

ICS 77.140.75

CCS H 48



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

GB/T 3087-2022

**Seamless steel tubes and pipes for low and medium pressure
boilers**

低中压锅炉用无缝钢管

Issued on: April 15, 2022

Implemented on: November 1, 2022

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

Table of Contents

1	Scope
2	Normative references
3	Terms and definitions
4	Order content
5	Size, shape, weight and allowable deviation
5.2	Allowable deviation of outer diameter and wall thickness
5.3	Length
5.3.2	Fixed length and multiple length
5.4	Bending
5.6	End shape
5.7	Weight
6	Technical requirements
6.1	Steel designation and chemical composition
6.2	Manufacturing method
6.3	Delivery state
6.4	Mechanical property
6.4.2	Tensile at high temperature
6.5	Process performance
6.5.1	Flattening
6.6	Hydraulic
6.8	Surface quality
7	Test methods
8	Inspection rules
8.2	Batching rules
9	Packaging, marking and quality certificate

1 Scope

China's national standard for seamless steel tubes and pipes for low and medium pressure boilers, and the current edition of GB/T 3087, replacing GB 3087-2008. It specifies the order content, the size, shape, weight and permissible deviations, the technical requirements, the test methods, the inspection rules, and the packaging, marking and quality certificate for these tubes. It applies to the manufacture of seamless tubes and pipes

of high quality carbon structural steel for low and medium pressure boilers, and other seamless tubes for pipelines may refer to it. This is one of the most widely used steel product standards in China, because it covers the tubes that make up the heating surfaces of the enormous population of industrial and heating boilers below the high pressure range - the water walls, the superheaters, the economisers and the connecting pipework. The service is unforgiving in a specific way: the tube carries water or steam under pressure with fire on the other side of a wall a few millimetres thick, so the wall thickness and its uniformity are the whole safety margin, and a local thinning, an eccentric bore or a seam defect is a failure waiting for the pressure and the temperature to find it. That is why so much of the document is dimensional - the outside diameter and wall thickness tolerances, the ovality, the straightness, the ends - alongside the composition, the mechanical properties, the flattening and flaring tests, the hydrostatic test and the non-destructive examination. The change of designation from GB to GB/T with this edition reflects the move of the mandatory safety requirements into the pressure equipment regulatory framework, leaving this document as the product standard it always effectively was. Issued on 15 April 2022 and in force since 1 November 2022.

This document specifies the order content, size, shape, weight and allowable deviation, technical requirements, test methods, inspection rules, packaging, marking and quality certificate of seamless steel tubes and pipes for low and medium pressure boilers. This document applies to the manufacture of high-quality carbon structural steel seamless steel tubes and pipes for low and medium pressure boilers (hereinafter referred to as "steel pipes"); it can be referred to by other seamless steel tubes and pipes for pipelines.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 222, Permissible tolerances for chemical composition of steel products

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

GB/T 223.12, Methods for chemical analysis of iron, steel and alloy - The sodium carbonate separation-diphenyl carbazide photometric method for the determination of chromium content

GB/T 223.19, Methods for chemical analysis of iron, steel and alloy - The neocuproine-chloroform extraction photometric method for the determination of copper content

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

spectrophotometric method

GB/T 223.37, Iron, steel and alloy - Determination of nitrogen content - Indophenol blue spectrophotometric method after distillation separation

GB/T 223.59, Iron, steel and alloy - Determination of phosphorus content - Bismuth phosphomolybdate blue spectrophotometric method and antimony phosphomolybdate blue spectrophotometric method

GB/T 223.63, Methods for chemical analysis of iron, steel and alloy - The sodium (potassium) periodate photometric method for the determination of manganese content

3 Terms and definitions

Terms and definitions determined by GB/T 30062 are applicable to this document.

4 Order content

A contract or order for the ordering of steel pipes under this document shall include the following.

- a) number of this document;
- b) product name.
- c) steel designation;

5 Size, shape, weight and allowable deviation

5.1 Outside diameter and wall thickness The nominal outer diameter (D) and nominal wall thickness (S) of the steel pipe shall comply with the provisions of GB/T 17395. According to the requirements of the buyer, after negotiation between the supplier and the buyer, steel pipes with dimensions other than those specified in GB/T 17395 can be supplied.

5.2 Allowable deviation of outer diameter and wall thickness

5.2.1 The allowable deviation of the outer diameter of the steel pipe shall meet the requirements in Table 1.

5.2.4 According to the requirements of the buyer, if it is negotiated between the supplier and the buyer, and indicated in the contract, the steel pipe with the allowable deviation of dimensions other than those specified in Table 1, Table 2, and Table 3 can be supplied.

5.3 Length

5.3.1 Normal length The normal length of the steel pipe is 4 000 mm ~ 12 000 mm. After it is negotiated between the supplier and the buyer, and indicated in the contract, steel pipes

other than the normal length can be supplied.

5.4 Bending

5.4.1 The bending per meter of the steel pipe shall meet the requirements of Table 4.

5.5 Out-of-roundness and uneven wall thickness According to the requirements of the buyer, if it is negotiated between the supplier and the buyer, and indicated in the contract, the out-of-roundness and uneven wall thickness of the steel pipe shall not exceed 80% of the outer diameter and wall thickness allowances, respectively.

5.6 End shape

5.6.1 For a steel pipe whose nominal outer diameter is more than 60 mm, the inclination of the pipe end shall not exceed

1.5 mm; for a steel pipe whose nominal outer diameter is more than 60 mm, the inclination of the pipe end shall not exceed 2.5% of the nominal outer diameter of the steel pipe, and shall not exceed 6 mm.

5.6.2 The burr of the pipe end cut shall be removed.

5.7 Weight

5.7.1 Steel pipes can be delivered according to actual weight and the theoretical weight. The theoretical weight of the steel pipe is calculated according to the provisions of GB/T 17395, and the density of the steel shall be

5.7.2 According to the requirements of the buyer, if it is negotiated between the supplier and the buyer, and indicated in the contract, the deviation between the actual weight and the theoretical weight of the delivered steel pipe shall meet the following requirements.

6.1 Steel designation and chemical composition

6.1.1 The steel designation and chemical composition (melting composition) shall comply with the requirements in Table 5.

6.1.2 When the buyer requires finished product analysis, it shall be indicated in the contract. The allowable deviation of the chemical composition of the finished steel pipe shall comply with the provisions of GB/T 222.

6.2 Manufacturing method

6.2.1 Smelting method of steels Steels shall be smelted by the method of electric arc furnace plus out-of-furnace refining or oxygen converter plus out-of-furnace refining. After it is negotiated between the supplier and the buyer, and indicated in the contract, other smelting methods with higher requirements can be used for manufacturing.