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**Guidelines for the selection of roller chain
drives**

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In the event of any doubts arising as to the contents,
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Foreword

This Japanese Industrial Standard has been 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 Chain Association (JCA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS B 1810** : 2018), which has been technically revised.

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Guidelines for the selection of roller chain drives

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 10823** : 2004, Edition 2, with some modifications of the technical contents to meet the local needs in Japan.

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 JA.

1 Scope

This Standard gives guidelines for the selection of chain drives composed of short-pitch transmission precision roller chains and bush chains conformant with **JIS B 1801** (hereafter referred to as chains) and sprockets.

Example of selection procedure of chain drive is provided in Annex A, and the formula for calculating maximum kW rating of chains, in Annex B.

Owing to the wide variations in loading characteristics, environmental conditions and achieved maintenance, there may be cases where this Standard is not applicable; in this case, the supplier of the chains shall be consulted.

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

ISO 10823 : 2004 *Guidelines for the selection of roller chain drives*(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 B 1801 *Short-pitch transmission precision roller chains and bush chains*

NOTE Normative reference in the corresponding International Standard: **ISO 606** *Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets*

JIS B 1812 *Glossary of terms relating to chains, sprockets and accessories*

3 Terms and definitions, and symbols

3.1 Terms and definitions

For the purpose of this Standard, the terms and definitions given in JIS B 1812 apply.

3.2 Symbols

For the purpose of this Standard, the symbols given in Table 1 apply.

Table 1 Symbols

Symbol	Designation	Unit
a	maximum sprocket centre distance	mm
a_0	approximate centre distance	mm
f_1	service factor (see Table 2)	—
f_2	teeth factor [see Figure 4 and Formula (5)]	—
f_3	factor for calculation of the number of links with different number of teeth (see Table 5)	—
f_4	factor for the calculation of the centre distance with different number of teeth (see Table 6)	—
i	speed ratio	—
n_1	driving sprocket speed	min^{-1}
n_2	driven sprocket speed	min^{-1}
n_s	small sprocket speed	min^{-1}
p	chain pitch	mm
P	input power	kW
P_c	corrected input power	kW
P_d	maximum kW rating	kW
T	input torque	$\text{N} \cdot \text{m}$
v	chain speed	$\text{m} \cdot \text{s}^{-1}$
X	number of pitches in chain	—
X_0	calculated number of pitches in chain	—
z	number of sprocket teeth	—
z_1	number of driving sprocket teeth	—
z_2	number of driven sprocket teeth	—
z_s	number of small sprocket teeth	—

4 Basic equations

4.1 Input power

The input power to the sprocket, P , if input torque is known, can be derived from the following equation:

$$P = \frac{T \times n_1}{9\,550} \dots\dots\dots (1)$$

4.2 Corrected input power

To allow for the characteristics of the driver and driven machinery, as well as the number of small sprocket teeth, the corrected input power, P_c , is calculated by the following equation:

$$P_c = P \times f_1 \times f_2 \dots\dots\dots (2)$$

5 Drive design specifications

The following design features should be specified before the chain and sprockets are selected:

- a) input power;
- b) type of driver and driven machinery;
- c) speeds and sizes of the driver and driven shafts;
- d) approximate centre distance and layout of the shafts;
- e) environmental conditions.

6 Sprocket selection

Determine the number of teeth on the sprockets using the following procedure:

- a) select the desired number of teeth for the driving sprocket;

It is good practice to use sprockets with not less than 17 teeth and not more than 114 teeth.

If the chain drive operates at high speed ¹⁾ or if it is subjected to impulse loads, the small sprocket ²⁾ should have at least 25 teeth and the teeth should be hardened.

- b) determine the speed ratio, i , using the equation:

$$i = \frac{n_1}{n_2} \dots\dots\dots (3)$$

- c) determine the number of teeth on the driven sprocket, z_2 , using the equation:

$$z_2 = i \times z_1 \dots\dots\dots (4)$$

Note ¹⁾ A high speed refers to the speed exceeding the maximum value of the small sprocket speed of maximum kW rating of each chain size.

Note ²⁾ The small sprocket means a sprocket with the number of teeth z_1 or z_2 .

whichever is smaller.

7 Chain calculations and selection

7.1 Normal operating conditions and maximum kW ratings for chains

The typical maximum kW rating charts shown in Figure 1 to Figure 3 apply to chain drives operating under the following conditions:

- a) a chain drive with two sprockets on parallel horizontal shafts;
- b) a small sprocket with 19 teeth;
- c) a simplex chain without offset link;
- d) a chain length of 120 pitches;
- e) a speed ratio from 1 : 3 to 3 : 1;
- f) an expected life of 15 000 h;
- g) an operating temperature between $-5\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$;
- h) sprockets correctly aligned and chain maintained in correct adjustment (see Clause 10);
- i) uniform operation without overload, shocks or frequent starts/stops;
- j) clean and adequate lubrication throughout the chain's life (see Clause 9).

Figure 1 to Figure 3 are the typical maximum kW rating charts showing the relation between the maximum kW rating, P_d , and the small sprocket speed, n_s , and the nominal number of chain.

The maximum kW rating charts are representative of those published by chain manufacturers. Individual manufacturers can rate their chains differently. It is therefore recommended that the appropriate manufacturer's rating chart be consulted.

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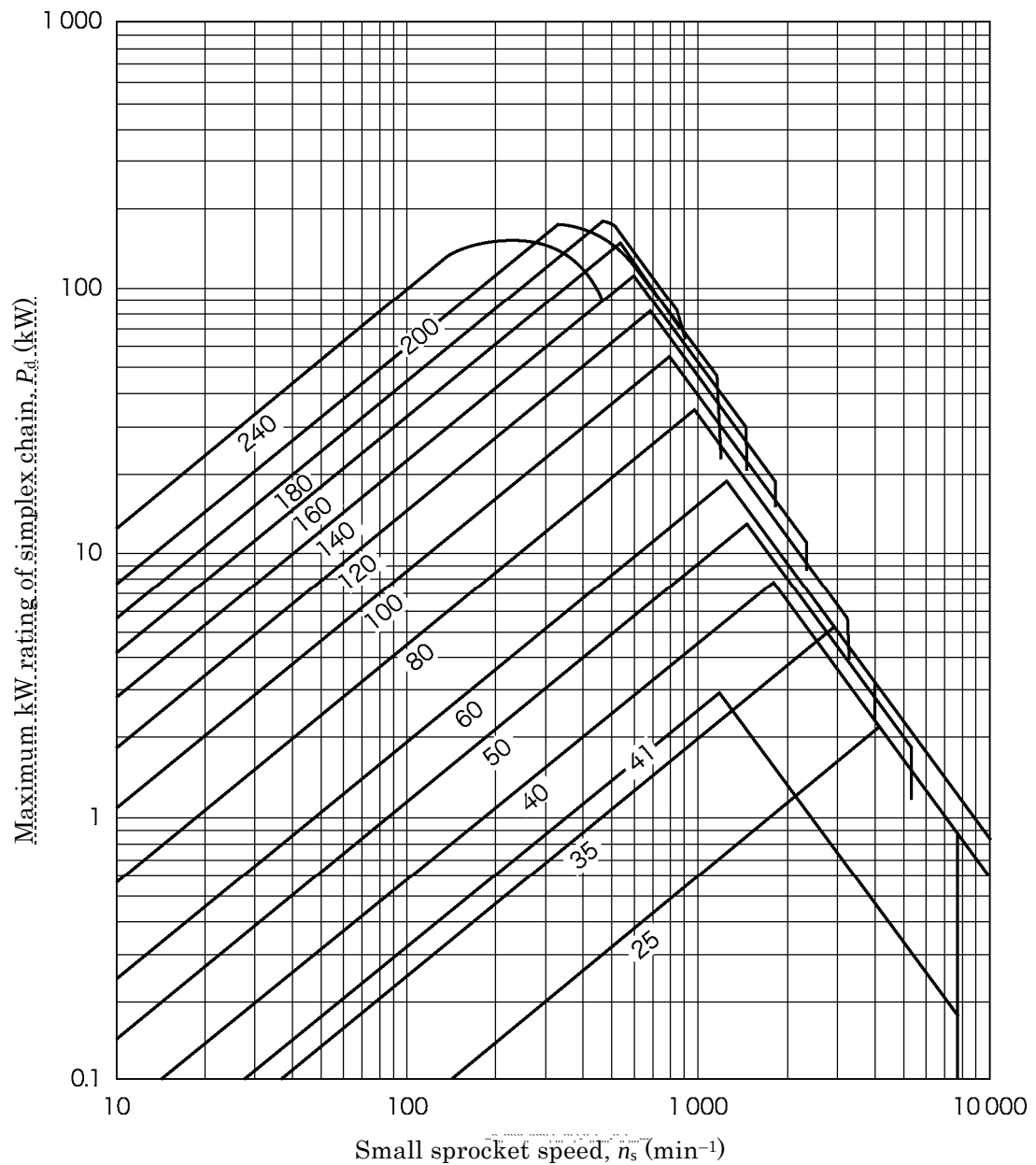


Figure 1 Typical maximum kW rating chart for selection of Series A chains based on 19-tooth sprocket conforming to JIS B 1801

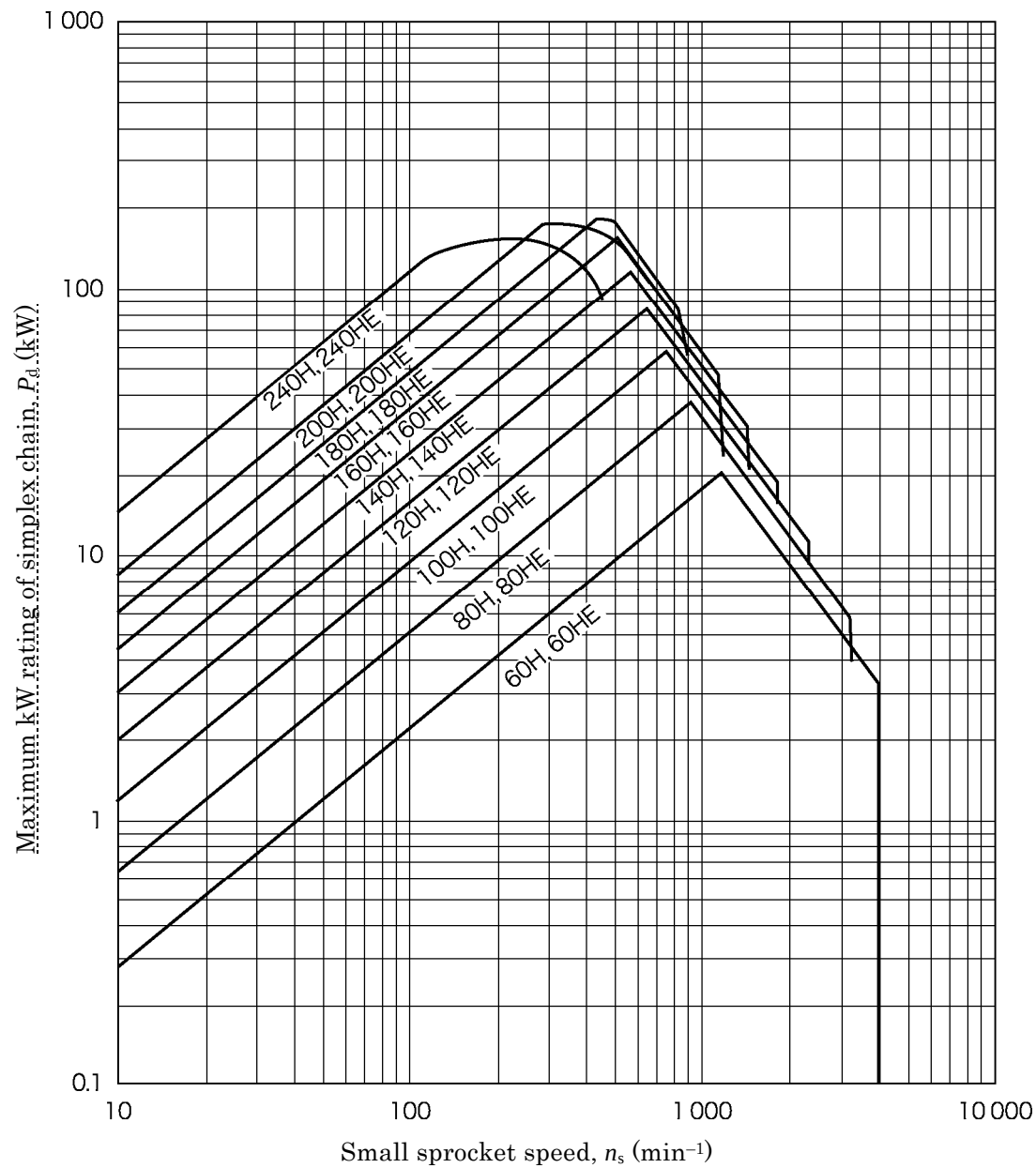


Figure 2 Typical maximum kW rating chart for selection of Series A Class H and Series A Class HE chains based on 19-tooth sprocket conforming to JIS B 1801