FORMETRIX™

L-40

Tool Steel Powder for Metal 3D Printing

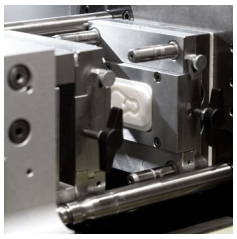
High-Performance Tool Steel for Powder Bed Fusion Platforms

Formetrix's L-40 tool steel material is an innovative, high-performance steel alloy designed to provide users with an unparalled combination of hardness, ductility, toughness, and 3D printability.

The unique properties of L-40 enable users to capture the significant benefits of 3D Printing (also known as Additive Manufacturing or AM) while delivering similar or superior performance to conventionally manufactured tools or components.

Powder Bed Fusion (PBF) is one of the premier metal 3D Printing technologies. It features density levels of up to nearly 100% and delivers the highest level of dimensional resolution for 3D Printed metals. It is for these reasons that L-40 has been optimized for PBF platforms and is an ideal solution for a wide range of challenging 3D printing applications including:

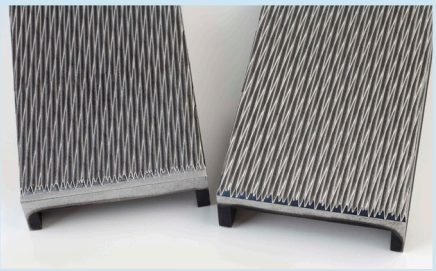
TOOL & DIE



MOLDS

SPECIALTY PARTS

Superior Performance/ Price to M300



KEY PROPERTIES

- **Easy to Print, Crack-Free**
- **Exceptional Material Properties**
  - Hardness: >50 HRC
  - Ductility: > 10% Elongation
  - Exceptional Toughness
  - Corrosion Resistance
  - Case Hardening: Up to 70 HRC
  - Safe: Low Toxicity (Cobalt Free)

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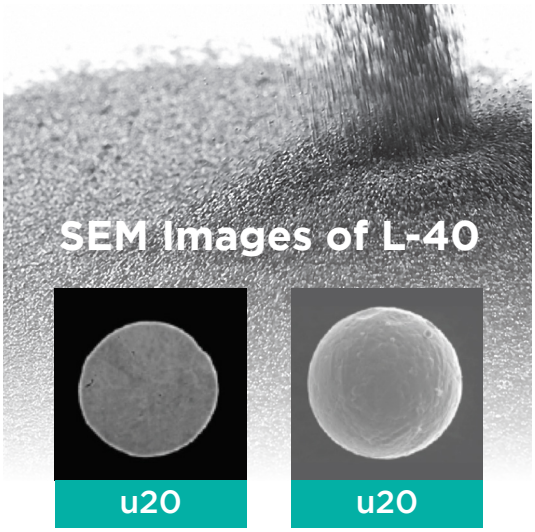
MECHANICAL PROPERTIES

when printed using Laser Powder Bed Fusion

PROPERTY	AS BUILT	HEAT TREATED
Hardness (HRC)*	46-48	50-52
Case Hardening (peak HRC)** via nitriding via carburizing	 n/a n/a	 70 65
Tensile Strength (MPa)***	1500	1650
Yield Strength (MPa)***	1300	1350
Elongation (%)***	14+	10
Charpy V-Notch (J)****	60	18

*ASTM E18; **ASTM E384; ***ASTM E8; **** ASTM E23
Industry standard processes are used for heat treatment and case hardening.
Recommended process details are available from Formetrix.



THERMAL PROPERTIES

when printed using Laser Powder Bed Fusion

PROPERTY	AS BUILT	HEAT TREATED
Therma Expansion Coefficient @ 20°C (ppm/°C)*	11.3	10.2
Thermal Conductivity (W/m-K)** @ 20 °C @ 300 °C @ 600 °C	 16.3 21.2 24.7	 18.2 22.3 24.5
Specific Heat (J/Kg-K)** @ 20 °C @ 300 °C @ 600 °C	 451 563 751	 424 531 750

*ASTM E228; **ASTM E1461

CHEMISTRY*

L-40 powder composition

ELEMENT	WEIGHT%
Iron (Fe)	Balance
Chromium (Cr)	>10.5%
Nickel (Ni)	<5%
Molybdenum (Mo)	<5%
Copper (Cu)	<1%
Niobium (Nb)	<1%
Carbon (C)	<1%
Nitrogen (N)	<1%

*Actual composition is proprietary.

FORMETRIX CUSTOMER SUPPORT: For customers, Formetrix can provide recommended component design rules, 3D Printer Settings, and Post-Processing details.

formetrixmetals.com