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Technological design principles for the combined warm and cold forging process

温锻冷锻联合成形工艺 工艺编制原则

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. This standard by the National Standardization Technical Committee Forging (SAC/TC74) and focal points. This standard was drafted. Shanghai Jiaotong University, Jiangsu Sunway Precision Forging Co., Ltd., Jiangsu Pacific Precision Forging Technology Co., Ltd., Beijing Inst. The main drafters of this standard. Zhao Zhen, Hucheng Liang, Xu Xianglong, Gongai Jun, Zhao Hongjun, Tao Liping, Xie talk, Zhou Lin. Warm forging Cold forging forming joint compilation principles Process Process

1 Scope

China's national principles for designing a combined warm and cold forging process. It specifies the principles for preparing such a process, including the process planning, the process parameters, the design of the intermediate forging shape and the selection of the forming equipment, and it applies to steel parts formed by combined warm and cold forging on a press. This is the companion to the product specification: one standard says what the part must be, and this one says how the process that produces it is designed. That division is unusual for a national standard and it is the right one here, because the process is not obvious and the decisions in it are not independent. The central question is where to put the boundary between the warm stages and the cold ones. Too much left to the cold stages and the forces exceed the press or the tooling breaks; too much done warm and the accuracy and surface that justified the process are lost. That decision then determines the intermediate shape - what the part looks like when it leaves the warm stages and enters the cold ones - which is the single most consequential piece of the design, because a cold stage can only redistribute material that the warm stages placed correctly. Around it sit the process parameters: the warm forging temperature, which has to be above the range where the material work-hardens too fast and below the range where scale forms; the deformation

per stage; the lubrication, which for both warm and cold forming is what makes the process possible at all; the tooling stresses; and the intermediate treatments between stages. The standard sets out how those are decided and in what order, with reference to the established cold extrusion process design principles. Issued on 9 June 2013 and in force since 1 March 2014.

This standard specifies the principles of the preparation process of cold forging steel forging Warm forging joint forming process, including process planning, process parameters, forging Pieces of rough and ready selection forming apparatus. This standard applies to steel forgings in warm forging forging joint press forming.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

JB/T 6054 pieces of cold extrusion process of the preparation of Principles

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Warm forging Cold forging joint forming combinedwarm-coldforgingprocess Preforming by warm forging and cold forging forming process using a joint final forming.

4.1 Process planning

4.1.1 complete warm forging forging preformed, cold forging complete forging a final shape. Complete with warm forging process of forging large deformation, the formation of complex shape Like; cold forging process is completed local small deformation forging to ensure the accuracy of critical dimensions.

4.1.2 The forging process design should avoid warm forging, cold forging defects, and warm forging and cold forging technology convergence occurs instability section.

4.1.3 warm forging Multi-station forming, each station should be a reasonable allocation of the amount of deformation before and after the station positioning and reliable, easy to remove and put in the work.

4.1.4 should minimize the number of cold forging process, when a cold forging forging deformation should be within the range of allowable degree of deformation.

4.1.5 Before forging process, the surface should be softened and lubricated. Available after warm forging process waste heat to soften the material.

4.1.6 should be conducive to the process of the preparation of the mold design,

manufacturing and cost reduction should be conducive to automation.

4.1.7 numerical methods can be used finite element simulation of the process parameters to optimize the design.

4.1.8 forging, should choose the right strain rate, reduce the impact of thermal effects.

4.2.1 Deformation and heating temperature

4.2.1.1 deformation temperature selection, should help to reduce the deformation resistance, improve forging material formability.

4.2.1.2 The heating temperature should avoid the blue brittle region, billet heating time in order to achieve a uniform billet before forging temperature as the basis, and should reduce the metal oxide And decarbonization.