

ICS 77.140.50

CCS H 46



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 38277-2026

Replacing GB/T 38277-2019

Brittle crack arrest high strength steel plate for ships

船用高强度止裂钢板

Issued on: May 25, 2026

Implemented on: December 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

- 1 Scope
- 7 Technical Requirements
 - 7.1 Grade and Chemical Composition
 - 7.2 Mechanical Properties
 - 7.3 Surface Quality
- 8 Test Methods
 - 8.1 Test Requirements
 - 8.2 Dimensional Inspection
- 9 Inspection Rules

7.1 Grade and Chemical Composition

7.1.1 The grade and chemical composition (smelting analysis) of the steel shall conform to the specifications in Table

2. For steel plates delivered by thermomechanical rolling, the carbon equivalent... The maximum values of (Ceq) and the weld crack susceptibility index (Pcm) should conform to the provisions of Table 3.

7.1.2 When the purchaser requires that the performance in the thickness direction be guaranteed, the sulfur content shall comply with the provisions of GB/T 5313.

7.1.3 The permissible deviation of the chemical composition of finished steel products shall comply with the provisions of GB/T 222.

7.2 Mechanical Properties

7.2.1 The tensile properties of the steel plate shall conform to the requirements of Table 4.

7.2.2 When the buyer requires guaranteed properties in the thickness direction of the steel plate, Z25 or Z35 should be specified, and the reduction of area in the thickness direction should meet the requirements. The provisions of GB/T 5313.

7.2.3 The impact performance of the steel plate shall conform to the specifications in Table

4. The impact test results of the steel plate shall be calculated as the arithmetic mean of a set of three specimens. It is permissible for one test value to be lower than the specified value, but it should not be lower than 70% of the specified value.

7.2.4 For type approval, steel plates with BCA1 or BCA2 properties shall be tested for brittle

crack arrest toughness according to GB/T 46169-2025. (Kca) or the crack arrest temperature (CAT) shall be determined according to Appendix A, and the results shall conform to the provisions of Table 5.

7.2.5 Small-scale testing methods (such as NDT) may be used in place of brittle crack arrest toughness (Kca) tests or crack arrest temperature tests before delivery of steel plates. (CAT) test, but approval is required before applying this test method. If the drop weight test (NDT) is used, the test results should conform to Table 5. According to the regulations.

7.2.6 During type approval, the coarse-grained heat effect of steel plates with COD characteristics shall be determined according to GB/T 21143 or other methods. The CTOD performance of the zone (CGHAZ) conforms to the specifications in Table 5.

7.3 Surface Quality

7.3.1 The surface of the steel plate shall be free from defects such as bubbles, scale, cracks, folds, inclusions, and pressed-in iron oxide scale. The end face of the steel plate shall be free from visually perceptible defects. See layering.

7.3.2 The surface of the steel plate is permitted to have a thin layer of iron oxide scale, rust, and other defects caused by the pressing of iron oxide scale and rolling mill rolls, which do not impede the inspection of surface defects. Minor roughness, cracks, scratches, and other localized defects are acceptable, but their depth should not exceed the negative tolerance of the steel plate thickness, and the steel plate should be allowed to... The minimum thickness of Xu.

7.3.3 Surface defects in steel plates may be removed by grinding. The cleaned area should be smooth and without sharp edges. After cleaning, the thickness of any part of the steel plate should not be reduced. Less than 93% of the nominal thickness, and under no circumstances should it be less than 3mm smaller than the nominal thickness; the area of a single grinding operation should not exceed 0.25m²; localized grinding... The sum of the grinding areas should not exceed 2% of the total area. The distance between two grinding surfaces should be greater than their average width; otherwise, it is considered as one. A grinding surface.

7.4 Non-destructive testing Each steel plate shall be ultrasonically tested according to NB/T 47013.3, with a passing grade of not less than Grade III. Alternatively, upon negotiation between the supplier and the buyer, [other methods may be used]. Other flaw detection standards and acceptance levels.

7.5 Other Requirements Other items may also be inspected upon consultation between the supplier and the buyer, with specific requirements to be specified in the technical agreement or contract.

7.6 Dimensions, shape, and weight The dimensions, shape, weight, and permissible deviations of the steel plates shall conform to the provisions of GB/T 709-2019, and the permissible deviations of the thickness shall conform to GB/T 709-2019. Category B, and the average thickness of the steel plate should not be less than the nominal thickness.

8.1 Test Requirements

8.1.1 The chemical composition analysis of steel is usually performed according to GB/T 223 (all parts), GB/T 4336, GB/T 20123, GB/T 20124, The arbitration shall be conducted in accordance with the provisions of GB/T 20125 or the general method, and shall be determined by the supply and demand parties through negotiation.

8.1.2 The inspection items, sampling quantity, sampling method and test method of steel plates shall comply with the provisions of Table 6.

8.2 Dimensional Inspection

8.2.1 The dimensions and shape of the steel plate shall be checked with appropriate measuring tools.

8.2.2 The method for measuring the average thickness of steel plates is as follows:

- a) The average thickness of the steel plate can be measured automatically or manually.
- b) Measurement location of the steel plate side. When using an automatic measurement method, the measurement location should be within a range of not less than 10mm and not more than 300mm from the side edge. Measurement; when using manual methods, the measurement should be taken within a range of not less than 10mm and not more than 100mm from the side.
- c) See Figure 1 for a schematic diagram of the average thickness measurement of the steel plate. As shown in Figure 1, at least two lines should be selected for measurement, and at least three measurements should be taken for each line. Measurement points (when more than 3 measurement points are selected, the measurement points for each line should be consistent); and calculate the average thickness of the steel plate based on the average value. Figure

9 Inspection Rules

9.1 The inspection and acceptance of steel plates shall be carried out by the supplier's quality inspection department.

9.2 Steel plates shall be accepted in batches. For steel plates delivered by thermomechanical rolling (TMCP), each rolled sheet constitutes a batch; for steel plates delivered by thermomechanical rolling... Steel plates delivered in (TMCP) tempered (T) or quenched and tempered (QT) condition, and which are rolled from the same sheet and

have the same heat treatment regime, constitute a batch.

9.3 The sampling quantity and sampling method for each batch of steel plates shall comply with the provisions of Table 6.

9.4 The rules for re-inspection and judgment of steel plates shall comply with the provisions of GB/T 17505.

9.5 The re-inspection and judgment of the thickness direction properties of Z-axis steel shall comply with the provisions of GB/T 5313.

9.6 The test results of mechanical properties and chemical composition shall be obtained by rounding comparison method, and the rounding rules shall comply with the provisions of GB/T 8170.

10. Packaging, labeling, and quality certificate The packaging, marking, and quality certificate of steel plates shall comply with the provisions of GB/T 247.