

kien098@tailieu.vn
JIS

JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

Ⓔ **JIS G 3112** : 2004
(JISF)

**Steel bars for
concrete reinforcement**

ICS 77.140.15; 91.080.40

Reference number : JIS G 3112 : 2004 (E)

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G 3112 : 2004

kien098@tailieu.vn

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 The Japan Iron and Steel Federation (JISF) 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 G 3112 : 1987 is replaced with this Standard.

This Standard has been made based on ISO 6935-1 : 1991 *Steel for the reinforcement of concrete—Part 1 : Plain bars* and ISO 6935-2 : 1991 *Steel for the reinforcement of concrete—Part 2 : Ribbed bars* for the purpose of making it easier to compare this Standard with International Standards, to prepare Japanese Industrial Standard conforming with International Standards; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

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.

Date of Establishment: 1964-07-01

Date of Revision: 2004-09-20

Date of Public Notice in Official Gazette: 2004-09-21

Investigated by: Japanese Industrial Standards Committee
Standards Board

Technical Committee on Iron and Steel

JIS G 3112:2004, First English edition published in 2005-02

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

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the original JIS is to be the final authority.

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Steel bars for concrete reinforcement

Introduction This Standard has been prepared based on **ISO 6935-1** *Steel for the reinforcement of concrete—Part 1 : Plain bars* and **ISO 6935-2** *Steel for the reinforcement of concrete—Part 2 : Ribbed bars* published in 1991 as the first edition with modifying some technical contents.

Portions sidelined or underlined with dots are the modified items of original International Standards. Comparison table is given in annex 1 (informative) with its explanations.

1 Scope This Japanese Industrial Standard specifies the round steel bar⁽¹⁾ and deformed steel bar⁽¹⁾ manufactured by hot rolling to be used for concrete reinforcement. However, those specified in **JIS G 3117** are excluded.

Note (1) The steel bars in coil form are included.

Remarks : The International Standards corresponding to this Standard are as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are **IDT** (identical), **MOD** (modified), and **NEQ** (not equivalent) according to **ISO/IEC Guide 21**.

ISO 6935-1 : 1991 *Steel for the reinforcement of concrete—Part 1 : Plain bars* (MOD)

ISO 6935-2 : 1991 *Steel for the reinforcement of concrete—Part 2 : Ribbed bars* (MOD)

2 Normative references The standards listed in attached table 1 contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) in attached table 1 shall be applied.

3 Grade and symbol The round and deformed steel bars shall be classified into two and five categories, respectively, and their symbols shall be as given in table 1.

Table 1 Symbol of grade

Division	Symbol of grade
Round steel bars	SR 235 SR 295
Deformed steel bars	SD 295 A SD 295 B SD 345 SD 390 SD 490

4 Chemical composition The round steel bars and deformed steel bars shall be tested in accordance with 9.1, and the cast analysis values shall conform to table 2.

Table 2 Chemical composition

Symbol of grade	Chemical composition %					
	C	Si	Mn	P	S	$C + \frac{Mn}{6}$
SR 235	—	—	—	0.050 max.	0.050 max.	—
SR 295	—	—	—	0.050 max.	0.050 max.	—
SD 295 A	—	—	—	0.050 max.	0.050 max.	—
SD 295 B	0.27 max.	0.55 max.	1.50 max.	0.040 max.	0.040 max.	—
SD 345	0.27 max.	0.55 max.	1.60 max.	0.040 max.	0.040 max.	0.50 max.
SD 390	0.29 max.	0.55 max.	1.80 max.	0.040 max.	0.040 max.	0.55 max.
SD 490	0.32 max.	0.55 max.	1.80 max.	0.040 max.	0.040 max.	0.60 max.

5 Mechanical properties The round and deformed steel bars shall be tested in accordance with 9.2, and their yield point or 0.2 % proof stress, tensile strength, elongation and bendability shall conform to table 3.

Furthermore, in the case of bend test, it shall be free from crack on the outside of the bent portion.

Table 3 Mechanical properties

Symbol of grade	Yield point or 0.2 % proof stress N/mm ²	Tensile strength N/mm ²	Tensile test piece	Elongation (%)	Bendability	
					Bend angle	Inside radius
SR 235	235 min.	380 to 520	No. 2	20 min.	180°	1.5 × Nominal diameter
			No. 14A	22 min.		
SR 295	295 min.	440 to 600	No. 2	18 min.	180°	1.5 × Nominal diameter for diameter 16 mm or less
			No. 14A	19 min.		2.0 × Nominal diameter for diameter more than 16 mm
SD 295 A	295 min.	440 to 600	Equivalent to No. 2	16 min.	180°	1.5 × Nominal diameter for diameter D 16 or under
			Equivalent to No. 14A	17 min.		2.0 × Nominal diameter for diameter over D 16
SD 295 B	295 to 390	440 min.	Equivalent to No. 2	16 min.	180°	1.5 × Nominal diameter for diameter D 16 or under
			Equivalent to No. 14A	17 min.		2.0 × Nominal diameter for diameter over D 16

Table 3 (concluded)

Symbol of grade	Yield point or 0.2 % proof stress N/mm ²	Tensile strength N/mm ²	Tensile test piece	Elongation ⁽²⁾ %	Bendability	
					Bend angle	Inside radius
SD 345	345 to 440	490 min.	Equivalent to No. 2	18 min.	180°	1.5 × Nominal diameter for diameter D 16 or under
			Equivalent to No. 14A	19 min.		2.0 × Nominal diameter for diameter over D 16 up to and incl. D 41
						2.5 × Nominal diameter for diameter D 51
SD 390	390 to 510	560 min.	Equivalent to No. 2	16 min.	180°	2.5 × Nominal diameter
			Equivalent to No. 14A	17 min.		
SD 490	490 to 625	620 min.	Equivalent to No. 2	12 min.	90°	2.5 × Nominal diameter for diameter D 25 or under
			Equivalent to No. 14A	13 min.		3.0 × Nominal diameter for diameter over D 25

Note (2) For the deformed steel bar exceeding designation D 32, 2 shall be deducted from the elongation value of table 3 for each increase of 3 in the number of the elongation. However, the limit of reduction shall be 4.

Remarks : 1 N/mm² = 1 MPa

6 Shape, dimension, mass and tolerances

6.1 Shape, dimension, mass and tolerances for round steel bars The shape, dimension, mass and tolerances for round steel bars shall conform to JIS G 3191. However, the standard length and its tolerance shall conform to tables 5 and 6.

6.2 Shape, dimension, mass and tolerances for deformed steel bars

6.2.1 Shape The shape shall be in accordance with the following.

- a) The deformed steel bar shall have protrusions⁽³⁾ on the surface.

Note (3) Protrusions in axial direction are referred to "ribs", and those in other directions "knots".

- b) Knots of the deformed steel bar shall be distributed at about a fixed interval throughout the whole length and shall have the identical shapes and dimension. However, in the case where letters or the like are indicated in the form of raised mark, the knots in that part may be lacked.
- c) The root parts of the knots of the deformed steel bar of designation D 16 or over shall be so shaped as to minimize the stress concentration.

6.2.2 Shape, dimension, mass and tolerances Shape, dimension, mass and tolerances of the deformed steel bars shall be as follows:

- a) Dimension, mass and allowable limits of knot for deformed steel bars shall conform to table 4.

Table 4 Dimension, mass and allowable limits of knot

Designation	Nominal diameter (<i>d</i>) mm	Nominal peripheral length (<i>l</i>) cm	Nominal section area (<i>S</i>) cm ²	Unit mass kg/m	Maximum value of mean interval between knots mm	Height of knot		Maximum value of sum of clearance between knots mm	Angle between knot and axial line
						Minimum value mm	Maximum value mm		
D 4	4.23	1.3	0.140 5	0.110	3.0	0.2	0.4	3.3	45° min.
D 5	5.29	1.7	0.219 8	0.173	3.7	0.2	0.4	4.3	
D 6	6.35	2.0	0.316 7	0.249	4.4	0.3	0.6	5.0	
D 8	7.94	2.5	0.495 1	0.389	5.6	0.3	0.6	6.3	
D 10	9.53	3.0	0.713 3	0.560	6.7	0.4	0.8	7.5	
D 13	12.7	4.0	1.267	0.995	8.9	0.5	1.0	10.0	
D 16	15.9	5.0	1.986	1.56	11.1	0.7	1.4	12.5	
D 19	19.1	6.0	2.865	2.25	13.4	1.0	2.0	15.0	
D 22	22.2	7.0	3.871	3.04	15.5	1.1	2.2	17.5	
D 25	25.4	8.0	5.067	3.98	17.8	1.3	2.6	20.0	
D 29	28.6	9.0	6.424	5.04	20.0	1.4	2.8	22.5	
D 32	31.8	10.0	7.942	6.23	22.3	1.6	3.2	25.0	
D 35	34.9	11.0	9.566	7.51	24.4	1.7	3.4	27.5	
D 38	38.1	12.0	11.40	8.95	26.7	1.9	3.8	30.0	
D 41	41.3	13.0	13.40	10.5	28.9	2.1	4.2	32.5	
D 51	50.8	16.0	20.27	15.9	35.6	2.5	5.0	40.0	

Remarks 1 The method of calculating the nominal sectional area, nominal peripheral length and unit mass shall be as follows:

In addition, the nominal section area (*S*) shall be rounded off to 4 places of significant figures, the nominal peripheral length (*l*) to 1 place of decimal, and the unit mass to 3 places of significant figures.

$$\text{Nominal sectional area } (S) = \frac{0.785 4 \times d^2}{100}$$

$$\text{Nominal peripheral length } (l) = 0.314 2 \times d$$

$$\text{Unit mass} = 0.785 \times S$$

- 2 The interval between the knots shall be 70 % or under of the nominal diameter and the calculated value shall be rounded off to 1 place of decimal.

3 The sum of clearances between knots⁽⁴⁾ shall be 25 % or less of the nominal peripheral length, and the calculated value shall be rounded off to 1 place of decimal.

Note (4) Clearances between knots shall be, in the case where a rib and knot are separated from each other, or where no rib is provided, the width of the position devoid of knots and, where a knot and rib are connected, shall be the width of the rib.

4 The height of knot shall conform to the following table, and the calculated value shall be rounded off to 1 place of decimal.

Size	Height of knot	
	Minimum	Maximum
Designation D 13 or under	4.0 % of nominal diameter	Twice the minimum value
Designation over D 13 to and excl. D 19	4.5 % of nominal diameter	Twice the minimum value
Designation D 19 or over	5.0 % of nominal diameter	Twice the minimum value

b) The standard length for the deformed steel bar shall conform to table 5.

Table 5 Standard length

Unit: m												
3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	8.0	9.0	10.0	11.0	12.0

Remarks : This table shall not apply to coils.

c) The tolerances on length for the deformed steel bar shall conform to table 6.

Table 6 Tolerances on length

Length	Tolerances
7 m or under	+40 mm 0
Over 7 m	For each increase of 1 m in length or its fraction, further 5 mm shall be added to the tolerances on the plus side given above. The maximum value, however, shall be limited to 120 mm.

Remarks 1 This table shall not apply to coils.

2 The purchaser may designate the tolerances other than given above.

d) The tolerances on mass for one piece of the deformed steel bar shall conform to table 7.

Table 7 Tolerances on mass for one piece

Dimension	Tolerances	Remarks
Designation under D 10	+ not specified - 8 %	The sampling methods of specimen and calculation of tolerances shall be in accordance with 9.3.2.
Designation D 10 or over to and excl. D 16	± 6 %	
Designation D 16 or over to and excl. D 29	± 5 %	
Designation D 29 or over	± 4 %	

- e) The tolerances on mass for one set of the deformed steel bar shall conform to table 8. However, this table shall be applied only when specified by the purchaser in advance.

Table 8 Tolerances on mass for one set

Dimension	Tolerances	Remarks
Designation under D 10	± 7 %	The sampling methods of specimen and calculation of tolerances shall be in accordance with 9.3.2.
Designation D 10 or over to and excl. D 16	± 5 %	
Designation D 16 or over to and excl. D 29	± 4 %	
Designation D 29 or over	± 3.5 %	

7 Appearance The round and deformed steel bars shall be free from defects that are detrimental to practical use.

8 Manufacturing method The round and deformed steel bars shall be manufactured by hot rolling from steel ingots.

9 Tests

9.1 Analytical test The analytical test shall be as given in the following:

- The general requirements for chemical analysis and sampling method of specimens shall be in accordance with clause 8 of JIS G 0404.
- The analytical method shall be in accordance with JIS G 0320.

9.2 Mechanical test

9.2.1 Test in general The general requirements for mechanical test shall be in accordance with clause 7 of JIS G 0404. In this case, sampling method of specimens shall be in accordance with Class A, and number of test pieces shall be as follows:

- The number of tensile test pieces and bend test pieces shall be each one piece taken from each lot of the same heat and several sizes where the difference of diameter or nominal diameter among them falls less than 10 mm. However, respective two pieces shall be taken from a lot exceeding 50 t.

9.2.2 Tensile test piece and bend test piece The tensile and bend test pieces shall be as follows. However, the test piece shall be the product as it is, not finished mechanically.

- a) The test piece shall be No. 2 test piece specified in **JIS Z 2201** (for the deformed steel bar, the applicable size shall be under designation D 25) or No. 14A test piece specified in **JIS Z 2201** (for the deformed steel bar, the applicable size shall be designation D 25 or over), and the gauge length and length of parallel portion of the deformed steel bar shall be determined according to the nominal diameter.
- b) The bend test piece shall be No. 2 test piece specified in **JIS Z 2204**.

9.2.3 Methods of tensile test and bend test The methods of tensile test and bend test shall be in accordance with **JIS Z 2241** and **JIS Z 2248**, respectively. And the cross section area to obtain the yield stress or 0.2 % proof stress and tensile strength of deformed steel bars shall apply the nominal section area as shown in table 4.

9.3 Measurement of shape, dimension and mass

9.3.1 Sampling method for measurement of shape, dimension and mass of round steel bars One specimen 0.5 m or over in length shall be taken from every lot of products rolled to the same shape and dimension within an identical roll chance. In the case of coil form, however, it shall be subjected to tests after being straightened at an ordinary temperature.

9.3.2 Sampling method of specimen and measuring method of shape, dimension and mass for deformed steel bar The sampling method of specimens and measuring method shall be as follows.

- a) For the deformed steel bar, the measuring method of the shape of knot and dimension and sampling method of the specimen shall be as follows.
 - 1) One specimen 0.5 m or over in length shall be taken from every lot of products rolled to the same shape and dimension within an identical roll chance. In the case of coil form, however, it shall be subjected to tests after being straightened at an ordinary temperature.
 - 2) The angle formed by the knot and the axial line of the deformed steel bar shall be measured with the development figure of surface of the deformed steel bar.
 - 3) The mean interval between knots shall be obtained by dividing into 10 equal parts either the sum of ten consecutive knot intervals measured on the centre line of knots, or a length corresponding to this measured on another line in the axial direction.
 - 4) The height of a piece of knot shall be obtained by averaging the values of three heights measured at points dividing the knot into four equal parts.
 - 5) The clearance between knots shall be determined either by measuring the distance between the end lines of confronting knots of the product itself as well as vertical to the end line using vernier callipers and the like, or by

measuring the development figure of the surface of the deformed steel bar. However, in the case where these distances are not uniform, the mean value shall be obtained by measuring the distance covering the consecutive ten knots.

Remarks : The development figure may be obtained, for example, by rolling a deformed steel bar on a sheet of oil clay.

- b) As to measurement of mass for the deformed steel bar, the sampling method of the specimen and calculation method of tolerance on mass shall be as follows.
- 1) The sampling method of specimen for measurement of mass of one piece shall be in accordance with 1) of 9.3.2 a). As to calculation method of tolerance on mass in this case, it shall be expressed in percentage of quotient of the difference between the theoretical mass, that is a product of the unit mass given in table 4 and the length, and actually measured mass divided by the said theoretical mass.
 - 2) As to the specimen for measurement of mass of one set of products, one specimen shall be taken from a lot of products of the identical shape and dimension, and of 1 t or more in mass. When the number of pieces corresponding to 1 t does not amount to 10 pieces, however, more than 10 pieces shall be taken to be one set. Further, as to calculation method of tolerance on mass in this case, it shall be expressed in percentage of quotient of the difference between the theoretical mass, this is a product of the unit mass given in table 4, the length and the number of pieces of one set and the actually measured mass divided by the said theoretical mass.

10 Inspection Inspection shall be as follows:

- a) Chemical composition, mechanical properties, shape, dimension, mass and appearance shall conform to clauses 4, 5, 6 and 7.
- b) Regarding the deformed steel bar of the designation D 32 or under for SD 295 B and SD 345, the purchaser, as particularly required, may designate a reverse bend test instead of a bend test. In this case, the sampling method, test method, acceptance criterion, and so on shall be agreed on between the purchaser and manufacturer, in advance.
- c) The round and deformed steel bars which have not passed the tensile test or bend test may be retested for acceptance in accordance with 9.8 of JIS G 0404.
- d) In the case of sampling inspection where the mass of one piece of deformed steel bar sampled has failed to conform to 6.2.2 d), two additional specimens shall be taken. When the test results for both meet the requirements, the lot shall be deemed as acceptable.

11 Marking The round and deformed steel bars shall be marked as specified in 11.1 and 11.2. However, the markings of the coil of the round steel bar and the coil of the deformed steel bar of designation D 4, D 5, D 6 and D 8 shall be in accordance with 11.2.

11.1 Marking on each piece The marking on each piece shall be as follows:

- a) The round and deformed steel bars shall be marked to identify the grade in accordance with table 9. However, the markings identifying the grade of the deformed steel bar shall employ the rolling mark method with exception of SD 295 A, and only the deformed steel bar of designation D 4, D 5, D 6 and D 8 and the deformed steel bar having screw-thread-shaped marks may be identified by colouring.
- b) The deformed steel bar shall be marked by rolling to denote the name of manufacturer or its abbreviation. However, the deformed steel bar of designation D 4, D 5, D 6 and D 8 in size (except for coils) and those of which manufacturer's name is self-evident due to the shape of the rolled mark, these indications may be omitted.

Table 9 Marking method for grade identification

Symbol of grade	Marking method for grade identification	
	Marking by rolling mark	Marking by colouring
SR 235	Not applied	Red (on one side section)
SR 295		White (on one side section)
SD 295 A	Without rolling mark	Not applied
SD 295 B	1 or	White (on one side section)
SD 345	Number of protrusions, one piece (•)	Yellow (on one side section)
SD 390	Number of protrusions, two piece (• •)	Green (on one side section)
SD 490	Number of protrusions, three piece (• • •)	Blue (on one side section)

11.2 Marking on each bundle The round and deformed steel bars shall be marked the following details by appropriate means.

- a) Symbol of grade
- b) Heat number or inspection number
- c) Nominal diameter or designation
- d) Manufacturers name or abbreviation

12 Report The report shall be in accordance with clause 13 of JIS G 0404.

Attached Table 1 Normative references

- JIS G 0320 *Standard test methods for heat analysis of steel products*
- JIS G 0404 *Steel and steel products—General technical delivery requirements*
- JIS G 3117 *Rerolled steel bars for concrete reinforcement*
- JIS G 3191 *Dimensions, mass and permissible variations of hot rolled steel bars and bar in coil*
- JIS Z 2201 *Test pieces for tensile test for metallic materials*
- JIS Z 2204 *Bend test pieces for metallic materials*
- JIS Z 2241 *Method of tensile test for metallic materials*
- JIS Z 2248 *Method of bend test for metallic materials*

Related standard:

- JIS G 0203 *Glossary of terms used in iron and steel (Products and quality)*

Annex 1 (informative)
Comparison table between JIS and corresponding International Standards

JIS G 3112: 2004 <i>Steel bars for concrete reinforcement</i>		ISO 6935-1: 1991 <i>Steel for the reinforcement of concrete— Part 1: Plain bars</i>		ISO 6935-2: 1991 <i>Steel for the reinforcement of concrete— Part 2: Ribbed bars</i>	
(I) Requirements in JIS	(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: text Indication method: dotted underlines or continuous sidelines	(V) Justification for the technical deviation and future measures
		Clause	Content		
1 Scope	Round steel bar and deformed steel bar manufactured by hot rolling to be used for concrete reinforcement.	ISO 6935-1, 6935-2	1	Round steel bar and deformed steel bar manufactured by hot rolling to be used for concrete reinforcement. However, deformed steel bar includes the cold formed material.	As ISO includes the cold formed material for deformed steel bar, TS/YP is equal or over 1.1, is lower than that of hot rolled material and is not the same with JIS designing standard. JIS types are already proposed to add to ISO (May, 2002).
2 Normative references	Eight standards are quoted (see attached table 1)		2	MOD/alteration	—

(I) Requirements in JIS		(II) International Standard number		(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures	
Clause	Content	Clause	Content	Classification by clause	Detail of technical deviation	Location of deviation: text	Indication method: dotted underlines or continuous sidelines		
3 Grade and symbol	Round steel bar 2 Deformed steel bar 5	5	Round steel bar 2 Deformed steel bar 5	MOD/alteration	Yield strength of both grades are close and similar grade. However, tensile strength of ISO is smaller than that of JIS compared with the same yield strength.			High TS/YP material of JIS type is proposed to be applied for ISO, and under working of ISO standard in TC 17/ SC 16/WG 7.	
4 Chemical composition	Round steel bar: P and S are specified. Deformed steel bar: P and S only, 5 elements and 5 elements plus C equivalent are specified according to the grade.	5 6	Round steel bar: P and S are specified. Deformed steel bar: P and S only, and 5 elements + N + C equivalent (for welding) are specified according to the grade.	MOD/deletion	Both are similar from the view point of chemical analysis. However, high-strength material of ISO deformed steel bar specifies the upper limit value of N.			Upper limit control of N is for the sake of improving the aging characteristic. The actual results of N in Japan are within the upper limit of ISO.	
5 Mechanical properties	Tensile test (tensile strength, yield point and elongation) and bending test are specified.	5 7	Round steel bar: Tensile test and bending test Deformed steel bar: Tensile test, bending test + reverse bending test (high tensile material) (+ fatigue characteristic if necessary)	MOD/alteration	Reverse bending test is specified for deformed steel bar of yield stress is 400 N/mm ² or over in ISO. In JIS, on the contrary, for the deformed steel bar of designation D 32 or under for SD 295 B and SD 345, the purchaser may designate a reverse bending test instead of bending test.			In JIS, aging is not so important problem, and since the reverse bending test is defined to be able under the condition cited in the left column, JIS almost coordinates with ISO.	

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Detail of technical deviation	
6	Shape, dimension, mass and tolerances		4	Round steel bar: Shape, dimension, mass and tolerances	MOD/alteration	Dimension mm Round 5.5 and 6-20 steel bar: over Deformed 4-51 steel bar: 6-40	The shape of deformed steel bar is different between JIS and ISO. It is difficult to change the shape of JIS to match with ISO, and will be proposed to add "shape can be changed under the agreement between the purchaser and the manufacturer" to ISO.
	6.1 Shape, dimension, mass and tolerances for round steel bar		4	Deformed steel bar: Shape, dimension, mass and tolerances			
	6.2 Shape, dimension, mass and tolerances (including shape of rib) for deformed steel bar		5	Deformed steel bar: Shape of rib			
7	Appearance			Not specified.	MOD/addition	Specification is necessary.	Will be proposed to add to ISO.
8	Manufacturing method		1 1	Mentioned in the scope.			ISO specifies deformed steel bar including cold formed material.

(I) Requirements in JIS		(II) International Standard number		(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures	
Clause	Content	Clause	Content	Classification by clause	Detail of technical deviation	Location of deviation: text	Indication method: dotted underlines or continuous sidelines		
9 Tests	9.1 Analytical test 9.2 Mechanical test 9.3 Measurement of shape, dimension and mass	7 10.3 8 11.3	Mechanical test Verification of characteristic values—chemical composition Mechanical tests Verification of characteristic values—chemical composition	MOD/ deletion	In ISO, shape and dimension are not referred, but it is not problem because the unit mass and tolerance are specified in table 1. For tensile test, there is the difference between ISO and JIS of TS for even the same YP. The bending radius of bend test is not the same for JIS and ISO.			Tensile test and bending test are specified for each grade. Grade of JIS is proposed to be applied to ISO, and also the test condition for the specification value of JIS grade will be proposed.	
10 Inspection	Specifies the condition of inspection	10 11	Certification and inspection Certification and inspection	MOD/ deletion	In ISO, the method of certification test is specified.				
11 Marking	Marking method for identification	9 10 Annex A	Marking Marking Marking system	MOD/ alteration	Method to identify the product is specified, and the detail is almost the same.				
12 Report	Report of the test results	11 12	Test report Test report	IDT					

Designated degree of correspondence between JIS and International Standards: MOD

- Remarks 1 Symbols in sub-columns of classification by clause in the comparison table indicate as follows:
- IDT: Identical in technical contents.
 - MOD/deletion: Deletes specification item(s) or content(s) of International Standards.
 - MOD/addition: Adds specification item(s) or content(s) which are not included in International Standards.
 - MOD/alteration: Alters the specification content(s) which are included in International Standards.
- 2 Symbol in column of designated degree of correspondence between JIS and International Standards in the comparison table indicates as follows:
- MOD: Modifies International Standards.

Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association, and also provided to subscribers of JIS (English edition) in *Monthly Information*.

Errata will be provided upon request, please contact:
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4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN
TEL. 03-3583-8002 FAX. 03-3583-0462

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