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**NATIONAL STANDARD OF THE
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GB/T 7659-2025

Replacing GB/T 7659-2010

Steel castings for welding structures

焊接结构用铸钢件

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1 Scope

This Document specifies the designation, manufacturing, technical requirements, test methods, inspection rules, marking, packaging, storage, and transportation requirements for steel castings for welding structures.

This Document applies to the manufacture of steel castings for welding structures (hereinafter referred to as "castings").

2 Normative References

GB/T 222
 GB/T 223.5
 GB/T 223.11
 GB/T 223.13
 GB/T 223.18
 GB/T 223.23
 GB/T 223.26
 GB/T 223.59
 GB/T 40800

GB/T 40805

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 5611 apply.

4 Designation

The designation representation method for casting shall comply with the provisions of GB/T 5613; and based on the performance level of the material, it is divided into five material designations. ZGH200-380, ZGH240-450, ZGH270-480, ZGH300-500, and ZGH340-550.

5.1.1 Unless otherwise specified by the purchaser, the smelting method and casting process

shall be determined by the supplier.

5.1.2 Core supports and internal chills shall not be used without the written permission of the purchaser.

5.1.3 Unless otherwise specified, castings shall undergo heat treatment; and the heat treatment

process shall be determined by the supplier. It shall implement according to the provisions of GB/T 16923 and GB/T 16924.

5.1.4 If castings occur deformation, correction is permissible; after correction, the castings shall

undergo stress relief treatment.

5.2 Welding repair

5.2.1 Unless otherwise specified, defects in castings may be repaired by welding.

5.2.2 Welders shall be qualified and certified according to the provisions of GB/T 15169.

5.2.3 The supplier may perform welding repairs on casting defects; the welding repair

conditions shall be determined by the supplier. If the purchaser has specific requirements regarding the location, size, and number of welding repairs, a supplementary technical agreement between the supplier and purchaser shall be established.

5.2.4 Prior to welding repair, a welding procedure qualification test shall be performed

according to the provisions of GB/T 40800. The supplier shall prepare a welding repair procedure specification to weld based on the welding procedure qualification report.

5.2.5 Before welding repair, the defective area of the casting shall be cleaned and the edges smoothly transitioned.

5.2.6 Welding repairs are considered significant if the depth of the groove (bevel) prepared for welding repair exceeds 20% of the casting wall thickness or 25 mm (whichever is smaller); or if the cross-sectional area of the welding repair cavity is greater than 65 cm²; or if there is leakage during the pressure test of pressure-bearing castings.

5.2.7 The welding repair procedure specification shall be confirmed by the purchaser before

implementation. The procedure specification for significant welding repairs must be confirmed by the purchaser before implementation; and a record of the location, extent, and process of the significant welding repair must be kept.

5.2.8 Stress relief heat treatment shall be performed after significant welding repairs.

5.2.9 After welding repairs are completed on the casting, the repaired area must be re-inspected according to the casting inspection requirements.

6.1 Chemical composition

6.1.1 The designation and chemical composition of the casting shall comply with the provisions of Table 1.

6.1.2 The carbon equivalent values and calculation methods for different designations of

castings are specified in Appendix A.

7.1.1 The sampling and sample preparation methods for chemical composition analysis shall

comply with the provisions of GB/T 20066.

7.1.2 The chemical analysis methods shall be implemented according to the provisions of GB/T 223.5, GB/T 223.11, GB/T 223.13, GB/T 223.18, GB/T 223.23, GB/T 223.26, GB/T 223.59, GB/T 223.69, and GB/T 223.72.

7.1.3 The spectroscopic analysis method shall be implemented according to the provisions of

GB/T 4336 or GB/T 20125.

7.1.4 In case of dispute over the analysis results, the results of chemical analysis shall prevail.

7.2 Mechanical properties

7.2.1 Tensile test shall be performed according to the provisions of GB/T 228.1.

7.2.2 Impact test shall be performed according to the provisions of GB/T 229.

7.3 Surface quality

7.3.1 The surface quality inspection of the castings shall in accordance with the provisions of GB/T 39428.

7.3.2 Penetrant test of castings shall be performed in accordance with the provisions of GB/T 9443.

7.3.3 Magnetic particle test of castings shall be performed in accordance with the provisions of GB/T 9444.

7.3.4 The surface roughness of castings shall be implemented in accordance with the provisions of GB/T 15056. Alternatively, visual inspection using comparison photographs may be used;

the comparison photographs shall comply with the that for surface roughness specified in

7.4 Internal quality

7.4.1 Ultrasonic test of castings shall be performed in accordance with the provisions of GB/T 7233.1.

7.4.2 Radiographic test of castings shall be performed in accordance with the provisions of GB/T 5677. Alternatively, X-ray digital imaging test method of castings may be used, which shall be performed in accordance with the provisions of GB/T 39638.

7.5 Geometric and dimensional tolerances

The geometric and dimensional tolerances of castings shall be inspected using appropriate precision measuring tools, gauge blocks, templates, or scribing tools.

7.6 Weight

The weight tolerance of castings shall be performed according to the provisions of GB/T 11351.

8.1 Inspection and acceptance

Unless otherwise specified, the supplier shall be responsible for the inspection and