

## PH 13-8MO, UNS S13800, X3CRNIMOAL13-8-2, 1.4534

**PH 13-8Mo** is a corrosion-resistant material with a martensitic structure, subjected to precipitation hardening (solution aging), exhibiting high strength and relatively high corrosion resistance, along with mechanical properties that can withstand dynamic loads and fracture. Compared to other similar materials like 17-4PH and other stainless steels, PH 13-8Mo steel has stringent limits on sulfur and phosphorus in its chemical composition, enhancing the purity of the steel and resulting in superior mechanical properties. In aggressive environments (excluding moisture resistance), this material shows good resistance to sodium chloride, nitric acid, and sodium hydroxide. PH 13-8Mo is mainly used in aerospace, nuclear, and petrochemical industries for parts and components that must endure corrosion and heavy loads.

### Chemical Composition

Steel Grade	Chemical Composition WT %										
	C	Mn	Si	P	S	Cr	Mo	Ni	Al	Ti	N
<b>ASTM PH 13-8 Mo, XM-13</b>	max 0.05	max 0.2	max 0.1	max 0.01	max 0.008	12.3 - 13.2	2.0 - 2.5	7.5 - 8.5	0.90 - 1.35	-	max 0.01
<b>LW 1.4534, X3CrNiMoAl13-8-2, X 3 CrNiMoAl 13-8-2</b>	max 0.05	max 0.1	max 0.1	max 0.01	max 0.008	12.25 - 13.25	2.0 - 2.5	7.5 - 8.5	0.90 - 1.20	-	max 0.01
<b>AMS 5629 - UNS S13800</b>	max 0.05	max 0.2	max 0.1	max 0.01	max 0.008	12.3 - 13.2	2.0 - 2.5	7.5 - 8.5	0.90 - 1.35	-	max 0.01
<b>AFNOR X1CrNiMoAl12-9, Z1CNDA12-09</b>	max 0.05	-	max 0.1	-	-	11.5 - 12.5	1.8 - 2.5	8.0 - 9.5	0.6 - 0.9	max 0.35	-
<b>B.S. 13-8</b>	max 0.05	max 0.2	max 0.1	-	-	12.25 - 13.25	2.0 - 2.5	7.5 - 8.5	0.90 - 1.35	-	max 0.01
<b>AFNOR Z4CNDAT13-09, Z 4 CNDAT 13-09</b>	max 0.04	max 0.2	max 0.1	max 0.015	max 0.008	11.5 - 13.5	1.8 - 2.5	7.5 - 9.5	0.6 - 1.4	max 0.40	-

### Mechanical Properties

#### Mechanical properties for ASTM A564 XM-13, PH 13-8 Mo

- **+A**
  - HRC Hardness: <38
  - HB Hardness: <363
- **+H950**
  - Tensile strength,  $R_m$ : >1515 MPa
  - Yield point,  $R_e$ : >1415 MPa
  - Elongation, A: >10%
  - HRC Hardness: >45
  - HB Hardness: >450
- **+H1000**
  - Tensile strength,  $R_m$ : >1415 MPa

- Yield point,  $R_e$ : >1310 MPa
- Elongation, A: >10%
- HRC Hardness: >43
- HB Hardness: >400
- **+H1025**
  - Tensile strength,  $R_m$ : >1280 MPa
  - Yield point,  $R_e$ : >1210 MPa
  - Elongation, A: >11%
  - HRC Hardness: >41
  - HB Hardness: >380
- **+H1050**
  - Tensile strength,  $R_m$ : >1210 MPa
  - Yield point,  $R_e$ : >1140 MPa
  - Elongation, A: >12%
  - HRC Hardness: >40
  - HB Hardness: >372
- **+H1100**
  - Tensile strength,  $R_m$ : >1035 MPa
  - Yield point,  $R_e$ : >950 MPa
  - Elongation, A: >14%
  - HRC Hardness: >34
  - HB Hardness: >313
- **+H1150**
  - Tensile strength,  $R_m$ : >930 MPa
  - Yield point,  $R_e$ : >620 MPa
  - Elongation, A: >14%
  - HRC Hardness: >30
  - HB Hardness: >283
- **+H1150M**
  - Tensile strength,  $R_m$ : >860 MPa
  - Yield point,  $R_e$ : >585 MPa
  - Elongation, A: >16%
  - HRC Hardness: >26
  - HB Hardness: >259

### **Mechanical properties for flat products PH 13-8Mo according to ASTM A693**

#### **In supersaturated condition:**

- **thickness from 0.038 - 101.6mm**
  - HRC Hardness: >38
  - HB Hardness: >363

#### **In condition after precipitation hardening - supersaturation and ageing at 510°C:**

- **Thickness <0.51mm**
  - Tensile strength,  $R_m$ : >1515 MPa
  - Yield point,  $R_e$ : >1410 MPa
  - Elongation, A: >6%
  - HRC Hardness: >45
- **Thickness 0.51 - 4.76mm**
  - Tensile strength,  $R_m$ : >1515 MPa
  - Yield point,  $R_e$ : >1410 MPa
  - Elongation A: >8%
  - HRC Hardness: >45
- **Thickness 4.76 - 15.88mm**

- Tensile strength,  $R_m$ : >1515 MPa
- Yield point,  $R_e$ : >1410 MPa
- Elongation, A: >10%
- HRC Hardness: >45
- **Thickness 15.9 - 102.0mm**
  - Tensile strength,  $R_m$ : >1515 MPa
  - Yield point,  $R_e$ : >1410 MPa
  - Elongation, A: >10%
  - HRC Hardness: >45
  - HB Hardness: >429

**In condition after precipitation hardening - supersaturation and ageing at 540°C:**

- **Thickness <0.51mm**
  - Tensile strength,  $R_m$ : >1380 MPa
  - Yield point,  $R_e$ : >1310 MPa
  - Elongation, A: >6%
  - HRC Hardness: >43
- **Thickness 0.51 - 4.76mm**
  - Tensile strength,  $R_m$ : >1380 MPa
  - Yield point,  $R_e$ : >1310 MPa
  - Elongation A: >8%
  - HRC Hardness: >43
- **Thickness 4.76 - 15.88mm**
  - Tensile strength,  $R_m$ : >1380 MPa
  - Yield point,  $R_e$ : >1310 MPa
  - Elongation, A: >10%
  - HRC Hardness: >43
- **Thickness 15.9 - 102.0mm**
  - Tensile strength,  $R_m$ : >1380 MPa
  - Yield point,  $R_e$ : >1310 MPa
  - Elongation, A: >10%
  - HRC Hardness: >43
  - HB Hardness: >401