

1.7362, A194 GRADE 3, TYPE 501, UNS S50100

1.7362, X12CrMo5 is a heat-resistant grade also classified as Boiler Steel (ASTM A387/A387M, SA387, Gr.5, Grade 5, F5) for pressure applications and operation at elevated temperatures. It exhibits good strength properties at elevated temperatures and resistance to hydrogen under pressure. The grade is used for work with load and pressure up to 100 atm, at temperatures 450 - 600 °C. It is mainly used in the form of pipes, sheets and hot-rolled bars in the production of oil cracking equipment in refineries, containing 0.75% Sulfur medium. Higher alloy grades with 7-9% chromium content are selected for higher concentration of Sulfur. In addition to the basic purpose, steel is also used in the manufacture of apparatus for hydrogenation of coal, ammonia synthesis equipment, superheaters and air heaters, parts of steam boilers, screws or bolts operating in aggressive conditions, turbine blades, pump parts, covers or springs of manometers.

1.7362 grade and replacements are delivered, among others: Hot-Rolled pipe, bars and **F5 sheets or Coils** in Annealed condition.

Delivery condition: +NT1, +NT2, +QT.

Chemical Composition

Grade	Chemical Composition WT %											
	C	Mn	Si	P	S	Cr	Ni	Mo	V	Al	Cu	N
A194 Grade 3, Type 501	0.08 - 0.15	0.3 - 0.6	0.15 - 0.50	Max 0.025	Max 0.010	4.0 - 6.0	-	0.45 - 0.65	-	Max 0.04	Max 0.3	-
1.7362, X12CrMo5	0.10 - 0.15	0.3 - 0.6	Max 0.5	Max 0.020	Max 0.005	4.0 - 6.0	Max 0.3	0.45 - 0.65	-	-	Max 0.3	Max 0.012
12CrMo19-5	0.08 - 0.15	0.3 - 0.6	Max 0.5	Max 0.025	Max 0.020	4.0 - 6.0	-	0.45 - 0.65	-	-	-	-
Z10CD5-05	Max 0.15	0.3 - 0.6	Max 0.35	Max 0.020	Max 0.015	4.0 - 6.0	-	0.45 - 0.65	Max 0.04	-	Max 0.3	-
X16CrMo5-1, 1.7366	Max 0.18	0.3 - 0.8	Max 0.4	Max 0.025	Max 0.015	4.0 - 6.0	-	0.45 - 0.65	-	-	-	-
ASTM A387, SA387 F5	Max 0.15	0.3 - 0.6	Max 0.5	Max 0.030	Max 0.030	4.0 - 6.0	Max 0.5	0.44 - 0.65	-	-	-	-
BS 625	Max 0.15	0.3 - 0.6	Max 0.5	Max 0.030	Max 0.030	4.0 - 6.0	Max 0.3	0.45 - 0.65	-	Max 0.2	-	-

Mechanical Properties

Mechanical properties of ASTM A194/A194M - Grade 3, Type 501

- +QT(quenched and tempered)
 - Tensile Strength (Rm) Mpa, 450-630
 - Yield Strength (0.2% offset), Mpa, min 300
 - Elongation (4D) %, min 20
 - Hardness, HB 248-327

Mechanical properties of ASTM A387/A387M - Grade 5

- +QT(quenched and tempered)
 - Tensile Strength (Rm) ksi, 515-690
 - Yield Strength (0.2% offset), Mpa, min 310
 - Elongation (4D) %, min 18
 - Reduction of area % min 45
 - Hardness, HB -

Mechanical properties of EN 10028 - 1.7362, X12CrMo5

- +NT
 - Tensile strength, Rm, MPa 510 - 690
 - Yield strength, Re, MPa min 320
 - Elongation, A: min20%
 - Akv, room: min 40J
 - AKV, 0°C min 34J
 - AKV, -20°C min 27J
- +QT
 - Tensile strength, Rm, MPa 450 - 630
 - Yield strength, Re, MPa min 300
 - Elongation, A: min20%
 - Akv, room: min 40J
 - AKV, 0°C min 34J
 - AKV, -20°C min 27J

Mechanical properties of EN 10089 - X11CrMo5

- Tensile strength, Rm min 390 MPa
- Yield Strength, Re min 215 MPa
- Elongation, A min 22%
- Hardness: max 170 HB
- +A(annealing)
 - Tensile strength, Rm 430 - 580 MPa
 - Yield strength, Re > 175 MPa
 - Longitudinally Properties:
 - Elongation, A: min 22%
 - Akv: min 40J
 - Transversally Properties:
 - Elongation, A: min 20%
 - Akv: min 27J

Heat Treatment**Heat treatment process of ASTM A194**

- Quenching Temperature: 920-970°C Holding Time: 1 hr. , oil cool
- Tempering Temperature: 680-750°C Holding Time: 1 hr. Air cool

Thermal Properties

Heat Treatment	Temp	Min	Max	Similar	Note
+NT2 t <= 100 mm	500	265.00	-	-	
+NT2 t <= 100 mm	450	280.00	-	-	
+NT2 t <= 100 mm	400	289.00	-	-	
+NT2 t <= 100 mm	350	299.00	-	-	
+NT2 t <= 100 mm	300	309.00	-	-	
+NT2 t <= 100 mm	250	332.00	-	-	
+NT2 t <= 100 mm	200	334.00	-	-	
+NT2 t <= 100 mm	150	350.00	-	-	
+NT2 t <= 100 mm	100	366.00	-	-	

<https://longhaisteel.com>