GKN ADDITIVE
FORECAST 3D

Metal Laser Sintering

From prototyping to production using powder bed fusion

About

GKN Additive (Forecast 3D) pushes the industrialization of laser additive manufacturing (AM) for serial production through a high degree of digitalization, standardization, and automation during part manufacturing.

The laser sintering 3D-printing process for metal parts, also known as Direct Metal Laser Sintering (DMLS) or Selective Laser Melting (SLM), yields extremely high build rates with a scaling potential that harnesses GKN Powder Metallurgy's longtime experience in sintering high-performance metal parts and products.

Benefits

- **Material options:** wide variety of high-performance metal alloys and tailored materials available
- **Precision:** highly precise and fine (down to 400 µm) to massive (up to 70 cm overall linear dimensions) product features
- **Digitalization:** process chain for data monitoring and data science available
- **Economical:** cost-efficient production through automated process chain

Applications

- Automotive parts (e.g., brackets, structural parts)
- Digital industry (e.g., heat management, fluid manifolds)
- Energy market (turbines, heat exchangers)

Process

1. GKN Additive (Forecast 3D) reviews the order file to evaluate and align on customer requirements.
2. Project technicians review the customer's CAD files to ensure data integrity and part printability, providing feedback for potential improvements.
3. Once aligned and approved on the order objective, the customer receives an order confirmation showing a detailed project schedule and ship date.
4. Laser Powder Bed Fusion printers use metal powders to print parts.
5. The parts are postprocessed to the requested finishing level.
6. The quality assurance team reviews parts for official sign-off and release to the customer.

This induction hardening coil was produced using CuCr1Zr, a copper alloy.

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Dimensional tolerance	.005″ for the first inch, with an additional .002″ per inch thereafter
Wall thickness	>0.5mm
Surface roughness	Rz 50µm
Part size	Max for single parts is the Build Volume
Build volume	X400 Y400 Z400 mm
Resolution	XY 1200DPI (21 µm) Z50–100 µm
General accuracy	IT class 11-13 DIN ISO 2768 class mK

Materials

AlSi10Mg: aluminum alloy used for prototyping and automotive applications

Stainless Steel 316L: universal austenitic stainless steel offering high corrosion resistance for automotive, industrial, consumer, and medical applications

Stainless Steel 17-4PH: stainless steel with high strength and hardness for automotive, industrial, and tooling applications

CX Tool Steel: tooling-grade steel with a combination of good corrosion resistance along with high strength and hardness

1.2709 Maraging Steel: ultra-high strength tooling-grade steel with excellent fatigue strength and good machinability

Inconel 625: a typical material for temperature resistant applications with high strength needed in the energy industry

CuCr1Zr: copper alloy used for electrical engineering and heat transport applications

Pure Copper: ideal for industrial applications that require high thermal and electrical conductivity

Titanium: particularly resistant to corrosion, with high mechanical properties compared to the low specific weight

DPLA 600 (dual phase low-alloy material): dual-phase steel used for crash-/impact-critical structural automotive applications

20MnCr5 Steel: case hardening low-carbon steel providing good wear resistance due to its high surface hardness after heat treatment

This fixture was created for fatigue testing with topology optimization using 1.2709 Maraging Steel.

Find out how GKN Additive (Forecast 3D) can take your product from prototype to production. Visit forecast3d.com today or contact us directly at (877) 835-6170 or hello@forecast3d.com to learn more.