

# ASTM A182 F11 Flange Specification

ASTM A182 F11 is a Cr-Mo (Chromium-Molybdenum) low alloy steel, used primarily for high-temperature service in pressure systems such as boilers, heat exchangers, power plants, and refinery piping.

- **Standard:** ASTM A182 - Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves
- **Grade:** F11 (Class 1, 2, or 3)
- **Material Type:** Ferritic Alloy Steel
- **Common Product:** Flanges (Weld Neck, Blind, Slip-On, Socket Weld, Threaded, etc.)

## Chemical Composition (Typical %)

Grade/Identification Symbol	UNS Designation	Carbon	Manganese	Phosphorus	Sulfur	Silicon	Nickel	Chromium	Molybdenum
F 11 Class 1	K11597	0.05–0.15	0.30–0.60	0.03	0.03	0.50–1.00	...	1.00–1.50	0.44–0.65
F 11 Class 2	K11572	0.10–0.20	0.30–0.80	0.04	0.04	0.50–1.00	...	1.00–1.50	0.44–0.65
F 11 Class 3	K11572	0.10–0.20	0.30–0.80	0.04	0.04	0.50–1.00	...	1.00–1.50	0.44–0.65

## Mechanical Properties

Grade Symbol	Tensile Strength, min, ksi [MPa]	Yield Strength, min, ksi [MPa] <sup>B</sup>	Elongation in 2 in. [50 mm] or 4D, min, %	Reduction of Area, min, %	Brinell Hardness Number, HBW, unless otherwise indicated
F 11 Class 1	60 [415]	30 [205]	20	45	121–174
F 11 Class 2	70 [485]	40 [275]	20	30	143–207
F 11 Class 3	75 [515]	45 [310]	20	30	156–207

# Flange Types

ASTM A182 F11 Flanges are available in the following types:

- ASTM A182 F11 **Weld Neck (WN) Flange**
- ASTM A182 F11 **Slip-On (SO) Flange**
- ASTM A182 F11 **Socket Weld (SW) Flange**
- ASTM A182 F11 **Blind (BL) Flange**
- **Threaded (TH) Flange**
- **Lap Joint (LJ) Flange**
- **Long Weld Neck (LWN) Flange**

Standards for Dimensions & Pressure Ratings:

- ANSI B16.5 (up to 24" )
  - ANSI B16.47 (26" and above)
  - ASME B16.48 for line blanks
  - Pressure Ratings: Class 150, 300, 600, 900, 1500, 2500
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## Applications

Due to its resistance to creep, oxidation, and high-temperature strength, F11 flanges are widely used in:

- **Petrochemical plants**
- **Power plants (steam piping)**
- **Oil and gas transmission**
- **Boiler systems**
- **Heat exchangers**
- **Refinery high-temperature lines**

## Advantages of ASTM A182 F11 Flanges

- High strength and temperature resistance
  - Good weldability and machinability
  - Resistant to hydrogen attack and corrosion under high temperatures
  - Available in multiple classes for flexible mechanical performance
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## Standard Delivery Conditions

- **Heat Treatment:** Normalized and Tempered or Quenched and Tempered (especially for Class 2 & 3)
- **Surface Finish:** Black/oiled/rust-proof coated
- **Markings:** Logo ASTM A182 F11 CL1/CL2 + size + pressure rating + heat number
- **Test Certificates:** EN 10204 3.1 / 3.2 upon request

## Equivalent Standards

Standard	Grade Equivalent
ASTM	A182 F11
ASME	SA182 F11
EN / DIN	13CrMo4-5
JIS	SCMV 3

