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**Sheet metal parts fabricated by fine blanking combined with
extrusion process - General specification**

金属板料精冲挤压复合成形件 通用技术条件

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Sheet metal parts fabricated by fine blanking combined with extrusion process - General specification

1 Scope

This document specifies the technical requirements, test methods, inspection rules, marking, packaging, transportation and storage of sheet metal parts fabricated by fine blanking combined with extrusion process (hereinafter referred to as “fine blanking extrusion parts”).

This document applies to steel fine blanking extrusion parts fabricated by fine blanking combined with extrusion process.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 223 (all parts), Methods for chemical analysis of iron, steel and alloy

GB/T 224, Determination of depth of decarburization of steels

GB/T 226, Test method for macrostructure and defect of steel by etching

GB/T 228.1, Metallic materials - Tensile testing - Part 1: Method of test at room temperature

GB/T 230.1, Metallic materials - Rockwell hardness test - Part 1: Test method

GB/T 231.1, Metallic materials - Brinell hardness test - Part 1: Test method

GB/T 699, Quality carbon structural steels

GB/T 1031, Geometrical product specifications (GPS) - Surface texture: Profile method - Surface roughness parameters and their values

GB/T 1591, High strength low alloy structural steels

GB/T 2828.1, Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 2829, Sampling procedures and tables for periodic inspection by attributes (apply to inspection of process stability)

GB/T 2975, Steel and steel products - Location and preparation of samples and test pieces for mechanical testing

GB/T 3077, Alloy Structure Steels

GB/T 4335, Determination of ferrite grain size for cold rolled low carbon steel sheets

GB/T 4336, Carbon and low-alloy steel - Determination of multi-element contents - Spark discharge atomic emission spectrometric method (routine method)

GB/T 5216, Structural steels with specified hardenability bands

GB/T 6394, Determination of estimating the average grain size of metal

GB/T 8541, Terminology of forging and stamping

GB/T 10561, Steel - Determination of Content of Nonmetallic Inclusions - Micrographic Method Using Standards Diagrams

GB/T 13298, Inspection methods of microstructure for metals

GB/T 13299, Determination of free cementite, pearlite and Widmanstatten structure in steel

GB/T 13320, Metallographic grading atlas and assessing method for steel die forgings

GB/T 30573, Fine blanked parts - General technical requirements

JB/T 5074-2007, Spheroidite grade of low and medium carbon steel

JB/T 9175.2, Fine blanked parts - Part 2: Quality

JB/T 9180.1, Cold extruded steel parts - Part 1: Dimensional tolerance

3 Terms and definitions

Terms and definitions determined by GB/T 8541 and the following ones are applicable to this document.

3.1 Edge straightness

The maximum distance between the concave side of the steel plate or strip and the line connecting the two ends of the length, within the measured length.

- a) Spheroidizing annealing treatment should be carried out, and the spheroidizing body rating shall meet the requirements of greater than or equal to grade 5 as specified in JB/T 5074-2007;
- b) Grain size grade requirements of steel sheet and strip: micro-alloyed fine grain steel should be grade 7 ~ 10, and other steel types should be grade 5 ~ 8;
- c) Decarburization depth and carbide segregation level requirements can be determined through negotiation between the supplier and the buyer.

4.2 Fine blanking extrusion parts

4.2.1 Dimensions

The dimensional requirements for fine blanking extrusion parts include:

- a) The fine blanking dimensional tolerance and shear surface roughness requirements shall meet the requirements of GB/T 30573, and the extrusion tolerance shall meet the requirements of JB/T 9180.1;
- b) The fine blanking shear surface verticality tolerance and the non-shear surface flatness tolerance shall meet the requirements of GB/T 30573, and the extrusion shear surface verticality tolerance shall not be greater than the fine blanking shear surface verticality tolerance;
- c) When extrusion is carried out under the condition of $d/D > 1$ (d is the diameter of the extrusion convex mold; D is the diameter of the extrusion concave mold), the diameter l and depth h of the extrusion shrinkage cavity shall meet the requirements of the buyer.

4.2.2 Appearance

The appearance requirements for fine blanking extrusion parts are as follows.

- a) The shear surface serviceability rate grade, the shear surface allowable tear grade, and the shear droop requirements, of fine blanking extrusion parts, shall meet the requirements of GB/T 30573.
- b) Surface quality defects on the non-shear surface of fine blanking extrusion parts due to coining, bumping, etc. shall be determined through negotiation between the supplier and the buyer.
- c) Fine blanking extrusion parts are divided into three categories according to d/D (for special-shaped extrusions, the calculation is based on the diameter of the envelope circle). The common defects of the three types of fine blanking extrusion parts are shown in Figure 1. The extrusion forming defect control of fine blanking extrusion parts shall meet the following requirements:

- a) General inspection: dimensional tolerance, shear surface serviceability rate grade, shear surface allowable tear grade, shear surface verticality, shear droop, burr, non-shear surface flatness and surface quality of non-shear surface, etc.;
- b) Supplementary inspection: shear surface roughness and metallographic structure, etc.

The inspection of fine blanking extrusion parts shall be confirmed through consultation between the supplier and the buyer. If random inspection is adopted, it shall be carried out in accordance with the provisions of GB/T 2828.1 and GB/T 2829.

6.4 The inspection of finished fine blanking extrusion parts shall be carried out by the quality inspection department of the supplier according to the drawings of fine blanking extrusion parts, the order contract, this document and the provisions of JB/T 9175.2.

6.5 The acceptance of finished fine blanking extrusion parts shall be carried out by the buyer according to the quality certificate of the supplier, the drawings of fine blanking extrusion parts, the order contract, this document and JB/T 9175.2, as agreed in the contract or according to GB/T 2828.1, GB/T 2829 for spot check and acceptance.

6.6 The batching, sampling and determination of inspection results for fine blanking extrusion parts shall be confirmed by both parties at the time of ordering.

6.7 After the inspection is completed, the product inspection report shall be given in time, mainly including three aspects: dimensions, material, and appearance. The report shall also include the names of supplier and buyer, part number, part name, user mark, supply status, order number, and inspection date, etc.

7 Marking, packaging, transportation and storage

7.1 Fine blanking extrusion parts are generally not marked. When marking is required, it shall be indicated in the drawing of the fine-blanking extrusion part.

7.2 Each batch of fine blanking extrusion parts shall have a quality certificate when delivered. Its main contents include:

- a) names of supplier and buyer;
- b) order contract number, name of the fine blanking extrusion part, and part number of the fine blanking extrusion part;
- c) quantity of fine blanking extrusion parts;
- d) material designation;
- e) inspection result;

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