

# JIS

JAPANESE  
INDUSTRIAL  
STANDARD

Translated and Published by  
Japanese Standards Association

---

**JIS B 1515-2** : 2006

(ISO 1132-2 : 2001)

(JBIA)

**Rolling bearings—Tolerances—  
Part 2 : Measuring and gauging  
principles and methods**

---

ICS 21.100.20

Reference number : JIS B 1515-2 : 2006 (E)

## 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 according to the proposal of establishing a Japanese Industrial Standard from The Japan Bearing Industrial Association (JBIA), with a draft of Industrial Standard based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

Consequently, **JIS B 1515**: 1988 is withdrawn and replaced with this Standard and **JIS B 1515-1**.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

**JIS B 1515** series consists of the following two parts, under the general title “*Rolling bearings—Tolerances*”:

*Part 1 : Terms and definitions*

*Part 2 : Measuring and gauging principles and methods*

Date of Establishment: 2006-09-20

Date of Public Notice in Official Gazette: 2006-09-20

Investigated by: Japanese Industrial Standards Committee  
Standards Board  
Technical Committee on Machine Elements

---

JIS B 1515-2:2006, First English edition published in 2007-02

Translated and published by: Japanese Standards Association  
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

---

In the event of any doubts arising as to the contents,  
the original JIS is to be the final authority.

© JSA 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

AT

## Contents

	Page
Introduction.....	1
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	2
4 Symbols for quantities and drawing symbols .....	3
5 General conditions .....	5
5.1 Measuring equipment.....	5
5.2 Masters and indicators.....	5
5.3 Arbors .....	5
5.4 Temperature .....	5
5.5 Measuring force and radius of measuring stylus.....	5
5.6 Coaxial measuring load.....	6
5.7 Measurement zone .....	7
5.8 Preparation before measuring.....	7
5.9 Reference face for measurements .....	7
6 Measuring and gauging principles and methods .....	7
6.1 General .....	7
6.2 Format of clauses .....	8
6.3 Caution .....	8
7 Principles of measuring bore diameter.....	9
7.1 Measurement of single bore diameter.....	9
7.2 Functional gauging of smallest single bore diameter of thrust needle roller and cage assembly and thrust washer .....	10
7.3 Measurement of single bore diameter of rolling element complement ...	11
7.4 Measurement of smallest single bore diameter of rolling element complement .....	12
7.5 Functional gauging of smallest single bore diameter of rolling element complement .....	13

7.6	Functional gauging of smallest single bore diameter of rolling element complement (radial needle roller and cage assemblies) .....	14
8	Principles of measuring outside diameter .....	15
8.1	Measurement of single outside diameter .....	15
8.2	Measurement of single outside diameter of rolling element complement .....	16
8.3	Functional gauging of largest single outside diameter of rolling element complement .....	17
9	Principles of measuring width and height .....	18
9.1	Measurement of single ring width .....	18
9.2	Measurement of single outer ring flange width .....	19
9.3	Measurement of actual bearing width (primary method) .....	20
9.4	Measurement of actual bearing width (alternative method) .....	21
9.5	Measurement of actual bearing height (thrust bearings) .....	22
9.6	Measurement of actual effective width of inner subunit (tapered roller bearings) .....	23
9.7	Measurement of actual effective width of outer ring (tapered roller bearings) .....	24
10	Principles of measuring ring and washer chamfer dimension .....	25
10.1	Measurement of single chamfer dimension (primary method) .....	25
10.2	Functional gauging of single chamfer dimension (alternative method) ..	26
11	Principles of measuring raceway parallelism .....	27
11.1	Measurement of parallelism of inner ring raceway with respect to the face .....	27
11.2	Measurement of parallelism of outer ring raceway with respect to the face .....	28
12	Principles of measuring surface perpendicularity .....	29
12.1	Measurement of perpendicularity of inner ring face with respect to the bore (method A) .....	29
12.2	Measurement of perpendicularity of inner ring face with respect to the bore (method B) .....	30
12.3	Measurement of perpendicularity of outer ring outside surface with respect to the face .....	31

12.4	Measurement of perpendicularity of outer ring outside surface with respect to the flange back face.....	32
13	Principles of measuring thickness variation.....	33
13.1	Measurement of variation in thickness between inner ring raceway and bore.....	33
13.2	Measurement of variation in thickness between outer ring raceway and outside surface.....	34
13.3	Measurement of variation in thickness between shaft washer raceway and back face.....	35
13.4	Measurement of variation in thickness between raceway and back face of central shaft washer.....	36
13.5	Measurement of variation in thickness between housing washer raceway and back face.....	37
14	Principles of measuring radial runout.....	38
14.1	Measurement of radial runout of inner ring of assembled bearing (primary method).....	38
14.2	Measurement of radial runout of inner ring of assembled bearing (alternative method).....	39
14.3	Measurement of radial runout of outer ring of assembled bearing (primary method).....	40
14.4	Measurement of radial runout of outer ring of assembled bearing (alternative method).....	41
14.5	Measurement of asynchronous radial runout of inner ring of assembled bearing.....	42
15	Principles of measuring axial runout.....	43
15.1	Measurement of axial runout of inner ring of assembled bearing.....	43
15.2	Measurement of axial runout of outer ring of assembled bearing.....	44
15.3	Measurement of axial runout of outer ring flange back face of assembled bearing.....	45
16	Principles of measuring radial clearance.....	46
16.1	Measurement of radial internal clearance (method A).....	46
16.2	Measurement of radial internal clearance (method B).....	47
Annex A (normative)	Cross-reference to clauses in JIS B 1515-1.....	48

# Rolling bearings—Tolerances— Part 2 : Measuring and gauging principles and methods

**Introduction** This Japanese Industrial Standard has been prepared based on the first edition of **ISO 1132-2** *Rolling bearings—Tolerances—Part 2 : Measuring and gauging principles and methods* published in 2001 without modifying the technical contents.

The portions underlined with dots are the matters not included in the original International Standard.

**1 Scope** This part of **JIS B 1515** establishes guidelines for measurement of dimensions, running accuracy and internal clearance of rolling bearings. The purpose is to outline the fundamentals of various measuring and gauging principles which may be used in order to clarify and comply with the definitions of **JIS B 0104** and **JIS B 1515-1**.

If it is found that there are other adequate measuring and gauging methods or that technical development have resulted in even more convenient methods, the producer and the user may consider a measuring and gauging method other than that specified in this part of **JIS B 1515**.

NOTE : The International Standard corresponding to this part of **JIS B 1515** is as follows.

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**.

ISO 1132-2:2001 *Rolling bearings—Tolerances—Part 2 : Measuring and gauging principles and methods* (IDT)

**2 Normative references** The following standards contain provisions which, through reference in this text, constitute provisions of this part of **JIS B 1515**. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0023 *Technical drawings—Geometrical tolerancing—Maximum material requirement and least material requirement*

JIS B 0104 *Rolling bearings—Vocabulary*

NOTE : **ISO 5593**:1997 *Rolling bearings—Vocabulary* is equivalent to the said standard.

JIS B 0124 *Rolling bearings—Symbols for quantities*

NOTE : **ISO 15241**:2001 *Rolling bearings—Symbols for quantities* is equivalent to the said standard.