

SonicLayer® R200

UAM Machine

SonicLayer® R200 Fully Automated System

The SonicLayer® R200 utilizes the patented 9kW UAM welding head to 3D print metal foils for research and development (also available as 4.5kW system). The system is designed as a low cost research platform for universities and laboratories. As such, the R200 foregoes CNC machining and automated tape placement systems to keep costs in line with research budgets. Like it's larger automated cousins

(SonicLayer 4000 & 7200) the R200 uses sound to weld thin layers of metal foil at low temperature with no melting. In aluminums, the peak temperatures are below 250 °F and for all metals the bonding temperature is significantly below melting temperature. The solid-state nature is a key advantage of Fabrisonic's patented process as it:

- Protects material properties of the incoming feedstock. Since the materials are heated only slightly, the materials do not experience changes in grain size, precipitation reactions, nor phase changes. The properties of the incoming feedstock are the same as the properties of the final part without post processing (such as heat treat, HIP, etc).
- Bonds dissimilar metals without creating brittle intermetallics seen in fusion based welding. This capability enables Fabrisonic to print custom materials to design a material with a given material property. For instance layers of Aluminum and

Titanium can be combined to produce an armor product that is lightweight but has sufficient ballistic performance.

- Embed Electronics in solid metal parts. Many electronic components including microprocessors, sensors, and telemetry have been successfully embedded in solid metal part using UAM. The low temperature bond allows delicate components to be embedded in solid metal without overheating.

Work Envelope

Powered X Axis: 22 in.
Powered Y Axis: 12 in.
Powered Z Axis: 10 in.

Table Size

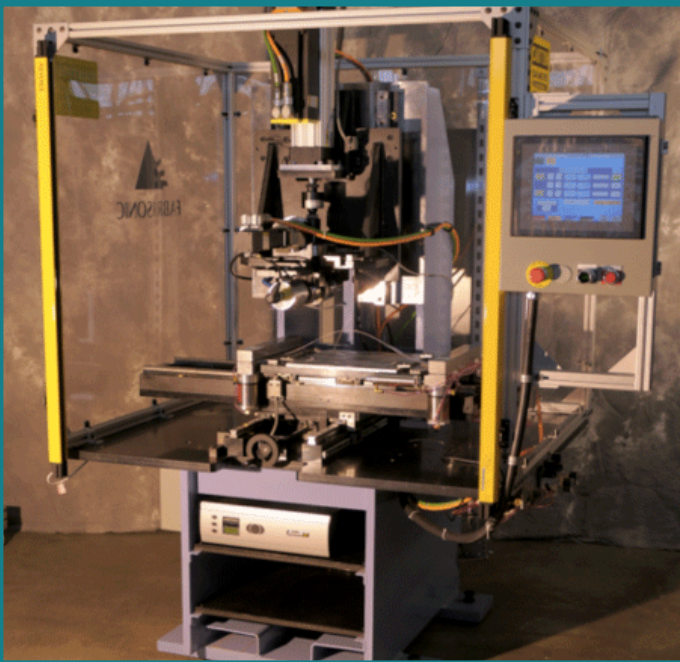
Length x Width: 22 x 10 in.

Welding Machine

Ultrasonic Power: 9 kW
Welding force: 2,000 lb.
Welding speed (max): 200 ipm
Steel welding sonotrode

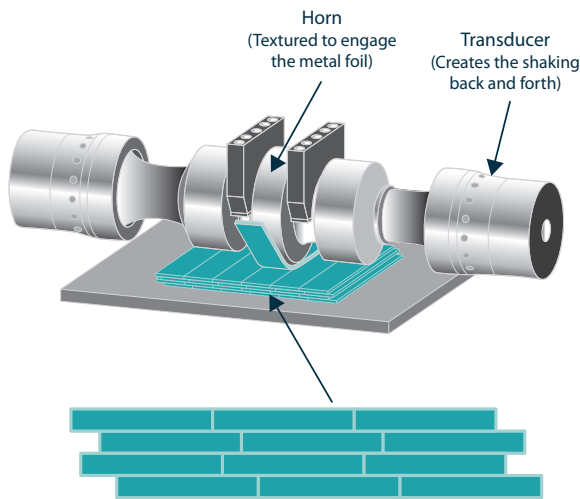
Machining Spindle

None



HOW IT WORKS: 3D PRINTING WITH SOUND

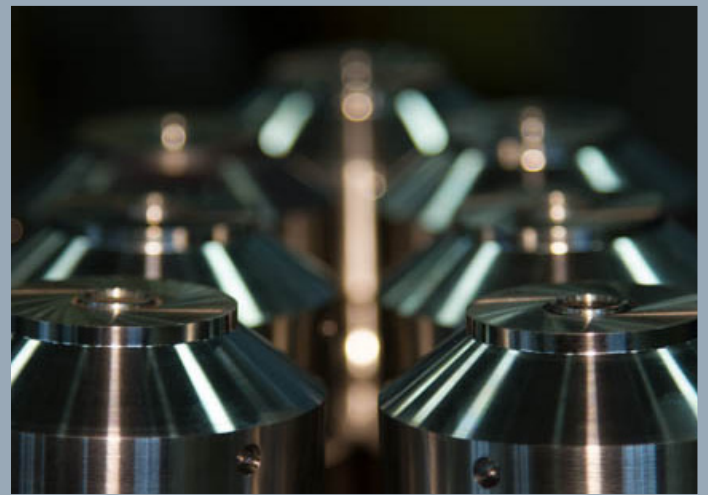
Ultrasonic Additive Manufacturing (UAM) is a 3D metal printing technology that lets you make the “impossible” parts possible. Fabrisonic has the capabilities to combine dissimilar metals while keeping their metallic properties, embed electronics and sensors without damage, and create complex internal geometry. How does it do that you ask? The process uses ultrasonic sound waves to merge layers of metal foil together in the solid-state; in other words, there is no melting of the metals. The process produces true metallurgical bonds with full density and works with a variety of metals including aluminum, copper, stainless steel, titanium, and more. Dissimilar metals can be printed together due to the low temperature welding process and used for a variety of reasons.



Computer Numerical Control (CNC) machining is used interchangeably with foil layering to introduce internal features along the way and for part finishing. By combining a hybrid system, with both additive and subtractive processes, UAM can build complex internal geometries with smooth finishes considered impossible to replicate with conventional manufacturing. For example, complex chemical reaction chambers with embedded controls and a layer of copper to wick away heat can be easily printed with UAM.

BENEFITS OF UAM

- High-speed process for additive manufacturing of metals
- Large available envelope (6' x 6' x 3') for substantial size parts
- No melting characteristic enables:
 - Bonding of dissimilar metals
 - Cladding
 - Metal matrix composites
 - “Smart” or reactive structures
- Low-temperature process enables:
 - Electronics embedding in tamper-proof structures
 - Non-destructive, fully-encapsulated fiber embedding
- Complex internal geometries
- No post treatments or machining necessary



PRODUCT LINE

- SonicLayer® R200 – Research platform for universities and R&D labs
- SonicLayer® 4000 – Mid-size fully automated UAM system (40" x 40" x 24")
- SonicLayer® 7200 – Production scale automated UAM system (72" x 72" x 36")

To read more about Fabrisonic, go to our website www.fabrisonic.com or visit <http://youtu.be/saSrmgEZJzM> to see our process in action.