TECHNICAL DATA SHEET
LPW M300 Tool Steel
1.2709

GENERAL DESCRIPTION

LPW M300 Tool Steel is an age hardenable martensitic tool steel with exceptional mechanical properties, specifically a high tensile strength and hardness. It is easily heat treated, with superior mechanical properties being achieved after age hardening.

APPLICATIONS

LPW M300 Tool Steel is used for a range of applications where exceptional tensile strength and hardness are required, and therefore lends itself to tooling applications. Specific examples are tool insets for injection moulding and die-casting, as well as functional components.

CHARACTERISTICS

The high carbon tool steels, such as H13 or M2, which are typically used in tooling and moulding applications are very difficult to process by conventional Laser Powder Bed Fusion. LPW-M300 offers a comparable alternative, in terms of mechanical properties, but with proven AM suitability. LPW-M300 maintains strict control on residual alloying elements to optimize for AM.

CHEMICAL COMPOSITION

Element		Minimum wt%	Maximum wt%
Al	Aluminium		0.1
C	Carbon		0.03
Co	Cobalt	8.5	10.0
Cr	Chromium		0.25
Fe	Iron	Balance	
Mn	Manganese		0.15
Mo	Molybdenum	4.5	5.2
N	Nitrogen		0.10
Ni	Nickel	17.00	19.00
O	Oxygen		0.10
P	Phosphorus		0.010
S	Sulfur		0.010
Si	Silicon		0.10
Ti	Titanium	0.8	1.2

Particle size distribution optimised to suit specific machine platforms and process types (i.e. SLM, EBM, LMD, etc.) Custom sizing also available.

Full powder qualification including (but not exclusive to) the following: Size Distribution, Flow Properties, Chemistry and Morphology.

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MECHANICAL PROPERTIES (INDICATIVE ONLY)

Property		As built	After Heat Treatment
Tensile Strength [1]	Horizontal Direction (XY) Vertical Direction (Z)	1000 - 1200 MPa 1000 - 1200 MPa	1900 - 2100 MPa 1900 - 2100 MPa
Yield Strength [1]	Horizontal Direction (XY) Vertical Direction (Z)	1000 - 1100 MPa 900 - 1100 MPa	1850 - 2050 MPa 1850 - 2050 MPa
Young's Modulus [1]	Horizontal Direction (XY) Vertical Direction (Z)	150 - 170 GPa 140 - 160 GPa	160 - 200 GPa 160 - 200 GPa
Elongation [1]	Horizontal Direction (XY) Vertical Direction (Z)	6 - 14 % 6 - 14 %	2 - 4 % 2 - 4 %
Hardness [2]		30 - 40 HRC	50 - 60 HRC
Coefficient of Thermal Expansion [3]	$10 - 11 \times 10^{-6}$ m/mK		
Thermal Conductivity [3]	15 - 20 W/mK		

1. As built. Mechanical testing in accordance with ISO 6892
2. As built. Hardness test in accordance with ISO 6508
3. In the range of 20°C (68°F) to 100°C (212°F)

Range of mechanical properties encompasses expected values across multiple machine platforms

SIMILAR MATERIALS

Company	Alternative Title
LPW	M300 Tool Steel
Other Generic Names	1.2709
3D Systems	Maraging Steel
Concept Laser	CL 50WS
EOS	MS1*
Realizer	N/A
Renishaw	N/A
SLM Solutions	1.2709
TRUMPF	ToolSteel 1.2709-A LMF

*A low Ti version for MS1 (Min Wt Ti 0.60 Max Wt Ti 0.80) is also available

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