This page is mainly introduced the 18Ni Maraging Steel Datasheet, including chemical information,mechanical properties, physical properties, mechanical properties, heat treatment, and Micro structure, etc. It also contains the use of 18Ni Maraging Steel,such as it is commonly used in bars, sheet,plates, steel coils, steel pipes,forged and other materials application.

Datasheet for Steel Grades Superalloys 18Ni Maraging Steel

18Ni Maraging Steel Standard Number:

ITEM	Standard Number	Descriptions
1	AMS 6514	
2	ASTM A 538	
3	Mil-S-46850D	
4	UNS K93120	

18Ni Maraging Steel Chemical composition(mass fraction)(wt.%)

Chemical	Min.(%)	Max.(%)
C		0.03
Si		0.10
Mn		0.10
P		0.010
S		0.010
Cr		0.50
Ni	18.00	19.00
Mo	4.60	5.20
Cu		0.50
Co	8.50	9.50
Al	0.05	0.15
Ti	0.50	0.80
Fe		Bal

C	Si	Mn	P	S	Cr	Ni	Mo	V	Ta
W	N	Cu	Co	Pb	B	Nb	Al	Ti	Other

MARAGING (C) 300

General: Maraging is a 18% nickel, cobalt strengthened steel (C-type), with excellent mechanical properties, workability and heat
treatment characteristics.

Applications: Typical applications for maraging include missile and rocket motor cases, landing and takeoff gear, munitions,
aerospace, extrusion tooling, die casting, high performance shafting, gears and fasteners.

Composition:

C Mn Si P S NI
0.03 max 0.10 max 0.10 max 0.010 max 0.010 max 18.00-19.00
Co Mo Ti Al Cr Cu
8.50-9.50 4.60-5.20 0.50 -0.80 0.05-0.15 0.50 max 0.50 max Fe Bal

Material Melt Method:

Maraging melt method is a VIM (Vacuum Induction Melt) + VAR (Vacuum Arc Remelt)

As Shipped Condition:

Maraging is supplied in the annealed and descaled condition. The alloy is very tough, relatively soft (36
Rc Max.), therefore, readily machined and formed.

*Bar Tolerances:

.250” - .499” .500” - .999” 1.000” – 3.625” 3.626” – 6.000” 6.001” – 8.000” 8.001” – 10.000”
-.000/+.005 -.000/+.010 -.000/+.031 -.000/+.047 -.000/+.063 -.000/+0.078

Minimum Properties after Aging:

Hardness ..... 52 Rc Charpy V-notch ..... 12 ft/lbs. min Reduction of Area 47%
Elongation ..... 5.0% Yield Strength ..... 280 ksi Fracture Toughness 60

Physical Properties:

Density..... .289 lbs./cu. In
Average Coefficient of Thermal Expansion (70 – 900 F) ..... 5.6 x 10 -6 in/in. F

Heat Treatment Aging Process: (Non Die Casting Applications)

Material is to be heat treated to 900 F +/- 10 holding at temperature for 6 hours then cooling at room air temperature. During the aging
treatment maraging shrinks uniformly and predictably on all dimensions .001 in/in

Heat Treatment Aging Process: (Die Casting Applications)

Following the rough machining of the die, anneal at 1500-1525 F for 1 hour per inch of thickness is recommended. After finish
machining , an aging heat treatment of 980-1000 F for 6 hours is recommended.

Machining:

Maraging steel in the annealed condition is comparable to 4340. However, when maraging is aged, the type of cutting tool and speeds
change. Rigid equipment, firm tool supports, sharp tools and abundant coolant are essential.

Welding:

Maraging is weld able without preheat, in both the annealed and aged condition. Only an aging heat treatment is needed to restore in the
weld.

Standards:

AMS 6514 ASTM A 538 *Mil-S-46850D UNS K93120

*DMI product is not supplied to the dimensional tolerances of MIL-S-46850D.
*The information, data and specifications presented here are representative only, and are not guaranteed values. Material or products
applications described are solely for illustrative purposes and should not be construed as express or implied warranties for fitness for these
or other applications

18Ni Maraging Steel Physical Properties

Tensile strength	115-234	σb/MPa
Yield Strength	23	σ 0.2 ≥/MPa
Elongation	65	δ5≥ (%)
ψ	-	ψ≥ (%)
Akv	-	Akv≥/J
HBS	123-321	-
HRC	30	-

18Ni Maraging Steel Mechanical Properties

Tensile strength	231-231	σb/MPa
Yield Strength	154	σ 0.2 ≥/MPa
Elongation	56	δ5≥(%)
ψ	-	ψ≥(%)
Akv	-	Akv≥/J
HBS	235-268	-
HRC	30	-

18Ni Maraging Steel Heat Treatment Regime

Annealing	Quenching	Tempering	Normalizing	Q & T
√	√	√	√	√

18Ni Maraging Steel Range of products

Product type	Products	Dimension	Processes	Deliver Status

Plates / Sheets	Plates / Sheets	0.08-200mm(T)*W*L	Forging, hot rolling and cold rolling	Annealed, Solution and Aging, Q+T, ACID-WASHED, Shot Blasting
Steel Bar	Round Bar, Flat Bar, Square Bar	Φ8-1200mm*L	Forging, hot rolling and cold rolling, Cast	Black, Rough Turning, Shot Blasting,
Coil / Strip	Steel Coil /Steel Strip	0.03-16.0x1200mm	Cold-Rolled & Hot-Rolled	Annealed, Solution and Aging, Q+T, ACID-WASHED, Shot Blasting
Pipes / Tubes	Seamless Pipes/Tubes, Welded Pipes/Tubes	OD:6-219mm x WT:0.5-20.0mm	Hot extrusion, Cold Drawn, Welded	Annealed, Solution and Aging, Q+T, ACID-WASHED

We can produce Superalloys the specifications follows: