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Technical drawings—Gears

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Gear Manufacturers Association (JGMA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 0003**:1989 is replaced with this Standard.

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Technical drawings—Gears

Introduction

This Japanese Industrial Standard was established in 1956 and has gone through five revisions to this day. The last revision was made in 1989, and the revision at this time is to respond to the revisions of related standards thereafter.

The corresponding International Standard has not been established at this point.

1 Scope

This Standard specifies the technical drawings for manufacture of the following gears of eight types used in general machines.

This Standard specifies the matters specific to gears. General matters contained in the drawings of gears shall be in accordance with **JIS B 0001**, **JIS B 0021** and **JIS B 0031**.

- a) Spur gear (figure 1)
- b) Helical gear (figure 2 and figure 3)
- c) Double helical gear (figure 4)
- d) Crossed helical gear (figure 5)
- e) Straight bevel gear (figure 6)
- f) Spiral bevel gear (figure 7)
- g) Hypoid gear (figure 8)
- h) Worm and worm wheel (figure 9 and figure 10)

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For standards with the year indication, only the editions of the indicated year shall be applied and the revisions (including amendments) made thereafter shall not be applied. For those without the indication of the year, the most recent edition (including amendments) shall be applied.

JIS B 0001 *Technical drawings for mechanical engineering*

JIS B 0021 *Geometrical product specifications (GPS)—Geometrical tolerancing—Tolerancing of form, orientation, location and run-out*

JIS B 0031 *Geometrical Product Specifications (GPS)—Indication of surface texture in technical product documentation*

JIS B 0102:1999 *Vocabulary of gear terms—Definitions related to geometry*

3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in **JIS B 0102** apply.

4 Illustration of gears

4.1 Tabular for part diagram and entry for illustration

For the part diagram of gears, the tabular and the illustration shall be used together, and respective entries shall be as follows.

- a) Data on gears shall be listed in the tabular. If required, matters related to work, assembly, inspection, etc. shall be given. **JIS B 1701-1** and **JIS B 1701-2** shall be referred. For the accuracy, **JIS B 1702-1**, **JIS B 1702-2**, **JIS B 1702-3** and **JIS B 1704** shall be referred.
- b) Dimensions which cannot be determined from the matters listed in the tabular shall be given in the illustration. If required, the reference surface shall be given.
- c) Matters related to the material, heat treatment, hardness, etc. shall be appropriately given in the note column or in the illustration, if required.
- d) Examples of the part diagram of various gears are shown in figure 1 to figure 10. All the shapes, numerical values, notes, etc. are examples, and some items other than the dimensions specific to the gear are omitted.

NOTE : As for the backlash, examples are shown in **JIS B 1705** and the standard of Japan Gear Manufacturers Association **JGMA 1103-01**, and as for the tooth contact pattern, in **JGMA 1002-01**.

The matters marked with * in the tabular shall be listed, if required.

- e) Though some of the dimensional tolerances on the dimensions are omitted in the drawings of this Standard, all necessary dimensional tolerances shall be given in actual drawings.

4.2 Illustration method

4.2.1 Usage of lines

Lines shall be used as follows.

- a) The tip circle is shown by a thick continuous line.
- b) The reference circle is shown by a thin chain line.
- c) The root circle is shown by a thin continuous line. When the illustration viewed from the direction perpendicular to the axis (hereafter referred to as “the principle projection chart”) is represented by a cross-section, the root is shown by thick continuous line (see figure 1 to figure 8, figure 10 and figure 15).

The root circle may be omitted. Especially, it is usually omitted in the illustration of the bevel gear and the worm wheel viewed from the axis direction (see figure 6 to figure 8 and figure 10).

- d) The direction of flank line is usually shown by three thin continuous lines [see figure 4, figure 5, figure 7 to figure 9, figure 16 a) to c), figure 18 a), figure 19 d), figure 19 e) and figure 20 a)].

- e) When the principle projection chart is illustrated by a cross-section, the direction of the flank line of the helical outer gear from the front side of the drawing paper shall be shown by three thin chain double-dashed lines (see figure 2), while that of the flank line of the helical inner gear shall be shown by three thin continuous lines (see figure 3).

4.2.2 Illustration of details of tooth flank form

The illustration of details of tooth flank form is shown in figure 2.

4.2.3 Illustration of details of tooth thickness and dimension measuring method

Details of tooth thickness and the dimension measuring method shall be illustrated in the drawings, if required. An example is shown in figure 11.

4.2.4 Illustration of chamfering of tooth

The illustration of chamfering of tooth is exemplified in figure 12.

4.2.5 Illustration of location of tooth

The case where the location of tooth needs to be shown clearly is exemplified in figure 13 and figure 14.

4.2.6 Illustration of contact of gears

The illustration of the contact of a pair of gears is exemplified in figure 15. Both of the tip circles in the contact part are given by thick continuous lines. When the principle projection chart is illustrated by a cross-section, the tip circle of one side of the contact part shall be given by thin broken lines or thick broken lines.

Simplified diagrams of the contact of gears are exemplified in figure 16 to figure 20.

Unit: mm

Spur gear				
Gear tooth profile		Rack shift	Finishing method	Hobbing
Basic rack	Tooth profile	Full depth tooth	Accuracy	JIS B 1702-1 Grade 7 JIS B 1702-2 Grade 8
	Module	6	Reference data	Number of teeth of mating gear 50
	Pressure angle	20°		Shift of mating gear 0
Number of teeth		18		Centre distance 207
Reference diameter		108		Backlash 0.20 to 0.89
Shift		+3.16		Material
Total tooth depth		13.34		Heat treatment
Tooth thickness	Sector span	47.96 ^{-0.08} _{-0.38} (Number of teeth spanned = 3)		Hardness

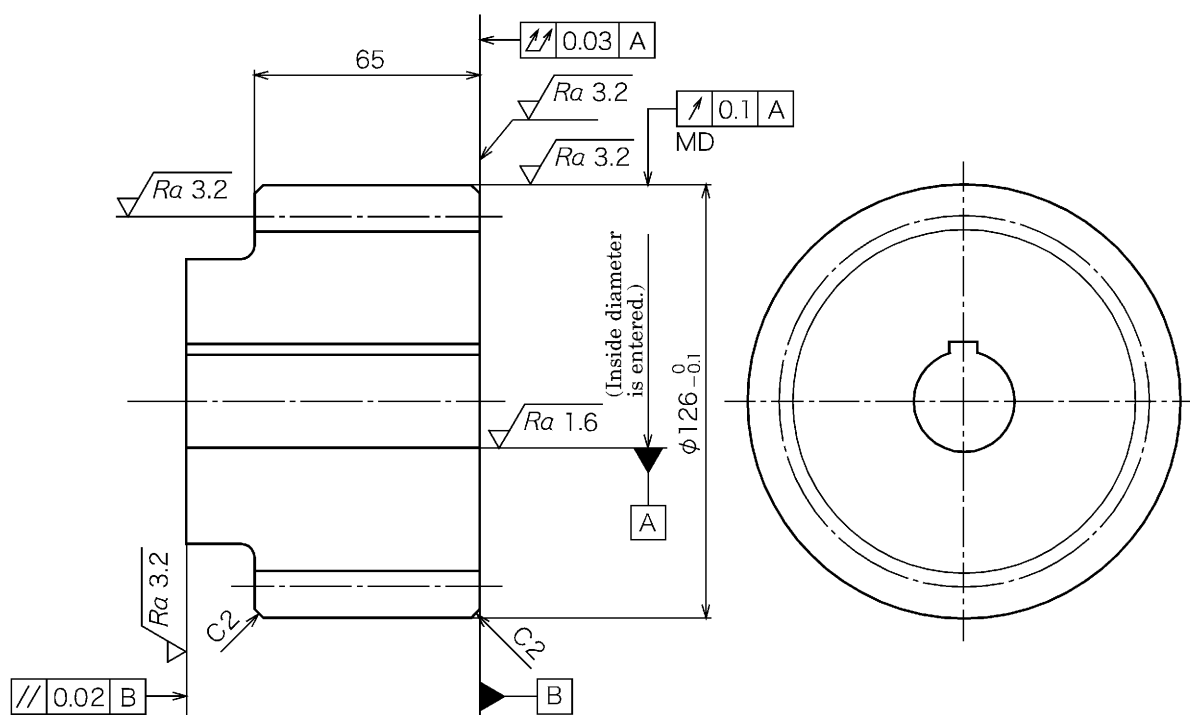


Figure 1 Spur gear