

# ASTM A790 UNS S32205 Duplex Stainless Steel Pipe Specification

This technical datasheet covers ASTM A790 UNS S32205 duplex stainless steel pipes, including chemical composition, mechanical properties, heat treatment, testing requirements

## 1. ASTM A790 Overview

ASTM A790 specifies seamless and straight-seam welded ferritic/austenitic (duplex) stainless steel pipes for general corrosive and high-pressure service. Dimensional tolerances are governed by ASTM A999/A999M.

## 2. Material Description – UNS S32205

UNS S32205 is a nitrogen-enhanced duplex stainless steel grade derived from UNS S31803. It provides higher strength, improved corrosion resistance, and more consistent mechanical performance.

## 3. Chemical Composition (UNS S32205)

Element	Composition (%)
C	≤ 0.030
Mn	≤ 2.00
P	≤ 0.030
S	≤ 0.020
Si	≤ 1.00
Cr	22.0 – 23.0
Ni	4.5 – 6.5
Mo	3.0 – 3.5
N	0.14 – 0.20
Fe	Balance

## 4. Mechanical Properties

Property	Minimum Requirement
Tensile Strength	≥ 620 MPa
Yield Strength (0.2%)	≥ 450 MPa
Elongation	≥ 25 %

## 5. Heat Treatment & Hardness

ASTM A790 UNS S32205 pipes shall be supplied in the solution annealed condition at 1020–1100 °C followed by rapid cooling. Maximum hardness shall not exceed 290 HBW.

## 6. Testing Requirements

Chemical analysis, tensile test, flattening test, hydrostatic or non-destructive electric test, and dimensional inspection are required in accordance with ASTM A790 and ASTM A999.

## 7. Size Range

Outside Diameter: 1/8" – 30" (seamless up to 8", welded up to 30").

Wall Thickness: SCH 10S – SCH XXS.

Length: Random, double random, or cut-to-length.

Item	UNS S32205 vs UNS S31803	UNS S31803
Nitrogen Content	0.14 – 0.20 %	0.08 – 0.20 %
Yield Strength	≥ 450 MPa	≥ 450 MPa
PREN (Typical)	≈ 34–35	≈ 32–33
Corrosion Resistance	Improved & consistent	Standard duplex
Typical Application	Offshore / Oil & Gas	General corrosive service

## 9. Comparison – ASTM A790 vs EN 10216-5 1.4462

Item	ASTM A790 UNS S32205	EN 10216-5 1.4462
Standard System	ASTM / ASME	EN / EU
Material Designation	UNS S32205	1.4462
Pipe Type	Seamless & Welded	Seamless
Heat Treatment	Solution Annealed	Solution Annealed
Dimensional Tolerance	ASTM A999	EN 10266
Typical Market	Oil & Gas / Global	EU Pressure Equipment

## 10. Typical Applications

Offshore oil and gas pipelines, pressure piping systems, desalination plants, heat exchangers, chemical processing equipment, and marine applications.

