MELTIO

Metal 3D Printing
Applications

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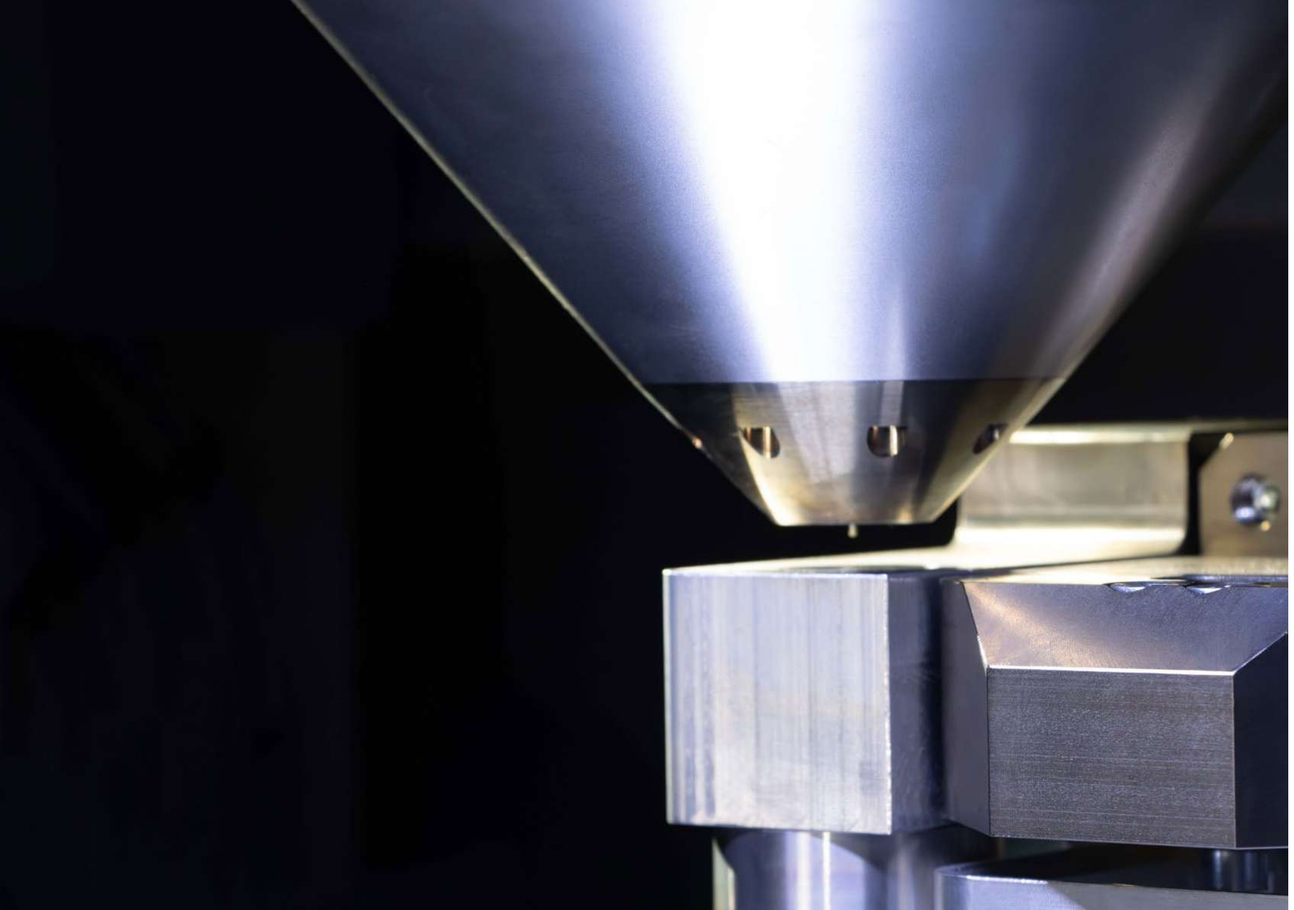


What makes our systems unique?

Safer operations

Fully enclosed systems, Class 1 laser safety, and wire feedstock eliminate airborne risks.

Single, Dual and Quadruple wire

Options for printing with up to four different materials in the same print sequentially with the reliability of a single wire process.

Precision and control

Patented Coaxial Wire Feed and multi-laser heads for consistent, precise deposition.

Great mechanical properties

Achieve near net-shape parts with superior properties.

Enhanced performance and reliability with Meltio Blue Lasers

High absorption and efficiency

450 nm blue light improves energy absorption and printing efficiency, enhancing deposition rates and reducing energy consumption.

Wide range of compatible materials

The multi-laser blue system is compatible with a broad range of metal materials, providing flexibility and versatility in production.

Factory laser alignment

Ensures maximum printing repeatability and minimal maintenance, enhancing long-term reliability and reducing downtime.

Integrated sensors and vision system

Real-time monitoring and feedback from integrated sensors and a vision system ensure precise control and continuous optimization during the printing process, enhancing quality and consistency.

Applications overview

Near net shapes

Replacement of casting and forging near net shapes for prototyping, pilot runs and low volumes to avoid upfront investment and minimum order quantities.

Lightweighting

Typical for the aerospace and aviation industries where weight savings have a significant impact on part cost and overall system efficiency.

Cooling

Integration of conformal cooling channels for increased performance, typically used in the aerospace industry, heat exchangers, molds and dies.

Repairs, spares, and obsolete parts

Commonly used in mold repairs or heavy industries such as marine, rail way, mining and defense where parts are required for machinery in remote areas.

Industries already working with Meltio

Energy, Oil & Gas

Corrosion-resistant parts and pipeline repairs, showcasing hybrid manufacturing that integrates additive and subtractive processes on a single platform.

Heavy Industry and Construction

Large-scale manufacturing and reinforcement structures, supported by large-scale printing case studies that significantly reduce production costs.

Aerospace, Defense and Naval

Part repair and on-demand manufacturing capabilities in remote or operational areas. Wide range of common military-grade metals. Legacy components no longer manufactured by the OEM. Rapid prototyping on designs for new components or specialized tools.

Automotive and Motorsport

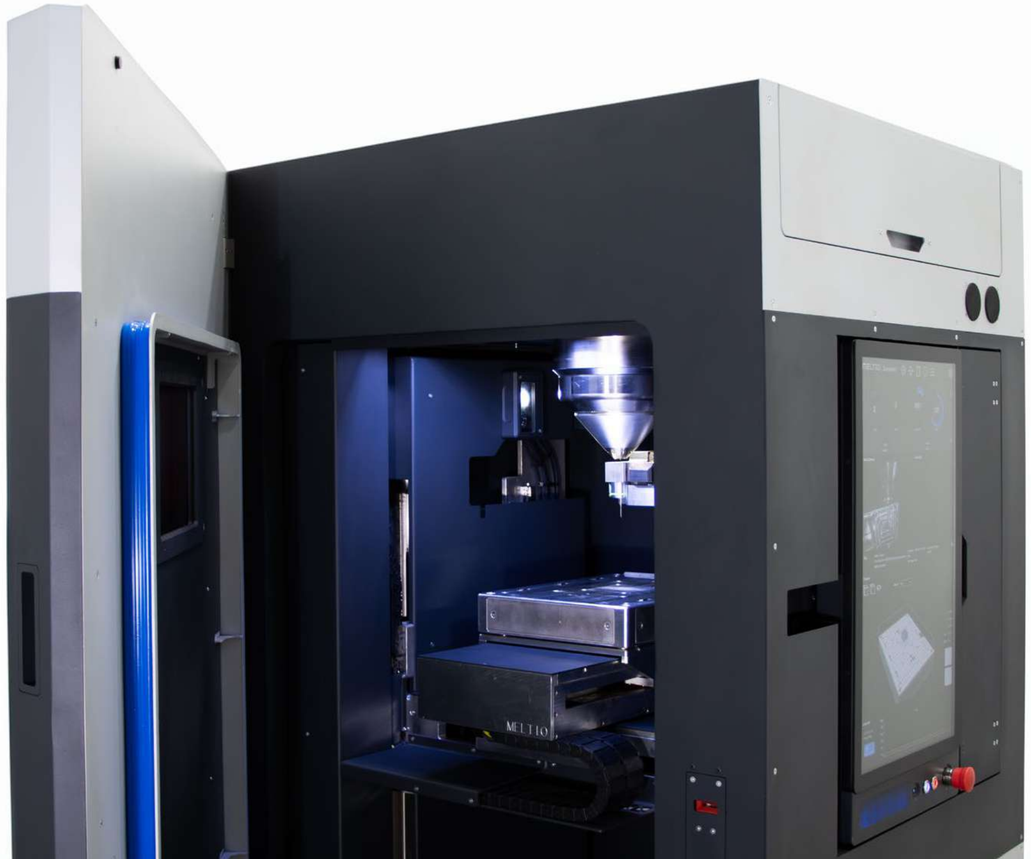
Production of high-performance components with successful implementations of multi-material printing to boost part efficiency.

Tooling and Molds

Custom tooling with conformal cooling channels, where multi-material printing and repair extend tool life and performance.

Mining

Create and repair parts directly at the point-of-need, even in remote locations. Greatly reduce the high costs for custom or complex parts. Improve the production process by cutting the equipment downtime impacting productivity.



Meltio M600

Industrial Metal 3D Printer

Expand your manufacturing capabilities with Blue Lasers, a large build volume and a fully inert chamber for the best material properties. Printing is easier than ever thanks to the improved process control, advanced sensors and live monitoring allowing you to produce parts consistently 24/7.

The Meltio M600, with its built-in 3-axis probing system and work-holding solutions, is the ideal companion for your manufacturing operations.

Production ready **Reliable** **Easy-to-use** **Repeatability**

Dimensions (WxDxH):	1050 x 1150 x 1950 mm
Build envelope (WxDxH):	300 x 400 x 600 mm
System weight:	800-1000 kg (depending on options)
Movement system:	Servo Motor Linear axis with absolute encoder on all axis
Filtration system:	3 Stage Particulate and Chemical Filtration included
Environment control:	Control O2 and Humidity levels
Laser type:	9x Direct Diode Lasers
Laser wavelength:	450 nm (Blue)
Total laser power:	1000 W

Power input:	380-415 V Three-phase + N + PE 200-240 V Three-phase +PE
Power consumption:	4-6 kW typical consumption,12 kW Max
Process control:	Closed Loop, Laser and Wire Modulation
Touch probe:	Automated XYZ Touch Probe integrated
Enclosure:	Laser safe, Controlled inert atmosphere
Interface:	USB, Ethernet
Cooling:	Active water-cooled chiller included
Wire feedstock:	Diameter: 0.8-1.2 mm / Spool Type: BS300 External wire drum ready

Hot wire:	Programmable power supply that preheats the material to increase the deposition rate
Dual / Quad wire:	This option allows for sequential 3D Printing of up to 2 / 4 materials with very fast automatic wire switches
External wire drum connection:	Connect external wire drums to the M600, allowing the use of 100 kg and 200 kg material packs
Zero point clamping system:	Accurately and quickly couple fixture plates to the print bed of the M600 for production

Adapter Plate

Internal use application

Thanks to the easy availability of Reliable machines for in house use we are starting to implement the usage of printed parts for all new products. Beyond faster turnaround times for prototypes we also see a large cost benefit.

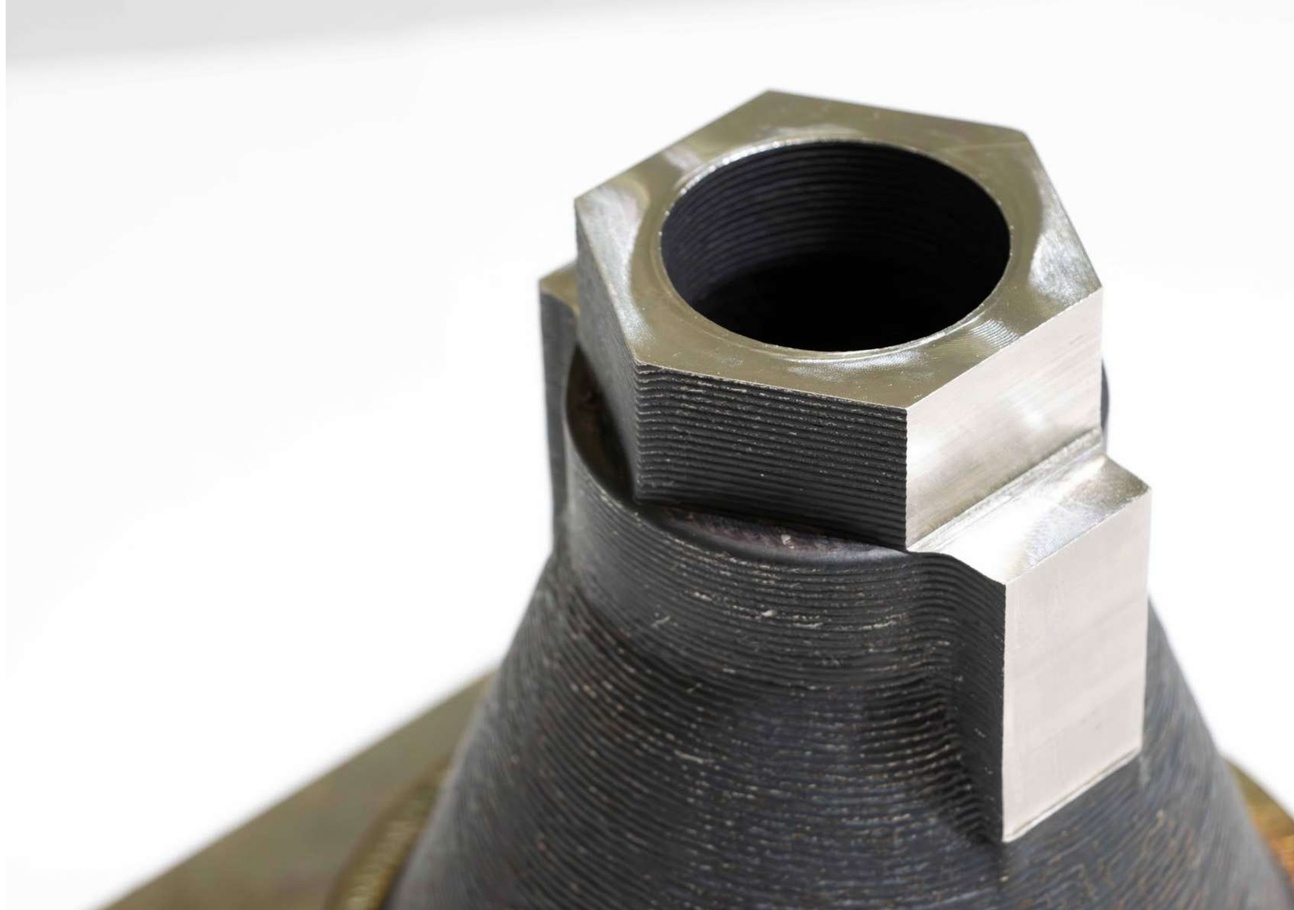
“Adapter Plate 80” and “Adapter Plate 150” are prototype part that will soon make it into production for an Improved Inert Gas system.

Adapter plate 80

Size:	100 x 100 x 81 mm
Weight:	0.8 kg
System:	Meltio M600
Material:	Stainless Steel 316L
Gas:	Argon
Layer Height:	1.2 mm

Adapter plate 150

Size:	146 x 151 x 146 mm
Weight:	2.26 kg
System:	Meltio M600
Material:	Stainless Steel 316L
Gas:	Argon
Layer Height:	1.2 mm



Heat Exchanger

Oil & Gas

This copper heat exchanger expand its heat transfer surface area by over 8 times, optimizing convective and conductive thermal exchange. Its topology-optimized geometry maximizes surface-to-volume ratio without excessive mass, ensuring efficient heat dissipation in high-performance environments. The additive manufacturing process eliminates joint interfaces found in conventional heat exchangers.

Size:	120 x 120 x 394 mm
Weight:	9.12 kg
System:	Meltio M600
Material:	CuCrZr
Gas:	Argon
Layer Height:	0.8 mm

High-Performance Exhaust Manifold - A Complex Part Successfully Printed

Automotive

A customer from the automotive sector challenged ERM Fab&Test to produce a part for a racing vehicle that could withstand temperatures above 800 °C, with tight turnaround and cost constraints.

The part had to be delivered quickly, offer high thermal resistance, and meet strict dimensional tolerances after post-processing. The team also needed to keep production costs low while ensuring a smooth machining workflow.

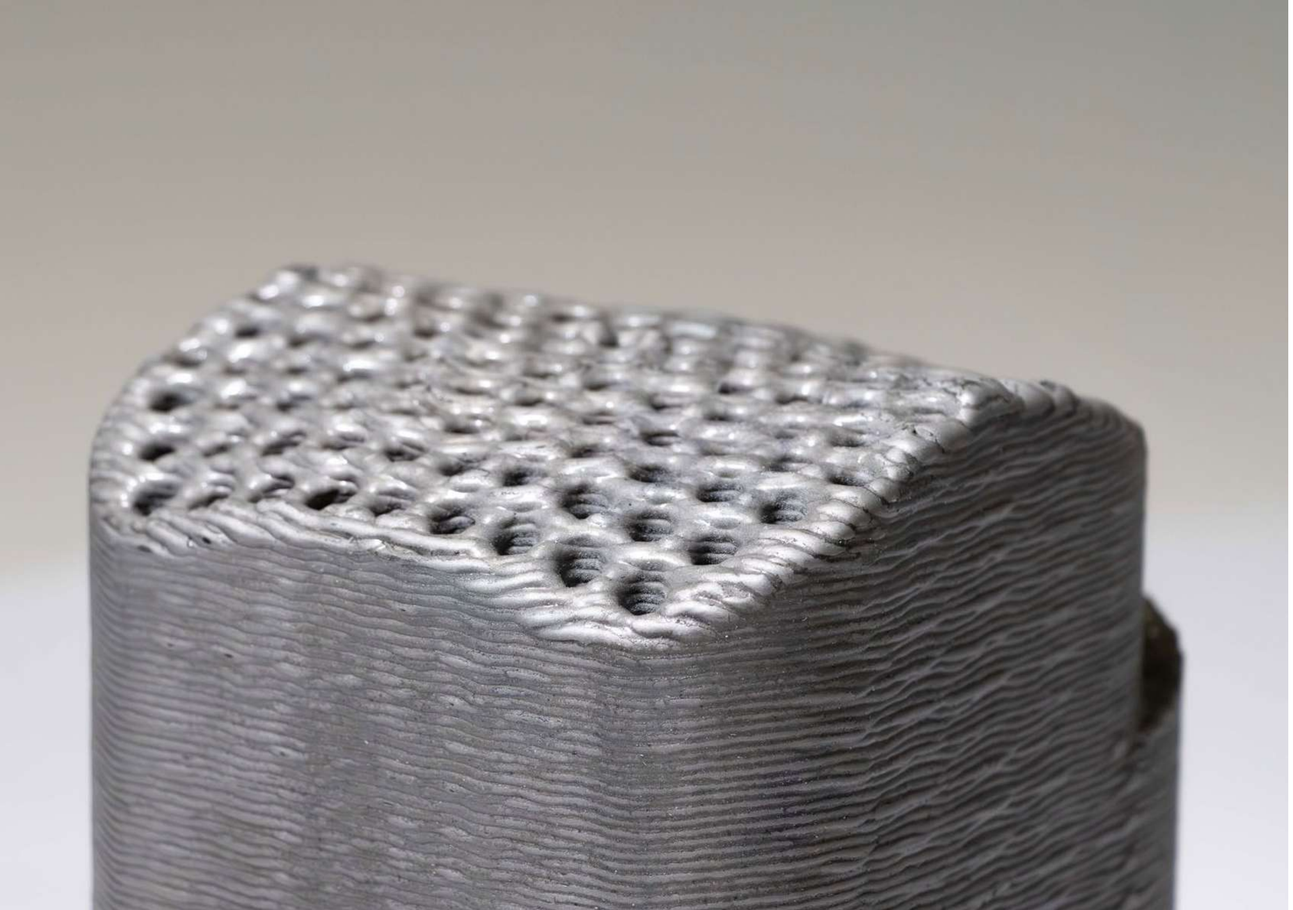
The component was printed in Inconel 718 using the Meltio M600, directly onto a 304L stainless steel base with 316L support structures.

Size:	125 x 111 x 110 mm
Weight:	4.6 kg
System:	Meltio M600
Material:	Stainless Steel 316L + Nickel 718
Gas:	Argon

3x faster production compared to traditional

Cost reduction of up to 70%

Optimised machining workflow



Anti-Cavitation Valve

Oil & Gas | Plumbing

Meltio's wire-laser metal 3D printing technology enables efficient production of complex parts like anti-cavitation devices using SS316LSi for corrosion resistance and durability. In fluid-handling systems, this approach eliminates the need for casting, welding, and extensive machining.

The part was redesigned with an internal honeycomb structure that improves flow without requiring supports or secondary operations, reducing production steps, costs, and lead times.

Size:	150 x 150 x 180 mm
Weight:	12.6 kg
System:	Meltio M600
Material:	Stainless Steel 316L
Gas:	Argon
Layer height:	1 mm

Stub Axle

Industrial

A Stub Axle component is a great example of how additive manufacturing can meet the toughest challenges in the automotive competition sector.

Developed by our partner Hirudi, it showcases the power of innovation applied to high-performance parts.

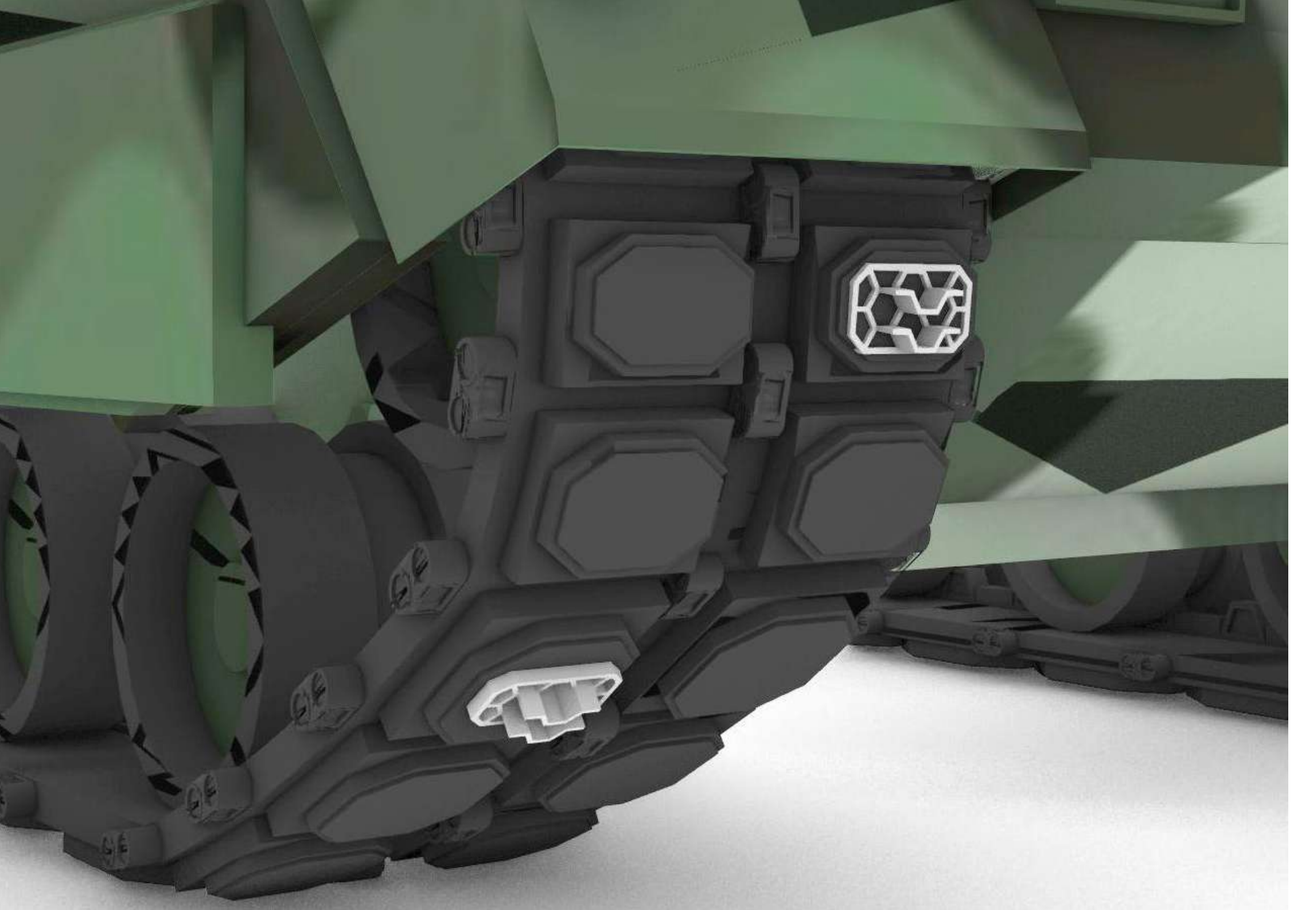
HIRUDI
3D intelligence

Size:	76 x 150 x 207 mm
Weight:	3.1 kg
System:	Meltio M600
Material:	Stainless Steel 316L
Gas:	Argon

35.7% cost savings

33% faster production

62.5% weight reduction



Ice Cleats - Used in the K2 Black Panther main battle tank

Defense

Meltio's metal additive manufacturing technology enables the South Korean defense sector to produce lightweight, high-performance components that were previously impossible or inefficient to manufacture.

Using Laser Wire DED, Meltio allows complex geometries, high material efficiency, and on-demand production directly in the field. This means critical tank parts, like snow pads for the K2 Black Panther, can be redesigned for 60% weight reduction without sacrificing strength or functionality.

Meltio also eliminates tooling, enables rapid prototyping, allows selective repair, and supports scalable production, all while improving operational efficiency and reducing logistical burdens for soldiers.

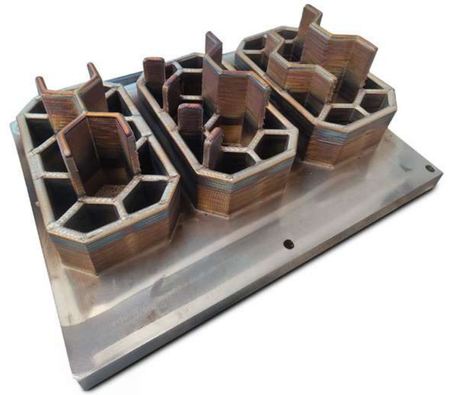
AM SOLUTIONS

Size:	191 x 115 x 105 mm
Weight:	12.5 kg
System:	Meltio M600
Material:	Stainless Steel 316L
Gas:	Argon

On-demand production directly in the field

high material efficiency **60% weight reduction**

Honeycomb structure



Meltio Engine Integration kit for CNCs

Hybrid Manufacturing

The most affordable hybrid manufacturing solution, fitting almost any Vertical Machining Center in the market. Enable metal 3D printing and machining of complex geometries in a single process step.

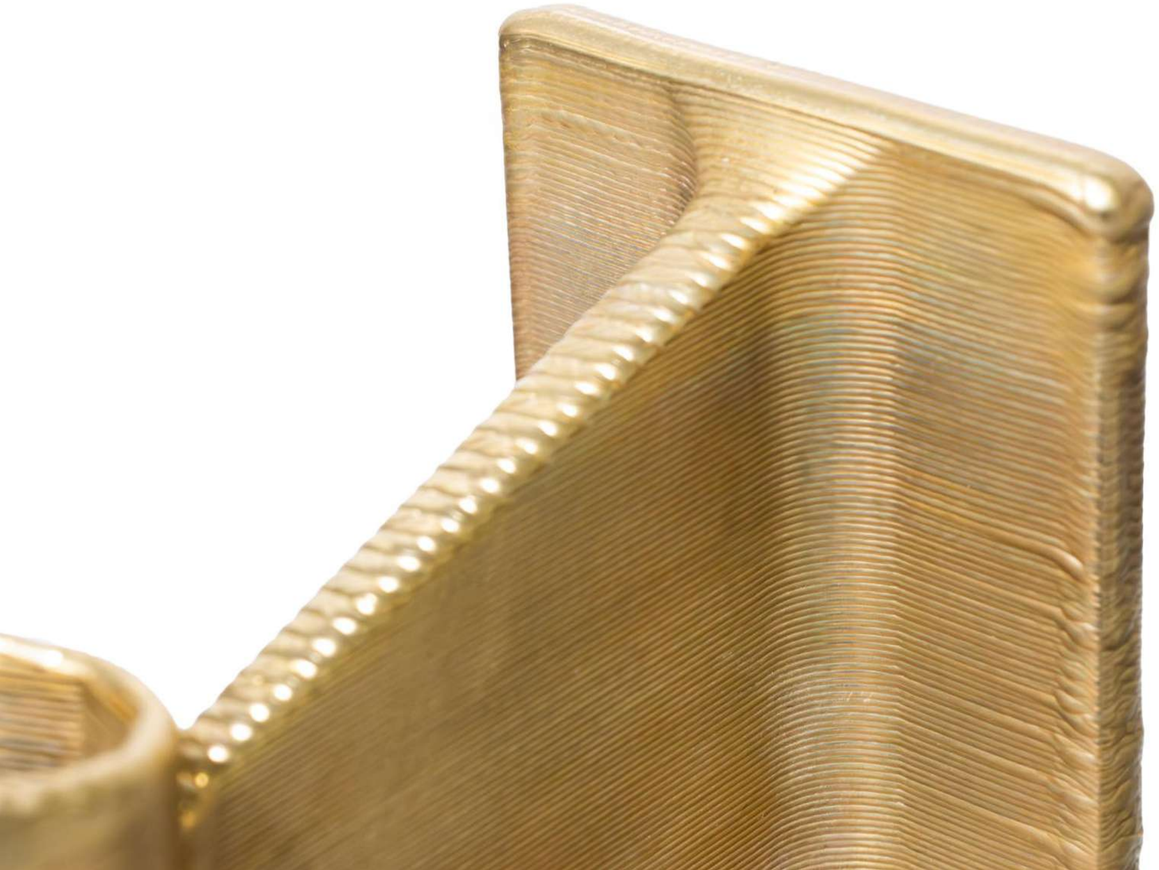
The Meltio Engine is the ideal complement for near-net shape manufacturing, repair and feature addition.

Hybrid **Retrofitting** **Geometry freedom** **Part repair**

Laser system:	1.0/1.4 kW 9 x 450 nm direct diode lasers
Printhead:	Mounted on the right side of the spindle 32.5 to 35 kg
Printhead retracted size (WxDxH):	280 x 332 x 684 mm
Printhead unretracted size (WxDxH):	280 x 332 x 943 mm
Control unit:	Wall mounted, air-cooled 80.5 kg 600 x 300 x 800 mm
Human machine interface:	Wall mounted 17” tactile screen
Cooling:	Water-cooled deposition head. Chiller Included
Print envelope (WxDxH):	Depending on the Machining Center

Feeder system:	Quad-point traction servo feeders, frictionless liners
Process control:	Melt Pool Camera & Closed-loop wire modulation
Power input:	200/240 V 3W+PE 380/415 V 3W+N+PE
Power consumption:	9.2 kW peak 2-5 kw avg.
Wire feedstock:	Diameter: 0.8-1.2 mm / Spool Type: BS300 External wire drum ready
Product configurations:	Single or Dual Wire

Hot wire:	Programmable power supply that preheats the material to increase the deposition rate
Dual wire:	This option allows for sequential 3D Printing of up to 2 / 4 materials with very fast automatic wire switches



Boat Shaft Bracket

Naval

This propeller shaft bracket is designed to maintain the correct position and angle of the shaft, making it a crucial component of a boat's motion system. By reducing vibrations and stress on the propeller shaft, engine, and bearings, it enhances overall performance and reliability.

Printed with the Meltio M600 using marine-grade bronze aluminum, it offers excellent corrosion resistance and strength, and can be customized in shape to meet the specific requirements of each vessel, without the need for molds.

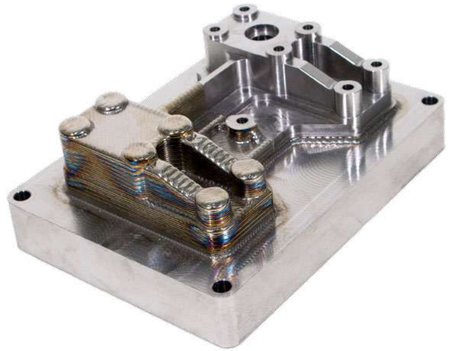
Size:	94 x 190 x 123 mm
Weight:	2.95 g
System:	Meltio Engine Integration kit for CNC
Material:	Marine Bronze
Gas:	Argon
Layer Height:	1 mm

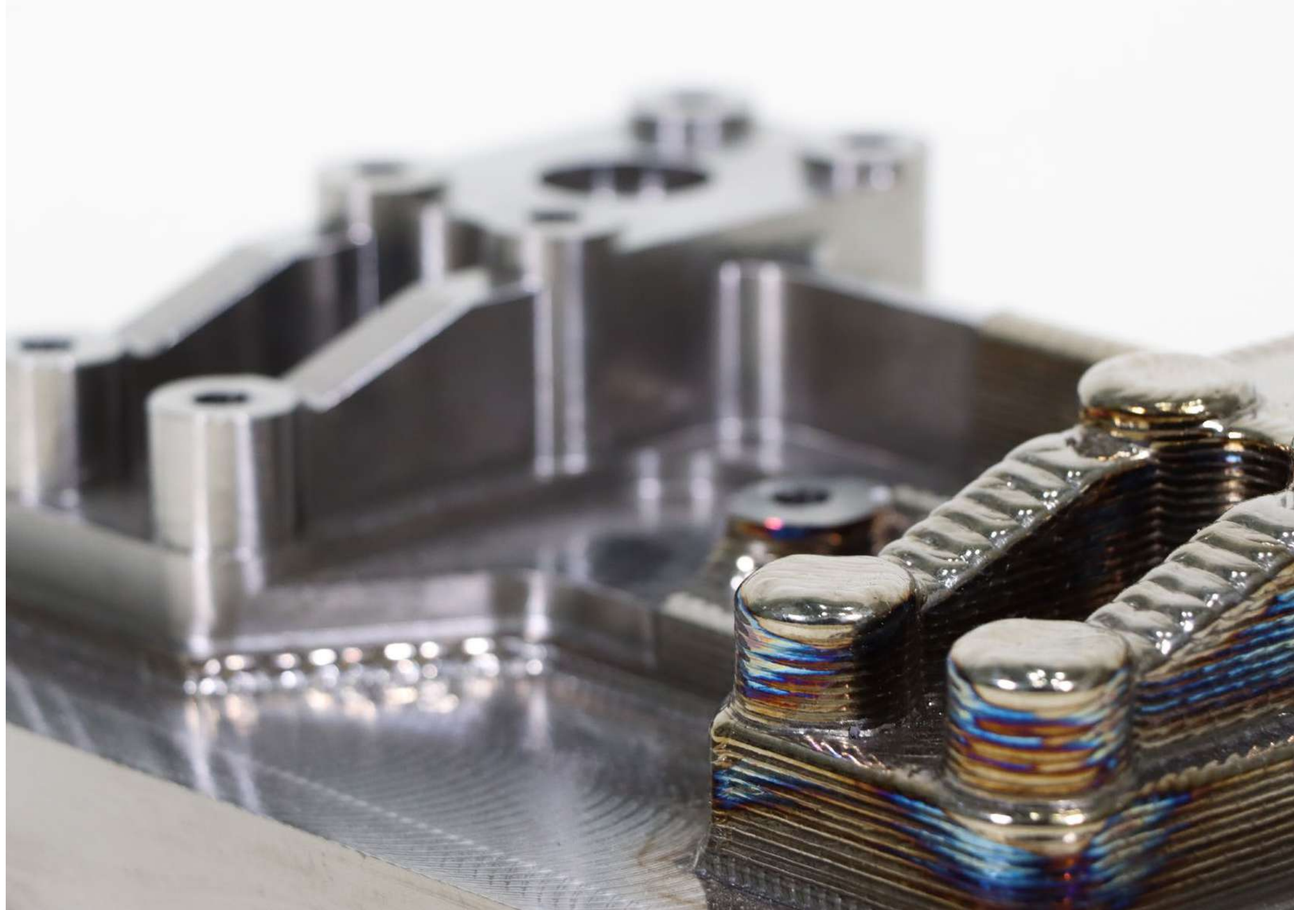
Aircraft Bracket

Aircraft Industry

The brackets are fundamentally supported structures that are used to attach two different components while supporting one over the other. In an aircraft, these brackets are used on a wide range of applications, such as landing gears, fuselage airframe assembly, wings assembly, engine mounts, fuel tanks, and electrical wire installations.

Size:	110 x 161 x 35 mm
Weight:	1.50 kg
System:	Meltio Engine Integration kit for CNC
Material:	Titanium 64
Gas:	Argon
Layer Height:	1.2 mm





Rotors

Manufacturing

Rotors play a critical role in the efficient operation of various industrial equipment, including pumps, compressors, engines, turbines, and mixers. Positive displacement pumps, which are vital in industries like food, chemical, pharmaceutical, oil and gas, and water treatment, extensively utilize rotors. The type of rotor employed in these pumps is determined by the specific requirements of each industry.

There are several prevalent rotor types in industrial settings, including trilobular, single-wing, bi-winged, and helical rotors.

Size:	94 x 56 x 45 mm
Weight:	1.27 kg
System:	Meltio Engine Integration kit for CNC
Material:	Stainless Steel 316L
Gas:	Argon
Layer Height:	1.2 mm

Semi-Open Impeller

Chemical Industry

The semi-open impeller is the main rotating component in centrifugal pumps. Semi-open impellers have a back-wall shroud that adds mechanical strength to the vanes, whilst remaining open on the other side.

They are somewhat of a middle ground between open and closed impellers in terms of efficiency and NPSHr, making them suited to medium sized pumps with a small amount of soft solids.

Size:	73 x 48 x 17 mm
Weight:	1.47 kg
System:	Meltio Engine Integration kit for CNC
Material:	Stainless Steel 316L + Nickel 625
Gas:	Argon
Layer Height:	1 mm

Meltio Engine Integration kit for Industrial Robots

Large and complex manufacturing

Turn a robot arm into a metal 3D printing system with no inherent size constraints. It is the perfect platform for large and complex 3D printing, repair, cladding and feature addition.

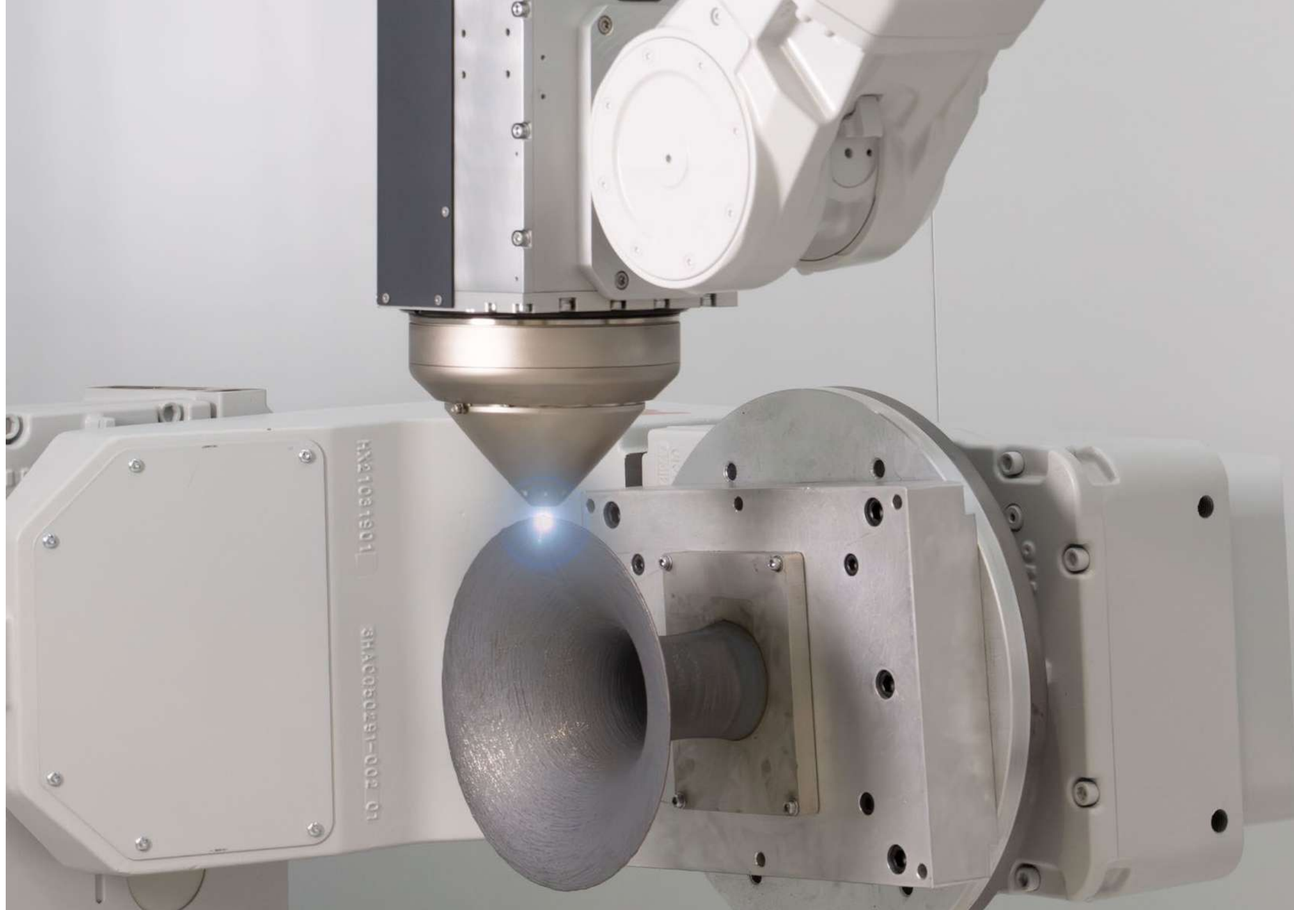
The Meltio Engine integrates with any robot arm manufacturer and interface on the market. Meltio Space slicer software for robots is compatible with ABB, Kuka, Fanuc, Yaskawa and Siemens.

Large-scale **Geometry freedom** **Part repair** **Cladding**

Laser system:	1.0/1.4 kW 9 x 450 nm direct diode lasers
Printhead:	Robot Mounted 20.5 to 23 kg
Printhead size (WxDxH):	262 x 272 x 572 mm
Control unit:	Wall mounted, air-cooled 80.5 kg 600 x 300 x 800 mm
Human machine interface:	Wall mounted 27” tactile screen
Cooling:	Water-cooled deposition head. Chiller Included
Slicer software:	Meltio Space 1-year subscription Included
Print envelope (WxDxH):	Depending on robot’s reach

Feeder system:	Quad-point traction servo feeders, frictionless liners
Process control:	Melt Pool Camera & Closed-loop wire modulation
Power input:	200/240 V 3W+PE 380/415 V 3W+N+PE
Power consumption:	9,2 kW peak 2-5 kw avg.
Wire feedstock:	Diameter: 0.8-1.2 mm / Spool Type: BS300 External wire drum ready
Product configurations:	Single or Dual Wire

Hot wire:	Programmable power supply that preheats the material to increase the deposition rate
Dual wire:	This option allows for sequential 3D Printing of up to 2 / 4 materials with very fast automatic wire switches



Meltio Engine Robot Cell

Plug-and-Play Solution for Robot Integration

An affordable turn-key solution for the Meltio Engine Robot Integration. It is designed to provide industries with a secure and efficient solution for manufacturing metal 3D printed parts.

The Meltio Engine Robot Cell is the most versatile and capable solution for 3D printing, repair, cladding and feature addition.

Plug-and-play installation **Best components** **Safe** **Tested and certified**

Dimensions (WxDxH):	4.050 x 2.350 x 3.000 mm Indoor use only
Print envelope:	1 meter diameter printing volume with continuous positioner axes interpolation. Actively Cooled 300 x 400 mm build platform
System weight:	4.000 kg
Laser type:	Meltio Engine Robot Integrated and Tested
Movement system:	6- Axis Robot Arm & 2-Axis Workpiece Positioner
Platform:	Structural Steel with Laser-safe Class 1 enclosure with CE certification. All equipment anchored to the platform

Integration:	Unified Control Panel, 4k WebCam monitoring & Live Timeline of sensors and 3D model based on reading TCP positions from robot
Slicing software:	Meltio Space one year subscription included. Pre-defined Print profiles and slicing strategies. Focused on ease of use
Power input:	385-415V 50/60Hz (3W+N+PE) 20 kW peak 7 kW avg. upon request: 230V 50/60Hz (3W)
Required inputs:	Inert Argon Gas supply between 2 to 5 bar. (Meltio offers an optional Gas Regulator) & Internet Lan cable connection
Accessories:	Inert Bubble for full Print envelope with Independent Atmospheric Control O2 and Humidity and Temperature Monitoring

Hot wire:	Programmable power supply that preheats the material to increase the deposition rate
Dual wire:	This option allows for sequential 3D Printing of up to 2 / 4 materials with very fast automatic wire switches

High Performance Exhaust Header

Automotive

This is the first worldwide application of an exhaust manifold for road use made with 3D metal printing. The use of this technology allows to create extremely complex geometries for optimizing exhaust flows in a combustion engine, surpassing the geometric limits of current technologies in use.

The exhaust manifold, produced by DMZ using Meltio's technology, was installed on an Abarth 595 that has traveled around 10,000 km during a year. 600 of this km were on a race track.It remained in the same initial condition.

DMZ ENGINEERING

Size:	326 x 159 x 192 mm
Weight:	4.5 kg
System:	Meltio Engine Integration kit for Industrial Robots
Material:	Stainless Steel 308L
Gas:	Argon

1 hour compared to the 8 hours of traditional working process

Same mechanical properties as the original part

Trenchers

Construction

Specialized construction and utility machines designed to dig narrow trenches in soil, rock, or asphalt for the installation of cables, pipes, or drainage systems. Their cutting wheels operate under extreme wear from constant exposure to abrasive materials such as rock, soil, and debris. To withstand these demanding conditions, key components can be reinforced with advanced hardfacing processes.

Using Meltio's laser wire deposition technology, wear-resistant layers with cast tungsten carbides in a nickel-based matrix are applied, delivering exceptional abrasion resistance, toughness, and durability. This innovation enhances component performance while ensuring material efficiency, repeatability, and cost-effectiveness.

Welding Alloys

Size:	250 x 765 x 45 mm
System:	Meltio Engine Integration kit for Industrial Robots
Material:	NicarbW
Gas:	Argon
Layer height:	1.2 mm

Dual Wire Beam

Architecture

The MMTO (Multi-Metal Topologically Optimised) Beam is an innovative structural part designed to reduce mass without sacrificing integrity. It uses mild steel and tool steel in varying proportions, allowing mass reductions of up to 80%.

The goal is to minimise embodied carbon, with optimisations ranging from 90% to 10% mass reduction. From a 20% reduction, the beams are solid and continuous. Compared to solid steel I-beams, the MMTO Beam can reduce embodied carbon by approximately 75% with 80% reduced mass.

The Bartlett School of Architecture

Size:	960 x 100 x 55 mm
Weight:	7.21 kg
System:	Meltio Engine Integration kit for Industrial Robots
Material:	ToolSteel H-11 + MildSteel ER70S
Gas:	Argon
Layer Height:	1 mm

Closed impeller

Naval

The fire suppression systems are critica! infrastructure on the line, where there's no room for downtime. The closed impellers must operate non-stop to ensure the system is pressurized and ready the moment it's needed. Traditionally, this impeller was made in cast bronze; strong, but not ideal for today's timelines or environments.

With Meltio's technology, the customer reimagined the impeller in stainless steel 316L, boosting mechanical and corrosion resistance. And They modified the design for printability. No more molds. No long delays. Just rapid, responsive manufacturing.

Size:	328 x 328 x 75 mm
Weight:	17 kg
System:	Meltio Engine Integration kit for Industrial Robots
Material:	Stainless Steel 316L
Gas:	Argon
Layer Height:	1 mm

Minimized storage of spares

Manufacture on-site and on-demand

Rapid production without waiting on molds

Geometry optimization

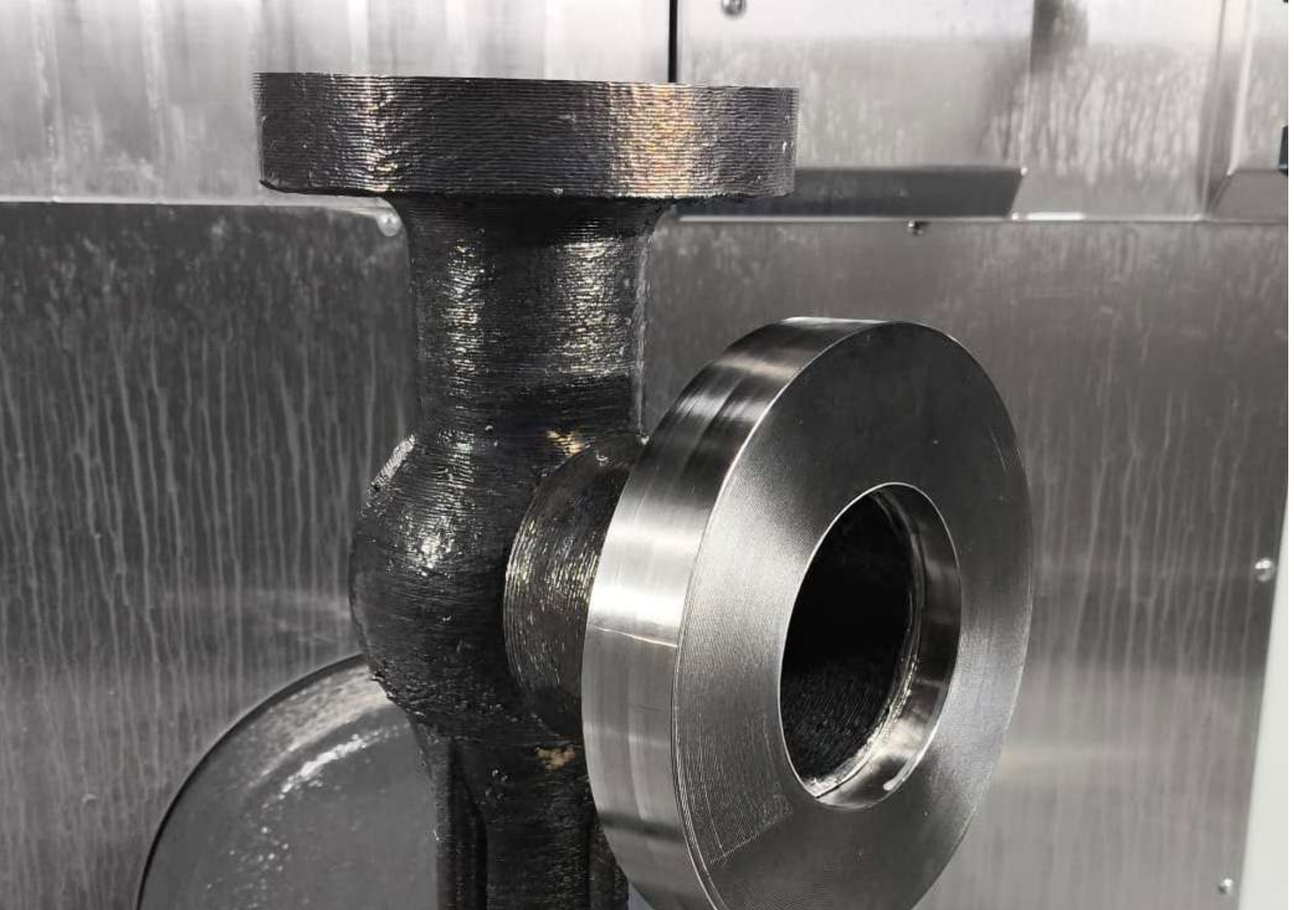
3 Blades Naval Propeller

Naval

This 3-blade naval propeller and 5-blade naval propeller, printed with Meltio's Engine Robot using corrosion-resistant SS316LSi, showcases the advantages of additive manufacturing in the naval sector.

Meltio technology enables the production of large, complex parts in one step, reducing assembly and machining while ensuring precision and durability. Ideal for harsh marine environments, this approach enhances performance, lowers maintenance, and allows for optimized, hydrodynamic designs tailored to specific vessel needs.

Size:	900 x 900 x 250 mm
Weight:	11 kg
System:	Meltio Engine Integration kit for Industrial Robots
Material:	Stainless Steel 316L
Gas:	Argon
Layer Height:	1.2 mm hub + 0.6 mm blades



Eductor

Defense

An eductor uses the Venturi effect to pump fluid without moving parts or an externa! pump, typically cast in copper alloys for ship systems. Constant wear and long casting lead times make replacements slow, posing challenges for critica! military operations.

Thanks to Meltio's wire-laser metal deposition (DED) technology, eductors can now be manufactured on demand, directly from digital files, eliminating the need for physical inventory and reducing production lead time.

System:	Meltio Engine Integration kit for Industrial Robots
Material:	Stainless Steel 316L
Gas:	Argon
Layer Height:	1.2 mm

Spare parts resilient to supply chain disruptions

On-demand production of functional parts

Spare parts resilient