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**Mechanical presses — Testing of the
grades and the accuracy**

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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 Forming Machinery Association (JFMA)/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 6402: 1997**), which has been technically revised.

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Mechanical presses — Testing of the grades and the accuracy

1 Scope

This Japanese Industrial Standard describes the accuracy grades and the testing of accuracy of single action crank presses and single action crankless presses among the machinery presses for general purposes, which are used for punching, bending, forming and drawing of metallic materials (hereafter referred to as the presses). This Standard is not applicable to the presses for hot forging and the link presses, and the presses of special structure ¹⁾.

Note ¹⁾ Special structure presses include screw presses, powder forming presses and exclusive use presses with feeding device.

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 0111 *Press machinery — Vocabulary*

JIS B 6190-1 *Test code for machine tools — Part 1 : Geometric accuracy of machines operating under no-load or quasi-static conditions*

JIS B 7440-2 *Geometrical product specifications (GPS) — Acceptance and verification tests for coordinate measuring machines (CMM) — Part 2 : CMMs used for measuring linear dimensions*

JIS B 7440-8 *Geometrical product specifications (GPS) — Acceptance and verification tests for coordinate measuring systems (CMS) — Part 8 : CMMs with optical distance sensors*

JIS B 7539 *Cylindrical squares*

3 Term and definition

For the purpose of this Standard, the term and definition given in **JIS B 0111**, and the following apply.

3.1

gib set

state in which a slide guide (gib) has been adjusted to be ready for the production operation

4 Accuracy

4.1 Accuracy grades

The accuracy grades of presses shall be classified into four of Special grade, Grade 1, Grade 2 and Grade 3.

Examples of application for each grade are shown in Table 1.

Table 1 Examples of application

Grade	Example of application
Special grade	Precise punching of thin sheet, high speed precise punching, punching requiring specially high accuracy
Grade 1	Punching of thin sheet, high speed punching, precise punching, precise drawing
Grade 2	General punching, drawing, forming
Grade 3	Press processing of general purposes other than above

4.2 Testing of accuracy

4.2.1 General

The accuracy shall be tested under no load by the procedures specified in **JIS B 6190-1**, **JIS B 7440-2**, **JIS B 7440-8** and **JIS B 7539**.

4.2.2 Testing of accuracy on straightness of bolster (or bed) surface and slide surface

The accuracy on the straightness of bolster (or bed) surface and slide surface shall be tested in right and left direction and in back and forth direction as follows, taking the frontal side of machinery as “front”.

- a) **Measuring method** The straightness shall be measured using a straightedge with placing a parallel block under the straightedge.

Set the parallel block between the two points where the deflection of straightedge due to its own weight becomes minimum.

Set a dial gauge with magnet on the stand, apply the gauge head of dial gauge to the straightedge on its normal line, and move the stand along a straight line (guiding straightedge) for the measurement (see Figure 1).

In the measurement of bolster (or bed) surface, put the straightedge at three positions of centre and both ends of bolster (or bed) surface, move the dial gauge along the bolster (or bed) surface, and take the maximum deviation among the readings of dial gauge at respective positions as the measured value (see Figure 2).

In the measurement of slide surface, use a processed slide singly. Place the slide surface upward, put the straightedge at three positions of centre and both ends of slide surface, move the dial gauge along the slide surface, and take the maximum deviation among the readings of dial gauge at respective positions as the measured value (see Figure 2). The measuring length L_1 shall be the length obtained by sub-

tracting the non-measuring length L_2 at both ends from the overall length L . The relation among the overall length L , measuring length L_1 and non-measuring length L_2 shall be in accordance with Table 2. The overall length L shows the dimensions of bolster (or bed) surface and slide surface in right and left direction and in back and forth direction.

Instead of the measuring method using a straightedge, the straightness may be measured using a length measuring device based on optical means or the like.

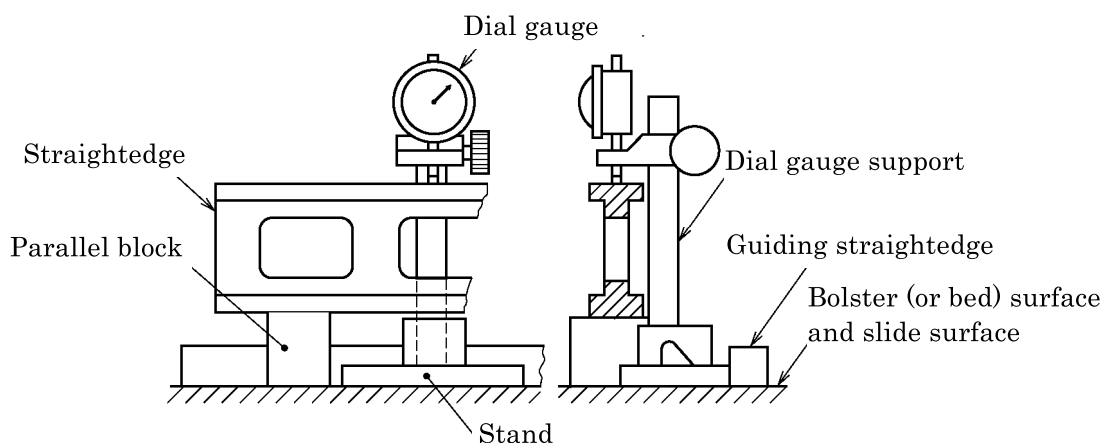


Figure 1 Example of straightness measuring method

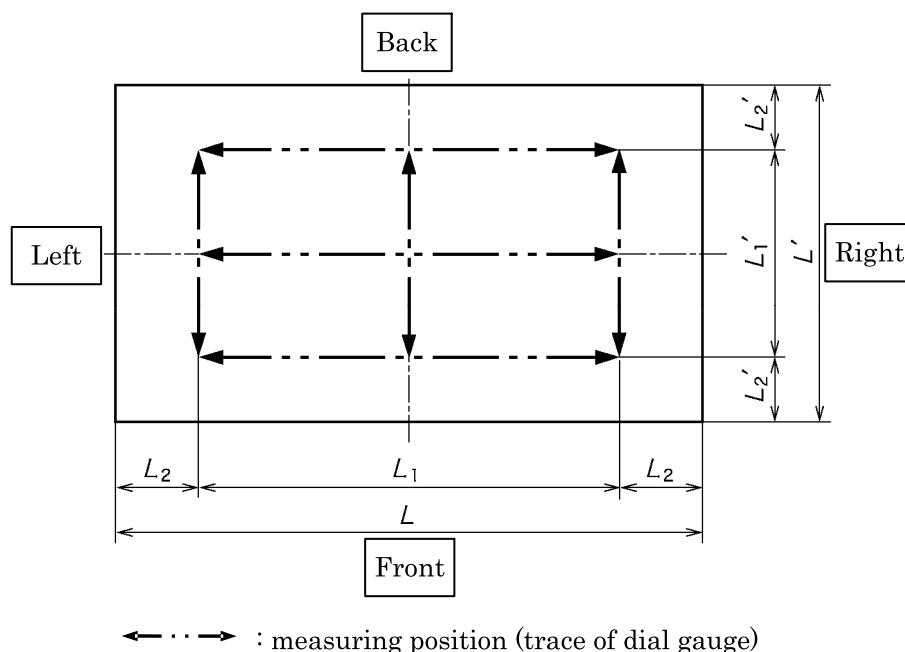


Figure 2 Measuring ranges of straightness

Table 2 Calculation method of measuring length

Unit: mm

Range of L	Measuring length L_1	Non-measuring length L_2
1 000 or under	$0.8L$	$0.1L$
Over 1 000 up to and incl. 3 000	$0.9L$	$0.05L$
Over 3 000	$L - 300$	150
The values in this table show the length in right and left direction. In the case of the length in back and forth direction, use L' , L_1' and L_2' instead of L , L_1 and L_2 .		

- b) **Permissible deviation** The permissible deviations of straightness shall be in accordance with Table 3.

Table 3 Permissible deviations of straightness of bolster (or bed) surface and slide surface

Unit: mm

Grade	Permissible deviation
Special grade	$0.010 + \frac{0.02}{1000} L_1$
Grade 1	$0.012 + \frac{0.04}{1000} L_1$
Grade 2	$0.015 + \frac{0.075}{1000} L_1$
Grade 3	$0.020 + \frac{0.12}{1000} L_1$
The values in this table show the permissible deviation in right and left direction. In the case of the permissible deviation in back and forth direction, use L_1' instead of L_1 for calculation.	

Figure A.1 shows an example of permissible deviation diagram for reference.

4.2.3 Testing of accuracy on parallelism between slide surface and bolster (or bed) surface

The accuracy on the parallelism between slide surface and bolster (or bed) surface shall be tested in right and left direction and in back and forth direction as follows.

- a) **Measuring method** The parallelism between two surfaces shall be measured in such a way that the relative distance between two surfaces is measured at four corners (front, back, right and left) taking one among the four measured values as a reference value and the differences between the reference value and other three measured values are taken as the measured values of parallelism.

Use a measuring stand and a dial gauge for the measurement. Set a dial gauge on the measuring stand having a flat bottom, put the measuring stand on the bol-