

Supply Technical Conditions of Baoshan Iron and Steel Co., Ltd.

Cold-rolled advanced high-strength steel plates and steel strips

Q/BQB 418-2014

Replacing Q/BQB 415-2009, Q/BQB 417-2009, Q/BQB 418-2009

1 Scope

This Technical Conditions specifies the terms and definitions, classification and code, dimension, shape, weight, technical requirements, inspection and test, packaging, marking and inspection documents of cold-rolled advanced high-strength steel plates and steel strips.

This Technical Conditions applies to cold-rolled advanced high-strength steel plates and steel strips with a thickness of 0.50 mm ~ 2.3 mm (hereinafter referred to as steel plates and steel strips) produced by Baoshan Iron and Steel Co., Ltd.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 223 Methods for chemical analysis of iron, steel and alloy

GB/T 228.1-2010 Metallic materials - Tensile testing - Part 1: Method of test at room temperature

GB/T 232-2010 Metallic materials - Bend test

GB/T 2975-1998 Steel and steel products - Location and preparation of test pieces for mechanical testing

GB/T 4336-2002 Standard test method for spark discharge atomic emission - Spectrometric analysis of carbon and low-alloy steel (routine method)

the retained austenite content is not less than 5 %. During the forming process, the retained austenite can be transformed into martensite structure. Due to its relatively high work hardening rate, the steel has a relatively high uniform elongation and a relatively high tensile strength. At the same tensile strength level, it has a higher elongation than dual phase steel.

3.4 complex phase steels (CP)

The microstructure of the steel is martensite, bainite, ferrite and a small amount of retained austenite. The matrix structure is mainly hard phase martensite and bainite, the yield is relatively high, and the uniform elongation is slightly lower than that of dual phase steel (DP) and transformation induced plasticity steel (TRIP) at the same tensile strength level. The tensile strength is usually above 600 MPa, and the bending property is excellent.

3.5 quenching and partitioning steel (QP)

The steel is a kind of high-formability ultra-high-strength steel produced by quenching-partitioning process. The microstructure of the steel is composed of multiphase composites such as martensite + ferrite + retained austenite. Utilizing the ultra-high strength of martensite and the transformation induced plasticity (TRIP) effect of retained austenite, it is possible to obtain better formability than conventional ultra-high strength steel. QP steel has a medium yield ratio and relatively high work hardening properties, and is suitable for body frame parts and safety parts with relatively complex shapes and high strength requirements.

4 Classification and code

4.1 The classification of steel plates and steel strips according to use shall comply with the requirements of Table 1.

4.2 The classification of steel plates and steel strips according to surface quality shall comply with the requirements of Table 2.

4.3 The classification of steel plates and steel strips according to surface structure shall comply with the requirements of Table 3.

5 Information required for ordering

5.1 The user shall provide the following information when ordering:

- a) product name (steel plate or steel strip);
- b) number of this Technical Conditions;
- c) grade;
- d) product specification and dimension, flatness accuracy;
- e) edge state;
- f) surface quality level;
- g) packaging method;
- h) use;
- i) other.

5.2 If the dimension and flatness accuracy, surface quality level, edge state and packaging method are not indicated in the order contract, then the products in this Technical Conditions are supplied as trimmed steel strips or trimmed steel plates with ordinary dimension and flatness accuracy, FB level surface quality, and packaged according to the packaging method provided by the supply party.

6 Dimension, shape, weight and tolerances

The dimension, shape, weight and tolerances of steel plates and steel strips shall comply with the requirements of Q/BQB 401.

7 Technical requirements

7.1 Chemical composition

7.1.1 The chemical composition of the steel (smelting analysis) shall comply with the requirements of Table 4.

7.1.2 The chemical composition tolerance of finished products of steel plates and steel strips shall comply with the requirements of GB/T 222.

7.3.1 Steel plates and steel strips are delivered after cold rolling, annealing and leveling.

7.3.2 Steel plates and steel strips are usually supplied with oiling, and the oil film applied shall be able to be removed with aqueous alkaline solution. Under normal conditions of packaging, transportation, handling and storage, the supply party shall ensure that the surface of steel plates and steel strips does not rust within 6 months from the date of completion of the manufacture. According to the requirements of the demand party, agreed upon between the supply and demand parties and specified in the contract, products may also be supplied without oiling. For non-oiled products, the supply party will not bear the corresponding product quality responsibility for defects such as rust, scratches and friction marks during the handling, storage and use.

NOTE: The date of issue in the product inspection document is usually specified as the date of completion of the manufacture of the product.

7.4 Mechanical properties

7.4.1 The supply party shall ensure that the mechanical properties of steel plates and steel strip before hot stamping comply with the requirements of Table 5, Table 6, Table 7, Table 8, Table 9 and Table 10 within 6 months from the date of completion of the manufacture.

7.4.2 When steel plates and steel strips are supplied according to the specified parts, the supply and demand parties may agree on a range of mechanical properties that meet the processing needs of the part as the acceptance criteria. At this time, the mechanical properties specified in Table 5, Table 6, Table 7, Table 8, Table 9 and Table 10 will no longer be used as the basis for delivery and acceptance.

7.4.3 Due to the influence of aging, the mechanical properties of steel plates and steel strips will deteriorate with the prolongation of storage time, such as the increase of yield strength and tensile strength, the decrease of elongation after break, formability deteriorates, tensile strain marks appear, etc. It is recommended that users use it as soon as possible.

Table 11

Level	Code	Characteristics
Relatively advanced finishing surface	FB	The surface is allowed to have a small amount of imperfections that do not affect the formability and coating and plating adhesion, such as slight gouges, dents, pocks, roll marks, and oxidized spots.
Advanced finishing surface	FC	The better side of the two sides of the product has no visible imperfections, and the other side must meet at least the requirements of FB.

7.5.3 For steel strips, the strip is allowed to be delivered with defects due to unwilling to cut the defective part, but the defective part shall not exceed 6 % of the total length of each coil.

7.6 Surface structure

When the surface structure is pitted surface (D), the average roughness R_a is controlled by $0.6 \mu\text{m} < R_a \leq 1.9 \mu\text{m}$; when the surface structure is bright surface (B), the average roughness R_a is controlled by $R_a \leq 0.9 \mu\text{m}$.

8 Inspection and test

8.1 The appearance of steel plates and steel strips shall be visually inspected.

8.2 The dimension and shape of steel plates and steel strips shall be measured with suitable measuring tools.

8.3 The tensile test shall be in accordance with Method B of GB/T 228.1. In order to improve the reproducibility of the measurement results, it is recommended to use the beam displacement control method. The rate to measure the yield strength is 5 % L_c/min (L_c is the parallel length of the specimen).

8.4 The n value is calculated over a 10 % to 20 % strain range. When the uniform elongation is less than 20 % but not less than 12 %, the strain range for calculation is 10 % to the end of the uniform extension; when the uniform elongation is less than 12 %, the strain hardening index shall be reported as the true strain value calculated at the end point of the uniform elongation ($n_{\text{uniform extension}} = \epsilon_{\text{uniform extension}}$).

8.5 Steel plates and steel strips shall be accepted in batches. Each inspection batch shall consist of steel plates and steel strips of the same grade, the same specification and the same processing state of not more than 30 tons. For steel strips weighing more than 30 tons, each steel coil constitutes an inspection batch.

Additional information:

This Technical Conditions is prepared with reference to prEN 10338:2013, FIAT MS.50002-2014 and GMW3399-2013.

This Technical Conditions replaces Q/BQB 415-2009, Q/BQB 417-2009 and Q/BQB 418-2009.

Compared with Q/BQB 415-2009, Q/BQB 417-2009 and Q/BQB 418-2009, the main technical changes are as follows:

- DELETE the following grades: HC280/590DP, HC550/690DP, HC500/780MS;
- ADD DP steel grades: HC550/980DP-EL, HC650/980DP;
- ADD CP steel grades: HC350/600CP, HC500/780CP, HC700/980CP, HC1350/1700MS;
- ADD QP steel grades: HC600/980QP, HC600/980QP-EL, HC820/1180QP, HC820/1180QP-EL.
- ADD the product quality responsibility rules for products without surface oiling;
- ADD the requirements for the duration of mechanical properties;
- ADD the requirements for mechanical properties of the specified parts when delivered;
- CLARIFY the method used in the tensile test;
- ADD the requirements for in-plant inspection method.

Annex A of this Technical Conditions is an informative annex.

This Technical Conditions was proposed by the Manufacturing Management Department of Baoshan Iron and Steel Co., Ltd.

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Drafter of this Technical Conditions: Sun Zhongming.

This Technical Conditions was first released in 1999, first revised in 2003, and

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Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

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