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Additive manufacturing - Materials - Mould steel powders

增材制造 材料 模具钢粉

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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: Please note that some of the contents of this document may involve patents: The issuing organization of this document does not assume the responsibility for identifying patents: This document was proposed by the China Iron and Steel Association: This document was jointly issued by the National Technical Committee on Steel Standardization (SAC/TC183) and the National Technical Committee on Additive Manufacturing Standardization (SAC/ TC562) are jointly managed: This document was drafted by: Xi'an Ouzhong Materials Technology Co:, Ltd:, China Iron and Steel Research Group Co:, Ltd:, Youyan Additive Technology Co:, Ltd: China Iron and Steel Research Institute Co:, Ltd:, Zhejiang Flashcast 3D Technology Co:, Ltd:, Jiangsu Wellari New Materials Technology Co:, Ltd:, Harbin Nengchuang Digital Technology Co:, Ltd:, Andron (Chongqing) Materials Technology Co:, Ltd:, Metallurgical Industry Information Standards Research Institute, China Machinery Research Institute Standard Technology Research Institute (Beijing) Co:, Ltd:, Xi'an National Institute of Additive Manufacturing Co:, Ltd:, Nanjing Normal University, Anhui Hart 3D Technology Co:, Ltd:, Hangzhou State Himalaya Information Technology Co:, Ltd: The main drafters of this document are: Li Shaoqiang, Zhang Shaoming, Hu Qiang, Zhu Zhen, Liang Jianxiong, Lai Yunjin, Qu Zonghong, Pei Wenjian, Jiang Baolin, Che Pengcheng, Tan Jianjun, Xue Sa, Lan Jian, Zhou Jian, Zhao Xinming, Wang Changjun, Qu Yuhui, Ying Hua, He Huaizhi, Pan Feifei, Li Haofeng, Tang Yueyue, Wang Lin, Xue Lian, Guo Wenhua, Yang Jiquan, Liu Tong, and Fan You: Additive Manufacturing Materials Mold Steel Powder

1 Scope

China's national standard for the mould steel powders used in additive manufacturing. Printing tool steel is one of the most economically compelling applications of the technology, for a reason specific to moulds: conformal cooling. A conventionally made injection mould is cooled by straight drilled channels, because that is what a drill produces, and they cannot follow the shape of the cavity - so the part cools unevenly, which lengthens the cycle and distorts the moulding. A printed mould can carry channels that follow the

surface at a constant distance, and the cycle time falls by a quarter or more while the part comes out straighter. Since cycle time is the entire economics of injection moulding, that pays for a printed insert quickly. The powders are the maraging and hot work steels adapted for the process, and their requirements turn on the sphericity, the size distribution and the oxygen content that determine whether the print is dense.

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 223:

9 Determination of aluminum content in steel and alloys - Chrome azurol S spectrophotometric method GB/T 223:

11 Determination of chromium content in steel and alloys Visual titration or potentiometric titration method GB/T 223:

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85 Determination of sulfur content in iron, steel and alloys - Infrared absorption method after combustion in an induction furnace GB/T 223:

86 Determination of total carbon content of steel and alloys - Infrared absorption method

after combustion in an induction furnace GB/T 1479:

GB/T 1480 Metal powder dry sieving method for particle size determination

GB/T 1482 Determination of metal powder fluidity - Standard funnel method (Hall flowmeter)

GB/T 5162 Determination of tap density of metal powders

GB/T 5314 Powder sampling method for powder metallurgy

GB/T 11261 Determination of oxygen content of iron and steel - Pulse heating inert gas fusion - infrared absorption method

GB/T 19077 Particle size analysis by laser diffraction method

GB/T 20124 Determination of nitrogen content in steel - Inert gas fusion thermal conductivity method (conventional method)

GB/T 35351 Terminology for Additive Manufacturing

GB/T 39251 Methods for characterizing properties of metal powders for additive manufacturing

GB/T 41978 Test method for hollow powder rate of metal powders for additive manufacturing YB/T 4396 Determination of multi-element content of stainless steel - Inductively coupled plasma atomic emission spectrometry

3 Terms and definitions

The terms and definitions defined in GB/T 5314 and GB/T 35351 apply to this document: