



CASE STUDY

NIKON SLM SOLUTIONS

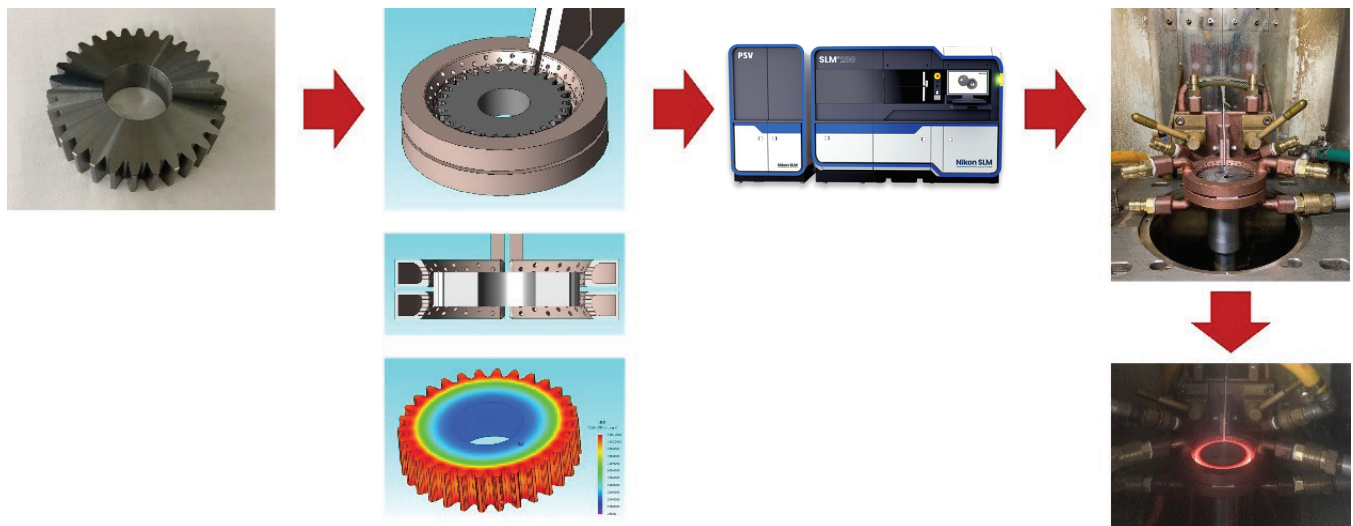
REVOLUTIONIZING INDUCTION
HEATING WITH TKE ENGINEERING
AND NIKON SLM SOLUTIONS



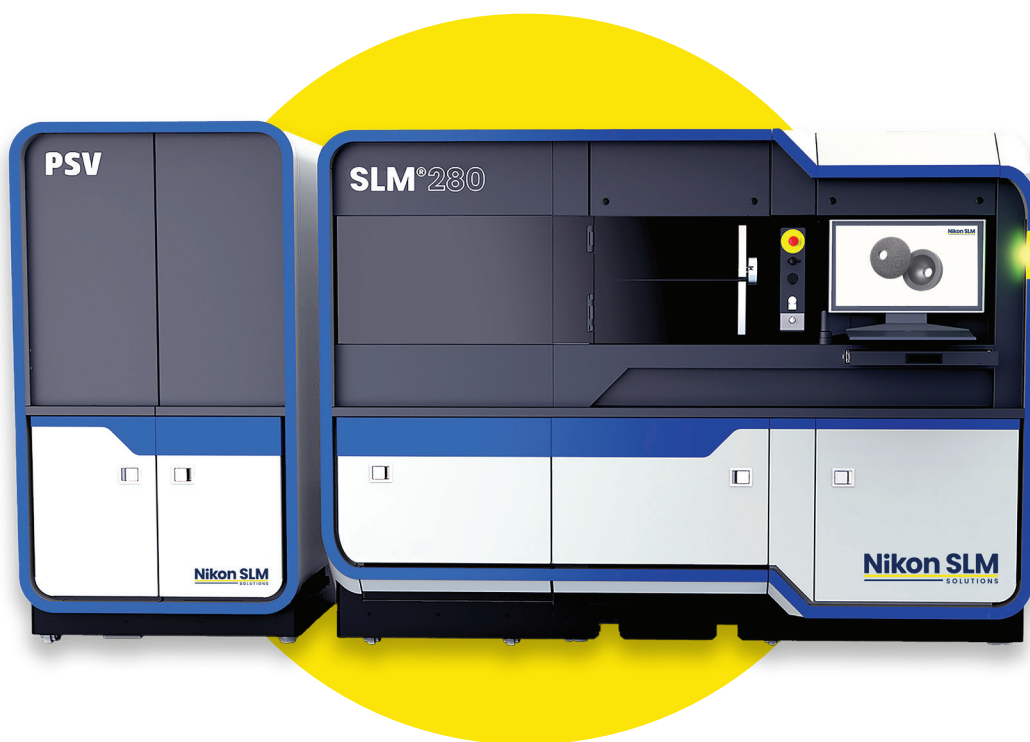
TKE Engineering Co., Ltd., a renowned service bureau based in Yatomi City Japan, specializes in contract fabrication using metal 3D printers, with a strong focus on copper alloys (CuCr1Zr/C18150 or equivalent). They excel in providing comprehensive modeling and printing service for induction heating coils, from design with heating simulation to heat treatment testing, ensuring high-quality outcomes for every component.

PIONEERING CONTRACT FABRICATION WITH COPPER ALLOYS

TK Engineering has embraced the power of selective laser melting (SLM®) technology, utilizing SLM®280 Production Series machines from Nikon SLM Solutions, chosen for their versatility, to achieve breakthroughs in the fabrication of heating coils. They pioneered the development of integrated modeling with a 3D printer in 2018, overcoming the challenges of copper modeling with the aid of Aichi Center for Industry and Science Technology and Aichi Sangyo Corporation, a local research center and a company that sells welding, cutting, and industrial machinery.



SLM®280 PRODUCTION SERIES



2 LASERS

280MM	280MM	365MM
X-AXIS	Y-AXIS	Z-AXIS

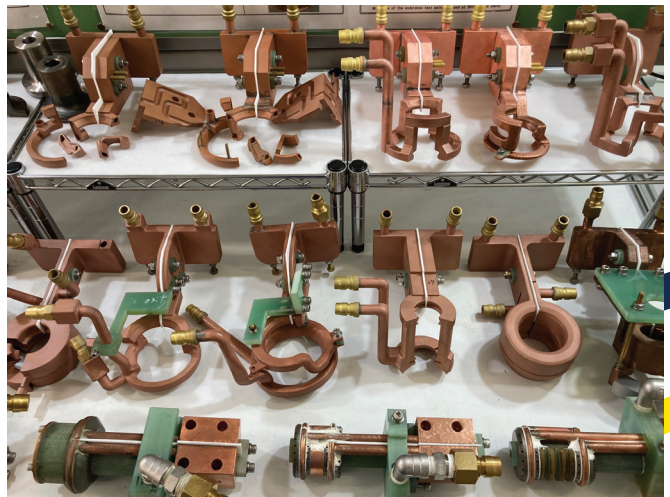
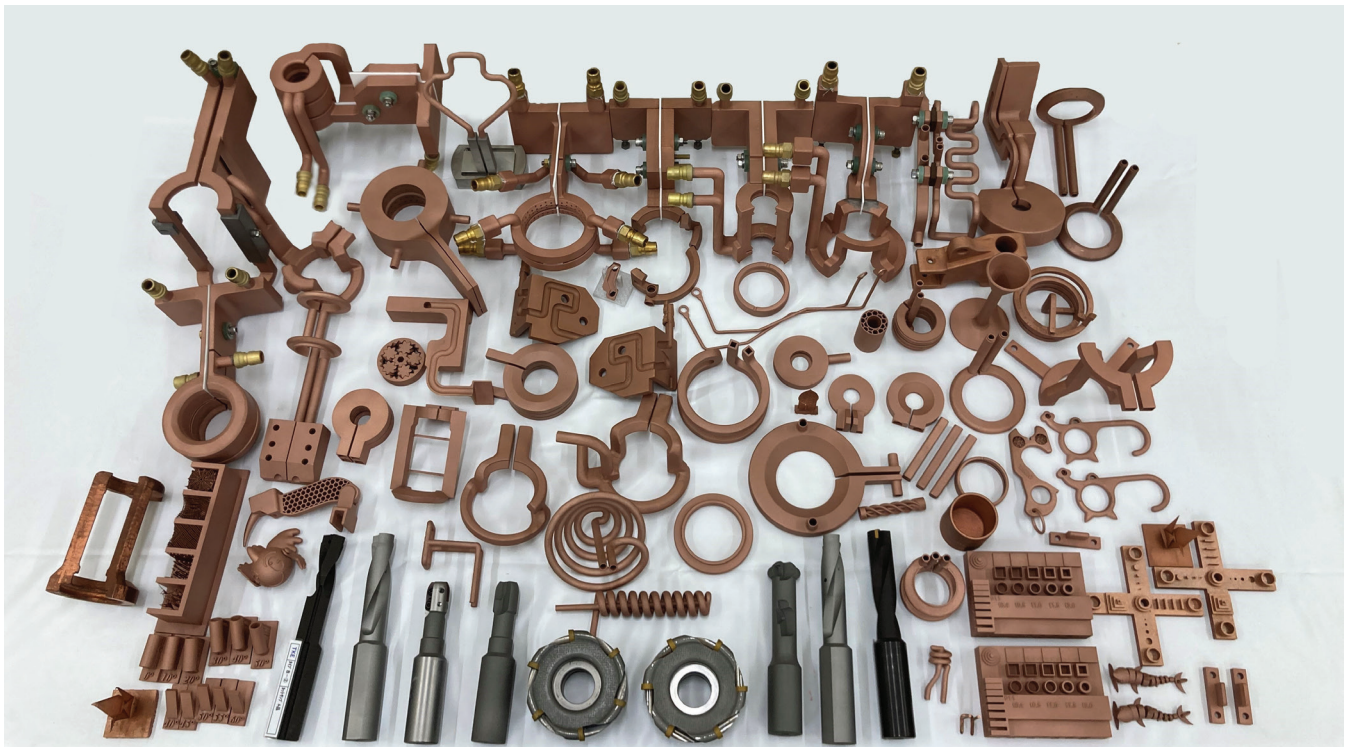




A NEW ERA FOR INDUCTION COILS

The company's approach to induction coils is a paradigm shift, offering significant advantages:

- 1 Quality and Longevity:** By fabricating coils in a single piece, TK Engineering eliminates weak points, significantly improving coil life and quality.
- 2 Rapid Production:** AM coils can be produced directly from 3D-CAD data in just nine days, reducing the traditional three-month production cycle.
- 3 Design Freedom:** The unrestricted design capabilities of AM allow for complex, application-specific coil designs.





EXEMPLARY AM COIL QUALITY AND PERFORMANCE

TK Engineering AM coils boast a stable relative density of over 99.8%, with dimensional accuracy that meets their stringent standards. They have demonstrated exceptional reproducibility and quality in inductively hardened products, matching those of traditionally brazed coils.

CONTRIBUTIONS TO CARBON NEUTRALITY

TK Engineering AM initiatives align with carbon-neutral goals:

- 1 Efficient Use of Materials:** Reducing the use of copper and steel materials by eliminating the need for excess coils and test pieces.
- 2 Zero Waste Manufacturing:** The 3D printing process generates no swarf, contrasting with the waste of traditional subtractive manufacturing.

BROADENING THE HORIZONS OF MANUFACTURING

Starting with heating coils and expanding to AM tools, TK Engineering leverages the advantages of AM to enhance product performance. Their dedication to innovation not only advances manufacturing processes but also contributes positively to societal needs.

For Nikon SLM Solutions, this partnership with TK Engineering highlights the potential of metal additive manufacturing to transform traditional production methods and pave the way for more sustainable manufacturing practices.



NIKON SLM SOLUTIONS

Nikon SLM Solutions helped invent the laser powder bed fusion process, was the first to offer multi-laser systems and all selective laser melting machines offer patented quality, safety and productivity features. Taking a vested interest in customers' long-term success in metal additive manufacturing, Nikon SLM Solutions' experts work, with customers at each stage of the process to provide support and knowledge-sharing that elevate use of the technology and ensure customers' return on investment is maximized. Optimal paired with Nikon SLM Solutions' software, powder and quality assurance products, the Nikon SLM technology opens new geometric freedoms that can enable lightweight construction, integrate internal cooling channels or decrease time to market.

A publicly traded company, Nikon SLM Solutions AG focuses exclusively on metal additive manufacturing and is headquartered in Germany with offices in China, France, India, Italy, Singapore and the United States and a network of global sales partners.

Further information is available on
www.nikon-slm-solutions.com

