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Heavy machinery - Design requirements for castings

重型机械 铸件设计要求

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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 and coordinated by the National Metallurgical Equipment Standardization Technical Committee (SAC/TC409): This document was drafted by: China Heavy Machinery Research Institute Co., Ltd., First Heavy Machinery Group Dalian Engineering Technology Co., Ltd., Second Heavy Machinery (Deyang) Heavy Industry Equipment Co., Ltd., Northwestern Polytechnical University, Taiyuan Heavy Industry Co., Ltd., Jinan Heavy Industry Co., Ltd., Tianjin Heavy Equipment Engineering Research Institute RESEARCH LIMITED: The main drafters of this document: Wu Liang, Wang Xia, Ren Yucheng, Qiu Mingjun, Quan Xiaohui, Xu Nuo, Li Lei, Li Heng, Lu Qingliang, Ruan Donghui, Xiao Zhangyu, Xia Juan, Liu Yong, Huang Weiyong, Zhang Junming, Wei Xinhong, Li Yonghui, Sheng Aijun, Lin Ping, Yang Yun, Yu Pulian, Yao Lei, Wang Di, Lin Kai, Shi Gang, Li Xuemin, Sun Xinyi, Yan Ying: Heavy machinery casting design requirements

1 Scope

China's national design requirements for heavy machinery castings. The document addresses the designer rather than the foundry, and its premise is that most casting defects are designed in rather than caused at the melt. A casting solidifies from its surfaces inward, and metal must be able to feed the shrinkage as it does; a section that thickens where it cannot be fed will contain a shrinkage cavity however well the foundry works. So the design rules are about geometry: uniform sections where possible, tapers that direct solidification toward the feeders, generous fillets at junctions where hot spots form, and the avoidance of isolated heavy bosses in thin walls. For a casting weighing tens of tonnes these decisions are irreversible and expensive - a pattern is made once - which is why the requirements are

set out as a design standard rather than left to be discovered in the foundry's methoding review.

This document specifies the material selection, structural elements, general precautions and drawing requirements for the design of castings in heavy machinery: This document is applicable to steel castings and gray castings cast in heavy machinery using sand molds, metal molds or molds with thermal conductivity similar to sand molds and metal molds: Iron parts, ductile iron castings, malleable iron parts: Other mold castings can be used as reference:

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 1348 Ductile iron castings

GB/T 5611 Casting terminology

GB/T 5680 Austenitic manganese steel castings

GB/T 6414-2017 Casting dimensional tolerances, geometric tolerances and machining allowances

GB/T 6967 Medium and high strength stainless steel castings for engineering structures

GB/T 8492 Heat-resistant steel and alloy castings for general purposes

GB/T 9439 gray iron castings

GB/T 9440 Malleable iron castings

GB/T 11351 Casting weight tolerance

GB/T 11352 Cast carbon steel parts for general engineering use

GB/T 28617 General Technical Guidelines for Green Manufacturing Casting

GB/T 37400:4-2019 General technical conditions for heavy machinery Part 4: Cast iron parts

GB/T 37400:6-2019 General technical conditions for heavy machinery Part 6: Steel castings GB/T 37400:

3 Terms and definitions

The terms and definitions defined in GB/T 5611 apply to this document: 3:1

contraction;shrinkage The reduction in volume and size that occurs when a cast alloy solidifies from a liquid state and cools to room temperature:

Note: Including liquid shrinkage, solidification shrinkage and solid shrinkage: [Source: GB/T 5611-2017,5:1:17]

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