

# ASTM A312 TP347 / TP347H Pipe Specification

[ASTM A312](#) covers seamless, welded, and heavily cold-worked austenitic stainless steel pipes intended for high-temperature and corrosive service.

TP347 and TP347H are niobium/tantalum-stabilized stainless steels designed to provide excellent resistance to intergranular corrosion and superior high-temperature strength.

## Chemical Composition

### ASTM A312 TP347 / TP347H Chemical Composition (% max/min)

Element	TP347	TP347H
Carbon (C)	≤ 0.08	0.04 - 0.10
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)	17.0 - 19.0	17.0 - 19.0
Nickel (Ni)	9.0 - 13.0	9.0 - 13.0
Niobium + Tantalum (Nb + Ta)	≥ 10 × C%	8 × C% to 1.10%

### Difference:

- TP347H has **higher carbon content**, improving high-temperature creep and rupture strength.

## Mechanical Properties (ASTM A312 Table 2)

Property	Requirement (Both 347 & 347H)
Tensile Strength	≥ 75 ksi (515 MPa)
Yield Strength (0.2% offset)	≥ 30 ksi (205 MPa)
Elongation	≥ 35% in 2" gauge length

Property	Requirement (Both 347 & 347H)
Hardness	≤ 92 HRB

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## Heat Treatment Requirements (ASTM A312 Section 5)

For 347 and 347H (as stabilized stainless steels):

- Solution annealing temperature:  
1900 - 2000° F (1040 - 1095° C)
- Cooling method:  
Water quench or rapid air cooling
- Mandatory requirement:  
All pipes must be furnished in the solution-annealed condition.

Special note for TP347H:

- TP347H is used for high-temperature service.
- It must meet the required carbon range for optimized creep resistance.

## Manufacturing Process (ASTM A312 Sections 6 & 7)

Allowed manufacturing methods:

- Seamless (SMLS) - hot-finished or cold-finished
- Welded pipe - without filler metal
- Welded pipe with filler metal
- Heavily cold-worked pipe

Requirements:

- Welded pipe must be fully radiographed *unless* weld is removed or pipe is HBW (heavily cold worked).

- Seamless pipes must be hot-finished or cold-finished.

## Surface Condition (Section 7)

- Pipe must be free from scale and contaminants.
- Acid pickling or mechanical cleaning is allowed.
- Weld seams must be smooth and free of visible cracks.

## Dimensional Requirements (ASTM A312 Section 12)

### Dimensions per:

- ASME B36.19M (stainless steel)
- ASME B36.10M (if applicable)

### Tolerances include:

- OD tolerance
- Wall thickness tolerance ( $\pm 12.5\%$ )
- Length:
  - Single Random (16 - 22 ft)
  - Double Random (35 - 40 ft)
  - Exact cut lengths

## Straightness Tolerance

Pipes must be reasonably straight; slight curvature allowed per standard practice.

## Hydrostatic / Nondestructive Testing (Section 16)

Each pipe must undergo one of the following:

### Hydrostatic Test

Unless waived by purchaser.

## OR Nondestructive Electric Test

Accepted methods:

- Eddy Current
- Ultrasonic
- Flux Leakage
- Pressure Rating Test

## Workmanship, Finish, and Appearance

Pipes must be free of defects like cracks, seams, laps, or porosity.

- Surface finish must meet ASTM A312 and industry practice.
- Minor imperfections allowed if they do not reduce wall thickness below minimum.

## Marking Requirements (Section 21)

Each pipe MUST be marked with:

- Manufacturer name or trademark
- ASTM A312
- Grade: **TP347** or **TP347H**
- Heat number
- Size & schedule
- “SMLS” or “WELDED” if applicable
- “H” for heavily cold-worked pipe
- Additional markings if purchaser requires
- Color coding (optional, per AWS A5.02)

## Certification Requirements

Mill Test Certificate (MTC) must include:

- Chemical composition
- Mechanical properties
- Heat treatment confirmation
- NDT or hydrostatic test results

- Manufacturing process declaration
- Compliance with ASTM A312

Certificates are usually issued as:

- EN 10204 3.1
- EN 10204 3.2 (if TPI involved)

## Supplementary Requirements (Optional)

Available upon request:

- S2 - Additional tensile tests
- S3 - Impact testing
- S6 - Hardness testing per lot
- S8 - Flare test for welded pipe
- S17 - Special marking
- S22 - Grain size requirements (often applied to 347/347H)

