MONEL ALLOY K-500:

A precipitation-hardenable nickel-copper alloy that combines the corrosion resistance of MONEL alloy 400 with greater strength and ardnessincreased properties are obtained by adding aluminum and titanium to the nickel-copper base, and by heating under controlled conditions so that submicroscopic particles of Ni3 (Ti, Al) are precipitated throughout the matrix.

The thermal processing used to effect precipitation is commonly called age hardening or aging.

It also has low permeability and is nonmagnetic to temperatures as low as -150°F (-101°C).

Typical applications for MONEL alloy K-500 products are chains and cables, fasteners and springs for marine service; pump and valve components for chemical processing; doctor blades and scrapers for pulp processing in paper production; oil well drill collars and instruments, pump shafts and impellers, non-magnetic housings, safety lifts and valves for oil and gas production; and sensors and other electronic components.

Chemical properties(Limiting Chemical Composition%)

Ni	C	Mn	Fe	S	Si	Cu	Al	Ti
63.0 min.	0.25 max.	1.5 max.	2.0 max.	0.01 max.	0.5 max.	27.0 - 33.0	2.30 - 3.15	0.35 - 0.85

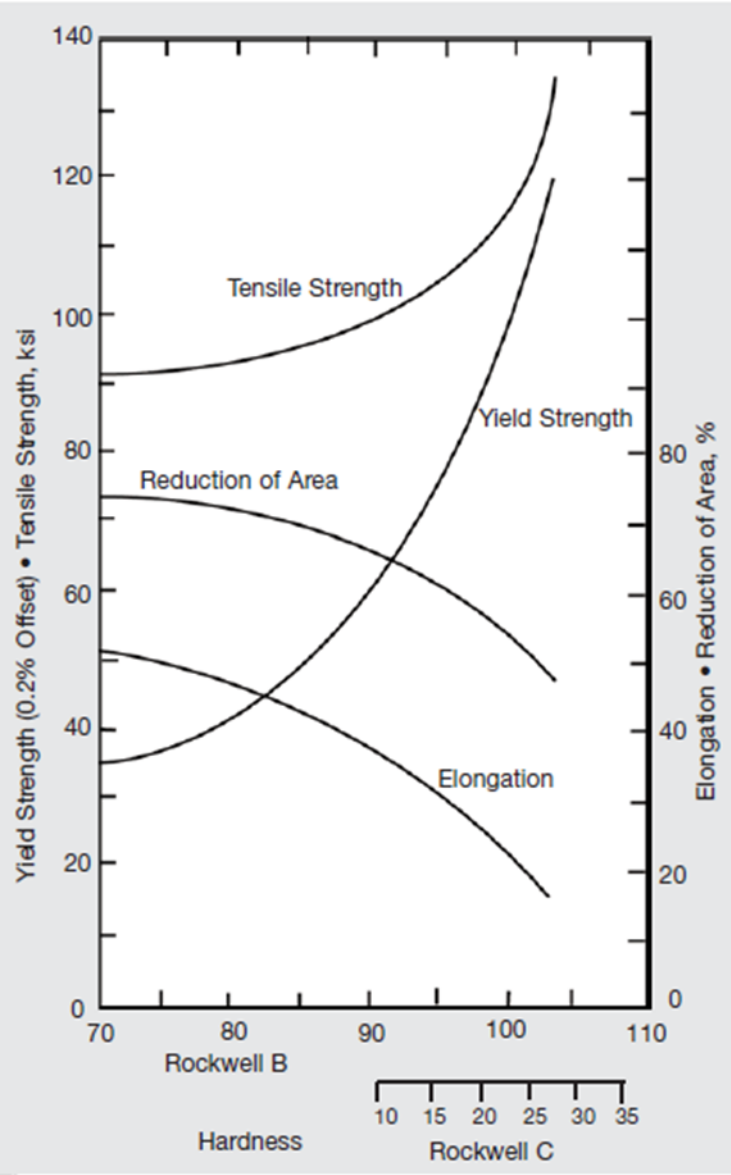
Physical properties

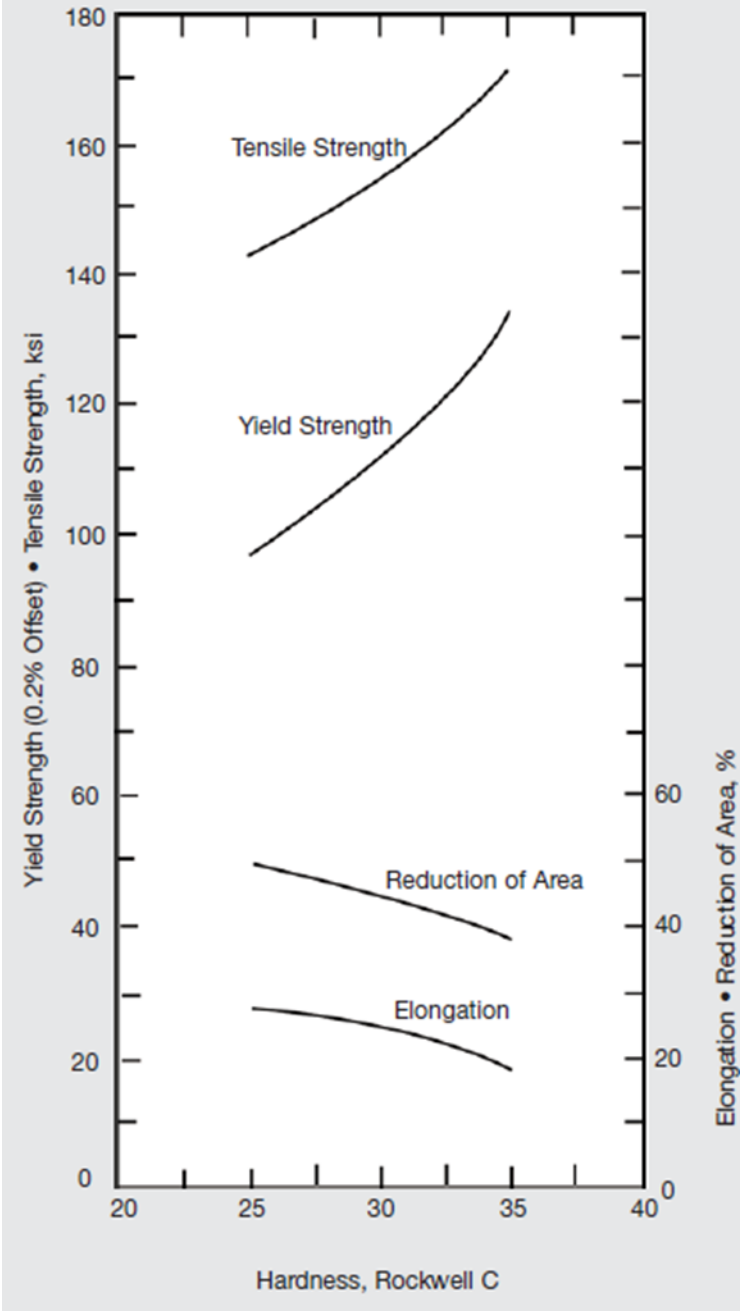
Density		Melting Range		Modulus of Elasticity, 103 ksi		Poisson's Ratio
g/cm3	lb/in.3	˚F	˚C	Tension	Torsion	0.32
8.44	0.305	2400-2460	1315-1350	26.0	9.5	

Mechanical properties

Form and Condition	Tensile Strength		Yield Strength (0.2% Offset)		Elongation, %	Hardness	
	ksi	MPa	ksi	MPa		Brinell (3000-kg)	Rockwell
Rod and Bar							
Hot-Finished	90-155	621-1069	40-110	276-758	45-20	140-315	75B-35C
Hot-Finished, Aged[b]	140-190	965-1310	100-150	690-1034	30-20	265-346	27-38C
Hot-Finished, Annealed	90-110	621-758	40-60	276-414	45-25	140-185	75-90B
Hot-Finished, Annealed and Aged[b]	130-165	896-1138	85-120	586-827	35-20	250-315	24-35C
Cold-Drawn, As-Drawn	100-140	690-965	70-125	483-862	35-13	175-260	88B-26C
Cold-Drawn, Aged[b]	135-185	931-1276	95-160	655-1103	30-15	255-370	25-41C
Cold-Drawn, Annealed	90-110	621-758	40-60	276-414	50-25	140-185	75-90B
Cold-Drawn, Annealed and Aged[b]	130-190	896-1310	85-120	586-827	30-20	250-315	24-35C
Sheet, Cold-Rolled, Annealed	90-105	621-724	40-65	276-448	45-25	-	85B max.
Strip, Cold-Rolled							
Annealed	90-105	621-724	40-65	276-448	45-25	-	85B max.
Annealed and Aged[b]	130-170	896-1172	90-120	621-827	25-15	-	24C min.
Spring Temper	145-165	1000-1138	130-160	896-1103	8-3	-	25C min.
Spring Temper, Aged[b]	170-220	1172-1517	130-195	896-1345	10-5	-	34C min.
Tube and Pipe, Seamless							
Cold-Drawn, Annealed	90-110	621-758	40-65	276-448	45-25	-	90B max.
Cold-Drawn, Annealed and Aged[b]	130-180	896-1241	85-120	586-827	30-15	-	24-36C
Cold-Drawn, As-Drawn	110-160	758-1103	85-140	586-965	15-2	-	95B-32C
Cold-Drawn, As-Drawn, Aged[b]	140-220	965-1517	100-200	690-1379	25-3	-	27-40C
Plate							
Hot-Finished	90-135	621-931	40-110	276-758	45-20	140-260	75B-26C
Hot-Finished, Aged[b]	140-180	965-1241	100-135	690-981	30-20	265-337	27-37C
Wire, Cold Drawn[c]							
Annealed	80-110	552-758	35-65	241-448	40-20	-	-
Annealed and Aged[b]	120-150	827-1034	90-110	621-758	30-15	-	-
Spring Temper	145-190	1000-1310	130-180	896-1241	5-2	-	-
Spring Temper, Aged[b]	160-200	1103-1379	140-190	965-1310	8-3	-	-

Mechanical properties diagram




Tensile Strength
Yield Strength
Reduction of Area
Elongation
Yield Strength (0.2% Offset) • Tensile Strength, ksi
Elongation • Reduction of Area, %
Hardness, Rockwell C
180
160
140
120
100
80
60
40
20
0
60
40
20
0
20
25
30
35
40