

## 13-8 Mo PH, WNR 1.4534, UNS S13800, AMS 5268, AMS 5629, AMS 5864, AISI 632, Grade 13-8 Mo PH-Stainless Steel

### Introduction :

PH 13-8 Mo stainless steel is an age hardening, precipitation stainless steel. It has general corrosion cracking, good resistance to stress, high transverse toughness and high strength obtained by a single low temperature heat treatment. Alloy 13-8 Mo Stainless Steel offers a high level of useful mechanical properties under severe environmental conditions as compared to other ferrous-base materials. Alloy 13-8 Mo is used in landing gear, aerospace components, petrochemical industry, nuclear reactor components; injection molding equipment etc. In the annealed condition alloy 13-8 stainless steel can be strengthened further by relatively low temperature heat treatment.

### Products Available in forms :

- 13-8 Mo PH, WNR 1.4534, UNS S13800 Plates
- 13-8 Mo PH, WNR 1.4534, UNS S13800 Pipes
- 13-8 Mo PH, WNR 1.4534, UNS S13800 Round Bar
- 13-8 Mo PH, WNR 1.4534, UNS S13800 Tube
- 13-8 Mo PH, WNR 1.4534, UNS S13800 Flanges
- 13-8 Mo PH, WNR 1.4534, UNS S13800 Wire
- 13-8 Mo PH, WNR 1.4534, UNS S13800 Fittings

### Standard Available in forms :

- ASTM A182/ ASME SA182 Stainless Steel Pipe Fittings
- ASTM A213 / ASME SA213 Seamless Stainless Steel Pipes
- ASTM A240/ ASME SA240 Stainless Steels Sheets / Plates
- ASTM A249/ ASME SA249 Stainless Steel Welded Tubes
- ASTM A269/ ASME SA269 Stainless Steel Tubes
- ASTM A270/ ASME SA270 Stainless Steel Sanitary Tubes
- ASTM A312/ ASME SA312 Stainless Steel Pipes
- ASTM A403/ ASME SA403 Stainless Steel Pipe Fittings
- ASTM A554/ ASME SA554 Stainless Steel Welded Tubes
- ASTM A731/ ASME SA731 Stainless Steel Pipes
- ASTM A789/ ASME SA789 Stainless Steel Tubes
- ASTM A790/ ASME SA790 Stainless Steel Pipes
- ASTM A791/ ASME SA791 Stainless Steel Tubes

### Chemical Composition

	13-8 Mo PH	WNR 1.4538	UNS S31800	AISI 632	GRADE 13-8 Mo PH
Carbon	0.50 max	0.50 max	0.50 max	0.50 max	0.50 max
Manganese	0.10 max	0.10 max	0.10 max	0.10 max	0.10 max
Phosphorus	0.10 max	0.10 max	0.10 max	0.10 max	0.10 max
Sulfur	0.008 max	0.008 max	0.008 max	0.008 max	0.008 max
Silicon	0.10 max	0.10 max	0.10 max	0.10 max	0.10 max
Chromium	12.25-13.25	12.25-13.25	12.25-13.25	12.25-13.25	12.25-13.25
Nickel	7.5-8.5	7.5-8.5	7.5-8.5	7.5-8.5	7.5-8.5
Nitrogen*	0.01max	0.01max	0.01max	0.01max	0.01max
Molybdenum	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5	2.0-2.5
Copper	-	-	-	-	-

## Mechanical Properties

	13-8 Mo PH	WNR 1.4538	UNS S13800	AISI 632	GRADE 13-8 Mo PH
Ultimate Tensile Strength, ksi	1620 Mpa, 235000 psi	1620 Mpa, 235000 psi	1620 Mpa, 235000 psi	1620 Mpa, 235000 psi	1620 Mpa, 235000 psi
0.2 % Offset Yield Strength, ksi	1480 Mpa, 215000psi	1480 Mpa, 215000psi	1480 Mpa, 215000psi	1480 Mpa, 215000psi	1480 Mpa, 215000psi
Elongation in 2 inches, %	12 min	12 min	12 min	12 min	12 min
Reduction in Area, %	-	-	-	-	-
Hardness, Rockwell B	-	-	-	-	-

## Fabrication and Heat Treatment

### Cold Working

- Stainless steel-grade 13-8 can be cold worked in a satisfied manner despite its high initial yield strength.

### Welding

- Stainless steel-grade 13-8 can be welded in the solution annealed condition with the usage of 13-8 MO filler material.
- Inert gas shielded and resistance methods can also be used to cold wok this alloy.

### Forging

- Stainless steel-grade 13-8 alloy can be forged at 1177°C [2150°F] for 1 h.
- The alloy is then solution treated, hardened and finally cooled at room temperature.

### Forming

- Conventional methods are used to form stainless steel-grade 13-8 alloy, wherein the degree of formability is limited by high initial yield strength.

### Machinability

- Stainless steel-grade 13-8 can be machined under all conditions thought this steel is known as a tough machining stainless steel.
- Good machinability results are obtained when this steel type is machined in condition H1150M.

### Heat Treatment

Stainless steel-grade 13-8 can be heat treated in the following conditions:

- CONDITION A: Soak at 927°C [1700°F] and cool for 1 h below 16°C [60°F].
- CONDITION RH 950: Treat Condition A material for 2 h at -73°C [-100°F], air warm to room temperature, heat the cold treated material to 510°C [950°F] for 4 hand finally cool the material in air.
- CONDITION H950, H1000, H1050, H1100, H1150: Soak solution treated material for 4 h at specific temperature and then cool the material in air.
- CONDITION H1150M: Soak solution treated material for 2 h at 760°C [1400°F], cool in air, re-heat for 4 h to 620°C [1150°F] and finally cool the material in air.

## Hot Working

- Stainless steel-grade 13-8 can be hot worked in a satisfied manner.
- After being hot worked, the material is first solution annealed and then hardened to obtain better results.

## Applications

- Stainless steel-grade 13-8 can be used in components in the nuclear and petrochemical industries, and also aircraft components such as structural sections and landing gears, shafts and valves.



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