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Metal injection moulding materials —
Specifications

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Foreword

This Japanese Industrial Standard has been established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by Japan Powder Metallurgy Association (JPMA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act.

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Metal injection moulding materials — Specifications

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 22068** : 2012, Edition 1, with some modifications of the technical contents.

Annex JA is unique to **JIS** and not given in the corresponding International Standard. The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies the requirements for the chemical composition and mechanical properties of materials produced by the metal injection moulding method (hereafter referred to as materials).

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 22068 : 2012 *Sintered-metal injection-moulded materials — Specifications* (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 21-1**.

2 Normative references

Part or all of the provisions of the following standards, 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 G 1211-1 *Iron and steel — Determination of carbon content — Part 1 : Combustion gravimetric method*

JIS G 1211-2 *Iron and steel — Determination of carbon content — Part 2 : Gas volumetric method after combustion*

JIS G 1211-3 *Iron and steel — Determination of carbon — Part 3 : Infrared absorption method after combustion*

JIS G 1211-4 *Iron and steel — Determination of carbon content — Part 4 : Infrared absorption method after combustion in a furnace with preheating or peak separating*

JIS G 1211-5 *Iron and steel — Determination of carbon content — Part 5 : Determination of non-combined carbon*

- JIS G 1212 *Iron and steel — Methods for determination of silicon content*
- JIS G 1213 *Iron and steel — Methods for determination of manganese content*
- JIS G 1214 *Iron and steel — Methods for determination of phosphorus content*
- JIS G 1215-1 *Iron and steel — Determination of sulfur content — Part 1 : Gravimetric method after separation of iron*
- JIS G 1215-2 *Iron and steel — Determination of sulfur content — Part 2 : Gravimetric method after chromatographic separation*
- JIS G 1215-3 *Iron and steel — Determination of sulfur content — Part 3 : Methylene blue spectrophotometric method after separation of hydrosulfide*
- JIS G 1215-4 *Iron and steel — Determination of sulfur — Part 4 : Infrared absorption method after combustion in an induction furnace*
- JIS G 1216 *Iron and steel — Methods for determination of nickel content*
- JIS G 1217 *Iron and steel — Methods for determination of chromium content*
- JIS G 1218 *Iron and steel — Methods for determination of molybdenum content*
- JIS G 1219 *Iron and steel — Methods for determination of copper content*
- JIS G 1228 *Iron and steel — Methods for determination of nitrogen content*
- JIS G 1237 *Iron and steel — Methods for determination of niobium content*
- JIS G 1239 *Iron and steel — Determination of oxygen — Infrared absorption method after fusion under inert gas*
- JIS G 1253 *Iron and steel — Method for spark discharge atomic emission spectrometric analysis*
- JIS G 1256 *Iron and steel — Method for X-ray fluorescence spectrometric analysis*
- JIS G 1258-1 *Iron and steel — ICP atomic emission spectrometric method — Part 1 : Determination of various elements — Decomposition with acids and fusion with potassium disulfate*
- JIS G 1258-2 *Iron and steel — ICP atomic emission spectrometric method — Part 2 : Determination of various elements — Decomposition with phosphoric and sulfuric acids*
- JIS G 1258-3 *Iron and steel — ICP atomic emission spectrometric method — Part 3 : Determination of various elements — Decomposition with acids and fusion with sodium carbonate*
- JIS H 1612 *Methods for determination of nitrogen in titanium and titanium alloys*
- JIS H 1617 *Methods for determination of carbon in titanium and titanium alloys*
- JIS H 1620 *Methods for determination of oxygen in titanium and titanium alloys*
- JIS H 1622 *Titanium alloys — Methods for determination of aluminium*

JIS H 1624 *Titanium alloys — Method for determination of vanadium*

JIS H 1631 *Titanium alloys — Method for X-ray fluorescence spectrometric analysis*

JIS Z 2241 *Metallic materials — Tensile testing — Method of test at room temperature*

NOTE 1 Normative reference in the corresponding International Standard : ISO 6892-1 *Metallic materials — Tensile testing — Part 1 : Method of test at room temperature*

NOTE 2 The **JIS** cited above is not equivalent to the ISO Standard given in NOTE 1 in the technical contents relevant to this Standard.

JIS Z 2274 *Method of rotating bending fatigue testing of metals*

JIS Z 2500 *Powder metallurgy — Vocabulary*

JIS Z 2550 *Sintered metal materials — Specifications*

JIS Z 8807 *Methods of measuring density and specific gravity of solid*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS Z 2500** apply.

4 Classification and symbols of grades

The materials shall be classified according to the production methods, chemical compositions, and mechanical and physical properties. The expression of symbols of grades shall be as given in Table 1 to Table 5.

The designation system shall be in accordance with Annex JA.

5 Quality

5.1 Chemical composition

The chemical composition of materials shall be tested in accordance with 7.1, and the results shall conform to Table 1 to Table 5.

5.2 Mechanical properties

5.2.1 Tensile strength, yield strength, elongation after fracture and fatigue strength

The tensile strength, yield strength and elongation after fracture of materials shall be tested in accordance with 7.2.1, and the results shall conform to Table 1 to Table 5.

The fatigue strength of materials shall be tested in accordance with 7.2.2, and the stress values at which the test piece remains unbroken up to the number of stress cycles of 10^7 shall conform to Table 3 to Table 5.

5.2.2 Apparent hardness

The apparent hardness of materials shall be tested in accordance with 7.2.3, and the

informative values are shown in Table 1 to Table 5.

5.3 Density

The density of materials shall be tested in accordance with 7.3, and the informative values are shown in Table 1 to Table 5.