INCONEL ALLOY 718:

Inconel alloy 718 is a precipitation-hardenable nickel-chromium alloy also containing significant amounts of iron, niobium and molybdenum along with lesser amounts of aluminum and titanium.

It combines corrosion resistance and high strength with outstanding weldability, including resistance to post-weld cracking.

The alloy has excellent creep-rupture strength at temperatures to 1300°F (700°C).

Used components for liquid fueled rockets, rings, casings and various formed sheet metal parts for aircraft and land-based gas turbine engines and cryogenic tankage, nuclear reactors, fasteners, pumps and tooling.

CHEMICAL PROPERTIES (Limiting Chemical Composition%)

Ni	C	Mn	Fe	S	Si	Cu	Al	Ti
50.00-55.00	0.08 max.	0.35 max.	Balance*	0.015 max.	0.35 max.	0.30 max.	0.20-0.80	0.65-1.15

Cr	Nb + Ta	Mo	Co	P	B
17.00-21.00	4.75-5.50	2.80-3.30	1.00 max.	0.015 max.	0.006 max.

PHYSICAL PROPERTIES

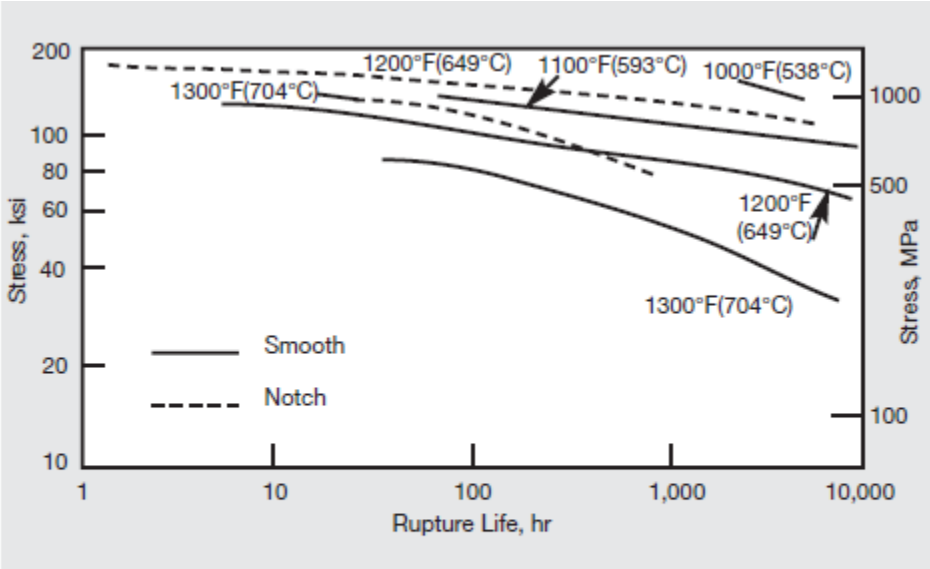
Density lb/in³		Melting Range		Permeability at 200 oersted and 70°F		Modulus of Elasticity, ksi x 103		Poisson's Ratio
Annealed	Annealed and Aged	°F	°C	Annealed Material	Annealed and Aged Material	Young's Modulus	Torsional Modulus	0.29
0.296	0.297	2300-2437	1260-1336	1.0013	1.0011	29.0	11.6	

MECHANICAL PROPERTIES

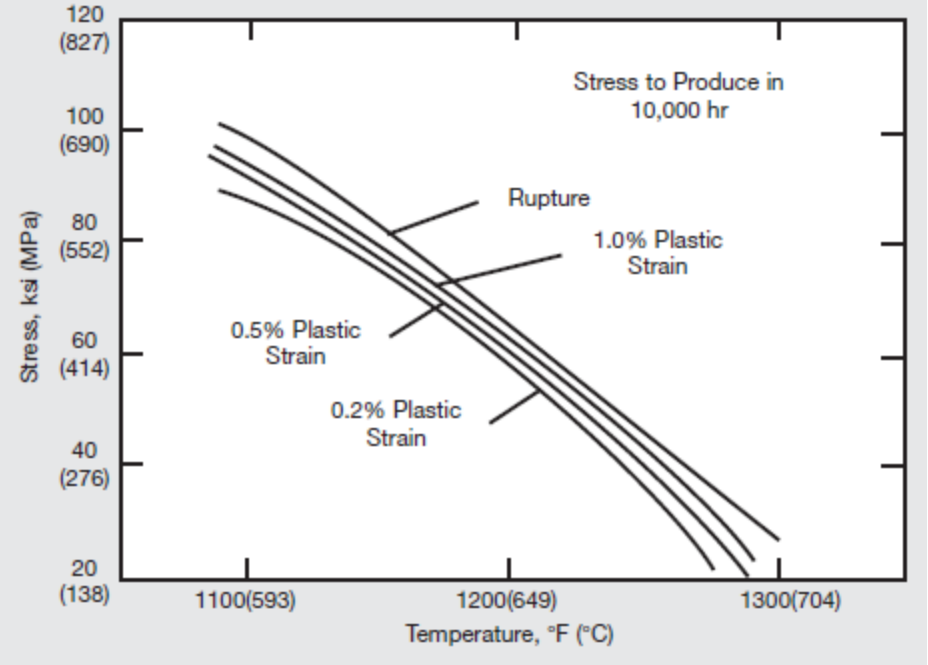
Effect of Cold Reduction on Properties of Sheet

Cold Reduction, %	Tests at Room Temperature				Tests at -320°F		
	Tensile Strength, ksi	Yield Strength (0.2% Offset), ksi	Elongation, %	Hardness, Rc	Tensile Strength, ksi	Yield Strength (0.2% Offset), ksi	Elongation, %
0	117.0	44.0	60.0	87 Rb	-	-	-
5.9	115.0	68.2	45.0	19	161.0	103.0	38.0
18.5	145.0	116.5	25.0	33	189.0	153.0	24.0
27.9	159.5	134.0	10.5	36	204.0	169.0	15.0
48.3	191.0	165.0	7.0	40	231.0	204.0	15.0
Aged 1325°F/8 hr, F.C. 100°F/1 hr to 1150°F (Held for Total Aging Time of 18 hr, A.C.) after Cold Rolling							
0	187.0	172.5	19.5	44	248.0	188.5	26.0
5.9	203.0	175.5	22.0	45	255.0	211.0	13.0
18.5	217.0	201.0	16.0	47	270.0	235.0	12.5
48.3	244.0	232.5	4.0	49	289.0	269.0	2.5

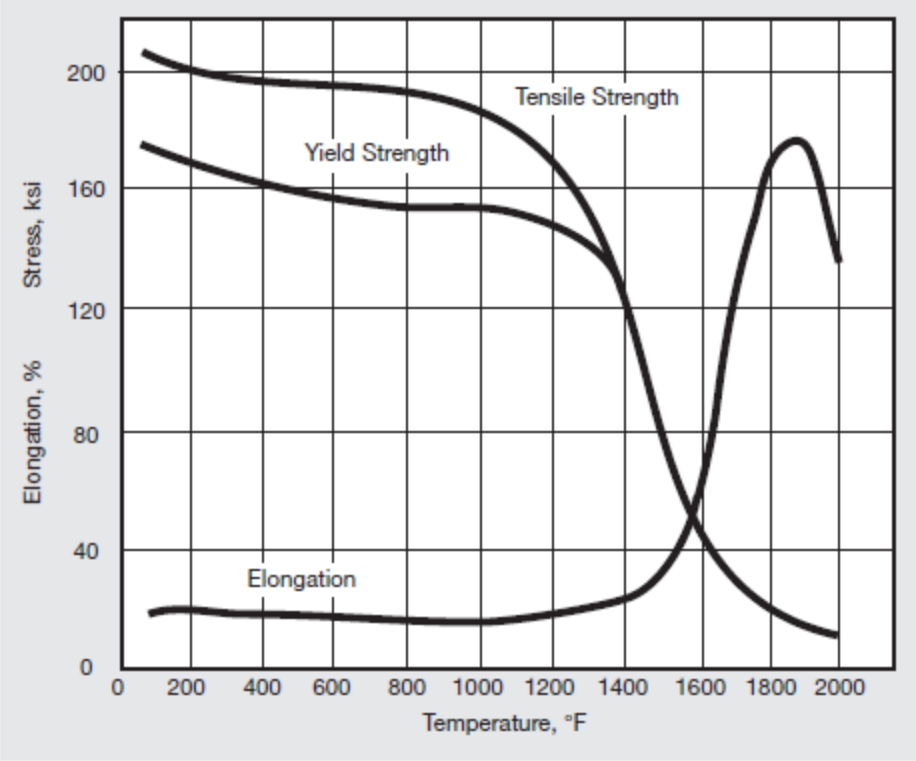
MECHANICAL PROPERTIES DIAGRAM



Smooth and notch rupture life of hot-rolled bar, 0.625-in.(15.9 mm) diameter (1800°F(982°C)/1 hr, W.Q. and aged 1325°F(718°C)/8 hr, F.C. to 1150°F(621°C), hold at 1150°F(621°C) for total aging time of 18 hr), K_t=4.



Creep-rupture properties (10,000 hr) of hot-rolled, 0.625-in. (15.9 mm) diameter bar (1800°F(982°C)/1 hr, W.Q. and aged 1325°F(718°C)/8 hr, F.C. to 1150°F(621°C), hold at 1150°F(621°C) for total aging time of 18 hr).



High-temperature properties of ½-in. diameter hot-rolled, annealed (1800°F/1 hr) and aged (1325°F/8 hr, F.C. to 1150°F, hold at 1150°F for total aging time of 18 hours) bar.