

**SPECIFICATION FOR 17-4PH STAINLESS STEEL (100/125) BARS & TUBING
- DOUBLE H1150 CONDITION**

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
0	Initial release	15-06-2018	MN	AS	KKD	Released

Summary: This specification covers 17-4PH (UNS S17400) precipitation-hardening stainless steel bars, shapes and tubing in the Double H1150 condition with minimum yield strength of 100,000 psi (689 MPa).

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1.0 Scope

This specification covers 17-4PH (UNS S17400) precipitation-hardening stainless steel bars, shapes and tubing in the Double H1150 condition with minimum yield strength of 100,000 psi (689 MPa)..

2.0 Reference Specifications

Documents	Descriptions
ASTM A564 GR 630	Standard Specification for Hot-Rolled and Cold- Finished Age-Hardening Stainless Steel Bars and Shapes
ASTM A370	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM A484	Standard Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings
ASTM A519	Standard Specification for Seamless Carbon and Alloy Steel Mechanical Tubing
NACE MR0175/ ISO 15156	Petroleum and natural gas industries - Materials for use in H2S-containing environments in oil and gas production

3.0 Chemical Requirements

The chemistry shall meet the requirements listed in Table 1.

Table 1: Chemical Requirements (All are maximums unless otherwise noted)

Elements	Wt. Percentage (%)
Carbon	0.07
Manganese	1.00
Phosphorus	0.040
Sulfur	0.030
Silicon	1.00
Chromium	15.00 - 17.50
Nickel	3.00 - 5.00
Copper	3.00 - 5.00
Niobium & Tantalum	0.15 - 0.45

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4.0 Heat Treatment

4.1 Bars, shapes, and tubes shall be solution treated and aged as follows.

- 4.1.1 Solution anneal at 1900°F (+/- 25°F) and air cool or suitable liquid quench to below 90°F before precipitation hardening.
- 4.1.2 Precipitation harden at 1150°F (+/- 25°F) for a minimum of 4 hours at temperature and air cool to below 90°F before the second precipitation hardening step.
- 4.1.3 Precipitation harden at 1150°F (+/- 25°F) for a minimum of 4 hours at temperature and air cool.

4.2 The following process may be used in lieu of 4.1.

- 4.2.1 Solution anneal at 1900°F (+/- 25°F) and air cool or suitable liquid quench to below 90°F before precipitation hardening.
- 4.2.2 Precipitation harden at 1400°F (+/- 25°F) for 2 hours minimum at temperature and air cool to below 90°F before the second precipitation hardening step.
- 4.2.3 Precipitation harden at 1150°F (+/- 25°F) for a minimum of 4 hours at temperature and air cool.

5.0 Mechanical Properties

The material shall meet the requirements of Table 2. Test specimens shall be removed in the longitudinal direction from actual product shape at mid-radius/mid-wall for sizes up to 10 inches. For sizes over 10", test specimens shall be taken 1" minimum below surface. Test specimens and test methods shall be per ASTM A370.

All the bars and tubing shall be checked for hardness.

The material shall meet the requirements of table 2.

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Table 2: Mechanical Requirements (All are minimums unless otherwise noted)

Tensile Strength	125,000 psi (862 MPa)
Yield Strength	100,000 psi (689 MPa)
Elongation in 2" or 4D	16%
Reduction of Area ¹	50%
Hardness (Raw) ²	28-31 HRC
Hardness (Finished), max	33 HRC

¹Reduction of area need not be reported on tubing with wall thickness less than 7/8".

²Reduced hardness to compensate for work hardening during machining.

6.0 Workmanship

Material shall be inspected in accordance with part report (DBI). Material shall be free of injurious defects that are detrimental to the integrity of the final product, such as laps, scabs, cracks and exogenous inclusions.