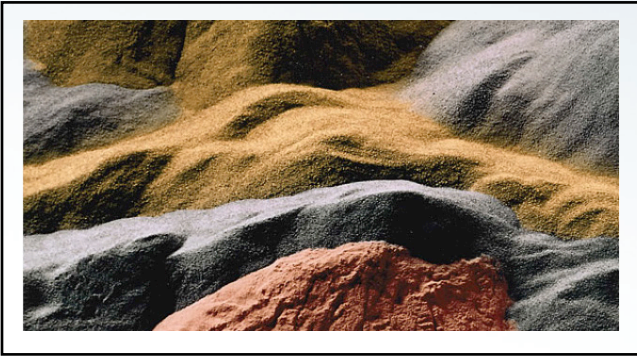


LENS[®] MATERIALS FAQs



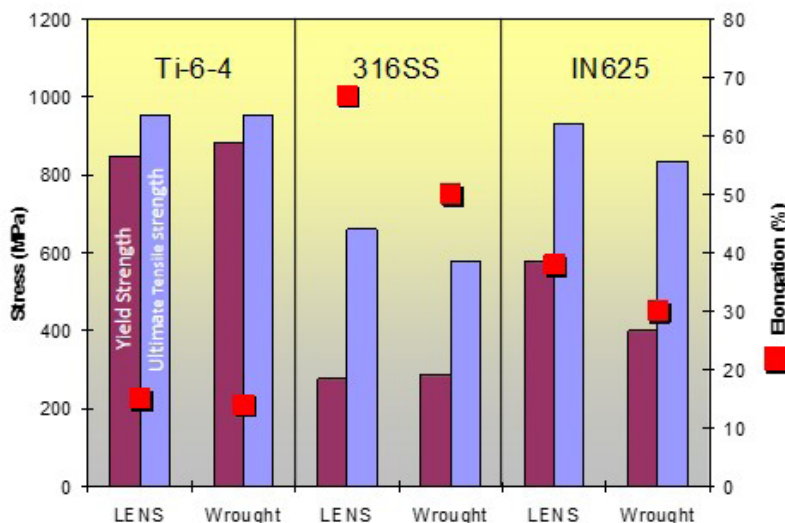
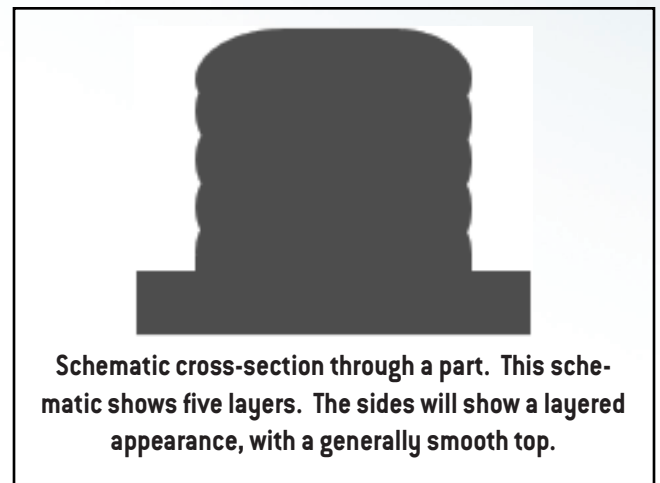
LENS systems process common engineering materials such as stainless steels, tool steels, titanium alloys, and cobalt alloys. LENS technology can also process other materials including Zirconium, Tantalum, Tungsten, Aluminum, Bronze, refractory metals and some ceramics. These materials are available in powder form from a variety of commercial suppliers.

Printing Features of LENS Systems:

- Layer Thickness: 250 to 750 microns
- Melt Pool Diameter: 2,000 microns Typical
- Minimum Wall Thickness: 300 microns
- Deposition Rate Based on Laser Power: 2 kW = 0.5kg/hr.
- Surface Roughness: On the sides, 12- 25 microns Ra

Printed Metal Properties

In general, the LENS process produces fully-dense material that has mechanical properties at least equal or better than cast material, and in some cases very similar to forged material.



Powder Characteristics:

- **Size:** Powder particle size is -100/+325 mesh, equivalent to a powder diameter of 44 to 150 microns.
- **Shape:** Powder sufficiently spherical to flow.
- **Chemistry:** The LENS process does not alter powder chemistry.
- **Cleanliness:** Inert-Gas-Atomized or Plasma-Rotating-Electrode powders are normally of acceptable quality.

MATERIALS FOR OPEN ATMOSPHERE

ALLOY CLASS	ALLOY	ALLOY CLASS	ALLOY
STAINLESS STEEL	13-8	NICKEL	IN625
	17-4		IN718
	304		IN690
	316	COPPER	GRCop-84
	410		CU-Ni
	420	TOOL STEEL	H13
	15-5PH		S7
	AM 355		A-2
	309	COBALT	Stellite 6, 21
	416	CARBIDE	Ni-WC
420	Co-WC		

MATERIALS FOR CONTROLLED ATMOSPHERE

ALLOY CLASS	ALLOY	ALLOY CLASS	ALLOY
TITANIUM	CP-Ti	NICKEL	Waspalloy
	Ti 6-4		Hastelloy X
	Ti 6-2-4-2		MarM 247
	Ti-6-2-4-6		Rene 41
	Ti-48-2-2		Rene 142
	Ti-22Al-23Nb	REFRACTORIES	W, Mo, Nb
CERAMICS	Alumina	COMPOSITES	TiC
ALUMINUM	4047		CrC

ABOUT OPTOMECC

Optomecc® is a privately-held, rapidly growing supplier of Additive Manufacturing systems. Optomecc's patented Aerosol Jet Systems for printed electronics and LENS 3D Printers for metal components are used by industry to reduce product cost and improve performance. Together, these unique printing solutions work with the broadest spectrum of functional materials, ranging from electronic inks to structural metals and even biological matter. Optomecc has more than 300 marquee customers around the world, targeting production applications in the Electronics, Energy, Life Sciences and Aerospace industries. For more information about Optomecc, visit <http://www.optomecc.com>.