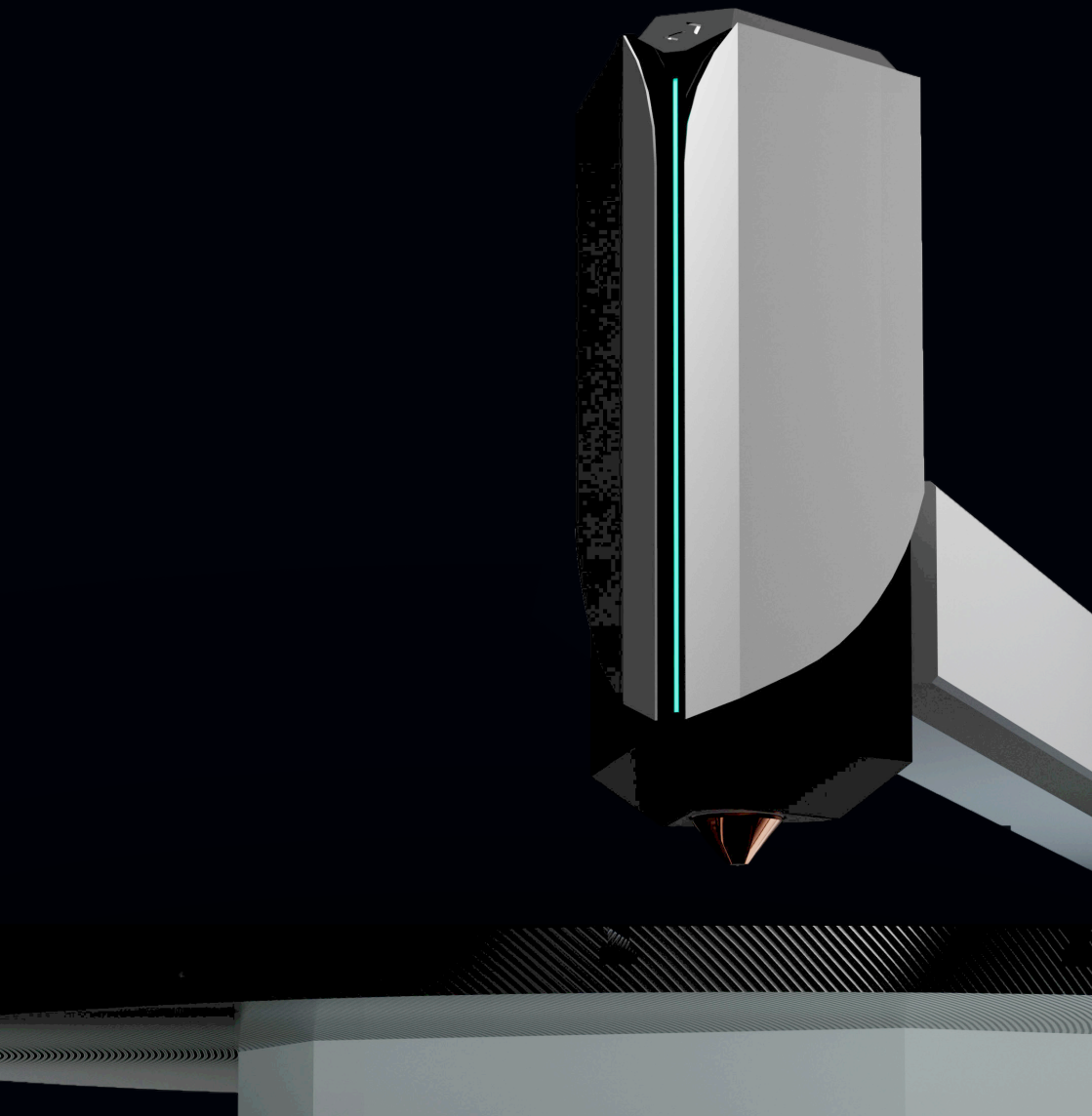
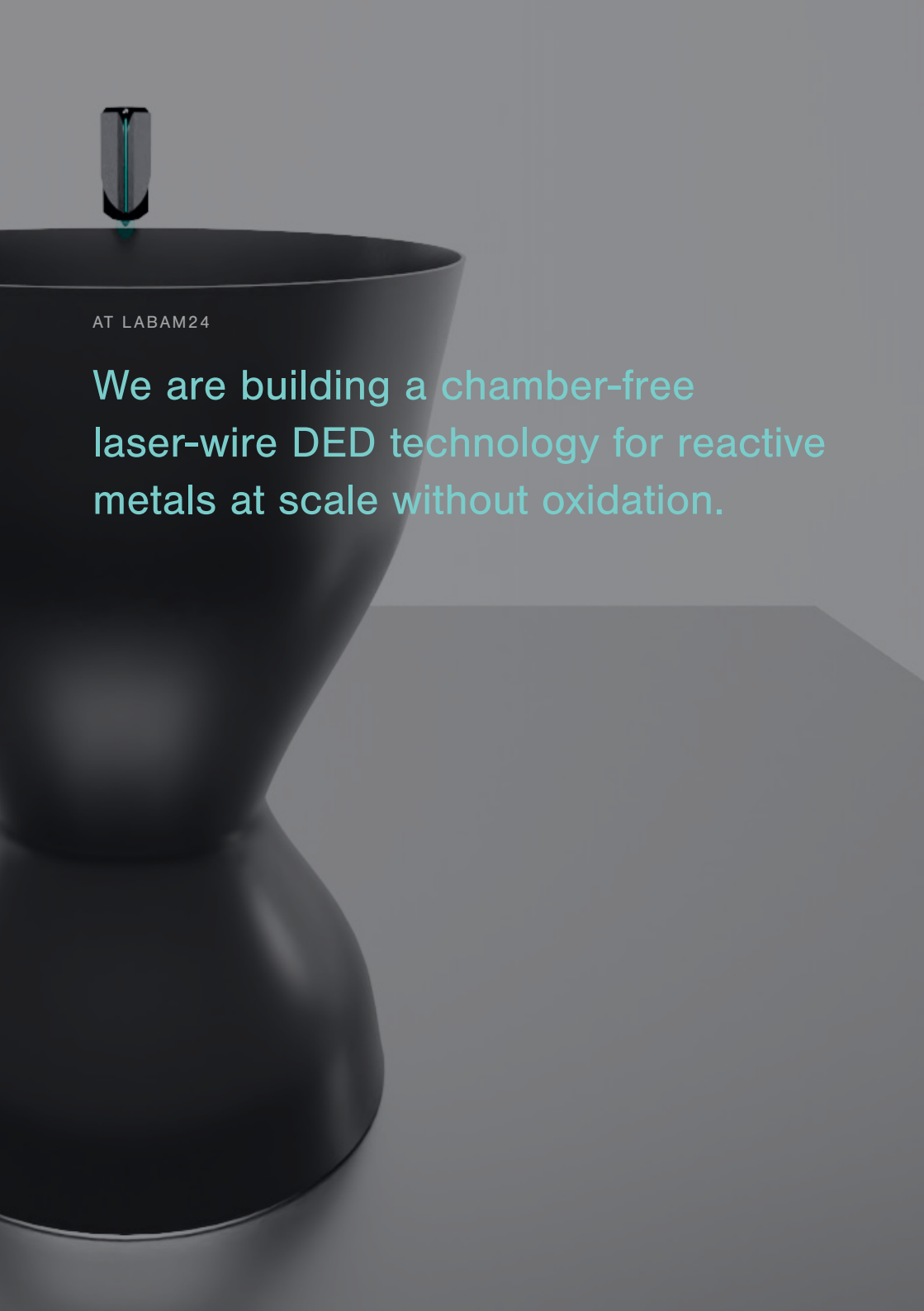
LabAM24

No Chamber,
Yes Inert.



LabAM24



AT LABAM24

We are building a chamber-free laser-wire DED technology for reactive metals at scale without oxidation.

Key Milestones

2024

- MAR **The Inception**
  Our journey began with the question, “can we overcome the constraints of inert 3D printing with portability?”
- SEP **Patented Technology**
  PCT and domestic patent applications completed for Morphing Shield Technology
- OCT **U.S. Air Force Funding**
  Morphing Shield Technology receives research funding by the U.S. Air Force Research Lab (AOARD)

2025

- MAR **Industrial R&D & Venture Enterprise Certification**
- MAY **KASA SBIR Program**
  Selected to participate in the Korea Aerospace Association Small Business Innovation Research Program Phase 1

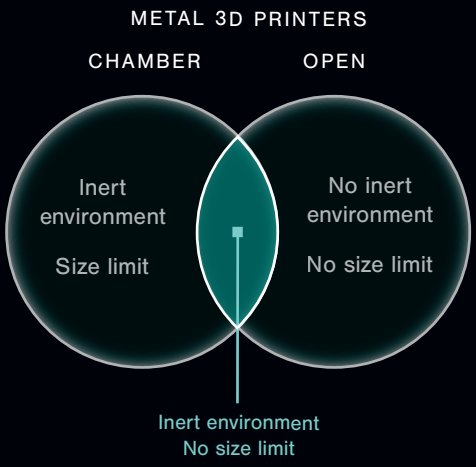
2026

- MAR **KARI Supply Contract**
  Supply contract to produce Niobium C-103 rocket nozzle awarded by Korea Aerospace Research Institute

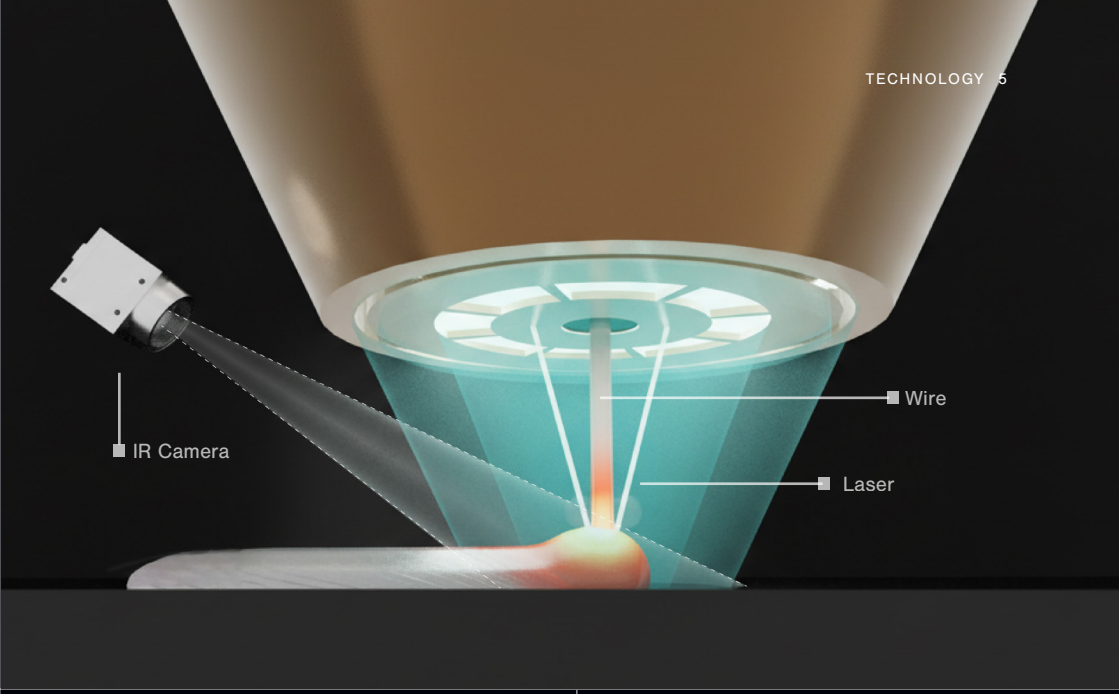
Technology

Overcoming the constraints of inert 3D printing with portability

As metal additive manufacturing scales, the industry has been constrained by a tradeoff between sealed-chamber systems and open-type platforms.



Our technology resolves this by generating a portable inert environment without a sealed chamber, enabling scalable, cost-efficient processing of oxidation-sensitive alloys. MST and RT-MCT form the core of this capability, implementing real-time monitoring and control of process parameters to minimize oxidation throughout the build.



MST

MORPHING SHIELD TECHNOLOGY

Morphing Shield Technology builds a portable argon inert gas environment surrounding the melting zone for laser-wire DED processes.

MST Algorithm

Process optimization with section-based gas pressure adjusting to the printing geometry.

RT-MCT

REAL-TIME TEMPERATURE MEASUREMENT & CONTROL TECHNOLOGY

Real-time monitoring technology implementing an IR camera to control melt pool size.

Melt Pool Monitoring

Real-time monitoring of the melt pool temperature to prevent oxidation.

Real-time Oxygen Control

Oxygen sensor operates during printing to ensure a stable inert environment is maintained.

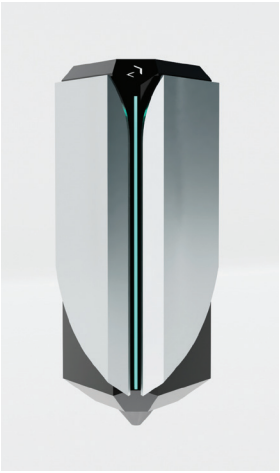
Test Results:
With MST, below 20ppm oxygen level was reached in 60 seconds and maintained for more than 1 hour.

Product

- INERTON
  LASER-WIRE DED DEPOSITION HEAD

Product Specifications

InertOn is a laser-wire directed energy deposition (LW-DED) head module that enables chamber-less metal 3D printing of reactive metals by implementing LabAM24's MST.



Laser System	Type	Triple Laser
	Power	≥ 3kW
	Chiller	Water Cooling System
	Sensor	Real-time Feedback #1
Morphing Shield System	Gas Consumption	< 30L/min
	Setup Time	< 1 minute
	Oxygen Level	< 20 ppm
	Sensor	Real-time Feedback #2
Wire Feeding System	Feeding	Coaxial
	Straightener	Included
Product Info	Dimensions	270 x 280 x 585 mm
	Weight	Approx. 20kg

Integration Options

InertOn is available as a standalone head module with full integration support onto existing motion systems, or as a fully configured solution in gantry or robot-type configurations.

Gantry Type

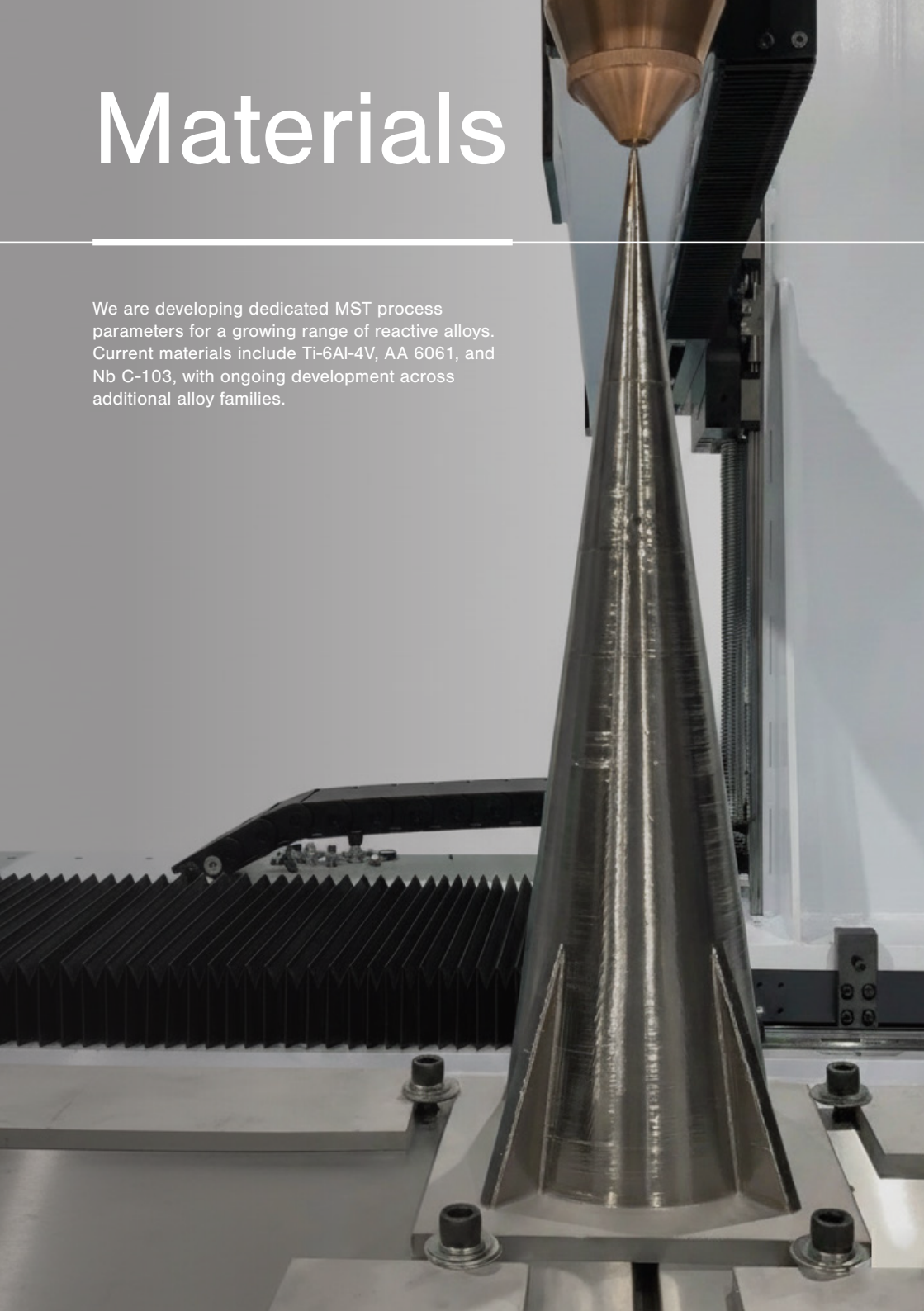
Motion System	5-Axis Simultaneous: Linear XYZ & Rotary AC
Size	Custom Configurations
Capacity	Custom Configurations

Robot Arm Type

Motion System	6-Axis Robot Arm & 2-Axis Rotary Table
Size	Custom Configurations
Capacity	Custom Configurations

Materials

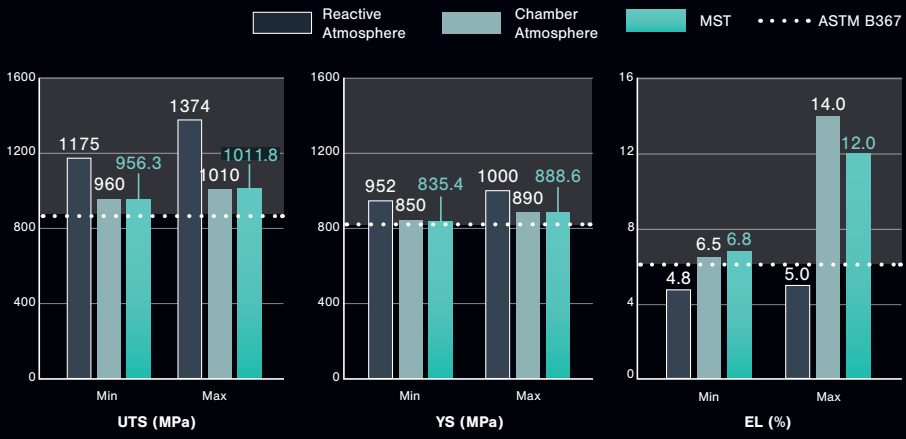
We are developing dedicated MST process parameters for a growing range of reactive alloys. Current materials include Ti-6Al-4V, AA 6061, and Nb C-103, with ongoing development across additional alloy families.



Ti-6Al-4V

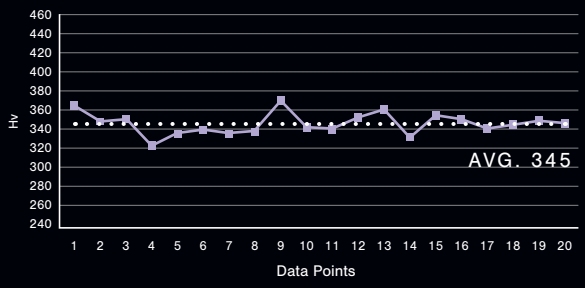
Titanium Alloy　Ø0.6mm Wire

COMPARISON OF MECHANICAL PROPERTIES UNDER VARIOUS INERT ENVIRONMENT CONDITIONS (AS-BUILT)

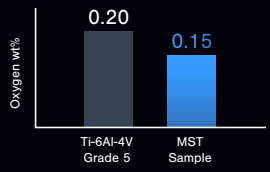


[References]
1. Procedia CIRP Volume 124, 2024, Pages 254-256 "Additive Manufacturing of Ti-6Al-4V with laser-wire DED and local shielding gas protection"
2. Physics Procedia 39 (2012) 416 – 424 "Material properties of Ti6Al4V parts produced by laser metal deposition" VITO (Flemish Institute for Technological Research), Materials Technology, Boeretang 200, 2400 Mol, Belgium
3. Degree Project in Materials Design and Engineering, Second cycle, 30 Credits Stockholm, Sweden 2018 "Effect of oxygen concentration in build chamber during laser metal deposition of Ti-64 wire"
4. LabAM24 conducted tensile strength testing through a third-party accredited analysis institution.

HARDNESS TEST RESULTS



ONH TEST RESULTS



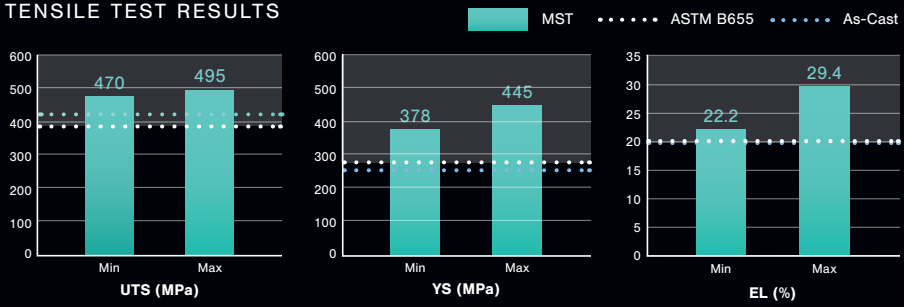
SURFACE ROUGHNESS

Ra Value 5.36 μm

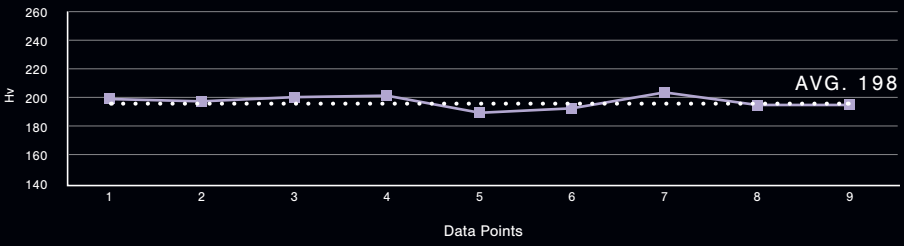
C-103

Niobium Alloy Ø0.6mm Wire

TENSILE TEST RESULTS



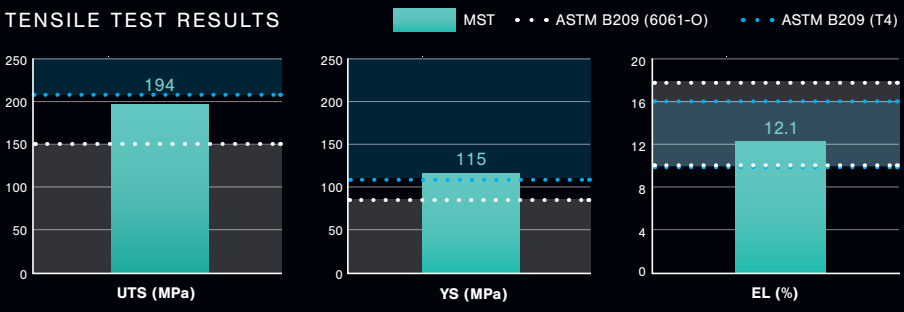
HARDNESS TEST RESULTS



AA 6061

Aluminum Alloy Ø0.8mm Wire

TENSILE TEST RESULTS

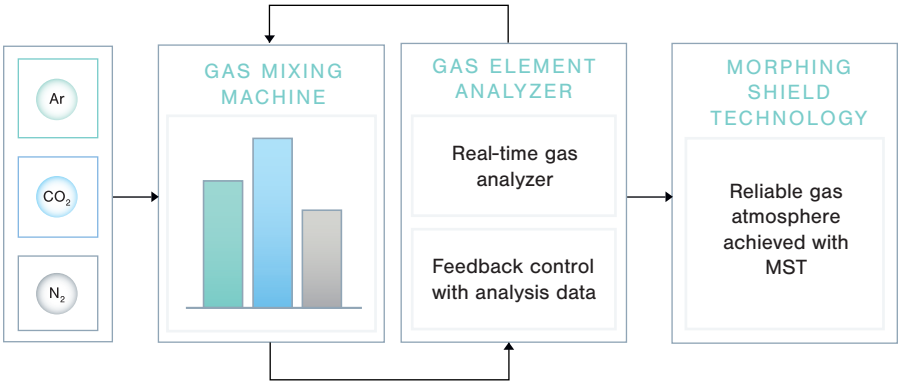


Material R&D

Research on how various atmospheric changes can induce alterations in material property using MST

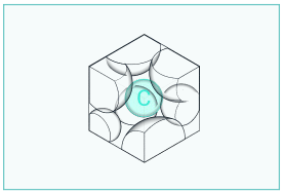
Reliable Gas Atmosphere Control

Creating optimal gas environments through precise analysis and adjustment of mixed gas compositions



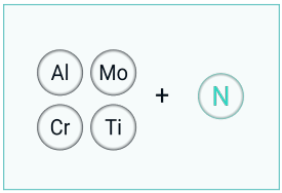
Research Areas for MST Applications

Optimizing gas composition and saturation levels to improve mechanical properties of materials.



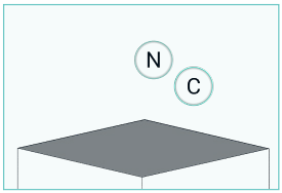
CARBURIZING

A carbon diffusion process that creates a hard surface while preserving a soft core



NITRIDING

A thermochemical process that uses nitrogen infusion into metal surfaces for enhanced hardness

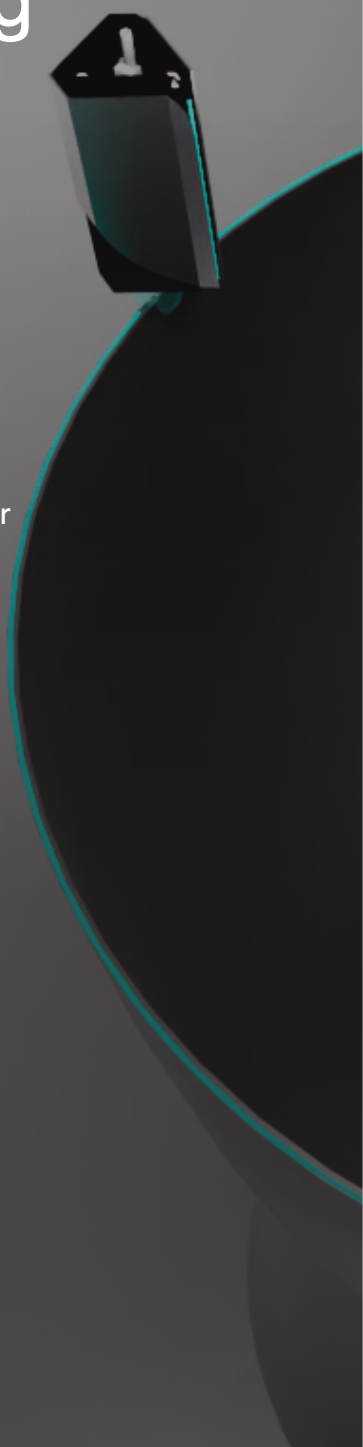


CARBONITRIDING

Simultaneous carbon and nitrogen diffusion that creates a hard, wear-resistant layer

We are Redefining Manufacturing Possibilities

We built MST to solve a specific problem: oxidation control in reactive metal 3D printing. That focus drives everything we do, ranging from aerospace to defense to energy, wherever reliable inert environment matters.



Our Distributors

We are actively engaged in global projects and sales across aerospace, defense, and industrial sectors. We are open to new partnerships and distribution opportunities. Contact us to start the conversation.

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