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Sheet metal precise cold bending - Technical specification

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Table of Contents

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 of Standardization Documents" Drafting. Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents. This document is proposed and managed by the National Technical Committee for Standardization of Forging and Pressing (SAC/TC74). This document is drafted by: Shanghai Jiaotong University, Dongguan Hengli Mould Technology Industry Development Co., Ltd., Beijing Electromechanical Research Institute Co., Ltd. Company, Wuxi Pengde Auto Parts Co., Ltd., Inner Mongolia First Machinery Group Co., Ltd., Weihai Huabang Fine Blanking Technology Co., Ltd., Anhui Jianghuai Automobile Group Co., Ltd., Elite Energy Equipment Co., Ltd., Hubei Sanhuan Forging Co., Ltd., China Heavy Machinery Machinery Research Institute Co., Ltd. The main drafters of this document. Zhuang Xincun, Zhao Zhen, Wu Guohong, Qin Sixiao, Tan Zhengguang, Li Junjie, Jing Qian, Huang Tao, Dou Lifa, Ren Xiufeng, Zhu Rongyu, Wei Wei, Zhang Wen, Ye Futian, Zhou Lin, Tan Tianning, Kou Haili, Zhang Peng, Zhao Xingming, Ruan Guoyong, Huang Jieliang, Xue Hongyan, Guan Chaoyu, Chang Meisheng, Wu Liang, Liu Yong. Specification for precision cold-formed sheet metal forming process

1 Scope

China's national technical specification for precise cold bending of sheet metal. Bending sheet on a press brake is among the most common metalworking operations and among the least predictable, because what determines the finished angle is springback - the elastic recovery when the tool is released - and springback depends on the material's yield strength, its thickness, the bend radius and the die opening, all of which vary within tolerance. A shop that bends by setting the ram to a depth and checking the first part is compensating for that empirically, and the compensation changes with each coil. Precise

cold bending means controlling it deliberately: characterising the material, computing the overbend, or measuring the angle in the press and correcting within the stroke. The specification matters because sheet metal parts are increasingly assembled without adjustment, and an angular error of a degree accumulates across a folded enclosure into a gap that will not close.

This document specifies the specification for the precision cold-formed sheet metal forming process, including general requirements, unfolded length of bent parts, accuracy of bent parts, bending Springback control, mold design and process. This document is applicable to the preparation of the process for precision cold bending of sheet metal on a press.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, dated citations documents, only the version corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to this document.

GB/T 4863 Basic terms of mechanical manufacturing process GB/T 8541 Forging Terms

GB/T 13914-2013 Dimensional tolerance of stamping parts

GB/T 13915-2013 Angle tolerance of stamping parts

GB/T 13916 Stamping parts shape and position without tolerance

GB/T 15055 Stamping parts unmarked tolerance dimensional limit deviation

JB/T 5109-2001 Design specification for sheet metal bending process

3 Terms and Definitions

Terms and definitions defined in GB/T 4863 and GB/T 8541 apply to this document.

4.1 General requirements

4.1.1 The minimum bending radius of commonly used materials shall comply with the provisions of JB/T 5109-2001.When the bend line is at an angle to the rolling direction When, the intermediate value between the vertical and parallel rolling directions shall be taken.

4.1.2 The structural manufacturability of bending parts shall comply with the provisions of JB/T 5109-2001.

4.1.3 The selection of precision cold forming equipment should comply with the provisions of JB/T 5109-2001.

4.2 Expanded length of bending part

4.2.1 Calculation method of arc radius of neutral layer The neutral layer of the bending part is shown in Figure 1, and the arc radius rho of the neutral layer should be calculated according to formula (1). rho=r xt (1) where. rho

--- the arc radius of the neutral layer, in millimeters (mm);