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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 32252-2024

Investment casting process - General technical guidelines

熔模铸造工艺 通用技术导则

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1.Structure and drafting rules for standardization documents" Drafting. This document replaces GB/T 32252-2015 "General Technical Guidelines for Investment Casting Process". Compared with GB/T 32252-2015, In addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) The scope of application has been changed (see Chapter 1, Chapter 1 of the.2015 edition);

b) The basic principles of process design have been changed (see Chapter 5, Chapter 4 of the.2015 edition);

c) The general technical requirements have been changed (see Chapter 6, Chapter 5 of the.2015 edition);

d) The process management requirements have been changed (see Chapter 7, Chapter 6 of the.2015 edition). Please note that some of the contents in this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the National Casting Standardization Technical Committee (SAC/TC54). This document was drafted by: China Machinery Engineering Institute Group Shenyang Foundry Research Institute Co., Ltd., Anhui Yingliu Hangyuan Power Technology Co., Ltd., Shanghai Wanze Precision Casting Co., Ltd., Jiashan Xinhai Precision Casting Co., Ltd., Suzhou Taier Aviation Materials Co., Ltd., Dongying Jiayang Precision Metal Co., Ltd., Zhejiang Suijin Special Casting Co., Ltd., Ningbo Baisai Power Technology Co., Ltd., Jinhua Feiben Metal Products Co., Ltd. Co., Ltd., Zhejiang Bodong Industry and Trade Co., Ltd., Guangdong Hunter Valley Precision Casting Technology Co., Ltd., Guizhou Anji Aviation Precision Casting Co., Ltd., Harbin Xinrun Industrial Co., Ltd., Jiangxi Bolifu Industry and Trade Co., Ltd., Shanghai Jiaotong

University, Tsinghua University, Jiangsu Zhongchao Aerospace Precision Casting Co., Ltd. Technology Co., Ltd., Xiangyang Jinnaite Machinery Co., Ltd., Changge Yida Zhongxin Machinery Manufacturing Co., Ltd., Wenzhou Wanhong Valve Co., Ltd. Shanghai Aerospace Precision Machinery Research Institute, Shanghai Liantai Technology Co., Ltd., Wenzhou Xinsen Special Steel Co., Ltd., Shanghai Youlian Intelligent Manufacturing Technology Technology Co., Ltd., Beijing Research Institute of Aeronautical Materials Co., Ltd., China Aerospace South Industries Co., Ltd., Guiyang Aerospace Precision Casting Co., Ltd. Company, Chongqing Xincheng Hangrui Technology Co., Ltd., and Qiangxin Machinery Technology (Laizhou) Co., Ltd. The main drafters of this document are. Xie Huasheng, Shi Kun, Wang Donghong, Lu Min, Du Yingliu, Li Yi, Duan Jidong, Wang Guoxiang, Na Yue, Wang Baobing, Xu Qingyan, Jiang Miao, Wang Zheng, Liu Tianyi, Luo Hongneng, Zhang Jianxiong, Li Shaochu, Hao Dawei, Wang Yifeng, Wu Guangpeng, Shuai Dejun, Xu Hongli, Cheng Lan, Lv Wei, Yu Qingxiao, Ge Liping, Gao Yalong, Chi Liangong, Wang Peihua, Hao Xin, Zheng Xianghua, Ji Keli, Mao Qunying, Yang Sujun, Zhang Yanbo, Xiao Guiyu, Luo Jianquan, Cao Jian, Wang Xingfang, Wu Hanchang, Qi Yubin, Feng Gangwen, Luo Xiaoxiao. This document was first published in.2015 and this is the first revision. General technical guidelines for investment casting process

1 Scope

China's national general technical guidelines for the investment casting process, and the current edition of GB/T 32252, replacing the 2015 edition. It sets out the basic principles of process design, the general technical requirements and the process management requirements for investment casting. Investment casting is the lost wax process: a wax pattern of the part is made in a die, assembled with others onto a runner system, dipped repeatedly in ceramic slurry and stucco to build a shell around it, dewaxed so that the wax runs out, fired, and filled with metal. The shell is then broken away and the castings cut from the runner. It is the only casting process that produces complex shapes to close tolerance with a good surface directly from the mould, which is why it makes turbine blades, aerospace structural parts, surgical instruments, valve bodies and firearm components - parts that would otherwise be machined from solid at many times the cost. It is also the most process-dependent of the casting routes. Every stage compounds the errors of the one before: the die makes the wax, the wax makes the shell, and the shell makes the casting, so a dimensional error at the pattern stage arrives in the casting multiplied by three shrinkages. Nothing about the process can be corrected downstream, and the shell is destroyed on removal so there is no reusable mould to adjust. That is why a general guideline is written for the process rather than product standards being left to specify it, and why the 2024 revision reworks the basic principles of process design, the general technical requirements and the process management requirements together. Issued on 15 March 2024 and in force since 1 October 2024.

This document specifies the overall objectives, basic principles, general technical

requirements and process management requirements for investment casting process design. This document is applicable to investment casting process design and process management.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 5611 Casting Terminology

3 Terms and definitions

The terms and definitions defined in GB/T 5611 apply to this document.

4 Overall objectives of process design

The overall goal of process design is to meet casting quality requirements, reduce manufacturing costs, increase productivity, and continuously improve processes and optimize structure, improve performance; on the basis of reducing the difficulty of casting process, reduce the consumption of raw and auxiliary materials and energy as much as possible; reduce the production process Pollution to the ecological environment and harm to human safety and health.

5 Basic principles of process design

5.1 Principle of applicability The process design should adopt advanced and practical new technologies, new materials, new processes and new equipment as much as possible to achieve efficient, low-consumption, clean and safe production the goal of.

5.2 Principle of Efficiency It is advisable to gradually eliminate inefficient process technologies and production equipment, use advanced process technologies and equipment, adopt new materials, and promote digital ization, informatization, intelligentization and other technologies, strengthen the integration with new technologies and processes such as additive manufacturing, and improve the process output rate and product qualification rate.

5.3 Low consumption principle

5.3.1 The casting process should be reasonably designed to minimize the energy consumption, material consumption and labor cost of castings while meeting the quality

requirements of castings.

5.3.2 Improve resource utilization, promote recycling technology, and reduce resource consumption per unit product (including raw materials, auxiliary materials, etc.) materials, water, electricity, etc.).

5.3.3 Additive manufacturing technology should be used to prepare wax patterns, shells and cores in order to shorten the production cycle.