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**Fasteners—Hot dip galvanized
coatings**

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as a result of proposal of establishing a Japanese Industrial Standard from The Japan Research Institute for Screw Threads and Fasteners (JFRI)/Japanese Standards Association (JSA), with a draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

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Fasteners—Hot dip galvanized coatings

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of **ISO 10684** published in 2004 with some modifications of the technical contents.

The portions given dotted underlines are the matters in which the contents of the original International Standard have been modified. A list of modifications with explanations is given in Annex JA.

1 Scope

This Standard specifies material, process, dimensional and some performance requirements for hot dip galvanized coatings applied to steel fasteners of thread from M8 to M64, and for property class under 10.9 for bolts, screws and studs as well as for property class below 12 for nuts.

It is not recommended to hot dip galvanize threaded fasteners in diameters smaller than M8 and/or with pitches below 1.25 mm.

NOTE 1 Attention is drawn to the fact that the proof load and stress under proof load of oversize tapped nuts with threads M8 and M10 and the ultimate tensile loads and proof loads of undersize threaded bolts and screws with threads M8 and M10 are reduced as compared to the values specified in **JIS B 1052** and **JIS B 1051** respectively and are specified in Annex A.

It primarily concerns the hot dip galvanizing of threaded steel fasteners, but it may also be applied to other threaded steel parts.

The specifications in this Standard may also be applied to non-threaded steel parts such as washers.

NOTE 2 This Standard applies to the fastener that is the nut tapped after coatings combined with the bolt coated after threading.

NOTE 3 This Standard specifies the characteristics of the hot dip galvanized coatings on fasteners, however, the specifications concerning the characteristics thereof shall be restricted for a certain processing technology. Therefore, it is not intended to perform conformity assessment with this Standard.

NOTE 4 The International Standard corresponding to this Standard is as follows.

ISO 10684:2004 *Fasteners—Hot dip galvanized coatings* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0209-1 *ISO general purpose metric screw threads—Tolerances—Part 1: Principles and basic data*

NOTE : Corresponding International Standard: **ISO 965-1**:1998 *ISO general-purpose metric screw threads—Tolerances—Part 1: Principles and basic data* (IDT)

JIS B 0209-2 *ISO general purpose metric screw threads—Tolerances—Part 2: Limits of sizes for general purpose external and internal screw threads—Medium quality*

NOTE : Corresponding International Standard: **ISO 965-2**:1998 *ISO general purpose metric screw threads—Tolerances—Part 2: Limits of sizes for general purpose external and internal screw threads—Medium quality* (IDT)

JIS B 0209-3 *ISO general purpose metric screw threads—Tolerances—Part 3: Deviations for constructional screw threads*

NOTE : Corresponding International Standard: **ISO 965-3**:1998 *ISO general purpose metric screw threads—Tolerances—Part 3: Deviations for constructional screw threads* (IDT)

JIS B 0209-4 *ISO general purpose metric screw threads—Tolerances—Part 4: Limits of sizes for hot-dip galvanized external screw threads to mate with internal screw threads tapped with tolerance position H or G after galvanizing*

NOTE : Corresponding International Standard: **ISO 965-4**:1998 *ISO general purpose metric screw threads—Tolerances—Part 4: Limits of sizes for hot-dip galvanized external screw threads to mate with internal screw threads tapped with tolerance position H or G after galvanizing* (IDT)

JIS B 0209-5 *ISO general purpose metric screw threads—Tolerances—Part 5: Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing*

NOTE : Corresponding International Standard: **ISO 965-5**:1998 *ISO general purpose metric screw threads—Tolerances—Part 5: Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing* (IDT)

JIS B 1010 *Designation system for fasteners*

NOTE : Corresponding International Standard: **ISO 8991**:1986 *Designation system for fasteners* (IDT)

JIS B 1051 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 1: Bolts, screws and studs*

NOTE : Corresponding International Standard: **ISO 898-1**:1999 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 1: Bolts, screws and studs* (IDT)

JIS B 1052 *Mechanical properties of steel nuts*

NOTE : Corresponding International Standard: **ISO 898-2**:1992 *Mechanical properties of fasteners—Part 2: Nuts with specified proof load values—Coarse thread* (MOD)

JIS H 0401 *Test methods for hot dip galvanized coatings*

NOTE : Corresponding International Standard: **ISO 1460**:1992 *Metallic coatings—Hot dip galvanized coatings on ferrous materials—Gravimetric determination of the mass per unit area* (MOD)

JIS H 8501 *Methods of thickness test for metallic coatings*

NOTE : Corresponding International Standard: **ISO 2064**:1996 *Metallic and other inorganic coatings—Definitions and conventions concerning the measurement of thickness* and **ISO 2178**:1982 *Non-magnetic coatings on magnetic substrates—Measurement of coating thickness—Magnetic method* (Overall evaluation: MOD)

JIS H 8641 *Hot dip galvanized coatings*

NOTE : Corresponding International Standard: **ISO 1461**:1999 *Hot dip galvanized coatings on fabricated iron and steel articles—Specifications and test methods* (MOD)

3 Terms and definitions

For the purposes of this Standard, the definitions given in **JIS H 8501** and the following definitions apply.

3.1 batch

quantity of identical parts cleaned, pickled, fluxed and galvanized together at one time in a galvanizing basket

3.2 production lot

batches of parts originating from the same manufacturing lot, processed continuously through cleaning, pickling, fluxing, dipping in molten zinc and spun in a centrifuge without any change in temperature and concentration of the constituents of the process

3.3 batch average thickness

calculated average thickness of a coating as if it was uniformly distributed over the surface of the parts of the batch

3.4 baking

process of heating parts for a definite time at a given temperature in order to minimize the risk of hydrogen embrittlement

3.5 stress relief

process of heating parts for a definite time at a given temperature in order to relieve stress induced by work hardening

3.6 hot dip galvanizing of fasteners

process whereby steel fasteners are zinc coated by immersion in a bath of molten zinc, resulting in the formation of a zinc-iron alloy coating or a zinc-iron alloy coating plus a zinc coating at the surface of the fastener

NOTE : This process involves the removal of excess zinc by spinning the parts in a centrifuge or by an equivalent method.

4 Materials

4.1 Raw material of parts

4.1.1 Chemical composition

Materials as included in **JIS B 1051** and **JIS B 1052** are suitable for hot dip galvanizing except if the total content of phosphorus and silicon is between 0.03 % and 0.13 %, in which case high temperature galvanizing (530 °C to 560 °C) is recommended.

4.1.2 Surface condition

The surface of the fastener, before immersion in the molten zinc, shall be clean and free from all contaminants that would adversely effect the galvanizing.

4.2 Zinc

The zinc used for this process shall be in accordance with **JIS H 8641**.

5 Hot dip galvanizing procedures and precautions

5.1 Stress relief

Fasteners subjected to severe work hardening may require stress relief before pickling and hot dip galvanizing.

5.2 Cleaning and pickling

Parts shall be cleaned. During the cleaning process, hydrogen could be absorbed into the steel. The hydrogen may not effuse completely in the galvanizing bath and consequently, may lead to brittle failure. Unless otherwise agreed between the parties concerned, parts heat treated or work hardened to a hardness of 320 HV and above shall be cleaned using an inhibited acid, alkaline or mechanical process. Immersion time in the inhibited acid depends on the as-received surface condition and should be of minimum duration.

NOTE : An inhibited acid is an acid to which a suitable inhibitor has been added to reduce corrosive attack on the steel and absorption hydrogen.

5.3 Baking

If baking is carried out, it shall be carried out prior to surface activation.