

ASTM A182 F316 / F316L Forging Flange and fittings Specification

ASTM A182 F316 and F316L are molybdenum-bearing austenitic stainless steels used for **forged or rolled flanges, fittings, valves, and pressure-containing parts** for high-temperature and corrosive service. The addition of molybdenum improves resistance to **pitting, crevice corrosion, and chloride environments**, making them ideal for **marine and chemical processing applications**.

- **F316** = Standard Mo-alloyed grade
- **F316L** = Low carbon version of F316 for improved weldability (L = Low carbon $\leq 0.035\%$)

Chemical Composition (% by weight)

Element	ASTM A182 F316	ASTM A182 F316L
Carbon (C)	≤ 0.08	≤ 0.035
Manganese (Mn)	≤ 2.00	≤ 2.00
Phosphorus (P)	≤ 0.045	≤ 0.045
Sulfur (S)	≤ 0.030	≤ 0.030
Silicon (Si)	≤ 1.00	≤ 1.00
Chromium (Cr)	16.0 - 18.0	16.0 - 18.0
Nickel (Ni)	10.0 - 14.0	10.0 - 14.0
Molybdenum (Mo)	2.0 - 3.0	2.0 - 3.0
Iron (Fe)	Balance	Balance

Mechanical Properties (Minimum per ASTM A182)

Property	F316	F316L
Tensile Strength	≥ 515 MPa	≥ 485 MPa
Yield Strength	≥ 205 MPa	≥ 170 MPa
Elongation	$\geq 30\%$	$\geq 30\%$
Hardness (HB)	≤ 192	≤ 192

Heat Treatment

- **Solution Annealed** at 1040 - 1120° C (1900 - 2050° F), followed by rapid cooling.
- Not hardenable by heat treatment (non-magnetic when annealed).
- **F316L** is preferred for welding due to reduced risk of intergranular corrosion (no sensitization).

Available Product Forms

- Forged Flanges (WN, SO, BL, SW, TH, LJ)
- Forged Pipe Fittings (Elbows, Tees, Nipples)
- Forged Shafts, Rings, Blocks
- Standard sizes and custom CNC-machined parts

Applications

- Marine and offshore equipment
- Chemical processing and acid handling
- Food and beverage industry
- Heat exchangers and boilers
- Seawater piping and desalination systems
- Pharmaceutical and pulp & paper industries

Compliance ASTM A182 / ASME SA182

- EN 10204 3.1 Mill Test Certificates
- NACE MR0175 / MR0103 (upon request)
- ISO 9001:2015 Certified production
- Third-party inspection: SGS / BV / TUV available

Related Materials

- ASTM A182 F304 / F304L Flanges
- ASTM A182 F316Ti Stainless Steel
- ASTM A403 WP316 / 316L Pipe Fittings