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

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**Foundry machinery - Investment casting and lost foam casting
equipment - Safety technical specifications**

铸造机械 熔模和消失模铸造设备 安全技术规范

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Foreword

This document complies with the provisions of GB/T 1:1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting: Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents: This document is proposed by China Machinery Industry Federation: This document is under the jurisdiction of the National Foundry Machinery Standardization Technical Committee (SAC/TC186): This document was drafted by: Jinan Casting and Forging Institute Inspection and Testing Technology Co., Ltd., Qingdao Kaijie Heavy Industry Machinery Co., Ltd., China Automobile Industry Engineering Co., Ltd., Nan'an China Machinery Standardization Research Institute Co., Ltd., Xiamen CIMC Xinzhi Testing Equipment Co., Ltd., Qingdao Zhongzhida Environmental Protection Smelting Equipment Co., Ltd., Shanxi Huaen Industrial Co., Ltd., Shanghai Wanze Precision Casting Co., Ltd., Fujian Minxuan Technology Co., Ltd: Division, Dongguan New Pivot Technology Service Co., Ltd., Qingdao Qingli Environmental Protection Equipment Co., Ltd., Qingdao Huihong Liangtai Intelligent Equipment Co., Ltd., Qingdao Antai Heavy Industry Machinery Co., Ltd., Shandong Jiechuang Machinery Co., Ltd., Jiangyin Casting Equipment Factory Co., Ltd., Weihai Gongyou Casting Machinery Co., Ltd., Qinhuangdao Zhuyeda Machinery Equipment Development Co., Ltd., Anhui Anhuang Machinery Co., Ltd., Qingdao Sanrui Machinery Manufacturing Co., Ltd: Company, Sichuan Zhonganke Safety Technology Co., Ltd: The main drafters of this document: Sun Shanshan, Li Chen, Cui Lixia, Su Ligu, Chen Jian, Ke Zhenzhen, Xiang Yang, Duan Jinting, Zhang Guohua, Chen Bowen, Li Song, Chen Huiling, Li Yi, Ma Minghui, Chen Liang, Ding Renxiang, Zhao Hengtao, Xia Xinhai, Chi Yingjie, Liu Zhongkui, Huang Changwen, Wu Guangxin, Qin Peiyun:

According to the national requirements for the integration and streamlining of mandatory standards, this document is a recommended standard and serves as a supporting standard for GB 20905: According to the classification of GB/T 15706-2012, this document belongs to Class C standard: This document is of particular relevance to the following stakeholders concerned with the safety of the machinery covered by this document:

---Machine manufacturer;

---Health and Safety Agencies: Other stakeholders affected by the safety level of machinery are:

---Machine users;

---Machine owner;

---Service providers: All the above-mentioned stakeholders may participate in the drafting of this document: The machines covered by this document and the range of hazards, hazardous states or hazardous events covered are given within the scope of this document: When the requirements in this document are different from those in Class A standards or Class B standards, for machines that have been designed and manufactured in accordance with this document, For devices, the requirements in this document take precedence over those in other standards: Casting machinery investment and lost foam casting equipment Safety technical specifications

1 Scope

China's national safety specifications for investment casting and lost foam casting equipment. The two processes are grouped because they share a hazard profile that differs from sand casting. Investment casting builds a ceramic shell around a wax pattern, then removes the wax by steam autoclave or flash firing and fires the shell - so the plant contains pressurised steam, molten wax, and furnaces, and the shell is filled with metal at temperatures above those of most foundry work. Lost foam replaces the pattern with expanded polystyrene left in the mould, which the incoming metal vaporises - producing a large volume of hot decomposition products that must be extracted, and a hazard if they are not. Both processes also involve handling shells and moulds that are fragile and hot. The specifications address each of those, and the extraction requirements are the ones most often found inadequate in practice.

This document specifies the safety requirements and/or risk reduction measures and usage information for investment and lost foam casting equipment, and describes the corresponding testing Proof method: This document lists the requirements for use of investment and lost foam casting equipment when used as intended and under conditions of misuse reasonably foreseeable by the manufacturer: When used, the major hazards associated with this type of equipment, and examples of hazardous states or hazardous events (see Appendix A): This document applies to the design, manufacture and acceptance of investment casting equipment and lost foam casting equipment:

Note 1: Investment casting equipment includes:

---Molding equipment: wax processing device (wax melting furnace, wax stirrer or continuous wax preparation line, static barrel), pneumatic wax press, pneumatic piston wax

press machine, hydraulic piston wax pressing machine, electric cylinder wax pressing machine;

---Shell making equipment: tree assembly line, slurry dipping machine, rain shower sand machine, boiling floating sand machine, sand throwing sand spreader, continuous shell making line robot shell making unit Yuan, constant temperature and humidity drying room;

---Dewaxing and roasting equipment: dewaxing kettle (electric heating and steam type), dewaxing line, roasting furnace (gas furnace or resistance furnace), core removal unit (including core removal kettle):

Note 2: Lost foam casting equipment includes:

---Molding equipment: intermittent pre-foaming machine (including fluidized bed), curing warehouse, molding machine, pattern processing machine (electric heating, cutting, engraving), pattern bonding sheet Yuan (including pattern bonding machine), bead conveying system;

---Coating preparation equipment: coating mixer (high speed/low speed), dip coating equipment, drying room;

---Lost foam molding line: vibration table, sand box (vacuum sand box), rain sand adding device, falling sand system (turning over the box, bottom unloading sand), vacuum system, sand box conveying system: This document does not apply to investment and lost foam casting equipment manufactured prior to the implementation of this document:

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document: GB/T 150:

4 Pressure vessels Part 4: Manufacturing, inspection and acceptance GB 2893 safety color GB 2894 Safety signs and guidelines for their use

GB/T 3766 General rules and safety requirements for hydraulic transmission systems and their components GB/T 3836:

15 Explosive atmospheres Part 15: Design, selection and installation of electrical installations

GB/T 4208-2017 Shell protection level (IP code) GB/T 5226:

1 Mechanical and electrical safety mechanical and electrical equipment Part 1: General technical conditions

GB/T 7932 General rules and safety requirements for pneumatic systems and their components

GB/T 8196-2018 General requirements for the design and manufacture of fixed and movable guards for mechanical safety guards

GB/T 9969 General Principles of Instructions for Use of Industrial Products

GB/T 12265 Minimum spacing for mechanical safety to prevent extrusion of human body parts

GB/T 13379 Visual ergonomics principles for indoor workplace lighting