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Technical requirements for cooling in heat treatment

热处理冷却技术要求

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Foreword

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1 Scope

China's national standard for the cooling stage of heat treatment. It specifies the terms and definitions, the development and implementation of a quench cooling process, and the quenching media. Cooling is the half of heat treatment that decides the outcome and the half that is hardest to control. Heating a steel to its austenitising temperature is a matter of a furnace and a thermocouple; what it becomes as it cools depends on how fast heat leaves every part of its surface, and that varies with the medium, its temperature, its agitation, its contamination and the geometry of the part. Cool too slowly and the steel does not harden; too fast and it cracks or distorts beyond recovery. The medium is therefore an engineered material rather than a tank of liquid: water, brine, polymer solutions of various concentrations, and oils of different quenching speeds, each with a characteristic cooling curve that the standard requires to be known and maintained rather than assumed.

This standard specifies the formulation and implementation methods of the immersion quenching and cooling process, the requirements for the use of cooling media, and the immersion quenching and cooling equipment. Technical requirements, technical requirements for quenching cranes, manipulators, manipulators and quenching fixtures, quality control and inspection, and safety production and environmental protection Request and so on. This standard is applicable to the immersion quenching cooling of steel. It is not suitable for non-immersion quenching and cooling. Other metal materials are immersed in quenching and cooling. To refer to this standard.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 265 petroleum product kinematic viscosity measurement method and dynamic viscosity calculation method

GB/T 268 Determination of residual carbon in petroleum products (Kang's method)

GB/T 511 Determination of mechanical impurities in petroleum and petroleum products and additives

GB/T 699 high quality carbon structural steel

GB/T 3077 alloy structural steel

GB/T 3536 Determination of flash point and ignition point of petroleum products Cleveland open cup method

GB/T 4945 Determination of acid value and base number of petroleum products and lubricants (color indicator method)

GB/T 7232 metal heat treatment process terminology

GB/T 7304 Determination of acid value of petroleum products - Potentiometric titration

GB 8978 Integrated Wastewater Discharge Standard

GB/T 11133 Determination of water content in petroleum products, lubricating oils and additives - Karl Fischer Coulometric titration

GB/T 11901 Determination of suspended solids by weight method

GB/T 13324 heat treatment equipment terminology

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9 Safety Production and Environmental Protection

17 Appendix A (informative) Method for the preparation of quenching and cooling process ---hardenability method (qualitative method)

19 Appendix B (informative) Measures to prevent quenching cracking and reduce quenching distortion

21 Appendix C (informative) equivalent cooling rate sample

23 Appendix D (informative) Cooling characteristics of quenching cooling media

26 Appendix E (Normative Appendix) Evaluation of Cooling Capacity of Quenching Cooling Medium

---Hardness Gradient Method

29 Appendix F (informative) Flow, guidance and current sharing of propeller agitators and media

31 Appendix G (informative) Media agitation device for cooling curve measurement

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard is proposed and managed by the National Heat Treatment Standardization Technical Committee (SAC/TC75). This standard was drafted. Shanghai Jiaotong University, Beijing Electromechanical Research Institute Co., Ltd., Nanjing Kerun Media Co., Ltd., Beijing Huali Fine Chemical Company, Hubei Sanhuan Forging Co., Ltd., Changzhou New District Hehai Heat Treatment Engineering Co., Ltd., Zhejiang Shuanghuan Transmission Machinery Co., Ltd. Company, Jiangsu Fengdong Heat Treatment and Surface Modification Engineering Technology Research Co., Ltd., Guizhou Hangyu Technology Development Co., Ltd., Zhongche Shushu Locomotive & Rolling Vehicle Technology Research Institute Co., Ltd., Xi'an Follett Heat Treatment Co., Ltd., Ningxiang Nuclear Industry Heat Treatment Materials Co., Ltd. Division, Shandong Tianrui Heavy Industry Co., Ltd., Shandong Cooper Bearing Technology Service Co., Ltd. The main drafters of this standard. Chen Nailu, Xu Yueming, Hu Xiaoli, Zuo Xunwei, Li Qiao, Zuo Yongping, Ge Shengdong, Dai Heping, Yin Heping, Niu Wanbin, Shi Yousen, Xie Chuye, Yang Minghua, Yang Hongfei, Zhang Fuquan, Li Yongsheng, Yan Jingxiang.

In the heat treatment process, different cooling methods are used depending on the material type, size, structural characteristics and performance requirements of the workpiece. The steel immersion quenching cooling method is the most widely used, so the heat treatment cooling technology specified in this standard is only for the steel immersion liquid. Quenching and cooling process. The rigor of the formulation and implementation of the quenching and cooling process will directly affect the performance and mass dispersion of the workpiece. Correct selection of quenching cooling Medium, quenching and cooling equipment, quenching fixtures and performing a reasonable quenching and cooling process are prerequisites for the performance of the workpiece, while quenching the cooling medium The composition, concentration, temperature, flow rate and uniformity, as well as the control accuracy of the quenching and cooling process determine the dispersion of the workpiece quality. The implementation of this standard will help to ensure the quenching and cooling quality of the workpiece, reduce the mass dispersion of the batch processing parts and achieve product quality. Traceable. Heat treatment cooling technical requirements