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Replacing JB/T 10174-2000

Methods of quality inspection on shot-peening for steel-iron parts

钢铁零件强化喷丸的质量检验方法

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Foreword

This Standard replaces JB/T 10174-2000 "Methods of quality inspection on shot-peening for steel-iron parts".

Compared with JB/T 10174-2000, the main changes in this Standard are as follows:

- regulated and labeled various information on the cover;
- adjusted and filled in related elements in the "Foreword";
- standardized the guide of "Normative reference", added normative reference, and marked the adopted project;
- standardized the terms and definitions;
- standardized the "NOTEs" in table (see Table 1);
- standardized the "unit" in table (see Table 2);
- modified "Annex A (standard)" in the previous edition to "Annex A (normative)" (see 5.1 and Annex A).

Annex A of this Standard is normative.

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee on Thermal Treatment of Standardization Administration of China (SAC/TC 75).

Main drafting organizations of this Standard: China FAW Group Jiaxin Heat Treatment Electroplating Co., Ltd., Changchun Institute of Automotive Materials, China Yi Hang Beijing Aviation Material Research Institute.

Main drafters of this Standard: Zhao Xiaoyi, Wang Zhengli, Yang Tao, Xu Zhaoyi, Mou Zongshan, Liang Zhikai.

Version of standard substituted by this Standard is:

- JB/T 10174-2000.

Methods of quality inspection on shot-peening for steel-iron parts

1 Scope

This Standard specifies the determination methods for the types, technical requirements, testing devices, shot strength and covert rate of projectile used for shot-peening.

This Standard is applicable to the inspection on shot-peening for steel-iron parts.

2 Normative references

The following standards contain the provisions which, through reference in this Standard, constitute the provisions of this Standard. For dated references, subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB/T 230.1, *Metallic materials - Rockwell hardness test - Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)* [GB/T 230.1-2004, ISO 6508-1:1999
Metallic materials-Rockwell hardness test-Part 1:Test method (scales A, B, C, D, E, F, G, H, K, N,T), MOD]

GB/T 1298, *Carbon tool steels* (GB/T 1298-1986, neq ASTM A686:1979)

GB/T 6003.1, *Test sieves of metal wire cloth* (GB/T 6003.1-1997, eqv ISO 3310-1:1990)

YB/T 5058, *Cold-rolled spring and tool steel strips*

YB/T 5149, *Cast steel shot*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 shot-peening

high-speed shot peening is sprayed on the surface of the steel part to cause plastic deformation of the surface layer under the impact of the projectile; this results in strengthening and surface compressive stress, which improves the fatigue resistance and stress corrosion resistance of the steel parts

3.2 almen

the almen is a special gauge that comprehensively measures the process parameters of shot peening; it is made of spring steel (shall comply with YB/T 5058); it has three sizes, the models are: N, A, C

3.3 arc high value

the standard Almen test piece is fixed on the fixture and is subjected to single-surface shot-peening; the almen is plastically deformed under the impact of the projectile, causing the almen spherically curved toward the peening surface; then the bending arc height of almen is measured with arc height gauge

3.4 shot time

the time required for the peened part to reach 100% covert rate from the start of shot-peening during the shot-peening of the peened part

3.5 shot strength

an indicator of the extent to which a projectile strikes a metal surface, which is a function of many process parameters (such as part material, projectile size, projectile performance, peening speed, peening time, etc.); the shot strength is represented by the arc height increase generated when the covert rate corresponding to the arc height increase produced by the almen (Almen test piece) less than or equal to 10% at a double peening time is at least 100%

3.6 covert rate

the degree of pressure pits on the surface of peened part; it is the ratio of the area occupied by the shot mark measured on the surface to be peened to the area required for shot-peening, expressed in percentage; the surface covert rate exceeding 100% is calculated in shot time

4 Projectile material for shot-peening

4.1 Projectile types

The cast steel projectile shall comply with the provisions of YB/T 5149. The cutting wire projectile of which the sharp corner is ground off by initial peening can also be used.

6.2 Measurement of convert rate

The convert rate of part surface can be checked with a 10x magnifying glass. When there is doubt about the covert rate in the known shot-peening cycle, a test piece (102mm x 102mm) of the same material and hardness as the part shall be polished and peened under the same conditions as the part. Then, place the almen under the metallurgical microscope to check the peened surface. Project the image 50x onto a frosted glass. Use an area meter to measure the total area of all peened areas at several observation sites. Take its mean value.

7 Quality control of part shot-peening

7.1 According to the working conditions and performance requirements of steel parts, the shot strength value is determined according to the technical requirements of the product drawings, generally be 0.35A or more.

7.2 The convert rate shall meet the technical requirements of the product drawings, generally not be less than 200%.

7.3 Appropriate shot strength shall be used for different part. For super thin or small-section parts, high shot strength must not be used so as to prevent the residual stress caused in the center of the part which shall result in deformation.

7.4 When there are special requirements for part shot-peening sites, they must be specified in the contract or related drawings so as to take appropriate protective measures.

7.5 The shot-peened parts must not be shaped by any other mechanical method other than the shot-peening method.

7.6 After shot-peening, if the parts need to be heated, the heating temperature shall generally be controlled within 200°C.

7.7 If the surface of the shot-peened part is to be ground or polished, the depth of the surface to be removed shall not exceed 10% of the value of the arc height of the shot strength almen A.

7.8 The hardness test shall not be carried out for the peened site of the part.

7.9 The parts shall be prevented from corrosion after shot-peening until the next process.

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