

# ADDITIVE MANUFACTURING CENTERS NORTH AMERICA

**Offering End-to-End Additive Manufacturing Services** from powder to finished components. voestalpine Additive Manufacturing Centers in North America are a ONE-STOP-SHOP developing solutions to meet customers' AM needs with a full service portfolio including:

- » AM Metal Powder
- » Design/Engineering/Simulation Consultation
- » Prototyping and Production
- » Complete AM Solutions

## STEP 1: Powder

Metal Powder tailored to customer applications (BÖHLER, Uddeholm and other leading providers).



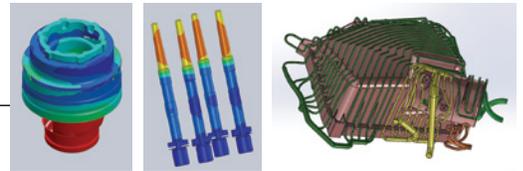
## STEP 2: Design

Design expertise in multiple industries such as Die Casting, Injection Molding, Oil and Gas and Automotive; as an example: conformal cooling applications.



## STEP 3: Simulation

FEA, CFD, heat transfer, plastic molding, metal forming, metal casting, metal extrusion, topology optimization.



## STEP 4: AM Build

- » Access to a variety of build technologies such as: direct metal laser sintering, direct metal deposition with equipment from leading manufacturers
- » Capability to print a variety of steels and super alloys
- » Different build volumes allows for efficient build of different sized parts
- » Breadth of equipment enables a tailored application of AM to select the most suitable technology to meet different technical requirements and economic considerations; competitive in producing single prototypes and serial production



## STEP 5: Post Processing

Powder extraction and shot peening to remove any loose material and smooth out any rough surfaces.



## STEP 6: FARO Arm Inspection

Verify as-built measurements by comparing directly to CAD file. Verification of product quality by performing 3D inspections, dimensional analysis, reverse engineering and more.

- » Accuracy and repeatability  $\pm 25 \mu\text{m}$
- » Scan Rate 300 frames per second



## STEP 7: Heat Treatment: voestalpine Thermo-Tech

Wide variety of Heat Treatment processes available for desired final material properties.



## STEP 8: Material Testing

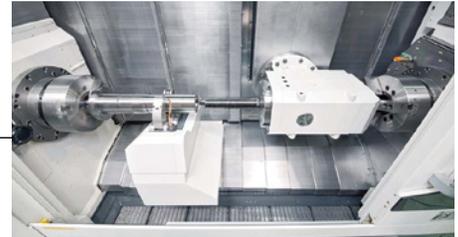
Verify material properties with:

- » Tensile testing
- » Charpy impact testing
- » Hardness testing
- » Microstructure inspection



## STEP 9: Finish Machining

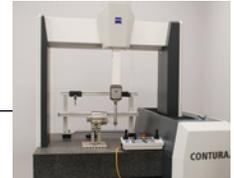
- » Access to the necessary final machining capabilities such as: turning, milling, grinding, polishing
- » Example of in-house capabilities: Nakamura-Tome NTRX-300L for fast, cost-efficient precision machining



## STEP 10: Final Inspection CMM: ZEISS

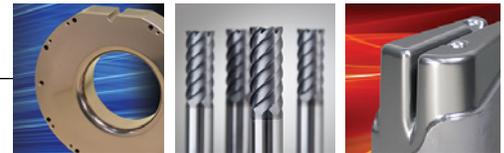
CONTURA 7 700 x 700 x 600 mm measurement envelope.

- » Achievable accuracy:  $1.5 + L/350 \mu\text{m}$



## STEP 11: Coatings: voestalpine eifeler Coatings

Achieve surface finish requirements with voestalpine eifeler Coatings' latest PVD (physical vapor deposition) coating technology; designed to improve performance and tool life, allowing components to function in environments they otherwise may not be able to operate in.



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**voestalpine**  
ONE STEP AHEAD.