

# ASME SA213 T22 Seamless tube Specification

## ASME SA213 T22 Seamless tube Manufacturer and exporter

SA213 T22 is a 2.25Cr - 1Mo ferritic alloy steel tube formulated under the ASME SA213/SA213M standard, mainly used in high-temperature and high-pressure components like boiler superheaters and heat exchangers. Its detailed specifications covering chemical composition, mechanical properties and other aspects are as follows:  
Chemical Composition

It is a typical chromium - molybdenum alloy steel, with strict limits on harmful elements such as phosphorus and sulfur to ensure its high - temperature performance and corrosion resistance. The specific components (mass fraction) are shown in the table below:

### ASME SA213 T22 Chemical composition

Grade	UNS Designation	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Nickel	Chromium	Molybdenum
T22	K21590	0.05-0.15	0.30-0.60	0.025	0.025	0.5	...	1.90-2.60	0.87-1.13

### ASME SA213 T22 Mechanical Properties

The material has stable mechanical properties at high temperatures and can maintain good performance under long-term service in high-temperature and high-pressure environments.

### ASME SA213 T22 tube Hardness

The hardness of SA213 T22 tube is strictly controlled to balance its toughness and processability. The maximum Brinell hardness is 163 HBW, the corresponding maximum Rockwell hardness is 85 HRB, and the maximum Vickers hardness is 170 HV.

### ASME SA213 T22 tube Heat Treatment

The heat treatment process directly affects the microstructure and performance of the tube, and the standard specifies two optional processes:

Normalizing + Tempering: This is the common process for SA213 T22. The normalizing temperature is controlled at 900 - 950°C to realize the homogenization of the structure. Then tempering is carried out at 700 - 750°C to obtain a stable tempered bainite structure,

so as to improve the toughness and reduce internal stress.

Full Annealing or Isothermal Annealing: It can also be used as an alternative heat treatment method to achieve similar structural optimization effects and meet the processing and service requirements of the tube.

## ASME SA213 T22 tube Marking Requirements

The marking of SA213 T22 tube shall comply with the additional provisions of ASTM A1016/A1016M standard on the basis of basic information marking, and the specific contents include standard number, steel grade, size (outer diameter and wall thickness), heat number, batch number, and it shall be clearly indicated whether the tube is hot - finished or cold - finished. The marking is usually applied to the tube bundle or packaging to facilitate traceability and inspection.

## ASME SA213 T22 Size Tolerance

The specific requirements are as follows:

**Outer Diameter Tolerance:** For cold - drawn tubes, when the outer diameter is less than 25.4mm, the tolerance is  $\pm 0.10\text{mm}$ ; when the outer diameter is between 76.2 - 101.6mm, the tolerance is  $\pm 0.38\text{mm}$ . For hot - rolled tubes, there is no negative tolerance, and the positive tolerance decreases with the increase of wall thickness. For example, when the outer diameter is  $\leq 101.6\text{mm}$  and the wall thickness is  $\leq 2.4\text{mm}$ , the positive tolerance is +40%.

**Wall Thickness Tolerance:** For cold - drawn tubes, the tolerance is  $\pm 0.1\text{mm}$ , and for cold - rolled tubes, it is more precise, with a tolerance of  $\pm 0.05\text{mm}$ . For hot - rolled tubes, when the outer diameter is  $\leq 101.6\text{mm}$  and the wall thickness is more than 4.6mm, the positive tolerance is +28% and there is no negative tolerance.

