations on the safety supervision and administration of special equipment. Lifting attachment components such as hooks, plate hooks and crossbeams shall be subjected to off-line flaw detection at least once a year; hooks, plate hooks, etc. shall be replaced in cases such as severe wear or separation of the hook plates, and the shafts of the plate hooks and crossbeams shall be subjected to flaw detection; metallographic examination shall be carried out when necessary to prevent creep.

4.7

The lifting and transporting of high-temperature molten metal must use special tanks meeting the requirements of GB 25683, GB/T 23583.1, GB/T 23583.2, GB/T 25714.1, GB/T 25714.2, JB/T 3260, YB/T 061, YB/T 4175, etc.; molten steel tank cars, hot metal tank cars and slag tank cars for metallurgical use shall meet the requirements of YB/T 4224 and JB/T