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PEOPLE'S REPUBLIC OF CHINA**

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Steel castings for pressure purposes

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1 Scope

This document specifies the technical requirements, test methods, inspection rules, marks, quality specifications, packaging, transportation and storage, supplementary requirements for steel castings for pressure purposes.

This Standard applies to steel castings for pressure purposes that are made of carbon steel and alloy steel.

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 223.3, Methods for chemical analysis of iron, steel and alloy - The dianitpyryl methane phosphomolybdate gravimetric method for the determination of phosphorus

content

GB/T 223.5, Steel and iron - Determination of acid-soluble silicon and total silicon content - Reduced molybdosilicate spectrophotometric method (GB/T 223.5-2008,

ISO 4829-1:1986, ISO 4829-2:1988, MOD)

GB/T 223.9, Iron, steel and alloy - Determination of aluminium content - Chrome azurol S photometric method

GB/T 223.11, Iron, steel and alloy - Determination of chromium content - Visual titration or potentiometric titration method (GB/T 223.11-2008, ISO 4937:1986, MOD)

GB/T 223.14, Methods for chemical analysis of iron, steel and alloy - The N-benzoyl-N-phenylhydroxylamine extraction photometric method for the determination of vanadium content

GB/T 223.18, Methods for chemical analysis of iron steel and alloy - The sodium thiosulfate separation iodometric method for the determination of copper content

GB/T 223.22, Methods for chemical analysis of iron, steel and alloy - The nitroso-R-salt spectrophotometric method for the determination of cobalt content

GB/T 223.23, Iron, steel and alloy - Determination of nickel content - The dimethylglyoxime spectrophotometric method

GB/T 223.25, Methods for chemical analysis of iron, steel and alloy - The dimethylglyoxime gravimetric method for the determination of nickel content

GB/T 223.26, Iron, steel and alloy - Determination of molybdenum content - The thiocyanate spectrophotometric method

GB/T 223.28, Methods for chemical analysis of iron, steel and alloy - The alpha-benzoin oxime gravimetric method for the determination of molybdenum content

GB/T 223.30, Methods for chemical analysis of iron, steel and alloy - The arsenazo III spectrophotometric method for the determination of zirconium content after separation by p-bromomandelic acid

GB/T 223.36, Methods for chemical analysis of iron, steel and alloy - The neutral titration method for the determination of nitrogen content after distillation separation

GB/T 223.58, Methods for chemical analysis of iron, steel and alloy - The sodium arsenite-sodium nitrite titrimetric method for the determination of manganese content

GB/T 223.60, Methods for chemical analysis of iron, steel and alloy - The perchloric acid dehydration gravimetric method for the determination of silicon content

GB/T 223.63, Iron, steel and alloy - Determination of manganese content - Sodium (potassium) periodate spectrophotometric method

GB/T 223.65, Steel, iron and alloy - Determination of cobalt content - Flame atomic absorption spectrometric method (GB/T 223.65-2012, ISO 11652:1997, MOD)

GB/T 223.75, Iron, steel and alloy - Determination of boron content - Methanol distillation-curcumin photometric method

GB/T 223.78, Methods for chemical analysis of iron, steel and alloy. Curcumin spectrophotometric method for the determination of boron content (GB/T 223.78-2000, idt ISO 10153:1997)

GB/T 223.81, Iron, steel and alloy - Determination of total aluminum and total boron contents - Microwave digestion-inductively coupled plasma mass spectrometric method

GB/T 223.84, Steel and iron - Determination of titanium content -Diantipyrylmethane spectrophotometric method (GB/T 223.84-2009, ISO 10280:1991, IDT)

GB/T 223.85, Steel and iron - Determination of sulfur content - Infrared absorption method after combustion in an induction furnace (GB/T 223.85-2009, ISO 4935:1989, IDT)

GB/T 223.86, Steel and iron - Determination of total carbon content - Infrared steel in the same furnace and heat treated in the same furnace are one batch;

b) Batch by piece: Each piece is a batch. Only applicable to the products specified in the technical conditions;

c) Other batching rules agreed upon by both parties.

5.3 Sampling rules

5.3.1 Sampling for chemical analysis

5.3.1.1 According to the provisions of GB/T 5678 or GB/T 20066, take samples from each molten steel for chemical composition analysis. When there is a dispute between the supplier and the purchaser on the analysis results, samples can be taken from the furnace sample, the test block or the specimen representing the casting. According to

GB/T 223.3, GB/T 223.5, GB/T 223.9, GB/T 223.11, GB/T 223.14, GB/T 223.18, GB/T 223.22, GB/T 223.23, GB/T 223.25, GB/T 223.26, GB/T 223.28, GB/T 223.30, GB/T 223.36, GB/T 223.58, GB/T 223.60, GB/T 223.63, GB/T 223.65, GB/T 223.75, GB/T 223.78, GB/T 223.81, GB/T 223.84, GB/T 223.85, GB/T 223.86, check and analyze the corresponding elements. It may refer to Annex E for the allowable deviation between the check analysis result and the smelting analysis result or it is negotiated between the supplier and the purchaser.

5.3.1.2 When the wall thickness is greater than 15mm, samples shall be taken at least 6mm below the casting surface.

5.3.2 Sampling for mechanical properties

5.3.2.1 Room temperature tensile specimen A tensile test specimen shall be taken from a test block representative of the batch of castings. The size of the specimen shall comply with the provisions of GB/T 228.1.

5.3.2.2 High temperature tensile specimen When the high temperature tensile test is specified, the tensile specimen shall be prepared from the test block according to the quantity specified in the contract. The size of the specimen shall comply with the provisions of GB/T 228.2.

5.3.2.3 Impact test specimen When the impact test is specified, a set (three pieces) of Charpy V-notch standard impact test specimens shall be prepared from the test block representing the batch of castings. The size of the specimen shall meet the requirements of GB/T 229.

5.3.2.4 Sampling location Unless otherwise agreed by the supplier and the purchaser, when sampling type A test

5.5.2 If the tensile test results are unqualified, double reinspection is allowed on the original test block (or another test block cast in the same furnace and heat-treated in the same furnace). The reinspection result shall meet the supplementary requirements specified in 3.5.1 and the contract, otherwise it shall be rejected.

5.5.3 If the average value of the three impact test results does not meet the requirements of 3.5.2 and (or) 3.5.3, or the impact test value of one specimen is lower than 70% of the index requirements, three additional specimens are allowed to be reinspected on the original test block or another test block cast in the same furnace and heat-treated in the same furnace. The average value of the six impact specimens before and after the reinspection shall comply with 3.5.2 and (or) 3.5.3 and the supplementary requirements specified in the contract. The reinspection specimen is not allowed to have a single value lower than 70% of the index requirements, otherwise it will be rejected.

5.6 Re-heat treatment When the mechanical property inspection or re-inspection fails, re-heat treatment of the casting and its test block is allowed. The reheat-treated castings and their test blocks shall be subjected to all mechanical property tests as a new batch. Without the consent of the purchaser, the re-heat treatment of the casting and its test block shall not exceed two times (if there is no special provision, the number of tempering times is not limited).

6 Marks, quality certificate, packaging, transportation and storage

6.1 Marks

6.1.1 In principle, each casting shall be clearly marked. The mark shall include the material designation, inspection batch number, melting furnace number or identification number traceable to the melting furnace number, and other contents required by the purchaser to be marked.