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Heavy machinery - Design specification for weldments

重型机械 焊接件设计规范

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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 and coordinated by the National Metallurgical Equipment Standardization Technical Committee (SAC/TC409): This document was drafted by: China Heavy Machinery Research Institute Co., Ltd., Dalian Engineering Technology Co., Ltd. of First Heavy Industry Group, Taiyuan Heavy Industry Co., Ltd. Co., Ltd., Erzong (Deyang) Heavy Equipment Co., Ltd., China Coal Beijing Coal Mining Machinery Co., Ltd., Xi'an Haiwei Xincheng Inspection and Testing Consulting INQUIRY LIMITED: The main drafters of this document: Wu Liang, Wang Di, Ren Yucheng, Qiu Mingjun, Fan Zhiqin, Xia Juan, Liu Yong, Wang Xia, Quan Xiaohui, Jing Dongqing, Deng Tingyu, Gao Lu, Zheng Yonghong, Zhang Ligang, Lin Kai, Ruan Donghui, Jia Liying, Liu Junyi, Yan Ying, Shen Yang: Design specifications for heavy machinery welding parts

1 Scope

China's national design specification for heavy machinery weldments. It is the counterpart to the casting design requirements and addresses the alternative: building a large structure from plate rather than casting it. The choice between them is a real one for a heavy machine's frames and housings, and it turns on quantity, on lead time and on the stress pattern. What a weldment design specification has to fix is where the welds go and what they are asked to do. Welds are the fatigue-critical features of any welded structure - the residual stress is at yield, the geometry is a stress concentration, and the defect population

is higher than in the parent plate - so a design that puts a weld at the point of highest stress range has created the failure it will suffer. The rules are therefore about placing joints in low-stressed regions, choosing joint types that can be inspected, and detailing to avoid the notches that fatigue exploits.

This document stipulates weldment materials, welding joint selection regulations, weld strength calculation, and the rationality and economy of weldment design: General specifications: This document applies to the welding manufacturing of steel welded parts in heavy machinery and parts:

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 324 Weld seam symbol representation GB/T 985:

1 Recommended grooves for gas welding, electrode arc welding, gas shielded welding and high energy beam welding GB/T 985:

3 Terms and definitions

There are no terms or definitions to be defined in this document:

4 Basic requirements for weldment design

When designing welding parts, we should take reliability as the premise, practicality as the core, and processability and economy as the constraints: We should pay attention to the design structure: The shape is beautiful and should meet the following requirements:

---Practicality: the welded parts achieve the required functions and expected effects;

---Reliability: The welded parts are safe and reliable during the service period, and can meet the requirements of strength, stiffness, stability, earthquake resistance, corrosion resistance, etc.;

---Manufacturing: The materials selected for the welded parts have not only good welding performance, but also good pre-weld pre-processing performance and post-weld heat treatment Performance, the structure of the welded parts is designed with accessibility for welding and inspection, and is easy to implement mechanized and automated welding;

---Economy: Manufacturing welding parts consumes the least amount of raw materials, energy and man-hours, and its overall cost is low:

5 Selection of steel materials for welding parts

1 General requirements The most commonly used welded structural material is steel: Commonly used steels include carbon structural steel, high-quality carbon structural steel, low alloy structural steel, controlled rolling Steel, stainless steel, heat-resistant steel and low-temperature steel, etc: The design should be based on the usage conditions (working load, working temperature, working medium, service life), environment Environmental conditions (ambient temperature, environmental medium), volume, rigidity and weight requirements, process performance (metal weldability, cutting performance, cold and hot processing