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**Dimensions, mass and permissible  
variations of hot rolled steel bars  
and bar in coil**

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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 the Japan Iron and Steel Federation (JISF)/the Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law. Consequently **JIS G 3191 : 1966** is replaced with this Standard.

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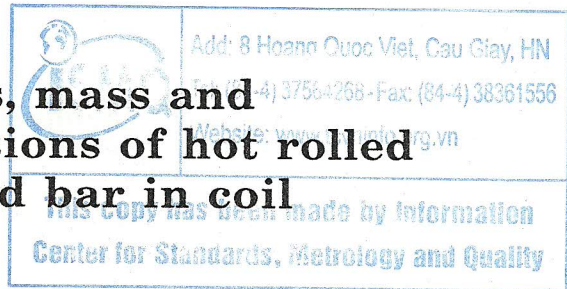
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**Dimensions, mass and  
permissible variations of hot rolled  
steel bars and bar in coil**



**1 Scope** This Standard specifies dimensions, mass and tolerances thereon as well as appearance, shape, and allowable limits thereto of steel bars and bar in coil which are manufactured by hot rolling.

In addition, the application of this Standard shall be stated in respective product standards.

**2 Normative reference** The following standard contains provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent edition of the standard (including amendments) indicated below shall be applied.

JIS Z 8401 *Guide to the rounding of numbers*

**3 Definitions** For the purposes of this Standard, the following definitions shall apply.

**3.1 steel bars** The steel which is hot rolled into a bar form and supplied by being cut into a prescribed length. There are types of round bars, square bars and hexagonal bars.

**3.1.1 round bars** The steel which is rolled into a bar form and of which cross sectional shape is round.

**3.1.2 square bars** The steel which is rolled into a bar form and of which cross sectional shape is square. It also includes a type of steel with the corner of cross sectional shape rounded.

**3.1.3 hexagonal bars** The steel which is rolled into a bar form and of which cross sectional shape is hexagonal.

**3.2 bar in coil** The steel which is hot rolled into a bar form and supplied by being wound into a coil shape.

**4 Expression of dimensions** The expression of dimensions shall be as follows.

**4.1** The dimensions of steel bars shall be expressed in millimeters for diameter, side or width across flats and in meters for length.

**4.2** The dimension of bar in coil shall be expressed in millimeters for diameter, side or width across flats.

**5 Standard dimensions** The standard dimensions shall be as follows.

**5.1** The standard diameter of round bar (including bar in coil) shall be in accordance with Table 1.

**Table 1 Standard diameter of round bar**

Unit : mm

5.5	6	7	8	9	10	11	12	13
(14)	16	(18)	19	20	22	24	25	(27)
28	30	32	(33)	36	38	(39)	42	(45)
46	48	50	(52)	55	56	60	64	65
(68)	70	75	80	85	90	95	100	110
(120)	130	140	150	160	180	200		

- Remarks 1 It is preferable that the standard diameters other than those being enclosed in parentheses should apply thereto.
- 2 The standard diameter shall apply to the round steel not less than 9 mm therein and to the bar in coil not more than 50 mm therein.

5.2 The standard length of steel bars shall be in accordance with Table 2.

**Table 2 Standard length of steel bars**

Unit : m

3.5,	4.0,	4.5,	5.0,	5.5,	6.0,	6.5,	7.0,	8.0,	9.0,	10.0
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Remarks : In the case of bar in coil, the total mass on order and coil unit mass shall be designated, when required.

6 **Dimensional tolerances** The dimensional tolerances shall be as follows.

6.1 The dimensional tolerances on diameter, side or width across flats and diametrical deviation of the steel bar and bar in coil shall be as given in Table 3.

**Table 3 Dimensional tolerance on diameter, side or width across flats and diametrical deviation of steel bar and bar in coil**

Unit : mm

Diameter, side or width across flats	Tolerance	Diametrical deviation <sup>(1)</sup>
Under 16	± 0.4	Not more than 70 % of total tolerance range of diameter, side or width across flats
16 or over to and excl. 28	± 0.5	
28 or over	± 1.8 %	

Note (1) The diametrical deviation denotes the difference between the maximum and minimum values of the diameter, side or width across flats in the same sectional area.

That is used for tolerance on diameter for round bar, side for square bar, and width across flats for hexagonal bar.

6.2 The tolerance on length of steel bar shall be as given in Table 4.

**Table 4 Tolerance on length of steel bar**

Length	Tolerance
7 m and under	+40 0 mm
Over 7 m	Add 5 mm to the tolerance on the + side above for every increment of 1 m length or the fractions.

**7 Mass** The mass shall be as follows.

**7.1** The mass of steel bar, in general, shall be the arithmetic mass in the units of kilograms. In case of bar in coil, the mass shall be the actual mass.

**7.2** The calculating method for the mass of steel bar shall be in accordance with Table 5. The dimension in this case shall be of the expressed dimension.

**7.3** The sectional area and unit mass to the standard diameter of the round bar which was found in accordance with 7.2 shall be as given in Attached Table 1.

**Table 5 Calculating method of mass of steel bar**

Sequence of calculation	Calculating method		Number of result figures
Basic mass kg/cm <sup>2</sup> /m	$7.85 \times 10^{-3}$ (sectional area of 1 mm <sup>2</sup> , mass of 1 m in length)		
Sectional area mm <sup>2</sup>	Round bar	$D^2 \times 0.785 4$ where $D$ : diameter (mm)	Round off in numerical value to 4 places of significant figures.
	Square bar	$A^2$ where $A$ : side (mm)	
	Hexagonal bar	$B^2 \times 0.866 0$ where $B$ : width across flats (mm)	
Unit mass kg/m	Basic mass (kg/cm <sup>2</sup> /m) $\times$ sectional area (mm <sup>2</sup> )		Round off in numerical value to 3 places of significant figures.
Mass per piece kg	Unit mass (kg/m) $\times$ length (m)		Round off in numerical value to 3 places of significant figures, provided that round off those exceeding 1 000 kg in the integer value of kg.
Gross mass kg	Mass per piece (kg) $\times$ total number of pieces of the same dimension		Round off in integer value of kg.

Remarks 1 The calculating method for the sectional area of steel bar which is not specified in Table 5 shall be in accordance with the agreement between the purchaser and the manufacturer.

2 The rounding of the numerical value shall be in accordance with **JIS Z 8401**.

**8 Tolerance on mass** The tolerance on mass of steel bar when designated by the purchaser shall be as given Table 6. In such case, the calculating method for tolerance shall be denoted in percentage of dividing the difference between arithmetic mass and actual mass by arithmetic mass.

**Table 6 Tolerance on mass**

Diameter, side or width across flats	Tolerance	Application
Under 10 mm	$\pm 7 \%$	Applicable to each unit (1 000 kg min.) of the same dimension, provided that applicable to each unit of 10 pieces or more in case of number of pieces corresponding to 1 000 kg not sufficing 10 pieces.
10 mm or over to and excl. 16 mm	$\pm 5 \%$	
16 mm or over to and excl. 28 mm	$\pm 4 \%$	
28 mm or over	$\pm 3.5 \%$	

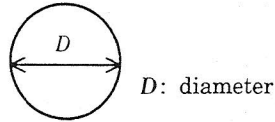
**9 Appearance** The appearance shall be as follows.

**9.1** The steel bar and bar in coil shall be free from detrimental defects to use. However, the bar in coil may possibly have some defects, because it is generally no occasion to remove the portion including the defect through the inspection.

**9.2** In case of the steel bar having the injurious surface defect, the manufacturer may remove the defect by chipping or grinding and the like, provided that the following conditions satisfy.

- a) The dimension (diameter, side or width across flats) of steel bar after being repaired shall be not less than 95 % of the expressed dimension.
- b) The repaired portion of steel bar shall be cleanly finished and smoothed on the boundary with the surface as it is rolled.

Attached Table 1 Sectional area and unit mass of round bar



Diameter mm	Sectional area mm <sup>2</sup>	Unit mass kg/m	Diameter mm	Sectional area mm <sup>2</sup>	Unit mass kg/m
5.5	23.76	0.186	(45)	1 590	12.5
6	28.27	0.222	46	1 662	13.0
7	38.48	0.302	48	1 810	14.2
8	50.27	0.395	50	1 964	15.4
9	63.62	0.499	(52)	2 124	16.7
10	78.54	0.617	55	2 376	18.7
11	95.03	0.746	56	2 463	19.3
12	113.1	0.888	60	2 827	22.2
13	132.7	1.04	64	3 217	25.3
(14)	153.9	1.21	65	3 318	26.0
16	201.1	1.58	(68)	3 632	28.5
(18)	254.5	2.00	70	3 848	30.2
19	283.5	2.23	75	4 418	34.7
20	314.2	2.47	80	5 027	39.5
22	380.1	2.98	85	5 675	44.5
24	452.4	3.55	90	6 362	49.9
25	490.9	3.85	95	7 088	55.6
(27)	572.6	4.49	100	7 854	61.7
28	615.8	4.83	110	9 503	74.6
30	706.9	5.55	120	11 310	88.8
32	804.2	6.31	130	13 270	104
(33)	855.3	6.71	140	15 390	121
36	1 018	7.99	150	17 670	139
38	1 134	8.90	160	20 110	158
(39)	1 195	9.38	180	25 450	200
42	1 385	10.9	200	31 420	247

Remarks : It is preferable that the standard diameter other than those being enclosed in parentheses should apply thereto.