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GB/T 702-2017

Replacing GB/T 702-2008

Hot-rolled steel bars - Dimensions, shape, weight and tolerances

热轧钢棒尺寸、外形、重量及允许偏差

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Foreword

GB/T 702-2017 was issued on 29 September 2017 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China together with the Standardization Administration of China, and came into force on 1 June 2018. It is classified under ICS 77.140.60 and Chinese classification code H 44, and it replaces GB/T 702-2008, Hot-rolled steel bars - Dimensions, shape, weight and tolerances.

The standard was drafted in accordance with the rules given in GB/T 1.1-2009.

Compared with GB/T 702-2008 the main changes are: the size range of hot-rolled round bar and square bar was adjusted; the dimensional tolerances of hot-rolled round bar and square bar were adjusted; the provision on the full length of ordinary-quality hot-rolled bar was deleted; the provision on the end cutting squareness of hot-rolled round and square bar was adjusted; a provision on the corner radius of hot-rolled flat bar was added; the provisions on the straightness of hot-rolled hexagonal and octagonal bar were adjusted; the provisions on the end cutting squareness of hot-rolled hexagonal and octagonal bar were adjusted; the designation example was deleted.

The standard was proposed by the China Iron and Steel Association and is under the jurisdiction of the National Technical Committee on Steel Standardization (SAC/TC 183).

Drafting organisations: Dongbei Special Steel Group Beiman Special Steel Co., Ltd.; Metallurgical Industry Information Standards Research Institute; Jiangyin Xingcheng Special Steel Works Co., Ltd.; Shougang Corporation; Fushun Special Steel Co., Ltd.

Principal drafters: Qian Chengyun, Wang Yujie, Chen Qinghua, Xiong Huabing, Gu Qiang, Liu Baoshi, Zhang Jinfeng.

The previous editions of the standards replaced by this document were issued as: GB/T 702-1965, GB/T 702-1972, GB/T 702-1986, GB/T 702-2004, GB/T 702-2008; GB/T 704-1983, GB/T 704-1989; GB/T 705-1983, GB/T 705-1990; GB/T 911-1966, GB/T 911-2004.

1 Scope

A hot-rolled bar leaves the last stand of the mill at something close to a thousand degrees C and then shrinks, sags and twists as it cools on the bed, so the section a customer measures cold is never exactly the section the rolls cut. Roll wear opens the gap between the two halves of the pass over a campaign, the bar spreads slightly where the pass is not full, and a long bar left unsupported takes a permanent bow. None of that matters to the steelmaker, who sells by weight; all of it matters to the machine shop that has to hold the bar in a chuck, the forge that has to fill a die, and the buyer who ordered a length and received a heap of short ends. This document fixes the common commercial language for that trade in China: the nominal sizes that may be ordered, the theoretical weight per metre attached to each of them, how far the real dimension may stray from the nominal one, how straight and how round the bar must be, how long it may be and how many short pieces a lot may contain. Because it governs geometry and not chemistry, it is called up by nearly every Chinese product standard for round, square, flat, hexagonal and octagonal bar.

This standard specifies the cross-sectional shape, the cross-sectional dimensions, the weight and the permissible deviations, the length and its permissible deviations, and the shape of hot-rolled steel bars (round bar, square bar, flat bar, hexagonal bar and octagonal bar).

This standard applies to hot-rolled round bar of 5.5 mm to 380 mm diameter and to hot-rolled square bar of 5.5 mm to 300 mm side length; to general-purpose hot-rolled flat bar of 3 mm to 60 mm thickness and 10 mm to 200 mm width; to hot-rolled tool steel flat bar of 4 mm to 100 mm thickness and 10 mm to 310 mm width (general-purpose hot-rolled flat bar and hot-rolled tool steel flat bar are together referred to below as hot-rolled flat bar); and to hot-rolled hexagonal bar of 8 mm to 70 mm across flats and hot-rolled octagonal bar of 16 mm to 40 mm across flats.

2 Cross-sectional shape

2.1 The cross-sectional shape of hot-rolled round bar and square bar is shown in Figure 1, the round bar being defined by its diameter (d) and the square bar by its side length (a).

2.2 The cross-sectional shape of hot-rolled flat bar is shown in Figure 2, defined by its width (b) and its thickness (t).

2.3 The cross-sectional shape of hot-rolled hexagonal bar and octagonal bar is shown in Figure 3, defined by the distance across flats (s) and the corner radius (r).

3.1 Dimensions and weight

3.1.1 The dimensions and theoretical weights of hot-rolled round bar and square bar shall conform to Table A.1 of Annex A.

3.1.2 The dimensions and theoretical weights of general-purpose hot-rolled flat bar shall conform to Table A.2.

3.1.3 The dimensions and theoretical weights of hot-rolled tool steel flat bar shall conform to Table A.3.

3.1.4 The dimensions and theoretical weights of hot-rolled hexagonal bar and octagonal bar shall conform to Table A.4.

3.1.5 Bars in sizes other than those listed in the tables of Annex A may also be supplied where the supplier and the purchaser have so agreed and the agreement is stated in the contract.

3.1.6 Hot-rolled steel bars are normally delivered by actual weight. Delivery by theoretical weight is permitted where the supplier and the purchaser have so agreed and the agreement is stated in the contract.

3.2 Dimensions and permissible deviations

3.2.1 The dimensional tolerances of hot-rolled round bar and square bar shall conform to Table 1. The tolerance group shall be stated in the relevant product standard or in the order contract; where it is not stated, group 3 applies.

Table 1 gives the permissible deviation on the nominal cross-sectional dimension (round bar diameter or square bar side length), in millimetres, for three tolerance groups. For over 5.5 to 20 the deviations are plus or minus 0.25, 0.35 and 0.40 for groups 1, 2 and 3; over 20 to 30, 0.30, 0.40 and 0.50; over 30 to 50, 0.40, 0.50 and 0.60; over 50 to 80, 0.60, 0.70 and 0.80; over 80 to 110, 0.90, 1.00 and 1.10; over 110 to 150, 1.20, 1.30 and 1.40; over 150 to 200, 1.60, 1.80 and 2.00; over 200 to 280, 2.00, 2.50 and 3.00; over 280 to 310, 2.50, 3.00 and 4.00; and over 310 to 380, 3.00, 4.00 and 5.00.

3.2.2 The dimensional tolerances of general-purpose hot-rolled flat bar shall conform to Table 2. The tolerance group shall be stated in the relevant product standard or in the order contract; where it is not stated, group 2 applies.

Table 2 gives the width tolerances in millimetres as follows, for groups 1 and 2 respectively: nominal width 10 to 50, plus 0.3 minus 0.9 and plus 0.5 minus 1.0; over 50 to 75, plus 0.4 minus 1.2 and plus 0.6 minus 1.3; over 75 to 100, plus 0.7 minus 1.7 and plus 0.9 minus 1.8; over 100 to 150, plus 0.8 per cent b minus 1.8 per cent b and plus 1.0 per cent b minus

2.0 per cent b; over 150 to 200, by agreement between supplier and purchaser. The thickness tolerances are: nominal thickness 3 to 16, plus 0.2 minus 0.4 for group 1 and plus 0.3 minus 0.5 for group 2; over 16 to 60, plus 1.0 per cent t minus 2.5 per cent t for group 1 and plus 1.5 per cent t minus 3.0 per cent t for group 2. The difference in thickness measured between any two points of the same cross section shall not be greater than 50 per cent of the thickness tolerance.

3.2.3 The dimensional tolerances of hot-rolled tool steel flat bar shall conform to Table 3.

Table 3 gives width tolerances in millimetres of 0 to plus 0.70 for a nominal width of 10; 0 to plus 0.80 for over 10 to 18; 0 to plus 1.20 for over 18 to 30; 0 to plus 1.60 for over 30 to 50; 0 to plus 2.30 for over 50 to 80; 0 to plus 2.50 for over 80 to 160; 0 to plus 2.80 for over 160 to 200; 0 to plus 3.00 for over 200 to 250; and 0 to plus 3.20 for over 250 to 310. The thickness tolerances are 0 to plus 0.40 for a nominal thickness of not less than 4 up to 6; 0 to plus 0.50 for over 6 to 10; 0 to plus 0.60 for over 10 to 14; 0 to plus 0.80 for over 14 to 25; 0 to plus 1.20 for over 25 to 30; 0 to plus 1.40 for over 30 to 60; and 0 to plus 1.60 for over 60 to 100.

3.2.4 The dimensional tolerances of hot-rolled hexagonal bar and octagonal bar shall conform to Table 4. The tolerance group shall be stated in the relevant product standard or in the order contract; where it is not stated, group 3 applies. Where the supplier and the purchaser have agreed and the agreement is stated in the contract, the bar may be rolled to positive tolerances only, in which case the dimensional tolerance of the hexagonal or octagonal bar shall be the tolerance listed in Table 4 for that size.

Table 4 gives the permissible deviation on the distance across flats s, in millimetres, for the three groups: not less than 8 up to 17, plus or minus 0.25, 0.35 and 0.40; over 17 to 20, plus or minus 0.25, 0.35 and 0.40; over 21 to 30, plus or minus 0.30, 0.40 and 0.50; over 30 to 50, plus or minus 0.40, 0.50 and 0.60; over 50 to 70, plus or minus 0.60, 0.70 and 0.80.

3.2.5 Where the supplier and the purchaser have agreed and the agreement is stated in the contract, the dimensional tolerances of the bar may follow special requirements other than those specified in Tables 1, 2, 3 and 4.

4 Length and permissible deviations

4.1 The usual lengths and short lengths of hot-rolled round bar and square bar shall conform to Table 5. The permissible deviation on a cut length or multiple length is plus 50 mm to 0 mm.

Table 5 gives, for all sizes, a usual length of 2 000 mm to 12 000 mm with a short length of not less than 1 500 mm. For carbon and alloy tool steel of nominal size not greater than 75 the usual length is 2 000 mm to 12 000 mm with a short length of not less than 1 000 mm, and for sizes over 75 the usual length is 1 000 mm to 8 000 mm with a short length of not less than 500 mm; the latter figure covers all sizes of high-speed tool steel.