ASTM A335 P5 Alloy Steel Seamless Pipe Specification

This specification covers ASTM A335 Grade P5 seamless ferritic alloy steel pipes for high-temperature and pressure service.

1. ASTM A335 Standard Overview

ASTM A335 specifies seamless ferritic alloy steel pipes for high-temperature service. Grade P5 is a chromium-molybdenum alloy steel widely used in power and petrochemical industries.

2. Material Introduction – P5

ASTM A335 P5 is a 5Cr-0.5Mo alloy steel offering excellent resistance to oxidation and high-temperature corrosion.

3. Chemical Composition – ASTM A335 P5

Element	Composition (%)
C	≤ 0.15
Mn	0.30 – 0.60
P	≤ 0.025
S	≤ 0.025
Si	≤ 0.50
Cr	4.00 – 6.00
Mo	0.45 – 0.65

4. Mechanical Properties

Property	Requirement
Tensile Strength	415 – 585 MPa
Yield Strength	≥ 205 MPa
Elongation	≥ 20 %

5. Heat Treatment

P5 pipes shall be supplied in the annealed or normalized and tempered condition.

6. Hardness

Maximum hardness shall not exceed 235 HB.

7. Testing & Inspection

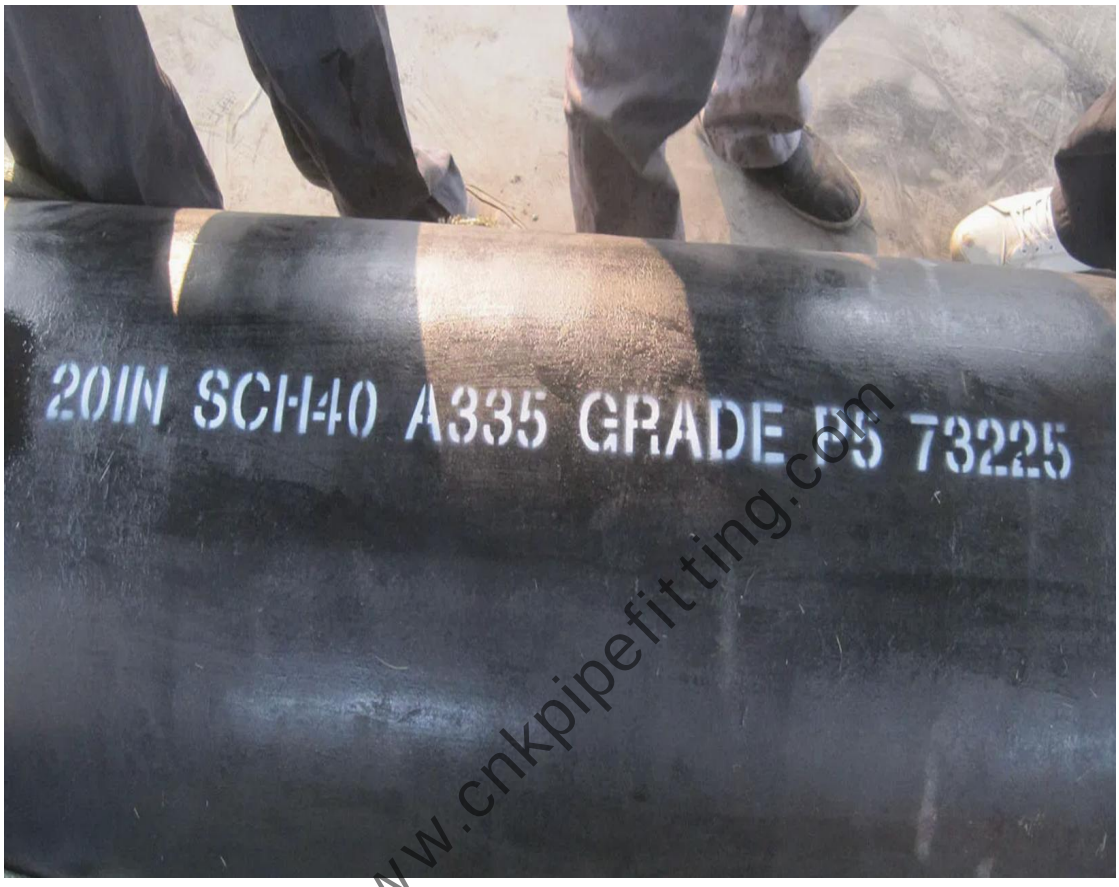
Chemical analysis, tensile testing, flattening test, hydrostatic or non-destructive electric test, and dimensional inspection per ASTM A999.

8. Size Range

Outside Diameter: 1/8" – 24". Wall Thickness: SCH 10 – SCH XXS. Length: Random, Double Random, or Cut-to-Length.

9. Typical Applications

High-temperature pressure piping, boilers, petrochemical processing units, refineries, and power plants.



ASTM A335 P5 Pipe vs ASME SA213 T5 Alloy Steel Seamless Tube Comparison

This document provides a technical comparison between ASTM A335 P5 seamless alloy steel pipes and ASME SA213 T5 seamless alloy steel tubes, both manufactured from 5Cr–0.5Mo alloy steel for high-temperature service.

1. Standard & Product Scope Comparison

Item	ASTM A335 P5	ASME SA213 T5
Product Type	Seamless Pipe	Seamless Tube
Standard Scope	High-temperature pressure piping	Boiler & heat exchanger tubes
ASME Code	ASME SA335	ASME SA213

2. Chemical Composition Comparison (Typical, %)

Element	A335 P5	SA213 T5
C	≤ 0.15	≤ 0.15
Mn	0.30 – 0.60	0.30 – 0.60
P	≤ 0.025	≤ 0.025
S	≤ 0.025	≤ 0.025
Si	≤ 0.50	≤ 0.50
Cr	4.00 – 6.00	4.00 – 6.00
Mo	0.45 – 0.65	0.45 – 0.65

3. Mechanical Properties Comparison

Property	A335 P5	SA213 T5
Tensile Strength	415 – 585 MPa	415 – 585 MPa
Yield Strength	≥ 205 MPa	≥ 205 MPa
Elongation	≥ 20 %	≥ 20 %

4. Application Differences

ASTM A335 P5 pipes are mainly used for high-temperature pressure piping systems, while ASME SA213 T5 tubes are designed for boilers, superheaters, and heat exchangers. Despite similar chemistry and strength, differences exist in dimensional tolerances and inspection requirements due to their respective standards.