



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 19349-2012

**Metallic and other inorganic coatings-Pretreatment of iron or
steel to reduce the risk of hydrogen embrittlement**

金属和其它无机覆盖层 为减少氢脆危险的钢铁预处理

(English Translation)

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Preface

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 19349-2003 "metal and other inorganic coatings to reduce the risk of hydrogen embrittlement of steel pretreatment", and GB/T 19349-2003 compared to the main technical changes are as follows.

--- modified the introduction;

--- modified the scope of Chapter 1;

--- normative reference documents have been re-adjusted;

--- modified the first 6.1;

--- modified Table 1, added Table 2.

This standard uses the translation method equivalent to ISO 9587.:2007 "Metal and other inorganic coatings to reduce the risk of hydrogen embrittlement.

deal with".

See Appendix NA for our documents in accordance with the normative correspondence between the normative references in this standard.

This standard has made the following editorial changes.

--- the preamble of the international standard is replaced by the preamble of the national standard;

--- "this standard" instead of "this international standard".

- the addition of the data Appendix NA, and the normative reference in this standard

international documents have a consistent correspondence between the Chinese documents.

This standard is proposed by the China Machinery Industry Federation.

This standard is nationalized by the National Standardization Technical Committee on Metals and Nonmetallic Coatings (SAC/TC57).

The drafting of this standard unit. Wuhan Institute of Materials Protection, Wuhan material warranty electroplating technology productivity promotion center.

Introduction

When the atoms of hydrogen into the steel and some other metals, such as aluminum and titanium alloy, can cause its toughness or carrying capacity loss or cracking (Usually sub-microscopic cracks), or in the external stress is much lower than the yield strength of the alloy even lower than the usual design strength of the alloy when the alloy disaster Difficult to brittle damage. This phenomenon often occurs in the use of traditional tensile test determination of alloy toughness and no significant loss of the case, this phenomenon of alloy, commonly known as hydrogen induced hysteresis, hydrogen cracking or hydrogen embrittlement. Cleaning, pickling, phosphating, electroplating, autocatalytic processes and materials Corrosive reaction or cathodic protection in the service will cause hydrogen to penetrate into the metal; in the cleaning, pickling, coating before the coating process, such as rolling into Type, machining and drilling, due to the improper selection of lubricants caused by decomposition will lead to hydrogen infiltration of metal; welding or brazing process can also make Hydrogen infiltration. Hardening heat treatment after mechanical processing, grinding, cold forming or cold straightening of the parts of the hydrogen embrittlement damage is particularly sensitive.

The heat treatment reduces the hydrogen embrittlement susceptibility caused by the tensile stress generated by the absorbed hydrogen atoms and/or the processing. Heat treatment time - temperature the degree of relationship depends on the composition of the steel, the structure and the coating type and coating method. For most high strength steels, the heat treatment effect with the reduction of processing time and the temperature drop sharply.

This standard is intended to be used in the direction of electroplating, supply or processing of technical requirements, these requirements marked on the parts or purchase orders.

Metal and other inorganic coatings to reduce the risk of hydrogen embrittlement of steel pretreatment

1 Scope

This standard specifies the requirements for high-strength steel to eliminate stress heat treatment in order to reduce the subsequent pretreatment, electroplating, electroless

plating, chemical transfer and the degree of hydrogen embrittlement sensitivity or sensitivity in the process of phosphating. This standard applies to heat at 190 ° C to 230 ° C or higher Processing without causing its performance to degrade the steel (see 6.2).

The heat treatment process specified in this standard reduces the tensile strength equal to or higher than 1000MPa and after the heat treatment by mechanical processing, grinding, the hydrogen embrittlement susceptibility of cold formed or cold straightened steel is effective. The heat treatment process is used in any step where hydrogen may be present Before, just as the cleaning process used for electroplating, electroless plating and other chemical cover before the same operation.

This standard does not apply to fasteners.

2 Normative reference documents

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

ISO 2080 Metal and other inorganic coatings Surface treatment, metals and other inorganic coatings Terminology (Metalicandother inorganiccoatings-Surfacetreatment, metalicandotherinorganiccoatings-Vocabulary) ISO 12686 Metal and other inorganic coatings Electroplated nickel, self-catalyzed nickel plating, chrome plated and final finish Automatic control of shot peening (Metalicandotherinorganiccoatings-Automatedcontroledshot-peeningofmetallic articlespriortonickel, autocatalyticnickelorchromiumplating, orasafinalfinish

3 Terms and Definitions

ISO 2080 and the following terms and definitions apply to this document.

Stress-relief stress treatment in a certain temperature range and a certain processing time to achieve without changing the matrix metal metallurgical structure (such as recrystallization) and to eliminate the parts to be plated Heat treatment of force.

4 Requirements

The substrate metal should be treated in accordance with Table 1 and Table 2 to reduce the risk of hydrogen embrittlement. In any case, should be in the whole of each part the heat treatment time is calculated when the specified temperature is reached.

Table 1 High strength steel elimination stress requirements level (see 4, 5 and 6 for details)

Grade steel tensile strength Rm/MPa temperature/°C minimum time/h SR-0 does not eliminate stress heat treatment SR-1 Rm > 1800.200 to 230 < 24 >

SR-3 1401? Rm? 1800.200 to 23018 SR-6 1000? Rm? 1400 to 230?

SR-8 surface hardening parts < 1400 130 ~ 160 8

Table 2 Some countries recommend the traditional treatment of high-strength steel to eliminate stress requirements (refer to 4, 5 and 6 for details)

Grade steel tensile strength Rm/MPa temperature/°C minimum time/h SR-0 does not eliminate stress heat treatment SR-2a Rm & gt; 1800 190 to 220 & lt; 24 & gt; ;.

SR-4a 1450 <= Rm <= 1800 190 ~ 220 18 SR-5a Rm >= 1034 177 to 205 3 SR-7a 1050 <= Rm <= 1450 190 ~ 220 1 a traditional processing.

Steel parts and tables with actual tensile strength higher than or equal to 1000MPa (corresponding hardness 300HV10,303HB or 31HRC) Surface hardened parts should be heat treated unless their stress relief heat treatment rating is specified as SR-0. Should be avoided in the presence of alkali or acid the pretreatment of the cathodic processing step is carried out.

Table 1 and Table 2 lists the elimination of stress heat treatment level, by the demand side according to Table 1 and Table 2 in the parts or purchase orders to the plating side, for

Should be made by the parties or processing. If the demand side does not provide for the elimination of the stress handling level, the SR-1 level should be used.

Note 1: The choice of treatment level is based on the experience or experimental data of the part or similar part and the particular alloy used. Due to alloy composition and structure, Size, quality or design parameters and other factors, some parts without stress relief treatment can also be satisfied with the use of performance, so the demand side does not want to heat the processed parts are rated SR-0.

Note 2: The use of corrosion inhibitors during pickling does not necessarily ensure that the hydrogen embrittlement is minimized.

Note 3: When the demand side does not specify the level, the use of the longest processing time SR-1 level is a shortcoming. Electroplating side, the supplier or the processing side generally do not grasp the relevant the necessary information to eliminate the stress treatment, such as design basis, stress caused by the manufacturing process. By the demand side of the parts designer, manufacturing engineer or other Qualified technical personnel in the parts or purchase orders on the provisions of the treatment level, in order to avoid unreasonable treatment caused by the additional costs, is in line with the demand side Benefit

5 Steel classification

In addition to surface hardening parts, should be based on the actual tensile strength selection heat treatment process. If only given the minimum tensile strength, or resistance to strong , The heat treatment process should be selected based on the actual tensile