

# ASTM A182 F51 UNS S31803 Duplex 2205 Specification

Keywords: ASTM A182 F51, UNS S31803, Duplex 2205, ASME SA182 F51, Duplex Stainless Steel Forgings

## ASTM A182 / ASME SA182 Standard Introduction

ASTM A182 / ASME SA182 covers forged or rolled alloy steel and stainless steel pipe flanges, forged fittings, valves, and parts for high-temperature and corrosive service. Grade F51 corresponds to UNS S31803 duplex stainless steel.

## ASTM A182 F51 (UNS S31803) Material Description

ASTM A182 F51, UNS S31803, commonly known as Duplex 2205, is a duplex stainless steel with a mixed austenitic-ferritic microstructure. It offers high strength, good toughness, and excellent resistance to chloride stress corrosion cracking.

## Chemical Composition of ASTM A182 F51 (wt.%)

Element	Requirement
Carbon (C)	0.030 max
Manganese (Mn)	2.00 max
Silicon (Si)	1.00 max
Phosphorus (P)	0.030 max
Sulfur (S)	0.020 max
Chromium (Cr)	21.0 – 23.0
Nickel (Ni)	4.5 – 6.5
Molybdenum (Mo)	2.5 – 3.5
Nitrogen (N)	0.08 – 0.20

## Mechanical Properties (Typical)

Property	Minimum Requirement
Tensile Strength	≥ 620 MPa
Yield Strength (0.2%)	≥ 450 MPa
Elongation	≥ 25 %
Hardness	≤ 290 HB

## Heat Treatment

ASTM A182 F51 forgings shall be supplied in the solution annealed condition, followed by rapid cooling to achieve the proper duplex microstructure.

## Corrosion Resistance and PREN

UNS S31803 duplex stainless steel offers excellent resistance to pitting and crevice corrosion. The typical Pitting Resistance Equivalent Number (PREN) is approximately 35.

## Product Range of ASTM A182 F51 Forgings

Pipe flanges, forged fittings, valve bodies, forged bars, rings, and other pressure-containing parts manufactured in accordance with ASTM A182.

## Typical Applications

Oil and gas industry, offshore platforms, chemical processing equipment, desalination plants, heat exchangers, pressure vessels, and piping systems exposed to chloride environments.

## Inspection and Testing

Chemical analysis, mechanical testing, hardness testing, non-destructive examination, and supplementary corrosion testing are performed according to ASTM A182.

## Certification and Documentation

EN 10204 3.1 Mill Test Certificate, Manufacturer Test Report, and third-party inspection certificates can be provided upon request.

