Material Data Sheet

Wipro 3D – MS1 / Maraging 300

Wipro 3D – Maraging steel (MS1)

Maraging Steel MS1 is an ultra-high strength tooling grade maraging steel. Its excellent properties are enabled by forming intermetallic phases and precipitates in heat treatment. Its nickel, cobalt, molybdenum and titanium alloying results in an excellent material for additive manufacturing, providing low distortion and balanced properties. The properties enable successful use in diverse applications including injection molding and cold and hot working.

Characteristics of the Alloy

- Ultra high strength and hardness
- Properties adjustable with different heat treatment
- Low distortions
- Good machinability

Applications

- Hot working tools
- High wear resistant applications
- High strength/hardness applications

Chemical Composition

Chemical composition of raw material and built parts is compliant to table given below.

Chemical Composition (weight%)	
Element	**Limits**
Cr	0.5 max
Co	8.5-9.5
Ti	0.5-1.0
Al	0.05-0.15
Cu	0.5 max
Si	0.3 max
C	0.03 max
P	0.03 max
Mo	4.5-5.5
Ni	17-19
S	0.03 max

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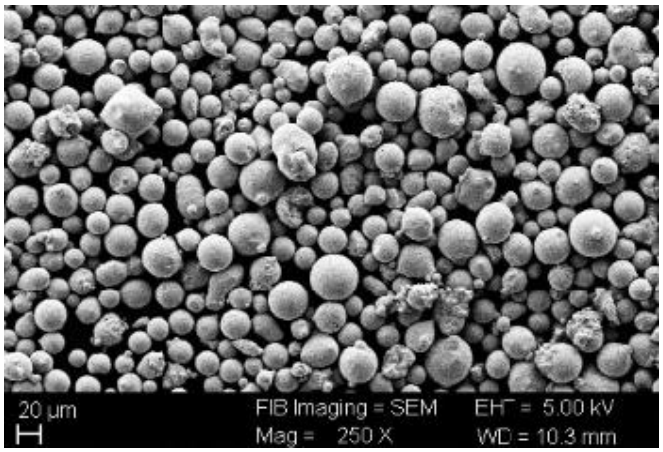
Microstructures & Density

SEM Images of powder



As printed micro-density: 99.97%

Mechanical Properties

Mechanical properties of coupons concurrently built along with part and heat treated comply to below mechanical properties:

Properties	Values in room temperature
Tensile Strength (MPa)	>1900
Yield Strength (MPa)	> 1800
Elongation (%)	> 3 %
Reduction in Area (%)	> 15%
Hardness	> 50 HRC
Modulus of elasticity	190 GPa
Coeff. Of thermal expansion (CTE)	10.6 *10^{-6}/K

There are various heat treatment methods for improving strength and/or elongation, hence if the user provides exact requirements, it can be discussed to achieve these properties.