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Heavy machinery - Design requirements for forgings

重型机械 锻件设计要求

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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 is proposed and coordinated by the National Technical Committee for Standardization of Metallurgical Equipment (SAC/TC409). This document was drafted by: China Heavy Machinery Research Institute Co., Ltd., Erzhong (Deyang) Heavy Equipment Co., Ltd., Taiyuan Heavy Industry Co., Ltd. Co., Ltd., First Heavy Industries Dalian Engineering Technology Co., Ltd., Taiyuan Tongze Intelligent Engineering Co., Ltd., Northwestern Polytechnical University, Taier Heavy Industry Co., Ltd. Co., Ltd. The main drafters of this document are. Wu Liang, Qiu Mingjun, Zhong Xiaobing, Song Guowang, Wang Liansheng, Wang Xia, Qiu Lipeng, Quan Xiaohui, Zhang Libo, Zhang Yingjie, Yan Ying, Shao Jumin, Xia Juan, Liu Yong, Li Lei, Li Heng, Su Zhenhua, Xia Qinghua, Xu Wei, Wang Dapeng, Wang Di, Bai Xinghong, Li Xuemin, Zhao Huaguo, Chen Yuan, Gao Weijun, Zheng Yonghong, and Li Xueming. Design requirements for heavy machinery forgings

1 Scope

China's national design requirements for heavy machinery forgings. It completes the set alongside the casting and weldment design specifications, and like them it addresses the designer rather than the maker. The requirements follow from what forging is: metal is worked in the solid, so the grain flows and follows the shape it is worked into, and the

properties depend on that flow being right. A forging designed as though it were a machined billet - with the shape cut from an oversize block - throws that advantage away and can be worse than the alternative, because the machining cuts through the grain flow at exactly the surfaces that will be loaded. The rules are therefore about designing for the process: shapes that can be filled, sections that can be worked through, parting lines and draft that suit the die, and orientation such that the grain runs along the principal stress rather than across it.

This document specifies the classification, design principles, material selection, structural element design and technical content design of forgings in heavy machinery. This document applies to the design of hot-formed free-forging steel parts and die-forging steel parts for heavy machinery.

Note. To avoid confusion, free-forged steel parts and die-forged steel parts in this document are collectively referred to as "forgings".

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 321 Priority numbers and priority number systems

GB/T 1182 Geometrical Product Specifications (GPS) Geometric Tolerances - Shape, Orientation, Position and Runout Tolerances

GB/T 4458.4 Dimensioning Methods for Mechanical Drawings

GB/T 4458.5 Dimensional tolerances and fits in mechanical drawings

GB/T 8541 Forging Terminology

GB/T 16675.2 Simplified representation of technical drawings Part

3 Terms and Definitions

The terms and definitions defined in GB/T 8541 and NB/T 47008 and the following apply to this document.

3.1 forging Under the action of pressure equipment and tools (dies), the blank or ingot undergoes partial or complete plastic deformation to obtain a certain geometric size, Processing methods for forgings of varying shapes and quality. [Source: GB/T 8541-2012, 3.1.19]

3.2 open-die forging; free forging Only simple universal tools are used, or external force is applied directly to the steel blank between the upper and lower anvils of the forging equipment to cause the steel blank to deform. Forming to obtain the required geometry and internal quality of forgings. [Source: GB/T 8541-2012, 3.5.5, modified]

3.3 die forging A forging is a product obtained by plastically deforming a steel blank through die forging. [Source: GB/T 8541-2012, 3.5.7, modified]

8 Forgings

GB/T 37400.9 General technical requirements for heavy machinery Part

9. Cutting parts NB/T 47008 Carbon steel and alloy steel forgings for pressure equipment