LayrrTool M300 - Maraging Steel M300

Type analysis

Single figures are nominal except where noted.

Iron	Balance	**Nickel**	17.0-19.0 %	**Cobalt**	8.50-10.0 %
Molybdenum	4.50-5.20 %	**Titanium**	0.80-1.20 %	**Chromium**	0.25 %
Manganese	0.15 %	**Oxygen**	0.10 %	**Silicon**	0.10 %
Carbon	0.030 %	**Phosphorus**	0.010 %	**Sulfur**	0.010 %

Description

LayrrTool M300 - Maraging Steel M300 is an ultra-high-strength, low-carbon steel optimized for Laser Powder Bed Fusion (LPBF). By utilizing intermetallic precipitation rather than carbon-based hardening, M300 achieves an extraordinary tensile strength of ~2000 MPa.

Material Behavior & Microstructure:

- Metallurgical Synergy: The term "Maraging" represents the combination of a Martensitic matrix and an Aging treatment.
- Low Carbon Advantage: Unlike H13 or D2 steels, M300 features a low-carbon martensitic structure. In its as-printed state, it is relatively soft (~30–35 HRC), allowing for easy machining and finishing.
- Nanoscale Reinforcement: Peak strength is reached through the precipitation of intermetallic compounds (Ni_3Ti and Ni_3Mo).
- Dimensional Precision: The absence of a traditional carbon quench means there is negligible distortion during the hardening process, preserving complex internal geometries.

Powder Properties

Part number	LayrrTool M300 - Maraging Steel M300 10-53 µm
Application	L-PBF[1]
Maximum particle size	Max 1 wt% > 53 µm[2]
Minimum particle size	Max 10 vol% < 10 µm[3]
LSD percentile	D10, D50, D90[4], reported
Atomisation	Nitrogen Gas Atomised
Apparent density (g/cm³)	Measured according to ASTM B212[4] and reported
Hall flow	Measured according to ASTM B964[5] and reported

[1] ASTM/ISO 52900: Laser - Powder Bed Fusion (L-PBF), Electron-Beam Powder Bed Fusion (EB-PBF), Directed Energy Deposition (DED)
[2] ASTM B214 Standard Test Method for Sieve Analysis for Metal Powders
[3] ASTM B822 Standard Test Method for Particle Size Distribution of Metal Powders and Related Compounds by Light Scattering
[4] ASTM B212 Standard Test Method for Apparent Density of Free-Flowing Metal Powders Using the Hall Flowmeter Funnel Testing of powder will fulfill certification requirements to Nadcap Materials Testing and ISO/IEC 17025 Chemical, per relevant ASTM procedures
[5] ASTM B213 Standard Test Method for Flow Rate of Metal Powders Using the Hall Flowmeter Funnel Testing of powder will fulfill certification requirements to Nadcap Materials Testing and ISO/IEC 17025 Chemical, per relevant ASTM procedures